

OAKDALE

Schematic Design

Oakdale Elementary School, Dedham, Massachusetts



August 29, 2024



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OAKDALE

Schematic Design
Oakdale Elementary School, Dedham, Massachusetts

Owner

Dedham, Massachusetts

Client

Dedham, Massachusetts

Architect

Jonathan Levi Architects LLC

OPM

Vertex

August 29, 2024

DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION SUBMITTAL

- 0.1 Cover Letter
- 0.2 Special Education Delivery Methodology
- 0.3 Signed Educational Space Summary
- 0.4 Floor Plans
- 0.5 Adjacency Table

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Department of Elementary and Secondary Education Submittal Cover Letter

August 28, 2024

Ms. Mary Pichetti
Director of Capital Planning
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, Massachusetts 02109

Dear Ms. Pichetti:

The District is pursuing execution of a Project Scope and Budget Agreement for the MSBA approved preferred schematic for **The Dedham Oakdale School Project**. The District's **[2024]** enrollment is **2,699**. The design enrollment for the proposed school project is **[360 Students]**. The existing **Oakdale Elementary School** currently serves grades **One through Five** and is proposed to serve grades **[One through Five]**.

In accordance with G.L. c. 70 B, MSBA staff has assembled the documents required for the review of the special education program at [insert school name]. The following are attached per the 'Submittal Requirements':

1. A letter from Superintendent **Nan Murphy** of **Dedham School District** describing its special education program.
2. Proposed space summary that includes the existing facility, proposed spaces, and MSBA guidelines based on the agreed upon design enrollment. The first page of this summary indicates a total of **8,210** square feet of space dedicated to the delivery of special education.
3. The floor plans for the proposed **87,009** square foot **Oakdale Elementary School**.
4. A completed Special Education Adjacency Table

I have reviewed the attached documents and confirm that the District's School Building Committee has officially approved the attached submittal on August 26, 2024) and verify that the space summary match the floor plan and is complete and conform to the MSBA requirements as described in Module 4 – Schematic Design Guidelines.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jon Lemieux". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jon Lemieux
Project Director
The Vertex Companies, LLC
One Edgewater Drive, Suite 204
Norwood, MA 02062

Dedham Public Schools

Home of America's First Tax-Supported Free Public School

Nan Skiff Murphy

*Superintendent
781-310-1011*

Dr. Heather Smith

*Assistant Superintendent
for Teaching & Learning
781-310-1020*



Dr. Ian P. Kelly

*Deputy Superintendent
781-310-1023*

Dr. Sara Stetson

*Assistant Superintendent
for Student Services
781-310-1025*

August 22, 2024

Matthew Deninger

Director of Resource Allocation Strategy and Planning
Massachusetts Department of Elementary and Secondary Education

District: Dedham
Project School: Oakdale Elementary School
Grades: 1-5
Current Enrollment of School: 275
Projected Enrollment of School: 360
Current Square Footage for SPED: 3,500
Proposed Square Footage for SPED: 8,210
Current SPED Enrollment (District-wide): ~ 599
Current SPED Enrollment (Oakdale): ~ 40

Dear Mr. Deninger,

The Dedham Public Schools (DPS) is pleased to submit this Special Education Delivery Methodology Letter (4B.2) and supporting information as part of the submission requirement for the Oakdale Elementary School Project located in Dedham, Massachusetts.

The current enrollment at the Oakdale Elementary School is approximately 275 students in grades one through five. The new Oakdale Elementary School will be designed to serve up to 360 students in grades one through five. As of the date of this communication, there are approximately 599 DPS students receiving special education services via Individualized Education Programs (IEPs). Special education services throughout DPS are tailored to meet the specific needs of students in the least restrictive environment, meaning that students with disabilities are included in general education classrooms with their non-disabled peers and access grade level curriculum and content with appropriate levels of support from instructional aides and modifications and accommodations of content as determined by the IEP team.

The DPS Student Services team provides evaluations, consultation, and direct services to students with disabilities, medical needs, students for whom English is a second language, students with mental and behavioral health challenges, homeless students, and students who require accommodation plans. Some of our elementary schools also house district programs for children with autism, language-based learning disabilities, and mental-behavioral health challenges.

The Dedham Public School does not discriminate on the basis of race, color, religion, national origin, sex, gender identity, sexual orientation, age, genetic information, ancestry, military status, disability, pregnancy, or pregnancy related condition in its educational activities or employment practices.

Administration Building, 100 Whiting Avenue, Dedham, MA 02026 (781) 310-1000 www.dedham.k12.ma.us

DPS provides a continuum of programs and services to ensure that the District is able to identify and address the specific needs of all children. Programs are staffed with licensed special educators, related service providers, and instructional support personnel. Program descriptions, populations served, and specialized services and learning opportunities are described in the following pages.

4B.2.1 Current Program & 4B.2.2 Proposed Program

General Special Education Programming - Current Program. Oakdale elementary school serves approximately 40 students with special needs. A part time Education Team Leader (ETL) coordinates special education services and compliance with state and federal regulations. Special educators, and related service providers such as speech language therapists, school psychologists, occupational therapists, and physical therapists provide direct, consultative, and assessment services. Other clinicians such as Board Certified Behavior Analysts, augmentative communication specialists, orientation and mobility specialists, low vision specialists, etc. provide consultation or direct services according to individual education plans. Oakdale has few spaces for clinicians. Clinicians share most spaces and this situation compromises confidentiality and diagnostic assessment procedures.

Students who have IEPs and are assigned to general education classrooms receive a combination of push-in and pull-out services. Most of the existing classrooms lack breakout rooms for pull-out or reinforcement of concepts. When teachers and clinicians need to access breakout spaces, students lose time on learning to travel. These limitations also increase exclusion from the general education setting.

General Special Education Programming - Proposed Program. Special education teachers require breakout spaces to provide preview, review, and re-teaching of curriculum content and to provide pull out services without losing teaching time and access to the general education classroom. The team leader and clinicians require confidential office spaces for confidential communication, assessment, and therapy services. The IEP Team also requires a dedicated conference room because of the number of annual meetings required by state and federal regulations.

4B.2.3 Specialized Programming

Specialized Programming - Current. Oakdale School does not have any specialized programs because of the severe limitations of space and ADA compliance.

Specialized Programming - Proposed - The Specialized Teaching and Readiness Program (STAR). The STAR program is currently housed at the Greenlodge Elementary School providing intensive therapeutic services and instruction for students diagnosed with Autism Spectrum and related disorders. This program offers intensive systematic and structured behavioral teaching approaches, complementing academic instruction, social pragmatic and social-emotional intervention.

Currently the program lacks sufficient breakout spaces for sensory therapies, augmentative communication training, related services, and staff consultation. For example, gross motor physical and occupational therapy services occur on the stage, which poses a danger. The staff cannot provide necessary sensory equipment such as a therapy swing or sensory room because there are no safe spaces in which to house them.

The proposed model places the STAR program at the new Oakdale school. The program requires the following:

Classroom space: Massachusetts law requires that age ranges in specialized classrooms should not exceed 48 months.. The STAR program requires one lower and one upper learning lab large enough for up to 12 students. Learning labs should be equipped with the same furniture, technology and storage as other classrooms.

The design of STAR classrooms should include individualized study carrels for Discrete Trial (ABA) instruction.

Restrooms and sinks: The design of STAR classrooms must include handicap-accessible sinks and bathrooms for students who require support with self-care. This is a critical element because many STAR students require toileting support and other students are working on Activities of Daily Living (ADL) skills that are critical to independence.

Breakout Spaces: The design of STAR classrooms must include adjoining breakout spaces to facilitate the provision of highly specialized instructional methodologies for individual and small groups of students. These breakout spaces should also be able to function as a sensory room to allow service providers to provide children with necessary sensory intervention and relief from the classroom conditions that at times overwhelm children's capacity for sensory input and integration.

OT/PT Room: The design of the OT/PT room should consider adjacent office spaces for occupational and physical therapists. These related service providers conduct direct services within the OT/PT space and in adjacent office spaces, conduct all related evaluations, and provide professional consultation to colleagues and families.

Specialized Programming - Proposed - ACCESS. ACCESS is a "partial inclusion" program at the Riverdale school. ACCESS is designed to meet the unique needs of children with developmental delays in more than one of the following domains: academics, motor skills, social-emotional skills, pragmatic language, or behavioral development.

Currently, the program is unable to meet the needs of District students because Riverdale does not have enough classrooms, breakout rooms, or spaces for clinicians. As a result, the District is unable to place all of the students who require the program. Students who do access the program may not have optimal like-learner cohorts because of capacity issues. Capacity issues have forced the District to place students in more restrictive out of district settings because of this issue.

The proposed model places the ACCESS program at the new Oakdale school. The program requires the following:

Classroom space: Massachusetts law requires age ranges in specialized classrooms should not exceed 48 months.. The ACCESS program requires one learning lab large enough for up to 12 students. Learning labs should be equipped with the same furniture, technology and storage as other classrooms.

Breakout spaces: Breakout spaces adjoining classrooms provide opportunities for pre-teaching, teaching, and reteaching within the inclusion classrooms. Breakout spaces could be accessed by ELL teachers, instructional coaches, interventionists, special education teachers, speech/language

pathologists and classroom teachers who require a quiet space and who are serving students in the classroom.

On behalf of the Dedham Public Schools we would like to thank you for your time and attention to this submittal and the Oakdale project. We are incredibly grateful for and excited at the opportunity to enhance learning opportunities for Dedham's youth through this project for many decades to come.

Sincerely,



Nan Murphy
Superintendent



Dr. Sara Stetson
Assistant Superintendent for Student Services



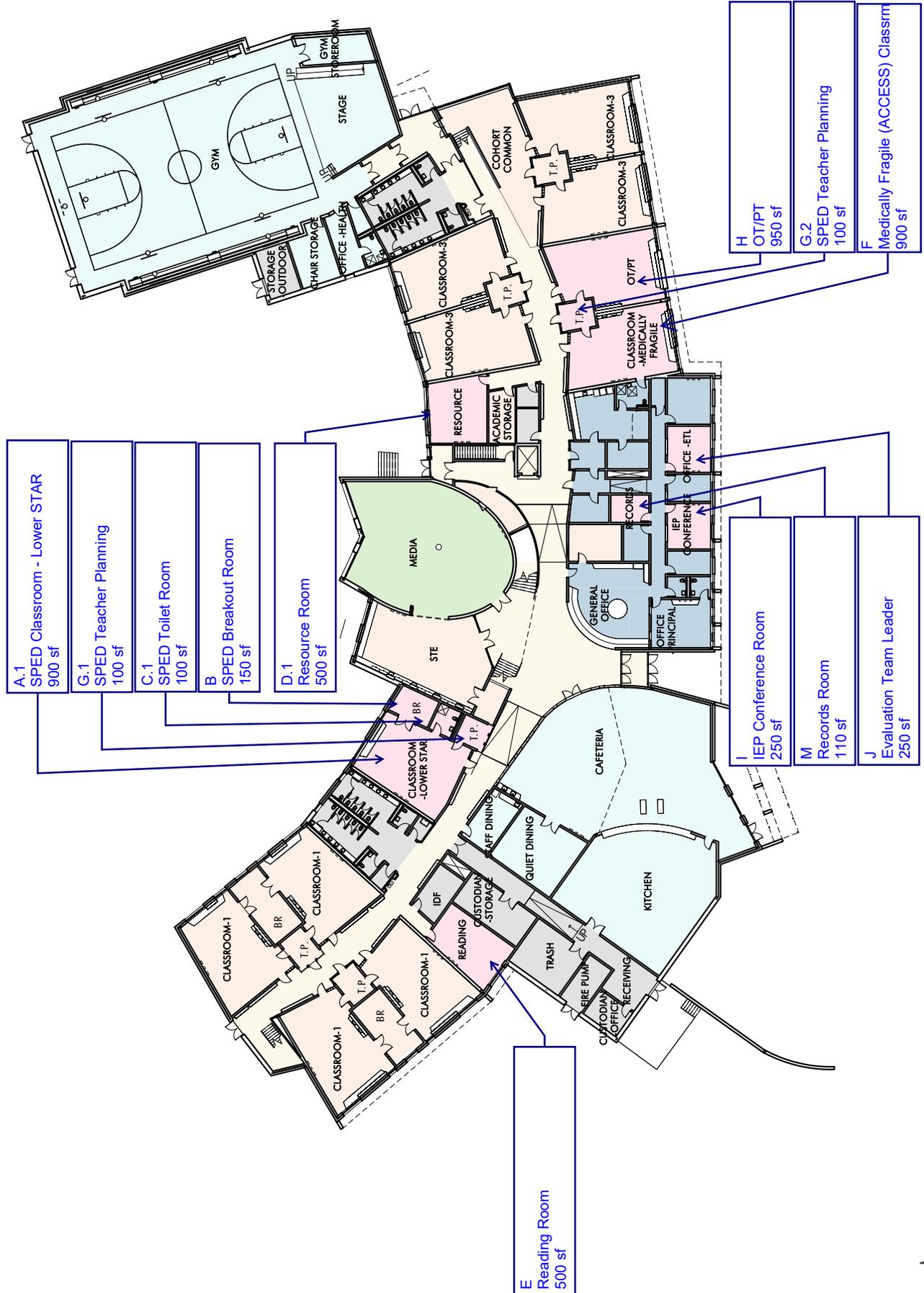
Kim Hermes
Principal

Proposed Space Summary - Elementary School
360 Students, Grades 1-5, 4 Classrooms per Grade

Legend Change from MSBA Guidelines

Date: 8/20/24 Schematic Design Submittal

OAKDALE ELEMENTARY SCHOOL	ROOM TYPE	PROPOSED PROGRAM			VARIATION TO MSBA GUIDELINES			MSBA GUIDELINES (DO NOT MODIFY) (Refer to Educational Facility Planning for additional information)			
		ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	COMMENTS
Core Academic		23,800			8,600			15,200			
<i>(List rooms of different sizes separately)</i>											
	Kindergarten Classroom with Toilet	1,200	0	0	0	0	0	0	0	-	
	General Classroom (Grades 1-5)	900	20	18,000	-50	4	2,800	950	16	15,200	4 Classrooms / Grade Combined with Teacher Planning Rms
	General Classroom (Grades 1-5)			0			0			-	
	General Classroom (Grades 1-5)			0			0			-	
	General Classroom (Grades 1-5)			0			0			-	
	General Classroom (Grades 1-5) w/toilet			0			0			-	
	Science, Technology, Engineering Room (Grades 3-5)	1,080	1	1,080	0	1	1,080	1,080	0	-	
	STE Storage Room (if applicable)	120	1	120	0	1	120	120	0	-	
	Teacher Planning	50	20	1,000	50	20	1,000				Combined with paired classrooms. (10) rooms at 100
	Classroom Breakout Grades 1 - 2	300	4	1,200	300	4	1,200				Between 2 Classrooms
	Cohort Commons - Grades 3, 4, 5	800	3	2,400	800	3	2,400				1 Cohort Commons per grade (6 CR)
Special Education		8,210			3,680			4,530			Spaces require DESE review and approval.
<i>(List rooms of different sizes separately)</i>											
	Self-Contained Special Education Classroom	900	3	2,700	-50	0	-150	950	3	2,850	Identical to Gen Ed Classrooms. Includes Upper and Lower STAR Classrooms
	Self-Contained Special Education Toilet Room	100	2	200	40	-1	20	60	3	180	Include changing tables (all) and Hoyer lift for medically fragile. Medically Fragile shared with Medical
	Resource Room	500	3	1,500	0	1	500	500	2	1,000	
	Small Group Room / Reading	500	1	500	0	0	0	500	1	500	
	Medically Fragile Special Education Classroom (ACCESS)	900	1	900	900	1	900				
	Teacher Planning	100	4	400	100	4	400				Each Teacher Planning room dedicated to Special Education Classroom, not shared
	OT / PT Room	950	1	950	950	1	950				
	IEP Conference Room	250	1	250	250	1	250				
	Psychiatrist Office	150	1	150	150	1	150				
	Guidance Office	150	1	150	150	1	150				
	Evaluation Team Leader Office	250	1	250	250	1	250				
	Break-out room	150	1	150	150	1	150				In Central Admin For Lower STAR
	Records Room	110	1	110	110	1	110				for STAR program
Collaborative Program Spaces (List rooms separately below)											
	Teacher Planning (above)	0	0	0	0	0	0				See above
	Classroom Breakout (above)	0	0	0	0	0	0				See above
	Cohort Commons (above)	0	0	0	0	0	0				See above
	Quiet Dining (below)	0	0	0	0	0	0				See below



1 DESE - Plan-Floor 1

1/32" = 1'-0"



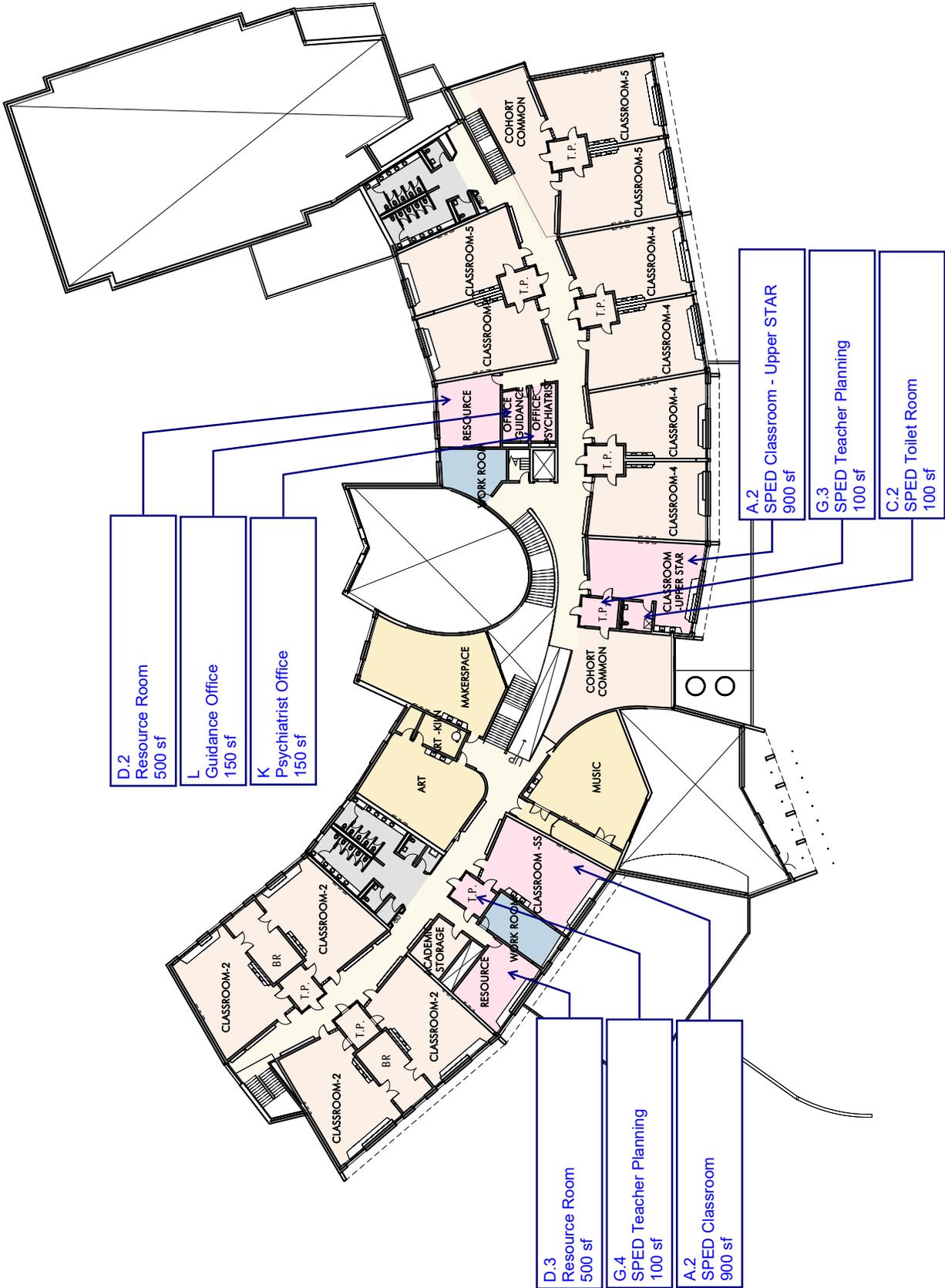
64

32

16



Jonathan Levi Architects



DESE - Plan-Floor 2



64'

32'

16'

0'

1/32" = 1'-0"

Jonathan Levi Architects

DESE - Plan-Floor 2

1/32" = 1'-0"

Jonathan Levi Architects

Proposed Space Description and Reasoning for Adjacencies			
Proposed Room Name	Floor Plan Designation (A-Z)	Proposed SF	
Floor 1			
Special Education Classroom	A.1	900	Lower STAR substantially separate service delivery for Cohort 1, (1st - 2nd grades). Designed like a general classroom. Students will receive services in occupational, physical and speech therapies as prescribed. The room will also be equipped to address the social and emotional challenges that many students may have. Supports that are currently in place, such as speech and language therapists, occupational therapists, physical therapists, BCBA, ABA technicians, school psychologists, schools adjustment counselors, and any additional staff required to meet the needs of the students with disabilities will be available. Adjacent to General Academic Spaces.
Teacher Planning	G.1	100	Office space for educator to perform work duties that are additional to instruction. Connected to Lower Star Special Education Classroom
Special Education Breakout Room	B	150	Connected to Lower STAR Classroom. Provides opportunities for pre-teaching, teaching, and reteaching within the inclusion classroom.
Toilet Room	C.1	100	Connected to Lower STAR Classroom
Reading Room	E	500	Instructional space for special education program and service provision. Located with same grade/grade-adjacent classrooms.
Resource Room	D.1	500	Instructional space for special education program and service provision. Located with same grade/grade-adjacent classrooms.
Medically Fragile (ACCESS) Program Classroom	F	900	Designed like a general classroom, this space provides the flexibility for a substantially separate service delivery for students with complex learner profiles. Students will receive services in general academics, occupational, physical and speech therapies as prescribed. The room will also be equipped to address the social and emotional challenges that many students may have. Supports that are currently in place, such as speech and language therapists, occupational therapists, physical therapists, BCBA, school psychologists, school adjustment counselors, and any additional staff required to meet the needs of the students with disabilities will be available. Adjacent to General Academic Spaces.

Oakdale School Adjacency Table, Dedham MA

Teacher Planning	G.2	100	Office space for educator to perform work duties that are additional to instruction. Connected to Special Education Classroom-Medically Fragile.
OT / PT	H	950	Space for provision of special education related services.
IEP Conference Room	I	250	Meeting space for special education related meetings.
Evaluation Team Leader Office	J	250	Office space for Educational Team Leader (ETL) to perform work duties. The ETL should be located in proximity to other main office functions give the role is family-facing.
Records Room	M	110	Connected to ETL Office
Floor 2			
Special Education Classroom	A.2	900	Upper STAR substantially separate service delivery for Cohort 2, (Grades 3-5). Designed like a general classroom. Students will receive services in occupational, physical and speech therapies as prescribed. The room will also be equipped to address the social and emotional challenges that many students may have. Supports that are currently in place, such as speech and language therapists, occupational therapists, physical therapists, BCBA, ABA technicians, school psychologists, schools adjustment counselors, and any additional staff required to meet the needs of the students with disabilities will be available. Adjacent to General Academic Spaces.
Teacher Planning	G.3	100	Office space for educator to perform work duties that are additional to instruction. Connected to Upper Star Special Education Classroom
Toilet Room	C.2	100	Connected to Upper STAR Classroom
Resource Room	D.2	500	Instructional space for special education program and service provision. Located with same grade/grade-adjacent classrooms.
Psychiatrist Office	K	150	Office space to perform work duties including servicing students.
Guidance Office	L	150	Office space to perform work duties including servicing students.
Special Education Classroom	A.3	900	Designed like a general classroom. Students will receive services in occupational, physical and speech therapies as prescribed. The room will also be equipped to address the social and emotional challenges that many students may have. Supports that are currently in place, such as speech and language therapists, occupational therapists, physical therapists, BCBA, ABA technicians, school psychologists, schools adjustment counselors, and any additional staff required to meet the needs of the students with disabilities will be available. Adjacent to General Academic Spaces.
Teacher Planning	G.4	100	Office space for educator to perform work duties that are additional to instruction. Connected to Special Education Classroom
Resource Room	D.3	500	Instructional space for special education program and service provision. Located with same grade/grade-adjacent classrooms.
	Total	8,210	

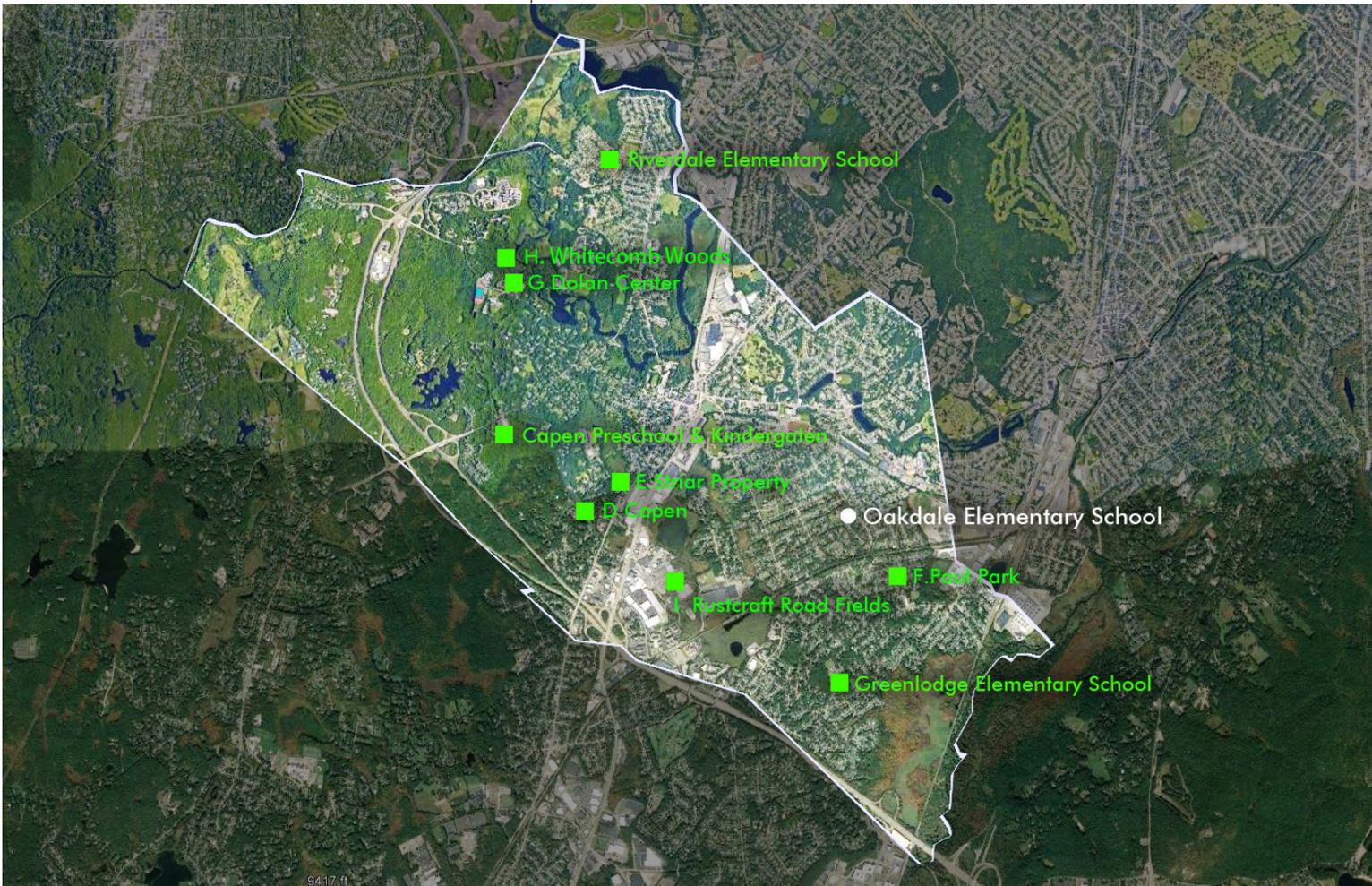
SCHEMATIC DESIGN

1 Introduction

1.0 Overview and Background

The 2020 Dedham Public Schools Facility Master Plan is a methodical process of planning and upgrading schools in the Dedham community. Throughout the 1980's the Dedham Public Schools closed four of its eight elementary schools and consolidated its declining enrollment at the remaining four schools. As the millennium came to a close, Dedham's aging school infrastructure was in clear need of an overhaul.

- December 2000 - the Town of Dedham established a School Building Rehabilitation Committee to study and recommend improvements to the aging structures that houses the town's students.
- 2003 - the district completed its first comprehensive 25 year School Facilities Master Plan, and the planning required to complete that initial document has continued to guide our thinking.
- 2006 - A new Dedham Middle School for Grades 6-8 opened.



- 2008 - An updated Facilities Master Plan completed.
- 2012 - A new Avery Elementary School opened.
- 2013 - An updated Facilities Master Plan completed.
- 2019 - A new Early Childhood Education Center opened.
- February 2020 - The current Facilities Master Plan update completed.

The 2020 Facilities Master Plan update provides a comprehensive review of the districts remaining outdated school buildings still in use (Oakdale, Greenlodge, and Riverdale Elementary Schools and Dedham High School). The report recommends immediate replacement of the 1902 Oakdale Elementary School. This building has been in constant use as an elementary school for more than 115 years and despite significant maintenance investment it is no longer adequate educational space to meet the needs of students in the 21st century.

Subsequently, the MSBA was engaged to conduct an analysis and prepare an enrollment projection that was completed in January 2022. As a result, (3) enrollment types were recommended to be investigated in the Feasibility Study for the new Oakdale Elementary School.

- Oakdale School – 235 students
- Oakdale + Greenlodge Schools – 550 students
- Oakdale + Riverdale Schools – 450 students

Enrollment Modification

The Preferred Schematic Report for the Oakdale school was submitted to the MSBA 8/31/2023 and approved 10/25/2023 based on the enrollment options above. Through the detailed PSR process, the School Committee voted unanimously on 6/7/23 for an Oakdale + Greenlodge 550 students school. The SBRC on 6/26/23 voted unanimously for the Oakdale site. The 8/31/23 PSR concluded with MSBA deliverables including scaled plans, site development, along with MEP, Structure, and Utility coordination for the following configuration.

- Oakdale + Greenlodge 550 students at Oakdale site.

The project subsequently moved into Schematic Design in the fall of 2023, further developing this enrollment configuration the Oakdale site. The Design team met with teachers, administrators, staff, custodial and kitchen staff to further refine the program, and study design options of how this materializes at this site.

On December 1, 2023 the MSBA provided responses to questions prompted by the Town of Dedham regarding a change in projected student enrollment. Given the responses provided, at the meeting on December 19, 2023 the SBRC voted to not submit the Schematic Design in process and engage the MSBA in a re-evaluation of the enrollment options.

On January 31, 2024 the MSBA issued a letter documenting a re-calculation of the enrollment projections and revised the enrollment options to the list below.

- Oakdale School - 360 students
- Oakdale + Riverdale Schools - 560 students
- Oakdale + Greenlodge - 665 students

On February 28, 2024 the MSBA issued a letter to return to the PSR phase to study new enrollment options identified.

The MSBA table outline of options to be re-evaluated:

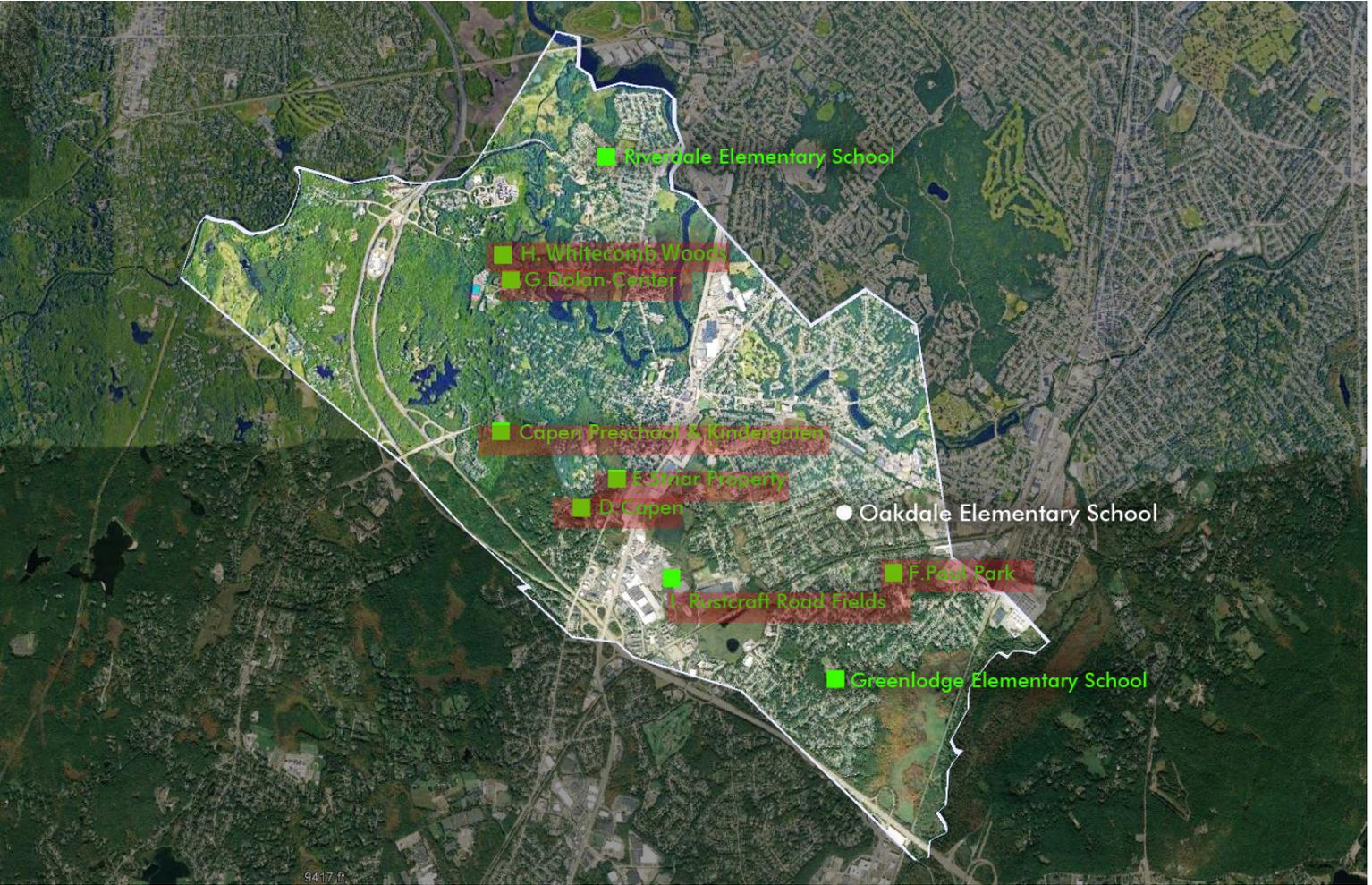
**Dedham, Oakdale Elementary Schools
Final Evaluation of Alternatives**

Enrollment Options	Enrollment for grades 1-5 at the Oakdale ES (360 Students)	Grade 1-5 enrollment in a consolidated Oakdale and Riverdale ES (560 students)		Grade 1-5 enrollment in a consolidated Oakdale and <u>Greenlodge ES</u> (665 students)	
		Oakdale ES	Riverdale ES	Oakdale ES	<u>Greenlodge ES</u>
<i>Sites</i>	<i>Oakdale ES</i>	<i>Oakdale ES</i>	<i>Riverdale ES</i>	<i>Oakdale ES</i>	<i><u>Greenlodge ES</u></i>
Base Repair (Code Upgrade)	Yes		Yes		Yes
Addition/Renovation	Yes	Yes	Yes	Yes	Yes
New Construction	Yes	Yes	Yes	Yes	Yes

Revised PDP and PSR Review

In the spring of 2024, the previously submitted PSR was revised to evaluate the adjusted enrollment options. During the original 2023 PDP and PSR processes, a multitude of sites were carefully considered and analyzed as potential school building locations.

- Oakdale
- Greenlodge
- Riverdale
- Capen
- Striar
- Capen-Striar
- Paul Park
- Dolan Center
- Whitcomb Woods
- Rustcraft Road



Reviewing for site constraints, wetlands, constructability, useable open space, access, accessibility, and safety, 3 sites advanced for further review:

- Oakdale
- Riverdale
- Greenlodge

These sites were investigated in depth considering the revised 3 enrollment configurations (360, 550, 665), as well as base repair, add/reno and new options resulting in 13 options for consideration:

- Oakdale site - Oakdale only - 360 student - Base Repair*
- Oakdale site - Oakdale Only - 360 students- new construction*
- Oakdale site - Oakdale Only - 360 students- add/reno*
- Oakdale site - Oakdale+Riverdale - 560 students - new construction*
- Oakdale site - Oakdale+Riverdale - 560 students - add/reno*
- Oakdale site - Oakdale+Greenlodge - 665 students - new construction*
- Oakdale site - Oakdale+Greenlodge - 665 students - add/reno*
- Riverdale site - Oakdale+Riverdale - 560 students - Base Repair*
- Riverdale site - Oakdale+Riverdale - 560 students - new construction*
- Riverdale site - Oakdale+Riverdale - 560 students - add/reno*
- Greenlodge site - Oakdale+Greenlodge - 665 students - Base Repair*
- Greenlodge site - Oakdale+Greenlodge - 665 students - new construction*
- Greenlodge site - Oakdale+Greenlodge - 665 students - add/reno*

Oakdale

Greenlodge

Riverdale

Capen

Striar

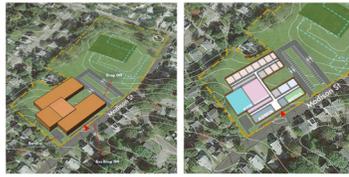
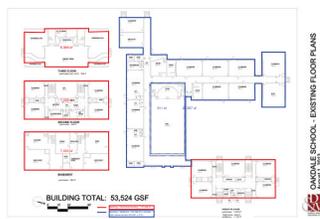
Capen-Striar

Paul Park

Dolan Center

Whitcomb Woods

Rustcraft Road



OAKDALE-360 NEW CONSTRUCTION
TEST FIT DIAGRAM
OAKDALE ONLY
51,000 GSF
83 SPACES, 3 BUSES, 1 VAN

■ New Construction
■ Existing to be Renovated



OAKDALE-360 NEW CONSTRUCTION
TEST FIT DIAGRAM
OAKDALE + REVERDALE
108,000 GSF
138 SPACES, 3 BUS, 2 VANS

■ New Construction
■ Existing to be Renovated



OAKDALE-360 ADDITION/RENOVATION
TEST FIT DIAGRAM
OAKDALE ONLY
108,000 GSF
138 SPACES, 3 BUS, 2 VANS

■ New Construction
■ Existing to be Renovated



REVERDALE-360 NEW CONSTRUCTION
TEST FIT DIAGRAM
OAKDALE + REVERDALE
108,000 GSF
138 SPACES, 3 BUS, 2 VANS

■ New Construction
■ Existing to be Renovated



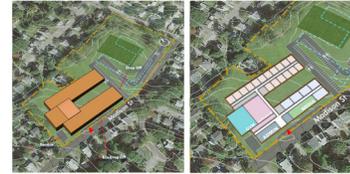
GREENLODGE-365 NEW CONSTRUCTION
TEST FIT DIAGRAM
OAKDALE + GREENLODGE
124,000 GSF
151 SPACES, 4 BUS, 1 VAN

■ New Construction
■ Existing to be Renovated



OAKDALE-360 ADDITION/RENOVATION
TEST FIT DIAGRAM
OAKDALE ONLY
61,000 GSF
82 SPACES, 3 BUSES, 1 VAN

■ New Construction
■ Existing to be Renovated



OAKDALE-465 NEW CONSTRUCTION
TEST FIT DIAGRAM
OAKDALE + GREENLODGE
128,000 GSF
151 SPACES, 4 BUSES, 1 VAN

■ New Construction
■ Existing to be Renovated



OAKDALE-465 ADDITION/RENOVATION
TEST FIT DIAGRAM
OAKDALE + GREENLODGE
128,000 GSF
151 SPACES, 4 BUSES, 1 VAN

■ New Construction
■ Existing to be Renovated



REVERDALE-360 ADDITION/RENOVATION
TEST FIT DIAGRAM
R.E.A.R. OAKDALE + REVERDALE
108,000 GSF
138 SPACES, 3 BUS, 2 VANS

■ New Construction
■ Existing to be Renovated

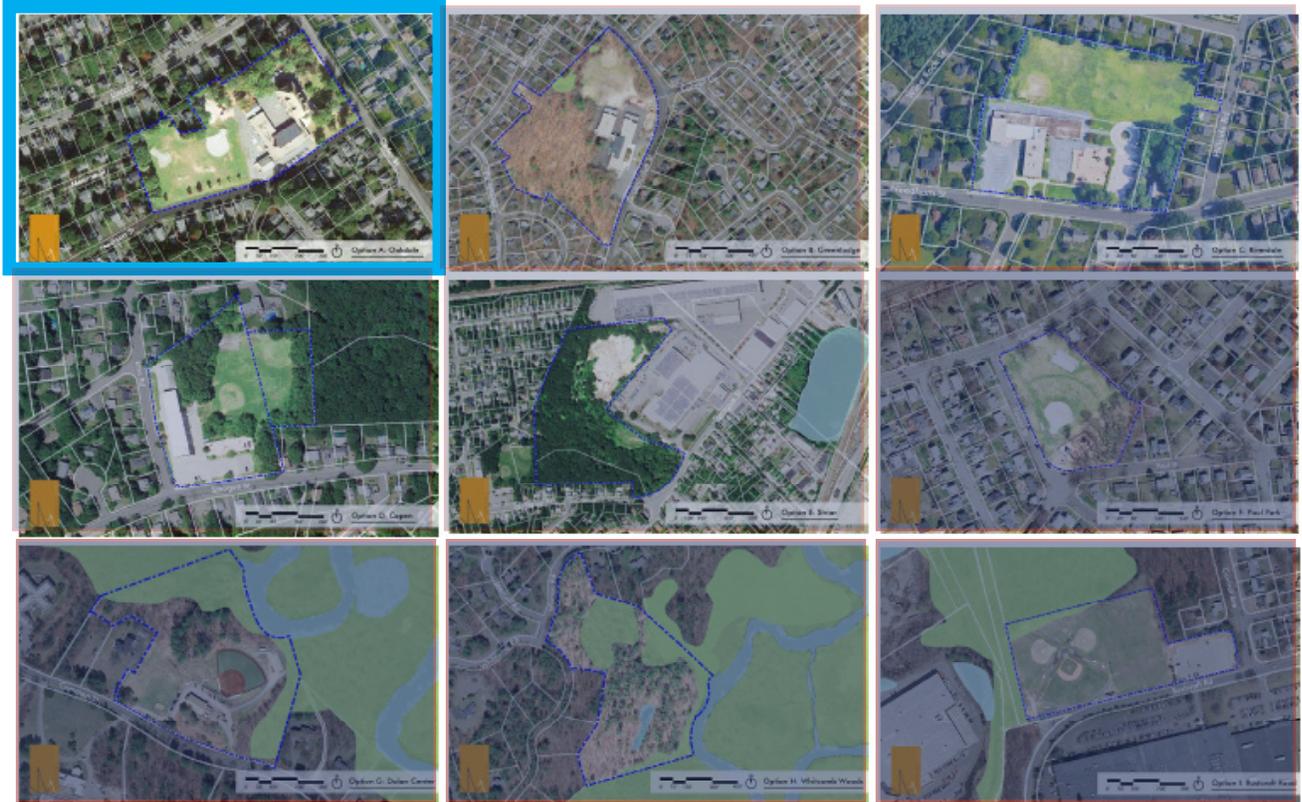


GREENLODGE-365 ADDITION/RENOVATION
TEST FIT DIAGRAM
OAKDALE + GREENLODGE
124,000 GSF
151 SPACES, 4 BUS, 1 VAN

■ New Construction
■ Existing to be Renovated

On March 20, 2024 the School Committee voted unanimously for an Oakdale only 360 enrollment school. On March 25, 2024 the SBRC voted unanimously for the Oakdale site. These votes removed the Riverdale and Greenlodge sites for further consideration.

The approved final configuration:
• Oakdale School - 360 students





1.1 Summary of PSR

The Oakdale site and 360 student enrollment are studied in depth with the approved Educational Program. Five alternatives were carefully reconsidered and reviewed:

- 0 Code Renovation
- A Academic Courtyard
- B Common Core Welcome
- C Addition/Renovation
- D Core Cluster

Options A, B and D build new 2 story construction on the open field portion of the site allow for the existing school to remain open during construction. Option C Add/Reno retains the 1902 brick building and builds 2 story academic wings to the north and south. Some phasing for the 1902 building renovation is required.

Option 0 does not satisfy the requirements of the Space Summary since the existing school is about 2/3 the size required for the 360 enrollment selected.

On April 29, 2024, the SBRC votes unanimously confirmed Option D Core Cluster as the Preferred Design.

The new construction preferred solution builds on the District's Educational Program by creating an exciting cluster of interactive core spaces in the center of the building, respects the site boundaries and adjacent properties, maximizes green space, minimizes student impact during construction and mindful of costs.

The Preferred Schematic Report was Revised 5/2/24 documenting the enrollment number change throughout the process with MSBA approval on 6/26/24.



OPTION A

A Academic Courtyard



OPTION B

B Common Core Welcome



OPTION C

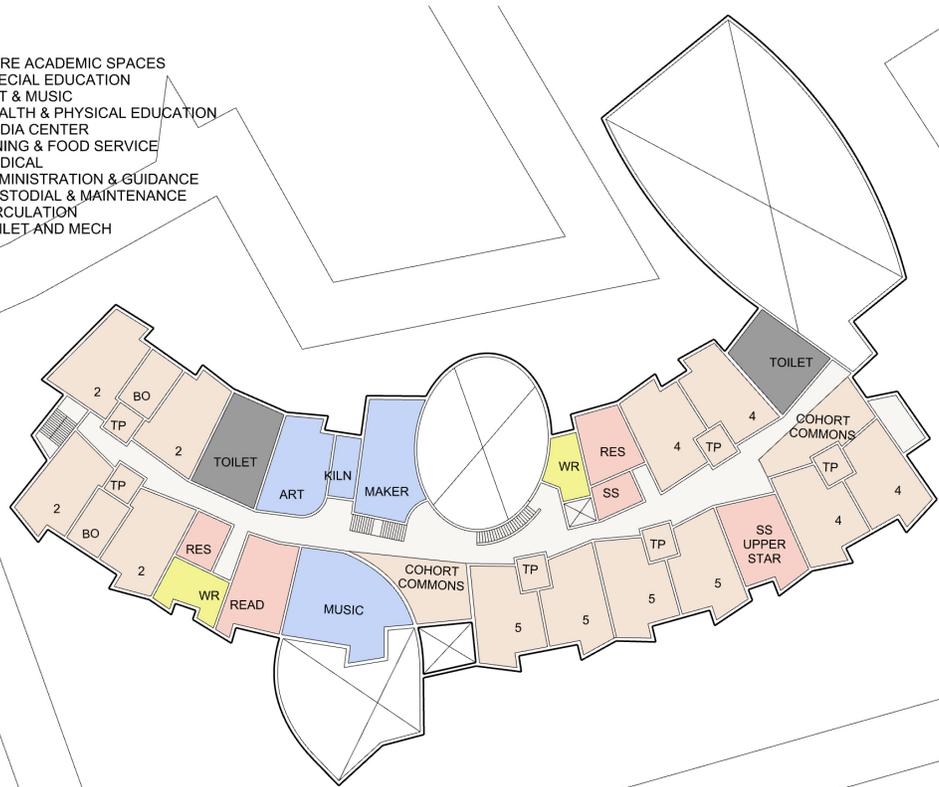
C Add/Reno



OPTION D

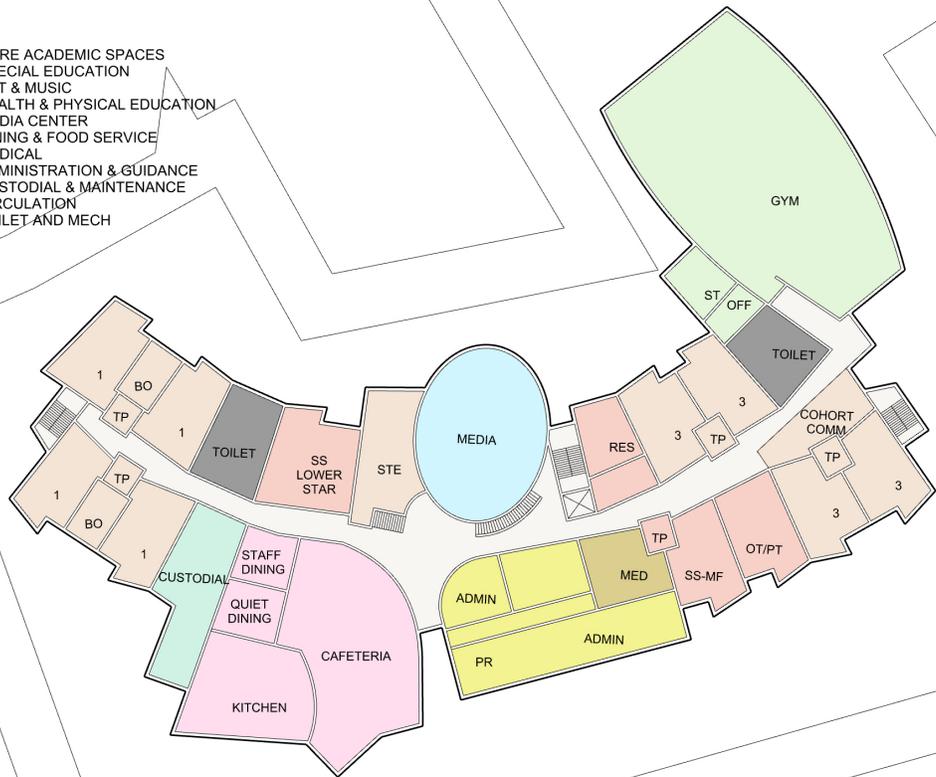
D Core Cluster

- CORE ACADEMIC SPACES
- SPECIAL EDUCATION
- ART & MUSIC
- HEALTH & PHYSICAL EDUCATION
- MEDIA CENTER
- DINING & FOOD SERVICE
- MEDICAL
- ADMINISTRATION & GUIDANCE
- CUSTODIAL & MAINTENANCE
- CIRCULATION
- TOILET AND MECH



0' 20' 40' 80' **2ND FLOOR**

- CORE ACADEMIC SPACES
- SPECIAL EDUCATION
- ART & MUSIC
- HEALTH & PHYSICAL EDUCATION
- MEDIA CENTER
- DINING & FOOD SERVICE
- MEDICAL
- ADMINISTRATION & GUIDANCE
- CUSTODIAL & MAINTENANCE
- CIRCULATION
- TOILET AND MECH



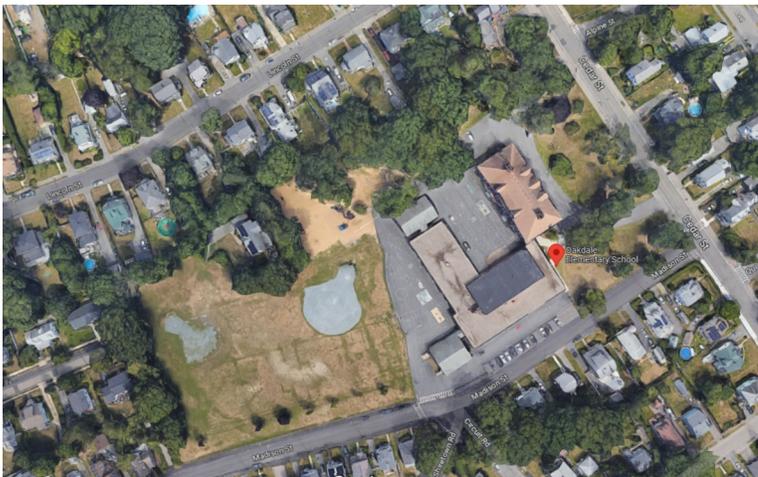
0' 20' 40' 80' **1ST FLOOR**

1.2 Overview of Process

The Town of Dedham created the School Building Rehabilitation Committee (SBRC) to include members with various backgrounds and as part of various other town committees as well as community members. The committee includes one member of the Select Board, one member of the finance committee, and two school committee members in an effort to allow the SBRC to make decisions reflecting the views of the broader town officials. The SBRC also added (6) Ex-Officio members through an application process in September 2023 to broaden the background and expertise of the group.

From the beginning of the project the SBRC has made community outreach a top priority. The SBRC has held multiple community forums throughout the PDP, PSR, and SD process. They met multiple times with direct abutters and residents of the surrounding area to gather input on the current design and to understand the issues with the current school traffic flows. The SBRC has also held many joint meetings with the School Committee, a joint meeting with the Select Board. They have also attended multiple planning board meetings, school PTO meetings, and have invited various town officials attend meetings to answer questions regarding project votes and finances.

All of the SBRC meetings are hybrid (in person with a virtual option) to allow as many participants as possible to attend and provide feedback. The meetings are also broadcast live locally on Dedham TV and available for streaming on the Dedham TV website. All meetings are posted publicly on the Town website and the zoom links are emailed directly to various town boards by the SBRC Chair. Each agenda notes what will be discussed at the upcoming meetings as well as what potential votes are up for discussion and motions. The SBRC will generally discuss a topic at one meeting before revisiting the same topic with a potential vote at the following meeting. The committee also solicits public comment at the end of each and every meeting. The tow has also set up a dedicated email address for residents to provide comments when it is convenient for them. The SBRC strives to provide responses to all questions within 48 hours. Please see the "local actions and approvals" letter for a list of all meetings held to date.



1.3 Total Project Budget

The proposed construction budget for the stand alone Oakdale School schematic design is \$83.1 million. The team estimates a total additional cost of \$22.6 million for all the soft costs including architect fees, OPM fees, permitting fees, FF&E, etc. which brings the total project budget to \$105.7 million without accounting for MSBA reimbursement. The Town of Dedham will request a debt exclusion to cover the cost of the project at a spring Town Meeting and Ballot vote. The order and timing of the votes are still under review by the SBRC, Select Board, and Town Manager's office. The Town of Dedham maintains a healthy balance sheet and its current debt load is well within the recommended level.

1.4 Description of Project

The proposed Oakdale Elementary School project is anticipated to serve 360 students in grades 1-5 on the existing 6.9 acre Oakdale site. The new construction school is to be built on the playfields adjacent to the existing Oakdale School, which will be demolished after the new school is built. The proposed building program is based on Dedham's Educational Program comprising of 87,008 GSF. The project included alternatives for consideration and are priced in the Cost Estimates: in Sections 18 and 19 of this Report:

1. Bay Windows (voted *not* to include 8/19/24)
alternate incorporates bay windows at exterior walls of Classrooms.
2. Artificial Turf field (voted to include 8/26/24)
incorporated into base project.
3. PV installed on Roof (voted to include 8/19/24)
incorporated into base project
4. PV Canopies at Parking (voted *not* to include 8/19/24)
5. Geothermal Heat Pump (voted to include 12/11/23) incorporated into base project
6. Air Source Heat Pump (included for comparative pricing only)
7. Air Source VRF (included for comparative pricing only)
8. Off Site Improvements (voted to include 8/26/24);
alternate incorporates road milling and resurfacing at Cedar and Madison Streets along the Oakdale property extents.

The project will have a CMR construction delivery method.

Total Project Budget

The total project budget for the Schematic Design Submission was voted on by the School Building Rehabilitation Committee and the School Committee at a joint meeting held on Monday August 26, 2024. The total approved project budget is \$105.7 million which includes a total construction cost of \$83.1 million. The budget has decreased from the submitted PSR budget due to some adjustments made to the building layout to make it more efficient. The design team also reduced

some of the glazing and removed the bay windows. The team has worked diligently to review the plans and estimates to reduce the cost of the project and provide potential value management ideas to the SBRC. The reconciled estimates are attached for review along with the 3011 total project budget.

Project Delivery Method

The Vertex team reviewed the two different project delivery methods with the SBRC at the August 21, 2023, SBRC meeting, the December 11, 2023 SBRC meeting, and the June 24, 2024 SBRC meeting. The Town of Dedham has used both delivery methods on past projects and are aware of the pros and cons both. At the December 19, 2023, meeting, the SBRC voted unanimously to approve the Construction Manager at Risk delivery method for the Oakdale School project due to the complex site logistics and the site being located in a heavily populated residential neighborhood. The Vertex team reviewed the CMR/DBB delivery methods again with the SBRC at the June 24, 2024, meeting and the SBRC reaffirmed their decision with a vote at the same meeting. Vertex will submit the request to use CM at Risk delivery method to the Office of the Inspector General on behalf of the Town. All cost estimates and project schedules reflect the cost for CMR as the project delivery method.

Design Description

The design of the new school has been developed to reflect and facilitate the 7 design principles and patterns identified by the visioning team and education plan that are critical to the way it provides education to all students.

1. SAFE AND WELCOMING - Creating a physical and psychological environment that is safe, secure and welcoming is the foundation of an effective learning environment.
2. SOCIAL EMOTIONAL LEARNING, COMMUNITY, AND BELONGING - Creating safe, caring and culturally responsive community in our





The new school will be located on the open space which now exists as a playfield. This location makes it possible to eliminate temporary swing space expenses and minimize disruption to ongoing educational activities by leaving the existing schools in operation during the construction phase. The building is oriented for energy efficiency and sustainability purposes to the south and to the north which utilizes a compact footprint to conserve site space.

The site is organized with vehicular movements removed entirely from the public roadways. A bus drop-off lane with sufficient queuing space for up to 2 buses to be parked simultaneously is located directly in front of the school, completely separate from the main parking area. Upon demolition of the existing school a new single parking area will be built sufficient in size to accommodate the needs of the school staff and visitors.

The school is entered through the administration suite where one will arrive and be able to see the entire array schools shared spaces for the school community including the Media Center, Cafeteria, Maker Space, Music and Art classrooms all at once. Stairs will branch off from this location to both wings for ease of communication between floors. The Gymnasium is located on the east side of the building with a separate community entrance convenient to parking for community events



View - Typical Classroom



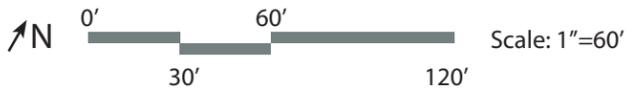
View - Front Entry

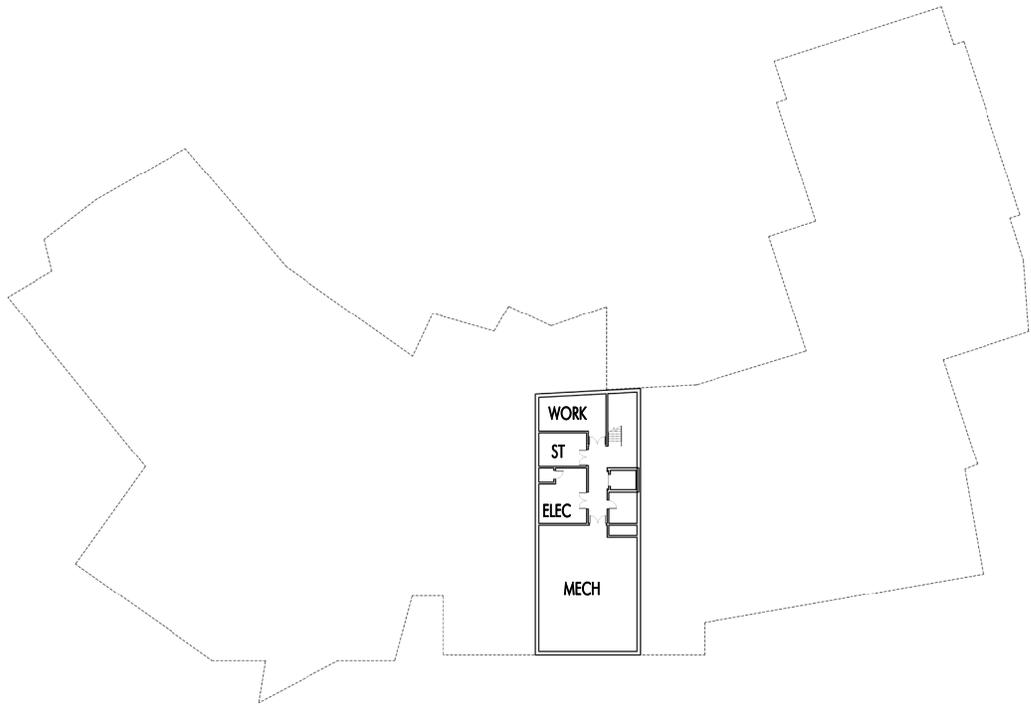
1.5 Visual Aids
Site Plan
Floor Plans
Elevations

SD Plan - Revised

70 Parking Spaces

- Minimum of 3 ADA Accessible Spaces Including 1 Van Space





 BASEMENT
0' 10' 20' 40' 100'
Jonathan Levi Architects



August 29, 2024
Concept Design Drawings
Oakdale Elementary School

Floor Plan - Floor 0



FIRST FLOOR PLAN

0' 8' 20' 40' 100'

Jonathan Levi Architects



August 29, 2024
 Concept Design Drawings
 Oakdale Elementary School



SECOND FLOOR PLAN

0' 10' 20' 40' 100'

Jonathan Levi Architects



August 29, 2024
 Concept Design Drawings
 Oakdale Elementary School

Floor Plan - Floor 2



South Elevation - View of Front Entry





South Elevation - View from southeast



Noth Elevation



East Elevation

1.6 MSBA PSR Review and District Response

The MSBA issued comments on the revised Preliminary Schematic Report on May 17, 2024. Comments were carefully reviewed by the Architect, OPM, and Town of Dedham and responses provided. The full MSBA PSR Comment and District Response document follows.

ATTACHMENT A
MODULE 3 – PREFERRED SCHEMATIC REPORT REVIEW COMMENTS (2.0)

District: Town of Dedham
School: Oakdale Elementary School
Owner’s Project Manager: The Vertex Companies, LLC
Designer Firm: Jonathan Levi Architects LLC
Submittal Due Date: May 2, 2024
Submittal Received Date: May 2, 2024
Review Date: May 2, 2024 – June 6, 2024
Reviewed by: J. Caron, C. Forde, C. Alles

MSBA REVIEW COMMENTS

The following comments¹ on the Preferred Schematic Report (“PSR”) submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

3.3 PREFERRED SCHEMATIC REPORT

Overview of Preferred Schematic Submittal	Complete	Provided; <i>Refer to comments following each section</i>	Not Provided; <i>Refer to comments following each section</i>	Receipt of District’s Response; <i>To be filled out by MSBA Staff</i>
OPM Certification of Completeness and Conformity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Table of Contents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.1 Introduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.2 Evaluation of Existing Conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.3 Final Evaluation of Alternatives	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.4 Preferred Solution	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3.5 Local Actions and Approval Certification	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹ The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA’s guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project’s planning process or plans and specifications.

3.3.1 INTRODUCTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Overview of the process undertaken since submittal of the Preliminary Design Program that concludes with submittal of the Preferred Schematic Report, including any new information and changes to previously submitted information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Summary of updated project schedule, including				
	a) Projected MSBA Board of Directors Meeting for approval of Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Projected Town/City vote for Project Scope and Budget Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Anticipated start of construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Target move in date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Summary of the final evaluation of existing conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Summary of final evaluation of alternatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Summary of District's preferred solution	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A copy of the MSBA Preliminary Design Program project review and corresponding District response	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MSBA Review Comments:

5) *The information provided indicates the District's Preferred Schematic option is a new 87,008 gsf building designed for 360 students on the existing Oakdale Elementary School site. However, the space summary provided indicates the proposed total building gross floor area is 91,136. In response to these review comments, please confirm the proposed total building gross floor area and update the information accordingly.*

No further review comments for this section.

3.3.2 EVALUATION OF EXISTING CONDITIONS

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	A narrative of any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions and its impact on the final evaluation of alternatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2	If changes are substantive, provide an updated Evaluation of Existing Conditions and identify as final. Identify additional testing that is recommended during future phases of the proposed project and indicate when the investigations and analysis will be completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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MSBA Review Comments:

2) *The information provided in the ‘Preliminary Geotechnical Data and Engineering Report’ conducted by Reliance Engineers states:*

“It is recommended that pre-construction surveys be performed for residential buildings abutting the proposed building site.”

“Additional borings are recommended as the proposed building design progresses to the final design phase.”

Additionally, the information provided in the ‘Geo-Environmental Sampling Results Summary’ by CDW Consultants states:

“During design development, it will be necessary to establish the location and volume of subsurface soil that will be disturbed and exported, and an estimate of additional characterization should be prepared.”

In response to these review comments, please provide the timeline associated with completing the work identified above and incorporate it into the overall project schedule. Also, please note and acknowledge that all cost increases subsequent to a Project Scope and Budget Approval from the MSBA’s Board of Directors will be the sole responsibility of the District and considered ineligible for reimbursement.

Response:

- Preconstruction surveys will be conducted by the CMR (TBD) prior to construction.
- Additional Borings will be completed during the Design Development Phase as suggested.
- Pre-characterization shall be performed as needed during detailed design.

VERTEX is working on updating the timeline with the District and is planning to submit an updated schedule as requested in the MSBA’s Board Action Letter provided on June 26, 2024. As soon as the dates of the Town Meeting and election are confirmed, we will be submitting that updated schedule. The balance of the comment is acknowledged.

No further review comments for this section.

3.3.3 FINAL EVALUATION OF ALTERNATIVES

Include at least three potential alternatives, with at least one renovation and/or addition option. Include the following for each alternative where appropriate:

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	An analysis of each prospective site including:				
	a) Natural site limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Building footprint(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Athletic fields	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Parking areas and drives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Bus and parent drop-off areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) Site access and surrounding site features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Evaluation of the potential impact that construction of each option will have on students and measures recommended to mitigate impact	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Conceptual architectural and site drawings that satisfy the requirements of the education program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	An outline of the major building structural systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	The source, capacities, and method of obtaining all utilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	A narrative of the major building systems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	A proposed total project budget and a construction cost estimate using the Uniformat II Elemental Classification format (to as much detail as the drawings and descriptions permit, but no less than Level 2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Permitting requirements and associated approval schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Proposed project design and construction schedule including consideration of phasing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Completed Table 1 – MSBA Summary of Preliminary Design Pricing spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

MSBA Review Comments:

As part of the PSR submittal, the District explored the following (13) options.

- *Option O-BR: Code Upgrade/ Base Repair for grades 1-5 with enrollment of 360 students at the existing Oakdale Elementary School.*
- *Option O-O-N: New Construction for grades 1-5 with enrollment of 360 students at the existing Oakdale Elementary School site. (District's Preferred Schematic).*
- *Option O-O-A/R: Addition/ Renovation for grades 1-5 with enrollment of 360 students at the existing Oakdale Elementary School.*

- *Option O-R-N: New Construction for grades 1-5 with enrollment of 560 students at the existing Oakdale Elementary School site.*
- *Option O-R-A/R: Addition/ Renovation for grades 1-5 with enrollment of 560 students at the existing Oakdale Elementary School.*
- *Option O-G-N: New Construction for grades 1-5 with enrollment of 665 students at the existing Oakdale Elementary School site.*
- *Option O-G-A/R: Addition/ Renovation for grades 1-5 with enrollment of 665 students at the existing Oakdale Elementary School.*
- *Option R-BR: Code Upgrade/ Base Repair for grades 1-5 with enrollment of 560 students at the existing Riverdale Elementary School.*
- *Option R-R-N: New Construction for grades 1-5 with enrollment of 560 students at the existing Riverdale Elementary School site.*
- *Option R-R-A/R: Addition/ Renovation for grades 1-5 with enrollment of 560 students at the existing Riverdale Elementary School.*
- *Option G-BR: Code Upgrade/ Base Repair for grades 1-5 with enrollment of 665 students at the existing Greenlodge Elementary School.*
- *Option G-G-N: New Construction for grades 1-5 with enrollment of 665 students at the existing Greenlodge Elementary School site.*
- *Option G-G-A/R: Addition/ Renovation for grades 1-5 with enrollment of 665 students at the existing Greenlodge Elementary School.*

2) In response to these review comments, please describe the emergency vehicle access provisions being discussed/evaluated that would allow for emergency access around the proposed building, specifically describing constraints across the north side (rear) of the building. Also, as part of the schematic design documents, provide further detail that clearly describes and illustrates the separation, safety provisions, and possible construction laydown areas that will be applied during construction for the Preferred Schematic. Please acknowledge.

Response: After review with the Dedham Fire Department, a 25' setback has been provided with a minimum 35' turning radius to accommodate DFD standards for emergency vehicle access. The Schematic Design documents will provide the further clarifications requested.

4) The 'Structural Systems Overview' provided by LeMessurier states:

"The proposed new building will consist of two and three stories on a relatively flat site with no basement totaling 103,000 gross square feet. The building will be configured to support a design enrollment of 550 students."

This information does not reflect the current proposed gross square footage or the design enrollment of 360 students associated with the District's Preferred Schematic. In response to these review comments, please provide updated narratives that reflect the revised Preferred Schematic and confirm

if there are any changes anticipated to the structural systems due to change in square footage, design enrollment, number of floors, and any additional information discovered through the updated geotechnical report.

Response: Updated Structural narrative dated 6/20/24 is attached.

5) *The information provided in the ‘Utilities’ narratives states:*

“The current Oakdale school is operational and is connected to the Town infrastructure. All options would connect to the available electric, water, sewer, and storm drain. Verifications of existing infrastructure to be further verified during Schematic Design.”

In response to these review comments, please provide the timeline associated with the additional existing infrastructure survey into the overall project schedule and how the potential scope of work will be captured in the scope and budget of the schematic design. Also, please note and acknowledge that all cost increases subsequent to a Project Scope and Budget Approval from the MSBA’s Board of Directors will be the sole responsibility of the District.

Response: The survey, dated 10/25/23 included in the Revised PSR, was updated from the prior submission and provides the noted information; no further verification required.

As previously mentioned, VERTEX is working on updating the timeline with the District and is planning to submit an updated schedule as requested in the MSBA’s Board Action Letter provided on June 26, 2024. As soon as the dates of the Town Meeting and election are confirmed, we will be submitting that updated schedule.

Also, the information provided indicates a fire pump will be required as part of the proposed project. In response to these review comments, please provide the proposed location of the fire pump equipment.

Response: A Fire Pump Room will be included along an exterior wall along Madison Street in the service area on the First Floor. This room will be clearly identified in the Schematic Design drawings.

6) *The information provided indicates that the narratives associated with Fire Protection Systems, Plumbing Systems, HVAC System, Electrical Systems, Technology Systems, and Security Systems are unchanged since the original August 2023 PSR submittal. In response to these review comments, please confirm if the proposed major building system narratives continue to remain applicable to the current proposed design. Also, please provide the process and timeline associated with finalizing systems selections.*

Response: Confirmed, the proposed major building system narratives remain applicable.

The SBRC has voted to approve the selected Geothermal system with displacement air distribution. No further action is required to finalize these systems.

The information provided indicates the District is targeting the minimum requirements of the Opt-in Specialized Code and also intends to meet the indoor air quality requirements in an effort to achieve additional incentive points associated with MSBA's Green Schools Program. It should be noted that the 'HVAC System Narrative' provided identifies (4) systems options under consideration, with one of those options being a mixed fuel building (natural gas and electric) air source heat pump RTUs with gas fired boiler plant heating. If the District intends to achieve MSBA's additional incentives for energy efficiency, please refer to MSBA Project Advisory 81 for meeting the minimum requirements associated with Opt-in Specialized Code when finalizing the HVAC systems options selection.

Additionally, the information provided references a Building Management System ("BMS"). In response to these review comments, confirm that building and District facilities, maintenance, and custodial personnel have been included in discussions regarding the following:

- *The selection and long-term operational and maintenance costs of the BMS and mechanical systems; and,*

Response: Confirmed.

- *That the training program will be coordinated with the District's facility, maintenance, and custodial staff and will include sufficient training hours to learn how to operate the proposed BMS before the opening of the proposed project as well as hours post turnover.*

Response: Confirmed.

7) As part of the schematic design documents, please provide the following:

- *Identify estimated cost associated with removal of any existing fuel storage tanks;*

Response: Acknowledged.

- *Identify estimated costs associated with the removal of existing flooring and ceiling materials containing asbestos;*

Response: Please see pages 14 and 15 of the Hazardous Materials Identification Study in SECTION 2.3 of the Revised PSR (pages 258-9 of the PDF) . These costs are included in the cost estimates.

- *Complete the "CSI" tab within the MSBA's total project budget spreadsheet; and,*
- *The information provided in the PM&C Cost Estimate indicates an add alternate for artificial turf field in lieu of grass with irrigation (+\$570,000). If add/deduct construction alternates are proposed at schematic design, please complete the "Alternates" tab within the MSBA's total project budget spreadsheet detailing the cost and the rationale associated with each alternate.*

Response: Comments acknowledged.

Please note, the District must include negotiated costs for OPM and Designer fees for the remainder of the project as part of their Total Project Budget. The fees must be listed separately by the applicable

line items that are included in the MSBA's Total Project Budget Template. In response to these review comments, please confirm that the District and its consultants will negotiate fees for the remainder of the project that are to be included in the District's schematic design documents to the MSBA.

Response: Acknowledged.

8) Please note and acknowledge that all permitting requirements and approvals must be obtained prior to construction bidding, and all permitting scope and costs are to be clearly identified as part of the schematic design submittal.

Response: Acknowledged.

10) Subsequent to receiving the updated PSR submittal, the MSBA received a revised Preliminary Design Pricing Table on June 5, 2024. The information provided indicates the District's Preferred Schematic is 87,008 gsf and includes an estimated total construction cost of \$83.8 million (\$964/sf) and an estimated total project cost of \$109 million. In response to these review comments, please provide additional information that clearly describes the cost drivers and underlying factors that contribute to an estimated total construction square foot cost of \$964/sf.

For reference, the MSBA has recently processed two elementary school projects of similar size, grade configuration, and design enrollment each with an estimated marked-up direct building cost of \$644/sf and \$554/sf respectively. By comparison, the direct estimated building cost for this proposed project, estimated at \$833/sf, results in a significant estimated cost variation. The MSBA would like to understand more about what is driving the cost of the proposed building, i.e. provide information related to potential interior/exterior material selection, gymnasium size and shape, size, shape, and double height configuration of the Cafeteria and Media spaces, etc. Describe any opportunities that could adjust the proposed design to maintain, or possibly reduce the estimated per square foot cost during the schematic design phase.

Response: The cost as reflected in the PSR reflects a few items that are driving the direct building cost. Those include the inclusion of costs related to having the building meet the Opt-In Energy code, including a geothermal HVAC system, triple glazed windows and a more enhanced building envelope. The demo and abatement of the existing building is a significant cost center and adds about \$40/sf. Also, the project included CM at Risk as a delivery method.

The Project Team and the SBRC have discussed cost on numerous occasions since submission of the PSR. The Designer is committed to bringing the construction cost for this project down and has recently presented numerous options that will result in better building efficiencies and simplified building geometries in a number of areas that should result in a lower construction cost.

No further review comments for this section.

3.3.4 PREFERRED SOLUTION

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
1	Educational Program				
	a) Summary of key components and how the preferred solution fulfills the educational program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Design responses including desired features and/or layout considerations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Proposed variances to, and benefits of, any changes to the current grade configuration (if any) and a related transition plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Preferred Solution Space Summary				
	a) Updated MSBA Space Summary spreadsheet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Itemization and explanation of variations from the initial space summary (and MSBA review) included in the Preliminary Design Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Preliminary NE-CHPS or LEED-S scorecard	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Clearly labeled site plans of the preferred solution including, but not limited to:				
	a) Structures and boundaries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Site access and circulation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Parking and paving	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Zoning setbacks and limitations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Easements and environmental buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	f) Emergency vehicle access	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Safety and security features	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	h) Utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	i) Athletic fields and outdoor educational spaces (existing and proposed)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	j) Site orientation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	An overview of the Total Project Budget and local funding including the following:				
	a) Estimated total construction cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Estimated total project cost	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) Estimated funding capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	d) List of other municipal projects currently planned or in progress	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Provide the following Items		Complete; <i>No response required</i>	Provided; <i>District's response required</i>	Not Provided; <i>District's response required</i>	Receipt of District's Response; <i>To be filled out by MSBA Staff</i>
	e) District's not-to-exceed Total Project Budget	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	f) Brief description of the local process for authorization and funding of the proposed project	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) Estimated impact to local property tax, if applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	h) Completed MSBA Budget Statement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Updated Project Schedule including the following projected dates:				
	a) Massachusetts Historical Commission Project Notification Form	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) MSBA Board of Directors meeting for approval to proceed into Schematic Design	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	c) MSBA Board of Directors meeting for approval of project scope and budget agreement and project funding agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	d) Town/City vote for project scope and budget agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	e) Design Development submittal date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	f) MSBA Design Development Submittal Review (include required 21-day duration)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	g) 60% Construction Documents submittal date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	h) MSBA 60% Construction Documents Submittal Review (include required 21-day duration)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	i) 90% Construction Documents submittal date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	j) MSBA 90% Construction Documents Submittal Review (include required 21-day duration)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	k) Anticipated bid date/GMP execution date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	l) Construction start	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	m) Move-in date	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Substantial completion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

MSBA Review Comments:

1b) In response to these review comments, please review and respond to the following:

- *The 'Performing Arts' section of the educational program notes several practice rooms/ dressing rooms should be included in the proposed project. However, the space summary does not indicate any music practice/ ensemble rooms are provided. Please confirm if the proposed space summary meets the current and future needs of the District's educational program. If the proposed space summary is sufficient, please update the educational narrative accordingly for clarification.*

Response: Please refer to the revised Educational Program. A 'redlined' and 'clean' copy have been attached for your reference.

- *The 'Health & Physical Education' section of the educational program notes there should be a classroom teaching space for health classes that could also double as a professional development space. However, the space summary does not indicate a separate classroom teaching space. Please confirm if the proposed space summary meets the current and future needs of the District's educational program.*

Response: Please refer to the revised Educational Program attached.

- *There appear to be several discrepancies between the 'Student Services & Special Education' section of the educational program and the proposed space summary. Please review and respond to the following:*
 - *The information provided regarding the Specialized Teaching and Readiness Program ("STAR") states:*

"The design of Dedham's newest elementary facility should include two classrooms for the STAR program to accommodate increased enrollments and the need to ensure statutory compliance with age span limits and ADA."

However, the STAR Program classrooms are not identified in the proposed space summary. Please confirm if the proposed space summary meets the current and future needs of the District's educational program and coordinate with the proposed space summary accordingly.

Response: The two STAR classrooms are (2) of the (3) "Self-Contained Special Education Classroom" identified in the Space Summary. Please refer to the updated attached Space Summary.

Additionally, the information provided states:

"The design of STAR classrooms must include an adjoining sensory room to best meet the needs of students."

Response: The Upper and Lower STAR classrooms will have adjoining spaces identified in the Schematic Design, such as a Breakout Room, that may be used as a sensory room.

However, there is no sensory room for STAR program identified in the proposed space summary. Please confirm if this meets the current and future needs of the District's education program and coordinate with the proposed space summary accordingly.

Response: Breakout Room and adjoining spaces may be used for the sensory rooms.

- *The information provided regarding the Elementary Complex Learner Program states:
“The design of Dedham’s newest elementary facility should include two classrooms for the Complex Learner Program to accommodate increased enrollments and the need to ensure statutory compliance with age space limits and ADA.”*

Per the information provided for the STAR Program and Complex Learner Program, it appears that it will require a total of (4) classrooms. However, the space summary indicates the District is proposing (3) self-contained special education classrooms and (1) medically fragile special education classroom. Please confirm if this meets the current and future needs of the District’s education program and clarify which program will be held in the self-contained special education classrooms.

Response: Please refer to the revised Educational Program attached.

Additionally, there is no medically fragile special education program narrative provided. Please provide additional information about the medically fragile special education program.

Response: Dedham is currently investigating alternative short-term solutions for its medically fragile elementary school students. It is uncertain if these children will attend the new Oakdale School when it opens, however it is important that one of the 4 special education classrooms be designed with the flexibility to accommodate medically fragile students as well as those without those specific physical needs. Since medically fragile classrooms cannot be effectively retrofitted in the future, it has been built into the current program.

- *The space summary indicates the District is proposing (1) 150 nsf Breakout Room in the ‘Special Education’ category. However, the educational program provided indicates the STAR Program and Complex Learner Program each require a breakout space. Please confirm the proposed breakout room is sufficient to accommodate the needs for each program identified in the educational program.*

Response: Confirmed. Please refer to the revised Educational Program attached.

- *The ‘Speech and Language Therapy’ narrative states: “The increased population projected will require at least two general speech-language therapy rooms and one STAR speech-language room.” However, the speech language therapy room is not identified in the proposed space summary. Please confirm if this meets the current and future needs of the District’s education program and coordinate the space summary and education program accordingly.*

Response: Confirmed. Please refer to the revised Educational Program attached.

- *The ‘Augmentative and Alternative Communication’ narratives states: “The AAC service requires an office with a small instructional space for testing devices and programming devices.” However, the AAC service office is not identified in the proposed space summary. Please confirm if this meets the current and future needs of the District’s education program and coordinate the space summary and education program accordingly.*

Response: Confirmed. Please refer to the revised Educational Program attached.

2a) Please refer to “Attachment B” for detailed review comments.

Response: Please refer to the revised Educational Program. A ‘redlined’ and ‘clean’ copy have been attached for your reference.

3) The information provided in the ‘Sustainability Documents’ states that the District intends to achieve the 4% additional reimbursement (including three incentive points for energy efficiency and one incentive point for indoor air quality) using the 2023 version of the MSBA Green Schools Program. However, there is no description of how the project will meet the minimum energy requirements described in the MA DOER “Opt-in Specialized Code” standards in the narrative. In response to these review comments, please confirm if the District intends to meet the “Opt-in Specialized Code” as a minimum requirement for additional three incentive points for energy efficiency.

Response: Confirmed. The district intends to meet the “Opt-in Specialized Code”.

If so, in the following Project Scope and Budget submittal, the Designer and OPM should describe in detail how compliance with the Opt-in Specialized Energy Code goals will be met (i.e. describe proposed compliance pathways, coordinate with the systems narratives, etc.) and that all provisions associated with the building design have been coordinated including square footage associated with accommodating appropriately sized mechanical spaces.

Response: Understood and agreed.

Also, please note and acknowledge if the District does not meet the requirements of the Green Schools Program, the District will not qualify for some or all of these incentive points, and the MSBA will adjust the reimbursement rate accordingly.

Response: Acknowledged.

4) In response to these review comments, please describe how the design team will work with the District to seek opportunities to simplify the design for constructability and management of construction costs.

Response: The design team has proposed several cost saving alternatives during Schematic Design which the SBRC will review and consider. In addition, the design team will coordinate ideas for additional Value Management. These will be included in the Schematic Design Submission.

Additionally, in response to these review comments, please provide the following:

- *Confirm that roof access provisions have or are being discussed with the District's facilities personnel and local safety officials to ensure an appropriate level of access and safety will be incorporated into the schematic design documents.*

Response: Confirmed.

- *Provide any preliminary details or supplemental information that may be available relevant to proposed roof access.*

Response: Stair access will be provided to the roof; no elevator service to roof required.

5f) In response to these review comments, please confirm that local emergency representatives have been consulted in the planning process and associated requirements have been incorporated into the Preferred Schematic.

Response: The Design Team, OPM, and the District met with the Dedham Fire along with the Police Department chiefs to review the preliminary design. The outcome of this meeting has been incorporated into this revised PSR. Reviews with the Fire and Police Chiefs will continue throughout the design process.

5e, 5g-5i) Please provide site plans that clearly identify the following features for the site of the preferred schematic:

- *Easements and environmental buffers;*

Response: 25' property line setback indicated, see attached plan.

- *Safety and security requirements;*

Response: A 25 foot wide 'Safety Access' zone with 35' radiused turns for truck access indicated, see attached plan.

- *Utilities; and,*

Response: The 10/25/23 survey included included in the revised PSR had been updated and provides the noted information; see Section 2.3 of the revised PSR. Utilities connections to Madison Street indicated on attached site plan.

Athletic fields and outdoor educational spaces (existing and proposed).

Response: The updated 10/25/23 survey includes existing surface conditions in the open areas. The Proposed preliminary site plan designates area east of the new school for fields and play areas. See attached site plan. Types of fields and play areas will be included in the Schematic Design.

5i) In response to these review comments, please include information that describes the process including those involved in making decisions associated with incorporating site improvement components such as landscape features, trees, plantings, irrigation, rain gardens, etc. The MSBA encourages the District to include facilities and maintenance personnel responsible for the future care and maintenance of the proposed site components to ensure that the design choices will align with the staffing levels and budget available for snow removal, and seasonal maintenance including mowing, mulch and planting bed maintenance. Through recent post occupancy evaluations, the MSBA has learned that proposed site development features often do not take into consideration the time, care, and staffing and budget resources required to maintain the intended site features and has resulted in districts modifying and/or removing plantings and landscape features soon following building occupancy.

Response: Facilities and maintenance personnel responsible for the future maintenance of the proposed site components will be included in the working group responsible for recommending the landscape design for approval by the SBRC.

6c, 6d, 6e, 6g) In response to these review comments, please provide the following:

- *Estimated funding capacity;*

Response: At this time the Town is prepared to fund the project at the value of the preferred option of \$113,216,071.

- *List of other municipal projects currently planned or in progress;*

Response: At this time there are no other municipal projects planned and the Town's prior public project, the Public Safety Building is in the final administrative phases of closeout.

- *District's not-to-exceed Total Project Budget; and,*

Response: The District's current not-to-exceed budget is \$113,216,071, however small fluctuations in that budget between PSR and Schematic Design are anticipated.

- *Estimated impact to local property tax, if applicable*

Response: At this time the tax impacts have not been officially calculated, however those impacts will be further developed during Schematic Design.

7a) *The information provided indicates a Project Notification Form (“PNF”) was submitted to the Massachusetts Historic Commission (“MHC”) on August 24, 2023, and MHC approval was received on September 19, 2023. Please note, the District should keep the MSBA informed of any decisions and/or proposed actions and should confirm that the proposed project is in conformance with Massachusetts General Law 950, CRM 71.00. Please acknowledge.*

Response: Acknowledged.

No further review comments for this section.

3.3.5 LOCAL ACTIONS AND APPROVALS

Provide the following Items		Complete; No response required	Provided; District’s response required	Not Provided; District’s response required	Receipt of District’s Response; To be filled out by MSBA Staff
1	Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Signed Local Actions and Approvals Certification(s):				
	a) Submittal approval certificate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	b) Grade reconfiguration and/or redistricting approval certificate (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Provide the following to document approval and public notification of school configuration changes associated with the proposed project:				
	a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

	required locally				
d)	A certification from the Superintendent stating the District’s intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

MSBA Review Comments:

1) The narrative notes the SBRC meeting minutes from March 20, 2024, are in draft and meeting minutes from April 29, 2024 and May 1, 2024 are in process. Please provide the certified meeting minutes that are listed above when available.

Response: The certified minutes from SBRC April 29, 2024 and School Committee May 1, 2024 are attached.

2a) The provided signed Local Actions and Approval certification is addressed to Mary Pichetti. Please note that Michael McGurl is the current Director of Capital Planning. In response to these review comments, please acknowledge and update the letterhead for all future submittals.

Response: Acknowledged.

2b) Not provided. Please provide a completed and signed Grade Reconfiguration Approval Certification that lists the School Committee meetings and public meetings in which the proposed Oakdale Elementary School only enrollment option was discussed and approved.

Response: Certification letter has been drafted and the fully executed document will be provided.

3a-d) Not provided. Please provide in response to these review comments.

Response:

3a) It is within the jurisdiction of the the School Committee to determine the enrollment of the project. The School Committee solicited public input by sending a survey to all DPS families, posted on social media pages and in newspapers and flyers. Out of 647 replies, 525 responded in favor of the stand alone Oakdale with an enrollment of 360 students. The motion to accept the 360 student enrollment was approved by a vote of 6-0 at the March 20, 2024 School Committee meeting.

3b) The SBRC discussed and voted to authorize the OPM to submit the PSR at the April 29, 2024 public meeting. Certified Minutes attached.

3c) Certified copies of minutes from School Committee meetings held on March 20, 2024 and May 1, 2024 are attached.

3d) Certification letter has been drafted and the fully executed document will be provided.

No further review comments for this section.

Additional Comments:

- *The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers (“OPM”), and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. The advisories can be found on the MSBA’s website. In response to these review comments, please confirm that the District’s consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

Response: Confirmed.

Regarding Past Projects:

MSBA records do not indicate previous grants associated with the Oakdale Elementary School, Riverdale Elementary School, or the Greenlodge Elementary School.

End

ATTACHMENT B
MODULE 3 – PREFERRED SCHEMATIC SPACE SUMMARY REVIEW (2.0)

District: Town of Dedham
School: Oakdale Elementary School
Owner’s Project Manager: The Vertex Companies, LLC
Designer Firm: Jonathan Levi Architects LLC
Submittal Due Date: May 2, 2024
Submittal Received Date: May 2, 2024
Review Date: May 2, 2024 – June 6, 2024
Reviewed by: J. Caron, C. Forde, C. Alles

The Massachusetts School Building Authority (the “MSBA”) has completed its review of the proposed space summary of the preferred alternative as produced by Jonathan Levi Architects LLC and its consultants. This review involved evaluating the extent to which the Oakdale Elementary School’s proposed space summary conforms to the MSBA guidelines and regulations.

The MSBA considers it critical that the Districts and their Designers aggressively pursue design strategies to achieve compliance with the MSBA guidelines for all proposed projects in the new program and strive to meet the gross square footage allowed per student and the core classroom space standards, as outlined in the guidelines. The MSBA also considers its stance on core classroom space critical to its mission of supporting the construction of successful school projects throughout the Commonwealth that meet current and future educational demands. The MSBA does not want to see this critical component of education suffer at the expense of larger or grander spaces that are not directly involved in the education of students.

The following review is based on the submitted new construction project option with an agreed upon design enrollment of 360 students in grades 1-5.

Please note that subsequent to receiving the submittal the MSBA received an updated space summary on May 30, 2024, which is the basis of the review comments below.

The MSBA review comments are as follows:

- **General Comment:** Please provide an updated space summary in response to these review comments and in subsequent submittals that does not adjust the MSBA guidelines section of the space summary template. Also, please note and acknowledge that the square footage identified on the space summary and floors plans must continue to align as part of the Schematic Design submittal.

Response: Acknowledged. Updated space summary attached.

- **Core Academic** – The District is proposing a total of 23,800 net square feet (“nsf”) which exceeds the MSBA guidelines by 8,600 nsf. The District is proposing the following:

- **General Classrooms (Grades 1-5)** – The District is proposing (20) 900 nsf General Classrooms totaling 18,000 nsf, which exceeds the MSBA guidelines by (4) classrooms and 2,800 nsf. Based on the information provided, the MSBA accepts this variation to the guidelines. Additionally, please review and respond to the following:

- As the project further develops, please note and acknowledge that 900 nsf is the minimum size for all newly constructed General Classrooms in an elementary school.

Response: Acknowledged.

- Confirm that the proposed project will provide a minimum of two sinks in each General Classroom for grades 1-5. Please refer to the attached memo regarding [MSBA's Staff Recommendation for 2018 STE Area Guidelines](#).

Response: Acknowledged. The sinks will be shown graphically in the Schematic Design.

- **Teacher Planning** – The District is proposing (20) 50 nsf Teacher Planning areas totaling 1,000 nsf, which exceeds the MSBA guidelines. The information provided indicates that the District is proposing a total of (20) 900 nsf General Classrooms that are each 50 nsf below the MSBA's allowable maximum classroom size. Based on the information provided, the MSBA accepts this variation to the guidelines. No further action required.

- **Classroom Breakout Grades 1-2** – The District is proposing (4) 300 nsf Classroom Breakout Grade 1-2 totaling 1,200 nsf, which exceeds the MSBA guidelines. Based on the information provided, the MSBA does not object to the additional square footage; however, the MSBA will consider this square footage ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Cohort Commons Grade 3-5** – The District is proposing (3) 800 nsf Cohort Commons Grade 3-5 totaling 2,400 nsf, which exceeds the MSBA guidelines. Based on the information provided, the MSBA does not object to the additional square footage; however, the MSBA will consider this square footage ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Science, Technology, Engineering (STE) Room (Grades 3-5)** – The District is proposing (1) 1,080 nsf STE Room, which exceeds the MSBA guidelines. The information provided indicates that the STE Room will be routinely scheduled for classroom instruction delivered and supervised by grade level classroom teachers. Please note that MSBA does not object to the additional square footage; however, the MSBA will consider this square footage ineligible for reimbursement based on the proposed staffing scenario. Please acknowledge. For additional information, please refer to the attached memo regarding [MSBA’s Staff Recommendation for 2018 STE Area Guidelines](#).

Response: Acknowledged.

- **STE Storage Room** – The District is proposing (1) 120 nsf STE Storage Room associated with the (1) STE Room, which exceeds the MSBA guidelines. Please note that MSBA does not object to the additional square footage; however, the MSBA will consider this square footage ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Special Education** – The District is proposing a total of 8,210 nsf which exceeds the MSBA guidelines by 3,680 nsf. Additionally, in response to these review comments, please review and respond to the following:

- As the project further develops, please note and acknowledge that 900 nsf is the minimum size of all newly constructed self-contained special education classrooms in an elementary school.

Response: Acknowledged.

- Please note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (“DESE”). The District should provide this information for this submittal with the Schematic Design Submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.

Response: Acknowledged.

- **Art & Music** – The District is proposing a total of 3,700 nsf which exceeds the MSBA guidelines by 1,200 nsf. In response to these review comments, please describe how the proposed Maker Space will be scheduled, staffed, and the types

of activities that will occur within the space. Additionally, please describe the difference between the proposed STE Room and the proposed Maker Space.

Response: **DPS**

- **Health & Physical Education** – The District is proposing a total of 7,150 nsf which exceeds the MSBA guidelines by 850 nsf. Please note the MSBA does not object to the additional square footage; however, all square footage exceeding MSBA guidelines will be considered ineligible for reimbursement. Please acknowledge and refer to the attached memo regarding the MSBA’s policy on physical education square footage exceeding MSBA guidelines.

Response: Acknowledged.

- **Media Center** – The District is proposing a total of 2,290 nsf which meets the MSBA guidelines. No further action required.
- **Dining & Food Service** – The District is proposing a total of 7,760 nsf which exceeds the MSBA guidelines by 1,880 nsf. Please note the MSBA does not object to the additional square footage; however, all square footage exceeding MSBA guidelines will be considered ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Medical** – The District is proposing a total of 600 nsf which exceeds the MSBA guidelines by 90 nsf. Please note the MSBA does not object to the additional square footage; however, all square footage exceeding MSBA guidelines will be considered ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Administration & Guidance** – The District is proposing a total of 2,535 nsf which exceeds the MSBA guidelines by 460 nsf. Please note the MSBA does not object to the additional square footage; however, all square footage exceeding MSBA guidelines will be considered ineligible for reimbursement. Please acknowledge.

Response: Acknowledged.

- **Custodial & Maintenance** – The District is proposing a total of 1,960 nsf which meets the MSBA guidelines. No further action required.
- **Non-Programmed Spaces** – Please complete the ‘Non-Programmed Spaces’ category as part of the Schematic Design submittal. Please acknowledge.

Response: Acknowledged.

- **Total Building Net Floor Area** – The District is proposing to provide a total of 58,005 nsf which exceeds the MSBA guidelines by 16,760 nsf. Please address the comments provided in the categories above as part of the District’s response to these comments in order for the MSBA to estimate an allowable net square footage.

Response: Acknowledged; comments provided above.

- **Total Building Gross Floor Area** – The District is proposing to provide a total of 87,008 gross square feet (“gsf”) which exceeds the MSBA guidelines by 25,141 gsf with a grossing factor of 1.50. As the project further develops, please note and acknowledge the MBSA will not support a new construction project with a grossing factor exceeding 1.50. Additionally, address the comments provided in the categories above as part of the District’s response to these comments in order for the MSBA to establish an allowable gross square footage.

Response: Acknowledged.

As it relates to estimated building cost, the proposed square footage exceeds MSBA guidelines in several of the categories listed above. In response to these review comments, please describe any opportunities to evaluate/reduce the proposed square footage/estimated building cost in conjunction with the comments provided in Attachment A, Section 3.3.3, Item 10. Additionally, in the schematic design phase, the design team should work to coordinate spatial provisions for mechanical spaces as the selection of systems evolves accordingly, where mechanical space contributes to the gross of the building and is not considered net programmable space. Please acknowledge.

Response: Acknowledged.

Please note that upon moving forward into subsequent phases of the proposed project, the Designer will be required to provide, with each submission, a signed, updated space summary that reflects the design and demonstrates that the design remains, except as agreed in writing by the MSBA, in accordance with the guidelines, rules, regulations and policies of the MSBA. Should the updated space summary demonstrate changes to the previous space summary include a narrative description of the change(s) and the reason for the proposed changes to the project.



SITE PLAN

OAKDALE ELEMENTARY SCHOOL

SCHEMATIC DESIGN STRUCTURAL NARRATIVE

(LEM # 22.0258)



DEDHAM, MA

DECEMBER 29, 2023 REVISED JUNE 20, 2024

PREPARED BY

LeMessurier.

1380 SOLDIERS FIELD ROAD
BOSTON, MA 02135

PREPARED FOR

JONATHAN LEVI ARCHITECTS

266 BEACON STREET,
BOSTON, MA 02116

STRUCTURAL NARRATIVE

INTRODUCTION

This schematic design structural narrative contains a project description, an outline of the structural components and estimated material quantities for the structural work of this project for preliminary budget purposes only. The report is to be read in conjunction with the schematic architectural drawings and narrative.

In general, the narrative included herein describe the main or typical structural elements in a preliminary manner. Appropriate allowances should be made for non-typical conditions.

PROJECT DESCRIPTION

The proposed new building will consist of two stories on a relatively flat site totaling 87,000 gross square feet. The building will be configured to support a design enrollment of 360 students.

STRUCTURAL SYSTEMS

The proposed main building structure will be a structural steel frame with concrete floor slabs on composite steel deck. The main building roof will be composite steel deck with concrete topping. The Cafeteria, Media Room and Gymnasium will be framed with mass-timber with galvanized metal roofing. The lateral load resisting system will consist of steel braced frames in the transverse direction and steel moment frames in the long direction. Foundations will be cast-in-place reinforced concrete walls, slabs-on-grade, and spread footings.

Foundations

A geotechnical engineering report titled “Preliminary Geotechnical Data and Engineering Report” was issued by Reliance Engineers dated 25 September 2023 has been issued. The report

recommends shallow foundations with an allowable bearing pressure of 4 tons per square foot and a seismic site class C. Footings are to bear on till ranging in depth from 4-feet to more than 7-feet deep. Footings will need to be lowered in locations to bear on till or the fill removed and backfilled with compacted structural fill. Based on this information the foundations for the project will be as follows:

A. Walls

Typical foundation walls will be 18-inch thick reinforced concrete with 10-inch wide shelves as required to support façade elements. Exterior foundation walls will extend down to a minimum of 4'-0" below finished exterior grade. All foundation walls enclosing below-grade space shall be waterproofed on the exterior surface and a drainage system shall be installed around the perimeter of the foundation to divert ground water away from the building.

B. Slab-on-Grade

The partial basement and first-floor slab on grade will be a 5-inch thick slab-on-grade. A 15-mil vapor barrier and 12-inch layer of crushed stone will be placed beneath the slab to provide an adequate substrate and to allow for an under-slab drainage system where portions of the floor slab extend below exterior grade. Further development in design will provide for depressions, trenches, housekeeping pads, and other potential equipment requirements.

C. Footings

The foundations will consist of reinforced concrete spread footings and continuous wall footings bearing on compacted structural fill or undisturbed soil. Partial basement foundation walls will be simply supported and rely on the ground floor slab on metal deck for lateral support at top of wall.

D. Pits

Elevator and other pits that may be required will consist of an 18-inch thick reinforced concrete base slab and 12-inch thick reinforced concrete pit walls. All pits shall receive waterproofing.

Superstructure – Gravity Load System

A. Partial Basement

Slab-on-grade as described above.

B. Ground Floor

Slab-on-grade as described above. Composite slab-on-metal deck with composite steel framing over the partial basement.

C. Typical Floor Construction

Floor construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The floor slab will be reinforced with WWF 6x6-W4.0xW4.0 throughout. Beams and girders will be structural steel rolled shapes (typically W14, W16, & W18) made composite with the floor slabs via ¾-inch diameter, 5½-inch long welded steel shear studs. Gravity columns will typically be structural steel HSS shapes (typically 6-inch and 8-inch square).

D. Typical Roof Construction

Typical construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The roof above the Media, Cafeteria and Gymnasium that do not require a fir rating will be 3-inch deep, 18 gage, galvanized steel roof deck. Roof beams and girders will be structural steel rolled shapes. Hot-dipped galvanized steel dunnage will be provided on top of the roof if necessary to support mechanical equipment and for mechanical equipment screening.

D. Cafeteria

The cafeteria structure will be constructed from mass-timber framing consisting of glue-laminated members. The leaf-like structure will consist of a central 23 ¾" wide by 75 ¾" deep slopped glue-lam spine girder running the length of the cafeteria with 13-5/8" x 27 ½" roof purlins at 11-feet on center spanning between the girder and perimeter framing. The roof deck will consist of galvanized steel roof decking. Glue-laminated columns will be located at the perimeter. Refer to Figure 1 below for an isometric of the timber framing. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.

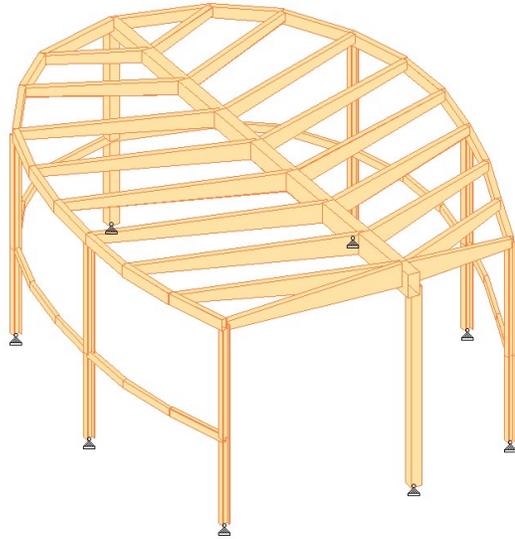


Figure 1 – Media Room Timber Framing Isometric

E. Media Room

The media room will be constructed from mass-timber framing consisting of glue-laminated members. The tree-like structure will consist of a central built-up glue-laminated columns with diagonal struts extending to the roof purlins. Roof purlins vary from 17-5/8" wide, 25-1/2" to 41-5/8" deep are supported by the central column, diagonal struts and glue-laminated columns at the perimeter. The roof deck will consist of galvanized steel roof decking. Refer to Figure 2 for an isometric of the timber framing and Figure 3 for a plan. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.

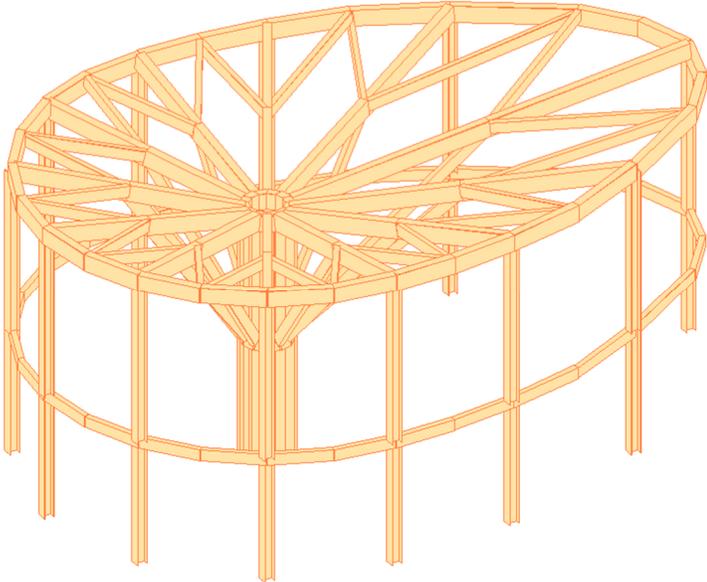


Figure 2 – Media Room Timber Framing Isometric

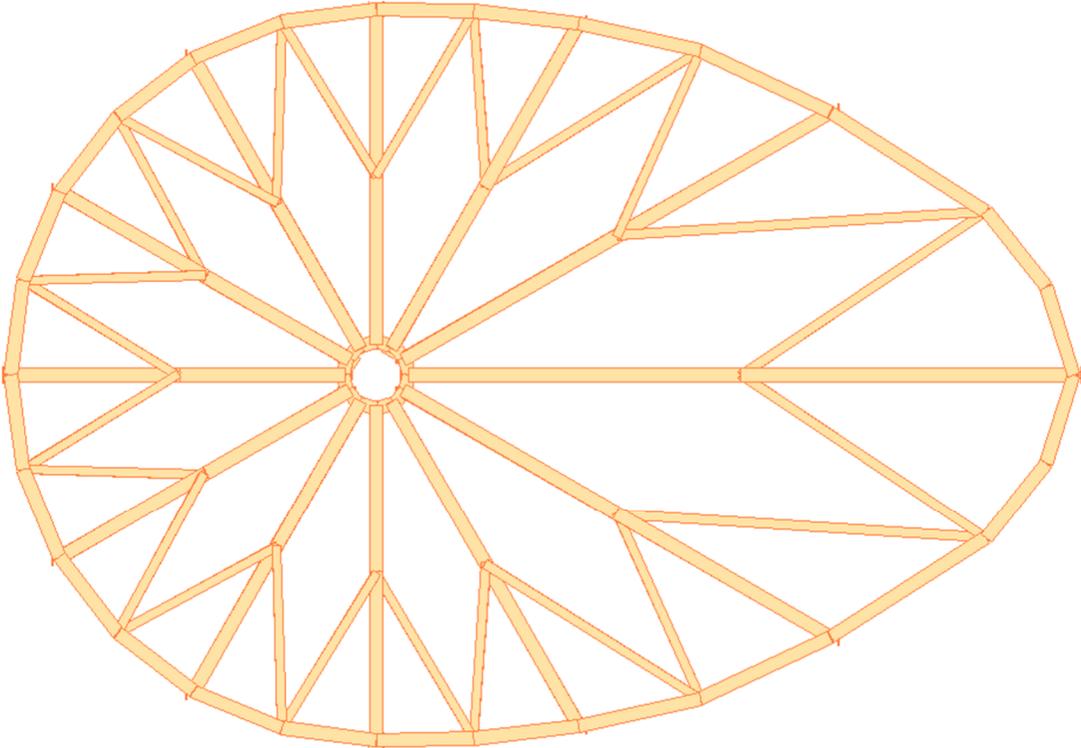


Figure 3 – Media Room Timber Framing Plan View

F. Gymnasium

The gymnasium roof structure will consist of open web steel joists with maximum spacing of approximately 7-feet on center. Depth of joist will be approximately 68-inches. Roof deck to consist of 1 ½-inch, 18-gage cellular galvanized acoustic roof deck. Joists will be supported by W30 girders at the perimeter with W12 columns. The perimeter walls will consist of 8-inch reinforced CMU walls which will act as the lateral load resisting system for the gymnasium.

G. Typical Façade Support

Continuous support of the building façade is expected to occur from each framed level above grade. This may likely consist of hung steel angle frames with all material outside the air and vapor barrier system to be hot-dipped galvanized.

Superstructure – Lateral Load System

The lateral force resisting system will consist of concentrically braced steel frames in the transverse direction. Structural steel tubes, 6-inch and 8-inch square, will be oriented diagonally in vertical planes between columns to provide resistance to wind and seismic forces. Initial considerations will be to concentrate the majority of the braced frames within stacked walls along the three floors and located in the common classroom walls. The lateral force resisting system in the longitudinal direction will consist of moment frames along the corridors. The stability of the gymnasium, media room and cafeteria will be satisfied with braced frames located at the perimeter walls. Final locations of the frames will be coordinated with the architectural layout as design progresses.

SCHEMATIC DESIGN ESTIMATED QUANTITIES

Footings	Typical Interior – 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Perimeter - 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Braced Frame - 10'-0"x10'-0"x2'-6" w/ 11-#7 T&B EW
Perimeter Frost Walls	1'-6" thick x 3'-6" deep, reinforced at a rate of 100 lbs/cu yd.
Frost Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Foundation Walls	18" foundation wall, reinforced at rate of 300 lbs/cu yd.
Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Grade Beams	24"x24" typical, reinforced at rate of 300 lbs/cu yd. Locate at braced frames.
Piers at Columns	2'-0"x2'-0", reinforced at rate of 300 lbs/cu yd.
Piers at BF Columns	2'-6"x2'-6", reinforced at rate of 300 lbs/cu yd.
Elevator Pit Walls	12" thick concrete, reinforced at rate of 180 lbs/cu yd. (Assume 5-ft pit)
Elevator Pit Slab	18" thick concrete, reinforced at rate of 200 lbs/cu yd
Slab-On-Grade	5" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
MEP Equipment Pads	6" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
Slab on Deck (Typ. Floor)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Slab on Deck (Typ. Roof)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Exterior Slab Edge	All exterior slab edges to have 3/8" perimeter bent plate with ¾" diameter x 8" long headed studs and hooked rebar (#5@12" on center x 5'-0" long). Curtain wall attachment to be coordinated.
Roof Deck (Typical)	3" deep, 18-gage galvanized Type N steel roof deck
Roof Deck (Acoustic)	3" deep, 18-gage galvanized cellular roof deck at Media Room, Cafeteria and Gymnasium.

Exterior Roof Edge	All exterior roof edges to have 3/8" perimeter plate cantilevered from spandrel beam.
Steel Floor Framing	Composite wide flange framing. See below for estimated quantities.
Steel Roof Framing	Typical wide flange framing. See below for estimated quantities.
Columns	W10 and HSS columns. Included in steel framing allowances.

STEEL FLOOR AND ROOF FRAMING ALLOWANCES

Level	Steel Allowance
Pop-Up/ Misc	12 psf
Roof	13 psf
Level 03	15 psf
Level 02	15 psf
Level 01 (over basement)	12 psf

Notes:

1. Steel allowances include steel floor framing, columns and bracing. A 10% allowance for connections has been included in the listed values.
2. Steel allowances do not include perimeter bent plate, parapets, screen wall, miscellaneous façade support framing, shear studs, etc... See below for additional items.

Shear Studs	¾" Diameter x 5 ½" long at a rate of 1/2 per square foot of floor and roof areas with slab.
Canopies	20 psf steel allowance
Parapets	Provide 60 lb/ft galvanized steel allowance at parapets at flat roofs.
Screen Walls	12 psf galvanized steel allowance over screen wall elevations.
Dunnage	15 psf galvanized steel allowance over equipment area.
Brick Relief	Continuous galvanized shelf angle at Levels 2 and 3. Hangers and kickers at hung relief (40 lb/ft allowance) Loose lintels above openings.

Lateral System	Typical HSS6x6 and HSS8x8 braced frames in transverse direction. Moment frames in longitudinal direction along the corridor consisting of W14 columns and W24 beams. Tonnage allowance included in steel framing allowance.
Elevator Backup Rails	Assume HSS6x6x3/8 behind each elevator guide. Assume three per elevator. HSS6x6x3/8 to span between floors.
Elevator Hoist Beam	W10x30 centered over the shaft.
Cafeteria	See description.
Media Room	See description.
Gymnasium	68DLH Open Web Joists at 7-ft on center. Double up at ends Joist Bridging at 1/5th points of joist span W30 girders at joist support (170 lbs/ft) W18 beams at perimeter (52 lbs/ft) W12 columns at 30-ft max on center (90lb/ft) SSPC 3 surface prep. Zinc-rich primer on all steel. 1-1/2" – 18 gage cellular acoustic roof deck 8" CMU walls at perimeter. Reinforce with #5 @ 24" vertical, #5 @ 32" horizontal and 9GA ladder reinforcement at 16".

Design contingency shall be as appropriate for stage of development.

DESIGN LOADS

Risk Category III (to be confirmed by Code Consultant)

Dead Loads:

Weight of Building Components	As Required
Roofing Allowance	15 psf
Hung Ceiling, Lights, HVAC	10 psf uniform
Hung Ceiling, Lights, HVAC	20 psf uniform (above MEP)

Live Loads:

Lobbies and Assembly Areas	100 psf uniform, 2,000 lbs conc
Gymnasium	100 psf uniform, 2,000 lbs conc
Cafeteria	100 psf uniform, 2,000 lbs conc
Classrooms	40 psf
Offices	50 psf uniform, 2,000 lbs conc
Corridors – First Floor	100 psf uniform, 2000 lbs conc
Corridors Above First Floor	80 psf uniform, 2000 lbs conc
Stairways	100 psf
Mechanical Rooms	150 psf or weight of mech equip.
Storage (light)	125 psf
Roof (Assembly Area)	100 psf
Roof	20 psf
Partition Allowance	20 psf (Included in live load \geq 100psf)

Live loads will be reduced as permitted by ASCE 7-16

Ground Snow Load:	40 psf
Importance Factor, Is	1.00
Flat Roof Snow Load	35 psf plus drift

Wind Loads: Basic wind speed	129 mph
Exposure	B
Importance Factor, I_w	1.00
Wind Pressure (ASCE 7-16)	$P = q G C_p - q_i (G C_{pi})$
Maximum Overall Drift	0.0020H

Earthquake Loads:

Soil Site Class	C
Importance Factor, I_e	1.25
Spectral Acceleration, S_s	0.244
Spectral Acceleration, S_1	0.062
Design Spectral Acceleration, S_{DS}	XX
Design Spectral Acceleration, S_{D1}	XX
Seismic Design Category	B
Seismic Resisting System	R = 3 Steel System
Response Modification Factor, R	3
Overstrength Factor	3
Deflection Amplification Factor, C_d	3
Seismic Base Shear, V	$C_s W$
Maximum Story Drift	0.015h

DESIGN CODES AND STANDARDS

- “International Building Code” (IBC 2021) with Massachusetts Amendments
- “Massachusetts State Building Code” (780 CMR, 10th Edition)
- “Minimum Design Loads for Buildings and Other Structures” (ASCE 7-16)
- “Specification for Structural Steel Buildings” (AISC 360-16)
- “Code of Standard Practice for Steel Buildings and Bridges” (AISC 303-16)
- “Seismic Provisions for Structural Steel Buildings” (AISC 341-16)
- “Specifications for Structural Joints Using ASTM A325 or A490 Bolts” (RCSC 2004)
- “Building Code Requirements for Reinforced Concrete” (ACI 318-19)
- “Specifications for Structural Concrete for Buildings” (ACI 301-16)
- “Manual of Concrete Practice 2014” (ACI, Volumes 1 through 6)
- “ACI Detailing Manual - 2004” (SP-66)
- “Manual of Standard Practice 2009” (CRSI)
- “Structural Welding Code – Steel Reinforcing Bars” (AWS D1.4/D1.4M-2018)
- “North American Specification for the Design of Cold-Formed Steel Structural Members” (AISI S100-16), including 2020 Supplement
- “Code of Recommended Standard Practice for Composite Deck, Form Deck, and Roof Deck Construction” (SDI 31)
- “National Design Specification 2018 for Wood Construction” (NDS 18 with Supplement)

CONSTRUCTION MATERIALS

Cast-in-Place Concrete (General):	$f_c = 4,000$ psi, unless noted otherwise
Cast-in-Place Concrete at Foundation Walls:	$f_c = 4,500$ psi
Concrete Slabs on Steel Deck:	$f_c = 4,000$ psi
Concrete Equipment Pads(lightweight):	$f_c = 3,000$ psi
Reinforcing Steel:	ASTM A615, Grade 60
Structural Steel:	ASTM A992, Grade 50
Rectangular or Square HSS (Tubes):	ASTM A500, Grade C ($F_y = 50$ ksi)
Round HSS (Pipes):	ASTM A500, Grade C ($F_y = 50$ ksi)
Anchor Bolts:	ASTM A307, ASTM A449 UNO
High Strength Bolts:	ASTM A325, ASTM A490

END OF STRUCTURAL NARRATIVE

DEDHAM LETTERHEAD

Module 3 Grade Reconfiguration and Districting Approval Certification Template

Instructions: Complete the letter and certification set forth below and print on **(Town of Dedham)** letterhead. Please submit one original, signed version of the letter and certification and one electronic version to the MSBA.

[Letterhead of Dedham, MA]

June 27, 2024

Mr. Michael McGurl
Director of Capital Planning
40 Broad Street
Boston, Massachusetts 02109

Dear Mr. McGurl,

The Town of Dedham School Committee (the "SC") understands the proposed change to existing Oakdale and Greenlodge Schools that is being proposed in the Preferred Schematic Report for the Oakdale School project (the "Project"), and on March 20, 2024 the School Committee voted to approve the revised single enrollment for the Oakdale School only for the following reason: they decided a combined school at the revised 560 student enrollment would be too large for the site and a stand alone 360 student enrollment for a standalone Oakdale school works better for the community as described in the Feasibility Study related materials. A certified copy of the SC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, are attached.

The SC has held eighteen (31) meetings regarding the proposed change to existing Oakdale and Greenlodge Schools as related to the proposed Project, in compliance with the state Open Meeting Law. These meetings include:

Please Note: Below is a list of School Committee meetings where the Oakdale School project was discussed. All meetings were posted to the Town Website in accordance with Open Meeting Laws

Dedham Oakdale School Committee Meetings				
<u>Mtg. Date</u>	<u>Topics</u>	<u>Present</u>	<u>Votes</u>	<u>Materials</u>
September 28, 2022	COMMUNITY MEETING - project overview	SBRC, School Committee, Vertex, Public	n/a	Project Timeline, Website/Contact Information
October 5, 2022	Community Meeting update, Dedham Day flyers and attendance update	School Committee	n/a	n/a
October 19, 2022	Designer Selection update, Harvard, MA School Visti	School Committee	n/a	n/a
November 2, 2022	Design Selection Pane update, Avery School PTO Meeting update	SC, Vertex, SBRC Chair	n/a	n/a

November 16, 2022	Designer Selection Panel, Greenlodge PTO Meeting update	School Committee	n/a	n/a
December 7, 2022	MSBA Program, ECEC PTO Meeting update, Introduction of JLA	School Committee, Vertex, SBRC Chair	n/a	n/a
January 4, 2023	Update on potential sites, Education Model for PDP	School Committee	n/a	n/a
January 18, 2023	Upcoming community meeting, site evaluation update	School Committee	n/a	n/a
February 1, 2023	Timeline & Process update, Educational Plan requirements for PDP,	School Committee, Vertex, JLA	Vertex Slides	n/a
February 15, 2023	Update on previous meetings, Timeline review, Cropper Redistricting Proposal Review, Visioning update	School Committee, Vertex, JLA	VOTE: to approve the Cropper GIS redistricting consultant proposal	Vertex Slides, JLA Slides
March 1, 2023	Educational Plan update, Visioning update	School Committee, Vertex, JLA	n/a	n/a
March 15, 2023 School Committee Mtg.	School Committee Meeting: PDP Submission, Educational Plan	John Tocci, Vertex, JLA, School Committee	VOTE: To approve Educational Plan for PDP submission	Vertex Slides, JLA Slides
April 1, 2023	Community Meeting update, Discussion of joint meeting with SBRC	School Committee	n/a	n/a
April 26, 2023 Joint Meeting with SBRC	Project overview, timeline update, site evaluation update	School Committee, Vertex, JLA	SBRC VOTE: to eliminate Striar property from consideration	Vertex Slides, JLA Slides
May 3, 2023	Review of site options as they relate to the enrollment options	School Committee, SBRC Chair, Vertex	n/a	n/a
May 17, 2023	School tours update, upcoming meetings regarding project financing	School Committee, SBRC Chair, Vertex	Vertex Slides	n/a
March 25, 2023, Community Meeting	Community Meeting to discuss potential project sites - held as an open discussion with stations for each site	School Committee, SBRC, Vertex, JLA, community members	n/a	Large poster boards of each site; large white boards to record public comments
June 7, 2023	Discussion on enrollment options	School Committee, SBRC Chair, Vertex	VOTE: to approve the 550 student enrollment option	n/a
August 22, 2023	PSR Submission Discussion	School Committee, SBRC Chair, Vertex	VOTE: to approve submission of the PSR to the MSBA	n/a
December 6, 2023	Discussion on NESDEC Enrollment Projections	School Committee	n/a	n/a

December 12, 2023, Joint Meeting with Select Board & SBRC	General project discussion, enrollment projections, potential vote sequencing	School Committee, Select Board, SBRC, Vertex, JLA	n/a	JLA Presentation, School Dept. Presentation, Town Clerk vote presentation
December 20, 2023	Discussion on SBRC Recommendation	School Committee	VOTE: to request a formal enrollment re-evaluation by the MSBA	n/a
January 31, 2024	Review MSBA Revised Enrollment options	School Committee	VOTE: to execute the enrollment certification from the MSBA for the Oakdale School Project	n/a
February 12, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
February 28, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 4, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 7, 2025	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 11, 2026	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 20, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve 360 stand alone Oakdale enrollment	n/a
April 3, 2024	Warrant Article recommendation for added funds for feasibility	School Committee	VOTE: To approve the updated Educational Program for the PSR VOTE: To approve warrant article for added feasibility funding	
May 1, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve submission of the PSR Report to the MSBA	n/a

References (in alphabetical order):

- ECEC: Early Childhood Education Center
- JLA: Jonathan Levi Architects (Project Designer)
- PTO: Parent Teacher Organization
- SBRC: School Building Rehabilitation Committee
- SBRC Chair: Refers to John Tocci
- SC: School Committee
- Vertex: The Vertex Companies (Owner's Project Manager)

In addition to the SC meetings listed above, the District held fourteen (30) public meetings, which were posted in compliance with the state Open Meeting Laws, at which the Project was discussed. These meetings include:

Dedham Oakdale Community Meetings				
Mtg. Date	Topics	Present	Votes	Materials
September 28, 2022 Community Mtg	Overall project timeline update	SBRC, School Committee, Vertex, Public	n/a	Project Timeline, Website/Contact Information
October 18, 2022 Riverdale Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Riverdale School PTO	n/a	Project Timeline, Website/Contact Information
November 1, 2022 Avery Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Avery School PTO	n/a	Project Timeline, Website/Contact Information
November 9, 2022 Oakdale Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Oakdale School PTO	n/a	Project Timeline, Website/Contact Information
November 22, 2022 Greenlodge Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Greenlodge School PTO	n/a	Project Timeline, Website/Contact Information
December 6, 2022 ECEC Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, ECEC PTO	n/a	Project Timeline, Website/Contact Information
December 7, 2022 School Committee Designer Intro Mtg	Introduction of JLA to School Committee	SBRC, Vertex, JLA	n/a	Project Timeline, Website/Contact Information
January 26, 2023 Community Mtg	Project Schedule, Site Matrix Review, Intro. JLA	SBRC, Vertex, JLA	n/a	Site Evaluation Matrix
February 2, 2023 Dedham MS Informational Mtg	Project Update at School PTO Meeting	SBRC, Vertex, Middle School PTO	n/a	Project Timeline, Website/Contact Information
March 25, 2023, Community Meeting	Community Meeting to discuss potential project sites - held as an open discussion with stations for each site	SBRC, Vertex, JLA, community members	n/a	Large poster boards of each site; large white boards to record public comments
June 17, 2023 Community Meeting	Community Meeting to review sites, project costs, schedule, and next steps	SBRC, Vertex, JLA, community members	n/a	Vertex Schedule & Costs slides; JLA site layout slides
July 13, 2023 Abutters Meeting	Meet with direct abutters to discuss the project. Walk the site to review actual conditions and answer questions.	SBRC, Vertex, JLA, Abutters	n/a	JLA Site layout slides
February 12, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
February 28, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a

March 4, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 7, 2025	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 11, 2026	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 20, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve 360 stand alone Oakdale enrollment	n/a
April 3, 2024	Warrant Article recommendation for added funds for feasibility	School Committee	VOTE: To approve the updated Educational Program for the PSR VOTE: To approve warrant article for added feasibility funding	
May 1, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve PSR Submission.	n/a

The presentation materials for each meeting, meeting minutes, and summary materials related to the Project are available locally for public review on the School Committee Website:

<https://www.dedham.k12.ma.us/schoolcommittee> and also on the project website:
<https://www.dedham.k12.ma.us/domain/686>

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§ 18-25 and 940 CMR 29 *et seq.*

If you have any questions or require any additional information, please contact Steve Theran, Senior Project Manager from Vertex stheran@vertexeng.com.

By signing this Grade Reconfiguration and Districting Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

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By: Leon I. Goodwin, III

Title: Town Manager (Chief Administrative Officer)

Date:

By:

Title: Superintendent of Schools

Date:

By:

Title: Chair of the School Committee

Date:

Dedham Public Schools
School Committee Meeting
Avery School
March 20, 2024

MEMBERS OF THE SCHOOL COMMITTEE:

Victor Hebert
Stephen Acosta
Mayanne Briggs
Dr. Leah Flynn Gallant
Cailen McCormick
Christopher Polito
Laurie Twomey

Naila Hernandez, student representative.

MEMBERS OF THE ADMINISTRATION:

Nan Murphy, Superintendent
Dr. Ian Kelly, Assistant Superintendent for Finance and Operations and Deputy Superintendent
Dr. Sara Stetson, Assistant Superintendent for Student Services

Meeting held at the Town Hall at 7 pm.

Open Meeting (Public Meeting is recorded and can be accessed via Dedham Television)

Pledge of Allegiance

Open Meeting (Public Meeting is recorded and can be accessed via Dedham Television)

Performance from the cast of Mean Girls from the Dedham High School musical.

- Discussion, Recommendation and Vote on the Enrollment Option for the Elementary Building Project

Motion was made to take the agenda out of order. Motion was approved by a vote of 7-0.

[Chris Polito recused himself due to personal conflict of interest.]

Supt. Murphy showed slides with the school building project survey feedback. Survey was emailed to all DPS families, posted on social pages and in newspapers and flyers, and shared at all public forums held through in-person and Zoom. There were a total of 647 respondents who participated in the survey. Out of the 647 replies, 525 responded in favor of the stand alone Oakdale.

Supt. Murphy said that she and the leadership team are recommending the stand-alone Oakdale with 360 student enrollment and would provide 110 more students than the current enrollment at Oakdale, that would allow expansion.

Mr. Acosta said that this decision makes sense with the new enrollment numbers and he would hope we can all move forward and address the capital improvements to the remaining buildings that need updates.

Ms. Flynn-Gallant said that we need a clear plan to address issues with the remaining facilities as soon as possible.

Ms. Twomey thanked the survey respondents. She applauded the leadership team for supplying so many outlets for feedback. It was important to hear the community voices.

Ms. Briggs said the 360 enrollment option gives us a new opportunity to alleviate overcrowding in the new facility.

Motion was made by Ms. Briggs to accept the 360-student stand alone school for the new Oakdale Building project. Motion was approved by a vote of Vote 6-0. (Mr. Polito recused himself from the discussion and vote).

[Chris Polito rejoined the committee.]

PUBLIC COMMENT

Carlene Campbell-Hegarty, 57 Holmes Rd., feels that the Town made the best choice possible for the Oakdale Project. Mr. Hebert replied that SBRC will look at the site again and then there will be meetings with the MSBA. He said if we move forward smoothly with the process we should only be six months behind the original schedule.

Jim Maher, 22 Sherman Rd. thanked the group for making the right decision.

Andrew Czazasty, 118 Sprague St. thanked the School Committee and hopes the decision will reflect well on the committee.

Matt Brophy, Pleasant St. said this was a lesson learned to apply to the other schools going forward.

John Tocci, 78 Adams St., Chair of the SBRC, thanked the School Committee members for being a great partner. He also thanked the School Committee for listening to the community. He feels that every decision made was for the best interest of the educators and students.

Student Representative Update

Naila Hernandez provided the bi-weekly update at DPS.

High School events:

- The English for EL classes got a special visit last month! They explored the award-winning book *The Only Road*, which is about a young Guatemalan boy's journey to the US. Students participated in a virtual visit with the author, Alexandra Diaz. Students took the lead in a thoughtful discussion about the book. Many thanks to the Dedham Education Foundation for making this event possible!
- The performance of *Mean Girls* was a huge success! After two months of rehearsal, the cast and crew outdid themselves. The audience was blown away and couldn't stop talking about how amazing and fantastic the show was. Much gratitude to Ms. Soson, Ms. Kirby, and everyone involved in the production for the amazing performances.

- On Thursday, March 7, the junior class participated in an important training, sponsored by the Norfolk County District Attorney's Office. This one-hour session, led by local first responders and public health partners, taught students what to do during an emergency. This training was one of the various challenges of Team Rival, a community service and peer leadership-based project that the Student Council participated in.

District Summary:

- At Oakdale, last Wednesday, the third graders attended a field trip to The Commonwealth Museum. They reviewed state history beginning in the 1600's and learned about the Native Americans, the Pilgrims, and Puritans. They explored the American Revolution and continued traveling through time where they ended up learning about the Lowell Mills. They also learned about child labor, the history of children working in the mills, and the right to an education.
- Congratulations to the middle school's 7th and 8th grade students, Celia , Izzy, Sasha, Adlai, Dershana, and Jorge. These students participated in the MMEA Eastern Junior Districts Festival this past weekend. After securing their spots in January, over a day and a half they rehearsed with their respective ensembles which culminated in a performance Saturday afternoon. During rehearsals, students worked with respected conductors based in New England.

UPCOMING NEWS & EVENTS

- Schools across the town are excited to announce that the award-winning author Rajani LaRocca will be visiting the Dedham students on April 12, 29, and 30th. Rajani will be offering presentations to students focused on her author journey and published books.
- Oakdale will be hosting a cultural night on Thursday, April 11 from 6-7:30 pm. It is one of their favorite family events of the year and a great opportunity to showcase family traditions, share favorite recipes, demonstrate a traditional performance or activity, or learn about a place or culture .
- The Smart Smiles Program through Dental Associates of Walpole will be at the ECEC this week teaching all students in PK and Kindergarten about the importance of good oral hygiene.
- ECEC is once again partnering with the Special Olympics to be a Unified Champion School. Since March not only includes Spread the Word Inclusion Day but also is National Disabilities Awareness month, Cerebral Palsy Awareness month, the start of World Autism week and World Down Syndrome Day, the ECEC will host its second Spread the Word Inclusion Week which will take place March 18-22th.
- For seniors not enrolled in a Wellness elective this year, the DHS grade 12 physical education requirement will take place during the underclass MCAS exam on Tuesday, March 26 or Wednesday, March 27. They are required to attend the date which they have been assigned to receive credit for their Grade 12 Physical Education Graduation Requirement.
- DHS will be hosting an On the Spot Admissions Day for seniors tomorrow, Thursday, March 21. During this event, seniors will have the opportunity to meet with admissions counselors to review their applications and receive an admissions decision while in the meeting.

Superintendent Update

- Supt. Murphy gave heartfelt thanks to Principals Hermesch and McGowan for their involvement in the building project. She confirmed that school leadership have intentions to continue to improve the Greenlodge School facility. She also thanked Drs. Kelly, Stetson and Smith for their roles in the building project process by providing information to the MSBA in a timely manner.

- March is Women’s History Month and the Supt. showed the events honoring women. STEMinist Conference at Roxbury Community was attended by some of our Middle and High School students. She recognized the female leaders at the district who attended the Women’s Leadership Conference in Framingham.
- DEF Spelling Bee – Riverdale took home the Spelling Bee trophy. She said she was amazed at the spelling skills exhibited by the teams.
- Inspection and monitoring of School Facilities are being undertaken by Dr. Kelly and Mat Haffner. Tours are scheduled to look for safety and capital improvements. The goal is to focus on issues that are under our control.
- Sixteen Middle School Art students have been selected to present their art at the K-12 virtual state Art Exhibit.
- Sample pages were shown from the DPS social media site that is open for families to follow.
- School Transition Plans. Opportunities will be available for students and families to tour and meet teachers in their new schools.

Ms. Twomey thanked the school for linking the High School course enrollment catalog so parents can see what is available.

Ms. McCormick said its important to objectify what students are exposed to every day in our school facilities.

Education Report

- Oakdale School Spirit Color – Principal Kimberly Hermesch

Principal Hermesch talked about the loss of Christine Stec and what she meant to the Town of Dedham. The Oakdale School often honors her with the color purple. She would like to ask that Oakdale school colors be changed to purple and white in Christine’s honor.

The Supt. said they are happy to see the colors transition to purple and white.

Mr. Hebert said even though the School Committee does not have purview over this decision, they would be pleased to vote in favor of the request.

Motion was made to make purple and white the official colors for Oakdale School. Motion was approved by a vote of 7-0.

- Winter Sports Update – Athletic Director Stephen Traister

Mr. Traister reported that 220 student athletes participated in sports at DHS this past winter. He provided an update and highlights of the Middle and High School teams.

He said that the new DHS field has made sports so much more enjoyable for the students. He made a comment that there is a need for more tennis courts in Dedham.

Mr. Traister talked about the plans for introducing the 8th graders to High School sports. He said that scores and game outcomes are posted on X (formerly Twitter) every day.

- Superintendent’s Evaluation

Ms. Twomey requested the superintendent add a little more evidence about her vision for aligning academic achievement activities.

Mr. Hebert announced that Dr. Flynn Gallant has volunteered to organize the evaluation feedback. Forms should be returned by March 26th.

Supt. Murphy and Mr. Hebert will meet to discuss the evaluation before the April 3rd School Committee meeting.

Business Report

- FY25 Budget Planning Update

Dr. Kelly said he is putting together the 3rd qtr. budget for April. He said it has come to his attention that the kilowatt hour projection is higher than budgeted by a substantial amount. He will be confirming the differential and reporting back to the group about that.

Dr. Kelly reported that Supt. Murphy and he met with the Finance and Warrant Committee about the budget on March 12th. They have also met about the budget with the leadership of six out of the seven schools.

A Community Forum about the budget will be held on April 4th and Supt. Murphy and Dr. Kelly will meet with Town leaders this week. If the budget needs to be capped at 8% increase, then we need to get a firm idea of the budget so that we are able to notify employees of layoffs before June 15th.

Dr. Kelly also reported that eight facility visits have been completed. Short and long-term concerns are being identified.

Mr. Polito thanked Dr. Kelly and the superintendent for taking such a vested interest in school facilities.

- Discussion & Vote to Accept and Authorize the School Committee Chair and Superintendent to sign the Town of Dedham Combined Financial Policies document

Mr. Polito said after much dialogue and interface with Town leadership, the financial policies document is ready for review. He clarified that the updated policy does not require changes to any of the existing School Committee policy.

Dr. Flynn Gallant reported the team involved in the financial policies process focused on ensuring that the policy is written in layman terms.

Motion was made to accept and authorize the School Committee Chair and the Superintendent to sign the Town of Dedham combined financial policies document. Motion was approved by a vote of 7-0.

Subcommittees Updates

- Budget

No further info.

- Curriculum Advisory

No updates.

- Facilities

Mr. Acosta reported that a tour of the high school will be held this Saturday at 11 am. Other Town committees and the public are welcome to join the tour.

- Negotiations

No updates.

- Policy

Mr. Acosta asked for members to submit any comments about policy description changes as soon as possible. He is planning to reach out to MASC about best practices in policy implementation.

- SBRC

Next meeting will be held on Monday night at 6:30 at Town Hall.

Donations

Dedham Educational Partnership has donated \$1200 to support the purchase of an exercise bike for the high school athletic program.

Motion was made to accept the donation of \$1200 from the Dedham Educational Partnership and approved by a 7-0 vote.

Review and Approval Vote of Previous Meeting Minutes

Motion was made to approve the February 28, 2024 meeting minutes and approved by a 7-0 vote.

Motion was made to approve the March 6, 2024 meeting minutes and approved by a 6-0 vote. (Ms. McCormick was absent for that meeting).

Old/New Business

Mr. Polito reminded the group that the Executive Session minutes review needs to be finalized.

Acknowledgements and Announcements

Ms. Briggs reached out to the community to partner with the School Committee to ensure that small neighborhood schools continue to be a focus. Three more school buildings are needed and we need the Town to support our endeavors in this regard. A solid financial building plan needs to be developed.

Dr. Flynn Gallant announced that tomorrow is World Down's Syndrome Day. This is about how everyone is more alike than different and how different modes of learning are necessary.

Motion was made to adjourn the meeting. Motion was approved with a roll call vote of 7-0.

Submitted by

Virginia Quinn

Recording Secretary

A True Copy Attest

Paul M Munchbach
Town Clerk

Dedham School Building Rehabilitation Committee

Hosted at the Dedham Town Hall and via Zoom

SBRC Meeting Minutes – **APPROVED**

Monday April 29, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

Voting Members:		Jonathan Levi Associates (Designer):		
A	John Tocci, Chair (JT)	A	Jonathan Levi (JL)	Anthony Rodriguez, Ex Officio (AR)
A	Steve Bilafer, Vice Chair (SB)		Philip Gray (PG)	Kaitlyn DeStefano, Ex Officio (KD)
A	Josh Donati, SelectBoard (JD)	A	Carol Harris (CH)	Shannan Kavanagh, Ex Officio (SK)
	John Heffernan, Finance Committee (JH)		Other:	A Dr. Ian Kelley, Deputy Superintendent (IK)
A	Mayanne MacDonald Briggs, School Committee (MMB)		Matt Haffner, Director of Facilities (MH)	
P	Stephen Acosta, School Committee (SA)	P	Kimberly Hermes, Oakdale School Principal (KH)	
A	Phillip Gonzalez (PG)	P	Ms. Nan Murphy, Superintendent of Schools (non-voting) (NM)	
	VERTEX: Owners Project Manager (OPM)		Jennifer McGowan, Greenlodge School Principal (JM)	
	Jon Lemieux, Project Director (JL)		Katherine Duceman, Ex Officio (KD)	
A	Stephen Theran, Sr. Project Manager (ST)	A	Steven Popper, Ex Officio (SP)	
	Anissa Ellis, Project Manager (AE)		Sara Rosenthal, Ex Officio (SR)	

Distribution: SBRC Members and other attendees

1. Old Business/Approval of Minutes:

No minutes were presented for approval.

2. Presentations by Vertex and JLA: discussion and consideration of Preferred Schematic Report and vote on same.

Vertex (ST) reviewed the schedule slide from Powerpoint presentation (attached). The Schematic Design submission is due to MSBA on August 29, 2024.

JLA (JL) reviewed the PSR submission including the Space Summaries and Test fits for the enrollment options of 360, 560 & 665. (Chart attached). Options for Oakdale, Greenlodge (combined Greenlodge and Oakdale) and Riverdale (combined Riverdale and Oakdale) were presented. (slides attached).

As requested by SBRC, JLA reviewed the 360 student Oakdale add/reno project further. (Slides shown) 360 student new build Oakdale site plan is presented further. Grades 3, 4 & 5 are on right (gym side). Grade 3 is on the first floor. 1902 building shown as being removed.

ST presents cost slide. Option D is shown with Total Project Cost (\$M) at \$113.2 with Construction Total (\$M) of \$87.1.

Note #2 on the slide is pointed out, providing the Schematic Design costs from December 2023 (not submitted to MSBA) for a 550 student Oakdale Greenlodge combined facility of \$120.9M and a Construction Cost per SF of \$862.98.

ST noted two primary reasons the cost for the current 360 student school compared to the 550 student Greenlodge/Oakdale combined school (\$113.2M vs. \$120.9M) as the added year of cost escalation for starting

one year later and that the space that was removed from the Greenlodge/Oakdale design was classroom space – the least costly space to build. All core spaces remain to serve the lower student enrollment.

JT: Was swing space included for the Partial Renovation option? \$112.6M compared to \$113.2.

JLA clarified that the Partial Renovation/Addition option cost show be shown as \$91.185M and a \$118.54M Total Project Cost.

JD: asks about logistical challenges of Partial Renovation/Addition approach. JL describes approach: first right wing is built. The school population then is moved to right wing. The left wing is then built and occupied. The center portion is then renovated and occupied. The schedule for this approach will require an additional year for the project.

SB: the \$5M higher cost is not as much of a difference as he recalled from the previous studies.

JD: have we reviewed the option to build the right wing and demo the 1902 building, instead of renovation the 1902 building, and build the left and center sections new?

MMB: the concerns from the traffic study provided a need to get traffic off of Cedar Street and Madison Street and to create queuing on site. Keeping the school close to Cedar Street significantly impacts the opportunity to create queuing on site.

PG: states his concern that the difference between a Build New approach compared to the Renovation/Addition approach would be significantly more than the estimated \$5M due to logistical complexities and the renovation component. SP expressed concurrence.

PG: appreciates that the current plans are conceptual, but is concerned that the building is very close or over the 25' setback lines on the plan.

JD: states that the expectation with the change of the building from 550 enrollment to 360 was not to achieve significant relief from the 25' perimeter setback .

JT: requests to see slides further in advance of SBRC meeting.

Comments/Questions:

No questions or comments from the audience present or online.

Motion: MMB: I make a motion for the Owner's Project Manager to submit the Preferred schematic Report to the MSBA, subject to any minor modifications through the SBRC Chair, reflecting the District's decision of a 360-student standalone school on the Oakdale site as its Preferred Option.

2nd: PG

Unanimous vote. Submission of PSR approved.

3. Discussion regarding Finance and Warrant Committee deliberations on warrant article and presentation to Town Meeting:

JT: Informs SBRC that FinCom voted to support unanimously the article presented to provide Design and OPM services through the Schematic Design vote.

Concerns expressed by FinCom included the projected long-term costs of building three schools over time instead of proceeding with a combined option.

4. New Business & Public comment:

No public comments from the audience present or online.

NM: Reminds SBRC of the previous efforts of the Communications Subcommittee to provide transparent information to the community and the need to remain cognizant of the need to continue with this effort.

Next Meetings: May 14, 2024, June 3, 2024

JT: Recognizes SBRC members John Heffernan, Anthony Rodriguez, Sara Rosenthal and Katherine Duceman as newly elected Town Meeting Members and offers congratulations.

5. Adjournment:

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by PG

SECOND: by JD

Vote to Adjourn - Unanimous

Meeting Adjourned at 7:24 pm.

Attachments:

4 29 24 SBRC Meeting Powerpoint presentation

A True Copy Attest

Paul M Munchbach
Town Clerk

Dedham Public Schools
School Committee Meeting
Dedham Town Hall
May 1, 2024

MEMBERS OF THE SCHOOL COMMITTEE:

Stephen Acosta (Vice-Chair)
Mayanne Briggs (Chair)
Dr. Leah Flynn Gallant
Joshua Langmead
Christopher Polito
Laurie Twomey
William Walsh

Naila Hernandez, student representative

MEMBERS OF THE ADMINISTRATION:

Nan Murphy, Superintendent
Dr. Ian Kelly, Assistant Superintendent for Finance and Operations and Deputy Superintendent
Dr. Sara Stetson, Assistant Superintendent for Student Services

Meeting held at the Dedham Middle School at 7 pm.

Open Meeting (Public Meeting is recorded and can be accessed via Dedham Television)

Pledge of Allegiance.

Recognitions – Grade 7 Students for Exhibit “Showcase of Asian Dynasties”

The 7th grade student exhibitors came to the podium to talk about their individual exhibits on Asian Dynasties. A photo of the students was taken with Superintendent Murphy.

School Choice Public Hearing

- Open Public Hearing

Motion was made to open the public hearing on School Choice and a roll call vote of 7-0 was taken to open the meeting.

- Public Comment on School Choice

No public comments.

Dr. Kelly explained that a hearing has to be held annually on whether to participate in the Mass. School Choice program. School Choice allows students from other communities to enroll in the Dedham Public Schools. He said his recommendation is that Dedham does not participate in School Choice due to increases in enrollment.

Dr. Kelly said that a vote needs to be registered before the June 1st deadline.

School Committee members decided to put this vote on the next agenda at the next School Committee meeting.

- Close Public Hearing

Motion was made to close the public hearing on School Choice and a roll call vote of 7-0 was taken to close the meeting.

PUBLIC COMMENT

Stephanie Ryan, pct. 5 Asked when the vote for design of school will be taken. And she also asked why public comment is at the end of the meeting.

Chair Briggs replied that the reason the public comment period is at the beginning of the meeting is because it is not a question and answer period, but the School Committee could elect to change the timing of this agenda item, if they deemed it necessary.

Ms. Briggs also answered that the final design will be submitted in August. The site plan has not been completed.

Mr. Polito thanked Stephanie Ryan and her family and neighbors for holding a Lemonade Drive during the PTO fundraiser.

Student Representative Update

Naila Hernandez gave the student update.

High School update:

- The prom last Friday was fantastic! The students looked stunning and represented their families and school impeccably. The staff at Avenir gave several unsolicited compliments about the students, praising their behavior and maturity.
- During April break, eight junior students participated in the trip to Madrid, Spain and the student exchange in Alicante. The adventures in the capital city included a flamenco show, the Palacio Real, Plaza Mayor, and Reina Sofia Museum. While on the Mediterranean Coast, students attended the CEU sister school, hiked to the Castillo Santa Barbara, and explored the historic city of Valencia.
- Students interested in the medical field took a trip to Norwood High. They had the opportunity to hear from professionals at South Shore Health about the various paths in the medical field. Some professions included diagnostic imaging, EMS, pharmacy, urgent care, cardiovascular/cath lab, nursing, rehab, and respiratory care. This was a great opportunity for students to further explore their interests in the medical field.
- The DHS Wellness Department will start its Break Free from Depression curriculum with all Wellness 1 classes on Monday, May 6, 2024.
- The local scholarship application deadline is today, at 11:59 p.m. Students can submit their application on PowerSchool and may update their information until the deadline. Individual applications that are part of the local scholarship program have also been shared via email to students.

District summary:

- Oakdale 4th Grade Teacher Nicole Sullivan ran in honor of Mrs. Stec this year at The Boston Marathon. She crushed the run and did a world of good raising funds for Dana Farber and cancer research.
- Schools across the district have also recognized earth day in many different ways. Students worked on various projects, read books and learned about new ways on how to better take care of the earth.
- The Riverdale student council is hosting a "NEIGHBORS HELPING NEIGHBORS" challenge and they are almost up to the 150th day of school. Their goal is to donate 150 nonperishable food items to the Dedham Food Pantry. Items will be collected through Tuesday, May 7th. Collection Boxes will be outside the library.

Superintendent Update

Education Reports

Supt. Murphy talked about the eight Middle School students who participated in the student exchange trip to Madrid, Spain.

Supt. Murphy reported about the new Superintendent Induction Program meetings. She said these meetings are held once a month and in addition she has a coach that spends one on one time with her. She regularly interacts with 40 new superintendents across the Commonwealth and they discuss in-depth, relevant issues.

Spring Happenings

- Oakdale participated in Earth Day and raised \$2K+ for environmental causes.
- 6th graders are studying the solar system.
- Middle School students getting 6th and 7th grade schedules prepared.
- Avery class did a community service project for Earth Day by doing work outside of the school.
- Kristin Cannon was appointed as the principal of the ECEC. The position was advertised in early April. The teachers at ECEC unanimously requested for her to be appointed as the new ECEC Principal.

Josh Langmead asked if Supt. Murphy plans to continue working with other new superintendents after this year. Supt. Murphy said that the New Superintendent Program is a three year program, but communication will continue as the new superintendents get to know each other and form their own communication networks.

• Mental & Behavioral Health Update – Office of Student Services

Dr. Ashley Dubé, Counseling and Services Director, joined Dr. Stetson to talk about student services centered around mental and behavioral health using four important guiding principles. Dr. Stetson talked about the importance of identifying student needs early on. She also stressed the importance of developing more culturally sensitive interventions in mental health. The models currently being used seem to be outdated. There is a need to develop wrap-around programs that meld specialized academic curriculum with behavioral and mental health methodology. She talked about shifting from the previous ALT model to a more inclusive model. She noted that since the District has moved to a more inclusive model, suspensions and attendance rates have improved.

Dr. Dubé talked about a wrap-around pilot study that involved Grades 4, 7, and 9. Each clinician was assigned one student to work with and they are now planning on expanding that program. Dr. Dubé has been working on developing the best universal screening program for district needs. They talked about starting partnerships with Williams James College and Boston College for training and other resources. They are vetting modules from Harvard that look at connectedness through project-based learning. They have secured \$472K in grant money to support specially developed behavioral programs and courses. They also plan on broadening the academic drop-in center to include mental health.

Dr. Flynn Gallant asked how these approaches differ from IEPs and how family is included in the conversation. Dr. Stetson said the programs include parental involvement, but the level of involvement is dictated by the student. Dr. Flynn Gallant asked how families are being involved in the work being done with their child? Dr. Stetson said the new protocol calls for parents meeting a few times per year. Dr. Dubé said when a child is struggling with behavioral health and mental health disorder, parents are always informed.

Ms. Twomey congratulated Drs. Stetson and Dubé for being so successful in securing grants. She asked if they have thought of engaging athletic coaches and other community organizations to participate in some of the mental health programs. Dr. Stetson said they anticipate connecting to many athletics and other community organizations.

Mr. Acosta asked about the trends and how DPS compares to other schools who measure behavioral and mental health issues? Dr. Dubé said that once they screen 90% of students, they will follow up on these comparisons.

Mr. Langmead asked if the District has the staffing for students with moderate challenges. Dr. Stetson replied that because they have added school mental health specialists with a variety of backgrounds, the District is able to support student needs at every level.

