

RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS

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INTRODUCTION

"This Manual is authorized and developed pursuant to Multnomah County Code Chapter 29, Section 29.571, and Multnomah County Rules For Street Standards, Rule 30. 100."

OVERALL ORGANIZATION OF MANUAL

This manual includes the engineering standards and specifications to be followed in the design and construction of new and improved roadways in Multnomah County. The document supplements the Multnomah County *Street Standards - Rules* document, which includes all administrative procedures to be followed with respect to roadway design and construction, including plan preparation format, permitting, and variances.

This Design and Construction Manual is a comprehensive reference to all relevant roadway design standards in Multnomah County. The standards and specifications are to be applied on all roadways either currently under County jurisdiction, or for which the County will assume maintenance responsibility upon the completion of construction.

This manual is divided into two other parts:

Part I: Design Manual, includes all roadway design-related standards, with sections covering traffic planning, geometric design, drainage, landscaping/urban design, and traffic engineering design.

Part II: Construction Manual, includes all procedures and specifications related to roadway construction. Sections covering traffic, roadway, drainage, and landscaping/urban design construction are presented.

Appendix A: Level of Service, describes the concept of level of service criteria and how it used to evaluate the performance of transportation facilities including unsignalized and signalized intersections, rural and suburban highways, urban and suburban arterials, etc.

DESIGN PROVISIONS

The design components of the manual are presented in different sections covering traffic, geometric design, drainage, landscaping/urban design and traffic engineering design elements. The following highlights the content of each chapter within the different sections.

Section 1 - Traffic Planning

Chapter 1: Traffic operations specifies standards for the functional classification and design treatments for the Multnomah County roadway system, and identifies traffic level of service thresholds to which new or improved roadways should be designed, as well as the appropriate analysis procedures to identify the required sizing and operations of roadways. Also, guidelines for performing site-impact traffic studies and public sector traffic studies are given.

Chapter 2: Access Management provides standards for the location and design of public and private access along a roadway. This includes standards for median provision, raised median vs. two-way left turn lane development, public intersection spacing, private driveway spacing, signal spacing, pedestrian crosswalk spacing, and bus stop placement

Section 2 - Geometric Design

Chapter 1: Roadway Cross Sections, includes a set of typical cross sections for roadways of different functional classification, based on right-of-way availability, the degree of integration of pedestrian, bicycle, and transit modes, and relative placement of different facilities within the right-of-way. Minimum widths for travel lanes, turn lanes, bike lanes, and sidewalks are also presented.

Chapter 2: Intersection Design, includes all standards related to intersection design, including curb returns, curb ramps, island channelization, minimum angle, and bus stop amenities.

Chapter 3: Engineering Design, specifies the standards for roadway geometric design. Included are design standards for stopping sight distance, horizontal and vertical alignment, cross slope, and curbs and sidewalks.

Section 3 - Traffic Engineering Design

Chapter 1: Traffic Signal Design, identifies the standards for signal warrants and signal phasing options, and the standards related to the layout of traffic signal installations, including mast arm vs. span wire installations, the format and content of signal plans.

Chapter 2: Traffic Signing, specifies the standards for the format and content of signing plans, the different types of street name signs, and the different types of sign materials.

Chapter 3: Pavement Marking, specifies the standards for the format and application of pavement marking designs, and the different types and uses of pavement marking materials.

Chapter 4: Construction Traffic Control, describes the standards for preparing construction traffic control plans during roadway improvement or construction projects.

Chapter 5: Speed Bump, describes standards and guidelines for application of speed bumps in the public ROW.

Section 4 - Pavement Design

Chapter 1: Standard Sections, describes standard sections to be used when full design calculations are not necessary.

Chapter 2: Flexible Pavement Design, gives standards for determining thickness and type of roadway pavement.

Chapter 3: Rigid Pavement Design: specifies AASHTO Guide to be used for rigid pavement design.

Section 5 - Drainage

Chapter 1: Introduction, specifies the standard minimum requirements and methodology used to determine various criteria necessary for design and construction of roadway drainage systems.

Chapter 2: Hydrology Calculations, identifies the standards to be applied in estimating stormwater runoff for use in designing roadway drainage facilities.

Chapter 3: Drainage Facility Components, identifies design standards for several different types of drainage facilities, including storm sewers, inlets, and detention ponds.

Section 6 - Street Lighting

Chapter 1: Placement Criteria, gives standards for street light spacing and average maintained lighting levels.

Chapter 2: Design Format, includes standards for conduit, cable and wire, poles, lighting fixtures, and lighting controls design.

Section 7 - Transit

Chapter 1: Bus Stop Spacing and Placement, includes standards for the optimum spacing of bus stops along a transit route. Also, an overview of the Tri-Met guidelines is given for optimum bus stop location, in terms of the near-side of an intersection, far-side of an intersection, or mid-block.

Chapter 2: Bus Stop Facilities, presents standards for typical on-street and off-street bus stop facilities. On-street facilities included are bus pullouts and curb extensions. Off-street facilities included are landing pads, bus stop benches, and bus stop shelters.

Chapter 3: Transit Provisions for Proposed Developments, includes standards in determining whether a proposed development is required to provide transit facilities.

Section 8 - Landscape/Urban Design

This section identifies placement standards associated with integration of landscaping and urban design elements into new and improved roadway projects. This includes criteria for placement of street trees, irrigation systems, and street furniture. The section also identifies standards to be applied for integration of low-level landscaping, street trees, irrigation systems, and street furniture, into roadway projects.

Section 9 – Survey

Section 10 – Erosion Control (Future Chapter) The erosion control measures shall be designed to perform as effectively as those prescribed in the “Erosion Control Plans Technical Guidance Handbook” and the “Surface Water Quality Facilities Technical Guidance Handbook.”

Section 12 – Structures (Future Chapter)**PART II – CONSTRUCTION**

The Standard Specifications are the Oregon Department of Transportation 1996 edition of the Standard Specification for Highway Construction,” and the 1998 Supplemental Standard Specifications.

PART I - DESIGN MANUAL

SECTION 1 - TRAFFIC PLANNING

1.1 TRAFFIC OPERATIONS

1.1.1 Roadway Functional Classification

The Multnomah County Comprehensive Framework Plan's *Policy 34: Trafficways and the Functional Classification of Trafficways Map*, includes nine roadway functional classifications, four within the broad arterial classification (principal, major, minor, and rural), three within the collector classification (major, neighborhood, and rural), and two within the local street classification (urban and rural). A brief description of each classification is presented in this section. In addition, a range of design treatments that can be accommodated within each functional classification will be described in subsection 1.1.2 of this manual. For a more detailed description of each functional classification, see *Policy 34: Trafficways and the Functional Classification of Trafficways Map*.

Arterials

Arterial streets comprise the regional roadway network, and provide for travel between communities in the County, and between counties. Arterial streets accommodate the full array of travel modes including the regional bikeway system, fixed-route transit network, goods delivery and higher volume automobile traffic than collector streets.

Principal Arterial Streets connect to freeways and highways that serve travelers without an origin or destination in the County. This interstate and interregional traffic, including trucks, is in addition to regional traffic traveling between cities and counties, and traffic generated by intensive and higher density land uses along the arterial corridor. The ability to move auto, truck, and regional bicycle traffic is preserved.

Major Arterial Streets carry high volumes of traffic between cities in the County as part of the regional trafficway system. Priority may be given to transit- and pedestrian-oriented land uses by way of regional boulevard design treatments. Design and management of major arterial streets emphasizes preservation of the ability to move auto and transit traffic by limiting accesses while also accommodating regional bikeways and pedestrian movements.

Minor Arterial Streets are the lowest order arterial facility in the urban regional street network. They typically carry less traffic volume than principal and major arterial streets, but have a high degree of connectivity between communities. Minor arterial streets provide major links in the regional road and bikeway networks; provide for truck mobility and transit corridors; and may serve as significant links in the local pedestrian system, especially where they are designed as community boulevards.

Rural Arterial Roads are the primary means of access into the County's large rural districts, and often connect between counties to accommodate through movements. Rural arterial roads connect to freeways or highways, and link rural collector and local roads to the urban area and other regions. Rural arterial roads carry greater traffic volumes than rural collector roads, including commuters and other home-based trips, natural resources involving trucks, and recreational trips involving autos, bicycles, and equestrians.

Collectors

Collector streets distribute traffic between local streets and the arterial street network. They are not intended to serve trips without an origin or destination inside the County. Collector streets provide for automobile, bicycle and pedestrian circulation, and basic transit service.

Major Collector Streets serve several purposes including linking neighborhoods to the regional system of bicycle and automobile streets, and basic transit service. They typically provide direct access between residential and commercial developments, schools, and parks.

Neighborhood Collector Streets provide access primarily to residential land uses and link neighborhoods to higher order roads. They generally have higher traffic volumes than local streets but through or non-local traffic is discouraged.

Rural Collector Roads distribute automobile traffic over large areas and generally connect to urban streets or rural arterial roads. They may also provide for recreational trips by auto, bicycle, and equestrian.

Local Streets

Local streets provide access to abutting land uses and do not serve through traffic. Local streets may be further classified by adjacent land use, such as residential, commercial, and industrial. Their primary purpose is to serve local pedestrian, bicycle, and automobile trips in urban areas. In rural areas, local roads serve automobile and farm circulation, as well as local pedestrian, bicycle, and equestrian uses.

1.1.2 Roadway Design Treatments

Metro’s Regional Transportation Policy’s “Regional Street Design Goals and Objectives,” provides design guidelines for streets in the region. The County’s roadway design treatments have incorporated Metro’s Street Design Guidelines. (For detailed description of each treatment, see Metro’s “Street Design Guidelines for 2040” and the Regional Street Design map in the current Regional Transportation Plan.)

Boulevards

Boulevards serve the multi-modal travel needs of the region’s most intensely developed activity centers, including regional centers, station communities, town centers and some main streets. Boulevards are the continuation of the regional street network within more intensively developed activity centers. Boulevards are designed with special amenities that promote pedestrian, bicycle, and public transportation travel in the districts they serve.

Boulevards are classified as regional and community scale designs. Regional boulevards are designated on specific major arterial roadways while community boulevards are designated on specific minor arterial roadways.

Regional and community boulevards are located within the most intensely developed activity centers with development oriented to the street. These are primarily regional centers, town centers, station

communities and some main streets.

Regional boulevards consist of four or more vehicle lanes, balanced multi-modal function, and a broad right of way. Features highly desirable on regional boulevards include on-street parking, bicycle lanes, narrower travel lanes than throughways, more intensive land use oriented to the street, wide sidewalks, and landscaped medians.

Community boulevards consist of four or fewer vehicle travel lanes, balanced multi-modal function, narrower right of way than a regional boulevard, landscaped medians, no on-street parking, narrower travel lanes than throughways, more intensive land use oriented to the street, and wide sidewalks.

Streets

Streets serve the multi-modal travel needs of corridors, inner and outer residential neighborhoods and some main streets. Streets typically are more vehicle-oriented and less pedestrian-oriented than boulevards, providing a multi-modal function with an emphasis on vehicle mobility. Streets are classified as regional and community designs. Regional streets are designated on specific major arterial roadways, while the community streets are designated on specific minor arterial roadways.

Regional streets consist of four or more vehicle travel lanes, balanced multi-modal function, broad right of way, limited on-street parking, wider travel lanes than boulevards, land use set back from the street, sidewalks with pedestrian buffering from street, and a raised landscaped median or, usually a continuous two way left turn lane.

Community streets consist of two to four travel lanes, balanced multi-modal function, narrower right of way than regional streets, on-street parking, narrower or fewer travel lanes than regional streets and residential neighborhood and corridor land use set back from the street. Community streets provide a higher level of local access and street connectivity than regional streets. Community streets have the greatest flexibility in cross sectional elements. Depending on the intensity of adjacent land use and site access needs, community streets can have three different median conditions; center two way left turn lane, narrow landscaped median, or no median.

The relation of the design treatments to the functional classifications is shown in Table 1.1.1.

Table 1.1.1
Application of the Design Treatments to the Functional Classifications

Design Treatment	Functional Classification	
	Major Arterial	Minor Arterial
Street Type	Regional Street	Community Street
Boulevard Type	Regional Boulevard	Community Boulevard

1.1.3 Traffic Study Requirements

Site-Development Traffic Impact Study - A site-development traffic impact study may be required by the County with the proposed development's land use application, depending on the type of proposed development, location of the site, and its perceived impact on the surrounding transportation system. A traffic impact study will generally be required for a proposed development under the following circumstances:

The proposed development is expected to forecast more than 1,000 vehicle trips per weekday, or the proposed development's location, proposed site plan, or trip generation characteristics could affect traffic safety, access management, street capacity, or other known traffic deficiencies in the vicinity of the site.

A Professional Engineer competent in traffic engineering or a registered Traffic Engineer in the State of Oregon shall prepare the traffic impact study. The County may exercise the prerogative to require a pre-study memorandum of understanding to be agreed upon between the County and the developer to specify the scope of the study. Traffic impact studies involving street network planning shall follow design standards for street connectivity as described in section 1.2.3. The following elements of the traffic impact study should be included as a minimum:

Purpose and Objectives of Study - Discussion of the purpose of the study, key traffic issues to be addressed, the characteristics of the surrounding transportation system, and development objectives related to the proposed site.

Project Description - Discussion of existing land uses and proposed land uses, including a map showing the site plan. Description of whether the proposed land use is in compliance with the existing zoning of the site property. If not, the study is labeled as a "zone change." Include discussion of proposed location of access driveways and estimated time line for ultimate build-out of site.

Existing Conditions - Description of surrounding roadway facilities, including functional classification of roadways, nature and intensity of nearby pedestrian and bicycle facilities and activity, and current or planned transit routes. Level of service analysis of key study intersections and/or arterial corridors, with diagrams of intersection/ arterial lane configurations, and traffic control. The County Transportation Division will provide direction in determining the study area and intersections to be evaluated. In general, all study intersections which will be impacted by 10 or more site-generated trips during the weekday a.m. or p.m. peak hour should be analyzed. The standard level of service analysis methodology and criteria is documented in 1.1.5 & Appendix B of this manual.

Background Conditions - Level of service analysis for background traffic conditions. “Background” traffic conditions constitute the future non-project-related traffic volumes and committed roadway configurations (diagrammed) during the future year the proposed development is expected to be fully constructed and operational. Background conditions would also include approved, but not yet completed off-site developments within the study area. If the proposed development is a “zone change” (see description under *Project Description* section), then an additional level of service analysis for a 20-year forecast background year may be required. See 1.1.4 for a description of the methodology to be used in formulating 20-year volume forecasts.

Development Site-Generated Trip Characteristics - Evaluation of expected trip generation, trip distribution, trip assignment, and modal split. Trip generation analysis should follow trip generation rates given in the latest edition of the *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE), unless more appropriate local data is available. Trip distribution analysis shall be clearly documented. A roadnet diagram with percentage distributions and the resulting volumes should be provided. The trip distribution methodology can be based on trip patterns of similar nearby developments, existing intersection or corridor volumes, modeling results from a regional transportation planning model (from Metro or other local jurisdiction), and/or the anticipated market area of the proposed development. For a 20-year forecast condition, a sub-area comparison of trips from the proposed zoning change versus the modeled zone designation shall be performed.

Total (Background plus Site-generated) Conditions - Level of service analysis of total traffic conditions with full build-out of the proposed development. Analysis should include proposed site-access driveways. Zone change studies may also be required to evaluate total traffic conditions for a 20-year forecast year.

On-site Circulation - Evaluation of safety and efficiency of on-site circulation for all modes (vehicle, bicycle, pedestrian, etc.). Anticipated truck movements should be safely accommodated.

Summary of Findings and Recommendations - Summarize key findings of study and recommendations necessary to mitigate traffic operations deficiencies under background or total traffic conditions. Include lane configuration and traffic control diagrams noting recommended modifications.

Public Project Traffic Study - Prior to the design of a new roadway or reconstruction of an existing roadway financed using public funds, a traffic study shall be conducted to identify the functional layout of the roadway improvement. The traffic analysis may be incorporated into a project environmental study process or preliminary design study, or may be a stand-alone analysis.

A public project traffic study typically would utilize traffic projections developed for the roadway to be designed from Metro's regional "emme/2" transportation model or approved traffic impact studies. The model traffic projections would be desegregated into turning movements at major intersections, with the information used to identify the number of travel lanes and appropriate access control along the roadway, as well as intersection channelization and signalization requirements.

1.1.4 Design Year Traffic Projections

New or improved arterial and collector roadways in Multnomah County shall be designed to provide added capacity to accommodate 20-year traffic projections, unless a shorter time frame is identified for design by the County Engineer. Traffic projections will be developed based on Metro's regional "emme/2" model projections, adjusted as necessary to reflect the specific analysis year and the roadway or intersection being designed.

The 20-year traffic projections will be translated into design hour volumes, by direction of travel. The design hour volume is typically the 30th highest hourly volume during the year, and in some cases can be accommodated by a weekday p.m. peak hour volume pattern (which is included in Metro's regional "emme/2" model). Under certain circumstances, the design hour volume might be reflective of weekend peak hour conditions.

The development of roadway segment traffic projections shall include estimated truck and bus traffic, and preferably bike traffic. Where specific truck traffic projections have not been developed, estimates based on existing truck percentages on certain road segments can be used and adjusted as necessary.

At intersections, model approach link volumes can be translated into future turning movement projections through application of an algorithm approved by the County Engineer, that adjusts approach volumes to reflect realistic turning movement patterns at the intersection. Traffic model turning movements at intersections typically require such adjustments. In cases where the design year is less than 20-years, factoring of the traffic based on an existing intersection turning movement count would be appropriate.

The development of intersection traffic projections shall include estimated truck and bus, and preferably bike and pedestrian traffic.

1.1.5 Design Level of Service

The roadway level of service (LOS) concept is applied in the U.S. as a qualitative assessment of the road user's perception of the quality of flow. LOS is represented by one of the letters "A" through "F," with "A" representing free flow operation and "F" stop and go operation. LOS reflects the quality of flow as measured by some scale of driver satisfaction. Measures of effectiveness such as average travel speed, volume to capacity ratio, average seconds of delay, and others, have been developed to approximate these qualitative representations quantitatively. Different measures of effectiveness are used for different types of roadways because the user's perception of quality of flow varies by road type.

Appendix B discusses the level of service concept in greater detail related to rural/suburban highways, urban/suburban arterials, and signalized/unsignalized intersections.

All new and improved arterial and major collector roadways in urban areas shall be designed to accommodate a level of service "D" or better during the design hour. In rural areas, such facilities shall be designed to accommodate level of service "C" or better during the design hour. On neighborhood collectors in urban areas, the design level of service shall also be "C" or better. In special circumstances, such as downtown central business districts or designated regional centers, level of service "E" might be acceptable for roadway design purposes, if approved by the County Engineer. Local streets intersecting arterials or collectors may be level of service "F" during the peak hour if approved by the County Engineer.

The required capacity (number of through lanes, intersection approach configuration) associated with a new or improved roadway project in Multnomah County will be identified using the procedures introduced in the latest edition of the *Highway Capacity Manual*, prepared by the Transportation Research Board. This document includes traffic operations analysis procedures for urban and suburban arterials, two-lane highways, multi-lane highways, and signalized and unsignalized intersections. At intersections, for sizing the number and configuration of lanes, the *operations* methodology will be applied, unless the *planning* methodology is approved by the County Engineer. At existing or new signal locations, the assumed signal cycle length and phasing shall be reviewed and approved by the County Transportation Division before any analysis proceeds.

Where there is a series of existing or prospective traffic signals in a roadway corridor to be upgraded, a corridor level operations analysis will be applied to verify the number of travel lanes and signalized intersection approach configurations. The TRANSYT-7F model is the preferred model of choice, with alternate models (PASSERII-90, TRAF-NETSIM, etc.) being applied only with the approval of the County Engineer. Analysis periods shall be at a minimum the weekday p.m. peak hour, and could also include the weekday a.m. peak hour and/or weekend peak hour if directed by the County Engineer.

1.2 ACCESS MANAGEMENT

Access management is needed to ensure both the safety and efficiency of traffic flow for vehicles traveling on the roadway system. Managing the access of roadways benefits the overall roadway system by increasing safety, increasing capacity, and reducing travel times. Controlling access must not become too restrictive, however, as to prohibit local businesses and home owners reasonable access to the roadway system. Overall, access management must balance the needs of through traffic, local traffic, pedestrians and bicyclists on a particular roadway. By the nature of the roadway functional classification system, arterial streets require the highest access management standards, while collector streets and local streets require less restrictive access management standards.

1.2.1 Minimum Traffic Signal Spacing

The minimum signal spacing standards on Multnomah County roadways is shown in Table 1.2.1.

Table 1.2.1
Minimum Traffic Signal Spacing Standards

Functional Classification	Minimum Traffic Signal Spacing
Major/Principal Arterial	800 m
Minor Arterial	800 m
Major Collector	400 m
Neighborhood Collector	400 m
Local Residential Street	N/A
Local Commercial/Industrial Street	N/A

Note: N/A = Not Applicable.

Typically, local street intersections should not be controlled by a traffic signal; thus, the signal spacing standard is not applicable for these streets. Traffic signals closer than the minimums can be considered if the signal will not cause vehicle queues to back-up into the adjacent signal, and if vehicle progression will not be impacted. Also, signals closer than the minimums can be considered for the purpose of optimizing vehicle capacity and safety, as well as for providing pedestrian crossing opportunities where appropriate.

Signals at private driveways, or access points, may be allowed with a variance but must adhere to the above signal spacing standards. One or more of the major signal warrants (No. 1 to No. 8) described in the Manual of Uniform Traffic Control Devices (MUTCD) should be met, or shown to be met upon full build-out of a development, before considering a traffic signal at a private access point. Private access points which are expected to become signalized shall be designed with full radius returns, and roadway type profiles/cross slopes per the geometric design section of this manual. Alternatives to signals should be investigated, including restricting turning movements. Final decisions shall be made on a case-by-case basis by the County Engineer.

1.2.2 Non-Traversable Median Openings

The minimum non-traversable median opening spacing standards on Multnomah County roadways are shown in Table 1.2.2. Refer to section 2.2.4 for a discussion of the criteria used in determining the type of median to be provided on a roadway: non-traversable (raised median) or traversable (center two way left turn lane). Table 1.2.2 also specifies the conditions where non-traversable medians are not recommended unless warranted under the criteria of section 2.2.4. These situations are noted with a “N/A.” According to Table 1.2.2, there are three different area types, which affect the median opening standards; rural, urban, and CBD/Regional & Town Centers. “Rural” refers to the area outside the urban growth boundary, “urban” refers to the area within the urban growth boundary, and “CBD/Regional & Town Centers” refers to urban locations within a central business district or regional and town centers.

Table 1.2.2
Minimum Non-traversable Median Opening Spacing Standards

Functional Classification	Area ⁽¹⁾	Minimum Median Opening Spacing
Major/Principal Arterial	Rural	240 m
	Urban	180 m
	CBD/Regional & Town Centers	120 m
Minor Arterial	Rural	150 m
	Urban	90 m
	CBD/Regional & Town Centers	60 m
Major Collector	All	N/A
Neighborhood Collector	All	N/A
Local Residential Street	All	N/A
Local Commercial/Industrial Street	All	N/A

Notes:(1)-“Rural” refers to locations outside the urban growth boundary.

“Urban” refers to locations inside the urban growth boundary.

“CBD/Regional & Town Centers” refers to urban locations within a central business district or regional & town centers as defined by regional planning authorities.

“All” refers to all areas within Multnomah County.

N/A = Not Applicable, since non-traversable medians are not recommended under these conditions.

1.2.3 Public Intersection Spacing

The aggregate effect of local street design impacts the effectiveness of the regional system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the regional network. Therefore, streets should be designed to keep through trips on arterial streets and provide local trips with alternative routes. The following design criteria is intended to improve local circulation in a manner that protects the integrity of the regional system.

- 1) For new residential and mixed-use development, all contiguous areas of vacant and primarily undeveloped land of five acres or more shall be identified and a map that identifies possible local street connections to adjacent developing areas will be prepared, consistent with region wide street design policies. The map shall include:
 - a) Full street connections at intervals of no more than 160 m, except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers. Street connections at intervals of no more than 100m are recommended in areas planned for the highest density mixed-use development.
 - b) accessways for pedestrians, bicycles or emergency vehicles on public easements or right-of-way where full street connections are not possible, with spacing between full street or accessway connections of no more than 100 m, except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers.
- 2) New residential and mixed-use developments shall include local street plans that:
 - a) encourage pedestrian and bicycle travel by providing short, direct public right-of-way routes to connect residential uses with nearby existing and planned commercial services, schools, parks and other neighborhood facilities; and
 - b) include no cul-de-sac streets longer than 60 m, and no more than 25 dwelling units on a closed-end street system except where topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers, prevent street extension; and
 - c) provide bike and pedestrian connections on public easements or right-of-way when full street connections are not possible, with spacing between connections of no more than 100 m except where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers; and
 - d) consider opportunities to incrementally extend and connect local streets in primarily developed areas; and
 - e) serve a mix of land uses on contiguous local streets; and
 - f) support posted speed limits; and
 - g) consider narrow street design alternatives that feature total right-of-way of no more than 15 m, including pavement widths of no more than 8.5 m, curb-face to curb-face, sidewalk widths of at least 1.5 m and landscaped pedestrian buffer strips that include street trees; and
 - h) limit the use of cul-de-sac designs and closed street systems to situations where topography, pre-existing development or environmental constraints prevent full street extensions.
- 3) For redevelopment of existing land uses, the minimum public intersection spacing standards on Multnomah County roadways are shown in Table 1.2.3.

Table 1.2.3
Minimum Public Intersection Spacing Standards

Functional Classification	Major/Princ. Arterial	Minor Arterial	Major Collector	Neighborhood Collector	Local Residential Street	Local Commercial/Industrial Street
Major/Princ. Arterial	1.6 km	1.6 km	400 m	300 m	150 m	150 m
Minor Arterial	1.6 km	1/2 mile	300 m	240 m	120 m	120 m
Major Collector	400 m	300 m	240 m	180 m	90 m	100 m
Neighborhood Collector	300 m	240 m	180 m	150 m	60 m	60 m
Local Residential Street	150 m	120 m	90 m	60 m	45 m	45 m
Local Commercial/Industrial Street	150 m	120 m	90 m	60 m	45 m	45 m

As shown in Table 1.2.3, the minimum spacing between a major arterial and neighborhood collector shall be 300 m. The minimum spacing between a major collector and minor arterial shall also be 300 m.

Intersection spacings closer than these standards may be granted through the variance process described in the “Street Standards Codes & Rules,” and will be decided on a case-by-case basis by the County Engineer.

1.2.4 Private Access Driveway Requirements

Reducing the number of existing and proposed access points on arterials and major collectors and improving traffic flow and safety in accordance with Multnomah Comprehensive Framework Plan Policy 34: Trafficways will be the primary consideration when reviewing access proposals for approval.

Variance to the access requirements of these rules for number, width, or location must be approved under the variance procedures in the “Street Standards Codes and Rules.” Restrictions may be imposed when approving a variance request. The restrictions could include limiting the turning movements, requiring a shared access, and/or closing one or more existing driveways. Existing lots of record, too small to meet the requirements, and minor modifications to existing active uses, may be given some flexibility when evaluating a variance request.

Single Family Residential Uses - Direct access onto arterials or major collectors will not be allowed if an approved alternate access is available. If no alternate is available, then direct access will only be allowed through the variance procedure of the “Street Standards Codes and Rules.” For access onto neighborhood collectors or local streets, the standard will be one driveway per lot.