• District Improvement Presentation II – Central Office Leaders & Secondary Principals

Mr. Forrest and Ms. Hillman, the High School and Middle School Principals came to the podium to talk about their Improvement plans.

Ms. Hillman summarized the foci of the Middle School plan:

Goal 1: Writing.

This goal was made accessible to all teachers so that writing is embedded in each subject. They are developing grade specific methodologies as the program evolves.

Goal 2: Data-Driven Supports and Intervention.

Interventions were started after the first progress report period. Instructional coaches developed individual plans with each student and communicated their plans with each family. It is a system of teachers helping other teachers. Students were polled on the results of the interventions and these results were used to enhance the programs.

Principal Hillman replied to Dr. Flynn Gallant that the inclusiveness and openness of the program improves attendance and increases positivity.

Mr. Polito asked if above average students are also given support so that they can become even better students. Dr. Hillman confirmed that support is available for students of all levels that want to improve themselves.

Dedham High School foci was summarized by Principal Forrest.

#1: Evaluation of Alternatives to CP2 Level Courses.

Elective courses were developed for the lower level courses and students were provided a chance to voice to provide feedback on their experiences. Grades for these students have improved and Mr. Forrest said they will continue to enhance this program.

#2: Defining and Enhancing Rigor in all Content Areas.

Through their accreditation process for New England Association of Schools and Colleges (NEASC) they are evaluating opportunities for increasing rigor by enhancing training and communication.

#3: Trauma Informed Practice: Culture Climate and Belonging.

36 staff have been trained in trauma informed practices and data is being collected to assess outcomes for programs currently being implemented.

#4: Creating Inclusive, Representative Spaces through Diversity Speaker Series.

Goal for the 2025-26 school year is to continue the Diversity Speaker series and new courses are being developed by the newly hired English Language Learning teacher.

Mr. Forrest reported that NEASC had a successful visit to the high school last week. Their report will drive further initiatives.

Ms. Twomey talked about Multicultural Night and mentioned how special it is that Nutritional Services created a menu that highlighted foods from different cultures.

Ms. Briggs made a suggestion to develop an interactive writing opportunity for high school students working as reporters for the Dedham Times and reporting on student-related experiences.

Mr. Polito asked about school absenteeism. Ms. Hillman and Mr. Forrest replied that they are working actively to improve absenteeism issues. Efforts are being made early on in the Elementary schools to address the issue. They also do home visits to ensure students are safe.

Mr. Acosta asked about how they are managing to challenge students who are doing well academically, but who need encouragement to excel? Mr. Forrest said that their strong guidance counseling support allows them to follow these students and ensure they are given the opportunity to stay on track and pursue higher levels of learning.

Business Report

• Discussion & Vote to Accept and Authorize School Committee Chair and Superintendent to Sign Preferred Schematic Report for Submission to MSBA

[Mr. Polito recused himself due to personal conflict.]

Dr. Kelly said this is the last step in submitting the PSR. The new report reflects the revised enrollment numbers. Steve Theran, Project Manager (OPM) from Vertex is here to answer any questions. The vote would be to authorize the School Committee and OPM to submit the PSR to the MSBA.

Mr. Acosta asked why they are having to vote on all the design options again.

Mr. Theran said the MSBA is requiring that they go back through the PSR stage and vote on all design options because of the enrollment changes.

Motion was made for the Owner's Project Manager to submit the PSR to the MSBA, subject to any minor modifications, through the SBRC Chair reflecting the District decision on the new 360 student stand-alone school on the Oakdale site as its preferred option. Motion was approved by a vote of 6-0. (Mr. Polito recused himself.)

Subcommittees Updates

- Budget

No updates.

- Curriculum Advisory

No updates.

- Facilities

Mr. Acosta said a tour of Riverdale is scheduled for May 16th at 6 pm.

- Negotiations

Supt. Murphy said contracts will be back from the attorney by the next meeting.

- Policy

No updates.

- SBRC

Ms. Briggs said the SBRC met last Monday and will be meeting again on May 14th.

- Finance and Warrant.

Dr. Flynn Gallant volunteered to be a regular member on the Finance and Warrant committee and Ms. Twomey volunteered to be an alternate.

Motion was made to accept Dr. Flynn Gallant and Ms. Twomey as the new members of the Finance and Warrant Committee.

Donations

No donations.

Review and Approval Vote of Previous Meeting Minutes

No meeting notes to approve.

Old/New Business

Mr. Walsh said as a soccer coach he has always been willing to work with students with behavioral and mental health issues and he thinks athletics is a good way to help students feel connected.

Mr. Walsh said he ran as a voice of the children and the community and many community members have asked if the Public Comment should become more interactive and adopt a question-and-answer format. Ms. Briggs said that the format of the Public Comments period is determined by the School Committee and this change could be a topic for discussion.

Mr. Walsh asked if there are residency checks done on a regular basis. He feels this is important given the budget shortfalls they are faced with this year. Supt. Murphy replied that residency checks are done regularly.

Mr. Polito asked if there was an internal survey that goes out at the end of the year polling faculty and staff about their experiences? Supt. Murphy said she has done two surveys this year with faculty and parents about her performance. Dr. Kelly said that historically they have done annual surveys with the faculty. Supt. Murphy and Dr. Kelly said they could talk to Dr. Smith and ask if they can develop a survey directed towards information important to the School Committee.

Mr. Polito brought up issues of safety at the high school and asked if there could be updates in the near future. Ms. Briggs agreed an update to the School Committee would be important. Supt. Murphy said updates are being shared with families and that they would prepare a report on this issue for the next School Committee meeting.

Supt. Murphy added that May 8th is the Superintendent's Academic dinner, June 8th is graduation and June 9th is the rain date for graduation.

Ms. Briggs talked about upcoming meeting dates leading up to the end of the school year.

Motion was made to adjourn. Motion was approved with a roll call vote of 7-0.

Submitted by

Virginia Quinn

Recording Secretary

A True Copy Attest

Paul M Munchbach
Town Clerk

2 Final Design Program

2.1 Architectural Characteristics

General and specific architectural characteristics desired:

The 2 story massing shape bows away from a projecting abuttor's property, thereby helping to alleviate neighborhood concerns and, at the same time, expanding available protected open space for outdoor classroom and recreational use.

The resulting arc of regularly spaced classrooms is articulated by the placement of several specially shaped core function elements: the rounded media center, the boat like cafeteria, the projecting gymnasium and the front facing administration cluster. Each element is treated with its own unique architectural character (see below) to form a playful and memorable destination for the children as part of their daily movements through the school. The gymnasium is given its own separate canopied entrance in support of the community functions it will serve after school hours.



The building entrance is framed by the cafeteria on one side and the administration cluster on the other. It leads to a central 'crossroads' lobby which will form a dignified setting for parent, teacher and student interactions. The administration wing commands views to the core spaces and central corridor.

The two academic wings, grades 1-2 to the left and 3-5 to the right form two 'schools within a school' creating appropriately sized learning sub-communities. They are differentiated from each other according to the program requirements; with the 3-5 corridor widening into shared



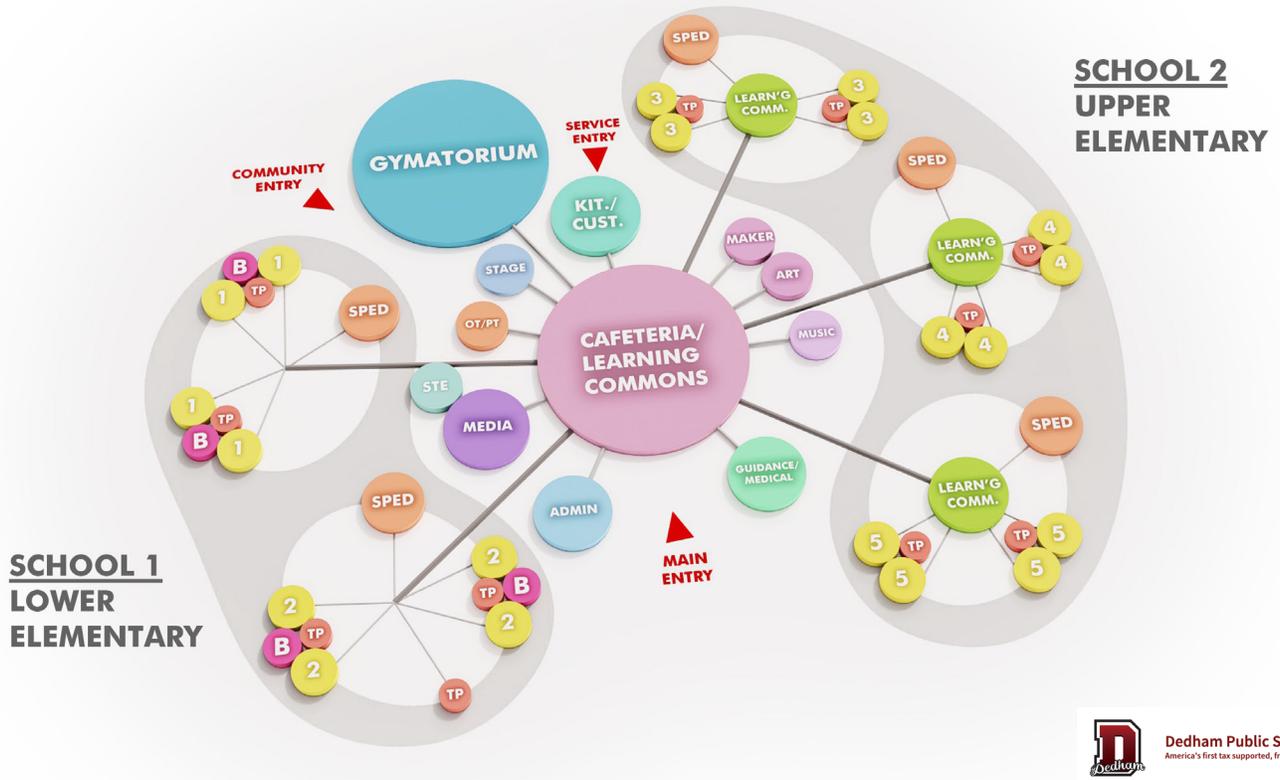
Media Center

collaborative cohort commons activity areas overlooking the wide playfields, while the 1-2 classrooms include shared breakout spaces. The building envelope is surfaced with brick to in order to join with Dedham's collection of public buildings and to relate to the many brick elements in the surrounding neighborhood. Classroom identities are expressed through projecting bays – also relating to the residential neighborhood. The bays on the south, public side of the building are fronted with delicate sunshade structures designed to assist with solar heat gain and glare inside the classrooms.



Cafeteria

Program Diagram – 360 student Enrollment



2.2 Space Summary

Proposed Space Summary - Elementary School
360 Students, Grades 1-5, 4 Classrooms per Grade

Legend Change from MSBA Guidelines
 Change from PSR Submission

Date: 8/20/24 Schematic Design Submittal

OAKDALE ELEMENTARY SCHOOL	EXISTING CONDITIONS OAKDALE SCHOOL		
ROOM TYPE	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
Core Academic	15,405		
<i>(List rooms of different sizes separately)</i>			
Kindergarten Classroom with Toilet	0	0	0
General Classroom (Grades 1-5)	750	6	4,500
General Classroom (Grades 1-5)	815	3	2,445
General Classroom (Grades 1-5)	895	5	4,475
General Classroom (Grades 1-5)	1,040	3	3,120
General Classroom (Grades 1-5) w/toilet			0
Science, Technology, Engineering Room (Grades 3-5)	797	1	797
STE Storage Room (if applicable)	68	1	68
Teacher Planning			0
Classroom Breakout Grades 1 - 2			0
Cohort Commons - Grades 3, 4, 5			0
Academic Storage			0
Special Education	3,500		
<i>(List rooms of different sizes separately)</i>			
Self-Contained Special Education Classroom	770	4	3,080
Self-Contained Special Education Toilet Room			
Resource Room	210	2	420
Small Group Room / Reading			0
Medically Fragile Special Education Classroom (ACCESS)			0
Teacher Planning			0
OT / PT Room			0
IEP Conference Room			0
Psychiatrist Office			0
Guidance Office			0
Evaluation Team Leader Office			0
Break-out room			0
Records Room			0
Collaborative Program Spaces (List rooms separately below)			
Teacher Planning (above)			0
Classroom Breakout (above)			0
Cohort Commons (above)			0
Quiet Dining (below)			0
Art & Music	940		
Art Classroom (25 seats)			0
Art Workroom with Storage and Kiln	240	1	240
Music Classroom / Large Group (25-50 seats)			0
Music Practice / Ensemble			0
Music Storage			0
Maker Space	700	1	700

PSR - FOR REFERENCE		
NEW CONSTRUCTION		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
24,200		
1,200	0	0
900	20	18,000
		0
		0
		0
		0
1,080	1	1,080
120	1	120
50	20	1,000
300	4	1,200
800	3	2,400
200	2	400
8,210		
900	3	2,700
100	2	200
500	3	1,500
500	1	500
900	1	900
100	4	400
950	1	950
250	1	250
150	1	150
150	1	150
250	1	250
150	1	150
110	1	110
		0
		0
		0
		0
		0
3,850		
1,000	1	1,000
150	1	150
1,350	1	1,350
75	0	0
150	1	150
1,200	1	1,200

PROPOSED PROGRAM								
EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0			23,800			23,800		
		0	1,200	0	0	1,200	0	0
		0	900	20	18,000	900	20	18,000
		0			0			0
		0			0			0
		0			0			0
		0			0			0
		0	1,080	1	1,080	1,080	1	1,080
		0	120	1	120	120	1	120
		0	50	20	1,000	50	20	1,000
		0	300	4	1,200	300	4	1,200
		0	800	3	2,400	800	3	2,400
		0			0			0
0			8,210			8,210		
		0	900	3	2,700	900	3	2,700
		0	100	2	200	100	2	200
		0	500	3	1,500	500	3	1,500
		0	500	1	500	500	1	500
		0	900	1	900	900	1	900
		0	100	4	400	100	4	400
		0	950	1	950	950	1	950
		0	250	1	250	250	1	250
		0	150	1	150	150	1	150
		0	150	1	150	150	1	150
		0	250	1	250	250	1	250
		0	150	1	150	150	1	150
		0	110	1	110	110	1	110
		0			0			0
		0			0			0
		0			0			0
		0			0			0
		0			0			0
0			3,700			3,700		
		0	1,000	1	1,000	1,000	1	1,000
		0	150	1	150	150	1	150
		0	1,350	1	1,350	1,350	1	1,350
		0	75	0	0	75	0	0
		0			0			0
		0			0			0
		0	1,200	1	1,200	1,200	1	1,200

VARIATION TO MSBA GUIDELINES		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
8,600		
0	0	0
-50	4	2,800
		0
		0
		0
		0
0	1	1,080
0	1	120
50	20	1,000
300	4	1,200
800	3	2,400
		0
3,680		
-50	0	-150
40	-1	20
0	1	500
0	0	0
900	1	900
100	4	400
950	1	950
250	1	250
150	1	150
150	1	150
250	1	250
150	1	150
110	1	110
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
1,200		
0	0	0
0	0	0
150	0	150
0	-2	-150
		0
1,200	1	1,200

MSBA GUIDELINES (DO NOT MODIFY) <i>(Refer to Educational Facility Planning for additional information)</i>			
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	COMMENTS
15,200			
1,200	0	-	
950	16	15,200	4 Classrooms / Grade Combined with Teacher Planning Rms
		-	
		-	
		-	
		-	
1,080	0	-	
120	0	-	
		-	Combined with paired classrooms. (10) rooms at 100 Between 2 Classrooms
		-	1 Cohort Commons per grade (6 CR)
4,530			Spaces require DESE review and approval.
950	3	2,850	Identical to Gen Ed Classrooms. Includes Upper and Lower STAR Classrms
60	3	180	Include changing tables (all) and Hoyer lift for medically fragile. Medically Fragile shared with Medical
500	2	1,000	
500	1	500	
		-	
		-	Each Teacher Planning room dedicated to Special Education Classroom, not shared
		-	
		-	
		-	
		-	In Central Admin For Lower STAR for STAR program
		-	See above
		-	See above
		-	See above
		-	See below
2,500			
1,000	1	1,000	
150	1	150	
1,200	1	1,200	
75	2	150	
		-	
		-	

Proposed Space Summary - Elementary School
360 Students, Grades 1-5, 4 Classrooms per Grade

Legend Change from MSBA Guidelines
 Change from PSR Submission

Date: 8/20/24 Schematic Design Submittal

OAKDALE ELEMENTARY SCHOOL		EXISTING CONDITIONS OAKDALE SCHOOL		
ROOM TYPE	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	
OTHER	0			
<i>(List rooms separately below)</i>				
Pre-Kindergarten Classroom with Toilet (if applicable)	0	0	0	
Net Zero Mechanical				
Total Building Net Floor Area (NFA)			35,381	
Proposed Student Capacity / Enrollment				
NON-PROGRAMMED SPACES				
<i>Other Occupied Rooms (List rooms separately below)</i>				
Unoccupied MEP / FP Spaces				
Unoccupied Closets, Supply Rooms, and Storage Rooms				
Toilet Rooms				
Circulation (corridors, stairs, ramps and elevators)				
Remaining ³				
Total Building Gross Floor Area (GFA) ²			0.00	
Grossing Factor (GFA / NFA)				

PSR - FOR REFERENCE		
NEW CONSTRUCTION		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
1,600		
1,200	0	0
1,600	1	1,600
60,355		
% of GFA 30,781		
2,789	3.1%	2,789
1,097	1.2%	1,097
3,076	3.4%	3,076
13,074	14.3%	13,074
8,967	9.8%	8,967
91,136		
1.51		

PROPOSED PROGRAM								
EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0			0			0		
0		0	1,200	0	0	1,200	0	0
0			58,005			67% 58,005		
% of GFA 0			% of GFA 29,003			% of GFA 29,003		
-	0.0%		2,789	3.2%	2,789	2,789	3.2%	2,789
-	0.0%		1,097	1.3%	1,097	1,097	1.3%	1,097
-	0.0%		3,076	3.5%	3,076	3,076	3.5%	3,076
-	0.0%		13,074	15.0%	13,074	13,074	15.0%	13,074
-	0.0%	0	8,967	10.3%	8,967	8,967	10.3%	8,967
0			87,008			87,008		
N/A			1.50			1.50		

VARIATION TO MSBA GUIDELINES		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0		
0	0	0
16,760		
24,728		
-0.01		

MSBA GUIDELINES (DO NOT MODIFY) <i>(Refer to Educational Facility Planning for additional information)</i>			
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	COMMENTS
0			
1,200	0	-	
		41,245	Total Building Net Floor Area (NFA)
# of Grade	5	360	Total Enrollment (Enter Design Enrollment)
K	0	0	Kindergarten Enrollment
Grade 1	1	144	Lower Elementary School Enrollment (Grades 1-2)
Grade 2	1	216	Upper Elementary School Enrollment (Grades 3-5)
Grade 3	1		
Grade 4	1		
Grade 5	1		
Grade 6	0		
			Complete this category with Schematic Design Submittal
		62,280	Total Building Gross Floor Area (GFA) ²
		1.51	Grossing Factor (GFA / NFA)

- ¹ Individual Room Net Floor Area (NFA) Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.
- ² Total Building Gross Floor Area (GFA) Includes the entire building gross square footage measured from the outside face of exterior walls.
- ³ Remaining Includes exterior walls, interior partitions, chases, and other areas not listed above. Do not calculate this area, it is assumed to equal the difference between the Total Building Gross Floor Area and area not accounted for above.

Architect Certification	<p>I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge.</p> <p>Name of Architecture Firm: <u>Jonathan Levi Architects</u></p> <p>Name of Principal Architect: <u>Jonathan Levi</u></p> <p>Signature of Principal Architect: _____</p> <p>Date: <u>8/20/24</u></p>
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Proposed Space Summary - Elementary School
360 Students, Grades 1-5, 4 Classrooms per Grade

Legend Change from MSBA Guidelines
 Change from PSR Submission

Date: 8/20/24 Schematic Design Submittal

OAKDALE ELEMENTARY SCHOOL	EXISTING CONDITIONS OAKDALE SCHOOL		
ROOM TYPE	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
Core Academic	15,405		
<i>(List rooms of different sizes separately)</i>			
Kindergarten Classroom with Toilet	0	0	0
General Classroom (Grades 1-5)	750	6	4,500
General Classroom (Grades 1-5)	815	3	2,445
General Classroom (Grades 1-5)	895	5	4,475
General Classroom (Grades 1-5)	1,040	3	3,120
General Classroom (Grades 1-5) w/toilet			0
Science, Technology, Engineering Room (Grades 3-5)	797	1	797
STE Storage Room (if applicable)	68	1	68
Teacher Planning			0
Classroom Breakout Grades 1 - 2			0
Cohort Commons - Grades 3, 4, 5			0
Academic Storage			0
Special Education	3,500		
<i>(List rooms of different sizes separately)</i>			
Self-Contained Special Education Classroom	770	4	3,080
Self-Contained Special Education Toilet Room			
Resource Room	210	2	420
Small Group Room / Reading			0
Medically Fragile Special Education Classroom (ACCESS)			0
Teacher Planning			0
OT / PT Room			0
IEP Conference Room			0
Psychiatrist Office			0
Guidance Office			0
Evaluation Team Leader Office			0
Break-out room			0
Records Room			0
Collaborative Program Spaces (List rooms separately below)			
Teacher Planning (above)			0
Classroom Breakout (above)			0
Cohort Commons (above)			0
Quiet Dining (below)			0
Art & Music	940		
Art Classroom (25 seats)			0
Art Workroom with Storage and Kiln	240	1	240
Music Classroom / Large Group (25-50 seats)			0
Music Practice / Ensemble			0
Music Storage			0
Maker Space	700	1	700

PSR - FOR REFERENCE		
NEW CONSTRUCTION		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
24,200		
1,200	0	0
900	20	18,000
		0
		0
		0
		0
1,080	1	1,080
120	1	120
50	20	1,000
300	4	1,200
800	3	2,400
200	2	400
8,210		
900	3	2,700
100	2	200
500	3	1,500
500	1	500
900	1	900
100	4	400
950	1	950
250	1	250
150	1	150
150	1	150
250	1	250
150	1	150
110	1	110
3,850		
1,000	1	1,000
150	1	150
1,350	1	1,350
75	0	0
150	1	150
1,200	1	1,200

PROPOSED PROGRAM								
EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0			23,800			23,800		
		0	1,200	0	0	1,200	0	0
		0	900	20	18,000	900	20	18,000
		0			0			0
		0			0			0
		0			0			0
		0			0			0
		0	1,080	1	1,080	1,080	1	1,080
		0	120	1	120	120	1	120
		0	50	20	1,000	50	20	1,000
		0	300	4	1,200	300	4	1,200
		0	800	3	2,400	800	3	2,400
		0			0			0
0			8,210			8,210		
		0	900	3	2,700	900	3	2,700
		0	100	2	200	100	2	200
		0	500	3	1,500	500	3	1,500
		0	500	1	500	500	1	500
		0	900	1	900	900	1	900
		0	100	4	400	100	4	400
		0	950	1	950	950	1	950
		0	250	1	250	250	1	250
		0	150	1	150	150	1	150
		0	150	1	150	150	1	150
		0	250	1	250	250	1	250
		0	150	1	150	150	1	150
		0	110	1	110	110	1	110
0			3,700			3,700		
		0	1,000	1	1,000	1,000	1	1,000
		0	150	1	150	150	1	150
		0	1,350	1	1,350	1,350	1	1,350
		0	75	0	0	75	0	0
		0			0			0
0			1,200			1,200		

VARIATION TO MSBA GUIDELINES		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
8,600		
0	0	0
-50	4	2,800
		0
		0
		0
		0
0	1	1,080
0	1	120
50	20	1,000
300	4	1,200
800	3	2,400
		0
3,680		
-50	0	-150
40	-1	20
0	1	500
0	0	0
900	1	900
100	4	400
950	1	950
250	1	250
150	1	150
150	1	150
250	1	250
150	1	150
110	1	110
1,200		
0	0	0
0	0	0
0	0	0
0	0	0
1,200	1	1,200

MSBA GUIDELINES (DO NOT MODIFY) <i>(Refer to Educational Facility Planning for additional information)</i>			
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	COMMENTS
15,200			
1,200	0	-	
950	16	15,200	4 Classrooms / Grade Combined with Teacher Planning Rms
		-	
		-	
		-	
		-	
1,080	0	-	
120	0	-	
		-	Combined with paired classrooms. (10) rooms at 100 Between 2 Classrooms
		-	1 Cohort Commons per grade (6 CR)
4,530			Spaces require DESE review and approval.
950	3	2,850	Identical to Gen Ed Classrooms. Includes Upper and Lower STAR Classrms
60	3	180	Include changing tables (all) and Hoyer lift for medically fragile. Medically Fragile shared with Medical
500	2	1,000	
500	1	500	
		-	
		-	Each Teacher Planning room dedicated to Special Education Classroom, not shared
		-	
		-	
		-	
		-	In Central Admin For Lower STAR for STAR program
		-	See above
		-	See above
		-	See above
		-	See below
2,500			
1,000	1	1,000	
150	1	150	
1,200	1	1,200	
75	2	150	
		-	
		0	
1,200	1	1,200	

Proposed Space Summary - Elementary School
360 Students, Grades 1-5, 4 Classrooms per Grade

Legend Change from MSBA Guidelines
 Change from PSR Submission

Date: 8/20/24 Schematic Design Submittal

OAKDALE ELEMENTARY SCHOOL		EXISTING CONDITIONS OAKDALE SCHOOL		
ROOM TYPE	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	
OTHER	0			
<i>(List rooms separately below)</i>				
Pre-Kindergarten Classroom with Toilet (if applicable)	0	0	0	
Net Zero Mechanical				
Total Building Net Floor Area (NFA)			35,381	
Proposed Student Capacity / Enrollment				
NON-PROGRAMMED SPACES				
<i>Other Occupied Rooms (List rooms separately below)</i>				
Unoccupied MEP / FP Spaces				
Unoccupied Closets, Supply Rooms, and Storage Rooms				
Toilet Rooms				
Circulation (corridors, stairs, ramps and elevators)				
Remaining ³				
Total Building Gross Floor Area (GFA) ²				
Grossing Factor (GFA / NFA)			0.00	

PSR - FOR REFERENCE		
NEW CONSTRUCTION		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
		1,600
1,200	0	0
1,600	1	1,600
		60,355
% of GFA		30,781
2,789	3.1%	2,789
1,097	1.2%	1,097
3,076	3.4%	3,076
13,074	14.3%	13,074
8,967	9.8%	8,967
		91,136
		1.51

PROPOSED PROGRAM								
EXISTING TO REMAIN / RENOVATED			NEW CONSTRUCTION			TOTAL		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS	ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0			0			0		
		0	1,200	0	0	1,200	0	0
		0			58,005			58,005
% of GFA		0	% of GFA		29,003	% of GFA 29,003		
-	0.0%		2,789	3.2%	2,789	2,789	3.2%	2,789
-	0.0%		1,097	1.3%	1,097	1,097	1.3%	1,097
-	0.0%		3,076	3.5%	3,076	3,076	3.5%	3,076
-	0.0%		13,074	15.0%	13,074	13,074	15.0%	13,074
-	0.0%	0	8,967	10.3%	8,967	8,967	10.3%	8,967
		0			87,008	87,008		
		N/A			1.50	1.50		

VARIATION TO MSBA GUIDELINES		
ROOM NFA ¹	# OF ROOMS	AREA TOTALS
0		
0	0	0
		16,760
		24,728
		-0.01

MSBA GUIDELINES (DO NOT MODIFY) <i>(Refer to Educational Facility Planning for additional information)</i>			
ROOM NFA ¹	# OF ROOMS	AREA TOTALS	COMMENTS
0			
1,200	0	-	
		41,245	Total Building Net Floor Area (NFA)
# of Grade	5	360	Total Enrollment (Enter Design Enrollment)
K	0	0	Kindergarten Enrollment
Grade 1	1	144	Lower Elementary School Enrollment (Grades 1-
Grade 2	1	216	Upper Elementary School Enrollment (Grades 3-
Grade 3	1		
Grade 4	1		
Grade 5	1		
Grade 6	0		
			Complete this category with Schematic Design Su
		62,280	Total Building Gross Floor Area (GFA) ²
		1.51	Grossing Factor (GFA / NFA)

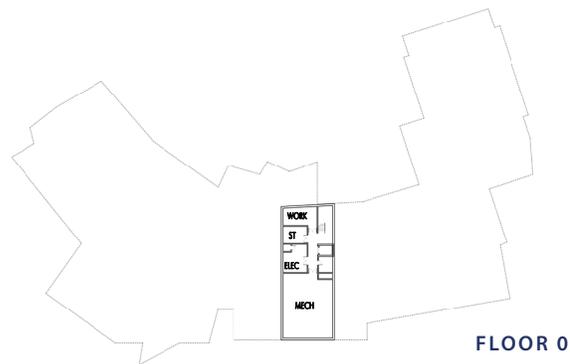
- ¹ Individual Room Net Floor Area (NFA) Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.
- ² Total Building Gross Floor Area (GFA) Includes the entire building gross square footage measured from the outside face of exterior walls.
- ³ Remaining Includes exterior walls, interior partitions, chases, and other areas not listed above. Do not calculate this area, it is assumed to equal the difference between the Total Building Gross Floor Area and area not accounted for above.

Architect Certification	<p>I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my</p> <p>Name of Architecture Firm: <u>Jonathan Levi Architects</u></p> <p>Name of Principal Architect: <u>Jonathan Levi</u></p> <p>Signature of Principal Architect: _____</p> <p>Date: <u>8/20/24</u></p>
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2.3 Proposed Project and the District Educational Program

The design of the new Oakdale School is based on the approved space summary and educational program from the revised Preferred Schematic Report. Qualities and objectives of the curriculum that played a primary role in determining the configuration of the new building include:

- Small-scale learning communities
- Collaborative learning
- Collaborative teaching
- Visible learning
- Flexible learning
- Community engagement
- Community accessible performing arts and athletic facilities





**LOWER SCHOOL
- GRADES 1-2
CLASSROOM SUITE**

Small-Scale Learning Communities

Small scale communities will be created for each grade level and shaped by not only by the array of classrooms on each level, which are specific to their grade, but also by including include 2 different types of small-scale learning communities or cohorts. The Lower Elementary for 1st and 2nd grades include shared breakout spaces between paired classrooms. This way the youngest students can have a separate collaboration space without the need to go into a hallway and leave the supervision of the staff. The Upper Elementary for grades 3, 4, and 5 have a dedicated corridor widening into shared collaborative cohort commons activity areas. Each cohort commons is meant as a place of flexible learning, of group collaboration and as a place for students to create the social bonds that eventually lead to exchange of ideas and creation. It is hoped that through the creation of strong cohort identity, all the students within their groups will be known to one another and will be known individually to the associated staff.

Collaborative Learning

Collaborative learning will be fostered on a number of different levels by the configuration of the new building. First and foremost is the arrangement of the classrooms. The classrooms are sized to allow multiple centers of learning to operate simultaneously within the confines of the room. This is facilitated by the large classroom size of 900 sf. The size will allow adequate separation for the simultaneous groupings of students working within the room.

Collaboration will also occur among the students in the learning commons and cohort commons spaces. At the first floor level, the cafeteria is meant as a continuous place of learning, project activity and

**UPPER SCHOOL
- GRADES 3-5
CLASSROOM SUITE**



socialization to be adapted by the students and the faculty as the needs of the curriculum evolve. These collaborative activities can take the form of anything from group work around conference tables, small group work around monitors or laptops, physical projects from the nearby STE room located directly adjacent to the media center to build on current STEM programming.

Collaborative Teaching

Building on the preferred schematic proposal, the team focused on the relationship between teachers and how team teaching could be enhanced. Each pair of classrooms can be opened up to combine the 2 rooms. When open, the two classrooms constitute a larger learning group as a basis for selecting collaborative partners in creating a greater range of project-based activities. At the same time, the pairing of classrooms allows for intimate collaboration, inspiration and mutual observation by pairs of teachers. Collaboration is further supported by the shared teacher preparation offices, which are embedded between paired classrooms while at the same time looking outward into the public space of the school. Teachers may also gather in a variety of group sizes to collaborate in the various cohort commons, and in the dedicated central conference room.

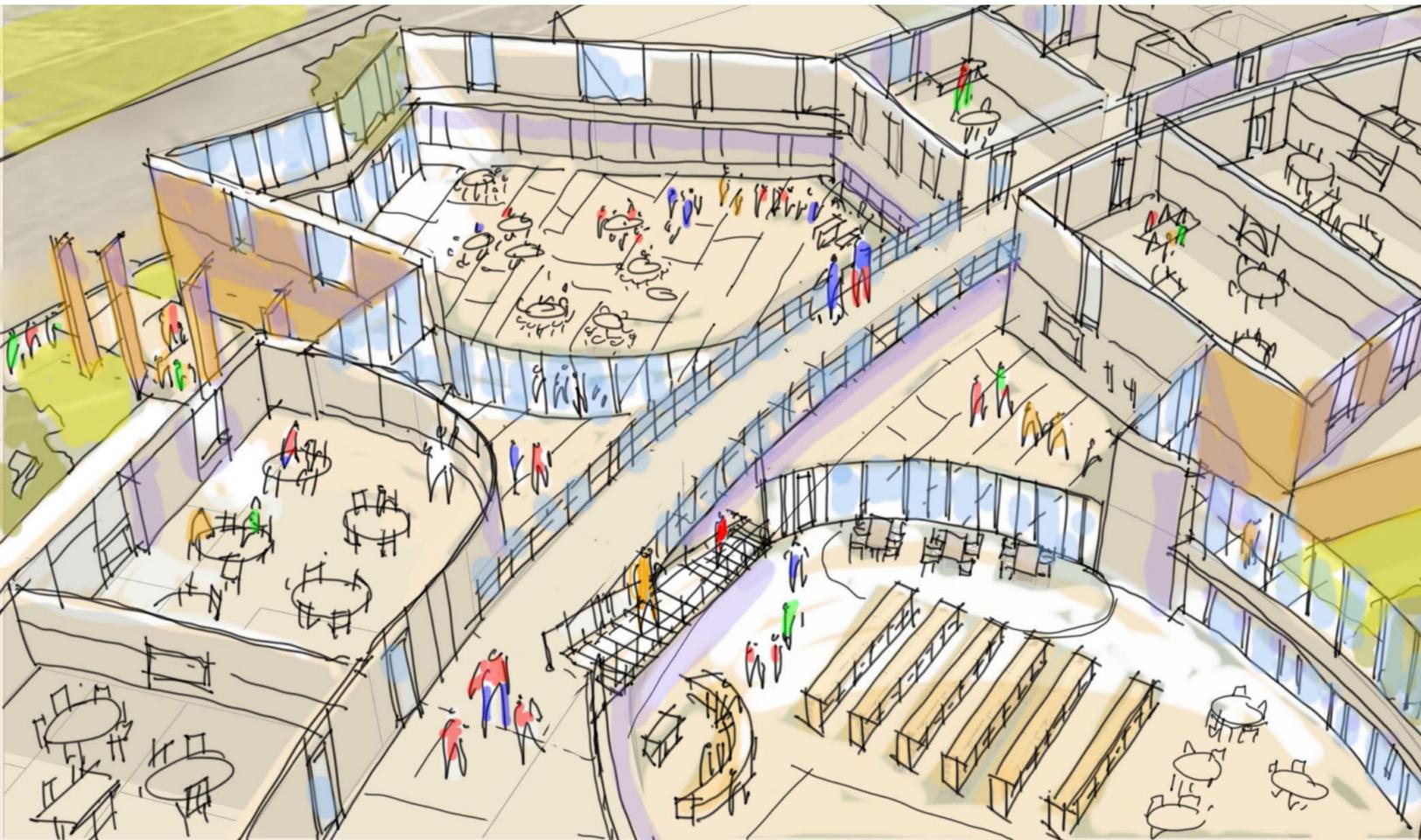
Visible Learning

A core principle of 21st century education concerns the ability of students to influence and inspire one another as much as they are influenced and inspired by their teachers and mentors. To this end, the new school arranged, as a largely transparent and multi-directionally interconnected interior. An exciting cluster of interactive core spaces occupies the center of the building, with cafetorium, media center, STE Room, maker space, art and music all proximate and visible to each

other. These classrooms are meant as demonstration platforms; the exploration and discovery that occurs within them is shared publicly due to their prominence to the central 2 story core. As a corollary to visible activity, the school will also feature many locations for visible work product, including public exhibit space, display walls, galleries and the wide-open project floor areas of the cohort commons. This is also true of the glazed teacher planning areas, where mentoring and specialized student work is on display.

Flexible Learning

Insofar as 21st century education relies on the spontaneous initiative of the students, spaces throughout the school are conceived as highly adaptable and highly configurable according to the needs of the curriculum and the students' initiatives. This includes the combinable classrooms described above. It also relates to the commons area themselves whether on the whole school level or on the cohort level. These spaces are intended to be built without fixed furnishings so that there can be variable interpretations of use by the school community - from individual study to group learning activities, whether in class size events or dispersed among many small pairings of students. Given that pedagogy is constantly evolving and will move in directions that we cannot know today, the intent of the building over the long term is also to be adaptable. Responding to this need, the building is planned modularly using a standard spacing of walls which can accommodate a variety of changes over the decades to come.



Community Engagement

The Gymnasium is designed for both athletic and performance activities. It has a separate community entrance, and can be separated from the remainder of the building when desired. It is located on the east side of the building, convenient to parking for community events, and proximate to the new playfields, playgrounds, and outdoor basketball court which will also be enjoyed by the community, when school is not in session.

The academic areas/cohort commons likewise can be partially or fully cordoned off depending on community use mode.

2.4 Instructional Technology

Elementary School Dedham Public Schools:

Purpose:

This document outlines the vision and plan for instructional technology in the Dedham Public Schools' new elementary school. The goal is to leverage technology to support the district's mission of promoting excellence in learning, self-discipline, and motivation in partnership with the community. This includes continuing to support and expand effective instructional practices. The Dedham Public School District Technology Plan provides detail into the objectives aligned to the district mission.

Current State:

Dedham is a recognized leader in accelerating the transformation of schools through the effective use of digital learning strategies. Technology has an ongoing impact on the instruction and learning processes of our teachers and students. As educational technologies become more sophisticated and our teaching culture evolves we adapt to maximize transformative changes which assist teachers, administrators, and students to achieve significantly improved outcomes.

Infrastructure:

In general, the current infrastructure in the old building (i.e. Oakdale) presents limitations including aging Cat5 cabling and limited drop locations which restrict wired connectivity and create unsightly wiring runs. Both Library Media Centers lack a central location and flexible furniture and shelving. There is no Science, Technology and Engineering (STE) Room for hands-on learning. The backbone of the school network is supported with 60 switches system-wide with 5 at Oakdale. These switches are exactly the same in all buildings in order to minimize maintenance and support and provide excellent throughput. These switches connect to a Dedham Public School robust fiber wide-area network connecting all school buildings back to its hub at Dedham High School.

Network cabling runs from network closets (MDF, IDF) to all spaces in the schools including instructional, office, and gyms. These cables also form the backbone of our wifi network. This wiring was retrofitted into the buildings in the late 1990s with Category 5 cabling. There is typically one set of five drops located in one part of the classroom for all wired needs including wireless connections. There are many drops that do not work and unsightly wiring because of the one drop location in rooms.

Classroom Spaces:

Student Devices:

All student Chromebooks and iPads are school-owned which allows us to address economic equity, instructional burden, and privacy and security concerns. This school owned model is fully supported by the National Education Technology Plan (Infrastructure section). Filtered Chromebooks are provided to students with a school owned 1:1 model for use at school. Chromebooks are stored in carts within the classroom teacher's classroom. These carts have electrical connections that cycle so they don't overload a circuit. Additionally, classrooms in Grades 1 and 2 have a small classroom set of iPads (i.e. five or six) and students with special considerations are also issued iPads as appropriate. Students are not allowed to have personal devices including phones on the schools networks. These devices primarily support dozens of educational software subscriptions fundamental to student academic success.

Staff Devices:

Staff have network logins and can access any resources through any connected desktop or laptop. Learning spaces typically include a connected multiple screen computer system with a document camera, interactive projector on a whiteboard which most often can print locally to a black and white laser printer. Smart Learning Suite software is loaded to connected devices to support interactive learning needs. There are limited locations that have shared spaces to print to color printing to reduce the cost of the more expensive printing model. Most staff are also issued Chromebooks which both model and support Chromebook use by students and provide a mobile device for staff work when away from their primary location. Smaller office spaces currently have non-interactive large display monitors to facilitate sharing visuals during meetings. There are currently a few Smartboards in small group areas.

Library Media Center

The current LMC at Oakdale is on the third floor of the old building. This LMC at Oakdale is only accessible by climbing over two flights of stairs and is not centrally located. Although the Oakdale LMC has adequate space it does not have flexible furniture nor flexible shelving to allow it to be fully utilized. The location at Oakdale makes it difficult for students to bring devices from the classroom to the library given the distance and number of stairs. Each LMC has relatively solid and up-to-date library collections.

The current schools does not have a Science, Technology, and Engineering (STE) room.

Proposed Plan:

Infrastructure:

The new build should include multiple network drop locations in most areas including locations in the ceiling for the wireless access points. Cabling will use up-to-date standards. Drop locations should typically have multiple ports to support network devices such as desktops and printers. Wireless internet access must be sufficient to meet the needs of multiple devices per user in any size grouping.

The wifi access points are new as of the fall of 2023 in the district which support an ever growing need for bandwidth and reliable wifi connectivity. Additionally new network switches are expected in the summer/fall of 2024. These devices were/are supported from the federal E-rate program under Category 2. Category 2 funding will be exhausted for the current cycle with a new 5-year cycle beginning in 2026. Both access points and switches have a typical life expectancy of five-years. These devices should be relocated to the new building. With that said, it is likely that some additional wireless access points and network switches that match the current specifications will be needed for a new building. It will likely be important to leverage the approximate 60% discount for allowed technology; which means application approximately 6-9 months in advance of need.

Classroom Spaces:

Student Devices:

We will continue to use the school owned device model. Improvement and changes in battery technology often result in changes to adapters and charging needs. It is likely that new storage carts for Chromebooks and iPads will be needed but likely carts will fit with the current footprint; dedicated space for carts and typical electrical needs should be a consideration in classroom design. We will continue replacement of Chromebooks on a four-year cycle and iPads on a six-year cycle. Student use of devices to access hundreds of software subscriptions and applications that are essential to their education.

Staff Devices:

Updated staff computers will be needed and must include multiple screens to help provide efficiency and instructional assistance. New document cameras will be needed. Technology stations ideally could be located in multiple locations in a room but must be connected to a projector without cables that interfere with staff and student movement. Projection on whiteboards allows teachers the most flexibility. State of the art projection (i.e. current laser projection; not with bulbs) must provide high resolution and lumens in all lighting scenarios. Interactive features should match current capabilities to support instructional strategies. New printers should support learning and administrative needs while strategically controlling the cost of supplies including toner. Equipment should continue to use the current interactive software;

currently Smart Learning Suite. Staff devices need to match what can be supported for all staff district-wide. Smaller classroom and office should include appropriately sized touch wall mounted monitors for instruction and meeting facilitation. These monitors should be on flexible mounts to allow for different heights and appropriate angles.

Library Media Center

A vibrant centrally located library media center is crucial for an enriching school experience. It's a welcoming space where young minds are ignited by a love of reading and learning. Beyond books, it offers a treasure trove of resources including Makerspace space and supplies, to fostering critical thinking, online and traditional research skills, and digital literacy. Under the guidance of a dedicated library media specialist, children explore diverse perspectives, delve into captivating stories, and discover the joy of lifelong learning. The library media center becomes a safe haven for creativity, collaboration, and independent exploration, nurturing curious minds and preparing them for success in the digital age. The library media center must be centrally located in the building to provide ease of access to one of the critical hubs of the school. Appropriately sized furniture for students and adults should be flexible as should the shelving for the library collection. Flexibility to reconfigure the space is critical to allow for individual, small group, classroom use, workshops, and large group presentations and meetings.

Science, Technology, and Engineering (STE) Room.

The purpose of the Science, Technology and Engineering room is to support technology education to spread technological literacy by providing a variety of hands-on activities using current technology. Technology Education emphasizes both design and problem-solving skills while raising students' awareness of career options in the technical fields. The STE Room should be larger than a typical classroom and be supplied with similar computer technology. Additionally this room should have ample storage and shelving for equipment such as 3D printers, robotic kits, building materials (e.g. Legos, K'Nex), simple machines, electric circuits kits, and tools (e.g. screwdrivers, hammer). This room needs a place to wash materials as well. Ideally this room would have an abundance of natural lights for life science, particularly plants and be adjacent to the Library Media Center.

Cohort Commons Spaces

Cohort common spaces should have a similar teaching setup as the classroom to provide opportunities for expert and peer modeling of effective instructional practices and ease of work on collaborative projects.

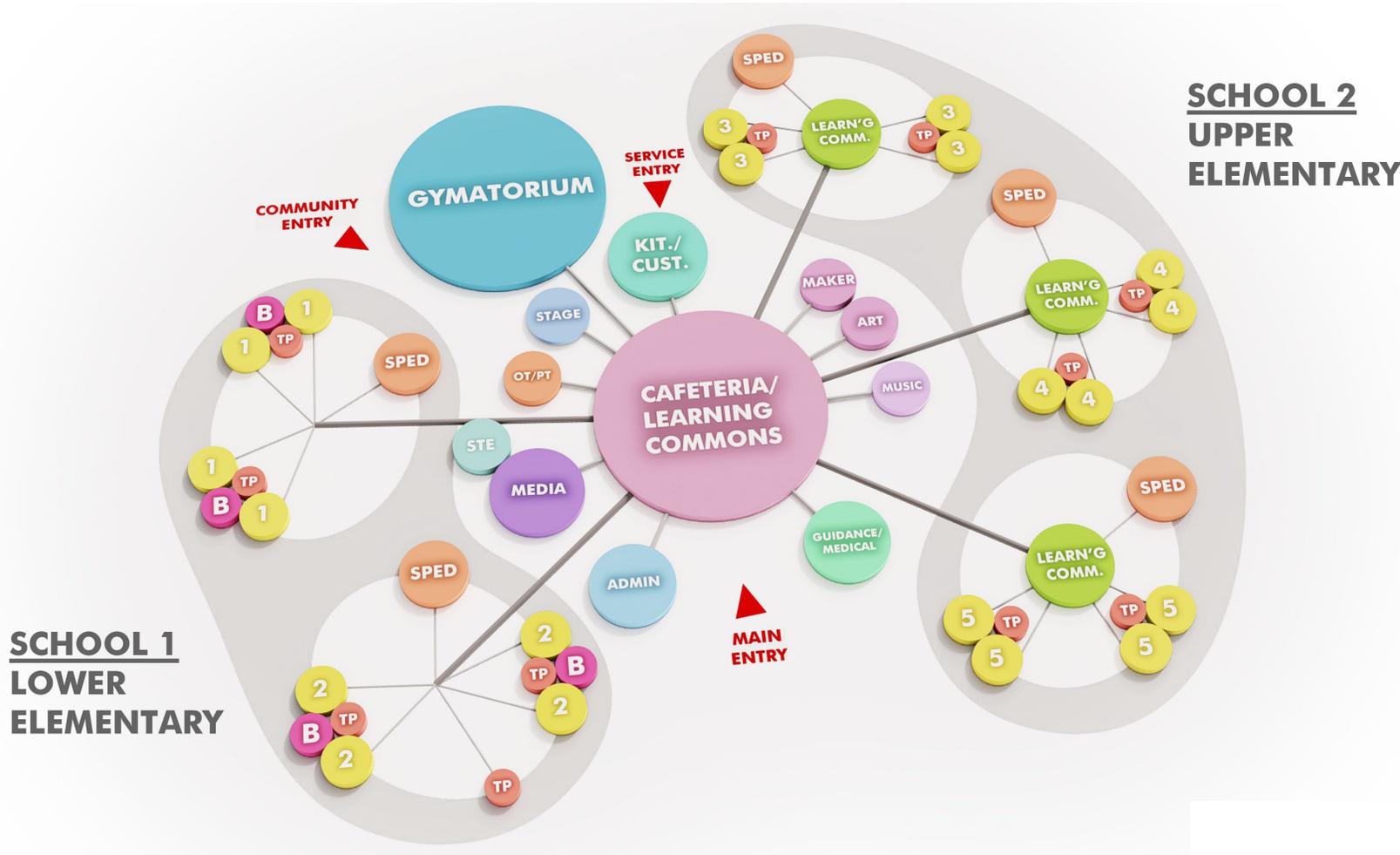
Large Spaces

Additionally any large space (Gym, Auditorium, Cafeteria) must be equipped with high-quality sound and lighting equipment to provide for an opportunity for students, staff and community to gather and provide an outlet to present learning and for all stakeholders to engage in their communities educational process.

2.5 Functional Relationships and Adjacencies

Functional relationships for the new School are best described in the program 'Bubble' Diagram' accompanying the preferred schematic submission. The highlights of which are as follows:

- Classrooms are cluster by grade to form separate learning communities, and located in clearly identifiable wings to create 2 'Schools within the School'
- The Lower Elementary for 1st and 2nd grades include shared breakout spaces between paired classrooms. This way the youngest students can have a separate collaboration space without the need to go into a hallway and leave the supervision of the staff.
- The Upper Elementary for grades 3, 4, and 5 have a dedicated corridor widening into shared collaborative cohort commons activity areas.
- Special Education spaces are dispersed throughout the school.



- Classroom cluster pairs are grouped around glass-enclosed teacher preparation offices.
- The central learning cafeteria/learning commons is placed at the heart of the school, and invites day-long activity and participation. The space can be partially or fully cordoned off depending on community use mode.
- Main administration is centrally located directly adjacent to the main entrance, and visible to the elevator and main circulation and cafeteria/learning common.
- The double height Media center is front and center in the learning commons and is also directly opposite and visible from the main entrance with two story high interior glazing to encourage student engagement and interactivity.
- The STE Room and Media Center are situated prominently together adjacent to each other, and to the cafeteria.
- Music, Maker, and Art classrooms are placed prominently in the 2 story central circulation area
- The Gymnasium is located with community access entry.
- The Gymnasium has direct access to the play fields. The gymnasium is sized to accommodate current program needs, including bleachers.
- Service and storage along with shared facilities maintenance quarters are located next to the loading dock. The loading area is convenient to the Kitchen.
- Student bathrooms are efficiently located for easy access both from the classroom wings and from the cafeteria/ learning commons. Separate bathrooms are provided for the community access to the Gymnasium.

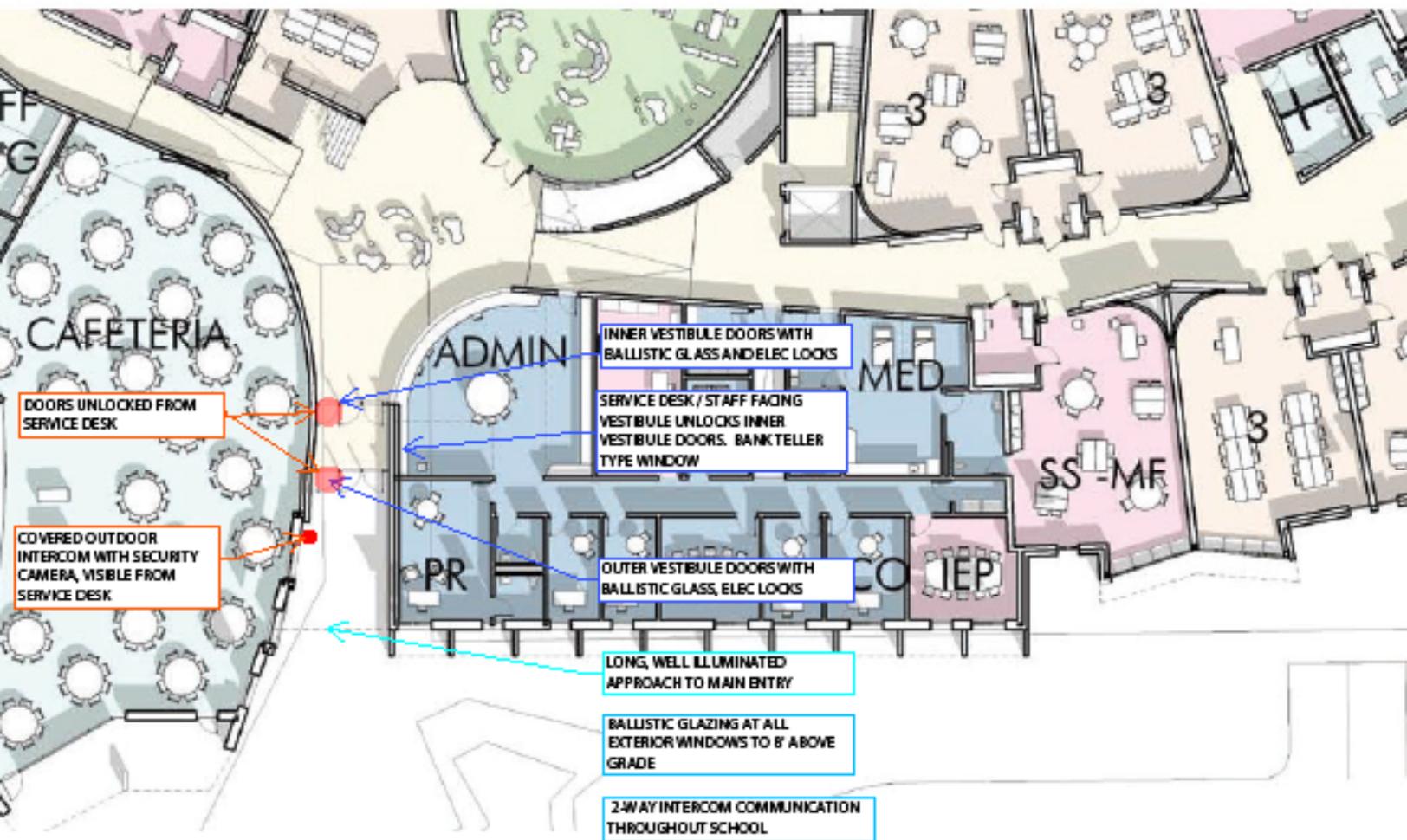
2.6 Security and Visual Access

The floor plan of the new school has been organized to allow for a prudent balance between the need for school security and the need for a warm and welcoming environment for the grade 1 through 5 students, staff, and visitors. The transparency and interconnectedness, which are desirable features of the educational program, also make for a favorable scheme for internal school security. The open floor plans provide a high degree of visual access from one portion of the school to another. This has been enhanced through the fine adjustment of classroom corridors to allow sightlines to connect the far corners of the school. All the classroom corridors include passive supervision from both teacher planning spaces and cohort commons.

Regarding security for the school from the visitors' perspective, the central administration has been located adjacent to the main entrance. Broad expanses of glass will allow observation of approaching visitors from the main school reception desk to the entrance approach and to the vestibule. The main entrance approach is configured with an outer covered area and an inner vestibule. The progress of an intruder can therefore be impeded at either line of doors. It is intended that the vestibule will be attended by administrative personnel facing into the vestibule from the central administration area.

Upon arriving, visitors will follow the following procedure:

1. Visitors will ring the bell located at the exterior door:
2. Through the voice intercom system, visitors will be asked to identify themselves and if they have an appointment in the building.
3. Once this information is received and verified for accuracy, visitors will be let into the vestibule.
4. Visitors will need to present driver's license which must be queried through the school's background check system.
5. After passing clearance, visitors will be issued a visitor badge.
6. Visitors who do not gain clearance, may be asked to leave the building immediately.
7. Anyone given a visitor badge cannot be left unattended in the building and will have staff accompany them to the designated location.
8. No visitor can ever be left unattended.



In the instance of an intruder who has successfully passed through the outer security measures of the school an intruder alarm system can be triggered. Additionally, all classrooms will be provided with roll down shades at windows facing the corridor, so that an intruder could not look directly into classrooms.

It should be noted that the intruder alarm strategy will not interfere with life safety issues during a fire alarm.

In order to allow for community access, the school is also compartmentalized for usage modes in addition to that uses during school hours. Access will be allowed through the east entrance vestibule to allow the community to utilize the Gymnasium. This vestibule will be outfitted with security cameras and electronic door locking hardware, which may be accessed and operated remotely by building security. Sliding metal fabric partitions will prevent access to the main school space.

City Representatives Consulted:

The design team has met with representatives of the Dedham Police Department and Dedham Fire department to consult on the planning process for both site and building design issues. Their input has been and will continue to be included in the project. Included in these meetings were discussions of:

- Main entrance design
- Classroom hardware (thumb turn lock function from interior, key lock function from exterior)
- Classroom Visibility
- Alternative entry locations
- Emergency vehicle access around entire building
- Ballistic Glazing

2.7 Site Development and Parking

Parking and Vehicular Access

The new school will have a larger enrollment than the existing Oakdale School, so will have an increased need for parking. The district anticipates a need for 70 permanent parking spaces to accommodate staff and visitors. These will include a minimum of 3 accessible spots, including 1 accessible van spot.

A separate pull off area will be created by widening Madison Street near the main entry to accommodate up to 2 buses, with no interaction between the buses and parent vehicles. The deliveries entrance is likewise completely separated from passenger vehicles.

SD Plan - Revised

70 Parking Spaces
- Minimum of 3 ADA Accessible Spaces Including 1 Van Space



HALVORSON
Tighe & Bond studio

2.8 Phasing

In Phases 1 and 2, while the new building is being constructed on the existing playfields, some of the new permanent parking areas will also be built adjacent to the existing Oakdale to help relieve some of the vehicular congestion issues currently being experienced.

In Phase 3, when the new school has opened, but the existing building has not yet been fully demolished, the 25' wide emergency vehicle access road will be utilized for parent queueing, if needed.

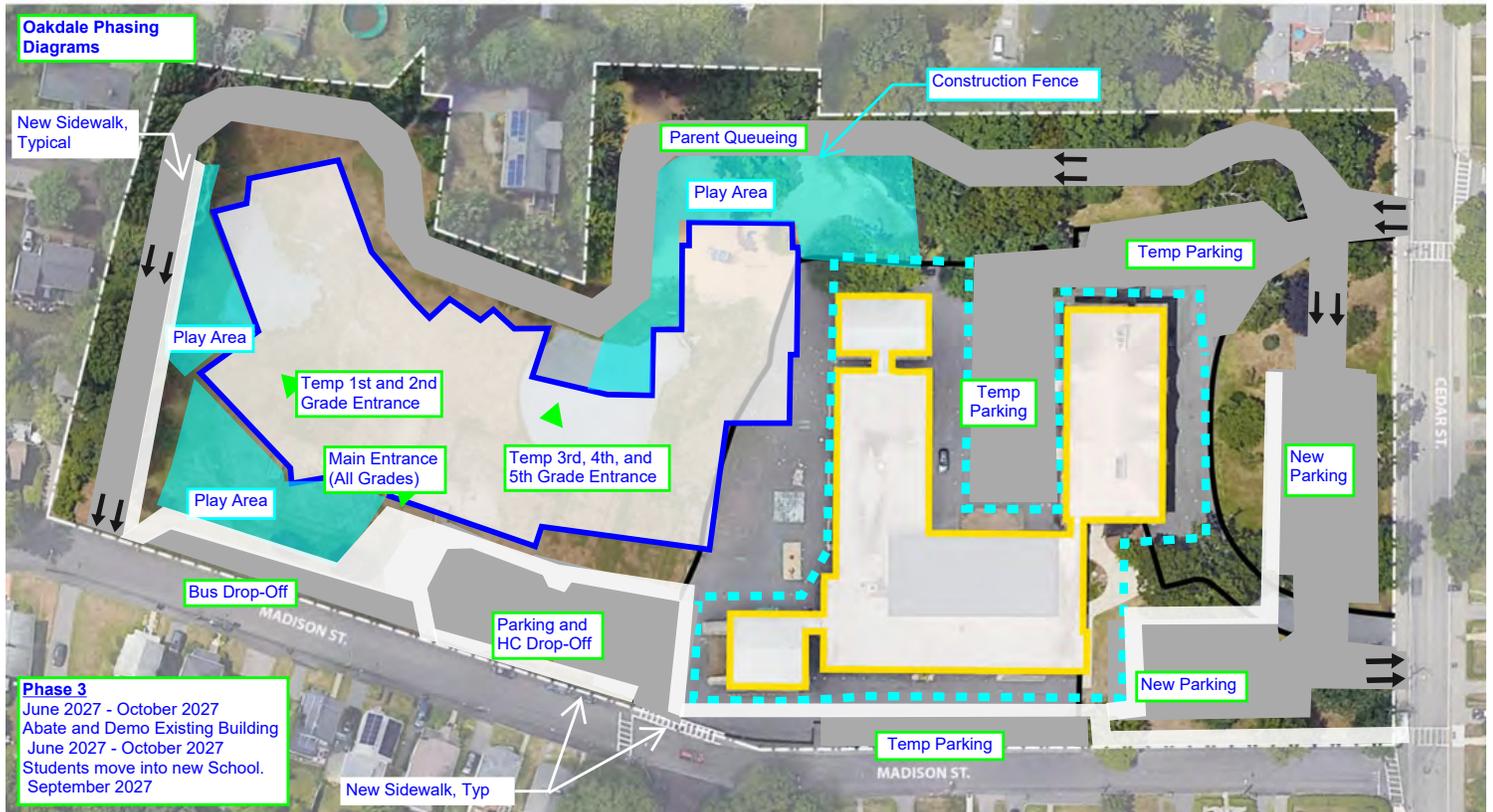
The completed project will allow the appropriate number of spaces to be available after the new building is finished, and provide appropriate queueing for passenger vehicles, as well as safe bicycle and pedestrian access.



EXISTING CONDITIONS



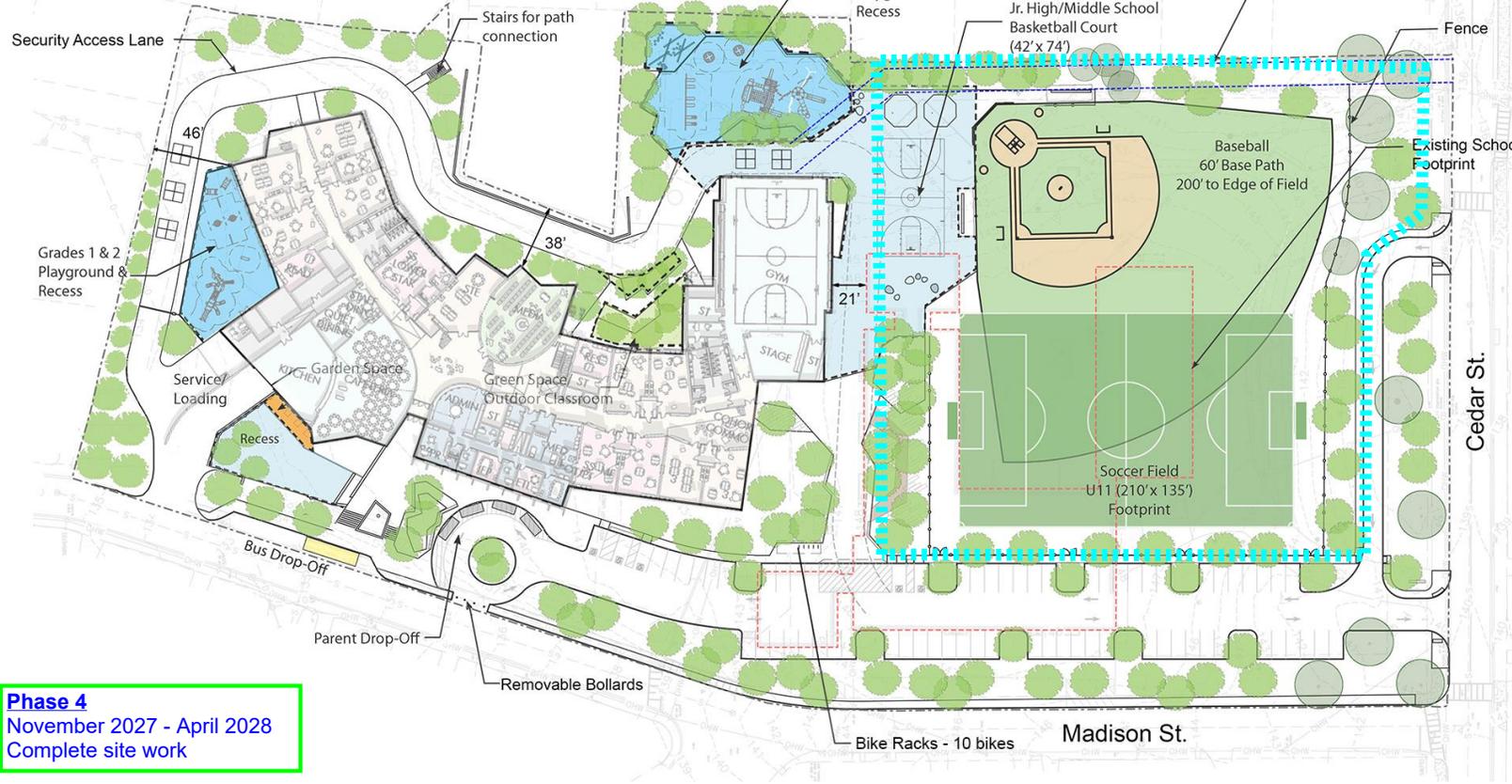
PHASE 1 AND 2



PHASE 3

Oakdale Phasing Diagrams

- Minimum of 3 ADA Accessible Spaces Including 1 Van Space



Phase 4
November 2027 - April 2028
Complete site work

PHASE 4

2.9 Focal Points and Features

The frontal cafeteria porch, with its iconic supporting columns, announces the civic presence of the school in the Dedham townscape. It is meant as a beacon drawing both students and community to the front entrance from the main viewpoint at Cedar St.



VIEW OF FRONT ENTRY FROM MADISON STREET



AREAL VIEW FROM THE NORTHWEST

AREAL VIEW FROM THE SOUTHEAST



3 Traffic Analysis

A full TIA Traffic Impact Analysis is included in the Appendix.

The report summarizes the traffic anticipated for the proposed Oakdale Elementary School can be safely accommodated on the area streets and intersections.”

4 State Site Permit Tracking Worksheet

Engineer and Architect signed worksheets follow.

- State Site Permit Tracking Worksheet
- MEPA Checklist

Date:	22-Aug-24					
District:	Dedham, Massachusetts					
Project Name:	Oakdale School					
MSBA Project ID:						
SITE PERMIT	REQUIREMENTS	FILING DATE	EXPECTED RESPONSE DATE	TRIGGER - YES/NO	AGENCY COMMENTS/SUGGESTED ACTIONS	DESIGNER RESPONSES
CONCOM	NOI	N/A	N/A	N/A		This project is not located near any resource areas (wetlands, lands subject to flooding or inundation by groundwater or surface water, ponds, streams, etc) and therefore does not require a NOI.
MHC	PNF	N/A	N/A	N/A		The existing buildings do not fall on any historic register and therefore do not require any MHC permitting
MA-DOT	PNF with MHC	N/A	N/A	N/A		This project will provide work on local Town managed roadways only.
MA-DEP	NOI	N/A	N/A	N/A		We do not anticipate having any construction activity that would trigger a MA-DEP permit.
NHESP	NOI	N/A	N/A	N/A		This project does not require a NHESP permit
MEPA	PNF with MHC	N/A	N/A	N/A		This project does not trigger any MEPA thresholds and does not require a MEPA permit.

Instructions to complete the permit tracking table:

1. Enter the date the PNF/NOI was filed.
2. Enter the date when the response is expected.
3. If a response is received from CONCOM/MHC/MA-DOT/MA-DEP/NHESP/MEPA, mention 'YES' in the 'trigger' column. Summarize the proposed/requested/mandated action by the agencies in a few words and corresponding Designer responses in the appropriate column. Please include the full response as an attachment with this submittal for MSBA's reference.
4. If there is no response by the expected response date, mention 'NO' in the 'trigger' column.
5. Indicate "Not Applicable" (where appropriate) in the "trigger" column and describe why each item is not applicable.
6. Describe the status of the following approvals. Any status updates/concerns/notes can be mentioned in the 'Designer Responses' column.
7. Make sure to attach the sheet with every submittal for the project to track any changes.
8. Provide the status of any other state or federal approval not listed above (the following list is not a comprehensive itemization of required state approvals; other requirements may apply, and some items listed below may not be applicable to this project).
9. Provide a copy of the PNF, NOI, appropriate application forms and/or approval letters where applicable.

Architect and Engineer Certification

By signing this certification, I hereby certify that all of the information provided in this "Permit Tracking Table" is true, complete and accurate to the best of my knowledge and belief.

Name of Architecture Firm: Jonathan Levi Architects

Name of Architect: Jonathan Levi

Signature of Architect: 

Date: 8/28/24

By signing this certification, I hereby certify that all of the information provided in this "Permit Tracking Table" is true, complete and accurate to the best of my knowledge and belief.

Name of Engineering Firm: CDW CONSULTANTS

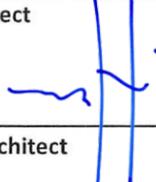
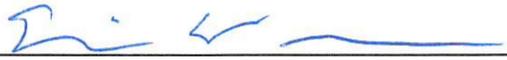
Name of Engineer: Eric Wilhelmsen

Signature of Engineer: 

Date: 8-28-24

			<ul style="list-style-type: none"> 2. Construction of a New roadway or bridge providing access to a barrier beach or a New utility line providing service to a structure on a barrier beach. 3. Dredging of 10,000 or more cy of material. 4. Disposal of 10,000 or more cy of dredged material, unless at a designated in-water disposal site. 5. Provided that a Chapter 91 License is required, New or existing unlicensed non-water dependent use of waterways or tidelands, unless the Project is an overhead utility line, a 6. Construction, reconstruction or Expansion of an existing solid fill structure of 1,000 or more sf base area or of a pile-supported or bottom-anchored structure of 2,000 or more sf base area, except a seasonal, pile-held or bottom-anchored float, provided the structure occupies flowed tidelands or other waterways. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
WATER	<ul style="list-style-type: none"> 1. New withdrawal or Expansion in withdrawal of: <ul style="list-style-type: none"> (a) 2,500,000 or more gpd from a surface water source; or (b) 1,500,000 or more gpd from a groundwater source. 2. New interbasin transfer of water of 1,000,000 or more gpd or any amount determined significant by the Water Resources Commission. 3. Construction of one or more New water mains ten or more miles in length. 4. Provided that the Project is undertaken by an Agency, New water service to a municipality or water district across a municipal boundary through New or existing pipelines, unless a 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> 1. New withdrawal or Expansion in withdrawal of 100,000 or more gpd from a water source that requires New construction for the withdrawal. 2. New withdrawal or Expansion in withdrawal of 500,000 or more gpd from a water supply system above the lesser of current system-wide authorized withdrawal volume or three- 3. Construction of one or more New water mains five or more miles in length. 4. Construction of a New drinking water treatment plant with a Capacity of 1,000,000 or more gpd. 5. Expansion of an existing drinking water treatment plant by the greater of 1,000,000 gpd or 10% of existing Capacity. 6. Alteration requiring a variance in accordance with the Watershed Protection Act, unless the Project consists solely of one single family dwelling. 7. Non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities. 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
WASTEWATER	<ul style="list-style-type: none"> 1. Construction of a New wastewater treatment and/or disposal facility with a Capacity of 2,500,000 or more gpd. 2. New interbasin transfer of wastewater of 1,000,000 or more gpd or any amount determined significant by the Water Resource Commission. 3. Construction of one or more New sewer mains ten or more miles in length. 4. Provided that the Project is undertaken by an Agency, New sewer service to a municipality or sewer district across a municipal boundary through New or existing pipelines, unless an 5. New discharge or Expansion in discharge of any amount of sewage, industrial waste water or untreated stormwater directly to an outstanding resource water. 6. New Capacity or Expansion in Capacity for storage, treatment, processing, combustion or disposal of 150 or more wet tpd of sewage sludge, sludge ash, grit, screenings, or other 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> 1. Construction of a New wastewater treatment and/or disposal facility with a Capacity of 100,000 or more gpd. 2. Expansion of an existing wastewater treatment and/or disposal facility by the greater of 100,000 gpd or 10% of existing Capacity. 3. Construction of one or more New sewer mains: <ul style="list-style-type: none"> (a) that will result in an Expansion in the flow to a wastewater treatment and/or disposal facility by 10% of existing Capacity; or (b) five or more miles in length. 4. New discharge or Expansion in discharge: <ul style="list-style-type: none"> (a) to a sewer system of 100,000 or more gpd of sewage, industrial waste water or untreated stormwater; (b) to a surface water of: <ul style="list-style-type: none"> i. 100,000 or more gpd of sewage; ii. 20,000 or more gpd of industrial waste water; or iii. any amount of sewage, industrial waste water or untreated stormwater requiring a variance from applicable water quality regulations; or (c) to groundwater of: <ul style="list-style-type: none"> i. 10,000 or more gpd of sewage within an area, zone or district established, delineated or identified as necessary or appropriate to protect a public drinking water supply, an ii. 50,000 or more gpd of sewage within any other area; iii. 20,000 or more gpd of industrial waste water; or iv. any amount of sewage, industrial waste water or untreated stormwater requiring approval by the Department of Environmental Protection of a variance from Title 5 of 5. New Capacity or Expansion in Capacity for: 	<input type="checkbox"/> <input type="checkbox"/>

	2. Modification of an existing Stationary Source with federal potential emissions that collectively will result, after construction and the imposition of required controls, of 75,000 tpy of GHGs based on CO2 Equivalent.	<input type="checkbox"/>	2. Modification of an existing Stationary Source resulting in a "significant net increase" in actual emissions, provided that the stationary source or facility is major for the pollutant. For purposes of this threshold, a "significant net increase" in actual emissions shall mean an increase in emissions of: 15 tpy of PM10; 10 tpy of PM 2.5; 100 tpy of CO; 40 tpy of SO2; 25 tpy of VOC or NOx; 0.6 tpy of lead.	<input type="checkbox"/>
SOLID AND HAZARDOUS WASTE.	1. New Capacity or Expansion in Capacity of 150 or more tpd for storage, treatment, processing, combustion or disposal of solid waste, unless the Project is a transfer station, is an Expansion of an existing facility within a validly site assigned area for the proposed use, or is exempt from site assignment requirements.	<input type="checkbox"/>	1. New Capacity or Expansion in Capacity for combustion or disposal of any quantity of solid waste, or storage, treatment or processing of 50 or more tpd of solid waste, unless the Project is exempt from site assignment requirements. 2. Provided that a Permit is required in accordance with M.G.L. c. 21D, New Capacity or Expansion in Capacity for the storage, recycling, treatment or disposal of hazardous waste.	<input type="checkbox"/> <input type="checkbox"/>
HISTORICAL AND ARCHAEOLOGICAL RESOURCES.	None		1. demolition of all or any exterior part of any Historic Structure listed in or located in any Historic District listed in the State Register of Historic Places or the Inventory of Historic and 2. destruction of all or any part of any Archaeological Site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth.	<input type="checkbox"/> <input type="checkbox"/>
AREAS OF CRITICAL ENVIRONMENTAL CONCERN.	None		1. Any Project of ½ or more acres within a designated ACEC, unless the Project consists solely of one single family dwelling.	<input type="checkbox"/>
REGULATIONS.	None		Promulgation of New or revised regulations, of which a primary purpose is protecting against Damage to the Environment, that significantly reduce: 1. standards for environmental protection; . 2. opportunities for public participation in permitting or other review processes; or 3. public access to information generated or provided in accordance with the regulations.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Architect and Engineer Certification By signing this certification, I hereby certify that all of the information provided in this "MEPA Trigger Checklist" is true, complete and accurate to the best of my knowledge and belief.		By signing this certification, I hereby certify that all of the information provided in this "MEPA Trigger Checklist" is true, complete and accurate to the best of my knowledge and belief.	
Jonathan Levi Architects <hr/> Name of Architecture Firm		<i>CDW Consultants</i> <hr/> Name of Engineering Firm	
Jonathan Levi <hr/> Name of Architect		<i>Eric W. Theberge</i> <hr/> Name of Engineer	
 <hr/> Signature of Architect		 <hr/> Signature of Engineer	
8/28/24 <hr/> Date		8-28-24 <hr/> Date	

5 Site Vulnerability Risk Assessment / Evaluation

The site design integrates weather-resistant materials and construction techniques to handle a range of climate conditions. It will include a modern drainage system tailored to manage runoff and prevent erosion. Furthermore, the site is located away from any wetland resource areas and is well outside designated flood zones, promoting resilience and environmental stability.

6 Environmental and Building Assessment

Hazardous materials were found that are consistent with a school of this vintage. The complete Hazardous Materials Identification Study dated July-August 2023 is included in the previously submitted Revised PSR dated. 5/2/24.

The Designer and OPM Cost Estimates included in Sections 18 and 19 of this report also identify the costs.

7 Geotechnical and Geoenvironmental Analysis

Geotech

There are no updates from the full Preliminary Geotechnical Data and Engineering Report dated 9/25/23 that was included in the previously submitted Revised PSR dated. 5/2/24.

A layer of organic rich topsoil is identified as not suitable bearing strata and would need to be removed and replaced with compacted structural fill. It is recommended the proposed building be supported on spread or strip footings where the bearing soil layer is at least 4-ft below the ground surface.

The Designer and OPM Cost Estimates, also included in Sections 18 and 19 of this report identify the costs.

Geoenvironmental

There are no updates from the full Geo-Environmental Sampling Results Summary dated 10/19/23 is included in the previously submitted Revised PSR dated. 5/2/24.

Based on the initial soil sampling, field screening, and laboratory analysis, there are no reportable conditions identified and the soil, where sampled, does not exhibit evidence of contamination.

8 Code Analysis

Fire Protection and Life Safety Narrative follows. This report also addresses ADA and MAAB requirements for the project.

SCHEMATIC DESIGN

August 20, 2024

FIRE PROTECTION AND LIFE SAFETY NARRATIVE

PREPARED FOR JONATHAN LEVI ARCHITECTS

DEDHAM OAKDALE SCHOOL

147 CEDAR STREET
DEDHAM, MA



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DOCUMENT HISTORY

Schematic Design Fire Protection and Life Safety Code Compliance Strategy November 13, 2023
100% Schematic Design Fire Protection and Life Safety Code Compliance Strategy December 29, 2023
Revised 100% Schematic Design Fire Protection and Life Safety Code Compliance Strategy August 20, 2024

This document “Schematic Design Fire Protection and Life Safety Code Compliance Strategy” is intended for use by the design team and code officials for understanding the building design concept for the proposed Dedham Oakdale School located in Dedham, MA. This document contains the code basis for the building design, functionality of the egress system, fire protection recommendations, the smoke control system design concept, and a comprehensive code outline.

This document is a preliminary draft based on the concept building plans sent from Jonathan Levi Architects dated July 25, 2024. This document is a work in progress, will be updated as the design progresses and discussions/agreements with the Authorities Having Jurisdiction occur.

PURPOSE

The purpose of this report is to document and provide the code compliance strategy, including the framework for the fire protection and life safety concept, for the proposed Dedham Oakdale School in Dedham, MA. This document will also identify design concepts that are not clearly addressed by the applicable building codes, which will require approval and or interpretation by the authorities having jurisdiction (AHJ).

APPLICABLE CODES AND REQUIREMENTS

The following codes are presently adopted in the State of Massachusetts:

- **Building** Massachusetts State Building Code (MSBC), 10th Edition, which adopts and amends the 2021 International Building Code and the 2021 International Existing Building Code (IEBC).
- **Accessibility** Massachusetts Architectural Access Board (MAAB), 521-CMR.
2010 ADA Standards for Accessible Design
- **Electrical** Massachusetts Electrical Code, 527 CMR, 12.00. The Massachusetts Electrical Code is an amended version of the 2023 National Electrical Code (NFPA 70).
- **Elevators** Massachusetts Elevator Regulations, 524-CMR.
- **Energy** 2021 Edition of the International Energy Conservation Code (IECC) as amended by the State of Massachusetts. This includes the opt in requirements adopted by the Town of Dedham.
- **Fire Prevention** 527 CMR 1.00: Massachusetts Comprehensive Fire Safety Code, which adopts and amends the 2021 edition of NFPA 1.
- **Mechanical** International Mechanical Code, 2021 edition, as adopted and amended by the MSBC (Chapter 28).
- **Plumbing** Massachusetts Fuel Gas and Plumbing Codes (248 CMR) (applicable December 8, 2023)
- **Other** National Fire Protection Association (NFPA) Standards, as referenced and amended by the MSBC and the MFPR.

It should be noted that the State of Massachusetts is in the process of adopting the 10th Edition of 780 CMR which will adopt and amend the 2021 International Building Code. The adoption of the new code has not yet been announced; however, it is Howe Engineers' understanding that the new code will be adopted in 2024. As such, it is recommended that the project be designed using the future code as opposed to the currently applicable 9th edition of 780 CMR.

PROJECT DESCRIPTION

Howe Engineers has prepared this document for the proposed Dedham Oakdale School in Dedham, MA. The proposed building will be a newly constructed, two (2) story building plus a basement with a footprint area of approximately 51,000 square feet. The building will contain primarily Group E, Educational spaces for students from 1st through 5th grade, with a cafeteria (Group A-2, Assembly), accessory office and lounge spaces, and accessory storage and mechanical space. There is a gymnasium in the building will be classified as a Group A-3 occupancy as it will be used to host public events. The Media Spaces, Cafeteria, and Gymnasium will all be double height spaces.

This narrative addresses the requirements contained in the 10th edition of 780 CMR, The Massachusetts State Building Code (MSBC), which is an amended version of the 2021 International Building Code (IBC).

GENERAL OPERATING ASSUMPTIONS

The following general operating assumptions serve as the basis for the Life Safety and Fire Protection design and should be incorporated into the new facility's operations plan. It is the responsibility of the Owner/Operator to ensure that these assumptions are enforced:

- Materials used will meet the interior finish requirements of the MSBC and NFPA 1.
- Hazardous materials and explosives are not permitted within the building unless protected in accordance with the MSBC and MFPC and approved by the AHJ.

NEW CONSTRUCTION – CODE COMPLIANCE APPROACH

OCCUPANCY CLASSIFICATION

The proposed Dedham Oakdale School is classified as a mixed-use occupancy in accordance with MSBC Section 508.1 with a primary occupancy of Group E, Educational. The occupancies in the building on the respective levels are as follows:

Basement	USE GROUP
Storage/ MEP	S-1/S-2
Level 1 (Level of Exit Discharge)	USE GROUP
Classrooms	E
Media Room	E/A-3
Office/Administration/Nurse	B
Lobby	B / A-3
Cafeteria/Kitchen	A-2
Gymnasium	A-3
Storage	S-1
MEP Space	S-2
Level 2	USE GROUP
Classrooms/ Maker Space	E
Office/Administration	B
Commons	A-3
Storage	S-1
MEP Space	S-2

OCCUPANCY SEPARATIONS

The building contains multiple occupancy types and is classified as “mixed occupancy” in accordance with MSBC Section 508.1. Therefore, the building is required to comply with the requirements of Section 508.3 (non-separated uses) or 508.4 (separated uses), or combinations of these sections. Occupancy separations will be required to be provided throughout the building. Refer to the Building Construction section below for minimum construction type necessary to achieve separated uses.

SPECIAL FIRE SEPARATIONS REQUIRED

Several reference standards applicable to this building require minimum/additional fire resistance rated separations for specific use areas within the building:

Room or Area	Separation and/or Protection
MSBC Section 509 - Furnace rooms where any piece of equipment is over 400,000 BTU/hr. input	1-hour, or automatic sprinkler protection ¹
MSBC Section 509 - Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1-hour, or automatic sprinkler protection ²
Refrigeration Machinery Rooms	1-hour, or provide sprinkler protection
MSBC Section 509 - Waste collection rooms over 100 square feet	1-hour, or automatic sprinkler protection ²
NFPA 110 – Emergency Generator Room	2-hour and automatic sprinklers
NFPA 20 – Fire Pump Room	1-hour and automatic sprinklers
NFPA 70 – Electrical Rooms (with equipment over 112.5 kVA)	1-hour and automatic sprinklers ²
Emergency Electrical Rooms	2-hours

¹ Where sprinkler protection is provided in lieu of a fire-resistance rated fire barriers, such space must be separated from the remainder of the building by construction capable of resisting the passage of smoke (smoke-tight construction). Such walls must extend from the floor surface to the underside of 2-hour fire-resistance rated construction or the roof. Doors within the wall construction must be self-closing and not provided with air-transfer openings. Walls must not be provided with air-transfer openings unless provided with a smoke damper.

BUILDING CONSTRUCTION

BUILDING HEIGHT AND AREA

A fully sprinklered building that contains Group A-2, Group A-3, Group B, Group E, and Group S-2 occupancies and utilizes the separated use provisions of MSBC Section 508.3 is permitted to be constructed of Type IIA or Type aIV-C construction. A variance may be sought to use CLT columns in a Type IIA building. The Dedham Oakdale School will be two (2) stories above grade plane with a footprint area of approximately 51,634 square feet. Refer to the optional construction type approaches below for further information on the minimum construction type required for the building.

CONSTRUCTION TYPE

The proposed Dedham Oakdale School must minimally be constructed of Type IIA protected noncombustible construction, or Type IV-C protected combustible construction, based on the proposed height and area. Type IIA and Type IV-C construction will require a separated mixed-use occupancy approach.

Refer to table below for the allowable height and area of each occupancy associated with the optional construction types discussed below.

Occupancy	Type IIA			Type IV-C		
	Allowable Height (Stories)	Allowable Area (SF)	Allowable Area (SF) w 100% open perimeter	Allowable Height (Stories)	Allowable Area (SF)	Allowable Area (SF) w 100% open perimeter
A-2 / A-3	4	46,500	58,125	6	56,250	70,312
B	6	112,500	140,625	9	113,000	168,750
E	4	79,500	99,375	4	98,625	119,531
S-1	5	78,000	97,500	5	95,625	119,531
S-2	6	117,000	146,250	5	144,875	180,468

Option 1: Type IIA Construction (lowest required structural fire ratings)

Based on the footprint area noted above, the building would not comply with the height and area limitations for Type IIB construction. As such, the building must minimally be constructed of Type IIA protected noncombustible construction (1-hr primary structure, floors, bearing walls, and roof) and is permitted to be a non-separated mixed use building. The roof structure in Type IIA construction is permitted to be heavy timber in accordance with the footnote in table 601 below, this does not apply to columns which are required to be noncombustible. **Given the media center column only supports the roof of the media center, it may be possible to pursue a variance for the use of CLT in the one structural element. This will need to be evaluated further as the design progresses. R**

Option 2: Type IV-C Construction

Alternatively, the building could be constructed as a non-separated mixed use building of Type IV-C construction (2-hr primary structure, bearing walls, floors, and a 1-hr roof) with a mix of CLT and noncombustible framing. **In this option, a CLT column would be permitted, provided it meets the necessary rating requirements for Type IV-C Construction (minimum 2-hour, reduced to 1-hour, where supporting a roof only).**

Refer to the table below for the fire-resistance ratings associated with Type IIA and IV-C construction.

FIRE RESISTANCE RATING

The fire-resistance rating requirements for Type IIA and IV-C construction can be found in MSBC Table 601. The required fire-resistance ratings for the building structural elements to achieve Type IIA and IV-C construction are provided in the table on the following page:

Fire Resistance Ratings of Structural Elements for Type IIA and IV-C Construction

BUILDING STRUCTURAL ELEMENT	FIRE RESISTANCE RATING – TYPE IIA	FIRE RESISTANCE RATING – TYPE IV-C
<p>Primary Structural Frame</p> <p>Including girders, beams, trusses and roof members (other than columns):</p> <p style="padding-left: 20px;">Supporting a floor</p> <p style="padding-left: 20px;">Supporting roof only</p> <p>Columns:</p> <p style="padding-left: 20px;">Supporting a floor</p> <p style="padding-left: 20px;">Supporting roof only</p>	<p>1 hour</p> <p>1 hour*</p> <p>1 hour</p> <p>1 hour</p>	<p>2 hours</p> <p>1 hour</p> <p>2 hours</p> <p>2 hours</p>
<p>Bearing Walls</p> <p>Exterior</p> <p>Interior Walls:</p> <p style="padding-left: 20px;">Supporting more than one floor</p> <p style="padding-left: 20px;">Supporting only roof</p>	<p>1 hour</p> <p>1 hour</p> <p>1 hour</p>	<p>2 hours</p> <p>2 hours</p> <p>2 hours</p>
<p>Nonbearing Walls and Partitions</p> <p>Exterior (<i>not less than fire separation requirements</i>)</p> <p>Interior (<i>not less than fire separation requirements</i>)</p>	<p>See Fire Separation (Table 705.5)</p> <p>0 hours</p>	<p>See Fire Separation (Table 705.5)</p> <p>0 hours</p>
<p>Floor Construction</p> <p>Including supporting beams and joists</p>	<p>1 hour</p>	<p>2 hours</p>
<p>Roof Construction (other than primary members)</p> <p><i>Including supporting beams and joists:</i></p> <p style="padding-left: 20px;">Less than 20 feet in height to lowest member</p> <p style="padding-left: 20px;">20 feet or more in height to lowest member</p>	<p>1 hour*</p> <p>0 hours*</p>	<p>1 hour</p> <p>1 hour</p>

*Heavy Timber complying with Section 2304.11 shall be allowed for roof construction, where a 1-hour or less fire resistance rating is required.

Where there is an accessible concealed floor, floor-ceiling, or attic space, any fire-resistance rated wall that is required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space (MSBC 703.5). Such identification shall:

- Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition.
- Include lettering not less than 3 inches in height with a minimum 3/8-inch stroke in a contrasting color incorporating the suggested wording “FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS,” or other wording.

The building is proposed to contain primarily noncombustible construction, however the design intent for larger/high ceiling spaces (gym, cafeteria, media center) includes the use of CLT within the roof structure. Heavy timber is permitted to be used as part of the primary roof framing in accordance with footnote C to table 601. As such, CLT/HT members could be used within roof framing.

In addition, it is Howe Engineers understanding that the design team may include a single CLT column in the center of the media center to support the roof structure. CLT is not permitted to be used in the primary structural framing in Type IIA construction. A CLT column would be permitted if the building is constructed of Type IV-C construction which permit heavy timber to be used in primary structural framing elements. If Type IIA construction is pursued for the building, a variance may be required in order to utilize a CLT column within the media center. **Further discussion with Howe Engineers and the AHJ is required as the design progresses.**

EXTERIOR WALLS

The MSBC regulates the fire resistance rating of exterior walls and the extent to which protected and unprotected openings are permitted in the exterior walls of facing buildings based on the fire separation distance to the lot line or to the center of the street. See tables below. For Type IIA and IV-C construction and the occupancies within the proposed Dedham Oakdale School, exterior walls must be 1-hour and 2-hour rated where the fire separation distance is less than 30 feet (MSBC Table 705.5). Since the building will be fully sprinklered, unlimited unprotected openings are permitted in these exterior walls where the fire separation distance is 20 feet or more (MSBC Table 705.8).

Fire Resistance Rating for Exterior Non-Loading-Bearing Walls

Based on Fire Separation Distance (MSBC Table 705.5)

FIRE SEPARATION DISTANCE (Building wall to property line for each side of the building)	FIRE-RESISTANCE RATING (GROUP S-1)	FIRE-RESISTANCE RATING (GROUP A, B, E, S-2)
<i>Less than 5 feet</i>	2 hours	1 hour
<i>Greater than or equal to 5 feet and less than 10 feet</i>	1 hour	1 hour
<i>Greater than or equal to 10 feet and less than 30 feet</i>	1 hour	1 hour
<i>Greater than or equal to 30 feet</i>	0 hours	0 hours

The required fire-resistance rating of exterior walls with a fire separation distance of greater than 10 feet must be rated for exposure to fire from the inside. The required fire-resistance rating of exterior walls with a fire separation distance of less than or equal to 10 feet must be rated for exposure to fire from both sides.

Maximum Area of Exterior Wall Openings

Based on MSBC Table 705.8

Fire Separation Distance to Lot Line (feet)	Allowable Area of Opening (Sprinklered)
0 to less than 3	Not Permitted
3 to less than 5	15%
5 to less than 10	25%
10 to less than 15	45%
15 to less than 20	75%
20 to less than 25	No Limit
25 to less than 30	No Limit
30 or greater	No Limit

Fire Resistant Joint Systems

Joints installed in or between fire-rated walls, floors or floor/ceiling assemblies and roofs or roof/ceiling assemblies must be protected by an approved fire-resistant joint assembly having a rating equal to the rating of the wall, floor, or roof. Joint systems shall be tested in accordance with MSBC Section 715. Firestopping Special Inspections are required in accordance with 780 CMR Chapter 17.

Listed and approved joint assemblies must be provided for all concealed locations where fire resistance rated assemblies form a joint.

INTERIOR FINISHES AND FLOOR FINISHES

Interior finishes in the building are required to meet the requirements of MSBC Section 803 for interior finish. Refer to the following tables for details. Interior finish applies to wall and ceiling finishes. Interior floor finish applies to floor coverings.

Interior Wall & Ceiling Finish Requirements by Occupancy

Sprinklered Building (MSBC Table 803.11)

USE GROUP	VERTICAL EXITS AND PASSAGEWAYS	EXIT ACCESS CORRIDORS	ROOMS AND ENCLOSED SPACES
A-2	A or B	A or B	A, B, or C
A-3	A or B	A or B	A, B, or C
B, E	A or B	A, B, or C	A, B, or C
S-1 & S-2	A, B, or C	A, B, or C	A, B, or C

Interior Floor Finish Requirements by Occupancy

Interior floor finish and floor coverings must comply with MSBC Section 804, unless the floor finish or covering material is of traditional type, such as wood, vinyl, linoleum, or terrazzo and resilient floor covering materials not comprised of fibers.

LABORATORY HAZARDOUS CHEMICAL STORAGE

Control Area Approach

The MSBC permits limited amounts of hazardous materials in Use Group E Educational Occupancies. Under this approach, each floor of the building is permitted to have a certain number of Control Areas that are separated by fire resistance rated construction. The number of Control Areas and quantity of hazardous materials permitted on each floor varies based on the ease of fire department access to those given spaces.

The control areas should be separated from adjacent spaces by one (1)-hour fire resistance rated separations on the First through Third Floors (MSBC Table 414.2.2). The required fire resistance rating for the floors and their supporting construction is one (1) hour rated, which is satisfied by the 1-hour floors per Type IIA Construction (2-hour floors per Type IV-C). Doors in the one (1)-hour control area separation should be rated for $\frac{3}{4}$ -hour and doors (MSBC Table 716.1(2)). It should be noted that unprotected vertical openings are not permitted in control areas unless a sum of the ratios for chemical quantity is utilized.

Multiple control areas per floor can be provided if they are separated with fire resistance rated fire barrier. Table 414.2.2 of the MSBC (shown below) provides the requirements for control area design by floor level in the building. It should be noted that the number of control areas permitted, and the maximum allowable quantity of hazardous materials permitted per control area is reduced on floors above and below grade. Hazardous materials in storage and in use within this control area will be limited to the quantities specified in MSBC Table 307.1 (1) and (2). The quantity limits shown include an allowable increase for approved storage and automatic sprinkler protection.

MSBC Table 414.2.2 Design and Number of Control Areas

Floor Level		Percentage of the Maximum Allowable Quantity Per Control Area	Number of Control Areas Per Floor	Fire-Resistance Rating for Fire Barriers in Hours
Above Grade	2	75	3	1
Plane	1	100	4	1

- a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 307.1(1) and 307.1(2) with all increases allowed in the notes to those tables.
- b. Fire barriers shall include walls and floors and supporting construction as necessary to provide separation from other portions of the building.

As can be seen from the table above, the First Floor is allowed to have four (4) control areas. Above grade floors are permitted to have fewer control areas and each control area above grade is permitted to store less hazardous materials.

Table 414.2.2 of the MSBC (shown above) provides the requirements for control area design by floor level in the building. The IBC has a defined threshold for when an occupancy must be classified as a Group H High Hazard occupancy. The maximum allowable quantity per control area for hazardous materials is found in IBC Section 307. **If the quantities from Table 307.1(1) are exceeded, the occupancy must be classified as a Group H occupancy.** Table 307.1(1) also indicates what Hazard Occupancy Group (Group H-1 through H-5) the building must be classified as when the quantities in Table 307.1(1) are exceeded.

Fire Code Requirements for Hazardous Chemicals

The Massachusetts Fire Code 527 CMR adopts and amends the 2021 version of NFPA 1. Chapter 66 from the Massachusetts fire code contains the requirements for Flammable and combustible liquids. The Massachusetts fire code requires that the storage, handling and use of flammable or combustible liquids comply with NFPA 30. According to Section 1.5.3, a laboratory installation made in accordance with NFPA 45 is determined to be in compliance with NFPA 30.

66.1.1* *The storage, handling, and use of flammable and combustible liquids, including waste liquids, as herein defined and classified, shall comply with this chapter; NFPA 30, Flammable and Combustible Liquids Code; Sections 60.1 through 60.4 of this Code; and NFPA 35 Standards for the Manufacture of Organic Coatings, as applicable.*

Most restrictive requirements NFPA 30 and NFPA 45-

It is noted that NFPA 30 does not govern storage of liquids in a laboratory. In the open work area of the laboratory, the quantity of flammable liquid in the work area is governed by NFPA 45, which is the standard on fire protection for laboratories using chemicals.

Massachusetts Fire Code Section 66.1.4 from NFPA 1 states that a laboratory that is installed in accordance with NFPA 45 is considered in compliance with the NFPA 1. Furthermore, it is noted that in accordance with Section 1.5.3 of NFPA 30, a laboratory that is installed in accordance with NFPA 45 is considered in compliance with NFPA 30.

1.5.3

Installations made in accordance with the applicable requirements of the following standards shall be deemed to be in compliance with this code:

- (1) NFPA 1
- (2) NFPA 20
- (3) NFPA 30A
- (4) NFPA 31
- (5) NFPA 32
- (6) NFPA 33
- (7) NFPA 34
- (8) NFPA 35
- (9) NFPA 36
- (10) NFPA 37
- (11) NFPA 45
- (12) NFPA 99
- (13) NFPA 101

Figure 1: NFPA 30 Section 1.5.3 states installations made in accordance with NFPA 45 are considered in compliance with NFPA 30.

66.1.4

Installations made in accordance with the applicable requirements of the following standards shall be deemed to be in compliance with this Code:

- (1) NFPA 20
- (2) NFPA 30A
- (3) NFPA 31
- (4) NFPA 32
- (5) NFPA 33,
- (6) NFPA 34
- (7) NFPA 35
- (8) NFPA 36
- (9) NFPA 37
- (10) NFPA 45
- (11) NFPA 99
- (12) NFPA 101

[30:1.5.3]

Figure 2: NFPA 1 Section 66.1.4 states installations made in accordance with NFPA 45 are considered in compliance with NFPA 1.

NFPA 45 Laboratory Installation Requirements

In NFPA 45, Laboratories are classified as Laboratory Units A through D. Classification A represents a high hazard and D minimum fire hazard. The difference being the quantity of flammable and combustible liquids permitted to be utilized in the laboratory. Table 5.1.1 from NFPA 45 contains the requirements for the separation and number of stories above and below grade that a lab can be located. This table is similar to the requirements contained in Table 414 of the International Building Code. In accordance with Section 5.1.3, a minimum 1-hour fire separation is required for laboratories in Educational Buildings.

Table 5.1.1 Separation Requirements and Height Allowances for Laboratory Units

Laboratory Unit ^a	Permitted Stories Above Grade	Permitted Stories Below Grade	Fire Separation ^b
A	1–3	Not permitted	2 hours
B	1–3	1	1 hour
	4–6		2 hours
C	1–6	1–2	1 hour ^c
	Over 6		2 hours
D	No limit	No limit	1 hour ^c

^aRefer to Table 9.1.1 for laboratory unit classification.

^bSeparation in this table refers to fire separation from laboratory unit(s) to nonlaboratory areas or fire separations from laboratory unit(s) of equal or lower hazard classification.

^cSee 5.1.2.

NFPA 45 Requirements for Maximum Allowable Quantities of Flammable Liquids.

Chapter 9 from NFPA 45 contains the quantity limitations for flammable and combustible liquids. The maximum allowable quantities for flammable and combustible liquids can be found in Table 9.1.1(b) (See Table 9.1.1(b) below).

Table 9.1.1(b) Maximum Quantities of Flammable and Combustible Liquids in Laboratory Units Outside of Inside Liquid Storage Areas (U.S. Customary Units)

Laboratory Unit Fire Hazard Class	Flammable and Combustible Liquid Class ^a	Quantities in Use ^a		Quantities in Use and Storage ^a	
		Maximum Quantity ^b per 100 ft ² of Laboratory Unit ^c (gal)	Maximum Quantity ^b per Laboratory Unit (gal)	Maximum Quantity ^b per 100 ft ² of Laboratory Unit ^c (gal)	Maximum Quantity ^b per Laboratory Unit (gal)
A	I	10	480	20	480
(high fire hazard)	I, II, and IIIA	20	800	40	1600
B ^d	I	5	300	10	480
(moderate fire hazard)	I, II, and IIIA	10	400	20	800
C ^e	I	2	150	4	300
(low fire hazard)	I, II, and IIIA	4	200	8	400
D ^e	I	1	75	2	150
(minimal fire hazard)	I, II, and IIIA	1	75	2	150

Note: For maximum container sizes, see Table 9.1.2.

^aThe maximum amount in use in open systems is limited to 10 percent of the quantities listed. Flammable and combustible liquid in a safety can or approved storage cabinet and not physically connected to equipment is considered to be in storage; otherwise the liquids are considered to be in use. PLDCs are always considered to be in use.

^bSee Section 4.2 for additional requirements for educational and instructional laboratory units, and laboratory units in health care facilities.

^cThe quantities per 100 ft² do not imply the quantities must be within that 100 ft² area; the quantities per 100 ft² are for calculation purposes to determine the total quantity allowed per laboratory work area and the total amount overall in the laboratory unit.

^dReduce quantities by 50 percent for B laboratory units located above the 3rd floor.

^eReduce quantities by 25 percent for C and D laboratory units located on the 4th–6th floors of a building, and reduce quantities by 50 percent for C and D laboratory units located above the 6th floor.

The maximum allowable quantity permitted by Table 9.1.1 is based on a per 100 sq. ft. of laboratory area.

NFPA 45 Instructional Laboratory classification

It is noted that NFPA 45 has a designation for Instructional Laboratories, which is classified as a lab that is used for educational purposes for college aged students. Experiments and testing in an Instructional Lab are typically conducted under supervision of a lab instructor.

3.3.31 Instructional Laboratory Unit.

A laboratory unit under the direct supervision of an instructor that is used for purposes of instruction for students beyond the twelfth grade.

Summary of the Maximum Allowable Quantities from IBC, NFPA 30 and NFPA 45

Table to be provided at a later date. Requires further discussion with Howe Engineers

PENETRATIONS OF DUCT AND AIR TRANSFER OPENINGS

MEP Shaft Enclosures

A shaft is required when the duct penetrates two (2) or more floor/ceiling assemblies (MSBC Section 717.6.1). A shaft is not required in occupancies other than Groups I-2 and I-3, for a duct constructed of approved materials in accordance with the International Mechanical Code that penetrates, not more than one (1) fire-resistance-rated floor/ceiling assembly (connecting only 2 stories), provided a listed fire damper is installed at the floor line or the duct is protected in accordance with MSBC Section 714.5 (MSBC Section 717.6).

MSBC Section 713.4 provides that for shafts connecting less than four (4) stories, a 1-hour fire rated shaft enclosure is required. Additionally, shaft enclosures must not have a fire resistance rating that is less than the rating of the floor that they are penetrating but need not exceed two (2) hours. Openings in a shaft enclosure are required to be limited to those necessary for the purpose of the shaft (MSBC Section 713.7.1). Where shafts do not extend to the top or bottom of a building, adequate protection should be provided (MSBC Section 713.11 and Section 713.12).

Further, as the building is considered Type IIA construction with 1-hour fire-resistance rated floor assemblies, duct systems constructed of approved materials are not required to be located within a shaft provided the duct does not penetrate more than two (2) stories and a listed fire damper is installed at the floor line or the duct is protected in accordance with Section 714.4.

Fire Dampers

Fire dampers should have a fire resistance rating in accordance with the table below (MSBC Table 717.3.2.1). The actuation temperature of the actuating device should be approximately 50°F above the normal temperature within the duct system (MSBC Section 717.3.3.1). If a fusible link is used, it should have a temperature rating not less than 160°F (MSBC Section 717.3.3.1).

Fire Damper Rating

Type of Penetration	Minimum Fire Damper Rating
Less than 3-hour fire-resistance rated assemblies	1½ hours
3-hour or greater fire-resistance rated assemblies	3 hours

Fire dampers are required at locations where ducts or air transfer openings of an air distribution system penetrate fire resistance rated assemblies including the following:

- Fire barriers (MSBC Section 717.5.2).
- Shaft enclosures (MSBC Section 717.5.3).
- Fire partitions (MSBC Section 717.5.4).
- Horizontal assemblies (MSBC Section 717.6).

Smoke Dampers

Actuation of smoke dampers should be achieved in accordance with the table below (MSBC Section 717.3.3.2).

Smoke Damper Actuation Methods

Damper Location	Activation Method
Within a duct	Activation controlled by a smoke detector within 5 feet of the damper with no air outlets or inlets between the detector and the damper.
Above smoke barrier doors in a smoke barrier	Activation controlled by a spot type detector listed for releasing service should be installed on both sides of the smoke barrier door opening.
In an un-ducted opening in a wall	Activation controlled by a spot type detector listed for releasing service should be installed within 5 feet of the damper.
In a corridor wall	Activation controlled by smoke detector system in the corridor.
All	Where a total-coverage smoke detector system is provided within areas served by HVAC system, dampers are permitted to be controlled by the smoke detection system.

Smoke dampers are required at locations where ducts or air transfer openings of an air distribution system penetrate assemblies including:

- Shaft enclosures (MSBC Section 717.5.3).
- Smoke barrier walls (MSBC Section 717.5.5).
- Horizontal Exits in fire walls (MSBC Section 717.5.1).
- Corridors (MSBC Section 717.5.4.1).
- Smoke Partitions (MSBC Section 717.5.7).
- Smoke-tight construction (MSBC Section 509.4.2)

The table on the following page reiterates smoke damper (SD) requirements and provides several exceptions in accordance with the MSBC.

Combination Smoke/Fire Dampers

Where a penetration of a smoke barrier is required to be provided with a fire damper, a combination fire and smoke damper equipped and arranged to be both smoke- and heat-responsive should be provided (MSBC 717.5). Combination smoke/fire dampers are required in shaft penetrations (MSBC 717.5.3).

Through Penetration Protection

Penetrations into or through fire barriers, smoke barrier walls, fire partitions, floor/ceiling assemblies, or the ceiling membrane of a roof/ceiling assembly are required to be protected with an approved through penetration or membrane penetration assembly (MSBC 714). See MSBC 714 for exceptions. Since the building will contain Group E occupancies with an occupant load greater than 250, it will be classified as Risk Category III per MSBC Table 1604.5, meaning special inspections must be performed for penetrations in accordance with MSBC 1705.17.

Damper Exceptions

The table below has been developed by Howe Engineers in identifying where dampers are required and where exceptions exist.

	FD	SD	MSBC	Applicable SD, FD & SD/FD Damper Exceptions
Fire Barriers (including horizontal exits) ²	Required	Not Required (NR)	717.5.2	Penetrations tested in accordance with ASTM E119 as part of a fire-resistance rated assembly (FD). [MSBC §717.5.2 Exception 1]
				Ducts used as part of an approved smoke control system (FD). [MSBC 717.5.2 Exception 2]
				Where fire barriers walls have a FRR of less than 1-hour and the following conditions apply: <ul style="list-style-type: none"> • The Building is protected throughout by automatic sprinklers; • Penetrations are limited to a ducted HVAC system conveying supply, return or exhaust air; • HVAC ducts are minimally 26 gage; • HVAC ducts are continuous from the AHU to the air outlet and inlet terminals (FD). [MSBC 717.5.2 Exception 3]
Smoke Barriers ³	NR	Required	717.5.5	Smoke dampers are not required where openings in ducts are limited to a single smoke compartment and ducts are constructed of steel (SD). [MSBC 717.5.5 Exception 1]
Floor / Ceiling Assemblies	Required	NR	717.6.1	A duct is permitted to penetrate two floors or less with a fire damper at each floor provided it meets all the requirements in 717.6.1 Exception (FD). [MSBC 717.6.3 Exception]
Shafts	Fire / Smoke Dampers Required		717.5.3	Steel exhaust sub ducts extending at least 22-inches vertically in an exhaust shaft provided there is a continuous upward airflow to the outside (FD). [MSBC 717.5.3 Exception 1.1]
				Penetrations tested in accordance with ASTM E119 as part of a fire-resistance rated assembly (FD). [MSBC 717.5.3 Exception 1.2]
				Ducts used as part of an approved smoke control system (FD). [MSBC 717.5.3 Exception 1.3]
				Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust systems when installed in accordance with the International Mechanical Code (SD/FD). [MSBC 717.5.3 Exception 5]. A duct that penetrates a fire-resistance rated floor/ceiling assembly that connects not more than 2 stories is permitted without a shaft enclosure, provided that a listed fire damper is installed at the floor line. [MSBC 717.6.3].
				Kitchen, clothes dryer, bathroom and toilet room exhaust openings are installed with steel exhaust sub ducts, having a minimum wall thickness of 0.187-inch (No. 26 gage), the sub ducts extend at least 22 inches vertically, and an exhaust fan providing continuous airflow to the outside is installed at the top of the shaft terminal. The exhaust fan should be provided with an uninterruptible power system for the first 15 minutes of loss of primary power (SD). [MSBC 717.5.3 Exception 2 for Group B and R occupancies only]
Corridors	NR	Required	717.5.4	Ductwork has a minimum wall thickness of 0.019 inches and there are not openings that serve the corridor (SD). [MSBC 717.5.4.1 Exception 2]
Fire Partitions	Required	NR	717.5.4	Ductwork does not exceed 100 square inches, constructed of steel a minimum of 0.0217 inch in thickness, does not have openings that communicate with the corridor, installed above the ceiling, shall not terminate at a wall register in the fire resistance rated wall, 12-inch long by 0.060-inch-thick steel sleeve centered in each duct opening and secured by rectangle angles (SD). [MSBC 717.5.4 Exception 3]

² Fire barriers within the building will include: Occupancy separations (if provided) and special use room enclosures.

³ Smoke barriers within the building will include: Fire service access elevator lobby separations.

Protected Vertical Openings

Vertical openings through floors will be protected by fire-rated assemblies in accordance with MSBC Section 712. Vertical openings include exit stairs, elevator shafts, and mechanical shafts. Shafts and exit enclosures, other than *exit access stairways* complying with MSBC Section 1019.3, will be enclosed with listed and approved shaft enclosure assemblies that provide a 1-hour fire-resistant rated noncombustible shaft assembly per MSBC Section 713.4 where connecting less than four (4) stories. As a result, some areas of the building will more closely resemble Type IB construction compared to the Type IIA construction type of the full building. The floor openings requiring shaft protection will include, but are not limited to:

- Grease Ducts, Trash chutes and linen chutes
- Elevator Shafts
- Mechanical, electrical and plumbing shafts
- Exit Stairways, other than exit access stairways complying with MSBC Section 1019.3 Item 1

Duct systems throughout the building that do not connect more than two (2) stories and are not required to be enclosed in shafts are not required to be provided with smoke dampers, provided the annular space around the shaft is sealed with an approved material (MSBC Section 714).

Unprotected Vertical Openings

The building will contain the following spaces that connect more than one level:

1. Gym - Double Height Space connecting Floors 1 and 2.
2. Media Center - Double Height Space Connecting Floors 1 and 2.
3. Cafeteria - Double Height Space Connecting Floors 1 and 2.
4. Open center stairs connecting Floors 1-2.

MSBC 712.1.9 permits vertical openings in fully sprinklered, Group E occupancies where the openings meet the following criteria:

- Does not connect more than two (2) stories.
- Does not penetrate a horizontal assembly that separates fire areas, or a smoke barrier that separates smoke compartments.
- Is not concealed within the construction of a wall or a floor/ceiling assembly.
- Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

The intent is to allow for unlimited openings between the first and second floors per 712.1.9.

Stage

The Oakdale School design includes a stage in the gymnasium space on the 1st floor. The requirements for stages are provided in MSBC Section 410. MSBC Section 410.3.1 requires stages to be constructed of materials as required for floors of the type of construction in which the stage is located. In buildings of Type IIA construction, a fire-resistance rated floor is not required, provided the space below the stage is equipped with an automatic sprinkler system or fire-extinguishing system in accordance with MSBC Section 903 or MSBC Section 904, respectively. In all types of construction, the finished floor must be constructed of wood or non-combustible materials. Openings through the stage floor must be equipped with tight-fitting, solid wood trap floors with approved safety locks.

Where the stage height is greater than 50 feet in height, all portions of the stage must be completely separated from the seating area by a proscenium wall with not less than a 2-hour fire-resistance rating extending continuously from the foundation to the roof (MSBC Section 410.3.4). Where a proscenium wall is required to have a fire-resistance rating, the stage openings must be provided with a fire curtain complying with NFPA 80, horizontal sliding doors complying with MSBC Section 716.5.2 having a fire protection rating of at least 1-hour, or an approved water curtain complying with MSBC Section 903.3.1.1. A proscenium is not required as the stage is less than 50-feet in height.

Combustible scenery used in sets must meet the fire propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 in accordance with Section 806 of the International Fire Code.

It should be noted that the current stage design was measured to be approximately 950 square feet. MSBC Section 410.3.7 requires emergency ventilation for stages larger than 1,000 square feet in floor area, or stages with a height greater than 50 feet. Ventilation must comply with MSBC Section 410.3.7.1 (roof vents) or MSBC Section 410.3.7.2 (smoke control).

Section 410.4 requires stages be separated from dressing/appurtenant rooms and other parts of the building by a fire barrier in accordance with section 707, or a horizontal assembly in accordance with section 711. For stage heights greater than 50 feet, a 2-hour rating is required. For stages 50 feet or less, a 1-hour rating is required.

Stages must be provided with automatic sprinkler protection in accordance with MSBC Section 903.3.1.1. Sprinklers must be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers must be installed in dressing rooms, performer lounges, and storerooms accessory to the stage (MSBC Section 410.7). Section 905.3.4 requires that stages greater than 1,000 square feet in area are provided with a Class III wet standpipe system with 1 ½-inch and 2 ½-inch hose connections on each side of the stage. **The height and area of the proposed stage must be confirmed as the design progresses. Additional protection measures may be required around the stage pending review of the design height and area.**

MEANS OF EGRESS SYSTEM DESIGN

GENERAL REQUIREMENTS

Occupant Load

The occupant load for each space within the building is determined using the occupant load factors listed in MSBC Table 1004.5, as shown in the table below.

SPACE	OCCUPANT LOAD FACTOR PER PERSON
Gymnasium/Auditorium	7 square feet (net) per person (or number of seats if fixed seating is provided)
Stage	15 square feet (net) per person
Unconcentrated Assembly (tables and chairs)	15 square feet (net) per person
Classrooms and lab/vocational areas	20 occupants per classroom
Gymnasiums	50 square feet (gross) per person
Locker Rooms	50 square feet (gross) per person
Concentrated Business	50 square feet (gross) per person
Offices	150 square feet (gross) per person
Kitchen	200 square feet (gross) per person
Storage/MEP	300 square feet (gross) per person

Refer to the tables below for occupant load calculations for the proposed Dedham Oakdale School. The occupant load for each assembly room or space shall be posted in accordance with IBC Section 1004.9. Posted signs shall be of an approved, legible design and located at a conspicuous location near the main entrance to the room or space.

Basement

Room	Size (sq. ft.)	Loading Factor (sq. ft. per occupant)	Calculated Occupant Load
MEP/Storage	3,249	300	11
Offices	380	100	4
Total:			15

Floor 1

Room	Size (sq. ft.)	Loading Factor (sq. ft. per occupant)	Calculated Occupant Load
Gym	6,205	15	414
Stage	914	15	61
Storage	257	300	1
Storage	506	300	2
Office	192	150	2
Storage	57	300	1
Cohort Commons	661	15	45
Classroom	913	20	46
Classroom	910	20	46
Teacher Planning	121	150	1
Classroom	898	20	45
Classroom	896	20	45
Teacher Planning	122	150	1
OT/PT	908	50	19
Classroom	894	20	45
Teacher Planning	120	150	1
Storage	360	300	2
Resource	477	150	4
Conference	255	15	17
Conference	253	15	17
Storage	51	300	1
Admin Offices	3,458	150	24
Storage	276	300	1
Storage	251	300	1
Media	2,264	50	46
Classroom	1,196	20	60
Classroom	903	20	46
Breakout	150	20	8
Teacher Planning	105	150	1
Cafeteria	3,401	15	227
Quiet Dining	595	15	40
Staff Dining	230	15	16
Kitchen	2,008	200	11
Custodian	151	150	2
MEP	1,645	300	6
IDF	192	300	1
Reading	481	50	10
Storage/MEP	43	300	1
Storage/MEP	42	300	1
Classroom	899	20	45
Breakout	324	20	17
Classroom	930	20	47
Teacher Planning	120	150	1
Classroom	901	20	46
Breakout	333	20	17
Classroom	909	20	46
Teacher Planning	130	150	1
Total:			1538

Floor 2

Room	Size (sq. ft.)	Loading Factor (sq. ft. per occupant)	Calculated Occupant Load
Cohort Commons	860	15	58
Classroom	921	20	47
Classroom	904	20	46
Teacher Planning	120	150	1
Classroom	909	20	46
Classroom	896	20	45
Teacher Planning	121	150	1
Classroom	914	20	46
Classroom	928	20	47
Teacher Planning	120	150	1
Classroom	861	20	44
Teacher Planning	122	150	1
Classroom	900	20	45
Classroom	896	20	45
Teacher Planning	122	150	1
Offices	819	150	6
Work Room	316	50	7
Cohort Commons	1,034	15	69
Makerspace	1,195	50	24
Storage	204	300	1
Art	942	20	48
Music	1,114	20	56
Storage	161	300	1
Classroom	892	20	45
Work Room	337	50	7
Teacher Planning	121	150	1
Offices	475	150	4
Storage	217	300	1
MEP	43	300	1
MEP	44	300	1
Classroom	903	20	46
Breakout	333	20	17
Classroom	909	20	46
Teacher Planning	122	150	1
Classroom	929	20	47
Breakout	324	20	17
Classroom	899	20	45
Total:			965

Number of Exit Access Doorways

MSBC Section 1006.2.1.1 requires that four (4) or more exits be provided when a space has a calculated occupant load of greater than 1,000 occupants. Three (3) exits must be provided if the occupant load of the space exceeds 500 occupants. MSBC Section 1006.2.1 requires two exits for all areas exceeding the occupant loads shown in MSBC Table 1006.2.1. For a Group A or Group E occupancy, two exits are required if the occupant load exceeds 49 occupants or where the common path of travel exceeds 75 feet. In Group B areas, two exits are required if the occupant load exceeds 49 occupants or where the common path of travel exceeds 100 feet. Further, in Group S areas, two exits are required if the occupant load exceeds 29 occupants or where the common path of travel exceeds 100 feet.

It should be noted that the means of egress for unique spaces such as boiler rooms, furnace rooms, and refrigeration machinery rooms is governed by MSBC Section 1006.2.2. Boiler rooms, incinerator rooms, and furnace rooms require two (2) means of egress where the area of the space is over 500 square feet and any fuel-fired equipment exceeds 400,000 BTU input capacity (MSBC Section 1006.2.2.1). Where two means of egress are required, one (1) is permitted to be a fixed ladder or an alternating tread device. The exits must be remotely located at a distance equal to one-half the length of the maximum overall diagonal dimension of the room. Refrigeration machinery rooms larger than 1,000 square feet must have at least two (2) exits (MSBC Section 1006.2.2.2). All portions of the machinery rooms must be within 150 feet of an exit or exit access doorway. Doors must swing in the direction of egress travel regardless of the occupant load served.

Based on previous projects, it is Howe Engineers understanding that classrooms may use a posted occupant load in lieu of a calculated occupant load. The use of a posted occupant load requires discussion and approval from the AHJ.

Arrangement of Means of Egress (MSBC Section 1007.1.1)

Where two (2) exits or exit access doors are required from a sprinklered space, they must be placed not less than one-third the overall diagonal distance of the space, measured in a straight line between the exit doors or exit access doors.

Where there are three (3) or more exits, or exit access doors, at least two (2) of the exits or exit access doors are required to meet the remoteness as defined above. The additional exits shall be located as remotely as possible.

Exit Capacities

The exits within the building will be designed using the exit capacity factors listed in MSBC Sections 1005.3.1 and 1005.3.2. The exit capacity for stairs is calculated at 0.20 inches per occupant, while all other means of egress components are calculated at 0.15 inches per occupant as the building will be fully sprinklered and provided with emergency voice/communication capabilities (Section 1005.3). The minimum required clear width shall not be less than those outlined within other sections of this report, which have been excerpted in the table below for reference.

EGRESS COMPONENT	EGRESS CAPACITY FACTOR	MINIMUM REQUIRED CLEAR WIDTH
Stairways	0.20 inches per person	44 inches (MSBC Section 1011.2)
Doors	0.15 inches per person	32 inches (MSBC Section 1010.1.1)

Refer to the tables below for egress capacity calculations for the proposed Dedham Oakdale School.

Egress Capacity Calculations for Basement

Area	Exit Description	Clear Width of Limiting Component (in)	Capacity Factor (in / occ.)	Exit Capacity (people)	Limiting Capacity (people)
Exits Serving Basement	Stair	60	0.20	300	300
	Total				300 > 15

Egress Capacity Calculations for Floor 1

Area	Exit Description		Clear Width of Limiting Component (in)	Capacity Factor (in / occ.)	Exit Capacity (people)	Limiting Capacity (people)
Exits Serving First Floor	Gym Northeast Doors	Door	67	0.15	446	446
	Gym Northwest Doors	Door	67	0.15	446	446
	North Doors	Door	67	0.15	446	446
	West Doors	Door	67	0.15	446	446
	Receiving Doors	Door	67	0.15	446	446
	Cafeteria Doors	Door	67	0.15	446	446
	South Door (Single)	Door	33	0.15	220	220
	South Doors (Double)	Door	72	0.15	480	480
	Northeast Doors	Door	72	0.15	480	480
	Total					3,856 > 1538

Egress Capacity Calculations for Floor 2

Area	Exit Description		Clear Width of Limiting Component (in)	Capacity Factor (in / occ.)	Exit Capacity (people)	Limiting Capacity (people)
Exits Serving Second Floor	West Stair	Stair	56	0.20	280	280
	Lobby West Stair	Stair	66	0.20	330	330
	Lobby East Stair	Stair	66	0.20	330	330
	Central Stair	Stair	36	0.20	180	180
		Door	33	0.15	220	
	East Stair	Stair	66	0.20	330	330
Total					1,450	> 965

Floors serving over 500 occupants require three (3) means of egress. The occupant load can be reduced if a program occupant load is used, which would result in less than 500 occupants with two (2) means of egress being acceptable. This requires discussion and approval from the Code Official.

Exit Access Travel Distance (MSBC Section 1017)

The maximum exit access travel distance for each of the occupancies will be in accordance with the requirements contained in MSBC Section 1017.2 and Table 1017.2. Refer to the table below:

OCCUPANCY	MAXIMUM ALLOWABLE TRAVEL DISTANCE (Sprinklered)
Group A, E	250 feet
Group B	300 feet
Group S-2	400 feet

Exit access travel distance must be measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance of an *exit* (MSBC Section 1017.3). Where an exit access stairway or ramp is used as part of the means of egress system, the travel distance along the exit access stairway or ramp must be included in the exit access travel distance measurement (MSBC Section 1017.3.1). The measurement along exit access stairways and ramps must comply with the following:

- Stairways: measurements must be made on a plane parallel and tangent to the stair tread and nosings in the center of the stair and landings.
- Ramps: measurement along ramps must be made on the walking surface in the center of the ramp and landing.

Note that an “exit” is defined by MSBC Section 202 as that portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, *interior exit stairways and ramps, exit passageways, exterior exit stairways and ramps and horizontal exits.*

Egress through Intervening Spaces (MSBC Section 1016.2)

Exit access from a room or space should not pass through an adjacent room or space, except where the room or area is accessory to the area being served. Exit access is not permitted to pass through kitchens, storerooms, restrooms, closets or other similar spaces. In addition, the exit access is not permitted to pass through rooms subject to locking.

Common Path of Travel Limits (MSBC Table 1006.2.1)

Maximum common path of egress travel distance is limited based on individual occupancies as outlined below.

- Business and Storage Occupancies 100 feet
- Assembly and Educational Occupancies 75 feet

Dead End Corridor Limits (MSBC Section 1020.5)

Per MSBC Section 1020.5, where more than one exit or exit access doorway is required, the exit access must be arranged such that there are no dead ends longer than:

- Assembly Occupancies 20 feet
- Business Occupancies 50 feet
- Storage Occupancies 50 feet
- Educational Occupancies 50 feet

Note that a dead-end corridor is not limited where the length is less than 2.5 times the minimum width of the dead end.

Exit Access Corridors (MSBC Section 1020)

Corridors used for the exit access portion of the means of egress will be constructed in accordance with the MSBC Section 1020. The exit access corridors will provide sufficient clear width to accommodate the number of occupants exiting through the corridor but will never be less than 44 inches unless serving an occupant load of less than 50 people, in which case they can be 36 inches.

Per MSBC Table 1020.2, since the building will be fully sprinklered, rated corridors are not required for the occupancies within the building.

It should also be noted that corridors in Group E occupancies serving greater than 100 occupants are required to be 72 inches in width (MSBC Table 1020.2).

Exit Stair Discharge

The MSBC requires 50 percent of the enclosed interior exit stairways to discharge to the exterior of the building. The remainder of the enclosed interior exit stairways are permitted to discharge to interior lobbies and vestibules (MSBC Section 1028.1).

The basement stair must discharge directly to the exterior of the building.

Doors (MSBC Section 1010)

Doors throughout the building must comply with MSBC Section 1010.1.

1. Dimensional Requirements (MSBC 1010.1.1)

Minimum clear width:	32 inches
Maximum size of a door leaf:	48 inches
Minimum Clear Height:	6 feet – 8 inches
2. Doors shall be side-hinged swinging in all spaces except within storage areas.
3. Doors serving a space with 50 people, or more are required to swing in the direction of egress travel towards the exit.
4. While opening, doors are not permitted to project more than 50 percent of the required clear width in an exit stair or exit access stairway at any moment during the swing when opening. In addition, doors, when fully open, are not permitted to project more than 7 inches into the required exit clear width.

Exit Signage (MSBC Section 1013)

1. Exit signs must be provided in each room or space that requires more than one (1) exit or exit access.
2. Exit signs must be placed such that no point within an exit access corridor is more than 100 feet or the listed viewing distance of the sign, whichever is less, from the nearest visible sign.
3. Main exterior exit doors or gates which obviously and clearly are identifiable as exits are not required to be provided with an exit sign where approved by the building official.
4. Every exit sign and directional exit sign must have plainly legible letters not less than 6 inches high with the principal strokes of the letters not less than $\frac{3}{4}$ inch wide. The word "EXIT" must be in high contrast with the background and shall be clearly discernible when the exit sign illumination means is or is not energized. When an arrow is provided as part of the exit sign, the construction shall be such that the arrow direction cannot be readily changed.
5. Exit signs and exit directional signs can be externally or internally illuminated. The level of illumination at the sign's surface must be no less than 5-foot candles.
6. Exit signs shall be illuminated at all times and connected to an emergency power source having a duration of not less than 90 minutes. Emergency power shall conform to the National Electrical Code (NFPA 70).
7. Exit signs must be provided within 18-inches of the floor in electric rooms if the electric room has over 1,200 amperes and is more than 6 feet wide. In addition, panic hardware should be provided from these spaces.
8. The International Symbol of Accessibility must be included on exit signs at exits to grade.
9. Directional signage indicating the location of other means of egress and in which there are accessible means of egress must be provided at the following locations:
 - a. At exits serving a required accessible space, but not providing an approved accessible means of egress.
 - b. At Elevator Landings
 - c. Within areas of refuge

Means of Egress Lighting (MSBC Section 1008)

MSBC Section 1008 requires the following for means of egress lighting:

- The means of egress, including the exit discharge, must be illuminated at all times the building space served by the means of egress is occupied, except aisle access ways in Group A occupancies.
- The means of egress illumination level must not be less than 1 foot-candle (11 lux) at the walking surface.
- The power supply for means of egress illumination must normally be provided by the premises' electrical supply. In the event of power supply failure, an emergency electrical system shall automatically illuminate all the following areas:
 - Aisles and unenclosed egress stairways in rooms and spaces that require two or more means of egress.
 - Corridors, exit enclosures and exit passageways in buildings required to have two or more exits.
 - Exterior egress components at other than their levels of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
 - All components to the access to public way must be illuminated.
 - Interior exit discharge elements, as permitted in Section 1027.1 of the MSBC, in buildings required to have two or more exits.
 - Exterior landings as required by Section 1008.1.6 for exit discharge doorways in buildings required to have two or more exits.
- The emergency power system must provide power for a duration of not less than 90 minutes and must consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system must be in accordance with Chapter 27 of the MSBC.
- Emergency lighting facilities must be arranged to provide initial illumination that is at least an average of 1 foot-candle (11 lux) and a minimum at any point of 0.1 foot-candle (1 lux) measured along the path of egress at floor level. Illumination levels are permitted to decline to 0.6 foot-candle (6 lux) average and a minimum at any point of 0.06 foot-candle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 must not be exceeded.

FIRE PROTECTION SYSTEMS

SUMMARY OF FIRE PROTECTION FEATURES

The following Fire Protection and Life Safety Features will be provided in the building:

1. The building will be constructed of Type IIA or IV-C construction.
2. The building will be fully sprinklered and provided with standpipes as outlined in the "Standpipes" section below.
3. A manual fire alarm system will be provided in the building and will meet current NFPA 72 spacing requirements.
4. Emergency voice/alarm communication systems will be installed in accordance with Section 907.2.3.
5. Emergency Power and Standby Power for all life safety systems.
 - a. At least one elevator will be available to operate on Standby power.
 - b. Egress signage and lighting will be provided with Emergency Power.
6. Portable fire extinguishers in supervised locations in accordance with NFPA 10.

AUTOMATIC SPRINKLER PROTECTION

The Dedham Oakdale School will be provided with an automatic sprinkler system as required for Group E occupancies with fire areas larger than 12,000 square feet and as required by the M. G. L. 148 26 G. The design densities of the sprinkler system will be determined by the engineer of record.

STANDPIPES

Standpipes are required throughout all buildings in which the highest occupiable floor is greater than 30 feet above the lowest level of fire department vehicle access (MSBC Section 905). As such, the proposed Dedham Oakdale School may be required to be equipped with a standpipe system if it is above 30 feet. It should be noted that Class I standpipes are permitted in buildings provided with automatic sprinkler protection in lieu of a Class III standpipe. **It is currently assumed the highest occupiable floor will be under 30 feet above the lowest level of fire department vehicle access. To be confirmed by JLA as the design progresses.**

It should also be noted that the stage may require a Class III wet standpipe system with a 1 ½-inch hose connection installed in accordance with NFPA 13 or NFPA 14 on each side of the stage (MSBC Section 905.3.4). Since the building is fully sprinklered, only a single 1 ½-inch hose connection would be required. This requirement is only applicable if the stage is greater than 1,000 square feet in area. **Based on the current plans, the stage is shown to exceed 1,000 square feet. To be confirmed by JLA as the design progresses.**

FIRE ALARM

Section 907.2.3 requires a manual fire alarm system for Group E occupancies with an occupant load greater than 50. The manual fire alarm system must initiate emergency voice/alarm communication features in the building. Where smoke detectors or automatic sprinkler systems are installed, the systems must be connected to the building fire alarm system. **It should be noted that manual fire alarm boxes are not required in Group E occupancies if the building is fully sprinklered, the emergency voice/alarm communication system will activate upon sprinkler waterflow, and manual activation capability is provided from a normally occupied location.**

Manual Fire Alarm Pull Stations

If provided, manual fire alarm devices must be located no more than 5 feet from the entrance to each exit. Additional manual fire alarm boxes must be located so that travel distance to the nearest manual pull station is no more than 200 feet. A manual pull station will also be provided in a constantly attended location to provide the capability to manually activate the fire alarm system in an emergency. **As noted above, manual fire alarm pull stations are not required if the building is fully sprinklered, the emergency voice/alarm communication system will activate upon sprinkler waterflow, and manual activation capability is provided from a normally occupied location.**

EMERGENCY POWER

The following systems shall be provided with emergency power:

1. Emergency lighting along the means of egress in the building and along the exit discharge at a minimum level of 1-foot candle. Emergency lighting shall be provided in those rooms when the area is occupied. Subject to the approval of the Authorities Having Jurisdiction.
 - a. Complete Emergency Lighting shall be provided to the exit discharge of the building exits as determined by the Authorities Having Jurisdiction.
2. Fire Alarm System and all associated equipment including, but not limited to, the following:
 - a. Fire alarm control panels (including all fire alarm control equipment throughout the facility).
 - b. Fire alarm controls.
 - c. Fire alarm power supply booster panels.
 - d. Digital fire alarm communicators and interface equipment.
 - e. Dedicated telephone line from the Fire Alarm Control Panel dialer.
 - f. Manual pull stations
3. Exit and Directional Exit Signs.
4. Power Operated Locks (if provided)
 - a. Manual override controls for any electric locking or hardware in the entire building.

ELEVATOR PROVISIONS

An elevator is proposed near the center of the building which will serve all floors of the building (Basement through 4th Floor).

Phase I and Phase II recall equipment prescribed by the ASME 17.1 elevator code will be provided for the elevator. Accessible elevators shall be located within the travel distance required by the Accessibility Standards.

Two-way communication devices must be provided at elevator landing/lobby areas above and below grade.

PORTABLE FIRE EXTINGUISHERS

The Massachusetts State Fire Code (MSFC) adopts and amends the 2021 edition of NFPA 1, which requires fire extinguishers in Groups A, B, and E occupancies. As such, fire extinguishers must be provided throughout all enclosed areas of the building. Portable fire extinguishers will be provided in locations where required by NFPA 10. Basic requirements are as follows.

In accordance with MSBC Section 906.1, extinguishers will be required in the following locations:

- Not more than 75 feet of travel distance to a fire extinguisher. Fire extinguishers need not be located in each room if the travel distance can be achieved and the extinguisher has the correct hazard classification for each hazard within the 75-foot travel distance.
- Portable Class BC in elevator machine rooms and kitchens (kitchens may require class K depending on contents and use)
- Shall not exceed 40 pounds capacity.

Actual Mounting Locations (2021 Edition NFPA 10)

- Bottom of extinguisher at least 4 inches above the floor
- Top of extinguisher not more than 5 feet above the floor
- 1-6.6: Fire extinguishers shall not be obstructed or obscured from view.
- 1-6.5: Cabinets shall not be locked (however, if extinguishers are in locations subject to malicious use, the cabinets can be locked, but there must be a means to open them in an emergency. Example: breaking the glass).
- 1-6.3: Fire extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of a fire. Preferably they shall be located along normal paths of travel, including exits from areas.
- 1-6.11: Operating instruction shall be located on the front of the extinguisher and be clearly visible (manufacturer requirement).
- 1-6.12: Fire extinguishers mounted in cabinets or wall recesses shall be placed so that the fire extinguisher operating instructions face outward.
- The location of such fire extinguishers shall be marked conspicuously (see 1-6.6).

FIRE DEPARTMENT ACCESS

Per 527 CMR Section 18.2.3.2, a fire department access road must be provided and maintained in a manner that allows at least one (1) exterior door to be within 50 feet of the access road, which can be opened from the outside. If the building is fully sprinklered in accordance with NFPA 13, the 50 feet requirement is permitted to be extended to 250 feet (527 CMR 18.2.3.2.2.1). The design team should consider providing two fire department access roads, as a single access road could be impaired by vehicle congestion. Also:

- All points of the building must be within 150 feet of the fire department access road. Since the building is protected throughout by an automatic sprinkler system, this maximum distance is increased to 250 feet.
- The fire department access road must have an unobstructed width of not less than 20 feet, and an unobstructed vertical clearance of 13 feet 6 inches.
- A minimum 25-foot turning radius must be provided and maintained (must be approved by AHJ)
- The access road must be designed and maintained to support the imposed loads of fire department apparatus and must be provided with an all-weather driving surface.
- Where necessary, dead ends are permitted, provided they do not exceed 150 feet in cumulative length.
- Turning radius must be approved by the AHJ, with a minimum turning radius of 25 feet.
- The access road plan must include an analysis and evaluation of fire apparatus maneuvers throughout the access roads created by sweep path analysis and turn simulation software.

EMERGENCY RESPONDER RADIO COVERAGE

Per MSBC Section 916.1, all buildings must have approved radio coverage for emergency responders within the building based on the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section does not require improvement of the existing public safety communication systems. The emergency responder radio coverage must be in accordance with Section 510 of the International Fire Code.

The building is considered to have acceptable emergency responder radio coverage when signal strength measurements in 95 percent of all areas on each floor of the building have a minimum signal strength of -95 dBm must be receivable within the building and a minimum signal strength of -100 dBm must be received by the agency's radio system when transmitted from within the building. **Details of the emergency responder radio coverage will be provided by the engineer of record. A bi-directional antenna or DAS system may be required for the building.**

ACCESSIBILITY

As new construction, the Dedham Oakdale School will be designed in full compliance with MAAB as well as the 2010 ADA Standards for Accessible Design (ADA).

GENERAL REQUIREMENTS

The Dedham Oakdale School must be designed to fully comply with MAAB as well as the 2010 ADA Standards for Accessible Design (ADA). Both MAAB and ADA require all the following components to be accessible:

- All entrances
- All restrooms
- All locker rooms/ changing rooms and showers. This includes benches 36" from lockers.
- All exterior pathways
- Parking (required percentage) if provided.

The following accessible features should be provided in the building:

- All restrooms and locker rooms should be accessible. Locker rooms should include the following features:
 - 36-inch wide accessible routes around all lockers. (including between benches and lockers)
 - 5% of lockers should be accessible, with not less than one accessible locker.
 - At least one accessible shower stall
 - Accessible toilet and plumbing fixtures
- The elevator will be fully accessible.
- All entrances must be accessible.
- All exterior walkways must be accessible.
- Classrooms must be accessible including all laboratory/science classrooms. Five percent, but not less than one (1) of each type of equipment/learning station, should be accessible.
- Two (2) accessible means of egress will be provided from the stage.

PUBLIC AND COMMON-USE SPACES

The public and common-use spaces are those spaces inside or outside the building that are used by students, staff, and/or visitors. This includes the gymnasiums on the basement floor and the assembly spaces on the 1st floor (cafeteria and auditorium). These spaces must be accessible per the requirements of 521 CMR and the 2010 ADA. These spaces should be on an accessible route that is at least 36 inches wide and which connects accessible parking, accessible entrances, and public and common-use spaces. Where possible, the accessible route should be the shortest possible route (521 CMR 10.2). All doorways and openings located in common-use and public use spaces and along accessible routes should comply with 521 CMR Sections 26.2 through 26.11 and ADA Section 404.

ACCESSIBLE MEANS OF EGRESS

All spaces or elements that are required to be accessible must be provided with at least one accessible means of egress. In spaces required to be provided with multiple means of egress, each space must be served by at least two accessible means of egress. Exit access stairways are permitted to be considered part of the accessible means of egress if they provide a clear width of at least 48 inches between the handrails and two-way communication is provided at the elevator landings in accordance with MSBC Section 1009.3. Areas of refuge are not required to be provided at the exit access stairways since the building will be fully sprinklered. Two-way communication is required to be provided at the elevator landings so that the exit access stairways in the school can be considered as part of the accessible means of egress.

PARKING

Parking will be provided in accordance with the following MAAB table based on the number of parking spaces provided. **One-eighth of accessible spaces, but not less than one accessible space, must be van accessible.**

23.2.1	<u>Total Parking in Lot</u>	<u>Required Minimum Number of Accessible Spaces</u>
	15-25	1
	26-50	2
	51-75	3
	76-100	4
	101-150	5
	151-200	6
	201-300	7
	301-400	8
	401-500	9
	501-1,000	2% of total
	1,001 and over	20 plus 1 for each 100 over 1000

ACCESSIBLE SEATING REQUIREMENTS

In places of assembly with fixed seating, the minimum number of accessible spaces provided must be in accordance with the table below:

<u>Total Seating</u>	<u>Wheelchair Spaces</u>
4 to 25	1
26 to 50	2
51 to 300	4
301 to 500	6
over 500	6, one additional space for each total seating capacity increase of 100.

Where more than 150 seats are provided, the wheelchair seating locations must be provided in more than one (1) location and must be dispersed through the seating area. Accessible seating must be integrated with the rest of the seating (i.e., shoulder-to-shoulder). Any bleachers should be ordered with cutouts where accessible seating will be provided.

In addition to wheelchair seating locations, 1% of all fixed seats must be a companion seat consisting of an aisle seat with no armrest on the aisle side.

Accessible seating positions are permitted to be clustered for bleachers, balconies and other areas having sight lines with a slope greater than 5%. Equivalent accessible viewing positions may be located on levels having accessible egress.

Ticket box offices and concession stands must be located on an accessible route, and a portion of the counter must be a maximum of 36 inches high for a length of at least 36 inches. A counter or auxiliary counter may be used to achieve this requirement.

PLAYGROUND

Per MAAB 19.7, an accessible route to the exterior playgrounds will be provided. The playgrounds should also comply with applicable ADA provisions including all surfaces and equipment.

PLUMBING FIXTURES

The Massachusetts Plumbing Code requires specific plumbing fixtures for various spaces in the building. The number of plumbing fixtures shall be determined based on the following factors, as excerpted from the Massachusetts State Plumbing Code, Section 10.10 Table 1.

The following table outlines the plumbing fixture requirements for new construction. The factors that dictate the fixture counts for the building depend on the intended and future function of the Dedham Oakdale School. It should be noted that staff and students require separate toilet facilities. Further, student fixtures are required on each floor and staff fixtures are permitted on every other floors. Finally, the gymnasium must be provided with locker rooms that include showers.

Occupancy	Subcategory	Water closets			Lavatories		Drinking Fountains
		Male	Female	Urinals	Male	Female	
Educational	E (Elementary/Middle/ High School)	1 per 25 up to 100 Over 100 add 1 for every 50	1 per 25 up to 100 Over 100 add 1 for every 50	Up to 50%	1 per 25	1 per 25	1 for each set of bathrooms
Educational	E (Staff)	1 per 25	1 per 20	Up to 33%	1 per 20	1 per 20	--

The following tables outline the required plumbing fixtures for the Dedham Oakdale School based on the use of a program occupant load, along with the number of proposed fixtures. A program occupant load captures the intended use of spaces, as opposed to the calculated occupant load which tends to be more conservative in nature. **The use of a program occupant load requires discussion and approval from the plumbing official. Additional fixtures may be required pending confirmation on the use of the building for public events. If public events are held in the gymnasium/cafeteria, fixtures must be provided to accommodate these events.**

Plumbing Fixtures Required Level 1

Occupancy	Subcategory	Total Calculated Occupant Load	Water closets			Lavatories		Drinking Fountains
			Male	Female	Urinals	Male	Female	
Education (Elementary)	E	220	5.000	5.000	Up to 50%	5.000	5.000	One for each set of restrooms
Education (Staff)	E	55	2.000	2.000	Up to 33%	2.000	2.000	N/A

Plumbing Fixtures Required Level 2

Occupancy	Subcategory	Total Calculated Occupant Load	Water closets			Lavatories		Drinking Fountains
			Male	Female	Urinals	Male	Female	
Education (Elementary)	E	220	5.000	5.000	Up to 50%	5.000	5.000	One for each set of restrooms
Education (Staff)	E	40	1.000	1.000	Up to 33%	1.000	1.000	N/A

CONCLUSION

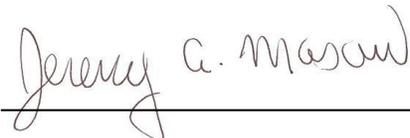
The Dedham Oakdale School is to be constructed in accordance with the requirements of the applicable codes. During this process, the building will be designed to provide levels of safety at least equivalent to the provisions contained in the applicable codes. To achieve these levels of safety, the following primary features will be provided:

1. The building will be of Type IIA construction (Optionally Type IV-C or Type IB) and will comply with the separated mixed-use provisions of MSBC Section 508.3.
2. The building will be fully sprinklered throughout and provided with standpipes as outlined herein.
3. The means of egress system will be provided as outlined in this report and will meet the requirements of MSBC Chapter 10. Refer to the Life Safety Plans prepared by Howe Engineers.
4. The building will be provided with a manual fire alarm system and emergency voice/alarm communication capabilities as required by MSBC Section 907.2.3.
5. The opening in the center of the building will contain two exit access stairways connecting level 1 and 2. Since the design consists of a maximum of two communicating floors, it is not considered an atrium and therefore does not require a smoke control system.
6. The building will be designed as fully accessible in accordance with MAAB (521 CMR) and ADA.
7. Plumbing fixtures will be provided in accordance with the provisions in the tables detailed above. Separate fixtures will be provided for staff and students.

Please contact our office if you have any questions regarding the items addressed in this report.

Prepared by,

Howe Engineers, Inc.

A handwritten signature in cursive script that reads "Jeremy A. Mason". The signature is written in black ink and is positioned above a solid horizontal line.

Jeremy A. Mason, P.E. ^(MA)
Associate Principal

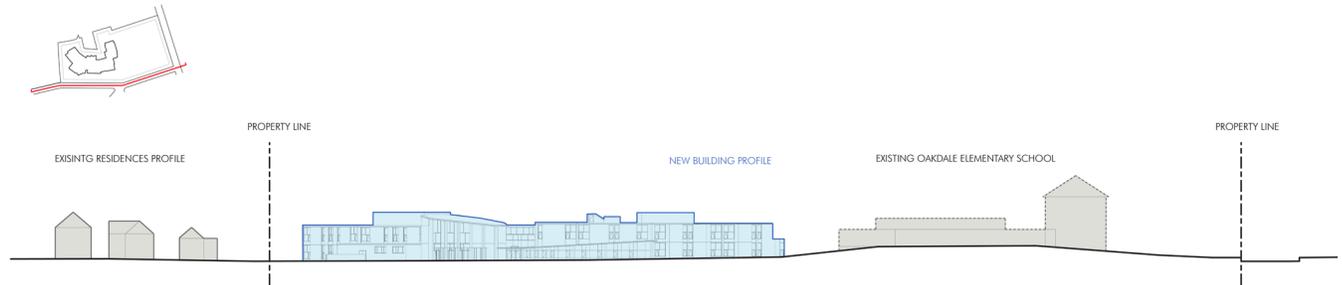
9 Utility Analysis

A survey of the Oakdale site previously submitted Revised PSR dated 5/2/24 is also incorporated in the Schematic Design Drawing set for reference.

Utility connections are identified on C03 Drainage and Utility Plan in the SD drawing set.

10 Massing Study

Massing analysis of the building's integration into its surroundings and neighborhood. The building's plan shape bows away from a projecting abuttor's property, thereby helping to alleviate neighborhood concerns and, at the same time, expanding available protected open space for outdoor classroom and recreational use.



MASSING: SITE SECTION CUTTING THROUGH MADISON LOOKING NORTH



MASSING: VIEW LOOKING NORTH



MASSING: VIEW LOOKING SOUTHEAST



MASSING: VIEW LOOKING NORTHEAST

11 Building Systems

11.1 Sustainable Design Elements

Scope necessary to target the MSBA's new incentives for a full 4% additional funding of eligible costs include the following:

- Geothermal wells,
- Triple glazed windows
- Additional insulation

Also, on 8/19/24, the SBRC voted unanimously to include Alternate 3 - PV panels on Roof as part of the base project.

Refer to Section 11.3 for Life Cycle Cost Analysis.

11.2 Building Structure

Outline of the major building structural systems follow.

OAKDALE ELEMENTARY SCHOOL

SCHEMATIC DESIGN STRUCTURAL NARRATIVE

(LEM # 22.0258)



DEDHAM, MA

DECEMBER 29, 2023 REVISED JUNE 20, 2024

PREPARED BY

LeMessurier.

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PREPARED FOR

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STRUCTURAL NARRATIVE

INTRODUCTION

This schematic design structural narrative contains a project description, an outline of the structural components and estimated material quantities for the structural work of this project for preliminary budget purposes only. The report is to be read in conjunction with the schematic architectural drawings and narrative.

In general, the narrative included herein describe the main or typical structural elements in a preliminary manner. Appropriate allowances should be made for non-typical conditions.

PROJECT DESCRIPTION

The proposed new building will consist of two stories on a relatively flat site with a partial basement totaling 87,000 gross square feet. The building will be configured to support a design enrollment of 360 students.

STRUCTURAL SYSTEMS

The proposed main building structure will be a structural steel frame with concrete floor slabs on composite steel deck. The main building roof will be composite steel deck with concrete topping. The Cafeteria, Media Room and Gymnasium will be framed with mass-timber with galvanized metal roofing. The lateral load resisting system will consist of steel braced frames in the transverse direction and steel moment frames in the long direction. Foundations will be cast-in-place reinforced concrete walls, slabs-on-grade, and spread footings.