Multi-Family Residential, Commercial, Office, and Industrial Uses - All requests for access must include a site plan and a traffic report as required by the County Engineer. The scope of the development will determine the information required, and could include, but not limited to, any or all of the information listed in the variance requirements of the “Street Standards Codes and Rules.” The evaluation of the access request will consider the impacts that traffic generated by the proposed development will have on through traffic, traffic patterns, traffic queuing, and safety in the area. Approval will be based on the access requirements of section 1.2 of this manual. Shared driveways will be encouraged, or required where possible. Easements to accomplish shared access, either current or future, may be required as a condition of site design review or permit approval. Access may be denied if minimum requirements cannot be met and there is an approved alternate such as a shared access or access to an equal or lower classification street.

One driveway access per frontage, or reasonable shared access, will be the standard for approval. Double frontage lots will be limited to access from a single street, usually the lower classification street. Approval of more than one driveway access, must be requested through the variance procedure.

Private Access Driveway Width - Private access driveways shall conform to the following width dimensions shown in Table 1.2.4.

Table 1.2.4
Private Access Driveway Width Standards

Land Use	Minimum	Maximum
Single Family Residential	3.6 m	7.5 m
Multi-Family Residential	6 m	10.5m
Commercial	6 m	10.5 m
Industrial	6 m	12 m
Agricultural	6 m	10.5 m

In general, the minimum widths listed in Table 1.2.4 should be used in designing the appropriate driveway width. However, larger widths may be used, up to the maximum widths listed in Table 1.2.4, if there are high turning movements which require an additional traffic lane entering and/or exiting the driveway. These larger widths shall be secured through the variance process to accommodate a safe turning movement for buses or large trucks.

Private Access Driveway Spacing - Table 1.2.5 shows the private access driveway, or access point, spacing standards on Multnomah County roadways.

Table 1.2.5
Minimum Private Access Driveway Spacing Standards
As Shown in Figure 1.2.1

Functional Classification	Minimum Access Driveway Spacing (AD)	Minimum Setback from Intersecting Street (AS)
Major/Principal Arterial	120 m	60 m
Minor Arterial	90 m	45 m
Major Collector	45 m	30 m
Neighborhood Collector	30 m	30 m
Local Residential Street	15 m ⁽¹⁾	15 m
Local Commercial/Industrial Street	15 m ⁽¹⁾	15 m

Note: (1) - 15 m spacing applies to all land uses except single family residential. There is no minimum spacing standard for single family residential driveways on local streets.

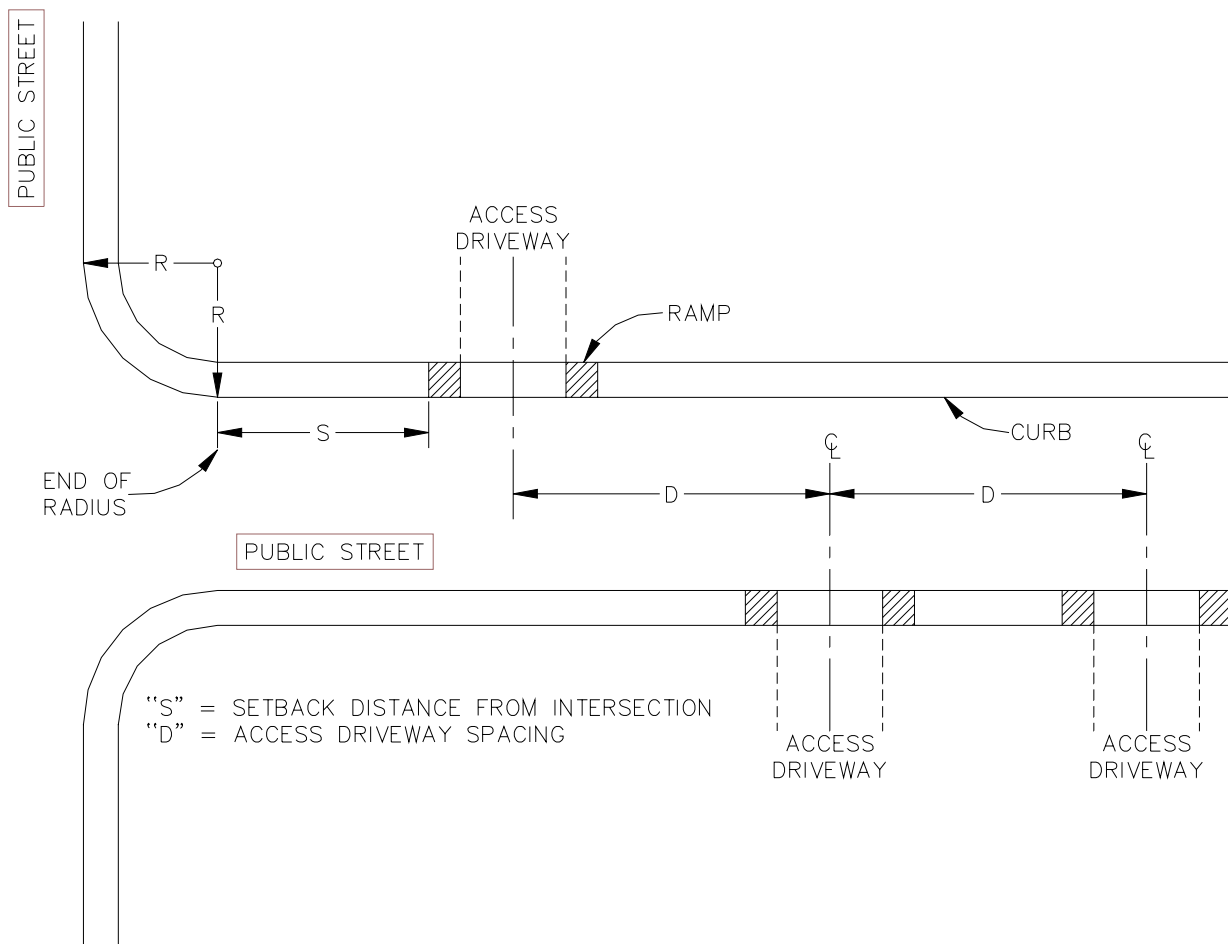
Figure 1.2.1 illustrates the definition of “access driveway spacing” and “setback from intersecting street.” As shown in Figure 1.2.1, the access driveway spacing is defined as the distance between driveway centerlines. The minimums apply both to driveways on the same side of the street as well as driveways on opposite sides of the street. Access driveways on opposite sides of the street should be located directly opposite each other, whenever possible. If not possible, the minimum access driveway spacing shall conform to Table 1.2.5. If these access driveway spacing standards preclude a frontage development from having an access driveway within their property, a driveway closer than the spacing standards with restricted turning movements can be considered through the variance process.

With the exception of shared driveways, no driveway may encroach on any neighboring frontage, and the top of the driveway ramp must start at least 0.6 m from the property line.

The intersection setback distance is defined as the distance between the intersection end of curb radius and the top of the driveway ramp. Access driveways near an intersection with a major collector or arterial shall be located beyond the maximum standing queue length at the intersection approach and no less than 15 m from the end of the radius return. If these intersection setback requirements prohibit access to the site, a driveway with restricted turning movements can be considered through the variance process.

Figure 1.2.1 Access Spacing

FIGURE 1.2.1



1.2.5 Pedestrian Crosswalk Spacing

Crosswalks shall be marked at all signalized intersections. Mid-block crosswalks may be considered in urbanized or rural areas on major collector or arterial streets in the vicinity of a major pedestrian generator. For a mid-block crosswalk to be considered, the pedestrian generator must be located at a point where it is inconvenient for pedestrians to walk to the nearest crosswalk to cross the street. The minimum distance between a mid-block crosswalk and an intersection crosswalk in fully developed urban areas (CBD, regional centers, town centers and LRT station area) shall be such that pedestrians do not need to walk more than 45 m to reach either a crosswalk or an intersection. This distance shall be 90m in other urban areas.

All designated mid-block pedestrian crosswalks shall have advance crossing warning signs per the MUTCD. Signalization of pedestrian crosswalks at locations where vehicular signal warrants are not met is appropriate where MUTCD pedestrian volume or accident experience warrants are met.

SECTION 2 - GEOMETRIC DESIGN

2.1 DESIGN REQUIREMENTS

2.1.1 Design Standards

- 1) Current AASHTO Standards
- 2) Manual of Uniform Traffic Control Devices(MUTCD)
- 3) Multnomah County Street Standards
- 4) ODOT Metric Standard Drawings (Current Revisions)
- 5) Multnomah County Metric Standard Drawings (Current Revisions)
- 6) Miscellaneous Details (1 of 2) #MC 100 (2 of 2) #MC 105
- 7) Manholes (AP and BP) #MC 110 – (Large Manhole) #MC 115
- 8) Sedimentation Manhole with Sump #MC 120
- 9) A design review narrative will be required with submitted plans. The narrative will include all criteria used to complete the design of the improvements.

2.1.2 Drawing Standards

- 1) Cover Sheet (Multnomah County Standard) Drawing #MC COV
- 2) Legend Sheet (Multnomah County Standard) Drawing #MC LGND
- 3) Plan Profile Sheet (Multnomah County Standard) Drawing #MC P&P
- 4) Plan and Profile to be in Metric units
- 5) Plan and Profile to be 1:250

2.1.3 Design Standard Variance Process

Requests for variance from design standards with justification and mitigation shall be submitted to the County Engineer as required in Rule 4.100 and approved in writing prior to incorporation of design features into project plans and/or other documents. Requests for design variances must be accompanied by justification documentation and should include mitigation. The request for variances shall consist of a completed application form and supporting documentation submitted to the County Engineer. The supporting documentation should include:

- 1) Summary of the proposed exception
- 2) Project description/purpose
- 3) Affect on other standards
- 4) Cost to build to standard
- 5) Reasons (low benefit/cost, relocations, environment impacts, etc.) for not attaining standard
- 6) Compatibility with adjacent sections (route continuity)
- 7) Accident history and potential (specifically as it applies to the requested exception.)
- 8) Probably time before reconstruction of the section due to traffic increases or changed conditions
- 9) Mitigation measures to be used

2.2 ROADWAY CROSS SECTIONS

2.2.1 Typical Sections for Functional/Design Classification

Tables 2.2.1 through 2.2.4 present the cross section standards for new or reconstructed Multnomah County arterials, collectors, boulevards, and local streets within the urban growth boundary of the County. Table 2.2.5 presents cross section standards for arterials, collectors, and local streets standards for the rural portion of the County, outside the urban growth boundary.

A minimum, preferred, and maximum cross section is shown for each street functional classification. Variations from the preferred cross section may be considered when right-of-way is restricted, on-street parking is necessary due to the lack of off-street parking, bicycle lanes are required on all streets classified as collector or above. Design elements less than the minimums or greater than the maximums shall only be approved by the County Engineer.

Urban Arterials - Principal arterials can be as wide as seven lanes, while major and minor arterials can have a five lane cross section. Detached sidewalks and planter strips, which can improve the visual aesthetics of the street and improve pedestrian safety are preferred. Bicycle lanes are also required on all urban arterials. On-street parking may be allowed on urban arterials in fully developed areas (CBD, regional center, LRT station area). Either a raised median or center two-way left turn lane are to be provided on all arterials. Where a raised median is provided, periodic median openings will be provided to maintain adequate local access to adjacent properties (see access management spacing criteria, section 1.2 of the Design part of this manual).

Urban Collectors - Major collectors are designated as three lane facilities, with a center left turn lane treatment. Major collectors have striped bicycle lanes, on-street parking lanes will be allowed in certain cases. Neighborhood collectors, the preferred cross-section includes two travel lanes, bike lanes and with on-street parking lanes on both sides. Detached sidewalks and planting strips should also be incorporated into the roadway cross-section.

Urban Local Streets - On local residential streets, a 9.7 m pavement width characteristic of traditional subdivision streets is preferred, with on-street parking lanes. Bikes share pavement with motor vehicles. Narrower cross sections may be allowed through: 1) reduction in travel way to 3.6 m ("queuing" street), or 2) provision of parking on only one side of the street or both.

Rural Arterials, Collectors, and Local Streets - The rural street typical cross sections reflect the provision of shoulders as opposed to curbing as an edge of road treatment. Paved shoulders are needed to accommodate bikes and pedestrians for arterial and collector roads. (See table 2.2.5) A portion of the shoulder will need to be gravel in areas of anticipated equestrian use. See Transportation Planning.

Private Accessways - The private accessway typical section will differ according to the number of residents it serves. See Table 1.2.4. Its intersection with the through street will have a 6 meter landing of no more than 3%. The landing will be measured from the curb line of the through street. Horizontal and vertical alignments will meet Current AASHTO Standards, design speed shall be 30 km/h minimum.

Table 2.2.1 Urban Arterial Cross Sections

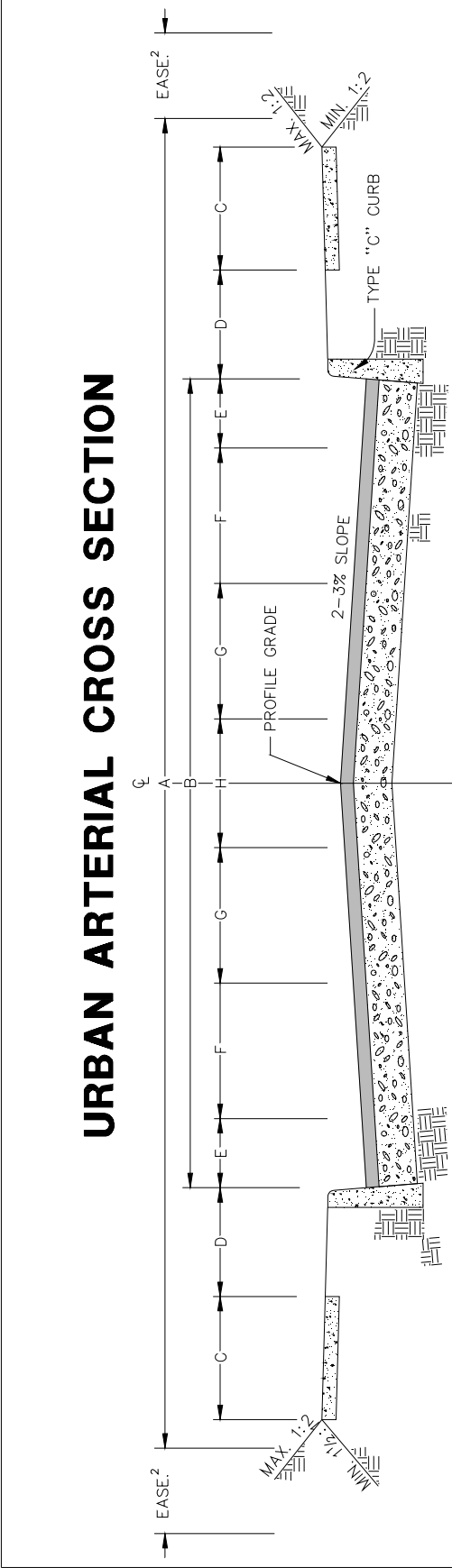
URBAN ARTERIAL CROSS SECTION										
										
SURFACING MATERIAL & THICKNESS SUBJECT TO STRUCTURAL DESIGN										
MINIMUM TYPICAL THICKNESS										
330mm OF 25-0mm AGGREGATE BASE MATERIAL										
150mm OF CLASS B/C ASPHALTIC CONCRETE (TWO LIFTS)										
DESIGN SPEED = 55 – 70 km/h										
Road Classification	Criteria ¹	Right-of-Way (Meter)	Paved Width (Meter)	Number of Lanes	Sidewalk (Meter)	Planting Strip (Meter)	Bike Lane (Meter)	Curb Travel Lane (Meter)	Travel Lane(s) (Meter)	Median or Center Turn Lane (Meter)
Principal/Major Arterial	Min.	24.4	19.8	5	1.8	0	1.5	3.3	3.3	3.6
	Max.	35.1	25.2		2.4	2.4	2.4	4.2	4.2	4.8
Minor Arterial	Pref.	30.5	22.2	5	2.1	1.8	1.8	3.6	3.6	4.2
	Min.	24.4	13.2	3	1.5	0	1.5	3.3	3.3	3.6
	Max.	32.1	22.2	5	2.4	2.4	1.8	3.6	3.6	4.2
	Pref.	27.4	13.8	3	1.8	1.8	1.8	3.3	3.3	3.6
NOTES:										
Parking Lanes may be allowed on arterials in central business districts or regional centers.										
1. Min. = Minimum, Max. = Maximum, Pref. = Preferred.										
2. Easement, See section 2 of Design Manual.										
3. Also see section 2.2.4.										

Table 2.2.2 Urban Collector Cross Sections

URBAN COLLECTOR CROSS SECTIONS										
SURFACING MATERIAL & THICKNESS SUBJECT TO STRUCTURAL DESIGN										
MINIMUM TYPICAL THICKNESS										
330mm OF 25-0mm AGGREGATE BASE MATERIAL										
102mm OF CLASS B/C ASPHALTIC CONCRETE (TWO LIFTS)										
DESIGN SPEED = 55 km/h										
Road Classification	Criteria	Right-of-Way	Paved Width (Meter)	Number of Lanes	Sidewalk (Meter)	Planting Strip (Meter)	Parking Lane (Meter)	Bike Lane (Meter)	Travel Lane(s) (Meter)	Center Turn Lane (Meter)
Major Collector	Min.	18.3	12.0	2	1.8	0	1.5	1.5	3.0	3.0
	Max.	29.7	19.8	3	2.1	2.4	2.4	1.8	3.6	4.2
Neighborhood Collector	Min.	15.2	11.7	2	1.5	0	2.1 ²	1.5	3.3	0
	Max.	21.9	15.0	3	1.8	1.8	2.4	1.5	3.6	0
	Pref.	24.4	15.0	2	1.5	0.6	2.1	1.5	3.3	0
NOTES:										
1. Min. = Minimum, Max. = Maximum, Pref. = Preferred.										
2. Minimum one side only.										
3. Easement, See section 2 of Design Manual.										
4. Also see section 2.2.4.										

Table 2.2.3 Boulevard Cross Sections

BOULEVARDS

The diagram illustrates the cross-section of a boulevard with the following components and labels:

- EASE.**: Easement area on both sides.
- A**: Right-of-way width.
- B**: Paved width.
- C**: Travel lane(s) width.
- D**: Median - Turn Lane width.
- E**: Parking Lane width.
- F**: Bike Lane width.
- G**: Travel Lane(s) width.
- H**: Median - Turn Lane width.
- PROFILE GRADE**: Indicated by a dashed line.
- 2-3% SLOPE**: Indicated for the main travel area.
- MAX 1:2**: Slope for the curb and easement areas.
- MIN 1:2**: Slope for the curb and easement areas.
- TYPE "C" CURB**: A concrete curb separating the travel area from the easement.

SURFACING MATERIAL & THICKNESS SUBJECT TO STRUCTURAL DESIGN

MINIMUM TYPICAL THICKNESS

330mm OF 25-0mm AGGREGATE BASE MATERIAL
150mm OF CLASS B/C ASPHALTIC CONCRETE (TWO LIFTS)

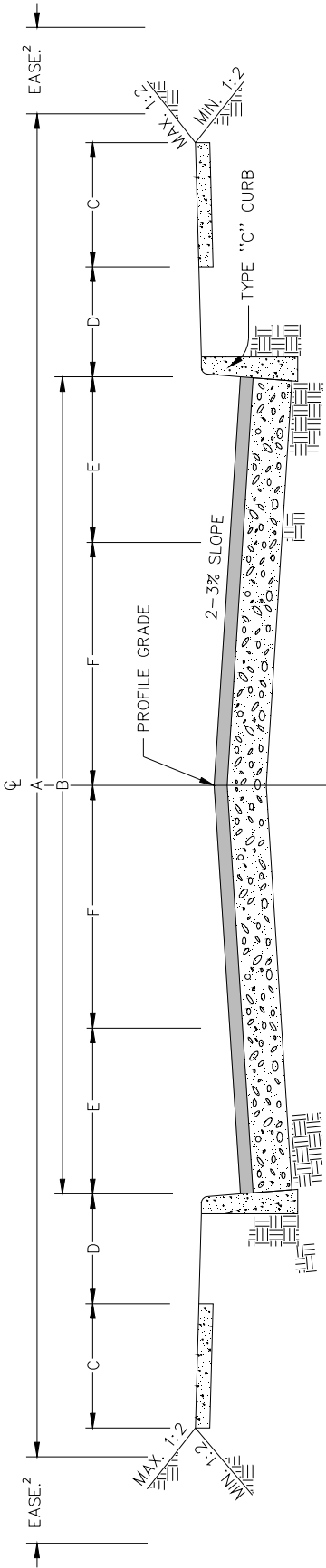
DESIGN SPEED = 55 km/h

Road Classification	Criteria ¹	Right-of-Way	Paved Width (Meter)	Number of Lanes	Sidewalk (Meter)	Planting Strip (Meter)	Parking Lane (Meter)	Bike Lane (Meter)	Travel Lane(s) (Meter)	Median - Turn Lane (Meter)
Regional Boulevard	Min.	27.4	19.8	4	1.8	1.5	0	1.5	3.3	3.6
	Max.	32.1	22.2		2.4	2.4		1.8	3.6	4.2
Community Boulevard	Pref.	27.4	20.4	4	1.8	1.6	0	1.5	3.3	4.2
	Min.	24.4	16.8	2	1.5	1.5	2.1	0.5	3.0	3.6
	Max.	33.9	27.0	4	1.8		2.4	1.8	3.6	4.2
	Pref.	24.4	18.0	2	1.5	1.5	2.4	1.5	3.3	3.6

NOTES:

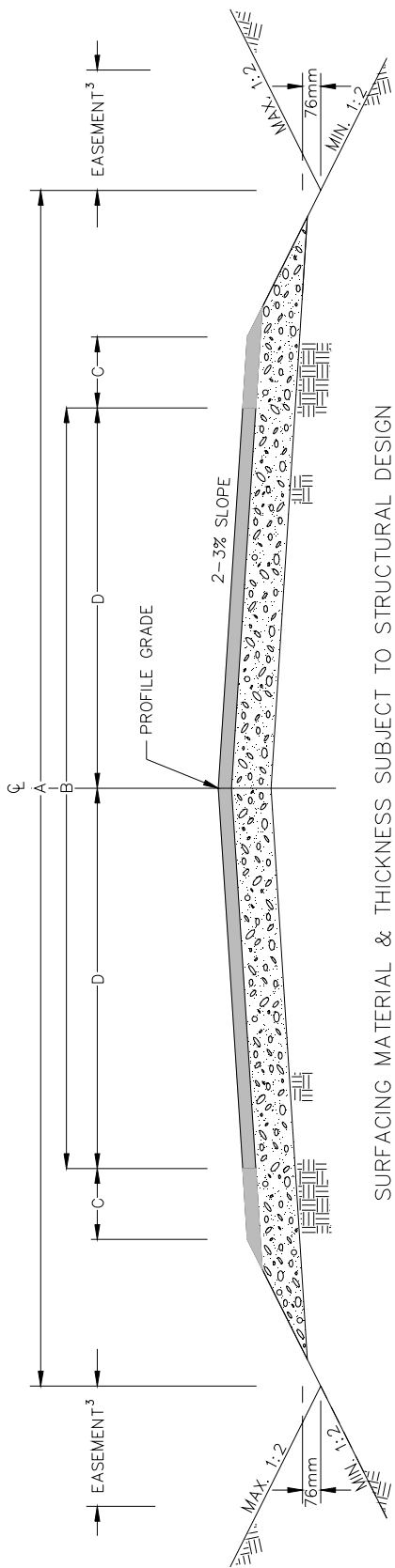
1. Min. = Minimum, Max. = Maximum, Pref. = Preferred.
2. Easement, See section 2 of Design Manual.
3. Also see section 2.2.4

Table 2.2.4 Urban Local Cross Sections

URBAN LOCAL STREET CROSS SECTIONS									
									
SURFACING MATERIAL & THICKNESS SUBJECT TO STRUCTURAL DESIGN									
MINIMUM TYPICAL THICKNESS									
330mm OF 25-0mm AGGREGATE BASE MATERIAL									
102mm OF CLASS B/C ASPHALTIC CONCRETE (TWO LIFTS)									
					DESIGN SPEED = 40 km/h				
Road Classification	Criteria ¹	Right-of-Way (Meter)	Paved Width (Meter)	Number of Lanes	Sidewalk (Meter)	Planting Strip (Meter)	Parking Lane (Meter)	Travel Lane(s) (Meter)	
Local Residential	Min.	15.2	9.0	1	1.5	0	2.4	4.2	4.8
	Max.	17.1	10.8						
Local Commercial & Industrial	Min.	15.2	10.8	2	1.5	0	2.4	3.0	3.6
	Max.	20.7	13.2						
	Pref.	15.2	9.8	1	1.5	1.2	2.8	4.2	
	Pref.	18.5	12.8	2	1.5	1.2	2.8	3.6	

NOTES:
1. Min. = Minimum, Max. = Maximum, Pref. = Preferred.
2. Easement, See section 2 of Design Manual.

Table 2.2.5 Rural Cross Sections

RURAL ARTERIAL/COLLECTOR/LOCAL CROSS SECTIONS									
 SURFACING MATERIAL & THICKNESS SUBJECT TO STRUCTURAL DESIGN MINIMUM TYPICAL THICKNESS 330mm OF 25-0mm AGGREGATE BASE MATERIAL 102mm OF CLASS B/C ASPHALTIC CONCRETE (TWO LIFTS)									
					DESIGN SPEED = 40 – 55 km/h				
Road Classification	Criteria ¹	Right-of-Way (Meter)	Paved Width (Meter)	Number of Lanes	Shoulder (Meter)	Travel Lane(s) (Meter)			
Arterial	Min.	18.3	6.6	2	1.8	3.3			
	Max.	27.4	16.8	4	2.4	4.2			
Collector	Pref.	18.3	7.2	2	2.4 ²	3.6			
	Min.	15.2	6.6	2	1.5	3.3			
Local	Pref.	18.3	7.2	2	1.8	3.6			
	Min.	15.2	6.0	2	1.5	3.0			
	Max.	18.3	7.2	2	1.8	3.6			
					18.3	6.6	2	1.5	3.3
NOTES:									
1. Min. = Minimum, Max. = Maximum, Pref. = Preferred.									
2. Shoulders wider than 1.8 m only need to be paved to 1.5 m wide.									
3. See section 2 of Design Manual.									

2.2.2 Widths for Roadway Cross Section Elements

Except in overlay zones or approved by County Engineer.

Travel Lanes - Travel lane widths vary from 3.6 m to 4.2 m on principal/major arterials, and 3.0 m to 4.2 m on minor arterials and collectors. There are no striped lanes on local streets, with the designated travel way varying from 3.6 m to 6 m for residential, and 6 m to 7.3 m for commercial.

Medians - Center Two Way Left Turn Lane (TWLTL) widths vary from 4.3 m on principal/major arterials, to 3.6 m on minor arterials and major collectors.

Non Traversable Median (raised) width is 3.6 m with an allowance of 0.6 m of clear area for striping each side of the median, giving a total of 4.8 m of median width. See figure 2.2.1

Parking Lanes - Where on-street parking is provided, a 2.7 m wide parking lane should be provided (2.4 m can be provided in certain circumstances where only compact vehicles are parked along a roadway, and a bike lane provides a buffer from the travel lane).

Bicycle Lanes - The preferred on-street bike lanes is 1.8 m., 1.5 m is acceptable if physical constraints or limited ROW prohibit the full width. The width of the bike lane is measured from the center of the 200 mm strip to the face of curb or edge of pavement.

Planting Strips - The planting strip separating the street from the sidewalk on arterial, collector and local streets varies in width from 2.4 m on principal/major arterials, to 1.8 m to 2.4 m on minor arterials, 1.5 m on minor arterials and major collectors, and 1.2 m on neighborhood collectors and local streets. See section 8.0, Landscape/Urban Design, for criteria related to placement of landscaping in the planting strip area.

Sidewalks - As a basic treatment, sidewalks should be detached from the curb on all urban street cross-sections. In fully developed areas (CBD, regional center, LRT station areas), the sidewalk may be extended into the planting strip with tree wells within the sidewalk. The layout of trees, etc. should take into consideration the traffic sign installation and maintenance requirements. Detached sidewalks shall be designed to allow the sidewalk transitions at driveway locations to meet ADA maximum grade requirements. Minimum sidewalk width varies from 1.8 m on principal/major arterials, to 1.5 m on minor arterials, collectors, and local streets. If sidewalk abuts curb and its width exceeds 1.5 m, traffic signs will be placed in sidewalk. See local jurisdictions for requirements.

2.2.3 Variance from Preferred Standards

The typical street cross-sections developed for Multnomah County's different street classifications include a preferred cross-section, with a range of minimum to maximum values given for each cross-section element. The range is given to provide flexibility to the standards in the realization that not every situation can be accommodated by the preferred cross-sections due to monetary, right-of-way, environmental, or some other constraint. The purpose of this section is to develop a framework which will help give guidance to the roadway designers when a given roadway can use the minimum or maximum standards.

The following evaluation criteria are to be used in determining if the roadway cross-section dimensions should be less or greater than the preferred standards:

Accessibility - Means access to the transportation system for all modes of travel, including trucks, buses, bicycles, and pedestrians. A multi-modal transportation system is therefore a vital component of effective street design. The role of a road's needed accessibility varies depending on the functional classification of the roadway. Accessibility also refers to the roadway system's impact on access to adjacent land uses, which is addressed in the access management section of this manual.

Travel Operations - Means the quality of mobility the roadway provides for vehicles, bicycles, and pedestrians. The two most commonly used subcriteria to evaluate the travel operations of motor vehicles are level of service and vehicle operating speed. The average vehicle operating speed refers to the efficiency which a roadway allows motorists to travel along a roadway. Level of service is the most widely used criteria for travel operations. Level of service refers to the amount of delay experienced by motorists at an intersection or along a roadway, and is developed by noting the difference in desired travel speed and actual operating speed.

Traffic Safety - Means to the safety of all travel modes on a roadway. Traffic safety can be compromised by vehicle-vehicle, pedestrian-vehicle, bicycle-vehicle, bicycle-bicycle, and bicycle-pedestrian conflicts. Enhancement of traffic safety indirectly decreases the cost of roadway maintenance, as vehicle accidents can often damage a part of the roadway such as the median or utility posts.

Environmental Impact - Is the assessment made of the effects a roadway will have on the surrounding environment. For example, a well-designed planter strip with trees can improve the aesthetic look of the roadway, as well as block noise and air pollution from entering the nearby residential neighborhoods. A multi-modal transportation system provides an alternative to single-occupied vehicle travel and help reduce the overall air and noise pollution in the environment.

Land Use - Refers to how the type and density of development along a roadway impacts the roadway cross-section and potential added provisions for alternate modes of travel. Higher density areas generally support greater provisions for pedestrians and transit.

Cost - Refers to the monetary cost of building and maintaining roadways. The cost of building a new roadway involves the cost of construction, which is effected by the width of the pavement, channelization, and number of traffic signals installed, as well as the cost of buying adjacent right-of-way. A street with a larger right-of-way requirement will be more expensive than a street with a smaller right-of-way requirement. Once a roadway is built, money is needed to maintain the roadway.

In evaluating these standards, a qualitative evaluation can be made for each of the listed criteria. For the evaluation criteria, the following qualitative comments can be made in evaluating the standards:

- 1) Pedestrian accessibility is directly affected by the presence of sidewalks and street crossing. For trucks and buses, a wider travel lane welcomes these larger vehicles to safely drive on the given roadway. Also, the access management standards affect the accessibility of vehicles in getting to adjacent businesses. More restrictive access management standards translates to less convenient access to local businesses but increases efficient movement of traffic and increases safety for bicyclists and pedestrians.
- 2) Traffic operations are improved as the width of the travel lanes, bike lanes, and sidewalks are increased to stated maximum widths. Also, a center two-way left-turn lane or median can improve traffic operations on arterials or major collectors (medians are not allowed on neighborhood collector or local streets). The number of travel lanes also directly affects the traffic operations of vehicles, with more lanes translating to more capacity and better traffic operations. The access management standards can also affect traffic operations by decreasing the number of turning movements, which slow the through traffic.
- 3) Traffic safety is generally increased as the width of travel lanes, bike lanes, and sidewalks are increased to stated maximum widths. Detached sidewalks improve safety for both pedestrians and motor vehicles. More restrictive access management standards (driveway spacing, intersection spacing), and the presence of a raised median, tend to create safer traffic operations by prohibiting unsafe movements and eliminating (or reducing) vehicle turning conflicts. Raised medians also provide pedestrian refuges.
- 4) Environmental Impacts which a roadway can have on the surrounding environment include impacts to storm drainage and air and noise pollution. Air and noise pollution, in general, is increased with the number of motor vehicles traveling on the roadway. In this sense, encouraging pedestrian, bicycle, and bus travel may help reduce the number of vehicles on the roadway. Thus, providing 1.8 m wide bicycle lanes and sidewalks helps reduce the air and noise environmental impacts.
- 5) In fully developed urban areas (CBD, regional centers, town centers, LRT station areas), pedestrian and bicycle travel is particularly encouraged, with sidewalks and bicycle lanes. Added transit amenities such as bus shelters and benches are also appropriate. Due to the lower speed of traffic on arterials and collectors in these developed areas, reduced travel lane width could be applicable. Also, on-street parking on arterials and major collectors could be appropriate if there are limited off-street parking truck loading provisions.
- 6) Cost is increased with more travel lanes, the presence of on-street parking lanes, bicycle lanes, planting strips, and sidewalks. Also, in general the width all elements proportionally impact the cost of the roadway.

2.2.4 Criteria for Placement of Non-Traversable Median vs. Center Left Turn Lane

For new multi-lane arterial roadways, a median treatment should be incorporated into the roadway design. Where the design speed is 70 km/h or higher, a non-traversable median shall be used. Continuous two-way left turn lanes may be considered on roadway segments which have the following characteristics:

- 1) The design speed, or 85th percentile speed is 65 km/h or less.
- 2) In fully developed urban areas which have a driveway density of more than 37 driveways per kilometer (total both sides) and it is impractical to provide U-turn's.

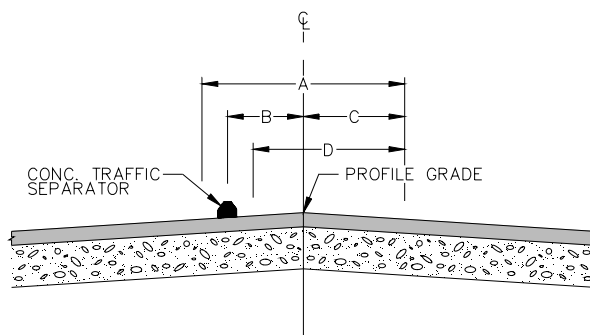
Existing undivided multi-lane roadways and those multi-lane roadways with continuous two-way left turn lanes should be considered for reconstruction with a non-traversable median when the average daily traffic exceeds 28,000 vehicles per day. A non-traversable median should be considered on existing two-lane roadways only when there is a high accident rate which may be corrected by a non-traversable median.

Specific details on median design can be found in the ODOT Metric Standard Drawings.

Turn lane width will need to be widened to accommodate the use of non-traversable medians. See Figure 2.2.1

Figure 2.2.1

LEFT TURN CONCRETE TRAFFIC SEPARATOR



Road Classification	Criteria ¹	Center Turn Lane (Meter)	Conc. Separator (Meter)	Right Stripe Lane (Meter)	Travel Lane (Meter)
		A	B	C	D
Left Turn Traffic Separator	Min.	4.3	1.5	2.15	3.0
	Max.	4.9	1.8	2.45 ²	3.6
	Pref.	4.6	1.65	2.3	3.3

2.3 INTERSECTION DESIGN STANDARDS

2.3.1 Curb Returns

The minimum allowed curb return radii between intersecting streets is shown in Table 2.3.1. The minimum radii is based on the lowest classification of the two intersecting streets. For example, if a minor arterial intersects a neighborhood collector, the minimum turning radius for the four intersection corners should be 7.6 m, as displayed on the neighborhood collector row of Table 2.3.1. If the intersection corner has on-street parking or bicycle lanes, the minimum radii can be reduced by 1.5 m. See Figure 2.3.1 for drawing and staking details.

Table 2.3.1
Minimum Curb Return Radii (meter)
Edge of Pavement/Curb

Lowest Street Classification of Two Intersecting Streets	Minimum Curb Return Radius
Principal/Major Arterial	9 m
Minor Arterial	9 m
Major Collector	7.6 m
Neighborhood Collector	7.6 m
Local Residential Street	4.5 m
Local Commercial/Industrial Street	9 m

Note: If bicycle lane or on-street parking exists, above turning radii may be reduced by 1.5 m.

Streets with heavy truck movements may be required to install larger curb radii than shown in Table 2.3.1. The County Engineer will provide direction in deciding if an area needs larger-than-minimum turning radii at specific intersections. When designing turning radii higher than the minimums, the County Engineer will identify the design vehicle to be applied. Streets with daily transit routes shall not have curb return radii less than 7.6 m to accommodate safe bus turning movements.

2.3.2 Sidewalk Ramps

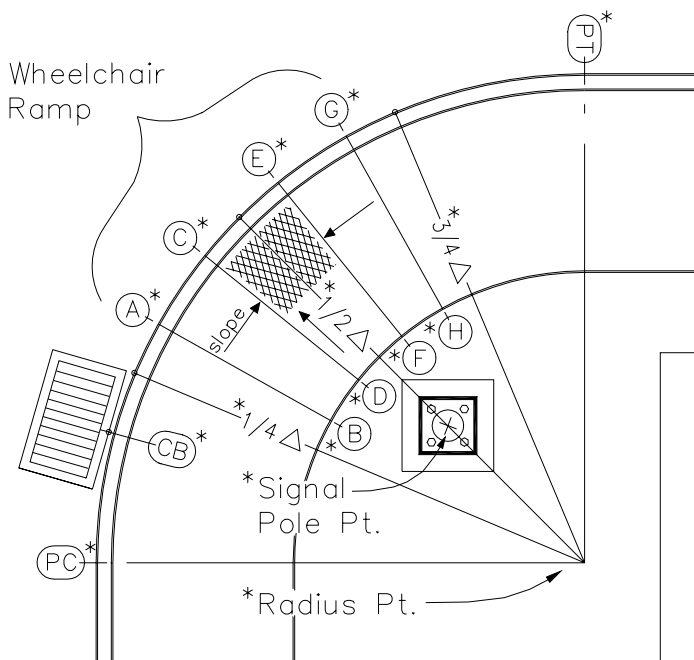
Sidewalk ramps shall be provided at all corners of all Multnomah County intersections which have sidewalks within the urban growth boundary, regardless of the curb type. Sidewalk ramps shall be designed to meet current ADA standards and as shown in Standard Drawing RD725 of the ODOT Standard Drawings Manual or Multnomah County Standard Drawing #MC-100. Double sidewalk ramps (two ramps on each street corner) shall be used on all street intersections. If the largest radii of the curb return is less than 6.5 m, double ramps will require widening behind the normal sidewalk width.

Figure 2.3.1 Curb Return Detail

CURB RETURN

Design & Layout Requirements
Typical Curb Return with Signal Pole

1. Provide positive drainage in Curb Return Area.
2. Details to be shown on Plans for each Curb Return on project.
3. Gutterline Profile to be shown on Plans.



PLAN

No Scale

TABLE

LOCATION	ELEV.
PC	
1/4 Δ	
CB	
A — 2% — B	
C — 2% — D	
1/2 Δ	
Sig Pole	
E — 2% — F	
G — 2% — H	
3/4 Δ	
PT	
D — max. 8.33% — B	
F — max. 8.33% — H	

*Curb return points and Wheelchair ramp points (for each ramp) to be calculated and staked for curb return.

2.3.3 Left-Turn Lane Channelization

The need for an exclusive left-turn lane at an intersection shall be based on the turning volumes, through volumes, opposing traffic volumes, roadway speed, accident experience, and available capacity. A traffic engineering analysis shall determine if an exclusive left-turn lane is warranted. The procedure for left-turn lane warrants shall follow those shown in Appendix C. Figure 2.3.2 shows the design elements of a channelized left-turn lane.

The following formulas should be used to determine the design taper lengths:

	<u>Desirable Minimum</u>	<u>Absolute Minimum</u>
Approach Taper:	$L = 0.6(W \times S)$ For $S = 70$ km/h or more $L = \frac{(W \times S^2)}{150}$ For $S =$ less than 70 km/h	In urban areas where space is restricted, "S" may be reduced to 30 km/h.
Bay Taper:	$L = \frac{(W \times S)}{4.7}$	In urban areas where space is restricted, 27 m minimum may be considered.

Where:

- L = minimum length of taper (meters)
- S = roadway design speed (km/h)
- W = width of left-turn lane (meters)

Bay tapers can either be straight line, partial tangent, symmetrical reverse, or asymmetrical reverse tapers. Taper lengths less than the desirable minimum should only be considered in urban areas where space is restricted. Proposed design lengths less than the desirable minimum will be considered on a case-by-case basis, and the final decision will be made by the Multnomah County Traffic Engineering Section.

2.3.4 Right-Turn Lane Channelization

The need for an exclusive right-turn lane at an intersection or driveway shall be based on the turning volumes, through volumes, roadway speed, and accident experience. A traffic engineering analysis shall determine if an exclusive right-turn lane is warranted. The length of the right-turn storage length and bay taper shall follow the formulas given for left-turn lane channelization.

Traffic islands are often used in channelizing a right-turn lane from the through lanes at an intersection approach. Right-turn traffic islands should be used on arterial or major collector streets where the curb return radius is at least 13 m. Islands shall be designed as shown in Standard Drawings RD710 of the ODOT Standard Drawings Manual. Right-turn islands in urban areas shall have three sidewalk ramps. The minimum island area shall be 13 square meters, with 20 square meters desirable. Type 'C' curbs are considered inappropriate for the use of right-turn islands. Provides bicycle lanes both directions past islands.

2.3.5 Through Lane Tapers

Street width transitions shall follow the guidelines set forth by Current AASHTO Standards and Current MUTCD Manual. For streets with through traffic lanes being added or dropped, the length of the transition taper shall be determined as follows:

$$L = 0.6(W \times S) \quad \text{for } S = 70 \text{ km/h or more}$$

$$L = \left(\frac{W \times S^2}{155} \right) \quad \text{for } S = \text{less than } 60 \text{ km/h}$$

Where: L = minimum length of taper (meters)
 S = design speed (km/h)
 W = width of lane being added or dropped (meters)

2.3.6 Minimum Intersection Angle

The interior angle at intersecting streets shall be kept as near to ninety (90) degrees as possible, and in no case shall it be less than seventy five (75) degrees. Regardless of the intersection angle, a tangent section shall be carried a minimum of 15 meters each side of intersecting right-of-way lines.

2.3.7 Corner Intersection Sight Distance

Corner intersection sight distance shall be in accordance with the procedures stated in current AASHTO Standards. Sight distance should be measured from a driver's eye 1.07 m high and 4.5m from the near edge of the nearest lane to an object height of 1.3 m above the street pavement. Table 2.3.2 below summarizes the minimum required intersection sight distance for minor streets of a two-way stop-controlled intersection.

Table 2.3.2
Minimum Corner Intersection Sight Distance

Design Speed of Major Street (km/h)	Minimum Corner Intersection Sight Distance (meters.)
30	25
40	35
50	40
60	50
70	60
80	65
90	75

Where the minimum corner intersection sight distance shown in Table 2.3.2 can not be met, the minimum sight distance should be no less than the stopping sight distance on the major street. Stopping sight distance requirements are shown in Section 2.4.1 of the Design portion of this manual.

2.3.8 U-Turn Design Elements

At intersections where U-turns are allowed, the minimum width between the right edge of the left-turn lane and the curb-line of the opposing traffic lanes shall be at least 19 m where all vehicles are allowed to make a U-turn. Where all vehicles are allowed except trucks, a minimum width of 15.8 m must be provided.

2.3.9 Curb Extensions/Pedestrian Refuge Islands

Curb extensions at intersections can be applied where on-street parking is provided and where such treatments are needed to reduce pedestrian crossing distance of the major street, and/or are desirable to increase pedestrian circulation space in the sidewalk area. Curb extensions may also facilitate transit operations at near side stops on lower volume collector streets, by allowing buses to stop in the travel lane. Curb extensions shall only be developed where adequate turning radius for identified design vehicles to and from the side street can be provided.

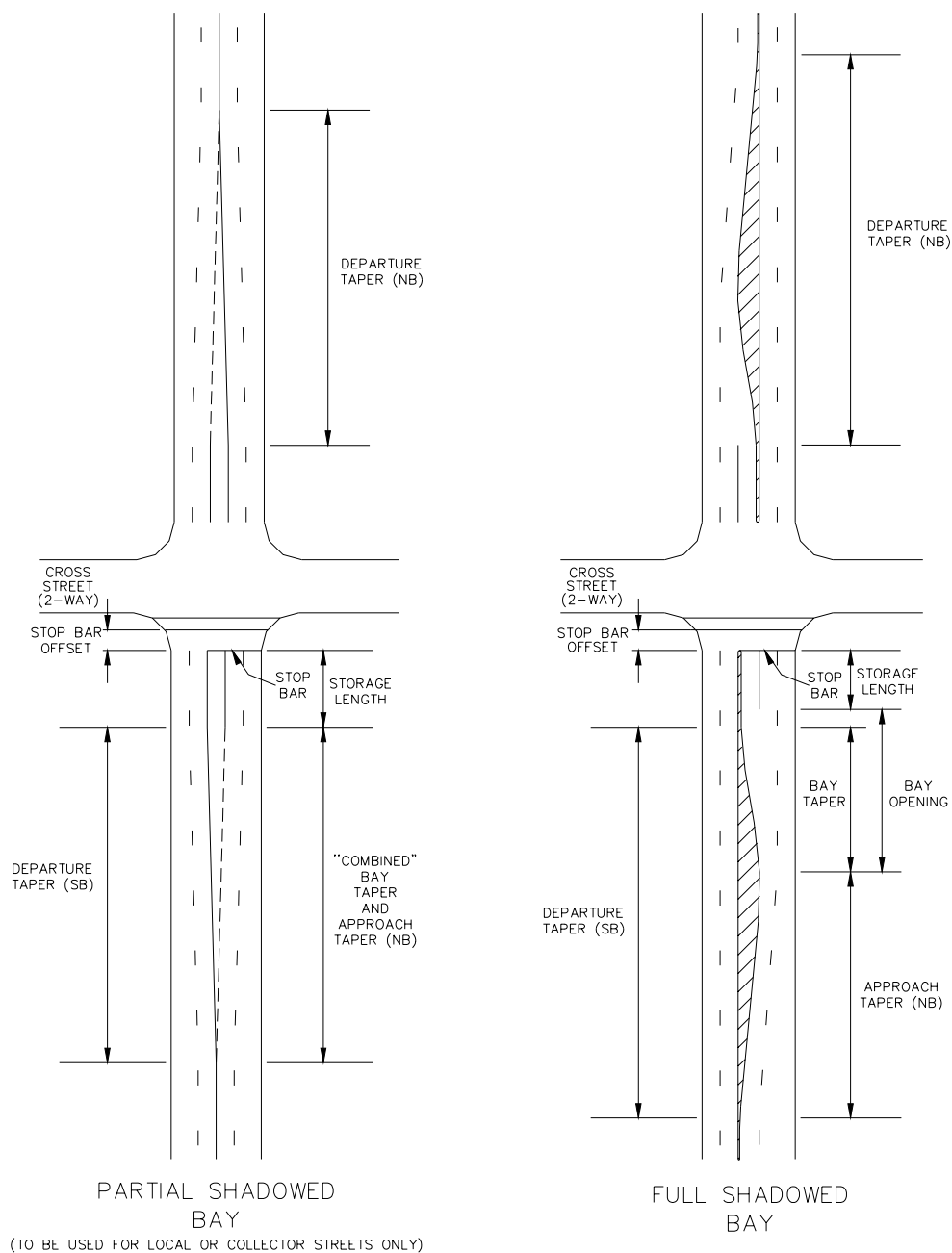
In certain situations at intersections, in lieu of or in addition to curb extensions, medians may be required to provide pedestrian refuge islands, due to the wide pavement to cross at unsignalized intersections, or the inability to provide sufficient pedestrian crossing time at signalized intersections (thus requiring pedestrians to cross half of the street at a time). In these cases, the width of the median should be at least 2.4 m, with appropriate ramp provisions.

The storage length should be determined through a traffic engineering analysis. In the analysis, the minimum storage length shall be based on the 95th percentile vehicle queue length during the peak hour periods. In other words, the storage length should be designed so that the vehicle queue will remain within the available storage at least 95 percent of the time during the critical peak hour period. The desirable minimum allowed storage length is 27 m, even if the 95th percentile queue length is less than 27 m. In constrained urban conditions, a storage length of 15 m may be considered as the absolute minimum. Desirable minimum bay opening is 50 m for arterials and 25 m for collectors. To calculate 95th percentile queue lengths, refer to Highway Capacity Manual procedures for the queue length methodology for both unsignalized and signalized intersections.

For roadways with design speeds equal to or less than 70 km/h, all deceleration can safely be accommodated within the bay taper length. For design speeds over 70 km/h, the braking distance (on wet pavement) becomes greater than the bay taper length. Thus, some deceleration must take place in the storage length area. Taking this into account, the following formulas summarize the minimum storage length for a channelized left-turn lane:

$$\begin{array}{ll}
 L = (95\% \text{ Vehicle Queue}) & \text{for } S = \text{or less than } 70 \text{ km/h} \\
 (95\% \text{ Vehicle Queue}) + 6 \text{ m} & \text{for } S = 80 \text{ km/h} \\
 (95\% \text{ Vehicle Queue}) + 18 \text{ m} & \text{for } S = 90 \text{ km/h}
 \end{array}$$

Where: L = Storage Length, meters
 S = Roadway Design Speed, km/h

Figure 2.3.2 Left Turn Channelization Elements

The "stop bar offset" refers to the distance between the stop bar at a signalized intersection approach and the near edge of the crosswalk. If the intersection geometry is such that buses or trucks cannot make a left-turn from the cross street to the major street without crossing over into the opposing major street travel lanes, then the stop bar should be offset from the crosswalk to facilitate a safe movement for buses and trucks. Stop bars shall only be placed in left-turn lanes, not in the through lanes. The Multnomah County Traffic Engineering Section should be contacted to determine the appropriate design vehicle. Refer to Current AASHTO Standards for minimum turning radii templates for different design vehicles.

Two separate types of left-turn channelization can be used: a full shadowed left-turn bay, or a partial shadowed left-turn bay. Figure 2.3.1 shows an example of a full shadowed and partial shadowed left turn bay. Full shadowed bays require the through vehicles to shift the entire width of the left-turn bay, while partial shadowed bays allow left-turning vehicles to move directly into the turn lane without first deflecting into the through lane. Partial shadowed bays shall only be used on collector or local streets. Full shadowed bays may be used on all street classifications. The length of the combined bay and approach taper for partial shadowed bays shall follow the formula given for the approach taper above.

Taper lengths may be adjusted if the roadway goes through a horizontal curve while tapering into a left- or right-turn lane. A left-turn taper should be longer if the horizontal curve direction is to the driver's left. Conversely, a left-turn taper should be shorter if the horizontal curve direction is to the driver's right. The adjustment for right-turns is opposite of that for left-turns. The severity of the taper adjustment is dependent on the deflection angle and can be figured graphically.

2.4 ENGINEERING DESIGN STANDARDS

2.4.1 Stopping Sight Distance

The sight distance requirements shall conform to the requirements as determined by the procedures specified by Current AASHTO Standards. Stopping site distance shall consider slope and use wet pavement in the design.

Sight distance is the length of roadway ahead visible to the driver. The minimum sight distance available on a roadway should be sufficient to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. This is called the stopping distance and is measured from the driver's eye, 1.07 m above the pavement, to the object, 0.15 m above the pavement.

Stopping sight distance is the sum of the brake reaction distance and the braking distance. The brake reaction distance is the distance the vehicle travels at design speed during a reaction time of 2.5 seconds.

The brake reaction distance is determined by the following formula:

$$d = 2.5 \text{ sec} \left(\frac{1000 \times V}{3600 \text{ sec}} \right) \quad d = 0.695V$$

Where: d = braking reaction distance (meters)
 V = design speed (km/h)

The braking distance of a vehicle on a level roadway is determined by the following formula:

$$d = \frac{V^2}{254f}$$

Where: d = braking distance (meters)
 V = initial speed (km/h)
 f = coefficient of friction between tires and roadways

SOURCE: Current AASHTO Standards

The minimum stopping sight distance on level roadways is given in Table 2.4.1.

Where the grade is not level, the braking distance of a vehicle on a roadway is determined by the following formula:

$$d = \frac{V^2}{254(f + g)}$$

Where: d = braking distance (meters)
 V = initial speed (km/h)
 f = coefficient of friction between tires and roadways
 g = grade in percent divided by 100 (+ for upgrade; - for downgrade)

Current AASHTO Standards

Hence the minimum stopping sight distance (SSD) can be computed from the following formula:

$$SSD_{\min} = 0.695V + \frac{V^2}{254(f+g)}$$

Table 2.4.1
Stopping Sight Distance

Design Speed(km/h)	Coefficient of Friction (f) ¹	Minimum Stopping Sight Distance ²
30	0.40	29.7
40	0.38	44.4
50	0.35	62.9
60	0.33	84.6
70	0.31	110.9
80	0.30	139.6
90	0.30	168.8

- Notes: 1. Based on wet pavement
 2. For level grades. Where grades are not level, minimum stopping sight distance shall be computed in accordance with Section 2.3.1.

2.4.2 Horizontal Alignment

Alignments shall meet the following requirements:

- 1) Centerline alignment of improvements should be parallel to the centerline of the right-of-way.
- 2) Centerline of a proposed street extension shall be aligned with the existing street centerline.
- 3) Horizontal curves in alignments shall meet the minimum radius requirements as shown in Table 2.4.2.

Table 2.4.2 - Design Speed and Centerline Radius Minimums
Major Collectors/Arterials Streets/All Rural Roads(high speed)

Design Speed (km/h)	Friction Factor (F)	Slope/Rad. In meters (min.)					
		(e) -4%	(e) -2%	(e) 0%	(e) 2%	(e) 4%	(e) 6%
30	.165	55	49	42	38	34	31
40	.160	101	90	76	70	61	56
50	.155	164	146	123	112	98	89
60	.150	258	218	189	167	149	135
70	.145	367	309	266	234	209	188
80	.140	504	420	360	315	280	252
90	.130	709	580	491	425	375	336
100	.120	984	787	656	562	492	437

Table 2.4.2 (cont.) - Design Speed and Centerline Radius Minimums
Minor Collectors/Local Street(Low Speed Urban)

Design Speed (km/h)	Friction Factor (F)	Slope/Rad. In meters (min.)					
		(e) -4%	(e) -2%	(e) 0%	(e) 2%	(e) 4%	(e) 6%
30	.312	26	24	23	21	20	19
40	.252	59	54	50	46	43	40
50	.214	113	101	92	84	78	72

Notes: Off right-of-way run-off shall be controlled to prevent concentrated cross flow in superelevated sections.