Foundations

A geotechnical engineering report titled “Preliminary Geotechnical Data and Engineering Report” was issued by Reliance Engineers dated 25 September 2023 has been issued. The report

recommends shallow foundations with an allowable bearing pressure of 4 tons per square foot and a seismic site class C. Footings are to bear on till ranging in depth from 4-feet to more than 7-feet deep. Footings will need to be lowered in locations to bear on till or the fill removed and backfilled with compacted structural fill. Based on this information the foundations for the project will be as follows:

A. Walls

Typical foundation walls will be 18-inch thick reinforced concrete with 10-inch wide shelves as required to support façade elements. Exterior foundation walls will extend down to a minimum of 4'-0" below finished exterior grade. All foundation walls enclosing below-grade space shall be waterproofed on the exterior surface and a drainage system shall be installed around the perimeter of the foundation to divert ground water away from the building.

B. Slab-on-Grade

The partial basement and first-floor slab on grade will be a 5-inch thick slab-on-grade. A 15-mil vapor barrier and 12-inch layer of crushed stone will be placed beneath the slab to provide an adequate substrate and to allow for an under-slab drainage system where portions of the floor slab extend below exterior grade. Further development in design will provide for depressions, trenches, housekeeping pads, and other potential equipment requirements.

C. Footings

The foundations will consist of reinforced concrete spread footings and continuous wall footings bearing on compacted structural fill or undisturbed soil. Partial basement foundation walls will be simply supported and rely on the ground floor slab on metal deck for lateral support at top of wall.

D. Pits

Elevator and other pits that may be required will consist of an 18-inch thick reinforced concrete base slab and 12-inch thick reinforced concrete pit walls. All pits shall receive waterproofing.

Superstructure – Gravity Load System

A. Partial Basement

Slab-on-grade as described above.

B. Ground Floor

Slab-on-grade as described above. Composite slab-on-metal deck with composite steel framing over the partial basement.

C. Typical Floor Construction

Floor construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The floor slab will be reinforced with WWF 6x6-W4.0xW4.0 throughout. Beams and girders will be structural steel rolled shapes (typically W14, W16, & W18) made composite with the floor slabs via ¾-inch diameter, 5½-inch long welded steel shear studs. Gravity columns will typically be structural steel HSS shapes (typically 6-inch and 8-inch square).

D. Typical Roof Construction

Typical construction will be 3½ -inch normal weight concrete on 3-inch deep, 18-gage galvanized, composite steel deck for a total slab thickness of 6½-inches. The roof above the Media, Cafeteria and Gymnasium that do not require a fir rating will be 3-inch deep, 18 gage, galvanized steel roof deck. Roof beams and girders will be structural steel rolled shapes. Hot-dipped galvanized steel dunnage will be provided on top of the roof if necessary to support mechanical equipment and for mechanical equipment screening.

D. Cafeteria

The cafeteria structure will be constructed from mass-timber framing consisting of glue-laminated members. The leaf-like structure will consist of a central 23 ¾" wide by 75 ¾" deep slopped glue-lam spine girder running the length of the cafeteria with 13-5/8" x 27 ½" roof purlins at 11-feet on center spanning between the girder and perimeter framing. The roof deck will consist of galvanized steel roof decking. Glue-laminated columns will be located at the perimeter. Refer to Figure 1 below for an isometric of the timber framing. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.



Figure 1 – Media Room Timber Framing Isometric

E. Media Room

The media room will be constructed from mass-timber framing consisting of glue-laminated members. The tree-like structure will consist of a central built-up glue-laminated columns with diagonal struts extending to the roof purlins. Roof purlins vary from 17-5/8" wide, 25-1/2" to 41-5/8" deep are supported by the central column, diagonal struts and glue-laminated columns at the perimeter. The roof deck will consist of galvanized steel roof decking. Refer to Figure 2 for an isometric of the timber framing and Figure 3 for a plan. Steel tension cross bracing will be located between columns for lateral stability at the perimeter.

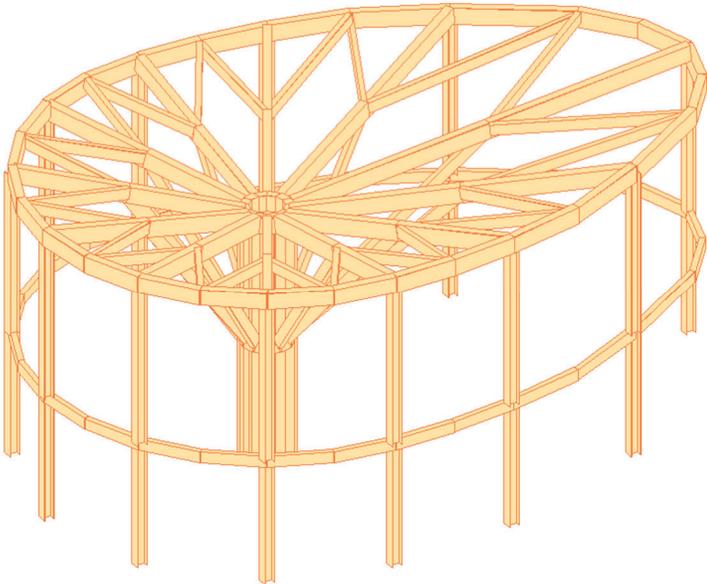


Figure 2 – Media Room Timber Framing Isometric

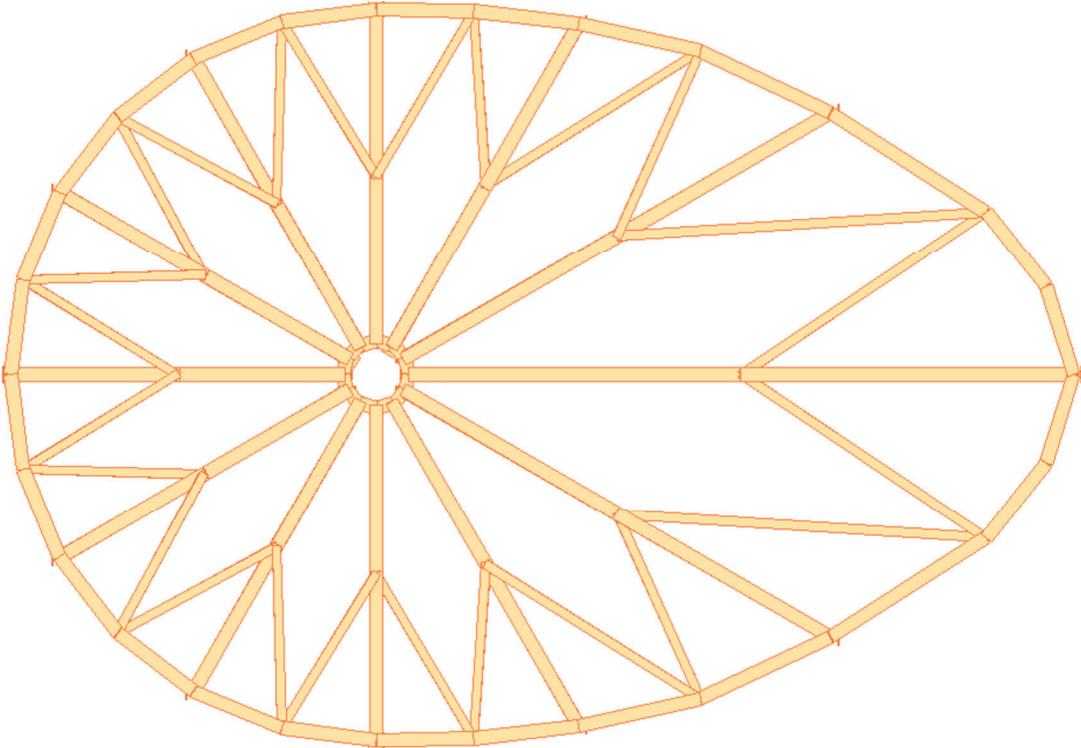


Figure 3 – Media Room Timber Framing Plan View

F. Gymnasium

The gymnasium roof structure will consist of open web steel joists with maximum spacing of approximately 7-feet on center. Depth of joist will be approximately 68-inches. Roof deck to consist of 1 ½-inch, 18-gage cellular galvanized acoustic roof deck. Joists will be supported by W30 girders at the perimeter with W12 columns. The perimeter walls will consist of 8-inch reinforced CMU walls which will act as the lateral load resisting system for the gymnasium.

G. Typical Façade Support

Continuous support of the building façade is expected to occur from each framed level above grade. This may likely consist of hung steel angle frames with all material outside the air and vapor barrier system to be hot-dipped galvanized.

Superstructure – Lateral Load System

The lateral force resisting system will consist of concentrically braced steel frames in the transverse direction. Structural steel tubes, 6-inch and 8-inch square, will be oriented diagonally in vertical planes between columns to provide resistance to wind and seismic forces. Initial considerations will be to concentrate the majority of the braced frames within stacked walls along the three floors and located in the common classroom walls. The lateral force resisting system in the longitudinal direction will consist of moment frames along the corridors. The stability of the gymnasium, media room and cafeteria will be satisfied with braced frames located at the perimeter walls. Final locations of the frames will be coordinated with the architectural layout as design progresses.

SCHEMATIC DESIGN ESTIMATED QUANTITIES

Footings	Typical Interior – 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Perimeter - 7'-0"x7'-0"x2'-0" w/ 8-#7 bottom EW Typical Braced Frame - 10'-0"x10'-0"x2'-6" w/ 11-#7 T&B EW
Perimeter Frost Walls	1'-6" thick x 3'-6" deep, reinforced at a rate of 100 lbs/cu yd.
Frost Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Foundation Walls	18" foundation wall, reinforced at rate of 300 lbs/cu yd.
Wall Footings	3'-0" wide x 1'-4" thick, reinforced at a rate of 80 lbs/cu yd
Grade Beams	24"x24" typical, reinforced at rate of 300 lbs/cu yd. Locate at braced frames.
Piers at Columns	2'-0"x2'-0", reinforced at rate of 300 lbs/cu yd.
Piers at BF Columns	2'-6"x2'-6", reinforced at rate of 300 lbs/cu yd.
Elevator Pit Walls	12" thick concrete, reinforced at rate of 180 lbs/cu yd. (Assume 5-ft pit)
Elevator Pit Slab	18" thick concrete, reinforced at rate of 200 lbs/cu yd
Slab-On-Grade	5" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
MEP Equipment Pads	6" thick concrete, reinforced with 4x4-W4.0xW4.0 WWF
Slab on Deck (Typ. Floor)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Slab on Deck (Typ. Roof)	3", 18 gage, galvanized composite steel deck with 4 ½" normal-weight concrete topping for a total thickness of 7 ½". Reinforce with WWF 4x4-W2.9xW2.9
Exterior Slab Edge	All exterior slab edges to have 3/8" perimeter bent plate with ¾" diameter x 8" long headed studs and hooked rebar (#5@12" on center x 5'-0" long). Curtain wall attachment to be coordinated.
Roof Deck (Typical)	3" deep, 18-gage galvanized Type N steel roof deck
Roof Deck (Acoustic)	3" deep, 18-gage galvanized cellular roof deck at Media Room, Cafeteria and Gymnasium.

Exterior Roof Edge	All exterior roof edges to have 3/8" perimeter plate cantilevered from spandrel beam.
Steel Floor Framing	Composite wide flange framing. See below for estimated quantities.
Steel Roof Framing	Typical wide flange framing. See below for estimated quantities.
Columns	W10 and HSS columns. Included in steel framing allowances.

STEEL FLOOR AND ROOF FRAMING ALLOWANCES

Level	Steel Allowance
Pop-Up/ Misc	12 psf
Roof	13 psf
Level 03	15 psf
Level 02	15 psf
Level 01 (over basement)	12 psf

Notes:

1. Steel allowances include steel floor framing, columns and bracing. A 10% allowance for connections has been included in the listed values.
2. Steel allowances do not include perimeter bent plate, parapets, screen wall, miscellaneous façade support framing, shear studs, etc... See below for additional items.

Shear Studs	¾" Diameter x 5 ½" long at a rate of 1/2 per square foot of floor and roof areas with slab.
Canopies	20 psf steel allowance
Parapets	Provide 60 lb/ft galvanized steel allowance at parapets at flat roofs.
Screen Walls	12 psf galvanized steel allowance over screen wall elevations.
Dunnage	15 psf galvanized steel allowance over equipment area.
Brick Relief	Continuous galvanized shelf angle at Levels 2 and 3. Hangers and kickers at hung relief (40 lb/ft allowance) Loose lintels above openings.

Lateral System	Typical HSS6x6 and HSS8x8 braced frames in transverse direction. Moment frames in longitudinal direction along the corridor consisting of W14 columns and W24 beams. Tonnage allowance included in steel framing allowance.
Elevator Backup Rails	Assume HSS6x6x3/8 behind each elevator guide. Assume three per elevator. HSS6x6x3/8 to span between floors.
Elevator Hoist Beam	W10x30 centered over the shaft.
Cafeteria	See description.
Media Room	See description.
Gymnasium	68DLH Open Web Joists at 7-ft on center. Double up at ends Joist Bridging at 1/5th points of joist span W30 girders at joist support (170 lbs/ft) W18 beams at perimeter (52 lbs/ft) W12 columns at 30-ft max on center (90lb/ft) SSPC 3 surface prep. Zinc-rich primer on all steel. 1-1/2" – 18 gage cellular acoustic roof deck 8" CMU walls at perimeter. Reinforce with #5 @ 24" vertical, #5 @ 32" horizontal and 9GA ladder reinforcement at 16".

Design contingency shall be as appropriate for stage of development.

DESIGN LOADS

Risk Category III (to be confirmed by Code Consultant)

Dead Loads:

Weight of Building Components	As Required
Roofing Allowance	15 psf
Hung Ceiling, Lights, HVAC	10 psf uniform
Hung Ceiling, Lights, HVAC	20 psf uniform (above MEP)

Live Loads:

Lobbies and Assembly Areas	100 psf uniform, 2,000 lbs conc
Gymnasium	100 psf uniform, 2,000 lbs conc
Cafeteria	100 psf uniform, 2,000 lbs conc
Classrooms	40 psf
Offices	50 psf uniform, 2,000 lbs conc
Corridors – First Floor	100 psf uniform, 2000 lbs conc
Corridors Above First Floor	80 psf uniform, 2000 lbs conc
Stairways	100 psf
Mechanical Rooms	150 psf or weight of mech equip.
Storage (light)	125 psf
Roof (Assembly Area)	100 psf
Roof	20 psf
Partition Allowance	20 psf (Included in live load \geq 100psf)

Live loads will be reduced as permitted by ASCE 7-16

Ground Snow Load:	40 psf
Importance Factor, Is	1.00
Flat Roof Snow Load	35 psf plus drift

Wind Loads: Basic wind speed	129 mph
Exposure	B
Importance Factor, I_w	1.00
Wind Pressure (ASCE 7-16)	$P = q G C_p - q_i (G C_{pi})$
Maximum Overall Drift	0.0020H

Earthquake Loads:

Soil Site Class	C
Importance Factor, I_e	1.25
Spectral Acceleration, S_s	0.244
Spectral Acceleration, S_1	0.062
Design Spectral Acceleration, S_{DS}	XX
Design Spectral Acceleration, S_{D1}	XX
Seismic Design Category	B
Seismic Resisting System	R = 3 Steel System
Response Modification Factor, R	3
Overstrength Factor	3
Deflection Amplification Factor, C_d	3
Seismic Base Shear, V	$C_s W$
Maximum Story Drift	0.015h

DESIGN CODES AND STANDARDS

- “International Building Code” (IBC 2021) with Massachusetts Amendments
- “Massachusetts State Building Code” (780 CMR, 10th Edition)
- “Minimum Design Loads for Buildings and Other Structures” (ASCE 7-16)
- “Specification for Structural Steel Buildings” (AISC 360-16)
- “Code of Standard Practice for Steel Buildings and Bridges” (AISC 303-16)
- “Seismic Provisions for Structural Steel Buildings” (AISC 341-16)
- “Specifications for Structural Joints Using ASTM A325 or A490 Bolts” (RCSC 2004)
- “Building Code Requirements for Reinforced Concrete” (ACI 318-19)
- “Specifications for Structural Concrete for Buildings” (ACI 301-16)
- “Manual of Concrete Practice 2014” (ACI, Volumes 1 through 6)
- “ACI Detailing Manual - 2004” (SP-66)
- “Manual of Standard Practice 2009” (CRSI)
- “Structural Welding Code – Steel Reinforcing Bars” (AWS D1.4/D1.4M-2018)
- “North American Specification for the Design of Cold-Formed Steel Structural Members” (AISI S100-16), including 2020 Supplement
- “Code of Recommended Standard Practice for Composite Deck, Form Deck, and Roof Deck Construction” (SDI 31)
- “National Design Specification 2018 for Wood Construction” (NDS 18 with Supplement)

CONSTRUCTION MATERIALS

Cast-in-Place Concrete (General):	$f_c = 4,000$ psi, unless noted otherwise
Cast-in-Place Concrete at Foundation Walls:	$f_c = 4,500$ psi
Concrete Slabs on Steel Deck:	$f_c = 4,000$ psi
Concrete Equipment Pads(lightweight):	$f_c = 3,000$ psi
Reinforcing Steel:	ASTM A615, Grade 60
Structural Steel:	ASTM A992, Grade 50
Rectangular or Square HSS (Tubes):	ASTM A500, Grade C ($F_y = 50$ ksi)
Round HSS (Pipes):	ASTM A500, Grade C ($F_y = 50$ ksi)
Anchor Bolts:	ASTM A307, ASTM A449 UNO
High Strength Bolts:	ASTM A325, ASTM A490

END OF STRUCTURAL NARRATIVE

11.3 Plumbing & HVAC with LCC

Narratives of the systems below follow:

- Plumbing narrative
- HVAC narrative
- Life Cycle Cost (Engineering Economic Analysis)

PLUMBING SYSTEMS

NARRATIVE REPORT

NEW BUILDING OPTION

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for **LEED v4 for Schools** were indicated on this narrative.

1. CODES

- A. All work installed under Section 22 00 00 shall comply with the MA Building Code, MA Plumbing Code 248 CMR and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

- A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

- A. The Plumbing Systems that will serve the project are cold water, hot water, tempered water, sanitary waste and vent system, grease waste system, special waste system and storm drain system.
- B. The building will be serviced by Municipal water and Municipal sewer system.
- C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. SEWER DRAINAGE SYSTEM

- A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.
- B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running through the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The exterior grease interceptor of 5,000-gallon capacity will provided under Division 33 scope.
- C. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type 'L' copper.
- D. Art room sinks will be provided with solid interceptors
- E. A floor drain will be provided in all toilet rooms where more than one water closet/urinal is present. Floor drains will be of cast iron body construction, heavy duty grade, PDI approved. Those for use in toilet rooms and other finished spaces will have rough bronze exposed finishes. Floor drains in Toilet rooms will require automatic trap primer systems. Those for use in mechanical rooms and other unfinished spaces will all be cast iron. All trap primers are to be electric, timer type.

5. STORM DRAIN SYSTEM

- A. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point 10 feet outside the building.

- B. The surface of the roof deck will be drained with dual-level promenade drains with the lower drain bodies flashed into the waterproofing membrane. The rainwater system will be sized to handle a rainfall rate of 4 inches per hour, with a total runoff from the main roof and the roof deck of just under 1 cubic foot per second.
- C. A roof with parapet wall will have overflow drains. Overflow drains will be extended to the exterior wall with a nozzle.
- D. The storm system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit at various locations of the building and connect to the rainwater collection system.

6. WATER SYSTEM

- A. Domestic Cold-Water Service
 - a. New 6" domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided. A new reduced pressure backflow preventer will be installed at the main domestic water supply to protect the service (per the DEP regulation 310 CMR 22).
 - b. A new triplex, variable speed water Booster Pump System (5 HP ea.) shall be provided to maintain flow and pressure operation requirements at the remote fixtures. A full line by-pass shall be provided so only the fixtures requiring boosted pressure are served by the booster pump.
 - c. Boiler water feed and make-up, and any other mechanical take-offs will branch off through a reduced pressure -backflow preventer. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.
 - d. Potable water will meet both the NSF 61 and NSF 372 standards for lead-free safe drinking water Act.
 - e. Domestic cold water inside the building will be "L" type copper tube with wrought or cast copper fittings.
 - f. All cold-water piping will be insulated to prevent condensation.
- B. Domestic Hot Water Service
 - a. Domestic hot water supply will be generated through a point of use instantaneous electric water heater. The electric water heater in the range of 3 to 8 kw will be mounted under each fixture requiring hot water. The water heater will be modulating type and will be capable of providing fixture hot water flow at 60 °F rise.
 - b. The kitchen hot water demand will be generated through one 50 KW electric hot water heater manifold with 120-gallon buffer tank. The hot water will maintain dual system and operate at 140°F to serve the pre-rinse and 3-Compartment sink.
 - c. The other system will operate at 120°F and will serve the other kitchen appliances, hand sinks, and custodian room sink.
- C. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC2015.
- D. Tepid (70 deg. F – 90 deg. F) water will be provided to the emergency shower/eyewash fixtures as required by code.

7. WATER SUB METERS

- A. The domestic water supply system will have water sub meters at a strategic location to record water consumption of fixtures on weekly basis. The following location were determined for remote analysis and trending of water consumption.

- a. Main domestic water supply. (Whole building)
- b. Submeter at domestic hot water supply to plumbing fixtures.
- c. Submeter at cold water supply to plumbing fixtures.

8. PLUMBING FIXTURES LEED v4

- A. Number of plumbing fixtures will be added in the facility to accommodate population of male students and female students and shall be in accordance with 248 CMR Paragraph 10.10, Table 1.
- B. Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction-LEED-V4, Credit 2).
- C. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- D. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Sloan, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.
- E. Fixtures shall be as scheduled on follows:
 - a. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Manually operated 1.28 gallon per flush-flush valve.
 - b. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Manually operated 0.13 gallon per flush-flush valve.
 - c. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet programmed for 10 second run-time cycle.
 - d. Sink: ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.
 - e. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling stations.
 - f. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.
 - g. Laboratory Sinks: Faucets with vacuum breakers and 0.74 GPM aerators.
 - h. Emergency Shower/Eyewash: Recessed barrier free eye wash and shower safety station with ceiling mounted exposed shower and "in wall" drop-down eye wash with drain pan.

9. DRAINS

- A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

10. VALVES

- A. Locate all valves so as to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

11. INSULATION

- A. A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.
- B. All piping will be insulated with 1 in. thick high-density fiberglass. The hot water (HW) and re-circulating (HWC) piping will be insulated per IECC 2015.

12. CLEANOUTS

- A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.
- B. Cleanouts for Special Waste System shall be Zurn #Z9A-C04 polypropylene cleanout plug with Zurn #ZANB-1463-VP nickel bronze scoriated floor access cover.

13. ACCESS DOORS

- A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

14. GREASE INTERCEPTOR

- A. The kitchen Grease Waste System shall be a completely separate system beginning at the exterior grease interceptor through the kitchen and vented individually through the roof. Do not connect soil lines to the grease waste nor sanitary vents to the grease vent. Furnish and install the cast iron tees and associated piping within the grease trap including 5-foot length on the outlet. All the piping within the grease trap shall be made up of caulked and leaded joints. Install an exterior cleanout as detailed at the point where the line leaves the kitchen area. Grease trap is furnished and set in place including manhole access covers by the General Contractor.

15. MISCELLANEOUS

- A. All toilet and mechanical rooms will have floor drains complete with trap primers.
- B. The boiler room will include a service sink and eyewash station.
- C. Plumbing roughing connections and faucets will be provided to each kitchen appliances requiring plumbing work. Non-freeze wall hydrants will be provided along the exterior wall of the school building.

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HVAC SYSTEM NARRATIVE

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for **LEED for Schools v4** where indicated on this narrative.

1. CODES

All work installed under Division 230000 shall comply with the Commonwealth of Massachusetts Adopted Building Codes (IBC 2021, IMC 2021, International Energy Efficiency Based on IECC 2021 - or latest Adopted Editions), Massachusetts Municipal Opt-In Specialized Stretch Energy Code 2023, and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

The HVAC narrative below provides a summary of options in section 4 below, and further defines the proposed preferred HVAC system under section 5 followed by two Alternate HVAC systems in sections 6 and 7, which shall also be studied as part of a life cycle cost analysis (LCCA). Sections 3, and 8 through 12 are general requirements and pertain to all options.

3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 7 deg. F, Summer 91 deg. F DB 74 deg. F WB

Inside: 70 deg. F +/- 2 deg. F for Heating, 75 deg. F +/- 2 deg. F (55% RH) for cooling for air-conditioned areas. Unoccupied temperature setback will be provided (60 deg. F heating (adj.), 85 deg. F cooling (adj.).

Outside air shall be provided at the rate in accordance with ASHRAE Standard 62.1 and the International Mechanical (latest adopted editions) as a minimum. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

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4. **HVAC SYSTEM OPTIONS:** As part of a life cycle cost analysis (LCCA), different HVAC systems shall be compared against a Stretch Code Compliant Baseline system to determine the system with the overall greatest savings over a 50 year study period.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year-round temperature control and comfort at a possible marginal increase in capital cost. The following HVAC systems are proposed to be studied as part of the life cycle cost analysis (LCCA) during the Schematic Design phase of the project.

- A. Baseline (All Electric Code):** The Baseline HVAC All-Electric System for comparison would be Packaged Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilator (ERV) providing Overhead Mixed-Air to terminal VAV units with Hot Water Coil Reheats. Hot water would be provided by an Air-to-Water Heat Pump Heater plant to terminal hot water radiation/radiant heating equipment for space perimeter heating, utility rooms, storage rooms, entryways, and other heated only areas of the building. Exhaust fans would be provided for janitor's closets, and utility rooms. Exhaust fans would be provided for janitor's closets, and utility rooms. Split system heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.
- B. Option 1 (Geothermal Heat Pump):** A central geothermal ground source water to water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Ground source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.
1. Pros: Smallest Emergency Generator Size of All-Electric Options, Simultaneous Heating & Cooling, No Fossil Fuel Use, Highest energy efficiency (lowest EUI), Highest Utility Company Incentives, Federal IRA Tax Credit potential, Lowest Maintenance due to hydronic based systems, No exterior sound associated with exterior heat pumps, and no concern for Snow Removal for Heating/Cooling Plant Equipment.
 2. Cons: Highest First Cost (can potentially be reduced with incentives and Federal tax credits), Site area required for wellfield. Indoor mechanical room required for heat pumps.

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- C. **Option 2 (Air Source Heat Pump):** A central air source to hydronic hot and chilled water heat recovery heat pump chiller plant shall be provided to generate hot water and chilled water for building air handling unit and terminal heating/cooling equipment. Central (indoor or rooftop) hot water and chilled water air handling units with 75% eff. Energy recovery ventilation (ERV) providing Displacement Ventilation to terminal VAV units w/ CO2 DCV (demand control ventilation) and terminal hot water and chilled water dual-temp perimeter passive radiant heating/cooling panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Ground source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms. A back-up electric boiler would be provided for the Air-to-Water Heat Pump Heater that would only operate in the event of an equipment failure.
1. Pros: Lower Maintenance than Option 3, High efficiency (low EUI), Utility Incentives, Moderate first cost
 2. Cons: Higher Maintenance than Option 1, Additional maintenance and future replacement costs for outdoor air source heat pump, Additional Exterior Sound from Air Source Heat pump equipment, Potential snow removal concerns.
- D. **Option 3 (Air Source VRF):** Roof mounted air source VRF (variable refrigerant flow) heat recovery heat pump units shall be connected to a combination of indoor ducted and ductless VRF indoor air handling units. Packaged Dedicated Outdoor Air System (DOAS) Air-Source Heat Pump Rooftop Units with 75% eff. Energy recovery ventilation (ERV) and back-up electric heat shall provide the ventilation requirements for the majority of building areas. Backup heating shall be provided in areas of the building with extensive exterior exposures via perimeter electric resistance radiant heating panels. Exhaust fans would be provided for janitor's closets, and utility rooms. Air source heat pump AC units shall be provided for IT Server Rooms, Electric rooms and elevator machine rooms.
1. Pros: Largest Emergency Generator Size of All Options, Simultaneous Heating & Cooling, No Fossil Fuel Use, Moderate First Cost, High energy efficiency (lower EUI), Utility Company Incentives.
 2. Cons: Largest Emergency Generator Size of All Options, Increased Refrigerant piping in occupied areas, Increased cost for refrigerant monitoring, Greatest maintenance costs, Increased System replacement costs, outdoor "plant" equipment results in increased outdoor sound and concerns for keeping equipment clear of snow build up for heating. System is not compatible with Displacement air distribution (lower ventilation effectiveness)

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5. **HVAC OPTION 1 - SYSTEM FEATURES AND CAPACITIES:** The following HVAC system features and capacities are based on HVAC Option 1 (Geothermal Heat Pump Displacement Ventilation System). Other HVAC system features and airflow, heating and cooling capacities will vary from this system and those differences will be studied and presented further during the Schematic Design LCCA phase of the project.

A. Geothermal Heating and Cooling Plant:

1. Heating and cooling for the entire building will be capable of being provided through the use of a high-efficiency geothermal heating and cooling plant including a modular ground water source to water simultaneous heating/cooling heat pump chillers with heat recovery with a capacity of 300 nominal tons total; with six (6) nominal 50-ton modules, with two (2) of modules for heating/cooling backup purposes. The estimated peak heating load is 200 tons (including allowance for domestic hot water heating capacity). The heat pump chiller units will be located in the Mechanical Room. The heat pump heat recovery chillers will be provided with ground source condenser water from approximately (50) closed loop type quad-loop ground source geothermal wells approximately 600 feet deep and spaced a minimum of 25' apart from one-another, based on a capacity of approximately 4 tons/well. The final well quantity, depth and distances shall be determined by the geothermal design consultant.
2. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. The plant shall supply a maximum hot water temperature of 130°F on a design heating day. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.
3. The heat pump chiller plant will distribute between 45°F and 55°F chilled water to the roof mounted air handling units and a compensated chilled water distribution system located throughout the building will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully-air conditioned Classrooms, Administration, Guidance, Media Center, Cafeteria, and Nursing Areas. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Chilled water pumps and variable frequency drives (which will control down to maintain a minimum flow to the chiller) will be provided for overall variable flow chilled water system distribution. Compensated chilled water pumps with variable frequency drives will be provided for variable flow chilled water system distribution. In addition to pumps, new chilled water accessories including air separators and expansion tanks shall be provided.
4. Primary and standby geothermal water pumps with variable frequency drives (which will control down to maintain a minimum flow to the heat pump chillers) will be provided for overall variable flow condenser water system distribution. In addition to pumps, new geothermal water accessories including air separators and expansion tanks shall be provided.

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- B. Ventilation air handling equipment: It is proposed that a new air-conditioning displacement ventilation system should be provided to provide air-conditioning and ventilation to the occupied areas of the building.
1. New rooftop air handling units with 100% outside air operation capability, supply and return air fans with VFDs, energy recovery wheels, hot water heating coil with modulating valve, chilled water cooling coil, hot water re-heat coil, economizer capability, and MERV 14 filtration will be provided to serve a new full air conditioning displacement ventilation system. Different building rooms and zones shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans. Each room (or zone) shall be provided with low wall or floor mounted supply air displacement diffusers. Classroom will typically be provided with two individual wall mounted displacement diffusing units between 275 and 400 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the rooms and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental ceiling mounted chilled/hot water radiant panels will be provided along exterior walls that shall be interlocked with space enthalpy sensors that shall modulate the control valve of the coil closed when the space enthalpy is above dewpoint conditions.
 2. It is estimated that the following Rooftop air handling equipment will be required to serve the different areas of the building:
 - a. RTU-1,2,3: Classrooms including SPED, Music, Art, Teacher Support, Cohort Commons, Circulation Areas: Estimated total airflow of 30,000 CFM (Average 10,000 CFM each)
 - b. RTU-4: Administration, Media Center and Adjacent Lobby Circulation Areas: Estimated total airflow of 9,000 CFM.
 - c. RTU-5: Cafeteria & Quiet Dining - Estimated airflow of 8,200 CFM
 - d. RTU-6: Gym & Stage - Estimated airflow of 13,000 CFM
 - e. RTU-7 Kitchen & Custodial/Support - Estimated airflow of 2,500 CFM
 - f. MUA-1: Kitchen Make-up air unit estimated at 4,500 CFM, with Kitchen Exhaust Fand and Dishwasher Exhaust Fan combined capacity of 5,000 CFM.

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6. HVAC OPTION 2 - SYSTEM DESCRIPTION – Air Source Heat Pump Chiller/Heater

A. Central Heating and Cooling Plant:

Heating and cooling for building areas shall be provided by a high-efficiency air source heat recovery heat pump chiller/heater plant that includes (10) modular air source to water heat pump chillers with heat recovery and a capacity of 30 nominal cooling tons each (approximately 25 tons heating per module), to meet the estimated peak heating load of 200 tons (including allowance for domestic hot water heating capacity). The heat pump chiller heater equipment shall consist of 2 banks of 5 modules manifolded together, with each bank having 1 backup module. The air cooled heat pump chiller units will be grade mounted on minimum 24" high structural support stands within a protected enclosure that allows adequate airflow. The unit shall be capable of providing 130°F heating hot water supply at a 5°F ambient temperature condition. A large outdoor location for the air-cooled heat pump chillers will be required. Provide pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.

A mechanical room shall be provided for the associated hot water and chilled water pumps and hydronic accessories. The heat pump chiller plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel and copper piping system. Primary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary hot water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new hot water accessories including air separators and expansion tanks shall be provided.

A supplemental backup electric boiler shall also be provided to inject heat into the hot water heating loop when ambient conditions limit the output capacity of the air-source heat pump chiller.

The heat pump chiller plant will distribute between 55°F and 65°F chilled water to the terminal radiant cooling panels units in the fully air-conditioned areas of the building. The chilled water distribution piping will be of the fiberglass insulated schedule 40 type and will be completely separate from the hot water distribution piping system. Primary Chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives which will modulate speed to maintain a minimum flow to the chiller. Secondary chilled water pumps (Quantity of 2 in a primary/standby arrangement) with variable frequency drives will be provided for variable flow chilled water system distribution. A plate & frame heat exchanger installed within the mechanical room shall be provided to separate the primary and secondary piping loops. In addition to pumps, new chilled water accessories including air separators, expansion and buffer tanks shall be provided.

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B. Air Handling (HVAC) System:

New air handling units shall have hot water heating, chilled water cooling, supply fans with VFD drives, MERV-14 filters, and energy recovery where code required. New return air fans with VFD drives shall also be provided. New air handling unit and return fan controls shall be provided. The air handling units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The ductwork system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods. All new air handling units or rooftop units shall include complete protection (interior and exterior) from the corrosive environment (salt air) associated with coastal areas.

Refer to Section 5 Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

C. Air Distribution Systems:

The building areas are to be served by a fully air-conditioned variable volume displacement ventilation air distribution system with supplemental chilled water radiant cooling and heating panel system.

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements (R-8). All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

Provide new toilet exhaust, kitchen exhaust, and utility room exhaust air fans systems shall be provided. All kitchen exhaust fans shall be rated for Grease exhaust duty.

E. Terminal Heating & Cooling Equipment:

Provide new hot and chilled water radiant heating and cooling panels for the perimeter heating and cooling for all general classroom, lobby and office areas of the building. New hot water radiant heating panels or fin tube radiation shall be provided for perimeter heating of all restrooms with exterior exposure heating loads. Hot water radiation heating equipment shall be provided for all corridors and entryways. Hot water unit heaters shall be provided for all utility rooms.

F. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

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7. **HVAC OPTION 3 - SYSTEM DESCRIPTION – Air Source Variable Refrigerant Flow (VRF)**

A. Central Heating and Cooling Plant:

Under this option, a high-efficiency Air Source Variable Refrigerant Flow (VRF) heat recovery system shall provide simultaneous heating and cooling capabilities to all regularly occupied spaces via a combination of fan coil, ductless wall and/or ductless ceiling cassette type VRF terminal air handling units. Air conditioning will be generated by outdoor grade mounted heat recovery type air source heat pump condensing units that shall be connected to indoor air handling units or terminal heating and cooling units. The HVAC system terminal heating/cooling systems (excluding supplemental AC and electric resistance heating systems) shall have a total estimated capacity of 300 tons based on the peak heating loads and providing one (1) redundant outdoor condensers for each bank of manifolded heat pump condensers). The outdoor VRF heat pump condensing units will be sized and located according to AHU and terminal equipment zones capacity requirements and VRF system piping length limitations. Therefore, multiple banks of VRF outdoor heat pump condensing units shall be required.

B. Air Handling (HVAC) Ventilation Systems:

Ventilation shall be provided to building areas via a dedicated outdoor air system (DOAS) air handling unit as described below. Air handling units shall be provided with split cooling/heating coils connected to high efficiency air source heat pump unit. Remote condenser heat pump sections will include inverter-based compressor technology similar to the VRF system for improved energy efficiency.

The DOAS units shall be provided with MERV 13 filters, heat pump cooling/heating coil section (split air source heat pump condensers for indoor units), supply and exhaust fans with variable frequency drives or EC motors, supplemental electric heating coils, total energy recovery wheel, and a sensible reheat wheel or hot gas re-heat coil for dehumidification. The DOAS units shall provide ventilation air to each occupied building area through a fiberglass insulated galvanized sheet-metal distribution system. Airflow from each space will be returned through a separate galvanized sheet-metal return air system back to the air handling units where it will pass through an energy recovery wheel which will transfer heat from the exhaust air stream to the outside air intake stream for preheating or vice-versa for pre-cooling. The DOAS system distribution shall include variable air volume terminal boxes equipped with CO2 demand ventilation controls that will control the amount of ventilation airflow to each space. The units will operate at reduced capacity during the unoccupied periods if unoccupied space set points are not maintained. All new air handling units or rooftop units shall include complete protection (interior and exterior) from the corrosive environment (salt air) associated with coastal areas.

Refer to Section 5 Ventilation Equipment description for AHU unit quantities and capacities, as these would be similar for this option.

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C. Air Distribution Systems:

New ductwork shall be constructed and installed in accordance with SMACNA and IMC requirements. All new supply and return air ductwork shall be insulated per IMC code requirements. All new Kitchen exhaust fans shall be provided with new Fire-wrapped carbon steel or stainless steel grease ductwork.

D. Exhaust Air Fan Systems:

Provide new toilet exhaust, kitchen exhaust, and utility room exhaust air fans systems shall be provided. All kitchen exhaust fans shall be rated for Grease exhaust duty.

E. Terminal Heating & Cooling Equipment:

Heating for Entryways, Storage Rooms, Toilet Rooms, Janitor Closets, etc. and support areas will be generated by a combination of electric unit heaters, convectors, radiant panels, and fin tube radiation.

F. Split system AC heat pump units:

Provide new ductless split system high efficiency heat pump AC units to serve Elevator machine rooms, and IT and MDF Server rooms.

8. **COMMON REQUIREMENTS FOR ALL HVAC OPTIONS:**

A. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems. For HVAC Option 3 VRF System – Electric terminal heating equipment shall be provided.

B. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation and will typically be heated with horizontal type ceiling suspended hot water or electric unit heaters.

The Main Electric Rooms and IDF rooms will be air conditioned by high efficiency ductless AC cooling units.

C. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

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D. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (electric, water). The new DDC/ATC system shall be capable of being integrated into the Town Wide Central energy management system.

The ATC/BMS system shall be designed as a proprietary system as manufactured by Siemens, or Equal.

9. **TESTING REQUIREMENTS:**

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Heat pump chiller plant system
- Condenser (Ground-Source or Air Source) water plant system
- Back up boiler plant
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems.
- Terminal heating and cooling devices
- Variable Refrigerant Flow and Ductless AC Systems
- Automatic temperature control and building energy management system.

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

10. **OPERATION MANUALS AND MAINTENANCE MANUALS**

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

11. **RECORD DRAWINGS AND CONTROL DOCUMENTS**

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

12. **COMMISSIONING**

The project shall be commissioned per the Commissioning Section of the specifications.

Engineering Economic Analysis for Oakdale Elementary School

Dedham, MA

**June 25, 2024
(Update)**

Prepared for:



Oakdale Elementary School
America's first tax supported, free public school

Prepared by:



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Oakdale Elementary School
Engineering Economic Analysis

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EXECUTIVE SUMMARY

Section 1.0: Executive Summary

The Oakdale Elementary School is a new three-story school with an approximate gross area of 89,000 s.f. located in Dedham, MA. The building has been simulated with the school's anticipated hours of operation including evening and summer programming.

The goal of the mechanical system life cycle engineering economic analysis is to assess the performance of various mechanical systems in comparison to a baseline mechanical system.

Each option is compared to the baseline system to determine the greatest combined savings over a 50 year cycle to determine the most advantageous system considering anticipated hours of operation (provided by owner), electrical costs, maintenance costs, initial construction costs, and replacement costs.

By comparison of each option to the baseline system, the option with the greatest total life-cycle savings is generally recommended. To further enhance controllability and overall system performance, additional options should be considered that will enhance year round temperature control and comfort at a possible marginal increase in capital cost.

Upon completion of the mechanical system life cycle engineering economic analysis, the design building is simulated with the recommended mechanical system in comparison to an ASHRAE Standard 90.1-2010 baseline building to project the anticipated energy cost percentage savings for LEED V4 EAc2 – Optimize Energy Performance.

Section 1.1: Mechanical System Analysis

1.1.A: Baseline System Option – Mixed-Air Overhead Packaged Air-Source Heat Pump (ASHP) Variable Air Volume (VAV) Air Handling Unit Systems with ASHP Heating Hot Water Plant

- ASHP heating/cooling VAV air handling units with energy recovery wheels and terminal VAV boxes with hot water reheat coils and demand control ventilation providing mixed-air over-head distribution the following areas:
 - RTU-1, 2, 3: 14,000 CFM (each) Classrooms, SPED, Music, Art, Teacher Support, & Circulation Areas
 - RTU-4: 10,000 CFM Administration, Media Center, & Lobby
 - RTU-5: 8,200 CFM Cafeteria & Quiet Dining
 - RTU-6: 13,000 CFM Gym & Stage
 - RTU-7: 2,500 CFM Kitchen & Custodial/Support
- 100% outside air ASHP heating VAV make-up air handling units and kitchen exhaust fans with kitchen hood controls serving the following areas:
 - MAU-1: 4,500 CFM Kitchen
- Overhead fiberglass insulated supply and return air ductwork distribution system
- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.
- 300 ton high-efficiency air-to-water source hot water heat pump plant providing hot water to the building (1 module for redundancy)
- Two-pipe hot water distribution system serving radiant heating panels, unit heaters, and variable air volume boxes with hot water reheat coils

- Hot water primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.C: System Option One – Chilled/Hot Water Cooling/Heating VAV Air Handling Unit Displacement Ventilation Systems with Ground-Source Heat Pump (GSHP) Heat Recovery Chiller/Heater Geothermal Plant

- 100% outside air hot water heating/chilled water cooling air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing displacement ventilation to the following areas:
 - RTU-1, 2, 3: 10,000 CFM (each) Classrooms, SPED, Music, Art, Teacher Support, & Circulation Areas
 - RTU-4: 9,000 CFM Administration, Media Center, & Lobby
- Passive chilled beam cooling/heating panels located along exterior walls of the above areas
- Hot water heating/chilled water cooling VAV air handling units with energy recovery wheels and demand control ventilation providing displacement ventilation to the following areas:
 - RTU-5: 8,200 CFM Cafeteria & Quiet Dining
 - RTU-6: 13,000 CFM Gym & Stage
 - RTU-7: 2,500 CFM Kitchen & Custodial/Support
- Hot water radiant heating panels located along exterior walls of the above areas
- 100% outside air hot water heating VAV make-up air handling unit and kitchen exhaust fan with kitchen hood controls serving the following areas:
 - MAU-1: 4,500 CFM Kitchen
- Overhead fiberglass insulated supply and return air ductwork distribution system
- Hot water radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.
- (50) 600' closed-loop type ground source geothermal wells (4 tons each for 200 tons total capacity)
- 300 ton (300 ton total capacity, 200 ton total load including domestic hot water preheat) high-efficiency water-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (2 modules for redundancy)
- Chilled, geothermal well, and hot water primary pumping with variable frequency drives
- Direct digital controls throughout

1.1.B: System Option Two – Chilled/Hot Water VAV Air Handling Unit Displacement Ventilation Systems with Air-Source Heat Pump (ASHP) Heat Recovery Chiller/Heater Plant

- This option is identical to Option 1 as outlined above but will utilize the following air-source heat pump chilled/hot water plant equipment rather than the geothermal ground source heat pump chilled/hot water plant with closed-loop geothermal well field outlined above:
 - 300 ton (300 ton total capacity, 200 ton total load including domestic hot water preheat) high-efficiency air-to-water source modular chilled/hot water heat recovery heat pump plant providing chilled and hot water to the building (2 modules for redundancy)
 - (2) 2,000 MBH (320 kW) electric hot water boilers (Back Up Only)
 - Chilled and hot water primary pumping with variable frequency drives

1.1.D: System Option Three - Air-Source Heat Pump Variable Refrigerant Flow (VRF) System with Supplemental Electric Heating Units

- 100% outside air ASHP heating/cooling VAV air handling units with energy recovery wheels and terminal variable air volume boxes with demand control ventilation providing ventilation to the terminal VRF units serving the following areas:
 - RTU-1, 2, 3: 10,000 CFM (each) Classrooms, SPED, Music, Art, Teacher Support, & Circulation Areas
 - RTU-4: 9,000 CFM Administration, Media Center, & Lobby
- Terminal VRF heat pump evaporator units serving the spaces indicated above
- Insulated refrigerant and condensate piping systems
- Air-source heat recovery VRF/AHU heat pump condensing units (300 ton total capacity, 200 ton total load)
- ASHP heating/cooling VAV air handling units with energy recovery wheels and demand control ventilation providing mixed-air over-head distribution the following areas:
 - RTU-5: 8,200 CFM Cafeteria & Quiet Dining
 - RTU-6: 13,000 CFM Gym & Stage
 - RTU-7: 2,500 CFM Kitchen & Custodial/Support
- 100% outside air ASHP heating VAV make-up air handling units and kitchen exhaust fans with kitchen hood controls serving the following areas:
 - MAU-1: 4,500 CFM Kitchen
- Overhead fiberglass insulated supply and return air ductwork distribution system
- Electric radiation and unit heaters for heating only areas such as storage rooms, entry ways, corridors, etc.
- Direct digital controls throughout

Section 1.2: Mechanical System Analysis Conclusion

The variable air volume air handling unit system is selected as the baseline system since it is an ASHRAE Standard 90.1/IECC baseline system that results in a low installed cost and relatively energy efficient system. Unfortunately, the selection results in overall ownership costs that in some cases are higher when compared to the alternative systems primarily relating to increased annual operating costs with potentially reduced thermal comfort conditions of the building. The option comparison of each alternative system to the baseline assesses the benefits of improved systems with potentially reduced combined operating costs and improved thermal comfort with the goal of selecting the system with the highest ownership savings over the 30 year study period.

Annual electrical is calculated through the results of a thermal dynamic heat transfer analysis utilizing Department of Energy (DOE-2)/eQuest software with all architectural data provided by Jonathan Levi Architects.

The building envelope reflects Jonathan Levi Architects' high-efficiency design with assembly rated U-Values as follows:

- Roof: U-0.022
- Walls: U-0.042
- Windows/Curtainwall: U-0.30, 0.32 SHGC

Utility cost data for electricity was obtained from published rates of the school's electrical supply and distribution providers as follows:

Electricity – National Grid: General Service G-2

- Customer Charge: \$300.00/month
- Supply Energy (Constellation): \$0.09548/kWh
- Distribution Demand: \$12.47/kW
- Distribution Energy: \$0.0132/kWh
- Transition: -\$0.00086/kWh
- Transmission: \$0.0280/kWh
- Energy Efficiency: \$0.01366/kWh
- Renewable Energy: \$0.0005/kWh
- Distributed Solar: \$0.00265/kWh
- Electric Vehicle: \$0.00043/kWh

The above rates reflect a total combined consumption cost between \$0.2961/kWh - \$0.3083/kWh dependent on system option.

The "Building Life-Cycle" analysis was performed in BLCC v5.3-22 and includes future worth of each system option considered using the DOE rates for nominal discount (1.4%), escalation (for each utility type based on region), inflation (2.0%), and interest (2.0%). The analysis includes equipment replacement costs for major system components after 20, 30, and 40 years (varying per system option as indicated in the replacement cost estimate sheet).

Our observations of the Mechanical System Payback Summary suggest that Option 3, Air-Source Heat Pump VRF System, represents the lowest life cycle cost of the system options studied by yielding an approximate \$2,228,018 savings over the 50 year study period with instant payback compared to the baseline system. It should be noted that such savings is the result of this system having a lower initial capital investment than the baseline system and has a higher annual

expense due to equipment maintenance and has a higher EUI (of 27.0 kBtu/s.f./yr.) than the alternate system options.

Section 1.3: Potential Incentives & Federal Tax Credit Analysis

Additional Life Cycle Calculations have been performed to account for potential incentives that each option could qualify for that should be factored in selecting the most cost effective system.

Section 1.3.1: Mass Save Space Heating Heat Pump Adder Incentives

Mass Save’s Commercial New Construction Program provides Space Heating Heat Pump Adder incentives for various types of heat pump equipment that would apply to each system option as follows:

Option	Type of Heat Pump	Incentive Rate	System Capacity	Potential Incentive
Base	Air Source Heat Pumps	\$800/ton	200 tons	\$160,000
1	Ground Source Heat Pumps	\$4,500/ton	200 tons	\$900,000
2	Air Source Heat Pumps	\$800/ton	200 tons	\$160,000
3	VRF Air Source Heat Pumps	\$1,200/ton	200 tons	\$240,000

(Note that the above equipment capacities and incentives will need to be further reviewed, coordinated, and confirmed by Mass Save and the design team as the design proceeds. Indicated System Capacities reflect the preliminary estimated peak heating load per Mass Save Requirements, which is also subject to change as the design proceeds.)

Mass Save’s Commercial New Construction Program additionally provides incentives on a square footage basis for various Incentive Path’s based on the project’s Targeted EUI. The following chart indicates the potential incentives rates that each system option could achieve based on the Incentive Path that they would comply with:

Option	EUI (kBtu/s.f.)	Incentive Path	Incentive Rate	Building Area (s.f.)	Potential Incentive	Heat Pump Incentive	Option Total Incentive
Base	27.8	Path 2	\$1.25/s.f.	89,000	\$111,250	\$160,000	\$271,250
1	23.4	Path 1	\$3.50/s.f.	89,000	\$311,500	\$900,000	\$931,150
2	24.4	Path 1	\$3.50/s.f.	89,000	\$311,500	\$160,000	\$471,500
3	27.0	Path 2	\$1.25/s.f.	89,000	\$111,250	\$240,000	\$351,250

(Note that Path 1 Incentives only apply to projects with an EUI below 25 kBtu/s.f. and Path 2 Incentives are based on energy reduction percentages. Incentive rates and EUI’s will need to be further reviewed, coordinated, and confirmed by Mass Save and the design team as the design proceeds.)

When accounting for the Mass Save Incentives, the Mechanical System Payback Summary suggests that Option 3, Air-Source Heat Pump VRF System, represents the lowest life cycle cost of the system options studied by yielding an approximate \$2,368,018 savings over the 50 year study period with instant payback compared to the baseline system.

It should also be noted that Option 1, Ground-Source Heat Pump Displacement System, represents the second lowest life cycle cost of the system options studied by yielding an approximate \$1,797,961 savings over the 50 year study period with a 41 year discounted payback savings compared to the baseline system.

A geothermal system additionally provides further benefits that should be considered such as providing the lowest EUI of all options at 23.4 kBtu/s.f./yr. The system further provides system longevity, reduced maintenance, reduced downtime, and improved controllability of equipment. The geothermal design also does not require exterior mounted condensing equipment which will provide the best acoustics of all options studied.

Section 1.3.2: Geothermal Federal Tax Credit

There are potential significant federal tax credits available to the University for installing a geothermal heating system. Per the 2022 Inflation Reduction Act, the Federal Investment Tax Credit (§ 48) can range from 6% to 30% if Prevailing Wage and Apprenticeship (PWA) requirements are met. Additional tax credits may also be available for using Domestic Content (up to 10% of related domestic steel and iron material and manufactured product costs). For the purpose of this study, a 25.5% federal tax credit was factored at this time assuming PWA requirements would be met (accounting for a 15% deduction required by projects funded by tax exempt bonds to the 30% incentive). Please note that it is recommended that the City consult with a financial tax advisor or attorney to complete the required IRS documentation if a Geothermal heating system is selected.

When accounting for the Mass Save Incentives and Federal Tax Credit, the Mechanical System Payback Summary suggests that System Option 1 represents the greatest total life cycle savings by yielding an approximate \$7,534,672 savings over the 50 year study period with an instant payback.

For additional information please refer to the following references:

- ClimateMaster's IRA 2023 Commercial Geothermal Tax Guide, weblink @ [lc028-climatemaster-commercial-federal-tax-incentives-brochure.pdf](#) , and included in Appendix B
- IRS Clean Energy Tax Credit Information: [Publication 5817-G \(6-2023\) \(irs.gov\)](#), weblink @ <https://www.irs.gov/pub/irs-pdf/p5817g.pdf>, and included in Appendix B
- IRS & US Treasury Dept Notice 2023-44: [Additional Guidance for the Qualifying Advanced Energy Project Credit Allocation Program under Section 48C\(e\) \(irs.gov\)](#), weblink @ <https://www.irs.gov/pub/irs-drop/n-23-44.pdf>

Section 2.0: LEED Energy Savings Summary

To estimate the LEED V4 EA c2 – Optimize Energy Performance savings, updated energy model simulations have been performed comparing the design building in comparison to a baseline ASHRAE Standard 90.1-2010 building.

1. The ASHRAE Standard 90.1-2010 baseline building is as follows:

- Envelope:
 - Wall: U-0.064
 - Roof: U-0.048
 - Operable Windows: 0.55 U-Value, 0.40 SHGC
 - Curtainwall/Storefront: 0.45 U-Value, 0.40 SHGC
- Mechanical System:
 - System 8 - Electric heating/chilled water cooling air handling units with energy recovery wheels and terminal fan-powered VAV boxes with electric reheat coils (one per floor)

- System 4 – Packaged electric heat pump cooling/heating constant volume single zone air handling units (serving spaces with loads varying by 10 Btuh/s.f. of the average space load)
- (2) high-efficiency water-cooled chillers with associated cooling tower
- Domestic Hot Water System:
 - Instantaneous electric domestic hot water system
- Lighting System:
 - 0.99 w/s.f.

2. The design building is as follows:

- Envelope:
 - Roof: U-0.022
 - Walls: U-0.042
 - Windows/Curtainwall: U-0.30, 0.32 SHGC
- Mechanical System:
 - (Refer to System Option descriptions)
- Domestic Hot Water System:
 - Instantaneous electric domestic hot water system
- Lighting System:
 - 0.50 w/s.f.

Section 2.1: LEED Energy Savings Analysis Conclusion

A comparison of the Design Building against the ASHRAE Standard 90.1-2010 Baseline Building results in the following energy savings for LEED V4 EAc2 – Optimize Energy Performance using EApc95 LEED Pilot ACP for each System Option as follows:

- System Option 1 – 39.3% savings for 15 points
- System Option 2 – 36.8% savings for 14 points
- System Option 3 – 30.0% savings for 13 points

Note:

The values indicated in this report are based on energy modelling performed for system comparison purposes only. Our office strongly recommends adding a 30% safety factor to the calculated values of this report for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1-2010:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

Oakdale Elementary School - Mechanical System Payback Summary

Baseline	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	1. Mixed-Air Overhead Air-Source Heat Pump (ASHP) VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils & Demand Control Ventilation (DCV) 2. High-Efficiency ASHP Hot Water Plant	\$9,608,440	726,450	\$215,112	\$2.42	27.8	\$58,976	\$1,751,878	\$80,325	\$2,822,778	\$274,088	-	-	-

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant	\$11,363,520	611,077	\$182,789	\$2.05	23.4	\$54,704	\$0	\$2,260,745	\$0	\$237,493	\$36,594	\$1,138,061	41
2	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant	\$9,534,570	635,790	\$196,020	\$2.20	24.4	\$59,296	\$1,156,679	\$1,569,950	\$1,156,679	\$255,316	\$18,772	\$1,145,774	Instant*****
3	1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Custodial/Kitchen, Cafe, and Gym/Stage areas 4. Supplemental Electric Resistance Heating Units	\$7,953,930	704,560	\$214,318	\$2.41	27.0	\$63,476	\$730,957	\$1,712,929	\$730,957	\$277,794	-\$3,706	\$2,288,018	Instant*****

* Capital Investment Costs based upon project cost estimates provided by A. M. Fogarty and PM&C dated 11/20/23 and reflect the average costs of the two estimates with a 10% contingency as confirmed in the Project Cost Estimate Review Meeting on 11/28/23.

** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

*** Total life-cycle savings is based on a 50 year study period.

**** Discounted payback years is based upon BLCC5 Life Cycle Analysis.

***** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

**Oakdale Elementary School - Mechanical System Payback Summary
Including Mass Save Incentives**

Baseline	System	Gross Capital Investment*	Potential Mass Save Incentive**	Net Investment	Annual Elec. Cons. (kWh)	Annual Gas Cons. (Therms)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBtu/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	1. Mixed-Air Overhead Air-Source Heat Pump (ASHP) VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils & Demand Control Ventilation (DCV) 2. High-Efficiency ASHP Hot Water Plant	\$9,608,440	\$271,250	\$9,337,190	726,450	0	\$215,112	\$0	\$215,112	\$2.42	27.8	\$58,976	\$1,751,878	\$80,325	\$2,822,778	\$274,088	-	-	-

Option	System	Gross Capital Investment*	Potential Mass Save Incentive**	Net Investment	Annual Elec. Cons. (kWh)	Annual Gas Cons. (Therms)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBtu/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings**	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant	\$11,363,520	\$931,150	\$10,432,370	611,077	0	\$182,789	\$0	\$182,789	\$2.05	23.4	\$54,704	\$0	\$2,260,745	\$0	\$237,493	\$36,594	\$1,797,961	41
2	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant	\$9,534,570	\$471,500	\$9,063,069	635,790	0	\$196,020	\$0	\$196,020	\$2.20	24.4	\$59,296	\$1,156,679	\$1,569,950	\$1,156,679	\$255,316	\$18,772	\$1,346,025	Instant*****
3	1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Custodial/Kitchen, Cafe, and Gym/Stage areas 4. Supplemental Electric Resistance Heating Units	\$7,953,930	\$351,250	\$7,602,680	704,560	0	\$214,318	\$0	\$214,318	\$2.41	27.0	\$63,476	\$730,957	\$1,712,929	\$730,957	\$277,794	-\$3,706	\$2,368,018	Instant*****

* Capital Investment Costs based upon project cost estimates provided by A. M. Fogarty and PM&C dated 11/20/23 and reflect the average costs of the two estimates with a 10% contingency as confirmed in the Project Cost Estimate Review Meeting on 11/28/23.

** Total payment costs indicated for these incentives need to be confirmed by the appropriate providers.

*** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

**** Total life-cycle savings is based on a 50 year study period.

***** Discounted payback years is based upon BLCC5 Life Cycle Analysis.

***** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.



**Oakdale Elementary School - Mechanical System Payback Summary
Including Mass Save Incentives & Federal Tax Credit**

Baseline	System	Gross Capital Investment*	Potential Mass Save Incentive**	25.5% IRA Geothermal Federal Tax Credit**	Net Investment	Annual Elec. Cons. (kWh)	Annual Gas Cons. (Therms)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
-	1. Mixed-Air Overhead Air-Source Heat Pump (ASHP) VAV AHU's w/ ERV & Terminal VAV's w/ Hot Water Re-Heat Coils & Demand Control Ventilation (DCV) 2. High-Efficiency ASHP Hot Water Plant	\$9,608,440	\$271,250	\$0	\$9,337,190	726,450	0	\$215,112	\$0	\$215,112	\$2.42	27.8	\$58,976	\$1,751,878	\$80,325	\$2,822,778	\$274,088	-	-	-
Option	System	Gross Capital Investment*	Potential Mass Save Incentive**	25.5% IRA Geothermal Federal Tax Credit**	Net Investment	Annual Elec. Cons. (kWh)	Annual Gas Cons. (Therms)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	20 Year Equipment Replacement Cost	30 Year Equipment Replacement Cost	40 Year Equipment Replacement Cost	Combined Annual Expense	Combined Expense Savings***	Total Life-Cycle Savings***	Discounted Payback (Years)****
1	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW DOAS AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency Ground Source Heat Pump (GSHP) Chiller/Heater Plant w/ Geothermal Well Field 4. Backup Side-Stream Electric Boiler Plant	\$11,363,520	\$931,150	\$2,897,698	\$7,534,672	611,077	0	\$182,789	\$0	\$182,789	\$2.05	23.4	\$54,704	\$0	\$2,260,745	\$0	\$237,493	\$36,594	\$4,695,659	Instant*****
2	1. Displacement Ventilation Diffusers w/ Radiant Cooling/Heating Panels 2. CHW/HHW Dedicated Outdoor Air System (DOAS) AHU's ERV & Terminal VAV's w/ DCV 3. High-Efficiency ASHP Chiller/Heater Plant 4. Backup Electric Boiler Plant	\$9,534,570	\$471,500	\$0	\$9,063,070	635,790	0	\$196,020	\$0	\$196,020	\$2.20	24.4	\$59,296	\$1,156,679	\$1,569,950	\$1,156,679	\$255,316	\$18,772	\$1,346,025	Instant*****
3	1. Variable Refrigerant Flow (VRF) Units w/ Air-Source Condensers serving the Classrooms, Administration and Support Areas 2. ASHP DOAS AHU's w/ ERV & Terminal VAV's w/ DCV providing Ventilation to the VRF Units 3. Mixed-Air Overhead AHSP VAV AHU's w/ ERV & DCV serving the Custodial/Kitchen, Cafe, and Gym/Stage areas	\$7,953,930	\$351,250	\$0	\$7,602,680	704,560	0	\$214,318	\$0	\$214,318	\$2.41	27.0	\$63,476	\$730,957	\$1,712,929	\$730,957	\$277,794	-\$3,706	\$2,368,018	Instant*****

* Capital Investment Costs based upon project cost estimates provided by A. M. Fogarty and PM&C dated 11/20/23 and reflect the average costs of the two estimates with a 10% contingency as confirmed in the Project Cost Estimate Review Meeting on 11/28/23.

** Total payment costs indicated for these incentives need to be confirmed by the appropriate providers.

*** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

**** Total life-cycle savings is based on a 50 year study period.

***** Discounted payback years is based upon BLCCS Life Cycle Analysis.

***** Discounted payback never reached because system is more efficient and/or less expensive than baseline system.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.



Oakdale Elementary School - LEED v4.0 Energy Savings Summary

Baseline	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Combined Expense Savings**	Energy Savings Percentage**	LEED EAc2 Points (EApc95)
LEED Baseline	1. ASHRAE 90.1-2010 Envelope 2. ASHRAE 90.1-2010 Mechanical Systems (System 7 - Packaged DX VAV AHU's w/ Fan-Powered VAV Boxes w/ Electric Reheat) 3. ASHRAE 90.1-2010 Lighting System (0.99 w/s.f.) 4. ASHRAE 90.1-2010 Electric Domestic Hot Water Systems	1,006,471	\$265,071	\$2.98	38.6	-	-	-

Option	Description	Annual Elec. Cons. (kWh)	Annual Electric Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Combined Expense Savings**	Energy Savings Percentage**	LEED EAc2 Points (EApc95)
1	1. Design Envelope 2. Geothermal VAV Displacement Ventilation System with Ground-Source Heat Recovery Heat Pump Chiller/Heater Plant 3. Design High-Efficiency Lighting System (0.50 w/s.f.) 4. Electric Domestic Hot Water Systems	611,077	\$182,789	\$2.05	23.4	\$82,282	39.3%	15
2	1. Design Envelope 2. ASHP VAV Displacement Ventilation System with Air-Source Heat Recovery Heat Pump Chiller/Heater Plant 3. Design High-Efficiency Lighting System (0.50 w/s.f.) 4. Electric Domestic Hot Water Systems	635,790	\$196,020	\$2.20	24.4	\$69,051	36.8%	14
3	1. Design Envelope 2. ASHP VRF System 3. Design High-Efficiency Lighting System (0.50 w/s.f.) 4. Electric Domestic Hot Water Systems	704,560	\$214,318	\$2.41	27.0	\$50,752	30.0%	13

*Combined expense savings is the difference between the combined annual expense of the baseline and building in comparison.

**Energy cost savings percentage is the difference between the annual energy costs of the baseline and building in comparison.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

LIFE CYCLE ANALYSES

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - ASHP VAV

Alternative: Option 1 - GSHP Disp

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:30:55 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,608,440	\$11,363,520	-\$1,755,080
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$2,760,957	\$403,135
Energy Demand Charges	\$5,739,160	\$4,910,477	\$828,683
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$3,447,476	\$1,661,323
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$11,118,910	\$2,893,141
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,620,491	\$22,482,430	\$1,138,061

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$2,893,141
- Increased Total Investment	\$1,755,080

Net Savings	\$1,138,061

Savings-to-Investment Ratio (SIR)

SIR = 1.65

Adjusted Internal Rate of Return

AIRR = 2.42%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	21
Simple Payback is negated in year	31
Simple Payback occurs in year	41
Discounted Payback occurs in year	21

Discounted Payback is negated in year 30

Discounted Payback occurs in year 41

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	611,077.0 kWh	115,373.0 kWh	5,768,176.2 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,085.1 MBtu	393.7 MBtu	19,681.8 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg
Total:				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - ASHP VAV

Alternative: Option 2 - ASHP Disp

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:31:35 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,608,440	\$9,534,570	\$73,870
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$2,872,614	\$291,477
Energy Demand Charges	\$5,739,160	\$5,371,764	\$367,396
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$4,695,769	\$413,031
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$12,940,147	\$1,071,904
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,620,491	\$22,474,717	\$1,145,774

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$1,071,904
- Increased Total Investment	-\$73,870

Net Savings	\$1,145,774

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	635,790.0 kWh	90,660.0 kWh	4,532,627.7 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,169.4 MBtu	309.3 MBtu	15,466.0 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	209,844.72 kg	29,922.65 kg	1,496,009.67 kg
SO2	68.00 kg	59.51 kg	8.49 kg	424.29 kg
NOx	183.08 kg	160.23 kg	22.85 kg	1,142.32 kg
Total:				
CO2	239,767.37 kg	209,844.72 kg	29,922.65 kg	1,496,009.67 kg
SO2	68.00 kg	59.51 kg	8.49 kg	424.29 kg
NOx	183.08 kg	160.23 kg	22.85 kg	1,142.32 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Baseline - ASHP VAV

Alternative: Option 3 - VRF Units

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:33:34 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,608,440	\$7,953,930	\$1,654,510
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$3,183,330	-\$19,238
Energy Demand Charges	\$5,739,160	\$5,822,136	-\$82,977
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$4,373,077	\$735,723
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$13,378,543	\$633,508
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,620,491	\$21,332,473	\$2,288,018

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$633,508
- Increased Total Investment	-\$1,654,510

Net Savings	\$2,288,018

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	704,560.0 kWh	21,890.0 kWh	1,094,410.1 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,404.1 MBtu	74.7 MBtu	3,734.3 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	232,542.50 kg	7,224.87 kg	361,213.89 kg
SO2	68.00 kg	65.95 kg	2.05 kg	102.45 kg
NOx	183.08 kg	177.56 kg	5.52 kg	275.81 kg
Total:				
CO2	239,767.37 kg	232,542.50 kg	7,224.87 kg	361,213.89 kg
SO2	68.00 kg	65.95 kg	2.05 kg	102.45 kg
NOx	183.08 kg	177.56 kg	5.52 kg	275.81 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Rebate B - ASHP VAV

Alternative: Rebate Option 1 - GSHP Disp

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:34:02 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,337,190	\$10,432,370	-\$1,095,180
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$2,760,957	\$403,135
Energy Demand Charges	\$5,739,160	\$4,910,477	\$828,683
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$3,447,476	\$1,661,323
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$11,118,910	\$2,893,141
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,349,241	\$21,551,280	\$1,797,961

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$2,893,141
- Increased Total Investment	\$1,095,180

Net Savings	\$1,797,961

Savings-to-Investment Ratio (SIR)

SIR = 2.64

Adjusted Internal Rate of Return

AIRR = 3.39%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	21
Simple Payback is negated in year	31
Simple Payback occurs in year	40
Discounted Payback occurs in year	21

Discounted Payback is negated in year 30

Discounted Payback occurs in year 41

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	611,077.0 kWh	115,373.0 kWh	5,768,176.2 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,085.1 MBtu	393.7 MBtu	19,681.8 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg
Total:				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Rebate B - ASHP VAV

Alternative: Rebate Option 2 - ASHP Disp

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:34:39 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,337,190	\$9,063,069	\$274,121
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$2,872,614	\$291,477
Energy Demand Charges	\$5,739,160	\$5,371,764	\$367,396
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$4,695,769	\$413,031
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$12,940,147	\$1,071,904
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,349,241	\$22,003,216	\$1,346,025

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$1,071,904
- Increased Total Investment	-\$274,121

Net Savings	\$1,346,025

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	635,790.0 kWh	90,660.0 kWh	4,532,627.7 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,169.4 MBtu	309.3 MBtu	15,466.0 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	209,844.72 kg	29,922.65 kg	1,496,009.67 kg
SO2	68.00 kg	59.51 kg	8.49 kg	424.29 kg
NOx	183.08 kg	160.23 kg	22.85 kg	1,142.32 kg
Total:				
CO2	239,767.37 kg	209,844.72 kg	29,922.65 kg	1,496,009.67 kg
SO2	68.00 kg	59.51 kg	8.49 kg	424.29 kg
NOx	183.08 kg	160.23 kg	22.85 kg	1,142.32 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Rebate B - ASHP VAV

Alternative: Rebate Option 3 - VRF Units

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:35:35 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,337,190	\$7,602,680	\$1,734,510
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$3,183,330	-\$19,238
Energy Demand Charges	\$5,739,160	\$5,822,136	-\$82,977
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$4,373,077	\$735,723
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$13,378,543	\$633,508
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,349,241	\$20,981,223	\$2,368,018

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$633,508
- Increased Total Investment	-\$1,734,510

Net Savings	\$2,368,018

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	---Average Base Case	Annual Alternative	Consumption--- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	704,560.0 kWh	21,890.0 kWh	1,094,410.1 kWh

Energy Savings Summary (in MBtu)

Energy Type	---Average Base Case	Annual Alternative	Consumption--- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,404.1 MBtu	74.7 MBtu	3,734.3 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	232,542.50 kg	7,224.87 kg	361,213.89 kg
SO2	68.00 kg	65.95 kg	2.05 kg	102.45 kg
NOx	183.08 kg	177.56 kg	5.52 kg	275.81 kg
Total:				
CO2	239,767.37 kg	232,542.50 kg	7,224.87 kg	361,213.89 kg
SO2	68.00 kg	65.95 kg	2.05 kg	102.45 kg
NOx	183.08 kg	177.56 kg	5.52 kg	275.81 kg

NIST BLCC 5.3-22: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology in OMB Circular A-94

Base Case: Rebate B - ASHP VAV

Alternative: IRA Rebate Option 1 - GSHP Disp

General Information

File Name: C:\Users\keith_lane.GGDMAIL\BLCC 5.3-22\projects\Oakdale Elementary School.xml
 Date of Study: Tue Jun 18 14:42:54 EDT 2024
 Project Name: Oakdale Elementary School
 Project Location: Massachusetts
 Analysis Type: OMB Analysis, Non-Energy Project
 Analysis Purpose: Public Investment or Regulatory Analysis
 Analyst:
 Base Date: September 1, 2025
 Service Date: September 1, 2025
 Study Period: 50 years 0 months(September 1, 2025 through August 31, 2075)
 Discount Rate: 1.4%
 Discounting Convention: End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	\$9,337,190	\$7,534,672	\$1,802,518
Future Costs:			
Energy Consumption Costs	\$3,164,091	\$2,760,957	\$403,135
Energy Demand Charges	\$5,739,160	\$4,910,477	\$828,683
Energy Utility Rebates	\$0	\$0	\$0
Water Costs	\$0	\$0	\$0
Recurring and Non-Recurring OM&R Costs	\$5,108,800	\$3,447,476	\$1,661,323
Capital Replacements	\$0	\$0	\$0
Residual Value at End of Study Period	\$0	\$0	\$0
	-----	-----	-----
Subtotal (for Future Cost Items)	\$14,012,051	\$11,118,910	\$2,893,141
	-----	-----	-----
Total PV Life-Cycle Cost	\$23,349,241	\$18,653,582	\$4,695,659

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	\$2,893,141
- Increased Total Investment	-\$1,802,518

Net Savings	\$4,695,659

NOTE: Meaningful SIR, AIRR and Payback can not be computed unless incremental savings and total savings are both positive.

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	726,450.0 kWh	611,077.0 kWh	115,373.0 kWh	5,768,176.2 kWh

Energy Savings Summary (in MBtu)

Energy Type	----Average Base Case	Annual Alternative	Consumption---- Savings	Life-Cycle Savings
Electricity	2,478.7 MBtu	2,085.1 MBtu	393.7 MBtu	19,681.8 MBtu

Emissions Reduction Summary

Energy Type	----Average Base Case	Annual Alternative	Emissions---- Reduction	Life-Cycle Reduction
Electricity				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg
Total:				
CO2	239,767.37 kg	201,688.11 kg	38,079.26 kg	1,903,806.79 kg
SO2	68.00 kg	57.20 kg	10.80 kg	539.95 kg
NOx	183.08 kg	154.00 kg	29.08 kg	1,453.70 kg

**APPENDIX A:
MASS SAVE INCENTIVES OVERVIEW**



Commercial New Construction or Major Renovation Program Overview



Choose Your Path to Generate Energy Savings and Reduce Carbon

The Sponsors of Mass Save can help make your new construction or major renovation project a high performing, energy efficient and low carbon building. We have technical experts and financial incentives to help bring your project to the next level of energy efficiency. Whether your goal is to design an all-electric Net Zero building, or, to simply incorporate more efficient systems into the design of your building, we have a pathway for you.

The earlier you engage, the deeper the energy savings potential

Connect with the Sponsors of Mass Save early in your project's design timeline to unlock opportunities for cost savings, technical support and optimal energy efficiency. Building owner incentives are available to help cover the incremental construction and design service costs associated with including energy efficient equipment and systems in your project.

By starting with us in your project's feasibility or conceptual design phase, your project team can achieve deep energy savings, and even net zero status, minimizing future energy use and carbon. We can also help you set an energy use intensity (EUI) target – which is much like a “miles per gallon” metric. It helps keep the project on an energy budget and can be used to evaluate your building's actual or predicted performance over time or compared to other, similar buildings.

There is a pathway for every project

Mass Save Sponsors offer the highest incentives for projects with the lowest EUIs and greatest levels of decarbonization.

Path 1. Net Zero and Low EUI Buildings (10,000 sf or greater)

Receive expert net zero building technical assistance and the highest new construction/major renovation project incentives available. Set an ultra-low EUI and save. We provide support through a post occupancy period to help you make sure the building performs at the level you expect.

Path 2. Whole Building Energy Use Intensity (EUI) Reduction Approach (50,000 sf or greater)

In this path for larger, complex building projects, your incentives will be greater with the lowest design EUIs. We offer technical support and energy modeling services to help you succeed.

Path 3: High Performance Buildings

For whole building projects of any size where customers do not wish to set and pursue an EUI target, projects that are not whole buildings (e.g., tenant fit outs, open air parking garages), projects that are process-load heavy buildings (e.g., cannabis, industrial), and projects where customers are only interested in one-off measures.

Receive technical assistance and financial incentives for implementing energy efficient technology and equipment.

About Mass Save:

Mass Save® is a collaborative of Massachusetts' natural gas and electric utilities and energy efficiency service providers including Berkshire Gas, Blackstone Gas, Cape Light Compact, Columbia Gas, Eversource, Liberty Utilities, National Grid, and Unitil. We empower residents, businesses, and communities to make energy efficient upgrades by offering a wide range of services, rebates, incentives, trainings, and information.

WE ARE MASS SAVE®:



EVERSOURCE



SUMMARY OF PATH INCENTIVES

PATH 1: NET ZERO/LOW EUI BUILDINGS

Customer Incentives

Construction Incentive	up to \$2.00/sf
Post Occupancy Incentive	\$1.50/sf
Space Heating Heat Pump Adder*	
• Air Source Heat Pumps:	\$800/ton
• Variable Refrigerant Flow (VRF):	\$1,200/ton
• Ground Source Heat Pumps:	\$4,500/ton
ZNE Or PH Certification Incentive	\$3,000
Technical Assistance For Net Zero Expert Consultant Services	50% of fee up to \$10,000
Verification Incentive	50% of fee up to \$10,000

PATH 2: WHOLE BUILDING EUI REDUCTION APPROACH

Customer Incentives

Incentive rate range (based on EUI % reduction)	\$0.35/sf - \$1.25/sf
Space Heating Heat Pump Adder*	
• Air Source Heat Pumps:	\$800/ton
• Variable Refrigerant Flow (VRF):	\$1,200/ton
• Ground Source Heat Pumps:	\$4,500/ton
Technical Assistance	up to 75% cost share (capped at \$20,000 per Sponsor)
Verification Incentive	50% of fee up to \$10,000

PATH 3: HIGH PERFORMANCE BUILDINGS

Customer Incentives

Custom: Envelope, lighting controls, unitary HVAC (RTU, AC), high efficiency chillers, energy recovery, demand control ventilation, variable flow kitchen hoods, DHW heaters, low flow water fixtures and other custom measures	\$0.35/kWh \$2.00/therm
Prescriptive: variable frequency drives	Current program rate
Space Heating Heat Pump*	
• Air Source Heat Pumps:	\$800/ton
• Variable Refrigerant Flow (VRF):	\$1,200/ton
• Ground Source Heat Pumps:	\$4,500/ton

*Refers to nominal heating capacity (btu/h) at AHRI conditions divided by 12,000. The heat pump adder is available for equipment that transfers heat from a source outside of the building (i.e., outside air or a ground loop) for space heating purposes. For ground source heat pump projects, the capacity of the ground loop is used instead of the capacity of the heat pump. Equipment must be used as a primary heating source to qualify.

Go to [MassSave.com/business](https://masssave.com/business), to learn more about the pathways. Click on the **Find Your Mass Save Sponsor** tool and enter your zip code to connect with your Mass Save Sponsor(s).

About Mass Save:

Mass Save® is a collaborative of Massachusetts' natural gas and electric utilities and energy efficiency service providers including Berkshire Gas, Blackstone Gas, Cape Light Compact, Columbia Gas, Eversource, Liberty Utilities, National Grid, and Until. We empower residents, businesses, and communities to make energy efficient upgrades by offering a wide range of services, rebates, incentives, trainings, and information.

WE ARE MASS SAVE®:



EVERSOURCE



**APPENDIX B:
2022 GEOTHERMAL FEDERAL
TAX CREDIT REFERENCES**

IRA 2023

COMMERCIAL GEOTHERMAL

Tax Guide 2023





INFLATION REDUCTION ACT OF 2022 (IRA)

The Inflation Reduction Act of 2022 (IRA) substantially extends and enhances the federal income tax credits and incentives available for the installation of geothermal heat pump (GHP) energy property in commercial buildings, including the introduction of a new direct payment option for non-taxable entities. For taxable businesses, there are also new carryback and transfer provisions along with a continuation of the accelerated depreciation benefits. These new incentives are unfortunately more complex in structure. This guide is designed to provide a detailed review of the new tax and depreciation incentives available for commercial GHP energy property under the IRA.

Federal Income Tax Credits:

- Investment tax credit (ITC) up to 30% of system cost basis
- Domestic content bonus tax credit up to 10% of system cost basis
- Energy community bonus tax credit up to 10% of system cost basis
- Direct-pay option for non-taxable entities
- No cap on total credit amount
- Can be used to offset AMT tax
- Can be used in more than one year
- Can be carried back up to 3 years or transferred/sold to an unrelated party
- Can be combined with solar and other clean energy tax credits

Accelerated Depreciation:

- 5-year MACRS depreciation of system cost basis (less ½ of tax credit)
- Eligible for first-year bonus depreciation

Eligibility:

- Building located in U.S.
- Original use begins with taxpayer
- Construction commenced before 1/1/2035



Business Energy Investment Tax Credit

The business ITC for geothermal heat pump property was originally enacted in the Energy Improvement and Extension Act of 2008. This legislation added geothermal heat pumps to the definition of energy property under section 48(a) of the Internal Revenue Code with a 10% tax credit. This credit was extended by Bipartisan Budget Act of 2018 and most recently enhanced and further extended by the IRA of 2022. Effective 1/1/2023, there is now a 2-tier structure in place with a base credit rate of 6% and an increased rate of 30% if any one of the following criteria are met:

1. The maximum net output capacity of the GHP project is less than 1 megawatt (3.4 million Btu/h) of thermal energy. The Geothermal Exchange Organization (GEO) has submitted analysis that equates this to a total installed system capacity of 445 tons for distributed zone-level GHPs or 285 tons for central plant GHPs. The Department of Treasury is currently developing guidance.
2. The project is installed under specific prevailing wage and apprenticeship requirements. The IRS issued guidance for these requirements in Notice 2022-61 on 11-30-2022.
3. Construction of the project was commenced prior to 1-29-2023.



The ITC for GHP energy property is effective for projects that commence construction prior to 1/1/2035. In 2033 the base rate drops to 5.2% and the increased rate to 26%, while in 2034 they decline to 4.4% and 22% respectively.

Domestic Bonus Tax Credit

The domestic content bonus requires that any steel, iron, or manufactured product that is part of the GHP project at time of completion be produced in the United States. There is a 2-tier structure in place with a base credit rate of 2% and an increased rate of 10% that is based on the same criteria as for the ITC outlined above.

For purposes of this bonus, steel and iron used in the GHP project must be produced in the United States. This requirement applies to construction materials made primarily of steel or iron, but not to steel or iron used as components or sub-components of other manufactured products. Manufactured products are deemed to have been manufactured in the United States if at least 40% of the total cost of the incorporated components and subcomponents are mined, produced, or manufactured in the United States. The percentage of domestic content required for manufactured products increases to 45% for projects that begin construction in 2025, 50% for projects that begin construction in 2026, and 55% for projects that begin construction after 2026. GHP projects certainly appear to be able meet these requirements, however the Department of Treasury is developing necessary guidance.

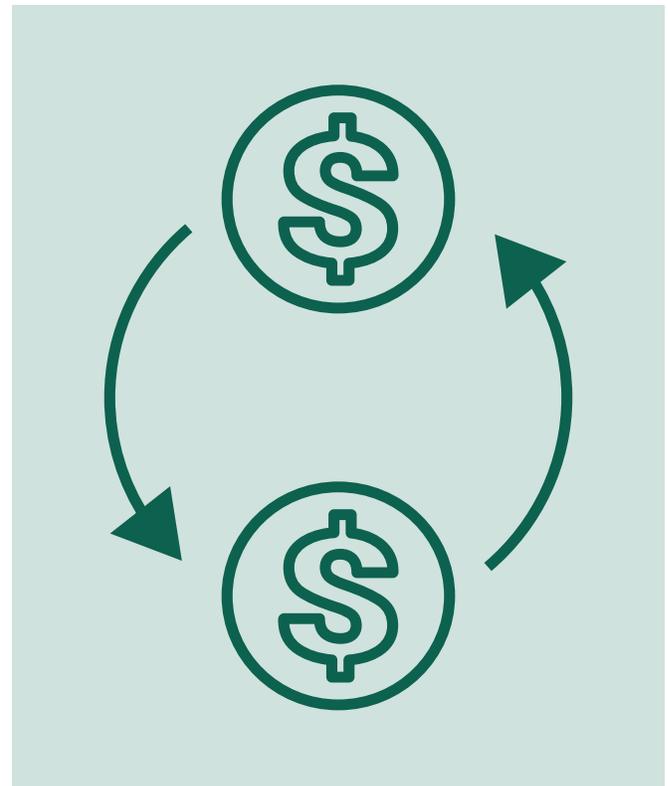
The Domestic Content Bonus is not available for GHP projects completed before 1/1/2023



Direct Pay

Non-taxable entities have historically been unable to use the ITC. To address this, the IRA creates a new direct pay mechanism that, in effect, provides a refundable credit equal to the GHP project ITC with any domestic content bonus. Entities eligible include tax exempt organizations, a State or political subdivision thereof, the Tennessee Valley Authority, Indian tribal governments, Alaska Native Corporations, and rural electric cooperatives. Examples of these entities include charities, churches, foundations, state and local government buildings, schools, universities, and other nonprofits.

Direct pay is available for GHP projects that are placed in service after 12/31/2022.



Transfer or Sale of Tax Credit

Taxpayers may transfer the ITC including any domestic content bonus to an unrelated taxpayer. Consideration must be paid in cash, is not included in the income of the transferor, and is not deductible to the transferee. The transferee shall be treated as the taxpayer for all purposes with respect to the credit. For GHP energy projects held by a partnership, only the partnership can elect to transfer the eligible credits, not the individual partners. Direct pay is available for GHP projects that are placed in service after 12/31/2022.

Credit Carryback

The IRA extends the ITC carryback period to 3 years. The credit must originate in a tax year that begins after 12/31/2022. Any unused portion of the credit can also be carried forward.



Depreciation of Energy Property

Energy property is classified as a 5-year property in section 168(e) (3)(B)(vi) of the Internal Revenue Code, meaning the cost of the property can be deducted on an accelerated MACRS basis. For depreciation purposes, the system cost basis must be reduced by one half of the energy tax credit. In the example of a C-corporation in a 26% overall (federal plus state) tax bracket receiving a 40% ITC (includes the domestic content bonus), MACRS depreciation provides an additional tax savings equal to 20.8% of the energy property basis over the first 5 years, or optionally most within the first year. By comparison, conventional heating and cooling systems are generally depreciated on a 39-year straight line basis and would provide only 3.33% of the basis in tax savings over the first 5 years. The tax benefits for pass-through entities such as S-corporations could be much higher due to the higher marginal tax rates for individuals.

Energy property is eligible for first year bonus depreciation. The bonus allowance is 100% in 2022, 80% in 2023, 60% in 2024, 40% in 2025, 20% in 2026 and phases out in 2027. Refer to IRS Publication 946 for more information regarding how to depreciate property.

Eligible Geothermal Heat Pump Energy Property

The tax credit may be claimed for spending on equipment which uses the ground or ground water as a thermal energy source to heat a structure or as a thermal energy sink to cool a structure. The structure must be located in the United States. Spending includes costs of installation.

The credit cannot be claimed for spending on equipment used solely for a purpose other than heating or cooling a structure or on previously used equipment.

Construction Commenced Requirement

The credit can be claimed on spending for projects on which construction has commenced prior to January 1st, 2035. There is no time limit on when the construction must be completed for GHP energy projects. See IRS Notice 2018-59 for methods of establishing the commencement of construction.

System Cost Basis

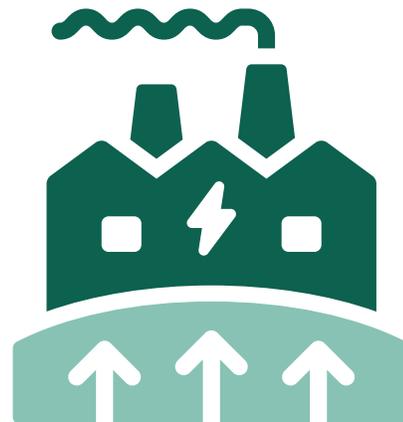
The cost basis includes the direct costs associated with the purchase and installation of the energy property as well as any indirect costs that may be partly or fully allocable to its construction (including taxes). This includes equipment such as ground heat exchangers or wells, distribution piping and ductwork, pumps, GHPs and controls along with the associated installation labor and materials. The basis also generally includes those portions of the electrical, plumbing, design and GC fees that are specifically associated with the geothermal property. Utility rebates usually reduce the basis. See the uniform capitalization rules of IRS section 263A.

Dual Use Property Hybrid GHP Systems

If a GHP energy property contains a source of energy other than from the ground or ground water, portions of the system that carry both forms of energy may be considered dual use equipment. This would typically be equipment such as ductwork downstream of the GHP. The presence of an auxiliary energy source solely for emergency back-up purposes is not considered in this determination. Otherwise, if more than 25% of the annual energy (not peak energy) comes from the auxiliary source, any dual use equipment in the system may no longer be eligible for inclusion in the ITC cost basis. These comments are based on an interpretation of a 1979 code definition of energy property for direct use geothermal energy such as hot water for heating. There have been no further guidelines published by the IRS since that time. The IRS may not apply this language in this same way to GHP energy property and, as such, this interpretation is offered on a precautionary basis for those developing hybrid GHP energy projects. See 26 CFR 1.48-9 - Definition of energy property.

Energy Credit and AMT

The ITC can be used to offset both regular income taxes and alternative minimum taxes (AMT).





Ownership Considerations

Geothermal energy property ITC credits and depreciation deductions can only be claimed by the owner of the eligible property, including utilities that own energy property. At present, business models as used by the solar industry where a third-party owner (TPO) leases or sells energy from an energy property to a consumer are prohibited for GHP property due to IRS rules related to “limited use.” The issue is the non-removable geothermal loop being dedicated to a single customer, in effect making the TPO a lender rather than a true owner. GEO is working with Treasury to develop a work around.



Energy Communities

The law includes an additional bonus credit of 10% (or 2% for projects over 1MW that don’t meet prevailing wage/apprenticeship requirements) for Section 48 technologies that are installed in “energy communities.” Energy communities are defined as:

- Census tract or adjoining tract with coal mine closed since 2000, or
- Census tract or adjoining tract with coal plant closed since 2010, or
- Defined as “a brownfield site” by the EPA, or
- a metropolitan or non-metropolitan statistical area where 0.17% or more direct employment, or at least 25% of local tax revenues, are related to extraction, processing, transport, or storage of coal, oil, or natural gas, and unemployment is at or above the national average in the previous year

Claiming the Credit

IRS Form 3468 is used to claim the Energy Credit. Visit www.irs.gov to download the latest tax form and instructions.



A NIBE GROUP MEMBER

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Clean Energy Tax Incentives: Elective Pay Eligible Tax Credits

The Inflation Reduction Act of 2022 (“IRA”) makes several clean energy tax credits available to businesses; tax-exempt organizations; state, local, and tribal governments; other entities; and individuals. The IRA also enables entities to take advantage of certain clean energy tax credits through its elective pay provision (also colloquially known as direct pay). Elective pay allows several types of entities, such as tax-exempts and governments, to treat the amount of certain credits as a payment against tax on their tax returns and as a result receive direct payments for certain clean energy tax credits.

	Tax Provision	Description
Energy Generation & Carbon Capture	Production Tax Credit for Electricity from Renewables (§ 45, pre-2025)	For production of electricity from eligible renewable sources , including wind, biomass, geothermal, solar, small irrigation, landfill and trash, hydropower, marine and hydrokinetic energy. Credit Amount (for 2022): 0.55 cents/kilowatt (kW); (1/2 rate for electricity produced from open loop biomass, landfill gas, and trash); 2.75 cents/kW if Prevailing Wage and Apprenticeship (PWA) rules are met ^{1,2,3,7}
	Clean Electricity Production Tax Credit (§ 45Y, 2025 onwards)	Technology-neutral tax credit for production of clean electricity. Replaces § 45 for facilities that begin construction and are placed in service after 2024. Credit Amount: Starts in 2025, consistent with credit amounts under section 45 ^{1,2,3,6,7}
	Investment Tax Credit for Energy Property (§ 48, pre-2025)	For investment in renewable energy projects including fuel cell, solar, geothermal, small wind, energy storage, biogas, microgrid controllers, and combined heat and power properties Credit Amount: 6% of qualified investment (basis); 30% if PWA requirements met ^{1,4,5,6,8}
	Clean Electricity Investment Tax Credit (§ 48E, 2025 onwards)	Technology-neutral tax credit for investment in facilities that generate clean electricity and qualified energy storage technologies. Replaces § 48 for facilities that begin construction and are placed in service after 2024 Credit Amount: 6% of qualified investment (basis); 30% if PWA requirements met ^{1,4,5,6}
	Low-Income Communities Bonus Credit (§ 48(e), 48E(h)) Application required	Additional investment tax credit for small-scale solar and wind (§ 48(e)) or clean electricity (§48E(h)) facilities (<5MW net output) on Indian land, federally subsidized housing, in low-income communities, and benefit low-income households. Allocated through an application process. Credit Amount: 10 or 20 percentage point increase on base investment tax credit ⁷
	Credit for Carbon Oxide Sequestration (§ 45Q)	Credit for carbon dioxide sequestration coupled with permitted end uses in the United States. Credit Amount: \$12-36 per metric ton of qualified carbon oxide captured and sequestered, used as a tertiary injectant, or used, depending on the specified end use; \$60-\$180 per metric ton if PWA requirements met. ^{1,7}
	Zero-Emission Nuclear Power Production Credit (§ 45U)	For electricity from nuclear power facilities. Facilities in operation prior to August 16, 2022. Credit Amount (for 2023): 0.3 cents/kWh (reduced rate for larger facilities); 1.5 cent/kWh if PW req’s met ^{1,7}
Manufacturing	Advanced Energy Project Credit (§ 48C) Application required	For investments in advanced energy projects. A total of \$10 billion will be allocated, not less than \$4 billion of which will be allocated to projects in certain energy communities. Credit Amount: 6% of taxpayer’s qualified investment; 30% if PWA requirements are met ¹
	Advanced Manufacturing Production Credit (§ 45X)	Production tax credit for domestic clean energy manufacturing of components including solar and wind energy, inverters, battery components, and critical materials. Credit Amount: Varies by component
Vehicles	Credit for Qualified Commercial Clean Vehicles (§ 45W)	For purchasers of commercial clean vehicles. Qualifying vehicles include passenger vehicles, buses, ambulances, and certain other vehicles for use on public streets, roads, and highways. Credit Amount: Up to \$40,000 (max \$7,500 for vehicles <14,000 lbs) ⁹
	Alternative Fuel Vehicle Refueling Property Credit (§ 30C)	For alternative fuel vehicle refueling and charging property , located in low-income and non-urban areas. Qualified fuels include electricity, ethanol, natural gas, hydrogen, and biodiesel. Credit Amount: 6% of basis for businesses and can increase to 30% if PWA is met.
Fuels	Clean Hydrogen Production Tax Credit (§ 45V)	For producing clean hydrogen at a qualified, U.S.-based clean hydrogen production facility. Credit Amount: \$0.60/kg multiplied by the applicable percentage (20% to 100%, depending on lifecycle greenhouse gas emissions), amount increases if PWA is met ^{1,7}
	Clean Fuel Production Credit (§ 45Z, 2025 onwards)	Technology neutral tax credit for domestic production of clean transportation fuels , including sustainable aviation fuels, beginning in 2025* Credit Amount: \$0.20/gallon (\$0.35/gal for aviation fuel) multiplied by CO2 “emissions factor”; \$1.00/gallon (\$1.75/gal for aviation fuel) multiplied by CO2 “emissions factor” if PWA is met ^{1,7}

Notes:

The information in this document may be subject to change as guidance is issued or finalized. For all IRA clean energy tax credits, please see [irs.gov/cleanenergy](https://www.irs.gov/cleanenergy) for further details and eligibility requirements.

¹ Credit is increased by 5 times for projects that pay prevailing wages and use registered apprentices. Apprenticeship requirements do not apply for §§ 45L and 45U. Prevailing wage and apprenticeship requirements do not apply to certain projects, including certain projects of less than 1 megawatt or those that began construction prior to January 29, 2023.

² Credit is increased by 10% if the project meets certain domestic content requirements for steel or iron, and manufactured products.

³ Credit is increased by 10% if located in an energy community.

⁴ Credit is increased by up to 10 percentage points for projects meeting certain domestic content requirements for steel, iron, and manufactured products.

⁵ Credit is increased by up to 10 percentage points if located in an energy community.

⁶ Section 168(e) provides favorable depreciation treatment for facilities or property qualifying for this tax credit. These facilities or property will be treated as a 5-year property for purposes of cost recovery, leaving them with lower taxable income in the earlier years of a clean energy investment.

⁷ Credit rate is adjusted annually for inflation.

⁸ See section 48 for more detail and applicable exceptions to the credit rate.

⁹ The entities eligible for elective pay of the commercial clean vehicle credit is a subset of the entities eligible for elective pay of other credits. In addition, starting January 1, 2024, the amount of a new clean vehicle or previously owned clean vehicle tax credit (but not a commercial clean vehicle credit) can be transferred to a dealer for an equivalent reduction in the eligible vehicle's sales price.



11.4 Fire Protection

Fire Protection narrative follows.

FIRE PROTECTION SYSTEMS
NARRATIVE REPORT

The following is the Fire Protection Systems narrative, which defines the scope of work and capacities of the Fire Protection Systems, as well as, the Basis of Design.

1. CODES

- A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

- A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. SYSTEM DESCRIPTION

- A. The building will be served from the new 8" fire service line from the campus hydrant line. Cross connection control shall be provided by use a supervised double check valve assembly backflow preventer on the fire service as it enters the building in the dedicated Fire Pump room, adjacent to the exterior building wall.
- B. The entire building shall be protected throughout with a wet automatic fire suppression system and fed from an 8" Wet Riser Check Valve. System will be a combined standpipe/sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.
- C. Standpipes meeting the requirements of NFPA 14-2013 shall be provided in the egress stairwells, horizontal exits and in the Stage area.
- D. Each floor will be divided in to Two (2) sprinkler zones and each wet sprinkler zone will include a control valve assembly. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.
- E. A fire department Siamese pumper connection will be provided at the outside of the fire service entrance or at a location requested by AHJ. The FDC will be wall-mount type. This system shall be designed in accordance with NFPA Standard 13, 2013, the Massachusetts State Building Code, 9th Edition and the local the town of Dedham Fire Department requirements.
- F. Furnish and install all Supervisory Switches, Flow Switches, Pressure Switches, and other Alarm Devices. Install all such devices on the piping and coordinate with the Electrical Subcontractor who shall wire all such devices to the Fire Alarm System. Every shutoff valve installed on this project shall have a supervisory trouble switch wired to the Fire Alarm Panel.
- G. An 8" electric bell will be provided on the exterior.
- H. A hydrant flow test was conducted and it was confirmed that a Fire pump is required for this building. The fire pump will be 750 GPM @ 60 PSI with a 40 HP motor and controller with ATS. A jockey pump will be 10 GPM @65 PSI with a 2 HP motor and controller.

4. BASIS OF DESIGN

- A. The mechanical rooms, kitchen, science classrooms, and storage rooms are considered Ordinary Hazard Group 1; Stage is considered Ordinary Hazard Group 2; all other areas are considered light hazard.
- B. Required Design Densities:
Light Hazard Areas = 0.10 GPM over 1,500 s.f.
Ordinary Hazard Group 1 = 0.15 GPM over 1,500 s.f.
Ordinary Hazard Group 2 = 0.20 GPM over 1,500 s.f.
- C. Sprinkler spacing (max.):
Light Hazard Areas = 225 s.f.
Ordinary Hazard Areas = 130 s.f.

5. PIPING

- A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe. All piping for dry system shall be Galvanized type.
- B. Schedule 40 black steel pipe with threaded fittings for 1-1/2" and smaller and Schedule 10 pipe with grooved fittings for 2" and larger.

6. FITTINGS

- A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

END OF SECTION

11.5 Electrical

Electrical Systems narrative follows.

ELECTRICAL SYSTEMS

NARRATIVE REPORT

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as the Basis of Design. The Electrical Systems shall be designed and constructed for **LEED BD+C for Schools** where indicated on this narrative.

1. CODES

All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. SEQUENCE OF OPERATIONS AND INTERACTIONS

- A. Interior lighting will be controlled by a networked lighting control system (NLCS) utilizing distributed load controllers (switching and dimming) actuated by signals from occupancy/vacancy sensors, daylight sensors, keypads, touchscreens, and auxiliary override inputs from the fire alarm, security, building management (BMS), and emergency power systems; BACnet/IP or contact closure output interfaces will be utilized from each system. Timed schedules following daily facility schedules with overrides will be employed for initial control of all common areas. Lighting will be fed from normal or life safety source panels; refer to item C below.
- B. Exterior lighting will be controlled by a networked lighting control system (NLCS) utilizing distributed load controllers or centralized panels (switching and dimming) actuated by signals from occupancy sensors, daylight sensors, keypads, touchscreens, and auxiliary override inputs from the fire alarm, security, building management, and emergency power systems; BACnet/IP or contact closure output interfaces will be utilized from each system. Pole-mounted area lighting will be provided with wireless load controller nodes integrated into each fixture allowing for individual or zoned control. Timed control following dusk-to-dawn schedules with overrides will be employed for initial control of all exterior lighting. Lighting will be fed from normal or life safety source panels; refer to item C below.
- C. Designated emergency and egress lighting will be wired to life safety source panels and be controlled by the NLCS when normal utility source power is available and brought to full "ON" through system control UL924 listed by-pass functions when normal utility source power is lost. Emergency exit signage shall be uncontrolled and remain "ON" constantly.
- D. Automatic control of receptacles based on occupancy will be provided for at least 50% of the receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, classrooms, and individual workstations. Controlled receptacles will be marked per NEC 406.3 (E).
- E. Demand response shedding of lighting loads will be capable in accordance with associated LEED requirements.

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4. DESCRIPTION OF THE SYSTEMS

A. Utilities:

1. The new building will be supplied with utility power from the utility company Eversource. The new service will be fed via an underground primary duct bank to a pad mounted utility company owned liquid filled transformer.
2. The service electrical transformer will be furnished, installed, owned and maintained by Eversource, and it will be located adjacent to the building as shown in the civil drawings. The transformer will be of the pad-mounted type with a primary voltage of 13.8 kV and a secondary voltage of 480Y/277 volts. The transformer will be sized by the utility company based on the load data provided by The Design team.
3. Concrete pad and grounding grid for the pad-mounted transformer is provided by the Contractor per the Eversource standards.
4. Concrete encased duct bank of the two 4" PVC conduits will be provided by the Electrical Contractor for the primary feeder installation from a utility pole to the pad-mounted transformer. Pre-cast concrete manholes 5' x 5' will be provided by the Contractor to facilitate the primary cables field installation. The duct bank routing is shown in the civil drawings.
5. Utility company will provide a primary feeder cable from the utility manhole to the pad-mounted transformer via the new manhole and terminate the feeder cable on both ends.
6. Transformer secondary feeder of the copper conductors will be installed underground in the duct bank of five 4" PVC conduits from the pad-mounted transformer to the main electrical switchboard located in the main electrical room. The secondary feeder and terminations at the switchboard side will be provided by the Electrical Contractor and terminated at the transformer side by National Grid. The new service will be metered at the transformer secondary voltage.
7. National Grid metering CTs will be installed in a CT section of the switch board, the meter will be located at the direction of the utility company.
8. Telephone, Cable TV, and City Fiber will be fed underground into the building's Main Distribution Frame/Head End Room.
9. Copper conductors shall be utilized for all branch circuit and feeder wiring. Aluminum conductors will be allowed for feeders 100 amperes or over.
10. The building connected electrical load estimate is based on the preliminary building systems design:

Load Type	KVA
HVAC Loads (including AHU, Destratification Fans, DCU, Chiller, UH, VRF, Boilers, FCs, Pumps, RTUs, Exhaust Fans, DCU)	758 KVA
Elevator	31.7 KVA
Exterior Lighting	2.0 KVA

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Load Type	KVA
Interior Lighting	47 KVA
General Power	189 KVA
Kitchen	75 KVA
EV Charging	144 KVA
Plumbing/Fire Protection (Pumps, etc.)	160 KVA
Total Connected Load	1406.7 KVA

11. Electrical power distribution equipment will be installed in the main electrical room and in the electrical closets. There is one main electric room that also contains a 2-hour rated emergency electric room for life safety electrical switchgear. The main electric room shall be located on the First Floor. We anticipate four remote electrical rooms.
12. Electrical power distribution equipment in each electrical room or closet will support lighting, power, and HVAC loads in the associated areas.
13. A typical electric room will serve interior lighting, HVAC equipment and receptacle loads in the Academic Core areas. Each closet will house a 250 Amp 120/208-volt power panel (double tub) via a 75KVA dry-type transformer, a 100 Amp 277/480 panel for lighting, and a 150Amp 120/208-volt mechanical panel via a 45KVA transformer.
14. The panels in the Gym electrical closet will serve local HVAC equipment, lighting, receptacles and Gym equipment. The closet will house a 225 Amp 277/480 volt power distribution panel to feed a lighting 100 Amp, 277/480 volt 3 phase panel and a dry-type 75 kVA transformer with a double-tub 250 Amp, 120/208 volt 3 phase receptacle panel. Provide 20-amp, 120-volt circuits for the basketball backboards, shot clocks, scoreboards, divider curtains and 20Amp, 208 volt, 3 phase circuit and disconnect for a mat lifter. Provide control stations and wiring for all Gym equipment.
15. A dry-type 75 kVA transformer and 250 Amp, 120/208 volt, 3 phase panels will be provided for the Cafeteria and Kitchen loads. The kitchen refrigeration equipment will be power fed from the standby power panel.
16. Roof-mounted HVAC equipment will be power fed from the 400 Amp, 480-volt, 3 phase power panels located in the nearest second floor electrical closets.
17. HVAC equipment serving data communication rooms, heating plant equipment including heat pumps and circulator pumps, a sewage pump station and an elevator will be supported by the standby generator power panels.

B. Electrical Distribution System:

1. The service capacity will be sized for 2,000 Amperes with a 100% rated main breaker. The main buss will be sized at 2,500 Amperes and will have an available breaker space provision at the end of the switchboard to accommodate a future grid connected photovoltaic array. The switchboard will be furnished with a service entrance surge protection device (SPD) rated at 240 kA and a digital metering unit to monitor voltage, current, power factor, demand KW with a data communication port for interface with BMS. Main switchboard's short circuit rating will be rated for 65 KAIC.
2. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

C. Interior Lighting System:

1. The lighting design intends to provide a visual environment for the students and faculty that supports the educational activities within the building. The lighting system will be designed in compliance with the applicable Energy Code and be eligible for the Utility company rebate program.
2. All lighting fixtures will incorporate LED sources and electronic control gear/power supplies meeting the latest Design Lights Consortium (DLC) qualified products listing requirements and Mass Save Energy incentive requirements (as applicable to lighting selections).
3. Interior lighting illumination levels will meet the IESNA recommended values for applicable activity type, and be in compliance with the IECC 2021 energy allowances and LEED control requirements.
4. Daylight harvesting through continuous dimming will be provided for all general lighting zones near daylight openings; maintained foot-candle levels will comply with associated LEED requirements.
5. Classroom lighting fixtures will consist of pendant mounted direct/indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and for multi-level switching. Two daylight dimming zones will be provided in each classroom.
6. Office lighting fixtures will consist of recessed mounted direct LED luminaries and dimming drivers for continuous level dimming capability. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

In general, lighting power density will be 30% less than current ASHRAE 90.1. The power density reduction relates to **LEED credit EAC2: Optimize Energy Performance**.

7. Lighting levels will be approximately 30 foot-candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with **LEED Credit EQC6: Interior Lighting**.

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8. Gymnasium lighting will be adjustable linear indirect fixtures with impact-resistant lensing zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Sensors and keypads will be impact resistant or provided with field-applied covers and wire guards.
9. Corridor lighting will combine recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Lighting will generally be scheduled for "ON" during normal school hours of operation with occupancy control of full "ON" overriding unoccupied dimmed levels and scheduled to "OFF" after normal business hours or other pre-determined time with occupancy sensor and keypad override.
10. Cafeteria lighting will be shielded flood lighting from top of the atrium for general illumination with a combination of recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads. Lighting will be generally be scheduled for "ON" during normal school hours of operation with occupancy control of full "ON" overriding unoccupied dimmed levels and scheduled to "OFF" after normal business hours or other pre-determined time with occupancy sensor and keypad override.
11. Kitchen and Servery lighting will be NSF listed recessed 2'x2' lensed troffers zoned for switching and dimming control via the NLCS on response from occupancy sensors and keypads.
12. Media Center lighting will be a combination of recessed direct linear slot and indirect linear cove fixtures zoned for switching and dimming control via the NLCS on response from occupancy sensors, daylight sensors, and keypads
13. Single occupant and "gang" bathroom lighting will be a combination of recessed linear wash wall slot and recessed linear direct linear slot zoned for switching and dimming control via the NLCS on response from occupancy and daylight sensors.
14. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied. Manual switches will be provided in each space. Classrooms and offices will have manual dimming capacities.
15. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC energy allowances, and LEED for Schools control requirements.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Classrooms	30 FC
Science Labs	40 FC
Offices, Conference Rooms, Library	30 FC
Kitchen	50 FC
Gymnasium	50 FC
Cafeteria	30 FC

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Corridors	20 FC
Utility and Storage Rooms	20 FC

D. Exterior Lighting System:

1. Site area lighting will be pole-mounted fixtures featuring full-cutoff optics in the parking area and roadways with switching and dimming control via the NLCS. Pole heights will generally be 16 feet on 2.5' concrete mounting bases.
2. Building perimeter lighting will be wall-mounted sconces featuring full-cutoff optics over exterior doors with switching and dimming control via the NLCS. Fixtures will be served from life safety source panels.

PROPOSED ILLUMINATION LEVELS

Location	Average Illumination Levels
Parking	2 FC
Roadways	1 FC
Walkways	2 FC
Building Entry	10 FC
Building Egress Points	5 FC
Outdoor Activity Areas	10 FC

E. Emergency Standby System:

1. One exterior 500 kW diesel emergency generators with sound attenuated enclosures and a 48-hour base tanks with alarms will be provided. Integral 200 kW resistive load banks will be provided for generator testing under load. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting and nurses' area will be connected to the emergency generator.
2. The generator power system has been sized to support emergency (life safety) and optional standby building loads. The life safety branch of the emergency system will be provided with a manual transfer switch on the emergency line side of the transfer switch in compliance with NEC 700.3(F).
 - a. All Exit signs and emergency lighting in the areas listed below are fed by Life Safety Emergency Power (required by code):
 - Corridors
 - Electrical/Mechanical Rooms
 - Gymnasium, Locker Rooms
 - Cafeteria/Commons
 - Media Center
 - Lobbies
 - Administration areas

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- Health Suite/Nurses Office
 - Toilets
 - Auditorium
 - Stage
 - Data rooms "Head End Room & IDF Closets"
 - Kitchen/Servery
 - Exterior Building mounted lights over doors required for egress lighting
 - Where required by code (egress areas)
- b. Fire Alarm System
- c. Optional Standby Equipment:
- Equipment listed below is fed by Optional Standby Emergency Power:
 - Heating Systems
 - Water Pumps
 - MDF and IDF Cooling units
 - Refrigeration (Kitchen/Nurse)
 - Strategically located receptacles in the administration area.
 - Equipment within the Head End and IDF rooms including (served by UPS):
 - Paging/Intercom System (MDF)
 - Security System (IDF/MDF)
 - Telephone System (MDF)
 - Network electronics (IDF/MDF)
 - Servers (MDF)
 - Clock system (MDF)
 - Building Management System (MDF)
- d. Standby power loads:
- Heating system with associated pumps and controls
 - Telephone/data closets and associated A/C equipment
 - Communication systems (telephone and public address systems)
 - Building DDC system control panels
 - Kitchen refrigeration equipment
 - Lighting and power in the Nurse/Medical area
 - Security system equipment

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F. Metering:

1. Measurement devices shall be installed to monitor the electrical energy use for each of the following separately:
 - a. Total electrical energy
 - b. Sub-metering in accordance with ASHRAE 90.1 para. 8.4.3.

Recording and Reporting:

- c. The electrical energy usage for all loads listed above shall be recorded a minimum of every 15 minutes and reported at least hourly, daily, monthly, and annually. The system shall be capable of maintaining all data collected for a minimum of 36 months.

G. Site Lighting System: **LEED Credit SSC6: Light Pollution Reduction**

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with the Illuminating Engineering Society.
2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

H. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.
2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.
3. Corridors will have a cleaning receptacle at approximately 25–40-foot intervals.
4. Exterior weatherproof receptacles with lockable in-use enclosures will be installed at exterior doors.
5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.
6. All receptacles will be of the tamper resistant type.

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I. Fire Alarm System:

1. A fire alarm and detection with mass notification system will be provided with 60 hours battery back-up standby, 15 minutes of alarm. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.
2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.
3. The sprinkler system will be supervised for water flow and tampering with valves.
4. Speaker/strobes with white and amber colored strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms. Amber strobes will be initiated during a mass notification event in which a different district message will be played over the speakers.
5. The system will be remotely connected to automatically report alarms to the Fire Department via an approved method by the Fire Department.

J. Uninterruptible Power Supply (UPS):

1. One (1) 24 KW, 3-phase centralized UPS systems will be provided with seven minutes of battery back-up.
2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.
3. The UPS system will also be connected to the stand-by generator.

K. Level 2 AC Dual Electric Vehicle Charging Equipment (EVSE):

1. Conduit and wiring provisions will be provided to 10% of parking spots for future EV charging stations.

L. Renewable Energy System Provisions:

1. Electrical provisions will be made for a ballasted roof mounted renewable energy system consisting of a grid connected Photovoltaic PV System intended to reduce the facilities demand for power.

M. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

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N. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners, and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication.

O. Security and Communications System Provisions:

1. Electrical Contractor will provide Integrated Security System and Technology System provisions including outlet boxes, empty raceways, 120-volt power, cable trays, and grounding.

5. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and power panels for correct phase balance.
- Emergency generator system.
- Lighting control system (interior and exterior).
- Fire alarm system.
- Two-way communication system.
- Distributed Antennae system.

B. Testing reports shall be submitted to the Engineer for review and approval before providing them to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide operation and maintenance manuals to the Owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

8. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

11.6 Information Technology

Technology Systems narrative follows.

TECHNOLOGY SYSTEMS

NARRATIVE REPORT

The following is the Technology System narrative, which defines the scope of work and capacities of the Communications system infrastructure as well as the Basis of Design.

1. CODES

- A. All work installed under Section 270000 shall comply with the Massachusetts Building Code and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

2. DESIGN INTENT

- A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Technology work and all items incidental thereto, including commissioning and testing.

3. TECHNOLOGY

- A. The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate VOIP based voice systems.
- B. Each classroom will have 2 data outlets for student computers. Two data, one voice with video and audio connections to an LCD monitor will be provided at teacher's station with interconnectivity to a interactive LCD touch screen monitor. A wall phone outlet with 2-way ceiling speaker will be provided for communications with administration. Wireless access points will be provided in all classrooms and other spaces and consist of (2) CAT6A cables.
- C. A central paging system will be provided and integrated with the telephone system.
- D. A wireless GPS/LAN based master clock system will be provided with 120V wireless remote clocks that act as transceivers.
- E. The Main Distribution Frame (MDF) will contain all core network switching and IP voice switch. Intermediate Distribution Frames (IDFs) will serve each floor/wing of the school. A fiber optic backbone will be provided from each IDF to MDF. The backbone will be designed for 10 Gbps Ethernet.

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- F. Two-way communication call boxes will be provided adjacent to each elevator that is above or below grade level. The base station will be located at a control point on the first floor.

4. TESTING REQUIREMENTS

- A. The Technology Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:
- Telephone and data cabling
 - Fiber optic backbone cabling
 - Paging system
 - Wireless clock system
 - A/V wiring for classrooms
- B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

- A. When the project is completed, the Technology Contractor shall provide operation and maintenance manuals to the Owner.

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

- A. When the project is completed, an as-built set of drawings, showing all tel/data requirements from contract and addendum items, will be provided to the Owner.

7. COMMISSIONING

- A. The project shall be commissioned per Section 019113 of the specifications.

11.7 Security

Security Systems narrative follows.

TECHNOLOGY SYSTEMS

NARRATIVE REPORT

The following is the Technology System narrative, which defines the scope of work and capacities of the Communications system infrastructure as well as the Basis of Design.

1. **CODES**

- A. All work installed under Section 270000 shall comply with the Massachusetts Building Code and all local, county, and federal codes, laws, statues, and authorities having jurisdiction.

2. **DESIGN INTENT**

- A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Technology work and all items incidental thereto, including commissioning and testing.

3. **TECHNOLOGY**

- A. The data system infrastructure will consist of fiber optic backbone cabling horizontal wiring will consist of Category 6A UTP Plenum rated cabling for both data and telephone systems for gigabit connectivity. The telephone infrastructure will accommodate VOIP based voice systems.
- B. Each classroom will have 2 data outlets for student computers. Two data, one voice with video and audio connections to an LCD monitor will be provided at teacher's station with interconnectivity to a interactive LCD touch screen monitor. A wall phone outlet with 2-way ceiling speaker will be provided for communications with administration. Wireless access points will be provided in all classrooms and other spaces and consist of (2) CAT6A cables.
- C. A central paging system will be provided and integrated with the telephone system.
- D. A wireless GPS/LAN based master clock system will be provided with 120V wireless remote clocks that act as transceivers.
- E. The Main Distribution Frame (MDF) will contain all core network switching and IP voice switch. Intermediate Distribution Frames (IDFs) will serve each floor/wing of the school. A fiber optic backbone will be provided from each IDF to MDF. The backbone will be designed for 10 Gbps Ethernet.

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- F. Two-way communication call boxes will be provided adjacent to each elevator that is above or below grade level. The base station will be located at a control point on the first floor.

4. TESTING REQUIREMENTS

- A. The Technology Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:
 - Telephone and data cabling
 - Fiber optic backbone cabling
 - Paging system
 - Wireless clock system
 - A/V wiring for classrooms
- B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

5. OPERATION MANUALS AND MAINTENANCE MANUALS:

- A. When the project is completed, the Technology Contractor shall provide operation and maintenance manuals to the Owner.

6. RECORD DRAWINGS AND CONTROL DOCUMENTS:

- A. When the project is completed, an as-built set of drawings, showing all tel/data requirements from contract and addendum items, will be provided to the Owner.

7. COMMISSIONING

- A. The project shall be commissioned per Section 019113 of the specifications.

12 Sustainable Building Design

12.1 LEED Scorecard



**LEEDv4 BD+C: Schools (LEEDv4 SC)
Project Scorecard**

Project: **Dedham Oakdale Elementary School**
Address: **147 Cedar St, Dedham, MA 02026**
Date: **11/29/2023**



Recent notes have been bolded.
Credit not applicable or not pursued.
Questions on compliance highlighted in BLUE.
Critical path items highlighted in RED.
Changes to scorecard highlighted in YELLOW.

LEED Goal	Silver or higher, meet new 2023 MSBA requirements for 4%
EUI Target	25
Bldg Area	87,009 sf
Parking	70
Site Area	Approximately 310k sf
FTE	72
Visitors	XX
Students	360

POINT TOTALS

Yes	M+	M-	No
62	12	16	20

GENERAL PROJECT DOCUMENTATION

Req'd	Team	Responsible	8/22/24 Notes
PIf1	Minimum Program Requirements		REQUIRED: Project must meet all MPRs to be eligible for LEED certification.

INTEGRATIVE PROCESS

Req'd	Team	Responsible	8/22/24 Notes
1			
IPC1	Integrative Process		CREDIT: Perform energy and water-use analysis in early design through the use of a "simple box" model and development of a water budget, respectively.

LOCATION & TRANSPORTATION

Req'd	Team	Responsible	8/22/24 Notes
15			
LTc1	LEED for Neighborhood Development Location		CREDIT: Project located in a LEED ND development.
1	Civil		CREDIT: Locate the development footprint on land that has been previously developed.
1-2	Env. Eng.		CREDIT: Locate on a brownfield where soil or groundwater contamination has been identified, and where the local, state, or national authority (whichever has jurisdiction) requires its remediation.
1-5	TGE		9.29.23: Project site is located in a DDA. Phase I ESA required to determine second point. 11.29.23 Phase I ESA requires no remediation. v4.1 CREDIT: Avg. surrounding density within 1/4 mile >22,000 sf (2pts) or >35,000 (3pts) and/or within 1/2 mile walking distance of at least 4-7 diverse uses (1pt) or >8 diverse uses (2pts). Physical education spaces that are part of the project site, such as playing fields and associated buildings used during sporting events only (e.g., concession stands) and playgrounds with play equipment, are excluded from the development density calculations. 9.29.23: Project has >8 diverse uses within 1/2 mile for 2 points. v4.1 CREDIT: 1pt - 72 wkdy & 30 wknd; 2 pts - 100 wkdy & 70 wknd; 3 pts - 144 wkdy & 108 wknd; 4 pts - 250 wkdy & 160 wknd trips; 5 pts - 360 wkdy & 216 wknd trips. 9.29.23: Endicott Commuter Rail Station within 1/2 mile has 32 weekday and 9 weekend trips. v4.1 CREDIT: Locate within 200 yds of bicycle network and provide long-term bike storage for at least 5% of all regular building occupants and short-term storage for at least 2.5% of all peak visitors. (4 spaces minimum for each.) Provide one shower for the first 100 regular building occupants and one additional for every 150 thereafter. Design or locate the project such that a functional entry or bicycle storage is within a 200-yard (180-meter) walking distance or bicycling distance from a bicycle network 9.29.23: Bicycle network connects to Endicott transit stop. Compliance dependent on bicycle facilities and showers. 8.22.24 Current FTE estimate would require 22 long term/covered spaces and 10 short term. SD set to include 38 spaces, 28 covered.
1-4	TGE		
4			
LTc5	Access to Quality Transit v4.1 (RP@1)		
1	Jonathan Lev/LA		
1			
LTc6	Bicycle Facilities v4.1		

D	1	1	1	Jonathan Levi/Civil	Reduced Parking Footprint v4.1	1	Jonathan Levi/Civil	<p>v4.1 CREDIT: Option 1 (1 pt): No off-street parking. Option 2 Reduced Parking (1 pt): Do not exceed the minimum local code requirements for parking capacity. Provide parking capacity that is a 30% reduction below the base ratios recommended by the Parking Consultants Council. Option 3 (1pt): Carshare: Provide at least one vehicle parking space for carshare vehicles for every 100 occupants. Option 4 Unbundled Parking: Sell parking separately from all property sales and leases at a daily parking fee equal or greater than the cost of municipal public transit. For ALL projects: The credit calculations must include all existing and new off-street parking spaces that are leased or owned by the project, including parking that is outside the project boundary but is used by the project. On-street parking in public rights-of-way is excluded from these calculations.</p> <p>9.29.23: Base ratio of 138 parking spaces. 108 Parking Spaces per 8.8.23 Planning Board Presentation do not meet 30% reduction from base ratio.</p> <p>8.22.24 Updated student count yields base ratio of 90, less than 63 spaces would be required for a 30% reduction. Current set shows 70 spaces.</p>
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D	1	1	1	Jonathan Levi/Civil	Electric Vehicles v4.1	1	Jonathan Levi/Civil	<p>v4.1 CREDIT: Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project.</p> <p>9.29.23: According to electrical narrative, 10% of parking spots will have conduit and wiring provisions for future EV charging stations.</p>
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Yes	M+	M-	No	SUSTAINABLE SITES					8/22/24 Notes
6	1	3	2	12	Responsible				

C	Y				SSpr1	Construction Activity Pollution Prevention	Req'd	Civil/CM	<p>REQUIRED: Create/implement an ESC plan for all construction activities associated with the project. The plan must conform to the requirements of the 2012 U.S. EPA Construction General Permit (CGP).</p> <p>9.29.23: Project will have an ESC plan.</p>
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D	Y				SSpr2	Environmental Site Assessment	Req'd	Env. Eng.	<p>REQUIRED: Conduct a Phase I ESA. If contamination is suspected, perform a Phase II ESA. If contamination exists, remediate the site to meet local, state or national EPA standards.</p> <p>9.29.23: Project will conduct a Phase I ESA.</p>
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D	1				SSc1	Site Assessment	1	Jonathan Levi/Civil/LA	<p>CREDIT: Complete and document a site assessment that includes: Topography, Hydrology, Climate, Vegetation, Soils, Human Use, Human health effects.</p> <p>9.29.23: Site assessment worksheet will be completed by project team.</p>
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D	1	1	1	LA	SSc2	Site Development - Protect or Restore Habitat (RP@2	1-2	LA	<p>CREDIT: Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist) and restore 30% (including the building footprint) of the previously developed site area with native & adaptive vegetation OR provide financial support equivalent to at least \$0.40 per square foot for the total site area to a nationally or locally recognized land trust or conservation organization.</p> <p>9.29.23: PSR Site Plan doesn't illustrate 30% restoration. Option to pay approximately \$125k to a land trust or conservation organization for 1 point.</p>
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D	1				SSc3	Open Space	1	LA	<p>CREDIT: Provide outdoor space greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy. The outdoor space must be physically accessible.</p>
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D	1	2	2	Civil	SSc4	Rainwater Management v4.1	2-3	Civil	<p>9.29.23: Calculations based on PSR Site Plan meet 30% outdoor space and 25% vegetated open space.</p> <p>v4.1 CREDIT: On site, manage the runoff from the developed site for the 80th percentile (1 pt) 85th percentile (2pts) or 90th percentile (3pts) of regional or local rainfall events using LID & GI strategies that best mimic natural site hydrology OR manage on site the annual increase in runoff volume from the natural land cover condition to the post developed condition</p> <p>ACTION ITEM: Civil to perform preliminary runoff calculations.</p>
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D	2				SSc5	Heat Island Reduction	1-2	Jonathan Levi/LA	<p>CREDIT: Use any combination of non-roof Measures, high-Reflectance roof, or vegetated roof to be equal to or greater than the total roof + hardscape area on-site AND/OR place a minimum of 75% of parking spaces under cover.</p> <p>9.29.23: Initial calculations using assumed roof SRI of 90 meets credit requirements.</p>
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D	1				SSc6	Light Pollution Reduction	1	GGD/LA	<p>CREDIT: Do not exceed allowable backlight, uplight or glare (BUG) ratings for all exterior lighting as determined by the project's lighting zone (LZ).</p> <p>9.29.23: Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. The illumination level will be 0.5fc for parking areas.</p>
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D	1				SSc7	Site Master Plan	1	School	<p>CREDIT: Achieve at least four of the following six credits: L To High Priority Site, SSc Protect or Restore Habitat, SSc Open Space, SSc Rainwater Management, SSc Heat Island Reduction, SSc Light Pollution Reduction. A site master plan must be developed in collaboration with school authorities. Projects where no future development is planned are not eligible for this credit.</p>
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D	1	SSc8	Joint Use of Facilities	Jonathan Levi/Owner	1	0	1	4	8/22/24 Notes
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CREDIT: Option 1 - Ensure 3 of the following are accessible and available for shared use by general public: auditorium, gymnasium, cafeteria, classroom(s), playing fields, parking. Option 2 - Contract with community or other organizations to provide at least two of the following spaces types in the building: commercial office, health clinic, community service centers, police office, library or media center, parking lot, one or more commercial businesses. Option 2 - Ensure that two of the following space types that are owned by other organizations are accessible to students: auditorium, gymnasium, cafeteria, classroom(s), swimming pool, playing fields.
11.29.23 Owner to confirm facilities will be available for public use.

WATER EFFICIENCY									
Yes	M+	M-	No	Req'd	Responsible	12	12	12	8/22/24 Notes
D	Y			WEpr1	Outdoor Water Use Reduction	LA			REQUIRED: Install landscape that does not require a permanent irrigation system beyond a maximum two-year establishment period OR reduce the project's landscape water requirement by at least 30% from the calculated baseline for the site's peak watering month. See credit
D	Y			WEpr2	Indoor Water Use Reduction	Akal			REQUIRED: Flush and flow fixtures must reduce aggregate water consumption by 20% from the baseline. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled. See credit
D	Y			WEpr3	Building-level Water Metering	School/GGD			REQUIRED: Install permanent water meters that measure the total potable water use for the building and associated grounds. Commit to sharing with USGBC the resulting whole-project water usage data for a five-year period. 9.29.23: Project will have building-level water metering.
D	2			WEc1	Outdoor Water Use Reduction	LA	1-2		CREDIT: Credit Reqs: Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period (2pts) OR reduce the project's landscape water requirement (LWR) by at least 50% (1pt) or 100% (2pts) from the calculated baseline for the site's peak watering month. 10.12.23 Confirmed, no plans for permanent landscape irrigation.
D	4	1	2	WEc2	Indoor Water Use Reduction	Akal	1-7		CREDIT: Further reduce fixture and fitting water use from the calculated baseline in WE Prerequisite Indoor Water Use Reduction and install equipment that meets the minimum requirements. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled. 9.29.23: Fixtures proposed will be either 1.6/1.1 or 1.28 WC, 0.25 or Waterless Urinals, and 0.5 Lavs. 12.11.23: Akal confirmed 1.1 gpf WC, 0.125 gpf Urinals, 0.35 gpm Lavs, 1.5 gpm Sinks, and 1.5 gpm Showerheads for a 41.55% water use reduction.
D			2	WEc3	Cooling Tower Water Use	GGD	1-2		CREDIT: Conduct a one-time potable water analysis, measuring at least the five control parameters required. Calculate the number of cooling tower cycles by dividing the maximum allowed concentration level of each parameter by the actual concentration level of each parameter found in the potable makeup water. Limit cooling tower cycles to avoid exceeding maximum values for any of these parameters.
D	1			WEc4	Water Metering	Akal	1		CREDIT: Install permanent water meters for two or more of the following water subsystems: irrigation, indoor plumbing fixtures and fittings, domestic hot water, boiler, reclaimed water, and/or other process water. ACTION ITEM: Akal to confirm plans to submeter.

ENERGY & ATMOSPHERE									
Yes	M+	M-	No	Req'd	Responsible	31	31	31	8/22/24 Notes
C	Y	3	4	0	EApr1	Fundamental Commissioning and Verification	CxA		REQUIRED: A qualified CxA must be engaged by end of DD to perform Cx services for all base-building HVAC&R equipment serving the project. An OPR document, BOD, and Current Facilities Requirements and Operations and Maintenance Plan must be prepared with information necessary to keep the building operating efficiently. 09.29.23: Project will have a CxA
D	Y			EApr2	Minimum Energy Performance	Team/GGD			REQUIRED: Demonstrate an improvement of at least 5% in the proposed building performance rating compared with the ASHRAE 90.1-2010 baseline. 9.29.23: Project will achieve 5% improvement in the proposed building performance rating from ASHRAE baseline.
D	Y			EApr3	Building-level Energy Metering	GGD			REQUIRED: Install new or use existing base building-level energy meters, or submeters that can be aggregated to provide base building-level data representing total building energy consumption and commit to sharing whole-building energy-use data with USGBC for 5 years. 9.29.23: Project will have building-level energy metering.
D	Y			EApr4	Fundamental Refrigerant Management	GGD			REQUIRED: Do not use chlorofluorocarbon (CFC)-based refrigerants in new HVAC&R systems. 9.29.23: Prerequisite requirement will be met.

C	6		Enhanced Commissioning	2-6	CxA	<p>CREDIT: Perform Enhanced Cx services for all base-building HVAC&R equipment (3pts) AND/OR develop monitoring-based procedures and identify points to be measured and evaluated to assess performance of energy- and water-consuming systems (1pt) AND/OR complete all required Cx process activities for the building's thermal envelope (2pts).</p> <p>9.29.23: Project will complete all required Cx process activities for the building's thermal envelope.</p>
D	14	2	Optimize Energy Performance (RP@@@)	1-16	Team/GGD	<p>CREDIT: Demonstrate an improvement of at least 6% (1pt) to 42% (16pts) on an energy-cost basis in the proposed building performance rating compared with the ASHRAE 90.1-2010 baseline.</p>
D	1		Advanced Energy Metering	1	GGD	<p>CREDIT: Permanent advanced energy metering must be installed for all energy sources used by the base building as well as any individual energy end uses that represent 10% or more of the total annual consumption of the building.</p> <p>The advanced energy metering must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location. Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate. The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure. The system must be capable of storing all meter data for at least 36 months. The data must be remotely accessible. All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.</p>
C		2	Demand Response	1-2	School/GGD	<p>CREDIT: Participate in an existing demand response (DR) program and design a system with the capability for real-time, fully-automated DR based on external initiation by a DR Program Provider (2pts) OR, if a DR program is not available, provide infrastructure to take advantage of future demand response programs or dynamic, real-time pricing programs and develop a comprehensive plan for shedding at least 10% of building estimated peak electricity demand (1pt).</p> <p>v4.1 Option: Load Flexibility and Management Strategies (1-2 points), i.e. Energy storage.</p>
D	4	1	Renewable Energy v4.1	1-3	Owner	<p>CREDIT: Use renewable energy systems to offset building energy costs by 1% (1pt), 5% (2pts), or 10% (3pts).</p> <p>v4.1 CREDIT: Use Tier 1 on-site renewable energy to offset at least 2% of total energy use (1 pt) up to 20% (5pts) AND/OR Use Tier 2 new off-site renewable energy to offset at least 10% of total energy use (1 pt) up to 50% (5 pts) AND/OR Use Tier 3 off-site renewable energy that is Green-e Energy certified to offset at least 35% of total energy use (1 pt) up to 100% (3 pts). Points achieved in each category may be added for a total of 5 points.</p> <p>8.22.24 Town voted to include PV as part of the base project, approximately 200 kW. Using default site energy based on gsf and conservative production for a 200 kW array approximately 21% of site energy is offset. TGE to revisit calcs when energy model results are available.</p>
D		1	Enhanced Refrigerant Management	1	GGD	<p>CREDIT: Credit Reqs: Select refrigerants that are used in HVAC&R equipment to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change (1 pt).</p>
C	X		Green Power and Carbon Offsets	1-2	School	<p>CREDIT: Purchase green power and/or carbon offsets through a 5-year contract to offset 50% (1pt) or 100% (2pts) of the building's energy use with renewable sources.</p>
<p>Yes M+ M- No</p>						
	3	4	3	3	13	8/22/24 Notes
MATERIALS & RESOURCES						
D	Y		MRpr1 Storage & Collection of Recyclables	Req'd	School/Levi	<p>REQUIRED: Provide dedicated areas for the collection and storage of recyclable materials for the entire building that includes mixed paper, corrugated cardboard, glass, plastics, and metals. Safe collection, storage, and disposal measures must also be provided for two of the following: batteries, mercury-containing lamps, and electronic waste.</p> <p>9.29.23: Project will have a recycling room with required collection streams.</p>
C	Y		MRpr2 Construction & Demo Waste Management Plan	Req'd	CM	<p>REQUIRED: Develop and implement a compliant construction and demolition waste management plan that establishes waste diversion goals for the project by identifying at least five materials targeted for diversion, approximate a percentage of the overall project waste that these materials represent, whether materials will be separated or commingled, descriptions of the diversion strategies planned, and describe where the material will be taken/how the recycling facility will process the material.</p> <p>9.29.23: Project will have a Construction and Demo Waste Management Plan.</p>

C	1	2	MRc1	Building Life-Cycle Impact Reduction v4.1 (RP@2)	2-5	Jonathan Levi Levi/CM	v4.1 CREDIT: Option 4: Path 1 (1 pt) - Conduct a life-cycle assessment of the project's structure and enclosure. Path 2 (2 pts) Conduct a life cycle assessment of the project's structure and enclosure that demonstrates a minimum of 5% reduction, compared with a baseline building in at least three of the six impact categories listed below, one of which must be global warming potential. Path 3 (3 pts) 10% reduction. CREDIT: Option 1: Historic Building Reuse (5pts); Option 2: Renovation of Abandoned or Blighted Building (5pts); Option 3: Building and Material Reuse - 25% (2pt), 50 (3pt), 75% (4pt); Option 4: Whole-Building Life-Cycle Assessment (3pts). 10.6.23 Points dependent on performing a whole building Life-Cycle Assessment. 1 pt is available for conducting analysis regardless of results. ACTION ITEM: Jonathan Levi to confirm interest in LCA.
C	1	1	MRc2	Building Product Disclosure & Optimization-EPD's v4.1	1-2	Jonathan Levi/CM	v4.1 CREDIT: Provide EPDs for at least 20 different permanently-installed products from 5 or more manufacturers (1pt). Multi-Attribute Optimization (1 additional point). EP point 40 products. 9.29.23: Products with EPDs will be specified for the project.
C	1	1	MRc3	BPDO-Sourcing of Raw Materials v4.1	1-2	Jonathan Levi/CM	v4.1 CREDIT: Responsible Sourcing of Raw Materials: Use products sourced from at least three different manufacturers that meet at least one of the responsible sourcing and extraction criteria for at least 20%, by cost, of the total value of permanently installed building products in the project (1 point). Five different manufacturers and 40% (2 points), 60% (1 EP point). Regional: 100 miles (160 km) of the project site.
C	1	1	MRc4	BPDO-Material Ingredients v4.1	1-2	Jonathan Levi/CM	v4.1 CREDIT: Option 1 Material Ingredient Reporting: Provide HPDs or C2C certification for at least 20 different permanently-installed products from 5 or more manufacturers (1pt). Material Ingredient Optimization OR Product Manufacturer Supply Chain Optimization (1 additional pt). 40 products (1 EP point). 9.29.23: Products with HPDs will be specified for the project.
C	1	1	MRc5	Construction and Demo Waste Management v4.1	1-2	CM	v4.1 CREDIT: Divert at least 50% of the total construction and demolition material (1pt) OR do not generate more than 15 lbs (1pt) or 10 lbs (2pts) of construction waste per square foot of the building's floor area.
16 Responsible							
INDOOR ENVIRONMENTAL QUALITY							
D	Y		EQpr1	Minimum IAQ Performance	Req'd	GGD	REQUIRED: Comply with the requirements of ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality. 9.29.23: Prerequisite requirements will be met.
D	Y		EQpr2	Environmental Tobacco Smoke (ETS) Control v4.1	Req'd	School	v4.1 REQUIRED: Project must prohibit smoking inside the building and outside the building except in designated smoking areas located at least 25 feet from all entries, outdoor air intakes, and operable windows. Communicate the no-smoking policy to occupants. Have in place provisions for enforcement or no-smoking signage. 9.29.23: No smoking will be allowed in the building or within 25' of all entrances and operable windows. REQUIRED: Meet LEED interior, HVAC background noise, exterior noise, and reverberation time requirements based on ANSI Standard S12.60-2010. 9.29.23: Prerequisite requirement will be met.
D	Y		EQpr3	Minimum Acoustical Performance	Req'd	Acoust. Eng.	
D	2		EQc1	Enhanced IAQ Strategies	1-2	Jonathan Levi/GGD	CREDIT: Comply with the following requirements for 1pt: Entryway Systems, Interior Cross-Contamination Prevention, and Filtration. For an additional point, comply with the one of the following: Exterior Contamination Prevention, Increased Ventilation, Carbon Dioxide Monitoring, Additional Source Control, or Monitoring. 12.5.23 GGD confirmed MERV 13 filtration on outdoor air supply and CO2 sensors in all densely occupied spaces. ACTION ITEM: Jonathan Levi to confirm grilles, walkoff mats, etc. at all regularly used entryways.
C	3		EQc2	Low-Emitting Materials v4.1	1-3	Jonathan Levi/CM	v4.1 CREDIT: Project must install compliant products that meet the (1) emissions testing requirements AND (2) VOC content standards for 2 (1pt), 3 (2pts), or 4 (3pts), 5 (3 points + EP) of the following categories: adhesives/sealants, paints/coatings, flooring, composite wood, ceilings, wall panels, insulation, and furniture. Meet 90% Threshold in 3 categories (1 EP point).
C	1		EQc3	Construction IAQ Management Plan	1	CM	CREDIT: Develop and implement an IAQ management plan that requires compliance with all applicable control measures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3. 9.29.23: Project will include an IAQ management plan. CREDIT: Select one or the following two options, to be implemented after construction ends and the building has been completely cleaned. Air interior finishes must be finished. Option 1: Flush-Out: Path 1: Before Occupancy: Install new filtration media and perform a building flush-out (1 pt). Path 2: During Occupancy: If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of gross floor area. Option 2: Air Testing: After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing for all occupied spaces. For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling point. Repeat until all requirements are met. (2 pts).
C	1	1	EQc4	IAQ Assessment	1-2	School/CM	

D	1	Thermal Comfort	EQc5	1	GGD	CREDIT: Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multioccupant spaces. Thermal comfort controls allow occupants, whether in individual spaces or shared multioccupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed, and humidity. Design thermal comfort system to ASHRAE Standard 55-2010 or to Iso and Cen Standards: Design HVAC systems and the building envelope to meet the requirements of the applicable standard.
D	1	Interior Lighting	EQc6	1-2	Jonathan Levi/GGD	CREDIT: Option 1 Lighting Control: For at least 90% of individual occupant spaces, provide individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, off, midlevel). Midlevel is 30% to 70% of the maximum illumination level (not including daylight contributions). For all shared multi occupant spaces, meet all of the requirements in the reference guide (1 pt). Option 2 Lighting Quality: Meet four of the lighting quality options in the reference guide (1 pt). 9.29.23: Lighting levels will be approximately 30 foot-candles in classrooms and offices in compliance with credit requirements. ACTION ITEM: Lighting designer to confirm minimum UGR of < 19 and CRI of > 90 in all regularly occupied spaces.
D	2	Daylight v4.1	EQc7	1-3	Jonathan Levi	v4.1 CREDIT: Option 1: Demonstrate through simulation that sDA of at least 40% (1pt), 55% (2pt), or 75% (3pts) is achieved. Option 2: Demonstrate through modeling that illuminance levels will be between 300 lux and 3,000 lux for 9 a.m. and 3 p.m., both on a clear-sky day at the equinox, for 55% (1pt), 75% (2 pts), or 90% (3pts) of the regularly occupied floor area. Option 3: With furniture, fixtures and equipment in place, conduct an on-site measurement that demonstrates the project achieves illuminance levels equal to Option 2 for 55% (1pt), 75% (2pts), or 90% (3pts) of the regularly occupied floor area. ACTION ITEM: Jonathan Levi to confirm interest in daylight modeling.
D	1	Quality Views	EQc8	1	Jonathan Levi	CREDIT: Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area that meets at least two of the four kinds of views outlined in the reference guide.
D	1	Acoustic Performance v4.1	EQc9	1	Acoust. Eng.	v4.1 CREDIT: For all occupied spaces, meet the requirements, as applicable, for HVAC background noise, sound transmission, reverberation time, and sound reinforcement and masking.

Yes		M+		M-		No	
5	1	0	0	6	Responsible	8/22/24 Notes	
D	1			1	Team	Several IN credits available, TGE to share options with design team	
D	1			1	Team		
D	1			1	Team		
C		1		1	Team		
C	1			1	Team		
C	1			1	Team		

Yes		M+		M-		No	
2	0	1	1	4	Responsible	8/22/24 Notes	
				1	-	Refer to base credit	
				1	-	Refer to base credit	
				1	-	Refer to base credit	
		1		1	-	Refer to base credit	
		1		1	-	Refer to base credit	
			1	1	-	Refer to base credit	

Yes		M+		M-		No	
62	12	16	20	110			

PROJECT TOTALS (Certification Estimates)
Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

12.2 Signed Sustainability Statement



Statement Regarding MSBA High Efficiency Green School Program

This is an acknowledgement that the Town of Dedham has identified a goal of 4% additional reimbursement from the MSBA High Efficiency Green School Program, consistent with MSBA Project Advisory 81. As their Designer, I have submitted a completed LEED scorecard showing 62 attempted points, and an additional 28 possible points which will meet that goal.

The Oakdale Elementary School shall be designed to achieve at least a LEED Silver certification.

The scope of work for this project will include the construction elements and performance tasks to achieve the goal, and all subsequent documents, including but not limited to, specifications, drawings and cost estimates will match the scope of work indicated in the submitted scorecard.

It should be noted that LEED Certified certification requires 50 to 59 points, and that it is anticipated that a cost benefit analysis will be performed during Schematic Design and Design Development to refine the list of targeted points as appropriate for this project, so that the final approved points will conservatively fall within this window.


Jonathan Levi, FAIA
Principal
Jonathan Levi Architects

13 ADA and MAAB Compliance

The new school will be fully accessible compliant providing equitable experiences for able bodied and physically challenged students.

Refer to the Code Report in Section 8 for the accessibility analysis.