Where superelevation is used, street curves should be designed for a maximum superelevation rate of 0.04. If terrain dictates sharp curvature, a maximum, superelevation of 0.06 is justified if the curve is long enough to provide an adequate superelevation transition.

On local streets, requests for design speeds less than 30 km/h shall be based on topography, R.O.W., or geographic conditions which impose an economic hardship on the applicant. Requests must show that a reduction in centerline radius will not compromise safety. There will be posting requirements associated with designs below 30 km/h.

2.4.3 Vertical Alignment

Alignments shall meet the following requirements:

- 1) Minimum tangent street gradients shall be one-half (0.5) percent along the crown and curb. Maximum street gradients shall be twelve (12) percent for minor collectors, and local streets, and ten (10) percent for all other streets. Grades in excess of twelve (12) percent must be approved by the County Engineer on an individual basis.
- 2) A minimum street gradient of 0.5% is allowed. Any flatter gradients require a variance approval.
- 3) Local streets intersecting with a minor collector or greater functional classification street or streets intended to be posted with a stop sign shall provide a landing averaging three(3) percent or less. Landings are that portion of the street within 6 m of the edge of the intersecting street at full improvement.
- 4) Grade changes of more than one (1) percent shall be accomplished with vertical curves. Minimum vertical curve length is 0.6 times speed (V) unless approved by County Engineer
- 5) Street grades, intersections and superelevation transitions shall be designed to not allow concentrations of storm water to flow over the pavement.
- 6) Streets intersected by streets not constructed to full urban standards shall be designed to match both present and future vertical alignments of the intersecting street. The requirements of this manual shall be met for both present and anticipated future conditions.
- 7) Vertical curves shall conform to the values set forth by Current AASHTO Standards.

Design Controls For Crest Vertical Curves Based On Stopping Sight Distance

When S (Stopping Sight Distance) is less than L

$$L = \frac{AS^2}{404}$$

When S (stopping sight distance) is greater than L

$$L = 2S - \frac{404}{A}$$

A = Algebraic Difference in grades, percent.

L = Length of vertical curve, (meters)

S = Light Beam Distance (meters)

Design Controls For Sag Vertical Curves Based On Stopping Sight Distance

When S is less than L

$$L = \frac{AS^2}{(120+3.5S)}$$

When S is greater than L

$$L = 2S - \frac{(120+3.5S)}{A}$$

A = Algebraic Difference in grades, percent.

L = Length of vertical curve, meters

S = Stopping Sight Distance in meters

Drainage along curb lines must also be studied for vertical curves that exceed minimum calculated lengths.

* Values may be reduced if street lighting is present for sag vertical curves. AASHTO publication, An Informational Guide for Roadway Lighting shall serve as a guide.

SOURCE: Current AASHTO

2.4.4 Cross-Slope

The standard street section for Multnomah County streets is a center crowned street with two percent (2%) slope to each side of the centerline. When preparing drawings for one half street improvements cross slope may vary from one percent (1.0%) to no greater than five percent (5%). These slopes shall be designed to ensure height of curb line is consistent with future development. See pavement design section. These slopes shall be limited to edge of street as defined by Multnomah County for the specific improvement. All paved shoulders along Multnomah County rural sections shall have the same slope as the pavement. All non-paved shoulders shall have a 6:1 cross slope.

2.4.5 Curbs and Sidewalks

The following specifies the requirements for curbs for streets:

- 1) Urban arterial and major collector roads shall include curbs on both sides except in the situations of interim width improvements. Interim designs shall have shoulders and ditches.

The following specifies the requirements for sidewalks:

- 1) Sidewalks shall be constructed according to Multnomah Standard Drawings. The location and width of the sidewalks shall be as required by the land development review. Check with Local Jurisdiction. Where clustered mailboxes or other objects larger than single mailboxes are within a sidewalk, the walk shall be widened to provide clearance equal to the ADA required sidewalk width.
- 2) In the instances where a permanent sidewalk cannot be constructed or standards met, a temporary walkway may be constructed. The temporary sidewalk may consist of a asphaltic concrete or Portland cement concrete to a width, location and structure approved by the County Engineer.
- 3) All sidewalk and driveway construction must meet ADA requirements.

SECTION 3 - TRAFFIC ENGINEERING DESIGN

3.1 TRAFFIC SIGNAL DESIGN

3.1.1 Signal Warrants/Phasing

New traffic signals on Multnomah County roadways should meet one of the signal warrants in the Manual of Uniform Traffic Control Devices, within three years after construction, and shall be approved for installation by the County Traffic Engineer. Peak hour volume warrants shall only be approved if the intersection serves a special generator with unique peak traffic characteristics. A traffic signal that is installed prior to meeting signal warrants shall be turned off until such time as field conditions demonstrate the meeting of a warrant.

The signal cycle length and phasing for a new or modified traffic signal during different times of day shall be based on an approved signalized intersection operations analysis. Guidelines for selection of signal phasing are included in ODOT's Traffic Signal Guidelines. This includes warrants for left turn protected, protected/permissive, and permissive/protected signal phasing, and protected right turn signal phasing.

Emergency vehicle signal preemption (Opticom) shall be incorporated into the signal operation of all approaches to the intersection. Railroad signal preemption shall be required when tracks are 60 meters or less from a signalized intersection. A green track clearance by vehicles and pedestrians shall be incorporated into the signal preemption design. Separate bicycle detectors should be placed in all striped bicycle lanes.

Pedestrian crossings shall be provided at all approaches of a signalized intersection, unless traffic studies show that crosswalks should not be allowed due to a dangerous situation that can not be resolved otherwise. Pedestrian crossing on any leg of the intersection can only be prohibited by official action of Multnomah County. In these cases pedestrian signal heads shall not be installed and signs shall be posted closing the crosswalk, and directing pedestrians to open crosswalks. Pedestrian signal push buttons shall be placed with direct access from sidewalk ramps or pedestrian landings.

3.1.2 Design Format

All new or modified traffic signal installations on Multnomah County roadways shall be designed based on the most current versions of the following:

- 1) ODOT Consultant Package for Traffic Signal Design
 - a) ODOT Traffic Signal Guidelines
- 2) Manual of Uniform Traffic Control Devices (MUTCD)
- 3) Oregon Supplement to the MUTCD
- 4) ODOT Metric Standard Drawings
- 5) ODOT Metric Standard Specifications for Roadway and Bridge Construction.
- 6) County Signal and Loop Installation Guideline Drawings.

Signal plan format should be as identified in the ODOT Traffic Signal Guidelines, with typical installations including a Signal Layout Plan and Detector Plan. As background information, these plans should provide Survey baseline, right-of-way boundaries, existing/proposed roadway and sidewalk geometrics, all existing/proposed utilities (underground and overhead), drainage systems, and other relevant topographical features. A Signal Interconnect Plan shall be required if the new or modified signal needs to be coordinated with adjacent signals. A Signal Removal Plan shall be required if significant signal removal items are a part of the project.

Typical plan scales are as follows:

Signal Layout Plan - 1:125 or 1:250

Detector Plan - 1:250

Signal Interconnect Plan - 1:600

Signal Removal Plan - 1:250

All signal plans on Multnomah County roadways shall be prepared in metric units, as displayed in the traffic signal standard drawings in Appendix XXX. The checklist as provided in Appendix XXX shall be used for review of traffic signal plans.

Particular signal design features to Multnomah County signal design include the following:

Signal Poles/Heads

- 1) Use mast arm poles where possible.
- 2) Use louvered traffic signal backboards.
- 3) Use elevated plumbizers for signals on mast arms whenever possible.
- 4) Use red LED signal heads, and glass lenses for incandescent signal heads.
- 5) Use 5 section Protected/Permitted signal heads, when warranted for left turns.
- 6) Use alternating dual color (green/yellow) fiber-optic arrow for right turn overlap phasing.

Detection

- 1) Use 1.8 meter diamond or circular loops.
- 2) Use ODOT standard for loop placement in through lanes.
- 3) Use County design of four consecutive loops in left turn lanes.
- 4) Use County standard wiring diagram drawing as applicable to the project.
- 5) Use 100mm PVC for loop feeder entrance under curbs instead of cast iron junction boxes.

Wiring

- 1) Signal wires shall be of XHHW type wires.
- 2) Use County color code for signal wires.
- 3) IMSA cable in conduit, poles, and arms.
- 4) Single conductors for power service and street lighting.
- 5) Install electrical meter bases without the meter for power service.

3.2 TRAFFIC SIGNING

3.2.1 Design Format

Traffic signs on Multnomah County roadways shall be designed and erected in conformance with the most current versions of the following:

- 1) Manual of Uniform Traffic Control Devices (MUTCD)
- 2) Oregon Supplement to the MUTCD
- 3) ODOT Metric Standard Drawings
- 4) ODOT Metric Standard Specifications for Roadway and Bridge Construction.
- 5) ODOT Traffic Line Manual

Traffic signing plans will be prepared at a minimum 1:600 scale, and may be combined with pavement marking plans if applicable. The signing plan shall identify the location of each sign to be installed, relocated or removed, as well as the type of mounting and sign panel. On simple roadway design projects, the sign legend (with identified dimensions) may be placed on the signing plan to identify each sign. On larger design projects involving several signs, a separate detail sheet should be prepared identifying the legend and dimensions of each sign.

All signing plans on Multnomah County roadways shall be prepared in metric units.

3.2.2 Street Name Signs

At all public street intersections, street name signs should be installed. In business districts and on major arterials, street name signs should be placed on all corners so that they will be on both sides of the intersection for traffic on all streets. At signalized intersections, larger size street name signs shall be mounted overhead on the far side signal support. In residential areas, at least two sets of street name signs will be mounted at each intersection.

On T-intersections, the street name signs will be designated at three locations. One set of street name signs shall be placed at the end of a T-intersection, and the other two sets shall be placed on the two corners of the intersecting street.

3.2.3 Sign Materials

Sign Panels - All traffic and street name signs shall be medium density plywood with the exception of mast arm/strain pole mounted street name signs which shall be aluminum not less than 2.5mm thick. No internally illuminated signs shall be installed except when approved by the County Traffic Engineer.

Sheeting - 3M Scotchlite brand reflective sheeting shall be used as a background, except for "STOP" and overhead street name signs where 3M Diamond Grade V.I.P. reflective sheeting is required. Manufacturer's splicing of sheeting will be permitted. Only one manufacturer's splice will be permitted per sign.

Letter Spacing - Spacing between letters, words, numbers, and/or symbols shall be in conformance with the Standard Alphabets for Highway Signs manual. For street name signs, all letters shall be white on a green background, and the location of the intersection shall determine the letter and panel sizes as follows:

- 1) Overhead-Mounted Signal Signage: Lettering shall be 300mm mixed case. Signs shall be 450mm (except dual line messages) x 1800 mm to 2400mm size with white reflective border.
- 2) Pole-Mounted Signal Signage: Lettering shall be 150mm upper case. Signs shall be 200mm x 900mm to 1150mm.
- 3) Local Side Street Signage: Lettering shall consist of two sizes, 50mm series "C" and 100mm series "B". Any block numbers shall be provided in 50mm series "C". All letters shall be upper case. Signs shall be 150mm x 600mm to 900mm.

Posts - Treated fir wood posts of 89mm x 89mm/ 89mm x 140mm/ 140mm x 140mm by 4.3m minimum length shall be used for signposts. Posts shall be pointed and embedding shall be at least 1.2m or more as provided in ODOT standard drawing TM205. The posts must be configured and drilled for breakaway per ODOT specifications.

Round metal posts will not be permitted. Square metal posts may be used for special purposes with prior approval of the County Traffic Engineer, and must be configured and drilled for breakaway per ODOT specifications. Square tubing of 50mm x 50mm by 3.0m minimum length, 12-gauge perforated posts, or approved equivalent shall be used for metal signposts. Heavy duty anchors or County standard pedestal bases are required with perforated posts.

Bases - The breakaway post base for metal posts shall consist of a 56mm x 56mm (I.D.) x 900mm galvanized base. All bases and any sleeves shall be heavy duty style.

Fastening - Nuts and bolts shall be used to fasten signs onto wood posts. Drive rivets or stainless steel bolts with esna nuts shall be used to fasten signs onto metal signposts. Stainless steel washers shall be used behind all fasteners to attach signs to posts.

3.3 PAVEMENT MARKING

3.3.1 Design Format

Multnomah County crews typically install pavement markings on County roadway projects. On significant projects for new roadways, the County Engineer may designate that contractors shall install pavement markings in accordance with County specifications. In either case, the format of pavement marking plans is similar, in conformance with the most current versions of the following:

- 1) Manual of Uniform Traffic Control Devices (MUTCD)
- 2) Oregon Supplement to the MUTCD
- 3) ODOT Metric Standard Drawings
- 4) ODOT Metric Standard Specifications for Roadway and Bridge Construction.
- 5) ODOT Traffic Line Manual

Pavement marking plans will be prepared at a minimum 1:600 scale, and may be combined with traffic signing plans if applicable. Included on a pavement marking plan is the location (by station) of each pavement marking. Either on the pavement marking plan or on a separate detail sheet, details showing the different pavement marking dimensions shall be provided.

All pavement marking plans on Multnomah County roadways shall be prepared in metric units.

3.3.2 Crosswalk Markings

Parallel pavement markings shall be used for crosswalks at signalized or stop-controlled crosswalks.

Ladder pavement markings shall be used for crosswalks at school crossings, mid-block crosswalks, pedestrian flasher crossings, and other crosswalks as determined by the county engineer.

3.3.3 Pavement Marking Materials

Different materials are used for different pavement marking treatments. The following standards should be followed on pavement marking installations not involving County forces. See Part III - Construction section of this manual for detailed application specifications.

- 1) Preformed thermoplastic shall be used for all permanent marking installed on all concrete streets. A concrete sealer recommended by the manufacturer shall be used prior to installing the markings.
- 2) Preformed thermoplastic shall be used on new asphalt streets, including overlays.
- 3) Painting or foil back tape may be used for temporary marking.
- 4) An approved pavement marking material and layout shall be submitted to and approved by the County Traffic Engineer prior to installation.

3.4 CONSTRUCTION TRAFFIC CONTROL

3.4.1 Design Format

Upon the direction of the County Traffic Engineer, construction traffic control plans shall be prepared on certain roadway improvement projects, during the design of such projects. Such plans are usually needed on more complex roadway projects involving construction staging and traffic detours, and are developed at the design stage of the project as an aid in identifying appropriate construction staging and project cost estimates. The plans would serve as a guide to contractors in bidding on a roadway project and in providing construction traffic control, with refined construction traffic control plans potentially being developed by the contractor at the outset of construction.

For both design and construction, the format of pavement marking plans is similar and shall be in conformance with the most current versions of the following:

- 1) Manual of Uniform Traffic Control Devices (MUTCD)
- 2) Oregon Supplement to the MUTCD
- 3) ODOT Metric Standard Drawings
- 4) ODOT Metric Standard Specifications for Roadway and Bridge Construction.

3.4.2 Traffic Control Plans Minimum Requirements

Construction traffic control plans will be prepared at a minimum 1:250 scale, and may be supplemented with larger scale drawings showing particular traffic control treatments at intersections or other areas. Included on a construction traffic control plan are both temporary signing and pavement marking during construction. The ODOT Metric Standard Drawings and the MUTCD show typical design treatments for alternate construction traffic control conditions. All construction traffic control plans shall be prepared in metric units. Specifications for construction traffic control are included in the Part III - Construction portion of this manual.

The following checklist sets forth the minimum presentation requirements for TCP submittals. Any set of TCPs that does not display at least these elements will be returned for proper re-submittal before review of the contents.

- 1) The pre-work situation, including all roadside features should be shown and dimensioned appropriately. The base map shall be an engineering drawing to scale whenever possible.
- 2) The area of the project activity shall be shown and dimensioned.
 - a) The limits of the construction work shall be shown, both along and across the road.
 - b) The area of the traffic rerouting/detour shall be shown.
- 3) Where traffic is maintained on the road with the construction, all side streets, driveways and curb cuts within the anticipated area of traffic control shall be shown in their proper location and clearly labeled.
- 4) The layout of temporary traffic lanes with the proposed control devices (including signing) shall be shown and dimensioned together with the pre-work pavement markings.
- 5) Any adjustments in signal operations shall be clearly identified and noted on the plans.
- 6) Where traffic will be completely removed from the road with the construction, detour routes with signing shall be identified. (Requests for street closure shall be submitted to the Right-of-Way Section, 248-3582, at least ten [10] working days in advance.)
- 7) Include North arrow.
- 8) Working hours and construction schedule are to be included.
- 9) Traffic Control Devices are to be shown per the *Manual on Uniform Traffic Control Devices* (MUTCD) and the County/ODOT manual for traffic control.

3.5 SPEED BUMP

3.5.1 Introduction

Speed bumps are traffic management devices used for lowering the speed of motor vehicles along specific street sections. Speed bumps should be used only when justified by field studies.

The following provides standards and guidelines for the application of speed bumps in the public right-of-way on streets classified as either “local streets” or “neighborhood collectors” as defined in the Multnomah County Street Standards. The use of speed bumps on streets of other classification is currently not allowed. Standards for 4.25m and 6.70m speed bumps are described in further detail on the following pages.

3.5.2 Standardization of Application

Through the strict adherence to standards and guidelines outlines in this manual, any given speed bump installation will be equally recognizable and require the same action on the part of the motorists regardless where it is encountered. Unique, “non-standard” situations may warrant unique treatment but shall be based on a comprehensive engineering evaluation and approval by the County Engineer.

Speed bumps should be installed only for the specific purpose prescribed for in this manual and shall be placed only by the authority of the County Engineer. The installation of an unauthorized speed bump by a private organization or individual is unlawful.

The application of speed bumps on County roads shall ordinarily be made in accordance with the criteria set forth in this manual. However, as with other traffic control devices, engineering judgment is essential to the proper use of speed bumps. Traffic engineering studies may indicate that speed bumps would be unnecessary or unsafe at certain locations. Data obtained from traffic engineering studies of physical and traffic related factors should be used in determining where speed bumps are appropriate.

3.5.3 Types of Speed Bumps

There are two types of speed bumps that have been adopted for use by Multnomah County:

Local 4.25 Meter Speed Bump - For use only on local streets that do not serve to move through traffic, as defined in Multnomah County Street Standards, Code & Rules.

Collector 6.70 Meter Speed Bump - For use on both local streets and neighborhood collectors, with volumes typically less than 4000 vehicles per day, and as defined in the Multnomah County Street Standards, Code & Rules.

3.5.4 Generalized Standards and Guidelines

The following are general standards and guidelines that apply to all speed bump applications. There may be situations which do not meet all criteria.

Grade - Speed bumps may be installed on street sections with a grade equal to or less than 5 percent. The installation of speed bumps on street sections with a grade greater than 5 percent must be based on an engineering evaluation to assure that the installation will not create inappropriate risks to traffic safety. Speed bumps shall not be installed on streets with grades greater than 8 percent.¹

Proximity To Curve - Speed bumps will only be placed on tangent sections. Speed bumps and/or speed bump warning signs should be placed where minimum stopping sight distance is provided per AASHTO standards.

¹ Based on ITE Draft Speed Bump Guidelines.

Street Condition - The County Maintenance Supervisor should inspect all streets prior to any proposed bump construction. The County Maintenance Supervisor will determine if the existing street pavement conditions are adequate to support the impact loads caused by the bumps and if any pavement maintenance is required. If it is determined that improvements or maintenance is required, that work should be completed before bumps are constructed.

Curbs - Speed bumps may be installed on streets without curbs. However, in order to avoid navigation around the bumps at locations without curbs, roadside delineators or similar devices may need to be installed.

Driveways - Speed bumps should be constructed at least 1.5 meters from the edge of driveways to reduce potential vehicle conflict.

PARKING - Parking removal on or near speed bumps is not required.

Street Lighting - Speed bumps should be located near existing street lights or lighting should be considered.

Diversion Potential - Adjacent streets identified as having potential for becoming alternate routes to the street with speed bumps should be monitored.

Transit & Truck Routes - Where possible, speed bumps should not be installed on transit or truck routes. If necessary, consider diverting transit to an alternate route.

Emergency Response Routes - Speed bumps not installed on primary emergency response routes or on streets with emergency facilities.

Spacing - Speed bumps installed in series should be spaced according to an engineering evaluation of the physical street section as well as traffic operations data. Speed bumps are most effective when spaced between 60 and 180 meters apart.

Utilities - Speed bumps should not be located over manholes or near fire hydrants. Avoid conflict with underground utility access to boxes and vaults and provide for adequate drainage.

3.5.5 Construction and Maintenance of Speed Bumps

Construction - Speed bumps may be constructed by the County Road Maintenance Section or by a private contractor per the appropriate Standard Plan as approved by the County Engineer. Speed bumps should be constructed of asphalt and installed within 0.3-0.6 meter of the curb or edge of road to provide drainage but prevent motorists from avoiding bumps.

Construction Tolerances - Speed bumps must be constructed per the appropriate Standard Plan within a tolerance of +/- 12mm in height.

Road/Utility Work - Any speed bump, including any associated pavement markings or signing, that is damaged by road or utility work shall be repaired to the original condition by the utility agency responsible for the damage.

Maintenance - Speed bumps shall be maintained by the County Road Maintenance Section.

Monitoring - The County Transportation Division will monitor speed bump locations for speed reductions and neighborhood satisfaction. If the speed bumps are not having the desired effect on traffic, they may be removed by the County.

3.5.6 4.25 Meter Speed Bump

Application

- 1) Limited for use on two lane local service streets, as defined in the Multnomah County Street Standards.
- 2) For use on streets posted 25 MPH (40 KPH) or in residence districts as defined by statutory law.
- 3) To be used on street sections with 85th percentile speeds between 25 and 35 MPH (40 and 55 KPH).²
- 4) Shall not be used on streets with an 85th percentile speed greater than 40 MPH (65 KPH).

Design

- 1) The vertical cross-section, measured in the direction of traffic flow, shall be a parabolic curve with a maximum height of 75mm at the mid-point, and shall be 4.25m in length as detailed in the standard plans for 4.25m speed bumps.
- 2) Shall be accompanied by appropriate signing and pavement markings as detailed in the standard plans for 4.25m speed bumps.

Placement

Where possible, 4.25m speed bumps should be located at least 18m from the closest perpendicular extension of an intersecting street curb or pavement edge line.³

² The application of a speed reduction device which lowers the 85th percentile speed at device locations more than 15 miles per hour (25 kilometers per hour) will tend to create a pronounced “sinewave” type velocity profile. Such a velocity profile is inappropriate with regards to traffic safety and the noise of acceleration and deceleration. Since research has indicated that 4.25 meter speed bumps reduce 85th percentile speeds to approximately 20 mph (30 kph), their use on streets with 85th percentile speeds in excess of 35 mph (55 kph) is inappropriate.

³ The placement of 4.25 meter speed bumps at a minimum of 20 meters from the closest intersecting curb or pavement line will assure that all bump related pavement markings remain outside the intersection and ensure that vehicles turning from the side street will engage the bump in a perpendicular fashion.

3.5.7 6.70 Meter Speed Bump

Application

- 1) Limited for use on two lane local streets and neighborhood collector streets, as defined in the Multnomah County Street Standards.
- 2) For use on streets posted 35 MPH (55 KPH) or less.
- 3) To be used on streets with 85th percentile speeds between 30 MPH (50 KPH)⁴ and 45 MPH (70 KPH)⁵.
- 4) Shall not be used on streets with 85th percentile speeds greater than 45 MPH (70 KPH)⁶.

Design

- 1) The vertical cross-section, measured in the direction of traffic flow, shall consist of a 3.0m horizontal platform, 75mm in height which transitions at both ends to existing pavement level by way of 1.83m parabolic curves, as detailed in the standard plan for collector speed bumps.
- 2) Shall be accompanied by appropriate signing and pavement markings as detailed in the standard plans for collector speed bumps.

Placement

Where possible, 6.70m bumps should be located at least 30m from the closest intersecting curb or pavement edge line.⁷

⁴ Research has indicated that the 6.70 meter speed bump is effective in reducing 85th percentile speeds to approximately 30 mph (50 kph). The use of 6.70 meter speed bumps on street sections with 85th percentile speeds less than 30 mph (50 kph) would be ineffective.

⁵ 6.70 meter speed bumps are yet to be tested on street segments with 85th percentile speeds between 40 and 45 mph (60 and 75 kph).

⁶ The application of a speed reduction device which lowers the 85th percentile speed at device locations more than 15 miles per hour (25 kilometers per hour) will tend to create a pronounced “sinewave” type velocity profile. Such a velocity profile is inappropriate with regards to traffic safety and the noise of acceleration and deceleration. Since research has indicated that 6.70 meter speed bumps reduce 85th percentile speeds to approximately 30 mph (50 kph), their use on streets with 85th percentile speeds in excess of 45 mph (70 kph) is inappropriate.

⁷ The placement of 6.70 meter speed bumps at a minimum of 30 meters from the closest intersecting curb or pavement line will assure that all bump related pavement markings remain outside the intersection and ensure that vehicles turning from the side street will engage the bump in a perpendicular fashion.

SECTION 4 - PAVEMENT DESIGN

Pavement sections shall be designed using the AASHTO design method as described in the latest AASHTO Guide For Design of Pavement Structures. The County Engineer may allow a project to install the standard section as an alternative to full testing and design analysis. The County Engineer may require full testing and analysis, if there are concerns such as traffic loading or soil conditions.

4.1 STANDARD SECTIONS

When the standard sections are used for the design during construction, the new installations shall match the existing section if the existing section is greater. Unless the County Engineer determines otherwise, the asphalt base courses shall be standard duty type B and the asphalt wearing surface shall be standard duty type C, all placed in lifts no thicker than 65 mm.

Street Classification	Pavement Standard Section	Standard Section Design Basis		
		SN	ESALs	Soil Mr
Arterial	175 mm Asphalt with 425 mm Base Rock	4.98	2,100,000	3800
Collector	125 mm Asphalt with 325 mm Base Rock	3.66	300,000	3800
Major Collector	150 mm Asphalt with 375 mm Base Rock	4.31	800,000	3800
Local	100 mm Asphalt with 325 mm Base Rock	3.24	150,000	3800

4.2 FLEXIBLE PAVEMENT DESIGN

4.2.1 AASHTO Design Method Parameters

Reliability (R%) - This is a measure of safety. A typical value recommended by ODOT is 90%.

Standard Deviation (S.) - This is a statistical number used in conjunction with the Reliability (R%) to determine the predicted error of the data. The recommended value from ODOT is 0.45.

20 Year 18 KIP ESAL - This is a measure of load repetition expressed as equivalent 18KIP single axle loads. A traffic classification count is required to provide a one-day count of the various vehicle types. ODOT has supplied us with damage factors, shown in the next section, to apply to axle groups based on state averages. The structural damage from four tire trucks, autos and motorcycles is assumed to be negligible. The bus counts are considered equal to 6 and 7 axle trucks. The summation of vehicle count by class multiplied by the damage factor is calculated for each lane. The summation result is then multiplied by the traffic expansion coefficient supplied by the Multnomah County Traffic Section to generate the annual average ESAL count. Multiply this by 20 to get the 20 year ESAL count.

Resilient Modulus (Mr) - This is a measure of a materials ability to resist deformation to an applied load. The modulus is moisture sensitive. ODOT recommends a soil study the to determine the moisture density curve and the average moisture content for the soil found by testing several times spread over a year's time. An alternate approach ODOT uses when the soil moisture information is not available is to test the materials modulus at a moisture content of 98% maximum density on the wet side of the curve.

Soil testing to obtain the strength of the soil (Resilient Modulus) is required to analyze and design the road structural section. Soil tests are needed on undisturbed samples of the subgrade materials that are expected to be within one Meter of the planned subgrade elevation. Samples are needed for each one thousand 300 meters of roadway and for each visually observed soil type. Soil tests are required from a minimum of two (2) locations. The soil test shall be run at confinement pressure of 0, 1 and 3 psi.

The resultant soil resilient modulus is dependent on the loading or confinement pressure supplied by the material placed on top of the subgrade. A soils program such as ELSYM 5 will interpret the test data and supply the resilient modulus based on an assumed loading. An iterative approach is required between the soils program and the AASHTO Design method. A suggested process is to input the loading of the standard pavement section along with a slightly higher and slightly lower loading. These calculated resilient modulus numbers can then be used in the AASHTO design method. The process will need to be repeated until the confinement pressure and resilient modulus matches between the two programs or methodologies.

Design Serviceability Loss (Δ Psi) - This is a measure of loss of serviceability of a facility from what was constructed to the terminal serviceability index Pt values range from 0 (impossible roads) to 5 (perfect roads). ODOT recommends using 4.2 as an upper limit and 2.5 for a terminal limit. This results in a Δ psi of $4.2 - 2.5 = 1.7$. A value for local streets may use Pt at 2.0.

Drainage Factor – This allows adjustment for poor draining areas. Use one unless there is a drainage problem.

4.2.2 Design Coefficient Values

Reliability	90%
Standard Deviation	0.45
Design Serviceability Loss	1.7
Drainage Coefficient	1.00

Layer Coefficient Value	
Asphalt	0.42
Bit Base	0.32
C.T.B.	0.22
Crushed Base	0.12

Typical Resilient Modulus Values	
Asphalt	400,000
A.T.B.	400,000
Crushed Base	21,500
Crushed Base with Geotextile	22,000
C.T.B.	820,000

Vehicle Damage Factors

- 100 for 2 Axle 6 tire trucks
- 220 for 3 axle trucks
- 320 for 4 axle trucks
- 650 for >5 axle trucks and busses

4.2.3 AASHTO Design Method

The calculations for the AASHTO Design Method can be done using the nomograph provided in the AASHTO manual. It is best to use a software program due to the graphical induced inaccuracies of a nomograph.

The AASHTO Design Method designs the structural section from the top layer down. The required structural number or SN is calculated for the top layer by inputting the ESAL and the resilient modulus of the layer directly below it. The thickness of asphalt in inches is then calculated using the equation:

$$D_1 = \frac{SN \text{ Asphalt}}{0.42}$$

Next using the modulus of subbase material, the SN is calculated for the entire structural section. The thickness of base material is calculated using the equation:

$$D_2 = \frac{SN \text{ total} - SN \text{ asphalt}}{a_2 m_2}$$

where $a_2 =$ 0.10 for 1"-0 Aggregate Base
 .22 for C.T.B.
 0.32 for Bit. Base
 $m_2 =$ Drainage Coefficient

The process is repeated for multiple layer structural systems. The value of SN is the summation of layer coefficients times the layer thickness and adjusted for drainage conditions.

$$SN = a_1 D_1 + a_2 D_2 + a_3 D_3$$

where $a_1, a_2, a_3 =$ layer coefficients
 $D_1, D_2, D_3 =$ layer thickness
 $m_2, m_3 =$ drainage coefficients

Swelling and frost heave also affect SN. Special consideration must be given to soils susceptible to these conditions.

4.3 RIGID PAVEMENT DESIGN

The latest AASHTO Guide For Design of Pavement Structures shall be used for Rigid Pavement Design.

SECTION 5 - DRAINAGE

5.1 Introduction

This section provides technical standards for projects and drainage systems within the ROW. This includes standards for water allowed entering or leaving the ROW. In addition to these standards any project must comply with all Federal, State, County and City environmental and land use regulations. Proof of required permits shall be submitted prior to any construction.

This Manual shall not be interpreted to authorize any water control or drainage management system contrary to the requirements of any Federal, State or Local law or regulation, including the Endangered Species Act (ESA). With respect to the pending ESA regulations relating to water quality and fish habitat protection, any party pursuing a development project subject to this Manual shall establish project compliance with such regulations through the appropriate Federal, State or Local agency. To the extent any provision of this Manual is found to be in conflict with any Federal or State law or regulation relating to water quality or fish habitat protection, such Federal or State provision shall prevail and control. The County shall periodically review this Manual to address any issues relating to compliance with all applicable Federal and State laws and regulations and shall revise this Manual as necessary to ensure compliance.

Stormwater shall be managed on site or as close as is practicable to the improvement project site. Stormwater management shall avoid impacts on other property and the environment. Stormwater management shall avoid a net negative impact on nearby streams, wetlands, groundwater and other water bodies. Improvement projects shall address more than just the on-site drainage concerns. The off-site concerns, both upstream and downstream of a project are critical to the development of proper improvements

5.1.1 Impact Evaluation

Impacts on Upstream Off-site Property - Modifications to the existing onsite storm drainage facilities shall not restrict flows creating backwater onto off-site property to levels greater than the existing conditions.

Impacts on Downstream Off-site Property - Proposed storm drainage facility modifications shall not move the location of the runoff's outflow without executing properly recorded agreements with all affected downstream property owners. Proposed undue concentration of outflows shall not be allowed without executing properly recorded agreements with all affected property owners between the release point and an existing defined receiving conveyance facility such as a pipe, culvert, ditch, creek, river, etc. Agreements described above shall include, but not be limited to, execution of the proper easements in favor of the public and construction of conveyance facilities satisfactory to all property owners and the County.

Environmental Impacts – Pollution control facilities permanent or temporary may be required to eliminate or reduce environmental impacts. Siltation of receiving streams due to construction of streets, drainage facilities and other utilities shall be prevented through the use of temporary and permanent on-site siltation detention systems. Such systems shall be subject to County approval. Erosion control plans and details may be required by the County as part of regular plan submittal.

5.1.2 Water Quantity Design Standards

The County uses the following guidelines to quantify the storm water issues so that the proper storm water mitigation can be designed. Flow control and volume storage shall be analyzed for the 2, 5, 10, and 25 year storm events for the pre-development discharges, and the post development discharges. The post-developed discharge flow rate shall be controlled to the pre-development levels. In addition, initial discharge flow rate shall be controlled to one half the 2 year flow rate before any development.

Public storm water infrastructure shall be designed to the 25-year storm, unless the structure is within a 100-year flood plain. Infrastructure within a 100-year flood plain shall be designed to the 100-year storm. All conveyance components shall be designed to provide a level of protection from all damage due to flooding for the specified storm event. Hydraulically, “a level of protection from all damage due to flooding” means that all surface runoff waters must pass through a conveyance system without flooding streets, rights-of-way, public and private property and other items of value not normally publicly acceptable to be flooded. Surcharge in below-ground facilities shall be allowed provided that it will not cause surface flooding. Surcharge in below-ground facilities shall not be allowed if it will cause subsurface seepage flooding in any portion of a habitable structure, including the below-floor crawl spaces.

Beyond the level of protection stated above, additional measures must be designed to minimize the potential damage incurred for more intense rainfall. Hydraulically, “additional measures must be designed to minimize the potential damage incurred” means that the surface runoff may surcharge the flood and cause damage, but this damage must be minimized as far as practicable. This level of minimization shall include making all attempts, as far as practicable, to reduce potential damage due to flooding in regards to loss of life, public safety, public and private property, structures and other items of value. Methods to minimize potential damage may include, but not be limited to, site grading, overflow structures (such as ditches), etc.

In developments where downstream storm systems are available, drains may be piped to the street gutter or directly to the storm drain system if proper on-site detention can be provided for. The connection to the street gutter shall be through a fifty (50) mm plastic pipe, set in the curb during construction or cut through an existing curb. These requirements shall apply to all storm drainage facilities in existing and proposed County Road rights-of-way, public rights-of-way, public drainage easements and tracts of common ownership in unincorporated areas. Storm drainage systems include, but are not limited to; inlets, pipes, ditches, creeks, rivers, and runoff detention facilities.

5.1.3 Water Quality Design Standards

The quality of stormwater entering or leaving the ROW after a project shall be equal to or better than the quality of stormwater entering or leaving the ROW before the project, as much as practicable, based on the following criteria:

Water quality control facilities required for projects shall be designed, installed and maintained in accordance with the City of Portland’s Stormwater Management Manual, which is based on achieving at least 70% removal of the Total Suspended Solids (TSS) from the flow entering the facility for the design storm. Projects in a watershed that drain to streams with established Total Maximum Daily Load limitations, as provided under the Federal Clean Water Act, Oregon Law, Administrative Rules and other legal mechanisms shall assure that water quality control facilities shall be consistent with requirements for specific pollutants of concern.

5.1.4 Drainage Easements

All portions of the storm drainage system shall preferably be located within the right-of-way, but if necessary, may be located in easements or common tracts. All common tracts for open drainage facilities such as ditches and creeks shall be three (3) meters wider than the width to carry the flows of a twenty-five (25) year storm. This additional width shall be on one side only, be usable for maintenance equipment and have adequate access to a right-of-way. Easements and Common Tracts that are not straight shall provide space at the corners adequate to allow maintenance vehicles to negotiate the required turns.

5.2 HYDROLOGY

The County accepts the Rational Method, the SCS Method from TR 55, and the SBUH Method.

5.2.1. Rational Method

The Rational Method ($Q=CIA$) can be used for drainage areas of one acre or less. References for the Rational Method come from ODOT Hydraulics Manual 1990 edition.

For the equation

$$Q = C * I * A$$

Q = Runoff rate (cfs)

C = Runoff Coefficient (From Table 2.1)

I = Rainfall Intensity (in/hr) (From IDF curve)

A = Drainage Basin Area (Acres)

Runoff Coefficient (C)

Use Table 2.1. In some instances, the use of individual characteristic runoff coefficients is more appropriate than composite coefficients. Project-specific composite coefficients can be calculated from an area-weighted-average basis using characteristic coefficients.

Rainfall Intensity (I (in/hr))

The rainfall intensity used in the design and analysis of storm drainage facilities shall vary depending on the time of concentration (T_c) for the drainage basin that is tributary to the location under consideration.

Time of concentration (T_c) (min)

The T_c for the drainage basin is equal to the sum of the travel times (T_t) of the various legs that make up the overall route that the water follows to get from the farthest point in the basin to the point of interest. These individual legs usually consist of one or more of the following:

- Overland Sheet flow, up to the first 300 feet
- Shallow concentrated flow
- Channel flow

Overland Sheet flow

Up to the first 300 feet can be considered to be overland sheet flow. To calculate the overland sheet flow the following equation needs to be solved:

$$T_t = (.93 * ((n * L)^{0.6}) / ((I^{0.4}) * (S^{0.3})))$$

T_t = Travel time (min)

L = Length (ft)

n = Manning roughness coefficient from Table 2.2

S = Average slope

I = Rainfall intensity (in/hr)

Use the appropriate recurrence year, and, IDF curve from Zones 5,7 or 8 to determine rainfall intensity. Use map on page A4 to determine which Zone to use.

The correct T_t has been achieved when the calculated T_t for the selected I equals the same T from the IDF curve for that same I on the curve. Example T_t calculated equals 25 minutes for a given I . Looking at the IDF curve and finding the given I you have the same 25 minutes for T . Figure 2.2 on Page 12 can be used to solve this equation by trial and error. See Worksheet 1, lines 5,6, and 7.

Shallow concentrated flow

Use Figure 2.3 to determine the average velocity of flow. Then solve the equation

$$T_t = L / (60 * V)$$

T_t = Travel time. (min)

L = Length (ft)

V = Velocity of shallow flow from Figure 2.3 (ft/sec)

To determine the velocity from Fig 2.3 you will need the average slope (s) and the ground cover type.

Channelized Flow

Channel flow can consist of several different geometrical shapes and different lengths. Use Manning's equation to solve for the average velocity, then solve for the equation above for T_t .

Manning's Equation

$$V = (1.49 * (r^{.667}) * (s^{.5})) / n$$

V = Velocity (ft/sec)

r = Hydraulic radius (ft) $R = A/P$

A = Cross sectional area of flow (ft²)

P = wetted perimeter (ft)

(Length of water contact surface)

n = Manning's friction factor (Table 3-1)

s = Average slope of channel

The T_t in a conveyance system shall be based on the full-flow velocity of the conveyance facility. The benefits of upstream detention systems shall not be accounted for in determining the T_c for any storm drain system.

Total T_c is equal to the sum of all T_t 's previously calculated. The minimum T_c allowable by calculation is 10 min. The minimum T_c without analysis is 25 min. unless justified by some other evidence. Longer minimum T_c can be required based upon available evidence that would support a longer T_c . Once the T_c has been calculated, then using the appropriate IDF curve, and recurrence storm, the rainfall intensity (I) can be determined. Use Worksheet 1 in the Appendix to calculate the T_c .

Drainage Basin Areas (A (Acres))

The drainage area used in the design or analysis of storm drainage facilities shall be limited to only the area undergoing alteration unless other drainage issues either impact the site or are impacted by the site.

Runoff (Q (cfs))

The runoff calculated from the formula $Q = C \cdot I \cdot A$ is the allowable runoff (Q_{all}) when calculated in the before any development conditions for the 2, 5, 10, and 25 year events. These runoff values shall limit the post developed runoff rates, requiring some kind of flow rate control device to be constructed and some temporary storage of water to be accommodated within the altered land area.

Detention/Retention Calculation

The calculation for the Detention/Retention facility follows the form of calculating the inflow volume versus the outflow volume over the same time period. In tabular form the analysis looks like the following:

Column 1	Time (min)
Column 2	Rainfall Intensity from IDF Curve (in/hr)
Column 3	$C \cdot A$ (Acres)
Column 4	$Q_{in} = \text{Col 2} \cdot \text{Col 3}$ (cfs)
Column 5	$V_{in} = \text{Col 1} \cdot \text{Col 4} \cdot 60$ (ft ³)
Column 6	If $\text{Col 4} \leq Q_{all}$; Use Col 4; otherwise use Q_{all} (cfs)
Column 7	$V_{out} = \text{Col 1} \cdot \text{Col 6} \cdot 60$ (ft ³)
Column 8	Storage = $\text{Col 5} - \text{Col 7}$ (ft ³)

1 T (min)	2 I (in/hr)	3 C*A (Acres)	4 Q _{in} (cfs)	5 V _{in} (ft ³)	6 Q _o (cfs)	7 V _{out} (ft ³)	8 Storage (ft ³)
5							
6							
7							

8 etc							
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Discussion of Calculation

Assumptions

The primary assumption inherent in this analysis is that the rainfall intensity is constant during the corresponding time interval. Thus the rainfall intensity (I) that corresponds to the time interval of 7 minutes is constant during that 7 minute interval. That assumption produces a constant runoff (Q) for that same time period that can be used to calculate the volume of water flowing into the detention/retention facility.

Results

The volume of the detention/retention facility has been determined when the Storage volume has reached its peak value. At some time (T) the Storage value will reach a peak value, with succeeding values decreasing as the allowable flow out is beginning to catch up with the flow coming in.

Infiltration Trench Calculation (in development)

References

1992 Stormwater Management Manual for the Puget Sound Basin III.-3.4
City of Portland 1999 Stormwater Management Manual 5.5.1

Flow Control Device Calculation

Orifice

References

1992 Stormwater Management Manual for the Puget Sound Basin III.-2.4.1

Weir

References

1992 Stormwater Management Manual for the Puget Sound Basin III.-2.4.1

5.2.2 SCS TR55 Method

The SCS Method can be used for any drainage areas. References for the SCS Method come from Soil Conservation Service (SCS) TR-55 and SCS Soil Survey of Multnomah County 1983 Edition.

Storm Type

SCS has developed several different storm types. This is an attempt to model the typical storm pattern across the country. The storm type that applies to Multnomah County is Type 1A.

Drainage Basin Areas (A)

The drainage area used in the design or analysis of storm drainage facilities shall be limited to only the area undergoing alteration unless other drainage issues either impact the site or are impacted by the site.

Curve Numbers (CN)

To determine the appropriate CN the hydrologic group and soil cover needs to be known. To determine the hydrologic group, determine the soil name using the SCS Soil Survey. After locating the soil name from the aerial photos look up the hydrologic group in Table 24 of the Survey. With the hydrologic group and ground cover, use Table 2.2, or Figure 2.3, or Figure 2.4 from TR55 to determine the CN for each ground condition within the site.

Time of concentration (Tc)

The Tc for the drainage basin is equal to the sum of the travel times (Tt) of the various legs that make up the overall route that the water follows to get from the farthest point in the basin to the point of interest. These individual legs usually consist of one or more of the following:

Overland Sheet flow, up to the first 300 feet
Shallow concentrated flow
Channel flow.

Channel flow can consist of several different geometrical shapes of different lengths and slopes.

Overland Sheet flow - Up to the first 300 feet can be considered overland sheet flow. To calculate the overland sheet flow the following equation needs to be solved:

$$T_t = (.42 * (n * L)^{0.8}) / ((P_2^{0.5}) * (S^{0.4}))$$

Tt = Overland sheet flow time (min)

L = Overland flow length (ft)

n = Manning roughness coefficient from Table 3-1

S = Average slope of overland area

P2 = 2 Year 24 hour rainfall total (in)

Use the 2 year 24 hour isopluvial map to determine P2.

Shallow concentrated flow - Use Figure 3-1 to determine the average velocity of flow. Then solve the equation

$$T_t = L / (60 * V)$$

Tt = shallow concentrated flow time. (min)

L = shallow flow length (ft)

V = velocity of shallow flow from Figure 3-1 (ft/sec)

Channelized Flow - Use Manning's equations to solve for the various channel types and solve for average velocity. Then solve for the equation above for Tt.

Manning's Equation

$$V = (1.49 * (r^{.667}) * (s^{.5})) / n$$

V = Velocity (ft/sec)

r = Hydraulic radius (ft) $R = A/P$

A = Cross sectional area of flow (ft²)

P = wetted perimeter (ft)

(Length of water contact surface)

n = Manning's friction factor (from appropriate Table)

s = Average slope of channel

The T_t in a conveyance system shall be based on the full-flow velocity of the conveyance facility. The benefits of upstream detention systems shall not be accounted for in determining the T_c for any storm drain system. Total T_c is equal to the sum of all T_t 's previously calculated. Use Worksheet 2 from the Appendix.

Runoff (Q (cfs))

The runoff calculated from the formula

$$Q = ((P - .2*((1000/CN)-10)))^2 / (P + (.8*((1000/CN) - 10)))$$

Q = runoff (in)

P = 24 hr rainfall (in)

CN = Curve Number

is the allowable runoff when calculated in the before any development conditions for the 2, 5, 10, and 25 year events. These runoff values shall limit the post developed runoff rates, requiring some kind of flow rate control device to be constructed and some temporary storage of water to be accommodated within the altered land area.

Detention Storage (in development from Chapter 6 TR55)

5.2.3 Santa Barbara Unit Hydrograph (SBUH) Method

The SBUH Method can be used for any drainage areas. References for the SBUH Method come from the SCS TR-55 and SCS Soil Survey of Multnomah County 1983 Edition and the February 1992 Stormwater Management Manual for the Puget Sound Basin Volume III.

Drainage Basin Areas (A)

The drainage area used in the design or analysis of storm drainage facilities shall be limited to only the area undergoing alteration unless other drainage issues either impact the site or are impacted by the site.

Curve Numbers (CN)

To determine the appropriate CN the hydrologic group and soil cover needs to be known. To determine the hydrologic group, determine the soil name using the SCS Soil Survey. After locating the soil name from the aerial photos look up the hydrologic group in Table 24 of the Survey. With the hydrologic group and ground cover, use Table 2.2, or Figure 2.3, or Figure 2.4 from TR55 to determine the CN for each ground condition within the site.

Time of concentration (Tc)

The Tc for the drainage basin is equal to the sum of the travel times (Tt) of the various legs that make up the overall route that the water follows to get from the farthest point in the basin to the point of interest. These individual legs usually consist of one or more of the following:

Overland Sheet flow, up to the first 300 feet
Shallow concentrated flow
Channel flow.

Channel flow can consist of several different geometrical shapes of different lengths and slopes.

Overland Sheet flow

Up to the first 300 feet can be considered overland sheet flow. To calculate the overland sheet flow the following equation needs to be solved:

$$T_t = (.42 * (n * L)^{0.8}) / ((P_2^{0.527}) * (S^{0.4}))$$

Tt = Overland sheet flow time (min)

L = Overland flow length (ft)

n = Manning roughness coefficient from Table III-1.4

S = Average slope of overland area

P2 = 2 Year 24 hour rainfall total (in)

Use the 2 year 24 hour isopluvial map to determine P2.

Shallow concentrated flow and Channelized flow

Solve the equation

$$V = k * (S^{.5})$$

V = velocity (ft/sec)

k = time of concentration velocity factor (ft/s) Table III-1.4

S = Average slope of overland area

Then solve the following equation

$$T_t = L / (60 * V)$$

Tt = shallow concentrated flow time. (min)

L = shallow flow length (ft)

V = velocity (ft/sec)

The Tt in a conveyance system shall be based on the full-flow velocity of the conveyance facility. The benefits of upstream detention systems shall not be accounted for in determining the Tc for any

storm drain system. Total T_c is equal to the sum of all T_t 's previously calculated. Use Worksheet 3 from the Appendix.

Hydrograph Calculation Section III 1.4.3 and III 1.4.4 (in development)

Detention Calculation (in development)

5.3 DRAINAGE FACILITY DESIGN

Water Quality Facilities

References

City of Portland 1999 Stormwater Management Manual Chapter 5.
Multnomah County NDPES Permit.

Use current City of Portland Stormwater Management Manual.
Meet the requirements of Multnomah County NDPES Permit

Catch Basins, Inlets and Grates

References

AASHTO 1991 Model Drainage Model 13.11
FHWA 1979 Design of Urban Highway Drainage 5.5
ODOT 1990 Hydraulics Manual 5.5
Multnomah County Standard Detail Sheet MC 105

Types: Precast or Cast-in-Place, G, CG, G-1, CG-1, G-2, CG-2, P-45, and D

Locations

The spacing between catch basins and curb or gutter inlets shall be as required hydraulically by the street gutter and the basin for the local roads. Flow shall not run deeper than ten (10) centimeters against a curb. For all other road classifications, water width shall not exceed a one and a third (1.35) meters or deeper than ten (10) centimeters against a curb. Where bike lanes exists, the water width shall not exceed two-thirds (0.65) meters. Catch basins and gutter inlets shall be of sufficient size to accept the inflows without backing up water on the street.

- 1) Catch basins with curb inlets or gutter inlets shall be provided just prior to curb returns on streets with a centerline gradient of three (3) percent or more and a street gutter drainage run of one hundred (100) feet or more.
- 2) Catch basins shall have a maximum depth of one (1) meter from surface to flowline. Minimum depth shall be top of outside surface of pipe is ten (10) centimeters below the subgrade surface.
- 3) Catch basins shall normally connect to a receiving conveyance pipe with a manhole or another catch basin, or gutter inlet. Where the conveyance pipe is nine hundred (900) mm or larger, tee connections are allowed. Wye connections are not allowed.

- 4) At 115 meters intervals maximum.
- 5) At intersection returns.
- 6) At low points of vertical curves, additional inlets to be installed to each side of the low point inlet.

Gutters

References

AASHTO 1991 Model Drainage Model 13.10

FHWA 1979 Design of Urban Highway Drainage 5.4

Manholes AP, BP, and Large

References

AASHTO 1991 Model Drainage Model 13.13

FHWA 1979 Design of Urban Highway Drainage 5.9.2

ODOT 1990 Hydraulics Manual 5.6

Standard Drawing 110

Standard Drawing 115

Manholes, shall be required at, but not limited to, the following locations:

- 1) Abrupt changes in vertical grade or horizontal alignment of storm drain pipes
- 2) Change in size or abrupt change in elevation of storm drain pipes.
- 3) Uppermost extent of storm pipe not open (day lighted) to receive ditch or other open conveyance flows. Cleanouts are not allowed in this situation.
- 4) Maximum spacing of one hundred and fifteen (115) meters

Manholes with pipe horizontal alignment changes of more than thirty (30) degrees in angle shall have the outlet pipe invert at least six (6) centimeter in elevation lower than all inflow pipe inverts, in addition to the normal grade crossing the manhole. Catch basins and curb inlets may be used instead of manholes if the catch basin and curb inlet criteria are also satisfied.

Manhole lids and frames shall conform to Multnomah County Standard Detail Sheet MC 110. Some locations may require the use of tamper proof lids.

Standard Frames and Lids shall be used in travel lanes.

Suburban Frames and Lids may be used in bike lanes and sidewalks

Manholes may be constructed with a concrete collar meeting the requirements of Standard Detail Sheet MC 105 in newly constructed pavement surfaces.

Manholes for pipes larger than thirty (30) inches shall conform to Multnomah County Standard Detail Sheet MC 115.

Pipes and Culverts

References

ODOT 1996 Standard Specifications for Highway Construction

Pipes and culverts may be constructed of the following materials:

Concrete, shall meet the requirements of Section 02410.10 and 02410.20

Corrugated Aluminum, shall meet the requirements of Section 02420.40

Polyethylene, smooth or corrugated shall meet the requirements of Section 02410.60

The material used shall be adequate to carry anticipated dead and live loads within deflection limits specified by the manufacturer. All pipe and culverts shall have a minimum design service life of seventy-five (75) years based on manufacturer recommendations and be per the applicable ASTM (American Society of Testing Materials) or AASHTO test standards. All pipes and culverts shall be strong enough to withstand the stresses created by cleaning equipment. Installation techniques shall be documented and follow manufacturers recommendations.

Pipes of different materials shall be connected together properly to avoid damaging chemical interaction between the different materials.

Minimum sizes for pipes and culverts shall be

- 1) Pipe lateral between Inlet and Manhole two hundred (200) mm.
- 2) Pipe lateral between Sedimentation Manhole and Sump two hundred and fifty (250) mm.
- 3) All other pipes and culverts, three hundred (300) mm.

For pipes and culverts not of circular cross-section the minimum clear dimension that crosses the centroid shall be three hundred (300) mm.

All pipes and culverts shall have minimum slope of one-half per cent (.5%).

Tongue and groove joints are preferred and shall be used when commercially available in the size required. Joints used shall meet the manufacturer recommendations.

All pipe and culvert type shall be as required by size, loading, bedding, and trench conditions.

No curved storm drain pipes shall be allowed by joint displacement or deflection if it results in a joint that allows the adjacent soil material to enter the pipe. Joints with rubber gaskets shall be used for all curved storm drains. Minimum radii shall not exceed manufacturers recommendations.

All pipe and culvert outlets with exit velocities in excess of one and a quarter (1.25) meter per second shall be examined with respect to soil type to guarantee adequate erosion control. Where grades require, all end pipes shall be supported by tie downs, end walls or aprons, etc. to prevent the separation and dislodging of pipe sections.

Pipes

References

AASHTO 1991 Model Drainage Model 13.15

Pipe design

Capacity

All pipes shall be designed to the 25 year storm, full build out of the right-of-way, and all natural runoff that drains into the right-of-way. If area of concern has been studied for stormwater planning, the pipe shall be designed so as to accommodate the stormwater plan flows.