14 Room Data Sheets

1.01

Classroom - General

FUNCTIONAL CRITERIA

Description: general instructional classroom

Area: 900 sf

Quantity: 20

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows: required, (1) operable

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) sink; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

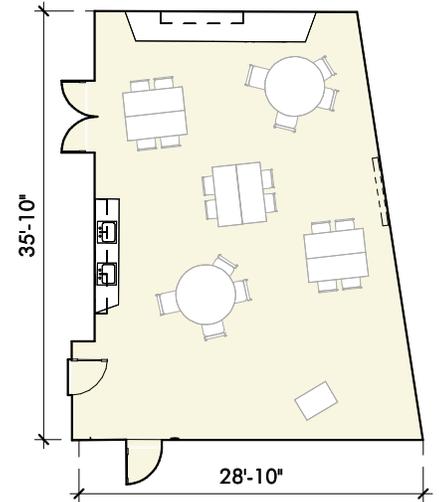
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface, adjustable shelving and cantilevered counter with undercounter mobile storage units

Furnishings: 1 moveable instructor podium, 5 student tables and 20 chairs all with wheels

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION 4 Classrooms per Grade, adjacent to shared Teacher Planning Room and Breakout Space (in lower school)



1.01

1.02

Science, Technology, Engineering Room

FUNCTIONAL CRITERIA

Description: STE instruction classroom

Area: 1,080 sf

Quantity: 1

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: magnetic / writable surface

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows: required, (1) operable vent

Mechanical: low volume displacement ventilation

Plumbing/FP: (5) sink; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

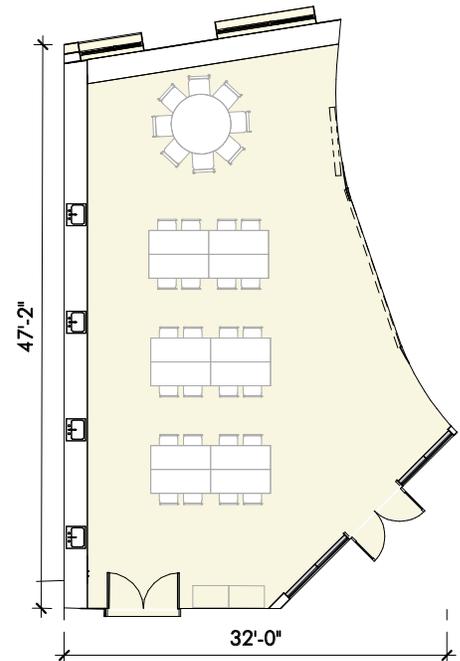
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable surface, epoxy counters with upper and lower cabinets

Furnishings: 1 moveable instructor podium, student tables and chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION



1.03

STE Storage Room

FUNCTIONAL CRITERIA

Description: storage for STE room

Area: 120 sf

Quantity: 1

Occupant Load: n/a

LOCATIONAL CRITERIA

Users: teachers

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling:

Acoustical:

Doors: wood flush

Windows:

Mechanical: ventilation only

Plumbing/FP: fire protection only

Lighting: utility

Electrical: general wall receptacles

Communication:

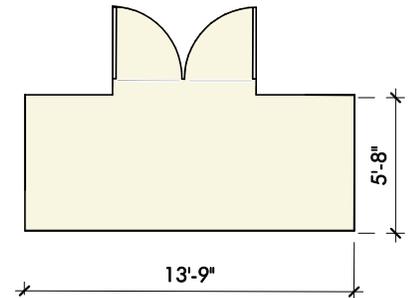
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: storage shelving

Equipment:

OTHER INFORMATION



1.03

1.04

Teacher Planning

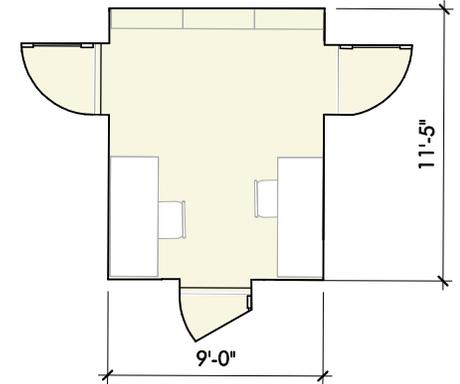
FUNCTIONAL CRITERIA

Description: office for teacher; coupled/shared space; adjacent to Classroom pair

Area: 100 sf (50 sf each space)

Quantity: 20

Occupant Load: 2 teachers



LOCATIONAL CRITERIA

Users: teachers (shared)

TECHNICAL CRITERIA

Floor: VCT

Walls: glazed-visual access

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection only

Lighting: recessed direct LED

Electrical: general wall receptacles, (1) d-duplex per workstation

Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: (2) desks and office chairs, storage shelving and cabinets

Equipment: 1 telephone (wall-mounted)

OTHER INFORMATION Combined with paired classrooms

1.05

Classroom Breakout Grades 1 -2

FUNCTIONAL CRITERIA

Description: group study, breakout, project area, shared

Area: 300

Quantity: 4

Occupant Load: 7 (1 teacher, 6 students)

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles

Communication: (2) data outlets, wall phone outlet,

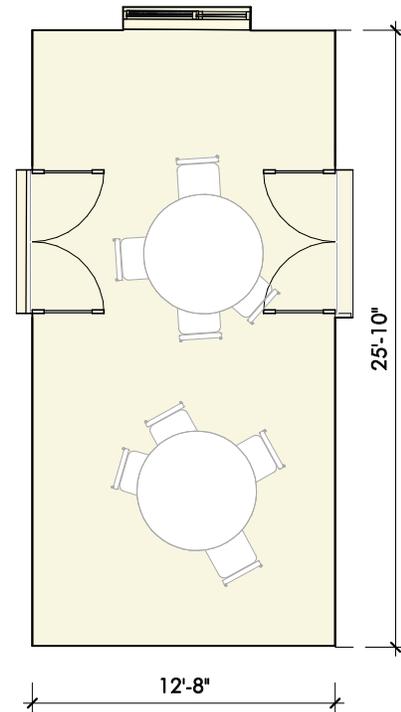
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: 2 tables and 10 chairs all with wheels

Equipment: 1 telephone (wall-mounted)

OTHER INFORMATION Shared between Classroom pair



1.05

1.06

Cohort Commons Grades 3, 4, 5

FUNCTIONAL CRITERIA

Description: group study, breakout, project space, and meeting space

Area: 800 sf

Quantity: 3

Occupant Load: 40

LOCATIONAL CRITERIA

Users: teacher, students

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors:

Windows:

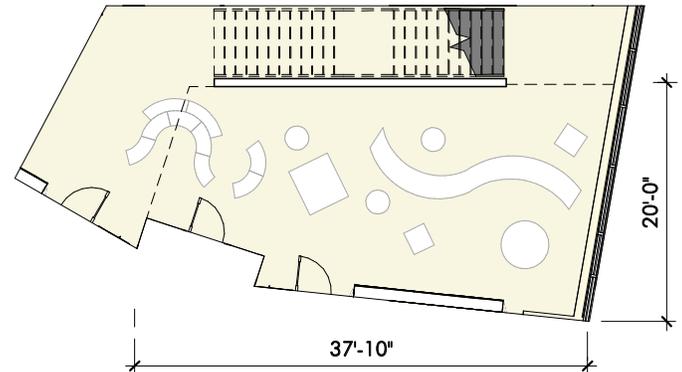
Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point



FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: tables/chairs, soft seating, writable surfaces

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor (mobile)

OTHER INFORMATION

2.01 Self Contained Special Education Classroom

FUNCTIONAL CRITERIA

Description: general instructional classroom (includes lower STAR and upper STAR programs)

Area: 900 sf

Quantity: 3

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: special education teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows: required, (1) operable

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) sink; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

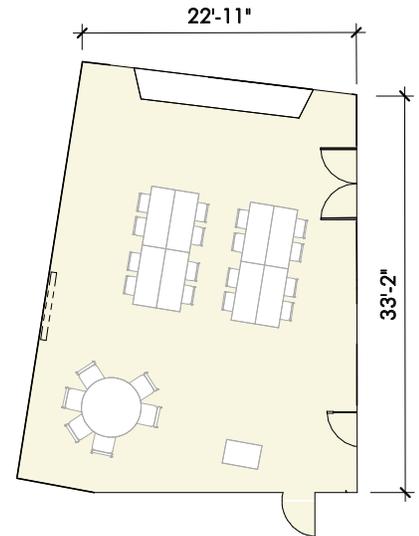
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface, adjustable shelving and cantilevered counter with undercounter mobile storage units

Furnishings: 1 moveable instructor podium, 5 student tables and 20 chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION combined with Teacher Planning rooms, identical to Gen Ed Classrooms



2.01

2.02 Self-Contained Special Education Breakout Room

FUNCTIONAL CRITERIA

Description: general instructor area

Area: 150

Quantity: 1

Occupant Load: 6 (1 teacher, 5 students)

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles

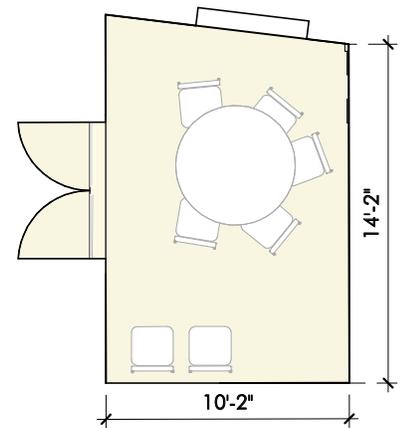
Communication: (2) data outlets, ceiling speaker

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: table and chairs all with wheels

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION For Lower STAR

2.03 Self-Contained Special Education Toilet Room

FUNCTIONAL CRITERIA

Description: toilet dedicated to Special Education (lower STAR and upper STAR)

Area: 100 sf

Quantity: 2

Occupant Load:

LOCATIONAL CRITERIA

Users: students, teacher, nurses

TECHNICAL CRITERIA

Floor: epoxy

Walls: wall tile

Ceiling: GWB

Acoustical:

Doors: wood flush

Windows:

Mechanical:

Plumbing/FP: sink, toilet, handheld shower with floor drain

Lighting: recessed linear direct LED

Electrical: GFCI

Communication:

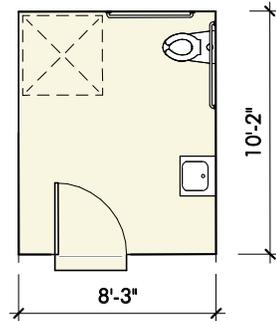
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: changing table, hooyer lift

Equipment:

OTHER INFORMATION



2.03

2.04

Resource Room

FUNCTIONAL CRITERIA

Description: SPED group and individual instruction

Area: 500 sf

Quantity: 3

Occupant Load: 20

LOCATIONAL CRITERIA

Users: adjustment counselor, students, special education teacher and aides

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required (1) operable vent

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

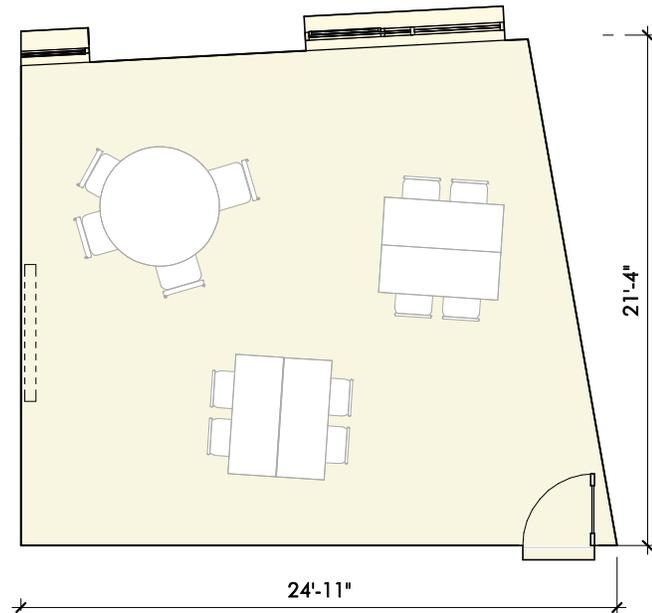
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: 3 tables and 12 chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION



2.05

Small Group Room / Reading

FUNCTIONAL CRITERIA

Description: SPED small group instruction

Area: 500 sf

Quantity: 1

Occupant Load: 20

LOCATIONAL CRITERIA

Users: special education teachers, aides, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: wall receptacles, teaching station outlets

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

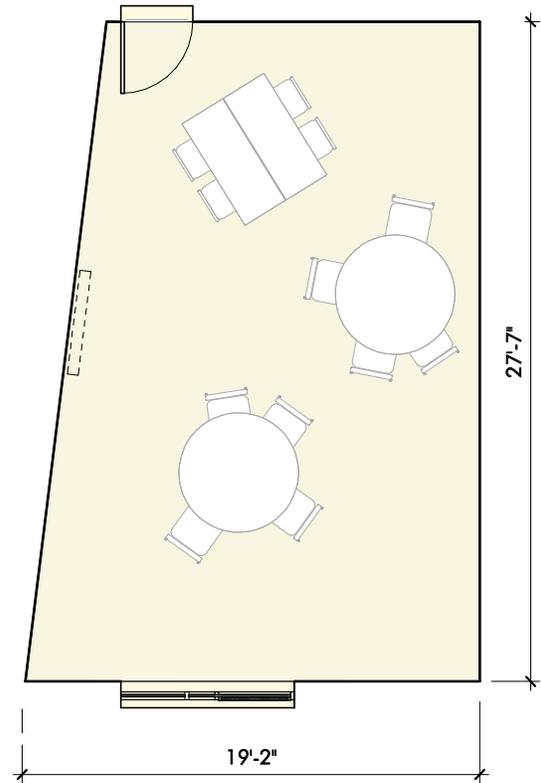
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: group tables and chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION



2.05

2.06

Medically Fragile SPED Classroom

FUNCTIONAL CRITERIA

Description: general instructional classroom

Area: 900 sf

Quantity: 1

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: special education teachers and students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows: required, (1) operable

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) sink; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

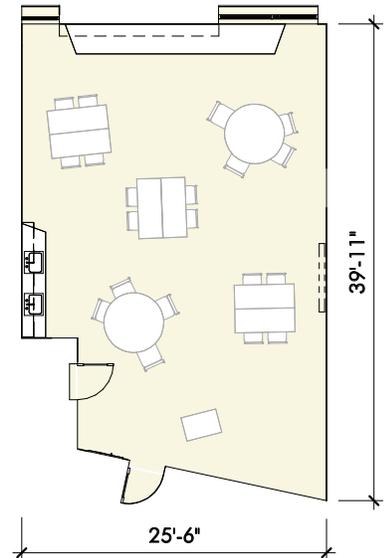
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface, adjustable shelving and cantilevered counter with undercounter mobile storage units

Furnishings: 1 moveable instructor podium, 5 student tables and 20 chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION identical to Gen Ed Classrooms, combined with Teacher Planning room, access to Medical Suite Toilet room



2.07

SPED Teacher Planning

FUNCTIONAL CRITERIA

Description: office for SPED teacher; attached to classroom

Area: 100 sf

Quantity: 4

Occupant Load: 2 teachers

LOCATIONAL CRITERIA

Users: teachers (shared)

TECHNICAL CRITERIA

Floor: VCT

Walls: glazed-visual access

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed direct LED

Electrical: general wall receptacles and (2) dedicated d-duplex at teacher workstation

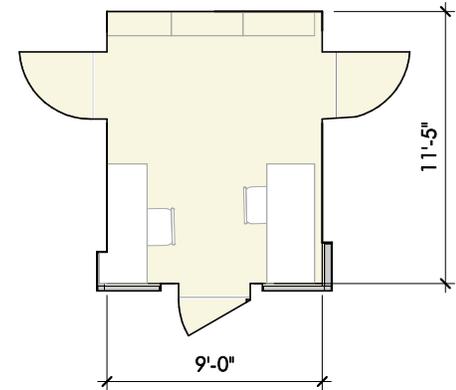
Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: (2) desks and office chairs, storage shelving and cabinets

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION Combined with SPED classrooms; identical to General Education Teacher Planning

2.07

2.08

OT / PT Room

FUNCTIONAL CRITERIA

Description: occupational and physical therapy room

Area: 950 sf

Quantity: 1

Occupant Load: 2 staff, 8 students

LOCATIONAL CRITERIA

Users: staff, students

TECHNICAL CRITERIA

Floor: VCT

Walls: magnetic / writable surface

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) sinks; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

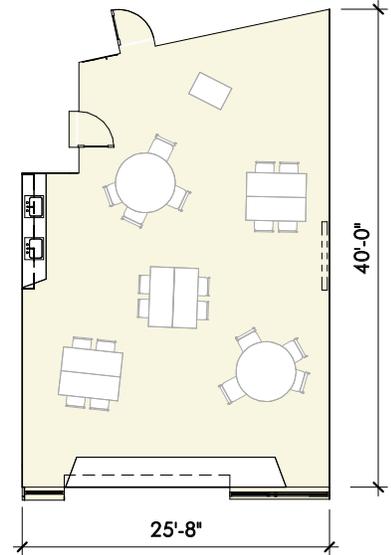
FIXTURES/ FURNISHINGS

Casework/Specialties: steel beam hooks for hanging equipment, magnetic writable wall surface, adjustable shelving and cantilevered counter with undercounter mobile storage units

Furnishings:

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION specialty furnishings/equipment



2.09

IEP Conference Room

FUNCTIONAL CRITERIA

Description: room to hold IEP meetings

Area: 250 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators, students, visitors

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: displacement through floor diffuser

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles, floor receptacle at conf. table

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker

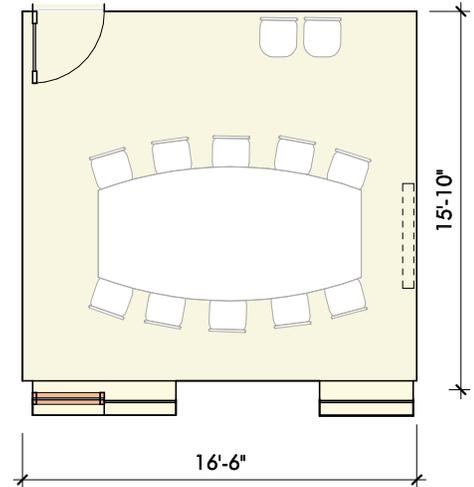
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface w/marker bumper rail system

Furnishings: conference table, 12 chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION in central admin



2.09

2.10

Evaluation Team Leader Office

FUNCTIONAL CRITERIA

Description: office for psychiatrist, used also for private counseling of students and meetings

Area: 250 sf

Quantity: 1

Occupant Load: 6

LOCATIONAL CRITERIA

Users: psychiatrist, students, parents

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall receptacles(1) d-duplex at workstation

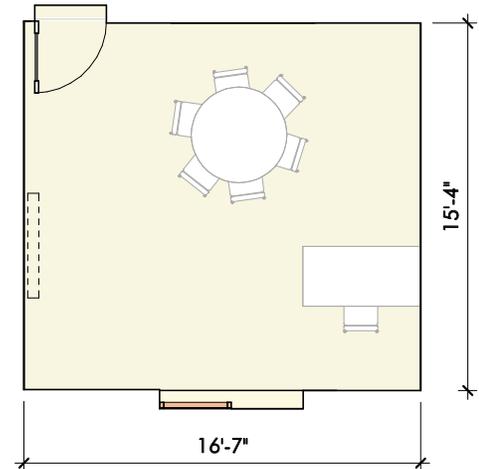
Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties: adjustable shelving, magnetic writable wall surface

Furnishings: 1 desk, 1 office chair, meeting table with chairs, filing cabinets

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION in central Admin

2.11

Psychiatrist Office

FUNCTIONAL CRITERIA

Description: office for psychiatrist, used also for private counseling of students and meetings

Area: 150 sf

Quantity: 1

Occupant Load: 4

LOCATIONAL CRITERIA

Users: psychiatrist, students, parents

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall outlets, (1) d-duplex at workstation

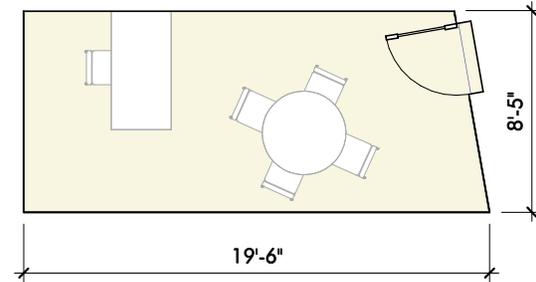
Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface w/marker bumper rail system

Furnishings: 1 desk, 1 office chair, filing cabinets, small meeting table with chairs

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION

2.11

2.12

Guidance Office

FUNCTIONAL CRITERIA

Description: office for guidance counselor, used also for private counseling of students and meetings with parents

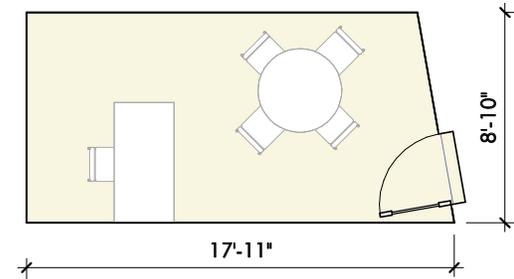
Area: 150 sf

Quantity: 1

Occupant Load: 4

LOCATIONAL CRITERIA

Users: guidance staff, students, parents



TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall outlets, (1) d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface w/marker bumper rail system

Furnishings: 1 desk, 1 office chair, filing cabinets, small meeting table with chairs

Equipment: 1 telephone (wall-mounted)

OTHER INFORMATION

2.13

Special Education Records Room

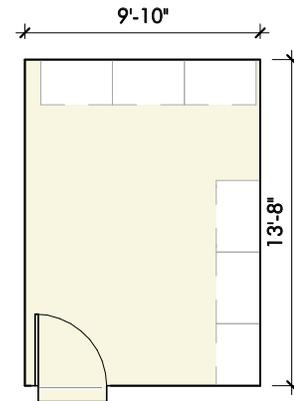
FUNCTIONAL CRITERIA

Description: Storage for student records

Area: 110 sf

Quantity: 1

Occupant Load:



LOCATIONAL CRITERIA

Users: guidance staff, teachers, administration

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood flush, secure/locking

Windows: ?

Mechanical: ?

Plumbing/FP: fire protection

Lighting: utility

Electrical: general wall receptacles

Communication: ?

FIXTURES/ FURNISHINGS

Casework/Specialties: ?

Furnishings: file cabinets, lockable

Equipment: ?

OTHER INFORMATION

2.13

3.01

Art Classroom

FUNCTIONAL CRITERIA

Description: instructional space for visual arts and crafts

Area: 1,000 sf

Quantity: 1

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: art teacher, students

TECHNICAL CRITERIA

Floor: VCT

Walls: magnetic wall covering

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows: required, (1) operable vent

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) work sinks; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

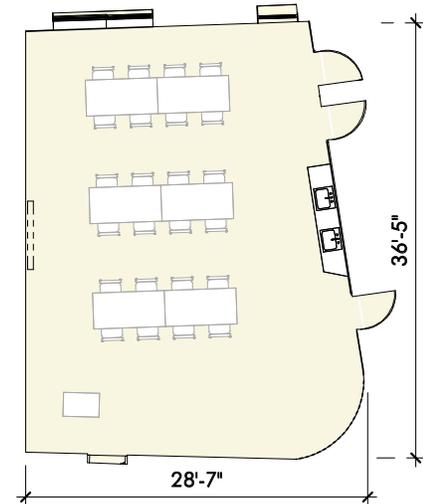
Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: 1 teacher's table, 5 student tables and 20 chairs all with wheels, mobile storage units

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor



OTHER INFORMATION

3.02

Art Workroom with Storage and Kiln

FUNCTIONAL CRITERIA

Description: space for kiln and material/equipment storage

Area: 150 SF

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: art teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors:

Windows:

Mechanical: kiln exhaust

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall receptacles, dedicated power to kiln

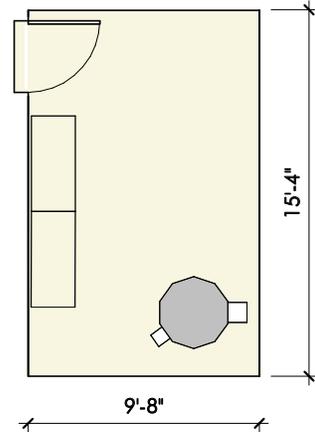
Communication:

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: storage shelves

Equipment: kiln



OTHER INFORMATION

3.02

3.03

Music Classroom / Large Group

FUNCTIONAL CRITERIA

Description: instruction/practice space for music

Area: 1,350 sf

Quantity: 1

Occupant Load: 25 (1 teacher, 24 students)

LOCATIONAL CRITERIA

Users: music teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces, acoustical surfaces

Ceiling: ACT- acoustic

Acoustical: reverberance noise control

Doors: wood full lite

Windows: required, (1) operable vent

Mechanical: ow volume displacement ventilation

Plumbing/FP: (2) sink; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

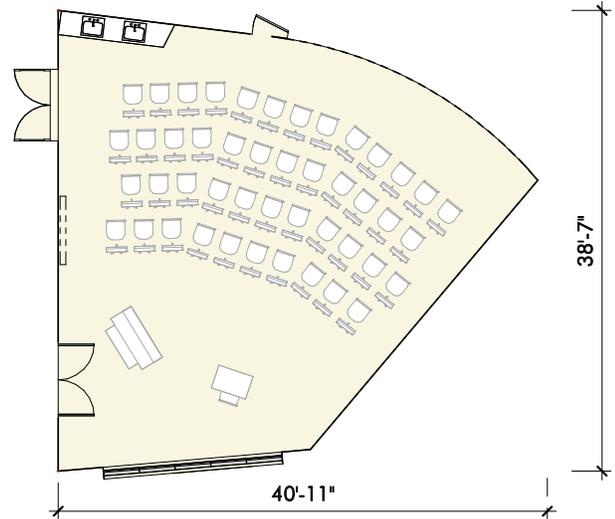
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: shelving, chairs, 1 moveable instructor podium, music stands

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION



3.04

Maker Space

FUNCTIONAL CRITERIA

Description: analog fabrication (shop, boat building)

Area: 1,200 sf

Quantity: 1

Occupant Load: 19 (1 teacher, 18 students)

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: magnetic / writable surface, acoustic

Ceiling: acoustic, double height

Acoustical: acoustical surface

Doors: wood full-lite

Windows: required, high volume equipment exhaust

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) sink, fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

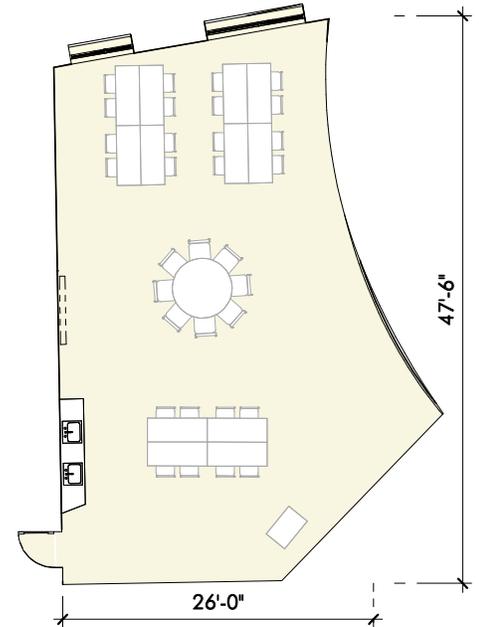
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface, adjustable shelving

Furnishings: teacher workstation, work tables w/ 20 stools, chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor, 3D printers

OTHER INFORMATION Safety Features: fire protection, ventilation shall be provided for all specialized equipment including 3D printers



3.04

4.01

Gymnasium

FUNCTIONAL CRITERIA

Description: physical education, sports activities space, occasional assemblies, community use, performances

Area: 6,750 sf

Quantity: 1

Occupant Load: 400 (event)

LOCATIONAL CRITERIA

Users: gym teachers, students, community, adaptive PE, performers, spectators

TECHNICAL CRITERIA

Floor: athletic wood flooring

Walls: acoustical surfaces, wall mats

Ceiling: exposed deck, painted

Acoustical: wall treatment

Doors: wood flush

Windows: clerestory, glare control

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe, protected spr. heads

Lighting: adj. linear indirect LED with impact resistant lens

Electrical: general wall receptacles, power for equipment

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

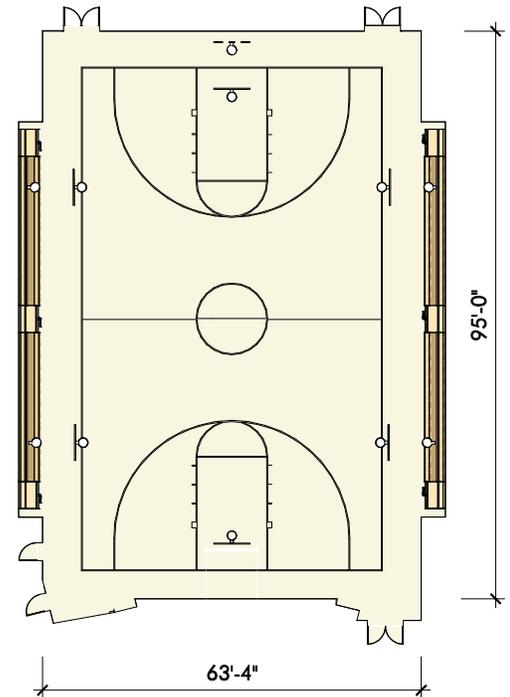
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: stackable seating for performances

Equipment: retractable and adjustable height basketball backstops (motorized), divider curtain (motorized), scoreboard, fixed bleachers, 1 telephone (wall-mounted), sound lift system, wireless access point

OTHER INFORMATION separated access for off hours/community use



4.02

Gym Store Room

FUNCTIONAL CRITERIA

Description: storage for gym related equipment

Area: 250 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: gym teachers, students

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling:

Acoustical:

Doors: wood flush

Windows: n/a

Mechanical: ventilation only

Plumbing/FP: fire protection

Lighting: utility LED

Electrical: general wall receptacles

Communication:

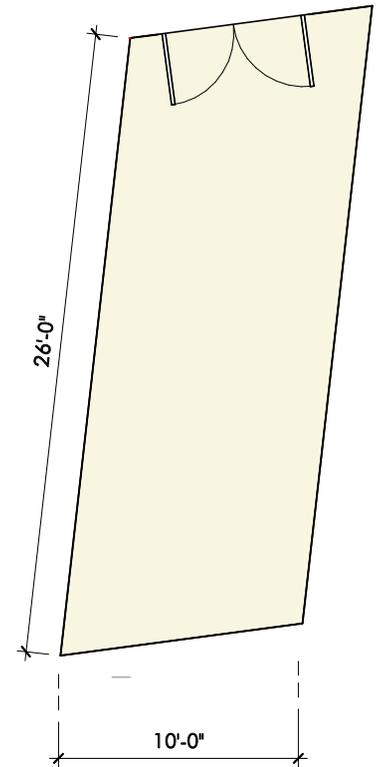
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



4.02

4.03 Health Instructor's Office with Shower and Toilet

FUNCTIONAL CRITERIA

Description: office for athletic director

Area: 150 sf

Quantity: 1

Occupant Load: 1

LOCATIONAL CRITERIA

Users: athletic director

TECHNICAL CRITERIA

Floor: VCT

Walls: magnetic/writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full-lite

Windows:

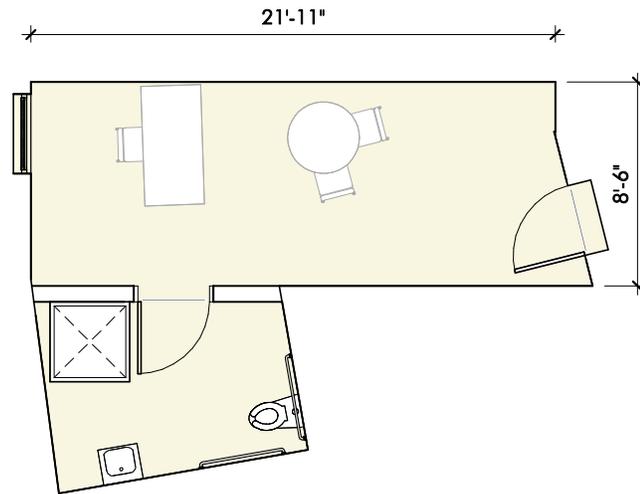
Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, shower

Lighting: recessed direct LED

Electrical: general wall receptacles, (1) d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system



FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface w/marker bumper rail system

Furnishings: desk, 1 desk chair, 2 side chairs, bookshelves

Equipment: 1 telephone (wall-mounted)

OTHER INFORMATION adjacent toilet/shower room

5.01

Media Center

FUNCTIONAL CRITERIA

Description: information and media center for the school

Area: 2,290 sf

Quantity: 1

Occupant Load: 62

LOCATIONAL CRITERIA

Users: media staff, teachers, students

TECHNICAL CRITERIA

Floor: carpet

Walls: magnetic/writable surfaces, acoustic treatment

Ceiling: exposed deck, ACT

Acoustical: reverberance noise control

Doors: wood full-lite

Windows: required, glare control

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: (2) duplex receptacles per teaching wall and (2) dedicated d-duplex at teacher workstation,

Communication: (2) receptacles for charging portable devices, (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

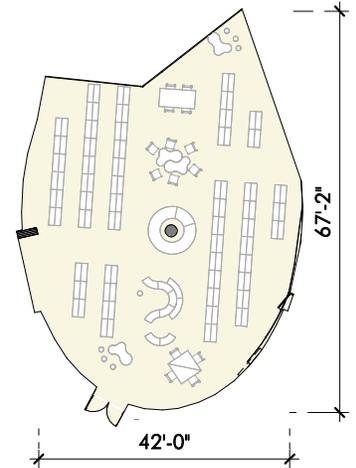
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface, circulation desk

Furnishings: reading tables, stacking chairs, computer tables, desk chairs, work tables, moveable tables, soft seating

Equipment: research computer stations, 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION double-height space



5.01

6.01

Cafeteria / Dining with Queuing

FUNCTIONAL CRITERIA

Description: lunch spaces

Area: 3,240 sf Dining, 250sf Queuing

Quantity: 1

Occupant Load: 216

LOCATIONAL CRITERIA

Users: students, teachers, aids, general staff, kitchen staff

TECHNICAL CRITERIA

Floor: VCT

Walls: display space

Ceiling: exposed deck-painted, ACT

Acoustical: reverberance noise control

Doors: wood full lite

Windows: required, glare control

Mechanical: low volume displacement ventilation

Plumbing/FP: (2) handwash sinks; fire protection, speaker/strobe

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

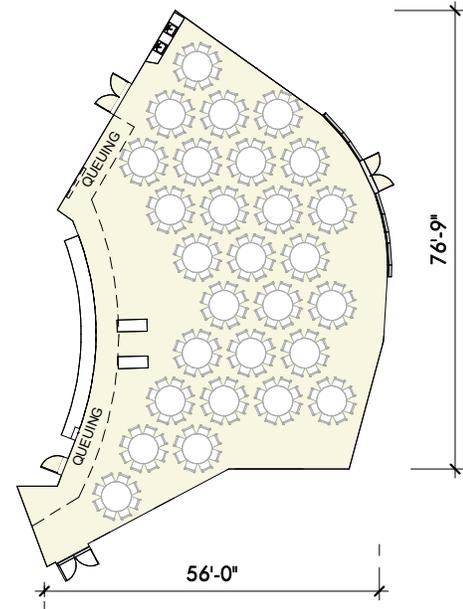
FIXTURES/ FURNISHINGS

Casework/Specialties: security grille, cantelevered counter

Furnishings: folding lunch tables w/chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION



6.02

Stage

FUNCTIONAL CRITERIA

Description: performance space for Gym-a-torium

Area: 1,000 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, students

TECHNICAL CRITERIA

Floor: mountable for equipment

Walls: GWB

Ceiling: exposed deck

Acoustical: wall/ceiling treatment for performance

Doors:

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection, speaker/strobe

Lighting: direct/indirect LED and performance lighting

Electrical: general wall receptacles, dedicated d-duplex at teacher workstation

Communication:

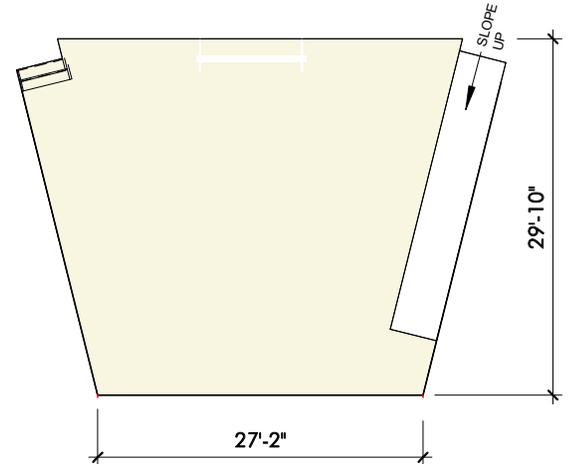
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: lectern

Equipment:

OTHER INFORMATION accessible stair and ramp access



6.02

6.03

Chair / Table / Equipment Storage

FUNCTIONAL CRITERIA

Description: storage for stacking chairs for performances

Area: 320 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: custodial staff, teachers

TECHNICAL CRITERIA

Floor:

Walls: GWB

Ceiling: exposed deck

Acoustical:

Doors: wood flush

Windows:

Mechanical: ventilation only

Plumbing/FP: fire protection

Lighting: utility

Electrical: general wall receptacles

Communication:

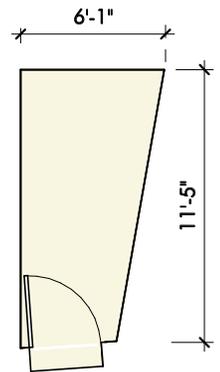
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: chair racks

Equipment:

OTHER INFORMATION Adjacent to Gymatorium for performances



6.04

Kitchen

FUNCTIONAL CRITERIA

Description: area for food prep

Area: 2,100 sf

Quantity: 1

Occupant Load: 6

LOCATIONAL CRITERIA

Users: kitchen staff

TECHNICAL CRITERIA

Floor: epoxy

Walls: FRP panels

Ceiling: ACT-kitchen

Acoustical:

Doors: flush

Windows:

Mechanical: exhaust and makeup air

Plumbing/FP: floor drains, sinks, grease interceptor, FP (ord.

Lighting: hazard), speaker/strobe

Electrical: recessed lens troffer, standby emergency power

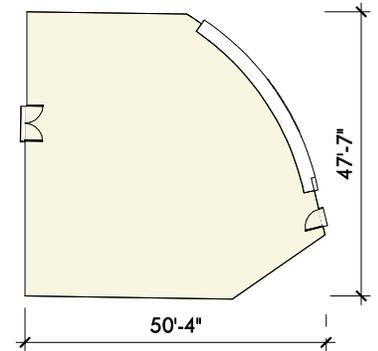
Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties: serving counter with coiling grille

Furnishings: food storage: dry goods, cold storage

Equipment: food prep equipment



OTHER INFORMATION

6.04

6.05

Staff Lunch Room

FUNCTIONAL CRITERIA

Description: staff lunch spaces

Area: 400 sf

Quantity: 1

Occupant Load: 24

LOCATIONAL CRITERIA

Users: teachers, aids, general staff, kitchen staff

TECHNICAL CRITERIA

Floor: VCT

Walls: easy to clean, display space

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: (1) sink, fire protection, speaker/strobe

Lighting: recessed linear and indirect LED cove

Electrical: general wall receptacles, GFCI at counters, refrigerator, microwave

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

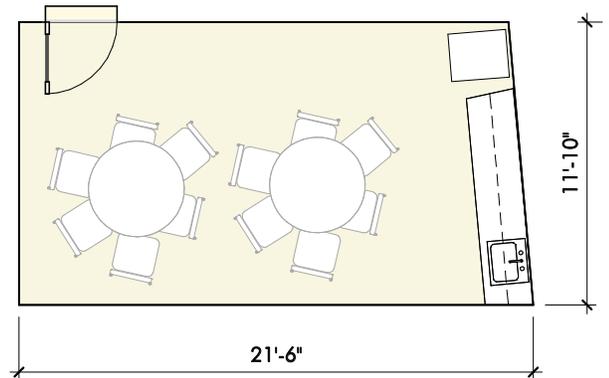
FIXTURES/ FURNISHINGS

Casework/Specialties: counter

Furnishings: tables and chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, refrigerator, microwave

OTHER INFORMATION



6.06

Quiet Dining

FUNCTIONAL CRITERIA

Description: Dining area for sensory sensitive students

Area: 600 sf

Quantity: 1

Occupant Load: 18 seats

LOCATIONAL CRITERIA

Users: students, teachers, aides

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical: wall panels for reverberation control

Doors: wood full lite

Windows:

Mechanical: low volume displacement

Plumbing/FP: fire protection, speaker/strobe

Lighting: recessed linear and indirect LED cove

Electrical: general wall receptacles

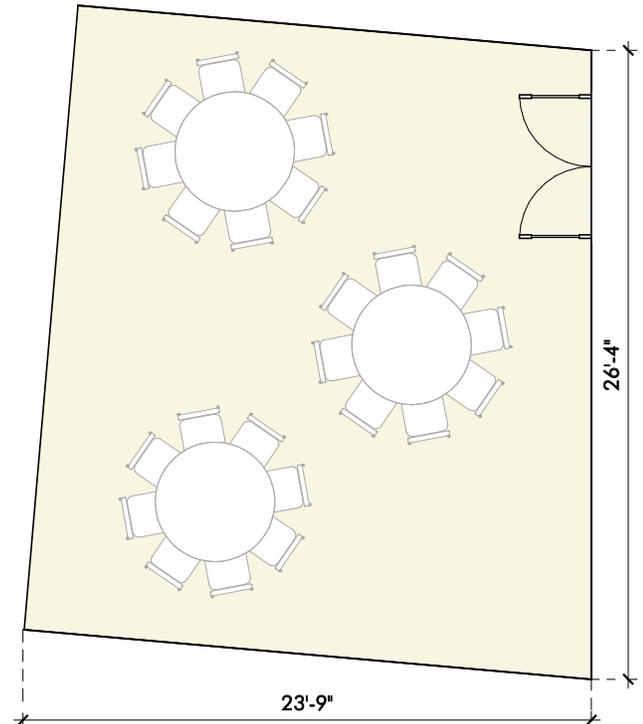
Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: flip-top tables, stacking chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point



OTHER INFORMATION for sensory sensitive students

6.06

7.01

Medical Suite Toilet

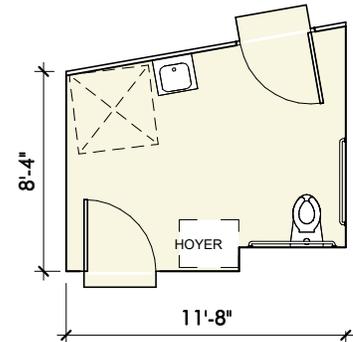
FUNCTIONAL CRITERIA

Description: dedicated toilet for Medical suite and medically fragile Classroom

Area: 100 sf

Quantity: 1

Occupant Load: 1



LOCATIONAL CRITERIA

Users: students, nurses

TECHNICAL CRITERIA

Floor: epoxy

Walls: wall tile

Ceiling: GWB

Acoustical:

Doors: flush

Windows:

Mechanical: low volume displacement

Plumbing/FP: sink, toilet, handheld shower, floor drain; fire

Lighting: protection, speaker/strobe

Electrical: recessed linear direct LED

Communication:

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: changing table, hoyer lift

Equipment:

OTHER INFORMATION shared with medically fragile SPED classroom

7.02

Nurses' Office / Waiting Room

FUNCTIONAL CRITERIA

Description: private office for nurse; health records storage

Area: 300 sf

Quantity: 1

Occupant Load: 2

LOCATIONAL CRITERIA

Users: students, nurses

TECHNICAL CRITERIA

Floor: VCT

Walls: easy to clean

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: high air exchange

Plumbing/FP: sink; fire protection, speaker/strobe

Lighting: recessed linear direct LED

Electrical: general wall receptacles, dedicated d-duplex per teacher workstation

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties: counter/workstation, upper cabinets, privacy curtain to exam areas

Furnishings: file storage, lockable medical storage, clothing storage, soft waiting seating

Equipment: refrigerator, freezer, audio and visual testing equipment, 1 telephone (wall-mounted), sound lift system, 1 wireless access point, washer, dryer

OTHER INFORMATION



7.02

7.03

Examination Room / Resting

FUNCTIONAL CRITERIA

Description: clinical treatment, observation and testing of students

Area: 100 sf

Quantity: 2

Occupant Load: 3

LOCATIONAL CRITERIA

Users: students, nurses

TECHNICAL CRITERIA

Floor: VCT

Walls: easy to clean

Ceiling: ACT

Acoustical:

Doors:

Windows:

Mechanical: high air exchange

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall receptacles

Communication: (2) data outlets, wall phone outlet, clock system

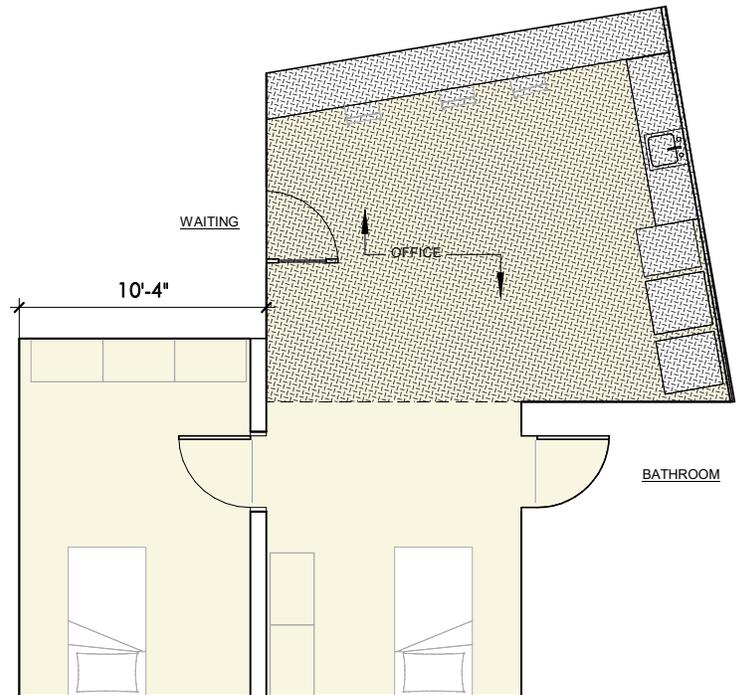
FIXTURES/ FURNISHINGS

Casework/Specialties: privacy curtains

Furnishings: recovery beds, lockable storage cabinets

Equipment:

OTHER INFORMATION 1 private/enclosed



8.01

General Office / Waiting Room

FUNCTIONAL CRITERIA

Description: administrative center, welcome

Area: 400sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators, students, parents

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: low volume displacement

Plumbing/FP: fire protection

Lighting: recessed linear and indirect LED cove

Electrical: general wall recptacles, d-duplex at workstations

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point
 PA system controls

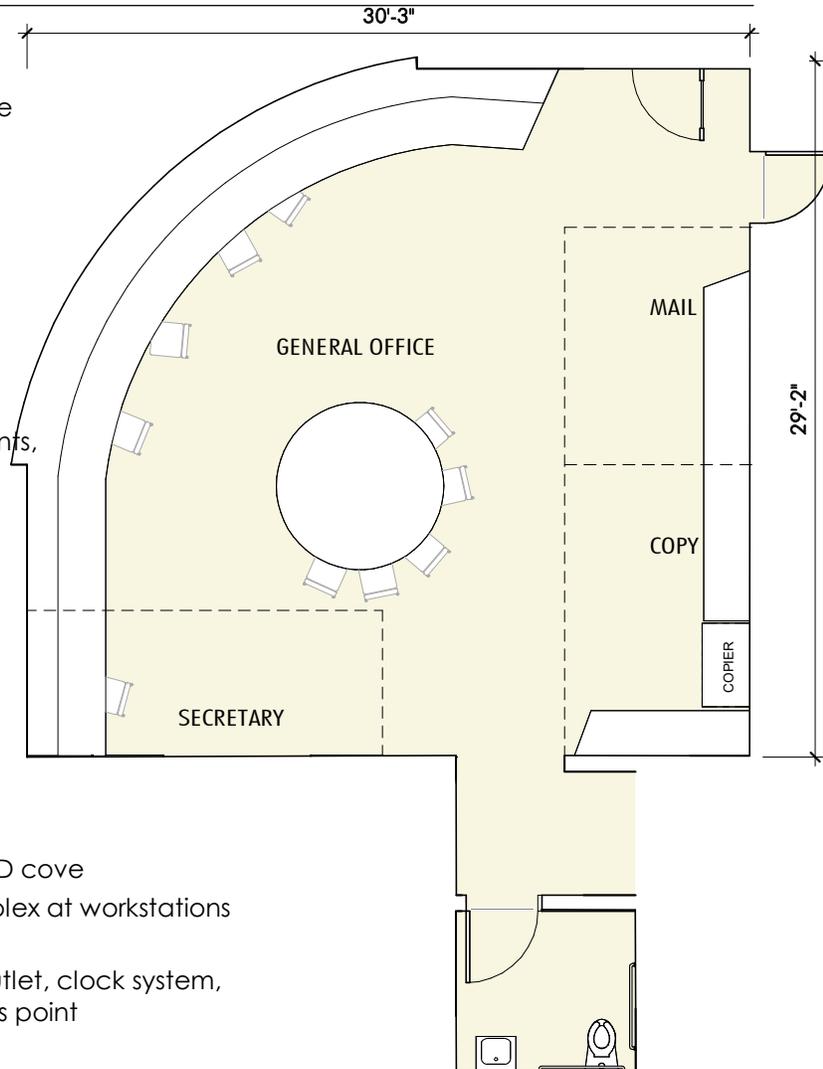
FIXTURES/ FURNISHINGS

Casework/Specialties: reception desk, work counter, tech board, cabinetry, coiling security screen

Furnishings: chairs with wheels

Equipment: PA system controls, video signage controls, 1 telephone (wall-mounted), 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION toilet room adjacent



8.01

8.02

Teacher Mail and Time Room

FUNCTIONAL CRITERIA

Description: mail distribution, teachers sign in/out

Area: 100 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: low velocity displacement

Plumbing/FP: fire protection

Lighting: recessed linear LED, task lighting

Electrical: general wall receptacles

Communication:

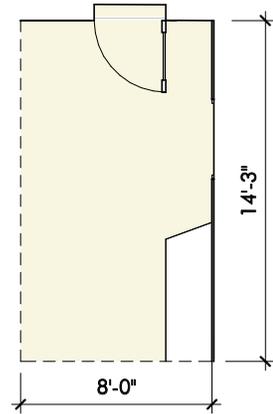
FIXTURES/ FURNISHINGS

Casework/Specialties: counter, mail slots, base cabinets

Furnishings:

Equipment:

OTHER INFORMATION part of main admin area



8.03

Copy Room

FUNCTIONAL CRITERIA

Description: central copy area for admin and teacher staff

Area: 150 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors:

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed linear LED, task lighting

Electrical: general wall receptacles, power for copier

Communication:

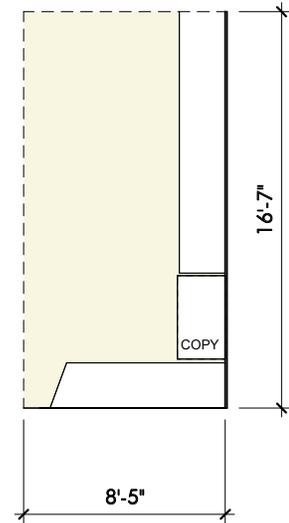
FIXTURES/ FURNISHINGS

Casework/Specialties: work counter, base cabinets, upper cabinets

Furnishings:

Equipment: copy machine

OTHER INFORMATION part of main admin area



8.03

8.04

Records Room

FUNCTIONAL CRITERIA

Description: Storage for student records

Area: 110 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administration

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood flush, secure/locking

Windows:

Mechanical:

Plumbing/FP: fire protection

Lighting: utility

Electrical: general wall receptacles

Communication:

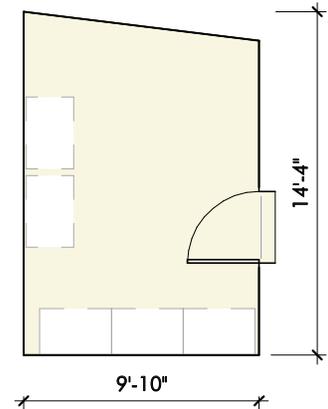
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: file cabinets, lockable

Equipment:

OTHER INFORMATION Seperate Record Room for STAR



8.05

Principal's Office

FUNCTIONAL CRITERIA

Description: office of the school principal with area for private small conferences

Area: 375 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: principal

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed linear and indirect LED cove

Electrical: general wall receptacles, d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system

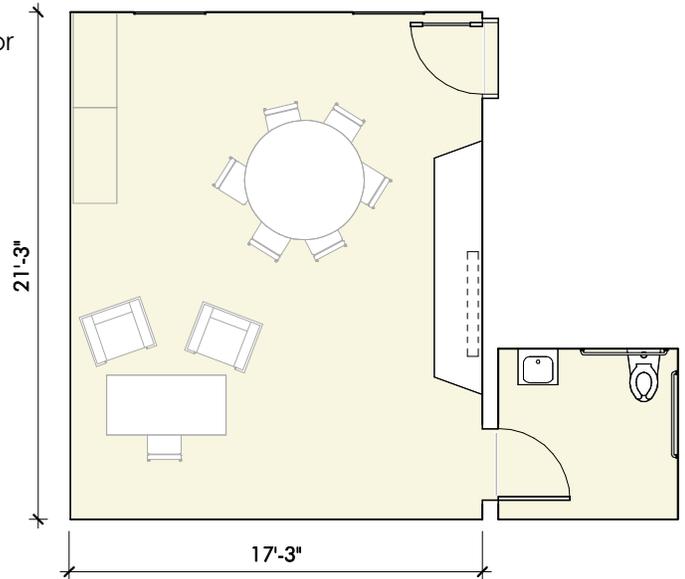
FIXTURES/ FURNISHINGS

Casework/Specialties: work counter

Furnishings: 1 desk, 1 office chair, side chairs, 1 medium conference table, filing cabinets

Equipment: 1 telephone (wall-mounted), 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION Includes private toilet



8.05

8.06

Principal's Secretary / Waiting

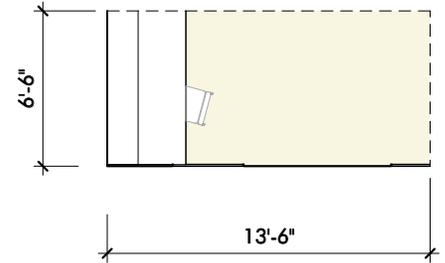
FUNCTIONAL CRITERIA

Description: welcome administrative area adjacent to principal and assistant principal

Area: 125 sf

Quantity: 1

Occupant Load: 1



LOCATIONAL CRITERIA

Users: principal's secretary, students, parents

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors:

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles, d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties: counter

Furnishings: 1 office chair, filing cabinets

Equipment:

OTHER INFORMATION adjacent to Principal's office

8.07

Supervisory / Spare Office

FUNCTIONAL CRITERIA

Description: administrative office

Area: 120 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators

TECHNICAL CRITERIA

Floor: VCT

Walls:

Ceiling:

Acoustical:

Doors:

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles, d-duplex at workstation

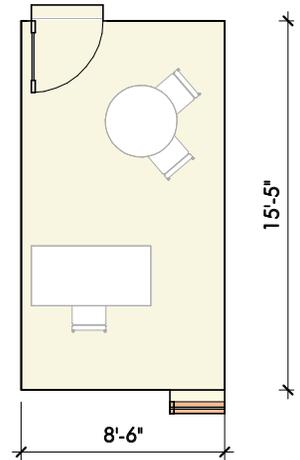
Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: 1 desk, 1 office chair, meeting table with chairs, filing cabinets

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION

8.07

8.08

Conference Room

FUNCTIONAL CRITERIA

Description: room to hold small meetings between staff, teachers, or visitors, teachers' professional development

Area: 250 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: teachers, administrators, visitors

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: displacement through floor diffuser

Plumbing/FP: fire protection

Lighting: recessed linear and indirect LED cove

Electrical: general wall receptacles, floor receptacle at conf table

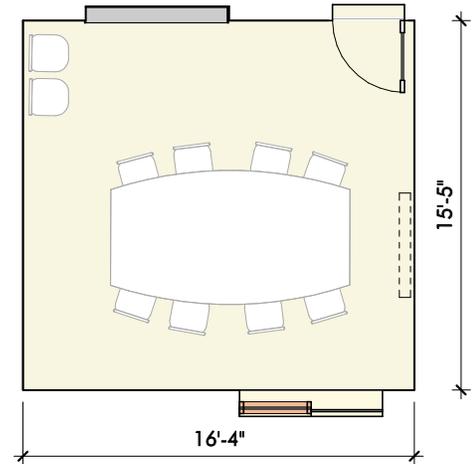
Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: conference table, chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor



OTHER INFORMATION

8.09

Guidance Office

FUNCTIONAL CRITERIA

Description: office for guidance counselor, used also for private counseling of students and meetings with parents

Area: 150 sf

Quantity: 1

Occupant Load:

LOCATIONAL CRITERIA

Users: guidance staff, students, parents

TECHNICAL CRITERIA

Floor: VCT

Walls: writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows: required

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: recessed direct and indirect LED cove

Electrical: general wall receptacles, d-duplex at workstation

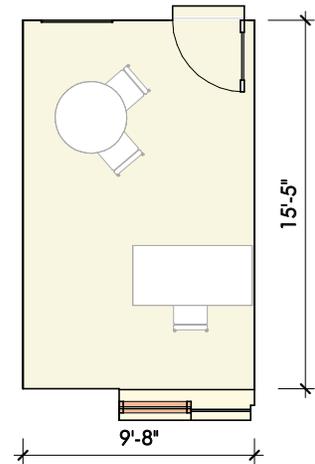
Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: 1 desk, 1 office chair, filing cabinets, small meeting table with chairs

Equipment: 1 telephone (wall-mounted)



OTHER INFORMATION

8.09

8.10

Guidance Storeroom

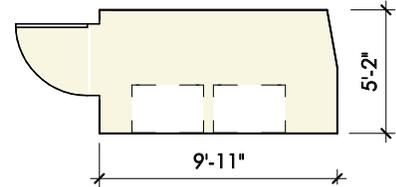
FUNCTIONAL CRITERIA

Description: storage for guidance documents

Area: 35 sf

Quantity: 1

Occupant Load:



LOCATIONAL CRITERIA

Users:

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling:

Acoustical:

Doors: wood flush, secure/locking

Windows:

Mechanical:

Plumbing/FP: fire protection

Lighting: utility LED

Electrical: general wall receptacles

Communication:

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: file cabinets

Equipment:

OTHER INFORMATION

8.11

Teacher's Work Room

FUNCTIONAL CRITERIA

Description: meeting and workspace for teachers to collaborate

Area: 300 sf

Quantity: 2

Occupant Load:

LOCATIONAL CRITERIA

Users: faculty and administration

TECHNICAL CRITERIA

Floor: VCT

Walls: GWB, writable surfaces

Ceiling: ACT

Acoustical:

Doors: wood full lite

Windows:

Mechanical: low volume displacement ventilation

Plumbing/FP:

Lighting: recessed direct and indirect LED cove

Electrical: wall receptacles

Communication: (2) data outlets, wall phone outlet, clock system, ceiling speaker, wireless access point

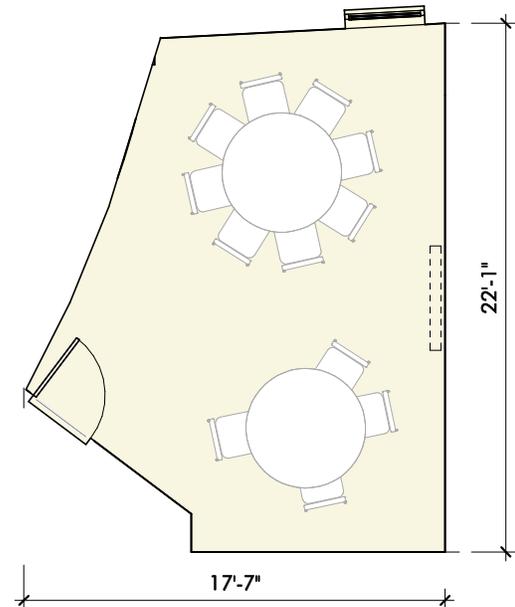
FIXTURES/ FURNISHINGS

Casework/Specialties: magnetic writable wall surface

Furnishings: work tables and chairs

Equipment: 1 telephone (wall-mounted), sound lift system, 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION 1 per wing



8.11

8.12

Lactation Room

FUNCTIONAL CRITERIA

Description: private space for new mothers to pump

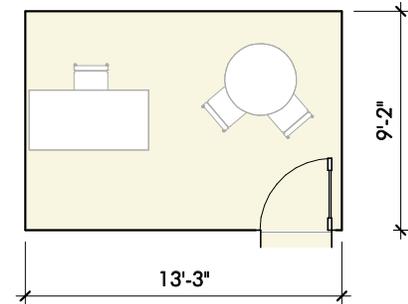
Area: 120 sf

Quantity: 1

Occupant Load: 1

LOCATIONAL CRITERIA

Users: teachers, admin, staff



TECHNICAL CRITERIA

Floor: VCT

Walls: GWB

Ceiling: ACT

Acoustical:

Doors: wood with opaque lite for privacy

Windows:

Mechanical: displacement air

Plumbing/FP: fire protection

Lighting: recessed linear direct LED

Electrical: general wall receptacles, d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: desk, task chair, lounge chairs - variety of seating types for new mothers

Equipment: mini refrigerator for storage, 1 telephone (wall-mounted), 1 wireless access point, 1 LED touch screen monitor

OTHER INFORMATION required by staff

9.01

Custodian's Office

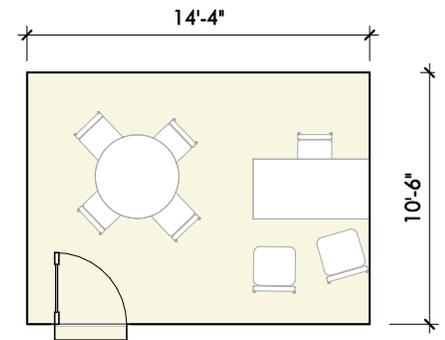
FUNCTIONAL CRITERIA

Description: office for custodian

Area: 150 sf

Quantity: 1

Occupant Load:



LOCATIONAL CRITERIA

Users:

TECHNICAL CRITERIA

Floor:

Walls:

Ceiling:

Acoustical:

Doors: full lite

Windows: required to receiving

Mechanical: low volume displacement ventilation

Plumbing/FP: fire protection

Lighting: utility LED, task lighting

Electrical: general wall receptacles, d-duplex at workstation

Communication: (2) data outlets, wall phone outlet, clock system,
wireless access point

FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings: desk and task chair, (2) side chair, storage cabinet

Equipment: 1 telephone (wall-mounted), 1 wireless access point

OTHER INFORMATION

9.01

9.02

Custodian's Workshop

FUNCTIONAL CRITERIA

Description: workspace for custodian staff

Area: 375 sf
Quantity: 1
Occupant Load:

LOCATIONAL CRITERIA

Users: custodial staff

TECHNICAL CRITERIA

Floor:
Walls: GWB
Ceiling:
Acoustical:
Doors: double
Windows:
Mechanical: exhaust
Plumbing/FP: fire protection
Lighting: utility LED
Electrical: general wall receptacles

Communication:

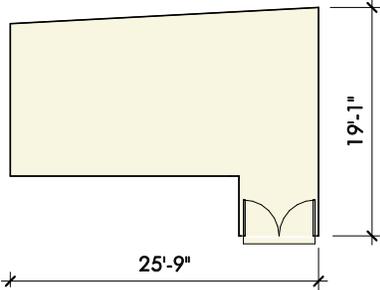
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



9.03

Custodian's Storage

FUNCTIONAL CRITERIA

Description: storage rooms

Area: 375 sf total, room sizes vary

Quantity: 4

Occupant Load:

LOCATIONAL CRITERIA

Users: custodians

TECHNICAL CRITERIA

Floor:

Walls:

Ceiling:

Acoustical:

Doors: flush

Windows:

Mechanical:

Plumbing/FP: (1) mop sink per floor; fire protection

Lighting: utility LED

Electrical: general wall receptacles

Communication:

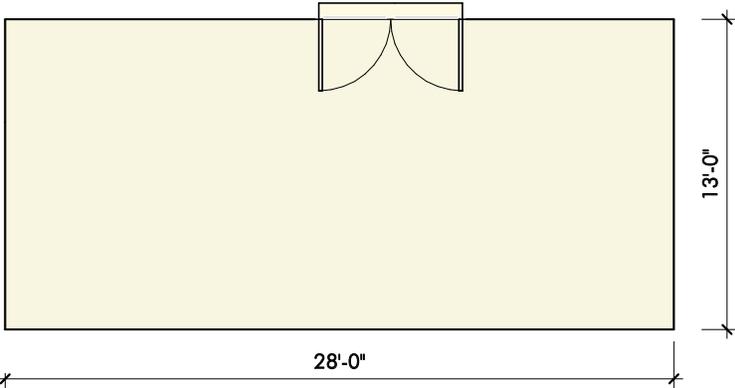
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION series of rooms dispersed throughtout building for easy access



9.04

Recycling Room / Trash

FUNCTIONAL CRITERIA

Description: Trash storage area

Area: 400 sf
Quantity: 1
Occupant Load:

LOCATIONAL CRITERIA

Users:

TECHNICAL CRITERIA

Floor:
Walls:
Ceiling:
Acoustical:
Doors:
Windows:
Mechanical: exhaust
Plumbing/FP: fire protection
Lighting: utility LED
Electrical:

Communication:

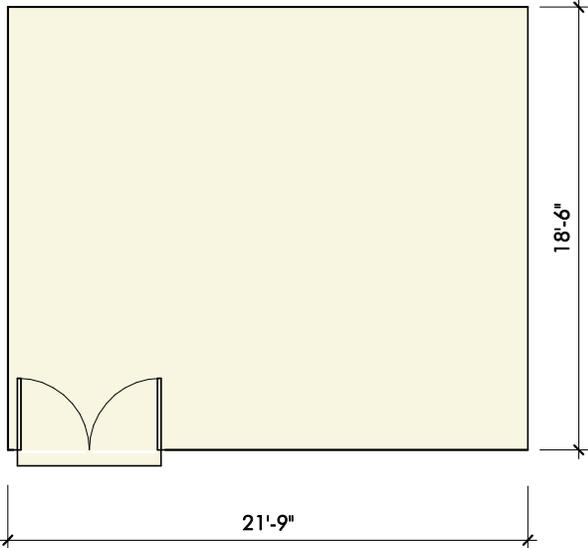
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



9.05

Receiving and General Supply

FUNCTIONAL CRITERIA

Description:

Area: 220 sf
Quantity: 1
Occupant Load:

LOCATIONAL CRITERIA

Users: custodial/kitchen staff

TECHNICAL CRITERIA

Floor:
Walls:
Ceiling:
Acoustical:
Doors:
Windows:
Mechanical:
Plumbing/FP: fire protection
Lighting: utility LED
Electrical: general wall receptacles

Communication:

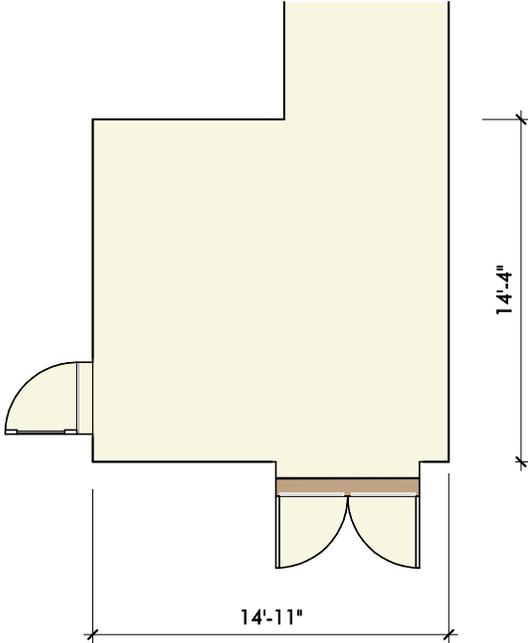
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



9.06

Storeroom

FUNCTIONAL CRITERIA

Description: storage area for buidling supplies

Area: 240 sf
Quantity: 2
Occupant Load:

LOCATIONAL CRITERIA

Users: custodial staff

TECHNICAL CRITERIA

Floor:
Walls:
Ceiling:
Acoustical:
Doors:
Windows:
Mechanical: ventilation only
Plumbing/FP: fire protection
Lighting: utility LED
Electrical: general wall receptacles

Communication:

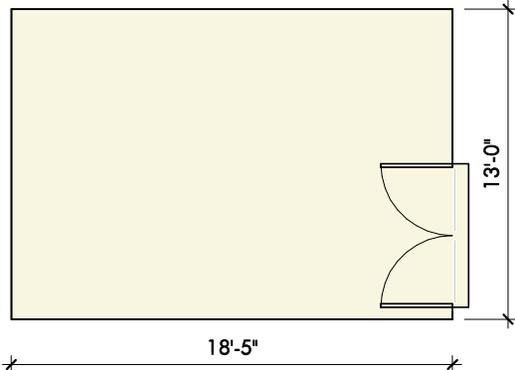
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



9.07

Network / Telecom Room

FUNCTIONAL CRITERIA

Description:

Area: 200 sf
Quantity: 1
Occupant Load:

LOCATIONAL CRITERIA

Users: IT staff

TECHNICAL CRITERIA

Floor:
Walls:
Ceiling:
Acoustical:
Doors:
Windows:
Mechanical: exhaust
Plumbing/FP: fire protection
Lighting: utility LED
Electrical:

Communication:

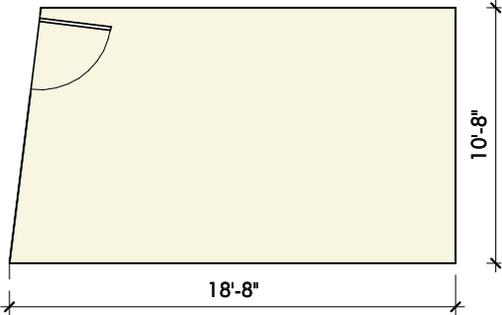
FIXTURES/ FURNISHINGS

Casework/Specialties:

Furnishings:

Equipment:

OTHER INFORMATION



15 Proposed Construction Methodology

The owner's project manager presented a power point slide providing details on both Design Bid Build and CM at Risk construction methods for project delivery at the December 11, 2023, and also at the June 24, 2024, SBRC meeting. The committee members discussed the pros and cons of both methods and deferred a vote to the next meeting on December 19, 2023, where they voted to approve CMR. They reconfirmed this vote again at the June 24, 2024, SBRC Meeting. The sides presented provide a brief overview of the two delivery methods as well as the history of Dedham's familiarity and experience with both methods. The committee continued discussions on the two delivery methods at the December 19, 2023, and the June 24, 2024 meeting at which time they voted to approve using the CM at Risk delivery method. A copy of the slides presented are attached.



Understanding Your Choices: Chapter 149 or 149A Oakdale-Greenlodge Elementary School Project Building Committee Meeting

via Zoom – 7:00 PM
August 21, 2023

“During the 1970’s, a new type of firm evolved. Most were GC’s looking to provide services, work as part of teams, and eliminate adversarial environments on projects. In doing this they raised construction to a higher level of project delivery and added value to the end product”

Project Delivery Systems for Construction published by AGC 2004

“It is important to note that the constructor’s obligation is to satisfy the minimum requirements of the drawing and specifications. In the bidding process, the Owner asks for the lowest possible price to perform only those things that are absolutely required by the drawings and specifications and not more.”

Project Delivery Systems for Construction published by AGC 2004

With CM at Risk – you are **hiring** a professional service firm which builds buildings

With D-B-B – you are **purchasing** a building in accordance with detailed plans and specifications

For reference

*D-B-B: ECEC, Town Hall
 CM@R Avery, Public Safety*

CM @ Risk

Design-Bid-Build

- Lower cost
- Competitively bid
- Lump sum payment
- Owners more familiar with this method
- Less paperwork
- Appropriate for “simpler” projects
- Quality contractors but smaller pool
- No design-phase services
- No GMP contingency
 - All COs to Owner
- Owner has little to no say on staff or subcontractors

- Qualifications based selection w/ fee proposal
 - Interview the team that will build project
- Negotiated price (except for fee percentage)
- Design Phase services
 - Planning; constructability reviews; estimating
- Open-book accounting
- Owner included in sub selection and descoping
- Early release packages can be done
 - Drive schedule / Strategic procurement
- GMP Contingency / Holds / Allowances
- Larger pool of potential firms
- Price premium ... 4 to 6% over D-B-B initially
- Post construction services

Design-Bid-Build (DBB)

- Filed Sub Bids
- + Everything else
- Lump Sum Bid Price**

CM at Risk

- Preconstruction fee
- + General conditions cost
- + Insurance and bond cost
- + Fee (i.e., profit on all work)
- + Trade bidders
- + Non-trade bidders
- + Allowances and Holds
- + CM Contingency
- Guaranteed Maximum Price**

- ▶ Bottom Line: Some projects are sufficiently “simple” that the initial cost savings with DBB outweigh the value-added services provided through CMR.
- ▶ IG Report on CMR: Owner’s view CM at Risk most appropriate for large, complex projects involving phasing, challenging logistics, on occupied campus and aggressive schedules; DBB as most appropriate for relatively basic new construction on open, clean sites, not time dependent.

With post-COVID inflation, we are seeing more CM participation due to cost concerns; the builder participates in the confirmatory estimate process instead of OPM’s third-party estimator

- Submit application to Inspector General to utilize CMR as a delivery method
- Post approval, there is a two-phase selection process that has to be undertaken
 1. Request for Qualifications (RFQ)
 2. Request for Proposals (RFP) – also has two parts
 - Price (bid their fee as a percentage, general conditions based on duration, contingency percentage, preconstruction fee)
 - Non-price (technical approach to the project)
 - Interviews

16 Reimbursement Rate

The base reimbursement rate before incentives for the Town of Dedham is 46.58% as provided by the MSBA on 8/8/2024. The Town of Dedham anticipates receiving an additional 1.2% for their maintenance program and another 4% for Energy Efficiency. After a presentation from the Mechanical Engineer at the December 11, 2023, meeting, the SBRC voted to approve including geothermal displacement ventilation as the preferred mechanical system for the building to help achieve an additional 4% points for the Energy Efficiency and Green Schools incentive offered by the MSBA. This is a total of 5.2% additional incentive points for a total reimbursement rate of 51.78% as noted on the 3011 form.

17 Total Project Budget

The Total Project Budget Worksheet follows.

Other Hazardous Material Abatement		\$0		
BUILDING SITE WORK				
Site Preparation	\$3,927,280	\$0		
Site Improvements	\$4,952,702	\$560,700		
Site Civil / Mechanical Utilities	\$1,499,981	\$0		
Site Electrical Utilities	\$500,800	\$0		
Scope Excluded Site Work	\$0	\$0		
Construction Trades Subtotal	\$60,825,110	\$560,700		
Contingencies (Design and Pricing)	\$6,082,511	\$56,070		
Sub-Contractor Bonds		\$0		
D/B/B Insurance		\$0		
General Conditions	\$6,730,399	\$62,042		
D/B/B Overhead & Profit		\$0		
GMP Insurance	\$1,420,266	\$13,092		
GMP Fee	\$1,979,100	\$18,244		
GMP Contingency	\$1,583,280	\$14,595		
Escalation to Mid-Point of Construction	\$4,516,264	\$41,632		
Construction Cost over Funding Cap		\$37,605,863		
Construction Budget	\$83,136,930	\$38,372,239		\$23,179,157
Alternates				
Ineligible Work Included in the Base Project	\$0	\$0	\$0	
Alternates Included in the Total Project Budget	\$0	\$0	\$0	
Alternates Excluded from the Total Project Budget	\$0	\$0	\$0	
Subtotal to be Included in Total Project Budget	\$0	\$0	\$0	\$0
Miscellaneous Project Costs				
Utility Company Fees	\$200,000	\$0	\$200,000	
Testing Services	\$300,000	\$0		
Swing Space / Modularity	\$0	\$0		
Other Project Costs (Mailing & Moving)	\$250,000	\$0		
Miscellaneous Project Costs Subtotal	\$750,000	\$0		\$388,350
Furnishings and Equipment				
Furniture, Fixtures, and Equipment	\$792,000	\$360,000		
Technology	\$432,000	\$0		
FF&E Subtotal	\$1,224,000	\$360,000		\$447,379
Soft Costs that exceed 20% of Construction Cost		\$0		
Project Budget	\$99,966,923	\$45,245,266		\$28,334,874

Eligible Demolition and Abatement Costs:		\$2,258,416
Marked Up Eligible Costs:		\$3,086,846
Eligible Site Work Cost		
Total Direct Site Work Costs:	\$10,880,763	
Ineligible Site Work Costs:	-\$560,700	68,889 Eligible Building GSF
Potentially Eligible Direct Site Work Costs:	\$10,320,063	\$55 Site Work Cost Limit (\$/sf) includes Mark Up
Potentially Eligible Marked Up Site Work Costs:	\$14,105,661	\$3,788,895 Site Work Cost Allowance includes Mark Up
Marked Up Eligible Site Work Costs:		\$3,788,895
Construction Costs and Funding Cap		
Total Building Area (GSF):	87,009	
Ineligible Excess Auditorium/PE Areas (GSF):	-1,275	
Other Ineligible Building Areas (GSF):	-16,845	
Eligible Building GSF:	68,889	
Building Cost Funding Limit (\$/sf):	\$550	
Eligible Building Costs:	\$37,888,950	
Eligible Site Work Costs:	\$3,788,895	
Eligible Demolition & Abatement Costs:	+ \$3,086,846	
Basis of Construction Costs:	\$44,764,691	
Construction Budget:	\$83,136,930	
Basis of Construction Costs:	-\$44,764,691	
Ineligible Construction Costs:	\$38,372,239	
Construction Cost over Funding Cap:	\$0	
If > 0 enter value into Cell C98		

Synthetic turf as ineligible

Added escalation to D&P C

FF&E Reimbursement				
Eligible Enrollment:	360	Enter Eligible Enrollment		
Furniture, Fixtures & Equipment:	\$1,200/student	Estimated Budget	\$792,000	Eligible Costs \$432,000 Ineligible Costs \$0 If >0 enter in Cell C112
Technology:	\$1,200/student	Estimated Budget	\$432,000	Eligible Costs \$432,000 Ineligible Costs \$0 If >0 enter in Cell C113

Incentive Points	
1.20	(0-2) Maintenance
0.00	(0-6) Newly Formed Regional School District
0.00	(0-5) Major Reconstruction or Reno/Reuse type in rounded to 2 decimal places
#DIV/0!	0 gsf Renovated or Existing to Remain
<--- Rate provided by MSBA on 08/08	0 gsf Total at Conclusion of Project
0.00	(0-1) Overlay Zoning 40R and 40S
0.00	(0-0.5) Overlay Zoning 100 units or 50% of units 1, 2, or 3 family structures
4.00	(0-4) Energy Efficiency - "Green Schools"
5.20 Total Incentive Points	
Owner's Contingency Cap: 0.50%	
Construction Contingency Cap: 1.00%	

Board Authorization	
Design Enrollment	360
Total Building Gross Floor Area (GSF)	87,009
Total Project Budget (excluding Contingencies)	\$99,966,923
Scope Items Excluded or Otherwise Ineligible	-\$45,245,266
Third Party Funding (Ineligible)	-\$0
Estimated Basis of Maximum Total Facilities Grant ¹	\$54,721,657
Reimbursement Rate ¹	51.78%
Est. Max. Total Facilities Grant (before recovery) ¹	\$28,334,874
Cx Costs associated with Ineligible Building Area ²	-\$23,375
Cost Recovery associated with Prior Projects ²	-\$0
Estimated Maximum Total Facilities Grant ¹	\$28,311,499

46.58 Reimbursement Rate Before Incentive Points
5.20 Total Incentive Points
51.78% MSBA Reimbursement Rate

NOTES
This template was prepared by the MSBA as a tool to assist Districts and consultants in understanding MSBA policies and practices regarding potential impact on the MSBA's calculation of a potential Basis of Total Facilities Grant and potential Total Maximum Facilities Grant. This template does not contain a final, exhaustive list of all evaluations which the MSBA may use in determining whether items are eligible for reimbursement by the MSBA. The MSBA will perform an independent analysis based on a review of information and estimates provided by the District for the proposed school project that may or may not agree with the estimates generated by the District using this template.

1 - The Estimated Basis of Total Facilities Grant and Estimated Maximum Facilities Grant amounts do not include any potentially eligible contingency funds and are subject to review and audit by the MSBA.

2 - Costs associated with the commissioning of ineligible building area is estimated to result in the recovery of a portion of the overall commissioning cost. The OPM has estimated this recovery of funds to be \$ _____. The proposed demolition of the School is expected to result in the MSBA recovering a portion of state funds previously paid to the District for the _____ project at the existing facilities completed in _____. The MSBA will perform an independent analysis based on a review of its records and information and estimates provided by the District for the proposed school project that may or may not agree with the estimated cost recovery generated by the District and its consultants using this template.

3 - Pursuant to Section 3.21 of the Project Funding Agreement and the applicable policies and guidelines of the Authority, any project costs associated with the reallocation or transfer of funds from either the Owner's contingency or the Construction contingency to other budget line items shall be subject to review by the Authority to determine whether any such costs are eligible for reimbursement by the Authority. All costs are subject to review and audit by the MSBA.

Commissioning (Cx) Costs associated with Ineligible Building Area	
Building GSF:	87,009
Cx Fee per GSF:	\$1.29
Ineligible GSF:	18,120
Ineligible Cx Costs:	\$23,375 If >0 enter in Cell B128
Commissioning Fee Schedule	

Cost Recovery associated with Prior Projects	
Prior Project ID Number:	
Prior Project Total Grant:	
Propose School Opens:	
Prior Project Substantial Completion:	
Beneficial use (years):	0.00
Unused Years:	20.00
Unused Years as % of 20:	100.00%
Prior Project Cost Recovery:	\$0 If >0 enter in Cell B128

Enter Date. Assume 15th of August if new school opens in September. For example if turnover is June, new school will not be used until September by students.

Enter Date. If only month is known, assume 15th of the month.

By signing this Total Project Budget, I hereby certify that I have read and understand the form and further certify, to the best of my knowledge and belief, that the information supplied by the District in the table above is true, accurate, and complete.

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Dedham Public Schools
Oakdale Elementary School

8/28/2024

Enter Budget Values for Ineligible Costs in light yellow highlighted cells.

Total Project Budget: All costs associated with the project are subject to 963 CMR 2.16(5)	Estimated Budget	Scope Items Excluded from the Estimated Basis of	Estimated Basis of Maximum Total Facilities	Estimated Maximum Total Facilities Grant ¹
Feasibility Study Agreement		Enter Budget Values for all light yellow highlighted cells.	Enter Budget Values for Ineligible Costs in light yellow highlighted cells.	
OPM Feasibility Study	\$384,952	\$0	\$384,952	
A&E Feasibility Study	\$860,000	\$0	\$860,000	
Environmental & Site		\$263,553	-\$263,553	
Other	\$18,601	\$0	\$18,601	
Feasibility Study Agreement Subtotal	\$1,263,553	\$263,553	\$1,000,000	\$517,800
Administration				
Legal Fees	\$35,000	\$0	\$35,000	\$18,123
Owner's Project Manager				
Design Development	\$285,206	\$0	\$285,206	
Construction Contract Documents	\$295,845	\$52,183	\$243,662	
Bidding	\$124,515	\$0	\$124,515	
Construction Contract Administration	\$2,187,712	\$1,822,786	\$364,926	
Closeout	\$271,662	\$0	\$271,662	
Extra Services	\$0	\$0	\$0	
Reimbursable & Other Services	\$10,000	\$0	\$10,000	
Cost Estimates	\$35,000	\$0	\$35,000	
Advertising	\$2,500	\$0	\$2,500	
Permitting	\$75,000	\$0	\$75,000	
Owner's Insurance	\$250,000	\$0	\$250,000	
Other Administrative Costs	\$300,000	\$0	\$300,000	
Administration Subtotal	\$3,872,440	\$1,874,969	\$1,997,471	\$1,034,290
Architecture and Engineering				
Basic Services				
Design Development	\$2,490,000	\$0	\$2,490,000	
Construction Contract Documents	\$3,320,000	\$134,652	\$3,185,348	
Bidding	\$166,000	\$0	\$166,000	
Construction Contract Administration	\$2,216,100	\$4,239,853	-\$2,023,753	
Closeout	\$107,900	\$0	\$107,900	
Other Basic Services	\$0	\$0	\$0	
Basic Services Subtotal	\$8,300,000	\$4,374,505	\$3,925,495	
Reimbursable Services				
Construction Testing	\$110,000	\$0	\$110,000	
Printing (over minimum)	\$30,000	\$0	\$30,000	
Other Reimbursable Costs	\$100,000	\$0	\$100,000	
Hazardous Materials	\$200,000	\$0	\$200,000	
Geotechnical & Geo-Environmental	\$590,000	\$0	\$590,000	
Site Survey	\$70,000	\$0	\$70,000	
Wetlands	\$0	\$0	\$0	
Traffic Studies	\$70,000	\$0	\$70,000	
Architectural / Engineering Subtotal	\$9,470,000	\$4,374,505	\$5,095,495	\$2,638,447
CM at Risk Pre-Construction Services				
Pre-Construction Services	\$250,000	\$0	\$250,000	\$129,450
Site Acquisition	\$0	\$0	\$0	\$0
Land / Building Purchase	\$0	\$0	\$0	\$0
Appraisal Fees	\$0	\$0	\$0	\$0
Recording fees	\$0	\$0	\$0	\$0
Site Acquisition Subtotal	\$0	\$0	\$0	\$0
Construction Costs				
SUBSTRUCTURE				
Foundations	\$2,125,260	\$0	\$2,125,260	
Basement Construction	\$1,998,879	\$0	\$1,998,879	
SHELL				
Super Structure	\$5,592,751	\$0	\$5,592,751	
Exterior Closure	\$0	\$0	\$0	
Exterior Walls	\$3,946,303	\$0	\$3,946,303	
Exterior Windows	\$1,870,765	\$0	\$1,870,765	
Exterior Doors	\$120,271	\$0	\$120,271	
Roofing	\$1,814,161	\$0	\$1,814,161	
INTERIORS				
Interior Construction	\$5,410,144	\$0	\$5,410,144	
Staircases	\$501,740	\$0	\$501,740	
Interior Finishes	\$2,523,605	\$0	\$2,523,605	
SERVICES				
Conveying Systems	\$256,900	\$0	\$256,900	
Plumbing	\$2,434,273	\$0	\$2,434,273	
HVAC	\$11,009,938	\$0	\$11,009,938	
Fire Protection	\$791,716	\$0	\$791,716	
Electrical	\$6,183,679	\$0	\$6,183,679	
EQUIPMENT & FURNISHINGS				
Equipment	\$929,650	\$0	\$929,650	
Furnishings	\$175,896	\$0	\$175,896	
SPECIAL CONSTRUCTION & DEMOLITION				
Special Construction	\$0	\$0	\$0	
Existing Building Demolition	\$481,716	\$0	\$481,716	
In-Building Hazardous Material Abatement	\$1,776,700	\$0	\$1,776,700	
Asbestos Containing Floor Material / Ceiling Tile Abatement	\$0	\$0	\$0	

NOTE that ineligible costs can not exceed Estimated Budget Cost for any individual line item, distribute across multiple lines if needed.

Template Revised: December 2023
Incorporates revisions to MSBA's project funding limits policy, which was approved at the October 25, 2023 MSBA Board of Directors Meeting.

Category	Estimated Budget	Excluded Costs	Eligible Soft Costs
Administration:	\$4,275,993	\$1,874,969	\$2,401,024
A/E Services:	\$10,330,000	\$4,638,058	\$5,691,942
Site Acquisition: Ineligible, therefore not included in calculation			
Miscellaneous Project Costs:	\$750,000	\$0	\$750,000
FFE:	\$1,224,000	\$360,000	\$864,000
Owners Contingency: Not included in this calculation			
Total Eligible Soft Costs =			\$9,706,966

Category	Estimated Budget
CM Pre-Construction Services:	\$250,000
Construction Cost:	\$83,136,930
Construction Contingency: Not included in this calculation	
Total Construction Cost:	\$83,386,930
Soft Cost Allowance:	20%
Reimbursable Soft Cost:	\$16,677,386
Eligible minus Reimbursable =	-\$6,970,420 If >0 enter into Cell C116

-If Eligible minus Reimbursable is negative; OK.
-If Eligible minus Reimbursable is positive enter value into "Soft Costs that exceed 20% of Construction Cost" below in the Ineligible column.

Category	Estimated Budget	Excluded (%)	Scope Excluded Costs
OPM Basic Services:	\$3,549,892	1.4700%	\$52,183
Designer Basic Services:	\$9,160,000	1.4700%	\$134,652

Category	Estimated Budget	Excluded (%)	Scope Excluded Costs
OPM Basic Services:	\$3,549,892	0.0000%	\$0
Designer Basic Services:	\$9,160,000	0.0000%	\$0
Total Scope Excluded OPM Fees (\$): \$0 Enter in Cell C13			
Total Scope Excluded Designer Fees (\$): \$0 Enter in Cell C28			

Category	Estimated Budget	Ineligible Costs	Eligible Costs	OPM Value @ 3.50%	Value > 3.5%
Basic Services:	\$3,549,892	\$1,874,969	\$1,674,923	\$1,674,923	\$0
Extra Services:	\$63,601	\$0	\$63,601		If >0 enter into Cell C15
Designer Services Estimated Budget					
Basic Services:	\$9,160,000	\$4,374,505	\$4,785,495	\$4,785,495	\$0
Extra Services:	\$1,170,000	\$263,553	\$906,447		If >0 enter into Cell C30

Ineligible Building Area	Ineligible NSF	Ineligible Aud/PE GSF	Other Ineligible GSF	Estimated District Cost
Core Academic:	7,600		11,400	\$10,892,700
Special Education:	-		-	\$0
Art & Music:	1,200		1,800	\$1,719,900
Vocations & Technology:			-	\$0
Chapter 74 CTE:			-	\$0
Health & Physical Education:	850	1,275		\$1,218,263
Media Center:	-		-	\$0
Auditorium / Drama:			-	\$0
Dining & Food Service:	1,880		2,820	\$2,694,510
Medical:	90		135	\$128,993
Administration & Guidance:	460		690	\$659,295
Custodial & Maintenance:			-	\$0
Other:			-	\$0
Total:	1,275	1,275	16,845	\$17,313,661
Grossing Factor:	1.50			

Category	Estimated Budget	Mark Up Ratio
Construction Budget	\$83,136,930	1.36681923
Construction Trades Subtotal	\$60,825,110	= Mark Up Ratio

Category	Estimated Budget
Total Demolition and Abatement Costs:	\$2,258,416
Ineligible Demolition and Abatement Costs:	\$0

Core
Teacher Planning
CI breakout 1-2
Cohort Commons 3-5
STE
STE storage
Teacher planning OK

18 Cost Estimate - Designer

The cost estimate from PM&C (Architect estimator) follows:

P

M

&

C

PM&C LLC

20 Downer Avenue, Suite 5
Hingham, MA 02043

(T) 781-740-8007

(F) 781-740-1012

Schematic Design Estimate

Oakdale Elementary School

Dedham, MA

MSBA Project Number:

202000730030

Prepared for:

Jonathan Levi Architects

August 27, 2024



Oakdale Elementary School
Dedham, MA

27-Aug-24

Schematic Design Estimate

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Gross Floor Area	\$/sf	Estimated Construction Cost
NEW CONSTRUCTION				
NEW BUILDING	Apr-26	87,009	\$548.06	\$47,685,931
DEMOLITION		26,068	\$9.00	\$234,612
1902 BUILDING		27,456	\$9.00	\$247,104
HAZARDOUS MATERIAL ABATEMENT, UEC Study July-August 2023 ¹				\$1,776,700
SITEWORK				\$10,880,763
SUB-TOTAL		87,009	\$699.07	\$60,825,110
DESIGN AND PRICING CONTINGENCY	10.0%			\$6,082,511
ESCALATION TO START OF CONSTRUCTION	6.75%			\$4,105,695
SUB-TOTAL				\$71,013,316
NON TRADES SUB BONDS				Included In Rates
GENERAL CONDITIONS - Building	20	MTHS	\$160,000	\$3,200,000
GENERAL CONDITIONS - Demo + Site	14	MTHS	\$100,000	\$1,400,000
GENERAL REQUIREMENTS	3.0%			\$2,130,399
BONDS	0.9%			\$639,120
GENERAL LIABILITY INSURANCE	1.1%			\$781,146
PERMIT				WAIVED
SUB-TOTAL				\$79,163,981
CM FEE	2.5%			\$1,979,100
GMP Contingency	2.0%			\$1,583,280
TEMPORARY CLASSROOMS				NR
TOTAL OF ALL CONSTRUCTION		87,009	\$950.78	\$82,726,361

¹ Inspection Fees and Monitoring Services not included

Anticipated Bid Date:

April 2026

ALTERNATES (including Markups)

1 Bay Windows	ADD	\$2,172,242
4 Solar Canopies at Parking	ADD	\$1,296,760
6 HVAC Option 2 - Air Source Heat Pump	DEDUCT	(\$3,854,863)
7 HVAC Option 3 - Air Source VRF	DEDUCT	(\$5,716,416)



Schematic Design Estimate

This Schematic Design cost estimate was produced from drawings, outline specifications and narratives prepared by Jonathan Levi Architects and their design team dated July 25, 2024. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, construction manager's overhead and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under Chapter 149a of the Massachusetts General Laws to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- All professional fees and insurance
- Building Permit costs
- Land acquisition, feasibility, and financing costs
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items (e.g. draperies, furniture and equipment)
- Rock excavation; special foundations (unless indicated by design engineers)
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction or occupancy phasing or off hours' work, (except as noted in this estimate)



Oakdale Elementary School
Dedham, MA

27-Aug-24

Schematic Design Estimate

ANTICIPATED FILED SUB BIDS

Total

040001	Unit Masonry	\$2,261,011
050001	Miscellaneous & Ornamental Iron	\$968,684
070001	Waterproofing, Damproofing & Caulking	\$606,561
070002	Roofing and Flashing	\$1,865,152
080001	Aluminum Windows	\$2,233,900
080002	Glass and Glazing	\$425,449
090002	Tile	\$409,909
090003	Acoustical Ceilings	\$678,189
090005	Resilient Flooring	\$553,406
090007	Painting	\$331,297
142424	Elevators	\$297,713
210000	Fire Suppression	\$953,160
220000	Plumbing	\$2,842,014
230000	HVAC	\$12,664,384
260000	Electrical Work	\$7,748,556

TOTAL FSB COST

\$34,839,385



Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	BUILDING		SITework	TOTAL PROJECT	
	Subtotal	Total		Subtotal	Total
DIV. 2 EXISTING CONDITIONS		\$0			\$2,258,416
024300 Building Demolition	\$0		\$481,716	\$481,716	
028000 Building Abatement	\$0		\$1,776,700	\$1,776,700	
DIV. 3 CONCRETE		\$3,291,903		\$46,825	\$3,338,728
033000 Cast In Place Concrete	\$3,274,098		\$46,825	\$3,320,923	
033001 Concrete Finishes	\$17,805			\$17,805	
039000 Precast Concrete	\$0			\$0	
DIV. 4 MASONRY		\$1,936,626		\$0	\$1,936,626
040001 Unit Masonry	\$1,936,626			\$1,936,626	
DIV. 5 METALS		\$4,971,506		\$0	\$4,971,506
050001 Miscellaneous & Ornamental Iron	\$829,708			\$829,708	
051200 Structural Steel Framing	\$4,141,798			\$4,141,798	
DIV. 6 WOODS, PLASTICS & COMPOSITES		\$2,405,900		\$0	\$2,405,900
061000 Rough Carpentry	\$767,881			\$767,881	
062000 Finish Carpentry	\$1,638,019			\$1,638,019	
DIV. 7 THERMAL & MOISTURE PROTECTION		\$3,566,982		\$0	\$3,566,982
070001 Waterproofing, Damproofing & Caulking	\$519,538			\$519,538	
070002 Roofing and Flashing	\$1,597,561			\$1,597,561	
072100 Insulation	\$474,868			\$474,868	
074200 Wall Panels	\$836,510			\$836,510	
078100 Applied Fireproofing	\$95,000			\$95,000	
078400 Firestopping	\$43,505			\$43,505	
DIV. 8 DOORS & WINDOWS		\$2,833,015		\$0	\$2,833,015
080001 Aluminum Windows	\$1,913,405			\$1,913,405	
080002 Glass and Glazing	\$364,410			\$364,410	
081100 Doors and Frames	\$226,200			\$226,200	
083100 Access Doors and Panels	\$10,000			\$10,000	
083323 Overhead Coiling Doors	\$61,300			\$61,300	
087100 Door Hardware	\$249,200			\$249,200	
089000 Louvers and Vents	\$8,500			\$8,500	
DIV. 9 FINISHES		\$5,102,035		\$0	\$5,102,035
090002 Tile	\$351,100			\$351,100	
090003 Acoustical Ceilings	\$580,890			\$580,890	
090005 Resilient Flooring	\$474,009			\$474,009	
090007 Painting	\$283,766			\$283,766	
092900 GWB, Lath and Plastering	\$3,005,910			\$3,005,910	
096400 Wood Flooring	\$24,720			\$24,720	
096466 Wood Athletic Flooring	\$205,160			\$205,160	
097233 Dry-Erase Wallcovering	\$0			\$0	
097500 Fluid Applied Flooring	\$66,880			\$66,880	
098414 Acoustic Panels	\$109,600			\$109,600	
DIV. 10 SPECIALTIES		\$296,043		\$0	\$296,043
101100 Markerboards	\$139,560			\$139,560	
101400 Signage	\$10,573			\$10,573	
102113 Toilet Compartments	\$68,000			\$68,000	
102228 Operable Partitions	\$24,360			\$24,360	
102813 Toilet Accessories	\$41,900			\$41,900	
104400 Fire Protection Specialties	\$11,650			\$11,650	
DIV. 11 EQUIPMENT		\$903,650		\$0	\$903,650
113100 Appliances	\$20,000			\$20,000	
114000 Foodservice Equipment	\$706,650			\$706,650	
115213 Projection Screens	\$12,000			\$12,000	
116100 Theatre Equipment	\$30,000			\$30,000	
116623 Gymnasium Equipment	\$135,000			\$135,000	
119000 Miscellaneous Equipment	\$0			\$0	
DIV. 12 FURNISHINGS		\$201,896		\$0	\$201,896
122400 Window Shades	\$175,896			\$175,896	
123000 Casework	\$0			\$0	
126613 Telescoping Bleachers	\$26,000			\$26,000	
DIV. 13 SPECIAL CONSTRUCTION		\$0		\$0	\$0
135000 Pre-engineered Building	\$0			\$0	
DIV. 14 CONVEYING SYSTEMS		\$255,000		\$0	\$255,000
142424 Elevators	\$255,000			\$255,000	



Oakdale Elementary School
Dedham, MA

27-Aug-24

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	BUILDING		SITework	TOTAL PROJECT	
	Subtotal	Total		Subtotal	Total
DIV. 21 FIRE SUPPRESSION		\$791,716		\$24,695	\$816,411
210000 Fire Suppression	\$791,716		\$24,695		\$816,411
DIV. 22 PLUMBING		\$2,434,273		\$0	\$2,434,273
220000 Plumbing	\$2,434,273				\$2,434,273
DIV. 23 HVAC		\$10,847,438		\$0	\$10,847,438
230000 HVAC	\$10,847,438				\$10,847,438
DIV. 26 ELECTRICAL		\$6,183,679		\$453,200	\$6,636,879
260000 Electrical Work	\$4,829,477		\$453,200		\$5,282,677
270000 Communications	\$745,138				\$745,138
280000 Electronic Safety and Security	\$609,064				\$609,064
DIV. 31 EARTHWORK		\$1,664,269		\$4,530,568	\$6,194,837
312000 Earthwork	\$1,664,269		\$3,539,397		\$5,203,666
311000 Site Preparation & Clearing	\$0		\$991,171		\$991,171
312500 Erosion Control	\$0				\$0
DIV. 32 EXTERIOR IMPROVEMENTS		\$0		\$4,557,757	\$4,557,757
320000 Paving, Curbing & Edging	\$0		\$3,127,751		\$3,127,751
321313 Site Concrete	\$0				\$0
321314 Exposed Aggregate Concrete Paving	\$0				\$0
321724 Signs	\$0				\$0
321816 Playground Protective Surfaces	\$0				\$0
325000 Site Improvements	\$0		\$314,170		\$314,170
325500 Synthetic Turf	\$0		\$560,700		\$560,700
323114 Fencing	\$0				\$0
323300 Segmental Retaining Wall	\$0				\$0
329800 Irrigation	\$0		\$21,522		\$21,522
329900 Landscaping	\$0		\$533,614		\$533,614
DIV. 33 UTILITIES		\$0		\$1,267,718	\$1,267,718
331000 Water Distribution	\$0		\$40,000		\$40,000
332313 Geothermal Wells	\$0				\$0
333000 Sanitary Sewerage	\$0		\$38,650		\$38,650
334000 Storm Drainage Systems	\$0		\$1,189,068		\$1,189,068
SUBTOTAL DIRECT (TRADE) COST		\$47,685,931		\$13,139,179	\$60,825,110



Oakdale Elementary School
Dedham, MA

27-Aug-24

Schematic Design Estimate

GSF

87,009

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM

SUB-TOTAL

\$/SF

A10 FOUNDATIONS

A1010	Standard Foundations	\$2,125,260	\$24.43
A1020	Special Foundations		
A1030	Lowest Floor Construction	\$1,998,879	\$22.97

B10 SUPERSTRUCTURE

B1010	Upper Floor Construction	\$2,138,429	\$24.58
B1020	Roof Construction	\$3,454,322	\$39.70

B20 EXTERIOR CLOSURE

B2010	Exterior Walls	\$3,946,303	\$45.36
B2020	Windows	\$1,870,765	\$21.50
B2030	Exterior Doors	\$120,271	\$1.38

B30 ROOFING

B3010	Roof Coverings	\$1,802,850	\$20.72
B3020	Roof Openings	\$11,311	\$0.13

C10 INTERIOR CONSTRUCTION

C1010	Partitions	\$2,409,665	\$27.69
C1020	Interior Doors	\$768,026	\$8.83
C1030	Specialties/Millwork	\$2,232,453	\$25.66

C20 STAIRCASES

C2010	Stair Construction	\$466,250	\$5.36
C2020	Stair Finishes	\$35,490	\$0.41

C30 INTERIOR FINISHES

C3010	Wall Finishes	\$532,256	\$6.12
C3020	Floor Finishes	\$864,664	\$9.94
C3030	Ceiling Finishes	\$1,126,685	\$12.95

D10 CONVEYING SYSTEMS



Oakdale Elementary School
Dedham, MA

27-Aug-24

Schematic Design Estimate

GSF

87,009

CONSTRUCTION COST SUMMARY

BUILDING SYSTEM

SUB-TOTAL

\$/SF

D1010 Elevator \$256,900 \$2.95

D20 PLUMBING

D20 Plumbing \$2,434,273 \$27.98

D30 HVAC

D30 HVAC \$11,009,938 \$126.54

D40 FIRE PROTECTION

D40 Fire Protection \$791,716 \$9.10

D50 ELECTRICAL

D5010 Complete System \$6,183,679 \$71.07

E10 EQUIPMENT

E10 Equipment \$929,650 \$10.68

E20 FURNISHINGS

E2010 Fixed Furnishings \$175,896 \$2.02

E2020 Movable Furnishings

F20 SELECTIVE BUILDING DEMOLITION

F2010 Building Elements Demolition

TOTAL DIRECT COST (Trade Costs)

\$47,685,931

\$548.06



Schematic Design Estimate

GFA 87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
----------	-------------	-----	------	-----------	-----------	-----------	------------

NEW CONSTRUCTION

GROSS FLOOR AREA CALCULATION

Floor 0	4,032
Floor 1	51,634
Floor 2	31,267
Roof	76

TOTAL GROSS FLOOR AREA (GFA)						87,009 sf
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A10 FOUNDATIONS

A1010 STANDARD FOUNDATIONS

033000 CONCRETE

Strip Footings/Grade Beams	341	CY
Foundation Walls	558	CY
Spread Footings	573	CY
Piers	59	CY
Total Foundation Concrete	<u>1,531</u>	CY

Strip footings

Formwork	3,783	sf	20.00	75,660
Re-bar, 80 #/cy	17,680	lbs.	2.00	35,360
Concrete material	221	cy	155.00	34,255
Placing concrete	221	cy	120.00	26,520

Retaining wall footings

Formwork	728	sf	20.00	14,560
Re-bar, 80 #/cy	6,720	lbs.	2.00	13,440
Concrete material 5000 psi	42	cy	155.00	6,510
Placing concrete	42	cy	120.00	5,040

Grade Beams, allow 500 LF

Formwork	2,000	sf	20.00	40,000
Re-bar, 300 #/cy	23,400	lbs.	2.00	46,800
Concrete material	78	cy	155.00	12,090
Placing concrete	78	cy	120.00	9,360

Foundation walls

Formwork	10,185	sf	22.00	224,070
Re-bar, 100 #/cy	29,700	lbs.	2.00	59,400
Concrete material	297	cy	155.00	46,035
Placing concrete	297	cy	120.00	35,640
Form shelf	1,455	lf	10.00	14,550

Retaining walls

Formwork	8,960	sf	25.00	224,000
Re-bar, 300 #/cy	78,300	lbs.	2.00	156,600
Concrete material	261	cy	155.00	40,455
Placing concrete	261	cy	120.00	31,320

Spread Footings

Formwork	7,772	sf	22.00	170,984
Re-bar	42,959	lbs.	2.00	85,918
Concrete material	573	cy	155.00	88,815
Placing concrete	573	cy	120.00	68,760
Set anchor bolts grout plates	127	ea	225.00	28,575

Piers/Pilasters

Formwork	1,524	sf	26.00	39,624
Re-bar, 300 #/cy	17,700	lbs.	2.00	35,400
Concrete material	59	cy	155.00	9,145
Placing concrete	59	cy	120.00	7,080

070001 WATERPROOFING, DAMPPROOFING AND CAULKING

Dampproofing at brick shelf	8,730	sf	3.00	26,190
Waterproofing to retaining wall	1,680	sf	12.00	20,160
Waterproofing at elevator pits	360	sf	20.00	7,200

072100 THERMAL INSULATION



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
----------	-------------	-----	------	-----------	-----------	-----------	------------

NEW CONSTRUCTION

55	Insulation at foundation wall	9,573	sf	3.50	33,506		
56							
57	312000 EARTHWORK						
58	Strip Footings/Grade Beams						
59	Excavation	3,603	cy	16.00	57,648		
60	Store onsite	3,603	cy	8.00	28,824		
61	Backfill with existing material	2,704	cy	18.00	48,672		
62	Spread footings						
63	Excavation	3,054	cy	16.00	48,864		
64	Store onsite	3,054	cy	8.00	24,432		
65	Backfill with existing material	2,481	cy	18.00	44,658		
66	Miscellaneous						
67	Gravel fill beneath footings	1,105	cy	60.00	66,300		
68	Perimeter drain, at retaining wall only	280	lf	28.00	7,840		
69	Temporary dewatering for foundation work	1	ls	25,000.00	25,000		
70	SUBTOTAL					2,125,260	

A1020 SPECIAL FOUNDATIONS

No work in this section
SUBTOTAL

A1030 LOWEST FLOOR CONSTRUCTION

77							
78	033000 CONCRETE						
79	Slab on grade	51,634	sf				
80	Vapor barrier at slab on grade	51,634	sf	1.25	64,543		
81	WWF reinforcement	59,379	sf	1.80	106,882		
82	Concrete - 5" thick	1,004	cy	155.00	155,620		
83	Placing concrete	1,004	cy	120.00	120,480		
84	Finishing and curing concrete	51,634	sf	3.00	154,902		
85	Allowance for slab depressions at entries, first floor toilets and Gym	1	ls	5,000.00	5,000		
86	Miscellaneous						
87	Equipment pads	1	ls	10,000.00	10,000		
88	Radon system	51,634	sf	3.00	NR		
89	Loading dock						
90	Loading dock slab	470	sf	15.00	7,050		
91	Steps	24	lf	125.00	3,000		
92	Wall & footing	64	lf	643.00	41,152		
93							
94	072100 THERMAL INSULATION						
95	Slab insulation, 2" thick	51,634	sf	3.50	180,719		
96							
97	312000 EARTHWORK						
98	Cut - over excavated 3' of fill beneath building	6,200	cy	20.00	124,000		
99	Cut - mostly mechanical room excavation	4,072	cy	20.00	81,440		
100	Import structural - 25% swell	4,500	cy	58.00	261,000		
101	312000 SOIL DISPOSAL - conversion factor 1.7 to tons						
102	Load excess soils for disposal	10,272	cy	2.50	25,680		
103	Less than RCS-1 - clean non-regulated	17,462	tn	25.00	436,550		
104	Gravel base, 12"	1,912	cy	48.00	91,776		
105	Compact existing sub-grade	51,634	sf	1.00	51,634		
106	Under slab E&B for plumbing	51,634	sf	1.50	77,451		
107	SUBTOTAL					1,998,879	

TOTAL - FOUNDATIONS

\$4,124,139

A20 BASEMENT CONSTRUCTION

A2010 BASEMENT EXCAVATION



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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

115 No Work in this section
116 SUBTOTAL

117
118 **A2020 BASEMENT WALLS**
119 No Work in this section
120

TOTAL - BASEMENT CONSTRUCTION							
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B10 SUPERSTRUCTURE							
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121
122
123
124
125
126
127 **B1010 FLOOR CONSTRUCTION**

15.1 lbs/sf
659 tns including roof screens and canopies
\$6,270 \$/Ton

131 033000 CONCRETE

132 WWF reinforcement 40,681 sf 1.80 73,226
133 Concrete fill to metal deck; 3-1/2" normal weight, total thickness 6 746 cy 160.00 119,360
1/2"
134 Place and finish concrete 35,375 sf 3.50 123,813
135 Rebar to decks 10,613 lbs 2.00 21,226

136 051200 STRUCTURAL STEEL FRAMING

137 Steel floor framing, columns and lateral bracing;
138 Floor framing 12 psf 24 tns 5,200.00 124,800
139 Floor framing 15 psf 235 tns 5,200.00 1,222,000
140 Brick relief/bent plate, 40 plf L2 29 tns 5,200.00 150,800
141 Shear studs 8,844 ea 3.50 30,954
142 3" metal floor deck 35,375 sf 6.00 212,250
143 Allowance for expansion joint 1 ls 10,000.00 10,000

144 078100 FIREPROOFING/FIRESTOPPING

145 Fire proofing; allowance 1 ls 15,000.00 15,000
146 Intumescent allowance 1 ls 35,000.00 35,000
147
148
149 SUBTOTAL 2,138,429

150
151 **B1020 ROOF CONSTRUCTION**

152 033000 CONCRETE

153 WWF reinforcement 59,679 sf 1.80 107,422
154 Concrete fill to metal deck; 3-1/2" normal weight, total thickness 6 1,093 cy 160.00 174,880
1/2"
155 Place and finish concrete 37,768 sf 3.50 132,188
156 Rebar to decks 15,569 lbs 2.00 31,138

157 051200 STRUCTURAL STEEL FRAMING

158 Steel roof framing, columns and lateral bracing;
159 Roof framing 13 psf at typical roof 300 tns 5,200.00 1,560,000
160 Bent plate at roof edge 42 tns 5,200.00 218,400
161 Steel at timber frames areas, tension tie rods, allow 5,727 sf 5.00 28,635
162 Allowance for additional miscellaneous steel angles, plates etc. assume included in lbs/sf tns
163 Shear studs 12,974 ea 3.50 45,409
164 3" metal roof deck 51,895 sf 6.00 311,370
165 Premium for 3" acoustic deck at gymnasium 8,400 sf 7.00 58,800
166 3" metal roof deck at canopies 530 sf 6.00 3,180
167 Canopies, 20 lbs/sf 5 tns 5,200.00 26,000
168 Parapets, 60 lb/ft NR
169 Screen walls galvanized steel framing, 12 psf 17 tn 5,800.00 98,600
170 Dunnage, allow 7 tns 5,800.00 40,600
171
172
173



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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

174	061000	GLULAM FRAMING					
175		Glue laminated timber framing					
176		Cafeteria, leaf like structure; beams and columns	3,430	sf	100.00	343,000	
177		Media, tree like structure; beams and columns	2,297	sf	100.00	229,700	
178							
179	078100	FIREPROOFING/FIRESTOPPING					
180		Intumescent paint, allow	1	ls	30,000.00	30,000	
181		Fireproofing; allowance	1	ls	15,000.00	15,000	
182		SUBTOTAL					3,454,322

TOTAL - SUPERSTRUCTURE							\$5,592,751
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B20	EXTERIOR CLOSURE	41,487	sf				
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B2010	EXTERIOR WALLS	33,009	sf	Total Exterior Closure			
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190	040001	MASONRY					
192		Brick veneer; 4 x 12 and 8 x 8 ironspot w/ custom scores, standard colors	30,151	sf	50.00	1,507,550	
193		Detailing	30,151	sf	6.00	Included	
194		Gym back up wall, 12"; grouted & reinforced	7,770	sf	42.00	326,340	
195		Staging/Lifts to exterior wall				Included	
196							
197	055000	MISCELLANOUS METALS					
198		Miscellaneous metals to exterior; lintels, etc.	37,921	sf	1.00	37,921	
199		Relieving angles				w/ structure	
200							
201	070001	WATERPROOFING, DAMPPROOFING AND CAULKING					
202		Air barrier, fluid applied	35,137	sf	8.00	281,096	
203		Air barrier @ overhangs/soffits	1,135	sf	9.00	10,215	
204		Miscellaneous sealants to closure	35,137	sf	0.50	17,569	
205							
206	072100	THERMAL INSULATION					
207		R22 high density mineral fiber board insulation	29,951	sf	6.00	179,706	
208		R22 high density mineral fiber board insulation 5" at phenolic	4,986	sf	6.00	29,916	
209		Spray foam at perimeter deck flutes	1	ls	25,000.00	25,000	
210		Insulation @ soffits	1,135	sf	5.00	5,675	
211		Insulation at window openings	3,391	lf	6.00	20,346	
212							
213	074213	WALL PANELS					
214		Phenolic panels	2,658	sf	110.00	292,380	
215		Phenolic panels - fins at Cafeteria overhang	2,328	sf	110.00	256,080	
216		Metal panel	200	sf	110.00	22,000	
217		EIFS at soffits - canopies and overhang	1,135	sf	30.00	34,050	
218		Roof screen, 10'	2,900	sf	80.00	232,000	
219							
220	092900	GYP SUM BOARD ASSEMBLIES					
221		6" metal stud backup, typical	25,239	sf	14.00	353,346	
222		Gypsum Sheathing	25,239	sf	3.50	88,337	
223		Drywall lining to interior face of stud backup	25,239	sf	4.00	100,956	
224		Framing at phenolic fins	2,328	sf	40.00	93,120	
225		Framing at soffits	1,135	sf	20.00	22,700	
226							
227	101400	SIGNAGE					
228		Signage	1	ls	10,000.00	10,000	
229		SUBTOTAL					3,946,303

B2020	WINDOWS	8,478	sf				
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092900	GYP SUM BOARD ASSEMBLIES						
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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST	
NEW CONSTRUCTION								
234	Wood blocking at openings	3,391	lf	14.00	47,474			
235								
236	079200 JOINT SEALANTS							
237	Backer rod & double sealant	3,391	lf	12.00	40,692			
238	Air barrier/flashing at windows	3,391	lf	6.25	21,194			
239								
240	080001 METAL WINDOWS							
241	Windows/Storefront; triple glazed	4,396	sf	160.00	703,360			
242	Curtainwall; triple glazed	4,082	sf	200.00	816,400			
243	Premium for schoolguard glazing to 8', allow	4,239	sf	55.00	233,145			
244								
245	089100 LOUVERS							
246	Louvers - allowance	100	sf	85.00	8,500			
247	SUBTOTAL					1,870,765		
248								
249	B2030 EXTERIOR DOORS							
250								
251	061000 ROUGH CARPENTRY							
252	Wood blocking at openings	117	lf	4.00	468			
253								
254	079200 JOINT SEALANTS							
255	Backer rod & double sealant	117	lf	9.00	1,053			
256								
257	081113 HOLLOW METAL DOORS & FRAMES							
258	HM doors and frames single	1	ea	950.00	950			
259	HM doors and frames double	5	pr	1,500.00	7,500			
260								
261	084110 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS							
262	Glazed entrance doors including frame and hardware; single door, double glazed	1	ea	7,500.00	7,500			
263	Glazed entrance doors including frame and hardware; double door, double glazed	5	pr	15,000.00	75,000			
264								
265	087100 DOOR HARDWARE							
266	Hardware	11	leaf	1,800.00	19,800			
267	Automatic opener	1	pr	8,000.00	8,000			
268	SUBTOTAL					120,271		
269								
270	TOTAL - EXTERIOR CLOSURE						\$5,937,339	
271								
272								
273	B30 ROOFING							
274								
275	B3010 ROOF COVERINGS							
276								
277	055000 MISC. METALS							
278	Roof ladders	2	ea	5,000.00	10,000			
279	Expansion joint cover	1	ls	20,000.00	20,000			
280	Tie-off davits				NR			
281	Free standing sunshade	400	sf	250.00	100,000			
282								
283	061000 ROUGH CARPENTRY							
284	Rough blocking at roofing	8,660	lf	10.00	86,600			
285								
286	070002 ROOFING AND FLASHING	52,425	total area					
287	Flat roof; PVC roof membrane system, 60 mil, coverboard, vapor retarder, tapered insulation	52,425	sf	26.00	1,363,050			
288	<u>Miscellaneous Roofing</u>							
289	Roof edge/fascia, painted aluminum	2,165	lf	80.00	173,200			
290	Walkway pads	5,000	sf	10.00	50,000			
291	SUBTOTAL					1,802,850		
292								
293	B3020 ROOF OPENINGS							
294	Dome skylight, 6' diameter	2	ea	5,655.60	11,311			



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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

295 SUBTOTAL 11,311

296 **TOTAL - ROOFING \$1,814,161**

300 **C10 INTERIOR CONSTRUCTION**

302 **C1010 PARTITIONS**

303 040001 MASONRY

304 Brick at vestibules 200 sf 50.00 10,000

305 Elevator shaft, 8" 2,576 sf 36.00 92,736

307 050001 MISCELLANEOUS METALS

308 Seismic clips to CMU 48 ea 200.00 9,600

309 Miscellaneous masonry accessories to interior CMU 2,576 sf 2.50 6,440

310 Support framing at operable partitions 14 lf 130.00 1,820

312 061000 ROUGH CARPENTRY

313 Blocking at partitions 80,739 sf 0.75 60,554

314 Wood blocking at interiors including at doors 87,009 gsf 0.30 26,103

315 Backer panels in electrical closets 1 ls 10,000.00 10,000

317 078400 FIREPROOFING/FIRESTOPPING

318 Fire stopping including slab edges and core 87,009 gsf 0.50 43,505

320 080002 GLASS AND GLAZING

321 2,252 total sf interior glazing

322 Teacher planning butt glazing, gradiated pattern 1,095 sf 110.00 120,450

323 Remainder of school butt glazing 585 sf 85.00 49,725

324 Glazed partition with plam fins at classrooms 425 sf 135.00 57,375

325 Vestibule storefront 147 sf 100.00 14,700

326 092900 GYPSUM BOARD ASSEMBLIES

327 80,739 SF

328 Standard partition 29,670 sf 19.50 578,565

329 Demising wall 12,005 sf 24.00 288,120

330 Corridor partition 20,960 sf 21.75 455,880

331 Stair 4,450 sf 28.00 124,600

332 Shaftwall 1,440 sf 28.00 40,320

333 Gym/stage 2,180 sf 26.00 56,680

334 Plumbing 6,020 sf 21.00 126,420

335 Curved GWB - one sided 2,082 sf 16.75 34,874

336 Furring at elevator shaft 1,932 sf 10.75 20,769

337 IR drywall to 8' 46,040 sf 1.50 69,060

338 Misc GWB assemblies 87,009 sf 1.00 87,009

339 102228 OPERABLE PARTITIONS

340 Operable partition at science classroom 168 sf 145.00 24,360

342 SUBTOTAL 2,409,665

344 **C1020 INTERIOR DOORS**

345 061000 ROUGH CARPENTRY

346 Wood blocking at openings 2,864 lf 4.00 11,456

348 070001 WATERPROOFING, DAMPPROOFING AND CAULKING

349 Backer rod & double sealant 2,864 lf 2.50 7,160

351 080002 GLASS AND GLAZING

352 Premium for full lite 1,452 sf 80.00 116,160

353 Premium for narrow lite panel 75 sf 80.00 6,000

355 081113 DOORS AND FRAMES

356 Single 132 ea 450.00 59,400

357 Double 31 ea 600.00 18,600

358 Flush door 58 lvs 590.00 34,220

359 Door with full glass panel 121 lvs 630.00 76,230



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NEW CONSTRUCTION							
361	Door with narrow lite	15	lvs	620.00	9,300		
362	STC rated doors, fire rated doors, acoustic seals at doors etc. - allowance	1	ls	20,000.00	20,000		
363							
364	083100 ACCESS DOORS AND FRAMES						
365	Access doors	1	ls	10,000.00	10,000		
366							
367	083300 OVERHEAD DOOR						
368	Grille at kitchen, allow	1	ls	40,000.00	40,000		
369	Grille at main office	140	sf	120.00	16,800		
370	Grille at dish drop	1	ea	4,500.00	4,500		
371							
372	084110 ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS						
373	Glazed aluminum doors including frame and hardware						
374	Double leaf	3	pr	12,000.00	36,000		
375	Single leaf	7	ea	6,000.00	42,000		
376	Stairs - fire rated						NR
377							
378	087100 DOOR HARDWARE						
379	Hardware	194	leaf	1,100.00	213,400		
380	Automatic opener	1	pr	8,000.00	8,000		
381							
382	090009 PAINTING						
383	Paint doors and frames	194	ea	200.00	38,800		
384	SUBTOTAL						768,026
385							
386	C1030 SPECIALTIES / MILLWORK						
387							
388	055000 MISCELLANEOUS METALS						
389	Miscellaneous metals complete	87,009	gsf	3.00	261,027		
390	Guardrails for open to below areas	85	lf	600.00	51,000		
391							
392	064100 FINISH CARPENTRY						
393	Window sill, plastic laminate	750	lf	50.00	37,500		
394	Single layer 3/4" P'lam w/ hardwood top marker tray and bottom edge	2,808	lf	110.00	NR		
395	3/4" MDF bumper rail w/ finished edges 18" at corridor	1,280	sf	40.00	51,200		
396	Marker tray/bumper - 3/4" MDF w/ hd wd top marker tray and btm edge at classrooms and science	2,764	sf	50.00	138,200		
397	Cantilevered bench, 48" outside classrooms		lf	500.00	NR		
398	Grades 1 & 2 - Plastic laminate cubbies; 36" x 15" x 12" slg tier	98	ea	500.00	49,000		
399	Grades 3 & 4 - Plastic laminate cubbies; 36" x 15" x 12" dbl tier	500	ope	300.00	150,000		
400	P'lam angled sides and back at cubbies	1,206	lf	90.00	108,540		
401	Corridor locker base	460	lf	45.00	20,700		
402	Reception desk	1	ls	35,200.00	35,200		
403	Mail slots at main office	1	ls	15,000.00	15,000		
404	Solid surface vanities at gang bathrooms	135	lf	250.00	33,750		
405	Handrails at steps/ramps	130	lf	150.00	19,500		
406	Cafeteria/Kitchen counter	33	lf	500.00	16,500		
407	Media desk, allow	130	lf	900.00	117,000		
408	Media center casework	1	ls	50,000.00	50,000		
409	<u>Art</u>						
410	Base cabinet with epoxy countertop	9	lf	550.00	4,950		
411	Wall cabinets	9	lf	300.00	2,700		
412	<u>Cafeteria</u>						
413	Wall hung countertop	10	lf	200.00	2,000		
414	<u>Classrooms</u>	25	rms				
415	Plam counter with edge and backsplash	550	lf	230.00	126,500		
416	Shelving @ ext wall and above sink, 4 adjustable shelves - see notes	425	lf	300.00	127,500		
417	Shelf jamb angled light reflector panel	200	lf	100.00	20,000		
418	Mobile base storage with counter; 36" wide	130	loc	1,500.00	195,000		



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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

419	<u>Copy</u>						
420	Base cabinets w/ plam counter	22	lf	450.00	9,900		
421	Upper cabinets & adjustable shelving	22	lf	300.00	6,600		
422	<u>Makerspace</u>						
423	Base cabinet with epoxy countertop	9	lf	550.00	4,950		
424	Upper cabinets	9	lf	300.00	2,700		
425	<u>Music</u>						
426	Wall hung countertop	10	lf	200.00	2,000		
427	<u>Office - Nurse</u>						
428	Base cab w/ plam counter	24	lf	450.00	10,800		
429	Upper cabinets & adjustable shelving	22	lf	300.00	6,600		
430	<u>Office - Principal</u>						
431	Base cab w/ plam counter	10	lf	450.00	4,500		
432	Upper cabinets & adjustable shelving	22	lf	300.00	6,600		
433	<u>Staff dining</u>						
434	Base cabinet with plam countertop	15	lf	450.00	6,750		
435	Upper cabinets	15	lf	300.00	4,500		
436	<u>Science</u>						
437	24" solid epoxy backsplash at science	91	sf	30.00	2,730		
438	Base cabinet with epoxy countertop	27	lf	550.00	14,850		
439	Epoxy countertop	40	lf	300.00	12,000		
440	Casework not yet defined	87,009	sf	1.50	130,514		
441	Display cases	1	ls	25,000.00	25,000		
442							
443	070001 WATERPROOFING, DAMPPROOFING AND CAULKING						
444	Miscellaneous sealants throughout building	87,009	gsf	1.00	87,009		
445							
446	101100 VISUAL DISPLAY SURFACES						
447	Tack surfaces above cubbies and at admin area backsplashes	716	sf	30.00	21,480		
448	Glass magnetic markerboards at classrooms and science	2,952	sf	40.00	118,080		
449							
450	101400 SIGNAGE						
451	Signage; complete package	716	gsf	0.80	573		
452							
453	102110 TOILET COMPARTMENTS						
454	Phenolic Compartments						
455	ADA	8	ea	2,000.00	16,000		
456	Standard	32	ea	1,600.00	51,200		
457	Privacy curtain and track at exam	16	lf	50.00	800		
458							
459	102800 TOILET ACCESSORIES						
460	Gang bathroom	8	rms	3,000.00	24,000		
461	Single bathroom	15	rms	900.00	13,500		
462	Shower accessories	4	ea	800.00	3,200		
463	Janitors Closet Accessories	2	rms	600.00	1,200		
464							
465	104400 FIRE PROTECTION SPECIALTIES						
466	Fire extinguisher cabinets	29	ea	350.00	10,150		
467	AED cabinets	1	ls	1,500.00	1,500		
468	SUBTOTAL					2,232,453	
469							
470	TOTAL - INTERIOR CONSTRUCTION						\$5,410,144
471							
472							
473	C20 STAIRCASES						
474							
475	C2010 STAIR CONSTRUCTION						
476							
477	033000 CONCRETE						
478	Concrete to stairs	4	flt	5,000.00	20,000		
479	Precast treads at central monumental and corridor ends	465	lf	250.00	116,250		



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NEW CONSTRUCTION

480	055000	MISCELLANEOUS METALS					
481		Egress Stairs	4	flt	45,000.00	180,000	
482		Monumental stairs; 6'-0" wide	2	flt	75,000.00	150,000	
483		SUBTOTAL					466,250
484							
485							
486	C2020	STAIR FINISHES					
487	090005	RESILIENT FLOORS					
488		Rubber to treads and risers at non precast treads	414	lfr	35.00	14,490	
489							
490	090007	PAINTING					
491		Paint to staircases	6	flt	3,500.00	21,000	
492		SUBTOTAL					35,490
493							
494							
495		TOTAL - STAIRCASES					\$501,740

C30 INTERIOR FINISHES

496							
497							
498							
499	C3010	WALL FINISHES					
500							
501	064000	INTERIOR ARCHITECTURAL WOODWORK					
502		Plastic laminate panels at stage	75	sf	60.00	4,500	
503		Plastic laminate panels at classroom	336	sf	60.00	20,160	
504		FRP at kitchen	775	sf	15.00	11,625	
505							
506	090002	TILE					
507		Ceramic tile, 98" high					
508		Bathrooms	7,785	sf	32.00	249,120	
509		Drinking fountains	300	sf	38.00	11,400	
510							
511	098413	SOUND ABSORBING PANELS					
512		Tectum					
513		Gymnasium	1,800	sf	22.00	39,600	
514		Fabric wrapped panels					
515		Music room	500	sf	40.00	20,000	
516		Lobby	500	sf	40.00	20,000	
517		Media center	250	sf	40.00	10,000	
518		Cafeteria, allow	500	sf	40.00	20,000	
519							
520	090009	PAINTING					
521		Paint to GWB	163,137	sf	0.70	114,196	
522		Paint to CMU	7,770	sf	1.50	11,655	
523		SUBTOTAL					532,256
524							
525							
526	C3020	FLOOR FINISHES					
527							
528	033000	CONCRETE					
529		Sealed Concrete (Back of House)	5,935	sf	3.00	17,805	
530							
531	090002	TILE					
532		Quarry Tile (Kitchen)	2,015	sf	42.00	84,630	
533		Quarry Tile Base (Kitchen)	175	lf	34.00	5,950	
534							
535	096700	SOLID EPOXY					
536		Solid epoxy w/ integral base	3,040	sf	22.00	66,880	
537							
538	090005	RESILIENT FLOORS					
539		VCT Running Bond	63,899	sf	6.00	383,394	
540		VCT w/ Schuler Edge Base; 12"	4,200	lf	10.00	42,000	
541		VCT Base; 6"	11,375	lf	3.00	34,125	
542							
543	096400	WOOD FLOORING					
544		Wood Stage	1,030	sf	24.00	24,720	
545		Wood Athletic Flooring	6,740	sf	30.00	202,200	
546		Vented Base (Gym)	370	lf	8.00	2,960	
547		SUBTOTAL					864,664



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NEW CONSTRUCTION

548								
549	C3030 CEILING FINISHES							
550								
551	064000 INTERIOR ARCHITECTURAL WOODWORK							
552	Stage reflector at proscenium	1	ls	30,000.00	30,000			
553								
554	092900 GYPSUM BOARD ASSEMBLIES							
555	GWB Ceilings, bathrooms	3,040	sf	17.00	51,680			
556	Summer Beam Light Cove & Ceiling Return; 4' x 6"	525	lf	150.00	78,750			
557	Miscellaneous soffits	1	ls	100,000.00	100,000			
558	Staging	1	ls	125,000.00	125,000			
559								
560	095100 ACOUSTICAL TILE							
561	ACT - Running Bond	54,244	sf	7.50	406,830			
562	Premium for angled Soffits, 5'	6,225	sf	10.00	62,250			
563	ACT - Back of House	5,890	sf	6.00	35,340			
564	Washable ACT - (Kitchen)	2,415	sf	8.00	19,320			
565	3D Metal Panel (Music Room)	1,130	sf	30.00	33,900			
566	Suspended acoustical panels at cafeteria	1,710	sf	50.00	85,500			
567								
568	090009 PAINTING							
569	Exposed Deck	30,283	sf	3.00	90,849			
570	Paint to GWB ceilings	3,565	sf	1.10	3,922			
571	Premium for high performance paint at bathrooms	3,040	sf	1.10	3,344			
572	SUBTOTAL						1,126,685	
573								
574	TOTAL - INTERIOR FINISHES							\$2,523,605

D10 CONVEYING SYSTEMS

577								
578								
579	D1010 ELEVATOR							
580								
581	055000 MISCELLANEOUS METALS							
582	Pit ladder and miscellaneous metals	1	ea	900.00	900			
583	Sill angles	40	lf	25.00	1,000			
584								
585	142000 ELEVATOR							
586	Elevator, 3 stop	1	ea	255,000.00	255,000			
587	SUBTOTAL						256,900	
588								
589	TOTAL - CONVEYING SYSTEMS							\$256,900

D20 PLUMBING

591							
592							
593							
594	D20 PLUMBING						
595	<u>Equipment</u>						
596	Reduced pressure backflow preventer, main	1	ea	6,500.00	6,500		
597	Water meter assembly	1	ea	3,500.00	3,500		
598	Triplex Water Booster Pump	1	ea	65,000.00	65,000		
599	Expansion tank	1	ea	2,500.00	2,500		
600	Air separator	1	ea	3,500.00	3,500		
601	Thermal mixing valve	1	ea	2,500.00	2,500		
602	Hot water recirculation pump	1	ea	2,800.00	2,800		
603	POU Instantaneous electric water heater - gang bathroom	8	ea	2,500.00	20,000		
604	POU Instantaneous electric water heater - Individual or double fixtures	78	ea	900.00	70,200		
605	Sub Metering	3	ea	2,500.00	7,500		
606	Kitchen water electric, 50kW with 120 gallons storage	1	ea	25,000.00	25,000		
607	Interior grease interceptor	1	ea	8,000.00	8,000		
608	Exterior grease interceptor, 5,000 Gal (Division 33)	1	ea	35,000.00	35,000		
609	Elevator pit sump pump with oil separator	1	ea	5,500.00	5,500		



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
NEW CONSTRUCTION							
610	Roof drain	20	ea	2,200.00	44,000		
611	Overflow roof drain	20	ea	2,200.00	44,000		
612	Floor drain	20	ea	1,800.00	36,000		
613	Kitchen floor drain	4	ea	1,800.00	7,200		
614	Kitchen floor sink	4	ea	2,400.00	9,600		
615	Hose bibb, allow	10	ea	500.00	5,000		
616	Freezeproof hose bibb, allow	8	ea	850.00	6,800		
617	Rough-in & connection to kitchen equipment	1	ls	25,000.00	25,000		
618	Miscellaneous plumbing equipment	87,009	sf	0.50	43,505		
619	<u>Plumbing Fixtures & Specialties</u>						
620	Water closet	55	ea	2,400.00	132,000		
621	Lavatory wall hung	14	ea	2,250.00	31,500		
622	Lavatory drop in	40	ea	2,250.00	90,000		
623	Classroom sink	48	ea	2,125.00	102,000		
624	Music room sink	2	ea	2,125.00	4,250		
625	Cafeteria sink	2	ea	2,125.00	4,250		
626	Classroom Sink - Art Room w/solids interceptor	2	ea	2,725.00	5,450		
627	Classroom Sink - Maker Space	2	ea	2,125.00	4,250		
628	Kitchenette - Staff Dining	1	ea	2,200.00	2,200		
629	Shower	4	ea	3,800.00	15,200		
630	Nurses Sink	1	ea	2,600.00	2,600		
631	Janitors Closet	4	ea	2,200.00	8,800		
632	Drinking fountain	4	ea	4,000.00	16,000		
633	Safety Shower/Eyewash	2	ea	2,200.00	4,400		
634	Dishwasher connection - assumed at Kitchenette sink	1	ea	500.00	500		
635	Coffee machine connection - assumed at Kitchenette sink	1	ea	500.00	500		
636	Refrigerant connection - assumed at Kitchenette sink	1	ea	500.00	500		
637	Misc. plumbing fixtures	87,009	sf	0.25	21,752		
638	<u>Domestic Water</u>						
639	Copper pipe type L w/fittings & hangers	8,280	lf	60.00	496,800		
640	Valves & accessories	1	ls	84,456.00	84,456		
641	<u>Pipe Insulation</u>						
642	Domestic water pipe insulation	8,280	lf	10.00	82,800		
643	<u>Sanitary Waste</u>						
644	Sanitary W&V UG, SV Cast Iron Pipe	800	lf	48.00	38,400		
645	Sanitary W&V AG, Hubless Cast Iron Pipe	6,265	lf	55.00	344,575		
646	<u>Grease Waste</u>						
647	Grease W&V UG, SV Cast Iron Pipe	400	lf	48.00	19,200		
648	Grease W&V AG, Hubless Cast Iron Pipe	200	lf	55.00	11,000		
649	<u>Storm Water</u>						
650	Storm Drainage UG, SV Cast Iron Pipe	87,009	sf	0.50	43,505		
651	Storm Drainage AG, Hubless Cast Iron Pipe	87,009	sf	1.50	130,514		
652	Pipe insulation on horizontal runs	87,009	sf	0.20	17,402		
653	Secondary Storm Drainage AG, Hubless Cast Iron Pipe	87,009	sf	1.00	87,009		
654	Secondary Pipe insulation on horizontal runs	87,009	sf	0.20	17,402		
655	<u>Natural Gas Piping</u>						
656	Natural Gas Piping				Not Required		
657	<u>Miscellaneous</u>						
658	Coordination & BIM	1	ls	69,607.20	69,607		
659	Coring, sleeves & fire stopping	1	ls	6,960.72	6,961		
660	Hydraulic lifts/rigging	1	ls	21,752.25	21,752		
661	Commissioning support	1	ls	6,200.00	6,200		
662	Testing and sterilization	1	ls	7,830.81	7,831		
663	Fees & permits	1	ls	24,101.71	24,102		
664	SUBTOTAL					2,434,273	
665							



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

666	TOTAL - PLUMBING						\$2,434,273
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667							
668							
669	D30 HVAC						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
670							
671	D30 HVAC						
672	Geothermal Heating and Cooling Plant:						
673	Closed loop type quad-loop ground source geothermal wells, 600ft deep (4 ton per well)	50	ea	50,000.00	2,500,000		
674	Vault and main distribution				Assume Not Required		
675	Modular ground water source to water simultaneous heating/cooling heat pump chillers with heat recovery, 6 x 50 ton modules	300	tons	2,600.00	780,000		
676	Chilled water pumps	2	ea	25,000.00	50,000		
677	Hot water pumps	2	ea	25,000.00	50,000		
678	Geothermal water pumps	2	ea	25,000.00	50,000		
679	Expansion tanks	3	ea	4,200.00	12,600		
680	Air separators	3	ea	3,500.00	10,500		
681	Glycol feeder	2	ea	3,800.00	7,600		
682	Heat exchanger	1	ea	15,000.00	15,000		
683	Radiant heating/cooling/perimeter	87,009	gsf	3.00	261,027		
684	Unit heaters and cabinet heaters	12	ea	1,800.00	21,600		
685	Split systems	3	ea	8,500.00	25,500		
686	Misc. Mech equipment	87,009	gsf	1.00	87,009		
687	<u>Air Distribution</u>						
688	ERV/RTU-1,2,3: Classrooms including SPED, Music, Art, Teacher Support, Cohort Commons, Circulation Areas; w/HW Coil, CW Coil & ERW, 30,000 CFM (Average 10,000 CFM each)	30,000	cfm	28.00	840,000		
689	ERV/RTU-4: Administration, Media Center and Adjacent Lobby Circulation Areas; w/HW Coil, CW Coil & ERU, 9,000 CFM.	9,000	cfm	28.00	252,000		
690	ERV/RTU-5: Cafeteria & Quiet Dining; w/HW Coil, CW Coil & ERW, 8,200 CFM	8,200	cfm	28.00	229,600		
691	RTU-6: Gym & Stage; w/HW Coil, CW Coil & ERW, 13,000 CFM	13,000	cfm	28.00	364,000		
692	ERV/RTU-7 Kitchen & Custodial/Support; w/HW Coil, CW Coil & ERW 2,500 CFM	2,500	cfm	28.00	70,000		
693	MUA-1: Kitchen Make-up air unit exhaust Fan and Dishwasher Exhaust Fan; 5,000 CFM.	5,000	cfm	23.00	115,000		
694	Misc. Mech Exhaust Fans	87,009	gsf	1.00	87,009		
695	<u>Sheet metal & Accessories</u>						
696	Galvanized ductwork with fittings & hangers	95,710	lbs	20.00	1,914,200		
697	Duct insulation	57,426	sf	6.00	344,556		
698	Black steel welded ductwork with hangers	1,500	lbs	26.00	39,000		
699	Duct insulation, fire wrap	900	sf	22.00	19,800		
700	Dishwasher exhaust	800	lbs	26.00	20,800		
701	Registers, grilles & diffusers	87,009	gsf	0.75	65,257		
702	VAV's w/coil	87,009	gsf	1.00	87,009		
703	Sound attenuators	1	ls	50,000.00	50,000		
704	Misc. Duct accessories	87,009	gsf	1.00	87,009		
705	<u>Mech. Piping</u>						
706	Hot water, supply and return	7,910	lf	65.00	514,150		
707	Chilled water, supply and return	4,394	lf	65.00	285,610		
708	Refrigerant piping - split systems	300	lf	50.00	15,000		
709	Condensate drain piping with fittings & hangers	696	lf	45.00	31,320		
710	Valves & accessories	1	ls	126,912.00	126,912		
711	Piping insulation	12,604	lf	14.00	176,456		
712	<u>Automatic Temperature Controls</u>						
713	Automatic temperature controls DDC	87,009	gsf	8.50	739,577		
714	<u>Balancing</u>						
715	System testing & balancing	87,009	gsf	1.00	87,009		
716	<u>Miscellaneous</u>						
717	Coring, cutting, sleeves & fire stopping	1	ls	16,000.00	16,000		
718	Vibration isolation and supports	1	ls	30,000.00	30,000		
719	Hydraulic lifts/rigging	1	ls	60,000.00	60,000		



Schematic Design Estimate

GFA 87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

720	Coordination / BIM / ENG Support / As-Builts	1	ls	160,966.65	160,967			
721	Commissioning Support	1	ls	25,000.00	25,000			
722	Fees & permits	1	ls	123,361.16	123,361			
723	312000 <u>GEOTHERMAL</u>							
724	Allowance for support of geothermal	65	ea	2,500.00	162,500			
725	SUBTOTAL					11,009,938		
726	TOTAL - HVAC						\$11,009,938	

D40 FIRE PROTECTION

732	D40 FIRE PROTECTION							
733	<u>Fire Protection Equipment</u>							
734	Fire water service entrance	1	ea	12,500.00	12,500			
735	Fire pump, incl jockey pump	1	ea	125,000.00	125,000			
736	Double check valve assembly	1	ea	8,500.00	8,500			
737	Wet alarm check valve assembly	1	ea	5,500.00	5,500			
738	Floor control valve assembly	6	ea	2,700.00	16,200			
739	Fire department connection	1	ea	1,600.00	1,600			
740	Electric bell	1	ea	500.00	500			
741	Misc. Fire Protection Equipment	87,009	gsf	0.25	21,752			
742	<u>Fire Protection Service</u>							
743	Sprinkler heads	914	ea	105.00	95,970			
744	Main sprinkler piping	1,737	lf	55.00	95,535			
745	Branch sprinkler piping	8,683	lf	40.00	347,320			
746	<u>Miscellaneous</u>							
747	Coordination & BIM	1	ls	28,000.00	28,000			
748	Hydraulic calculations	1	ls	5,500.00	5,500			
749	Coring, sleeves & fire stopping	1	ls	10,000.00	10,000			
750	Shop drawings	1	ls	7,500.00	7,500			
751	Commissioning of system	1	ls	2,500.00	2,500			
752	Fees & permits	1	ls	7,838.77	7,839			
753	SUBTOTAL					791,716		
754	TOTAL - FIRE PROTECTION						\$791,716	

D50 ELECTRICAL

760	D50 ELECTRICAL						
761	Gear & Distribution						
762	<u>Normal Power</u>						
763	2500A 480/277V main switchboard	1	ls	150,000.00	150,000		
764	Meter	1	ea	500.00	500		
765	400A 277/480V panelboard	1	ea	5,000.00	5,000		
766	225A 277/480V distribution panelboard	1	ea	4,000.00	4,000		
767	100A 277/480V panelboard	5	ea	1,750.00	8,750		
768	75KVA dry type transformer	6	ea	7,200.00	43,200		
769	45KVA dry type transformer	4	ea	6,200.00	24,800		
770	250A 120/208V double tub panelboard	5	ea	8,000.00	40,000		
771	250A 120/208V panelboard	1	ea	4,000.00	4,000		
772	150A 120/208V panelboard	4	ea	2,500.00	10,000		
773	Scope not yet defined	87,009	sf	0.50	43,505		
774	Feeders	87,009	sf	2.00	174,018		
775	Metering	1	ls	30,000.00	30,000		
776	<u>Grounding</u>						
777	Grounding & bonding	87,009	sf	0.45	39,154		
778	Telecom closet grounding	2	loc		Included above		
779	Lightning protection	87,009	sf	0.65	56,556		
780	<u>Generator Power</u>						



Schematic Design Estimate

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
NEW CONSTRUCTION							
781	500KW diesel fueled generator set in weatherproof enclosure	1	ls	225,000.00	225,000		
782	Emergency power switchgear	87,009	sf	1.00	87,009		
783	Automatic transfer switches				Included above		
784	24KW UPS	1	ea		Included above		
785	Feeders	87,009	sf	1.00	87,009		
786	<u>Photovoltaic System</u>						
787	Additional roof structural steel to support PV arrays	1	ls		TBD		
788	Roof Mounted Photovoltaic system: 18,300sf of array	1	ls	700,000.00	700,000		
789	Electrical rough-in, allow	1	ls	50,000.00	50,000		
790							
791	<u>Equipment Wiring</u>						
792	Equipment wiring: feeds, connections & safety switches						
793	Chilled water pump	4	ea	1,750.00	7,000		
794	Split system units	3	pr	3,000.00	9,000		
795	DDC system	1	ls	1,500.00	1,500		
796	Boiler, allow	1	ea	1,650.00	1,650		
797	Dishwasher exhaust fan	1	ea	2,000.00	2,000		
798	Electric water heater	1	ea	2,000.00	2,000		
799	Elevator	1	ea	3,500.00	3,500		
800	Elevator cab	1	ea	3,500.00	3,500		
801	Exhaust fans	1	ls	8,000.00	8,000		
802	HWRP	1	ea	1,750.00	1,750		
803	HP WP	1	ea	5,000.00	5,000		
804	Fire pump	1	ea	10,000.00	10,000		
805	Chilled water pump	4	ea	1,750.00	7,000		
806	Hot water pump	4	ea	1,750.00	7,000		
807	Jockey pump	1	ea	1,750.00	1,750		
808	Kiln	1	ea	2,000.00	2,000		
809	Kitchen exhaust fan	1	ea	2,000.00	2,000		
810	MUA	1	ea	3,500.00	3,500		
811	POU electric water heater	86	ea	850.00	73,100		
812	RTU	7	ea	3,500.00	24,500		
813	Sump pump	1	ea	1,500.00	1,500		
814	UH/CUH	12	ea	1,000.00	12,000		
815	Kitchen equipment wiring	1	ls	45,000.00	45,000		
816	Gymnasium:						
817	Backboard	6	ea	2,000.00	12,000		
818	Bleacher	2	ea	2,000.00	4,000		
819	Scoreboard/shot clocks	1	ea	2,000.00	2,000		
820	Matt lifter	1	ea	2,000.00	2,000		
821	Motorized curtain	1	ea	2,000.00	2,000		
822	Equipment wiring not yet detailed	87,009	sf	1.50	130,514		
823	SUBTOTAL					2,169,265	
824							
825	D5020 LIGHTING & POWER						
826	Lighting fixture materials	87,009	sf	6.50	565,559		
827	Emergency/egress labor	87,009	sf	0.65	56,556		
828	Installation labor	87,009	sf	1.50	130,514		
829	Lighting Controls with daylight harvesting	87,009	sf	2.25	195,770		
830	Lighting Circuitry	87,009	sf	4.00	348,036		
831	Branch Devices	87,009	sf	1.15	100,060		
832	Duplex receptacle, tamper resistant: per narrative				Included above		
833	Double duplex receptacle, tamper resistant: per narrative				Included above		
834	GFI duplex receptacle, tamper resistant: per narrative				Included above		
835	Branch Circuitry	87,009	sf	4.00	348,036		
836	SUBTOTAL					1,744,531	
837							
838	D5030 COMMUNICATION & SECURITY SYSTEMS						
839	<u>Telecommunications:</u>						
840	Head-end PBX				NIC		
841	Telcom devices & cabling	87,009	sf	2.70	234,924		



Schematic Design Estimate

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87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
NEW CONSTRUCTION							
842	MDF fit out	1	ea	5,500.00	5,500		
843	IDF fit out	1	ea	2,500.00	2,500		
844	2 Port data device	38	ea		Included above		
845	Data device	56	ea		Included above		
846	Teacher 3port	28	ea		Included above		
847	Telephone device	28	ea		Included above		
848	Wireless AN	28	ea		Included above		
849	Backbone cabling	130	lf		Included above		
850	Cat cabling				Included above		
851	Rough-in: back boxes & conduit	87,009	sf	0.80	69,607		
852	MDF rough-in	1	ea	3,500.00	3,500		
853	IDF rough-in	1	ea	2,000.00	2,000		
854	Backboard	2	ea	750.00	1,500		
855	4" sleeves, allow	6	ea	250.00	1,500		
856	4" EMT, allow 2 runs between closets	450	lf	65.00	29,250		
857	Devices box with conduit stub				Included above		
858	<u>Public address/Master Clock System</u>						
859	PA/MC system	87,009	sf	0.60	52,205		
860	Head-end	1	ls		Included above		
861	PA speakers & addition devices				Included above		
862	Wireless clocks				Included above		
863	Rough-in: back boxes & conduit	87,009	sf	0.60	52,205		
864	120V power to clocks				Included above		
865	<u>Speech Reinforcement System</u>						
866	Speech Reinforcement equipment, allow Topcat equivalent	38	loc	3,500.00	133,000		
867	Rough-in	38	loc	1,000.00	38,000		
868	<u>Audio Visual Systems</u>						
869	Digital signage system	1	ls	30,000.00	30,000		
870	Rough-in	1	ls	7,500.00	7,500		
871	Gym sound system	1	ls	50,000.00	50,000		
872	Rough-in	1	ls	20,000.00	20,000		
873	Rough-in: general building	87,009	sf	1.00	87,009		
874	<u>Stage Systems:</u>						
875	Gym stage dimming package, allow	1	ls	50,000.00	50,000		
876	Gym stage lighting package, allow	1	ls	85,000.00	85,000		
877	Rough-in, installation and power	1	ls	25,000.00	25,000		
878	<u>Specialty Communications:</u>						
879	BDA/DAS system	87,009	sf	1.00	87,009		
880	Elevator lobby emergency call system	1	ls	15,000.00	15,000		
881	<u>Fire alarm</u>						
882	Fire alarm system	87,009	sf	3.50	304,532		
883	Fire alarm control panel, master box, Knox box, beacon, remote annunciator, terminal cabinets	1	ls		Included above		
884	Initiating devices				Included above		
885	Signal devices				Included above		
886	Kitchen Ansul connection				Included above		
887	Elevator recall connection				Included above		
888	Testing & programming				Included above		
889	Rough-in				Included above		
890	Mass notification	87,009	sf	0.65	56,556		
891	<u>Security System</u>						
892	Security Systems	87,009	sf	3.50	304,532		
893	Head-end				Included above		
894	Access control				Included above		
895	CCTV				Included above		
896	Intrusion detection				Included above		
897	Video intercom				Included above		
898	Rough-in	87,009	sf	1.00	87,009		
899	SUBTOTAL					1,834,838	
900							
901	D5040 OTHER ELECTRICAL SYSTEMS						
902	<u>Common Work Results for Electrical</u>	87,009	sf	5.00	435,045		
903	Temporary power & lighting				Included above		



Schematic Design Estimate

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

904	Coordination & management					Included above		
905	Testing & commissioning					Included above		
906	Fees & permits					Included above		
907	SUBTOTAL						435,045	
908								
909	TOTAL - ELECTRICAL							\$6,183,679
910								
911								

E10 EQUIPMENT

E10 EQUIPMENT, GENERALLY								
912								
913								
914								
915	113100	APPLIANCES						
916		Refrigerator	2	ea	2,000.00	4,000		
917		Microwave, allow	2	ea	900.00	1,800		
918		Dryer	1	ea	1,600.00	1,600		
919		Washer	1	ea	1,600.00	1,600		
920		Residential appliances not yet shown; allowance	1	ls	6,000.00	6,000		
921		Kiln	1	ea	5,000.00	5,000		
922								
923	114000	FOODSERVICE EQUIPMENT						
924		Kitchen equipment; Crabtree McGrath Associates, Inc., 11/30/2023	1	ls	706,650.00	706,650		
925								
926	115213	PROJECTION SCREENS						
927		Projection screen; gymnasium stage	1	ea	12,000.00	12,000		
928								
929	116200	THEATRE EQUIPMENT						
930		Curtain and rigging; allowance	1	ls	30,000.00	30,000		
931								
932	116600	ATHLETIC EQUIPMENT						
933		Gym safety wall pads	1,250	sf	20.00	25,000		
934		Basketball backstops, motorized	6	ea	10,000.00	60,000		
935		Gymnasium dividing curtain	1	lf	25,000.00	25,000		
936		Volleyball net and standards	1	ls	5,000.00	5,000		
937		Score board in Gym - allow	1	ea	20,000.00	20,000		
938		Bleachers; 130 capacity	1	ls	26,000.00	26,000		
939		SUBTOTAL					929,650	
940								
941	TOTAL - EQUIPMENT							\$929,650
942								
943								

E20 FURNISHINGS

E2010 FIXED FURNISHINGS								
944								
945								
946								
947								
948	122100	WINDOW TREATMENT						
949		Roller shades, manual - exterior	8,478	sf	8.00	67,824		
950		Roller shades, manual - interior lites, glazed partitions	3,354	sf	8.00	26,832		
951		Premium for motorized, allow	4,062	sf	20.00	81,240		
952								
953	123000	CASEWORK						
954		Wood casework				w/ C1030		
955		SUBTOTAL					175,896	
956								
957	E2020 MOVABLE FURNISHINGS							
958		All movable furnishings to be provided and installed by owner						
959		SUBTOTAL					NIC	
960								
961	TOTAL - FURNISHINGS							\$175,896
962								
963								

F10 SPECIAL CONSTRUCTION

F10 SPECIAL CONSTRUCTION							
964							
965							
966		SUBTOTAL					-
967							
968							



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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NEW CONSTRUCTION

969
970
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TOTAL - SPECIAL CONSTRUCTION							
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F20 SELECTIVE BUILDING DEMOLITION							
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F2010 BUILDING ELEMENTS DEMOLITION
SUBTOTAL

-

F2020 HAZARDOUS COMPONENTS ABATEMENT
See main summary for HazMat allowance
SUBTOTAL

See Summary

TOTAL - SELECTIVE BUILDING DEMOLITION							
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TRADE SUBTOTAL

\$47,685,931



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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SITWORK