Load Bearing

Concrete

Use Table 6.9 ODOT 1990 Hydraulics Manual

Polyethylene

Corrugated aluminum

Use Table 6.4 ODOT 1990 Hydraulics Manual

Culverts

References

AASHTO 1991 Model Drainage Model Chapter 9.0

AASHTO 1992 Highway Drainage Guidelines Volume IV

FHWA 1985 Hydraulic Design of Highway Culverts

ODOT 1990 Hydraulics Manual Chapter 4

Culvert Design

See Appendix for Worksheets 5 and 6 for design data input for Culvert Design calculations

Fish Passage Design

References

FHWA 1985 Hydraulic Design of Highway Culverts Section VI.B.6

AASHTO 1992 Highway Drainage Guidelines Volume IV Section 7.4

ODOT 1999 Culvert Fish Passage Improvement

ODOT 1990 Hydraulics Manual 4.4.9

Fish Passage Design shall meet the requirements of the Endangered Species Act (in development).

Outfalls

Rip Rap Design

References

AASHTO 1991 Model Drainage Model 11.8

City of Portland 1999 Stormwater Management Manual 5.4.4

Energy Dissipaters**References**

AASHTO 1991 Model Drainage Model 11.9

Ditches and Open Channel Flow**References**

ODOT 1990 Hydraulics Manual Chapter 3

AASHTO 1991 Model Drainage Chapter 8

Proposed roadside ditches shall be properly sized to pass all required flows, have a maximum depth of no more than two thirds (.65) meter as measured from the shoulder of the road, side slopes no steeper than two (2) to one (1). All other ditches shall be properly sized to pass all required flows but are not limited to the geometric restrictions of roadside ditches. Any proposed roadside ditch improvement that does not meet this requirement above shall be piped.

All proposed or modified channels shall have adequate erosion control provisions to prevent damage to the shoulder of the adjacent road or the water course channel. Side slopes no steeper than two (2) to one (1) will be allowed unless soil/rock conditions substantiated by a geotechnical report demonstrates that erosion control is adequate, four (4) to one (1) is the desired channel side slope.

No protruding pipes, culverts or other structures which reduce or hinder the flow characteristics of the ditch channel or creek will be allowed.

Pollution Control Manhole**References:**

Standard Drawing MC 125

Sedimentation Manhole with Sump**References:**

Standard Drawing MC 120

All new sumps within the right-of-way shall have a sediment manhole just upstream.

Rational Method Calculation

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

- | | | |
|----|--|-------|
| 1. | Surface description (table 2.2) | |
| 2. | Manning's roughness coeff., n (table 2.2) | |
| 3. | Flow length, L (total $L \leq 300$ ft) | ft |
| 4. | Land slope, s | ft/ft |
| 5. | Trial I from IDF Curve | in/hr |
| 6. | Trial T from IDF Curve for I from line 5 | min |
| 7. | $T_t = \frac{0.93(nL)^{0.6}}{I^{0.4} s^{0.3}}$ | min |
| | Compute T_t | min |

(Check computed T_i with I from IDF curve. If line 7 equals line 6, Done. If line 7 does not equal line 6 pick new I in line 5. Repeat until line 7 equals line 6)

Shallow concentrated flow

Segment ID

- | | | |
|-----|--|-------|
| 8. | Surface description (paved or unpaved) | |
| 9. | Flow length, L | ft |
| 10. | Watercourse slope, s | ft/ft |
| 11. | Average velocity, V (figure 2.3) | |
| 12. | Compute T_t | min |
- $$T_t = \frac{L}{60V}$$

Channel flow

Segment ID

- | | |
|---|-----------------|
| 13. Cross sectional flow area, a | ft ² |
| 14. Wetted perimeter, P_w | ft |
| 15. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r | ft |
| 16. Channel slope, s | ft/ft |
| 17. Manning's roughness coeff., n (Appendix 3.1) | |
| 18. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V | ft/s |
| 19. Flow length, L | ft |
| 20. $T_t = \frac{L}{60V}$ Compute T_t | min |

Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) min

5 - 19

SBUH Method Calculation

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

Notes: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table III-1.4)

2. Manning's roughness coeff., n (table III-1.4)

3. Flow length, L (total $L \leq 300$ ft) ft

4. Two-yr. 24-hr rainfall, P_2 in

5. Land slope, s ft/ft

6. $T_t = \frac{0.42(nL)^{0.8}}{P_2^{0.527} S^{0.4}}$ Compute T_t min

Compute T_t min

Shallow concentrated flow

Segment ID

7. Surface description (table III-1.4).....

8. Time of concentration velocity factor,
- K
- (table III-1.4) ft/s

9. Watercourse slope, s ft/ft

10. $V = K\sqrt{s}$ ft/s

11. Flow length,
- L
- ft

12. $T_t = \frac{L}{60V}$ Compute T_t min

Compute T_t min

Channel flow

Segment ID

13. Surface description (table III-1.4).....

14. Time of concentration velocity factor,
- K
- (table III-1.4) ft/s

15. Watercourse slope,
- s
- ft/ft

16. $V = K\sqrt{s}$ ft/s

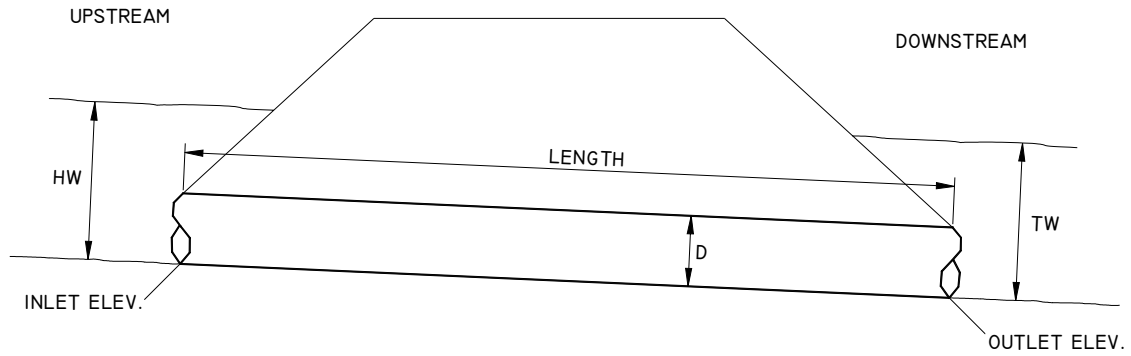
17. Flow length,
- L
- ft

18. $T_t = \frac{L}{60V}$ Compute T_t min

Compute T_t min

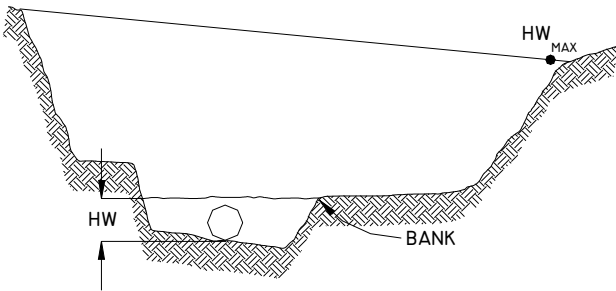
19. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) min

CIRCULAR CULVERT ANALYSIS WORKSHEET

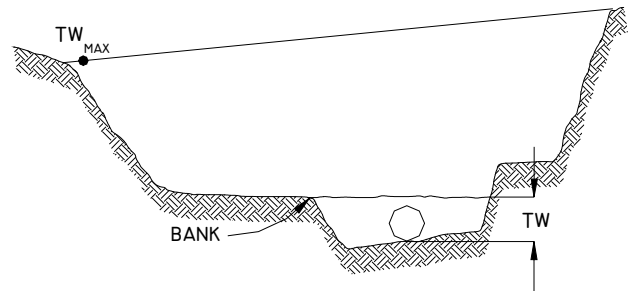


CULVERT PROFILE

UPSTREAM CROSS SECTION

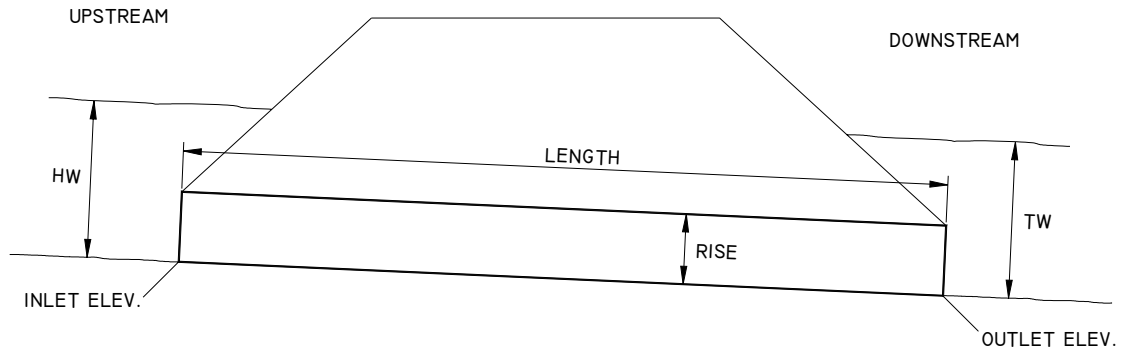


DOWNSTREAM CROSS SECTION



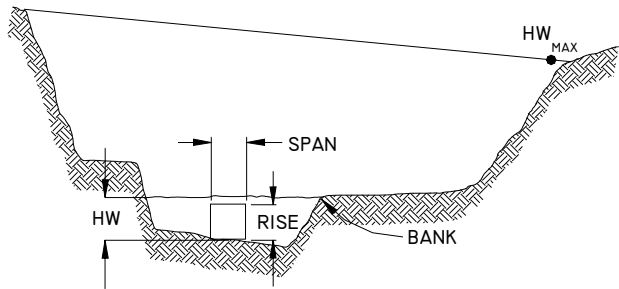
Q	_____	DESIGN FLOW OF WATER IN CUBIC FEET PER SECOND
# OF BARRELS	_____	BARRELS
MAX. ELEV.	_____	MAXIMUM HEIGHT BEFORE WATER OVERTOPS EMBANKMENT
INLET ELEV.	_____	CULVERT ELEVATION AT UPSTREAM END
OUTLET ELEV.	_____	CULVERT ELEVATION AT DOWNSTREAM END
LENGTH	_____	LENGTH OF CULVERT
S	_____	SLOPE OF CULVERT (INLET ELEV. - OUTLET ELEV.)/LENGTH
HW	_____	HEADWATER DEPTH
TW	_____	TAILWATER DEPTH
N	_____	MANNINGS "N" FOR PIPE SMOOTHNESS
D	_____	PIPE DIAMETER
C	_____	CORRUGATION
HW/D	_____	HEADWATER DEPTH/PIPE DIAMETER
KE	_____	ENTRANCE LOSS COEFFICIENT (SEE ATTACHED TABLE)

BOX CULVERT ANALYSIS WORKSHEET

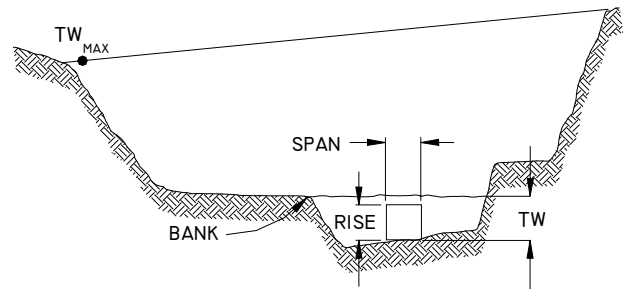


CULVERT PROFILE

UPSTREAM CROSS SECTION



DOWNSTREAM CROSS SECTION



Q	_____	DESIGN FLOW OF WATER IN CUBIC FEET PER SECOND
# OF BARRELS	_____	BARRELS
MAX. ELEV.	_____	MAXIMUM HEIGHT BEFORE WATER OVERTOPS EMBANKMENT
INLET ELEV.	_____	CULVERT ELEVATION AT UPSTREAM END
OUTLET ELEV.	_____	CULVERT ELEVATION AT DOWNSTREAM END
LENGTH	_____	LENGTH OF CULVERT
S	_____	SLOPE OF CULVERT (INLET ELEV. - OUTLET ELEV.)/LENGTH
HW	_____	HEADWATER DEPTH
TW	_____	TAILWATER DEPTH
		} MAXIMUM HEIGHT BEFORE WATER JUMPS NATURAL BANK
N	_____	MANNINGS "N" _____ FOR BOTTOM, _____ FOR SIDES
RISE	_____	HEIGHT IN FEET
SPAN	_____	WIDTH IN FEET
HW/D	_____	HEADWATER DEPTH/PIPE DIAMETER
KE	_____	ENTRANCE LOSS COEFFICIENT (SEE ATTACHED TABLE)

SECTION 6 - STREET LIGHTING

6.1 PLACEMENT CRITERIA

In the past, Multnomah County did not have a formal standard for incorporating lighting into road improvement projects. Typically, lighting was mounted onto existing utility poles where possible, with minimal use of separate street light poles and circuitry.

All new urban street construction or reconstruction should incorporate street lighting. A lighting analysis software program should be applied to identify requirements along a corridor, given the particular pavement and right-of-way section proposed. Table 6.1.2 identifies lighting level standards which should be achieved in the location and design of new street lighting installations for asphalt surfaces. The average to minimum ratio should be less than 6 for a local street, less than 4 for a minor collector and less than 3 for all other streets.

Table 6.1.1
Average Maintained Lighting Levels for Asphalt Surfaces

Street Classification	Minimum Average Maintained in Lux		
	Commercial	Intermediate	Residential
Major/Minor Arterial	20	14	10
Major Collector	12	9	6
Minor Collector	9	6	5
Local	9	6	5

Table 6.1.2
Average Maintained Lighting Levels

Other Pedestrian and Bicycle Ways	Average Lux
Sidewalk and Bikeway Distant From Roadway	5
Pedestrian Tunnels	40
Pedestrian Overpasses	5
Pedestrian Stairways	6

The spillover of light onto adjacent property needs to be checked on all designs. The maximum point lighting level on adjacent property more than 8 meters from the ROW should be less than half of the street's averaged maintained lighting level. The lighting of adjacent property within 8 meters of the ROW will be limited as much as possible.

When locating standard lighting along a corridor, preference should be given to mount luminaries on existing utility poles. If this is not possible, separate light poles should be installed. Cobra Head fixtures mounting height shall not be less than 7.5 m for 100watt, not less than 9 m for 150 watt, and not less than 10.5 m for 200 watt and over. Typical spacing of Cobra Head fixtures is 45 m to 54 m feet apart on one side of the street for Minor Collectors and Local Streets. Arterials and Major Collectors typically require street lights on both sides. All streets with median planter strips shall require street lights on both sides of the street.

Any separate street light poles installed, as part of a roadway project should be located near property lines. Lights should be at least 7.5 m from any trees or be located on mast arms long enough to extend past the tree canopy over the street. Boulevards should be lighted with pedestrian friendly, globe style fixtures installed on 4.2 m poles. 4.8 m poles are required for 200 watt and over globe fixtures.

6.2 DESIGN FORMAT

General Design - All street lighting shall be designed using the Illuminating Engineering Society of North America guidelines as modified in this manual. All electrical components shall be UL approved or approved equal. All fixtures, poles, mast arms and other major components must be on PGE's approved products list.

All street lighting plans shall include: pole locations, conduit locations, junction box locations, transformer/service cabinet locations, photometrics from the lighting level analysis, along with any other pertinent information. The contractor shall be responsible for making arrangements with PGE for connecting the street lighting system to the local distribution system.

Conduit - All new installations and cable replacements shall be in schedule 40 PVC conduit, which shall conform to the requirements in the National Electrical code. Junction boxes within sidewalks shall be concrete with cast metal covers, and stamped "Street Lighting." Any PGE approved box may be used outside of sidewalk areas. Connections between a junction box and a light pole are to be made using direct buried cable as opposed to conduit if direct bury poles are used. Splices shall never be done within the conduit. All conduit shall have a burial depth of 0.9 m to 1.1 m below finished grade.

Cable and Wire - Most cable and wire for street lighting will be installed and owned by PGE in conduit provided by the project. Wires shall be sized to limit voltage drops to a maximum of 5 percent. All wire shall be stranded copper, single conductor, with a 600 volt installation. The minimum size shall be #10 AWG stranded copper type THWN or THHN. The maximum wire size shall be #1 AWG stranded copper.

Poles - For separate light poles to be installed on roadway projects, anchor base poles shall be used, unless otherwise approved by the County Transportation Division. These poles are to be aluminum, unless the County approves another material. All poles shall have a 63.5 mm by 127 mm hand hole placed at 1.2 m above the ground line.

Lighting Fixtures - Cobra head fixtures shall be the GE Powr/Dor fixtures (unless otherwise pre-approved by Mid- County Lighting District), with a sharp cutoff optical system. High-pressure sodium lamps shall be used in all fixtures, per the lighting levels required of different street classifications as identified in Table 6.1.2. A twist-lock photocell receptacle shall be incorporated into the fixtures. All lighting fixtures shall have a factory house side shield.

Lighting Controls - The location and type of street light service cabinet(s), if required, shall be shown on all street lighting plans. Whenever possible, the service cabinets should be installed away from intersections. Each service cabinet shall be placed on a concrete pad. The cabinet shall have a service panel with a UL label (or approved label) attached to the panel.

SECTION 7 - TRANSIT

In general, the standards for transit facilities on Multnomah County roadways shall follow those set forth by Tri-Met. This section summarizes the key design guidelines featured in the Tri-Met manuals which are used by roadway designers. This section should be used in conjunction with the referenced Tri-Met manuals.

7.1 BUS STOP SPACING AND PLACEMENT

7.1.1 Bus Stop Spacing

As specified by Tri-Met, the following spacing guidelines should be followed:

- 1) **Group 1 Stops** - Provide access to commercial districts, shopping centers, office developments, medium- or high-density housing (22 or more units per 0.4 hectare), or other areas of medium-density development. Spacing should be about 234 m.
- 2) **Group 2 Stops** - Provide access to low-density or scattered residential developments (4 to 22 units per 0.4 hectare) or transfer points in low-density areas. Spacing should be about 300 m.
- 3) **Group 3 Stops** - Provide access to rural or isolated areas (fewer than four residences per 0.4 hectare). Stops should be placed as needed, but no closer than 300 m.

Contact Tri-Met for which group should be used for a particular area. A Right of Way permit is required for new or modified stops.

7.1.2 Bus Stop Placement

The placement of a bus stop relative to an intersection is an important decision since it affects the traffic operations of both buses and passenger vehicles, and it affects the safety of vehicles and pedestrians near the intersection. The placement of a bus stop depends on a number of criteria, highlighted below.

Far-Side Stops - In general, far-side stops are preferred. They result in fewer traffic delays, provide better auto and pedestrian sight distances, provide more bus maneuvering area, and cause fewer conflicts between buses and pedestrians. At signalized intersections, far-side stops should generally only be provided when the bus can avoid stopping in the travel lane (i.e., bus pullout).

Near-Side Stops - Near-side stops are preferred where the bus must stop in a travel lane on a street with curbside parking so that the front door of the bus is at the intersection crosswalk.

Coordination of Far-side and Near-side Stops - Coordination of near-side and far-side stops should be occur where major transit routes cross and form important transfer points. In these areas, the stop locations should be designed to allow for transfers along commute routes without crossing the street.

Mid-block Stops - Mid-block stops should generally be avoided as it is typically undesirable to develop mid-block pedestrian crossings of streets to access such a stop. Locations where mid-block stops may be desirable are where the distance between intersections is unusually long or major transit generators that are located at mid-block cannot be adequately served by nearby intersection stops.

Design Constraints - When designing a bus stop at a particular location, the following design constraints should be considered:

- 1) Adequate distance between bus stops and driveways should be maintained to prevent buses from blocking driveway traffic or sight lines. In constrained situations, buses may block driveways if other access is provided to the property and adequate sight distances are maintained.
- 2) Bus stops should not be located where a bus wheel will stop on a catch basin (storm drain). This event could cause the bus to lurch or change direction and could cause excessive settlement of the basin structure.
- 3) Where possible, bus stops should not be located on an upgrade in a residential area, as the bus engine noise will bother area residents. Slippery winter conditions dictate not placing bus stops on steep grades.

7.2 BUS STOP FACILITIES

7.2.1 On-Street Facilities

Bus Pullouts - Bus pullouts are intended to provide safe passenger loading and unloading while minimizing delays to passenger vehicles. Pullouts should be placed where buses can easily re-enter the traffic flow and allow for adequate vehicle acceleration and deceleration. Pullouts should be avoided at mid-block locations unless a development generating significant transit ridership is linked to a mid-block pedestrian crossing.

Bus pullouts must allow adequate tapers and lane widths to accommodate safe bus movement. Figure 7.1 displays bus pullout design options. Tri-Met suggests the following pullout design guidelines:

- 1) Along arterials with posted speeds over 50 km/h, provide a 3.6 m wide pullout lane to reduce the potential for accidents. Adjacent to bike lanes, the pullout lane width may be reduced to 3 m unless buses will be stopped for extended periods of time (e.g., layovers).
- 2) Bus pullouts may be required by the County Engineer on arterial or collector streets if traffic conflicts create congestion levels impacting air quality, levels of service or other safety considerations. Buses are required to use pullouts where they exist.
- 3) At far-side pullouts, provide a minimum 5:1 exit taper. An entrance taper may be necessary if the intersection can not accommodate a 18 m long deceleration movement into the pullout.

- 4) At far-side pullouts with curb extensions and at mid-block pullouts, allow for a 10:1 entrance and a 5:1 exit taper if traffic speeds range from 50 to 65 km/h. Where roadway design speeds are less than 50 km/h or exceed 65 km/h, design entrance and exit tapers according to the following formula:

$$L = \frac{(0.6) \times W \times S}{3}$$

Where:

L = Length of Taper, meters

W = Pullout Width, meters

S = Roadway Design Speed, km/h

- 5) Allow a 18 m stopping length for a standard bus and 24 m feet for an articulated bus. Coordinate with Tri-Met on what type of vehicle serves a particular site.

Curb Extensions - Curb extensions create a bulb at an intersection, usually the width of the parking lane. Curb extensions are typically considered appropriate along streets with lower traffic speeds (i.e., boulevards) and/or reduced traffic congestion where it is acceptable to stop buses in the travel lane. Collector streets in neighborhoods and designated pedestrian districts are also good candidates for such treatment. Curb extensions should be designed to facilitate an adequate turning radius for right turn vehicles, as well as an adequate width for the adjacent travel lane. Bus stops in the vicinity should be located at the near side of an intersection. Figure 7.2 identifies a typical curb extension treatment.

7.2.2 Off-Street Facilities

Lighting - All bus stops should have adequate lighting to increase transit customer safety. Lighting levels must be sufficient to provide customers with a sense of security while they wait for buses as well as provide adequate visibility for bus operators to safely approach and depart from a bus stop. Between 10 and 15 lux of illumination should be provided at each bus stop.

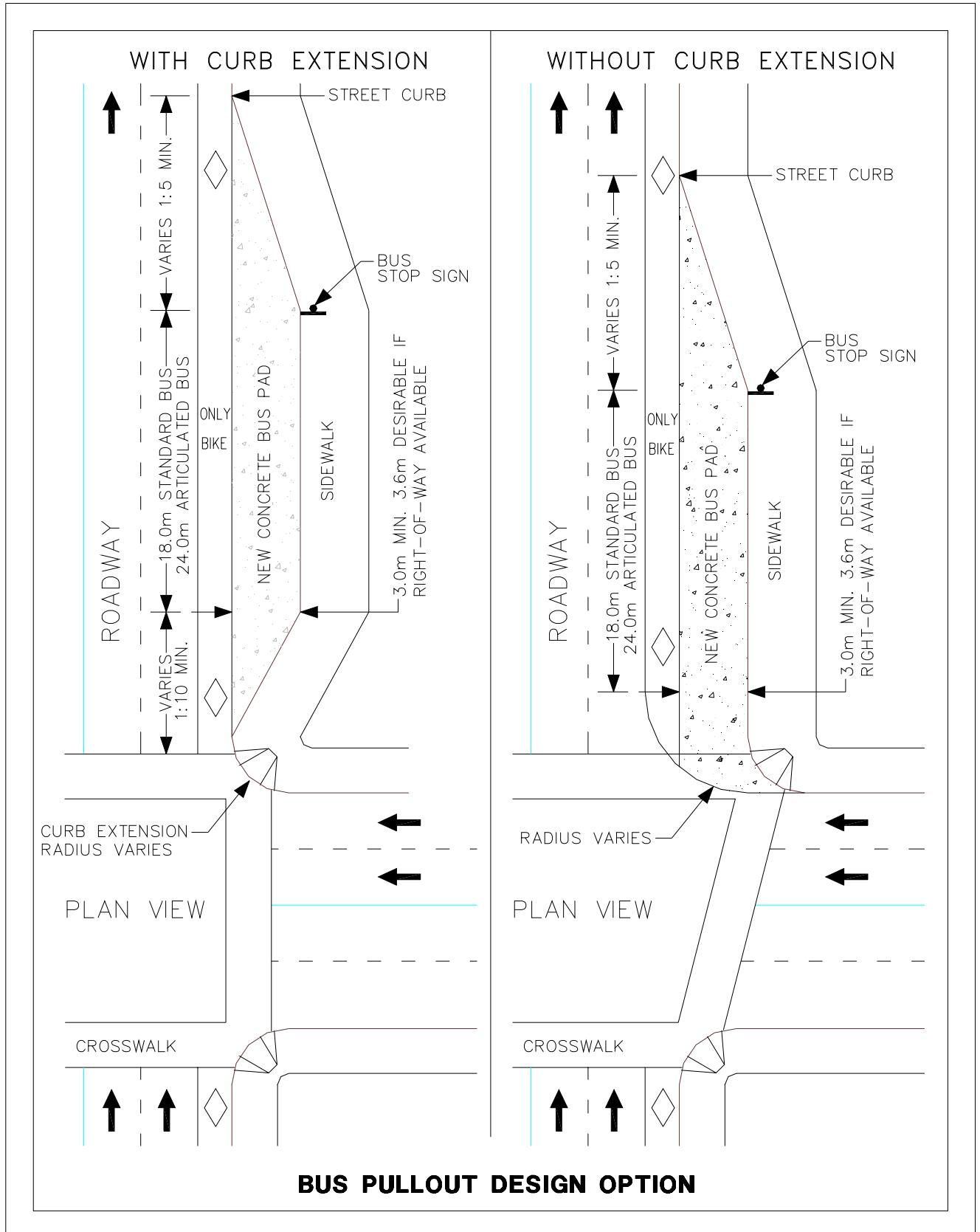
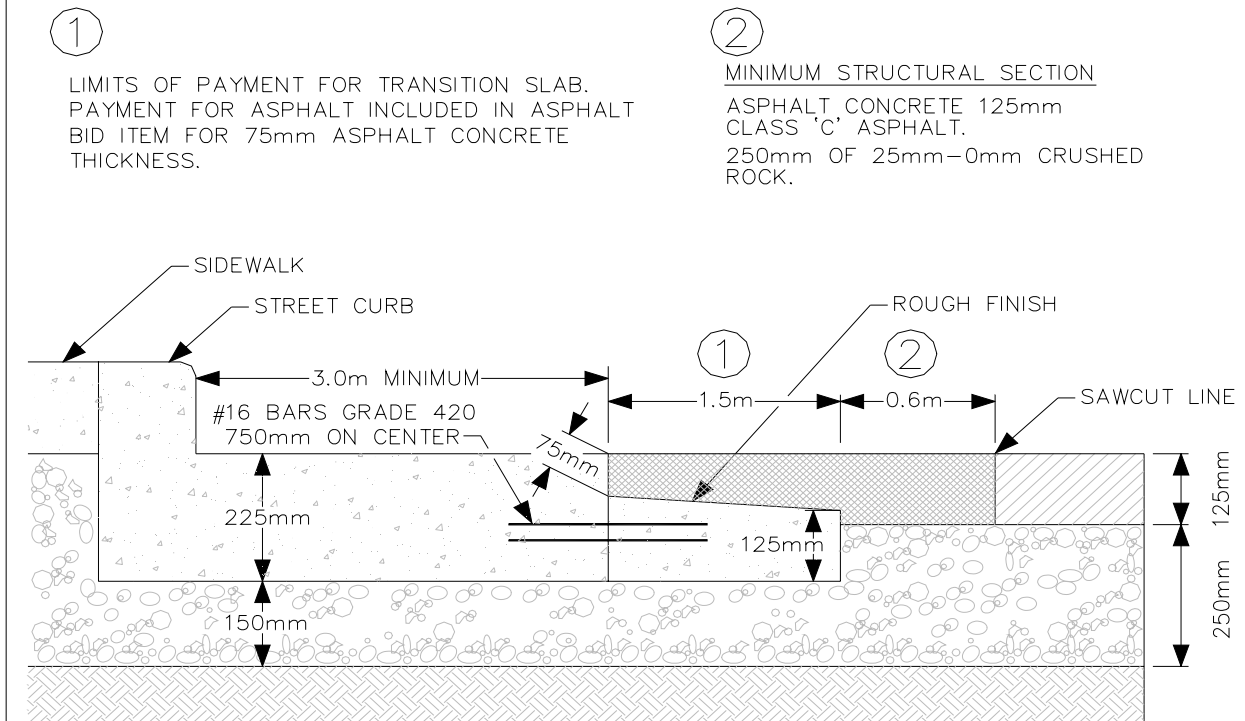
Figure 7.1 Bus Pullout Design Option

Figure 7.2 Bus Pad Concrete Pavement SectionCross Section**Note:**

CONTRACTOR SHALL MATCH EXISTING STREET SECTION IF GREATER THAN THE MINIMUM SECTION SHOWN ABOVE.

Legend

EXISTING ASPHALT CONCRETE



NEW ASPHALT CONCRETE



PORTLAND CEMENT CONCRETE



25mm-0mm CRUSHED ROCK



COMPACTED SUBGRADE

**BUS PAD CONCRETE PAVEMENT SECTION**

Bus Stop Shelters - The following criteria should be used to determine if a shelter is warranted at an existing or new bus stop:

- 1) Number of passenger boardings per day - A stop warrants a shelter if it has at least 20 passenger boardings per day. To evaluate potential ridership of a new development, contact Tri-Met's Transit Development Department.
- 2) Type of population served - Locations that serve higher concentrations of elderly customers or people with disabilities are given priority for shelter placement. This frequently includes stops at medical facilities and public service agencies.
- 3) Preparation required - Level sites that provide adequate placement area with minimal impact to surrounding properties are preferred.
- 4) Availability of nearby shelter - To achieve the best level of service for each customer, shelters are distributed to obtain maximum coverage and access.
- 5) Weather Conditions – Winds, rain and sun impacts should be considered and shelters installed on a trial basis if potential ridership exists.

The design of bus stop shelters must meet ADA standards which, in part, state that the inside of a shelter must provide a minimum clear floor area of 0.75 m by 1.2 m. Also, the interior of the structure should not be constructed to be any part of the separate 2.4 m by 3 m passenger landing area.

Benches - Providing bus benches without shelters at a particular bus stop should be considered under the following conditions:

- 1) The number of regular riders is just short of the normal ridership threshold to warrant a shelter.
- 2) The existence of adjacent site features that attract riders onto adjacent property (i.e., retaining walls, stairs, low fences).
- 3) In high-use areas unsuitable for shelters due to high pedestrian movement over a small area.
- 4) In high ridership locations with local weather protection but without seating.
- 5) At transfer locations with buses on long headways.
- 6) At locations used by elderly and disabled persons.

Bus benches should be located upstream of where the bus will stop and outside the 2.4 m by 3 m ADA landing pad.

7.3 TRANSIT PROVISIONS FOR PROPOSED DEVELOPMENTS

All proposed developments with frontage on an existing, or planned future, transit street shall adhere to the provisions set forth in this chapter. All affected developments should be reviewed by Tri-Met which may recommend transit-related facilities to be constructed at the time of development. Any transit facilities recommended by Tri-Met and required by Multnomah County shall be identified on the site plan to be submitted with the application.

The extent of the required transit facilities depends on the street classification, length of block, proximity of major pedestrian destinations, level of existing transit service in site vicinity, and projected transit needs of the proposed development. When transit facilities are required, the minimum requirement shall include a landing pad (see Chapter 7.2.2 of this section) and transit signage conforming to current Tri-Met standards. Additional requirements may include bus pullouts, curb extensions, median refuges for pedestrian crossings, bus shelters, public telephones, benches, or pedestrian lights. The following guidelines shall be considered in determining whether a proposed development is required to provide transit facilities:

- 1) If the proposed development is located within 150 m of an existing transit stop, a new transit stop shall only be provided if recommended by Tri-Met and required by Multnomah County.
- 2) Proposed developments which are estimated to generate over 1,000 average daily vehicle trips may be required to provide a transit improvement dedication along the frontage of the transit street for the installation of a bus pullout and/or other facilities.

SECTION 8 - LANDSCAPE TREATMENTS

8.0 LANDSCAPE TREATMENTS

Landscape treatments in the right-of-way shall be based on the classification of the street and the base land use zone in which the street is located. Landscaping should exist within the framework of the Metro design guidelines which:

- 1) Provide a safe environment
- 2) Support regional multi-modal travel
- 3) Support economic vitality
- 4) Create pedestrian and bicycle accessibility
- 5) Support social contact
- 6) Provide orientation and identity to the region
- 7) Provide for physical comfort and spatial orientation

The following sections are intended as a guideline of practices which should be followed in order to achieve regional goals.

8.1 MEDIAN LANDSCAPING

All medians with a minimum width of 1.2 m - 1.8 m should be considered for landscaping. All landscape treatments should consider a combination of trees, shrubs and groundcovers. Planting themes should be designated for transportation corridors linking individual districts with a unifying plant characteristic, i.e., bloom color, habit, or fall color. When specifying thematic planting material, monocultures should be avoided, particularly those species susceptible to disease and weather conditions. Medians used for pedestrian refuge should be designed for short-term use only with plant material for cooling and dust control and pedestrian-scale lighting. The design of these spaces should facilitate safe pedestrian crossing with lighting and accent paving to delineate a safe crossing zone visually clear to motorists and pedestrians alike.

Street Trees - Medians wider than 1.8 m should have street tree plantings. Trees should be planted according to the minimum on center distances appropriate to the tree and the size of tree should correlate with the width of the median (refer to Figure 8.1.1 Plant Material matrix). The habit, scale and placement of street trees should relate to the character of an area or district and categorized as either high density urban (Figure 8.1.2) or low density suburban (Figure 8.1.3). These terms should be used to loosely define an area, requiring final interpretation by the County Engineer. Street tree placement should also respond to the more repetitious and ordered urban environment with formal plantings of regularly-spaced trees depending on densities and the type of vehicle traffic. For medians narrower than 3.6 m wide, trees may be arranged in a triangular pattern to create the illusion of a wider median and to spread the tree canopies increasing cooling and dust control. Plantings in medians wider than 3.6 m may have a double row of street trees arranged in a linear pattern to create a strong, formal visual effect as well as to maximize tree canopy for cooling and dust control.

Lower density suburban areas (low use mix and low end of allowed density range) should have round-headed to broad tree canopies to provide shade and dust control while responding to lower densities and shorter structures of the built environment and remnants of countryside often remaining within this development type. Street tree placement should also respond to the lower density suburban environment with naturally occurring patterns of irregularly-spaced trees arranged in a roughly triangular pattern for maximization of tree canopy cooling and dust control.

Shrubs and Groundcovers - All medians used for pedestrian refuge shall have low plant masses within 1.5 m of pedestrian crossings to enhance visibility for safety and criminal deterrence (Figure 8.1.4). Medians used only as buffers should have medium (1.1 m – 1.7 m) plant masses to block lights of oncoming traffic, decrease dust and heat, and enhance the aesthetics of the roadway. Plantings may comprise of evergreen year-round or provide seasonal interest with fall color, blooms or fruits, and at maturity maintain growth within planting area (refer to Figure 8.1.1 Plant Material matrix). Plant placement shall also adhere to clear sight line requirements as well as any other relevant County safety measures.

Table 8.1.1a

**Recommendation List
STREET TREES**

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
Green Ash	Fraxinus Pennsylvanica Lanceolata			Early Cultivator, bottom of slope near water	Glossy green leaves, yellow fall color
Marshall Ash	Fraxinus Pennsylvanica Marshall	15 m	13.5 m	Adaptable, irregular and asymmetrical in shape, seedless	Dark glossy green leaves
Summit Ash	Fraxinus Pennsylvanica Summit	13.5 m	7.5 m	Uniform branching to narrow oval, open, light , dry foliage, seedless	Fast growing
Patmore Ash	Fraxinus Pennsylvanica Palmore	15 m	12 m	Symmetrical upright branches forming an oval head, extremely hardy, seedless	Dark green glossy leaves
Emerald Ash	Fraxinus Pennsylvanica Emerald	13.5 m	12 m	Roundheaded, heavily furrowed bark and hardy in hot, dry weather	Medium green leaves, yellow fall color
Dr. Pirone Ash	Fraxinus Agustifolia Doctor Pirone	10.5 m		Excellent, strong up- sweeping branches, good crotches. Can be used in 1.2 m beds or over tree lawn	Beautiful bright glossy green leaves
Autumn Applause Ash	Fraxinus Americana Autumn Applause	13.5 m	7.5 m	Small, dense, oval form	Purple fall color
Rosehill Ash	Fraxinus Americana Rosehill	15 m	10.5 m	Fast growing, upright form with open branching, seedless	Purple fall color
Flowering Ash	Fraxinus	7.5 m to 9 m	7.5 m	Exceptional, fragrant flowers, roundheaded	Dark green leaves
Golden Desert Ash	Fraxinus Oxycarpa Aureafolia	7.5 m	5.5 m to 6 m	Handsome, distinctively different and of great ornamental value. Excellent where site factors limit the use of large growing trees.	Rich golden bark, green leaves turning gold in July
Rancho Roundhead Ash	Fraxinus Excelsior Rancho	7.5 m to 9 m	6 m to 7.5 m	Suitable for low overhead wire conditions and can be used in parking strips (narrow as 1.2 m), adaptable to most soil conditions.	
Amur Chokecherry	Prunus Maacki	7.5 m to 9 m		Good foliage, the white flowers are typical of chokecherry that hang in	White flowers, golden flaky

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
				graceful raceme, extremely hardy	bark
Kwanzan Flowering Cherry	Prunus Serrulata Kwanzan	10.5 m to 12 m	9 m	Grafted on a 6 1/2 mazzard, understock provides immediate clearance on streets greatly reducing maintenance	Rosy/pink flowers, leaves are red when young
Alberti Cherry	Prunus Padus Alberti	6 m	9 m	Upright, oval and very floriferous. Has spikes of flowers 50 mm to 100 mm in length and hearty in this region	White flowers
Rancho Columnar Sargent Cherry	Prunus Sargenti Rancho	7.5 m to 9 m	3.6 m	Strong and handsome, can be used in a 0.9 m tree lawn, incredibly it survives storm damage. Ascending branches with strong crotches	Rose/pink flowers, spectacular red fall color
Redbark Cherry	Prunus Serrula	9 m		The bark is magnificent, bright and shinny	Red
September Goldenrain	Koelreuteria Paniculata September Goldenrain	10.5 m	6 m to 7.5 m	Intense flower blooms in late August, early September, the panicle is large and densely branched and is roundheaded	Sulphur yellow flower
Lavalle Hawthorn	Crataegus Lavelle	9 m	7.5 m	Prized ornamental street tree, oval headed and best used for low overhead wire situations	Rich shining green leaves, white flowers coral color berries
Globe-Headed European Hornbeam	Carpinus Betulus Pyramidalis	7.5 m to 9 m	5.4 m	Tight, compact and roundheaded.	
Japanese Tree Lilac	Syringa Amurensis Japonica	7.5 m	3.6 m to 4.5 m	Ideal for narrow parkways, a slow grower with tough, hardy and beautiful large flowers that bloom in June, roundheaded	White flowers
Bicentennial Linden	Tilia Cordata Bicentennial	10.5 m	5.4 m to 6 m	A tight pyramidal form, small leaves	Rich color
Rancho Littleleaf Linden	Tilia Cordata Rancho	9 m	4.8 m	Early branching habits and different from other Littleleaf Lindens, branch pattern is flat, fan-like and departs from the trunk in whorls that gracefully curl upward to build a nice,	Dark green leaves

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
				compact crown of small and finely serrated leaves	
Redmond Linden	Tilia Americana Redmond	10.5 m	7.5 m	Rapidly growing, densely pyramidal and symmetrical with large leaves	
Greenspire Linden	Tilia Cordata Greenspire	12 m	10.5 m	Pyramidal and symmetrical with uniform branching	
Amur Maple	Acer Ginnala	6 m		A fine, sturdy roundheaded tree, flower spikes give the tree an exotic look and bloom to 150 mm in August, a small slow growing tree	White flowers
Almira Norway Maple	Acer Platanoides Almira	4.8 m in 30 years	3.6 m to 4.5 m	Excellent for use under low wire situations, an informal dwarf globe selection	
Armstrong II Red Maple	Acer Rubrum Armstrong II	9 m max height	2.4 m	An improved variety and superior to other Armstrong Red Maples, it has a tighter form, narrower crotches and tight ascending branches, the strong branches and narrow silhouette make it resistant to ice and storm damage and requires practically no maintenance, a good selection for vary narrow streets with a 0.9 m parkway and 1.5 m to 2.1 m setback from the sidewalk, ideal for business streets with shallow setbacks and business signs, the root system is greatly restricted to eliminate future sidewalk and curb problems	
Cavalier Norway Maple	Acer Platanoides Cavalier	12 m	13.5 m	Compact, roundheaded, a fine selection of the Norway Maple it should be spaced at a minimum of 12 m	Yellow fall color
Cleveland II Norway Maple	Acer Platanoides Cleveland II	9 m to 10.5 m	6 m	An improved maple with superior branching habits, the branches are closely spaced along the trunk giving the effect of a	

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
				dense, compact head with oval form	
Crimson Sentry Maple	Acer Platanoides Crimson Sentry	7.5 m	4.5 m	Compact, dense and pyramidal to oval shape	Deep purple leaves changing to maroon in fall
Crimson Kind Maple	Acer Platanoides Crimson King	12 m	10.5 m	Oval when young becoming roundheaded in maturity	Deep purple leaves
Deborah Maple	Acer Platanoides Deborah	13.5 m	12 m	Broad oval shape	Reddish purple leaves in spring, bronze green in summer and bronze in the fall
Emerald Queen Maple	Acer Platanoides Emerald Queen	15 m	12 m	Dense oval with upright spreading branches	Deep green summer leave color, bright yellow in the fall
Olmsted Norway Maple	Acer Platanoides Olmsted			Extremely narrow, columnar shape. Excellent for heavy traffic street	Deep green leaves
Royal Red Maple	Acer Platanoides Royal Red				
Schlesinger Red Maple	Acer Rubrum Schlesinger				
Schedleri Maple	Acer Platanoides Schedleri				
Superform Maple	Acer Platanoides Superform	13.5 m	12 m	Broad oval to rounded shape, well behaved, uniformed branching and symmetrical	
Columnar Norway Maple	Acer Platanoides Columnare	10.5 m	4.5 m	Compact narrow form of the Norway maple and is ideal for streets with narrow parkways and close building situations	
English Hedge Maple	Acer Campestre	7.5 m	5.4 m to 6 m	Sturdy and compact-headed, the branches come off the trunk and proceed about 200 mm to 250 mm and then sharply curve upward, it is an ideal shade tree	

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
Faassen Black Norway Maple	Acer Platanoides Faassen's		10.5 m	Roundheaded	Deep Red
Autumn Flame Maple	Acer Rubrum Autum Flame	10.5 m	10.5 m	Dense, rounded, small front and hardy, a slow grower with small leaves, best in small leaves, best in small yards or cul-de-sacs	
Bowhall Red Maple	Acer Rubrum Bowhall	12 m	4.5 m	Upright, very narrow column, tightly formed	Good fall color
October Glory Red Maple	Acer Rubrum October Glory	12 m	10.5 m	Broad oval to rounded, midwinter and hot summer prep is the best application	Glossy medium green leavers turning to deep red and purple in fall
Scarlet Sentinel Red Maple	Acer Rubrum Scarlet Sentinel	12 m	6 m	Upright and narrow branching pattern giving bold appearance	
Gerling Red Maple	Acer Rubrum Schlesinger	10.5 m	6 m to 6.6 m	Broad-leaf pyramidal	
Globe-head Norway Maple	Acer Platanoides Globosum	4.5 m	5.4 m	Grafted on a 2.1 m standard, this is ideal under low overhead wires in a 4.5 m parkway to provide vehicular and pedestrian branch clearance, a very formal looking tree, appropriate for small cul-de-sac front yards	
Pyramidal Sycamore Maple	Acer Psuedoplatanus Pyramidalis	9 m to 10.5 m	5.4 m	Rich leaves, strong up-sweeping branches and good crotches	
Red Sunset Red Maple	Acer Rubrum Red Sunset	13.5 m	10.5 m to 12 m	Up right and oval	Bright orange-red fall coloring holding for several weeks
Scanlon Red Maple	Acer Rubrum Scanlon	10.5 m	7.5 m	Extensively used on narrow setbacks, since the branches are compact, it is conical shaped	Dark green leaves that turns to brilliant orange, amber and red in fall
Tilford Red Maple	Acer Rubrum Tilford	10.5 m	7.5 m	Roundheaded, excellent fine textured branches and small foliage	
	Acer Pseudoplatanus				Deep rich

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
Spaethii Maple	Altopurpureum	12m	9 m	Roundheaded	green leaves with burgundy colored under parts of the leaf
Columnar Sugar Maple	Acer Secharum				
Green Mt. Sugar Maple	Acer Saccharum	13.5 m	10.5 m	Broadly, oval, very hardy	Dark green leaves turns orange in fall
Legacy Sugar Maple	Acer Accharum	15 m	10.5 m	Oval, very symmetrical and tough leaves resistant to wind tatter	Glossy, dark green leaves, turn orange/red in fall
Parkway Maple	Acer Platanoides Parkway	12 m	7.5 m	Oval with good central leader. Faster growing than other Norway Maples	
Queen Elizabeth Maple	Acer Campestre Queen Elizabeth			Small, upright, oval and varying habit, small leaves with wavy margins, good selection for front yard on cul-de-sacs	Dark glossy green
Green Column Maple	Acer Nigrum Green Column	15 m	6 m	Upright, narrow oval with good resistance to heat and dry conditions, leaf shape is unique	Excellent fall color
Commorating Sugar Maple	Acer Succharum				
Columbia Queen Mt. Ash	Sorbus Aucuparia Columbia Queen	10.5 m	4.5 m to 5.4 m	Vigorous grower with a cone shaped head	Dark green leaves with red heavy fruit clusters
Hybrid Mt. Ash	Pyramidal Oakleaf Mt. Ash, Sorbus Hybrida Pyramidalis	10.5 m	2.4 m to 3 m	A tight compact branching structure	
Northern Red Oak	Quercus Borealis	30 m	25.5 m to 27 m'	Roundheaded and large broad leaf	Red fall color
Chanticleer Flowering Pear	Pyrus Calleryanda Chanticleer, Arisotcrat Pear	10.5 m	4.8 m to 5.4 m		Glossy green leaves in summer, white flowers, fall plum color
Rancho Pear	Pyrus Calleryana Rancho			The apex crown is blunt, compact and handsome. An important trait is it colors-up at least 10 days	

COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPREAD	TEMPERAMENT	COLORING
				earlier than the chanticleer	
Trinity Pear	Pyrus Calleryana Trinity	9 m	6 m	Roundheaded, profusion of delicate flowers blooming in early May, small sparse fruit	Green waxy leaves
Skyrocket Oak	Quercus Skyrocket	9 m	3 m	Extremely Columnar	Leaves persist through winter
Fruitless Mulberry	Morus Alba Kingpin	9 m	6 m	Roundheaded	Bright green leaves, fall lemon color
Zelkova Greenvase	Zelkova Serratta Greenvase	15 m	15 m	Developed as a replacement for the Elm, it's disease resistant, yet has structural characteristics similar to the Elm. It has small leaflets and requires a 15 m space in a neighborhood with homes of appropriate scale and proportion	