1	G SITEWORK						
2	G10 SITE PREPARATION & DEMOLITION						
3							
4	311000	GENERAL CONDITIONS					
5		Temp laydown areas	1	acres	10,000.00	10,000	
6		Temporary signs	1	ls	20,000.00	20,000	
7		Layout/As-builts/Survey	1	ls	15,000.00	15,000	
8		Construction offices area prep - allowance	1	ls	10,000.00	10,000	
9		Temporary signs	1	ls	20,000.00	w/ GRs	
10		Wheel wash rack	1	ls	20,000.00	20,000	
11		Engineering/layout	24	mths	8,000.00	w/ GRs	
12		As-builts	1	ls	15,000.00	15,000	
13		Concrete pump staging areas	2	loc	10,000.00	20,000	
14		Vibration monitoring station allowance	5	loc	5,000.00	25,000	
15		Snow removal - allowance	1	ls		w/ GRs	
16		Winter conditions - allowance	1	ls		w/ GRs	
17		Police details	1	ls		w/ GRs	
18		Site security	1	ls		w/ GRs	
19		Job site construction trailer	1	ls		w/ GRs	
20		Temp utilities for job trailer	1	ls		w/ GRs	
21	311000	PHASING - from PSR					
22		<u>Phase 1</u>					
23		6' high site construction fence	1,900	lf	35.00	66,500	
24		Site construction fence gates and entrance	2	ea	15,000.00	30,000	
25		Silt fence/erosion control	1,900	lf	12.00	22,800	
26		Mobilizations	1	ea	50,000.00	50,000	
27		Temp playground allowance	1	ls	25,000.00	25,000	
28		<u>Phase 2</u>					
29		6' high site construction fence	1,400	lf	35.00	49,000	
30		Site construction fence gates and entrance	2	ea	15,000.00	30,000	
31		Silt fence/erosion control	1,400	lf	12.00	16,800	
32		<u>Phase 3</u>					
33		6' high site construction fence	1,250	lf	35.00	43,750	
34		Site construction fence gates and entrance	2	ea	15,000.00	30,000	
35		Silt fence/erosion control	1,250	lf	12.00	15,000	
36	311000	SITE SALVAGE ITEMS					
37		Allowance for future salvage items, memorials etc.	1	ls	25,000.00	25,000	
38	311000	SITE DEMOLITION AND RELOCATIONS					
39		Demolish curbing	1,173	lf	6.00	7,038	
40		Demolish steps	413	lf	20.00	8,260	
41		Demolish existing paving	63,053	sf	1.25	78,816	
42		Demolish existing concrete walk	7,055	sf	1.50	10,583	
43		Demolish existing gravel and stones	652	sf	0.25	163	
44		Demolish existing handrails	108	lf	25.00	2,700	
45		Demolish existing playground	22,248	sf	1.50	33,372	
46		Demolish existing infields	13,309	sf	0.50	6,655	
47		Demolish existing fencing	2,129	lf	5.00	10,645	
48		Demolish existing signs	9	ea	150.00	1,350	
49		Demolish existing backstops	2	ea	1,250.00	2,500	
50		Miscellaneous site demolition; furnishings, concrete pads, signs etc.	1	ls	50,000.00	50,000	
51	311000	UTILITY DEMOLITION					
52		Demolish existing utility and drainage allowance	1	ls	25,000.00	25,000	
53		Remove OHW	1,362	lf		by utility comp.	
54	311000	ROADWAY WORK					
55		Sawcut	1,218	lf	8.25	10,049	
56		Remove pavement	1,260	sf	3.50	4,410	
57		Temp pavement patching	1,260	sf	8.00	10,080	
58		Steel plates	1	ls	2,500.00	2,500	



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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SITWORK

59	Police details	4	dy	850.00	3,400			
60	Permanent pavement patch	1,260	sf	10.00	12,600			
61	311000 VEGETATION & TOPSOIL MANAGEMENT							
62	Clear existing vegetation/invasive species	4	acre	5,000.00	20,000			
63	Vegetation protection fencing	672	lf	25.00	16,800			
64	Strip topsoil (swell 25%)	15,000	cy	11.00	incl. below			
65	312000 SOIL DISPOSAL - conversion factor 1.7 to tons							
66	Load excess soils for disposal	15,000	cy	2.50	incl. below			
67	Less than RCS-1 - clean non-regulated	25,500	tn	25.00	incl. below			
68	Street sweeping allowance during hauling	1	ls	25,000.00	25,000			
69	312000 EROSION & SEDIMENT CONTROL							
70	Silt Sacks; installation and removal	5	ea	250.00	1,250			
71	Street sweeping & dust control allowance	1	ls	40,000.00	40,000			
72	Erosion Control monitoring & maintenance	1	ls	25,000.00	25,000			
73	SUBTOTAL						947,021	
74								
75	312000 BUILDING EARTHWORK					w/ A1030		
76								
77	312000 SITE EARTHWORK							
78	Strip topsoil (swell 25%)	15,000	cy	11.00	165,000			
79	312000 SOIL DISPOSAL - conversion factor 1.7 to tons							
80	Load excess soils for disposal	15,000	cy	2.50	37,500			
81	Less than RCS-1 - clean non-regulated	25,500	tn	15.00	382,500			
82	<u>Site cut to design subgrade - phase 1</u>	7,800	cy					
83	Cut	7,800	cy	10.00	78,000			
84	<u>Site fill to design subgrade - phase 1</u>	926	cy					
85	Fill - imported granular fill; swell 25%	1,158	cy	48.00	55,584			
86	312000 SOIL DISPOSAL - conversion factor 1.7 to tons							
87	Load excess soils for disposal	7,800	cy	2.50	19,500			
88	Less than RCS-1 - clean non-regulated	13,260	tn	25.00	331,500			
89								
90	<u>Site cut to design subgrade - phase 2</u>	24,800	cy					
91	Cut	24,800	cy	10.00	248,000			
92	Store cut onsite	1,950	cy	3.50	6,825			
93	<u>Site fill to design subgrade - phase 2</u>	1,950	cy					
94	Fill - from cut	1,950	cy	12.00	23,400			
95	Structural fill at demo-ed building - basements, foundations, pits etc.	1,444	cy	50.00	72,200			
96	312000 SOIL DISPOSAL - conversion factor 1.7 to tons							
97	Load excess soils for disposal	22,850	cy	2.50	57,125			
98	Less than RCS-1 - clean non-regulated	38,845	tn	25.00	971,125			
99								
100	312000 GEOTHERMAL							
101	Allowance for support of geothermal	1	ls		ALTERNATE			
102								
103	312000 SUPPORT OF EXCAVATION							
104	SOE allowance; along west side of existing	3,360	sf	90.00	302,400			
105								
106	312000 ESTABLISHING GRADE							
107	Sub grade establishment	324,000	sf	0.15	48,600			
108	Fine grading throughout the site	324,000	sf	0.25	81,000			
109								
110	312000 HAZARDOUS MATERIALS							
111	UST removal allowance	2	ea	50,000.00	100,000			
112	SUBTOTAL						2,980,259	
113								
114	TOTAL - SITE PREPARATION							\$3,927,280
115								
116	G20 SITE IMPROVEMENTS							
117	320000	ROADWAYS AND PARKING LOTS						



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
118	<u>Asphalt Paving: parking lots and roadway</u>	62,710	sf				
119	crushed stone base; 12" thick	2,323	cy	60.00	139,380		
120	asphalt top; 1.5" thick	600	tns	225.00	135,000		
121	asphalt binder; 3" thick	1,199	tns	190.00	227,810		
122	Drive apron	81	sf	20.00	1,620		
123	320000 CURBING						
124	Vertical granite curb	2,808	lf	58.00	162,864		
125	ADA Curb cuts	9	ea	850.00	7,650		
126	Detectable warning	41	sf	125.00	5,125		
127	320000 ROAD MARKINGS AND SIGNS						
128	Parking spot	66	ea	85.00	5,610		
129	Parking spot ADA	3	ea	250.00	750		
130	Sign allowance	1	ls	10,000.00	10,000		
131	Pavement markings allowance	1	ls	20,000.00	20,000		
132	Crosswalk hatching	3	loc	2,500.00	7,500		
133	SUBTOTAL					723,309	
134							
135	320000 OFFSITE IMPROVEMENTS						
136	<u>Overlay Milled Roadways</u>	42,179	sf				
137	1.5" Top Course	395	tn	225.00	88,875		
138	Mill (Cold Plane) Existing Roadways	4,687	sy	8.00	37,496		
139	Sawcut at end of mill and overlay runs	83	lf	8.25	685		
140	<u>Bituminous sidewalks - assume 5' wide and breaks at driveways</u>	8,980	sf				
141	gravel base; 6" thick	166	cy	60.00	Removed		
142	Scored finish concrete paving; 4" thick	8,980	sf	13.00	Removed		
143	<u>Concrete sidewalks - Cedar St.</u>	35,038	sf				
144	gravel base; 6" thick	649	cy	60.00	Removed		
145	Scored finish concrete paving; 4" thick	35,038	sf	13.00	Removed		
146	Vertical granite curb - assume none at driveways	1,796	lf	65.00	Removed		
147	Vertical granite curb - cedar st.	6,400	lf	65.00	Removed		
148	Crosswalks and curb cuts - allowance	6	ea	8,500.00	Removed		
149	Curb cuts - cedar st.	23	ea	850.00	Removed		
150	Crosswalks- cedar st.	11	ea	2,500.00	Removed		
151	Speed bumps in Cedar St.	2	ea	10,000.00	20,000		
152	Sawcut	2,240	lf	8.25	Removed		
153	Sawcut - cedar street	6,400	lf	8.25	Removed		
154	Curb patch	8,640	lf	10.00	Removed		
155	Demolish existing sidewalks	8,980	sf	1.50	Removed		
156	Demolish existing sidewalks - cedar st.	48,208	sf	1.50	Removed		
157	Police details	1	ls	50,000.00	50,000		
158	Signage	1	ls	25,000.00	25,000		
159	Utility adjustment allowance	1	ls	25,000.00	25,000		
160	Landscaping strip at new sidewalk/abutters repair	1,796	lf	15.00	Removed		
161	Landscaping strip at new sidewalk/abutters repair - cedar st.	6,400	lf	15.00	Removed		
162	Repair driveway aprons	37	ea	2,500.00	Removed		
163	Repair driveway aprons - Cedar St.	47	ea	2,500.00	Removed		
164	SUBTOTAL					247,056	
165							
166	320000 PEDESTRIAN PAVING						
167	<u>Bituminous sidewalks</u>	6,484	sf				
168	gravel base; 6" thick	120	cy	60.00	7,200		
169	asphalt top; .75" thick	31	tns	225.00	6,975		
170	asphalt binder; 1.5" thick	62	tns	190.00	11,780		
171	<u>Concrete sidewalks</u>	13,071	sf				
172	gravel base; 8" thick	324	cy	60.00	19,440		
173	Scored finish concrete paving; 4" thick	13,071	sf	13.00	169,923		



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITWORK							
174	<u>Concrete pavers on concrete slabs</u>	602	sf				
175	gravel base; 8" thick	15	cy	50.00	750		
176	Concrete slab paving; 4" thick	602	sf	12.00	7,224		
177	Concrete pavers	602	sf	32.00	19,264		
178	Reclaimed granite curb surfacing	1,909	sf	28.00	53,452		
179	<u>Permeable concrete pavers</u>	2,561	sf				
180	Concrete unit pavers	2,561	sf	28.00	71,708		
181	Bedding stone layers; 9" thick	71	cy	75.00	5,325		
182	Structural soils; 36" thick	285	cy	100.00	28,500		
183	Sand layer; 3" thick	24	cy	55.00	1,320		
184	Triaxial geogrid	2,561	sf	2.25	Removed		
185	Edging	115	lf	18.00	2,070		
186	<u>Stabilized stone dust pathway</u>	998	sf				
187	Gravel base; 6" thick	18	cy	50.00	900		
188	Stone dust 4" thick	25	tns	250.00	6,250		
189	Flush CIP curb edging	101	lf	32.00	3,232		
190	320000 <u>STAIRS AND RAMPS</u>						
191	Stairs - cast-in-place concrete	93	lf	225.00	20,925		
192	Stairs- precast	223	lf	350.00	78,050		
193	Stair foundations	84	lf	250.00	21,000		
194	Stair handrails - galvanized	27	lf	350.00	9,450		
195	Stair handrails - stainless steel	23	lf	425.00	9,775		
196	SUBTOTAL					554,513	
197							
198	320000 <u>SITE IMPROVEMENTS</u>						
199	320000 <u>SITE FURNISHINGS</u>						
200	Bollards - concrete filled steel	14	ea	1,200.00	16,800		
201	Bollards - removable	3	ea	1,800.00	5,400		
202	School sign	1	ea	25,000.00	25,000		
203	Bike racks	5	ea	850.00	4,250		
204	Bike racks - covered	19	ea	850.00	16,150		
205	Bike shelter - 12' long	6	ea	24,414.60	146,488		
206	Flagpole - 30' Ht.	1	ea	9,000.00	9,000		
207	Flagpole foundation	1	ea	3,500.00	3,500		
208	Trash and Recycling receptacles - Chase Park by LF	4	ea	3,136.00	12,544		
209	Picnic tables	7	ea	4,000.00	28,000		
210	Sitting logs	17	ea	500.00	8,500		
211	Raised garden beds	4	ea	4,500.00	18,000		
212	Pedestrian light poles	17	ea	500.00	8,500		
213	Relocated utility pole	1	ea	500.00	500		
214	Wood benches on pedestals - drifter - streetlife	228	lf	500.00	114,000		
215	Sculptural precast seating feature - quote by MD3	1	ls	46,995.20	46,995		
216	Wood platform seating feature over tree island	737	sf	100.00	73,700		
217	Boardwalk allowance	676	sf	80.00	54,080		
218	Pavement markings allowance - painted games	1	ls	25,000.00	25,000		
219	320000 <u>UTILITY AREAS AND FURNISHINGS</u>						
220	<u>Concrete pads</u>	663	sf				
221	gravel base; 12" thick	25	cy	60.00	1,500		
222	Broom finish concrete paving; 8" thick	663	sf	24.00	15,912		
223	320000 <u>PLAY AREAS</u>						
224	<u>Playground - pour-in-place safety surfacing</u>	10,084	sf				
225	gravel base; 12" thick	373	cy	75.00	27,975		
226	Pour-in-place safety surface	10,084	sf	32.00	322,688		
227	EWf	1,174	sf	7.00	8,218		
228	PIP edging	501	lf	18.00	9,018		



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITework							
229	Allowance for play equipment	1	ls	350,000.00	350,000		
230	Allowance for adventure play equipment	1	ls	50,000.00	50,000		
231	320000 SPORTS COURTS						
232	<u>Pavement areas</u>	3,108	sf				
233	gravel base; 8" thick	77	cy	75.00	5,775		
234	asphalt top; 1.5" thick	29	tns	225.00	6,525		
235	asphalt binder; 1.5" thick	29	tns	190.00	5,510		
236	Basketball hoops	2	ea	6,700.00	13,400		
237	Single basketball court color coating	1	ls	10,000.00	10,000		
238	320000 ATHLETIC EQUIPMENT						
239	<u>Baseball</u>						
240	Baseball mound	1	loc	3,500.00	3,500		
241	Baseball bases	1	set	2,500.00	2,500		
242	Baseball batters boxes	1	loc	3,500.00	3,500		
243	Baseball backstop	1	ea	40,000.00	40,000		
244	Baseball dugouts - concrete pads	600	sf	20.00	12,000		
245	Baseball dugouts - players benches	4	ea	4,000.00	16,000		
246	<u>Soccer/Football/Lacrosse</u>						
247	Soccer goals	2	ea	4,500.00	9,000		
248	320000 BLEACHERS AND SCOREBOARDS						
249	Portable bleacher 6-row allowance	4	loc	18,000.00	72,000		
250	320000 FENCING						
251	4' Ht - Chain link fence	840	lf	65.00	54,600		
252	4' Ht - Chain link double gate	4	ea	2,500.00	10,000		
253	8' Ht - Chain link fence	67	lf	85.00	5,695		
254	Dumpster enclosure allowance	1	ls	15,000.00	15,000		
255	Vehicular gate	2	ea	8,500.00	17,000		
256	Ball control netting - 20' Ht. - allowance	500	lf	200.00	100,000		
257	SUBTOTAL					1,803,723	
258							
259	329900 SITE WALLS						
260	<u>Stair and ramp cheek walls - 2' ht. - form liner finish</u>	101	lf	510.89	51,600		
261	Excavation	42	cy	100.00	4,200		
262	Backfill - (assume using onsite soils)	51	cy	35.00	1,785		
263	Wall drain	101	lf	22.00	2,222		
264	Formliner premium single sided	303	sf	15.00	4,545		
265	<u>Cast-in-place retaining wall - 3' ht. - form liner finish</u>	73	lf	589.86	43,060		
266	Excavation	30	cy	100.00	3,000		
267	Backfill - (assume using onsite soils)	37	cy	35.00	1,295		
268	Wall drain	73	lf	22.00	1,606		
269	Formliner premium single sided	292	sf	15.00	4,380		
270	<u>Cast-in-place retaining wall - 6' ht. - form liner finish</u>	210	lf	1,045.29	219,510		
271	Excavation	175	cy	100.00	17,500		
272	Backfill - (assume using onsite soils)	210	cy	35.00	7,350		
273	Wall drain	210	lf	22.00	4,620		
274	Formliner premium single sided	1,260	sf	15.00	18,900		
275	SUBTOTAL					385,573	
276							
277	Landscaping						
278	329900 LAWN AND SEED						
279	Topsoil - imported 6" thick; swell 25%	1,643	cy	65.00	NR		
280	Soil and mulch at planting areas; 12" thick	245	cy	80.00	19,600		
281	Power rake and hydroseed disturbed areas	59,902	sf	0.35	20,966		
282	Sodding	11,088	sf	2.25	24,948		
283	Rain garden seed mix - profile	1,164	sf	18.00	20,952		
284	Rain garden planting soil; 36" thick	129	cy	60.00	7,740		



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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SITework

285	Granite landscape curbing	195	lf	200.00	39,000			
286	Tree grates	11	ea	5,000.00	55,000			
287	320000 <i>ATHLETIC LANDSCAPING</i>							
288	Synthetic turf field, value per A.M. Fogarty	1	ls	560,700.00	560,700			
289	Topsoil - imported 8" thick; swell 25%	1,940	cy	65.00	NR			
290	Planting maintenance - 1 year	1	ls	15,000.00	NR			
291	<u>Sports field lawns</u>	62,559	sf		NR			
292	Infield mix	113	tn	225.00	NR			
293	Sand gravel fill; 6" thick	1,159	cy	48.00	NR			
294	Sodding	62,559	sf	2.25	NR			
295	Irrigation	62,559	sf	2.00	NR			
296	Underdrain allowance below field	1	ls	50,000.00	50,000			
297	329900 <i>TREES</i>							
298	Deciduous trees - 2.5-3" cal.	129	ea	1,900.00	245,100			
299	Evergreen trees for screening	40	ea	1,200.00	48,000			
300	329900 <i>SHRUBS AND GROUNDCOVERS</i>							
301	Shrubs and groundcovers allowance	1	ls	100,000.00	100,000			
302	329900 <i>MAINTENANCE</i>							
303	1-yr plant maintenance	1	ls	25,000.00	25,000			
304	328400 <i>IRRIGATION</i>							
305	Irrigation area - allowance for planting beds	6,622	sf	3.25	21,522			
306	SUBTOTAL						1,238,528	
307								
308	TOTAL - SITE IMPROVEMENTS							\$4,952,702

G30 CIVIL MECHANICAL UTILITIES

312	210000 <i>FIRE PROTECTION</i>						
313	8" CLDI	113	lf	90.00	10,170		
314	6" CLDI	115	lf	75.00	8,625		
315	Fire department connection	1	ea	2,500.00	2,500		
316	Gate valve	2	ea	1,200.00	2,400		
317	Fire hydrant	4	ea	6,500.00	NIC		
318	Thrust blocks	2	ea	500.00	1,000		
319	331000 <i>CONNECTIONS</i>						
320	Connect to existing water line; 6/8/10 (in roadway)	2	ea	20,000.00	40,000		
321	312000 <i>EXCAVATION & BACKFILL</i>	228	lf				
322	DI gravity piping excavation	203	cy	46.75	9,490		
323	Trench bedding	46	cy	50.00	2,300		
324	Backfill w/cut soils	157	cy	20.00	3,140		
325	Pressure test & chlorinate	228	lf	5.00	1,140		
326	SUBTOTAL						80,765
327							
328	333000 <i>SANITARY SEWER</i>						
329	6" PVC	195	lf	50.00	9,750		
330	SMH - 0-5' deep	3	ea	4,800.00	14,400		
331	SMH - 5-12' doghouse	1	ea	12,000.00	12,000		
332	Grease trap; 5,000 gal.	1	ea	25,000.00	w/ bldg		
333	Concrete encasement allowance	1	ea	2,500.00	2,500		
334	333000 <i>CONNECTIONS</i>						
335	Connect to existing structure (inside site)	1	ea	5,000.00	incl. above		
336	312000 <i>EXCAVATION & BACKFILL - Gravity</i>	195	lf				
337	PVC gravity piping excavation	173	cy	46.75	8,088		
338	Trench bedding	58	cy	50.00	2,900		
339	Backfill w/cut soils	115	cy	20.00	2,300		
340	Pressure testing	195	lf	4.00	780		
341	Video Inspection	1	ls	10,000.00	10,000		



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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SITework

342	Grease trap; 5,000 gal. (e/b only) incl. shoring	1	ea	10,000.00	10,000			
343	SUBTOTAL					72,718		
344								
345	334000 STORM DRAINAGE							
346	12" HDPE	2,280	lf	75.00	171,000			
347	4' Dia. DMH - 0-5' deep	24	ea	5,000.00	120,000			
348	DMH - Stormceptor	2	ea	20,000.00	40,000			
349	DMH - 5-12' doghouse	2	ea	12,000.00	24,000			
350	CB - 4' Dia.	21	ea	4,800.00	100,800			
351	Roof drain connections	3	ea	500.00	1,500			
352	334000 CONNECTIONS							
353	Connect to existing structure (inside site)	1	ea	5,000.00	5,000			
354	334000 SUBSURFACE DRAINAGE SYSTEMS							
355	<u>Underground recharger</u>	20,060	sf					
356	Cultech 330 HD chambers and installation - 79.26 cuft/per chamber with a 6" stone base (8'6" long x 52" wide/ea)	543	ea	650.00	352,950			
357	Cultech 330 HD end cap and installation - allowance	46	ea	350.00	16,100			
358	Excavate and dispose of soils; assume 4' depth	4,012	cy	25.00	100,300			
359	Load excess soils for disposal	4,012	cy	2.50	10,030			
360	Less than RCS-1 - clean non-regulated	6,820	tn	25.00	170,500			
361	Install stone base; 12" thick	1,226	tn	65.00	79,690			
362	Fine grade base	20,060	sf	0.25	5,015			
363	Back-fill infiltration bed with 1-2" crushed stone; 2.3 cy/ea	2,240	tn	50.00	112,000			
364	Geotextile fabrics	50,150	sf	0.75	37,613			
365	SUBTOTAL					1,346,498		
366								
367	220001 NATURAL GAS							
368	Piping excavation/backfill (inside site)	109	lf	35.00	NR			
369	SUBTOTAL					-		
370								
371	TOTAL - SITE MECHANICAL UTILITIES						\$1,499,981	
372								
373	G40 ELECTRICAL UTILITIES							
374								
375	<u>Civil Scope for Electrical</u>							
376	Concrete:							
377	Primary service duct bank 2-4", allow	60	lf	45.00	2,700			
378	Secondary service duct bank: 5-4" PVC, allow	140	lf	45.00	6,300			
379	Concrete pad: generator, transformer	2	ea	2,500.00	5,000			
380	Site fixture bases, allow	1	ls	5,000.00	5,000			
381	Excavation & Backfill:							
382	Primary service duct bank 2-4", allow	60	lf	35.00	2,100			
383	Secondary service duct bank: 5-4" PVC, allow	140	lf	35.00	4,900			
384	EV charging, allow	800	lf	12.00	9,600			
385	Site lighting, allow	1,000	lf	12.00	12,000			
386								
387	<u>Power</u>							
388	Connect to existing riser pole	1	ea	2,500.00	2,500			
389	Primary service duct bank 2-4", empty, allow	60	lf	60.00	3,600			
390	Primary cabling					Eversource		
391	Pad mount transformer	1	ea			Eversource		
392	Transformer grounding	1	ea	1,000.00	1,000			
393	Secondary service duct bank: 5-4" PVC with 2000A feeder, allow	140	lf	850.00	119,000			
394	Generator							
395	Generator duct bank, allow	60	lf	500.00	30,000			
396	Generator grounding	1	ea	1,000.00	1,000			
397	Electric Vehicle Stations							
398	EV station - dual head	4	ea			Future		
399	40A circuit in PVC conduit	800	lf	22.00	17,600			



CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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SITework

400	Pull box	4	ea	1,000.00	4,000			
401	Distribution panel, allow 200A & feeder	1	ea	6,000.00	6,000			
402	Security							
403	Site camera system, allow	1	ls	30,000.00	30,000			
404	Telecommunications							
405	Communication riser	1	ea	2,500.00	2,500			
406	Telcom duct bank 4-4" PVC, empty, allow	200	lf	180.00	36,000			
407	<u>Site lighting</u>							
408	Site lighting fixtures with installation labor & grounding, allow	1	ls	200,000.00	200,000			
409	Pole mounted fixture, landscape drawing	7	ea		Included above			
410	SUBTOTAL						500,800	
411								
412	TOTAL - ELECTRICAL UTILITIES							\$500,800
413	TOTAL - SITE DEVELOPMENT							\$10,880,763



Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

GROSS FLOOR AREA CALCULATION

Floor 0	
Floor 1	790
Floor 2	1,170
Roof	

TOTAL GROSS FLOOR AREA (GFA)	1,960 sf
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A10 FOUNDATIONS

A1010 STANDARD FOUNDATIONS

Strip footings

Formwork	100	sf	20.00	2,000
Re-bar, 80 #/cy	480	lbs.	2.00	960
Concrete material	6	cy	155.00	930
Placing concrete	6	cy	120.00	720

Foundation walls

Formwork	350	sf	22.00	7,700
Re-bar, 100 #/cy	1,000	lbs.	2.00	2,000
Concrete material	10	cy	155.00	1,550
Placing concrete	10	cy	120.00	1,200
Form shelf	50	lf	10.00	500

070001 WATERPROOFING, DAMPPROOFING AND CAULKING

Dampproofing at brick shelf	175	sf	3.00	525
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072100 THERMAL INSULATION

Insulation at foundation wall	175	sf	3.50	613
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312000 EARTHWORK

Strip Footings/Grade Beams

Excavation	46	cy	16.00	736
Store onsite	46	cy	8.00	368
Backfill with existing material	30	cy	18.00	540

Miscellaneous

Gravel fill beneath footings	4	cy	60.00	240
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SUBTOTAL

20,582

A1020 SPECIAL FOUNDATIONS

No work in this section

SUBTOTAL

-

A1030 LOWEST FLOOR CONSTRUCTION

033000 CONCRETE

<u>Slab on grade</u>	790	sf		
Vapor barrier at slab on grade	790	sf	1.25	988
WWF reinforcement	909	sf	1.80	1,636
Concrete - 5" thick	15	cy	155.00	2,325
Placing concrete	15	cy	120.00	1,800
Finishing and curing concrete	790	sf	3.00	2,370

Miscellaneous

Radon system	790	sf	3.00	NR
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072100 THERMAL INSULATION

Slab insulation, 2" thick	790	sf	3.50	2,765
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312000 EARTHWORK

Gravel base, 12"	29	cy	48.00	1,392
Compact existing sub-grade	790	sf	1.00	790



Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

54	Under slab E&B for plumbing	790	sf	1.50	1,185		
55	SUBTOTAL					15,251	

TOTAL - FOUNDATIONS						\$35,833
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A20 BASEMENT CONSTRUCTION

A2010 BASEMENT EXCAVATION

No Work in this section
SUBTOTAL

-

A2020 BASEMENT WALLS

No Work in this section
SUBTOTAL

-

TOTAL - BASEMENT CONSTRUCTION						
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B10 SUPERSTRUCTURE

B1010 FLOOR CONSTRUCTION

23.5 lbs/sf
23 tns including roof screens and canopies
\$6,139 \$/Ton

79	033000 CONCRETE						
80	WWF reinforcement	1,346	sf	1.80	2,423		
81	Concrete fill to metal deck; 3-1/2" normal weight, total thickness 6 1/2"	25	cy	160.00	4,000		
82	Place and finish concrete	1,170	sf	3.50	4,095		
83	Rebar to decks	351	lbs	2.00	702		
84	051200 STRUCTURAL STEEL FRAMING						
86	Steel floor framing, columns and lateral bracing;						
87	Floor framing 15 psf	9	tns	5,200.00	46,800		
88	Brick relief/bent plate, 40 plf L2	1	tns	5,200.00	5,200		
89	Shear studs	293	ea	3.50	1,026		
90	3" metal floor deck	1,170	sf	6.00	7,020		
91	078100 FIREPROOFING/FIRESTOPPING						
93	Fire proofing; 2 hour rated	1,170	sf	3.00	3,510		
94	SUBTOTAL					74,776	

B1020 ROOF CONSTRUCTION

98	033000 CONCRETE						
99	WWF reinforcement	2,266	sf	1.80	4,079		
100	Concrete fill to metal deck; 4-1/2" normal weight, total thickness 7-1/2"	42	cy	160.00	6,720		
101	Place and finish concrete	1,970	sf	3.50	6,895		
102	Rebar to decks	591	lbs	2.00	1,182		
103	051200 STRUCTURAL STEEL FRAMING						
105	Steel roof framing, columns and lateral bracing;						
106	Roof framing 13 psf at typical roof	13	tns	5,200.00	67,600		
107	Allowance for additional miscellaneous steel angles, plates etc.				assume included in lbs/sf tns		
108	Shear studs	493	ea	3.50	1,726		
109	3" metal roof deck	1,970	sf	6.00	11,820		
110	078100 FIREPROOFING/FIRESTOPPING						
112	Fireproofing to roof deck and structure	1,970	sf	3.50	6,895		



Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	ESTD COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

113 SUBTOTAL 106,917

114 **TOTAL - SUPERSTRUCTURE \$181,693**

115 **B20 EXTERIOR CLOSURE**

1,400 sf

116 **B2010 EXTERIOR WALLS 700 sf Total Exterior Closure**

117 040001 MASONRY

118 055000 MISCELLANEOUS METALS

119 070001 WATERPROOFING, DAMPPROOFING AND CAULKING

120 Air barrier, fluid applied 700 sf 9.00 6,300

121 Air barrier, fluid applied at fins 1,260 sf 9.00 11,340

122 Air barrier @ overhangs/soffits 800 sf 9.00 7,200

123 Miscellaneous sealants to closure 700 sf 0.50 350

124 072100 THERMAL INSULATION

125 R22 high density mineral fiber board insulation 700 sf 6.00 4,200

126 R22 high density mineral fiber board insulation at fins 1,260 sf 6.00 7,560

127 Insulation @ soffits 800 sf 5.00 4,000

128 Insulation at window openings 280 lf 6.00 1,680

129 074213 WALL PANELS

130 Phenolic panels 700 sf 110.00 77,000

131 Phenolic panels at fins 1,260 sf 110.00 138,600

132 ACM panels at soffits - canopies and overhang 800 sf 95.00 76,000

133 092900 GYPSUM BOARD ASSEMBLIES

134 6" metal stud backup, typical 700 sf 14.00 9,800

135 Gypsum Sheathing 700 sf 3.50 2,450

136 Framing at phenolic fins 630 sf 40.00 25,200

137 Framing at soffits 800 sf 20.00 16,000

138 SUBTOTAL 387,680

139 **B2020 WINDOWS 700 sf**

140 092900 GYPSUM BOARD ASSEMBLIES

141 Wood blocking at openings 280 lf 14.00 3,920

142 079200 JOINT SEALANTS

143 Backer rod & double sealant 280 lf 12.00 3,360

144 080001 METAL WINDOWS

145 Windows/Storefront; triple glazed 700 sf 190.00 133,000

146 Premium for schoolguard glazing to 8', allow 350 sf 75.00 26,250

147 SUBTOTAL 166,530

148 **B2030 EXTERIOR DOORS**

149 SUBTOTAL -

150 **TOTAL - EXTERIOR CLOSURE \$554,210**

151 **B30 ROOFING**

152 **B3010 ROOF COVERINGS**

153 070002 ROOFING AND FLASHING

154 Flat roof; PVC roof membrane system, 60 mil, coverboard, vapor retarder, tapered insulation 1,970 sf 26.00 51,220



Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

176 SUBTOTAL 51,220

177

178 **B3020 ROOF OPENINGS**

179 SUBTOTAL -

180

181

TOTAL - ROOFING							\$51,220
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182

183

184

185 **C10 INTERIOR CONSTRUCTION**

186

187 **C1010 PARTITIONS**

188

189 061000 ROUGH CARPENTRY

190 Blocking at partitions 486 sf 1.00 486

191 Wood blocking at interiors including at doors 1,960 gsf 0.30 588

192

193 078400 FIREPROOFING/FIRESTOPPING

194 Fire stopping including slab edges and core 1,960 gsf 0.50 980

195

196 092900 GYPSUM BOARD ASSEMBLIES

197 Demising wall 486 SF

198 486 sf 24.00 11,664

199 SUBTOTAL 13,718

200

201 **C1020 INTERIOR DOORS**

202 SUBTOTAL -

203

204 **C1030 SPECIALTIES / MILLWORK**

205

206 055000 MISCELLANEOUS METALS

207 Miscellaneous metals complete 1,960 gsf 2.50 4,900

208

209 064100 FINISH CARPENTRY

210 Window sill, plastic laminate 100 lf 50.00 5,000

211

212 070001 WATERPROOFING, DAMPPROOFING AND CAULKING

213 Miscellaneous sealants throughout building 1,960 gsf 1.00 1,960

214

215 101100 VISUAL DISPLAY SURFACES

216 Tack surfaces, allow 1,960 gsf 0.25 490

217

218 101400 SIGNAGE

219 Signage; complete package 1,960 gsf 0.80 1,568

220 SUBTOTAL 13,918

221

TOTAL - INTERIOR CONSTRUCTION							\$27,636
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222

223

224 **C20 STAIRCASES**

225

226 **C2010 STAIR CONSTRUCTION**

227 SUBTOTAL -

228

229 **C2020 STAIR FINISHES**

230 SUBTOTAL -

231

TOTAL - STAIRCASES							
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232

233 **C30 INTERIOR FINISHES**

234

235 **C3010 WALL FINISHES**

236

237 090009 PAINTING

238 Paint to GWB 875 sf 0.70 613

239 SUBTOTAL 613

240

241 **C3020 FLOOR FINISHES**

242

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Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

247	090005	RESILIENT FLOORS						
248		VCT Running Bond	1,960	sf	6.00	11,760		
249		VCT w/ Schulter Edge Base; 12"	170	lf	10.00	1,700		
250		SUBTOTAL					13,460	
251								
252								
253	C3030	CEILING FINISHES						
254	095100	ACOUSTICAL TILE						
255		ACT - Running Bond	1,960	sf	8.00	15,680		
256		SUBTOTAL					15,680	
257								
258								
259	TOTAL - INTERIOR FINISHES							\$29,753

D10 CONVEYING SYSTEMS

262	D1010	ELEVATOR						
263								
264	055000	MISCELLANEOUS METALS						
265		Pit ladder and miscellaneous metals	1	ea	900.00	900		
266		Sill angles	40	lf	25.00	1,000		
267								
268	142000	ELEVATOR						
269		Elevator, 3 stop	1	ea	255,000.00	255,000		
270		SUBTOTAL					256,900	
271								
272								
273								
274	TOTAL - CONVEYING SYSTEMS							\$256,900

D20 PLUMBING

277	D20	PLUMBING						
278								
279		Plumbing add	1,960	sf	27.98	54,841		
280		SUBTOTAL					54,841	
281								
282								
283	TOTAL - PLUMBING							\$54,841

D30 HVAC

285	D30	HVAC						
286								
287		HVAC add	1,960	sf	126.54	248,018		
288		SUBTOTAL					248,018	
289								
290								
291								
292	TOTAL - HVAC							\$248,018



Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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ALTERNATE - BAY WINDOW

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D40 FIRE PROTECTION

D40 FIRE PROTECTION

Fire protection add	1,960	sf	9.10	17,836		
SUBTOTAL						17,836

TOTAL - FIRE PROTECTION \$17,836

D50 ELECTRICAL

D50 ELECTRICAL

Electrical add	1,960	sf	71.07	139,297		
SUBTOTAL						139,297

TOTAL - ELECTRICAL \$139,297

ALTERNATE SUBTOTAL **\$1,597,237**



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
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ALTERNATES

Solar Canopies at Parking

Parking area solar canopies: 11 canopies, total: 12,000 sf total of array	1	ls	475,000.00	475,000		
Electrical rough-in, allow (includes Civil Scope for Electrical)	1	ls	100,000.00	100,000		
Foundations for solar canopies	42	ea	2,500.00	105,000		
Connect to stormwater for roof runoff	1	ls	15,000.00	15,000		
Structure for solar canopies, assumed galvanized; allow 8#/SF	47	tns	5,500.00	258,500		
SUBTOTAL						953,500

TOTAL - Solar Canopies						ADD	\$953,500
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HVAC Option 2 - Air Source Heat Pump

Baseline - Geothermal	(1)	ls	11,009,938.00	(11,009,938)		
Air Source Heat Pump Chiller/Heater						
Air source heat recovery heat pump chiller/heater plant, 10 modular air source to water heat pump chillers with heat recovery w/30 tons of cooling per unit	300	tons	4,000.00	1,200,000		
Supplemental backup electric boiler	1	ea	50,000.00	50,000		
Chilled water pumps	4	ea	22,000.00	88,000		
Hot water pumps	4	ea	22,000.00	88,000		
Expansion tanks	3	ea	4,200.00	12,600		
Air separators	3	ea	3,500.00	10,500		
Buffer tanks	1	ea	4,200.00	4,200		
Glycol feeder	1	ea	3,800.00	3,800		
Heat exchanger	2	ea	15,000.00	30,000		
Radiant heating/cooling/perimeter	87,009	gsf	3.00	261,027		
Unit heaters and cabinet heaters	12	ea	1,800.00	21,600		
Split systems	3	ea	8,500.00	25,500		
Misc. Mech equipment	87,009	gsf	1.00	87,009		
<u>Air Distribution</u>						
ERV/RTU-1,2,3: Classrooms including SPED, Music, Art, Teacher Support, Cohort Commons, Circulation Areas; w/HW Coil, CW Coil & ERW, 30,000 CFM (Average 10,000 CFM each)	30,000	cfm	28.00	840,000		
ERV/RTU-4: Administration, Media Center and Adjacent Lobby Circulation Areas; w/HW Coil, CW Coil & ERU, 9,000 CFM.	9,000	cfm	28.00	252,000		
ERV/RTU-5: Cafeteria & Quiet Dining; w/HW Coil, CW Coil & ERW, 8,200 CFM	8,200	cfm	28.00	229,600		
RTU-6: Gym & Stage; w/HW Coil, CW Coil & ERW, 13,000 CFM	13,000	cfm	28.00	364,000		
ERV/RTU-7 Kitchen & Custodial/Support; w/HW Coil, CW Coil & ERW 2,500 CFM	2,500	cfm	28.00	70,000		
MUA-1: Kitchen Make-up air unit exhaust Fan and Dishwasher Exhaust Fan; 5,000 CFM.	5,000	cfm	22.00	110,000		
Misc. Mech Exhaust Fans	87,009	gsf	1.00	87,009		
<u>Sheet metal & Accessories</u>						
Galvanized ductwork with fittings & hangers	73,958	lbs	20.00	1,479,160		
Duct insulation	44,375	sf	6.00	266,250		
Black steel welded ductwork with hangers	1,500	lbs	26.00	39,000		
Duct insulation, fire wrap	900	sf	22.00	19,800		
Dishwasher exhaust	800	lbs	26.00	20,800		
Registers, grilles & diffusers	87,009	gsf	0.75	65,257		
VAV's w/coil	87,009	gsf	1.00	87,009		
Sound attenuators	1	ls	50,000.00	50,000		
Misc. Duct accessories	87,009	gsf	0.85	73,958		
<u>Mech. Piping</u>						
Pre-insulated underground piping from heating/cooling plant to an indoor mechanical room.	200	lf	120.00	24,000		
Hot water, supply and return	7,566	lf	65.00	491,790		
Chilled water, supply and return	4,323	lf	65.00	280,995		



Schematic Design Estimate

GFA 87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATES							
	Refrigerant piping - split systems	300	lf	50.00	15,000		
	Condensate drain piping with fittings & hangers	800	lf	45.00	36,000		
	Valves & accessories	1	ls	82,378.50	82,379		
	Piping insulation	12,189	lf	14.00	170,646		
	<u>Automatic Temperature Controls</u>						
	Automatic temperature controls DDC	87,009	gsf	8.00	696,072		
	<u>Balancing</u>						
	System testing & balancing	87,009	gsf	0.85	73,958		
	<u>Miscellaneous</u>						
	Coring, cutting, sleeves & fire stopping	1	ls	16,000.00	16,000		
	Vibration isolation and supports	1	ls	30,000.00	30,000		
	Hydraulic lifts/rigging	1	ls	60,000.00	60,000		
	Coordination / BIM / ENG Support / As-Builts	1	ls	156,616.20	156,616		
	Commissioning Support	1	ls	25,000.00	25,000		
	Fees & permits	1	ls	80,945.35	80,945		
	SUBTOTAL					(2,834,458)	

TOTAL - HVAC Option 2	ADD	(\$2,834,458)
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HVAC Option 3 - Air Source VRF

Baseline - Geothermal	(1)	ls	11,009,938.00	(11,009,938)
Air Source Variable Refrigerant Flow (VRF)				
Air source heat pump condensing units	300	tons	2,600.00	780,000
Brach controller	10	ea	5,500.00	55,000
Fan coil units	97	ea	2,600.00	252,200
Supplemental backup electric boiler				Assumed Not Required
Hot water pumps				Assumed Not Required
Expansion tanks				Assumed Not Required
Air separators				Assumed Not Required
Glycol feeder				Assumed Not Required
Radiant heating/cooling/perimeter	87,009	gsf	3.00	261,027
Unit heaters and cabinet heaters - Elec	12	ea	1,800.00	21,600
Split systems	3	ea	8,500.00	25,500
Misc. Mech equipment	87,009	gsf	0.50	43,505
<u>Air Distribution</u>				
DOAS/RTU-1,2,3: Classrooms including SPED, Music, Art, Teacher Support, Cohort Commons, Circulation Areas; w/HW Coil, CW Coil & ERU, 30,000 CFM (Average 10,000 CFM each)	30,000	cfm	28.00	840,000
DOAS/RTU-4: Administration, Media Center and Adjacent Lobby Circulation Areas; w/HW Coil, CW Coil & ERU, 9,000 CFM.	9,000	cfm	28.00	252,000
DOAS/RTU-5: Cafeteria & Quiet Dining; w/HW Coil, CW Coil & ERU, 8,200 CFM	8,200	cfm	28.00	229,600
DOAS/RTU-6: Gym & Stage; w/HW Coil, CW Coil & ERU, 13,000 CFM	13,000	cfm	28.00	364,000
DOAS/RTU-7 Kitchen & Custodial/Support; w/HW Coil, CW Coil & ERU 2,500 CFM	2,500	cfm	28.00	70,000
MUA-1: Kitchen Make-up air unit exhaust Fan and Dishwasher Exhaust Fan; 5,000 CFM.	5,000	cfm	18.00	90,000
Misc. Mech Exhaust Fans	87,009	gsf	0.50	43,505
<u>Sheet metal & Accessories</u>				
Galvanized ductwork with fittings & hangers	52,205	lbs	20.00	1,044,100
Duct insulation	31,323	sf	6.00	187,938
Black steel welded ductwork with hangers	1,500	lbs	26.00	39,000
Duct insulation, fire wrap	900	sf	22.00	19,800
Dishwasher exhaust	800	lbs	26.00	20,800
Registers, grilles & diffusers	87,009	gsf	0.75	65,257
VAV's- Elec	87,009	gsf	0.80	69,607
Sound attenuators	1	ea	50,000.00	50,000
Misc. Duct accessories	87,009	gsf	1.00	87,009
<u>Mech. Piping</u>				
Refrigerant piping - CU to DOAS Units	600	lf	70.00	42,000
Refrigerant piping for VRF	10,876	lf	50.00	543,800
Refrigerant piping - split systems	300	lf	50.00	15,000



Schematic Design Estimate

GFA

87,009

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
ALTERNATES							
	Condensate drain piping with fittings & hangers	1,740	lf	45.00	78,300		
	Valves & accessories	1	ls	101,865.00	101,865		
	Piping insulation	13,516	lf	14.00	189,224		
	<u>Automatic Temperature Controls</u>						
	Automatic temperature controls DDC	87,009	gsf	6.00	522,054		
	<u>Balancing</u>						
	System testing & balancing	87,009	gsf	0.80	69,607		
	<u>Miscellaneous</u>						
	Coring, cutting, sleeves & fire stopping	1	ls	16,000.00	16,000		
	Vibration isolation and supports	1	ls	30,000.00	30,000		
	Hydraulic lifts/rigging	1	ls	60,000.00	60,000		
	Coordination / BIM / ENG Support / As-Builts	1	ls	135,000.00	135,000		
	Commissioning Support	1	ls	25,000.00	25,000		
	Fees & permits	1	ls	67,392.98	67,393		
	SUBTOTAL					(4,203,247)	

TOTAL - HVAC Option 3	DEDUCT	(\$4,203,247)
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19 Cost Estimate - OPM

The cost estimates from AM Foggarty (OPM estimator) follows.

Schematic Design
Oakdale Elementary School
Dedham, MA
MSBA PROJECT NO: #202000730030
27-Aug-24

Drawings Dated 7/8/2024:
Designer: Jonathan Levi Architects

NEW BUILDING	87,009	GSF	\$559.63	\$48,692,569
SITework				\$12,587,524
BUILDING DEMOLITION	25,200	GSF	\$9.00	\$226,800
BUILDING DEMOLITION - 1902	27,456	GSF	\$10.00	\$274,560
HAZARDOUS WASTE REMOVAL (UEC 8-14-23 QUOTE LESS DESIGN)				\$1,776,700
TOTAL DIRECT COST (escalated to the mid point of construction)				----- \$63,558,154
CM, Ch. 149a:				
DESIGN CONTINGENCY		10%		\$6,355,815
CM CONTINGENCY		3%		\$2,097,419
ESCALATION (winter 2026)		6.75%		\$4,719,193
GENERAL CONDITIONS	20	MOS	\$165,000	\$3,300,000
GENERAL CONDITIONS	8	MOS	\$120,000	\$960,000
GENERAL REQUIRMENTS		3.25%		\$2,632,194
BUILDING PERMIT		waived		
BOND AND GL INSURANCE		2%		\$1,672,455
PROFIT		2.75%		\$2,345,619
TOTAL CONSTRUCTION COST				----- \$87,640,849
COST PER S.F.				\$1,007.26

Project: Oakdale Elementary School
 Location: Dedham, MA
 Client: The Vertex Companies, LLC
 Date: 27-Aug-24

NO. OF SQ. FT.: 87,009
 COST PER SQ. FT.: \$704.30

CSI SUMMARY

NEW ELEMENTARY SCHOOL

	DIVISION TOTAL	PERCENT OF PROJECT	COST PER SF
DIVISION 02 - EXISTING CONDITIONS			
024100 DEMOLITION	0	0%	0.00
024180 ASBESTOS ABATEMENT	0	0%	0.00
024116 STRUCTURE DEMOLITION	0	0%	0.00
DIVISION 03 - CONCRETE			
033000 CAST IN PLACE CONCRETE	3,969,954	6%	45.63
DIVISION 04 - MASONRY			
040001 MASONRY*	1,951,530	3%	22.43
DIVISION 05 - METALS			
050001 MISCELLANEOUS & ORNAMENTAL IRON*	750,411	1%	8.62
051200 STRUCTURAL STEEL	3,186,668	5%	36.62
053100 STEEL DECKING	571,332	1%	6.57
054000 COLD FORMED METAL FRAMING	0	0%	0.00
DIVISION 06 - WOOD, PLASTICS & COMPOSITES			
061000 ROUGH CARPENTRY	574,660	1%	6.60
062000 FINISH CARPENTRY	342,080	1%	3.93
064000 ARCHITECTURAL CASEWORK	1,544,815	3%	17.75
DIVISION 07 - THERMAL & MOISTURE PROTECTION			
070001 DAMPPROOF., WATERPROOF. & CAULKING*	248,148	0%	2.85
070002 ROOFING AND FLASHING*	1,695,644	3%	19.49
071326 AIR & VAPOR BARRIERS	328,228	1%	3.77
072100 INSULATION	421,087	1%	4.84
074000 EXT WALL PANELS & TRIM	859,914	1%	9.88
078100 FIREPROOFING	372,357	1%	4.28
079500 EXPANSION CONTROL	0	0%	0.00
DIVISION 08 - OPENINGS			
080001 METAL WINDOWS*	2,247,480	4%	25.83
080002 GLASS AND GLAZING*	315,386	1%	3.62
081113 HOLLOW METALWORK	119,140	0%	1.37
081416 WOOD DOORS	183,900	0%	2.11
083323 SPECIAL DOORS	65,000	0%	0.75
087100 FINISH HARDWARE	345,260	1%	3.97

Oakdale Elementary School - Schematic Estimate CSI SUMMARY	DIVISION TOTAL	PERCENT OF PROJECT	COST PER SF
			0.00
DIVISION 09 - FINISHES			0.00
090002 TILE*	347,178	1%	3.99
090003 ACOUSTICAL TILE*	662,240	1%	7.61
090005 RESILIENT FLOORING*	462,517	1%	5.32
090007 PAINTING*	323,389	1%	3.72
092116 GYPSUM WALLBOARD	2,929,017	5%	33.66
095000 WOOD ATHLETIC FLOOR	179,358	0%	2.06
096800 CARPET	0	0%	0.00
097500 RESINOUS FLOORING	102,935	0%	1.18
098400 ACOUSTICAL WALL TREATMENT	96,670	0%	1.11
098400 ACOUSTIC ROOM COMPONENTS		0%	0.00
			0.00
DIVISION 10 - SPECIALTIES	0		0.00
101100 VISUAL DISPLAY	100,060	0%	1.15
101400 IDENTIFYING DEVICES	39,500	0%	0.45
102113 COMPARTMENTS & CUBICLES	46,900	0%	0.54
102813 TOILET ACCESSORIES	49,530	0%	0.57
109000 MISCELLANEOUS SPECIALTIES	390,471	1%	4.49
			0.00
DIVISION 11 - EQUIPMENT	0		0.00
113100 APPLIANCES	11,000	0%	0.13
114000 FOOD SERVICE EQUIPMENT	706,650	1%	8.12
115213 PROJECTION SCREENS	12,000	0%	0.14
116143 STAGE DRAPERY	30,000	0%	0.34
116600 ATHLETIC & SPORTS EQUIPMENT	146,320	0%	1.68
119000 MISC. EQUIPMENT	6,700	0%	0.08
			0.00
DIVISION 12 - FURNISHINGS	0		0.00
122413 SHADES	179,908	0%	2.07
124813 ENTRANCE MATS & FRAMES	26,070	0%	0.30
			0.00
DIVISION 13 - SPECIAL CONSTRUCTION	0		0.00
139000 SPCEIAL CONSTRUCTION	0	0%	0.00
			0.00
DIVISION 14 - CONVEYING EQUIPMENT	0		0.00
140001 ELEVATORS & LIFTS*	170,000	0%	1.95
			0.00
DIVISION 21 - FIRE SUPPRESSION	0		0.00
210001 FIRE SUPPRESSION*	793,850	1%	9.12
			0.00
Oakdale Elementary School - Schematic Estimate		PERCENT OF PROJECT	COST PER SF
DIVISION 22 - PLUMBING	0		0.00
220001 PLUMBING*	2,425,723	4%	27.88
			0.00
DIVISION 23 - HVAC	0		0.00
230001 HVAC*	10,980,106	18%	126.20
			0.00
DIVISION 26 - ELECTRICAL	0		0.00
260001 ELECTRICAL*	6,633,825	11%	76.24
			0.00
DIVISION 31 - EARTHWORK	0		0.00
310000 EARTHWORK	4,865,247	8%	55.92
311000 SITE PREPARATION & CLEARING	747,119	1%	8.59

			0.00
DIVISION 32 - EXTERIOR IMPROVEMENTS	0		0.00
321000 PAVEMENT, CURBING & EDGING	2,000,849	3%	23.00
323100 SITE IMPROVEMENTS	2,998,925	5%	34.47
328000 IRRIGATION	122,363	0%	1.41
329000 LANDSCAPING	903,444	1%	10.38
			0.00
DIVISION 33 - UTILITIES	0		0.00
330000 UTILITIES	1,697,235	3%	19.51
SUB-TOTAL			

DIRECT COST	61,280,094	100%	704.30

*DENOTES FILED SUB-BID

PROJECT: Oakdale Elementary School
 LOCATION: Dedham, MA
 CLIENT: The Vertex Companies, LLC
 DATE: 27-Aug-24

NO. OF SQ. FT.: 87,009
 COST PER SQ. FT.: \$704.30
 *Email Noted GSF

No.: 23075

SUMMARY

NEW ELEMENTARY SCHOOL

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
A. SUBSTRUCTURE			
A10 - FOUNDATIONS			
A1010 STANDARD FOUNDATIONS	3,445,609	6%	39.60
A1020 SPECIAL FOUNDATIONS	0	0%	0.00
A1030 SLAB ON GRADE	931,600	2%	10.71
A20 - BASEMENT CONSTRUCTION			
A2010 BASEMENT EXCAVATION	0	0%	0.00
A2020 BASEMENT WALLS	0	0%	0.00
B. SHELL			
B10 - SUPERSTRUCTURE			
B1010 FLOOR CONSTRUCTION	2,129,434	3%	24.47
B1020 ROOF CONSTRUCTION	3,078,649	5%	35.38
B20 - EXTERIOR ENCLOSURE			
B2010 EXTERIOR WALLS	3,909,458	6%	44.93
B2020 EXTERIOR WINDOWS	2,047,970	3%	23.54
B2030 EXTERIOR DOORS	126,544	0%	1.45
B30 - ROOFING			
B3010 ROOF COVERINGS	1,777,019	3%	20.42
B3020 ROOF OPENINGS	0	0%	0.00
C. INTERIORS			
C10 - INTERIOR CONSTRUCTION			
C1010 PARTITIONS	2,617,514	4%	30.08
C1020 INTERIOR DOORS	1,093,420	2%	12.57
C1030 FITTINGS	2,372,584	4%	27.27
C20 - STAIRS			
C2010 STAIR CONSTRUCTION	405,212	1%	4.66
C2020 STAIR FINISHES	43,856	0%	0.50
C30 - INTERIOR FINISHES			
C3010 WALL FINISHES	938,097	2%	10.78
C3020 FLOOR FINISHES	1,076,853	2%	12.38
C3030 CEILING FINISHES	1,044,131	2%	12.00
D. SERVICES			
D10 - CONVEYING			
D1010 ELEVATORS & LIFTS	179,000	0%	2.06
D1010 ESCALATORS & MOVING WALKS	0	0%	0.00
D1090 OTHER CONVEYING SYSTEMS	0	0%	0.00
D20 - PLUMBING			
D2010 PLUMBING	2,425,723	4%	27.88

Oakdale Elementary School - Schematic

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
D30 - HVAC			
D3010 HVAC	10,980,106	18%	126.20
D40 - FIRE PROTECTION			
D4010 SPRINKLERS	793,850	1%	9.12
D4020 STANDPIPES	0	0%	0.00
D4030 FIRE PROTECTION SPECIALTIES	0	0%	0.00
D4090 OTHER FIRE PROTECTION SYSTEMS	0	0%	0.00
D50 - ELECTRICAL			
D5010 ELECTRICAL SERVICE & DISTRIBUTION	6,183,363	10%	71.07
D5020 LIGHTING & BRANCH WIRING	0	0%	0.00
D5030 COMMUNICATION & SECURITY	0	0%	0.00
D5090 OTHER ELECTRICAL SYSTEMS	0	0%	0.00
E. EQUIPMENT & FURNISHINGS			
E10 - EQUIPMENT			
E1010 COMMERCIAL EQUIPMENT	706,650	1%	8.12
E1020 INSTITUTIONAL EQUIPMENT	0	0%	0.00
E1030 VEHICULAR EQUIPMENT	0	0%	0.00
E1090 OTHER EQUIPMENT	206,020	0%	2.37
E20 - FURNISHINGS			
E 2010 FIXED FURNISHINGS	179,908	0%	2.07
E2020 MOVABLE FURNISHINGS	0	0%	0.00
F. SPECIAL CONSTRUCTION & DEMOLITION			
F10 - SPECIAL CONSTRUCTION			
F1010 SPECIAL STRUCTURES	0	0%	0.00
F1020 INTEGRATED CONSTRUCTION	0	0%	0.00
F1030 SPECIAL CONSTRUCTION SYSTEMS	0	0%	0.00
F1040 SPECIAL FACILITIES	0	0%	0.00
F1050 SPECIAL CONTROLS & INSTRUMENTATION	0	0%	0.00
F20 - SELECTIVE BUILDING DEMOLITION			
F2010 BUILDING ELEMENTS DEMOLITION	0	0%	0.00
F2020 HAZARDOUS COMPONENTS ABATEMENT	0	0%	0.00
G. BUILDING SITEWORK			
G10 - SITE PREPARATION			
G1010 SITE CLEARING	747,119	1%	8.59
G1020 SITE DEMOLITION & RELOCATIONS	0	0%	0.00
G1030 SITE EARTHWORK	3,509,623	6%	40.34
G1040 HAZARDOUS WASTE REMEDIATION	0	0%	0.00
G20 - SITE IMPROVEMENTS			
G2010 ROADWAYS	1,273,476	2%	14.64
G2020 PARKING LOTS	0	0%	0.00
G2030 PEDESTRIAN PAVING	727,372	1%	8.36
G2040 SITE DEVELOPMENT	3,156,431	5%	36.28
G2050 LANDSCAPING	1,025,806	2%	11.79

Oakdale Elementary School - Schematic

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
G30 - SITE MECHANICAL UTILITIES			
G3010 WATER SUPPLY	129,340	0%	1.49
G3020 SANITARY SEWER	100,300	0%	1.15
G3030 STORM SEWER	1,302,945	2%	14.97
G3040 HEATING DISTRIBUTION	0	0%	0.00
G3050 COOLING DISTRIBUTION	0	0%	0.00
G3060 FUEL DISTRIBUTION	0	0%	0.00
G3090 OTHER SITE MECHANICAL UTILITIES	9,150	0%	0.11
G40 - SITE ELECTRICAL UTILITIES			
G4010 ELECTRICAL DISTRIBUTION	285,368	0%	3.28
G4020 SITE LIGHTING	320,594	1%	3.68
G4030 SITE COMMUNICATIONS & SECURITY	0	0%	0.00
G4090 OTHER SITE ELECTRICAL UTILITIES	0	0%	0.00
G90 - OTHER SITE CONSTRUCTION			
G9010 SERVICE AND PEDESTRIAN TUNNELS	0	0%	0.00
G9090 OTHER SITE SYSTEMS	0	0%	0.00
TOTAL DIRECT COST	61,280,094	100%	704.30

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A. SUBSTRUCTURE				
A10 - FOUNDATIONS				
A1010 STANDARD FOUNDATIONS				
033000 CAST IN PLACE CONCRETE				
Column Footing (7x7x2 @ 71 ea): 4,000 psi, NW, (incl. placement)	260	CY	328.00	85,280
Formwork	4,000	SFCA	15.00	60,000
Rebar	19,500	LBS	1.65	32,175
<i>*unit cost \$682.52</i>				
Perim B LVL Wall Footing (3' x 1'-4" 234 LF): 4,000 psi, NW, (incl. placement)	35	CY	328.00	11,480
Formwork	936	SFCA	16.00	14,976
Rebar	2,625	LBS	1.65	4,331
<i>*unit cost \$879.64</i>				
Perim 1ST Flr Wall Footing (6' x 1'-4" 1,440 LF): 4,000 psi, NW, (incl. placement)	426	CY	328.00	139,728
Formwork	5,760	SFCA	16.00	92,160
Stepped Formwork	334	SFCA	16.00	5,344
Rebar	31,950	LBS	1.65	52,718
<i>*unit cost \$680.63</i>				
Basement Perim. Foundation Wall 18" x 18' deep (278 lf): 4,000 psi, NW, (incl. placement)	278	CY	328.00	91,184
Formwork	10,008	SFCA	25.00	250,200
Brick Shelf/stem wall	200	LF	24.00	4,800
Reinforcing steel	83,400	LBS	1.65	137,610
<i>*unit cost \$1,740.27</i>				
Perim. 1st Flr Frost Wall 18" x 4' depth (1,400 lf): 4,000 psi, NW, (incl. placement)	310	CY	328.00	101,680
Formwork - 4'	11,200	SFCA	25.00	280,000
Formwork - Stepped 4 - 18'	4,000	SFCA	28.79	115,140
Brick Shelf/stem wall	1,400	LF	24.00	33,600
Reinforcing steel	31,000	LBS	1.65	51,150
<i>*unit cost \$1,876.03</i>				
Allow Grade Beam @ Int. Brace Frame - (2'x2' - 225 lf): 4000 psi, NW, (incl. placement)	34	CY	328.00	11,152
Formwork	900	SFCA	24.00	21,600
Rebar	3,230	LBS	1.65	5,330
<i>*unit cost \$1,120.04</i>				
Int Wall Footing @ platform & ramps (2' x 1'- 355 LF): 4,000 psi, NW, (incl. placement)	26	CY	328.00	8,528
Formwork	710	SFCA	16.00	11,360
Rebar	1,950	LBS	1.65	3,218
<i>*unit cost \$888.67</i>				
Int Knee Wall @ platform & ramps (355 lf):				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4,000 psi, NW, (incl. placement)	55	CY	328.00	18,040
Formwork	2,840	SFCA	18.00	51,120
Reinforcing steel	8,250	LBS	1.65	13,613
<i>*unit cost \$1,504.95</i>				
Pier/pilaster	43	CY	1,100.00	47,300
Int mechanical pads	1	LS	5,000.00	5,000
18" Elevator mat	11	CY	750.00	8,250
Elev sump pit	1	EA	850.00	850
12" Elevator pit wall 5'H	8	CY	1,250.00	10,000
Concrete Protection and Clean up and Mobilization	1	LS	100,000.00	100,000
Anchor bolts and grouting	180	EA	235.00	42,300
Loading Dock :				
Wall footing (58 LF)	4.5	CY	675.00	3,038
Foundation wall (58 LF)	17	CY	1,350.00	22,950
Loading Dock Stair Structure-allow	1	FLT	7,500.00	7,500
Misc. Foundations	1	LS	200,000.00	200,000
Site Walls & Stairs		w/ sitework		
<u>072100 INSULATION</u>				
R=10 2" Rigid ext. found. insul - B LVL	4,448	SF	3.95	17,570
R=10 2" Rigid ext. found. insul - frost wall	5,600	SF	3.95	22,120
<u>070001 DAMPPROOF., WATERPROOF. & CAULKING*</u>				
Foundation wall / ftg waterproofing - B LVL	5,740	SF	9.25	53,095
Foundation dampproofing - 1st FLR	8,432	SF	2.10	17,707
Elev. pit waterproofing	1	EA	7,900.00	7,900
<u>310000 EARTHWORK</u>				
Over excavate 3' :				
Building Cut	5,737	CY	11.00	63,108
Haul and load spoil	5,737	CY	8.00	45,897
Soil Disposal	9,753	TONS	23.00	224,321
Structural fill	5,737	CY	58.00	332,752
Building Earthwork:				
Building Cut	4,381	CY	11.00	48,191
Haul and load spoil	4,381	CY	8.00	35,048
Soil Disposal	7,448	TONS	23.00	171,297
Structural fill	650	CY	58.00	37,700
Foundation excavation	3,800	CY	12.00	45,600
Foundation backfill - on site mat'l	3,800	CY	15.00	57,000
Dewatering	1	LS	30,000.00	30,000
Drainage System-Allow:				
Under slab Perf Drain		N/A		
Perim fnd drain B LVL	250	LF	48.00	12,000
Perim fnd drain 1st flr	1,450	LF	48.00	69,600
SUB-TOTAL				----- 3,445,609

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A1030 SLAB ON GRADE				
<u>310000 EARTHWORK</u>				
12" Gravel base (@ SOG	1,912	CY	62.00	118,567
Excavate plumbing trench/ col ftg	51,634	GSF	1.25	64,543
<u>033000 CAST IN PLACE CONCRETE</u>				
5" Slab on Grade - B & 1st flr:				
4,000 psi, NW, (incl. placement)	797	CY	350.00	278,950
WWF (4x4 - W 4.0 x W4.0)	51,634	LBS	1.80	92,941
Control Joint	3,442	LF	2.60	8,949
Trowel Finish	51,634	SF	2.45	126,503
*unit cost \$9.83				
Cohort Common raised slab on grade(1 loc)	1	LS	20,000.00	20,000
Stegro vapor barrier (15 mil)	51,634	SF	1.04	53,699
Ext Concrete Loading Dock Slab :				
5" Typ Conc pavement w/ wwf	400	SF	12.00	4,800
<u>072100 INSULATION</u>				
R10 2" Rigid Slab Insul - 100%	51,634	SF	3.15	162,647
SUB-TOTAL				931,600
TOTAL A10 FOUNDATIONS				4,377,209

B. SHELL**B10 - SUPERSTRUCTURE****B1010 FLOOR CONSTRUCTION****051200 STRUCTURAL STEEL**

Floor Frame - Allow:

1st Flr Frame Structural Steel (12 #/4,032 SF)	24.2	TONS	5,350.00	129,427
2nd, 3rd & PH Frame Structural Steel (15 #/31,343SF)	235.1	TONS	5,350.00	1,257,638

*Typ steel allowance includes col, bracing and connections allowance 10%

Miscellaneous:

Shear stud (25/100 sf)	5,000	EA	5.65	28,250
Expansion joint assembly	85	LF	225.00	19,125
Elev hoist beam & backup rails(1 Elev)	1	LS	5,250.00	5,250

033000 CAST IN PLACE CONCRETE

6.5 - 3 1/2" NW Deck fill (6x6 w2xw2.9)	35,375	SF	9.80	346,675
1" Gyp cement underlayment & 1/4" acoustic mat (035413)		W / C3020		

053100 STEEL DECKING

3" x 18 Ga. Typ Floor Comp Deck	35,375	SF	6.05	214,019
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<u>078100 FIREPROOFING</u>				
Fireproofing Floor:				
Cementitious Fireproofing (078116)	35,375	SF	2.80	99,050
Intumescent Fireproofing (078123)	1	LS	30,000.00	30,000

SUB-TOTAL				2,129,434
<u>B1020 ROOF CONSTRUCTION</u>				
<u>033000 CAST IN PLACE CONCRETE</u>				
6.5 - 3 1/2" NW Deck fill (6x6 w2.9xw2.9):				
Typ	47,900	SF	9.80	469,420
<u>051200 STRUCTURAL STEEL</u>				
Structural Steel Frame-Allowance:				
Typ roof (13# @ 47,900 SF)	311.4	TONS	5,350.00	1,665,723
Allow galv steel dunnage	7	TONS	6,000.00	42,000
Shear stud (25/100 sf)	2,000	EA	5.35	10,700
Supplemental Steel @ Mass Timber Roof Frame:				
Tension tie rod	5,711	SF	5.00	28,555
*Steel tension access bracing				
<u>053100 STEEL DECKING</u>				
Roof Deck 3"x18 ga Galv. Cellular:				
Cafe (leaf like)	3,430	SF	13.50	46,305
Media ctr (tree like)	2,281	SF	13.50	30,794
*072100 spec notes installation of sound-absorbing insulation at acoustical metal deck				
3" x 18 ga - Roof Comp Deck :				
Typ Roof	47,900	SF	5.85	280,215
<u>078100 FIREPROOFING</u>				
Fireproofing Roof:				
Cementitious Fireproofing (078116)	47,900	SF	3.00	143,700
Intumescent Fireproofing (078123)	1	LS	30,000.00	30,000
<u>061000 ROUGH CARPENTRY</u>				
Mass Timber Roof Frame:				
Cafe (leaf like)	3,430	GSF	58.00	198,940
Media ctr (tree like)	2,281	GSF	58.00	132,298

SUB-TOTAL				3,078,649
TOTAL B10 SUPERSTRUCTURE				5,208,083

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B20 - EXTERIOR ENCLOSURE				
B2010 EXTERIOR WALLS				
<u>040001 MASONRY*</u>				
Exterior Wall Mock-up	1	LS	75,000.00	75,000
Masonry Veneer:				
Scored Utility Brick veneer	30,151	SF	45.50	1,371,871
Cafe Column Base	4	LOC	5,000.00	20,000
Enrty Column base	7	LOC	3,500.00	24,500
Gym 12" CMU Back-up	7,352	SF	40.10	294,815
S.S. Masonry flashing	1,500	LF	24.00	36,000
Staging		inc. w/ unit		
*Brick 4x12 & 8x8 ironspot brick w/ custom 3/8"score(Endicott/Belden)				
<u>050001 MISCELLANEOUS & ORNAMENTAL IRON*</u>				
Allow:				
Galv. loose lintel	1,500	LF	48.00	72,000
<u>092116 GYPSUM WALLBOARD</u>				
Exterior Wall:				
6" x 16 ga. Exterior Wall Frame	25,457	SF	14.25	362,762
1/2" Dens glass sheathing	25,457	SF	3.95	100,555
Int. 1 lyr 5/8" Gyp Finish	24,000	SF	4.00	96,000
Fins:				
4" x 16 ga. Exterior Wall Frame	2,328	SF	10.00	23,280
1/2" Dens glass sheathing	2,328	SF	6.00	13,968
Soffit and Canopy:				
4" x 16 ga. Exterior Wall Frame	2,464	SF	8.50	20,944
1/2" Dens glass sheathing	2,464	SF	5.00	12,320
<u>070001 DAMPPROOF., WATERPROOF. & CAULKING*</u>				
Misc Ext Wall Control joints	1	LS	15,000.00	15,000
<u>071326 AIR & VAPOR BARRIERS</u>				
Adhered air & vapor barrier:				
Typical wall	25,457	SF	9.15	232,932
Ext Soffit	2,464	SF	9.15	22,546
Fins	2,328	SF	9.15	21,301
<u>072100 INSULATION</u>				
Exterior Wall:				
5" Rigid stone wool @ panel	2,658	SF	4.95	13,157
3" Mineral wool @ masonry R-22	30,151	SF	4.10	123,619
6" Cavity insul.		N/A		
Soffit:				
3" Mineral wool @ masonry R-22	2,464	SF	4.10	10,102

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Fins:				
2" Rigid Insul.	2,328	SF	5.25	12,222
Spray foam @ perim wall openings-allow	4,200	LF	8.25	34,650
Spray insul @ perim deck flute/ roof edge-allow	1	LS	25,000.00	25,000
<u>074000 EXT WALL PANELS & TRIM</u>				
Phenolic panel:				
Main Bldg Envelope	2,658	SF	100.00	265,800
Fins/piers	2,328	SF	112.00	260,736
Metal Panels:				
Roof Penthouse	200	SF	100.00	20,000
Ext Prefinished Alum Soffit Panel:	2,464	SF	52.00	128,128
Roof Screen RTU Panel - 10'	2,850	SF	65.00	185,250
*Includes girt fastening sys & excludes acoustic panels				
<u>090007 PAINTING*</u>				
Misc. ext. painting	1	LS	10,000.00	10,000
<u>101400 IDENTIFYING DEVICES</u>				
Ext signage -allow	1	LS	5,000.00	5,000
*Site signage is with site improvements				
SUB-TOTAL				3,909,458
B2020 EXTERIOR WINDOWS				
<u>061000 ROUGH CARPENTRY</u>				
P.T. blocking perim ext CW open.	4,200	LF	14.50	60,900
<u>071326 AIR & VAPOR BARRIERS</u>				
Flex flashing - perim ext CW open.	4,200	LF	12.25	51,450
<u>070001 DAMPPROOF., WATERPROOF. & CAULKING*</u>				
Exterior sealants - perim. ext CW open.	4,200	LF	15.50	65,100
<u>080001 METAL WINDOWS*</u>				
Alum Window - Triple glazed	4,396	SF	165.00	725,340
Alum. Curtainwall - triple glaze	4,396	SF	205.00	901,180
Allow:				
Premium Op vent		inc.		
Premium Safety Glazing @ 1st flr - allow	5,000	SF	40.00	200,000
Sun Control CW Horiz screen @ Cafe	260	SF	150.00	39,000
<u>109000 MISCELLANEOUS SPECIALTIES</u>				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Alum louvers(089000)	1	LS	5,000.00	5,000
SUB-TOTAL				2,047,970
B2030 EXTERIOR DOORS				
<u>061000 ROUGH CARPENTRY</u>				
P.T. - perim blocking HM open	82	LF	13.25	1,087
<u>070001 DAMPPROOF., WATERPROOF. & CAULKING*</u>				
Exterior sealants - perim. HM open	82	LF	15.50	1,271
Adhered membrane - perim. HM open	82	LF	13.00	1,066
<u>080001 METAL WINDOWS*</u>				
8' Ext. Alum. Door, Frame, Glass, Glazing & Hardware-Allow:				
Entry - sgl	1	EA	6,800.00	6,800
Entry - dbl	1	PR	14,250.00	14,250
Cafe - dbl	1	PR	14,250.00	14,250
Sides and Rear Egress - dbl	3	PR	14,250.00	42,750
Premium Safety Glazing (@ Alum. Door(088713):				
8'H Entry - sgl	1	EA	625.00	625
8'H Entry - dbl	5	PR	1,250.00	6,250
<u>081113 HOLLOW METALWORK</u>				
8'H Ext. HM Frame-Allow :				
Single Door	2	EA	360.00	720
Double Door	5	EA	400.00	2,000
8'H Insulated HM Doors -Allow :				
PH Roof access - sgl	1	EA	875.00	875
Outdoor Storage Rm- dbl	1	EA	1,750.00	1,750
Receiving- dbl	1	EA	1,750.00	1,750
Gym - dbl	2	EA	2,000.00	4,000
Fire Pump - dbl	1	EA	2,000.00	2,000
<u>087100 FINISH HARDWARE</u>				
Allow:				
Card reader		w/Elec		
Hold open		w/Elec		
Entry auto opener	1	LOC	9,000.00	9,000
Exterior Hardware Set (@ HM Door @) :				
PH Roof access - sgl	1	EA	1,800.00	1,800
Outdoor Storage Rm- dbl	1	EA	2,200.00	2,200
Receiving- dbl	1	EA	2,200.00	2,200
Gym - dbl	2	EA	2,500.00	5,000
Fire Pump - dbl	1	EA	2,500.00	2,500
Exterior Hardware Set @ Alum Door		W / Unit Cost		

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<u>090007 PAINTING*</u>				
Paint Exterior Door & Frame:				
Paint HM door & Frame - sgl	2	EA	200.00	400
Paint HM door & Frame - dbl	5	EA	400.00	2,000
SUB-TOTAL				126,544
TOTAL B20 - EXTERIOR ENCLOSURE				6,083,972

B30 - ROOFING

B3010 ROOF COVERINGS

061000 ROUGH CARPENTRY

Blocking & Ply	54,250	SF	1.50	81,375
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070002 ROOFING AND FLASHING*

Typ Roof & Canopy :				
PVC Roofing (white memb 60 mil)	54,250	SF	11.00	596,750
1/2" Cover board	54,250	SF	2.60	141,050
Rigid insul(R-46)	54,250	SF	9.00	488,250
Air & vapor barrier	54,250	SF	2.25	122,063
Self adhering vapor retarder @ conc deck	47,900	SF	2.25	107,775
Flexible walkway paver-allow	2,000	SF	7.75	15,500
Membrane Flashing-allow	53,611	SF	1.50	80,417
Flashing(Zinc-coated Copper) @ :				
Typ base flashing	645	LF	28.00	18,060
Typ roof edge	1,839	LF	45.00	82,755
PH Scupper w/ downspout & splash	1	LOC	2,000.00	2,000
Exp jt assembly - allow	85	LF	165.00	14,025
Mech equip roof screen flashing - allow	1	LS	5,000.00	5,000
MEP equip flashing - allow	1	LS	10,000.00	10,000
Roof hatch		NIC		
Entrance Canopy TRP Dome skylight (086200 7' W)	2	EA	6,000.00	12,000
Fall protection guardrail		TBD		

SUB-TOTAL				1,777,019
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B3020 ROOF OPENINGS

050001 MISCELLANEOUS & ORNAMENTAL IRON*

Ext Roof Ladder		NIC		
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SUB-TOTAL				0
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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TOTAL B30 ROOFING				1,777,019
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C. INTERIORS

C10 - INTERIOR CONSTRUCTION

C1010 PARTITIONS

040001 MASONRY*

Allow:

Masonry Veneer - Int Vestibule (2 loc)	200	SF	45.00	9,000
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CMU Partition-:

8" CMU Elevator Shaft	1,687	SF	44.00	74,228
12" CMU - Gym	1,098	SF	42.00	46,116

050001 MISCELLANEOUS & ORNAMENTAL IRON*

Elev Shaft CMU Partition:

Angle brace frame - 4' OC	32	EA	235.00	7,520
Loose lintels	28	LF	45.00	1,260

Allow:

Support frame @ Glazed Folding Door Sys	42	LF	145.00	6,090
Support frame @ coiling grille	60	LF	145.00	8,700

061000 ROUGH CARPENTRY

Interior blocking	87,009	GSF	0.65	56,556
Misc. rough carpentry	87,009	GSF	0.50	43,505

070001 DAMPPROOF., WATERPROOF. & CAULKING*

Int joint sealants(079200)	87,009	GSF	1.00	87,009
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078100 FIREPROOFING

Firestopping(0784100)	87,009	GSF	0.80	69,607
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081113 HOLLOW METALWORK

Int H.M. Sidelight and Transom Frame		N/A		
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080001 METAL WINDOWS*

Int Alum CW / Storefront Frame, Glass & Glazing:

Entry Vestibule 10'H (2 loc)	130	SF	165.00	21,450
Security Window w/ pass thru complete	1	EA	6,200.00	6,200

Premium Safety Glazing @ Alum. Door(088713):

Entry Vestibule 10'H (2 loc)	130	SF	50.00	6,500
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080002 GLASS AND GLAZING*

Int. Glass & Glazing W / Alum CH Frame - Complete:

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Teacher Planning/Corridor (19 loc / 120 SF)	1,634	SF	94.00	153,596
Cohort Common 1st flr (1 loc)	217	SF	94.00	20,398
Cohort Common 2nd & 3rd flr	48	SF	94.00	4,512
Premium Decorative Glazing Interlayer Lam Glass(088713) @: Int. Glass & Glazing W / Alum CH Frame - 50%	950	SF	20.00	19,000

092116 GYPSUM WALLBOARD

Drywall Partitions (NIC cement & ply Backer Bd)-Allow:

Admin/Offices typ.	12,189	SF	19.00	231,591
Basement typ.	1,324	SF	18.00	23,832
Classroom typ.	19,235	SF	22.00	423,170
Corridor typ.	25,143	SF	22.00	553,146
Classroom Demising	8,328	SF	22.00	183,216
Media Ctr.	1,393	SF	22.00	30,646
MEP typ.	2,722	SF	26.50	72,133
Plumbing Chase	7,528	SF	15.00	112,920
Shaft wall -allow	1,200	SF	23.00	27,600
Chase wall/ furring @ elev cmu	1,400	SF	12.50	17,500
Level 5 Premium	20000	SF	3.50	70,000
Preformed reveal premium	1	LS	25,000.00	25,000
Abuse Resistant premium	25,000	SF	3.00	75,000
Misc GWB Assemblies	87,009	GSF	1.50	130,514

*Partitions include sound attenuation, tape & joint compound finish(lvl 5 exp. to view)

SUB-TOTAL

2,617,514C1020 INTERIOR DOORS081113 HOLLOW METALWORK

8'H Int HM Door Frame:

Sgl door	117	EA	315.00	36,855
Dbl door	28	EA	360.00	10,080

Int H.M. Sidelight and Transom Frame:

Admin Offices - HM (2 ea)	247	SF	46.00	11,362
Classroom Sidelites (25 ewa)	717	SF	46.00	32,982
Makerspace - HM (1 ea)	82	SF	46.00	3,772
Music Room - HM (1 ea)	83	SF	46.00	3,818
STE Classroom (1 ea)	156	SF	46.00	7,176

081416 WOOD DOORS

HM /Wood Door, Glass & Glazing:

Admin - sgl (glazed)	24	EA	950.00	22,800
Admin Suite - sgl (glazed)	2	EA	950.00	1,900
Basement Custodian - dbl	1	EA	1,400.00	1,400
Basement MEP - dbl	2	EA	1,400.00	2,800
Basement MEP - sgl	2	EA	700.00	1,400
Basement Storeroom - dbl	1	EA	1,400.00	1,400
Breakout class connector - dbl	5	EA	1,900.00	9,500
Cafeteria- dbl	1	EA	1,900.00	1,900

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Classroom- dbl	1	EA	1,900.00	1,900
Classroom- sgl	27	EA	850.00	22,950
Corridor - dbl	5	EA	2,000.00	10,000
Gym/Vestibule - dbl	1	EA	2,000.00	2,000
Kitchen- dbl	1	EA	1,000.00	1,000
Kitchen- sgl	1	EA	1,750.00	1,750
MEP - sgl	3	EA	1,750.00	5,250
Stair Hall - sgl	1	EA	1,350.00	1,350
Storage - dbl	4	EA	675.00	2,700
Storage - sgl	5	EA	1,600.00	8,000
Teacher Planning class connector.-sgl (glazed)	27	EA	2,000.00	54,000
Teacher Planning/Corr.-sgl (swing vs sliding glazed)	13	EA	1,000.00	13,000
Toilet Rm sgl user	13	EA	1,300.00	16,900

087100 FINISH HARDWARE

Interior Door Hardware @ HM / WD Door:

Admin - sgl (glazed)	24	EA	1,200.00	28,800
Admin Suite - sgl (glazed)	2	EA	1,200.00	2,400
Basement Custodian - dbl	1	EA	1,100.00	1,100
Basement MEP - dbl	2	EA	1,100.00	2,200
Basement MEP - sgl	2	EA	875.00	1,750
Basement Storeroom - dbl	1	EA	1,110.00	1,110
Breakout class connector - dbl	5	EA	2,000.00	10,000
Cafeteria- dbl	1	EA	3,000.00	3,000
Classroom- dbl	1	EA	1,800.00	1,800
Classroom- sgl	27	EA	1,350.00	36,450
Corridor - dbl	5	EA	3,000.00	15,000
Gym/Vestibule - dbl	1	EA	3,000.00	3,000
Kitchen- dbl	1	EA	1,800.00	1,800
Kitchen- sgl	1	EA	2,500.00	2,500
MEP - sgl	3	EA	25,000.00	75,000
Stair Hall - sgl	1	EA	1,400.00	1,400
Storage - dbl	4	EA	850.00	3,400
Storage - sgl	5	EA	2,500.00	12,500
Teacher Planning class connector.-sgl (glazed)	27	EA	3,000.00	81,000
Teacher Planning/Corr.-sgl (swing vs sliding glazed)	13	EA	2,000.00	26,000
Toilet Rm sgl user	13	EA	950.00	12,350

080001 METAL WINDOWS*

8' Int. Alum. Door, Frame, Glass, Glazing & Hardware-Allow:

Media Center - dbl	1	EA	7,500.00	7,500
Cafe - dbl	1	EA	7,500.00	7,500
Entry Vest - sgl	1	EA	6,200.00	6,200
Entry Vest - dbl	2	EA	13,500.00	27,000
Gym /Vestibule - dbl	3	EA	13,500.00	40,500

Premium Safety Glazing @ Alum. Door(088713):

8'H Entry - sgl	1	EA	650.00	650
8'H Entry - dbl	2	PR	1,150.00	2,300

Interior Aluminum Storefront /Curtainwall Frame, Glass & Glazing

Teacher Planning (13 ea)	1,489	SF	115.00	171,235
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083323 SPECIAL DOORS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Access panels	1	LS	2,500.00	2,500
Allow Int Overhead Coiling Grille (083340):				
Kitchen Servery Grille(16' x 10' 2 EA)	320	SF	120.00	38,400
Kitchen Dish Drop	1	EA	4,500.00	4,500
Main Office Ctr Radial Grille(28 LF x 5'H)	140	SF	140.00	19,600
Corridor Security Grille		TBD		
<u>080002 GLASS AND GLAZING*</u>				
Glazing at HM Frames	1,285	SF	88.00	113,080
<u>090007 PAINTING*</u>				
HM Door Frame - sgl	182	EA	150.00	27,300
HM Door Frame - dbl	26	EA	190.00	4,940
HM BL and Sidelight	1,285	SF	6.00	7,710
SUB-TOTAL				1,093,420
C1030 FITTINGS				
<u>050001 MISCELLANEOUS & ORNAMENTAL IRON*</u>				
Int Gym Platform Ramp:				
Post mtd SS guard railing	24	LF	450.00	10,800
Wall mtd SS hand railing	24	LF	225.00	5,400
Int 1st Flr Ramp(4 loc) :				
Post mtd SS guard railing	52	LF	450.00	23,400
Wall mtd SS hand railing	116	LF	225.00	26,100
2nd Flr Lobby/Ramp guard rail (nic stairs)	96	LF	450.00	43,200
Metal Pan Stair		Includes all rails		
OT/PT rm equip support	1	RM	5,000.00	5,000
Gyp equip supports	1	LS	10,000.00	10,000
Gym Platform equip. supports	1	LS	5,000.00	5,000
Perf. decorative mtl mech grille & frame(radial class wall)		nic		
Misc. metals	87,009	GSF	1.50	130,514
<u>062000 FINISH CARPENTRY</u>				
Allow:				
Window sill	1,200	LF	68.00	81,600
Cohort Common low wall cap	135	LF	50.00	6,750
Int standing & running trim	1	LS	25,000.00	25,000
*Excludes ext CW perim & int door & borrowed light trim				
PL Bumper rail	2,066	LF	95.00	196,270

064000 ARCHITECTURAL CASEWORK***Counter is plastic laminate unless noted otherwise**

Main Office -Allow :

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Radial service counter only 30" D	28	LF	800.00	22,400
Service work counter 24" D	16	LF	425.00	6,800
Mailbox unit	16	LF	900.00	14,400
Typ counter	30	LF	140.00	4,200
Typ base cabinet (nic ctr)	15	LF	250.00	3,750
Typ wall cabinet 30"H	30	LF	140.00	4,200
Main Office Kitchenette		NIC		
Media Center -Allow :				
P. lam circulation desk - radial	10	LF	1,200.00	12,000
Book shelving sys - free standing		NIC		
8'6" Book shelving sys-perm fixed unit	40	LF	500.00	20,000
P. lam work ctr	10	LF	165.00	1,650
Storytelling area risers		NIC		
Media Ctr Work Room		N/A		
Corridor Locker Enclosure (460 LF nic locker):				
15"W @ locker base 36loc	460	LF	45.00	20,700
Cap 15"W @ locker 36loc	575	SF	125.00	71,875
End panel 72 loc	648	SF	125.00	81,000
Typ Class Room (30 EA):				
PL Typ counter(10 LF/RM)	340	LF	185.00	62,900
Wall cabinet 30"H(10 LF/RM)	340	LF	230.00	78,200
Allow ext wall shelving unit (4 tier 4LF / RM)	136	EA	1,500.00	204,000
Counter @ Mobile base(12 LF/RM)	408	LF	700.00	285,600
Allow mobile storage unit (36"wx27"H 4 EA)		nic		
*Includes Med frag., SPED & OT/PT,				
Cubbies (Open 15"w x 12"d x 36"h -DBL)	360	EA	250.00	90,000
Makerspace Room (1 EA):				
PL Typ counter(10 LF/RM)	10	LF	185.00	1,850
Wall cabinet 30"H(10 LF/RM)	10	LF	230.00	2,300
Allow ext wall shelving unit (4 tier 4LF / RM)	1	EA	1,500.00	1,500
Counter @ Mobile base(12 LF/RM)	12	LF	700.00	8,400
Allow mobile storage unit (36"wx27"H 4 EA)		nic		
STE Room (1 EA):				
Epoxy counter(10 LF/RM)	10	LF	335.00	3,350
Wall cabinet 30"H(10 LF/RM)	10	LF	230.00	2,300
Allow ext wall shelving unit (4 tier 4LF / RM)	1	EA	1,500.00	1,500
Epoxy Counter @ Mobile base(12 LF/RM)	12	LF	700.00	8,400
Allow mobile storage unit (36"wx27"H 4 EA)		nic		
STE Storage Rm - Storage Sys		NIC		
Art Room (1 EA):				
PL Typ counter(10 LF/RM)	10	LF	185.00	1,850
Wall cabinet 30"H(10 LF/RM)	10	LF	230.00	2,300
Allow ext wall shelving unit (4 tier 4LF / RM)	1	EA	1,500.00	1,500
Counter @ Mobile base(12 LF/RM)	12	LF	700.00	8,400
Allow mobile storage unit (36"wx27"H 4 EA)		nic		
Art Storage Rm - Storage Sys		NIC		
Music Room (1 EA): NONE LISTED/SHOWN				
PL Typ counter(10 LF/RM)	10	LF	185.00	1,850
Wall cabinet 30"H(10 LF/RM)	10	LF	230.00	2,300
Allow ext wall shelving unit (4 tier 4LF / RM)	1	EA	1,500.00	1,500

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Counter @ Mobile base(12 LF/RM) Allow mobile storage unit (36"wx27"H 4 EA) Music Storage Rm -Instrument Storage Sys	12	LF nic NIC	700.00	8,400
Staff Dinning Room (1EA)-Allow: Typ wall cabinet 30"H Typ counter ADA sink base cabinet (nic ctr) Typ base cabinet (nic ctr)	15 15 3 12	LF LF LF LF	230.00 165.00 225.00 250.00	3,450 2,475 675 3,000
Nurse Office Casework (1 LOC)-Allow: Typ wall cabinet 30"H Typ counter ADA sink base cabinet (nic ctr) Typ base cabinet (nic ctr)	20 25 3 16	LF LF LF LF	220.00 165.00 225.00 250.00	4,400 4,125 675 4,000
Shared Teachers Planning Room (19 EA): Work counter(10 LF/RM) Full ht open storage unit(10 LF/RM)	190 190	LF LF	180.00 225.00	34,200 42,750
Custodian Office Casework (2 LOC)-Allow: Typ wall cabinet 30"H Typ counter Typ base cabinet (nic ctr)	6 6 6	LF LF LF	220.00 145.00 250.00	1,320 870 1,500
Misc Casework @ : Marker Board Tray Allow corr. cant. bench - class entry (4 LF/38EA) Display Case - Complete Solid surf lav counter- single user rm Cohort Common (1 EA) Breakout Rooms - Nothing Listed/Shown Shared Breakout RM (6 EA) Custom Corridor / Lobby Wood/Upholstered Bench Class custom cubbies Custodial Workshop Resource Room (EA) Staff Work Room (2 EA) Quiet Dinning Room (1 EA) Café Trash/ recycle ctr Misc. utility & closet shelving-allow Misc Arch Casework allowance *Counter tops include manufactures wall brackets	1 100 1 236 1 1 1	LS LF LS LF NIC NIC NIC LS NIC NIC NIC NIC NIC LS LS	200,000.00 300.00 25,000.00 265.00 20,000.00 25,000.00 100,000.00	200,000 30,000 25,000 20,000 25,000 100,000

080002 GLASS AND GLAZING*

Wall Mirror - Allow: Toilet Rm OT/PT Class	48	W / 102813 SF	100.00	4,800
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102113 COMPARTMENTS & CUBICLES

Solid Plastic Toilet Partitions: Std. partition HC partition	22 8	EA EA	1,450.00 1,875.00	31,900 15,000
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<u>102813 TOILET ACCESSORIES</u>				
Furnish & Install Toilet Rm Accessories:				
42" Grab Bar	42	EA	115.00	4,830
Mirror	54	EA	275.00	14,850
Recessed Paper Towel & Trash Recp.	25	EA	75.00	1,875
Sani Napkin Dispenser	20	EA	100.00	2,000
Shower Rod	4	EA	500.00	2,000
Soap Dispenser	105	EA	75.00	7,875
Toilet Paper Dispenser	52	EA	75.00	3,900
Coat hooks	30	EA	40.00	1,200
Allow:				
Janitor shelf/mop holder	5	EA	200.00	1,000
Changing sta - fixed	2	EA	2,000.00	4,000
Changing sta - power op	1	EA	5,000.00	5,000
Kitchen / Custodian TR accessories	1	RM	1,000.00	1,000
Class / Work Rm Accessories		NIC		
<u>101100 VISUAL DISPLAY</u>				
Marker and tackboards	87,009	GSF	1.15	100,060
<u>109000 MISCELLANEOUS SPECIALTIES</u>				
Allow:				
Kitchen/Custodian Staff Locker(15"w x 15" D x 72"h)	6	EA	295.00	1,770
Misc Wall & corner guards	1	LS	5,000.00	5,000
Health office privacy curtain	2	EA	2,100.00	4,200
Allow (104400):				
Fire extinguisher & cab	15	EA	510.00	7,650
Fire extinguisher & bracket	5	EA	385.00	1,925
AED cabinets	2	EA	1,200.00	2,400
<u>101400 IDENTIFYING DEVICES</u>				
Interior Signage - Allow:				
Door Signage	140	EA	185.00	25,900
Dedication plaque	1	EA	3,600.00	3,600
Misc Interior Signage - Allow	1	LS	5,000.00	5,000
SUB-TOTAL				2,372,584
TOTAL C10 - INTERIOR CONSTRUCTION				6,083,518

C20 - STAIRS

C2010 STAIR CONSTRUCTION

033000 CAST IN PLACE CONCRETE

Pre-cast Conc.l - mon. stair	384	LF	165.00	63,360
Sealed Conc. Metal Pan Fill - typ stair	3	FLT	3,200.00	9,600

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<u>050001 MISCELLANEOUS & ORNAMENTAL IRON*</u>				
West Monumental Stair - straight full flt 8'W x 13' 4"H (1 flts):				
Metal Pan landing	40	SF	95.00	3,800
Metal Pan tread and riser	192	LFT	128.00	24,576
Stringer structure	56	LF	175.00	9,800
Wall rail	28	LF	215.00	6,020
Stair guardrail	28	LF	425.00	11,900
LVL 2 Lobby guardrail	32	LF	425.00	13,600
Cane rail	1	LOC	1,600.00	1,600
East Monumental Radial Stair - straight full flt 7-8' W x 13' 4"H (1 flts):				
Metal Pan landing	40	SF	95.00	3,800
Metal Pan tread and riser	192	LFT	128.00	24,576
Stringer structure	56	LF	175.00	9,800
Wall rail	28	LF	215.00	6,020
Stair guardrail	28	LF	425.00	11,900
LVL 2 Lobby guardrail	30	LF	450.00	13,500
Cane rail	1	LOC	1,600.00	1,600
West Stair Hall - switchback full flt 5'W x 13' 4"H (1 flts):				
Metal Pan landing	50	SF	95.00	4,750
Metal Pan tread and riser	120	LFT	128.00	15,360
Stringer structure	56	LF	175.00	9,800
Wall rail	28	LF	215.00	6,020
Stair guardrail	28	LF	425.00	11,900
Cane rail	1	LOC	1,600.00	1,600
East Stair Hall - Straight full flt 5'W x 13' 4"H (1 flts):				
Metal Pan landing	50	SF	95.00	4,750
Metal Pan tread and riser	120	LFT	128.00	15,360
Stringer structure	56	LF	175.00	9,800
Wall rail	28	LF	215.00	6,020
Stair guardrail	28	LF	425.00	11,900
Cane rail	1	LOC	1,600.00	1,600
Metal Pan Stair:				
Roof	1	FLTS	45,000.00	45,000
Basement	1	FLTS	45,000.00	45,000
Gym Platform Stair:				
Stair 7" riser (3 EA)	12	LFR	75.00	900
SUB-TOTAL				405,212

C2020 STAIR FINISHES

062000 FINISH CARPENTRY

Gym Platform Stair:				
Wood stair tread 12"W	8	LFT	85.00	680
Wood stair riser 7"H	12	LFR	35.00	420
Wood stage nosing	64	LF	40.00	2,560

090005 RESILIENT FLOORING*

N/A

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Rubber Tread and Riser	264	FLT	26.50	6,996
Rubber landing tile	128	SF	25.00	3,200
<u>090007 PAINTING*</u>				
Paint metal pan stair & rails (NIC SS):				
Monumental Radial Stair E	1	FLT	5,000.00	5,000
Monumental Stair W	1	FLT	5,000.00	5,000
Metal pan stair	4	FLT	5,000.00	20,000
SUB-TOTAL				43,856
TOTAL C20 - STAIRS				449,068
C30 - INTERIOR FINISHES				
C3010 WALL FINISHES				
<u>092116 GYPSUM WALLBOARD</u>				
Allow FRP - Fiberglass Reinforced Plastic Panel(097625):				
Custodian closet 4'H	400	SF	14.00	5,600
Kitchen 8'H	1,050	SF	14.00	14,700
Misc FRP	250	SF	14.00	3,500
<u>090002 TILE*</u>				
Sgl/Multi-user toilet rm Wall Tile (23 EA):				
CWT - 98" H all walls	8,121	SF	32.00	259,872
Wall Tile -Allowance:				
Drinking Fountain Alcove(60 sf /loc)	240	SF	34.00	8,160
<u>090007 PAINTING*</u>				
Interior painting- walls	87,009	GSF	2.15	187,069
<u>098400 ACOUSTICAL WALL TREATMENT</u>				
Cementitious Wood Fiber Wall Panel (097112):				
Gymnasium 1" Tectum -allow	1,800	SF	21.50	38,700
Allow Fabric Wrapped Tackable Wall Panel Type 1(097713):				
Music and Caf� - 8'h	1,705	SF	34.00	57,970
<u>109000 MISCELLANEOUS SPECIALTIES</u>				
Dry-Erase Wall Covering(097233)				
Class Typ Wall (5'-6"h avg)	19,596	SF	18.50	362,526
SUB-TOTAL				938,097

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
C3020 FLOOR FINISHES				
<u>033000 CAST IN PLACE CONCRETE</u>				
1" Gyp cement underlayment (2nd -3rd 035413)	31,267	SF	4.75	148,518
1/4" Acoustic mat (2nd -3rd)	31,267	SF	2.50	78,168
Sealed Concrete Floor:				
Basement	3,384	SF	2.25	7,614
MEP RM	184	SF	2.25	414
Custodian Storage /Back of House 100%	1,026	SF	2.25	2,309
<u>090002 TILE*</u>				
Kitchen:				
Quarry Tile (Thin set /Mud set ?)	2,058	SF	37.50	77,175
Quarry tile wall base/transition-allow	176	LF	11.20	1,971
*Includes cooler, freezer storage and toilet rm ?				
Toilet rm flr tile		N/A		
Lobby / entry floor tile		N/A		
<u>090005 RESILIENT FLOORING*</u>				
VCT (running bond 12"x12"):	60,933	SF	5.90	359,505
Stair Hall:				
VCT Running Bond	1,263	SF	5.90	7,452
Wall Base:				
VCT 12"H w/ Schluter top edge	10,875	LF	7.00	76,125
Typ resilient wall base 6"	2,400	LF	3.85	9,240
<u>095000 WOOD ATHLETIC FLOOR</u>				
Gym strip wood sports flr sys -complete	7,200	SF	21.50	154,800
Gym wall base - vented rubber & transitions	475	LF	7.80	3,705
Allow - Gym Platform & Ramp wd dance flr sys	982	SF	20.50	20,131
Stage vented wall base	107	LF	6.75	722
<u>096800 CARPET</u>				
Carpet -Admin		NIC		
Carpet -Media Center		NIC		
<u>097500 RESINOUS FLOORING</u>				
Epoxy Flooring w/ Int Wall Base:				
SGL/ Multi User Toilet Room	3,152	SF	23.75	74,860
Base	1,123	LF	25.00	28,075
<u>124813 ENTRANCE MATS & FRAMES</u>				
Int vestibule recessed walk-off grate	474	SF	55.00	26,070
Ext recessed walk-off grate		NIC		
SUB-TOTAL				1,076,853

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
C3030 CEILING FINISHES				
062000 FINISH CARPENTRY				
Allow: Prefin HDWD stage proscenium panel(062000)	320	SF	90.00	28,800
092116 GYPSUM WALLBOARD				
2 HR Gyp Ceiling-Allow: Elev MR, BDA & Emerg Elec Rm	250	SF	25.00	6,250
Typ Gyp Ceiling - 100%: Gyp Ceiling W/ Soffits	2,988	SF	14.50	43,326
Gyp Ceiling W/ Soffits -Allow: Academic Space (summer beam 24 loc 21 LF x 4'W)	2,016	SF	65.00	131,040
Lifts	1	LS	75,000.00	75,000
Misc GWB Soffits & light cove	87,009	GSF	0.50	43,505
090003 ACOUSTICAL TILE*				
MTL CLG USG Geometrix: Music Class Rm (1 EA)	1,115	SF	40.00	44,600
Wood Panel CLG:	1,912	SF	55.00	105,160
ACT Systems(Typ 2 x W / 1/3 Running Bond Pattern):				
ACT -2: 2x2 (corridors, public areas & BOH)	31,428	SF	8.00	251,424
ACT 2x2 (academic areas)	28,908	SF	8.00	231,264
ACT 2x2 (kitchen)	2,055	SF	8.00	16,440
ACT 2x2 (teacher planning)	1,669	SF	8.00	13,352
090007 PAINTING*				
Paint gyp ceiling	8,340	SF	1.25	10,425
Paint gyp soffit	1	LS	20,000.00	20,000
Paint Exposed Metal Structure/Metal Deck:				
Exposed ceiling - Café	1,507	SF	2.50	3,768
Gym Platform (100 %)	7,911	SF	2.50	19,778
SUB-TOTAL				1,044,131
TOTAL C30 - INTERIOR FINISHES				3,059,081

D. SERVICES

D10 - CONVEYING

D1010 ELEVATORS & LIFTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<u>140001 ELEVATORS & LIFTS*</u>				
Passenger elevator (1 door 4,500 lb)	2	STOP	85,000.00	170,000
<u>050001 MISCELLANEOUS & ORNAMENTAL IRON*</u>				
Elevators:				
Elev. framing	1	EA	4,500.00	4,500
Elev. pit ladder	1	EA	2,200.00	2,200
Elev. sump grate	1	EA	2,300.00	2,300
SUB-TOTAL				179,000
TOTAL D10 - CONVEYING				179,000

D20 - PLUMBING

D2010 PLUMBING

220001 PLUMBING*

Fixtures:

Water closet	54	EA	2,100.00	113,400
Lavatory	52	EA	1,450.00	75,400
Classroom Sink	50	EA	1,625.00	81,250
Sink	13	EA	1,625.00	21,125
Nurse Sink	1	EA	1,625.00	1,625
Mop sink	2	EA	1,800.00	3,600
Shower	4	EA	3,200.00	12,800
Drinking fountain	4	EA	4,000.00	16,000
Art Sink W/ Plaster trap SI-1	2	EA	2,650.00	5,300
Ice Maker (Connection)	1	EA	1,500.00	1,500
Eye wash	1	EA	3,500.00	3,500
Washer Dryer Connection	1	EA	1,000.00	1,000
Fixture Rough-in	185	EA	200.00	37,000
HB	10	EA	475.00	4,750
Wall Hydrant	8	EA	525.00	4,200
Auto Flush Valve	54	EA	525.00	28,350
Auto Faucet	52	EA	480.00	24,960

Hot Water Heater Schedule:

E-POU 3-5K	36	EA	2,500.00	90,000
EWB 50K Kitchen	1	EA	15,000.00	15,000
120 Gal Buffer Tank	1	EA	1,800.00	1,800
RCP-1	1	EA	2,500.00	2,500
DMV -1	1	EA	10,000.00	10,000
Misc. Valve and trim	36	EA	1,000.00	36,000
Mech Rm Equipment Pipe/ Connections	1	LS	25,000.00	25,000

Kitchen equipment hookup	1	LS	25,000.00	25,000
GI-1	1	EA	4,800.00	4,800
GI-2	1	EA	4,800.00	4,800
5,000 gal Ext. Grease Interceptor		w/ sitework		

Roof/Storm Drain System	87,009	GSF	4.50	391,541
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Sanitary System				
Underground D/W/V Pipe:				
4"-6"	1,257	LF	90.00	113,130
FD	15	EA	725.00	10,875
FS - 1	4	EA	1,600.00	6,400
Oil interceptor	1	EA	2,400.00	2,400
Elevator Sump Pump	1	EA	2,500.00	2,500
FCO	15	EA	428.50	6,428
Above Ground D/W/V Pipe:				
2"-4"	7,030	LF	45.00	316,350
CO	20	EA	400.00	8,000
FD	12	EA	695.00	8,340
Under slab Drain Line:				
Perforated 4" PVC		TBD		
Domestic Piping & Insulation:				
Branch 1/2"-3/4"	5,090	LF	55.00	279,950
Main	5,090	LF	85.00	432,650
Pipe Valves and Fittings	1	LS	50,000.00	50,000
Gas Pipe:				
		N/A		
Misc.				
Test and Sanitize	1	LS	10,000.00	10,000
Core and Firesafing	1	LS	7,500.00	7,500
Trap Primer	1	LS	5,000.00	5,000
RP2BP - mech	1	EA	1,500.00	1,500
Water service BFP and meter rough in	1	LS	12,500.00	12,500
PRV	1	LS	10,000.00	10,000
Permit/ Commissioning	1	LS	10,000.00	10,000
Coordination/CAD	1	LS	15,000.00	15,000
Supervision	1	LS	75,000.00	75,000
SUB-TOTAL				2,425,723
TOTAL D20 - PLUMBING				2,425,723

D30 - HVAC

D3010 HVAC

230001 HVAC*

Geothermal				
Geothermal Well -600'	50	EA	40,000.00	2,000,000
8 HDPE S&R	300	LF	200.00	60,000
Discharge Permit (EPA)	1	LS	2,500.00	2,500
Frac tank and maintance	1	LS	100,000.00	100,000
Dewatering at Well points	1	LS	75,000.00	75,000
Testing of well	1	EA	40,000.00	40,000
Geothermal Vault	1	LS	65,000.00	65,000
Tie Geothermal loop into Mechanical Room Header	14	LOC	3,000.00	42,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Roof Top Air Handling Unit: (HW/CHW)				
RTU-1-2-3 (Class)	30,000	CFM	22.50	675,000
RTU-4 (Media)	9,000	CFM	22.50	202,500
RTU-5 (Cafe)	8,200	CFM	22.50	184,500
RTU-6 (Gym& Stage)	13,000	CFM	22.50	292,500
RTU-7 (Kitchen)	2,500	CFM	22.50	56,250
MAU - 1 (4,500 CFM)	1	EA	100,000.00	100,000
Pipe Valves and Fittings	8	EA	6,500.00	52,000
Curbs	8	EA	5,500.00	44,000
Merv Filters	16	EA	2,500.00	40,000
Sound Attenuation box	125,400	CFM	0.72	90,288
Cooling Generation				
Modular Water to Water Chiller	300	TONS	2,600.00	780,000
CHWS&R Pumps (20HP)	2	EA	30,000.00	60,000
GCHW Pumps	4	EA	20,000.00	80,000
VFD	4	EA	2,500.00	10,000
CHW ET (23 Gal)	3	EA	2,800.00	8,400
Chiller 6" AS	2	EA	10,000.00	20,000
HX	2	EA	30,000.00	60,000
Chem Shot Feeder	1	EA	4,500.00	4,500
Water Treatment	1	EA	60,000.00	60,000
Pipes Valves and Fittings	1	LS	125,000.00	125,000
Heat Generation:				
Back Up Electric Boiler				
Boiler (2,000 MBH)	1	EA	75,000.00	75,000
Boiler Pump	1	EA	5,500.00	5,500
HWS&R Pumps (10 HP)	2	EA	16,000.00	32,000
VFD	2	EA	2,500.00	5,000
Boiler ET	1	EA	5,200.00	5,200
Boiler AS	1	EA	8,500.00	8,500
Chem Shot Feeder	1	EA	4,500.00	4,500
Water Treatment	1	EA	45,000.00	45,000
Pipes Valves and Fittings	1	LS	50,000.00	50,000
Mech RM Exhaust/Intake	1	LS	30,000.00	30,000
HW/CHW Piping and Insulation (4-Pipe)	87,009	SF	16.00	1,392,144
Condensate Piping	87,009	LF	1.50	130,514
VAV W/ Reheat	56	EA	1,250.00	70,000
Radiant Panel	948	LF	165.00	156,420
FTR	272	LF	88.00	23,936
Isolation Valve	180	LF	125.00	22,500
Modular Valve	90	LF	215.00	19,350
Air Distribution:				
Grilles and Dampers	87,009	GSF	0.88	76,568
FSD	14	EA	1,400.00	19,600
Galvanized ductwork	96,000	LBS	18.00	1,728,000
Duct insul	60,000	SF	6.50	390,000
EPDM wrap	1,000	SF	12.00	12,000
Exhaust VAV	40	EA	950.00	38,000
Kitchen hood exhaust duct - welded	1,500	LBS	17.50	26,250
Fire wrap at duct	800	SF	9.00	7,200

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	
Exhaust Fan:					
Dish washer Exhaust	1	EA	2,500.00	2,500	
KEF - 1	1	EA	12,500.00	12,500	
Kiln Fan	1	EA	2,800.00	2,800	
Utility EF	6	EA	2,800.00	16,800	
Split System (Elec/IT)					
Split System	5	EA	16,500.00	82,500	
Condensate Pump	5	EA	350.00	1,750	
Temperature Control/ C02	87,009	SF	9.00	783,081	
Seismic & vibrator control	1	LS	30,000.00	30,000	
Rigging	1	LS	45,000.00	45,000	
Test and balance	87,009	GSF	0.65	56,556	
Commission coordination	200	HRS	110.00	22,000	
Start-Up	200	HRS	110.00	22,000	
Supervision	1	LS	200,000.00	200,000	

SUB-TOTAL				10,980,106	
TOTAL D30 - HVAC				\$126.20 /sf	10,980,106

D40 - FIRE PROTECTION

D4010 SPRINKLERS

210001 FIRE SUPPRESSION*

Fire Pump/ Jockey Pump	1	EA	145,000.00	145,000
8" BF Preventer Assembly	1	EA	12,500.00	12,500
Wet valve assembly	1	LS	3,500.00	3,500
Butterfly Valve	4	LS	2,000.00	8,000
Elec. bell	1	LS	1,500.00	1,500
Siamese fire dept connection	1	LS	1,350.00	1,350
Standpipe Ctrl Valve 6"	4	EA	2,100.00	8,400
Roof Hydrant	2	EA	1,500.00	3,000
Fire Dept. Connection:				
2 1/2" Hose Valve w/cabinet	2	EA	3,200.00	6,400
2 1/2" FDV	4	EA	1,850.00	7,400
ZCVA - 4"	4	EA	2,450.00	9,800
Tamper sw	10	EA	225.00	2,250
Heads w/ Branch:	880	EA	425.00	374,000
Concealed head				incl. above
Upright head				incl. above
Sidewall Head				incl. above
Dry head				incl. above
Sch. 10:				
Drain 3"	190	LF	50.00	9,500
Main 2-1/2" - 3"	250	LF	50.00	12,500
Main 4"-6"	1,350	LF	75.00	101,250

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Coring and firesafing	1	LS	15,000.00	15,000
Misc. Valves and Gauges	1	LS	10,000.00	10,000
Hydraulic Calcs	1	LS	7,500.00	7,500
Test, as built	1	LS	10,000.00	10,000
Supervision	1	LS	45,000.00	45,000
SUB-TOTAL				793,850

TOTAL D40 - FIRE PROTECTION	\$9.12 /sf			793,850
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D50 - ELECTRICAL

D5010 ELECTRICAL SERVICE & DISTRIBUTION

260001 ELECTRICAL*

Lighting Fixtures:	87,009	GSF	9.50	826,586
Theatrical lighting/Diming	1	LS	150,000.00	150,000
Lighting Control	87,009	GSF	2.80	243,625
Power Wiring Devices:	87,009	GSF	3.75	326,284
Photovoltaic:				
PV Array	200	KW	3,150.00	630,000
PV Rough-in	1	LS	20,000.00	20,000
Lighting Protection	87,009	SF	0.65	56,556
Mechanical Wiring	87,009	SF	3.00	261,027
Wilson Pro Cell Repeater System		N/A		
Rath Two Way communication System	1	LS	15,000.00	15,000
BDA:	87,009	GSF	0.50	43,505
Fire Alarm System	87,009	GSF	4.50	391,541
*excludes mass notification				
Switchgear Panels & Xfmrs:				
MSB - 2000A W/ 2500A Bus	1	EA	175,000.00	175,000
500KW Diesel Gen	1	EA	350,000.00	350,000
UPS 24KW	1	EA	30,000.00	30,000
House Panel & Feeder	87,009	GSF	9.00	783,081
Integrated security systems (Conduit & Drops)	87,009	GSF	3.00	261,027
Communications-Tel/Data (Conduit & Drops)	87,009	GSF	3.50	304,532
WAP				incl.
Data D1				incl.
Data D2				incl.
Video Outlet				incl.
Wall phone				incl.
Mic				incl.
HDMI				incl.

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
MDF				incl.
27 41 00: IPTV And VOD System Gym/ Café Projector	1	N/A LS	50,000.00	50,000
Large Venue A/V Systems Cafeteria/Stage	1	LS	85,000.00	85,000
Gymnasium	1	LS	50,000.00	50,000
Chorus/Band Room	1	LS	15,000.00	15,000
A/V Display Systems		By Owner		
Speech Reinforcement	50	EA	3,150.00	157,500
PA and Clock System: Clock System Clock/Speaker Clock PA Speaker PA Head end	87,009	GSF	1.50	130,514 Incl. Incl. Incl. Incl. Incl.
Temporary Power	1	LS	50,000.00	50,000
12% OH&P	1	LS	547,587.64	547,588
DJE	1	LS	230,000.00	230,000
SUB-TOTAL				6,183,363
TOTAL D50 - ELECTRICAL		\$71.07 /sf		6,183,363

E. EQUIPMENT & FURNISHINGS

E10 - EQUIPMENT

E1010 COMMERCIAL EQUIPMENT

114000 FOOD SERVICE EQUIPMENT

Kitchen equipment & casework - (crabtree&mcgrath11/30/23)	1	LS	706,650.00	706,650
SUB-TOTAL				706,650

E1090 OTHER EQUIPMENT

113100 APPLIANCES

Staff Dining Room (1 EA): Allow- Refrigerator	2	EA	1,600.00	3,200
Allow - Microwave	2	EA	1,200.00	2,400
Custodian Workroom(1 EA): Allow- Refrigerator	1	EA	1,600.00	1,600
Allow - Microwave	1	EA	1,200.00	1,200

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Medical Office-Allow:				
Allow- Refrigerator	1	EA	1,600.00	1,600
Allow- Ice maker under ctr	1	EA	1,000.00	1,000
Misc. Allow:				
Washer		W / Kitchen Equip.		
Dryer		W / Kitchen Equip.		
Classroom Appliance		NIC		
Main Office Kitchenette		NIC		
Staff Work Rm Kitchenette		NIC		
<u>116600 ATHLETIC & SPORTS EQUIPMENT</u>				
Main Gym:				
Telescoping Bleachers (126600 130 seats)	1	LS	30,000.00	30,000
Basketball backstops - electric	6	EA	10,200.00	61,200
Wall padding (8'-8" H)	1,360	SF	17.00	23,120
Retractable batting cage	1	LOC	5,000.00	5,000
Badminton flr plt & sleeves	1	EA	1,500.00	1,500
Volley bay flr plt & sleeves	1	EA	1,500.00	1,500
Tennis net sys	1	EA	2,000.00	2,000
Scoreboard	1	EA	22,000.00	22,000
Motorized gym divider		NIC		
Climbing ropes		NIC		
Climbing wall w/ safety pad		NIC		
OT/PT Therapy swing		NIC		
<u>116143 STAGE DRAPERY</u>				
Gym Platform - Allow:				
Stage curtains, tracks & rigging sys.	1	LS	30,000.00	30,000
<u>115213 PROJECTION SCREENS</u>				
Elec. Op Projection Screen-Allow:				
Gym platform	1	EA	12,000.00	12,000
<u>119000 MISC. EQUIPMENT</u>				
Kiln	1	EA	3,500.00	3,500
Library equipment		NIC		
Changing sta - power operated		W / Fittings		
Loading dock bumpers	1	LS	3,200.00	3,200
SUB-TOTAL				206,020
TOTAL E10 - EQUIPMENT				912,670

E20 - FURNISHINGS

E 2010 FIXED FURNISHINGS

122413 SHADES

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Typ Ext Meco Shade - Manual Allow	4,400	SF	9.50	41,800
Motor op shade Allow:				
Media Center	612	SF	34.00	20,808
Cafe	1,448	SF	34.00	49,232
GYM	2,002	SF	34.00	68,068
Int. Shade @Borrowed Light W / Alum CH Frame		NIC		
Int. Shade @ Glazed doors		NIC		
SUB-TOTAL				179,908
E2020 MOVABLE FURNISHINGS		NIC		
				0
TOTAL E20 - FURNISHINGS				179,908

F. SPECIAL CONSTRUCTION & DEMOLITION

F10 - SPECIAL CONSTRUCTION

F1010 SPECIAL STRUCTURES

N/A

SUB-TOTAL

0

TOTAL F10 - SPECIAL CONSTRUCTION	0
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F20 - SELECTIVE BUILDING DEMOLITION

F2010 BUILDING ELEMENTS DEMOLITION

024100 DEMOLITION

BUILDING DEMOLITION

See Grand Summary

SUB-TOTAL

0

F2020 HAZARDOUS COMPONENTS ABATEMENT

See Grand Summary

SUB-TOTAL

0

TOTAL F20 - SELECTIVE BUILDING DEMOLITION	0
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G. BUILDING SITEWORK

G10 - SITE PREPARATION

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G1010 SITE CLEARING				
311000 SITE PREPARATION & CLEARING				
Construction fence 100 %	2,500	LF	15.00	37,500
Construction entrance gate -allow	2	EA	500.00	1,000
Gravel pad @ entrance	3,000	SF	15.00	45,000
Erosion control	2,165	LF	9.50	20,568
Inlet protection	20	EA	75.00	1,500
Protect tree	14	EA	600.00	8,400
Remove tree- allow	4	EA	850.00	3,400
Remove plant bed & shrubs	2,350	SF	2.00	4,700
Clear and Grub- minimum	1	LS	10,000.00	10,000
Saw cut bit roadway & walk	1,008	LF	4.75	4,788
Street sweep and dust control	1	LS	25,000.00	25,000
Snow removal	1	LS	35,000.00	35,000
Site Remove Existing:				
Bit pavement -parking & play area	62,976	SF	1.10	69,274
Bit pavement - walk	4235	SF	1.10	4,659
Conc. Paving - walk	1,772	SF	1.40	2,481
Traffic/ Parking Signage	1	LS	2,500.00	2,500
Drainage structure	2	EA	650.00	1,300
Storage shed (180 GSF)	1	EA	1,000.00	1,000
BB Backstop	2	EA	1,500.00	3,000
BB player bench	4	EA	300.00	1,200
BB Hoop	1	EA	500.00	500
4'H Chain link fence	1395	LF	22.00	30,690
6'H Chain link fence	214	LF	27.00	5,778
Concrete pad (loc)	590	SF	10.00	5,900
Gravel surface	358	SF	1.20	430
School Signage	1	LS	500.00	500
Utility pole(overhead elec)		By Others		
Sewer line-allow	500	LF	50.00	25,000
Water line-allow	500	LF	45.00	22,500
Drain Line-allow	1,500	LF	45.00	67,500
Gas line-allow	500	LF	45.00	22,500
Play yard equip	1	LOC	2,500.00	2,500
Play yard surfacing	22,337	SF	2.00	44,674
Mtl BLDG fire escape	2	LOC	1,500.00	3,000
Conc BLDG entry stoop, ramps & stair (17 loc)	1173	GSF	5.00	5,865
Misc site demolition & prep	310,054	SF	0.25	77,514
Site Phasing logistics	1	LS	150,000.00	150,000
Salvage items (BLDG & Site)		TBD		
SUB-TOTAL				747,119
G1020 SITE DEMOLITION & RELOCATIONS		W / G1010		
SUB-TOTAL				0
G1030 SITE EARTHWORK				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
310000 EARTHWORK				
Strip top soil - 24" (178,557 sf)	13,226	CY	12.00	158,712
Haul and load spoil	13,226	CY	8.00	105,808
Soil Disposal	21,162	TONS	20.00	423,232
Site grading:				
Cut	34,132	CY	12.50	426,650
Site Fill - reuse existing	2,518	CY	10.00	25,180
Load and haul spoil	31,614	CY	25.00	790,350
Soil disposal	50,582	TONS	25.00	1,264,560
Site Grading	33,388	SY	2.40	80,131
Shoring		nic		
Remove underground fuel tanks	2	EA	50,000.00	100,000
Phasing logistis	1	LS	75,000.00	75,000
Fill at demo'd building	1,500	CY	40.00	60,000
SUB-TOTAL				3,509,623
G1040 HAZARDOUS WASTE REMEDIATION		See Grand Summary		
SUB-TOTAL				0
TOTAL G10 - SITE PREPARATION				4,256,742

G20 - SITE IMPROVEMENTS

G2010 ROADWAYS

321000 PAVEMENT, CURBING & EDGING

A1 Bit Pavement :				
A1A Bit Pavement - Play Area	18,739	SF	5.90	110,560
A1A Bit Pavement - Road and Parking	33,823	SF	5.90	199,556
A1A Bit Pavement - Service and Fire Lane	15,556	SF	5.90	91,780
12" Gravel base @ bit drive	2,523	CY	62.00	156,419
B1 Site Granite Curbing:				
Radial	752	LF	55.00	41,360
Straight	2,351	LF	51.00	119,901
*Excludes play area curb W/G2040				
12" Street Patch @ new curb	618	LF	50.00	30,900
Neighborhood Paving - allowance	1	LS	500,000.00	500,000
Street Patch @ new utility		W G/30		
Misc. Pavement striping/markings	1	LS	18,000.00	18,000
Parking/Traffic Signage	1	LS	5,000.00	5,000
SUB-TOTAL				1,273,476

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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G2020 PARKING LOTS

*Included with G2010

SUB-TOTAL				0
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G2030 PEDESTRIAN PAVING

321000 PAVEMENT, CURBING & EDGING

A1 Bit Pavement walk	7,222	SF	4.50	32,499
8" Gravel @ conc walk	178	CY	58.00	10,343
A3 Concrete Pavement				
4" Typ Conc pavement w/ wwff	9,419	SF	11.50	108,319
8" Gravel @ conc walk	233	CY	58.00	13,489
A6a Concrete Unit Pavers over Concrete base				
Concrete paver w/ set bed	608	SF	40.00	24,320
Base 4" Conc pavement w/ wwff	608	SF	9.00	5,472
8" Gravel @ conc walk	15	CY	66.00	990
A12 & A6B Concrete / Granite Unit Pavers				
Granite/ Concrete paver w/ stone setting bed	9,610	SF	35.00	336,350
Geogrid fabric	9,610	SF	1.00	9,610
36" Structural Soil	1,068	CY	145.00	154,828
3" Sand Layer	89	CY	80.00	7,119
4" Perf Underdain	9,610	SF	0.75	7,208
A11 Stone Dust Paving:				
A1 Stonedust	992	SF	6.00	5,952
8" Dense crushed stone	21	CY	64.00	1,344
Filter Fabric	992	SF	1.00	992
36" Structural Soil - SBSS condition??		tbd		
Concrete Pavement -Loading Dock Slab		W / A1030		
HC Cast Iron tactile paver -allow	61	LF	140.00	8,540

SUB-TOTAL				727,372
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G2040 SITE DEVELOPMENT

033000 CAST IN PLACE CONCRETE

C1 Concrete Site Stair- Main Entrance:				
Stair foundation	10	CY	1,100.00	11,000
Stair tread	221	LF	122.00	26,962
C1 Precast Concrete Stair Trad	221	LF	185.00	40,885
C2 Concrete Site Stair- Main Entrance:				
Stair foundation	12	CY	1,100.00	13,200
Stair tread	72	LF	122.00	8,784

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8" Conc dumpster pad w/ reinf edge -allow	100	SF	25.00	2,500
<u>050001 MISCELLANEOUS & ORNAMENTAL IRON*</u>				
Allow:				
C1 Stainless Steel Main Entrance Rail	25	LF	425.00	10,625
C2 Stainless Steel Rear Rail	34	LF	425.00	14,450
Rails @ Loading Dock Stair	12	LF	350.00	4,200
6" Galv. metal utility bollard	8	EA	1,800.00	14,400
Removable bollard @ drop off	3	EA	3,500.00	10,500
<u>323100 SITE IMPROVEMENTS</u>				
A5 Playground Safety Surface - Poured in Permeable Rubber:				
Top surface & Base mat (poured in place)	10,349	SF	26.00	269,074
8" Dense crushed stone	256	CY	58.00	14,819
Filter fabric -allow	10,349	SF	26.00	269,074
6" gravel drainage base	192	CY	65.00	12,457
Flat drain	10,349	SF	0.75	7,762
Perim flush concrete curb	495	LF	48.00	23,760
A4 Enginered Wood Fiber Playground	1,191	SF	7.75	9,230
6" gravel drainage base	22	CY	65.00	1,434
B 4.1 Flush Concrete Curb - landscaping	101	LF	48.00	4,848
B3 Granite Landscape curb	127	LF	110.00	13,970
A7 Basketball Hoop	2	EA	4,500.00	9,000
A9 Rain Garden Boardwalk (1 loc)	688	SF	150.00	103,200
E1 Picnic table	7	EA	5,000.00	35,000
E2 Trash/recycle receptacle	5	EA	3,200.00	16,000
E3 Bike storage loop	14	EA	1,100.00	15,400
E4 Playground Equipment (2 loc)	1	LS	400,000.00	400,000
E5 Custom slide(1 loc)	1	LS	50,000.00	50,000
E6 Adventure Play Area(1 loc)	1	LS	100,000.00	100,000
Baseball Field:				
E7 Baseball backstop	71	LF	275.00	19,525
E8 Team bench	49	LF	100.00	4,900
Bases @ pitching rubber	1	LS	1,500.00	1,500
Netting		NIC		
Foul pole		NIC		
E9 Goal	2	EA	4,000.00	8,000
Baseball / Soccer Field :				
Artificial Turf	66,615	SF	8.50	566,228
12" Drainage Layer	2,468	CY	58.00	143,144
Underdrain	66,615	SF	0.75	49,961
Prerm Curb	1,050	LF	72.00	75,600
Fence:				
E11 4' CL Fence	832	LF	82.00	68,224
E12 4' CL dbl Gate	4	EA	4,500.00	18,000
E13 8' CL Fence	78	LF	105.00	8,190
E17 Vehicle Gate	1	EA	18,000.00	18,000
Site Wall -Complete:				
D1 wall - Front Entry	88	LF	1,000.00	88,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
D1 wall - Loading Dock	72	LF	1,000.00	72,000
D1 wall - rear property line	210	LF	1,000.00	210,000
Allow:				
A16 Wood Platform Seating Feature	753	SF	125.00	94,125
E15 Sitting stump	18	EA	200.00	3,600
E16 Sculptural Precast Seating Feature	10	EA	1,000.00	10,000
E5 Wooden Bench	227	LF	200.00	45,400
Flagpole	1	EA	12,000.00	12,000
Site Sign	1	LS	30,000.00	30,000
Perim 18" gravel drip -allow	1,500	LF	65.00	97,500
SUB-TOTAL				3,156,431
G2050 LANDSCAPING				
<u>329000 LANDSCAPING</u>				
Rain Garden (1 Loc 379 SF) :				
Excavate and dispose of spoil	42	CY	60.00	2,527
18" Bio media - import	21	CY	85.00	1,785
18" Soil	21	CY	78.00	1,638
Planting	379	SF	10.00	3,790
Planting - Allowance				
F2 Deciduous Tree (232 ea)	232	EA	2,000.00	464,000
Ground cover /plant bed	1	LS	100,000.00	100,000
12" Soil @ shrub bed (18,200 sf)	674	CY	72.00	48,528
Mulch @ shrub bed & tree pits	200	CY	68.00	13,600
TYP Lawn:				
Sod (bldg permimeter)	12,511	SF	1.10	13,762
Rake , Seed, Fertilize	57,758	SF	0.50	28,879
6" Loam - import	1,301	CY	74.00	96,295
Planting Bed (20,606 sf) :				
18" Planting soil	1,145	CY	82.00	93,872
2" Bark mulch	122	CY	80.00	9,769
Planting Maintenance	1	LS	25,000.00	25,000
328000 IRRIGATION				
Irrigation System - planting bed	20,606	SF	1.50	30,909
Irrigation System - playing field	60,969	SF	1.50	91,454
SUB-TOTAL				1,025,806
TOTAL G20 - SITE IMPROVEMENTS				6,183,086

G30 - SITE MECHANICAL UTILITIES

G3010 WATER SUPPLY

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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330000 UTILITIES

St Connection	2	LOC	20,000.00	40,000
6" Domestic service	118	LF	130.00	15,340
8" Fire service	118	LF	150.00	17,700
6" Gate valve	1	EA	3,400.00	3,400
8" Gate valve	1	EA	3,800.00	3,800
Test, sanitize, misc.	1	LS	7,500.00	7,500
Madison St cut & patch	1	LOC	4,000.00	4,000
New Hydrant - allow	4	EA	4,800.00	19,200
New Hydrant 6" service - allow	100	LF	150.00	15,000
New Hydrant 6" Gate valve- allow	1	EA	3,400.00	3,400

SUB-TOTAL

129,340

G3020 SANITARY SEWER

330000 UTILITIES

Sewer doghouse	1	LOC	10,000.00	10,000
5,000 gal Ext. Grease Interceptor	1	EA	45,000.00	45,000
Sewer manhole	3	EA	5,000.00	15,000
6" PVC sanitary	202	LF	150.00	30,300

SUB-TOTAL

100,300

G3030 STORM SEWER

330000 UTILITIES

Street -Connection w/ New Drain Manhole	1	EA	25,000.00	25,000
Site -Connect to Doghouse Drain Manhole	1	EA	8,000.00	8,000
Catch Basin	21	EA	4,800.00	100,800
Drain Manhole	20	EA	4,800.00	96,000
Drain Manhole (stormceptor)	2	EA	18,000.00	36,000

New Piping and Trenching (assumes reuse backfill):

12" HDPE	2,305	LF	105.00	242,025
Allow for field manifolds	1	LS	15,000.00	15,000
UG - 1	12,889	SF	40.00	515,560
UG - 2	5,814	SF	40.00	232,560
UG - 3	800	SF	40.00	32,000

* Foundation and slab drainage are included w/ A1010

SUB-TOTAL

1,302,945

G3040 HEATING DISTRIBUTION

330000 UTILITIES

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
SUB-TOTAL				0
G3090 OTHER SITE MECHANICAL UTILITIES				
330000 UTILITIES				
Gas Service		By Others		
Gas meter pad	1	EA	1,200.00	1,200
Trench exc & bf (st - BLDG)	110	LF	45.00	4,950
Street cut & patch	1	LOC	3,000.00	3,000
SUB-TOTAL				9,150
TOTAL G30 - SITE MECHANICAL UTILITIES				1,541,735

G40 - SITE ELECTRICAL UTILITIES

G4010 ELECTRICAL DISTRIBUTION

330000 UTILITIES

Transformer pad	1	EA	3,500.00	3,500
Generator Pad	1	EA	4,000.00	4,000
Ext. Trench, Backfill and Concrete:				
Primary	100	LF	160.00	16,000
Secondary	50	LF	160.00	8,000
Generator	100	LF	160.00	16,000
Tele/Data	200	LF	160.00	32,000
EV Direct buried	1	LS	10,000.00	10,000
<u>260001 ELECTRICAL*</u>				
Site Electrical:				
Demo and disconnect	1	LS	35,000.00	35,000
HH Handhole	2	EA	1,100.00	2,200
T xfmr pad grounding	1	EA	2,700.00	2,700
T xfmr pad sleeves & 90 deg	1	EA	650.00	650
MH Manhole F&I by E.C.	1	EA	11,250.00	11,250
MH Manhole grounding & racks	1	EA	1,800.00	1,800
Exist. utility pole dressing	1	EA	2,650.00	2,650
Primary (2) 4" PVC-w/P.S.	200	LF	16.50	3,300
Secondary (4) 4" PVC-w/P.S.	200	LF	16.50	3,300
Tele/Data (4) " PVS w/P.S	400	LF	16.50	6,600
Power Distribution:				
Secondary (4) #600 mcm	200	LF	225.00	45,000
Generator feed	1	LS	30,000.00	30,000
EV rough-in	1	EA	10,000.00	10,000
EV Loop	2000	LF	10.50	21,000
OH&P 15%	1	LS	10,417.50	10,418

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
DJE	1	LS	10,000.00	10,000
SUB-TOTAL				285,368
G4020 SITE LIGHTING				
<u>330000 UTILITIES</u>				
New Site Lighting:				
Site light trenching	3,000	LF	13.00	39,000
Concrete Pole Base				
Roadway and Parking Pole Base	20	EA	950.00	19,000
Pedestrian Light Pole	10	EA	800.00	8,000
260001 ELECTRICAL*				
Exterior Site/Elec/Lighting:				
20' roadway pole	30	EA	2,740.00	82,200
14' Walkway post top	20	EA	2,280.00	45,600
uplight	3	EA	660.00	1,980
CCTV camera pole prep	8	EA	550.00	4,400
Flagpole grounding	1	EA	315.00	315
PVC-2"C w/ps for fiber	1,000	LF	3.10	3,100
HH handhole 15"x22"x18"D	3	EA	940.00	2,820
Pole base grounding	30	EA	150.00	4,500
Pole base anchor bolt sys	30	EA	56.00	1,680
Pole base sleeves & 90 deg	30	EA	130.00	3,900
Surveillance cab power	8	EA	350.00	2,800
PVC-1 1/4"C-2#4 & 1#6	3,000	LF	10.50	31,500
CCTV	2400	EA	8.00	19,200
OH&P 15%	1	LS	30,599.25	30,599
DJE	1	LS	20,000.00	20,000
SUB-TOTAL				320,594
TOTAL G40 - SITE ELECTRICAL UTILITIES				605,962

20 Project Work Plan

20.1 Project Directory

Project Name:
Date: 8/22/2024

**Dedham Oakdale School
Dedham, MA**

Name	Title	Phone	Cell Phone	E-mail
Client				
Oakdale School 147 Cedar St. Dedham, MA 02026				
Dedham School Building Rehabilitation Committee				
John Tocci	Chair, Town Moderator			jtocci@toccilee.com
John Heffernan	Vice Chair, Finance & Warrant Committee			jheff61@msn.com
Erin Boles Welsh	Member, Select board			eboleswelsh@dedham-ma.gov
Maryanne Briggs	Member, School Committee			mbriggs@dedham.k12.ma.us
Stephen Acosta	Member, School Committee			sacosta@dedham.k12.ma.us
Phillip Gonzalez	Member, Town Moderator			philncarrie@comcast.net ;
Sara Rosenthal	Member, Community At Large, Architect			sara.a.rosenthal@gmail.com
Ex Officio Members:				
Nan Murphy	Superintendent of Schools			nmurphy@dedham.k12.ma.us
Dr. Ian Kelly	Assistant Superintendent - Finance and Operations			mwells@dedham.512.ma.us
Nancy Baker	Ex-Officio, Assistant Town Manager			nbaker@dedham-ma.gov
Kim Hermesch	Oakdale Principal			khermesch@dedham.k12.ma.us
Katherin Duceman	Ex Officio			kduceman@gmail.com
Kaitlyn DeStafano	Ex Officio			kaitlyn.destafano@gmail.com
Steve Popper	Ex Officio			poppersh@aol.com
Kerrie Bryant	Ex Officio			kbryant@dedham.k12.ma.us
Anthony Rodriguez	Ex Officio			anthonyrodriguez10@gmail.com
Kelly Leahy	Ex Officio			k Leahy@dedham-ma.gov
School Committee				
Mayanne MacDonald Briggs	Chair			mbriggs@dedham.k12.ma.us
Stephen Acosta	Vice Chair			sacosta@dedham.k12.ma.us
Dr. Leah Flynn Gallant	Member			lgallant@dedham.k12.ma.us
Laurie Twomey	Member			ltwomey@dedham.k12.ma.us
Chris Polito	Member			chrispolitosc@gmail.com
Joshual Langmead	Member			jlangmead@dedham.k12.ma.us
William Walsh	Member			wwalsh@dedham.k12.ma.us
Town of Dedham				
Town Hall 450 Washington Street Dedham, MA 02026				
Leon Goodwin	Town Manager	(781) 310-1141	(603) 496-9981	lgoodwin@dedham-ma.gov
Joe Flanagan	Director of Public Works	(781) 751-9377	(617) 799-9940	jflanagan@dedham-ma.gov
Nancy Baker	Assistant Town Manager	(781) 751-9100	(781) 603-9633	nbaker@dedham-ma.gov
Bernardo Rodriguez	Project Manager - Facilities & Maintenance			brodriguez@dedham-ma.gov
Amanda Smith	Public Information Officer			asmith@dedham-ma.gov
Sara Erickson	Communications Coordinator	508-810-8905		serrickson@dedham.k12.ma.us
Bassem Awad	IT Director			bawad@dedham-ma.gov
Matt Haffner	Director - Facilities & Maintenance	(781) 310-1141	(781) 752-7812	dhaffner@dedham-ma.gov
School Department 100 Whiting Ave. Dedham, MA 02026				
Nan Murphy	Superintendent			nmurphy@dedham.k12.ma.us
Dr. Ian Kelly	Assistant Superintendent for Business and			ikelly@dedham.k12.ma.us
Amy Hicks	Executive Assistant to the Superintendent			ahicks@dedham.k12.ma.us
Dedham Fire Department 436 Washington Street Dedman, MA 02026				
William Spillane	Chief of Department, CFO	(781) 751-9414	(781) 727-0597	wspillane@dedham-ma.gov

Project Name:
Date: 8/22/2024

**Dedham Oakdale School
Dedham, MA**

Name	Title	Phone	Cell Phone	E-mail
Dedham Police Department 450 Washington Street Dedham, MA 02026				
Michael D'Entremont	Chief of Police	(781) 751-9332	(781) 603-6159	mdentremont@police.dedham-ma.gov

Owner's Project Manager

**Compass Project Management
One Edgewater Drive, Suite 204
Norwood, MA 02026**

John Lemieux	Project Director	(508) 359-6031	(617) 869-7670	jlemieux@vertexeng.com
Steve Theran	Senior Project Manager		(781) 927-8857	stheran@vertexeng.com
Anissa Ellis	Project Manager	(508) 589-5061	(781) 223-2659	aellis@compasspminc.com
Mary Kuppens	Project Accountant		(781) 820-5046	mkuppens@compasspminc.com

Architect

**Jonathan Levi Architects, Inc.
266 Beacon Street
Boston, MA 02116**

Jonathan Levi	Partner	617-829-2892		jlevi@leviarc.com
Carol Harris	Senior Associate	617-795-3091		charris@leviarc.com
Philip Gray	Senior Principal	617-437-9458		pgray@leviarc.com

20.2 Roles and Responsibilities

The roles and responsibilities of the OPM and Designer have not changed and services are being provided as outlined in their respective agreements with the Town.

20.3 Communications and Document Control

All communications between the Owner and Designer are made through the OPM. Communications have been, and will continue to be, primarily through video conferencing and emails with other team members copied as needed. Design documents are reviewed in house by both the Designer and OPM prior to forwarding to the Owner for review and approval at the open bi-weekly public meetings. The Town has create a “working group” to help keep the project on track, they meet bi-weekly virtually to preview the documents being brought to the larger SBRC group for review.

The SBRC also follows all Town and Massachusetts open meeting laws and posts agendas at least 48 hours prior to any public meetings. They also offer meetings in person with a virtual option to allow for community members to attend from home and still stay involved with the project.

20.4 Designer Work Plan

Oakdale Elementary School Work Plan

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
Project Scope and Budget	Peer	Phase 1 Environmental Report	Forward copy of report to Designer	8/23/2024	Complete	
	Reliance	Geotechnical Site Evaluation	Preliminary Geotechnical Report	8/23/2024	Complete	
	JLA, DPS	Final Design Program	Excel spreadsheet and architect's signature	8/23/2024	Complete	
	Pare	Traffic Study	Traffic Study	8/23/2024	Complete	
	JLA, LeM ,AKAL, GGD	Building Description Narratives	Architectural, Sustainable Design, MEP, Fire Protection, Structural, and Technology	8/23/2024	Complete	
	JLA, Green Engineer	LEED Scorecard	LEED Scorecard and Potential rating	8/23/2024	Complete	
	JLA GGD	Utility Analysis	Narrative	8/23/2024	Complete	
	JLA, DPS, Vertex	DESE Approval	Plans and Program forwarded to Vertex and WPS Working Group. WPS' Narrative describing SPED Program Spaces	8/23/2024	Complete	
	JLA	Document Updates: Plans, Site Plan, Exterior Elevations, Model Images, Specifications	Plans and Specs to PM&C and Vertex for Cost Estimate	8/23/2024	Complete	
	JLA, Vertex	Site Development Plans and Analysis	Schematic Site Plan, and Surveys	8/23/2024	Complete	
	JLA	Specifications	Outline Specifications	8/23/2024	Complete	
	JLA, DPS	Schematic Building Floor Plans	Overall 1/8" Building Floor Plans	8/23/2024	Complete	
	JLA	Schematic Roof Plans	Overall and 1/8" Roof Plans	8/23/2024	Complete	
	JLA	Schematic Exterior Elevations	Overall and 1/8" exterior Elevations	8/23/2024	Complete	
	JLA	Massing Study	Images of Exterior Design	8/23/2024	Complete	
	Vertex	Preliminary Project Cash Flow	MSBA Formatted Cash Flow Projections	8/23/2024	Complete	
	Vertex	Project Schedule	OPM Project Schedule	8/23/2024	Complete	
	PM&C	Cost Estimate	Uniformat Detailed Estimate 100% SD	8/19/2024	Complete	
	AM Fogarty	Cost Estimate	Uniformat Detailed Estimate 100% SD	8/19/2024	Complete	
	PM&C, AM Fogarty	Reconcile Cost Estimate	Reconciled Cost Estimates	8/23/2024	Complete	
	Vertex	Project Budget Cost	Excel Spreadsheet 3011	8/23/2024	Complete	
	SUBMITTALS					
	Vertex	Submit Documents for DESE Review	Cover Letter, Space Summary, Plans	8/29/2024	Complete	
	JLA	Submit Documents for Cost Estimates	Plans and Specifications	7/25/2024	Complete	
	JLA	Submit Documents to Vertex	MSBA Formatted PS&B Submission	8/28/2024	Complete	
	Vertex	Submit Documents to MSBA	Final PS&B Submittal	8/29/2024	Complete	

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
Design Development Documents	JLA, Reliance	Geotechnical Site Evaluation	Updated Geotechnical Report			
	JLA	Program Comparison Analysis	Letter from Architect outlining differences from PS&B Space Summary Submittal	5/28/2025		
	JLA	Program Space Summary	Space Summary Document signed by Architect	5/28/2025		
	CDW	Site Related Code Analysis: Permitting and Zoning	Detailed Review of Dedham's Regulatory Requirements	5/28/2025		
	Vertex	Updated Schedule	Schedule	5/28/2025		
	Design Team	Design Development Documents	PDF Files	5/28/2025		
	Design Team	Design Development Specification	PDF Files	5/28/2025		
	PM&C	Design Development Cost Estimate	Detailed Cost Estimate	5/28/2025		
	PM&C, CMR	Reconcile Cost Estimate	Reconciled Estimates	5/28/2025		
	Vertex	Value Engineering Report	VE Report	5/28/2025		
	SUBMITTALS					
	Design team	Design Development Documents	Drawings, Specifications, Binder	5/28/2025		
	Vertex	Submit Documents to MSBA	DD Submittal	5/30/2025		

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
100% Construction Documents 100% Site Enabling and Structural Package	Howe Engineers	Site Related Code Analysis: Permitting	Detailed Review of the Regulatory Requirements	9/24/2025		
	Vertex /JLA	Approval of Proprietary Items	School Committee Vote	8/25/2025		
	JLA	Program Comparison Analysis	Letter from Architect outlining differences from PS&B Space Summary Submittal	9/24/2025		
	JLA	Program Space Summary	Space Summary Document signed by Architect	9/24/2025		
	JLA	Project Design Compliance	Letter from Architect verifying compliance of design with PS&B	9/24/2025		
	Vertex	Updated Schedule	Schedule	9/24/2025		
	Design Team	60% Construction Documents	PDF Files	9/24/2025		
	Design Team	60% Construction Specification	PDF Files	9/24/2025		
	PM&C	60% Cost Estimate	Detailed Cost Estimate	9/16/2025		
	PM&C, CMR	Reconcile Cost Estimate	Meeting	9/12/2025		
	Vertex	Value Engineering Report	VE Report	9/13/2025		
	SUBMITTALS					
	Design team	60% Construction Documents	Drawings, Specifications, Binder	9/24/2025		
	Design team	100% Site Enabling and Structural Package	Drawings & Specifications	9/24/2025		
	Vertex	Submit Documents to MSBA	60% CD Submittal	9/26/2025		

Phase	Responsibility	Description of Key Tasks	Deliverable	Submittal Date	Status	
90% and 100% Construction Documents	JLA	Program Space Summary	Space Summary Document signed and certified by Architect	11/11/2025		
	Vertex	Geotechnical Peer Review	Letter and Report from Second Peer Review	11/11/2025		
	Cx Agent	Cx Review	Review Questions and responses from design team	11/11/2025		
	JLA, Howe, GGD	Building Code and Fire Safety Review	Letter from Architect and Code Review Consultant	11/11/2025		
	JLA	Utility Certification & Board Approval	Letter from Architect stating review meetings and approvals obtained from City Departments	11/11/2025		
	JLA	Program Comparison Analysis	Letter from Architect outlining differences from 60% Space Summary Submittal	11/11/2025		
	Howe	Site and Building ADA MAAB Review	Letter of Compliance from the Accessibility Consultant. Design Team's responses to the detailed Review Document provided by Accessibility Consultant	11/11/2025		
	JLA	Testings and Permits compliance	Letter from Architect stating all testing and permits have been obtained for the project	11/11/2025		
	JLA, GGD	Compliance with Energy Code	Com CHECK 3.8.1 2009 IEC Report	11/11/2025		
	LeM	Structural Design Calculations	Structural Design Calculation Report	11/11/2025		
	JLA	90% Construction Documents	Documents available for review by design team and independent estimator	11/11/2025		
	Design Team	90% Construction Documents	Bound AutoCAD files	11/11/2025		
	Design Team	90% Construction Specification	PDF File of Specification	11/11/2025		
	JLA	Interior Materials Color Board	Color Board for DPS review	11/11/2025		
	Design Team	Designer review responses to the 60% MSBA review comments	Letters of compliance from Design Team	11/11/2025		
	PM&C	Final Designer Cost Estimate	Cost Estimates	11/4/2025		
	CMR	Final CMR Cost Estimate	Cost Estimates	11/4/2025		
	Vertex	Cost Estimate Comparison Spreadsheet	Cost Estimate Comparison Spreadsheet	11/4/2025		
	PM&C, CMR	Reconcile Cost Estimate	Meeting	11/4/2025		
	JLA, Vertex	Independent Structural Peer Review	Letter of compliance to Building Code	11/11/2025		
	Vertex	Value Engineering Report	VE Report	11/11/2025		
	SUBMITTALS					
	Design Team	90% Construction Documents to MSBA	Drawings & Specifications	11/14/2025		
	Design Team	100% Construction Documents to MSBA	Drawings & Specifications	12/19/2025		

20.5 Project Schedule

See attached updated project schedule reflecting Design Development, Construction Documents, Construction, FFE/Technology, Demolition, and close out.

21 Local Actions and Approvals

21.1 Local Actions Certification Letter

Dennis J. Teehan, Jr., Chair
 Erin Boles Welsh, Vice Chair
 James A. MacDonald
 Dimitria Sullivan

Leon I. Goodwin III
 Town Manager

Nancy A. Baker
 Assistant Town Manager



TOWN OF DEDHAM
 Select Board

DEDHAM TOWN HALL
 450 Washington Street
 DEDHAM, MA 02026

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WEB SITE
www.dedham-ma.gov

E-mail Address for Select Board
SelectBoard@dedham-ma.gov

August 27, 2024

Ms. Mary Pichetti
 Director of Capital Planning
 40 Broad Street
 Boston, Massachusetts 02109

Dear Ms. Pichetti:

The Town of Dedham School Building Rehabilitation Committee ("SBRC") has completed its review of the Preferred Schematic Report for the Oakdale school project (the "Project"), and on August 26, 2024, the SBRC voted to approve and authorize the Owner's Project Manager to submit the Schematic Design related materials to the MSBA for its consideration. A certified copy of the SBRC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, will be provided once they are approved by the SBRC.

Since the MSBA's Board of Directors invited the District to conduct a Feasibility Study on *April 14, 2021*, the SBRC has held Fifty Six (56) meetings regarding the proposed project, in compliance with the state Open Meeting Law. These meetings include:

Dedham School Building Rehabilitation Committee (SBRC) Meetings:				
<u>Mtg. Date</u>	<u>Topics</u>	<u>Present</u>	<u>Votes</u>	<u>Materials</u>
May 25, 2022 SBRC Meeting	Shortlist OPM Candidates	SBRC	VOTE: Shortlist OPM Candidates	
June 8, 2022 SBRC Meeting	Interview OPM Candidates	SBRC, OPM Firms	n/a	OPM Provided Presentations
June 14, 2022 SBRC Meeting	OPM Candidates	SBRC	VOTE: Approve Compass/Vertex as OPM	
July 17, 2022 SBRC Meeting	Introduce Compass/Vertex, Review Project Timeline	SBRC, Vertex	n/a	OPM Timeline, Team Introductions
August 22, 2022 SBRC Meeting	Designer Select Update - RFS issued	SBRC, Vertex	n/a	Vertex Slides with project update

September 19, 2023 SBRC Mtg	Designer Select panel Reps; Community Mtg on 9/28/22	SBRC, Vertex	n/a	Vertex Slides with project update
October 11, 2022 SBRC Mtg	(3) Designer Proposals rec'd; DSP Update; Community Meeting Discussion	SBRC, Vertex	n/a	Vertex Slides with project update
November 21, 2022 SBRC Mtg	DSP Update (JLA selected); Public Communications Subcommittee creation	SBRC, Vertex	VOTE: Public Communication Subcommittee formation	Vertex Slides with project update, JLA Introduction slides
December 5, 2022 SBRC Mtg	JLA Introduction; Possible project sites; Public Feedback	SBRC, Vertex, JLA	n/a	JLA Slide presentation
December 19, 2022 SBRC Mtg	Site Evaluation Matrix; Potential community meetings	SBRC, Vertex, JLA	n/a	Site Evaluation Matrix
January 17, 2023 SBRC Mtg	Site Evaluation Matrix; Visioning; Redistricting Consultant	SBRC, Vertex, JLA	n/a	Site Evaluation Matrix; Visioning Introduction
January 31, 2023 SBRC Mtg	Site Evaluations; 1/26/23 Community Mtg; Visioning; Redistricting Consultant	SBRC, Vertex, JLA	VOTE: to Eliminate Paul Park, Dolan Center, Whitcomb Woods, and Rustcraft Rd as potential sites	Site Evaluation Matrix
February 13, 2023 SBRC Mtg	Site Test Fits; Space Summaries; Visioning update	SBRC, Vertex, JLA	VOTE: to eliminate remove the Oakdale/Riverdale combination school options from both the Striar and Capen School sites VOTE: Approve Cropper GIS Redistricting Consultant	Site Test Fits, Space Summaries
February 18, 2023 SBRC Mtg/Site Walk	Outdoor Site walk of all potential sites	SBRC, Vertex, JLA	n/a	none
February 27, 2023 SBRC Mtg	Visioning Report Review; Updated Building Test Fits; School Committee Update; Community Meeting	SBRC, Vertex, JLA	n/a	Visioning Report, Building Test Fits
March 13, 2023 SBRC Mtg	Test Fits for Add/Reno Options; Community Meeting Details	SBRC, Vertex, JLA	VOTE: to eliminate a combined Capen/Striar option	Building Test Fits
March 27, 2023 SBRC Mtg	Project update, survey results discussion	SBRC, Vertex, JLA	VOTE: To approve PDP submittal to MSBA	PDP Report

April 10, 2023 SBRC Meeting	Project Cost presentation, meeting schedule, joint meeting prep	SBRC, Vertex, JLA	n/a	Vertex schedule & cost slides
April 26, 2023 Joint SBRC/School Committee Meeting	Project cost presentation, site matrix review, schedule review	SBRC, School Committee, Vertex, JLA	VOTE: to Eliminate Striar Property	Vertex schedule & cost slides, JLA Matrix
May 9, 2023 SBRC Meeting	Survey discussion, schedule review	SBRC, Vertex, JLA	n/a	Draft Site Survey
May 22, 2023 SBRC School Tours	Tour of the Fales School in Westborough and the Field School in Weston	SBRC, Vertex, JLA	n/a	None
May 23, 2023 SBRC Meeting	Project Financing with Town Finance Manager, schedule review, survey update, Matrix review	SBRC, Vertex, JLA, Town Representatives	n/a	Vertex Schedule, JLA Matrix & Draft matrix summary
June 5, 2023 SBRC Meeting	Schedule Review, Site Considerations discussion, classroom layout presentation	SBRC, Vertex, JLA	n/a	JLA bubble diagrams and classroom layout examples
June 21, 2023 SBRC Meeting	conceptual site layouts, Site considerations & public comment on sites,	SBRC, Vertex, JLA	VOTE: to remove Greenlodge sit from consideration	JLA Site Layout presentation
June 26, 2023 SBRC Meeting	conceptual site layouts, Site considerations & public comment on sites, SBRC Vote on Preferred Site	SBRC, Vertex, JLA	VOTE: to select Oakdale as the preferred site and eliminate Capen.	Vertex Schedule Slide, JLA Site Layout presentation
July 10, 2023 SBRC Meeting	Discuss PSR process and schedule, future meeting schedule	SBRC, Vertex, JLA	n/a	JLA PSR Schedule
July 17, 2023 SBRC Meeting	Discussion on possible rescission of site vote with public comment; Building option presentation	SBRC, Vertex, JLA	n/a	JLA Site & Building Layout presentation
July 31, 2023 SBRC Meeting	Building option matrix review, Building option presentation, cost discussion	SBRC, Vertex, JLA	n/a	JLA Site & Building Layout presentation, Vertex Cost presentation
August 7, 2023 SBRC Meeting	Schedule review; Discussion on voting process, Discussion on Building options	SBRC, Vertex, JLA	VOTE: to selection Building Option D as the preferred option.	JLA Site & Building Layout presentation, Vertex Cost presentation
August 21, 2023 SBRC Meeting	Schedule Review, PSR Review, Discussion on project name change and communications	SBRC, Vertex, JLA	VOTE: to approve the PSR Submittal to the MSBA	Vertex Slides, JLA Option D Slide

September 11, 2023 SBRC Meeting	MSBA/PSR update, Design update, Traffic Study update	SBRC, Vertex, JLA	n/a	JLA Design Presentation
September 26, 2023 SBRC Meeting	MSBA/PSR update, Design update, Traffic Study update, 1902 building discussion, ex officio member discussion	SBRC, Vertex, JLA	VOTE: to close the ex-officio member posting	JLA Design Presentation
October 10, 2023 SRC Meeting	1902 building discussion, Design update, School committee report, Fincom meeting report	SBRC, Vertex, JLA	VOTE: to demolish the existing 1902 building VOTE: to approve design option D.2 VOTE: to add ex-officio members	JLA Design presentation
October 23, 2023 SBRC Meeting	Financial/Tax implication discussion, Design update, Traffic Study update, Landscape Design discussion	SBRC, Vertex, JLA	VOTE: to create subcommittees and update working group members	JLA Design Presentation
November 7, 2023 SBRC Meeting	Landscape design, building design, community meetings	SBRC, Vertex, JLA	VOTE: to add more ex-officio members	Halvorson Design Presentation
November 20, 2023 SBRC Meeting	community meetings, history of project to date, school dept. report, design update,	SBRC, Vertex, JLA	n/a	Halvorson Design Presentation, SC Presentation on larger schools
December 4, 2023 SBRC Meeting	Design update, project budget review, school department report,	SBRC, Vertex, JLA	n/a	3011 budget form, JLA Value management presentation, school department slides
December 11, 2023 SBRC meeting	Design update, site design discussion, HVAC/Geothermal discussion, CMR v DBB, Value management, Responses to MSBA queries	SBRC, Vertex, JLA	VOTE: to move forward with Geothermal	JLA phasing diagrams, Vertex CMR v DBB presentation, Value Management spreadsheet
December 12, 2023 Joint SBRC, School Committee, Select Board Meeting	General project discussion, vote schedule discussion	SBRC, Vertex, JLA, School Committee, Select Board	n/a	Town clerk vote schedule presentation, JLA design presentation, School Department Presentation

December 19, 2023 SBRC Meeting	CMR v DBB discussion, Value management, response to MSBA enrollment query	SBRC, Vertex, JLA	VOTE: to move forward with CMR delivery VOTE: to accept removal of saw tooth roof at gym VOTE: to go back to the MSBA and request a formal enrollment review	none
January 22, 2024 SBRC Meeting	Project recap, discussion on public outreach, Town capital improvements on surrounding streets	SBRC, Vertex, JLA	n/a	JLA Classroom/Enrollment matrix
February 6, 2024 SBRC Meeting	MSBA Enrollment options update, future meeting dates	SBRC, Vertex, JLA	n/a	JLA Classroom/Enrollment matrix
March 5, 2024 SBRC Meeting	MSBA Enrollment options update, School Committee report	SBRC, Vertex, JLA	n/a	none
March 25, 2024 SBRC Meeting	MSBA Enrollment options update, Potential site discussion, Added cost for new PSR/SD	SBRC, Vertex, JLA	VOTE: to move forward with the Oakdale school site	none
April 9, 2024 SBRC Meeting	Warrant Article discussion, PSR update & discussion	SBRC, Vertex, JLA	n/a	none
April 29, 2024 SBRC Meeting	Design review, PSR submission discussion	SBRC, Vertex, JLA	VOTE: to approve submission of revised PSR to the MSBA	JLA Design Presentation
May 14, 2024 SBRC Meeting	PSR update, ex-officio members, community input on SD plans	SBRC, Vertex, JLA	n/a	Project Timeline Review slide
June 3, 2024 SBRC Meeting	Design update, Review updated OPM and Arch. Contracts/amendments, Geothermal HVAC review, DBB/CRM Review	SBRC, Vertex, JLA	VOTE: to approve JLA & Vertex Amendments VOTE: to approve/confirm demolition of 1902 building VOTE: to approve Geothermal heating system	JAL Design Presentation, Amendments

June 10, 2024 SBRC Meeting	Design update, Walk the site with neighbors/abutters, discuss SBRC officers, upcoming meeting schedule	SBRC, Vertex, JLA	VOTE: to nominate John Heffernan as SBRC Vice Chair VOTE: to nominate John Tocci as SBRC Chair VOTE: to nominate Kerrin O'Brien and Cat Philipe as Ex Officio Members	JLA Design presentation
June 24, 2024 SBRC Meeting	Design update, construction schedule, working group membership, DBB vs CMR	SBRC, Vertex, JLA	VOTE: to approve CM at Risk delivery method	JLA Design Presentation, Vertex DBB/CMR Presentation
July 8, 2024 SBRC Meeting	Design update, Working Group membership, Discuss new Select Board Designee	SBRC, Vertex, JLA	n/a	JLA Design presentation
July 29, 2024 SBRC Meeting	Discuss Warrant article	SBRC, Vertex, JLA	VOTE: to appoint members to draft warrant article language	n/a
August 19, 2024 SBRC Meeting	Project history, project timeline, Design update, budget review	SBRC, Vertex, JLA	VOTE: to remove Bay Windows from project. VOTE: to approve PV on the building Roof	JLA Design presentation, 3011 budget review
August 26, 2024 SBRC Meeting	Project design, turf fields, sidewalk/street work, SBRC membership, project budget, MSBA SD Report	SBRC, Vertex, JLA, School Committee	VOTE: To include \$550K for street improvements. VOTE: To approve inclusion of Turf Fields. VOTE: To Approve the OPM to submit the SD Report to the MSBA VOTE: To work with PB on warrant article to add additional SBRC members VOTE: To approve the Project Warrant Article Vote Language	JLA Design presentation, Sidewalk/Street work slides, 3011 review

In addition to the regular SBRC meetings listed above, the District held Thirty (32) public community and school committee meetings, which were posted in compliance with the

state Open Meeting Law and at which the Project was discussed. These meetings include:

Dedham Oakdale Community Meetings				
<u>Mtg. Date</u>	<u>Topics</u>	<u>Present</u>	<u>Votes</u>	<u>Materials</u>
September 28, 2022 Community Mtg	Overall project timeline update	SBRC, School Committee, Vertex, Public	n/a	Project Timeline, Website/Contact Information
October 18, 2022 Riverdale Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Riverdale School PTO	n/a	Project Timeline, Website/Contact Information
November 1, 2022 Avery Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Avery School PTO	n/a	Project Timeline, Website/Contact Information
November 9, 2022 Oakdale Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Oakdale School PTO	n/a	Project Timeline, Website/Contact Information
November 22, 2022 Greenlodge Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, Greenlodge School PTO	n/a	Project Timeline, Website/Contact Information
December 6, 2022 ECEC Informational Meeting	Project Update at School PTO Meeting	SBRC, Vertex, ECEC PTO	n/a	Project Timeline, Website/Contact Information
December 7, 2022 School Committee Designer Intro Mtg	Introduction of JLA to School Committee	SBRC, Vertex, JLA	n/a	Project Timeline, Website/Contact Information
January 26, 2023 Community Mtg	Project Schedule, Site Matrix Review, Intro. JLA	SBRC, Vertex, JLA	n/a	Site Evaluation Matrix
February 2, 2023 Dedham MS Informational Mtg	Project Update at School PTO Meeting	SBRC, Vertex, Middle School PTO	n/a	Project Timeline, Website/Contact Information
March 25, 2023, Community Meeting	Community Meeting to discuss potential project sites - held as an open discussion with stations for each site	SBRC, Vertex, JLA, community members	n/a	Large poster boards of each site; large white boards to record public comments
June 17, 2023 Community Meeting	Community Meeting to review sites, project costs, schedule, and next steps	SBRC, Vertex, JLA, community members	n/a	Vertex Schedule & Costs slides; JLA site layout slides

July 13, 2023 Abutters Meeting	Meet with direct abutters to discuss the project. Walk the site to review actual conditions and answer questions.	SBRC, Vertex, JLA, Abutters	n/a	JLA Site layout slides
February 12, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
February 28, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 4, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 7, 2025	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 11, 2026	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
June 10, 2024 SBRC Meeting	Design update, Walk the site with neighbors/abutters, discuss SBRC officers, upcoming meeting schedule	SBRC, Vertex, JLA	<p>VOTE: to nominate John Heffernan as SBRC Vice Chair</p> <p>VOTE: to nominate John Tocci as SBRC Chair</p> <p>VOTE: to nominate Kerrin O'Brien and Cat Philipe as Ex Officio Members</p>	JLA Design presentation

Dedham Oakdale School Committee Meetings				<u>Materials</u>
<u>Mtg. Date</u>	<u>Topics</u>	<u>Present</u>	<u>Votes</u>	Project Timeline, Website/Contact Information
September 28, 2022	COMMUNITY MEETING - project overview	SBRC, School Committee, Vertex, Public	n/a	n/a
October 5, 2022	Community Meeting update, Dedham Day flyers and attendance update	School Committee	n/a	n/a

October 19, 2022	Designer Selection update, Harvard, MA School Visit	School Committee	n/a	n/a
November 2, 2022	Design Selection Pane update, Avery School PTO Meeting update	SC, Vertex, SBRC Chair	n/a	n/a
November 16, 2022	Designer Selection Panel, Greenlodge PTO Meeting update	School Committee	n/a	n/a
December 7, 2022	MSBA Program, ECEC PTO Meeting update, Introduction of JLA	School Committee, Vertex, SBRC Chair	n/a	n/a
January 4, 2023	Update on potential sites, Education Model for PDP	School Committee	n/a	n/a
January 18, 2023	Upcoming community meeting, site evaluation update	School Committee	n/a	n/a
February 1, 2023	Timeline & Process update, Educational Plan requirements for PDP,	School Committee, Vertex, JLA	Vertex Slides	Vertex Slides, JLA Slides
February 15, 2023	Update on previous meetings, Timeline review, Cropper Redistricting Proposal Review, Visioning update	School Committee, Vertex, JLA	VOTE: to approve the Cropper Gis redistricting consultant proposal	n/a
March 1, 2023	Educational Plan update, Visioning update	School Committee, Vertex, JLA	n/a	Vertex Slides, JLA Slides
March 15, 2023 School Committee Mtg.	School Committee Meeting: PDP Submission, Educational Plan	John Tocci, Vertex, JLA, School Committee	VOTE: To approve Educational Plan for PDP submission	n/a
April 1, 2023	Community Meeting update, Discussion of joint meeting with SBRC	School Committee	n/a	Vertex Slides, JLA Slides
April 26, 2023 Joint Meeting with SBRC	Project overview, timeline update, site evaluation update	School Committee, Vertex, JLA	SBRC VOTE: to eliminate Striar property from consideration	n/a
May 3, 2023	Review of site options as they relate to the enrollment options	School Committee, SBRC Chair, Vertex	n/a	n/a
May 17, 2023	School tours update, upcoming meetings regarding project financing	School Committee, SBRC Chair, Vertex	Vertex Slides	Large poster boards of each site; large white boards to record public comments

March 25, 2023, Community Meeting	Community Meeting to discuss potential project sites - held as an open discussion with stations for each site	School Committee, SBRC, Vertex, JLA, community members	n/a	n/a
June 7, 2023	Discussion on enrollment options	School Committee, SBRC Chair, Vertex	VOTE: to approve the 550 student enrollment option	n/a
August 22, 2023	PSR Submission Discussion	School Committee, SBRC Chair, Vertex	VOTE: to approve submission of the PSR to the MSBA	n/a
December 6, 2023	Discussion on NESDEC Enrollment Projections	School Committee	n/a	JLA Presentation, School Dept. Presentation, Town Clerk vote presentation
December 12, 2023, Joint Meeting with Select Board & SBRC	General project discussion, enrollment projections, potential vote sequencing	School Committee, Select Board, SBRC, Vertex, JLA	n/a	n/a
December 20, 2023	Discussion on SBRC Recommendation	School Committee	VOTE: to request a formal enrollment re-evaluation by the MSBA	n/a
January 31, 2024	Review MSBA Revised Enrollment options	School Committee	VOTE: to execute the enrollment certification from the MSBA for the Oakdale School Project	n/a
February 12, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
February 28, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 4, 2024	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 7, 2025	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a
March 11, 2026	Community Forum on Greenlodge/Oakdale ES Project	School Committee	n/a	n/a

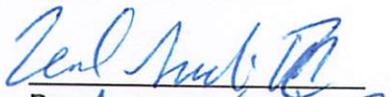
March 20, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve 360 stand alone Oakdale enrollment	n/a
April 3, 2024	Warrant Article recommendation for added funds for feasibility	School Committee	VOTE: To approve the updated Educational Program for the PSR VOTE: To approve warrant article for added feasibility funding	n/a
May 1, 2024	Recommendation on enrollment option for new Elementary School	School Committee	VOTE: To approve 360 stand alone Oakdale enrollment	n/a
June 16, 2024	Public Comments about Project	School Committee	n/a	n/a
August 26, 2024	Project Budget (3011), SD report package	School Committee, SBRC	VOTE: To Approve the OPM to submit the SD Report to the MSBA	n/a

The presentation materials for each meeting, meeting minutes, and summary materials related to the Project are available locally for public review at the project website, the School Committee Website, or the SBRC Website which are all pages attached to the Town of Dedham Town Webpage: <https://www.dedham-ma.gov/>
SBRC Meetings Webpage: <https://www.dedham-ma.gov/government/school-building-rehabilitation-committee/meetings/-npage-2>
School Committee Meetings Webpage: <https://www.dedham.k12.ma.us/Page/2717>

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§ 18-25 and 940 CMR 29 *et seq.*

If you have any questions or require any additional information, please contact Steve Theran, Sr. Project Manager, Vertex Companies at stheran@vertexeng.com or 508-353-1203.

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.


By: Leon I. Goodwin

Title: Chief Executive Officer

Date: 8/27/2024

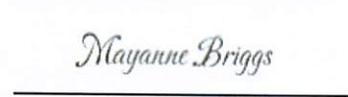
By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.


By:

Title: Superintendent of Schools

Date:

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.


By:

Title: Chair of the School Committee

By:
Date: 8-28-2024

21.2 Certified Meeting Minutes

See attached Meeting Minutes for the following:

4/9/24 SBRC
4/29/24 SBRC
5/14/24 SBRC
6/3/24 SBRC
6/24/24 SBRC DRAFT
7/8/24 SBRC DRAFT

Dedham School Building Rehabilitation Committee

Hosted at the Dedham Town Hall and via Zoom

SBRC Meeting Minutes – **DRAFT for Approval**

Monday April 09, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates (Designer):</u>	A	Anthony Rodriguez, Ex Officio
A	John Tocci, Chair	A	Jonathan Levi	A	Kaitlyn DeStefano, Ex Officio Via Zoom
A	Steve Bilafer, Vice Chair		Philip Gray		Shannan Kavanagh, Ex Officio
A	Josh Donati, Selectman	A	Carol Harris		Kerri Bryant, Ex Officio
A	John Heffernan, Finance Committee		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent
A	Mayanne MacDonald Briggs, School Committee	A	Matt Haffner, Director of Facilities Via Zoom		
A	Stephen Acosta, School Committee	A	Kimberly Hermes, Oakdale School Principal		
A	Phillip Gonzalez	A	Ms. Nan Murphy, Superintendent of Schools (non-voting)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal		
	Jon Lemieux, Project Director		Katherine Duceman, Ex Officio		
A	Stephen Theran, Sr. Project Manager	A	Steven Popper, Ex Officio		
A	Anissa Ellis, Project Manager	A	Sara Rosenthal, Ex Officio		

Distribution: SRBC Members and other attendees

1. Old Business:

No Old Business

2. Approval of Minutes:

DRAFT MINUTES WILL BE FORWARDED ONCE COMPLETED. APPROVED/CERTIFIED MINUTES WILL FOLLOW.

3. Report on Warrant Article 17:

Discussion on warrant article for Town Meeting to extend the Feasibility process and provide additional funding for the OPM and Designer.

4. Presentation & Discussion on PSR:

Discussion on PSR submission and budgets.

MOTION: Motion to approve the estimated construction cost and total estimated project budget as presented for a 360-student school on the Oakdale site, subject to any minor modifications through the Chair or Vice Chair of the SBRC, and to authorize the Owner's Project

Manager to submit the Schematic Design Report to the MSBA for its consideration at their Board Meeting made by Mr. Heffernan.

SECOND: by Mr. Donati.

Vote 7-0-0. Motion passes unanimously.

5. New Business & Public comment:

6. Adjournment:

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by Ms. MacDonald Briggs.

SECOND: by Mr. Acosta

Attachments:

JLA Presentation

DRAFT

Dedham School Building Rehabilitation Committee

Hosted at the Dedham Town Hall and via Zoom

SBRC Meeting Minutes – **APPROVED**

Monday April 29, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates (Designer):</u>		Anthony Rodriguez, Ex Officio (AR)
A	John Tocci, Chair (JT)	A	Jonathan Levi (JL)		Kaitlyn DeStefano, Ex Officio (KD)
A	Steve Bilafer, Vice Chair (SB)		Philip Gray (PG)		Shannan Kavanagh, Ex Officio (SK)
A	Josh Donati, SelectBoard (JD)	A	Carol Harris (CH)		Kerri Bryant, Ex Officio (KB)
	John Heffernan, Finance Committee (JH)		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent (IK)
A	Mayanne MacDonald Briggs, School Committee (MMB)		Matt Haffner, Director of Facilities (MH)		
P	Stephen Acosta, School Committee (SA)	P	Kimberly Hermes, Oakdale School Principal (KH)		
A	Phillip Gonzalez (PG)	P	Ms. Nan Murphy, Superintendent of Schools (non-voting) (NM)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal (JM)		
	Jon Lemieux, Project Director (JL)		Katherine Duceman, Ex Officio (KD)		
A	Stephen Theran, Sr. Project Manager (ST)	A	Steven Popper, Ex Officio (SP)		
	Anissa Ellis, Project Manager (AE)		Sara Rosenthal, Ex Officio (SR)		

Distribution: SRBC Members and other attendees

1. Old Business/Approval of Minutes:

No minutes were presented for approval.

2. Presentations by Vertex and JLA: discussion and consideration of Preferred Schematic Report and vote on same.

Vertex (ST) reviewed the schedule slide from Powerpoint presentation (attached). The Schematic Design submission is due to MSBA on August 29, 2024.

JLA (JL) reviewed the PSR submission including the Space Summaries and Test fits for the enrollment options of 360, 560 & 665. (Chart attached). Options for Oakdale, Greenlodge (combined Greenlodge and Oakdale) and Riverdale (combined Riverdale and Oakdale) were presented. (slides attached).

As requested by SBRC, JLA reviewed the 360 student Oakdale add/reno project further. (Slides shown) 360 student new build Oakdale site plan is presented further. Grades 3, 4 & 5 are on right (gym side). Grade 3 is on the first floor. 1902 building shown as being removed.

ST presents cost slide. Option D is shown with Total Project Cost (\$M) at \$113.2 with Construction Total (\$M) of \$87.1.

Note #2 on the slide is pointed out, providing the Schematic Design costs from December 2023 (not submitted to MSBA) for a 550 student Oakdale Greenlodge combined facility of \$120.9M and a Construction Cost per SF of \$862.98.

ST noted two primary reasons the cost for the current 360 student school compared to the 550 student Greenlodge/Oakdale combined school (\$113.2M vs. \$120.9M) as the added year of cost escalation for starting

one year later and that the space that was removed from the Greenlodge/Oakdale design was classroom space – the least costly space to build. All core spaces remain to serve the lower student enrollment.

JT: Was swing space included for the Partial Renovation option? \$112.6M compared to \$113.2.

JLA clarified that the Partial Renovation/Addition option cost show be shown as \$91.185M and a \$118.54M Total Project Cost.

JD: asks about logistical challenges of Partial Renovation/Addition approach. JL describes approach: first right wing is built. The school population then is moved to right wing. The left wing is then built and occupied. The center portion is then renovated and occupied. The schedule for this approach will require an additional year for the project.

SB: the \$5M higher cost is not as much of a difference as he recalled from the previous studies.

JD: have we reviewed the option to build the right wing and demo the 1902 building, instead of renovation the 1902 building, and build the left and center sections new?

MMB: the concerns from the traffic study provided a need to get traffic off of Cedar Street and Madison Street and to create queuing on site. Keeping the school close to Cedar Street significantly impacts the opportunity to create queuing on site.

PG: states his concern that the difference between a Build New approach compared to the Renovation/Addition approach would be significantly more than the estimated \$5M due to logistical complexities and the renovation component. SP expressed concurrence.

PG: appreciates that the current plans are conceptual, but is concerned that the building is very close or over the 25' setback lines on the plan.

JD: states that the expectation with the change of the building from 550 enrollment to 360 was not to achieve significant relief from the 25' perimeter setback .

JT: requests to see slides further in advance of SBRC meeting.

Comments/Questions:

No questions or comments from the audience present or online.

Motion: MMB: I make a motion for the Owner's Project Manager to submit the Preferred schematic Report to the MSBA, subject to any minor modifications through the SBRC Chair, reflecting the District's decision of a 360-student standalone school on the Oakdale site as its Preferred Option.

2nd: PG

Unanimous vote. Submission of PSR approved.

3. Discussion regarding Finance and Warrant Committee deliberations on warrant article and presentation to Town Meeting:

JT: Informs SBRC that FinCom voted to support unanimously the article presented to provide Design and OPM services through the Schematic Design vote.

Concerns expressed by FinCom included the projected long-term costs of building three schools over time instead of proceeding with a combined option.

4. New Business & Public comment:

No public comments from the audience present or online.

NM: Reminds SBRC of the previous efforts of the Communications Subcommittee to provide transparent information to the community and the need to remain cognizant of the need to continue with this effort.

Next Meetings: May 14, 2024, June 3, 2024

JT: Recognizes SBRC members John Heffernan, Anthony Rodriguez, Sara Rosenthal and Katherine Duceman as newly elected Town Meeting Members and offers congratulations.

5. Adjournment:

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by PG

SECOND: by JD

Vote to Adjourn - Unanimous

Meeting Adjourned at 7:24 pm.

Attachments:

4 29 24 SBRC Meeting Powerpoint presentation

Dedham School Building Rehabilitation Committee

Hosted at the Dedham Town Hall and via Zoom

SBRC Meeting Minutes – **APPROVED**

Monday May 14, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates</u> <u>(Designer):</u>	A	Anthony Rodriguez, Ex Officio (AR)
A	John Tocci, Chair (JT)		Jonathan Levi (JL)	A	Kaitlyn DeStefano, Ex Officio (KD)
A	Steve Bilafer, Vice Chair (SB)		Philip Gray (PG)		Shannan Kavanagh, Ex Officio (SK)
A	Josh Donati, SelectBoard (JD)	A	Carol Harris (CH)		Kerri Bryant, Ex Officio (KB)
A	John Heffernan, Finance Committee (JH)		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent (IK)
A	Mayanne MacDonald Briggs, School Committee (MMB)		Matt Haffner, Director of Facilities (MH)		
A	Stephen Acosta, School Committee (SA)	A	Kimberly Hermes, Oakdale School Principal (KH)		
A	Phillip Gonzalez (PG)		Ms. Nan Murphy, Superintendent of Schools (non-voting) (NM)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal (JM)		
	Jon Lemieux, Project Director (JL)	A	Katherine Duceman, Ex Officio (KD)		
A	Stephen Theran, Sr. Project Manager (ST)		Steven Popper, Ex Officio (SP)		
	Anissa Ellis, Project Manager (AE)	A	Sara Rosenthal, Ex Officio (SR)		

Distribution: SRBC Members and other attendees

1. Old Business/Approval of Minutes:

No minutes were presented for approval.

2. Discussion about School Committee Meeting held on May 13, 2024.

MMB: Questions included confirming the warrant article funding request. Some indicated that questions would be asked at TM. JH: A presentation at Town Meeting is not recommended.

3. Updates and Presentations by Vertex and JLA:

Vertex reviewed the Schematic Design Schedule (attached), highlighting that the submission of the Preferred Schematic Report (PSR) has occurred and the MSBA review is ongoing. The Schematic Design plans for cost estimating will be provided to estimators during the week of 7/22/24, with the schedule for submission of the Schematic Design Report by Aug. 29, 2024.

SB: Emphasizes the opportunity for Community comment on the design. The dates for proposed SBRC meetings and Working Group meetings will be reviewed to eliminate conflicts.

MMB: We should consider adding a meeting for Community Groups and include dates onto this schedule.

Design Team will review current progress and will endeavor to provide updated design for the next Working Group meeting and planning for the next Community Meeting at Oakdale for June 3 is discussed.

MSBA call this am Facilities Assessment meeting with MSBA (5/14/24):

ST started the discussion by presenting MSBA's request to see the Site Plan as it is developed further and MSBA's cautions and concerns with the price point (\$/sf) of the project.

SA: Relayed concern from the call that the "specials" music, art etc. are shown to be located on the 2nd floor and they wanted to see how all students would travel to the 2nd floor for these activities.

CH: Overall a positive meeting with MSBA mentioning being pleased with the overall educational plan.

JD: We need to understand better the concern from the MSBA about high costs.

ST: The MSBA stated that this project is at the highest Cost/Sf that has been submitted. This project, with a reduced number of classrooms has the same core requirements: cafeteria, gymnasium, media center, administration, etc. The simpler classroom spaces is what was reduced from the previous design. MSBA noted again the curved interior and exterior walls.

JT: Restated the concern with the curved walls and what can and will be done about it.

CH: Explained that the walls aren't curved as shown at this diagrammatic phase, but faceted and not as expensive to build as curved walls.

AR: Restated concern with curved walls.

JH: Requests clarification about what is driving the costs if it isn't curved walls.

ST: JLA will review the concerns expressed today and will bring some well thought out solutions forward. Keep in mind that the MSBA program to incentivize electrifying the building with geothermal systems is a new program and adds to the total project cost and cost/sf – even though the MSBA incentive provides reimbursement for the associated costs.

SA: Concern is with building setbacks and the concerns that the setbacks have decreased.

CH: The setbacks will be reviewed and concerns addressed.

4. Presentation by ex officio sub-committee and discussion of appointment of new ex officio members.

How do we get participation by educators in sub-committees? Best if we wait until fall to make changes.

Communications SubCommittee: No update at this time.

5. Discussion of committee and community input on design during Schematic Design process.

ST: Working Group typically provides feedback to the Design and presentations of these decisions are made to the SBRC. The concept of what the building is and where it is has been in place for 1+ year.

Dates are to be finalized for upcoming meetings.

JH: Concept plans and upcoming design decisions should be provided in advance of meetings to allow all to review and bring comments & questions.

6. New Business:

ST presents two new items:

Total Project Budget Review:

\$81,986 – is uncommitted amount from the original \$1,000,000 appropriation.

This \$81,986 was taken into account when the new request to complete SD – 2 was created.

A request for Amendments to be authorized to the two firms in these amounts:

JLA: \$60,000

Vertex: \$15,000

The SBRC will be able to consider taking action on this item at the next meeting.

CM at Risk: Chapter 149a.

For next meeting, we recommend a discussion and vote to authorize a Construction Manager through the Chap. 149a construction delivery method.

7. Public Comment:

No public comment made in person or through the virtual zoom forum.

JT comment: JT mentions that this meeting will be the last SBRC meeting for Steve Bilafer and offers his thanks to Steve for his contribution of his knowledge, guidance and wisdom to Dedham and to the SBRC. Steve has served on the SBRC for nine years and has a total of seventeen years of participation on other various Town Committees.

SB: Confirms his support for the effort to build this project and the challenges with the remaining schools after this project.

JH: States his thanks to SB for his contribution and reminds SB that an ex-officio member opening is available.

Next Meetings: June 3, 2024

8. Adjournment:

Mr. Bilifer requested a motion to adjourn.

MOTION: to adjourn by JT

SECOND: by SA

Vote to Adjourn - Unanimous

Meeting Adjourned at 7:26 pm.

Attachments:

5 14 24 SBRC Agenda

5 8 24 Dedham SD Schedule

5 14 24 Total Project Budget page from Vendor Invoice Package

Dedham School Building Rehabilitation Committee

Community meeting hosted at the Oakdale Elementary School Gymnasium & via Zoom

SBRC Meeting Minutes – **APPROVED**

Monday June 3, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates (Designer):</u>	A	Anthony Rodriguez, Ex Officio (AR)
A	John Tocci, Chair (JT)	A	Jonathan Levi (JL)		Kaitlyn DeStefano, Ex Officio (KD)
A	John Heffernan (JH), Finance Committee		Philip Gray (PG)		Shannan Kavanagh, Ex Officio (SK)
	Josh Donati, SelectBoard (JD)	A	Carol Harris (CH)		Kerri Bryant, Ex Officio (KB)
A	Mayanne MacDonald Briggs, School Committee (MMB)		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent (IK)
A	Stephen Acosta, School Committee (SA)		Matt Haffner, Director of Facilities (MH)		
A	Phillip Gonzalez (PG)	A	Kimberly Hermes, Oakdale School Principal (KH)		
		A	Ms. Nan Murphy, Superintendent of Schools (non-voting) (NM)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal (JM)		
	Jon Lemieux, Project Director (JL)	A	Katherine Duceman, Ex Officio (KD)		
A	Stephen Theran, Sr. Project Manager (ST)	A	Steven Popper, Ex Officio (SP)		
	Anissa Ellis, Project Manager (AE)		Sara Rosenthal, Ex Officio (SR)		

Distribution: SRBC Members and other attendees

1. **Old Business**

MMB: Ask Chairman JT if SBRC reorganization was planned for tonight or after.

JT: This will take place at a future meeting.

2. **Approval of Minutes:**

No minutes were presented for approval.

3. **Presentation to community by OPM and Designer of latest design, discuss timeline and elicit feedback from community members:**

JL provided an updated presentation on new 20 classroom building.

Supt. Nan Murphy outlines the sevens guiding items that were established during the Visioning Meetings:

1. Place where people want to be
2. Provide a setting for social and emotional needs of students – the whole child.
3. Joyful
4. Accessible to entire community. Grade levels are thoughtfully placed in the building.
5. Space is flexible and adaptable to adapt to student’s needs
6. Connection to nature and embraces sustainability
7. Safety of students and staff

Jonathan Levi reviews the final program for the school and schedule, including the timing to issue a pricing set of documents in late July. Pricing will be reviewed in August with a submission of the Schematic Design Report to MSBA by August 29. JLA

Public comment allowed on presentation:

Image in presentation not able to be seen with remote viewing. Challenge is operating combined virtual and in-person meeting outside of Town Hall meeting rooms.

Concern expressed about high ceilings and impact on acoustics in the space. JLA responded indicating that an acoustician is part of the Design Team and will review all spaces and that taller spaces are typically disperse noise better than spaces with lower ceilings.

The scale of the two-story building appears to fit better within the neighborhood.

Is there a plan to show building the new school in the location of the existing school building? We would like to see plans to build the new school in that location. JLA: The decision was made by the SBRC during the Preferred Schematic Review (PSR) to build the new school in the field area and project designs since that decision have shown the school as such.

There appear to be too many curves and angles and it appears to be inefficient for furniture placement. While eye-catching, it doesn't appear to be very efficient.

For safety and for fitting into the neighborhood, the design seems to have too much glass.

4. Consideration and vote on amended Vertex and JLA contracts:

Town Meeting has authorized the added amount in full. Amendments are to be authorized by SBRC per the Town Meeting authorization.

Motion made to authorize the amendments as proposed: Mayanne MacDonald Briggs

2nd provided by: John Heffernan

Motion passes unanimously.

5. Discussion and vote regarding demolition of 1903 structure

JT: The new school facility needs as much room as possible to achieve the objectives of the new school and the existing building should be removed.

JH: The idea of saving the existing building is great, but disrupts the area remaining for the new school building.

Motion made to confirm the inclusion of the demolition of the existing 1903 school structure as part of the plan to build the new school by Philip Gonzalez.

2nd provided by Steven Acosta.

Motion passes unanimously.

6. Discussion and vote on geothermal option.

The SBRC voted in support of including the geothermal ground source heat pumps in the design of the building. The MSBA has increased the project reimbursement to support electrification of new buildings and the inclusion of ground source heat pumps as the selected mechanical system.

Motion made to confirm the inclusion of the geothermal system in the project design by Mayanne MacDonald Briggs.

2nd provided by John Heffernan.

Motion passes unanimously.

7. Presentation/refresher on design bid build option versus CM at-risk option:

ST provided a refresher on the options for construction delivery methods for the project: Design-Bid-Build or the CM at Risk method.

The SBRC takes the refresher under advisement with the plan to list taking a vote on the construction delivery method at the next SBRC meeting.

8. Discussion of future meeting dates, including June 10 abutters meeting.

Meetings following June 10 will likely be June 24, July 8 and August 19.

9. New Business

Philip Gonzalez mentioned a request to preserve any memorial benches or stones that are currently on the Oakdale School property. Kimberly Hermes will review the status of any memorials and will report back.

10. Public Comment

No further public comment provided.

Next Meetings: June 10, 2024

11. Adjourn

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by Philip Gonzalez

SECOND: by Mayanne MacDonald Briggs

Vote to Adjourn - Unanimous

Meeting Adjourned at 8:06pm

Attachments:

6 3 24 SBRC Agenda

5 8 24 Dedham SD Schedule

6 3 24 JLA presentation

Dedham School Building Rehabilitation Committee

Hosted at the Dedham Town Hall and via Zoom

SBRC Meeting Minutes – **DRAFT for Approval**

Monday June 24, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates (Designer):</u>	A	Anthony Rodriguez, Ex Officio
	John Tocci, Chair	A	Jonathan Levi	A	Kaitlyn DeStefano, Ex Officio
	Steve Bilafer, Vice Chair		Philip Gray		Shannan Kavanagh, Ex Officio
A	Sara Rosenthal	A	Carol Harris		Kerri Bryant, Ex Officio
A	John Heffernan, Finance Committee		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent
A	Mayanne MacDonald Briggs, School Committee	A	Matt Haffner, Director of Facilities		
A	Stephen Acosta, School Committee	A	Kimberly Hermes, Oakdale School Principal		
A	Phillip Gonzalez		Ms. Nan Murphy, Superintendent of Schools (non-voting)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal		
	Jon Lemieux, Project Director	A	Katherine Duceman, Ex Officio		
A	Stephen Theran, Sr. Project Manager	A	Steven Popper, Ex Officio		
	Anissa Ellis, Project Manager		Sara Rosenthal, Ex Officio		

Distribution: SRBC Members and other attendees

1. Old Business:

Mr. Heffernan noted that Mr. Donati has stepped down from the committee and he thanked him for his time and work on the project.

2. Approval of Minutes:

No minutes for approval this evening.

3. Project Invoice Approval:

Mr. Heffernan requested a motion to approve the Vendor Invoice Package for the month of May 2024.

MOTION: Motion to approve the Vendor Invoice Package for the month of May 2024 made by Ms. MacDonald Briggs.

SECOND: by Ms. Rosenthal.

Vote 4-0-0. Motion passes unanimously

4. Presentation & Discussion on project design updates:

Discussion on PSR submission and budgets.

5. Presentation on CMR vs DBB:

Mr. Theran provided a review of the Design Bid Build project delivery method vs. the CM at Risk delivery method again for the committee to discuss.

MOTION: Motion to approve CM at Risk Delivery Method for the new Oakdale School project made by Ms. MacDonald Briggs

SECOND: by Ms. Rosenthal

****Additional Discussion by committee****

Vote 5-0-0. Motion passes unanimously.

6. Adjournment:

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by Ms. MacDonald Briggs.

SECOND: by Mr. Acosta

Attachments:

JLA Presentation

DRAFT

Dedham School Building Rehabilitation Committee

Hosted Virtually via Zoom

SBRC Meeting Minutes – **DRAFT for Approval**

Monday July 08, 2024 – 6:30 PM

Members present:

(A= attended Meeting; P= attended partial meeting)

	<u>Voting Members:</u>		<u>Jonathan Levi Associates (Designer):</u>	A	Anthony Rodriguez, Ex Officio
	John Tocci, Chair	A	Jonathan Levi	A	Kaitlyn DeStefano, Ex Officio
	Steve Bilafer, Vice Chair		Philip Gray		Shannan Kavanagh, Ex Officio
A	Sara Rosenthal	A	Carol Harris	A	Kerri Bryant, Ex Officio
A	John Heffernan, Finance Committee		<u>Other:</u>	A	Dr. Ian Kelley, Deputy Superintendent
A	Mayanne MacDonald Briggs, School Committee		Matt Haffner, Director of Facilities	A	Kat Philipe, Ex Officio
A	Stephen Acosta, School Committee	A	Kimberly Hermes, Oakdale School Principal		
	Phillip Gonzalez	A	Ms. Nan Murphy, Superintendent of Schools (non-voting)		
	<u>VERTEX: Owners Project Manager (OPM)</u>		Jennifer McGowan, Greenlodge School Principal		
	Jon Lemieux, Project Director	A	Katherine Duceman, Ex Officio		
A	Stephen Theran, Sr. Project Manager		Steven Popper, Ex Officio		
A	Anissa Ellis, Project Manager		Sara Rosenthal, Ex Officio		

Distribution: SRBC Members and other attendees

1. Old Business:

Mr. Heffernan welcomed Ms. Kat Philipe to the board as an ex-officio member.

2. Approval of Minutes:

No minutes for approval this evening.

3. Design Review:

Mr. Levi provided a design update to reflect updates made in response to abutter and neighbor feedback.

4. Discussion on Working Group membership:

Committee reviewed the make up of the working group and discussed possible changes to the group as we move into design development.

5. Discussion on Select Board Designee:

Mr. Heffernan noted that Mr. Donati was the SBRC select board designee and he has resigned from the Select Board and therefore is no longer part of the SBRC. The Select Board will appoint a new designee member for the SBRC when they next meet.

6. Adjournment:

Mr. Tocci requested a motion to adjourn.

MOTION: to adjourn by Mr. Acosta

SECOND: by Ms. MacDonald Briggs

Attachments:

JLA Presentation

DRAFT

22 Appendices

22.1 Traffic Impact Analysis

**TRAFFIC IMPACT ANALYSIS FOR
GREENLODGE-OAKDALE ELEMENTARY SCHOOL
DEDHAM, MASSACHUSETTS**

**SUBMITTED TO:
JONATHAN LEVI ARCHITECTS
266 BEACON STREET
BOSTON, MA 02116**

**SUBMITTED BY:
PARE CORPORATION
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865**

DECEMBER 2023



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Appendix E	Trip Generation & Distribution
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INTRODUCTION

The Town of Dedham is proposing to demolish the existing Oakdale Elementary School located at 147 Cedar Street, and replace it with a larger school, designed for 550 students. The opening of the new Greenlodge-Oakdale Elementary School will coincide with a redistricting of the elementary schools within Dedham. While the redistricting plan has not been finalized, a preliminary plan has been developed that includes the new Greenlodge-Oakdale School absorbing all of the current Greenlodge Elementary School students.

The proposed new Greenlodge-Oakdale Elementary School is proposed to have one access off of Cedar Street and a service access off of Madison Street, as opposed to the current school which has a parent pick-up/drop-off loop on Cedar Street and two access points off of Madison Street that serves as a bus loop and service/emergency access. A locus map of the study area is provided in Figure 1 and the proposed site layout is provided in Figure 2.

This study contains a description of existing conditions in the vicinity of the project site, a safety analysis of the study area, an analysis of the traffic based on existing, future (2030) no-build and future (2030) build conditions, and proposed mitigation measures and/or recommendations, as necessary.

DATA COLLECTION

As part of this study, ten intersections including the school's site driveway have been identified for review with regards to traffic capacity and safety.

The intersections include:

- Cedar Street at site driveway
- Madison Street at Circuit Street/Shiretown Road
- Whiting Avenue at Walnut Street
- River Street at Whiting Avenue
- Cedar Street at River Street/Sanderson Avenue/Cobbler Lane
- Cedar Street at Madison Street
- Cedar Street at Turner Street
- Cedar Street at Sprague Street
- East Street at Cedar Street
- Sprague Street at Greenlodge Street/Dresser Avenue

On October 12, 2023, manual turning movement counts (MTMCs) were conducted at the above eight intersections between the hours of 7:00 a.m. and 9:00 a.m. and between 2:00 p.m. and 6:00 p.m. In addition, an automatic traffic recorder (ATR) was utilized along Madison Street and Cedar Street in the vicinity of the existing school.

Crash data for the roadway network in the vicinity of the project site was retrieved from the Massachusetts Department of Transportation (MassDOT) Crash Data Portal for the period of October 2018 through September 2023. A crash review is included in this report to identify any potential trends that may warrant mitigation.



PROJECT NO. 23178.00

DATE: NOVEMBER 2023



FIGURE 1
LOCUS MAP

147 CEDAR STREET
DEDHAM, MASSACHUSETTS

Figure 2: Conceptual Site Layout



A field review of the area was conducted on Tuesday, October 24, 2023. Geometric measurements and other field observations were recorded at the significant intersections in the vicinity of the project site, the information obtained was used in the analysis of the study area intersections. Observations of the school's drop-off and pick-up operations were also conducted.

The Planning Department for the Town of Dedham was contacted to determine if there are currently any developments proposed or under construction whose trip generation information should be included in the study. None were identified.

EXISTING CONDITIONS

The study area for Greenlodge-Oakdale Elementary School is defined as the significant roadways and intersections in the vicinity of the site that may be impacted by the expansion of the school. Listed below are the roadways and intersections included in the study area. The study area was determined through multiple meetings with Town officials.

Study Area Roadways

- Whiting Avenue – from Walnut Street to River Street
- River Street – from Cedar Street to Whiting Avenue
- Cobbler Lane – From River Street to Oakdale Avenue
- Oakdale Avenue – from Walnut Street to Cobbler Lane
- Cedar Street – from River Street to East Street
- Sprague Street – from Cedar Street to Greenlodge Street
- Madison Street – from Cedar Street to Shiretown Road

Study Area Intersections

- Whiting Avenue at Walnut Street – unsignalized
- River Street at Whiting Avenue – unsignalized
- Cedar Street at River Street/Sanderson Avenue/Cobbler Lane – unsignalized
- Cedar Street at Madison Street – unsignalized
- Madison Street at Circuit Road/Shiretown Road - unsignalized
- Cedar Street at Turner Street – unsignalized
- Cedar Street at Sprague Street – unsignalized
- East Street at Cedar Street – roundabout
- Sprague Street at Greenlodge Street/Dresser Avenue – unsignalized

Study Area Roadways

Whiting Avenue

Whiting Avenue is classified as a major collector under Town jurisdiction. It runs through the study area generally in the northwest-southeast direction. The typical cross-section of Whiting Avenue consists of an 11-foot-wide travel lane, a one-foot-wide shoulder, and a seven-foot-wide sidewalk along each direction. Whiting Avenue has double yellow striping to separate the directions of travel. North of its intersection with Walnut Street, sharrow pavement markings have been installed as Whiting Avenue approaches Dedham High School. South of its intersection with River Street, Whiting Road turns into a private way with severe pavement deterioration observed. Land uses along this roadway are mostly residential with a few mixes of commercial uses.

River Street

River Street is a two-way street, classified as a major collector under Town jurisdiction. River Street runs in the general east/west direction. The typical cross-section of River Street varies within the study area. In the area between Cedar Street and Oakdale Avenue, River Street is striped as one wide travel lane in each direction, but on-street parking is available. A six-foot-wide concrete sidewalk is present along both sides for this section of the roadway. East of Oakdale Avenue, River Street contains an 11-foot-wide travel lane and a one-foot-wide shoulder along each direction. A seven-foot-wide sidewalk connected with a cape cod berm is present in most of the stretch of River Street along both sides of the roadway within the study area. Land uses along River Street are mostly residential with a few commercial businesses present as it approaches major intersections.

Cobbler Lane

Cobbler Lane is a short section of roadway, classified as a local road under Town jurisdiction, that runs in the general north-south direction and links Cedar Street to Oakdale Avenue. Cobbler Lane is approximately 25 feet wide, with one travel lane in each direction. There is a seven-foot-wide bituminous raised sidewalk on the west side of the roadway and an 11-foot-wide flush bituminous concrete sidewalk along the eastern side of the roadway. A park is located on the eastern side of the roadway and a church and one duplex home is located on the west side of the roadway.

Oakdale Avenue

Oakdale Avenue is a two-way street that runs generally in a north-south direction and is classified as a local road under Town jurisdiction. A typical cross-section of this roadway consists of an 11-foot-wide travel lane and a one-foot-wide shoulder for each direction. There is an eight-foot-wide sidewalk lined with cape cod berm curbing on the east side of the roadway. There is no sidewalk on the west side of the roadway, except in the immediate vicinity of Walnut Street. Land uses surrounding Oakdale Avenue are predominantly residential except for a day care center at the corner of Fairview Street.

Cedar Street

Cedar Street is a two-way street, classified as a major collector under Town jurisdiction. From its intersection with East Street to its intersection with Border Street, Cedar Street runs in the general northeast/southwest direction where it runs parallel with the Franklin/Foxboro rail line, then transitions to run in the general northwest/southeast direction until it reaches Walnut Street. Cedar Street overpasses rail line along this curve, just south of its intersection with Border Street. A typical cross-section of Cedar Street consists of an 11-foot-wide travel lane and a three-foot-wide paved shoulder in each direction. Varying sidewalk widths ranging between four feet to ten feet are present along both sides of Cedar Street. Land uses surrounding Cedar Street are predominantly residential except for Oakdale Elementary School. A speed limit of 30 miles per hour is posted along this roadway, with a school zone speed limit of 20 miles per hour present during school hours in the immediate vicinity of th



Photo 1. Flashing Speed Limit and Radar Speed Signs along Cedar Street

e Oakdale School. The school zone speed limit signs are supplemented by radar speed signs in both directions as motorists approach the school.

Sprague Street

Sprague Street is a two-way street, classified as a minor arterial under Town jurisdiction. Sprague Street runs in the general northwest-southeast direction within the study area. The cross section of Sprague Street consists of one travel lane in each direction that is approximately 18 feet wide, with two-foot-wide paved shoulders. A five-foot-wide concrete sidewalk is present on each side of the street, with a four-foot grassed buffer strip between the street and sidewalk. Sharrow pavement markings are present in both directions, but a recent utility project has obliterated some of these markings in the northwest travel direction. A speed limit of 20 miles per hour is posted. Land uses surrounding this roadway are residential.

Madison Street

Madison Street is a two-way street classified as a local road under Town jurisdiction. Madison Street runs in the general east/west direction within the study area with a width of approximately 23 feet. No striping is present to delineate specific lanes. Sidewalks are present along most of the length of the roadway except where there is staff parking alongside the school, but these are lined with cape cod berm curbing, making them mountable for vehicles. East of its intersection with Circuit Road and Shiretown Road, post-mounted signs are present on the southern side of the street stating “NO SCHOOL DROP-OFF OR PICK UP. RESIDENTS ONLY.” Towards Oakdale Elementary School, there is a posted speed limit of 20 miles per hour for the hours “8:30 AM- 9:30 AM, 2:30 PM – 3:30 PM.” Land use surrounding Madison Street is predominantly residential, except for the school.



Photo 2. Sidewalk/ Street Parking along Madison Street

Study Area Intersections



Photo 3. Intersection of Whiting Avenue at Walnut Street

Whiting Avenue at Walnut Street

The intersection of Whiting Avenue and Walnut Street operates as an unsignalized, four-legged intersection. Walnut Street makes up the northern and southern legs, while Whiting Avenue makes up the northwestern and southeastern legs. The intersection functions as all-way-stop-controlled, with stop signs present for all four legs. Each leg of the intersection contains two lanes of traffic, one as a traffic lane and the other as a receiving lane. There are ladder-style painted at-grade crosswalks across all four legs of the intersection and concrete sidewalks present along the perimeter of the intersection with curb ramps present at the ends of the crosswalks that appear to meet ADA standards.

River Street at Whiting Avenue

The intersection of River Street at Whiting operates as an unsignalized, four-legged intersection. Whiting Street makes up the northwestern and southeastern legs, while River Street makes up the eastern and western legs. The intersection functions as all-way-stop-controlled, with stop signs present for all four legs. Each leg of the intersection contains two lanes of traffic with one lane in each direction. Bituminous concrete sidewalks are present on the south side of River Street, as well as on the north side of River Street west of Whiting Avenue and on both sides of Whiting Avenue north of River Street. There are no painted crosswalks or curb ramps at this intersection.



Photo 4. Intersection of River Street at Whiting Avenue



Photo 5. Intersection of Cedar Street with River Street, Sanderson Avenue, and Cobble Lane

Cedar Street at River Street/Sanderson Avenue/Cobbler Lane (Oakdale Square)

The intersection of Cedar Street at River Street/Sanderson Avenue/Cobbler Lane, locally known as Oakdale Square, operates as an unsignalized, five-legged intersection. Cobble Lane make up the northern leg, Cedar Street makes up the northwestern and southern legs, while River Street and Sanderson Avenue make up the eastern and western legs, respectively. The intersection functions as all-way-stop-controlled traffic circle, with stop signs present for all five legs and a small center island that motorists navigate around in a counterclockwise direction. Each leg of the intersection contains two lanes of traffic with one lane in each direction. Additionally, there is a post mounted traffic flashing red beacon atop the small concrete island with multiple post mounted signs stating, “KEEP RIGHT.” There are ladder-style striped crosswalks across each leg. There are concrete sidewalks present along the perimeter of the intersection with curb ramps present at the ends of the crosswalks that appear to meet ADA standards.

The intersection of Cedar Street at River Street/Sanderson Avenue/Cobbler Lane, locally known as Oakdale Square, operates as an unsignalized, five-legged intersection. Cobble Lane make up the northern leg, Cedar Street makes up the northwestern and southern legs, while River Street and Sanderson Avenue make up the eastern and western legs, respectively.



Photo 6. Post-mounted traffic beacon in the middle of the intersection

Cedar Street at Madison Street

The intersection of Cedar Street and Madison Street operates as an unsignalized, three-legged intersection. Cedar Street makes up the northern and southern legs, while Madison Street makes up the western leg. The western leg is stop-controlled, while the north and south legs are free-flowing. Each leg of the intersection contains two lanes of traffic with one travel lane in each direction. There are ladder-style striped crosswalks present across the northern and western legs of the intersection, with concrete paved sidewalks present along the perimeter of the intersection with curb ramps present at the ends of the crosswalks that appear to meet ADA standards.



Photo 7. Intersection of Cedar Street at Madison Street



Photo 8. Intersection of Cedar Street at Turner Street

Cedar Street at Turner Street

The intersection of Cedar Street and Turner Street operates as an unsignalized, three-legged intersection. Cedar Street makes up the eastern and western legs of the intersection, while Turner Street makes up the southern leg. The Turner Street leg is stop-controlled, while the Cedar Street legs operate freely. All three legs contain a single approach lane. A ladder-style striped crosswalk is present across the Turner Street leg. Bituminous concrete sidewalks are provided on both sides of Cedar Street. There are curb ramps on each side of the crosswalk, but these do not meet current ADA

standards.

Cedar Street at Sprague Street

The intersection of Cedar Street and Sprague Street operates as an unsignalized, three-legged intersection. Cedar Street makes up the northern and southern legs allowing vehicles to operate freely, while Sprague Street makes up the eastern leg as a stop-controlled approach. Each approach contains two lanes with one approach lane and one receiving lane. The intersection of Cedar Street and East Street is located approximately 200 feet west of this intersection. Concrete sidewalks surround the perimeter of the intersection. Additionally, ladder-style striped crosswalks are present across the western and southern legs of the intersection with curb ramps that appear to meet current ADA standards at the ends of each crosswalk.



Photo 9. Intersection of Cedar Street at Sprague Street



Photo 10. Roundabout formed by East Street and Cedar Street

East Street at Cedar Street (Endicott Circle)

The intersection of East Street and Cedar Street, locally known as Endicott Circle, operates as a three-legged, single-lane roundabout. East Street makes up the northern and southern legs, while Cedar Street makes up the eastern leg. A 65-foot diameter raised and landscaped center island is present in the middle of the roundabout. Yield signs are post-mounted at each approach at the entrance to the roundabout. Each approach contains one approach lane and one receiving lane separated by raised concrete splitter islands. Concrete sidewalks are present along the perimeter of

the roundabout. No crosswalks or curb ramps are provided at this intersection.

Sprague Street at Greenlodge Street/Dresser Avenue

The intersection of Sprague Street with Greenlodge Street and Dresser Avenue operates as an unsignalized four-legged intersection. Sprague Street makes up the eastern and western legs of this approach allowing vehicles to operate freely, while Greenlodge Street and Dresser Avenue make up the southern and northern legs, respectively, as stop-controlled approaches. All legs contain two lanes with one approach lane allowing movements for all directions, and one receiving lane. Concrete sidewalks are present along the perimeter of the intersection. Additionally, ladder-style striped crosswalks are present across the northern, southern, and western legs with ADA-compliant curb ramps at the ends of each except for the southeastern corner, where the curb ramp does not meet current ADA standards. A rectangular rapid flashing beacon (RRFB) is present on Sprague Street with pedestrian push buttons available at each end of the crosswalk across Sprague Street.



Photo 11. Intersection of Sprague Street with Greenlodge Street and Dresser Avenue

SCHOOL OBSERVATIONS

Oakdale Elementary School is an elementary school serving students from grades one through five and is located at 147 Cedar Street in Dedham, Massachusetts. As part of the field review process, traffic observations were conducted during the morning arrival and afternoon dismissal periods associated with Oakdale Elementary School on Tuesday, October 24, 2023 while the school was operating under typical conditions. A summary of general site observations and narratives of the arrival and departure peaks can be found in the following paragraphs.

Safety Measures

- There are flashing 20-miles-per-hour school zone speed limit signs mounted in advance of the school site along Cedar Street.
- A crossing guard is present during the morning and afternoon period to assist students crossing at the intersection of Madison Street at Circuit Road and Shiretown Road. A crossing guard was also observed at Oakdale Square.

-
- A police officer was present on Cedar Street during the morning arrival period.

Site Layout and Circulation

- There is a horseshoe-style semicircular driveway along Cedar Street. The southern opening is an entrance only and the northern curb cut is an exit-only. Entrance to this driveway has a “DO NOT ENTER 8:15-8:40 AND 2:55-3:15 EXCEPT STAFF MEMBERS” sign.
- A one-way loop is formed along the south side of the building accessed through two curb cuts on Madison Street and provides school bus access.
- Parent drop-off activity occurs along Cedar Street and Madison Street.
- Oakdale students enter through their respective classroom doors. Students and parents typically wait outside the doors until it opens at approximately 8:35 a.m.
- Early Childhood Education Center (ECEC) students are allowed to enter the building as they arrive to wait for the bus.

Parking

- Faculty/staff parking is available along the northern, southern, and eastern sides of the building.
- Ten and 12 spots are available along the northern and southern parking lot, respectively.
- Parking spots are available along the horseshoe driveway that can be accessed from Cedar Street.
- A few faculty/staff members were observed parking along Circuit Road.
- Approximately 30 cars were observed parking within the school property.
- Parents were observed parking along both sides of Madison Street and along Cedar Street.
- Two handicap parking spots are available along the eastern side of the building.

Morning Arrival Operations

During the morning arrival period, school activity begins at 7:25 a.m. with faculty and staff beginning to arrive, though peak activity is from 8:28 a.m. to 8:40 a.m. The crossing guard on Madison Street arrived at approximately 8:15 a.m. to assist walkers and bikers crossing the roadway. No crossing guard was observed on Cedar Street in front of the building; however, a police cruiser was parked along the sidewalk. Additionally, a crossing guard was present at Oakdale Square.

The majority of students arrived on foot, some with their parents, others on their own. A total of approximately 50 vehicles were observed to be stopped along the surrounding roadways. Half of these vehicles parked along Cedar Street and side streets connected to Cedar Street, while the other half parked along Madison Street near the Madison Street/Cedar Street intersection or the southern perimeter of the field. Parents typically park, then walk their children to the doors.

There were three buses observed during the morning period. One minibus was observed to arrive at approximately 8:00 a.m. and used the horseshoe driveway along Cedar Street. Yellow buses arrived eastbound on Madison Street and used the bus loop located along Madison Street. The first yellow bus arrived at 8:19 a.m. to pick up students for the Early Childhood Education Center (ECEC) located on the other side of town. Oakdale Elementary School currently serves as a pick-up spot for these students. The second yellow bus arrived at approximately 8:34 a.m. to drop students off.

A maximum queue of eight cars were observed to form along Cedar Street, though this dissipated quickly and caused minimal traffic disruption. Vehicles typically pull up on the side of the road. This roadway is also lined with cape cod berm curbing allowing vehicles enough space to be on it. Most students got off the vehicles and walked to the school building, while some were accompanied by their parents. No queue was observed to form along Madison Street. After students entered the building, parents either returned to their vehicles or walked back.

Traffic during the morning arrival period dissipated by 8:40 a.m. The crossing guard left the premises at approximately 8:45 a.m. Parents with tardy students used the driveway on Cedar Street and accompanied students to the main entrance located on the east side of the building.

Figure 3: School Operations at Oakdale Elementary School



Afternoon Dismissal Operations

The afternoon dismissal procedure operates in a similar pattern to the morning arrival procedure. However, traffic queuing along Cedar Street was significantly less than in the morning as most utilized Madison Street. Parents typically pulled up on the side of the road to park and walked to the school building to wait for the students. A crossing guard arrived on Madison Street at 2:45 p.m., while none was observed along Cedar Street. Students crossing Cedar Street were typically accompanied by parents. Traffic in the area begins at 2:33 p.m. Peak activity begins at 2:50 p.m. and dissipates by 3:20 p.m.

The majority of parents arrived at the school at around 2:50 p.m. Most parents driving to the school parked along Madison Street; only two parents were observed parked along Cedar Street. Parents typically gathered in the area just west of the building, while a few were observed south of the building.

The dismissal bell rings at 3:00 p.m. At this time, all doors connected to the classroom opens and students leave the building. While some left the school premises either walking on their own or with their parents, most of the students stayed in the playground, while parents were talking to each other. By approximately 3:20 p.m., most of the students had left though a few were still in the playground.

Similar to the morning, two yellow buses arrived at the school. The first bus arrived at 3:07 p.m. to pick students up. The second bus arrived from ECEC to drop students off at approximately 3:15p.m. Additionally, two minibuses were observed along the Cedar Street driveway at 2:45 p.m. and 2:52 p.m.

SAFETY ANALYSES

Crash Data

Crash data was obtained through the Massachusetts Department of Transportation (MassDOT) crash portal for the five-year period from October 2018 through September 2023, for the entire study area.

A total of 84 crashes occurred within the study area. Of these 84 crashes, 50 crashes occurred between study intersections, while the remaining 34 crashes occurred at the study intersections. A total of 31 crashes (37%) resulted in personal injury, while the other 52 crashes resulted only in property damage. There were no fatalities in the study area during this period.

A total of 25 crashes (30%) occurred along the approximately 1-mile-long Cedar Street corridor outside of the study intersections. The types of crashes were varied and do not indicate a specific deficiency in the roadway design that lead to the crashes along this corridor. The highest crash locations at study intersections included the intersection of Whiting Avenue and Walnut Street, with 18 crashes (21%), with the overwhelming majority of these crashes being angle crashes within the intersection.

Angle crashes were the most prominent crash type along both study roadways and at study intersections with 34 total crashes making up approximately 40% of all the crashes in the study area. Angle collisions at intersections are often caused by drivers' failure to obey traffic controls, or by attempting to enter or exit the roadway through a gap in traffic that is not large enough through either aggressive driving or lack of available sight distance. Single vehicle crashes were the next most common crash type with 17 total crashes of this type. These are typically vehicles leaving the roadway and striking fixed objects or colliding with animals. Rear-end crashes were the only other crash type to have more than 10 occurrences over the five-year period, with 14. The crash patterns observed are typical at intersections and along corridors in densely populated areas where there are many side streets and driveways.

Table 1 breaks down the accidents along study area roadway segments, but outside of the immediate vicinity of study intersections, by type and severity. **Table 2** presents the same information for crashes at study intersections. The complete crash data summary is provided in **Appendix A**.

Table 1: Crash Data Summary – Roadway Corridors Outside of Study Intersections

Roadway Segment	Total Crashes	Crash Severity		Crash Type					
		Non-Fatal Injuries	Fatalities	Rear End	Sideswipe	Head On	Single Vehicle	Angle	Other/Unknown
Whiting Ave. – from Walnut St. to River St.	15	5	0	1	4	2	0	8	0
River St. – from Cedar St. to Whiting Ave.	2	0	0	1	0	0	1	0	0
Cedar St. – from River St. to East St.	25	11	0	6	3	2	7	7	0
Cobbler Lane – from Walnut St. to Cedar St.	1	0	0	1	0	0	0	0	0
Madison St. – from Cedar St. to Mount Vernon St.	1	0	0	1	0	0	0	0	0
Sprague St. – from Cedar St. to Dresser Ave.	3	5	0	1	0	0	0	2	0
Oakdale Ave. – from Walnut St. to River St.	3	1	0	0	0	0	1	0	2
Total	50	22	0	11	7	4	9	17	2

Sight Distance

On October 12, 2023, spot speed studies were conducted along Madison Street and Cedar Street adjacent to the school to assess driving speeds along both roadways. Along Cedar Street, the posted speed limit is generally 30 miles per hour, but along the site frontage and where the speed study was conducted, a school zone speed limit of 20 miles per hour is posted. A summary of the speed data results is shown in **Tables 3 and 4** below. The most notable metric presented in the table is the 85th percentile speed, which was utilized for the sight distance analysis. Based on the speeds observed, the sight distance analysis was conducted using a design speed of 30 miles per hour and 35 miles per hour for Madison Street and Cedar Street, respectively. The raw speed study data sheets are shown in **Appendix B**.

Table 2: Crash Data Summary – Study Intersections

Intersection	Total Crashes	Crash Severity		Crash Type					
		Non-Fatal Injuries	Fatalities	Rear End	Sideswipe	Head On	Single Vehicle	Angle	Other/Unknown
Whiting Ave. at Walnut St.	18	7	0	0	2	0	0	14	2
Oakdale Square	1	0	0	1	0	0	0	0	0
Cedar St. at Madison St.	2	0	0	0	0	0	2	0	0
Cedar St. at Sprague St.	1	0	0	0	0	0	0	1	0
Sprague St. at Greenlodge St.	1	1	0	0	0	0	0	1	0
Whiting Ave. at River St.	0	0	0	0	0	0	0	0	0
Cedar St. at Turner St.	0	0	0	0	0	0	0	0	0
Endicott Circle	11	1	0	3	0	1	6	1	0
Total	34	9	0	4	2	1	8	17	2

Table 3: Madison Street Speed Study Summary

	Posted Speed	Average Speed	True Median (50 th Percentile)	85 th Percentile	10 MPH Pace	% over Posted
Eastbound	20	21	20	27	17-26	50
Westbound	20	22	24	25	16-25	67

Table 4: Cedar Street Speed Study Summary

	Posted Speed	Average Speed	True Median (50 th Percentile)	85 th Percentile	10 MPH Pace	% over Posted
Northbound	20	29	29	33	24-33	100
Southbound	20	30	29	33	25-34	100

According to the latest editions of the American Association of State Highway and Transportation Officials (AASHTO) publication *A Policy on the Geometric Design of Highways and Streets*, the minimum safe stopping sight distance for speeds of 30 miles per hour and 35 miles per hour is 200 feet and 250 feet, respectively. In addition, AASHTO gives guidance for a more desirable sight distance for this speed, which will not only avoid collisions, but maintain vehicular flow of at least 70 percent of the original operating speed. Meeting the desirable criteria for sight distance is more applicable to heavily traveled, where maintaining steady traffic flow along the major road is important to avoid additional congestion. A summary of the sight distance for all three driveways can be found in **Table 5** below.

Table 5: Sight Distance Summary

		Required ISD (ft)	Desirable ISD (ft)	Measured ISD (ft)
Madison Street Driveway (Proposed Service Area Driveway)	Looking East (left)	200	290	465
	Looking West (right)	200	335	270
Cedar Street Driveway (Existing Entrance and Proposed Driveway)	Looking North (left)	250	240	>500
	Looking South (right)	250	280	330

ISD = Intersection Sight Distance



Photo 12. Sight distance looking east (left) from the proposed service area driveway located on Madison Street



Photo 13. Sight distance looking west (right) from the proposed service area driveway located on Madison Street



Photo 14. Sight distance looking north (left) from the existing entrance/ proposed driveway located on Cedar Street



Photo 15. Sight distance looking south (right) from the existing entrance/ proposed driveway located on Cedar Street

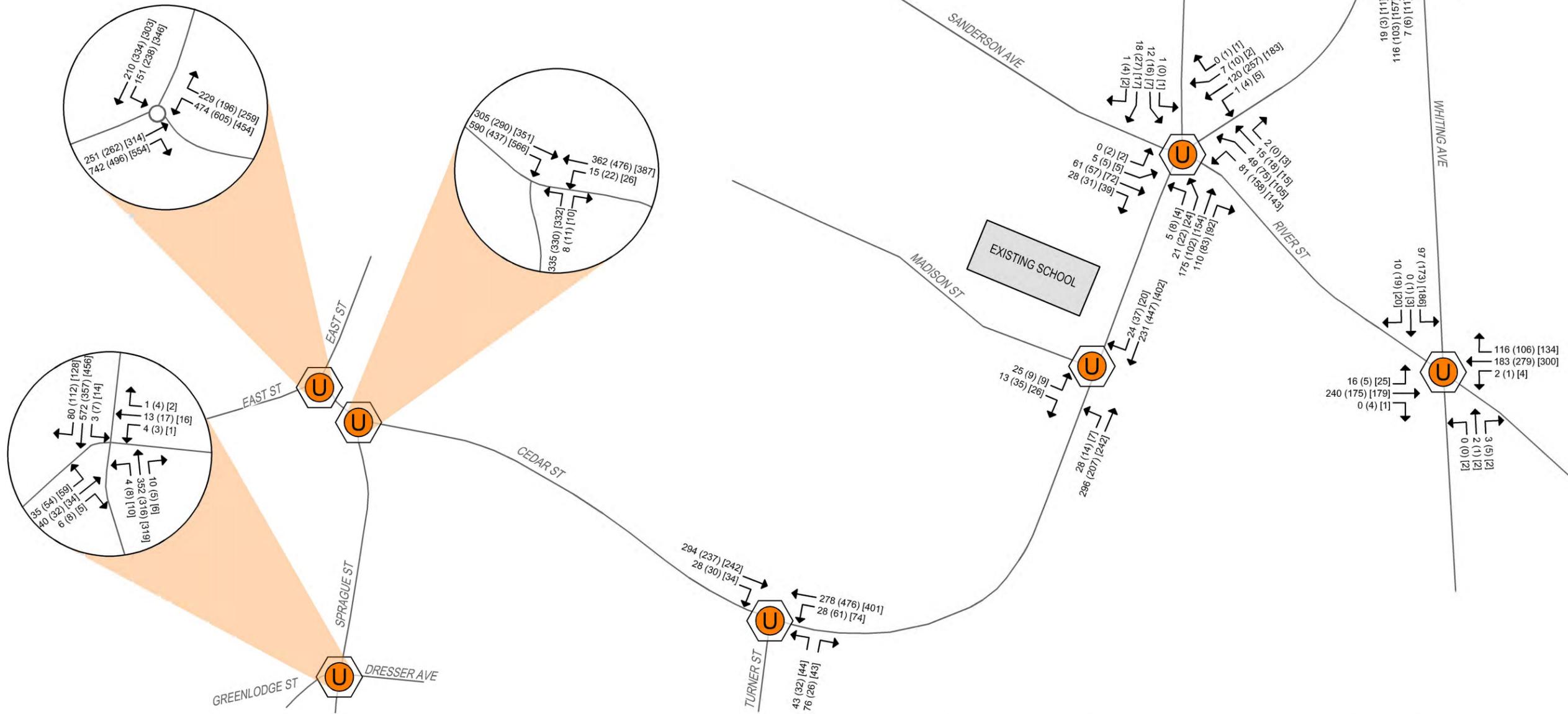
Sight distance from both driveways located along Madison Street and Cedar Street exceeds the minimum sight distance required for vehicles to avoid a collision. Sight distance along Madison Street can be extended through the removal of the chain link fence and vegetation west of the proposed driveway. Photos of the sight lines are shown in **Photos 9 through 12** above.

EXISTING TRAFFIC VOLUMES

Manual turning movement counts (MTMCs) will be conducted during the hours of 7:00 a.m. to 9:00 a.m. and 2:00 p.m. to 6:00 p.m. at the following intersections:

- Whiting Avenue at Walnut Street
- River Street at Whiting Avenue
- Oakdale Square
- Cedar Street at Madison Street
- Cedar Street at Turner Street
- Cedar Street at Sprague Street
- Endicott Circle
- Sprague Street at Greenlodge Street/Dresser Avenue

These traffic count periods not only capture the time periods when the proposed elementary school will be most active, but also capture the time periods when commuters are most active. Traffic Count data is provided in **Appendix C**. Existing traffic volumes for the morning peak hour, school dismissal peak hour, and afternoon commuter peak hour are shown in **Figure 4**.



AM PEAK VOLUMES (PM SCHOOL PEAK VOLUMES) [PM COMMUTER PEAK VOLUMES]



PROJECT NO. 23178.00 DATE: NOVEMBER 2023

FIGURE 4
EXISTING (2023) TRAFFIC VOLUMES
WEEKDAY 7:00-9:00 AM & 2:00-6:00 PM
DEDHAM, MASSACHUSETTS

NO-BUILD CONDITIONS

Future no-build traffic volumes are determined by projecting the existing traffic volumes based on a determined annual growth rate and including known potential developments within the study area.

To account for background growth along the roadways within the vicinity of the project site, the existing traffic volumes were projected forward over a five-year horizon from 2023 to 2030. Recent census data was reviewed to determine the appropriate background growth rate. The census data showed a population increase of approximately 0.25% per year from 2010 to 2020 for the City of Dedham. Therefore, a growth rate of 0.5 % per year was used for the seven-year projection.

The Dedham Planning Department was contacted to determine if there are currently any developments proposed within the vicinity of the site whose trip generation information should be included in this study, none of which were noted.

A copy of the available census data is provided in **Appendix D. Figure 5** shows the 2030 no-build volumes for the three peak hours.

BUILD CONDITIONS

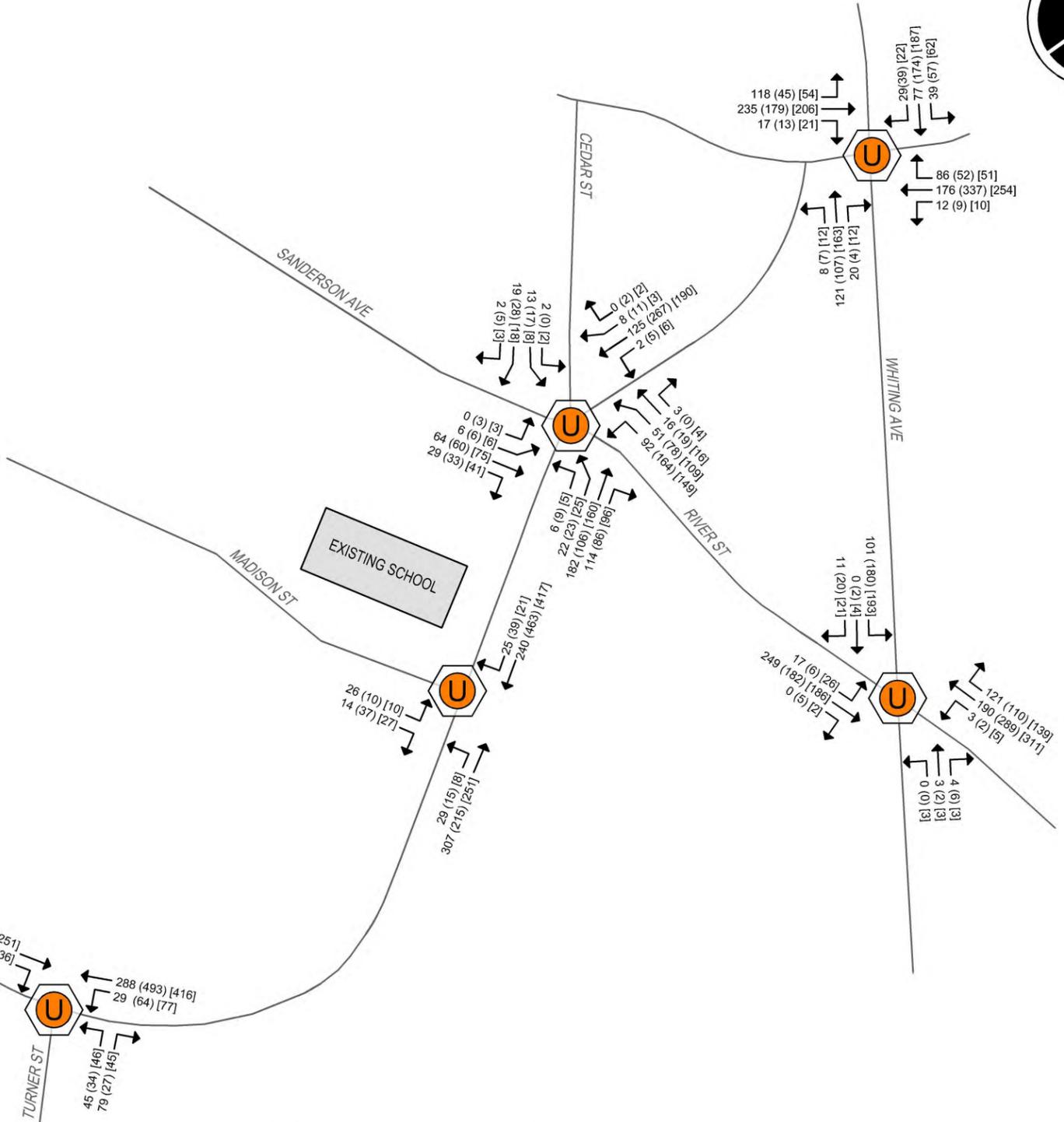
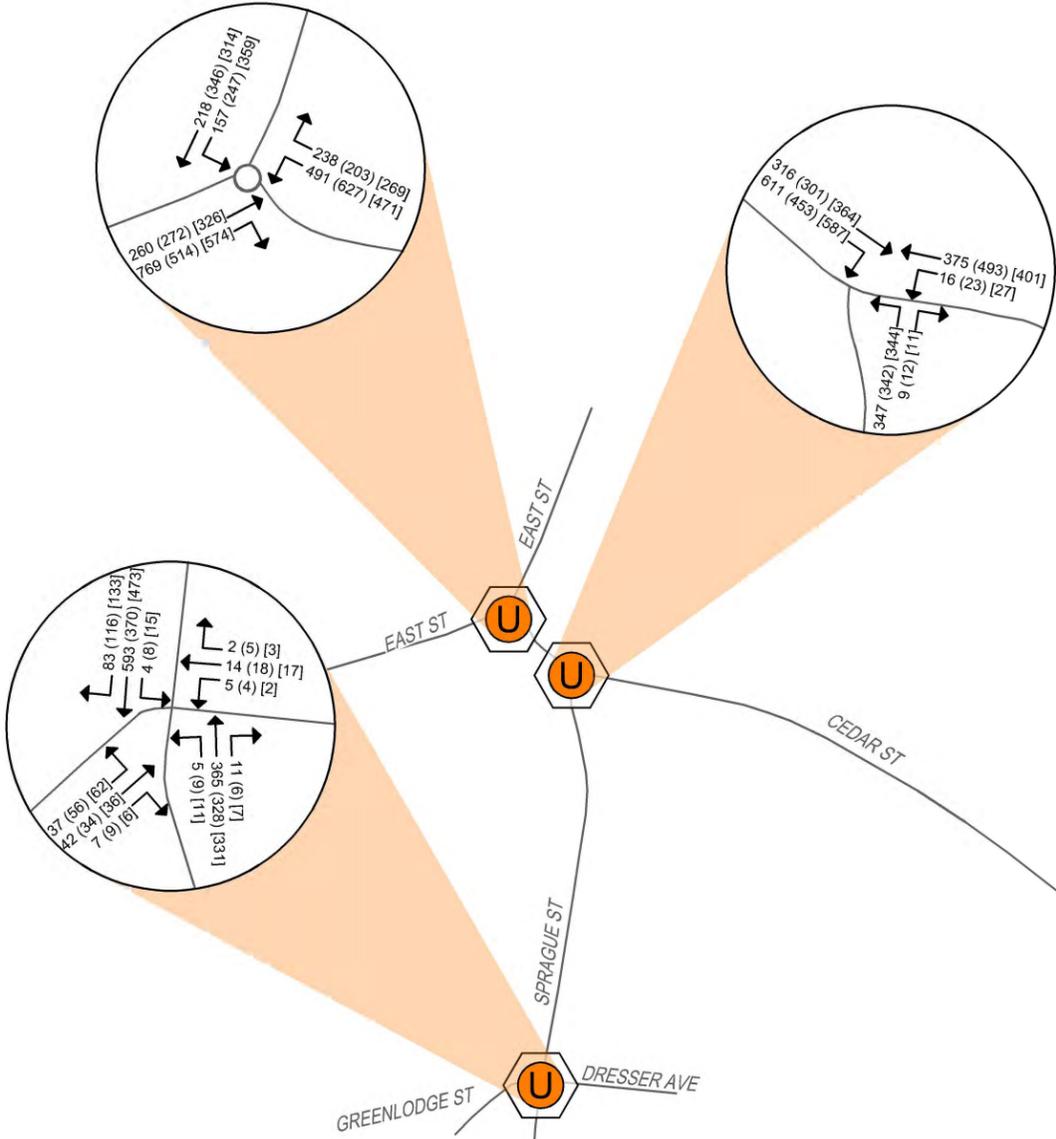
The future 2030 build condition represents the future 2030 no-build condition plus the anticipated trips due to increase in enrollment at the reconstructed elementary school.

Trip Generation

The proposed expansion and reconstruction of the elementary school is to be located at the same site as the current Oakdale Elementary School. Trip generation for the elementary school was calculated using data contained in the 11th edition of *Trip Generation*, published by the Institute of Transportation Engineers for an elementary school with the additional 300 students. This information is shown in **Table 6** below.

Table 6: Trip Generation Summary

		Morning Arrival Peak	School Dismissal Peak	Afternoon Commuter Peak
LUC 520 – Elementary School – 300 Students	Entering	120	62	22
	Exiting	102	73	26
	Total	222	135	48



AM PEAK VOLUMES (PM SCHOOL PEAK VOLUMES) [PM COMMUTER PEAK VOLUMES]



PROJECT NO. 23178.00 DATE: NOVEMBER 2023

FIGURE 5

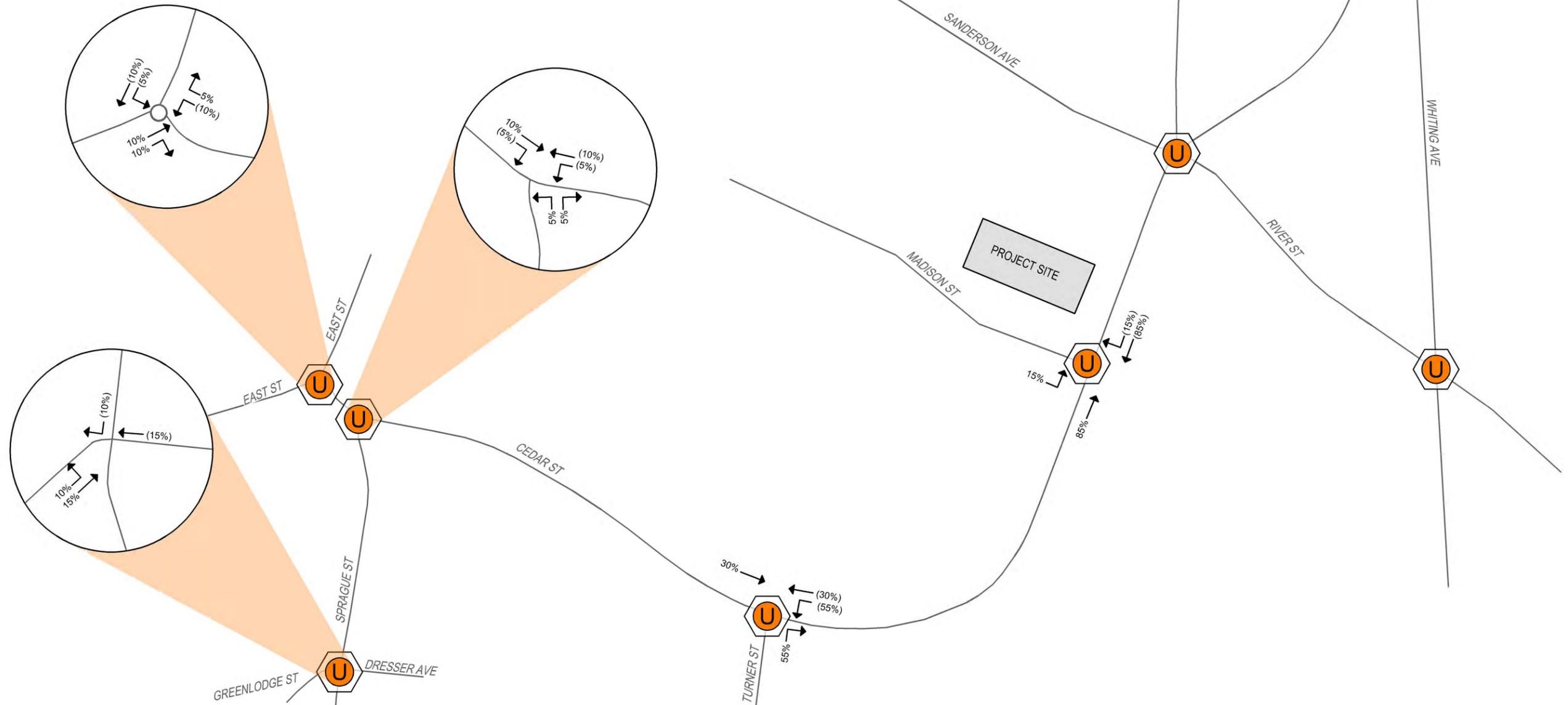
FUTURE (2030) NO-BUILD TRAFFIC VOLUMES
WEEKDAY 7:00-9:00 AM & 2:00-6:00 PM

DEDHAM, MASSACHUSETTS

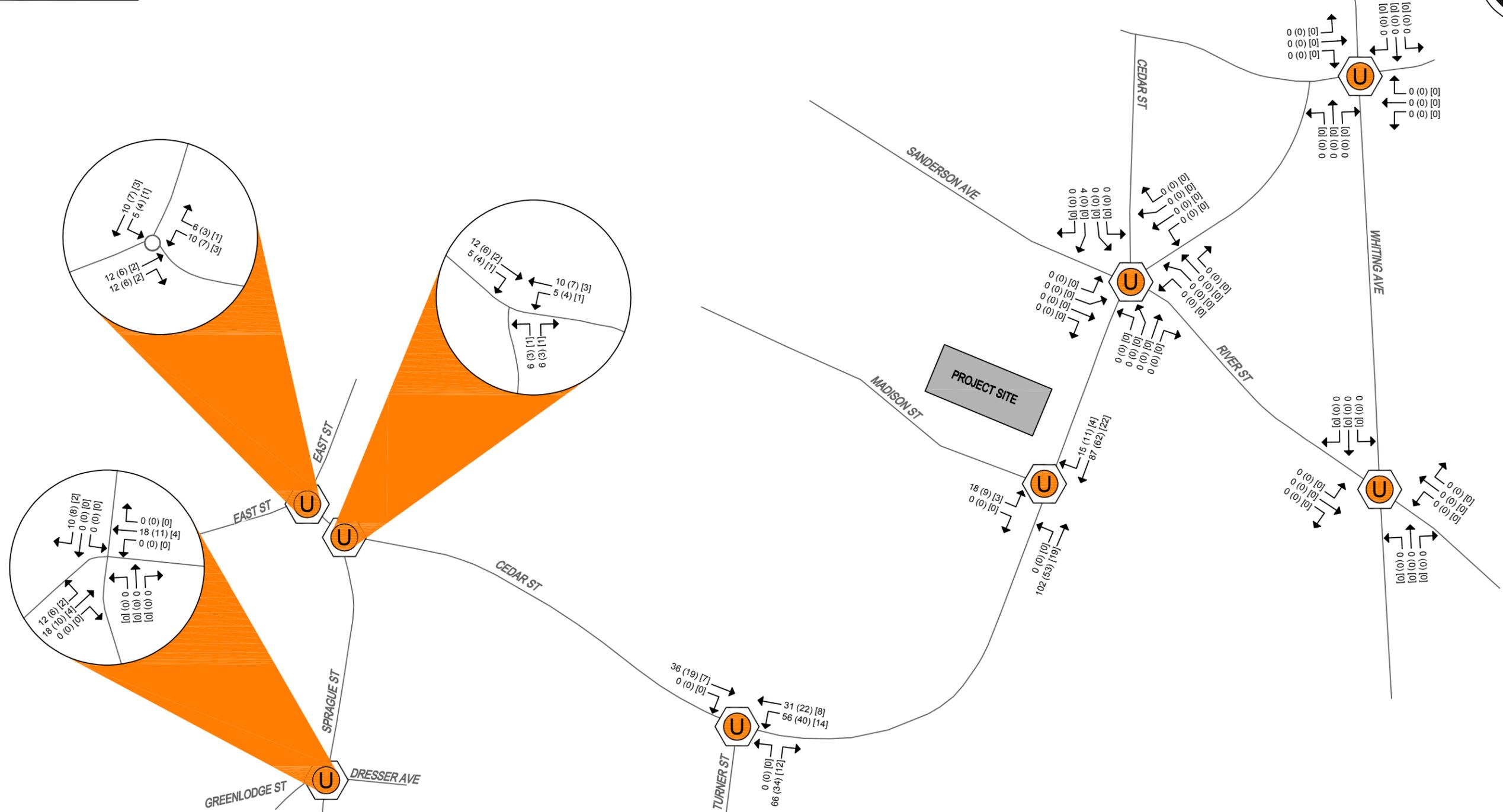
Trip Distribution

Along with the expansion/reconstruction of Greenlodge-Oakdale Elementary School, the town of Dedham is planning to close Greenlodge Elementary School, located approximately one-and-a-half miles away. As a result, the Town will need to redistrict its elementary school districts. While the proposed redistricting plan has not been finalized, it is anticipated that all of the current Greenlodge district students will be attending Greenlodge-Oakdale Elementary School. The proposed school is designed for 550 students, which is approximately 300 students more than what the current school has, and also approximately the current number of students at Greenlodge Elementary School. As a result, this study assumed that the additional traffic generated by the proposed expansion/reconstruction of the Greenlodge-Oakdale Elementary School will be oriented to/from the current Greenlodge district, or south of Cedar Street parallel to the Franklin Line railroad tracks.

Most students that will be attending from the Greenlodge District are assumed to access the school via Endicott Circle, or via Cedar Street from Sprague Street or Turner Street. Complete trip distribution calculations are provided in **Appendix E**. Site-generated traffic percentages are shown in **Figures 6**, site-generated traffic volumes are shown in **Figures 7**, and **Figures 8** displays the 2028 build condition volumes.



	PROJECT NO. 23178.00	DATE: NOVEMBER 2023
	FIGURE 6 TRIP DISTRIBUTION WEEKDAY 7:00-9:00 AM & 2:00-6:00 PM	
	DEDHAM, MASSACHUSETTS	



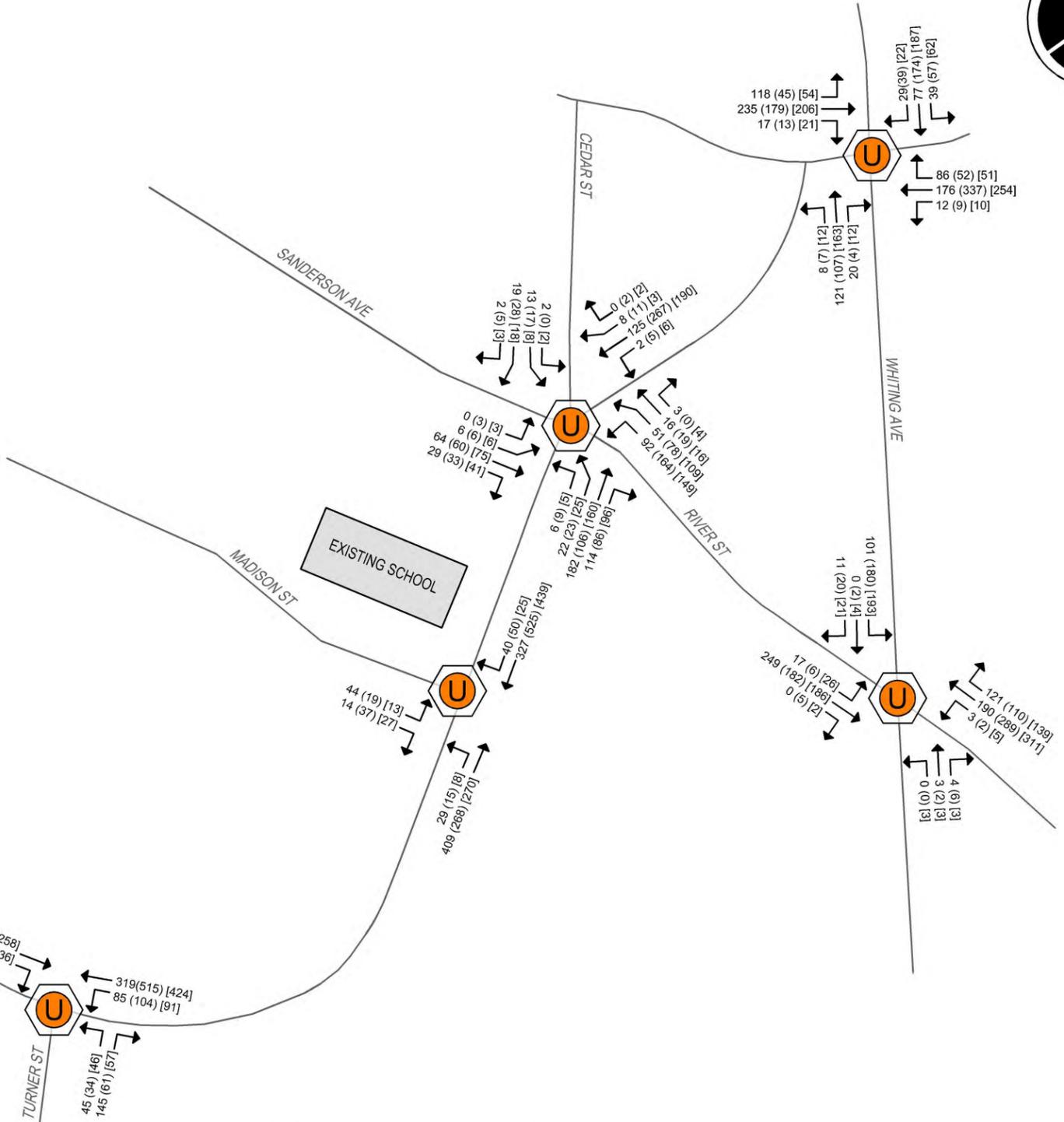
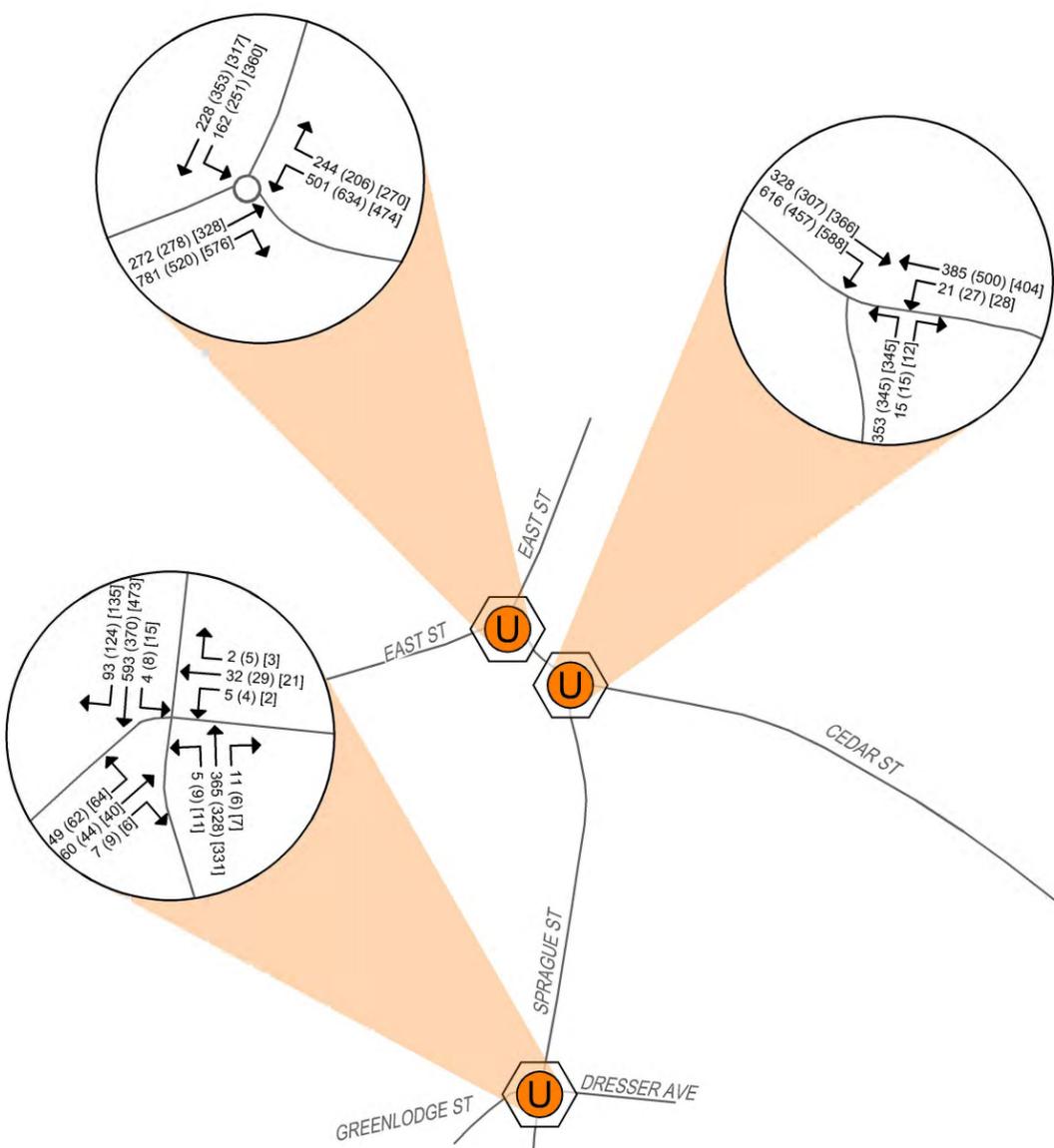
AM PEAK VOLUMES (PM SCHOOL PEAK VOLUMES) [PM COMMUTER PEAK VOLUMES]



PROJECT NO. 23178.00 DATE: NOVEMBER 2023

FIGURE 7
 SITE GENERATED TRAFFIC VOLUMES
 WEEKDAY 7:00-9:00 AM & 2:00-6:00 PM

DEDHAM, MASSACHUSETTS



AM PEAK VOLUMES (PM SCHOOL PEAK VOLUMES) [PM COMMUTER PEAK VOLUMES]



PROJECT NO. 23178.00 DATE: NOVEMBER 2023

FIGURE 8

FUTURE (2030) BUILD TRAFFIC VOLUMES
WEEKDAY 7:00-9:00 AM & 2:00-6:00 PM

DEDHAM, MASSACHUSETTS

CAPACITY ANALYSES

Capacity analyses were completed for all study intersections for existing, future (2030) no-build, and future (2030) build conditions. Capacity analyses characterize intersections based on their level of service (LOS). LOS is a quality measure describing operational conditions within a traffic stream, generally in terms of service measures such as speed, travel times, traffic interruptions, etc. Six LOS values, from A to F, are defined for each type of facility, with A representing the best operating conditions and F representing the worst operating conditions. The LOS criteria for all study intersections are provided in **Table 7** below. The complete capacity analysis worksheets can be found in **Appendix F**.

Table 7: LOS Criteria for Unsignalized Intersections

LOS	Unsignalized Intersection
	Delay Time (seconds/vehicle)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

As shown in the following tables below, most of the study intersections reviewed showed minimal changes in delay between the no-build and the build scenarios. Intersections noted with increased delays are all located south of the study area due to the redistricting of current Greenlodge Elementary School students to attend Greenlodge-Oakdale Elementary School. Due to the roadway geometry in the area, residents from this district can only access Greenlodge-Oakdale Elementary School using Cedar Street and East Street.

Overall, the northbound Sprague Street approach to Cedar Street operates at LOS F conditions under all analyzed conditions. It should be noted that the capacity analysis calculations at unsignalized intersections does get unstable once the LOS calculation reached LOS F conditions. The delays on this approach are likely not as high as shown; however, it is clear that the demand on this approach exceeds its capacity. Further, with significant delays on this approach, motorists driving to Greenlodge-Oakdale do have other options to get to Cedar Street, including accessing Cedar Street from Taylor Avenue, Kimball Road, or Beech Street via Dresser Avenue, which would reduce the demand at the Sprague Street approach to Cedar Street.

Changes in LOS between no-build and build conditions are noted on the Greenlodge Street approach to Sprague Street and on the northbound approach to Endicott Circle during the morning peak hour. All other intersection approaches during all analyzed time period either do not exhibit an LOS change between no-build and build conditions or a delay increase of less than two seconds.

Table 8: Morning Peak Hour LOS Summary

Intersection	Movement		Existing (2023)		Future (2030) No-Build		Future (2030) Build	
			LOS (Delay ¹)	Queue Length ² h ²	LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
<i>Whiting Avenue at Walnut Street</i>	EB	LTR	C (24.1)	172.5	C (16.8)	105	C (16.8)	105
	WB	LTR	B (14.0)	67.5	B (12.7)	57.5	B (12.7)	57.5
	NB	LTR	B (12.5)	30	B (11.9)	30	B (11.9)	30
	SB	LTR	B (12.2)	30	B (11.4)	27.5	B (11.4)	27.5
<i>River Street at Whiting Avenue</i>	EB	LTR	B (10.6)	42.5	B (10.4)	42.5	B (10.4)	42.5
	WB	LTR	B (10.6)	50	B (10.4)	50	B (10.4)	50
	NB	LTR	A (8.3)	0	A (8.3)	0	A (8.3)	0
	SB	LTR	B (10.1)	22.5	A (9.7)	17.5	A (9.7)	17.5
<i>Oakdale Square</i>	EB	ALL	A (6.8)	66	A (7.1)	70	A (6.8)	64
	WB	ALL	A (6.9)	68	A (7.0)	74	A (7.3)	79
	NB	ALL	A (7.7)	90	A (8.3)	98	A (6.0)	91
	SB	ALL	A (6.8)	58	A (6.8)	56	A (7.1)	59
	SEB	ALL	A (5.3)	44	A (5.6)	47	A (5.7)	46
<i>Cedar Street at Madison Street</i>	NB	L	A (7.9)	2.5	A (7.9)	2.5	A (8.2)	2.5
	EB	LR	B (12.9)	7.5	B (13.4)	7.5	C (18.0)	17.5
<i>Cedar Street at Turner Street</i>	NB	LR	C (15.2)	32.5	B (14.1)	25	C (17.7)	52.5
	WB	L	A (8.1)	2.5	A (8.1)	2.5	A (8.4)	7.5
<i>Cedar Street at Sprague Street</i>	NB	LR	F (\$359.4)	610	F (\$393.7)	657.5	F (\$466.8)	722.5
	WB	L	B (10.1)	2.5	B (10.3)	2.5	B (10.4)	2.5
<i>Endicott Circle</i>	SB		B (12.6)	80	B (13.1)	87	B (14.0)	96
	WB		C (19.9)	373	B (20.8)	234	C (23.3)	261
	NB		D (29.4)	228	E (48.0)	541	F (56.1)	604
<i>Sprague Street at Greenlodge Street/Dresser Avenue</i>	EB	L	A (8.1)	0	A (8.1)	0	A (8.1)	0
	WB	L	A (9.2)	0	A (9.2)	0	A (9.2)	0
	NB	LTR	E (40.2)	57.5	E (41.0)	60	F (64.1)	110
	SB	LTR	D (26.9)	10	D (26.6)	10	D (30.3)	20

- 95th percentile volume exceeds capacity; queue may be longer.

\$ - Delay exceeds 300 seconds.

1. Delay shown in seconds per vehicle.

2. Queue Length shown in feet assuming 25 feet per vehicle.

Table 9: Afternoon School Peak Hour LOS Summary

Intersection	Movement		Existing (2023)		Future (2030) No-Build		Future (2030) Build	
			LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
<i>Whiting Avenue at Walnut Street</i>	EB	LTR	C (15.1)	60	B (14.1)	57.5	B (14.1)	57.5
	WB	LTR	C (22.8)	147.5	C (20.7)	137.5	C (20.7)	137.5
	NB	LTR	B (12.6)	27.5	B (11.8)	22.5	B (11.8)	22.5
	SB	LTR	C (18.3)	97.5	C (15.5)	70	C (15.5)	70
<i>River Street at Whiting Avenue</i>	EB	LTR	B (10.4)	32.5	B (10.3)	32.5	B (10.3)	32.5
	WB	LTR	B (13.5)	87.5	B (13.6)	87.5	B (13.6)	87.5
	NB	LTR	A (8.6)	2.5	A (8.5)	0	A (8.5)	0
	SB	LTR	B (11.5)	37.5	B (11.5)	37.5	B (11.5)	37.5
<i>Oakdale Square</i>	EB	ALL	A (7.9)	59	A (7.9)	60	A (8.0)	62
	WB	ALL	A (8.9)	82	A (8.9)	82	A (9.0)	80
	NB	ALL	A (7.5)	79	A (7.8)	82	A (6.4)	80
	SB	ALL	A (9.2)	89	A (9.5)	103	A (9.3)	95
	SEB	ALL	A (7.2)	49	A (7.4)	48	A (7.4)	52
<i>Cedar Street at Madison Street</i>	NB	L	A (8.5)	0	A (8.6)	0	A (8.8)	2.5
	EB	LR	B (13.6)	12.5	B (13.6)	10	C (16.0)	15
<i>Cedar Street at Turner Street</i>	NB	LR	C (17.3)	15	C (17.2)	17.5	C (18.2)	27.5
	WB	L	A (8.1)	5	A (8.1)	5	A (8.2)	7.5
<i>Cedar Street at Sprague Street</i>	NB	LR	F (\$323.3)	565	F (\$431.2)	680	F (\$474.2)	717.5
	WB	L	A (9.5)	2.5	A (9.6)	2.5	A (9.7)	2.5
<i>Endicott Circle</i>	SB		D (31.7)	245	F (52.4)	359	F (58.8)	389
	WB		D (31.6)	340	E (39.4)	411	E (43.3)	440
	NB		C (30.1)	356	D (29.8)	344	D (32.3)	368
<i>Sprague Street at Greenlodge Street/Dresser Avenue</i>	EB	L	A (8.0)	0	A (8.0)	0	A (8.0)	0
	WB	L	A (8.5)	0	A (8.5)	0	A (8.5)	0
	NB	LTR	D (27.7)	47.5	D (27.2)	45	D (31.4)	62.5
	SB	LTR	C (19.1)	10	C (19.0)	7.5	C (20.5)	12.5

- 95th percentile volume exceeds capacity; queue may be longer.

\$ - Delay exceeds 300 seconds.

1. Delay shown in seconds per vehicle.

2. Queue Length shown in feet assuming 25 feet per vehicle.

Table 10: Afternoon Commuter Peak Hour LOS Summary

Intersection	Movement		Existing (2023)		Future (2030) No-Build		Future (2030) Build	
			LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²	LOS (Delay ¹)	Queue Length ²
<i>Whiting Avenue at Walnut Street</i>	EB	LTR	C (16.0)	80	C (16.3)	77.5	C (16.3)	77.5
	WB	LTR	C (15.8)	80	C (17.5)	92.5	C (17.5)	92.5
	NB	LTR	B (13.1)	40	B (13.6)	42.5	B (13.6)	42.5
	SB	LTR	B (15.0)	62.5	C (16.4)	75	C (16.4)	75
<i>River Street at Whiting Avenue</i>	EB	LTR	B (11.4)	42.5	B (11.2)	37.5	B (11.2)	37.5
	WB	LTR	C (18.3)	145	C (17.0)	127.5	C (17.0)	127.5
	NB	LTR	A (9.4)	2.5	A (9.3)	2.5	A (9.3)	2.5
	SB	LTR	B (12.3)	40	B (12.5)	45	B (12.5)	45
<i>Oakdale Square</i>	EB	ALL	A (7.4)	59	A (7.6)	58	A (7.6)	59
	WB	ALL	A (8.4)	69	A (8.7)	74	A (8.8)	72
	NB	ALL	A (8.1)	82	A (8.2)	90	A (8.3)	88
	SB	ALL	A (7.9)	76	A (8.0)	75	A (7.9)	75
	SEB	ALL	A (6.7)	46	A (6.9)	45	A (6.5)	45
<i>Cedar Street at Madison Street</i>	NB	L	A (8.5)	0	A (8.3)	0	A (8.4)	0
	EB	LR	B (14.3)	12.5	B (12.6)	7.5	B (13.3)	7.5
<i>Cedar Street at Turner Street</i>	NB	LR	C (20.4)	35	C (16.9)	25	C (17.5)	27.5
	WB	L	A (8.2)	7.5	A (8.1)	5	A (8.1)	7.5
<i>Cedar Street at Sprague Street</i>	NB	LR	F (\$500.6)	735	F (\$532.6)	740	F (\$542.7)	750
	WB	L	B (10.2)	2.5	B (10.6)	2.5	B (10.6)	2.5
<i>Endicott Circle</i>	SB		D (28.5)	268	D (34.2)	305	E (35.5)	314
	WB		C (18.5)	195	D (25.1)	268	D (25.8)	274
	NB		E (48.8)	455	F (69.6)	589	F (71.5)	600
<i>Sprague Street at Greenlodge Street/Dresser Avenue</i>	EB	L	A (8.1)	0	A (8.1)	0	A (8.1)	0
	WB	L	A (8.9)	0	A (8.9)	0	A (8.9)	0
	NB	LTR	E (48.0)	92.5	E (41.5)	72.5	E (45.0)	80
	SB	LTR	C (23.4)	10	C (23.3)	10	C (24.1)	10

- 95th percentile volume exceeds capacity; queue may be longer.

\$ - Delay exceeds 300 seconds.

1. Delay shown in seconds per vehicle.

2. Queue Length shown in feet assuming 25 feet per vehicle.

Mitigating the delays at the Cedar Street/Sprague Street intersection are difficult due to this intersection's proximity to Endicott Circle. Signalization of the intersection would not be recommended, as any queue in excess of 100 feet on the eastbound Cedar Street approach to Sprague Street would extend into Endicott Circle, bringing the roundabout to a standstill. Significant property acquisitions would be required to move the intersection further away from the roundabout or incorporate it into the roundabout.

Another intersection with anticipated difficult levels of service occurs at Endicott Circle. The East Street northbound approach is quite heavy during the morning and afternoon commuter peak hours. But like the intersection of Cedar Street and Sprague Street, mitigation of this approach's congestion is impossible without property acquisition. Further, it is anticipated that only a small percentage of the school's students would utilize this approach to the intersection.

Finally, the Greenlodge Street approach to its intersection with Sprague Street is anticipated to perform at an LOS F in the build scenario during the morning peak hour. However, it should be noted that the existing conditions traffic counts at this intersection undoubtedly includes traffic generated by the Greenlodge School, which is located on Greenlodge Street. As it is generally extremely difficult to know which counted vehicles are heading to or from the Greenlodge School and which are not, these trips were not removed from the traffic stream before adding the trips to Greenlodge-Oakdale. Therefore, these trips are double-counted in the build scenario. As a result, it is likely that the impacts at this intersection from the changing of the school districts will be less than shown. Further, the existing volumes at this intersection do not appear to be high enough to meet warrants for signalization, but additional study would be needed to complete a full traffic signal warrant analysis at the intersection.

CONCLUSIONS

Based on the analyses conducted, it is Pare's professional opinion that the traffic anticipated from the proposed Greenlodge-Oakdale Elementary School can be safely accommodated on the area streets and intersections.

Pare Corporation conducted analyses of the potential impacts of the reconstruction of Greenlodge-Oakdale Elementary School which will coincide with a redistricting of elementary school students throughout Dedham. The school is proposed to serve 550 students, and is anticipated to include all current Greenlodge Elementary students, which will account for essentially the entire increase in the number of students served at the school.

The school currently has four driveways, two of each along Cedar Street and Madison Street. The proposed new Greenlodge-Oakdale Elementary School is to contain one primary access from Cedar Street and a service driveway access is proposed on Madison Street southwest of the proposed school building.

As part of the analysis, Pare reviewed conditions at the existing elementary school. Observations at school reflected four common travel methods: parent drop-off/pickup, bus drop-off/pickup, biking and walking. Only a small percentage of students were observed using the bus. The majority of the students were driven or walked to the school with or without a guardian. Parent drop-off/pick-up was observed along both Madison Street and Cedar Street. Two buses and one minibus were observed for the morning arrival period, with the same number plus an additional minibus was observed in the afternoon dismissal period. For both, one of these buses was utilized for Early Childhood Education Center (ECEC) students as the Oakdale Elementary School served as a pick-

up/drop-off point.

Anticipated distribution of trips to and from the school were estimated through the location of residential areas within the Greenlodge school district and their anticipated routes to and from the Greenlodge-Oakdale School. The remaining students are anticipated to use the same travel patterns that are used today in the future.

Based on the safety analyses conducted, it is anticipated that the addition of the school's vehicular traffic to the surrounding roadway network can be accommodated safely. The change of school arrival and departure patterns are not expected to significantly exacerbate the crash patterns that were found in the study area. Sight distances were measured at the proposed site driveway locations and all minimum requirements were met, and all desirable values are anticipated to be met after construction and site clearing are complete.

Capacity analyses conducted at the study intersections indicated minor increases in delay for majority of the intersections when compared against existing or no-build conditions. While a few intersection approaches were identified as being near or over capacity in the build condition, mitigating these delays would require the acquisition of private property along Sprague Street near Cedar Street and adjacent to Endicott Circle. At Sprague Street and Greenlodge Street, signalization may reduce congestion on the Greenlodge Street approach to the intersection during peak periods, but the intersection does not appear to meet warrants for signalization. Therefore, the ability to enact measures to reduce congestion at these intersections is extremely limited.

Appendix A

Crash Data

Project Name OAKDALE ELEMENTARY SCHOOL
 Town/City, State DEDHAM, MA
 Crash Data Summary
 Project Number 23178
 Date 10/23/2023



Crash Ref. No.	Report No.	Date	Time	On Street	Intersecting Street(s)	Directions of Travel	No. of Vehicles	Injuries	Fatalities	Weather Condition	Road Condition	Lighting	Crash Type	Notes
1	4603525	10/01/2018	6:08 PM	Whiting Avenue		V1: S / V2: S	2	0	0	Rain	Wet	Dusk	Sideswipe	
2	4611026	10/15/2018	7:32 PM	Walnut Street		V1: S / V2: W	2	1	0	Cloudy/Rain	Wet	Dark-Lighted	Angle	
3	4615210	10/27/2018	8:10 PM	Walnut Street		V1: W / V2: S	2	0	0	Rain	Wet	Dark-Lighted	Angle	
4	4618742	11/06/2018	5:15 PM	Sprague Street	Greenlodge Street	V1: S / V2: E	2	1	0	Rain	Wet	Dark-Not Lighted	Angle	
5	4619627	11/09/2018	4:59 PM	Cedar Street		V1: S	1	0	0	Rain/Rain	Wet	Dark-Lighted	Single Vehicle	
6	4624762	11/16/2018	3:12 PM	Whiting Avenue		V1: W / V2: N	2	0	0	Clear/Clear	Wet	Daylight	Sideswipe	
7	4626639	11/13/2018	5:55 AM	East Street		V1: S	1	1	0	Rain	Wet	Dark-Lighted	Single Vehicle	
8	4630329	11/19/2018	9:23 PM	East Street		V1: N / V2: N	2	0	0	Cloudy	Wet	Dark-Lighted	Single Vehicle	
9	4630331	11/20/2018	4:52 PM	Cedar Street	Sprague Street	V1: N / V2: W	2	0	0	Sleet, hail (fi	Wet	Dark-Lighted	Angle	
10	4647543	01/05/2019	5:22 PM	Whiting Avenue		V1: W / V2: N	2	1	0	Rain	Wet	Dark-Not Lighted	Angle	
11	4649253	01/06/2019	6:50 PM	Whiting Avenue		V1: W / V2: S	2	1	0	Clear	Dry	Dark-Lighted	Angle	
12	4682726	03/29/2019	1:15 PM	River Street		V1: E / V2: E	2	0	0	Rain	Wet	Daylight	Rear-End	
13	4682727	03/29/2019	6:46 PM	East Street		V1: N / V2: N	2	0	0	Cloudy	Wet	Dawn	Angle	
14	4688925	04/08/2019	6:26 AM	Sprague Street		V1: W / V2: W	2	0	0	Rain	Wet	Dawn	Rear-End	
15	4695269	04/29/2019	4:45 PM	River Street		V1: W	1	0	0	Cloudy	Dry	Daylight	Single Vehicle	
16	4702981	05/11/2019	10:41 PM	Cedar Street		V1: E / V2: E / V3: E	3	0	0	Clear	Dry	Dark-Lighted	Sideswipe	
17	4710990	05/04/2019	7:15 AM	Cedar Street		V1: E / V2: W / V3: E	3	0	0	Rain	Wet	Dark-Lighted	Head-On	
18	4723955	07/11/2019	6:07 PM	East Street		V1: N	1	0	0	Clear		Daylight	Single Vehicle	
19	4729937	07/26/2019	4:42 PM	Walnut Street		V1: W / V2: S	2	0	0	Clear		Daylight	Angle	
20	4734223	07/26/2019	6:55 AM	Whiting Avenue		V1: E / V2: E	2	0	0	Clear	Dry	Daylight	Sideswipe	
21	4735225	08/05/2019	3:24 PM	East Street		V1: S	1	0	0	Clear	Dry	Daylight	Single Vehicle	
22	4735632	08/04/2019	4:36 PM	Whiting Avenue	Walnut Street	V1: S / V2: W	2	0	0	Clear/Clear	Dry	Daylight	Angle	
23	4737527	08/13/2019	2:11 PM	East Street		V1: S / V2: S	2	0	0	Cloudy/Clou	Dry	Daylight	Rear-End	
24	4746264	09/01/2019	3:03 AM	Oakdale Avenue		V1: S	1	1	0	Clear	Dry	Dark-Lighted	Single Vehicle	
25	4750363	09/14/2019	7:00 PM	East Street		V1: N / V2: W	2	0	0	Rain	Wet	Dark-Lighted	Head-On	
26	4762466	10/17/2019	1:11 PM	Walnut Street		V1: W / V2: S	2	0	0	Cloudy/Clou	Dry	Daylight	Angle	
27	4766166	10/24/2019	6:51 PM	East Street		V1: E	1	0	0	Clear/Clear	Dry	Dark-Lighted	Single Vehicle	
28	4768563	10/30/2019	6:37 PM	Whiting Avenue		V1: E / V2: S	2	0	0	Rain/Fog, sn	Wet	Dark-Lighted	Angle	
29	4769455	10/28/2019	1:00 PM	Walnut Street		V1: S / V2: E	2	0	0	Rain	Wet	Daylight	Sideswipe	
30	4779320	11/19/2019	2:53 PM	Cedar Street		V1: W / V2: E	2	1	0	Cloudy/Clou	Wet	Daylight	Angle	
31	4785304	10/04/2019	7:09 PM	Walnut Street		V1: N / V2: E	2	1	0	Clear/Clear	Dry	Dark-Not Lighted	Angle	
32	4794065	12/23/2019	9:30 AM	Cedar Street		V1: S / V2: E	2	1	0	Clear/Clear	Dry	Daylight	Sideswipe	
33	4799508	12/17/2019	10:08 AM	Cedar Street		V1: E	1	2	0	Sleet, hail (fi	Wet	Daylight	Single Vehicle	
34	4806964	01/17/2020	11:24 AM	Cedar Street		V1: S / V2: S / V3: S	3	0	0	Clear/Clear	Dry	Daylight	Rear-End	
35	4806965	01/17/2020	2:58 PM	Sprague Street		V1: S / V2: W	2	2	0	Clear/Clear	Dry	Daylight	Angle	
36	4842626	04/17/2020	2:00 PM	Cedar Street		V1: N / V2: N	2	0	0	Clear/Clear	Dry	Daylight	Rear-End	
37	4844264	05/19/2020	10:40 AM	Cedar Street		V1: E / V2: S	2	0	0	Clear	Dry	Daylight	Angle	
38	4854319	06/25/2020	8:48 PM	Whiting Avenue		V1: E / V2: E	2	0	0	Clear/Clear	Dry	Dusk	Rear-End	
39	4854320	06/28/2020	2:30 AM	Cedar Street		V1: W	1	0	0	Clear	Dry	Dark-Lighted	Single Vehicle	
40	4859874	07/15/2020	6:58 PM	Whiting Avenue		V1: W / V2: N	2	0	0	Clear	Dry	Daylight	Angle	

Project Name OAKDALE ELEMENTARY SCHOOL
Town/City, State DEDHAM, MA
Crash Data Summary
Project Number 23178
Date 10/23/2023



Crash Ref. No.	Report No.	Date	Time	On Street	Intersecting Street(s)	Directions of Travel	No. of Vehicles	Injuries	Fatalities	Weather Condition	Road Condition	Lighting	Crash Type	Notes
41	4860360	07/13/2020	5:09 PM	Whiting Avenue		V1: S / V2: S	2	0	0	Clear/Clear	Dry	Daylight	Angle	
42	4861895	07/18/2020	1:52 AM	Cedar Street	Madison Street	V1: E	1	0	0	Clear	Dry	Dark-Lighted	Single Vehicle	
43	4890766	10/22/2020	9:29 PM	Cedar Street		V1: N / V2: N / V3: I	3	0	0	Clear	Dry	Dark-Lighted	Rear-End	
44	4895298	10/28/2020	7:59 AM	East Street		V1: E	1	0	0	Cloudy/Rain	Wet	Daylight	Single Vehicle	
45	4901461	11/24/2020	5:20 PM	Whiting Avenue		V1: S / V2: N	2	1	0	Clear	Dry	Dark-Lighted	Head-On	
46	4908660	12/02/2020	1:28 PM	Whiting Avenue		V1: N / V2: W	2	1	0	Clear/Clear	Dry	Daylight	Sideswipe	
47	4914866	12/31/2020	6:10 PM	Cedar Street		V1: S / V2: W	2	0	0	Cloudy	Dry	Dark-Lighted	Angle	
48	4942987	03/03/2021	4:24 PM	Cedar Street	River Street	V1: N / V2: N	2	0	0	Clear	Dry	Daylight	Rear-End	
49	4943064	03/02/2021	1:46 PM	East Street		V1: N / V2: N	2	0	0	Clear	Dry	Daylight	Rear-End	
50	4947138	03/31/2021	1:37 PM	Whiting Avenue		V1: E / V2: S	2	0	0	Clear	Dry	Daylight	Angle	
51	4947665	03/29/2021	12:30 PM	Whiting Avenue		V1: E / V2: N	2	0	0	Clear/Clear	Dry	Daylight	Angle	
52	4954574	04/21/2021	1:30 PM	East Street		V1: S / V2: S / V3: S	4	0	0	Cloudy/Clea	Dry	Daylight	Rear-End	
53	4955053	03/10/2021	10:14 AM	Whiting Avenue		V1: S / V2: E / V3: V	3	0	0	Clear/Clear	Dry	Daylight	Angle	
54	4967765	06/01/2021	10:09 PM	Cedar Street	Madison Street	V1: E	1	0	0	Clear	Dry	Dark-Lighted	Single Vehicle	
55	4970568	06/12/2021	8:26 AM	Cedar Street		V1: W / V2: W / V3:	3	0	0	Cloudy/Rain	Wet	Daylight	Sideswipe	
56	4994578	08/11/2021	11:01 AM	Cedar Street		V1: E / V2: S	2	1	0	Clear/Clear	Dry	Daylight	Angle	
57	5003564	08/31/2021	10:18 AM	Walnut Street		V1: S / V2: W	2	0	0	Clear	Dry	Daylight	Angle	
58	5026840	10/01/2021	4:50 PM	Cedar Street		V1: E / V2: N	2	0	0	Clear/Clear	Dry	Daylight	Angle	
59	5026849	08/25/2021	2:12 PM	Cedar Street		V1: S / V2: S	2	0	0	Clear	Dry	Daylight	Angle	
60	5026855	09/13/2021	3:20 PM	Walnut Street		V1: S / V2: E / V3: V	3	1	0	Clear	Dry	Daylight	Angle	
61	5027355	09/14/2021	3:54 AM	Whiting Avenue		V1: N	1	1	0	Clear	Dry	Dark-Lighted	Head-On	
62	5057462	01/07/2022	6:04 AM	Oakdale Avenue		V1: N	1	0	0	Snow	Snow	Dark-Lighted	Unknown	
63	5057960	01/15/2022	12:23 AM	Cedar Street		V1: W / V2: W	2	0	0	Clear/Clear	Dry	Dark-Lighted	Rear-End	
64	5060366	12/30/2021	12:07 PM	Cedar Street		V1: S	1	0	0	Rain/Fog, sn	Wet	Daylight	Rear-End	
65	5065510	01/31/2022	1:42 AM	Oakdale Avenue		V1: N	1	0	0	Snow	Ice	Dark-Lighted	Unknown	
66	5069560	02/13/2022	10:40 AM	Cedar Street		V1: S	1	0	0	Snow	Slush	Daylight	Head-On	
67	5074860	02/25/2022	3:13 PM	Whiting Avenue	Walnut Street	V1: N / V2: E	2	0	0	Snow/Sleet, Snow		Daylight	Unknown	
68	5076279	02/23/2022	11:11 AM	Whiting Avenue	Walnut Street	V1: N / V2: W	2	0	0	Not Reporte	Dry	Daylight	Unknown	
69	5079278	02/25/2022	10:22 AM	Cobbler Lane		V2: S / V1: S	2	0	0	Snow/Sleet, Snow		Daylight	Rear-End	
70	5097263	03/24/2022	9:57 PM	Whiting Avenue	Walnut Street	V1: E / V2: S	2	0	0	Rain	Wet	Dark-Lighted	Angle	
71	5101175	03/10/2022	4:40 PM	Cedar Street		V1: W	1	0	0	Clear	Dry	Daylight	Single Vehicle	
72	5146020	05/17/2022	4:22 PM	Whiting Avenue	Walnut Street	V1: W / V2: N	2	0	0	Clear	Dry	Daylight	Angle	
73	5149884	09/07/2022	7:40 PM	Cedar Street		V1: W	1	1	0	Clear/Clear	Dry	Dark-Lighted	Single Vehicle	
74	5162852	10/10/2022	10:18 AM	Walnut Street		V1: E / V2: N	2	2	0	Clear/Clear	Dry	Daylight	Angle	
75	5174691	11/11/2022	6:13 PM	Whiting Avenue	Walnut Street	V1: W / V2: S	2	1	0	Cloudy/Clou	Dry	Dark-Lighted	Angle	
76	5186537	12/11/2022	12:11 AM	Walnut Street		V1: E / V2: N	2	0	0	Clear	Dry	Dark-Lighted	Sideswipe	
77	5189873	12/13/2022	3:14 PM	Cedar Street		V1: N / V2: Not Rep	2	0	0	Clear	Dry	Daylight	Rear-End	
78	5197675	01/07/2023	12:51 AM	Cedar Street		V1: S	1	1	0	Fog, smog, s	Wet	Dark-Lighted	Single Vehicle	
79	5221504	02/15/2023	4:13 PM	Cedar Street		V1: E / V2: N	2	2	0	Clear/Clear	Dry	Daylight	Angle	
80	5262239	04/13/2023	8:20 PM	Whiting Avenue	Walnut Street	V1: N / V2: W	2	0	0	Clear/Clear	Dry	Dark-Lighted	Angle	

Project Name OAKDALE ELEMENTARY SCHOOL
Town/City, State DEDHAM, MA
Crash Data Summary
Project Number 23178
Date 10/23/2023



Crash Ref. No.	Report No.	Date	Time	On Street	Intersecting Street(s)	Directions of Travel	No. of Vehicles	Injuries	Fatalities	Weather Condition	Road Condition	Lighting	Crash Type	Notes
81	5262251	05/30/2023	12:54 PM	Sprague Street		V1: W / V2: E	2	3	0	Clear/Clear	Dry	Daylight	Angle	
82	5269045	06/21/2023	3:19 PM	Whiting Avenue	Walnut Street	V1: E / V2: N	2	1	0	Clear/Clear	Dry	Daylight	Angle	
83	5275752	07/14/2023	9:56 PM	Cedar Street		V1: W	1	2	0	Cloudy/Clou	Dry	Dark-Lighted	Single Vehicle	
84	5083067	3/18/2022	8:14 PM	Madison Street		V1: W / V2: W / V3:	3	0	0		Dry	Dark-Lighted	Rear-End	

Appendix B

Speed Study Data

Pare Corporation

8 Blackstone Valley Place
Lincoln, RI, 02865
401-334-4100
www.parecorp.com

Roadway: Cedar St
City/State: Dedham MA
Weather: 60 & Cloudy
Name: Saira Ramzan

File Name : Oakdale Elementary School (Cedar St)
Site Code : 23178.00
Start Date : 10/24/2023
Page No : 1

#	SB	NB
1	29	30
2	28	30
3	31	29
4	31	28
5	31	24
6	35	27
7	33	24
8	33	25
9	26	28
10	21	32
11	31	36
12	33	25
13	30	29
14	31	27
15	31	30
16	27	27
17	34	34
18	33	26
19	24	31
20	29	29
21	48	31
22	29	27
23	32	28
24	30	27
25	31	35
26	37	32
27	23	33
28	26	27
29	41	32
30	32	31
31	28	24
32	30	28
33	31	35
34	32	24
35	29	29
36	33	28
37	21	31
38	24	31
39	25	31
40	32	35
41	26	33
42	27	33
43	30	26
44	26	21
45	23	31
46	25	33
47	23	30
48	22	31
49	37	31
50	30	27
51	27	26
52	33	25
53	25	39
54	34	31
55	23	31
56	26	33
57	25	26
58	23	34
59	26	34
60	30	31
61	28	28
62	28	27

Pare Corporation

8 Blackstone Valley Place
 Lincoln, RI, 02865
 401-334-4100
 www.parecorp.com

File Name : Oakdale Elementary School (Cedar St)
 Site Code : 23178.00
 Start Date : 10/24/2023
 Page No : 2

#	SB	NB
63	31	30
64	31	34
65	30	26
66	29	32
67	28	31
68	26	27
69	27	25
70	46	25
71	41	34
72	30	26
73	29	36
74	29	36
75	28	33
76	29	27
77	29	28
78	42	33
79	29	21
80	28	28
81	28	26
82	25	26
83	27	29
84	29	30
85	28	27
86	34	28
87	27	30
88	34	35
89	34	33
90	29	26
91	31	29
92	36	30
93	21	24
94	22	32
95	25	23
96	33	31
97	30	23
98	36	27
99	29	28
100	30	28
101		

Class	Vehicle Count	85 Percentile	10 MPH Pace Speed	Number in Pace	Percent in Pace	Number of Vehicles Over 20 MPH	Percent of Vehicles Over 20 MPH	Average Speed	True Median (50th Percentile)
SB	100	33	25 - 34	78	78	100	100	30	29
NB	100	33	24 - 33	83	83	100	100	29	29
Summary	200	33	25 - 34	161	80	200	100	29	29

Pare Corporation

8 Blackstone Valley Place
 Lincoln, RI, 02865
 401-334-4100
 www.parecorp.com

Roadway: Madison St
 City/MA: Dedham MA
 Weather: 60 & Cloudy
 Name: Saira Ramzan

File Name : Oakdale Elementary School (Madison St)
 Site Code : 23178
 Start Date : 10/24/2023
 Page No : 1

#	EB	WB
1	21	22
2	17	12
3	17	24
4	25	25
5	24	25
6	23	20
7	29	20
8	23	24
9	28	23
10	19	25
11	17	18
12	17	32
13	24	
14	19	
15	20	
16	10	
17	26	
18	27	
19	17	
20	14	
21	27	
22	20	
23		

Class	Vehicle Count	85 Percentile	10 MPH Pace Speed	Number in Pace	Percent in Pace	Number of Vehicles Over 20 MPH	Percent of Vehicles Over 20 MPH	Average Speed	True Median (50th Percentile)
EB	22	27	17 - 26	16	73	11	50	21	20
WB	12	25	16 - 25	10	83	8	67	22	24
Summary	34	26	17 - 26	26	76	19	56	22	22

Appendix C

Traffic Counts

Transportation Data Corporation
 Mario Perone, mperone1@verizon.net
 tel (781) 587-0086 cell (781) 439-4999

N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770A
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	1	8	9	1	15	34	5	2	5	22	2	1	2	58	10	0	175
07:15 AM	7	19	9	3	30	40	1	2	3	30	0	3	5	58	61	3	274
07:30 AM	16	15	13	0	22	45	5	5	6	30	2	1	5	54	25	6	250
07:45 AM	2	15	7	2	11	42	1	0	7	27	3	2	1	55	11	1	187
Total	26	57	38	6	78	161	12	9	21	109	7	7	13	225	107	10	886
08:00 AM	3	24	8	6	14	41	4	0	3	27	1	0	4	58	13	5	211
08:15 AM	3	24	9	7	28	51	4	0	6	32	3	0	2	62	6	0	237
08:30 AM	6	22	10	2	10	41	1	1	5	39	0	0	3	65	13	0	218
08:45 AM	3	16	5	2	8	30	5	2	2	30	1	0	3	60	4	3	174
Total	15	86	32	17	60	163	14	3	16	128	5	0	12	245	36	8	840
Grand Total	41	143	70	23	138	324	26	12	37	237	12	7	25	470	143	18	1726
Apprch %	14.8	51.6	25.3	8.3	27.6	64.8	5.2	2.4	12.6	80.9	4.1	2.4	3.8	71.6	21.8	2.7	
Total %	2.4	8.3	4.1	1.3	8	18.8	1.5	0.7	2.1	13.7	0.7	0.4	1.4	27.2	8.3	1	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	19	9	3	38	30	40	1	2	73	3	30	0	3	36	5	58	61	3	127	274
07:30 AM	16	15	13	0	44	22	45	5	5	77	6	30	2	1	39	5	54	25	6	90	250
07:45 AM	2	15	7	2	26	11	42	1	0	54	7	27	3	2	39	1	55	11	1	68	187
08:00 AM	3	24	8	6	41	14	41	4	0	59	3	27	1	0	31	4	58	13	5	80	211
Total Volume	28	73	37	11	149	77	168	11	7	263	19	114	6	6	145	15	225	110	15	365	922
% App. Total	18.8	49	24.8	7.4		29.3	63.9	4.2	2.7		13.1	78.6	4.1	4.1		4.1	61.6	30.1	4.1		
PHF	.438	.760	.712	.458	.847	.642	.933	.550	.350	.854	.679	.950	.500	.500	.929	.750	.970	.451	.625	.719	.841

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770A
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	2	0	0	0	1	4	0	7
08:00 AM	0	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	4
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	2	0	0	1	0	0	0	0	2	1	0	1	0	0	0	7
Grand Total	0	2	0	0	1	0	0	0	0	4	1	0	1	1	4	0	14
Apprch %	0	100	0	0	100	0	0	0	0	80	20	0	16.7	16.7	66.7	0	
Total %	0	14.3	0	0	7.1	0	0	0	0	28.6	7.1	0	7.1	7.1	28.6	0	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:00 AM	0	1	0	0	1	1	0	0	0	1	0	0	1	0	1	1	0	0	0	1	4
Total Volume	0	1	0	0	1	1	0	0	0	1	0	2	1	0	3	1	0	3	0	4	9
% App. Total	0	100	0	0		100	0	0	0		0	66.7	33.3	0		25	0	75	0		
PHF	.000	.250	.000	.000	.250	.250	.000	.000	.000	.250	.000	.500	.250	.000	.750	.250	.000	.750	.000	1.00	.563

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N/S: Whiting Avenue
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 Client: Pare/Derek Hug

File Name : 05770A
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	5	1	0	0	0	0	0	0	0	1	0	0	7
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	5	1	0	0	0	0	0	0	0	1	0	0	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Grand Total	0	0	0	0	5	1	0	0	0	0	0	0	0	3	0	0	9
Apprch %	0	0	0	0	83.3	16.7	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	55.6	11.1	0	0	0	0	0	0	0	33.3	0	0	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	1	7
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	1	7
% App. Total	0	0	0	0		83.3	16.7	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.250	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.250

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00 AM

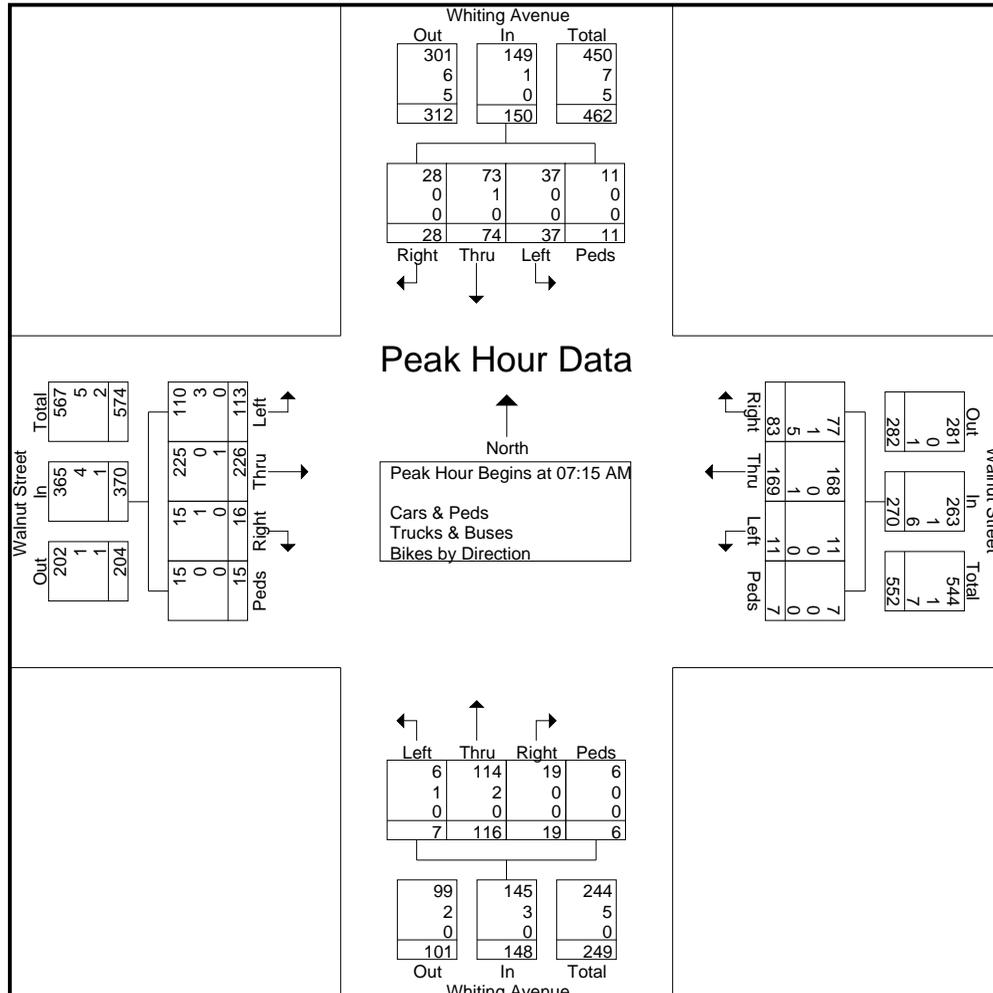
Transportation Data Corporation

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N/S: Whiting Avenue
E/W: Walnut Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770A
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	19	9	3	38	35	41	1	2	79	3	31	0	3	37	5	59	62	3	129	283
07:30 AM	16	15	13	0	44	22	45	5	5	77	6	31	2	1	40	5	54	26	6	91	252
07:45 AM	2	15	7	2	26	11	42	1	0	54	7	27	3	2	39	1	55	12	1	69	188
08:00 AM	3	25	8	6	42	15	41	4	0	60	3	27	2	0	32	5	58	13	5	81	215
Total Volume	28	74	37	11	150	83	169	11	7	270	19	116	7	6	148	16	226	113	15	370	938
% App. Total	18.7	49.3	24.7	7.3		30.7	62.6	4.1	2.6		12.8	78.4	4.7	4.1		4.3	61.1	30.5	4.1		
PHF	.438	.740	.712	.458	.852	.593	.939	.550	.350	.854	.679	.935	.583	.500	.925	.800	.958	.456	.625	.717	.829
Cars & Peds	28	73	37	11	149	77	168	11	7	263	19	114	6	6	145	15	225	110	15	365	922
% Cars & Peds	100	98.6	100	100	99.3	92.8	99.4	100	100	97.4	100	98.3	85.7	100	98.0	93.8	99.6	97.3	100	98.6	98.3
Trucks & Buses	0	1	0	0	1	1	0	0	0	1	0	2	1	0	3	1	0	3	0	4	9
% Trucks & Buses	0	1.4	0	0	0.7	1.2	0	0	0	0.4	0	1.7	14.3	0	2.0	6.3	0	2.7	0	1.1	1.0
Bikes by Direction	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	1	7
% Bikes by Direction	0	0	0	0	0	6.0	0.6	0	0	2.2	0	0	0	0	0	0	0.4	0	0	0.3	0.7



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N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770A
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	1	8	9	1	15	34	5	2	5	22	2	1	2	59	11	0	177
07:15 AM	7	19	9	3	35	41	1	2	3	31	0	3	5	59	62	3	283
07:30 AM	16	15	13	0	22	45	5	5	6	31	2	1	5	54	26	6	252
07:45 AM	2	15	7	2	11	42	1	0	7	27	3	2	1	55	12	1	188
Total	26	57	38	6	83	162	12	9	21	111	7	7	13	227	111	10	900
08:00 AM	3	25	8	6	15	41	4	0	3	27	2	0	5	58	13	5	215
08:15 AM	3	24	9	7	28	51	4	0	6	32	3	0	2	62	6	0	237
08:30 AM	6	23	10	2	10	41	1	1	5	40	0	0	3	66	13	0	221
08:45 AM	3	16	5	2	8	30	5	2	2	31	1	0	3	61	4	3	176
Total	15	88	32	17	61	163	14	3	16	130	6	0	13	247	36	8	849
Grand Total	41	145	70	23	144	325	26	12	37	241	13	7	26	474	147	18	1749
Apprch %	14.7	52	25.1	8.2	28.4	64.1	5.1	2.4	12.4	80.9	4.4	2.3	3.9	71.3	22.1	2.7	
Total %	2.3	8.3	4	1.3	8.2	18.6	1.5	0.7	2.1	13.8	0.7	0.4	1.5	27.1	8.4	1	
Cars & Peds	41	143	70	23	138	324	26	12	37	237	12	7	25	470	143	18	1726
% Cars & Peds	100	98.6	100	100	95.8	99.7	100	100	100	98.3	92.3	100	96.2	99.2	97.3	100	98.7
Trucks & Buses	0	2	0	0	1	0	0	0	0	4	1	0	1	1	4	0	14
% Trucks & Buses	0	1.4	0	0	0.7	0	0	0	0	1.7	7.7	0	3.8	0.2	2.7	0	0.8
Bikes by Direction	0	0	0	0	5	1	0	0	0	0	0	0	0	3	0	0	9
% Bikes by Direction	0	0	0	0	3.5	0.3	0	0	0	0	0	0	0	0.6	0	0	0.5

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	7	19	9	3	38	35	41	1	2	79	3	31	0	3	37	5	59	62	3	129	283
07:30 AM	16	15	13	0	44	22	45	5	5	77	6	31	2	1	40	5	54	26	6	91	252
07:45 AM	2	15	7	2	26	11	42	1	0	54	7	27	3	2	39	1	55	12	1	69	188
08:00 AM	3	25	8	6	42	15	41	4	0	60	3	27	2	0	32	5	58	13	5	81	215
Total Volume	28	74	37	11	150	83	169	11	7	270	19	116	7	6	148	16	226	113	15	370	938
% App. Total	18.7	49.3	24.7	7.3		30.7	62.6	4.1	2.6		12.8	78.4	4.7	4.1		4.3	61.1	30.5	4.1		
PHF	.438	.740	.712	.458	.852	.593	.939	.550	.350	.854	.679	.935	.583	.500	.925	.800	.958	.456	.625	.717	.829
Cars & Peds	28	73	37	11	149	77	168	11	7	263	19	114	6	6	145	15	225	110	15	365	922
% Cars & Peds	100	98.6	100	100	99.3	92.8	99.4	100	100	97.4	100	98.3	85.7	100	98.0	93.8	99.6	97.3	100	98.6	98.3
Trucks & Buses	0	1	0	0	1	1	0	0	0	1	0	2	1	0	3	1	0	3	0	4	9
% Trucks & Buses	0	1.4	0	0	0.7	1.2	0	0	0	0.4	0	1.7	14.3	0	2.0	6.3	0	2.7	0	1.1	1.0
Bikes by Direction	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	1	7
% Bikes by Direction	0	0	0	0	0	6.0	0.6	0	0	2.2	0	0	0	0	0	0	0.4	0	0	0.3	0.7

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N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770AA
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	8	30	11	0	11	76	2	0	1	32	4	0	4	47	18	0	244
02:15 PM	17	44	20	11	12	81	1	10	1	17	2	2	3	38	10	3	272
02:30 PM	3	36	9	4	12	73	2	0	0	27	0	3	4	39	6	4	222
02:45 PM	9	58	15	11	15	92	3	0	1	25	0	0	1	47	7	10	294
Total	37	168	55	26	50	322	8	10	3	101	6	5	12	171	41	17	1032
03:00 PM	4	43	15	6	9	63	4	0	3	21	2	0	1	41	7	5	224
03:15 PM	5	39	16	3	9	70	2	0	2	33	7	0	2	35	8	0	231
03:30 PM	7	43	17	0	10	77	3	1	1	26	2	0	0	49	8	0	244
03:45 PM	7	48	14	0	17	66	2	1	2	34	1	2	2	37	14	2	249
Total	23	173	62	9	45	276	11	2	8	114	12	2	5	162	37	7	948
04:00 PM	3	48	14	3	10	82	2	0	3	27	0	5	2	37	15	1	252
04:15 PM	6	41	6	1	9	71	2	2	2	32	1	6	4	52	7	1	243
04:30 PM	9	57	8	0	7	73	1	0	4	23	3	0	3	41	6	1	236
04:45 PM	5	60	16	1	14	68	2	1	5	27	1	0	0	40	11	3	254
Total	23	206	44	5	40	294	7	3	14	109	5	11	9	170	39	6	985
05:00 PM	4	50	10	0	12	60	3	0	2	40	2	2	5	52	9	2	253
05:15 PM	7	42	17	3	9	65	0	0	4	34	2	3	6	40	13	4	249
05:30 PM	5	45	15	1	12	62	5	1	3	43	2	6	5	51	9	0	265
05:45 PM	5	43	17	1	15	55	1	3	1	39	5	6	4	54	21	2	272
Total	21	180	59	5	48	242	9	4	10	156	11	17	20	197	52	8	1039
Grand Total	104	727	220	45	183	1134	35	19	35	480	34	35	46	700	169	38	4004
Apprch %	9.5	66.3	20.1	4.1	13.3	82.7	2.6	1.4	6	82.2	5.8	6	4.8	73.5	17.7	4	
Total %	2.6	18.2	5.5	1.1	4.6	28.3	0.9	0.5	0.9	12	0.8	0.9	1.1	17.5	4.2	0.9	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	50	10	0	64	12	60	3	0	75	2	40	2	2	46	5	52	9	2	68	253
05:15 PM	7	42	17	3	69	9	65	0	0	74	4	34	2	3	43	6	40	13	4	63	249
05:30 PM	5	45	15	1	66	12	62	5	1	80	3	43	2	6	54	5	51	9	0	65	265
05:45 PM	5	43	17	1	66	15	55	1	3	74	1	39	5	6	51	4	54	21	2	81	272
Total Volume	21	180	59	5	265	48	242	9	4	303	10	156	11	17	194	20	197	52	8	277	1039
% App. Total	7.9	67.9	22.3	1.9		15.8	79.9	3	1.3		5.2	80.4	5.7	8.8		7.2	71.1	18.8	2.9		
PHF	.750	.900	.868	.417	.960	.800	.931	.450	.333	.947	.625	.907	.550	.708	.898	.833	.912	.619	.500	.855	.955

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N/S: Whiting Avenue
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 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770AA
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
02:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3
Total	0	0	0	0	0	2	0	0	0	2	0	0	0	1	2	0	7
03:00 PM	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	3
03:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2
03:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	0	3	1	0	0	0	1	0	6
04:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3
Grand Total	0	0	1	0	1	6	0	0	0	5	1	0	0	1	3	0	18
Apprch %	0	0	100	0	14.3	85.7	0	0	0	83.3	16.7	0	0	25	75	0	
Total %	0	0	5.6	0	5.6	33.3	0	0	0	27.8	5.6	0	0	5.6	16.7	0	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	2	3
03:00 PM	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	2
Total Volume	0	0	1	0	1	0	0	0	0	0	0	5	0	0	5	0	1	3	0	4	10
% App. Total	0	0	100	0		0	0	0	0		0	100	0	0		0	25	75	0		
PHF	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.625	.000	.000	.625	.000	.250	.750	.000	.500	.833

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 02:30 PM

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N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770AA
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
Total	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	4
Grand Total	0	0	0	0	0	6	0	0	1	1	0	0	0	1	0	0	9
Apprch %	0	0	0	0	0	100	0	0	50	50	0	0	0	100	0	0	
Total %	0	0	0	0	0	66.7	0	0	11.1	11.1	0	0	0	11.1	0	0	

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
04:30 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	0	4
% App. Total	0	0	0	0	0	0	100	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.375	.000	.000	.375	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.500

Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

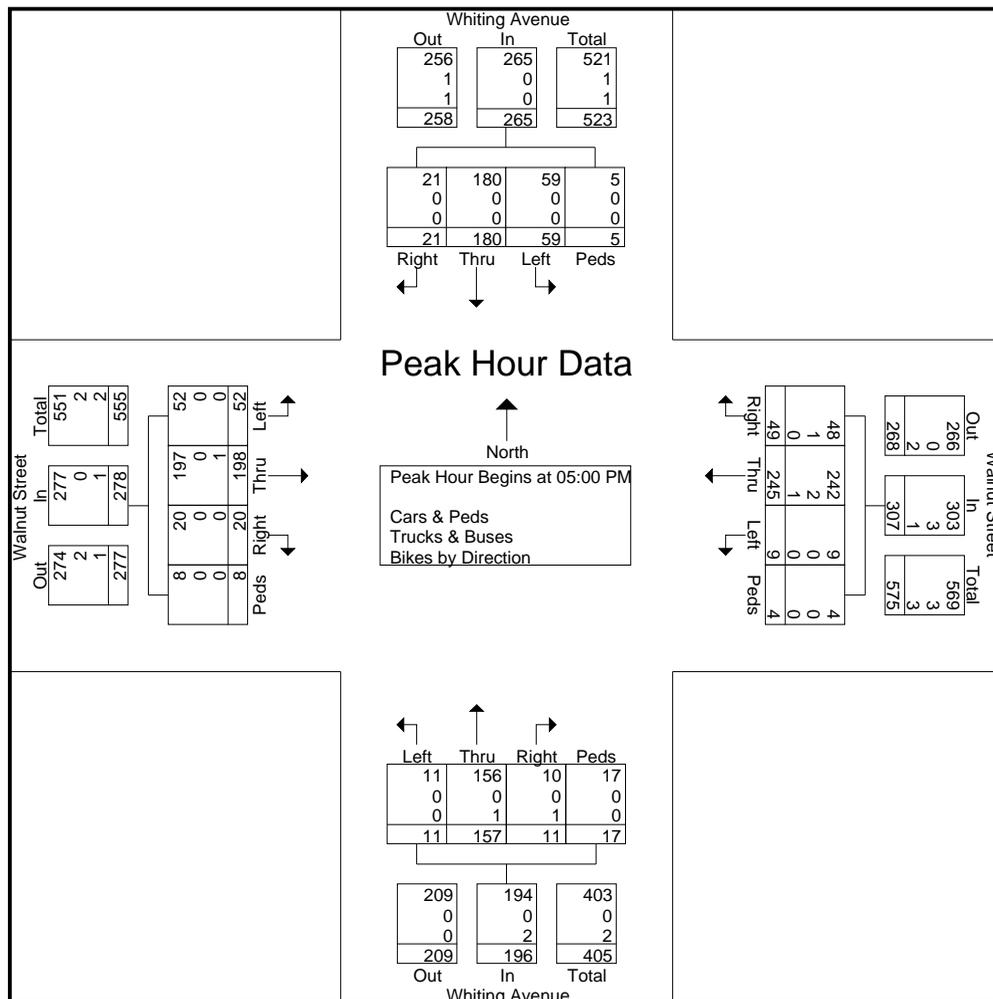
Peak Hour for Entire Intersection Begins at 04:30 PM

Transportation Data Corporation
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N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770AA
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	50	10	0	64	12	60	3	0	75	2	40	2	2	46	5	52	9	2	68	253
05:15 PM	7	42	17	3	69	10	66	0	0	76	4	35	2	3	44	6	40	13	4	63	252
05:30 PM	5	45	15	1	66	12	64	5	1	82	3	43	2	6	54	5	51	9	0	65	267
05:45 PM	5	43	17	1	66	15	55	1	3	74	2	39	5	6	52	4	55	21	2	82	274
Total Volume	21	180	59	5	265	49	245	9	4	307	11	157	11	17	196	20	198	52	8	278	1046
% App. Total	7.9	67.9	22.3	1.9		16	79.8	2.9	1.3		5.6	80.1	5.6	8.7		7.2	71.2	18.7	2.9		
PHF	.750	.900	.868	.417	.960	.817	.928	.450	.333	.936	.688	.913	.550	.708	.907	.833	.900	.619	.500	.848	.954
Cars & Peds	21	180	59	5	265	48	242	9	4	303	10	156	11	17	194	20	197	52	8	277	1039
% Cars & Peds	100	100	100	100	100	98.0	98.8	100	100	98.7	90.9	99.4	100	100	99.0	100	99.5	100	100	99.6	99.3
Trucks & Buses	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	3
% Trucks & Buses	0	0	0	0	0	2.0	0.8	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0.3
Bikes by Direction	0	0	0	0	0	0	1	0	0	1	1	1	0	0	2	0	1	0	0	1	4
% Bikes by Direction	0	0	0	0	0	0	0.4	0	0	0.3	9.1	0.6	0	0	1.0	0	0.5	0	0	0.4	0.4



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N/S: Whiting Avenue
 E/W: Walnut Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770AA
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Whiting Avenue From North				Walnut Street From East				Whiting Avenue From South				Walnut Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	8	30	11	0	11	77	2	0	1	32	4	0	4	47	18	0	245
02:15 PM	17	44	20	11	12	83	1	10	1	17	2	2	3	38	10	3	274
02:30 PM	3	36	9	4	12	73	2	0	0	28	0	3	4	39	7	4	224
02:45 PM	9	58	15	11	15	92	3	0	1	26	0	0	1	48	8	10	297
Total	37	168	55	26	50	325	8	10	3	103	6	5	12	172	43	17	1040
03:00 PM	4	43	16	6	9	63	4	0	3	23	2	0	1	41	7	5	227
03:15 PM	5	39	16	3	9	70	2	0	2	34	7	0	2	35	9	0	233
03:30 PM	7	43	17	0	10	77	3	1	1	26	3	0	0	49	8	0	245
03:45 PM	7	48	14	0	17	67	2	1	2	34	1	2	2	37	14	2	250
Total	23	173	63	9	45	277	11	2	8	117	13	2	5	162	38	7	955
04:00 PM	3	48	14	3	10	83	2	0	3	27	0	5	2	37	15	1	253
04:15 PM	6	41	6	1	9	72	2	2	2	32	1	6	4	52	7	1	244
04:30 PM	9	57	8	0	7	75	1	0	4	23	3	0	3	41	6	1	238
04:45 PM	5	60	16	1	14	69	2	1	5	27	1	0	0	40	11	3	255
Total	23	206	44	5	40	299	7	3	14	109	5	11	9	170	39	6	990
05:00 PM	4	50	10	0	12	60	3	0	2	40	2	2	5	52	9	2	253
05:15 PM	7	42	17	3	10	66	0	0	4	35	2	3	6	40	13	4	252
05:30 PM	5	45	15	1	12	64	5	1	3	43	2	6	5	51	9	0	267
05:45 PM	5	43	17	1	15	55	1	3	2	39	5	6	4	55	21	2	274
Total	21	180	59	5	49	245	9	4	11	157	11	17	20	198	52	8	1046
Grand Total	104	727	221	45	184	1146	35	19	36	486	35	35	46	702	172	38	4031
Apprch %	9.5	66.3	20.1	4.1	13.3	82.8	2.5	1.4	6.1	82.1	5.9	5.9	4.8	73.3	18	4	
Total %	2.6	18	5.5	1.1	4.6	28.4	0.9	0.5	0.9	12.1	0.9	0.9	1.1	17.4	4.3	0.9	
Cars & Peds	104	727	220	45	183	1134	35	19	35	480	34	35	46	700	169	38	4004
% Cars & Peds	100	100	99.5	100	99.5	99	100	100	97.2	98.8	97.1	100	100	99.7	98.3	100	99.3
Trucks & Buses	0	0	1	0	1	6	0	0	0	5	1	0	0	1	3	0	18
% Trucks & Buses	0	0	0.5	0	0.5	0.5	0	0	0	1	2.9	0	0	0.1	1.7	0	0.4
Bikes by Direction	0	0	0	0	0	6	0	0	1	1	0	0	0	1	0	0	9
% Bikes by Direction	0	0	0	0	0	0.5	0	0	2.8	0.2	0	0	0	0.1	0	0	0.2

Start Time	Whiting Avenue From North					Walnut Street From East					Whiting Avenue From South					Walnut Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	4	50	10	0	64	12	60	3	0	75	2	40	2	2	46	5	52	9	2	68	253
05:15 PM	7	42	17	3	69	10	66	0	0	76	4	35	2	3	44	6	40	13	4	63	252
05:30 PM	5	45	15	1	66	12	64	5	1	82	3	43	2	6	54	5	51	9	0	65	267
05:45 PM	5	43	17	1	66	15	55	1	3	74	2	39	5	6	52	4	55	21	2	82	274
Total Volume	21	180	59	5	265	49	245	9	4	307	11	157	11	17	196	20	198	52	8	278	1046
% App. Total	7.9	67.9	22.3	1.9		16	79.8	2.9	1.3		5.6	80.1	5.6	8.7		7.2	71.2	18.7	2.9		
PHF	.750	.900	.868	.417	.960	.817	.928	.450	.333	.936	.688	.913	.550	.708	.907	.833	.900	.619	.500	.848	.954
Cars & Peds	21	180	59	5	265	48	242	9	4	303	10	156	11	17	194	20	197	52	8	277	1039
% Cars & Peds	100	100	100	100	100	98.0	98.8	100	100	98.7	90.9	99.4	100	100	99.0	100	99.5	100	100	99.6	99.3
Trucks & Buses	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	3
% Trucks & Buses	0	0	0	0	0	2.0	0.8	0	0	1.0	0	0	0	0	0	0	0	0	0	0	0.3
Bikes by Direction	0	0	0	0	0	0	1	0	0	1	1	1	0	0	2	0	1	0	0	1	4
% Bikes by Direction	0	0	0	0	0	0	0.4	0	0	0.3	9.1	0.6	0	0	1.0	0	0.5	0	0	0.4	0.4

Transportation Data Corporation

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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Aspeed
Site Code: 23178.00

Northbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/11/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	2	4	5	2	1	0	0	0	0	0	14	42	46
06:00	2	3	13	66	80	23	2	1	0	0	0	0	0	190	34	38
07:00	11	7	64	153	92	11	2	0	0	0	0	0	0	340	32	34
08:00	34	44	106	81	27	4	3	0	0	0	0	0	0	299	29	33
09:00	5	3	33	117	80	25	3	0	0	0	0	0	0	266	34	37
10:00	8	7	29	86	69	19	4	0	0	0	0	0	0	222	34	38
11:00	7	6	24	92	45	9	1	0	0	0	0	0	0	184	33	35
12 PM	5	5	50	92	61	14	0	0	0	0	0	0	0	227	33	35
13:00	4	5	27	90	58	17	2	0	0	1	0	0	0	204	34	37
14:00	19	12	38	86	58	9	2	1	0	0	0	0	0	225	33	35
15:00	27	15	43	52	44	15	0	0	0	0	0	0	0	196	33	36
16:00	5	3	23	84	71	21	1	1	0	0	1	0	1	211	34	38
17:00	10	2	32	97	70	16	0	0	0	0	0	0	0	227	33	36
18:00	7	1	22	104	86	19	2	0	0	0	0	0	0	241	34	37
19:00	3	0	10	36	43	17	4	0	0	0	0	0	0	113	36	39
20:00	0	0	2	27	37	12	2	0	0	0	0	0	0	80	35	39
21:00	0	0	0	13	16	10	1	0	0	1	0	0	0	41	37	39
22:00	0	0	0	5	8	0	0	0	0	0	0	0	0	13	33	34
23:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	33	34
Total	147	113	516	1284	950	246	31	4	0	2	1	0	1	3295		
Percent	4.5%	3.4%	15.7%	39.0%	28.8%	7.5%	0.9%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	07:00	07:00	09:00	10:00	05:00						07:00		
Vol.	34	44	106	153	92	25	4	1						340		
PM Peak	15:00	15:00	12:00	18:00	18:00	16:00	19:00	14:00		13:00	16:00		16:00	18:00		
Vol.	27	15	50	104	86	21	4	1		1	1		1	241		

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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Aspeed
Site Code: 23178.00

Northbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/12/23	0	0	0	1	1	0	0	0	0	0	0	0	0	2	33	34
01:00	1	0	0	0	0	0	0	0	0	0	0	0	0	1	12	14
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1	39	39
05:00	0	0	2	7	17	8	3	2	0	0	0	0	0	39	39	45
06:00	1	0	0	21	45	23	2	1	0	0	0	0	0	93	37	39
07:00	6	1	43	117	86	17	1	0	0	0	0	0	0	271	33	36
08:00	28	20	61	72	33	10	1	0	0	0	0	0	0	225	31	34
09:00	3	0	4	44	57	25	4	0	0	0	0	0	0	137	36	39
10:00	1	2	11	32	49	22	3	0	0	0	0	0	0	120	36	39
11:00	1	1	6	38	45	23	6	1	0	0	0	0	0	121	37	40
12 PM	4	2	9	41	55	23	2	0	0	0	0	0	0	136	35	38
13:00	3	0	13	54	49	18	3	0	0	0	0	0	0	140	35	38
14:00	7	6	30	78	42	15	3	1	0	0	0	0	0	182	34	38
15:00	12	16	29	61	41	12	1	0	0	0	0	0	0	172	33	36
16:00	4	0	17	50	78	20	2	0	0	0	0	0	0	171	34	38
17:00	7	0	16	73	100	23	1	1	0	0	0	0	0	221	34	38
18:00	9	1	7	85	80	15	4	0	0	0	0	0	0	201	34	37
19:00	1	0	5	32	40	12	4	0	0	0	0	0	0	94	35	39
20:00	0	0	2	24	43	12	4	0	0	0	0	0	0	85	36	39
21:00	0	0	0	6	13	8	0	0	0	0	0	0	0	27	37	39
22:00	0	0	0	1	4	2	0	0	0	0	0	0	0	7	37	39
23:00	0	0	0	0	1	0	0	1	0	0	0	0	0	2	48	49
Total	88	49	255	837	879	289	44	7	0	0	0	0	0	2448		
Percent	3.6%	2.0%	10.4%	34.2%	35.9%	11.8%	1.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	07:00	07:00	09:00	11:00	05:00						07:00		
Vol.	28	20	61	117	86	25	6	2						271		
PM Peak	15:00	15:00	14:00	18:00	17:00	12:00	18:00	14:00						17:00		
Vol.	12	16	30	85	100	23	4	1						221		
Grand Total	235	162	771	2121	1829	535	75	11	0	2	1	0	1	5743		
Percent	4.1%	2.8%	13.4%	36.9%	31.8%	9.3%	1.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 23 MPH
50th Percentile : 29 MPH
85th Percentile : 34 MPH
95th Percentile : 38 MPH

Stats 10 MPH Pace Speed : 26-35 MPH

Number of Vehicles > 30 MPH : 2454
Percent of Vehicles > 30 MPH : 42.7%
Mean Speed(Average) : 29 MPH

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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Aspeed
Site Code: 23178.00

Southbound

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/11/23	0	0	2	1	1	0	0	0	0	0	0	0	0	4	32	33
01:00	1	0	0	2	0	0	0	0	0	0	0	0	0	3	28	29
02:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	33	34
03:00	4	0	0	1	1	1	0	0	0	0	0	0	0	7	34	38
04:00	2	0	0	5	3	0	0	0	0	0	0	0	0	10	32	34
05:00	6	1	3	11	9	2	0	0	0	0	0	0	0	32	33	35
06:00	3	2	11	30	43	18	2	0	0	0	0	0	0	109	36	39
07:00	10	8	45	87	59	9	1	0	0	0	0	0	0	219	33	34
08:00	31	51	73	63	27	5	2	0	0	0	0	0	0	252	29	33
09:00	5	2	17	83	56	12	2	1	0	0	0	0	0	178	33	37
10:00	4	5	15	73	64	19	2	0	0	0	0	0	0	182	34	38
11:00	9	6	36	86	60	15	0	0	1	0	0	0	0	213	33	36
12 PM	12	14	47	102	51	13	0	0	0	0	0	0	0	239	32	35
13:00	3	10	33	110	76	17	1	0	0	0	0	0	0	250	33	36
14:00	11	22	93	115	67	11	1	0	0	0	0	0	0	320	32	34
15:00	34	48	133	166	85	19	0	0	0	0	0	0	0	485	31	34
16:00	31	15	86	195	101	7	2	0	0	0	0	0	0	437	32	34
17:00	22	9	79	170	70	11	1	0	0	0	0	0	0	362	31	34
18:00	18	5	54	189	64	6	1	0	0	0	0	0	0	337	31	34
19:00	10	5	36	107	51	5	1	0	0	0	0	0	0	215	32	34
20:00	7	2	16	56	29	5	0	0	0	0	0	0	0	115	32	34
21:00	0	1	9	40	19	4	1	0	0	0	0	0	0	74	33	36
22:00	1	0	5	29	12	3	0	0	0	0	0	0	0	50	33	35
23:00	2	0	2	8	6	0	0	0	0	0	0	0	0	18	32	34
Total	226	206	795	1730	955	182	17	1	1	0	0	0	0	4113		
Percent	5.5%	5.0%	19.3%	42.1%	23.2%	4.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	07:00	10:00	10:00	06:00	09:00	11:00					08:00		
Vol.	31	51	73	87	64	19	2	1	1					252		
PM Peak	15:00	15:00	15:00	16:00	16:00	15:00	16:00							15:00		
Vol.	34	48	133	195	101	19	2							485		

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Aspeed
Site Code: 23178.00

Southbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/12/23	0	0	2	4	2	1	0	0	0	0	0	0	0	9	34	37
01:00	0	1	0	2	1	0	0	0	0	0	0	0	0	4	32	34
02:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2	28	29
03:00	1	0	1	1	1	0	0	0	0	0	0	0	0	4	32	34
04:00	1	0	0	2	4	2	0	0	0	0	0	0	0	9	36	38
05:00	2	1	6	9	10	4	0	0	0	0	0	0	0	32	34	37
06:00	19	1	6	33	35	5	1	0	0	0	0	0	0	100	33	35
07:00	27	13	66	80	42	7	3	0	0	0	0	0	0	238	31	34
08:00	52	61	60	54	17	4	0	0	0	0	0	0	0	248	28	32
09:00	17	3	29	60	53	5	0	0	0	0	0	0	0	167	33	34
10:00	18	8	17	83	43	8	0	0	0	0	0	0	0	177	32	34
11:00	19	7	23	96	40	9	0	0	0	0	0	0	0	194	32	34
12 PM	22	7	40	89	63	4	0	0	0	0	0	0	0	225	32	34
13:00	24	1	24	123	48	10	0	0	0	0	0	0	0	230	32	34
14:00	32	37	106	154	91	9	0	0	0	0	0	0	0	429	31	34
15:00	76	69	120	132	50	4	1	0	0	0	0	0	0	452	29	33
16:00	26	9	76	176	91	15	1	0	0	0	0	0	0	394	32	34
17:00	28	11	64	149	89	7	0	0	0	0	0	0	0	348	32	34
18:00	16	5	52	139	70	9	1	0	0	0	0	0	0	292	32	34
19:00	6	2	29	93	48	9	0	0	0	0	0	0	0	187	33	34
20:00	5	2	35	85	40	11	0	0	0	0	0	0	0	178	33	35
21:00	5	0	9	36	9	1	0	0	0	0	0	0	0	60	30	33
22:00	1	2	6	24	9	0	0	0	0	0	0	0	0	42	31	33
23:00	0	0	3	7	3	0	0	0	0	0	0	0	0	13	31	33
Total	397	240	775	1632	859	124	7	0	0	0	0	0	0	4034		
Percent	9.8%	5.9%	19.2%	40.5%	21.3%	3.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	07:00	11:00	09:00	11:00	07:00							08:00		
Vol.	52	61	66	96	53	9	3							248		
PM Peak	15:00	15:00	15:00	16:00	14:00	16:00	15:00							15:00		
Vol.	76	69	120	176	91	15	1							452		
Grand Total	623	446	1570	3362	1814	306	24	1	1	0	0	0	0	8147		
Percent	7.6%	5.5%	19.3%	41.3%	22.3%	3.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 20 MPH
50th Percentile : 27 MPH
85th Percentile : 32 MPH
95th Percentile : 34 MPH

Stats 10 MPH Pace Speed : 26-35 MPH

Number of Vehicles > 30 MPH : 2146
Percent of Vehicles > 30 MPH : 26.3%
Mean Speed(Average) : 26 MPH

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Avolume
Site Code: 23178.00

Start Time	11-Oct-23 Wed	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	65			1	55				
12:15		0	59			0	59				
12:30		0	49			1	52				
12:45		0	54	0	227	2	73	4	239	4	466
01:00		0	57			2	73				
01:15		0	47			0	58				
01:30		0	64			0	56				
01:45		0	36	0	204	1	63	3	250	3	454
02:00		0	61			0	68				
02:15		0	46			1	64				
02:30		0	59			0	86				
02:45		0	59	0	225	1	102	2	320	2	545
03:00		0	59			0	115				
03:15		0	39			1	131				
03:30		0	44			2	128				
03:45		0	54	0	196	4	111	7	485	7	681
04:00		0	44			2	137				
04:15		0	47			2	92				
04:30		0	40			1	111				
04:45		0	80	0	211	5	97	10	437	10	648
05:00		0	53			5	103				
05:15		1	50			2	73				
05:30		4	64			10	99				
05:45		9	60	14	227	15	87	32	362	46	589
06:00		28	72			17	131				
06:15		37	69			28	84				
06:30		59	45			30	67				
06:45		66	55	190	241	34	55	109	337	299	578
07:00		79	41			44	80				
07:15		110	19			54	49				
07:30		72	32			61	48				
07:45		79	21	340	113	60	38	219	215	559	328
08:00		76	18			68	42				
08:15		63	33			61	24				
08:30		80	15			76	26				
08:45		80	14	299	80	47	23	252	115	551	195
09:00		71	22			41	27				
09:15		59	6			44	17				
09:30		77	11			42	18				
09:45		59	2	266	41	51	12	178	74	444	115
10:00		49	6			36	18				
10:15		59	5			35	11				
10:30		60	1			58	12				
10:45		54	1	222	13	53	9	182	50	404	63
11:00		42	0			46	7				
11:15		48	1			52	5				
11:30		55	1			51	4				
11:45		39	0	184	2	64	2	213	18	397	20
Total		1515	1780			1211	2902			2726	4682
Combined Total		3295				4113				7408	
Percentage	0.0%										

Transportation Data Corporation

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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Avolume
Site Code: 23178.00

Start Time	12-Oct-23 Thu	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	38			5	51				
12:15		0	35			2	67				
12:30		1	24			1	52				
12:45		0	39	2	136	1	55	9	225	11	361
01:00		0	34			1	61				
01:15		0	30			0	57				
01:30		1	37			0	47				
01:45		0	39	1	140	3	65	4	230	5	370
02:00		0	49			0	92				
02:15		0	35			0	102				
02:30		0	46			1	116				
02:45		0	52	0	182	1	119	2	429	2	611
03:00		0	41			0	127				
03:15		0	44			1	104				
03:30		0	45			1	131				
03:45		0	42	0	172	2	90	4	452	4	624
04:00		0	35			3	126				
04:15		0	54			3	105				
04:30		1	46			3	85				
04:45		0	36	1	171	0	78	9	394	10	565
05:00		0	60			0	93				
05:15		9	45			6	103				
05:30		7	62			12	86				
05:45		23	54	39	221	14	66	32	348	71	569
06:00		13	59			23	96				
06:15		19	57			19	75				
06:30		21	46			27	66				
06:45		40	39	93	201	31	55	100	292	193	493
07:00		59	33			51	54				
07:15		99	29			53	44				
07:30		57	22			64	47				
07:45		56	10	271	94	70	42	238	187	509	281
08:00		61	22			65	45				
08:15		53	24			59	46				
08:30		63	28			80	48				
08:45		48	11	225	85	44	39	248	178	473	263
09:00		42	11			42	29				
09:15		38	5			40	9				
09:30		29	10			41	17				
09:45		28	1	137	27	44	5	167	60	304	87
10:00		35	3			35	15				
10:15		28	1			35	9				
10:30		24	2			48	11				
10:45		33	1	120	7	59	7	177	42	297	49
11:00		25	0			49	2				
11:15		32	2			51	6				
11:30		32	0			50	1				
11:45		32	0	121	2	44	4	194	13	315	15
Total		1010	1438			1184	2850			2194	4288
Combined Total			2448			4034				6482	
Percentage	0.0%										
Total Percent		2525	3218			2395	5752			4920	8970
		44.0%	56.0%			29.4%	70.6%			35.4%	64.6%
ADT		ADT 6,945		AAADT 6,945							

Transportation Data Corporation

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Cedar Street
north of Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Avolume
Site Code: 23178.00

Start Time	11-Oct-23 Wed		NB		SB		Combined		12-Oct Thu		NB		SB		Combined	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	0	65	1	55	1	120	1	38	5	51	6	89				
12:15	0	59	0	59	0	118	0	35	2	67	2	102				
12:30	0	49	1	52	1	101	1	24	1	52	2	76				
12:45	0	54	2	73	2	127	0	39	1	55	1	94				
01:00	0	57	2	73	2	130	0	34	1	61	1	95				
01:15	0	47	0	58	0	105	0	30	0	57	0	87				
01:30	0	64	0	56	0	120	1	37	0	47	1	84				
01:45	0	36	1	63	1	99	0	39	3	65	3	104				
02:00	0	61	0	68	0	129	0	49	0	92	0	141				
02:15	0	46	1	64	1	110	0	35	0	102	0	137				
02:30	0	59	0	86	0	145	0	46	1	116	1	162				
02:45	0	59	1	102	1	161	0	52	1	119	1	171				
03:00	0	59	0	115	0	174	0	41	0	127	0	168				
03:15	0	39	1	131	1	170	0	44	1	104	1	148				
03:30	0	44	2	128	2	172	0	45	1	131	1	176				
03:45	0	54	4	111	4	165	0	42	2	90	2	132				
04:00	0	44	2	137	2	181	0	35	3	126	3	161				
04:15	0	47	2	92	2	139	0	54	3	105	3	159				
04:30	0	40	1	111	1	151	1	46	3	85	4	131				
04:45	0	80	5	97	5	177	0	36	0	78	0	114				
05:00	0	53	5	103	5	156	0	60	0	93	0	153				
05:15	1	50	2	73	3	123	9	45	6	103	15	148				
05:30	4	64	10	99	14	163	7	62	12	86	19	148				
05:45	9	60	15	87	24	147	23	54	14	66	37	120				
06:00	28	72	17	131	45	203	13	59	23	96	36	155				
06:15	37	69	28	84	65	153	19	57	19	75	38	132				
06:30	59	45	30	67	89	112	21	46	27	66	48	112				
06:45	66	55	34	55	100	110	40	39	31	55	71	94				
07:00	79	41	44	80	123	121	59	33	51	54	110	87				
07:15	110	19	54	49	164	68	99	29	53	44	152	73				
07:30	72	32	61	48	133	80	57	22	64	47	121	69				
07:45	79	21	60	38	139	59	56	10	70	42	126	52				
08:00	76	18	68	42	144	60	61	22	65	45	126	67				
08:15	63	33	61	24	124	57	53	24	59	46	112	70				
08:30	80	15	76	26	156	41	63	28	80	48	143	76				
08:45	80	14	47	23	127	37	48	11	44	39	92	50				
09:00	71	22	41	27	112	49	42	11	42	29	84	40				
09:15	59	6	44	17	103	23	38	5	40	9	78	14				
09:30	77	11	42	18	119	29	29	10	41	17	70	27				
09:45	59	2	51	12	110	14	28	1	44	5	72	6				
10:00	49	6	36	18	85	24	35	3	35	15	70	18				
10:15	59	5	35	11	94	16	28	1	35	9	63	10				
10:30	60	1	58	12	118	13	24	2	48	11	72	13				
10:45	54	1	53	9	107	10	33	1	59	7	92	8				
11:00	42	0	46	7	88	7	25	0	49	2	74	2				
11:15	48	1	52	5	100	6	32	2	51	6	83	8				
11:30	55	1	51	4	106	5	32	0	50	1	82	1				
11:45	39	0	64	2	103	2	32	0	44	4	76	4				
Total	1515	1780	1211	2902	2726	4682	1010	1438	1184	2850	2194	4288				
Day Total	3295		4113		7408		2448		4034		6482					
% Total	20.5%	24.0%	16.3%	39.2%			15.6%	22.2%	18.3%	44.0%						
Peak	-	07:00	05:30	07:45	03:15	07:15	03:15	-	07:15	05:30	07:45	02:45	07:15	02:45		
Vol.	-	340	265	265	507	580	688	-	273	232	274	481	525	663		
P.H.F.		0.773	0.920	0.872	0.925	0.884	0.950		0.689	0.935	0.856	0.918	0.863	0.942		
ADT	ADT 6,945		AADT 6,945													

Transportation Data Corporation

Mario Perone, mperone1@verizon.net

tel (781) 587-0086 cell (781) 439-4999

N/S: Whiting Avenue
 E/W: River Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770B
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	1	0	10	1	18	37	1	1	3	0	0	3	1	43	5	1	125
07:15 AM	1	0	14	0	21	28	0	1	1	1	0	1	0	63	8	1	140
07:30 AM	2	0	16	1	23	45	0	0	1	2	0	0	1	51	7	0	149
07:45 AM	3	0	15	0	32	50	0	0	2	0	0	1	0	58	6	0	167
Total	7	0	55	2	94	160	1	2	7	3	0	5	2	215	26	2	581
08:00 AM	2	0	34	0	24	47	2	0	0	2	0	0	0	65	5	0	181
08:15 AM	3	0	25	0	32	38	0	0	0	0	0	0	0	55	2	0	155
08:30 AM	2	0	21	0	23	45	0	0	1	0	0	0	0	59	3	0	154
08:45 AM	1	1	37	0	23	39	1	0	1	1	1	3	2	55	3	1	169
Total	8	1	117	0	102	169	3	0	2	3	1	3	2	234	13	1	659
Grand Total	15	1	172	2	196	329	4	2	9	6	1	8	4	449	39	3	1240
Apprch %	7.9	0.5	90.5	1.1	36.9	62	0.8	0.4	37.5	25	4.2	33.3	0.8	90.7	7.9	0.6	
Total %	1.2	0.1	13.9	0.2	15.8	26.5	0.3	0.2	0.7	0.5	0.1	0.6	0.3	36.2	3.1	0.2	

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	2	0	34	0	36	24	47	2	0	73	0	2	0	0	2	0	65	5	0	70	181
08:15 AM	3	0	25	0	28	32	38	0	0	70	0	0	0	0	0	0	55	2	0	57	155
08:30 AM	2	0	21	0	23	23	45	0	0	68	1	0	0	0	1	0	59	3	0	62	154
08:45 AM	1	1	37	0	39	23	39	1	0	63	1	1	1	3	6	2	55	3	1	61	169
Total Volume	8	1	117	0	126	102	169	3	0	274	2	3	1	3	9	2	234	13	1	250	659
% App. Total	6.3	0.8	92.9	0		37.2	61.7	1.1	0		22.2	33.3	11.1	33.3		0.8	93.6	5.2	0.4		
PHF	.667	.250	.791	.000	.808	.797	.899	.375	.000	.938	.500	.375	.250	.250	.375	.250	.900	.650	.250	.893	.910

Transportation Data Corporation
 Mario Perone, mperone1@verizon.net
 tel (781) 587-0086 cell (781) 439-4999

N/S: Whiting Avenue
 E/W: River Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770B
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
07:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	5
08:00 AM	0	0	1	0	2	1	0	0	0	0	0	0	0	1	0	0	5
08:15 AM	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0	0	4
08:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	2	0	4	3	0	0	0	0	0	0	0	2	0	0	11
Grand Total	0	0	2	0	8	3	0	0	0	0	0	0	0	3	0	0	16
Apprch %	0	0	100	0	72.7	27.3	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	12.5	0	50	18.8	0	0	0	0	0	0	0	18.8	0	0	

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
07:45 AM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	1	0	1	2	1	0	0	3	0	0	0	0	0	0	1	0	0	1	5
08:15 AM	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	4
Total Volume	0	0	2	0	2	5	3	0	0	8	0	0	0	0	0	0	3	0	0	3	13
% App. Total	0	0	100	0		62.5	37.5	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.500	.000	.500	.625	.375	.000	.000	.667	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750	.650

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
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N/S: Whiting Avenue
E/W: River Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770B
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.250

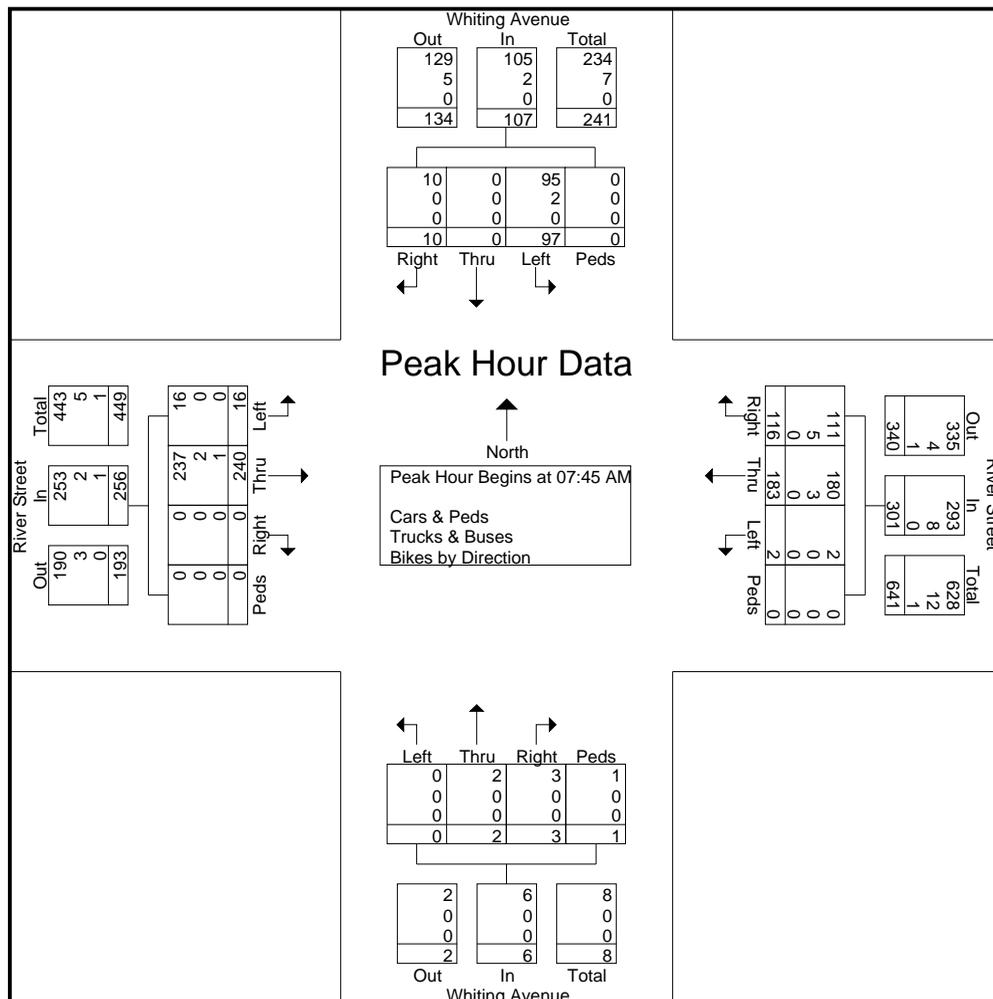
Transportation Data Corporation

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N/S: Whiting Avenue
E/W: River Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770B
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	3	0	15	0	18	34	50	0	0	84	2	0	0	1	3	0	59	6	0	65	170
08:00 AM	2	0	35	0	37	26	48	2	0	76	0	2	0	0	2	0	66	5	0	71	186
08:15 AM	3	0	26	0	29	32	40	0	0	72	0	0	0	0	0	0	56	2	0	58	159
08:30 AM	2	0	21	0	23	24	45	0	0	69	1	0	0	0	1	0	59	3	0	62	155
Total Volume	10	0	97	0	107	116	183	2	0	301	3	2	0	1	6	0	240	16	0	256	670
% App. Total	9.3	0	90.7	0		38.5	60.8	0.7	0		50	33.3	0	16.7		0	93.8	6.2	0		
PHF	.833	.000	.693	.000	.723	.853	.915	.250	.000	.896	.375	.250	.000	.250	.500	.000	.909	.667	.000	.901	.901
Cars & Peds	10	0	95	0	105	111	180	2	0	293	3	2	0	1	6	0	237	16	0	253	657
% Cars & Peds	100	0	97.9	0	98.1	95.7	98.4	100	0	97.3	100	100	0	100	100	0	98.8	100	0	98.8	98.1
Trucks & Buses	0	0	2	0	2	5	3	0	0	8	0	0	0	0	0	0	2	0	0	2	12
% Trucks & Buses	0	0	2.1	0	1.9	4.3	1.6	0	0	2.7	0	0	0	0	0	0	0.8	0	0	0.8	1.8
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0.4	0.1



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N/S: Whiting Avenue
 E/W: River Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770B
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	1	0	10	1	18	37	1	1	3	0	0	3	1	43	5	1	125
07:15 AM	1	0	14	0	22	28	0	1	1	1	0	1	0	63	8	1	141
07:30 AM	2	0	16	1	24	45	0	0	1	2	0	0	1	52	7	0	151
07:45 AM	3	0	15	0	34	50	0	0	2	0	0	1	0	59	6	0	170
Total	7	0	55	2	98	160	1	2	7	3	0	5	2	217	26	2	587
08:00 AM	2	0	35	0	26	48	2	0	0	2	0	0	0	66	5	0	186
08:15 AM	3	0	26	0	32	40	0	0	0	0	0	0	0	56	2	0	159
08:30 AM	2	0	21	0	24	45	0	0	1	0	0	0	0	59	3	0	155
08:45 AM	1	1	37	0	24	39	1	0	1	1	1	3	2	55	3	1	170
Total	8	1	119	0	106	172	3	0	2	3	1	3	2	236	13	1	670
Grand Total	15	1	174	2	204	332	4	2	9	6	1	8	4	453	39	3	1257
Apprch %	7.8	0.5	90.6	1	37.6	61.3	0.7	0.4	37.5	25	4.2	33.3	0.8	90.8	7.8	0.6	
Total %	1.2	0.1	13.8	0.2	16.2	26.4	0.3	0.2	0.7	0.5	0.1	0.6	0.3	36	3.1	0.2	
Cars & Peds	15	1	172	2	196	329	4	2	9	6	1	8	4	449	39	3	1240
% Cars & Peds	100	100	98.9	100	96.1	99.1	100	100	100	100	100	100	100	99.1	100	100	98.6
Trucks & Buses	0	0	2	0	8	3	0	0	0	0	0	0	0	3	0	0	16
% Trucks & Buses	0	0	1.1	0	3.9	0.9	0	0	0	0	0	0	0	0.7	0	0	1.3
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	3	0	15	0	18	34	50	0	0	84	2	0	0	1	3	0	59	6	0	65	170
08:00 AM	2	0	35	0	37	26	48	2	0	76	0	2	0	0	2	0	66	5	0	71	186
08:15 AM	3	0	26	0	29	32	40	0	0	72	0	0	0	0	0	0	56	2	0	58	159
08:30 AM	2	0	21	0	23	24	45	0	0	69	1	0	0	0	1	0	59	3	0	62	155
Total Volume	10	0	97	0	107	116	183	2	0	301	3	2	0	1	6	0	240	16	0	256	670
% App. Total	9.3	0	90.7	0		38.5	60.8	0.7	0		50	33.3	0	16.7		0	93.8	6.2	0		
PHF	.833	.000	.693	.000	.723	.853	.915	.250	.000	.896	.375	.250	.000	.250	.500	.000	.909	.667	.000	.901	.901
Cars & Peds	10	0	95	0	105	111	180	2	0	293	3	2	0	1	6	0	237	16	0	253	657
% Cars & Peds	100	0	97.9	0	98.1	95.7	98.4	100	0	97.3	100	100	0	100	100	0	98.8	100	0	98.8	98.1
Trucks & Buses	0	0	2	0	2	5	3	0	0	8	0	0	0	0	0	0	2	0	0	2	12
% Trucks & Buses	0	0	2.1	0	1.9	4.3	1.6	0	0	2.7	0	0	0	0	0	0	0.8	0	0	0.8	1.8
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0.4	0.1

Transportation Data Corporation

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N/S: Whiting Avenue
 E/W: River Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770BB
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	5	0	46	0	19	37	1	0	0	2	0	1	0	45	4	0	160
02:15 PM	5	1	50	0	24	41	0	1	1	0	0	0	0	41	5	5	174
02:30 PM	2	1	32	0	21	41	1	0	0	0	0	1	0	40	6	0	145
02:45 PM	5	0	43	0	27	70	0	0	1	0	0	1	0	38	3	0	188
Total	17	2	171	0	91	189	2	1	2	2	0	3	0	164	18	5	667
03:00 PM	4	0	34	0	27	79	1	0	4	1	0	3	1	47	1	4	206
03:15 PM	3	1	42	0	25	70	0	0	0	0	0	0	0	41	2	0	184
03:30 PM	7	0	48	0	20	61	0	0	0	0	0	1	3	45	1	1	187
03:45 PM	5	0	48	0	32	68	0	1	1	0	0	0	0	40	1	0	196
Total	19	1	172	0	104	278	1	1	5	1	0	4	4	173	5	5	773
04:00 PM	2	0	39	0	38	70	1	2	0	0	0	3	0	32	3	0	190
04:15 PM	2	0	46	0	31	59	2	0	1	1	0	2	0	46	4	1	195
04:30 PM	2	3	48	0	23	63	0	1	0	0	0	3	0	39	3	0	185
04:45 PM	4	0	49	0	24	72	1	1	1	1	1	0	1	59	3	0	217
Total	10	3	182	0	116	264	4	4	2	2	1	8	1	176	13	1	787
05:00 PM	6	0	44	0	35	93	2	0	0	2	0	0	0	55	7	1	245
05:15 PM	4	0	45	0	32	62	0	0	0	0	0	0	0	32	6	0	181
05:30 PM	3	2	50	0	28	77	1	0	2	0	2	0	1	40	9	0	215
05:45 PM	7	1	47	0	39	67	1	0	0	0	0	2	0	52	3	2	221
Total	20	3	186	0	134	299	4	0	2	2	2	2	1	179	25	3	862
Grand Total	66	9	711	0	445	1030	11	6	11	7	3	17	6	692	61	14	3089
Apprch %	8.4	1.1	90.5	0	29.8	69	0.7	0.4	28.9	18.4	7.9	44.7	0.8	89.5	7.9	1.8	
Total %	2.1	0.3	23	0	14.4	33.3	0.4	0.2	0.4	0.2	0.1	0.6	0.2	22.4	2	0.5	

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	6	0	44	0	50	35	93	2	0	130	0	2	0	0	2	0	55	7	1	63	245
05:15 PM	4	0	45	0	49	32	62	0	0	94	0	0	0	0	0	0	32	6	0	38	181
05:30 PM	3	2	50	0	55	28	77	1	0	106	2	0	2	0	4	1	40	9	0	50	215
05:45 PM	7	1	47	0	55	39	67	1	0	107	0	0	0	2	2	0	52	3	2	57	221
Total Volume	20	3	186	0	209	134	299	4	0	437	2	2	2	2	8	1	179	25	3	208	862
% App. Total	9.6	1.4	89	0		30.7	68.4	0.9	0		25	25	25	25		0.5	86.1	12	1.4		
PHF	.714	.375	.930	.000	.950	.859	.804	.500	.000	.840	.250	.250	.250	.250	.500	.250	.814	.694	.375	.825	.880

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N/S: Whiting Avenue
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 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770BB
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0	4
02:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	2	1	0	0	0	0	0	0	0	1	0	0	5
03:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
03:15 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0	4
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	0	2	0	4	3	0	0	0	0	0	0	0	2	0	0	11
Apprch %	0	0	100	0	57.1	42.9	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	18.2	0	36.4	27.3	0	0	0	0	0	0	0	18.2	0	0	

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	0	1	0	0	1	4
02:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
03:15 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	1	0	1	4	2	0	0	6	0	0	0	0	0	0	2	0	0	2	9
% App. Total	0	0	100	0		66.7	33.3	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.250	.000	.250	.500	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.563

Transportation Data Corporation

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N/S: Whiting Avenue
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City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770BB
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
04:00 PM	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	2	0	2	1	0	0	0	0	0	0	0	2	0	0	7
Apprch %	0	0	100	0	66.7	33.3	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	28.6	0	28.6	14.3	0	0	0	0	0	0	0	28.6	0	0	

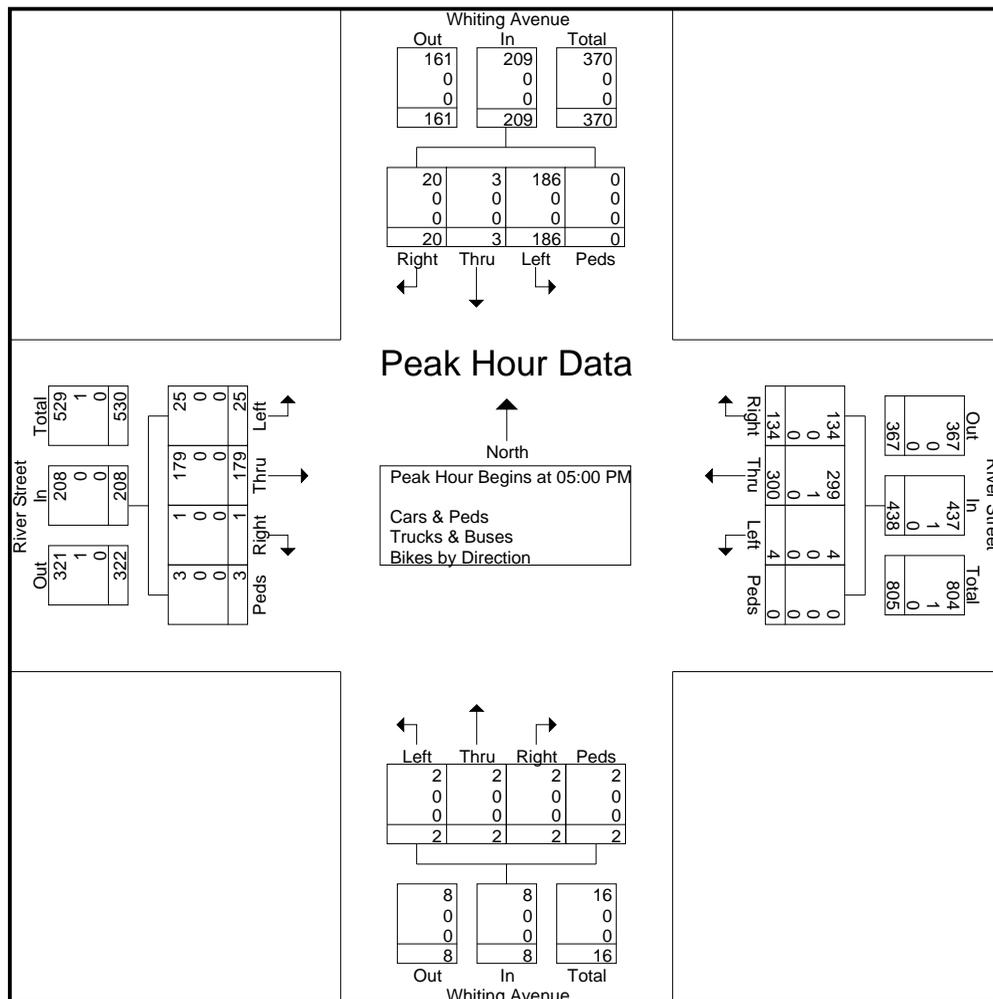
Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:15 PM																					
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:00 PM	0	0	1	0	1	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	4
Total Volume	0	0	2	0	2	2	1	0	0	3	0	0	0	0	0	0	1	0	0	1	6
% App. Total	0	0	100	0		66.7	33.3	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.500	.000	.500	.250	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.375

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N/S: Whiting Avenue
 E/W: River Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770BB
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	6	0	44	0	50	35	93	2	0	130	0	2	0	0	2	0	55	7	1	63	245
05:15 PM	4	0	45	0	49	32	62	0	0	94	0	0	0	0	0	0	32	6	0	38	181
05:30 PM	3	2	50	0	55	28	77	1	0	106	2	0	2	0	4	1	40	9	0	50	215
05:45 PM	7	1	47	0	55	39	68	1	0	108	0	0	0	2	2	0	52	3	2	57	222
Total Volume	20	3	186	0	209	134	300	4	0	438	2	2	2	2	8	1	179	25	3	208	863
% App. Total	9.6	1.4	89	0		30.6	68.5	0.9	0		25	25	25	25		0.5	86.1	12	1.4		
PHF	.714	.375	.930	.000	.950	.859	.806	.500	.000	.842	.250	.250	.250	.250	.500	.250	.814	.694	.375	.825	.881
Cars & Peds	20	3	186	0	209	134	299	4	0	437	2	2	2	2	8	1	179	25	3	208	862
% Cars & Peds	100	100	100	0	100	100	99.7	100	0	99.8	100	100	100	100	100	100	100	100	100	100	99.9
Trucks & Buses	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Trucks & Buses	0	0	0	0	0	0	0.3	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Whiting Avenue
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 Client: Pare/Derek Hug

File Name : 05770BB
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Whiting Avenue From North				River Street From East				Whiting Avenue From South				River Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	5	0	46	0	19	37	1	0	0	2	0	1	0	45	4	0	160
02:15 PM	5	1	50	0	24	41	0	1	1	0	0	0	0	41	5	5	174
02:30 PM	2	1	32	0	23	42	1	0	0	0	0	1	0	41	6	0	149
02:45 PM	5	0	44	0	27	70	0	0	1	0	0	1	0	39	3	0	190
Total	17	2	172	0	93	190	2	1	2	2	0	3	0	166	18	5	673
03:00 PM	4	0	34	0	28	79	1	0	4	1	0	3	1	48	1	4	208
03:15 PM	3	1	42	0	26	71	0	0	0	0	0	0	0	42	2	0	187
03:30 PM	7	0	48	0	20	61	0	0	0	0	0	1	3	45	1	1	187
03:45 PM	5	0	49	0	32	68	0	1	1	0	0	0	0	40	1	0	197
Total	19	1	173	0	106	279	1	1	5	1	0	4	4	175	5	5	779
04:00 PM	2	0	40	0	40	71	1	2	0	0	0	3	0	32	3	0	194
04:15 PM	2	0	46	0	31	59	2	0	1	1	0	2	0	46	4	1	195
04:30 PM	2	3	48	0	23	63	0	1	0	0	0	3	0	39	3	0	185
04:45 PM	4	0	50	0	24	72	1	1	1	1	1	0	1	59	3	0	218
Total	10	3	184	0	118	265	4	4	2	2	1	8	1	176	13	1	792
05:00 PM	6	0	44	0	35	93	2	0	0	2	0	0	0	55	7	1	245
05:15 PM	4	0	45	0	32	62	0	0	0	0	0	0	0	32	6	0	181
05:30 PM	3	2	50	0	28	77	1	0	2	0	2	0	1	40	9	0	215
05:45 PM	7	1	47	0	39	68	1	0	0	0	0	2	0	52	3	2	222
Total	20	3	186	0	134	300	4	0	2	2	2	2	1	179	25	3	863
Grand Total	66	9	715	0	451	1034	11	6	11	7	3	17	6	696	61	14	3107
Apprch %	8.4	1.1	90.5	0	30	68.8	0.7	0.4	28.9	18.4	7.9	44.7	0.8	89.6	7.9	1.8	
Total %	2.1	0.3	23	0	14.5	33.3	0.4	0.2	0.4	0.2	0.1	0.5	0.2	22.4	2	0.5	
Cars & Peds	66	9	711	0	445	1030	11	6	11	7	3	17	6	692	61	14	3089
% Cars & Peds	100	100	99.4	0	98.7	99.6	100	100	100	100	100	100	100	99.4	100	100	99.4
Trucks & Buses	0	0	2	0	4	3	0	0	0	0	0	0	0	2	0	0	11
% Trucks & Buses	0	0	0.3	0	0.9	0.3	0	0	0	0	0	0	0	0.3	0	0	0.4
Bikes by Direction	0	0	2	0	2	1	0	0	0	0	0	0	0	2	0	0	7
% Bikes by Direction	0	0	0.3	0	0.4	0.1	0	0	0	0	0	0	0	0.3	0	0	0.2

Start Time	Whiting Avenue From North					River Street From East					Whiting Avenue From South					River Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	6	0	44	0	50	35	93	2	0	130	0	2	0	0	2	0	55	7	1	63	245
05:15 PM	4	0	45	0	49	32	62	0	0	94	0	0	0	0	0	0	32	6	0	38	181
05:30 PM	3	2	50	0	55	28	77	1	0	106	2	0	2	0	4	1	40	9	0	50	215
05:45 PM	7	1	47	0	55	39	68	1	0	108	0	0	0	2	2	0	52	3	2	57	222
Total Volume	20	3	186	0	209	134	300	4	0	438	2	2	2	2	8	1	179	25	3	208	863
% App. Total	9.6	1.4	89	0		30.6	68.5	0.9	0		25	25	25	25		0.5	86.1	12	1.4		
PHF	.714	.375	.930	.000	.950	.859	.806	.500	.000	.842	.250	.250	.250	.250	.500	.250	.814	.694	.375	.825	.881
Cars & Peds	20	3	186	0	209	134	299	4	0	437	2	2	2	2	8	1	179	25	3	208	862
% Cars & Peds	100	100	100	0	100	100	99.7	100	0	99.8	100	100	100	100	100	100	100	100	100	100	99.9
Trucks & Buses	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Trucks & Buses	0	0	0	0	0	0	0.3	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Transportation Data Corporation

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Madison Street
west of Cedar Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Bspeed
Site Code: 23178.00

Eastbound															85th	95th
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	Total	Percent	Percent
10/11/23	0	0	0	1	0	0	0	0	0	0	0	0	0	1	29	29
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2	33	34
06:00	0	1	5	0	0	0	0	0	0	0	0	0	0	6	24	24
07:00	8	11	8	7	1	0	0	0	0	0	0	0	0	35	26	29
08:00	18	15	4	1	0	0	0	0	0	0	0	0	0	38	19	23
09:00	1	5	6	1	0	0	0	0	0	0	0	0	0	13	24	26
10:00	3	5	8	1	0	0	0	0	0	0	0	0	0	17	24	25
11:00	1	4	3	1	0	0	0	0	0	0	0	0	0	9	24	27
12 PM	4	4	6	2	0	0	0	0	0	0	0	0	0	16	24	27
13:00	3	4	11	3	0	0	0	0	0	0	0	0	0	21	24	28
14:00	3	9	15	5	0	0	0	0	0	0	0	0	0	32	25	28
15:00	12	13	12	1	0	0	0	0	0	0	0	0	0	38	23	24
16:00	5	12	15	1	0	0	0	0	0	0	0	0	0	33	23	24
17:00	5	14	12	7	0	0	0	0	0	0	0	0	0	38	25	28
18:00	5	13	20	4	0	0	0	0	0	0	0	0	0	42	24	27
19:00	2	5	9	1	0	0	0	0	0	0	0	0	0	17	24	25
20:00	0	4	6	0	0	0	0	0	0	0	0	0	0	10	23	24
21:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3	23	24
22:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2	23	24
23:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4	23	24
Total	70	123	145	37	2	0	0	0	0	0	0	0	0	377		
Percent	18.6%	32.6%	38.5%	9.8%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	07:00	07:00	05:00									08:00		
Vol.	18	15	8	7	1									38		
PM Peak	15:00	17:00	18:00	17:00										18:00		
Vol.	12	14	20	7										42		

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Client: Pare/Derek Hug

05770Bspeed
Site Code: 23178.00

Eastbound																	
Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent	
10/12/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	
05:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1	24	24	
06:00	1	2	4	1	0	0	0	0	0	0	0	0	0	8	24	27	
07:00	4	2	14	4	1	0	0	0	0	0	0	0	0	25	26	29	
08:00	14	13	12	1	0	0	0	0	0	0	0	0	0	40	22	24	
09:00	1	6	7	1	0	0	0	0	0	0	0	0	0	15	24	26	
10:00	5	2	6	1	0	0	0	0	0	0	0	0	0	14	24	26	
11:00	4	5	5	2	0	0	0	0	0	0	0	0	0	16	24	27	
12 PM	1	6	5	1	0	0	0	0	0	0	0	0	0	13	24	26	
13:00	1	4	8	2	0	0	0	0	0	0	0	0	0	15	24	28	
14:00	6	7	9	3	0	1	0	0	0	0	0	0	0	26	25	29	
15:00	15	15	10	2	0	0	0	0	0	0	0	0	0	42	22	24	
16:00	3	9	20	8	0	0	0	0	0	0	0	0	0	40	26	28	
17:00	4	10	25	2	0	0	0	0	0	0	0	0	0	41	24	24	
18:00	4	21	12	3	1	0	0	0	0	0	0	0	0	41	24	28	
19:00	1	2	4	1	1	0	0	0	0	0	0	0	0	9	28	32	
20:00	1	2	8	2	0	0	0	0	0	0	0	0	0	13	25	28	
21:00	1	3	1	2	0	0	0	0	0	0	0	0	0	7	27	29	
22:00	0	1	5	1	0	0	0	0	0	0	0	0	0	7	24	28	
23:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2	24	24	
Total	66	110	158	37	3	1	0	0	0	0	0	0	0	375			
Percent	17.6%	29.3%	42.1%	9.9%	0.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
AM Peak	08:00	08:00	07:00	07:00	07:00									08:00			
Vol.	14	13	14	4	1									40			
PM Peak	15:00	18:00	17:00	16:00	18:00	14:00								15:00			
Vol.	15	21	25	8	1	1								42			
Grand Total	136	233	303	74	5	1	0	0	0	0	0	0	0	752			
Percent	18.1%	31.0%	40.3%	9.8%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				

15th Percentile : 12 MPH
50th Percentile : 20 MPH
85th Percentile : 24 MPH
95th Percentile : 27 MPH

Stats 10 MPH Pace Speed : 16-25 MPH

Number of Vehicles > 25 MPH : 80
Percent of Vehicles > 25 MPH : 10.6%
Mean Speed(Average) : 19 MPH

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Madison Street
west of Cedar Street
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05770Bspeed
Site Code: 23178.00

Westbound

Start Time	15	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/11/23	0	0	0	1	0	0	0	0	0	0	0	0	0	1	29	29
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	1	0	1	0	0	0	0	0	0	0	0	0	0	2	23	24
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	1	0	0	0	0	0	0	0	0	0	0	0	0	1	12	14
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19	19
06:00	1	1	4	1	0	0	0	0	0	0	0	0	0	7	24	28
07:00	4	13	9	4	0	0	0	0	0	0	0	0	0	30	24	28
08:00	23	15	3	0	0	0	0	0	0	0	0	0	0	41	18	21
09:00	3	4	2	0	0	0	0	0	0	0	0	0	0	9	21	23
10:00	2	4	4	1	0	0	0	0	0	0	0	0	0	11	24	27
11:00	1	5	3	1	0	0	0	0	0	0	0	0	0	10	24	27
12 PM	1	6	6	0	0	0	0	0	0	0	0	0	0	13	23	24
13:00	3	13	3	0	0	0	0	0	0	0	0	0	0	19	20	23
14:00	7	16	5	1	0	0	0	0	0	0	0	0	0	29	21	24
15:00	15	13	4	1	0	0	0	0	0	0	0	0	0	33	20	24
16:00	6	11	10	1	0	0	0	0	0	0	0	0	0	28	23	24
17:00	4	18	12	0	0	0	0	0	0	0	0	0	0	34	22	24
18:00	0	7	10	2	0	0	0	0	0	0	0	0	0	19	24	27
19:00	0	8	3	1	0	0	0	0	0	0	0	0	0	12	23	26
20:00	0	0	4	0	0	0	0	0	0	0	0	0	0	4	24	24
21:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19	19
22:00	0	1	1	0	1	0	0	0	0	0	0	0	0	3	32	34
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19	19
Total	72	138	84	14	1	0	0	0	0	0	0	0	0	309		
Percent	23.3%	44.7%	27.2%	4.5%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	07:00	07:00										08:00		
Vol.	23	15	9	4										41		
PM Peak	15:00	17:00	17:00	18:00	22:00									17:00		
Vol.	15	18	12	2	1									34		

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
tel (781) 587-0086 cell (781) 439-4999

Madison Street
west of Cedar Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Bspeed
Site Code: 23178.00

Westbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	Total	85th Percent	95th Percent
10/12/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	1	0	0	0	0	0	0	0	0	0	0	0	0	1	12	14
05:00	0	2	1	0	1	0	0	0	0	0	0	0	0	4	32	33
06:00	1	3	1	1	0	0	0	0	0	0	0	0	0	6	25	28
07:00	3	3	12	3	0	0	0	0	0	0	0	0	0	21	24	28
08:00	34	10	5	0	0	0	0	0	0	0	0	0	0	49	18	22
09:00	3	7	4	0	0	0	0	0	0	0	0	0	0	14	22	24
10:00	1	3	8	1	0	0	0	0	0	0	0	0	0	13	24	26
11:00	4	3	3	1	0	0	0	0	0	0	0	0	0	11	23	27
12 PM	1	4	9	1	0	0	0	0	0	0	0	0	0	15	24	26
13:00	1	5	6	0	0	0	0	0	0	0	0	0	0	12	23	24
14:00	4	16	4	2	0	0	0	0	0	0	0	0	0	26	22	26
15:00	11	20	4	0	0	0	0	0	0	0	0	0	0	35	19	22
16:00	6	15	14	1	0	0	0	0	0	0	0	0	0	36	23	24
17:00	12	23	13	0	0	0	0	0	0	0	0	0	0	48	22	24
18:00	4	13	11	1	0	0	0	0	0	0	0	0	0	29	23	24
19:00	0	7	5	1	0	0	0	0	0	0	0	0	0	13	24	26
20:00	1	9	5	1	0	0	0	0	0	0	0	0	0	16	23	25
21:00	0	1	4	0	0	0	0	0	0	0	0	0	0	5	24	24
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2	19	19
23:00	1	1	1	2	0	0	0	0	0	0	0	0	0	5	28	29
Total	88	147	110	15	1	0	361									
Percent	24.4%	40.7%	30.5%	4.2%	0.3%	0.0%										
AM Peak	08:00	08:00	07:00	07:00	05:00									08:00		
Vol.	34	10	12	3	1									49		
PM Peak	17:00	17:00	16:00	14:00										17:00		
Vol.	12	23	14	2										48		
Grand Total	160	285	194	29	2	0	670									
Percent	23.9%	42.5%	29.0%	4.3%	0.3%	0.0%										

15th Percentile : 9 MPH
50th Percentile : 18 MPH
85th Percentile : 23 MPH
95th Percentile : 24 MPH

Stats 10 MPH Pace Speed : 16-25 MPH

Number of Vehicles > 25 MPH : 31
Percent of Vehicles > 25 MPH : 4.6%
Mean Speed(Average) : 18 MPH

Transportation Data Corporation

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Madison Street
west of Cedar Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Bvolume
Site Code: 23178.00

Start Time	11-Oct-23 Wed	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	5			0	3				
12:15		1	4			0	4				
12:30		0	4			1	4				
12:45		0	3	1	16	0	2	1	13	2	29
01:00		0	10			0	6				
01:15		0	5			0	4				
01:30		0	5			0	4				
01:45		0	1	0	21	0	5	0	19	0	40
02:00		0	4			1	1				
02:15		0	7			0	4				
02:30		0	6			1	6				
02:45		0	15	0	32	0	18	2	29	2	61
03:00		0	15			0	14				
03:15		0	7			0	5				
03:30		0	8			0	5				
03:45		0	8	0	38	0	9	0	33	0	71
04:00		0	7			0	7				
04:15		0	9			0	8				
04:30		0	10			0	5				
04:45		0	7	0	33	1	8	1	28	1	61
05:00		0	8			0	12				
05:15		0	10			1	10				
05:30		1	7			0	7				
05:45		1	13	2	38	0	5	1	34	3	72
06:00		1	7			1	6				
06:15		1	13			2	6				
06:30		2	13			3	2				
06:45		2	9	6	42	1	5	7	19	13	61
07:00		3	5			1	4				
07:15		7	4			7	4				
07:30		11	5			10	2				
07:45		14	3	35	17	12	2	30	12	65	29
08:00		13	6			3	2				
08:15		8	2			15	0				
08:30		11	1			18	1				
08:45		6	1	38	10	5	1	41	4	79	14
09:00		4	1			5	0				
09:15		3	1			2	0				
09:30		3	1			1	1				
09:45		3	0	13	3	1	0	9	1	22	4
10:00		3	1			1	0				
10:15		5	0			6	2				
10:30		4	1			2	1				
10:45		5	0	17	2	2	0	11	3	28	5
11:00		1	2			2	0				
11:15		2	1			5	0				
11:30		5	1			1	0				
11:45		1	0	9	4	2	1	10	1	19	5
Total		121	256			113	196			234	452
Combined Total		377				309				686	
Percentage	0.0%										

Transportation Data Corporation

Mario Perone, mperone1@verizon.net
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Madison Street
west of Cedar Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Bvolume
Site Code: 23178.00

Start Time	12-Oct-23 Thu	EB		Hour Totals		WB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	2			0	0				
12:15		0	3			0	7				
12:30		0	2			0	3				
12:45		0	6	0	13	0	5	0	15	0	28
01:00		0	4			0	2				
01:15		0	1			0	2				
01:30		0	8			0	4				
01:45		0	2	0	15	0	4	0	12	0	27
02:00		0	6			0	5				
02:15		0	8			0	3				
02:30		0	2			0	6				
02:45		0	10	0	26	0	12	0	26	0	52
03:00		0	19			0	17				
03:15		0	9			0	5				
03:30		0	4			0	8				
03:45		0	10	0	42	0	5	0	35	0	77
04:00		0	9			0	14				
04:15		0	9			0	4				
04:30		0	14			0	8				
04:45		0	8	0	40	1	10	1	36	1	76
05:00		0	11			0	19				
05:15		0	9			1	16				
05:30		1	11			2	7				
05:45		0	10	1	41	1	6	4	48	5	89
06:00		2	6			1	8				
06:15		2	16			1	13				
06:30		1	10			2	5				
06:45		3	9	8	41	2	3	6	29	14	70
07:00		4	2			3	4				
07:15		7	4			6	4				
07:30		5	3			4	2				
07:45		9	0	25	9	8	3	21	13	46	22
08:00		15	4			6	8				
08:15		11	8			17	3				
08:30		9	0			21	2				
08:45		5	1	40	13	5	3	49	16	89	29
09:00		4	0			0	3				
09:15		3	4			2	0				
09:30		4	1			6	2				
09:45		4	2	15	7	6	0	14	5	29	12
10:00		3	2			5	1				
10:15		2	2			2	0				
10:30		7	0			3	1				
10:45		2	3	14	7	3	0	13	2	27	9
11:00		4	1			3	3				
11:15		2	1			4	1				
11:30		3	0			2	0				
11:45		7	0	16	2	2	1	11	5	27	7
Total		119	256			119	242			238	498
Combined Total		375				361				736	
Percentage	0.0%										
Total Percent		240	512			232	438			472	950
		31.9%	68.1%			34.6%	65.4%			33.2%	66.8%
ADT		ADT 711		AADT 711							

Transportation Data Corporation

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Madison Street
west of Cedar Street
City, State: Dedham, MA
Client: Pare/Derek Hug

05770Bvolume
Site Code: 23178.00

Start Time	11-Oct-23 Wed		EB		WB		Combined		12-Oct Thu		EB		WB		Combined	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00	0	5	0	3	0	8	0	2	0	0	0	0	0	0	2	
12:15	1	4	0	4	1	8	0	3	0	7	0	10	0	0	10	
12:30	0	4	1	4	1	8	0	2	0	3	0	5	0	0	5	
12:45	0	3	0	2	0	5	0	6	0	5	0	11	0	0	11	
01:00	0	10	0	6	0	16	0	4	0	2	0	6	0	0	6	
01:15	0	5	0	4	0	9	0	1	0	2	0	3	0	0	3	
01:30	0	5	0	4	0	9	0	8	0	4	0	12	0	0	12	
01:45	0	1	0	5	0	6	0	2	0	4	0	6	0	0	6	
02:00	0	4	1	1	1	5	0	6	0	5	0	11	0	0	11	
02:15	0	7	0	4	0	11	0	8	0	3	0	11	0	0	11	
02:30	0	6	1	6	1	12	0	2	0	6	0	8	0	0	8	
02:45	0	15	0	18	0	33	0	10	0	12	0	22	0	0	22	
03:00	0	15	0	14	0	29	0	19	0	17	0	36	0	0	36	
03:15	0	7	0	5	0	12	0	9	0	5	0	14	0	0	14	
03:30	0	8	0	5	0	13	0	4	0	8	0	12	0	0	12	
03:45	0	8	0	9	0	17	0	10	0	5	0	15	0	0	15	
04:00	0	7	0	7	0	14	0	9	0	14	0	23	0	0	23	
04:15	0	9	0	8	0	17	0	9	0	4	0	13	0	0	13	
04:30	0	10	0	5	0	15	0	14	0	8	0	22	0	0	22	
04:45	0	7	1	8	1	15	0	8	1	10	1	18	1	0	18	
05:00	0	8	0	12	0	20	0	11	0	19	0	30	0	0	30	
05:15	0	10	1	10	1	20	0	9	1	16	1	25	1	0	25	
05:30	1	7	0	7	1	14	1	11	2	7	3	18	0	0	18	
05:45	1	13	0	5	1	18	0	10	1	6	1	16	0	0	16	
06:00	1	7	1	6	2	13	2	6	1	8	3	14	0	0	14	
06:15	1	13	2	6	3	19	2	16	1	13	3	29	0	0	29	
06:30	2	13	3	2	5	15	1	10	2	5	3	15	0	0	15	
06:45	2	9	1	5	3	14	3	9	2	3	5	12	0	0	12	
07:00	3	5	1	4	4	9	4	2	3	4	7	6	0	0	6	
07:15	7	4	7	4	14	8	7	4	6	4	13	8	0	0	8	
07:30	11	5	10	2	21	7	5	3	4	2	9	5	0	0	5	
07:45	14	3	12	2	26	5	9	0	8	3	17	3	0	0	3	
08:00	13	6	3	2	16	8	15	4	6	8	21	12	0	0	12	
08:15	8	2	15	0	23	2	11	8	17	3	28	11	0	0	11	
08:30	11	1	18	1	29	2	9	0	21	2	30	2	0	0	2	
08:45	6	1	5	1	11	2	5	1	5	3	10	4	0	0	4	
09:00	4	1	5	0	9	1	4	0	0	3	4	3	0	0	3	
09:15	3	1	2	0	5	1	3	4	2	0	5	4	0	0	4	
09:30	3	1	1	1	4	2	4	1	6	2	10	3	0	0	3	
09:45	3	0	1	0	4	0	4	2	6	0	10	2	0	0	2	
10:00	3	1	1	0	4	1	3	2	5	1	8	3	0	0	3	
10:15	5	0	6	2	11	2	2	2	2	0	4	2	0	0	2	
10:30	4	1	2	1	6	2	7	0	3	1	10	1	0	0	1	
10:45	5	0	2	0	7	0	2	3	3	0	5	3	0	0	3	
11:00	1	2	2	0	3	2	4	1	3	3	7	4	0	0	4	
11:15	2	1	5	0	7	1	2	1	4	1	6	2	0	0	2	
11:30	5	1	1	0	6	1	3	0	2	0	5	0	0	0	0	
11:45	1	0	2	1	3	1	7	0	2	1	9	1	0	0	1	
Total	121	256	113	196	234	452	119	256	119	242	238	498				
Day Total	377		309		686		375		361		736					
% Total	17.6%	37.3%	16.5%	28.6%			16.2%	34.8%	16.2%	32.9%						
Peak	-	07:30	05:45	07:45	02:30	07:45	02:45	-	07:45	05:30	07:45	04:30	07:45	04:30		
Vol.	-	46	46	48	43	94	87	-	44	43	52	53	96	95		
P.H.F.	0.821	0.767	0.667	0.597	0.810	0.659	0.733	0.566	0.619	0.697	0.800	0.660				
ADT	ADT 711	AADT 711														

Transportation Data Corporation
 Mario Perone, mperone1@verizon.net
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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770C
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	
07:00 AM	0	1	20	1	0	0	1	13	18	1	21	52	2	2	0	1	5	0	1	2	0	1	1	1	2	146
07:15 AM	0	0	32	0	1	0	2	10	11	0	32	73	12	0	0	5	10	1	0	2	0	3	3	0	2	199
07:30 AM	2	4	25	0	4	0	3	24	12	3	20	38	12	2	0	13	12	4	0	1	1	6	2	0	0	188
07:45 AM	0	0	24	1	2	0	0	18	17	1	31	38	5	1	0	9	8	2	0	4	0	4	3	1	3	172
Total	2	5	101	2	7	0	6	65	58	5	104	201	31	5	0	28	35	7	1	9	1	14	9	2	7	705
08:00 AM	0	2	35	0	2	1	5	8	20	4	30	42	1	0	4	6	11	2	0	2	0	3	5	0	2	185
08:15 AM	0	0	35	1	1	0	1	15	14	3	23	36	8	2	3	8	19	1	0	5	0	4	1	0	4	184
08:30 AM	0	1	27	0	2	1	3	14	20	5	25	46	5	3	3	7	11	2	0	6	1	9	4	0	3	198
08:45 AM	0	4	23	0	0	0	5	7	22	6	27	48	7	0	2	1	14	0	0	4	0	2	2	1	4	179
Total	0	7	120	1	5	2	14	44	76	18	105	172	21	5	12	22	55	5	0	17	1	18	12	1	13	746
Grand Total	2	12	221	3	12	2	20	109	134	23	209	373	52	10	12	50	90	12	1	26	2	32	21	3	20	1451
Apprch %	0.8	4.8	88.4	1.2	4.8	0.7	6.9	37.8	46.5	8	31.9	56.9	7.9	1.5	1.8	27.9	50.3	6.7	0.6	14.5	2.6	41	26.9	3.8	25.6	
Total %	0.1	0.8	15.2	0.2	0.8	0.1	1.4	7.5	9.2	1.6	14.4	25.7	3.6	0.7	0.8	3.4	6.2	0.8	0.1	1.8	0.1	2.2	1.4	0.2	1.4	

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total					
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right		Right	Thru	Left	Peds	App. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 08:00 AM																															
08:00 AM	0	2	35	0	2	39	1	5	8	20	4	38	30	42	1	0	4	77	6	11	2	0	2	21	0	3	5	0	2	10	185
08:15 AM	0	0	35	1	1	37	0	1	15	14	3	33	23	36	8	2	3	72	8	19	1	0	5	33	0	4	1	0	4	9	184
08:30 AM	0	1	27	0	2	30	1	3	14	20	5	43	25	46	5	3	3	82	7	11	2	0	6	26	1	9	4	0	3	17	198
08:45 AM	0	4	23	0	0	27	0	5	7	22	6	40	27	48	7	0	2	84	1	14	0	0	4	19	0	2	2	1	4	9	179
Total Volume	0	7	120	1	5	133	2	14	44	76	18	154	105	172	21	5	12	315	22	55	5	0	17	99	1	18	12	1	13	45	746
% App. Total	0	5.3	90.2	0.8	3.8	1.3	9.1	28.6	49.4	11.7	33.3	54.6	6.7	1.6	3.8	22.2	55.6	5.1	0	17.2	2.2	40	26.7	2.2	28.9						
PHF	.000	.438	.857	.250	.625	.853	.500	.700	.733	.864	.750	.895	.875	.896	.656	.417	.750	.938	.688	.724	.625	.000	.708	.750	.250	.500	.600	.250	.813	.662	.942

Transportation Data Corporation
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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770C
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total					
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds						
07:00 AM	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	0	1	1	0	4	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
07:45 AM	0	0	0	0	0	0	0	2	1	0	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Total	0	0	0	0	0	0	0	3	3	0	5	8	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	22
08:00 AM	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
08:15 AM	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	9
08:30 AM	0	0	0	0	0	0	0	2	3	0	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	9
08:45 AM	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Total	0	0	0	0	0	0	1	5	5	0	5	3	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	27
Grand Total	0	0	0	0	0	0	1	8	8	0	10	11	1	0	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	49
Apprch %	0	0	0	0	0	0	5.9	47.1	47.1	0	45.5	50	4.5	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	2	16.3	16.3	0	20.4	22.4	2	0	0	8.2	12.2	0	0	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						Int. Total	
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total		
07:30 AM	0	0	0	0	0	0	0	0	1	1	0	2	4	1	1	0	0	6	1	0	0	0	0	1	0	0	0	0	0	0	9	
07:45 AM	0	0	0	0	0	0	0	0	2	1	0	3	1	3	0	0	0	4	0	1	0	0	0	1	0	0	0	0	0	0	8	
08:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	0	5	
08:15 AM	0	0	0	0	0	0	0	1	1	1	0	3	1	1	0	0	0	2	1	3	0	0	0	4	0	0	0	0	0	0	9	
Total Volume	0	0	0	0	0	0	0	1	4	4	0	9	9	5	1	0	0	15	2	5	0	0	0	7	0	0	0	0	0	0	31	
% App. Total	0	0	0	0	0	0	0	11.1	44.4	44.4	0	60	33.3	6.7	0	0	28.6	71.4	0	0	0	0	0	0	0	0	0	0	0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.250	.500	1.00	.000	.750	.563	.417	.250	.000	.000	.625	.500	.417	.000	.000	.000	.438	.000	.000	.000	.000	.000	.000	.861	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770C
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total					
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds						
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	75	25	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	60	20	0	0	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						Int. Total					
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total						
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	75	25	0	0	0	0	0	0	0	0	0	0	0	0	0					
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.375	.250	.000	.000	.000	.000	.333	.000	.000	.000	.000	.000	.000	.417				

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

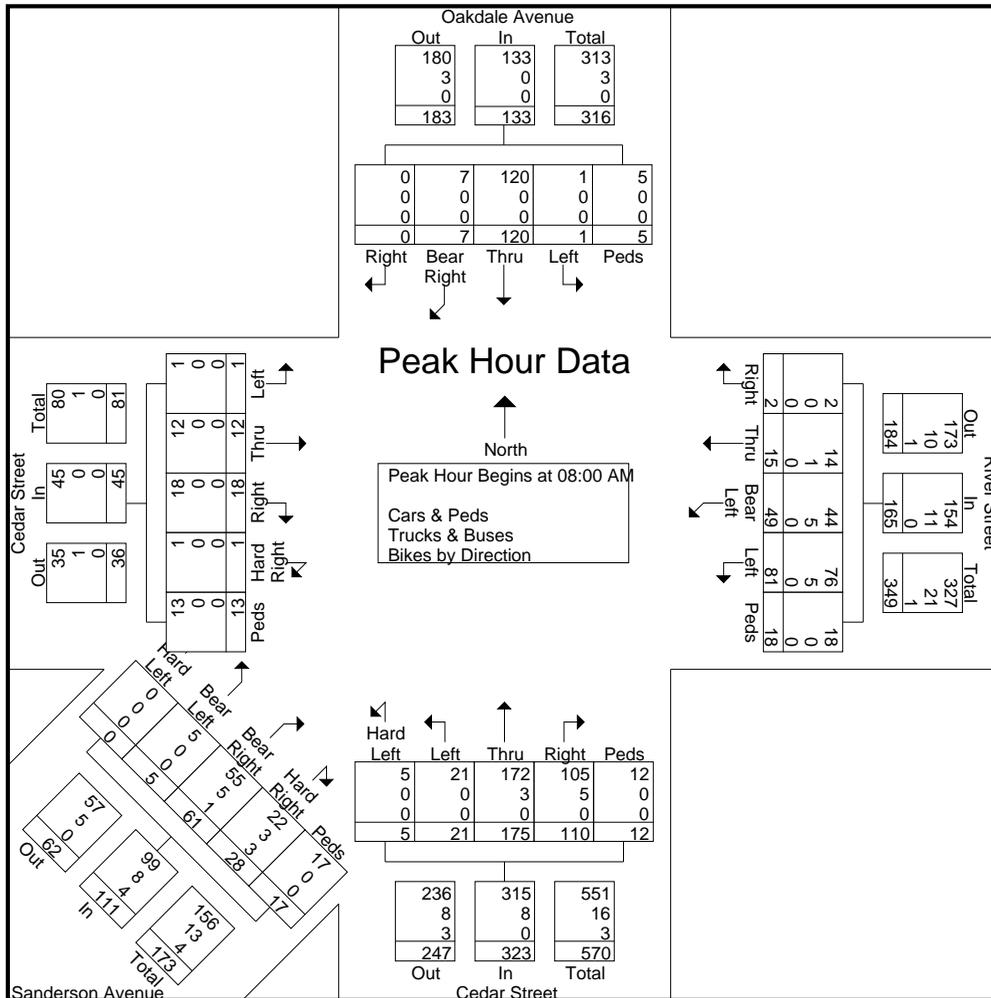
Transportation Data Corporation

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N/NW,S: Oakdale Avenue/Cedar Street
E/W: River Street/Sanderson Avenue
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770C
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						App. Total	Int. Total
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																																
Peak Hour for Entire Intersection Begins at 08:00 AM																																
08:00 AM	0	2	35	0	2	39	1	5	8	21	4	39	33	42	1	0	4	80	7	12	2	0	2	23	0	3	5	0	2	10	191	
08:15 AM	0	0	35	1	1	37	0	2	16	15	3	36	24	37	8	2	3	74	11	23	1	0	5	40	0	4	1	0	4	9	196	
08:30 AM	0	1	27	0	2	30	1	3	16	23	5	48	25	48	5	3	3	84	8	12	2	0	6	28	1	9	4	0	3	17	207	
08:45 AM	0	4	23	0	0	27	0	5	9	22	6	42	28	48	7	0	2	85	2	14	0	0	4	20	0	2	2	1	4	9	183	
Total Volume	0	7	120	1	5	133	2	15	49	81	18	165	110	175	21	5	12	323	28	61	5	0	17	111	1	18	12	1	13	45	777	
% App. Total	0	5.3	90.2	0.8	3.8	1.2	9.1	29.7	49.1	10.9	34.1	54.2	6.5	1.5	3.7	25.2	55	4.5	0	15.3	2.2	40	26.7	2.2	28.9							
PHF	.000	.438	.857	.250	.625	.853	.500	.750	.766	.880	.750	.859	.833	.911	.656	.417	.750	.950	.636	.663	.625	.000	.708	.694	.250	.500	.600	.250	.813	.662	.938	
Cars & Peds	0	7	120	1	5	133	2	14	44	76	18	154	105	172	21	5	12	315	22	55	5	0	17	99	1	18	12	1	13	45	746	
% Cars & Peds	0	100	100	100	100	100	100	93.3	89.8	93.8	100	93.3	95.5	98.3	100	100	100	97.5	78.6	90.2	100	0	100	89.2	100	100	100	100	100	100	96.0	
Trucks & Buses	0	0	0	0	0	0	0	1	5	5	0	11	5	3	0	0	0	8	3	5	0	0	0	8	0	0	0	0	0	0	27	
% Trucks & Buses	0	0	0	0	0	0	0	6.7	10.2	6.2	0	6.7	4.5	1.7	0	0	0	2.5	10.7	8.2	0	0	0	7.2	0	0	0	0	0	0	3.5	
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	0	0	0	0	0	0	4	
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	1.6	0	0	0	3.6	0	0	0	0	0	0	0.5	



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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770CC
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	
02:00 PM	0	2	46	0	0	1	6	15	16	0	22	30	3	3	2	6	8	2	1	2	1	3	3	0	2	174
02:15 PM	0	1	31	1	0	0	5	11	21	1	15	21	7	2	3	4	13	3	0	6	3	6	5	1	4	164
02:30 PM	0	3	43	0	0	1	8	12	21	0	20	33	2	0	0	9	17	2	0	7	1	7	3	1	6	196
02:45 PM	1	5	53	0	1	0	5	13	38	2	23	27	2	0	2	12	13	1	1	10	3	7	5	0	6	230
Total	1	11	173	1	1	2	24	51	96	3	80	111	14	5	7	31	51	8	2	25	8	23	16	2	18	764
03:00 PM	0	0	57	2	1	0	3	29	39	2	23	31	9	5	2	5	8	2	1	7	0	8	3	0	6	243
03:15 PM	0	3	77	1	1	0	4	18	38	0	19	18	8	0	0	9	17	1	0	4	1	6	2	0	4	231
03:30 PM	0	2	70	1	1	0	6	11	41	4	16	23	3	1	0	4	15	1	0	1	0	5	6	0	1	212
03:45 PM	1	1	62	2	0	1	3	21	30	3	13	32	3	4	3	6	16	1	0	3	0	5	2	1	4	217
Total	1	6	266	6	3	1	16	79	148	9	71	104	23	10	5	24	56	5	1	15	1	24	13	1	15	903
04:00 PM	1	3	68	0	1	0	3	20	44	1	18	33	3	1	1	9	11	0	0	1	0	12	2	0	2	234
04:15 PM	0	3	46	1	3	1	1	19	28	4	15	36	6	2	0	2	18	3	0	3	0	7	5	0	2	205
04:30 PM	0	2	56	0	4	2	2	21	23	1	15	28	2	1	0	11	15	0	0	4	0	11	2	1	2	203
04:45 PM	0	0	45	2	2	1	1	27	38	1	25	43	7	2	0	13	18	2	1	9	0	6	0	0	5	248
Total	1	8	215	3	10	4	7	87	133	7	73	140	18	6	1	35	62	5	1	17	0	36	9	1	11	890
05:00 PM	0	1	52	3	0	0	8	31	43	6	24	32	8	1	6	6	21	1	0	1	0	6	2	0	1	253
05:15 PM	1	0	35	0	1	1	2	24	23	3	17	33	2	0	2	5	13	1	1	1	1	2	2	0	0	170
05:30 PM	0	1	46	0	2	1	4	23	39	3	23	44	6	0	0	13	20	1	0	7	1	3	3	1	5	246
05:45 PM	0	3	41	2	0	0	4	23	39	1	19	43	6	3	0	6	18	2	1	2	0	3	2	0	3	221
Total	1	5	174	5	3	2	18	101	144	13	83	152	22	4	8	30	72	5	2	11	2	14	9	1	9	890
Grand Total	4	30	828	15	17	9	65	318	521	32	307	507	77	25	21	120	241	23	6	68	11	97	47	5	53	3447
Apprch %	0.4	3.4	92.6	1.7	1.9	1	6.9	33.7	55.1	3.4	32.8	54.1	8.2	2.7	2.2	26.2	52.6	5	1.3	14.8	5.2	45.5	22.1	2.3	24.9	
Total %	0.1	0.9	24	0.4	0.5	0.3	1.9	9.2	15.1	0.9	8.9	14.7	2.2	0.7	0.6	3.5	7	0.7	0.2	2	0.3	2.8	1.4	0.1	1.5	

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total					
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right		Right	Thru	Left	Peds	App. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:45 PM																															
04:45 PM	0	0	45	2	2	49	1	1	27	38	1	68	25	43	7	2	0	77	13	18	2	1	9	43	0	6	0	0	5	11	248
05:00 PM	0	1	52	3	0	56	0	8	31	43	6	88	24	32	8	1	6	71	6	21	1	0	1	29	0	6	2	0	1	9	253
05:15 PM	1	0	35	0	1	37	1	2	24	23	3	53	17	33	2	0	2	54	5	13	1	1	1	21	1	2	2	0	0	5	170
05:30 PM	0	1	46	0	2	49	1	4	23	39	3	70	23	44	6	0	0	73	13	20	1	0	7	41	1	3	3	1	5	13	246
Total Volume	1	2	178	5	5	191	3	15	105	143	13	279	89	152	23	3	8	275	37	72	5	2	18	134	2	17	7	1	11	38	917
% App. Total	0.5	1	93.2	2.6	2.6	1.1	5.4	37.6	51.3	4.7	32.4	55.3	8.4	1.1	2.9	27.6	53.7	3.7	1.5	13.4	5.3	44.7	18.4	2.6	28.9						
PHF	.250	.500	.856	.417	.625	.853	.750	.469	.847	.831	.542	.793	.890	.864	.719	.375	.333	.893	.712	.857	.625	.500	.500	.779	.500	.708	.583	.250	.550	.731	.906

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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770CC
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total					
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds						
02:00 PM	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
02:15 PM	0	0	1	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
02:30 PM	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
02:45 PM	0	0	0	0	0	0	0	3	1	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Total	0	0	1	0	0	0	0	5	5	0	4	6	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	24
03:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
03:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
03:30 PM	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
03:45 PM	0	0	3	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total	0	0	3	0	0	0	0	1	2	0	3	2	0	1	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	15
04:00 PM	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	0	0	1	0	0	0	1	1	1	0	3	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Grand Total	0	0	6	0	0	0	1	8	8	0	11	9	2	2	0	2	4	0	0	0	0	1	0	0	0	0	0	0	0	0	54
Apprch %	0	0	100	0	0	0	5.9	47.1	47.1	0	45.8	37.5	8.3	8.3	0	33.3	66.7	0	0	0	0	100	0	0	0	0	0	0	0	0	
Total %	0	0	11.1	0	0	0	1.9	14.8	14.8	0	20.4	16.7	3.7	3.7	0	3.7	7.4	0	0	0	0	1.9	0	0	0	0	0	0	0	0	

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						Int. Total					
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total						
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	5	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
02:15 PM	0	0	1	0	0	1	0	0	1	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
02:30 PM	0	0	0	0	0	0	0	0	1	1	0	2	1	2	0	0	0	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
02:45 PM	0	0	0	0	0	0	0	0	3	1	0	4	0	2	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7
Total Volume	0	0	1	0	0	1	0	0	5	5	0	10	4	6	0	0	0	10	2	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	24
% App. Total	0	0	100	0	0		0	0	50	50	0		40	60	0	0	0		66.7	33.3	0	0	0		0	0	0	0	0		0	0	0	0	0	
PHF	.000	.000	.250	.000	.000	.250	.000	.000	.417	.417	.000	.625	.333	.750	.000	.000	.500	.500	.250	.000	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.857	

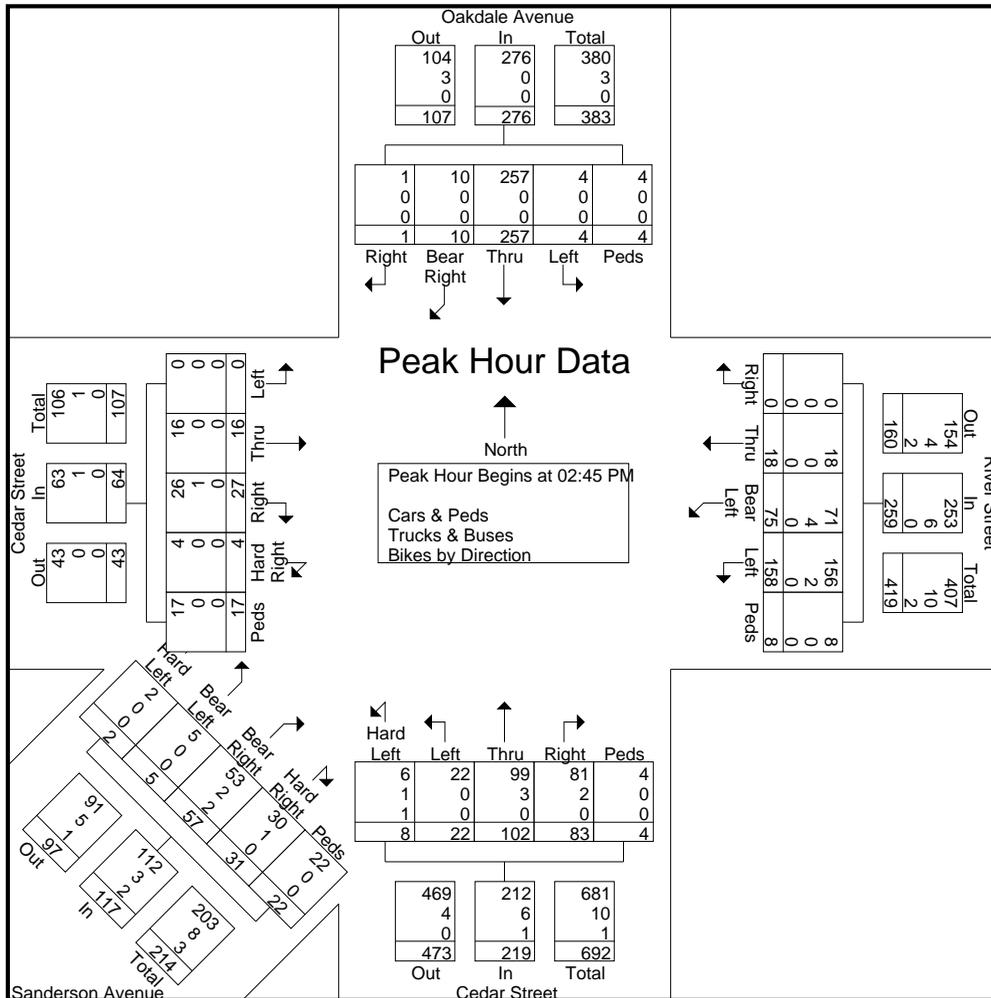
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 02:00 PM

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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770CC
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						Int. Total
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 02:45 PM																															
02:45 PM	1	5	53	0	1	60	0	5	16	39	2	62	23	29	2	0	2	56	13	13	1	1	10	38	3	7	5	0	6	21	237
03:00 PM	0	0	57	2	1	60	0	3	29	39	2	73	24	31	9	6	2	72	5	9	2	1	7	24	0	9	3	0	6	18	247
03:15 PM	0	3	77	1	1	82	0	4	18	38	0	60	20	19	8	0	0	47	9	18	1	0	4	32	1	6	2	0	4	13	234
03:30 PM	0	2	70	1	1	74	0	6	12	42	4	64	16	23	3	2	0	44	4	17	1	0	1	23	0	5	6	0	1	12	217
Total Volume	1	10	257	4	4	276	0	18	75	158	8	259	83	102	22	8	4	219	31	57	5	2	22	117	4	27	16	0	17	64	935
% App. Total	0.4	3.6	93.1	1.4	1.4		0	6.9	29	61	3.1		37.9	46.6	10	3.7	1.8		26.5	48.7	4.3	1.7	18.8		6.2	42.2	25	0	26.6		
PHF	.250	.500	.834	.500	1.00	.841	.000	.750	.647	.940	.500	.887	.865	.823	.611	.333	.500	.760	.596	.792	.625	.500	.550	.770	.333	.750	.667	.000	.708	.762	.946
Cars & Peds	1	10	257	4	4	276	0	18	71	156	8	253	81	99	22	6	4	212	30	53	5	2	22	112	4	26	16	0	17	63	916
% Cars & Peds	100	100	100	100	100	100	0	100	94.7	98.7	100	97.7	97.6	97.1	100	75.0	100	96.8	96.8	93.0	100	100	100	95.7	100	96.3	100	0	100	98.4	98.0
Trucks & Buses	0	0	0	0	0	0	0	0	4	2	0	6	2	3	0	1	0	6	1	2	0	0	0	3	0	1	0	0	0	1	16
% Trucks & Buses	0	0	0	0	0	0	0	0	5.3	1.3	0	2.3	2.4	2.9	0	12.5	0	2.7	3.2	3.5	0	0	0	2.6	0	3.7	0	0	0	1.6	1.7
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	2	0	0	0	0	0	0	3
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.5	0	0.5	0	3.5	0	0	0	1.7	0	0	0	0	0	0	0.3



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N/NW,S: Oakdale Avenue/Cedar Street
 E/W: River Street/Sanderson Avenue
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770CC
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Oakdale Avenue From North					River Street From East					Cedar Street From South					Sanderson Avenue From Southwest					Cedar Street From West					Int. Total
	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	
02:00 PM	0	2	46	0	0	1	6	15	16	0	25	33	3	3	2	6	9	2	1	2	1	3	3	0	2	181
02:15 PM	0	1	32	1	0	0	5	12	25	1	15	21	7	2	3	4	13	3	0	6	3	6	5	1	4	170
02:30 PM	0	3	43	0	0	1	8	13	22	0	21	36	2	0	0	10	17	2	0	7	1	7	3	1	6	203
02:45 PM	1	5	53	0	1	0	5	16	39	2	23	29	2	0	2	13	13	1	1	10	3	7	5	0	6	237
Total	1	11	174	1	1	2	24	56	102	3	84	119	14	5	7	33	52	8	2	25	8	23	16	2	18	791
03:00 PM	0	0	57	2	1	0	3	29	39	2	24	31	9	6	2	5	9	2	1	7	0	9	3	0	6	247
03:15 PM	0	3	77	1	1	0	4	18	38	0	20	19	8	0	0	9	18	1	0	4	1	6	2	0	4	234
03:30 PM	0	2	70	1	1	0	6	12	42	4	16	23	3	2	0	4	17	1	0	1	0	5	6	0	1	217
03:45 PM	1	1	65	2	0	1	3	21	31	3	14	33	3	4	3	6	16	1	0	3	0	5	2	1	4	223
Total	1	6	269	6	3	1	16	80	150	9	74	106	23	12	5	24	60	5	1	15	1	25	13	1	15	921
04:00 PM	1	3	69	0	1	0	4	21	44	1	19	33	3	1	1	10	12	0	0	1	0	12	2	0	2	240
04:15 PM	0	3	46	1	3	1	1	19	28	4	15	36	7	2	0	2	18	3	0	3	0	7	5	0	2	206
04:30 PM	0	2	57	0	4	2	2	21	24	1	15	32	2	1	0	13	15	0	0	4	0	11	2	1	2	211
04:45 PM	0	0	45	2	2	1	1	27	38	1	27	45	7	3	0	13	18	2	1	9	0	6	0	0	5	253
Total	1	8	217	3	10	4	8	88	134	7	76	146	19	7	1	38	63	5	1	17	0	36	9	1	11	910
05:00 PM	0	1	52	3	0	0	8	31	43	6	24	32	8	1	6	8	21	1	0	1	0	6	2	0	1	255
05:15 PM	1	0	36	0	1	1	2	24	23	3	18	33	2	0	2	5	13	1	1	1	1	2	2	0	0	172
05:30 PM	0	1	50	0	2	1	4	23	39	3	23	44	7	0	0	13	20	1	0	7	1	3	3	1	5	251
05:45 PM	0	3	46	2	0	0	4	24	39	1	19	44	6	3	0	6	18	2	1	2	0	3	2	0	3	228
Total	1	5	184	5	3	2	18	102	144	13	84	153	23	4	8	32	72	5	2	11	2	14	9	1	9	906
Grand Total	4	30	844	15	17	9	66	326	530	32	318	524	79	28	21	127	247	23	6	68	11	98	47	5	53	3528
Apprch %	0.4	3.3	92.7	1.6	1.9	0.9	6.9	33.9	55	3.3	32.8	54	8.1	2.9	2.2	27	52.4	4.9	1.3	14.4	5.1	45.8	22	2.3	24.8	
Total %	0.1	0.9	23.9	0.4	0.5	0.3	1.9	9.2	15	0.9	9	14.9	2.2	0.8	0.6	3.6	7	0.7	0.2	1.9	0.3	2.8	1.3	0.1	1.5	
Cars & Peds	4	30	828	15	17	9	65	318	521	32	307	507	77	25	21	120	241	23	6	68	11	97	47	5	53	3447
% Cars & Peds	100	100	98.1	100	100	100	98.5	97.5	98.3	100	96.5	96.8	97.5	89.3	100	94.5	97.6	100	100	100	100	99	100	100	100	97.7
Trucks & Buses	0	0	6	0	0	0	1	8	8	0	11	9	2	2	0	2	4	0	0	0	0	1	0	0	0	54
% Trucks & Buses	0	0	0.7	0	0	0	1.5	2.5	1.5	0	3.5	1.7	2.5	7.1	0	1.6	1.6	0	0	0	0	1	0	0	0	1.5
Bikes by Direction	0	0	10	0	0	0	0	0	1	0	0	8	0	1	0	5	2	0	0	0	0	0	0	0	0	27
% Bikes by Direction	0	0	1.2	0	0	0	0	0	0.2	0	0	1.5	0	3.6	0	3.9	0.8	0	0	0	0	0	0	0	0	0.8

Start Time	Oakdale Avenue From North						River Street From East						Cedar Street From South						Sanderson Avenue From Southwest						Cedar Street From West						Int. Total
	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	
Peak Hour for Entire Intersection Begins at 02:45 PM	1	5	53	0	1	60	0	5	16	39	2	62	23	29	2	0	2	56	13	13	1	1	10	38	3	7	5	0	6	21	237
02:45 PM	1	5	53	0	1	60	0	5	16	39	2	62	23	29	2	0	2	56	13	13	1	1	10	38	3	7	5	0	6	21	237
03:00 PM	0	0	57	2	1	60	0	3	29	39	2	73	24	31	9	6	2	72	5	9	2	1	7	24	0	9	3	0	6	18	247
03:15 PM	0	3	77	1	1	82	0	4	18	38	0	60	20	19	8	0	0	47	9	18	1	0	4	32	1	6	2	0	4	13	234
03:30 PM	0	2	70	1	1	74	0	6	12	42	4	64	16	23	3	2	0	44	4	17	1	0	1	23	0	5	6	0	1	12	217
Total Volume	1	10	257	4	4	276	0	18	75	158	8	259	83	102	22	8	4	219	31	57	5	2	22	117	4	27	16	0	17	64	935
% App. Total	0.4	3.6	93.1	1.4	1.4		0	6.9	29	61	3.1		37.9	46.6	10	3.7	1.8		26.5	48.7	4.3	1.7	18.8		6.2	42.2	25	0	26.6		
PHF	.250	.500	.834	.500	1.000	.841	.000	.750	.647	.940	.500	.887	.865	.823	.611	.333	.500	.760	.596	.792	.625	.500	.550	.770	.333	.750	.667	.000	.708	.762	.946
Cars & Peds	1	10	257	4	4	276	0	18	71	156	8	253	81	99	22	6	4	212	30	53	5	2	22	112	4	26	16	0	17	63	916
% Cars & Peds	100	100	100	100	100	100	0	100	94.7	98.7	100	97.7	97.6	97.1	100	75.0	100	96.8	96.8	93.0	100	100	100	95.7	100	96.3	100	0	100	98.4	98.0
Trucks & Buses	0	0	0	0	0	0	0	0	4	2	0	6	2	3	0	1	0	6	1	2	0	0	0	3	0	1	0	0	0	1	16
% Trucks & Buses	0	0	0	0	0	0	0	0	5.3	1.3	0	2.3	2.4	2.9	0	12.5	0	2.7	3.2	3.5	0	0	0	2.6	0	3.7	0	0	0	1.6	1.7
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	2	0	0	0	0	0	0	3
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.5	0	0.5	0	3.5	0	0	0	0	1.7	0	0	0	0	0	0	0.3

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N/S: Cedar Street
W: Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770D
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	1	42	3	76	0	0	1	1	0	124
07:15 AM	3	46	0	109	4	0	1	6	1	170
07:30 AM	2	56	3	62	7	1	3	7	2	143
07:45 AM	3	51	3	73	6	0	2	5	0	143
Total	9	195	9	320	17	1	7	19	3	580
08:00 AM	2	66	4	73	5	1	5	6	1	163
08:15 AM	7	55	14	65	10	0	2	5	2	160
08:30 AM	10	55	4	74	6	0	3	9	0	161
08:45 AM	2	53	0	76	2	0	3	3	1	140
Total	21	229	22	288	23	1	13	23	4	624
Grand Total	30	424	31	608	40	2	20	42	7	1204
Apprch %	6.2	87.4	6.4	93.5	6.2	0.3	29	60.9	10.1	
Total %	2.5	35.2	2.6	50.5	3.3	0.2	1.7	3.5	0.6	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	3	51	3	57	73	6	0	79	2	5	0	7	143
08:00 AM	2	66	4	72	73	5	1	79	5	6	1	12	163
08:15 AM	7	55	14	76	65	10	0	75	2	5	2	9	160
08:30 AM	10	55	4	69	74	6	0	80	3	9	0	12	161
Total Volume	22	227	25	274	285	27	1	313	12	25	3	40	627
% App. Total	8	82.8	9.1		91.1	8.6	0.3		30	62.5	7.5		
PHF	.550	.860	.446	.901	.963	.675	.250	.978	.600	.694	.375	.833	.962

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N/S: Cedar Street
W: Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770D
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	0	1	0	2	0	0	0	0	0	3
07:15 AM	0	0	0	2	0	0	0	0	0	2
07:30 AM	0	3	0	7	1	0	0	0	0	11
07:45 AM	0	1	0	3	0	0	0	0	0	4
Total	0	5	0	14	1	0	0	0	0	20
08:00 AM	0	1	0	3	0	0	0	0	0	4
08:15 AM	1	1	0	2	0	0	0	0	0	4
08:30 AM	1	1	0	2	0	0	0	0	0	4
08:45 AM	0	2	0	1	0	0	0	0	0	3
Total	2	5	0	8	0	0	0	0	0	15
Grand Total	2	10	0	22	1	0	0	0	0	35
Apprch %	16.7	83.3	0	95.7	4.3	0	0	0	0	
Total %	5.7	28.6	0	62.9	2.9	0	0	0	0	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	3	0	3	7	1	0	8	0	0	0	0	11
07:45 AM	0	1	0	1	3	0	0	3	0	0	0	0	4
08:00 AM	0	1	0	1	3	0	0	3	0	0	0	0	4
08:15 AM	1	1	0	2	2	0	0	2	0	0	0	0	4
Total Volume	1	6	0	7	15	1	0	16	0	0	0	0	23
% App. Total	14.3	85.7	0		93.8	6.2	0		0	0	0		
PHF	.250	.500	.000	.583	.536	.250	.000	.500	.000	.000	.000	.000	.523

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N/S: Cedar Street
W: Madison Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770D
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	1	1	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	1	0	0	1
Total	0	0	0	1	1	0	1	0	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	1	1	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	0	0	0	2
Grand Total	0	0	0	2	2	0	1	0	0	5
Apprch %	0	0	0	50	50	0	100	0	0	
Total %	0	0	0	40	40	0	20	0	0	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	0	0	0	1	1	0	2	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	1	1	0	2	0	0	0	0	2
Total Volume	0	0	0	0	2	2	0	4	1	0	0	1	5
% App. Total	0	0	0	0	50	50	0	50	100	0	0	25	62.5
PHF	.000	.000	.000	.000	.500	.500	.000	.500	.250	.000	.000	.250	.625

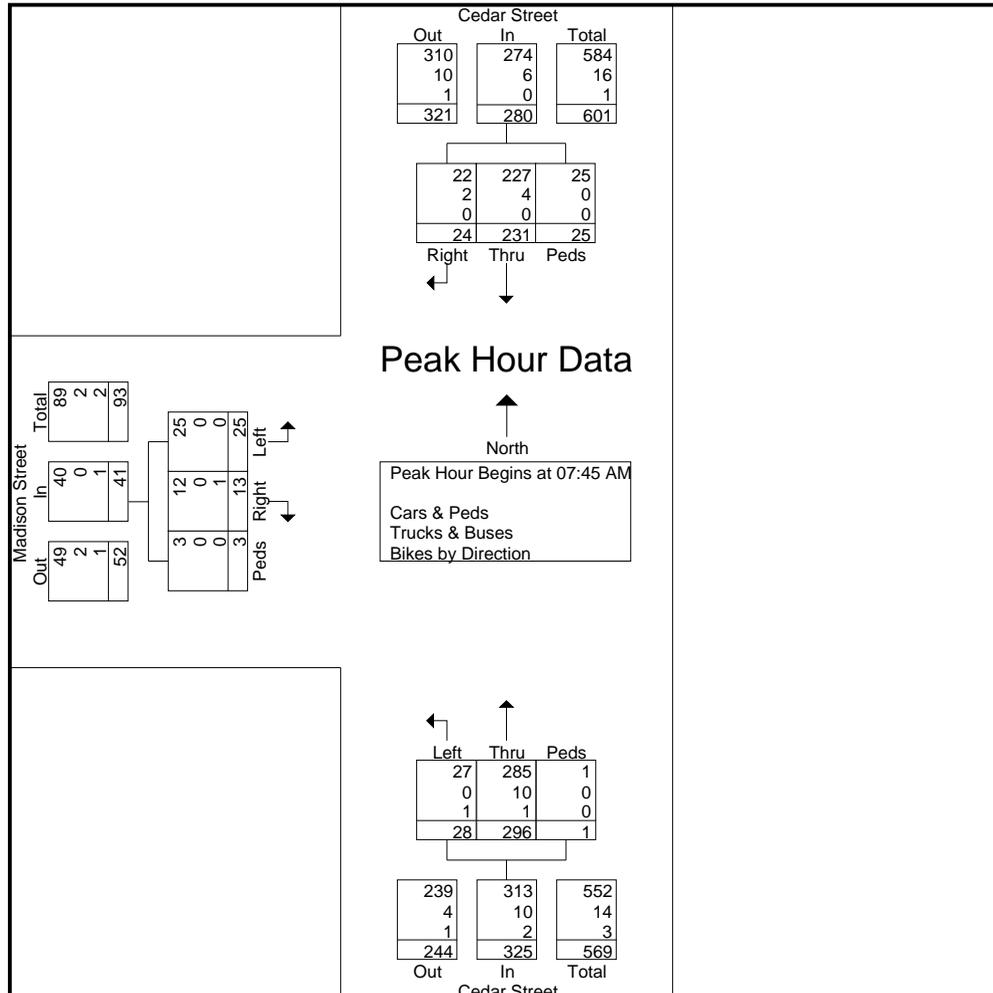
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File Name : 05770D
Site Code : 23178.00
Start Date : 10/11/2023
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Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	3	52	3	58	76	6	0	82	3	5	0	8	148
08:00 AM	2	67	4	73	76	5	1	82	5	6	1	12	167
08:15 AM	8	56	14	78	68	11	0	79	2	5	2	9	166
08:30 AM	11	56	4	71	76	6	0	82	3	9	0	12	165
Total Volume	24	231	25	280	296	28	1	325	13	25	3	41	646
% App. Total	8.6	82.5	8.9		91.1	8.6	0.3		31.7	61	7.3		
PHF	.545	.862	.446	.897	.974	.636	.250	.991	.650	.694	.375	.854	.967
Cars & Peds	22	227	25	274	285	27	1	313	12	25	3	40	627
% Cars & Peds	91.7	98.3	100	97.9	96.3	96.4	100	96.3	92.3	100	100	97.6	97.1
Trucks & Buses	2	4	0	6	10	0	0	10	0	0	0	0	16
% Trucks & Buses	8.3	1.7	0	2.1	3.4	0	0	3.1	0	0	0	0	2.5
Bikes by Direction	0	0	0	0	1	1	0	2	1	0	0	1	3
% Bikes by Direction	0	0	0	0	0.3	3.6	0	0.6	7.7	0	0	2.4	0.5



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File Name : 05770D
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	1	43	3	78	0	0	1	1	0	127
07:15 AM	3	46	0	111	4	0	1	6	1	172
07:30 AM	2	59	3	70	9	1	3	7	2	156
07:45 AM	3	52	3	76	6	0	3	5	0	148
Total	9	200	9	335	19	1	8	19	3	603
08:00 AM	2	67	4	76	5	1	5	6	1	167
08:15 AM	8	56	14	68	11	0	2	5	2	166
08:30 AM	11	56	4	76	6	0	3	9	0	165
08:45 AM	2	55	0	77	2	0	3	3	1	143
Total	23	234	22	297	24	1	13	23	4	641
Grand Total	32	434	31	632	43	2	21	42	7	1244
Apprch %	6.4	87.3	6.2	93.4	6.4	0.3	30	60	10	
Total %	2.6	34.9	2.5	50.8	3.5	0.2	1.7	3.4	0.6	
Cars & Peds	30	424	31	608	40	2	20	42	7	1204
% Cars & Peds	93.8	97.7	100	96.2	93	100	95.2	100	100	96.8
Trucks & Buses	2	10	0	22	1	0	0	0	0	35
% Trucks & Buses	6.2	2.3	0	3.5	2.3	0	0	0	0	2.8
Bikes by Direction	0	0	0	2	2	0	1	0	0	5
% Bikes by Direction	0	0	0	0.3	4.7	0	4.8	0	0	0.4

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	3	52	3	58	76	6	0	82	3	5	0	8	148
08:00 AM	2	67	4	73	76	5	1	82	5	6	1	12	167
08:15 AM	8	56	14	78	68	11	0	79	2	5	2	9	166
08:30 AM	11	56	4	71	76	6	0	82	3	9	0	12	165
Total Volume	24	231	25	280	296	28	1	325	13	25	3	41	646
% App. Total	8.6	82.5	8.9	100	91.1	8.6	0.3	100	31.7	61	7.3	100	97.6
PHF	.545	.862	.446	.897	.974	.636	.250	.991	.650	.694	.375	.854	.967
Cars & Peds	22	227	25	274	285	27	1	313	12	25	3	40	627
% Cars & Peds	91.7	98.3	100	97.9	96.3	96.4	100	96.3	92.3	100	100	97.6	97.1
Trucks & Buses	2	4	0	6	10	0	0	10	0	0	0	0	16
% Trucks & Buses	8.3	1.7	0	2.1	3.4	0	0	3.1	0	0	0	0	2.5
Bikes by Direction	0	0	0	0	1	1	0	2	1	0	0	1	3
% Bikes by Direction	0	0	0	0	0.3	3.6	0	0.6	7.7	0	0	2.4	0.5

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Client: Pare/Derek Hug

File Name : 05770DD
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	76	2	56	1	0	5	0	0	140
02:15 PM	1	55	1	45	3	0	4	2	2	113
02:30 PM	5	70	2	51	1	0	2	3	0	134
02:45 PM	12	98	8	55	10	0	8	3	2	196
Total	18	299	13	207	15	0	19	8	4	583
03:00 PM	13	99	11	60	2	0	11	5	3	204
03:15 PM	4	124	6	43	1	2	7	0	0	187
03:30 PM	5	123	0	45	1	0	5	1	1	181
03:45 PM	5	104	1	51	3	0	6	3	1	174
Total	27	450	18	199	7	2	29	9	5	746
04:00 PM	4	126	3	52	1	0	9	0	0	195
04:15 PM	7	85	0	53	1	1	7	2	0	156
04:30 PM	4	94	0	46	1	0	6	3	0	154
04:45 PM	4	91	0	81	4	0	4	4	1	189
Total	19	396	3	232	7	1	26	9	1	694
05:00 PM	8	83	1	55	4	0	7	4	1	163
05:15 PM	7	62	2	53	3	0	6	4	1	138
05:30 PM	7	94	1	73	0	1	4	2	1	183
05:45 PM	3	81	5	67	2	0	9	4	2	173
Total	25	320	9	248	9	1	26	14	5	657
Grand Total	89	1465	43	886	38	4	100	40	15	2680
Apprch %	5.6	91.7	2.7	95.5	4.1	0.4	64.5	25.8	9.7	
Total %	3.3	54.7	1.6	33.1	1.4	0.1	3.7	1.5	0.6	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:45 PM													
02:45 PM	12	98	8	118	55	10	0	65	8	3	2	13	196
03:00 PM	13	99	11	123	60	2	0	62	11	5	3	19	204
03:15 PM	4	124	6	134	43	1	2	46	7	0	0	7	187
03:30 PM	5	123	0	128	45	1	0	46	5	1	1	7	181
Total Volume	34	444	25	503	203	14	2	219	31	9	6	46	768
% App. Total	6.8	88.3	5		92.7	6.4	0.9		67.4	19.6	13		
PHF	.654	.895	.568	.938	.846	.350	.250	.842	.705	.450	.500	.605	.941

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 Client: Pare/Derek Hug

File Name : 05770DD
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	0	0	5	0	0	0	0	0	5
02:15 PM	0	4	0	0	0	0	0	0	0	4
02:30 PM	0	2	0	3	0	0	0	0	0	5
02:45 PM	1	1	0	2	0	0	1	0	0	5
Total	1	7	0	10	0	0	1	0	0	19
03:00 PM	1	0	0	0	0	0	1	0	0	2
03:15 PM	0	0	0	2	0	0	1	0	0	3
03:30 PM	0	1	0	0	0	0	0	0	0	1
03:45 PM	0	3	0	2	0	0	0	0	0	5
Total	1	4	0	4	0	0	2	0	0	11
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	1	0	0	0	0	0	2
04:30 PM	0	2	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	3	0	0	0	0	0	3
Total	0	3	0	4	0	0	0	0	0	7
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	1	0	0	0	0	0	2
05:45 PM	0	0	0	1	0	0	0	0	0	1
Total	0	1	0	2	0	0	0	0	0	3
Grand Total	2	15	0	20	0	0	3	0	0	40
Apprch %	11.8	88.2	0	100	0	0	100	0	0	
Total %	5	37.5	0	50	0	0	7.5	0	0	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	0	0	0	0	5	0	0	5	0	0	0	0	5
02:15 PM	0	4	0	4	0	0	0	0	0	0	0	0	4
02:30 PM	0	2	0	2	3	0	0	3	0	0	0	0	5
02:45 PM	1	1	0	2	2	0	0	2	1	0	0	1	5
Total Volume	1	7	0	8	10	0	0	10	1	0	0	1	19
% App. Total	12.5	87.5	0		100	0	0		100	0	0		
PHF	.250	.438	.000	.500	.500	.000	.000	.500	.250	.000	.000	.250	.950

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 Client: Pare/Derek Hug

File Name : 05770DD
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	1	0	0	0	0	0	0	0	1
02:30 PM	0	0	0	1	0	0	0	0	0	1
02:45 PM	0	0	0	0	0	0	1	0	0	1
Total	0	1	0	1	0	0	1	0	0	3
03:00 PM	1	1	0	0	0	0	0	0	0	2
03:15 PM	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	1	0	0	0	0	0	0	0	2
04:00 PM	1	1	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	2	0	6	0	0	0	0	0	8
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	3	0	6	0	0	0	0	0	10
05:00 PM	0	2	0	0	0	0	0	0	0	2
05:15 PM	0	2	0	1	0	0	0	0	0	3
05:30 PM	0	3	0	0	0	0	0	0	0	3
05:45 PM	0	5	0	0	0	0	0	0	0	5
Total	0	12	0	1	0	0	0	0	0	13
Grand Total	2	17	0	8	0	0	1	0	0	28
Apprch %	10.5	89.5	0	100	0	0	100	0	0	
Total %	7.1	60.7	0	28.6	0	0	3.6	0	0	

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	2	0	2	6	0	0	6	0	0	0	0	8
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	2	0	2	0	0	0	0	0	0	0	0	2
05:15 PM	0	2	0	2	1	0	0	1	0	0	0	0	3
Total Volume	0	6	0	6	7	0	0	7	0	0	0	0	13
% App. Total	0	100	0		100	0	0		0	0	0		
PHF	.000	.750	.000	.750	.292	.000	.000	.292	.000	.000	.000	.000	.406

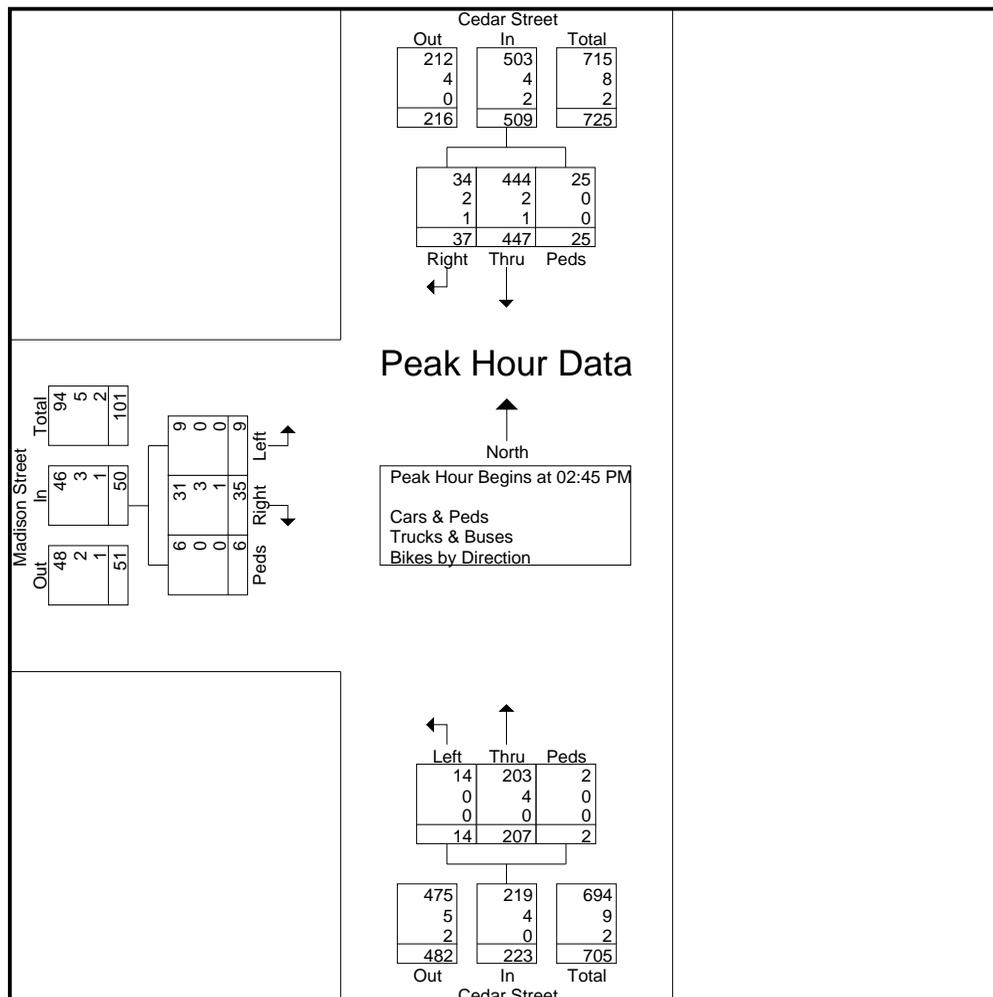
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Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:45 PM													
02:45 PM	13	99	8	120	57	10	0	67	10	3	2	15	202
03:00 PM	15	100	11	126	60	2	0	62	12	5	3	20	208
03:15 PM	4	124	6	134	45	1	2	48	8	0	0	8	190
03:30 PM	5	124	0	129	45	1	0	46	5	1	1	7	182
Total Volume	37	447	25	509	207	14	2	223	35	9	6	50	782
% App. Total	7.3	87.8	4.9		92.8	6.3	0.9		70	18	12		
PHF	.617	.901	.568	.950	.863	.350	.250	.832	.729	.450	.500	.625	.940
Cars & Peds	34	444	25	503	203	14	2	219	31	9	6	46	768
% Cars & Peds	91.9	99.3	100	98.8	98.1	100	100	98.2	88.6	100	100	92.0	98.2
Trucks & Buses	2	2	0	4	4	0	0	4	3	0	0	3	11
% Trucks & Buses	5.4	0.4	0	0.8	1.9	0	0	1.8	8.6	0	0	6.0	1.4
Bikes by Direction	1	1	0	2	0	0	0	0	1	0	0	1	3
% Bikes by Direction	2.7	0.2	0	0.4	0	0	0	0	2.9	0	0	2.0	0.4



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File Name : 05770DD
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Cedar Street From North			Cedar Street From South			Madison Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	76	2	61	1	0	5	0	0	145
02:15 PM	1	60	1	45	3	0	4	2	2	118
02:30 PM	5	72	2	55	1	0	2	3	0	140
02:45 PM	13	99	8	57	10	0	10	3	2	202
Total	19	307	13	218	15	0	21	8	4	605
03:00 PM	15	100	11	60	2	0	12	5	3	208
03:15 PM	4	124	6	45	1	2	8	0	0	190
03:30 PM	5	124	0	45	1	0	5	1	1	182
03:45 PM	5	107	1	53	3	0	6	3	1	179
Total	29	455	18	203	7	2	31	9	5	759
04:00 PM	5	127	3	52	1	0	9	0	0	197
04:15 PM	7	86	0	54	1	1	7	2	0	158
04:30 PM	4	98	0	52	1	0	6	3	0	164
04:45 PM	4	91	0	84	4	0	4	4	1	192
Total	20	402	3	242	7	1	26	9	1	711
05:00 PM	8	85	1	55	4	0	7	4	1	165
05:15 PM	7	64	2	54	3	0	6	4	1	141
05:30 PM	7	98	1	74	0	1	4	2	1	188
05:45 PM	3	86	5	68	2	0	9	4	2	179
Total	25	333	9	251	9	1	26	14	5	673
Grand Total	93	1497	43	914	38	4	104	40	15	2748
Apprch %	5.7	91.7	2.6	95.6	4	0.4	65.4	25.2	9.4	
Total %	3.4	54.5	1.6	33.3	1.4	0.1	3.8	1.5	0.5	
Cars & Peds	89	1465	43	886	38	4	100	40	15	2680
% Cars & Peds	95.7	97.9	100	96.9	100	100	96.2	100	100	97.5
Trucks & Buses	2	15	0	20	0	0	3	0	0	40
% Trucks & Buses	2.2	1	0	2.2	0	0	2.9	0	0	1.5
Bikes by Direction	2	17	0	8	0	0	1	0	0	28
% Bikes by Direction	2.2	1.1	0	0.9	0	0	1	0	0	1

Start Time	Cedar Street From North				Cedar Street From South				Madison Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:45 PM													
02:45 PM	13	99	8	120	57	10	0	67	10	3	2	15	202
03:00 PM	15	100	11	126	60	2	0	62	12	5	3	20	208
03:15 PM	4	124	6	134	45	1	2	48	8	0	0	8	190
03:30 PM	5	124	0	129	45	1	0	46	5	1	1	7	182
Total Volume	37	447	25	509	207	14	2	223	35	9	6	50	782
% App. Total	7.3	87.8	4.9		92.8	6.3	0.9		70	18	12		
PHF	.617	.901	.568	.950	.863	.350	.250	.832	.729	.450	.500	.625	.940
Cars & Peds	34	444	25	503	203	14	2	219	31	9	6	46	768
% Cars & Peds	91.9	99.3	100	98.8	98.1	100	100	98.2	88.6	100	100	92.0	98.2
Trucks & Buses	2	2	0	4	4	0	0	4	3	0	0	3	11
% Trucks & Buses	5.4	0.4	0	0.8	1.9	0	0	1.8	8.6	0	0	6.0	1.4
Bikes by Direction	1	1	0	2	0	0	0	0	1	0	0	1	3
% Bikes by Direction	2.7	0.2	0	0.4	0	0	0	0	2.9	0	0	2.0	0.4

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N/S: Cedar Street
 E: Turner Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770E
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	51	4	4	10	8	2	2	72	0	153
07:15 AM	66	3	0	27	13	0	9	87	0	205
07:30 AM	59	11	1	15	10	0	8	57	2	163
07:45 AM	69	7	2	17	16	1	7	64	0	183
Total	245	25	7	69	47	3	26	280	2	704
08:00 AM	78	7	0	13	4	0	2	74	0	178
08:15 AM	69	8	2	9	11	0	4	67	4	174
08:30 AM	66	3	3	8	9	0	5	79	0	173
08:45 AM	65	4	4	6	3	0	7	74	0	163
Total	278	22	9	36	27	0	18	294	4	688
Grand Total	523	47	16	105	74	3	44	574	6	1392
Apprch %	89.2	8	2.7	57.7	40.7	1.6	7.1	92	1	
Total %	37.6	3.4	1.1	7.5	5.3	0.2	3.2	41.2	0.4	

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	66	3	0	69	27	13	0	40	9	87	0	96	205
07:30 AM	59	11	1	71	15	10	0	25	8	57	2	67	163
07:45 AM	69	7	2	78	17	16	1	34	7	64	0	71	183
08:00 AM	78	7	0	85	13	4	0	17	2	74	0	76	178
Total Volume	272	28	3	303	72	43	1	116	26	282	2	310	729
% App. Total	89.8	9.2	1		62.1	37.1	0.9		8.4	91	0.6		
PHF	.872	.636	.375	.891	.667	.672	.250	.725	.722	.810	.250	.807	.889

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File Name : 05770E
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	1	0	1	1	0	0	1	0	4
07:15 AM	1	0	0	0	0	0	1	2	0	4
07:30 AM	2	0	0	3	0	0	0	5	0	10
07:45 AM	1	0	0	0	0	0	1	2	0	4
Total	4	1	0	4	1	0	2	10	0	22
08:00 AM	2	0	0	1	0	0	0	2	0	5
08:15 AM	1	0	0	1	0	0	0	2	0	4
08:30 AM	2	0	0	0	0	0	0	4	0	6
08:45 AM	2	0	0	1	0	0	0	1	0	4
Total	7	0	0	3	0	0	0	9	0	19
Grand Total	11	1	0	7	1	0	2	19	0	41
Apprch %	91.7	8.3	0	87.5	12.5	0	9.5	90.5	0	
Total %	26.8	2.4	0	17.1	2.4	0	4.9	46.3	0	

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	1	0	0	1	0	0	0	0	1	2	0	3	4
07:30 AM	2	0	0	2	3	0	0	3	0	5	0	5	10
07:45 AM	1	0	0	1	0	0	0	0	1	2	0	3	4
08:00 AM	2	0	0	2	1	0	0	1	0	2	0	2	5
Total Volume	6	0	0	6	4	0	0	4	2	11	0	13	23
% App. Total	100	0	0	100	100	0	0	100	15.4	84.6	0	100	100
PHF	.750	.000	.000	.750	.333	.000	.000	.333	.500	.550	.000	.650	.575

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File Name : 05770E
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	0	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	1	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	1	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	1	0	0	0	1	0	2
Apprch %	0	0	0	100	0	0	0	100	0	
Total %	0	0	0	50	0	0	0	50	0	

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	0	0	1	0	1	0	1	2
% App. Total	0	0	0	0	100	0	0	0	0	100	0	0	
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.250	.000	.250	.500

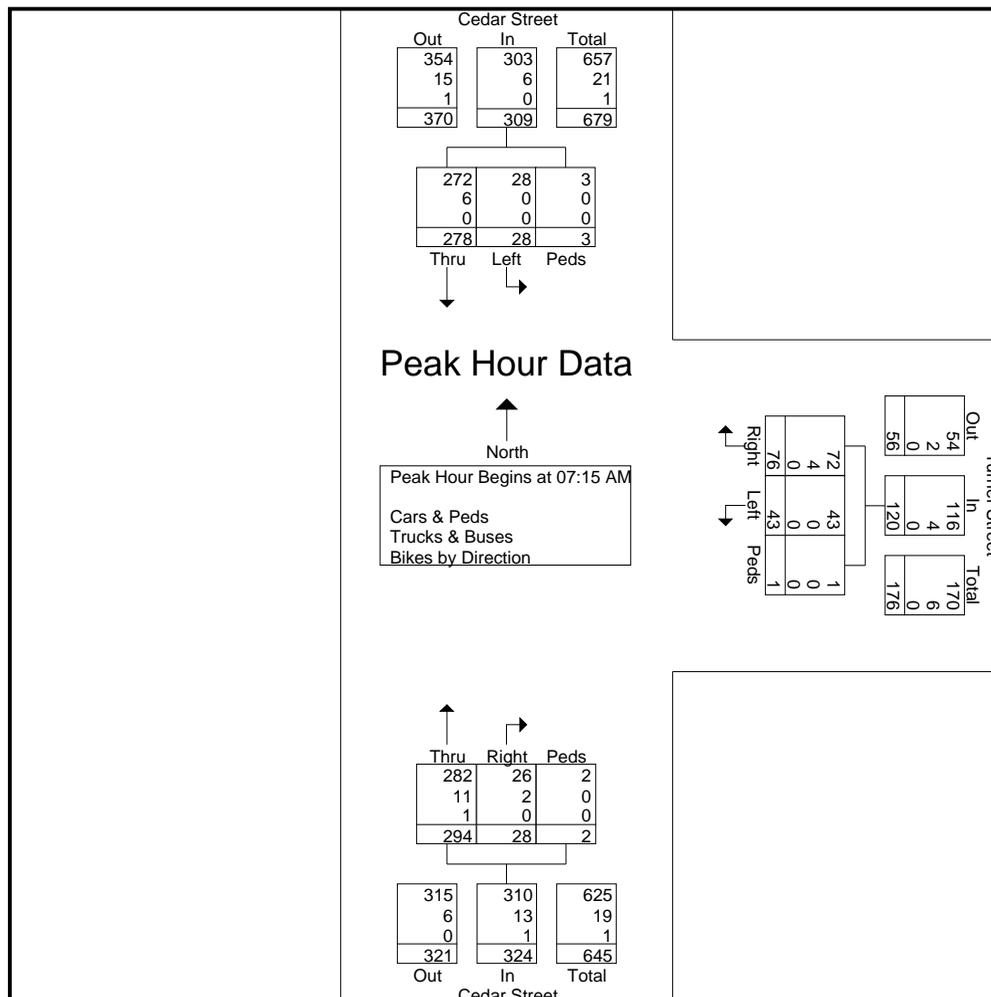
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File Name : 05770E
Site Code : 23178.00
Start Date : 10/11/2023
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Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	67	3	0	70	27	13	0	40	10	89	0	99	209
07:30 AM	61	11	1	73	18	10	0	28	8	63	2	73	174
07:45 AM	70	7	2	79	17	16	1	34	8	66	0	74	187
08:00 AM	80	7	0	87	14	4	0	18	2	76	0	78	183
Total Volume	278	28	3	309	76	43	1	120	28	294	2	324	753
% App. Total	90	9.1	1		63.3	35.8	0.8		8.6	90.7	0.6		
PHF	.869	.636	.375	.888	.704	.672	.250	.750	.700	.826	.250	.818	.901
Cars & Peds	272	28	3	303	72	43	1	116	26	282	2	310	729
% Cars & Peds	97.8	100	100	98.1	94.7	100	100	96.7	92.9	95.9	100	95.7	96.8
Trucks & Buses	6	0	0	6	4	0	0	4	2	11	0	13	23
% Trucks & Buses	2.2	0	0	1.9	5.3	0	0	3.3	7.1	3.7	0	4.0	3.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	1	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0.3	0	0.3	0.1



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File Name : 05770E
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	51	5	4	12	9	2	2	73	0	158
07:15 AM	67	3	0	27	13	0	10	89	0	209
07:30 AM	61	11	1	18	10	0	8	63	2	174
07:45 AM	70	7	2	17	16	1	8	66	0	187
Total	249	26	7	74	48	3	28	291	2	728
08:00 AM	80	7	0	14	4	0	2	76	0	183
08:15 AM	70	8	2	10	11	0	4	69	4	178
08:30 AM	68	3	3	8	9	0	5	83	0	179
08:45 AM	67	4	4	7	3	0	7	75	0	167
Total	285	22	9	39	27	0	18	303	4	707
Grand Total	534	48	16	113	75	3	46	594	6	1435
Apprch %	89.3	8	2.7	59.2	39.3	1.6	7.1	92	0.9	
Total %	37.2	3.3	1.1	7.9	5.2	0.2	3.2	41.4	0.4	
Cars & Peds	523	47	16	105	74	3	44	574	6	1392
% Cars & Peds	97.9	97.9	100	92.9	98.7	100	95.7	96.6	100	97
Trucks & Buses	11	1	0	7	1	0	2	19	0	41
% Trucks & Buses	2.1	2.1	0	6.2	1.3	0	4.3	3.2	0	2.9
Bikes by Direction	0	0	0	1	0	0	0	1	0	2
% Bikes by Direction	0	0	0	0.9	0	0	0	0.2	0	0.1

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	67	3	0	70	27	13	0	40	10	89	0	99	209
07:30 AM	61	11	1	73	18	10	0	28	8	63	2	73	174
07:45 AM	70	7	2	79	17	16	1	34	8	66	0	74	187
08:00 AM	80	7	0	87	14	4	0	18	2	76	0	78	183
Total Volume	278	28	3	309	76	43	1	120	28	294	2	324	753
% App. Total	90	9.1	1		63.3	35.8	0.8		8.6	90.7	0.6		
PHF	.869	.636	.375	.888	.704	.672	.250	.750	.700	.826	.250	.818	.901
Cars & Peds	272	28	3	303	72	43	1	116	26	282	2	310	729
% Cars & Peds	97.8	100	100	98.1	94.7	100	100	96.7	92.9	95.9	100	95.7	96.8
Trucks & Buses	6	0	0	6	4	0	0	4	2	11	0	13	23
% Trucks & Buses	2.2	0	0	1.9	5.3	0	0	3.3	7.1	3.7	0	4.0	3.1
Bikes by Direction	0	0	0	0	0	0	0	0	0	1	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0.3	0	0.3	0.1

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 Client: Pare/Derek Hug

File Name : 05770EE
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	80	8	0	13	6	1	9	58	0	175
02:15 PM	55	15	0	13	7	0	10	50	0	150
02:30 PM	77	5	0	8	9	1	9	51	1	161
02:45 PM	89	20	0	7	4	0	16	67	0	203
Total	301	48	0	41	26	2	44	226	1	689
03:00 PM	115	9	0	9	4	2	9	69	0	217
03:15 PM	122	15	0	5	7	2	3	46	0	200
03:30 PM	131	20	0	7	8	0	13	48	0	227
03:45 PM	104	16	0	5	11	0	4	70	0	210
Total	472	60	0	26	30	4	29	233	0	854
04:00 PM	136	16	0	14	13	2	5	57	0	243
04:15 PM	87	14	0	5	11	1	11	53	0	182
04:30 PM	81	18	0	13	12	1	11	49	0	185
04:45 PM	95	24	0	9	8	0	7	78	0	221
Total	399	72	0	41	44	4	34	237	0	831
05:00 PM	103	19	0	6	6	0	4	60	0	198
05:15 PM	74	14	0	10	12	0	8	65	0	183
05:30 PM	93	8	1	10	10	1	8	71	0	202
05:45 PM	87	13	0	12	13	0	10	60	0	195
Total	357	54	1	38	41	1	30	256	0	778
Grand Total	1529	234	1	146	141	11	137	952	1	3152
Apprch %	86.7	13.3	0.1	49	47.3	3.7	12.6	87.3	0.1	
Total %	48.5	7.4	0	4.6	4.5	0.3	4.3	30.2	0	

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:15 PM													
03:15 PM	122	15	0	137	5	7	2	14	3	46	0	49	200
03:30 PM	131	20	0	151	7	8	0	15	13	48	0	61	227
03:45 PM	104	16	0	120	5	11	0	16	4	70	0	74	210
04:00 PM	136	16	0	152	14	13	2	29	5	57	0	62	243
Total Volume	493	67	0	560	31	39	4	74	25	221	0	246	880
% App. Total	88	12	0		41.9	52.7	5.4		10.2	89.8	0		
PHF	.906	.838	.000	.921	.554	.750	.500	.638	.481	.789	.000	.831	.905

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Client: Pare/Derek Hug

File Name : 05770EE
Site Code : 23178.00
Start Date : 10/11/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	0	0	0	0	0	0	0	5	0	5
02:15 PM	4	0	0	0	0	0	0	0	0	4
02:30 PM	2	0	0	2	0	0	0	2	0	6
02:45 PM	2	0	0	1	1	0	0	2	0	6
Total	8	0	0	3	1	0	0	9	0	21
03:00 PM	0	0	0	0	0	0	0	0	0	0
03:15 PM	1	1	0	0	1	0	0	2	0	5
03:30 PM	1	0	0	0	0	0	1	0	0	2
03:45 PM	2	0	0	0	1	0	0	2	0	5
Total	4	1	0	0	2	0	1	4	0	12
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	1	0	1
04:30 PM	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	2	0	2
Total	1	0	0	0	0	0	0	3	0	4
05:00 PM	1	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	2	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	0	0	0	0	0	3
Grand Total	16	1	0	3	3	0	1	16	0	40
Apprch %	94.1	5.9	0	50	50	0	5.9	94.1	0	
Total %	40	2.5	0	7.5	7.5	0	2.5	40	0	

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	0	0	0	0	0	0	0	0	0	5	0	5	5
02:15 PM	4	0	0	4	0	0	0	0	0	0	0	0	4
02:30 PM	2	0	0	2	2	0	0	2	0	2	0	2	6
02:45 PM	2	0	0	2	1	1	0	2	0	2	0	2	6
Total Volume	8	0	0	8	3	1	0	4	0	9	0	9	21
% App. Total	100	0	0		75	25	0		0	100	0		
PHF	.500	.000	.000	.500	.375	.250	.000	.500	.000	.450	.000	.450	.875

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File Name : 05770EE
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Turner Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	1	0	0	0	0	0	0	0	1
02:30 PM	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	0	1
03:00 PM	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	2	0	2
04:30 PM	0	2	0	2	0	0	0	0	0	4
04:45 PM	1	0	0	0	0	0	0	0	0	1
Total	1	2	0	2	0	0	0	2	0	7
05:00 PM	0	1	0	0	0	0	0	0	0	1
05:15 PM	0	1	0	1	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	3	0	0	0	0	0	0	0	0	3
Total	3	2	0	1	0	0	0	0	0	6
Grand Total	4	5	0	3	0	0	0	2	0	14
Apprch %	44.4	55.6	0	100	0	0	0	100	0	
Total %	28.6	35.7	0	21.4	0	0	0	14.3	0	

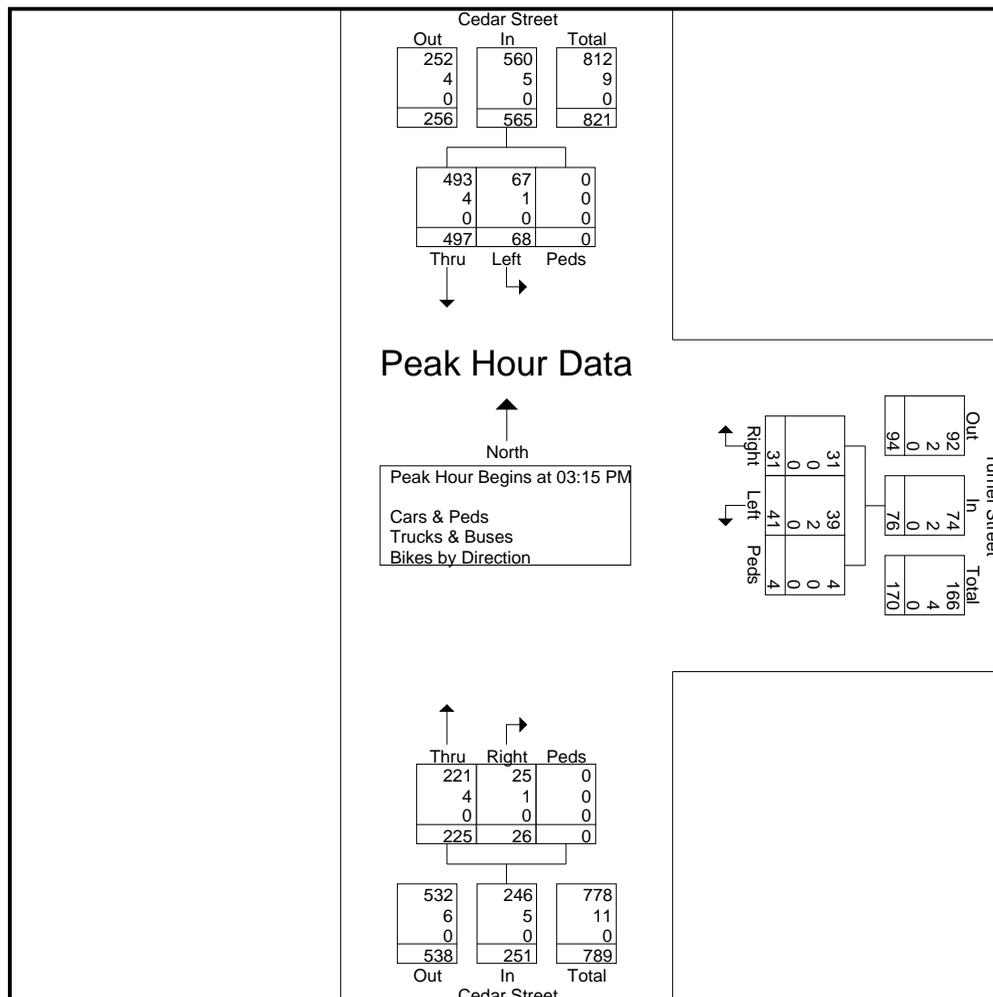
Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	2
04:30 PM	0	2	0	2	2	0	0	2	0	0	0	0	4
04:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	1
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	1	3	0	4	2	0	0	2	0	2	0	2	8
% App. Total	25	75	0		100	0	0		0	100	0		
PHF	.250	.375	.000	.500	.250	.000	.000	.250	.000	.250	.000	.250	.500

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 E: Turner Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770EE
 Site Code : 23178.00
 Start Date : 10/11/2023
 Page No : 1

Start Time	Cedar Street From North				Turner Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 03:15 PM													
03:15 PM	123	16	0	139	5	8	2	15	3	48	0	51	205
03:30 PM	132	20	0	152	7	8	0	15	14	48	0	62	229
03:45 PM	106	16	0	122	5	12	0	17	4	72	0	76	215
04:00 PM	136	16	0	152	14	13	2	29	5	57	0	62	243
Total Volume	497	68	0	565	31	41	4	76	26	225	0	251	892
% App. Total	88	12	0		40.8	53.9	5.3		10.4	89.6	0		
PHF	.914	.850	.000	.929	.554	.788	.500	.655	.464	.781	.000	.826	.918
Cars & Peds	493	67	0	560	31	39	4	74	25	221	0	246	880
% Cars & Peds	99.2	98.5	0	99.1	100	95.1	100	97.4	96.2	98.2	0	98.0	98.7
Trucks & Buses	4	1	0	5	0	2	0	2	1	4	0	5	12
% Trucks & Buses	0.8	1.5	0	0.9	0	4.9	0	2.6	3.8	1.8	0	2.0	1.3
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770F
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	75	0	0	4	75	0	104	66	0	324
07:15 AM	79	1	0	4	81	0	121	65	1	352
07:30 AM	96	4	0	1	74	0	134	76	1	386
07:45 AM	107	3	0	1	87	0	146	66	1	411
Total	357	8	0	10	317	0	505	273	3	1473
08:00 AM	72	4	0	3	78	0	152	85	1	395
08:15 AM	83	4	0	3	83	0	138	74	0	385
08:30 AM	94	0	0	2	60	0	134	77	0	367
08:45 AM	85	0	0	1	55	0	129	71	0	341
Total	334	8	0	9	276	0	553	307	1	1488
Grand Total	691	16	0	19	593	0	1058	580	4	2961
Apprch %	97.7	2.3	0	3.1	96.9	0	64.4	35.3	0.2	
Total %	23.3	0.5	0	0.6	20	0	35.7	19.6	0.1	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	96	4	0	100	1	74	0	75	134	76	1	211	386
07:45 AM	107	3	0	110	1	87	0	88	146	66	1	213	411
08:00 AM	72	4	0	76	3	78	0	81	152	85	1	238	395
08:15 AM	83	4	0	87	3	83	0	86	138	74	0	212	385
Total Volume	358	15	0	373	8	322	0	330	570	301	3	874	1577
% App. Total	96	4	0		2.4	97.6	0		65.2	34.4	0.3		
PHF	.836	.938	.000	.848	.667	.925	.000	.938	.938	.885	.750	.918	.959

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Client: Pare/Derek Hug

File Name : 05770F
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	3	1	0	4	4	0	8	2	0	22
07:15 AM	2	0	0	0	1	0	5	3	0	11
07:30 AM	0	0	0	0	2	0	6	2	0	10
07:45 AM	2	0	0	0	5	0	6	1	0	14
Total	7	1	0	4	12	0	25	8	0	57
08:00 AM	1	0	0	0	3	0	2	1	0	7
08:15 AM	1	0	0	0	3	0	6	0	0	10
08:30 AM	1	0	0	0	5	0	2	1	0	9
08:45 AM	3	0	0	0	5	0	1	0	0	9
Total	6	0	0	0	16	0	11	2	0	35
Grand Total	13	1	0	4	28	0	36	10	0	92
Apprch %	92.9	7.1	0	12.5	87.5	0	78.3	21.7	0	
Total %	14.1	1.1	0	4.3	30.4	0	39.1	10.9	0	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
07:00 AM	3	1	0	4	4	4	0	8	8	2	0	10	22
07:15 AM	2	0	0	2	0	1	0	1	5	3	0	8	11
07:30 AM	0	0	0	0	0	2	0	2	6	2	0	8	10
07:45 AM	2	0	0	2	0	5	0	5	6	1	0	7	14
Total Volume	7	1	0	8	4	12	0	16	25	8	0	33	57
% App. Total	87.5	12.5	0	0	25	75	0	0	75.8	24.2	0	0	0
PHF	.583	.250	.000	.500	.250	.600	.000	.500	.781	.667	.000	.825	.648

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

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Client: Pare/Derek Hug

File Name : 05770F
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	0	0	0	0	0	1	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	1	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	1
Grand Total	0	0	0	0	1	0	1	0	0	2
Apprch %	0	0	0	0	100	0	100	0	0	
Total %	0	0	0	0	50	0	50	0	0	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	0	0	0	0	0	0	0	1	0	0	1	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	0	0	1	1
% App. Total	0	0	0	0	0	0	0	0	100	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.250

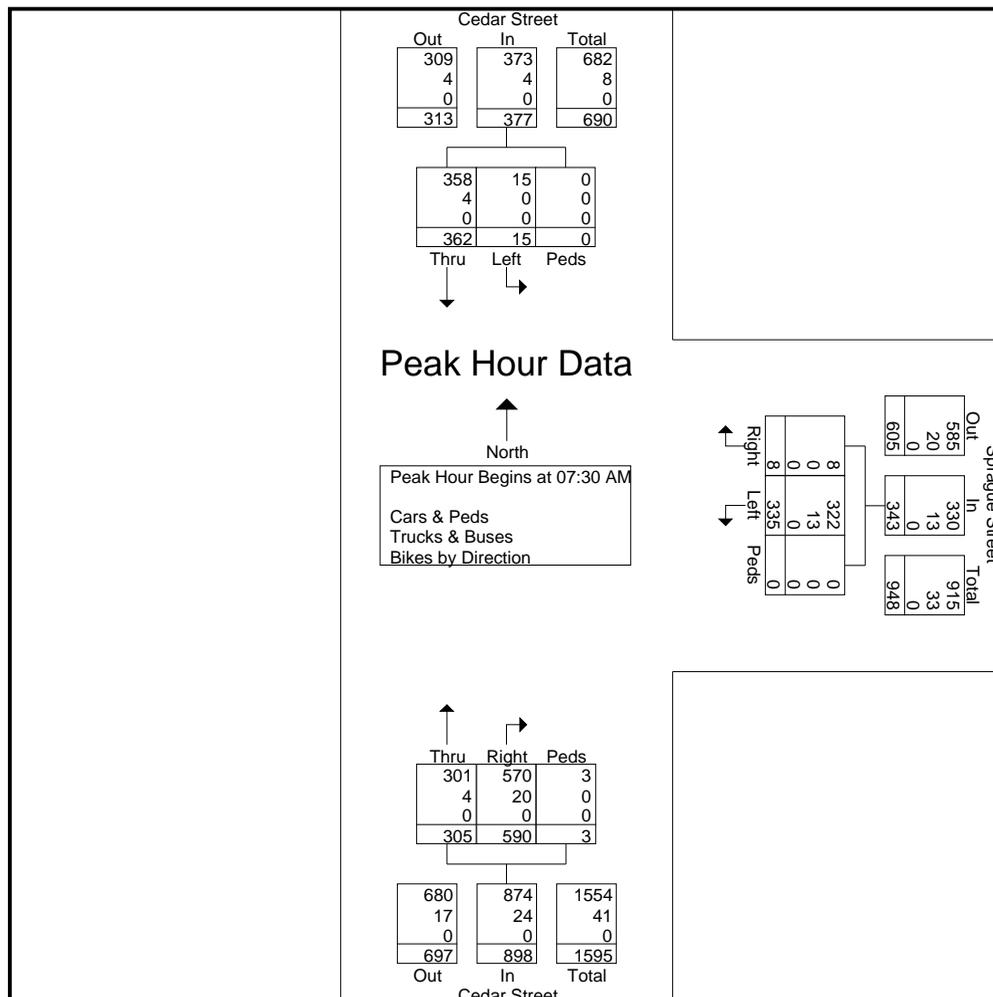
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Client: Pare/Derek Hug

File Name : 05770F
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	96	4	0	100	1	76	0	77	140	78	1	219	396
07:45 AM	109	3	0	112	1	92	0	93	152	67	1	220	425
08:00 AM	73	4	0	77	3	81	0	84	154	86	1	241	402
08:15 AM	84	4	0	88	3	86	0	89	144	74	0	218	395
Total Volume	362	15	0	377	8	335	0	343	590	305	3	898	1618
% App. Total	96	4	0		2.3	97.7	0		65.7	34	0.3		
PHF	.830	.938	.000	.842	.667	.910	.000	.922	.958	.887	.750	.932	.952
Cars & Peds	358	15	0	373	8	322	0	330	570	301	3	874	1577
% Cars & Peds	98.9	100	0	98.9	100	96.1	0	96.2	96.6	98.7	100	97.3	97.5
Trucks & Buses	4	0	0	4	0	13	0	13	20	4	0	24	41
% Trucks & Buses	1.1	0	0	1.1	0	3.9	0	3.8	3.4	1.3	0	2.7	2.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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Client: Pare/Derek Hug

File Name : 05770FF
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	96	11	0	2	69	0	94	63	1	336
02:15 PM	102	8	0	0	61	0	65	67	0	303
02:30 PM	105	3	0	2	66	0	106	72	0	354
02:45 PM	94	4	0	0	72	0	95	70	6	341
Total	397	26	0	4	268	0	360	272	7	1334
03:00 PM	124	6	0	5	83	0	86	53	0	357
03:15 PM	121	5	0	0	78	0	114	79	1	398
03:30 PM	123	4	0	3	85	0	110	68	0	393
03:45 PM	104	6	0	3	76	0	116	82	0	387
Total	472	21	0	11	322	0	426	282	1	1535
04:00 PM	107	6	0	1	80	0	95	64	4	357
04:15 PM	108	2	0	4	69	0	109	91	0	383
04:30 PM	89	3	0	0	85	0	110	79	0	366
04:45 PM	91	8	0	3	93	0	129	76	0	400
Total	395	19	0	8	327	0	443	310	4	1506
05:00 PM	95	4	0	3	91	0	164	100	2	459
05:15 PM	99	8	0	3	66	2	122	90	3	393
05:30 PM	100	6	1	1	77	1	144	83	3	416
05:45 PM	88	5	0	3	96	0	123	79	1	395
Total	382	23	1	10	330	3	553	352	9	1663
Grand Total	1646	89	1	33	1247	3	1782	1216	21	6038
Apprch %	94.8	5.1	0.1	2.6	97.2	0.2	59	40.3	0.7	
Total %	27.3	1.5	0	0.5	20.7	0	29.5	20.1	0.3	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	91	8	0	99	3	93	0	96	129	76	0	205	400
05:00 PM	95	4	0	99	3	91	0	94	164	100	2	266	459
05:15 PM	99	8	0	107	3	66	2	71	122	90	3	215	393
05:30 PM	100	6	1	107	1	77	1	79	144	83	3	230	416
Total Volume	385	26	1	412	10	327	3	340	559	349	8	916	1668
% App. Total	93.4	6.3	0.2		2.9	96.2	0.9		61	38.1	0.9		
PHF	.963	.813	.250	.963	.833	.879	.375	.885	.852	.873	.667	.861	.908

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 Client: Pare/Derek Hug

File Name : 05770FF
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	1	0	0	0	9	0	4	1	0	15
02:15 PM	2	0	0	0	4	0	6	1	0	13
02:30 PM	1	0	0	0	3	0	3	4	0	11
02:45 PM	3	0	0	0	0	0	10	4	0	17
Total	7	0	0	0	16	0	23	10	0	56
03:00 PM	1	1	0	0	2	0	2	3	0	9
03:15 PM	2	0	0	0	2	0	3	3	0	10
03:30 PM	1	0	0	0	1	0	5	1	0	8
03:45 PM	0	0	0	0	2	0	1	1	0	4
Total	4	1	0	0	7	0	11	8	0	31
04:00 PM	1	0	0	0	4	0	2	1	0	8
04:15 PM	1	0	0	0	2	0	3	1	0	7
04:30 PM	1	0	0	0	0	0	3	0	0	4
04:45 PM	0	0	0	0	3	0	4	2	0	9
Total	3	0	0	0	9	0	12	4	0	28
05:00 PM	0	0	0	0	1	0	1	0	0	2
05:15 PM	0	0	0	0	1	0	2	0	0	3
05:30 PM	2	0	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	1	0	1	0	0	2
Total	2	0	0	0	3	0	4	0	0	9
Grand Total	16	1	0	0	35	0	50	22	0	124
Apprch %	94.1	5.9	0	0	100	0	69.4	30.6	0	
Total %	12.9	0.8	0	0	28.2	0	40.3	17.7	0	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	1	0	0	1	0	9	0	9	4	1	0	5	15
02:15 PM	2	0	0	2	0	4	0	4	6	1	0	7	13
02:30 PM	1	0	0	1	0	3	0	3	3	4	0	7	11
02:45 PM	3	0	0	3	0	0	0	0	10	4	0	14	17
Total Volume	7	0	0	7	0	16	0	16	23	10	0	33	56
% App. Total	100	0	0		0	100	0		69.7	30.3	0		
PHF	.583	.000	.000	.583	.000	.444	.000	.444	.575	.625	.000	.589	.824

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 Client: Pare/Derek Hug

File Name : 05770FF
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			Sprague Street From East			Cedar Street From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
02:00 PM	0	0	0	0	1	0	1	0	0	2
02:15 PM	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	1	0	0	2
03:00 PM	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	1	0	0	0	0	1
03:30 PM	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	1
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	1	0	0	1
04:30 PM	0	0	0	0	1	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	1	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	1	0	1
Grand Total	0	0	0	0	3	0	2	1	0	6
Apprch %	0	0	0	0	100	0	66.7	33.3	0	
Total %	0	0	0	0	50	0	33.3	16.7	0	

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	0	0	0	0	0	1	0	1	1	0	0	1	2
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	1	0	0	1	2
% App. Total	0	0	0	0	0	100	0	0	100	0	0	0	0
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.000	.250	.250

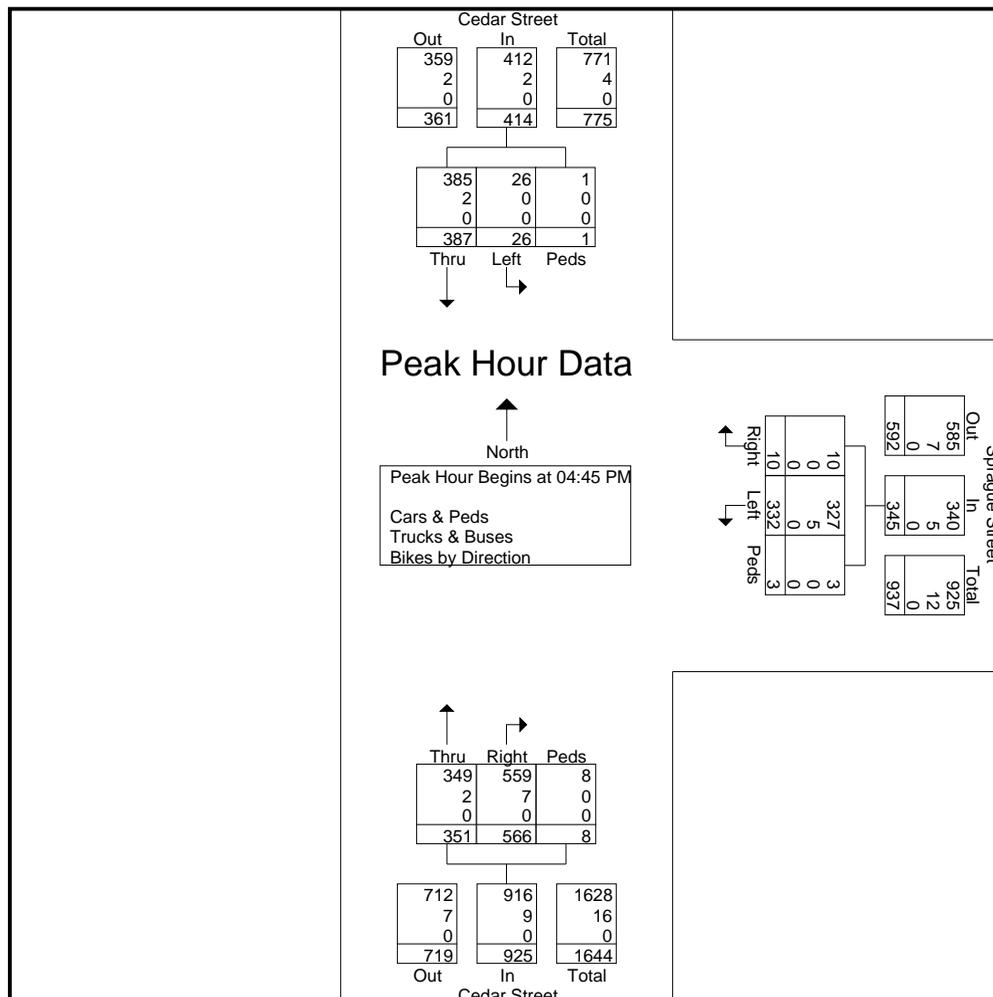
Transportation Data Corporation

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N/S: Cedar Street
E: Sprague Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770FF
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Start Time	Cedar Street From North				Sprague Street From East				Cedar Street From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	91	8	0	99	3	96	0	99	133	78	0	211	409
05:00 PM	95	4	0	99	3	92	0	95	165	100	2	267	461
05:15 PM	99	8	0	107	3	67	2	72	124	90	3	217	396
05:30 PM	102	6	1	109	1	77	1	79	144	83	3	230	418
Total Volume	387	26	1	414	10	332	3	345	566	351	8	925	1684
% App. Total	93.5	6.3	0.2		2.9	96.2	0.9		61.2	37.9	0.9		
PHF	.949	.813	.250	.950	.833	.865	.375	.871	.858	.878	.667	.866	.913
Cars & Peds	385	26	1	412	10	327	3	340	559	349	8	916	1668
% Cars & Peds	99.5	100	100	99.5	100	98.5	100	98.6	98.8	99.4	100	99.0	99.0
Trucks & Buses	2	0	0	2	0	5	0	5	7	2	0	9	16
% Trucks & Buses	0.5	0	0	0.5	0	1.5	0	1.4	1.2	0.6	0	1.0	1.0
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Cedar Street/East Street
W: East Street (Rotary)
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770H
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	40	108	0	146	59	0	39	23	0	415
07:15 AM	48	110	0	163	72	0	43	20	0	456
07:30 AM	62	114	0	188	55	0	56	25	0	500
07:45 AM	69	125	0	174	66	0	57	34	0	525
Total	219	457	0	671	252	0	195	102	0	1896
08:00 AM	47	109	0	190	63	0	34	52	0	495
08:15 AM	48	113	0	170	65	0	62	34	0	492
08:30 AM	54	98	0	183	66	0	61	30	0	492
08:45 AM	39	103	0	164	71	0	57	34	0	468
Total	188	423	0	707	265	0	214	150	0	1947
Grand Total	407	880	0	1378	517	0	409	252	0	3843
Apprch %	31.6	68.4	0	72.7	27.3	0	61.9	38.1	0	
Total %	10.6	22.9	0	35.9	13.5	0	10.6	6.6	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	62	114	0	176	188	55	0	243	56	25	0	81	500
07:45 AM	69	125	0	194	174	66	0	240	57	34	0	91	525
08:00 AM	47	109	0	156	190	63	0	253	34	52	0	86	495
08:15 AM	48	113	0	161	170	65	0	235	62	34	0	96	492
Total Volume	226	461	0	687	722	249	0	971	209	145	0	354	2012
% App. Total	32.9	67.1	0		74.4	25.6	0		59	41	0		
PHF	.819	.922	.000	.885	.950	.943	.000	.959	.843	.697	.000	.922	.958

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City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770H
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	1	5	0	9	1	0	1	1	0	18
07:15 AM	0	3	0	7	0	0	2	1	0	13
07:30 AM	0	2	0	5	1	0	0	3	0	11
07:45 AM	1	6	0	6	0	0	0	2	0	15
Total	2	16	0	27	2	0	3	7	0	57
08:00 AM	0	3	0	3	0	0	0	1	0	7
08:15 AM	2	2	0	6	1	0	1	0	0	12
08:30 AM	2	4	0	2	0	0	1	1	0	10
08:45 AM	4	5	0	1	0	0	1	0	0	11
Total	8	14	0	12	1	0	3	2	0	40
Grand Total	10	30	0	39	3	0	6	9	0	97
Apprch %	25	75	0	92.9	7.1	0	40	60	0	
Total %	10.3	30.9	0	40.2	3.1	0	6.2	9.3	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
07:00 AM	1	5	0	6	9	1	0	10	1	1	0	2	18
07:15 AM	0	3	0	3	7	0	0	7	2	1	0	3	13
07:30 AM	0	2	0	2	5	1	0	6	0	3	0	3	11
07:45 AM	1	6	0	7	6	0	0	6	0	2	0	2	15
Total Volume	2	16	0	18	27	2	0	29	3	7	0	10	57
% App. Total	11.1	88.9	0	93.1	6.9	0	0	7.25	30	70	0	83.3	79.2
PHF	.500	.667	.000	.643	.750	.500	.000	.725	.375	.583	.000	.833	.792

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00 AM

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W: East Street (Rotary)
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770H
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
07:00 AM	0	0	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	1	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	1
Grand Total	1	0	0	1	0	0	0	0	0	2
Apprch %	100	0	0	100	0	0	0	0	0	
Total %	50	0	0	50	0	0	0	0	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	0	0	1	0	0	0	0	1
% App. Total	0	0	0	0	100	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.250

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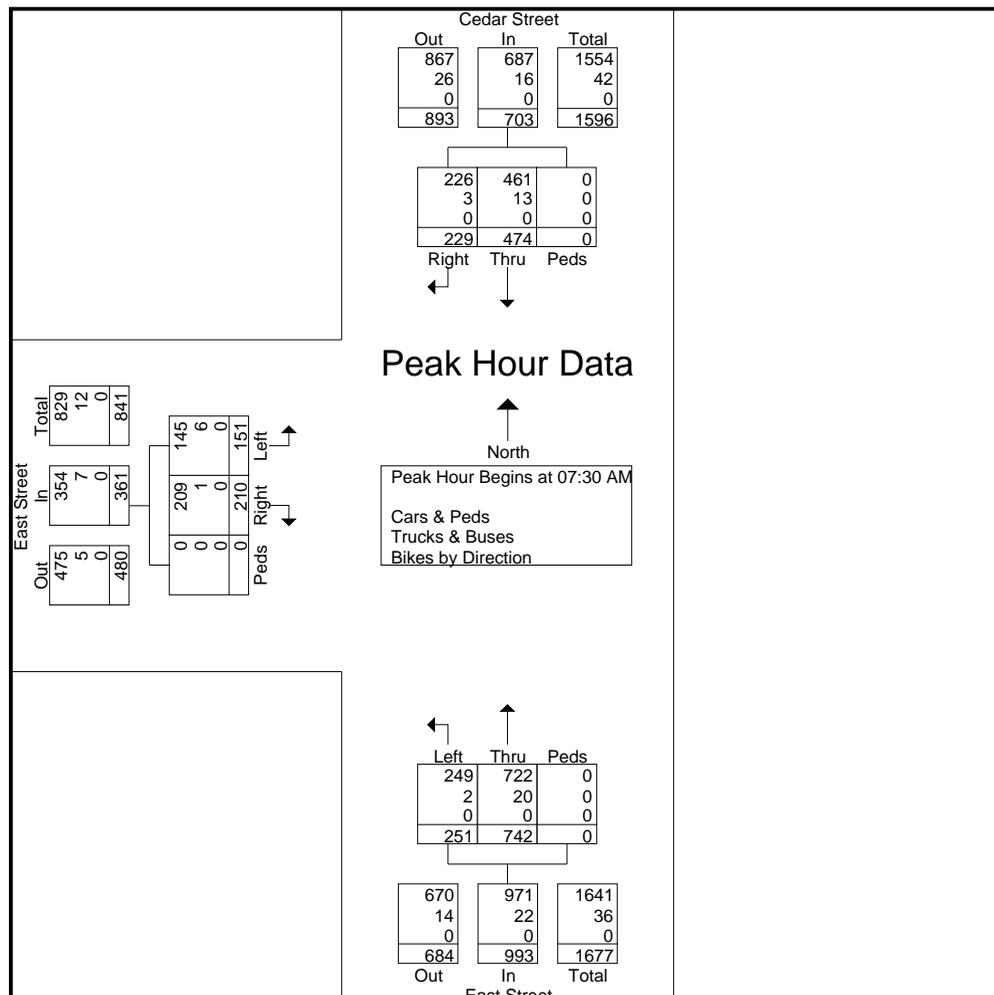
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N/S: Cedar Street/East Street
 W: East Street (Rotary)
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770H
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	62	116	0	178	193	56	0	249	56	28	0	84	511
07:45 AM	70	131	0	201	180	66	0	246	57	36	0	93	540
08:00 AM	47	112	0	159	193	63	0	256	34	53	0	87	502
08:15 AM	50	115	0	165	176	66	0	242	63	34	0	97	504
Total Volume	229	474	0	703	742	251	0	993	210	151	0	361	2057
% App. Total	32.6	67.4	0		74.7	25.3	0		58.2	41.8	0		
PHF	.818	.905	.000	.874	.961	.951	.000	.970	.833	.712	.000	.930	.952
Cars & Peds	226	461	0	687	722	249	0	971	209	145	0	354	2012
% Cars & Peds	98.7	97.3	0	97.7	97.3	99.2	0	97.8	99.5	96.0	0	98.1	97.8
Trucks & Buses	3	13	0	16	20	2	0	22	1	6	0	7	45
% Trucks & Buses	1.3	2.7	0	2.3	2.7	0.8	0	2.2	0.5	4.0	0	1.9	2.2
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Cedar Street/East Street
W: East Street (Rotary)
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770HH
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Cars & Peds

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	42	132	0	109	55	0	78	46	0	462
02:15 PM	35	141	0	89	61	0	75	43	0	444
02:30 PM	38	133	0	123	42	0	77	67	0	480
02:45 PM	36	132	0	111	60	0	79	56	0	474
Total	151	538	0	432	218	0	309	212	0	1860
03:00 PM	35	166	0	97	56	0	91	57	0	502
03:15 PM	54	145	0	130	72	0	81	67	0	549
03:30 PM	57	152	0	115	55	0	77	44	0	500
03:45 PM	47	132	0	140	77	0	81	66	0	543
Total	193	595	0	482	260	0	330	234	0	2094
04:00 PM	59	123	0	113	54	0	80	60	0	489
04:15 PM	52	120	0	128	63	0	88	63	0	514
04:30 PM	56	116	0	130	66	0	93	71	0	532
04:45 PM	68	114	0	126	63	0	77	66	0	514
Total	235	473	0	497	246	0	338	260	0	2049
05:00 PM	71	113	0	138	70	0	71	111	0	574
05:15 PM	64	101	0	131	71	0	62	74	0	503
05:30 PM	53	121	0	141	87	0	85	90	0	577
05:45 PM	71	114	0	140	85	0	85	70	0	565
Total	259	449	0	550	313	0	303	345	0	2219
Grand Total	838	2055	0	1961	1037	0	1280	1051	0	8222
Apprch %	29	71	0	65.4	34.6	0	54.9	45.1	0	
Total %	10.2	25	0	23.9	12.6	0	15.6	12.8	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	71	113	0	184	138	70	0	208	71	111	0	182	574
05:15 PM	64	101	0	165	131	71	0	202	62	74	0	136	503
05:30 PM	53	121	0	174	141	87	0	228	85	90	0	175	577
05:45 PM	71	114	0	185	140	85	0	225	85	70	0	155	565
Total Volume	259	449	0	708	550	313	0	863	303	345	0	648	2219
% App. Total	36.6	63.4	0		63.7	36.3	0		46.8	53.2	0		
PHF	.912	.928	.000	.957	.975	.899	.000	.946	.891	.777	.000	.890	.961

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W: East Street (Rotary)
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770HH
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Groups Printed- Trucks & Buses

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	10	0	5	1	0	0	0	0	16
02:15 PM	1	6	0	4	0	0	0	3	0	14
02:30 PM	1	3	0	7	1	0	1	0	0	13
02:45 PM	0	3	0	9	1	0	0	5	0	18
Total	2	22	0	25	3	0	1	8	0	61
03:00 PM	0	3	0	4	1	0	0	1	0	9
03:15 PM	1	3	0	3	0	0	1	2	0	10
03:30 PM	1	2	0	5	0	0	1	1	0	10
03:45 PM	0	2	0	2	1	0	2	0	0	7
Total	2	10	0	14	2	0	4	4	0	36
04:00 PM	2	4	0	4	0	0	0	0	0	10
04:15 PM	1	2	0	4	0	0	0	0	0	7
04:30 PM	0	1	0	3	0	0	0	0	0	4
04:45 PM	1	3	0	6	1	0	0	0	0	11
Total	4	10	0	17	1	0	0	0	0	32
05:00 PM	0	1	0	1	1	0	0	0	0	3
05:15 PM	0	1	0	2	0	0	0	0	0	3
05:30 PM	0	2	0	0	0	0	0	0	0	2
05:45 PM	0	1	0	1	0	0	0	0	0	2
Total	0	5	0	4	1	0	0	0	0	10
Grand Total	8	47	0	60	7	0	5	12	0	139
Apprch %	14.5	85.5	0	89.6	10.4	0	29.4	70.6	0	
Total %	5.8	33.8	0	43.2	5	0	3.6	8.6	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 02:00 PM													
02:00 PM	0	10	0	10	5	1	0	6	0	0	0	0	16
02:15 PM	1	6	0	7	4	0	0	4	0	3	0	3	14
02:30 PM	1	3	0	4	7	1	0	8	1	0	0	1	13
02:45 PM	0	3	0	3	9	1	0	10	0	5	0	5	18
Total Volume	2	22	0	24	25	3	0	28	1	8	0	9	61
% App. Total	8.3	91.7	0		89.3	10.7	0		11.1	88.9	0		
PHF	.500	.550	.000	.600	.694	.750	.000	.700	.250	.400	.000	.450	.847

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N/S: Cedar Street/East Street
 W: East Street (Rotary)
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770HH
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	0	1	0	0	0	0	0	1	0	2
02:15 PM	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	1	0	2
03:00 PM	0	0	0	0	0	0	0	0	0	0
03:15 PM	1	0	0	0	0	0	0	0	0	1
03:30 PM	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	1
04:00 PM	0	1	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	1
Total	0	1	0	0	0	0	1	1	0	3
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	1	0	1
Grand Total	1	2	0	0	0	0	1	3	0	7
Apprch %	33.3	66.7	0	0	0	0	25	75	0	
Total %	14.3	28.6	0	0	0	0	14.3	42.9	0	

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	1	0	1	0	0	0	0	1	1	0	2	3
% App. Total	0	100	0		0	0	0		50	50	0		
PHF	.000	.250	.000	.250	.000	.000	.000	.000	.250	.250	.000	.500	.750

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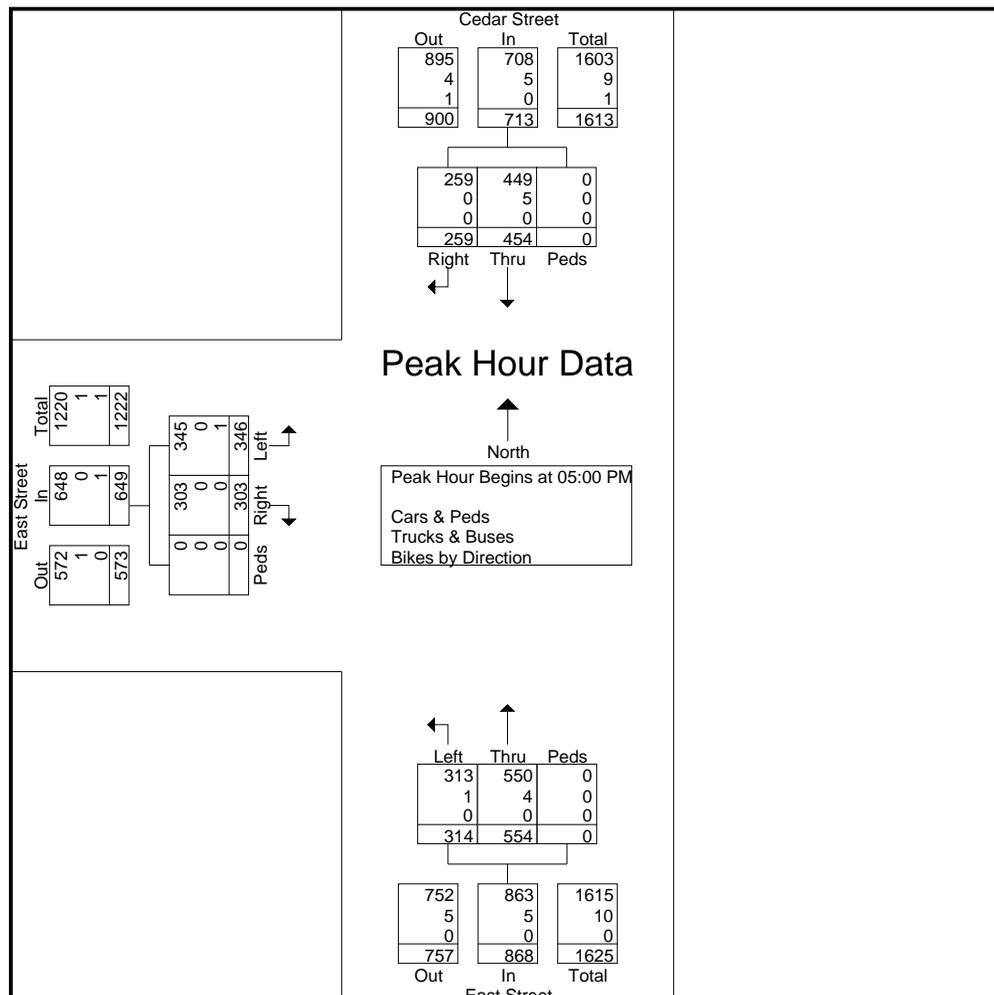
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N/S: Cedar Street/East Street
 W: East Street (Rotary)
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770HH
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	71	114	0	185	139	71	0	210	71	111	0	182	577
05:15 PM	64	102	0	166	133	71	0	204	62	74	0	136	506
05:30 PM	53	123	0	176	141	87	0	228	85	90	0	175	579
05:45 PM	71	115	0	186	141	85	0	226	85	71	0	156	568
Total Volume	259	454	0	713	554	314	0	868	303	346	0	649	2230
% App. Total	36.3	63.7	0		63.8	36.2	0		46.7	53.3	0		
PHF	.912	.923	.000	.958	.982	.902	.000	.952	.891	.779	.000	.891	.963
Cars & Peds	259	449	0	708	550	313	0	863	303	345	0	648	2219
% Cars & Peds	100	98.9	0	99.3	99.3	99.7	0	99.4	100	99.7	0	99.8	99.5
Trucks & Buses	0	5	0	5	4	1	0	5	0	0	0	0	10
% Trucks & Buses	0	1.1	0	0.7	0.7	0.3	0	0.6	0	0	0	0	0.4
Bikes by Direction	0	0	0	0	0	0	0	0	0	1	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0.3	0	0.2	0.0



Transportation Data Corporation
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N/S: Cedar Street/East Street
 W: East Street (Rotary)
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770HH
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Cedar Street From North			East Street From South			East Street From West			Int. Total
	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	
02:00 PM	42	143	0	114	56	0	78	47	0	480
02:15 PM	36	147	0	93	61	0	75	46	0	458
02:30 PM	39	136	0	130	43	0	78	67	0	493
02:45 PM	36	135	0	120	61	0	79	61	0	492
Total	153	561	0	457	221	0	310	221	0	1923
03:00 PM	35	169	0	101	57	0	91	58	0	511
03:15 PM	56	148	0	133	72	0	82	69	0	560
03:30 PM	58	154	0	120	55	0	78	45	0	510
03:45 PM	47	134	0	142	78	0	83	66	0	550
Total	196	605	0	496	262	0	334	238	0	2131
04:00 PM	61	128	0	117	54	0	80	60	0	500
04:15 PM	53	122	0	132	63	0	88	64	0	522
04:30 PM	56	117	0	133	66	0	93	71	0	536
04:45 PM	69	117	0	132	64	0	78	66	0	526
Total	239	484	0	514	247	0	339	261	0	2084
05:00 PM	71	114	0	139	71	0	71	111	0	577
05:15 PM	64	102	0	133	71	0	62	74	0	506
05:30 PM	53	123	0	141	87	0	85	90	0	579
05:45 PM	71	115	0	141	85	0	85	71	0	568
Total	259	454	0	554	314	0	303	346	0	2230
Grand Total	847	2104	0	2021	1044	0	1286	1066	0	8368
Apprch %	28.7	71.3	0	65.9	34.1	0	54.7	45.3	0	
Total %	10.1	25.1	0	24.2	12.5	0	15.4	12.7	0	
Cars & Peds	838	2055	0	1961	1037	0	1280	1051	0	8222
% Cars & Peds	98.9	97.7	0	97	99.3	0	99.5	98.6	0	98.3
Trucks & Buses	8	47	0	60	7	0	5	12	0	139
% Trucks & Buses	0.9	2.2	0	3	0.7	0	0.4	1.1	0	1.7
Bikes by Direction	1	2	0	0	0	0	1	3	0	7
% Bikes by Direction	0.1	0.1	0	0	0	0	0.1	0.3	0	0.1

Start Time	Cedar Street From North				East Street From South				East Street From West				Int. Total
	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	71	114	0	185	139	71	0	210	71	111	0	182	577
05:15 PM	64	102	0	166	133	71	0	204	62	74	0	136	506
05:30 PM	53	123	0	176	141	87	0	228	85	90	0	175	579
05:45 PM	71	115	0	186	141	85	0	226	85	71	0	156	568
Total Volume	259	454	0	713	554	314	0	868	303	346	0	649	2230
% App. Total	36.3	63.7	0		63.8	36.2	0		46.7	53.3	0		
PHF	.912	.923	.000	.958	.982	.902	.000	.952	.891	.779	.000	.891	.963
Cars & Peds	259	449	0	708	550	313	0	863	303	345	0	648	2219
% Cars & Peds	100	98.9	0	99.3	99.3	99.7	0	99.4	100	99.7	0	99.8	99.5
Trucks & Buses	0	5	0	5	4	1	0	5	0	0	0	0	10
% Trucks & Buses	0	1.1	0	0.7	0.7	0.3	0	0.6	0	0	0	0	0.4
Bikes by Direction	0	0	0	0	0	0	0	0	0	1	0	1	1
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0.3	0	0.2	0.0

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N/S: Dresser Ave./Greenlodge St.
 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770K
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	2	0	3	72	0	0	2	5	7	1	1	115	1	3	212
07:15 AM	1	1	1	0	1	70	1	0	2	16	21	0	9	110	0	2	235
07:30 AM	0	0	1	0	5	93	1	2	0	11	10	4	15	130	2	1	275
07:45 AM	0	3	2	0	4	91	0	1	1	9	8	0	20	136	0	1	276
Total	1	4	6	0	13	326	2	3	5	41	46	5	45	491	3	7	998
08:00 AM	1	4	0	0	0	78	1	1	1	13	5	1	16	163	1	2	287
08:15 AM	0	5	1	0	1	78	2	0	3	7	11	2	23	127	0	5	265
08:30 AM	2	2	1	0	1	66	0	2	5	13	21	4	9	127	5	1	259
08:45 AM	0	0	2	0	0	69	3	0	0	2	7	0	10	114	2	6	215
Total	3	11	4	0	2	291	6	3	9	35	44	7	58	531	8	14	1026
Grand Total	4	15	10	0	15	617	8	6	14	76	90	12	103	1022	11	21	2024
Apprch %	13.8	51.7	34.5	0	2.3	95.5	1.2	0.9	7.3	39.6	46.9	6.2	8.9	88.3	1	1.8	
Total %	0.2	0.7	0.5	0	0.7	30.5	0.4	0.3	0.7	3.8	4.4	0.6	5.1	50.5	0.5	1	

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	1	0	1	5	93	1	2	101	0	11	10	4	25	15	130	2	1	148	275
07:45 AM	0	3	2	0	5	4	91	0	1	96	1	9	8	0	18	20	136	0	1	157	276
08:00 AM	1	4	0	0	5	0	78	1	1	80	1	13	5	1	20	16	163	1	2	182	287
08:15 AM	0	5	1	0	6	1	78	2	0	81	3	7	11	2	23	23	127	0	5	155	265
Total Volume	1	12	4	0	17	10	340	4	4	358	5	40	34	7	86	74	556	3	9	642	1103
% App. Total	5.9	70.6	23.5	0		2.8	95	1.1	1.1		5.8	46.5	39.5	8.1		11.5	86.6	0.5	1.4		
PHF	.250	.600	.500	.000	.708	.500	.914	.500	.500	.886	.417	.769	.773	.438	.860	.804	.853	.375	.450	.882	.961

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N/S: Dresser Ave./Greenlodge St.
 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770K
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	8	0	0	0	0	1	0	3	6	0	0	18
07:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	6	0	0	8
07:30 AM	0	0	0	0	0	3	0	0	0	0	0	0	1	6	0	0	10
07:45 AM	0	0	0	0	0	5	0	0	0	0	0	0	1	5	0	0	11
Total	0	0	0	0	0	17	0	0	0	0	1	0	6	23	0	0	47
08:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	4
08:15 AM	0	0	0	0	0	2	0	0	0	0	1	0	1	4	0	0	8
08:30 AM	0	0	0	0	0	2	0	0	0	0	2	0	0	2	0	0	6
08:45 AM	0	0	0	0	0	4	1	0	0	0	1	0	1	1	0	0	8
Total	0	0	0	0	0	10	1	0	0	0	4	0	3	8	0	0	26
Grand Total	0	0	0	0	0	27	1	0	0	0	5	0	9	31	0	0	73
Apprch %	0	0	0	0	0	96.4	3.6	0	0	0	100	0	22.5	77.5	0	0	
Total %	0	0	0	0	0	37	1.4	0	0	0	6.8	0	12.3	42.5	0	0	

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	8	0	0	8	0	0	1	0	1	3	6	0	0	9	18
07:15 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	6	0	0	7	8
07:30 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	6	0	0	7	10
07:45 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	1	5	0	0	6	11
Total Volume	0	0	0	0	0	0	17	0	0	17	0	0	1	0	1	6	23	0	0	29	47
% App. Total	0	0	0	0	0	0	100	0	0	100	0	0	100	0	0	20.7	79.3	0	0		
PHF	.000	.000	.000	.000	.000	.000	.531	.000	.000	.531	.000	.000	.250	.000	.250	.500	.958	.000	.000	.806	.653

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00 AM

Transportation Data Corporation

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N/S: Dresser Ave./Greenlodge St.

E/W: Sprague Street

City, State: Dedham, MA

Client: Pare/Derek Hug

File Name : 05770K

Site Code : 23178.00

Start Date : 10/12/2023

Page No : 1

Groups Printed- Bikes by Direction

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
08:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3
08:15 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
Total	0	2	0	0	0	2	0	0	1	1	0	0	2	0	0	0	8
Grand Total	0	2	0	0	0	2	0	0	1	2	0	0	2	1	0	0	10
Apprch %	0	100	0	0	0	100	0	0	33.3	66.7	0	0	66.7	33.3	0	0	
Total %	0	20	0	0	0	20	0	0	10	20	0	0	20	10	0	0	

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	3
Total Volume	0	2	0	0	2	0	2	0	0	2	1	1	0	0	2	2	0	0	0	2	8
% App. Total	0	100	0	0		0	100	0	0		50	50	0	0		100	0	0	0		
PHF	.000	.500	.000	.000	.500	.000	.500	.000	.000	.500	.250	.250	.000	.000	.500	.250	.000	.000	.000	.250	.667

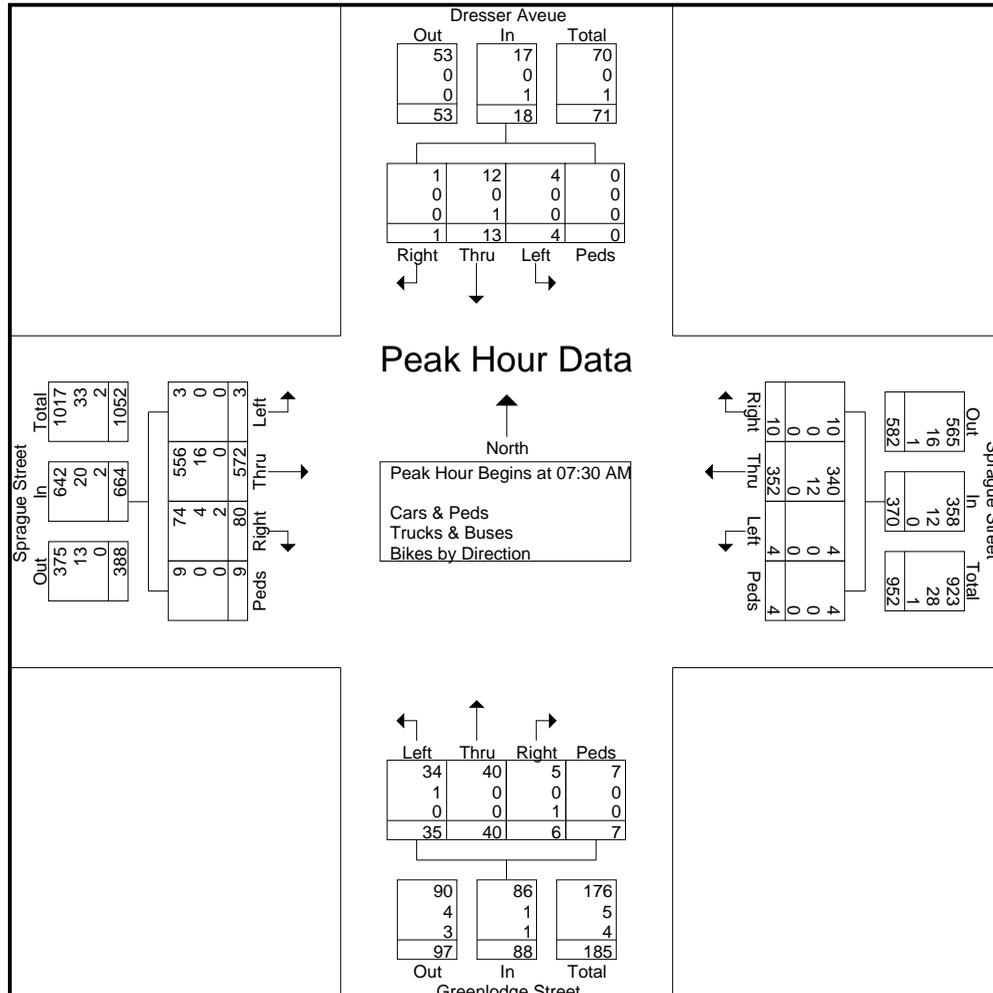
Transportation Data Corporation

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N/S: Dresser Ave./Greenlodge St.
E/W: Sprague Street
City, State: Dedham, MA
Client: Pare/Derek Hug

File Name : 05770K
Site Code : 23178.00
Start Date : 10/12/2023
Page No : 1

Start Time	Dresser Avenue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	1	0	1	5	96	1	2	104	0	11	10	4	25	16	136	2	1	155	285
07:45 AM	0	3	2	0	5	4	96	0	1	101	1	9	8	0	18	21	141	0	1	163	287
08:00 AM	1	5	0	0	6	0	80	1	1	82	1	13	5	1	20	19	164	1	2	186	294
08:15 AM	0	5	1	0	6	1	80	2	0	83	4	7	12	2	25	24	131	0	5	160	274
Total Volume	1	13	4	0	18	10	352	4	4	370	6	40	35	7	88	80	572	3	9	664	1140
% App. Total	5.6	72.2	22.2	0		2.7	95.1	1.1	1.1		6.8	45.5	39.8	8		12	86.1	0.5	1.4		
PHF	.250	.650	.500	.000	.750	.500	.917	.500	.500	.889	.375	.769	.729	.438	.880	.833	.872	.375	.450	.892	.969
Cars & Peds	1	12	4	0	17	10	340	4	4	358	5	40	34	7	86	74	556	3	9	642	1103
% Cars & Peds	100	92.3	100	0	94.4	100	96.6	100	100	96.8	83.3	100	97.1	100	97.7	92.5	97.2	100	100	96.7	96.8
Trucks & Buses	0	0	0	0	0	0	12	0	0	12	0	0	1	0	1	4	16	0	0	20	33
% Trucks & Buses	0	0	0	0	0	0	3.4	0	0	3.2	0	0	2.9	0	1.1	5.0	2.8	0	0	3.0	2.9
Bikes by Direction	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2	0	0	0	2	4
% Bikes by Direction	0	7.7	0	0	5.6	0	0	0	0	0	16.7	0	0	0	1.1	2.5	0	0	0	0.3	0.4



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N/S: Dresser Ave./Greenlodge St.
 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770K
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	0	2	0	3	80	0	0	2	5	8	1	4	122	1	3	231
07:15 AM	1	1	1	0	1	71	1	0	2	17	21	0	10	116	0	2	244
07:30 AM	0	0	1	0	5	96	1	2	0	11	10	4	16	136	2	1	285
07:45 AM	0	3	2	0	4	96	0	1	1	9	8	0	21	141	0	1	287
Total	1	4	6	0	13	343	2	3	5	42	47	5	51	515	3	7	1047
08:00 AM	1	5	0	0	0	80	1	1	1	13	5	1	19	164	1	2	294
08:15 AM	0	5	1	0	1	80	2	0	4	7	12	2	24	131	0	5	274
08:30 AM	2	2	1	0	1	69	0	2	5	13	23	4	9	129	5	1	266
08:45 AM	0	1	2	0	0	74	4	0	0	3	8	0	11	115	2	6	226
Total	3	13	4	0	2	303	7	3	10	36	48	7	63	539	8	14	1060
Grand Total	4	17	10	0	15	646	9	6	15	78	95	12	114	1054	11	21	2107
Apprch %	12.9	54.8	32.3	0	2.2	95.6	1.3	0.9	7.5	39	47.5	6	9.5	87.8	0.9	1.8	
Total %	0.2	0.8	0.5	0	0.7	30.7	0.4	0.3	0.7	3.7	4.5	0.6	5.4	50	0.5	1	
Cars & Peds	4	15	10	0	15	617	8	6	14	76	90	12	103	1022	11	21	2024
% Cars & Peds	100	88.2	100	0	100	95.5	88.9	100	93.3	97.4	94.7	100	90.4	97	100	100	96.1
Trucks & Buses	0	0	0	0	0	27	1	0	0	0	5	0	9	31	0	0	73
% Trucks & Buses	0	0	0	0	0	4.2	11.1	0	0	0	5.3	0	7.9	2.9	0	0	3.5
Bikes by Direction	0	2	0	0	0	2	0	0	1	2	0	0	2	1	0	0	10
% Bikes by Direction	0	11.8	0	0	0	0.3	0	0	6.7	2.6	0	0	1.8	0.1	0	0	0.5

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	1	0	1	5	96	1	2	104	0	11	10	4	25	16	136	2	1	155	285
07:45 AM	0	3	2	0	5	4	96	0	1	101	1	9	8	0	18	21	141	0	1	163	287
08:00 AM	1	5	0	0	6	0	80	1	1	82	1	13	5	1	20	19	164	1	2	186	294
08:15 AM	0	5	1	0	6	1	80	2	0	83	4	7	12	2	25	24	131	0	5	160	274
Total Volume	1	13	4	0	18	10	352	4	4	370	6	40	35	7	88	80	572	3	9	664	1140
% App. Total	5.6	72.2	22.2	0		2.7	95.1	1.1	1.1		6.8	45.5	39.8	8		12	86.1	0.5	1.4		
PHF	.250	.650	.500	.000	.750	.500	.917	.500	.500	.889	.375	.769	.729	.438	.880	.833	.872	.375	.450	.892	.969
Cars & Peds	1	12	4	0	17	10	340	4	4	358	5	40	34	7	86	74	556	3	9	642	1103
% Cars & Peds	100	92.3	100	0	94.4	100	96.6	100	100	96.8	83.3	100	97.1	100	97.7	92.5	97.2	100	100	96.7	96.8
Trucks & Buses	0	0	0	0	0	0	12	0	0	12	0	0	1	0	1	4	16	0	0	20	33
% Trucks & Buses	0	0	0	0	0	0	3.4	0	0	3.2	0	0	2.9	0	1.1	5.0	2.8	0	0	3.0	2.9
Bikes by Direction	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2	0	0	0	2	4
% Bikes by Direction	0	7.7	0	0	5.6	0	0	0	0	0	16.7	0	0	0	1.1	2.5	0	0	0	0.3	0.4

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N/S: Dresser Ave./Greenlodge St.
 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770KK
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Dresser Avenue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	1	0	63	0	1	1	6	12	4	13	73	3	1	178
02:15 PM	0	2	0	0	1	65	12	4	0	1	5	1	15	53	2	0	161
02:30 PM	1	6	0	0	1	74	2	1	0	9	10	0	30	83	3	1	221
02:45 PM	0	2	1	1	0	65	1	2	2	3	8	0	28	78	1	7	199
Total	1	10	1	2	2	267	15	8	3	19	35	5	86	287	9	9	759
03:00 PM	1	3	2	1	1	72	2	0	2	6	14	0	26	65	1	3	199
03:15 PM	0	2	0	0	0	72	0	0	3	9	16	0	27	100	1	2	232
03:30 PM	3	4	1	0	1	82	4	0	1	10	11	0	28	82	2	2	231
03:45 PM	0	7	0	3	3	83	2	1	2	7	8	1	27	104	3	2	253
Total	4	16	3	4	5	309	8	1	8	32	49	1	108	351	7	9	915
04:00 PM	0	5	0	0	3	67	4	0	1	6	17	0	25	81	0	2	211
04:15 PM	0	4	0	4	1	69	3	0	1	1	11	0	22	94	2	2	214
04:30 PM	0	9	0	0	0	77	6	1	1	2	10	0	32	93	2	1	234
04:45 PM	0	4	0	1	4	96	2	0	1	14	13	0	22	103	2	4	266
Total	0	22	0	5	8	309	15	1	4	23	51	0	101	371	6	9	925
05:00 PM	1	6	0	1	0	82	1	1	0	8	8	1	44	119	2	3	277
05:15 PM	0	5	0	4	4	70	2	0	2	9	13	0	36	99	3	2	249
05:30 PM	1	2	0	3	1	80	0	2	2	7	13	5	26	122	5	0	269
05:45 PM	0	3	1	2	4	84	7	2	1	10	24	0	21	112	4	2	277
Total	2	16	1	10	9	316	10	5	5	34	58	6	127	452	14	7	1072
Grand Total	7	64	5	21	24	1201	48	15	20	108	193	12	422	1461	36	34	3671
Apprch %	7.2	66	5.2	21.6	1.9	93.2	3.7	1.2	6	32.4	58	3.6	21.6	74.8	1.8	1.7	
Total %	0.2	1.7	0.1	0.6	0.7	32.7	1.3	0.4	0.5	2.9	5.3	0.3	11.5	39.8	1	0.9	

Start Time	Dresser Avenue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	6	0	1	8	0	82	1	1	84	0	8	8	1	17	44	119	2	3	168	277
05:15 PM	0	5	0	4	9	4	70	2	0	76	2	9	13	0	24	36	99	3	2	140	249
05:30 PM	1	2	0	3	6	1	80	0	2	83	2	7	13	5	27	26	122	5	0	153	269
05:45 PM	0	3	1	2	6	4	84	7	2	97	1	10	24	0	35	21	112	4	2	139	277
Total Volume	2	16	1	10	29	9	316	10	5	340	5	34	58	6	103	127	452	14	7	600	1072
% App. Total	6.9	55.2	3.4	34.5	2.6	92.9	2.9	1.5	4.9	33	56.3	5.8	21.2	75.3	2.3	1.2					
PHF	.500	.667	.250	.625	.806	.563	.940	.357	.625	.876	.625	.850	.604	.300	.736	.722	.926	.700	.583	.893	.968

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 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770KK
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	8	0	0	0	0	1	0	0	5	0	0	14
02:15 PM	0	0	0	0	0	3	0	0	0	0	1	0	2	4	0	0	10
02:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	1	2	0	0	6
02:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	2	8	0	0	11
Total	0	0	0	0	0	14	0	0	1	0	2	0	5	19	0	0	41
03:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	2	1	0	0	5
03:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	1	3	0	0	6
03:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
03:45 PM	0	0	0	0	0	2	0	0	0	0	1	0	0	1	0	0	4
Total	0	0	0	0	0	6	0	0	0	0	2	0	3	6	0	0	17
04:00 PM	0	0	0	0	0	2	0	0	1	0	0	0	0	3	0	0	6
04:15 PM	0	0	0	0	0	2	0	0	0	0	1	0	0	3	0	0	6
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
04:45 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	3	0	0	5
Total	0	0	0	0	0	5	0	0	1	0	2	0	0	12	0	0	20
05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
Total	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6
Grand Total	0	0	0	0	0	28	0	0	2	0	6	0	8	40	0	0	84
Apprch %	0	0	0	0	0	100	0	0	25	0	75	0	16.7	83.3	0	0	
Total %	0	0	0	0	0	33.3	0	0	2.4	0	7.1	0	9.5	47.6	0	0	

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:00 PM																					
02:00 PM	0	0	0	0	0	0	8	0	0	8	0	0	1	0	1	0	5	0	0	5	14
02:15 PM	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	2	4	0	0	6	10
02:30 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	2	0	0	3	6
02:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	8	0	0	10	11
Total Volume	0	0	0	0	0	0	14	0	0	14	1	0	2	0	3	5	19	0	0	24	41
% App. Total	0	0	0	0	0	0	100	0	0	100	33.3	0	66.7	0	33.3	20.8	79.2	0	0	20.8	33.3
PHF	.000	.000	.000	.000	.000	.000	.438	.000	.000	.438	.250	.000	.500	.000	.750	.625	.594	.000	.000	.600	.732

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N/S: Dresser Ave./Greenlodge St.
 E/W: Sprague Street
 City, State: Dedham, MA
 Client: Pare/Derek Hug

File Name : 05770KK
 Site Code : 23178.00
 Start Date : 10/12/2023
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3
03:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
03:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
Total	0	1	0	0	0	1	0	0	0	0	3	0	1	0	0	0	6
04:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	0	3	0	0	0	0	0	0	0	1	0	0	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	3
Grand Total	1	2	0	0	0	4	0	0	0	1	4	0	2	3	0	0	17
Apprch %	33.3	66.7	0	0	0	100	0	0	0	20	80	0	40	60	0	0	
Total %	5.9	11.8	0	0	0	23.5	0	0	0	5.9	23.5	0	11.8	17.6	0	0	

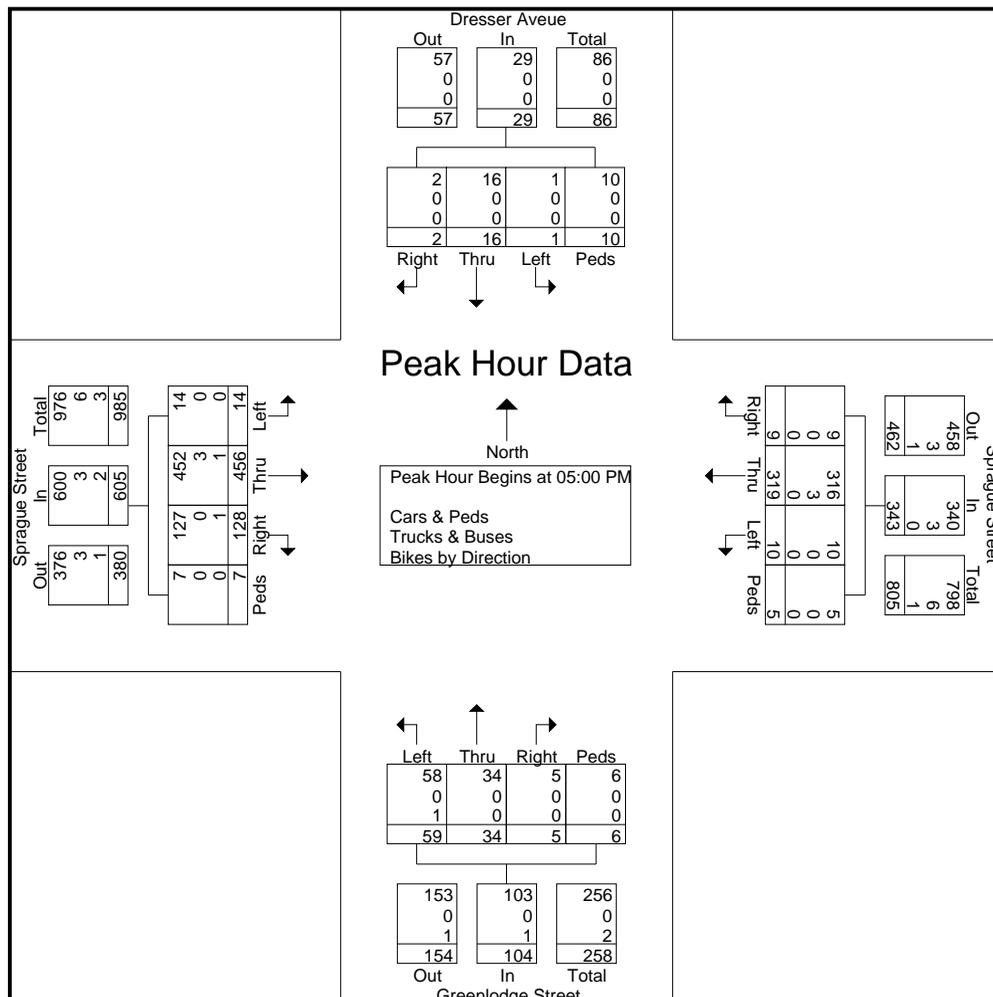
Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
03:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	2
Total Volume	0	1	0	0	1	0	1	0	0	1	0	0	3	0	3	1	0	0	0	1	6
% App. Total	0	100	0	0		0	100	0	0		0	0	100	0		100	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.250	.000	.000	.250	.000	.000	.375	.000	.375	.250	.000	.000	.000	.250	.750

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File Name : 05770KK
 Site Code : 23178.00
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Start Time	Dresser Avenue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	6	0	1	8	0	83	1	1	85	0	8	9	1	18	45	119	2	3	169	280
05:15 PM	0	5	0	4	9	4	71	2	0	77	2	9	13	0	24	36	101	3	2	142	252
05:30 PM	1	2	0	3	6	1	80	0	2	83	2	7	13	5	27	26	123	5	0	154	270
05:45 PM	0	3	1	2	6	4	85	7	2	98	1	10	24	0	35	21	113	4	2	140	279
Total Volume	2	16	1	10	29	9	319	10	5	343	5	34	59	6	104	128	456	14	7	605	1081
% App. Total	6.9	55.2	3.4	34.5		2.6	93	2.9	1.5		4.8	32.7	56.7	5.8		21.2	75.4	2.3	1.2		
PHF	.500	.667	.250	.625	.806	.563	.938	.357	.625	.875	.625	.850	.615	.300	.743	.711	.927	.700	.583	.895	.965
Cars & Peds	2	16	1	10	29	9	316	10	5	340	5	34	58	6	103	127	452	14	7	600	1072
% Cars & Peds	100	100	100	100	100	100	99.1	100	100	99.1	100	100	98.3	100	99.0	99.2	99.1	100	100	99.2	99.2
Trucks & Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6
% Trucks & Buses	0	0	0	0	0	0	0.9	0	0	0.9	0	0	0	0	0	0	0.7	0	0	0.5	0.6
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	2	3
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	1.0	0.8	0.2	0	0	0.3	0.3



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City, State: Dedham, MA

Client: Pare/Derek Hug

File Name : 05770KK

Site Code : 23178.00

Start Date : 10/12/2023

Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Dresser Aveue From North				Sprague Street From East				Greenlodge Street From South				Sprague Street From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
02:00 PM	0	0	0	1	0	71	0	1	1	6	13	4	13	79	3	1	193
02:15 PM	0	2	0	0	1	68	12	4	0	2	6	1	17	57	2	0	172
02:30 PM	1	6	0	0	1	77	2	1	0	9	10	0	31	85	3	1	227
02:45 PM	1	2	1	1	0	65	1	2	3	3	8	0	30	86	1	7	211
Total	2	10	1	2	2	281	15	8	4	20	37	5	91	307	9	9	803
03:00 PM	1	3	2	1	1	74	2	0	2	6	16	0	28	66	1	3	206
03:15 PM	0	2	0	0	0	75	0	0	3	9	16	0	28	103	1	2	239
03:30 PM	3	5	1	0	1	82	4	0	1	10	12	0	28	83	2	2	234
03:45 PM	0	7	0	3	3	85	2	1	2	7	10	1	28	105	3	2	259
Total	4	17	3	4	5	316	8	1	8	32	54	1	112	357	7	9	938
04:00 PM	0	5	0	0	3	71	4	0	2	6	17	0	25	84	0	2	219
04:15 PM	0	4	0	4	1	71	3	0	1	1	12	0	22	98	2	2	221
04:30 PM	0	9	0	0	0	78	6	1	1	2	10	0	32	96	2	1	238
04:45 PM	0	5	0	1	4	97	2	0	1	14	14	0	22	106	2	4	272
Total	0	23	0	5	8	317	15	1	5	23	53	0	101	384	6	9	950
05:00 PM	1	6	0	1	0	83	1	1	0	8	9	1	45	119	2	3	280
05:15 PM	0	5	0	4	4	71	2	0	2	9	13	0	36	101	3	2	252
05:30 PM	1	2	0	3	1	80	0	2	2	7	13	5	26	123	5	0	270
05:45 PM	0	3	1	2	4	85	7	2	1	10	24	0	21	113	4	2	279
Total	2	16	1	10	9	319	10	5	5	34	59	6	128	456	14	7	1081
Grand Total	8	66	5	21	24	1233	48	15	22	109	203	12	432	1504	36	34	3772
Apprch %	8	66	5	21	1.8	93.4	3.6	1.1	6.4	31.5	58.7	3.5	21.5	75	1.8	1.7	
Total %	0.2	1.7	0.1	0.6	0.6	32.7	1.3	0.4	0.6	2.9	5.4	0.3	11.5	39.9	1	0.9	
Cars & Peds	7	64	5	21	24	1201	48	15	20	108	193	12	422	1461	36	34	3671
% Cars & Peds	87.5	97	100	100	100	97.4	100	100	90.9	99.1	95.1	100	97.7	97.1	100	100	97.3
Trucks & Buses	0	0	0	0	0	28	0	0	2	0	6	0	8	40	0	0	84
% Trucks & Buses	0	0	0	0	0	2.3	0	0	9.1	0	3	0	1.9	2.7	0	0	2.2
Bikes by Direction	1	2	0	0	0	4	0	0	0	1	4	0	2	3	0	0	17
% Bikes by Direction	12.5	3	0	0	0	0.3	0	0	0	0.9	2	0	0.5	0.2	0	0	0.5

Start Time	Dresser Aveue From North					Sprague Street From East					Greenlodge Street From South					Sprague Street From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	6	0	1	8	0	83	1	1	85	0	8	9	1	18	45	119	2	3	169	280
05:15 PM	0	5	0	4	9	4	71	2	0	77	2	9	13	0	24	36	101	3	2	142	252
05:30 PM	1	2	0	3	6	1	80	0	2	83	2	7	13	5	27	26	123	5	0	154	270
05:45 PM	0	3	1	2	6	4	85	7	2	98	1	10	24	0	35	21	113	4	2	140	279
Total Volume	2	16	1	10	29	9	319	10	5	343	5	34	59	6	104	128	456	14	7	605	1081
% App. Total	6.9	55.2	3.4	34.5	2.6	93	2.9	1.5	4.8	32.7	56.7	5.8	21.2	75.4	2.3	1.2					
PHF	.500	.667	.250	.625	.806	.563	.938	.357	.625	.875	.625	.850	.615	.300	.743	.711	.927	.700	.583	.895	.965
Cars & Peds	2	16	1	10	29	9	316	10	5	340	5	34	58	6	103	127	452	14	7	600	1072
% Cars & Peds	100	100	100	100	100	100	99.1	100	100	99.1	100	100	98.3	100	99.0	99.2	99.1	100	100	99.2	99.2
Trucks & Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6
% Trucks & Buses	0	0	0	0	0	0	0.9	0	0	0.9	0	0	0	0	0	0	0.7	0	0	0.5	0.6
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	2	3
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	1.0	0.8	0.2	0	0	0.3	0.3

Appendix D

Census Data

Oakdale Elementary School
Dedham, MA
Existing and Proposed Traffic Volumes
PARE Project No. 23178.00
October 12, 2023



**US Census Data
Town of Dedham**

	Population
2020	25364
2010	24729
Years	10

ANNUAL GROWTH RATE 0.25%

SAY 0.50%

Source:

[U.S. Census Bureau QuickFacts: Dedham CDP, Massachusetts](#)

Appendix E

Trip Generation & Distribution



2023-2030
 TRAFFIC VOLUME SUMMARY
 Future No-Build Growth Factor = .50%

Weekday AM Peak Hour 7:15 - 8:15 AM					
Whiting Avenue at Walnut Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
EB - L	113	0	118	0	118
EB - T	226	0	235	0	235
EB - R	16	0	17	0	17
WB - L	11	0	12	0	12
WB - T	169	0	176	0	176
WB - R	83	0	86	0	86
NB - L	7	0	8	0	8
NB - T	116	0	121	0	121
NB - R	19	0	20	0	20
SB - L	37	0	39	0	39
SB - T	74	0	77	0	77
SB - R	28	0	29	0	29

School PM Peak Hour 2:00 - 3:00 PM					
Whiting Avenue at Walnut Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
EB - L	43	0	45	0	45
EB - T	172	0	179	0	179
EB - R	12	0	13	0	13
WB - L	8	0	9	0	9
WB - T	325	0	337	0	337
WB - R	50	0	52	0	52
NB - L	6	0	7	0	7
NB - T	103	0	107	0	107
NB - R	3	0	4	0	4
SB - L	55	0	57	0	57
SB - T	168	0	174	0	174
SB - R	37	0	39	0	39

Weekday PM Peak Hour 5:00 - 6:00 PM					
Whiting Avenue at Walnut Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
EB - L	52	0	54	0	54
EB - T	198	0	206	0	206
EB - R	20	0	21	0	21
WB - L	9	0	10	0	10
WB - T	245	0	254	0	254
WB - R	49	0	51	0	51
NB - L	11	0	12	0	12
NB - T	157	0	163	0	163
NB - R	11	0	12	0	12
SB - L	59	0	62	0	62
SB - T	180	0	187	0	187
SB - R	21	0	22	0	22

Weekday AM Peak Hour 7:45 - 8:45 AM					
Whiting Avenue at River Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
EB - L	16	0	17	0	17
EB - T	240	0	249	0	249
EB - R	0	0	0	0	0
WB - L	2	0	3	0	3
WB - T	183	0	190	0	190
WB - R	116	0	121	0	121
NB - L	0	0	0	0	0
NB - T	2	0	3	0	3
NB - R	3	0	4	0	4
SB - L	97	0	101	0	101
SB - T	0	0	0	0	0
SB - R	10	0	11	0	11

School PM Peak Hour 3:00 - 4:00 PM					
Whiting Avenue at River Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
EB - L	5	0	6	0	6
EB - T	175	0	182	0	182
EB - R	4	0	5	0	5
WB - L	1	0	2	0	2
WB - T	279	0	289	0	289
WB - R	106	0	110	0	110
NB - L	0	0	0	0	0
NB - T	1	0	2	0	2
NB - R	5	0	6	0	6
SB - L	173	0	180	0	180
SB - T	1	0	2	0	2
SB - R	19	0	20	0	20

Weekday PM Peak Hour 5:00 - 6:00 PM					
Whiting Avenue at River Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
EB - L	25	0	26	0	26
EB - T	179	0	186	0	186
EB - R	1	0	2	0	2
WB - L	4	0	5	0	5
WB - T	300	0	311	0	311
WB - R	134	0	139	0	139
NB - L	2	0	3	0	3
NB - T	2	0	3	0	3
NB - R	2	0	3	0	3
SB - L	186	0	193	0	193
SB - T	3	0	4	0	4
SB - R	20	0	21	0	21

Weekday AM Peak Hour 8:00 - 9:00 AM					
Oakdale Avenue/River Street/Cedar Street/Sanderson Avenue					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
EB - L	0	0	0	0	0
EB - BL	5	0	6	0	6
EB - T	61	0	64	0	64
EB - R	28	0	29	0	29
WB - L	81	0	84	8	92
WB - T	49	0	51	0	51
WB - BR	15	0	16	0	16
WB - R	2	0	3	0	3
NB - L	5	0	6	0	6
NB - BL	21	0	22	0	22
NB - T	175	0	182	0	182
NB - R	110	0	114	0	114
SB - L	1	0	2	0	2
SB - T	120	0	125	0	125
SB - BR	7	0	8	0	8
SB - R	0	0	0	0	0
SEB - L	1	0	2	0	2
SEB - BL	12	0	13	0	13
SEB - BR	18	0	19	0	19
SEB - R	1	0	2	0	2

School PM Peak Hour 2:45 - 3:45 PM					
Oakdale Avenue/River Street/Cedar Street/Sanderson Avenue					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
EB - L	2	0	3	0	3
EB - BL	5	0	6	0	6
EB - T	57	0	60	0	60
EB - R	31	0	33	0	33
WB - L	158	0	164	0	164
WB - T	75	0	78	0	78
WB - BR	18	0	19	0	19
WB - R	0	0	0	0	0
NB - L	8	0	9	0	9
NB - BL	22	0	23	0	23
NB - T	102	0	106	0	106
NB - R	83	0	86	0	86
SB - L	4	0	5	0	5
SB - T	257	0	267	0	267
SB - BR	10	0	11	0	11
SB - R	1	0	2	0	2
SEB - L	0	0	0	0	0
SEB - BL	16	0	17	0	17
SEB - BR	27	0	28	0	28
SEB - R	4	0	5	0	5

Weekday PM Peak Hour 4:45 - 5:45 PM					
Oakdale Avenue/River Street/Cedar Street/Sanderson Avenue					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
EB - L	2	0	3	0	3
EB - BL	5	0	6	0	6
EB - T	72	0	75	0	75
EB - R	39	0	41	0	41
WB - L	143	0	149	0	149
WB - T	105	0	109	0	109
WB - BR	15	0	16	0	16
WB - R	3	0	4	0	4
NB - L	4	0	5	0	5
NB - BL	24	0	25	0	25
NB - T	154	0	160	0	160
NB - R	92	0	96	0	96
SB - L	5	0	6	0	6
SB - T	183	0	190	0	190
SB - BR	2	0	3	0	3
SB - R	1	0	2	0	2
SEB - L	1	0	2	0	2
SEB - BL	7	0	8	0	8
SEB - BR	17	0	18	0	18
SEB - R	2	0	3	0	3



2023-2030
 TRAFFIC VOLUME SUMMARY
 Future No-Build Growth Factor = .50%

Weekday AM Peak Hour 7:45 - 8:45 AM					
Cedar Street at Madison Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
EB - L	25	0	26	18	44
EB - R	13	0	14	0	14
NB - L	28	0	29	0	29
NB - T	296	0	307	102	409
SB - T	231	0	240	87	327
SB - R	24	0	25	15	40

School PM Peak Hour 2:45 - 3:45 PM					
Cedar Street at Madison Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
EB - L	9	0	10	9	19
EB - R	35	0	37	0	37
NB - L	14	0	15	0	15
NB - T	207	0	215	53	268
SB - T	447	0	463	62	525
SB - R	37	0	39	11	50

Weekday PM Peak Hour 4:00 - 5:00 PM					
Cedar Street at Madison Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
EB - L	9	0	10	3	13
EB - R	26	0	27	0	27
NB - L	7	0	8	0	8
NB - T	242	0	251	19	270
SB - T	402	0	417	22	439
SB - R	20	0	21	4	25

Weekday AM Peak Hour 7:15 - 8:15 AM					
Cedar Street at Turner Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
NB - L	43	0	45	0	45
NB - R	76	0	79	66	145
EB - T	294	0	305	36	341
EB - R	28	0	29	0	29
WB - L	28	0	29	56	85
WB - T	278	0	288	31	319

School PM Peak Hour 3:00 - 4:00 PM					
Cedar Street at Turner Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
NB - L	32	0	34	0	34
NB - R	26	0	27	34	61
EB - T	237	0	246	19	265
EB - R	30	0	32	0	32
WB - L	61	0	64	40	104
WB - T	476	0	493	22	515

Weekday PM Peak Hour 4:00 - 5:00 PM					
Cedar Street at Turner Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
NB - L	44	0	46	0	46
NB - R	43	0	45	12	57
EB - T	242	0	251	7	258
EB - R	34	0	36	0	36
WB - L	74	0	77	14	91
WB - T	401	0	416	8	424

Weekday AM Peak Hour 7:30 - 8:30 AM					
Cedar Street at Sprague Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
NB - L	335	0	347	6	353
NB - R	8	0	9	6	15
EB - T	305	0	316	12	328
EB - R	590	0	611	5	616
WB - L	15	0	16	5	21
WB - T	362	0	375	10	385

School PM Peak Hour 3:00 - 4:00 PM					
Cedar Street at Sprague Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
NB - L	330	0	342	3	345
NB - R	11	0	12	3	15
EB - T	290	0	301	6	307
EB - R	437	0	453	4	457
WB - L	22	0	23	4	27
WB - T	476	0	493	7	500

Weekday PM Peak Hour 4:45 - 5:45 PM					
Cedar Street at Sprague Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
NB - L	332	0	344	1	345
NB - R	10	0	11	1	12
EB - T	351	0	364	2	366
EB - R	566	0	587	1	588
WB - L	26	0	27	1	28
WB - T	387	0	401	3	404

Weekday AM Peak Hour 7:30 - 8:30 AM					
Cedar Street at East Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
SB - L	151	0	157	5	162
SB - T	210	0	218	10	228
NB - T	251	0	260	12	272
NB - R	742	0	769	12	781
WB - L	474	0	491	10	501
WB - R	229	0	238	6	244

School PM Peak Hour 3:00 - 4:00 PM					
Cedar Street at East Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
SB - L	238	0	247	4	251
SB - T	334	0	346	7	353
NB - T	262	0	272	6	278
NB - R	496	0	514	6	520
WB - L	605	0	627	7	634
WB - R	196	0	203	3	206

Weekday PM Peak Hour 5:00 - 6:00 PM					
Cedar Street at East Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
SB - L	346	0	359	1	360
SB - T	303	0	314	3	317
NB - T	314	0	326	2	328
NB - R	554	0	574	2	576
WB - L	454	0	471	3	474
WB - R	259	0	269	1	270



2023-2030
 TRAFFIC VOLUME SUMMARY
 Future No-Build Growth Factor = .50%

Weekday AM Peak Hour 7:45 - 8:45 AM					
Sprague Street at Dresser Avenue and Greenlodge Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2030 Future Build
EB - L	3	0	4	0	4
EB - T	572	0	593	0	593
EB - R	80	0	83	10	93
WB - L	4	0	5	0	5
WB - T	352	0	365	0	365
WB - R	10	0	11	0	11
NB - L	35	0	37	12	49
NB - T	40	0	42	18	60
NB - R	6	0	7	0	7
SB - L	4	0	5	0	5
SB - T	13	0	14	18	32
SB - R	1	0	2	0	2

School PM Peak Hour 3:00 - 4:00 PM					
Sprague Street at Dresser Avenue and Greenlodge Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Total Site Generated	2028 Future Build
EB - L	7	0	8	0	8
EB - T	357	0	370	0	370
EB - R	112	0	116	8	124
WB - L	8	0	9	0	9
WB - T	316	0	328	0	328
WB - R	5	0	6	0	6
NB - L	54	0	56	6	62
NB - T	32	0	34	10	44
NB - R	8	0	9	0	9
SB - L	3	0	4	0	4
SB - T	17	0	18	11	29
SB - R	4	0	5	0	5

Weekday PM Peak Hour 5:00 - 6:00 PM					
Sprague Street at Dresser Avenue and Greenlodge Street					
	2023 Existing	Outside Developments	2030 Future No-Build	Site Generated	2028 Future Build
EB - L	14	0	15	0	15
EB - T	456	0	473	0	473
EB - R	128	0	133	2	135
WB - L	10	0	11	0	11
WB - T	319	0	331	0	331
WB - R	6	0	7	0	7
NB - L	59	0	62	2	64
NB - T	34	0	36	4	40
NB - R	5	0	6	0	6
SB - L	1	0	2	0	2
SB - T	16	0	17	4	21
SB - R	2	0	3	0	3

Oakdale Elementary School
Dedham, MA

PARE Project No. 23178.00
November 3, 2023



Proposed Elementary School
Land Use Code 520: Elementary School

		300.00	Students
On a: Weekday, AM			
On a: Weekday Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 am			
Average Rate:	0.74*300	222	
Fitted Curve Equation:	Not Given		
Trips Entering	54%*222	120	
Trips Exiting	46%*222	102	
		222	
On a: Weekday, PM			
On a: Weekday PM Peak Hour of Generator			
Average Rate:	0.45*300	135	
Fitted Curve Equation:	Not Given		
Trips Entering	46%*135	62	
Trips Exiting	54%*135	73	
		135	
On a: Weekday, PM			
On a: Weekday Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 pm			
Average Rate:	0.16*300	48	
Fitted Curve Equation:	Not Given		
Trips Entering	46%*48	22	
Trips Exiting	54%*48	26	
		48	

Appendix F

Traffic Capacity Analyses

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	240	0	2	183	116	0	2	3	97	0	10
Future Vol, veh/h	16	240	0	2	183	116	0	2	3	97	0	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.50	0.50	0.50	0.72	0.72	0.72
Heavy Vehicles, %	0	1	0	0	2	4	0	0	0	2	0	0
Mvmt Flow	18	267	0	2	203	129	0	4	6	135	0	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.6	10.6	8.3	10.1
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	1%	91%
Vol Thru, %	40%	94%	61%	0%
Vol Right, %	60%	0%	39%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	256	301	107
LT Vol	0	16	2	97
Through Vol	2	240	183	0
RT Vol	3	0	116	10
Lane Flow Rate	10	284	334	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.372	0.412	0.224
Departure Headway (Hd)	5.261	4.709	4.432	5.432
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	684	759	809	655
Service Time	3.261	2.766	2.484	3.512
HCM Lane V/C Ratio	0.015	0.374	0.413	0.227
HCM Control Delay	8.3	10.6	10.6	10.1
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0	1.7	2	0.9

Intersection	
Intersection Delay, s/veh	18
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	113	226	16	11	169	83	7	116	19	37	74	28
Future Vol, veh/h	113	226	16	11	169	83	7	116	19	37	74	28
Peak Hour Factor	0.72	0.72	0.72	0.85	0.85	0.85	0.93	0.93	0.93	0.85	0.85	0.85
Heavy Vehicles, %	3	0	6	0	0	1	14	2	0	0	1	0
Mvmt Flow	157	314	22	13	199	98	8	125	20	44	87	33
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	24.1	14	12.5	12.2
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	32%	4%	27%
Vol Thru, %	82%	64%	64%	53%
Vol Right, %	13%	5%	32%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	355	263	139
LT Vol	7	113	11	37
Through Vol	116	226	169	74
RT Vol	19	16	83	28
Lane Flow Rate	153	493	309	164
Geometry Grp	1	1	1	1
Degree of Util (X)	0.286	0.758	0.488	0.295
Departure Headway (Hd)	6.745	5.639	5.681	6.488
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	534	646	637	556
Service Time	4.769	3.639	3.681	4.513
HCM Lane V/C Ratio	0.287	0.763	0.485	0.295
HCM Control Delay	12.5	24.1	14	12.2
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	1.2	6.9	2.7	1.2

Intersection						
Int Delay, s/veh	75.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Vol, veh/h	305	590	15	362	335	8
Future Vol, veh/h	305	590	15	362	335	8
Conflicting Peds, #/hr	0	0	0	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	84	84	92	92
Heavy Vehicles, %	1	3	0	1	4	0
Mvmt Flow	328	634	18	431	364	9

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	962	0	1115
Stage 1	-	-	-	-	645
Stage 2	-	-	-	-	470
Critical Hdwy	-	-	4.1	-	6.44
Critical Hdwy Stg 1	-	-	-	-	5.44
Critical Hdwy Stg 2	-	-	-	-	5.44
Follow-up Hdwy	-	-	2.2	-	3.536
Pot Cap-1 Maneuver	-	-	724	-	~ 228
Stage 1	-	-	-	-	519
Stage 2	-	-	-	-	625
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	724	-	~ 220
Mov Cap-2 Maneuver	-	-	-	-	~ 220
Stage 1	-	-	-	-	519
Stage 2	-	-	-	-	603

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 359.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	223	-	-	724	-
HCM Lane V/C Ratio	1.672	-	-	0.025	-
HCM Control Delay (s)	\$ 359.4	-	-	10.1	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	24.4	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	294	28	28	278	43	76
Future Vol, veh/h	294	28	28	278	43	76
Conflicting Peds, #/hr	0	1	1	0	2	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	89	89	75	75
Heavy Vehicles, %	4	7	0	2	0	5
Mvmt Flow	359	34	31	312	57	101

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	394	0	753 380
Stage 1	-	-	-	-	377 -
Stage 2	-	-	-	-	376 -
Critical Hdwy	-	-	4.1	-	6.4 6.25
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.345
Pot Cap-1 Maneuver	-	-	1176	-	380 660
Stage 1	-	-	-	-	698 -
Stage 2	-	-	-	-	699 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1175	-	367 657
Mov Cap-2 Maneuver	-	-	-	-	367 -
Stage 1	-	-	-	-	697 -
Stage 2	-	-	-	-	675 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	15.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	511	-	-	1175	-
HCM Lane V/C Ratio	0.311	-	-	0.027	-
HCM Control Delay (s)	15.2	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.1	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		L		T	
Traffic Vol, veh/h	25	13	28	296	231	24
Future Vol, veh/h	25	13	28	296	231	24
Conflicting Peds, #/hr	25	1	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	99	99	90	90
Heavy Vehicles, %	0	0	0	3	2	8
Mvmt Flow	29	15	28	299	257	27

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	654	275	287	0	0
Stage 1	274	-	-	-	-
Stage 2	380	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	435	769	1287	-	-
Stage 1	777	-	-	-	-
Stage 2	696	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	421	766	1283	-	-
Mov Cap-2 Maneuver	421	-	-	-	-
Stage 1	754	-	-	-	-
Stage 2	694	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1283	-	498	-	-
HCM Lane V/C Ratio	0.022	-	0.09	-	-
HCM Control Delay (s)	7.9	0	12.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

AM Peak Hour
 Existing

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	572	80	4	352	10	35	40	6	4	13	1
Future Vol, veh/h	3	572	80	4	352	10	35	40	6	4	13	1
Conflicting Peds, #/hr	0	0	7	7	0	0	9	0	4	4	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	88	88	88	75	75	75
Heavy Vehicles, %	0	3	5	0	3	0	3	0	0	0	0	0
Mvmt Flow	3	643	90	4	396	11	40	45	7	5	17	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	407	0	0	740	0	0	1129	1116	699	1134	1156	411
Stage 1	-	-	-	-	-	-	701	701	-	410	410	-
Stage 2	-	-	-	-	-	-	428	415	-	724	746	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1163	-	-	876	-	-	180	209	443	181	198	645
Stage 1	-	-	-	-	-	-	428	444	-	623	599	-
Stage 2	-	-	-	-	-	-	603	596	-	420	424	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1163	-	-	868	-	-	163	205	437	146	194	638
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	205	-	146	194	-
Stage 1	-	-	-	-	-	-	422	438	-	621	595	-
Stage 2	-	-	-	-	-	-	574	592	-	368	418	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			40.2			26.9		
HCM LOS							E			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	191	1163	-	-	868	-	-	188
HCM Lane V/C Ratio	0.482	0.003	-	-	0.005	-	-	0.128
HCM Control Delay (s)	40.2	8.1	0	-	9.2	0	-	26.9
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	2.3	0	-	-	0	-	-	0.4

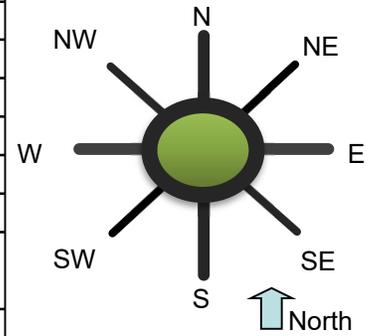
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	6.8	6.9	7.7	6.8	5.3	7.1

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	LTR	LTR>	<LTR	LTR	<LR>
Maximum Queue (ft)	78	86	107	64	38
Average Queue (ft)	39	42	59	37	20
95th Queue (ft)	66	68	90	58	44
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2023, AM Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					742		151	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	474						210	
	SW (6), vph								
	W (7), vph	229				251			
	NW (8), vph								
Output	Total Vehicles	703	0	0	0	993	0	361	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96.0%	100.0%	100.0%	100.0%	96.5%	100.0%	95.5%	100.0%
% Heavy Vehicles	4.0%	0.0%	0.0%	0.0%	3.5%	0.0%	4.5%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.87	0.95	0.95	0.95	0.97	0.95	0.93	0.95
F _{HV}	0.962	1.000	1.000	1.000	0.966	1.000	0.957	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	792	0	170	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	564	0	0	0	0	0	236	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	272	0	0	0	268	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	837	0	0	0	1060	0	406	0
Conflicting flow, pcu/h	268	0	0	0	170	0	564	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	1010	NA	NA	NA	1121	NA	743	NA
Entry Flow Rates, vph	804	0	0	0	1024	0	388	0
V/C ratio	0.80				0.91		0.52	
Control Delay, sec/pcu	19.9				29.4		12.6	
LOS	C				D		B	
Average Queue (ft)	111				209		34	
95th % Queue (ft)	228				373		80	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	23.0	Int LOS	C	Max Approach V/C	0.91

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	249	0	3	190	121	0	3	4	101	0	11
Future Vol, veh/h	17	249	0	3	190	121	0	3	4	101	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	2	4	0	0	0	2	0	0
Mvmt Flow	18	271	0	3	207	132	0	3	4	110	0	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	10.4	8.3	9.7
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	1%	90%
Vol Thru, %	43%	94%	61%	0%
Vol Right, %	57%	0%	39%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	266	314	112
LT Vol	0	17	3	101
Through Vol	3	249	190	0
RT Vol	4	0	121	11
Lane Flow Rate	8	289	341	122
Geometry Grp	1	1	1	1
Degree of Util (X)	0.011	0.372	0.412	0.184
Departure Headway (Hd)	5.14	4.628	4.35	5.435
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	689	775	826	656
Service Time	3.226	2.673	2.392	3.503
HCM Lane V/C Ratio	0.012	0.373	0.413	0.186
HCM Control Delay	8.3	10.4	10.4	9.7
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0	1.7	2	0.7

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	118	235	17	12	176	86	8	121	20	39	77	29
Future Vol, veh/h	118	235	17	12	176	86	8	121	20	39	77	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	6	0	0	1	14	2	0	0	1	0
Mvmt Flow	128	255	18	13	191	93	9	132	22	42	84	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16.8	12.7	11.9	11.4
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	32%	4%	27%
Vol Thru, %	81%	64%	64%	53%
Vol Right, %	13%	5%	31%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	370	274	145
LT Vol	8	118	12	39
Through Vol	121	235	176	77
RT Vol	20	17	86	29
Lane Flow Rate	162	402	298	158
Geometry Grp	1	1	1	1
Degree of Util (X)	0.283	0.61	0.444	0.266
Departure Headway (Hd)	6.282	5.458	5.369	6.068
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	568	660	667	588
Service Time	4.364	3.521	3.44	4.151
HCM Lane V/C Ratio	0.285	0.609	0.447	0.269
HCM Control Delay	11.9	16.8	12.7	11.4
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	1.2	4.2	2.3	1.1

HCM 6th TWSC
7: Sprague Street & Cedar Street

AM Peak Hour
No Build

Intersection						
Int Delay, s/veh	83.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	316	611	16	375	347	9
Future Vol, veh/h	316	611	16	375	347	9
Conflicting Peds, #/hr	0	0	0	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	3	0	1	4	0
Mvmt Flow	343	664	17	408	377	10

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	1007	0	1120
Stage 1	-	-	-	-	675
Stage 2	-	-	-	-	445
Critical Hdwy	-	-	4.1	-	6.44
Critical Hdwy Stg 1	-	-	-	-	5.44
Critical Hdwy Stg 2	-	-	-	-	5.44
Follow-up Hdwy	-	-	2.2	-	3.536
Pot Cap-1 Maneuver	-	-	696	-	~ 226
Stage 1	-	-	-	-	502
Stage 2	-	-	-	-	642
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	696	-	~ 218
Mov Cap-2 Maneuver	-	-	-	-	~ 218
Stage 1	-	-	-	-	502
Stage 2	-	-	-	-	620

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 393.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	221	-	-	696	-
HCM Lane V/C Ratio	1.751	-	-	0.025	-
HCM Control Delay (s)	\$ 393.7	-	-	10.3	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	26.3	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	305	29	29	288	45	79
Future Vol, veh/h	305	29	29	288	45	79
Conflicting Peds, #/hr	0	1	1	0	2	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	7	0	2	0	5
Mvmt Flow	332	32	32	313	49	86

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	365	0	728	352
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	379	-
Critical Hdwy	-	-	4.1	-	6.4	6.25
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.345
Pot Cap-1 Maneuver	-	-	1205	-	393	685
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1204	-	379	682
Mov Cap-2 Maneuver	-	-	-	-	379	-
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	672	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	529	-	-	1204	-
HCM Lane V/C Ratio	0.255	-	-	0.026	-
HCM Control Delay (s)	14.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	26	14	29	307	240	25
Future Vol, veh/h	26	14	29	307	240	25
Conflicting Peds, #/hr	25	1	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	3	2	8
Mvmt Flow	28	15	32	334	261	27

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	701	279	291	0	0
Stage 1	278	-	-	-	-
Stage 2	423	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	408	765	1282	-	-
Stage 1	774	-	-	-	-
Stage 2	665	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	393	762	1278	-	-
Mov Cap-2 Maneuver	393	-	-	-	-
Stage 1	748	-	-	-	-
Stage 2	663	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1278	-	473	-	-
HCM Lane V/C Ratio	0.025	-	0.092	-	-
HCM Control Delay (s)	7.9	0	13.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

AM Peak Hour
 No Build

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	593	83	5	365	11	37	42	7	5	14	2
Future Vol, veh/h	4	593	83	5	365	11	37	42	7	5	14	2
Conflicting Peds, #/hr	0	0	7	7	0	0	9	0	4	4	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	5	0	3	0	3	0	0	0	0	0
Mvmt Flow	4	645	90	5	397	12	40	46	8	5	15	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	409	0	0	742	0	0	1136	1124	701	1142	1163	412
Stage 1	-	-	-	-	-	-	705	705	-	413	413	-
Stage 2	-	-	-	-	-	-	431	419	-	729	750	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1161	-	-	874	-	-	178	207	442	179	196	644
Stage 1	-	-	-	-	-	-	426	442	-	620	597	-
Stage 2	-	-	-	-	-	-	601	593	-	417	422	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1161	-	-	866	-	-	162	202	436	143	192	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	202	-	143	192	-
Stage 1	-	-	-	-	-	-	420	435	-	616	593	-
Stage 2	-	-	-	-	-	-	573	589	-	363	416	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			41			26.6		
HCM LOS							E			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	190	1161	-	-	866	-	-	189
HCM Lane V/C Ratio	0.492	0.004	-	-	0.006	-	-	0.121
HCM Control Delay (s)	41	8.1	0	-	9.2	0	-	26.6
HCM Lane LOS	E	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	2.4	0	-	-	0	-	-	0.4

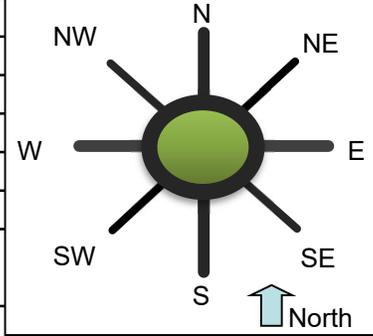
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	7.1	7.0	8.3	6.8	5.6	7.4

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	LTR	LTR>	<LTR	LTR	<LR>
Maximum Queue (ft)	86	83	122	63	43
Average Queue (ft)	40	44	64	37	23
95th Queue (ft)	70	74	98	56	47
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 NO BUILD, AM Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					769		157	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	491						218	
	SW (6), vph								
	W (7), vph	238				260			
	NW (8), vph								
Output	Total Vehicles	729	0	0	0	1029	0	375	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96.0%	100.0%	100.0%	100.0%	96.5%	100.0%	95.5%	100.0%
% Heavy Vehicles	4.0%	0.0%	0.0%	0.0%	3.5%	0.0%	4.5%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.962	1.000	1.000	1.000	0.966	1.000	0.957	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	865	0	178	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	555	0	0	0	0	0	248	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	269	0	0	0	293	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	824	0	0	0	1158	0	426	0
Conflicting flow, pcu/h	293	0	0	0	178	0	555	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	985	NA	NA	NA	1112	NA	750	NA
Entry Flow Rates, vph	792	0	0	0	1118	0	408	0
V/C ratio	0.80				1.01		0.54	
Control Delay, sec/pcu	20.8				48.0		13.1	
LOS	C				E		B	
Average Queue (ft)	114				372		37	
95th % Queue (ft)	234				541		87	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	32.5	Int LOS	D	Max Approach V/C	1.01

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	249	0	3	190	121	0	3	4	101	0	11
Future Vol, veh/h	17	249	0	3	190	121	0	3	4	101	0	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	2	4	0	0	0	2	0	0
Mvmt Flow	18	271	0	3	207	132	0	3	4	110	0	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	10.4	8.3	9.7
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	6%	1%	90%
Vol Thru, %	43%	94%	61%	0%
Vol Right, %	57%	0%	39%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	266	314	112
LT Vol	0	17	3	101
Through Vol	3	249	190	0
RT Vol	4	0	121	11
Lane Flow Rate	8	289	341	122
Geometry Grp	1	1	1	1
Degree of Util (X)	0.011	0.372	0.412	0.184
Departure Headway (Hd)	5.14	4.628	4.35	5.435
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	689	775	826	656
Service Time	3.226	2.673	2.392	3.503
HCM Lane V/C Ratio	0.012	0.373	0.413	0.186
HCM Control Delay	8.3	10.4	10.4	9.7
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0	1.7	2	0.7

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	118	235	17	12	176	86	8	121	20	39	77	29
Future Vol, veh/h	118	235	17	12	176	86	8	121	20	39	77	29
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	6	0	0	1	14	2	0	0	1	0
Mvmt Flow	128	255	18	13	191	93	9	132	22	42	84	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16.8	12.7	11.9	11.4
HCM LOS	C	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	32%	4%	27%
Vol Thru, %	81%	64%	64%	53%
Vol Right, %	13%	5%	31%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	370	274	145
LT Vol	8	118	12	39
Through Vol	121	235	176	77
RT Vol	20	17	86	29
Lane Flow Rate	162	402	298	158
Geometry Grp	1	1	1	1
Degree of Util (X)	0.283	0.61	0.444	0.266
Departure Headway (Hd)	6.282	5.458	5.369	6.068
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	568	660	667	588
Service Time	4.364	3.521	3.44	4.151
HCM Lane V/C Ratio	0.285	0.609	0.447	0.269
HCM Control Delay	11.9	16.8	12.7	11.4
HCM Lane LOS	B	C	B	B
HCM 95th-tile Q	1.2	4.2	2.3	1.1

HCM 6th TWSC
7: Sprague Street & Cedar Street

AM Peak Hour
Build

Intersection

Int Delay, s/veh 100.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	328	616	21	385	353	15
Future Vol, veh/h	328	616	21	385	353	15
Conflicting Peds, #/hr	0	0	0	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	3	0	1	4	0
Mvmt Flow	357	670	23	418	384	16

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	1027	0	1159
Stage 1	-	-	-	-	692
Stage 2	-	-	-	-	467
Critical Hdwy	-	-	4.1	-	6.44
Critical Hdwy Stg 1	-	-	-	-	5.44
Critical Hdwy Stg 2	-	-	-	-	5.44
Follow-up Hdwy	-	-	2.2	-	3.536
Pot Cap-1 Maneuver	-	-	684	-	~ 214
Stage 1	-	-	-	-	493
Stage 2	-	-	-	-	627
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	684	-	~ 204
Mov Cap-2 Maneuver	-	-	-	-	~ 204
Stage 1	-	-	-	-	493
Stage 2	-	-	-	-	598

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	\$ 466.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	209	-	-	684	-
HCM Lane V/C Ratio	1.914	-	-	0.033	-
HCM Control Delay (s)	\$ 466.8	-	-	10.4	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	29	-	-	0.1	-

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	4.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	341	29	85	319	45	145
Future Vol, veh/h	341	29	85	319	45	145
Conflicting Peds, #/hr	0	1	1	0	2	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	4	7	0	2	0	5
Mvmt Flow	371	32	92	347	49	158

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	404	0	921 391
Stage 1	-	-	-	-	388 -
Stage 2	-	-	-	-	533 -
Critical Hdwy	-	-	4.1	-	6.4 6.25
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.345
Pot Cap-1 Maneuver	-	-	1166	-	303 651
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	593 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1165	-	272 648
Mov Cap-2 Maneuver	-	-	-	-	272 -
Stage 1	-	-	-	-	689 -
Stage 2	-	-	-	-	534 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	17.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	488	-	-	1165	-
HCM Lane V/C Ratio	0.423	-	-	0.079	-
HCM Control Delay (s)	17.7	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.3	-

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	44	14	29	409	327	40
Future Vol, veh/h	44	14	29	409	327	40
Conflicting Peds, #/hr	25	1	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	3	2	8
Mvmt Flow	48	15	32	445	355	43

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	914	381	401	0	0
Stage 1	380	-	-	-	-
Stage 2	534	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	306	671	1169	-	-
Stage 1	696	-	-	-	-
Stage 2	592	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	293	668	1165	-	-
Mov Cap-2 Maneuver	293	-	-	-	-
Stage 1	669	-	-	-	-
Stage 2	590	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1165	-	339	-	-
HCM Lane V/C Ratio	0.027	-	0.186	-	-
HCM Control Delay (s)	8.2	0	18	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

AM Peak Hour
 Build

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	593	93	5	365	11	49	60	7	5	32	2
Future Vol, veh/h	4	593	93	5	365	11	49	60	7	5	32	2
Conflicting Peds, #/hr	0	0	7	7	0	0	9	0	4	4	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	5	0	3	0	3	0	0	0	0	0
Mvmt Flow	4	645	101	5	397	12	53	65	8	5	35	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	409	0	0	753	0	0	1152	1130	707	1157	1174	412
Stage 1	-	-	-	-	-	-	711	711	-	413	413	-
Stage 2	-	-	-	-	-	-	441	419	-	744	761	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1161	-	-	866	-	-	174	205	439	175	193	644
Stage 1	-	-	-	-	-	-	422	439	-	620	597	-
Stage 2	-	-	-	-	-	-	593	593	-	410	417	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1161	-	-	858	-	-	144	200	433	127	189	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	144	200	-	127	189	-
Stage 1	-	-	-	-	-	-	416	432	-	616	592	-
Stage 2	-	-	-	-	-	-	545	588	-	339	411	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			64.1			30.3		
HCM LOS							F			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	177	1161	-	-	858	-	-	184
HCM Lane V/C Ratio	0.712	0.004	-	-	0.006	-	-	0.23
HCM Control Delay (s)	64.1	8.1	0	-	9.2	0	-	30.3
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	4.4	0	-	-	0	-	-	0.9

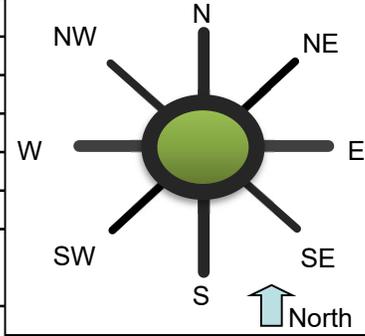
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	6.8	7.3	6.0	7.1	5.7	6.5

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	LTR	LTR>	<LTR	LTR	<LR>
Maximum Queue (ft)	75	96	110	72	47
Average Queue (ft)	38	47	60	39	22
95th Queue (ft)	64	79	91	59	46
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 BUILD, AM Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					781		162	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	501						228	
	SW (6), vph								
	W (7), vph	244				272			
	NW (8), vph								
Output	Total Vehicles	745	0	0	0	1053	0	390	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96.0%	100.0%	100.0%	100.0%	96.5%	100.0%	95.5%	100.0%
% Heavy Vehicles	4.0%	0.0%	0.0%	0.0%	3.5%	0.0%	4.5%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.962	1.000	1.000	1.000	0.966	1.000	0.957	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	879	0	184	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	566	0	0	0	0	0	259	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	276	0	0	0	306	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	842	0	0	0	1185	0	443	0
Conflicting flow, pcu/h	306	0	0	0	184	0	566	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	971	NA	NA	NA	1105	NA	741	NA
Entry Flow Rates, vph	810	0	0	0	1145	0	424	0
V/C ratio	0.83				1.04		0.57	
Control Delay, sec/pcu	23.3				56.1		14.0	
LOS	C				F		B	
Average Queue (ft)	131				446		41	
95th % Queue (ft)	261				604		96	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	37.4	Int LOS	E	Max Approach V/C	1.04

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	175	4	1	279	106	0	1	5	173	1	19
Future Vol, veh/h	5	175	4	1	279	106	0	1	5	173	1	19
Peak Hour Factor	0.88	0.88	0.88	0.90	0.90	0.90	0.31	0.31	0.31	0.88	0.88	0.88
Heavy Vehicles, %	0	1	0	0	0	2	0	0	0	0	0	0
Mvmt Flow	6	199	5	1	310	118	0	3	16	197	1	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	13.5	8.6	11.5
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	90%
Vol Thru, %	17%	95%	72%	1%
Vol Right, %	83%	2%	27%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	184	386	193
LT Vol	0	5	1	173
Through Vol	1	175	279	1
RT Vol	5	4	106	19
Lane Flow Rate	19	209	429	219
Geometry Grp	1	1	1	1
Degree of Util (X)	0.029	0.3	0.555	0.342
Departure Headway (Hd)	5.397	5.17	4.756	5.611
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	665	700	763	643
Service Time	3.418	3.17	2.756	3.622
HCM Lane V/C Ratio	0.029	0.299	0.562	0.341
HCM Control Delay	8.6	10.4	13.5	11.5
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0.1	1.3	3.5	1.5

Intersection	
Intersection Delay, s/veh	18.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	43	172	12	8	325	50	6	103	3	55	168	37
Future Vol, veh/h	43	172	12	8	325	50	6	103	3	55	168	37
Peak Hour Factor	0.88	0.88	0.88	0.89	0.89	0.89	0.79	0.79	0.79	0.77	0.77	0.77
Heavy Vehicles, %	5	1	0	0	1	0	0	2	0	0	0	0
Mvmt Flow	49	195	14	9	365	56	8	130	4	71	218	48
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.1	22.8	12.6	18.3
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	19%	2%	21%
Vol Thru, %	92%	76%	85%	65%
Vol Right, %	3%	5%	13%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	112	227	383	260
LT Vol	6	43	8	55
Through Vol	103	172	325	168
RT Vol	3	12	50	37
Lane Flow Rate	142	258	430	338
Geometry Grp	1	1	1	1
Degree of Util (X)	0.272	0.465	0.716	0.594
Departure Headway (Hd)	6.896	6.493	5.992	6.337
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	519	552	602	567
Service Time	4.97	4.557	4.045	4.394
HCM Lane V/C Ratio	0.274	0.467	0.714	0.596
HCM Control Delay	12.6	15.1	22.8	18.3
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.1	2.4	5.9	3.9

Intersection						
Int Delay, s/veh	68.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	290	437	22	476	330	11
Future Vol, veh/h	290	437	22	476	330	11
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	94	94	95	95
Heavy Vehicles, %	2	0	4	1	2	0
Mvmt Flow	319	480	23	506	347	12

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	799	0	1112
Stage 1	-	-	-	-	559
Stage 2	-	-	-	-	553
Critical Hdwy	-	-	4.14	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.236	-	3.518
Pot Cap-1 Maneuver	-	-	815	-	~ 231
Stage 1	-	-	-	-	572
Stage 2	-	-	-	-	576
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	815	-	~ 222
Mov Cap-2 Maneuver	-	-	-	-	~ 222
Stage 1	-	-	-	-	572
Stage 2	-	-	-	-	553

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 323.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	226	-	-	815	-
HCM Lane V/C Ratio	1.588	-	-	0.029	-
HCM Control Delay (s)	\$ 323.3	-	-	9.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	22.6	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	237	30	61	476	32	26
Future Vol, veh/h	237	30	61	476	32	26
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	88	88	91	91
Heavy Vehicles, %	0	3	2	0	6	0
Mvmt Flow	276	35	69	541	35	29

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	315	0	977 298
Stage 1	-	-	-	-	298 -
Stage 2	-	-	-	-	679 -
Critical Hdwy	-	-	4.12	-	6.46 6.2
Critical Hdwy Stg 1	-	-	-	-	5.46 -
Critical Hdwy Stg 2	-	-	-	-	5.46 -
Follow-up Hdwy	-	-	2.218	-	3.554 3.3
Pot Cap-1 Maneuver	-	-	1245	-	273 746
Stage 1	-	-	-	-	744 -
Stage 2	-	-	-	-	496 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1239	-	250 743
Mov Cap-2 Maneuver	-	-	-	-	250 -
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	456 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	17.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	356	-	-	1239	-
HCM Lane V/C Ratio	0.179	-	-	0.056	-
HCM Control Delay (s)	17.3	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	9	35	14	207	447	37
Future Vol, veh/h	9	35	14	207	447	37
Conflicting Peds, #/hr	25	2	6	0	0	6
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	62	62	82	82	95	95
Heavy Vehicles, %	0	9	0	2	0	5
Mvmt Flow	15	56	17	252	471	39

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	808	499	516	0	-	0
Stage 1	497	-	-	-	-	-
Stage 2	311	-	-	-	-	-
Critical Hdwy	6.4	6.29	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.381	2.2	-	-	-
Pot Cap-1 Maneuver	353	558	1060	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	748	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	342	553	1053	-	-	-
Mov Cap-2 Maneuver	342	-	-	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1053	-	491	-	-
HCM Lane V/C Ratio	0.016	-	0.145	-	-
HCM Control Delay (s)	8.5	0	13.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

School Peak Hour
 Existing

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	357	112	8	316	5	54	32	8	3	17	4
Future Vol, veh/h	7	357	112	8	316	5	54	32	8	3	17	4
Conflicting Peds, #/hr	4	0	1	1	0	4	9	0	1	1	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	91	91	91	85	85	85	70	70	70
Heavy Vehicles, %	0	2	3	0	2	0	4	0	0	0	0	0
Mvmt Flow	8	406	127	9	347	5	64	38	9	4	24	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	356	0	0	534	0	0	879	861	472	882	922	363
Stage 1	-	-	-	-	-	-	487	487	-	372	372	-
Stage 2	-	-	-	-	-	-	392	374	-	510	550	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.14	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1214	-	-	1044	-	-	266	295	596	269	272	686
Stage 1	-	-	-	-	-	-	558	554	-	653	622	-
Stage 2	-	-	-	-	-	-	629	621	-	550	519	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1208	-	-	1043	-	-	238	287	595	233	265	675
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	287	-	233	265	-
Stage 1	-	-	-	-	-	-	552	548	-	643	612	-
Stage 2	-	-	-	-	-	-	586	611	-	499	513	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			27.7			19.1		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	267	1208	-	-	1043	-	-	289
HCM Lane V/C Ratio	0.414	0.007	-	-	0.008	-	-	0.119
HCM Control Delay (s)	27.7	8	0	-	8.5	0	-	19.1
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.9	0	-	-	0	-	-	0.4

3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.3	0.1	0.1
Total Del/Veh (s)	7.9	8.9	7.5	9.2	7.2	8.5

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR	<LTR	LTR>	<LR>
Maximum Queue (ft)	67	95	94	105	52
Average Queue (ft)	36	53	52	58	26
95th Queue (ft)	59	82	79	89	49
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2023, School Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	

Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					496		238	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	605						334	
	SW (6), vph								
	W (7), vph	196				262			
	NW (8), vph								
Output	Total Vehicles	801	0	0	0	758	0	572	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	95.4%	100.0%	100.0%	100.0%	90.5%	100.0%	99.7%	100.0%
% Heavy Vehicles	4.6%	0.0%	0.0%	0.0%	9.5%	0.0%	0.3%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.95	0.95	0.95	0.95	0.86	0.95	0.97	0.95
F _{HV}	0.956	1.000	1.000	1.000	0.913	1.000	0.997	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	631	0	247	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	670	0	0	0	0	0	346	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	217	0	0	0	333	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	887	0	0	0	964	0	593	0
Conflicting flow, pcu/h	333	0	0	0	247	0	670	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	939	NA	NA	NA	980	NA	695	NA
Entry Flow Rates, vph	848	0	0	0	880	0	592	0
V/C ratio	0.90				0.90		0.85	
Control Delay, sec/pcu	31.6				30.1		31.7	
LOS	D				D		D	
Average Queue (ft)	186				184		130	
95th % Queue (ft)	340				356		245	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	31.1	Int LOS	D	Max Approach V/C	0.90

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	182	5	2	289	110	0	2	6	180	2	20
Future Vol, veh/h	6	182	5	2	289	110	0	2	6	180	2	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	0	2	0	0	0	0	0	0
Mvmt Flow	7	198	5	2	314	120	0	2	7	196	2	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	13.6	8.5	11.5
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	89%
Vol Thru, %	25%	94%	72%	1%
Vol Right, %	75%	3%	27%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	193	401	202
LT Vol	0	6	2	180
Through Vol	2	182	289	2
RT Vol	6	5	110	20
Lane Flow Rate	9	210	436	220
Geometry Grp	1	1	1	1
Degree of Util (X)	0.013	0.299	0.56	0.341
Departure Headway (Hd)	5.456	5.137	4.628	5.597
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	658	705	767	646
Service Time	3.476	3.137	2.722	3.606
HCM Lane V/C Ratio	0.014	0.298	0.568	0.341
HCM Control Delay	8.5	10.3	13.6	11.5
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0	1.3	3.5	1.5

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	179	13	9	337	52	7	107	4	57	174	39
Future Vol, veh/h	45	179	13	9	337	52	7	107	4	57	174	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	5	1	0	0	1	0	0	2	0	0	0	0
Mvmt Flow	49	195	14	10	366	57	8	116	4	62	189	42
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.1	20.7	11.8	15.5
HCM LOS	B	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	2%	21%
Vol Thru, %	91%	76%	85%	64%
Vol Right, %	3%	5%	13%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	118	237	398	270
LT Vol	7	45	9	57
Through Vol	107	179	337	174
RT Vol	4	13	52	39
Lane Flow Rate	128	258	433	293
Geometry Grp	1	1	1	1
Degree of Util (X)	0.237	0.443	0.692	0.506
Departure Headway (Hd)	6.663	6.197	5.762	6.204
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	537	580	632	581
Service Time	4.725	4.246	3.762	4.252
HCM Lane V/C Ratio	0.238	0.445	0.685	0.504
HCM Control Delay	11.8	14.1	20.7	15.5
HCM Lane LOS	B	B	C	C
HCM 95th-tile Q	0.9	2.3	5.5	2.8

Intersection						
Int Delay, s/veh	94.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	301	453	23	493	342	12
Future Vol, veh/h	301	453	23	493	342	12
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	0	4	1	2	0
Mvmt Flow	327	492	25	536	372	13

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	819	0	1160
Stage 1	-	-	-	-	573
Stage 2	-	-	-	-	587
Critical Hdwy	-	-	4.14	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.236	-	3.518
Pot Cap-1 Maneuver	-	-	801	-	~ 216
Stage 1	-	-	-	-	564
Stage 2	-	-	-	-	556
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	801	-	~ 206
Mov Cap-2 Maneuver	-	-	-	-	~ 206
Stage 1	-	-	-	-	564
Stage 2	-	-	-	-	531

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 431.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	210	-	-	801	-
HCM Lane V/C Ratio	1.832	-	-	0.031	-
HCM Control Delay (s)	\$ 431.2	-	-	9.6	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	27.2	-	-	0.1	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	246	32	64	493	34	27
Future Vol, veh/h	246	32	64	493	34	27
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	3	2	0	6	0
Mvmt Flow	267	35	70	536	37	29

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	306	0	965
Stage 1	-	-	-	-	289
Stage 2	-	-	-	-	676
Critical Hdwy	-	-	4.12	-	6.46
Critical Hdwy Stg 1	-	-	-	-	5.46
Critical Hdwy Stg 2	-	-	-	-	5.46
Follow-up Hdwy	-	-	2.218	-	3.554
Pot Cap-1 Maneuver	-	-	1255	-	278
Stage 1	-	-	-	-	751
Stage 2	-	-	-	-	498
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1249	-	255
Mov Cap-2 Maneuver	-	-	-	-	255
Stage 1	-	-	-	-	748
Stage 2	-	-	-	-	458

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	17.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	360	-	-	1249	-
HCM Lane V/C Ratio	0.184	-	-	0.056	-
HCM Control Delay (s)	17.2	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	10	37	15	215	463	39
Future Vol, veh/h	10	37	15	215	463	39
Conflicting Peds, #/hr	25	2	6	0	0	6
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	9	0	2	0	5
Mvmt Flow	11	40	16	234	503	42

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	821	532	551	0	-	0
Stage 1	530	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Critical Hdwy	6.4	6.29	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.381	2.2	-	-	-
Pot Cap-1 Maneuver	347	534	1029	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	337	530	1023	-	-	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	580	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1023	-	472	-	-
HCM Lane V/C Ratio	0.016	-	0.108	-	-
HCM Control Delay (s)	8.6	0	13.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

School Peak Hour
 No Build

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	370	116	9	328	6	56	34	9	4	18	5
Future Vol, veh/h	8	370	116	9	328	6	56	34	9	4	18	5
Conflicting Peds, #/hr	4	0	1	1	0	4	9	0	1	1	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	2	3	0	2	0	4	0	0	0	0	0
Mvmt Flow	9	402	126	10	357	7	61	37	10	4	20	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	368	0	0	529	0	0	886	872	467	893	932	374
Stage 1	-	-	-	-	-	-	484	484	-	385	385	-
Stage 2	-	-	-	-	-	-	402	388	-	508	547	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.14	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1202	-	-	1048	-	-	263	291	600	264	269	677
Stage 1	-	-	-	-	-	-	560	555	-	642	614	-
Stage 2	-	-	-	-	-	-	621	612	-	551	521	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1196	-	-	1047	-	-	239	283	599	228	261	666
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	283	-	228	261	-
Stage 1	-	-	-	-	-	-	553	548	-	632	604	-
Stage 2	-	-	-	-	-	-	582	602	-	499	515	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			27.2			19		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	268	1196	-	-	1047	-	-	287
HCM Lane V/C Ratio	0.402	0.007	-	-	0.009	-	-	0.102
HCM Control Delay (s)	27.2	8	0	-	8.5	0	-	19
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0	-	-	0.3

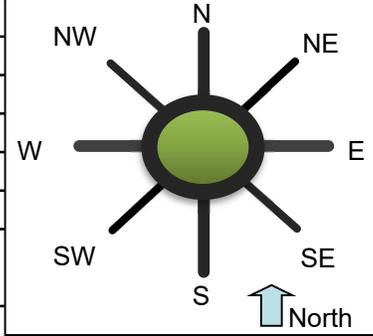
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.3	0.1	0.1
Total Del/Veh (s)	7.9	8.9	7.8	9.5	7.4	8.7

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR	<LTR	LTR>	<LR>
Maximum Queue (ft)	71	102	98	133	54
Average Queue (ft)	37	52	55	61	27
95th Queue (ft)	60	82	82	103	48
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 NO BUILD, School Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					514		247	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	627						346	
	SW (6), vph								
	W (7), vph	203				272			
	NW (8), vph								
Output	Total Vehicles	830	0	0	0	786	0	593	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	95.4%	100.0%	100.0%	100.0%	90.5%	100.0%	99.7%	100.0%
% Heavy Vehicles	4.6%	0.0%	0.0%	0.0%	9.5%	0.0%	0.3%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.956	1.000	1.000	1.000	0.913	1.000	0.997	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	612	0	269	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	713	0	0	0	0	0	377	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	231	0	0	0	324	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	944	0	0	0	936	0	646	0
Conflicting flow, pcu/h	324	0	0	0	269	0	713	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	948	NA	NA	NA	958	NA	665	NA
Entry Flow Rates, vph	902	0	0	0	854	0	645	0
V/C ratio	0.95				0.89		0.97	
Control Delay, sec/pcu	39.4				29.8		52.4	
LOS	E				D		F	
Average Queue (ft)	247				177		235	
95th % Queue (ft)	411				344		359	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	39.5	Int LOS	E	Max Approach V/C	0.97

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	182	5	2	289	110	0	2	6	180	2	20
Future Vol, veh/h	6	182	5	2	289	110	0	2	6	180	2	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	0	2	0	0	0	0	0	0
Mvmt Flow	7	198	5	2	314	120	0	2	7	196	2	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	13.6	8.5	11.5
HCM LOS	B	B	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	3%	0%	89%
Vol Thru, %	25%	94%	72%	1%
Vol Right, %	75%	3%	27%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	193	401	202
LT Vol	0	6	2	180
Through Vol	2	182	289	2
RT Vol	6	5	110	20
Lane Flow Rate	9	210	436	220
Geometry Grp	1	1	1	1
Degree of Util (X)	0.013	0.299	0.56	0.341
Departure Headway (Hd)	5.456	5.137	4.628	5.597
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	658	705	767	646
Service Time	3.476	3.137	2.722	3.606
HCM Lane V/C Ratio	0.014	0.298	0.568	0.341
HCM Control Delay	8.5	10.3	13.6	11.5
HCM Lane LOS	A	B	B	B
HCM 95th-tile Q	0	1.3	3.5	1.5

Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	179	13	9	337	52	7	107	4	57	174	39
Future Vol, veh/h	45	179	13	9	337	52	7	107	4	57	174	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	5	1	0	0	1	0	0	2	0	0	0	0
Mvmt Flow	49	195	14	10	366	57	8	116	4	62	189	42
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.1	20.7	11.8	15.5
HCM LOS	B	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	2%	21%
Vol Thru, %	91%	76%	85%	64%
Vol Right, %	3%	5%	13%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	118	237	398	270
LT Vol	7	45	9	57
Through Vol	107	179	337	174
RT Vol	4	13	52	39
Lane Flow Rate	128	258	433	293
Geometry Grp	1	1	1	1
Degree of Util (X)	0.237	0.443	0.692	0.506
Departure Headway (Hd)	6.663	6.197	5.762	6.204
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	537	580	632	581
Service Time	4.725	4.246	3.762	4.252
HCM Lane V/C Ratio	0.238	0.445	0.685	0.504
HCM Control Delay	11.8	14.1	20.7	15.5
HCM Lane LOS	B	B	C	C
HCM 95th-tile Q	0.9	2.3	5.5	2.8

Intersection

Int Delay, s/veh 111.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	366	588	28	404	345	12
Future Vol, veh/h	366	588	28	404	345	12
Conflicting Peds, #/hr	0	3	3	0	8	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	0	0	2	0
Mvmt Flow	398	639	30	439	375	13

Major/Minor

	Major1	Major2	Minor1		
Conflicting Flow All	0	0	1040	0	1228
Stage 1	-	-	-	-	721
Stage 2	-	-	-	-	507
Critical Hdwy	-	-	4.1	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.2	-	3.518
Pot Cap-1 Maneuver	-	-	676	- ~	197
Stage 1	-	-	-	-	482
Stage 2	-	-	-	-	605
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	673	- ~	183
Mov Cap-2 Maneuver	-	-	-	- ~	183
Stage 1	-	-	-	-	480
Stage 2	-	-	-	-	565

Approach

	EB	WB	NB
HCM Control Delay, s	0	0.7	\$ 542.7
HCM LOS			F

Minor Lane/Major Mvmt

	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	187	-	-	673	-
HCM Lane V/C Ratio	2.075	-	-	0.045	-
HCM Control Delay (s)	\$ 542.7	-	-	10.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	30	-	-	0.1	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	258	36	91	424	46	57
Future Vol, veh/h	258	36	91	424	46	57
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	280	39	99	461	50	62

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	323	0	963 304
Stage 1	-	-	-	-	304 -
Stage 2	-	-	-	-	659 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1248	-	286 740
Stage 1	-	-	-	-	753 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1242	-	254 737
Mov Cap-2 Maneuver	-	-	-	-	254 -
Stage 1	-	-	-	-	750 -
Stage 2	-	-	-	-	463 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	399	-	-	1242	-
HCM Lane V/C Ratio	0.281	-	-	0.08	-
HCM Control Delay (s)	17.5	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.3	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	13	27	8	270	439	25
Future Vol, veh/h	13	27	8	270	439	25
Conflicting Peds, #/hr	3	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	0	15
Mvmt Flow	14	29	9	293	477	27

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	806	493	505	0	-	0
Stage 1	492	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	354	580	1070	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	350	579	1069	-	-	-
Mov Cap-2 Maneuver	350	-	-	-	-	-
Stage 1	612	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	477	-	-
HCM Lane V/C Ratio	0.008	-	0.091	-	-
HCM Control Delay (s)	8.4	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

PM Peak Hour
 Build

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	473	135	11	331	7	64	40	6	2	21	3
Future Vol, veh/h	15	473	135	11	331	7	64	40	6	2	21	3
Conflicting Peds, #/hr	10	0	6	6	0	10	7	0	5	5	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	514	147	12	360	8	70	43	7	2	23	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	667	0	0	1034	1028	599	1048	1097	381
Stage 1	-	-	-	-	-	-	626	626	-	398	398	-
Stage 2	-	-	-	-	-	-	408	402	-	650	699	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	932	-	-	212	236	505	208	215	671
Stage 1	-	-	-	-	-	-	475	480	-	632	606	-
Stage 2	-	-	-	-	-	-	624	604	-	461	445	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1178	-	-	925	-	-	184	223	499	167	203	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	223	-	167	203	-
Stage 1	-	-	-	-	-	-	461	466	-	611	589	-
Stage 2	-	-	-	-	-	-	582	587	-	401	432	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.3			45			24.1		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	204	1178	-	-	925	-	-	217
HCM Lane V/C Ratio	0.586	0.014	-	-	0.013	-	-	0.13
HCM Control Delay (s)	45	8.1	0	-	8.9	0	-	24.1
HCM Lane LOS	E	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.2	0	-	-	0	-	-	0.4

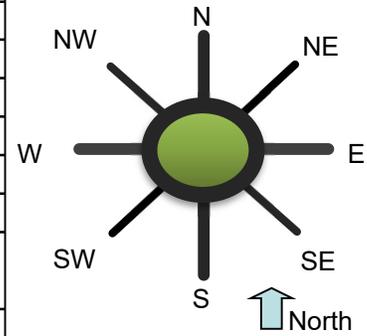
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.3	0.1	0.1
Total Del/Veh (s)	8.0	9.0	6.4	9.3	7.4	8.2

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR	<LTR	LTR>	<LR>
Maximum Queue (ft)	77	100	90	124	60
Average Queue (ft)	39	53	55	59	27
95th Queue (ft)	62	80	80	95	52
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 BUILD, School Peak Hour	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					520		251	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	634						353	
	SW (6), vph								
	W (7), vph	206				278			
	NW (8), vph								
Output	Total Vehicles	840	0	0	0	798	0	604	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	95.4%	100.0%	100.0%	100.0%	90.5%	100.0%	99.7%	100.0%
% Heavy Vehicles	4.6%	0.0%	0.0%	0.0%	9.5%	0.0%	0.3%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.956	1.000	1.000	1.000	0.913	1.000	0.997	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	619	0	274	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	721	0	0	0	0	0	385	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	234	0	0	0	331	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	955	0	0	0	950	0	658	0
Conflicting flow, pcu/h	331	0	0	0	274	0	721	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	941	NA	NA	NA	953	NA	660	NA
Entry Flow Rates, vph	913	0	0	0	867	0	657	0
V/C ratio	0.97				0.91		1.00	
Control Delay, sec/pcu	43.3				32.3		58.8	
LOS	E				D		F	
Average Queue (ft)	275				194		268	
95th % Queue (ft)	440				368		389	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	43.6	Int LOS	E	Max Approach V/C	1.00

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	179	1	4	300	134	2	2	2	186	3	20
Future Vol, veh/h	25	179	1	4	300	134	2	2	2	186	3	20
Peak Hour Factor	0.83	0.83	0.83	0.84	0.84	0.84	0.50	0.50	0.50	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	30	216	1	5	357	160	4	4	4	196	3	21
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.4	18.3	9.4	12.3
HCM LOS	B	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	12%	1%	89%
Vol Thru, %	33%	87%	68%	1%
Vol Right, %	33%	0%	31%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	205	438	209
LT Vol	2	25	4	186
Through Vol	2	179	300	3
RT Vol	2	1	134	20
Lane Flow Rate	12	247	521	220
Geometry Grp	1	1	1	1
Degree of Util (X)	0.021	0.366	0.7	0.362
Departure Headway (Hd)	6.166	5.331	4.83	5.92
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	578	674	751	607
Service Time	4.235	3.372	2.83	3.968
HCM Lane V/C Ratio	0.021	0.366	0.694	0.362
HCM Control Delay	9.4	11.4	18.3	12.3
HCM Lane LOS	A	B	C	B
HCM 95th-tile Q	0.1	1.7	5.8	1.6

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	52	198	20	9	245	49	11	157	11	59	180	21
Future Vol, veh/h	52	198	20	9	245	49	11	157	11	59	180	21
Peak Hour Factor	0.85	0.85	0.85	0.94	0.94	0.94	0.91	0.91	0.91	0.96	0.96	0.96
Heavy Vehicles, %	0	0	0	0	1	2	0	0	0	0	0	0
Mvmt Flow	61	233	24	10	261	52	12	173	12	61	188	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16	15.8	13.1	15
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	3%	23%
Vol Thru, %	88%	73%	81%	69%
Vol Right, %	6%	7%	16%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	179	270	303	260
LT Vol	11	52	9	59
Through Vol	157	198	245	180
RT Vol	11	20	49	21
Lane Flow Rate	197	318	322	271
Geometry Grp	1	1	1	1
Degree of Util (X)	0.354	0.536	0.536	0.474
Departure Headway (Hd)	6.47	6.078	5.991	6.306
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	555	591	600	571
Service Time	4.525	4.127	4.04	4.357
HCM Lane V/C Ratio	0.355	0.538	0.537	0.475
HCM Control Delay	13.1	16	15.8	15
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	1.6	3.2	3.2	2.5

Intersection

Int Delay, s/veh 107.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	351	566	26	387	332	10
Future Vol, veh/h	351	566	26	387	332	10
Conflicting Peds, #/hr	0	3	3	0	8	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	87	87	87	87
Heavy Vehicles, %	1	1	0	0	2	0
Mvmt Flow	369	596	30	445	382	11

Major/Minor

	Major1	Major2	Minor1		
Conflicting Flow All	0	0	968	0	1183
Stage 1	-	-	-	-	670
Stage 2	-	-	-	-	513
Critical Hdwy	-	-	4.1	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.2	-	3.518
Pot Cap-1 Maneuver	-	-	720	-	~ 209
Stage 1	-	-	-	-	509
Stage 2	-	-	-	-	601
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	717	-	~ 195
Mov Cap-2 Maneuver	-	-	-	-	~ 195
Stage 1	-	-	-	-	507
Stage 2	-	-	-	-	563

Approach

	EB	WB	NB
HCM Control Delay, s	0	0.6	\$ 500.6
HCM LOS			F

Minor Lane/Major Mvmt

	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	198	-	-	717	-
HCM Lane V/C Ratio	1.985	-	-	0.042	-
HCM Control Delay (s)	\$ 500.6	-	-	10.2	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	29.4	-	-	0.1	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	242	34	74	401	44	43
Future Vol, veh/h	242	34	74	401	44	43
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	78	78	78	78
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	306	43	95	514	56	55

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	353	0	1036
Stage 1	-	-	-	-	332
Stage 2	-	-	-	-	704
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1217	-	259
Stage 1	-	-	-	-	731
Stage 2	-	-	-	-	494
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1212	-	229
Mov Cap-2 Maneuver	-	-	-	-	229
Stage 1	-	-	-	-	728
Stage 2	-	-	-	-	440

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	20.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	344	-	-	1212	-
HCM Lane V/C Ratio	0.324	-	-	0.078	-
HCM Control Delay (s)	20.4	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0.3	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	9	26	7	242	402	20
Future Vol, veh/h	9	26	7	242	402	20
Conflicting Peds, #/hr	3	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	52	52	71	71	77	77
Heavy Vehicles, %	0	0	0	2	0	15
Mvmt Flow	17	50	10	341	522	26

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	900	537	549	0	-	0
Stage 1	536	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	312	548	1031	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	308	547	1030	-	-	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	583	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1030	-	456	-	-
HCM Lane V/C Ratio	0.01	-	0.148	-	-
HCM Control Delay (s)	8.5	0	14.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

PM Peak Hour
 Existing

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	456	128	10	319	6	59	34	5	1	16	2
Future Vol, veh/h	14	456	128	10	319	6	59	34	5	1	16	2
Conflicting Peds, #/hr	10	0	6	6	0	10	7	0	5	5	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	88	88	88	74	74	74	81	81	81
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	507	142	11	363	7	80	46	7	1	20	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	380	0	0	655	0	0	1023	1018	589	1041	1086	384
Stage 1	-	-	-	-	-	-	616	616	-	399	399	-
Stage 2	-	-	-	-	-	-	407	402	-	642	687	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1190	-	-	942	-	-	216	239	512	210	218	668
Stage 1	-	-	-	-	-	-	481	485	-	631	606	-
Stage 2	-	-	-	-	-	-	625	604	-	466	450	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1176	-	-	935	-	-	191	226	505	167	206	654
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	226	-	167	206	-
Stage 1	-	-	-	-	-	-	467	470	-	610	590	-
Stage 2	-	-	-	-	-	-	587	588	-	404	437	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.3			48			23.4		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	209	1176	-	-	935	-	-	219
HCM Lane V/C Ratio	0.634	0.013	-	-	0.012	-	-	0.107
HCM Control Delay (s)	48	8.1	0	-	8.9	0	-	23.4
HCM Lane LOS	E	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.7	0	-	-	0	-	-	0.4

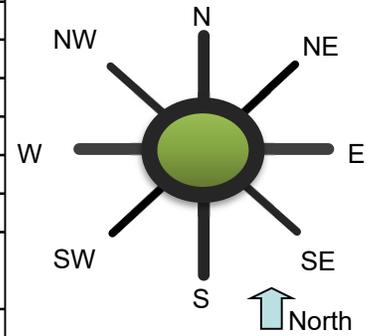
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	7.4	8.4	8.1	7.9	6.7	8.0

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR>	<LTR	LTR>	<LR>
Maximum Queue (ft)	68	78	94	92	49
Average Queue (ft)	37	47	56	48	19
95th Queue (ft)	59	69	82	76	46
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2023, Commuter Peak	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					554		346	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	454						303	
	SW (6), vph								
	W (7), vph	259				314			
	NW (8), vph								
Output	Total Vehicles	713	0	0	0	868	0	649	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	98.9%	100.0%	100.0%	100.0%	99.0%	100.0%	100.0%	100.0%
% Heavy Vehicles	1.1%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.96	0.95	0.95	0.95	0.95	0.95	0.89	0.95
F _{HV}	0.989	1.000	1.000	1.000	0.990	1.000	1.000	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	588	0	388	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	479	0	0	0	0	0	340	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	273	0	0	0	333	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	752	0	0	0	921	0	728	0
Conflicting flow, pcu/h	333	0	0	0	388	0	479	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	972	NA	NA	NA	919	NA	847	NA
Entry Flow Rates, vph	744	0	0	0	912	0	728	0
V/C ratio	0.77				0.99		0.86	
Control Delay, sec/pcu	18.5				48.8		28.5	
LOS	C				E		D	
Average Queue (ft)	96				309		144	
95th % Queue (ft)	195				455		268	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	33.1	Int LOS	D	Max Approach V/C	0.99

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	186	2	5	311	139	3	3	3	193	4	21
Future Vol, veh/h	26	186	2	5	311	139	3	3	3	193	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	28	202	2	5	338	151	3	3	3	210	4	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.2	17	9.3	12.5
HCM LOS	B	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	12%	1%	89%
Vol Thru, %	33%	87%	68%	2%
Vol Right, %	33%	1%	31%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	214	455	218
LT Vol	3	26	5	193
Through Vol	3	186	311	4
RT Vol	3	2	139	21
Lane Flow Rate	10	233	495	237
Geometry Grp	1	1	1	1
Degree of Util (X)	0.017	0.345	0.666	0.383
Departure Headway (Hd)	6.096	5.334	4.846	5.826
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	585	672	752	616
Service Time	4.159	3.374	2.846	3.87
HCM Lane V/C Ratio	0.017	0.347	0.658	0.385
HCM Control Delay	9.3	11.2	17	12.5
HCM Lane LOS	A	B	C	B
HCM 95th-tile Q	0.1	1.5	5.1	1.8

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	54	206	21	10	254	51	12	163	12	62	187	22
Future Vol, veh/h	54	206	21	10	254	51	12	163	12	62	187	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	1	2	0	0	0	0	0	0
Mvmt Flow	59	224	23	11	276	55	13	177	13	67	203	24
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16.3	17.5	13.6	16.4
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	3%	23%
Vol Thru, %	87%	73%	81%	69%
Vol Right, %	6%	7%	16%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	187	281	315	271
LT Vol	12	54	10	62
Through Vol	163	206	254	187
RT Vol	12	21	51	22
Lane Flow Rate	203	305	342	295
Geometry Grp	1	1	1	1
Degree of Util (X)	0.374	0.533	0.583	0.524
Departure Headway (Hd)	6.622	6.279	6.126	6.41
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	541	571	585	560
Service Time	4.694	4.342	4.185	4.475
HCM Lane V/C Ratio	0.375	0.534	0.585	0.527
HCM Control Delay	13.6	16.3	17.5	16.4
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.7	3.1	3.7	3

HCM 6th TWSC
7: Sprague Street & Cedar Street

PM Peak Hour
No Build

Intersection

Int Delay, s/veh 109.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	364	587	27	401	344	11
Future Vol, veh/h	364	587	27	401	344	11
Conflicting Peds, #/hr	0	3	3	0	8	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	0	0	2	0
Mvmt Flow	396	638	29	436	374	12

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1037
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	678
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	675
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	\$ 532.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	188	-	-	675	-
HCM Lane V/C Ratio	2.052	-	-	0.043	-
HCM Control Delay (s)	\$ 532.6	-	-	10.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	29.6	-	-	0.1	-

Notes
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	36	77	416	46	45
Future Vol, veh/h	251	36	77	416	46	45
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	273	39	84	452	50	49

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	316	0	917 297
Stage 1	-	-	-	-	297 -
Stage 2	-	-	-	-	620 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1256	-	304 747
Stage 1	-	-	-	-	758 -
Stage 2	-	-	-	-	540 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1250	-	275 744
Mov Cap-2 Maneuver	-	-	-	-	275 -
Stage 1	-	-	-	-	755 -
Stage 2	-	-	-	-	491 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	16.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	-	-	1250	-
HCM Lane V/C Ratio	0.247	-	-	0.067	-
HCM Control Delay (s)	16.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.2	-

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	10	27	8	251	417	21
Future Vol, veh/h	10	27	8	251	417	21
Conflicting Peds, #/hr	3	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	0	15
Mvmt Flow	11	29	9	273	453	23

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	760	467	477	0	-	0
Stage 1	466	-	-	-	-	-
Stage 2	294	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	377	600	1096	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	599	1095	-	-	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1095	-	514	-	-
HCM Lane V/C Ratio	0.008	-	0.078	-	-
HCM Control Delay (s)	8.3	0	12.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

PM Peak Hour
 No Build

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	473	133	11	331	7	62	36	6	2	17	3
Future Vol, veh/h	15	473	133	11	331	7	62	36	6	2	17	3
Conflicting Peds, #/hr	10	0	6	6	0	10	7	0	5	5	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	514	145	12	360	8	67	39	7	2	18	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	665	0	0	1031	1027	598	1045	1095	381
Stage 1	-	-	-	-	-	-	625	625	-	398	398	-
Stage 2	-	-	-	-	-	-	406	402	-	647	697	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	934	-	-	213	236	506	209	215	671
Stage 1	-	-	-	-	-	-	476	480	-	632	606	-
Stage 2	-	-	-	-	-	-	626	604	-	463	446	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1178	-	-	927	-	-	189	223	500	171	203	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	223	-	171	203	-
Stage 1	-	-	-	-	-	-	462	466	-	611	589	-
Stage 2	-	-	-	-	-	-	588	587	-	407	433	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.3			41.5			23.3		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	207	1178	-	-	927	-	-	220
HCM Lane V/C Ratio	0.546	0.014	-	-	0.013	-	-	0.109
HCM Control Delay (s)	41.5	8.1	0	-	8.9	0	-	23.3
HCM Lane LOS	E	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.9	0	-	-	0	-	-	0.4

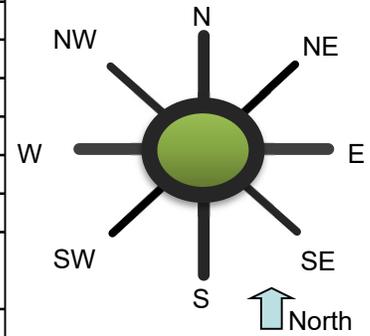
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	7.6	8.7	8.2	8.0	6.9	8.2

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR>	<LTR	LTR>	<LR>
Maximum Queue (ft)	64	89	108	84	41
Average Queue (ft)	37	49	60	48	20
95th Queue (ft)	58	74	90	75	45
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 NO BUILD, Commuter Peak	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					574		359	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	471						314	
	SW (6), vph								
	W (7), vph	269				326			
	NW (8), vph								
Output	Total Vehicles	740	0	0	0	900	0	673	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	98.9%	100.0%	100.0%	100.0%	99.0%	100.0%	100.0%	100.0%
% Heavy Vehicles	1.1%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.989	1.000	1.000	1.000	0.990	1.000	1.000	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	630	0	390	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	518	0	0	0	0	0	341	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	296	0	0	0	358	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	813	0	0	0	988	0	732	0
Conflicting flow, pcu/h	358	0	0	0	390	0	518	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	948	NA	NA	NA	918	NA	814	NA
Entry Flow Rates, vph	804	0	0	0	978	0	732	0
V/C ratio	0.85				1.07		0.90	
Control Delay, sec/pcu	25.1				69.6		34.2	
LOS	D				F		D	
Average Queue (ft)	140				473		174	
95th % Queue (ft)	268				589		305	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	45.1	Int LOS	E	Max Approach V/C	1.07

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	26	186	2	5	311	139	3	3	3	193	4	21
Future Vol, veh/h	26	186	2	5	311	139	3	3	3	193	4	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	28	202	2	5	338	151	3	3	3	210	4	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.2	17	9.3	12.5
HCM LOS	B	C	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	12%	1%	89%
Vol Thru, %	33%	87%	68%	2%
Vol Right, %	33%	1%	31%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	214	455	218
LT Vol	3	26	5	193
Through Vol	3	186	311	4
RT Vol	3	2	139	21
Lane Flow Rate	10	233	495	237
Geometry Grp	1	1	1	1
Degree of Util (X)	0.017	0.345	0.666	0.383
Departure Headway (Hd)	6.096	5.334	4.846	5.826
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	585	672	752	616
Service Time	4.159	3.374	2.846	3.87
HCM Lane V/C Ratio	0.017	0.347	0.658	0.385
HCM Control Delay	9.3	11.2	17	12.5
HCM Lane LOS	A	B	C	B
HCM 95th-tile Q	0.1	1.5	5.1	1.8

Intersection	
Intersection Delay, s/veh	16.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	54	206	21	10	254	51	12	163	12	62	187	22
Future Vol, veh/h	54	206	21	10	254	51	12	163	12	62	187	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	1	2	0	0	0	0	0	0
Mvmt Flow	59	224	23	11	276	55	13	177	13	67	203	24
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16.3	17.5	13.6	16.4
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	3%	23%
Vol Thru, %	87%	73%	81%	69%
Vol Right, %	6%	7%	16%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	187	281	315	271
LT Vol	12	54	10	62
Through Vol	163	206	254	187
RT Vol	12	21	51	22
Lane Flow Rate	203	305	342	295
Geometry Grp	1	1	1	1
Degree of Util (X)	0.374	0.533	0.583	0.524
Departure Headway (Hd)	6.622	6.279	6.126	6.41
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	541	571	585	560
Service Time	4.694	4.342	4.185	4.475
HCM Lane V/C Ratio	0.375	0.534	0.585	0.527
HCM Control Delay	13.6	16.3	17.5	16.4
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.7	3.1	3.7	3

Intersection

Int Delay, s/veh 111.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	366	587	28	404	345	12
Future Vol, veh/h	366	587	28	404	345	12
Conflicting Peds, #/hr	0	3	3	0	8	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	0	0	2	0
Mvmt Flow	398	638	30	439	375	13

Major/Minor

	Major1	Major2	Minor1		
Conflicting Flow All	0	0	1039	0	1227
Stage 1	-	-	-	-	720
Stage 2	-	-	-	-	507
Critical Hdwy	-	-	4.1	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.2	-	3.518
Pot Cap-1 Maneuver	-	-	677	-	~ 197
Stage 1	-	-	-	-	482
Stage 2	-	-	-	-	605
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	674	-	~ 183
Mov Cap-2 Maneuver	-	-	-	-	~ 183
Stage 1	-	-	-	-	480
Stage 2	-	-	-	-	565

Approach

	EB	WB	NB
HCM Control Delay, s	0	0.7	\$ 542.7
HCM LOS			F

Minor Lane/Major Mvmt

	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	187	-	-	674	-
HCM Lane V/C Ratio	2.075	-	-	0.045	-
HCM Control Delay (s)	\$ 542.7	-	-	10.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	30	-	-	0.1	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	258	36	91	424	46	57
Future Vol, veh/h	258	36	91	424	46	57
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	280	39	99	461	50	62

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	323	0	963 304
Stage 1	-	-	-	-	304 -
Stage 2	-	-	-	-	659 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	1248	-	286 740
Stage 1	-	-	-	-	753 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1242	-	254 737
Mov Cap-2 Maneuver	-	-	-	-	254 -
Stage 1	-	-	-	-	750 -
Stage 2	-	-	-	-	463 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	399	-	-	1242	-
HCM Lane V/C Ratio	0.281	-	-	0.08	-
HCM Control Delay (s)	17.5	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.3	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	13	27	8	270	439	25
Future Vol, veh/h	13	27	8	270	439	25
Conflicting Peds, #/hr	3	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	0	15
Mvmt Flow	14	29	9	293	477	27

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	806	493	505	0	-	0
Stage 1	492	-	-	-	-	-
Stage 2	314	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	354	580	1070	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	350	579	1069	-	-	-
Mov Cap-2 Maneuver	350	-	-	-	-	-
Stage 1	612	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	477	-	-
HCM Lane V/C Ratio	0.008	-	0.091	-	-
HCM Control Delay (s)	8.4	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

HCM 6th TWSC
 15: Greenlodge Street/Dresser Avenue & Sprague Street

PM Peak Hour
 Build

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	473	135	11	331	7	64	40	6	2	21	3
Future Vol, veh/h	15	473	135	11	331	7	64	40	6	2	21	3
Conflicting Peds, #/hr	10	0	6	6	0	10	7	0	5	5	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	16	514	147	12	360	8	70	43	7	2	23	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	667	0	0	1034	1028	599	1048	1097	381
Stage 1	-	-	-	-	-	-	626	626	-	398	398	-
Stage 2	-	-	-	-	-	-	408	402	-	650	699	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1192	-	-	932	-	-	212	236	505	208	215	671
Stage 1	-	-	-	-	-	-	475	480	-	632	606	-
Stage 2	-	-	-	-	-	-	624	604	-	461	445	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1178	-	-	925	-	-	184	223	499	167	203	657
Mov Cap-2 Maneuver	-	-	-	-	-	-	184	223	-	167	203	-
Stage 1	-	-	-	-	-	-	461	466	-	611	589	-
Stage 2	-	-	-	-	-	-	582	587	-	401	432	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.3			45			24.1		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	204	1178	-	-	925	-	-	217
HCM Lane V/C Ratio	0.586	0.014	-	-	0.013	-	-	0.13
HCM Control Delay (s)	45	8.1	0	-	8.9	0	-	24.1
HCM Lane LOS	E	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.2	0	-	-	0	-	-	0.4

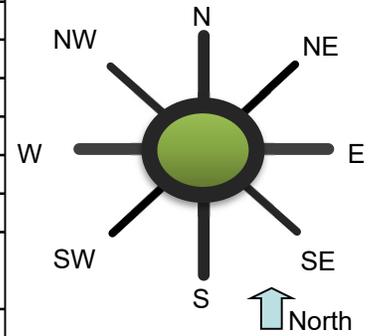
3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane Performance by approach

Approach	EB	WB	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	7.6	8.8	8.3	7.9	6.5	8.3

Intersection: 3: Cedar Street & Sanderson Avenue/River Street & Cobbler Lane

Movement	EB	WB	NB	SB	SE
Directions Served	<LTR	LTR>	<LTR	LTR>	<LR>
Maximum Queue (ft)	75	84	99	90	38
Average Queue (ft)	38	49	58	48	20
95th Queue (ft)	59	72	88	75	45
Link Distance (ft)	789	1256	862		449
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

General & Site Information		v 4.2
Analyst:	Buen Salvamari Orbiso	
Agency/Co:	Pare Corporation	
Date:	November 14 2023	
Project or PI#:	23178.00 Dedham- Oakdale School	
Year, Peak Hour:	2030 BUILD, Commuter Peak	
County/District:	Norfolk County	
Intersection Name:	Cedar Street at East Street	



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
Exit Legs (TO)	N (1), vph					576		360	
	NE (2), vph								
	E (3), vph								
	SE (4), vph								
	S (5), vph	474						317	
	SW (6), vph								
	W (7), vph	270				328			
	NW (8), vph								
Output	Total Vehicles	744	0	0	0	904	0	677	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	98.9%	100.0%	100.0%	100.0%	99.0%	100.0%	100.0%	100.0%
% Heavy Vehicles	1.1%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%
% Bicycle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
# of Pedestrians (ped/hr)	0	0	0	0	0	0	0	0
PHF	0.92	0.95	0.95	0.95	0.92	0.95	0.92	0.95
F _{HV}	0.989	1.000	1.000	1.000	0.990	1.000	1.000	1.000
F _{ped}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	0	0	632	0	391	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	0	0	0	0	0	0	0	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	521	0	0	0	0	0	345	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	297	0	0	0	360	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	818	0	0	0	992	0	736	0
Conflicting flow, pcu/h	360	0	0	0	391	0	521	0

Results: Approach Measures of Effectiveness								
HCM 6th Edition	N	NE	E	SE	S	SW	W	NW
Entry Capacity, vph	945	NA	NA	NA	917	NA	811	NA
Entry Flow Rates, vph	809	0	0	0	983	0	736	0
V/C ratio	0.86				1.07		0.91	
Control Delay, sec/pcu	25.8				71.5		35.5	
LOS	D				F		E	
Average Queue (ft)	145				488		181	
95th % Queue (ft)	274				600		314	

Overall Intersection Measures of Effectiveness					
Int Control Delay (sec)	46.4	Int LOS	E	Max Approach V/C	1.07

Notes: v 4.2

Unit Legend:
 vph = vehicles per hour
 PHF = peak hour factor
 F_{HV} = heavy vehicle factor
 pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)						
Select Exit Leg for Bypass (TO)						
Does the bypass have a dedicated receiving lane?						
Volumes						
Right Turn Volume removed from Entry Leg						
Volume Characteristics (for entry leg)						
PHF						
F _{HV}						
F _{ped}						
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow, pcu/hr						
Conflicting Flow, pcu/hr						
Bypass Lane Results (HCM 6th Edition)						
Entry Capacity of Bypass, vph						
Flow Rates of Exiting Traffic, vph						
V/C ratio						
Control Delay, s/veh						
LOS						
95th % Queue (veh)						
95th % Queue (ft)						
Approach w/Bypass Delay, s/veh						
Approach w/Bypass LOS						



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