Updated: 2/4/99

Figure 8.1.2

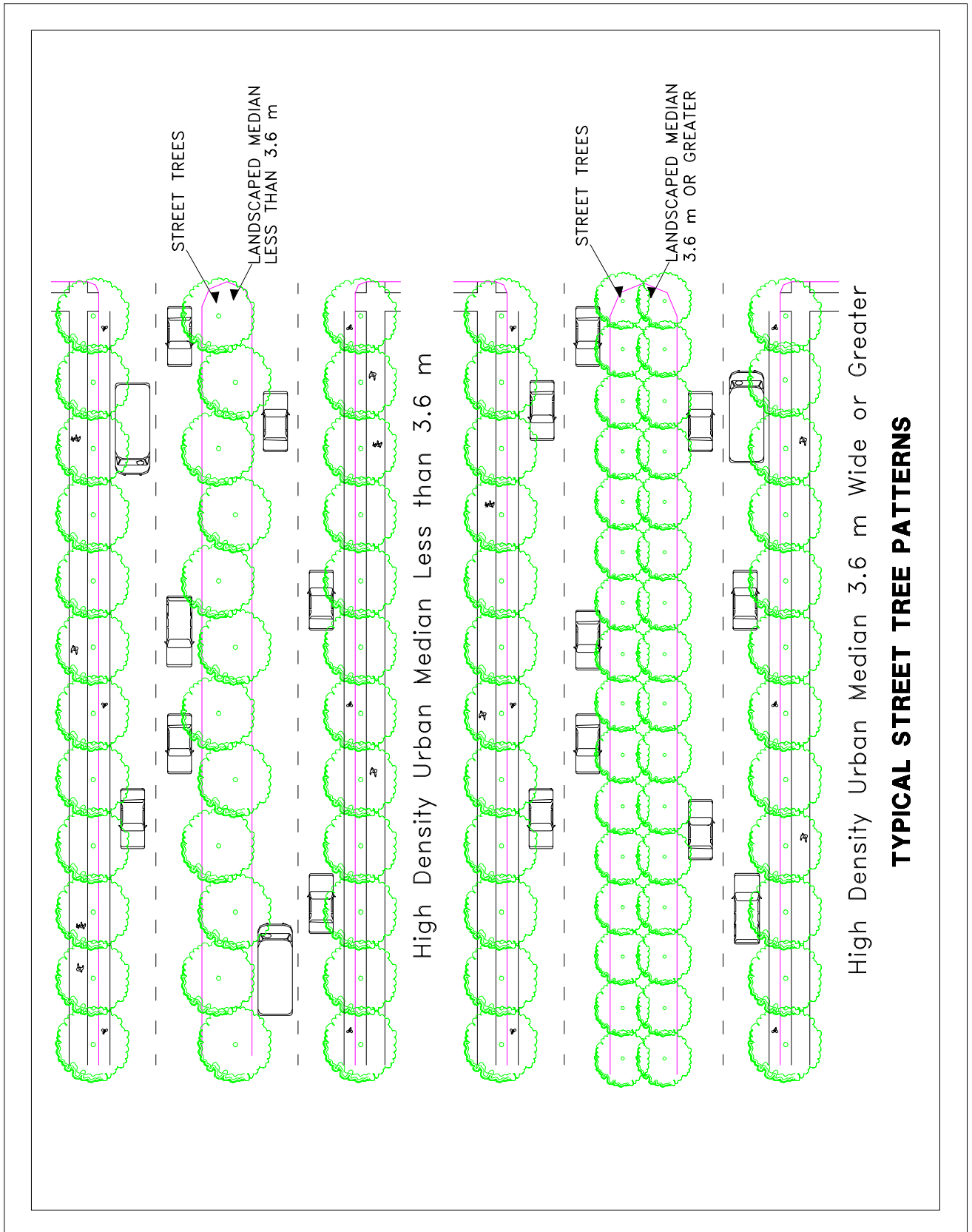


Figure 8.1.3

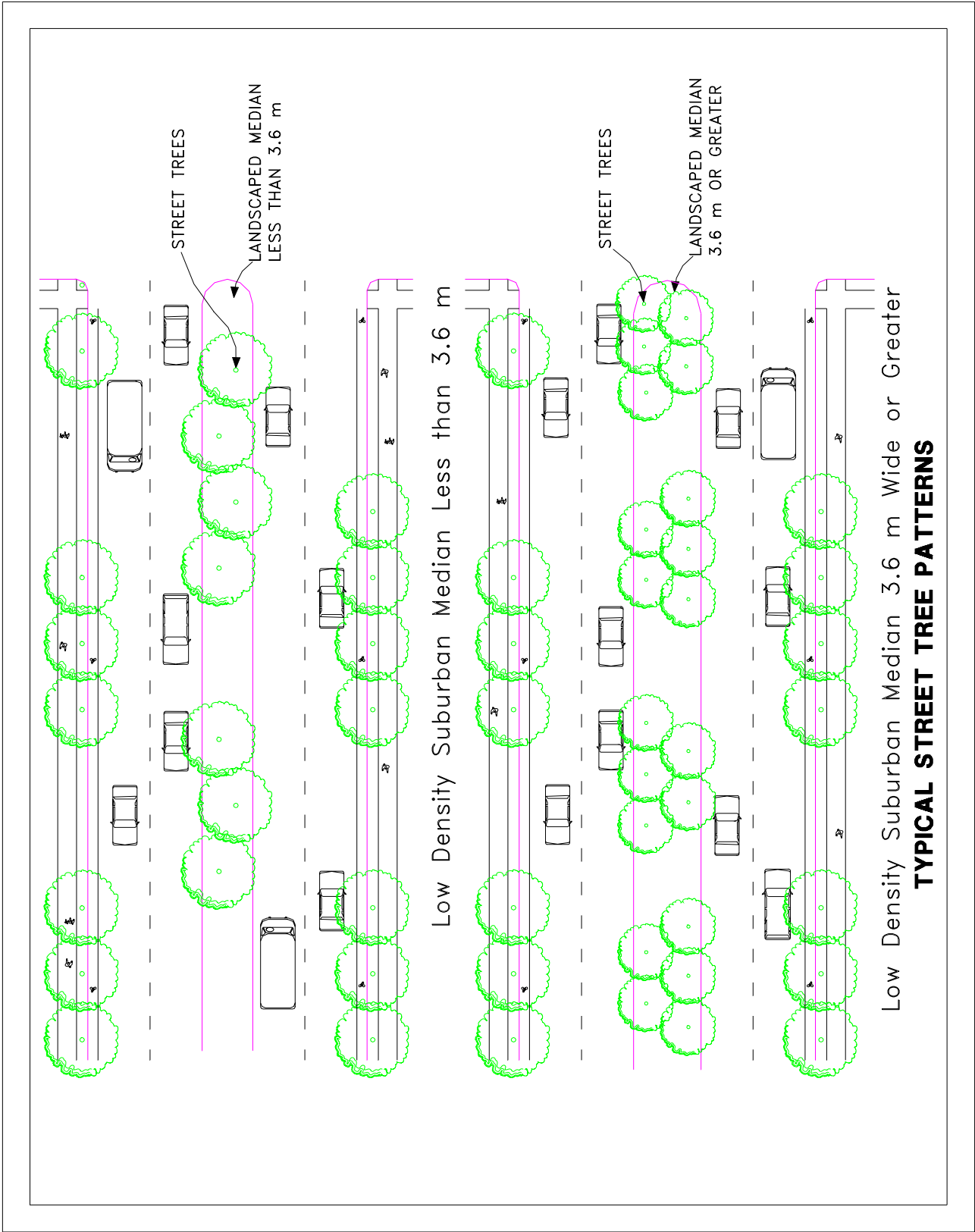
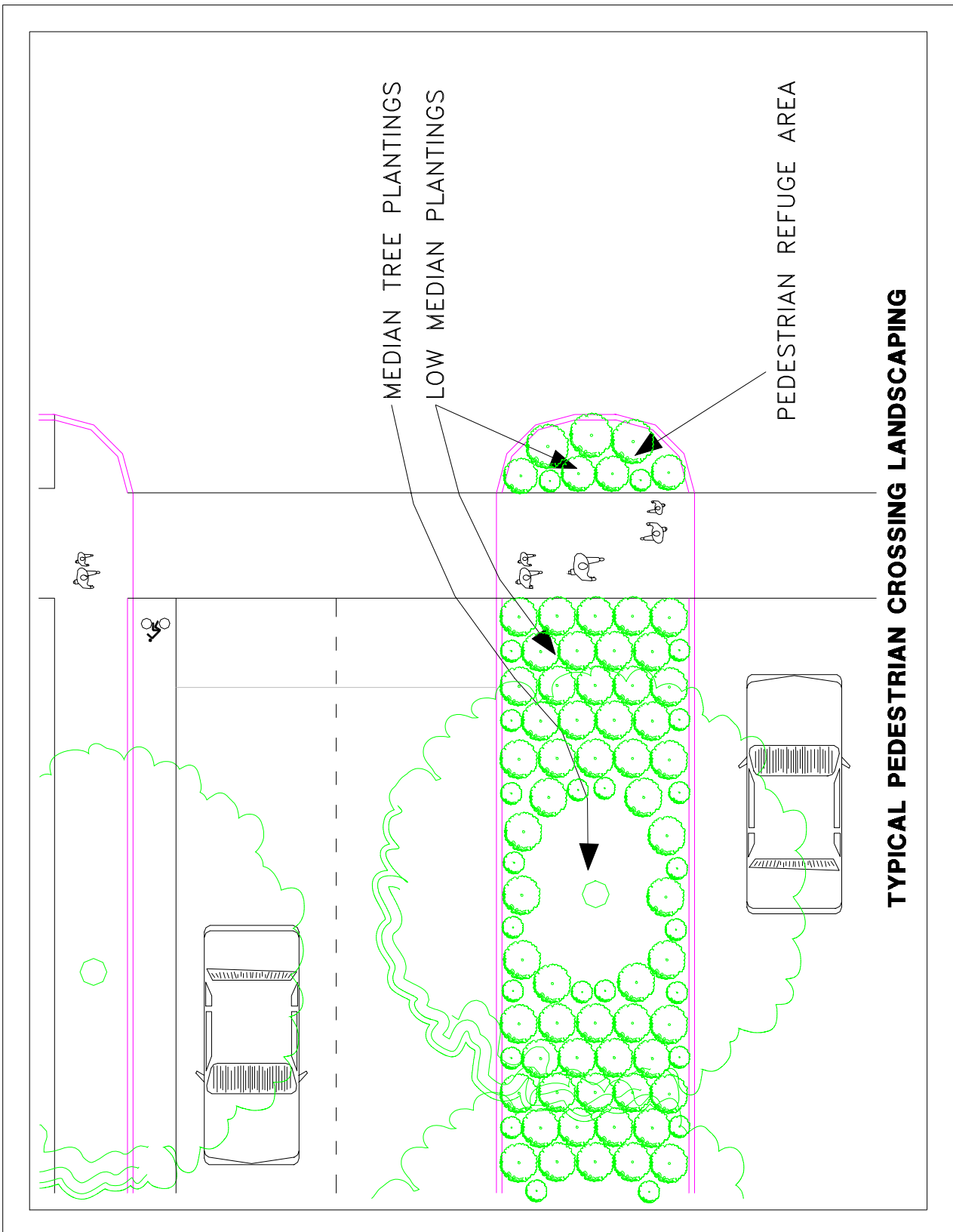


Figure 8.1.4



8.2 PEDESTRIAN SPACE LANDSCAPING

Pedestrian spaces include sidewalks and planting strips. Planting strips provide a physical and psychological buffer for pedestrians from traffic with plant material that reduces heat and dust creating a more comfortable pedestrian environment. Planting strips also provide areas for street furniture for pedestrian comfort and safety, i.e., benches, waste receptacles and pedestrian-scale lighting. These spaces should be designed for short as well as long-term use. Elements of pedestrian spaces shall not obstruct sight lines and shall adhere to any other required County safety measures.

Planting strips should have different arrangements and combinations of plant material when adjacent to on-street parking. Planting strips which do not have adjacent parking should have a combination of groundcovers, low shrubs and trees (Figure 8.2.1). Planting strips adjacent to on-street parking should have trees protected with tree grates. (Figure 8.2.2). District themes or corridor themes linking individual districts should be followed utilizing a unifying plant characteristic, i.e. bloom color, habit, or fall color. When specifying thematic plant material, monocultures should be avoided, particularly those species susceptible to disease.

Street Trees - All planting strips should have street trees. Planting strips which do not have adjacent parking should have a combination of groundcovers, low shrubs and trees. (Figure 8.2.1). Planting strips adjacent to on-street parking should have trees protected with tree grates. (Figure 8.2.2). Trees must be planted according to the minimum on center distances appropriate to the tree and the size of tree should correlate with the width of the street (refer to Figure 8.1.1 Plant Material matrix). The habit, scale and placement of street trees should correlate with the character of an area or district and categorized as either higher density urban or lower density suburban (refer to Figure 8.1.1 Plant Material matrix). Street tree placement should also respond to the more repetitious and ordered urban environment with formal plantings of regularly-spaced trees depending on densities and the type of vehicle traffic. Lower density suburban areas (low use mix and low end of allowed density range) should have round-headed to broad tree canopies to provide shade and dust control while responding to lower densities and shorter structures as well as remnants of countryside often remaining between this development type. Street tree placement should also respond to the lower density suburban environment with naturally occurring patterns of irregularly-spaced trees arranged in a roughly triangular pattern for maximization of tree canopy cooling and dust control (Figure 8.1.2).

Shrubs and Groundcovers - Planting strips without adjacent parking should have low planting masses to enhance visibility, discourage criminal activity, and provide a physical as well as psychological buffer from passing traffic (Figure 8.1.4). Plantings may comprise of evergreen year-round or provide seasonal interest with fall color or blooms, and at maturity maintain growth within planting area. All plant placement shall adhere to clear sight line requirements as well as any other relevant County safety measures.

Figure 8.2.1

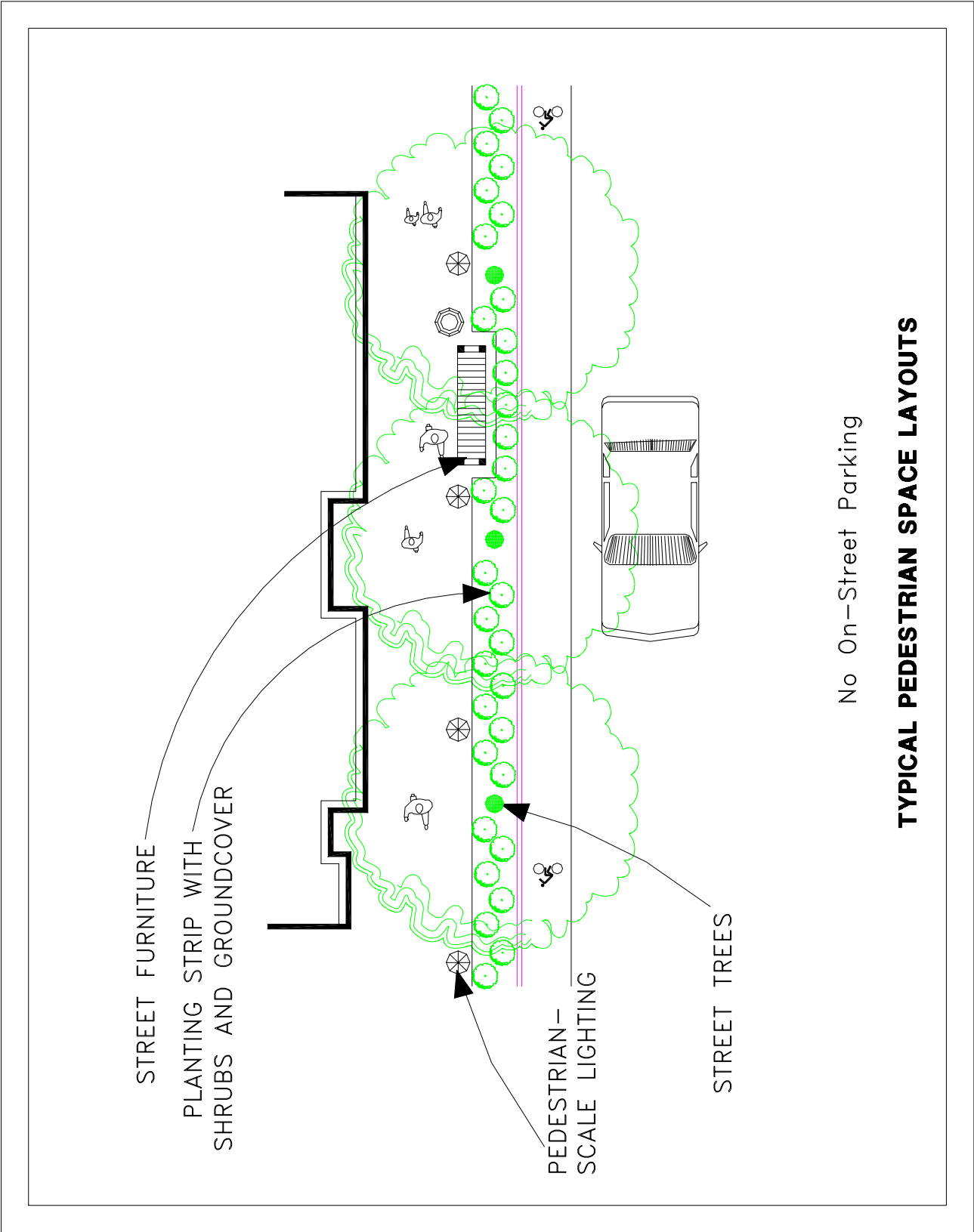
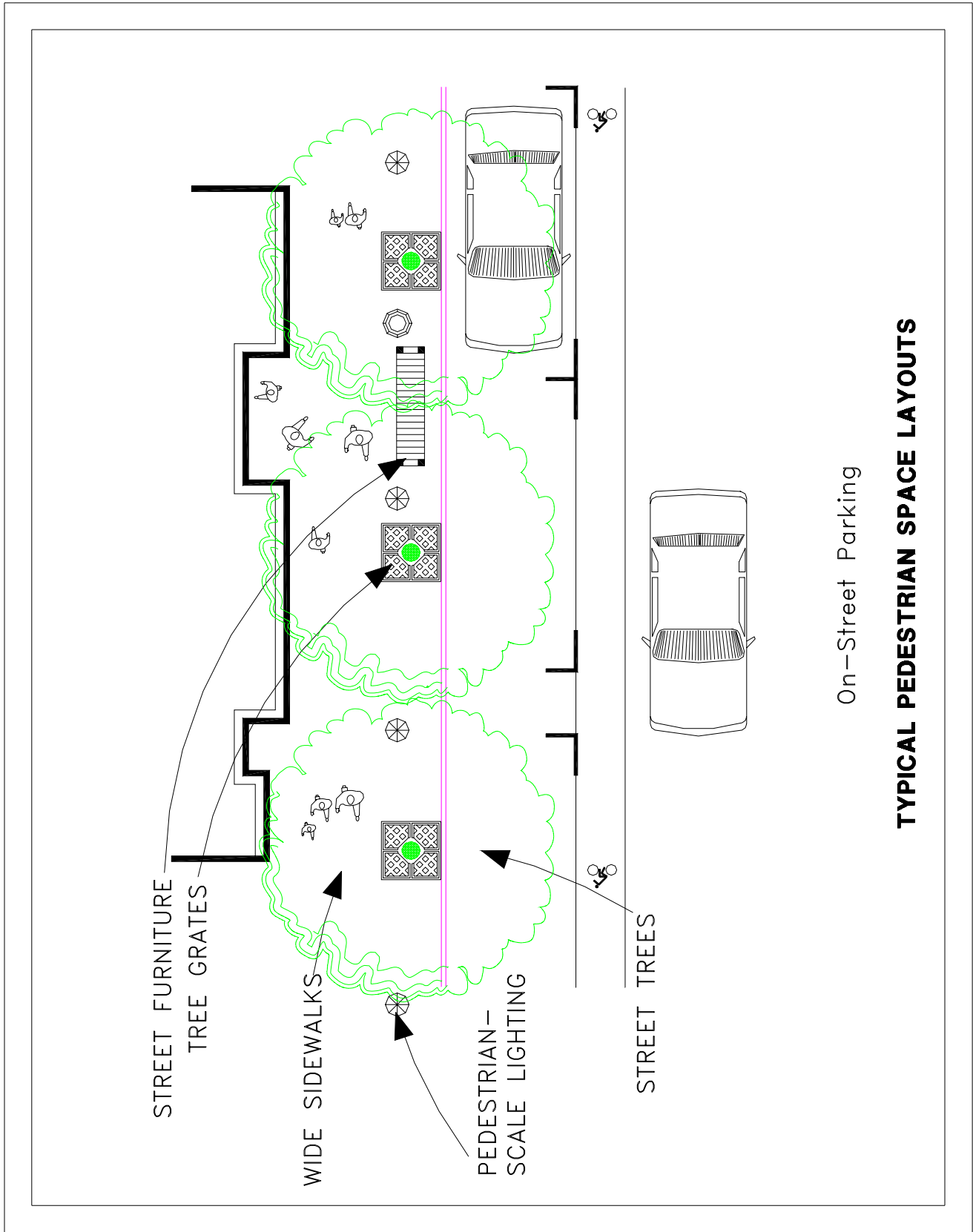


Figure 8.2.2



Lighting - Pedestrian-scale lighting should be installed along sidewalks and in medians used for pedestrian refuge. Pole lights as well as bollard lighting may be specified, however the amount and type of pedestrian activity during evening hours, i.e. transit stops, nighttime service districts, should ultimately determine the type of fixture chosen. Luminaire styles should match the area/district theme or existing luminaires and should not conflict with existing building or roadway lights causing glare. Lighting heights and styles should be chosen to prevent glare and to designate a clear and safe path and discourage vandalism (Figure 8.2.1). Lighting should be placed near the curb to provide maximum illumination for spaces furthest from building illumination. Spacing should correspond to that of the street trees to prevent tree foliage from blocking light.

Street Furniture - Street furniture such as benches and waste receptacles should be provided for spaces near sidewalks. Furniture should be sited in areas with the heaviest pedestrian activity, i.e. transit stops, shopping districts/centers. Benches should be arranged to facilitate conversation between individuals with L-shaped arrangements and should face the area focal point, i.e. shops, fountain, plaza, and divert attention away from nearby traffic. Other street furniture such as bus shelters should be sited and provided by the responsible transportation agency.

Paved Surface Details - Paving and curb cuts shall facilitate safe pedestrian crossing and meet all ADA requirements for accessibility. Accent paving may be used at key intersections to clearly define the pedestrian crosswalk and not impede wheelchair accessibility or conflict with surfacing for sight-impaired individuals. Accent paving should include scored or colored asphalt or concrete surfaces in contrast from the predominant paving type as well as any modular paving units.

County Transportation staff shall define which locations are considered key intersections according to traffic flow, amount and type of pedestrian activity, and width of crossing. Curb cuts shall be provided for accessibility at sidewalk corners per ADA guidelines.

8.3 SWALE

All swales shall be landscaped. Plant material shall filter storm water runoff and improve the aesthetics of the roadway. Plantings shall be easily maintained, non-toxic, non-invasive plants designed to cover all surfaces of the swale to prevent erosion (refer to Figure 8.1.1 Plant Material matrix). Street trees shall be prohibited within the depression of the swale. All plant placement shall adhere to clear sight line requirements as well as any other relevant County safety measures.

Installation - Earthwork of all swales shall meet the minimum slope and water retention requirements as defined by County engineering standards. Grading shall be prohibited during wet periods particularly during the months of November through February unless an exception is granted by the County Engineer. Soil erosion shall be controlled by County approved methods immediately following grading. Slopes shall be protected from erosion with a layer of filter fabric and seeded with *Carex* grass seed, or other equal substitute, for long-term storm water runoff filtration purposes. Grass seed substitutions may be considered by the County Engineer if the proposed material is non-invasive, low maintenance, and equal to *Carex* in terms of filtration capability. Density and method of seeding shall be in accordance with grower recommendations to achieve complete and uniform coverage.

8.4 MAINTENANCE

All landscapes shall be maintained for the duration of the planting to encourage health of plant material as well as public health and safety. A maintenance schedule detailing fertilizing, weeding and watering requirements shall be provided on all landscape plans as individual water requirements of plants and planting density affects frequency and duration of maintenance activities. All street trees and shrubs shall be pruned to maintain health and structure of the plant material for public safety purposes.

Irrigation - All plant material shall be maintained with an automatic irrigation system or hand-watered during long periods of hot weather as recommended. Two different types of irrigation systems may be installed subject to final approval by the County Engineer. Conventional pop-up spray heads are the most typical irrigation application in this area. They are most beneficial for delivering large amounts of water over large areas for a short duration. Drip irrigation systems are installed below grade and provide water to roots via an underground conduit which slowly emits water into the soil. These systems are particularly useful because of their low water-usage, deep-watering, which encourages deep rooting protecting curbs and paved surfaces, and low potential for over watering, which often causes erosion and slick paved surfaces. Because of this, drip irrigation is the preferred system for small and/or narrow planting areas. However, soils must be analyzed prior to installation because emitters are subject to clogging in some soils and may be difficult to reach for replacement and/or maintenance.

Pruning - All street trees shall be pruned according to the National Arborist Association (N.A.A.) standards. These standards describe methods of hazard pruning, crown reduction and two different intensities of general pruning practices. Maturing trees shall be routinely maintained to provide clearance underneath the canopy and to develop a central leader and strong limbs. Lowest limbs shall be removed to provide a minimum clearance of 2.4 m between sidewalk and lowest limb and a minimum clearance of 3 m between roadway surface and lowest limb. This shall eliminate limbs blocking pedestrian and vehicular traffic and views. Trees shall also be pruned if the crown conflicts with utility lines or other structures while preserving its overall shape and structural integrity. All shrubs shall be pruned if foliage or limbs extend into the path of pedestrian or vehicular traffic. Natural shrub habit shall be maintained, prohibiting "poodling" or "bonsai" pruning styles.

Fertilizing - All landscapes shall be fertilized to maintain health of plant material. At a minimum, landscapes shall be fertilized at installation. Organic fertilizers shall be required for all applications to prevent contaminant increase in storm water runoff. In planted areas which are intended to filter storm water runoff or areas adjacent to natural water bodies, fertilizers shall be "environmentally safe" as determined by the Environmental Protection Agency and amount shall be regulated to prevent nutrient increase in water bodies which may lead to algae blooms and habitat degradation.

Weeding - All landscapes shall be weeded to eliminate competition during establishment of plant material as well as for aesthetic purposes. At a minimum, landscapes shall be weeded until established and weeded two times per year thereafter.

SECTION 9 - SURVEY

9.1 MONUMENTATION - ROAD REPAIR AND MAINTENANCE

Any road repair project needs to take care to preserve survey monuments. This includes maintenance work as well as road repairs.

ORS 209.140 requires any person or public agency that finds it necessary to interfere with or pave over any established public land survey corner (includes section corners, quarter corner and Donation Land Claim corners) or accessories shall notify the county surveyor, who shall take steps to preserve the monument. The county surveyor may charge a fee for this work.

ORS 209.150 requires that any person or public agency removing, disturbing or destroying any survey monument of record in the office of the county surveyor or county clerk shall cause a registered professional land surveyor to reference and replace the monument within 90 days.

9.2 MONUMENTATION - ROAD CONSTRUCTION

Any road construction or reconstruction project is required to preserve monumentation and establish new monumentation in some cases. See ORS 209.155 for complete requirements and options.

Oregon Revised Statutes

209.140 Necessary interference with corners; prior notice to county surveyor required; exception for emergency; fees.

- 1) Any person or public agency that finds it necessary to interfere with or pave over any established public land survey corner or accessories for any reason, shall notify the county surveyor prior to the interference, who shall lower and witness the monument, or place another monument and witness over the existing monument or reference and replace or set a witness monument, as the case may demand, and record the proceedings in the record of permanent surveys. The county surveyor may charge a fee in an amount that will reimburse the county for the work performed.
- 2) When an emergency exists and the county surveyor is unavailable, the person or public agency causing the interference shall cause a registered professional land surveyor to preserve the monument as required in subsection (1) of this section. The registered professional land surveyor referencing the monument shall notify the county surveyor of the references within two business days after the references or interference, whichever occurs first. [Amended by 1979 c.653 s.9; 1985 c.582 s.8; 1989 c.394 s.11]

209.150 Removal or destruction of monument; notice to county surveyor; replacement of monument; exception.

- 1) Any person or public agency removing, disturbing or destroying any survey monument of record in the office of the county surveyor or county clerk shall cause a registered professional land surveyor to reference and replace the monument within 90 days of the removal, disturbance or destruction. The registered professional land surveyor referencing and replacing the monument shall do so in the same manner that is provided for public land survey corners according to ORS 209.140 and shall notify the county surveyor of that action within two business days. The costs of referencing and replacing the survey monument shall be paid by the person or public agency causing the removal, disturbance or destruction.
- 2) Notwithstanding subsection (1) of this section, a county surveyor may, upon written request and written notice to an affected property owner, provide written authorization to a registered professional land surveyor to remove a survey monument other than a public land survey corner as defined in ORS 209.005. A county surveyor may require that the position of the removed monument be referenced to another survey monument and noted on a survey map filed in accordance with ORS 209.250. [Amended by 1979 c.653 s.10; 1989 c. 394 s.12; 1991 c.339 s.2; 1997 c.336 s.3; 1997 c.489 s.10]

209.155 Removal or destruction of monument during road construction; survey map in lieu of replacement; delineation of newly defined right of way.

- 1) Notwithstanding ORS 209.150, when a recorded survey monument, other than a public land survey corner, is removed, destroyed or disturbed as a result of construction or reconstruction of a public road, the survey monument does not have to be replaced if:
 - a) The original location of the recorded survey monument is within the new right of way; and
 - b) The person or public agency responsible for the construction or reconstruction causes a registered professional land surveyor to locate any survey monuments that are subject to removal, destruction or disturbance and to file a map, prior to the beginning of construction, with the county surveyor that identifies all existing recorded monuments, the existing right of way and controlling centerline and the survey control used to comply with this section.
- 2) The newly defined right of way may be delineated by either of the following methods:
 - a) All control points that define the right of way centerline are monumented or referenced with monuments. The right of way boundary is monumented at all angle points, points of curve, points of tangency and at least every 1,000 feet on long curves and tangents. A survey that identifies the survey control and the new right of way and controlling centerline shall be filed with the county surveyor within 180 days after completion of construction.
 - b) A permanent survey control point network is established referencing the new right of way and controlling centerline. The network shall consist of at least three control monuments and must span the length of the project. Each control monument shall be intervisible with at least two other control monuments. At least two monuments on the network must be part of the original control used to locate the monuments

described in subsection (1)(b) of this section. A map identifying the control network and the new right of way and controlling centerline shall be filed with the county surveyor within 180 days after completion of construction.

- 3) The types of monuments shall be as described in ORS 92.060.
- 4) The survey maps required by this section shall comply with ORS 209.250 and any other requirement of law.
- 5) For the purpose of complying with subsection (1)(b) of this section, locating a survey monument may consist of establishing coordinates on the monument. These coordinates may be Oregon State Plane coordinates, Local Datum Plane coordinates or other coordinates compatible with those coordinates shown on the survey.
- 6) For the purpose of complying with this section, the date of completion of construction shall be considered to be the date when all substantial road improvements are completed. [1997 c.336 s.2]

MULTNOMAH COUNTY TRANSPORTATION DIVISION FIELD AND OFFICE/MAP PROCEDURES AS PART OF OUR ROAD CONSTRUCTION PROJECTS

Field Procedures

- 1) Establish a control traverse or network. Control points shall be permanent monuments, i.e. 5/8" X 15" rebar with red plastic caps marked "MULT. CO. CONTROL" set below grade, preferably in places that will be preserved during construction. Make sure that at least two control points are established at each end of the project and are a safe distance outside the scope of the project. These control points should be observable by GPS.
- 2) Traverses through control points shall be accomplished using an electronic data collector. Two sets of angles (set = BS, FS, RFS, RBS) shall be turned at each control point and distances will be measured both to FS and to BS, and recorded. ***NOTE: The data collector must be properly set up for this!*** Traverses will be run using the "leap frog method" (tripod to tripod).
- 3) Make a thorough search for all property corners of record (County Surveyor's Office or County Recorder's Office), benchmarks, Geodetic Control Points, Government corners, existing centerline and right of way monuments that may be disturbed by the construction project. ALSO, look in obvious places (i.e. occupation lines) for unrecorded survey monuments. ***Contact property owner/occupant before going on private property.***
- 4) All ties are to be made from precisely set control points.
- 5) Double the angles to each monument (one complete set) (or single angle and distance from two control points) and as a check, measure and record a second distance.
- 6) Record a complete description of each found monument. A complete description should include the following: type, size (I.D. for pipe, length if pulled), above/below ground, condition (bent, rusty, etc.), color and identification of cap. If monument is "bent", spin, pull, straighten, measure length, and reset before tying to it.

- 7) Make a written record of any conversations with property owners/occupants concerning the replacement of monuments that may be destroyed or anything else that you think might develop into a problem later.
- 8) If any benchmarks or geodetic control points are found, tie to them as outlined above and notify the office surveyor, who will notify the appropriate agency/surveyor that their survey mark might be disturbed.
- 9) Record sketches and field notes to help the office surveyor to reduce the data collected. Field notes shall contain the following: date, party chief and crew, instruments used, weather conditions, etc.
- 10) Upon completion of the construction project, all established and reestablished corner/control points shall be replaced by a set of angles and rechecked from other control points.

Office Procedures

- 1) Research survey office records for recorded property and right of way surveys (Road maps, field notes and Road Records Book), Plat Records, Benchmarks, Geodetic Control Monuments, and government corners along the entire length of the project.
- 2) Prior to the commencement of the field work (ties to property corners, etc.), notify the land owner/occupant by letter outlining our objectives.
- 3) Field notes shall be computed and a preliminary right of way map prepared. Along with the usual centerline and right of way data, all found monuments shall be shown by centerline stationing and right angle offset distance.
- 4) The preliminary right of way map complying with ORS 209.250 must be completed and filed in the County Surveyor's Office **prior** to the commencement of actual construction.
- 5) Upon completion of the construction project:
 - a) Notify "Underground Utilities" (246-6699) for a locate 10 days prior to the setting of any monumentation.
 - b) Monument the road centerline and right of way per ORS 209.150(2b).
 - c) Government corners shall be reestablished.
 - d) Reset destroyed/disturbed property corners that were on or outside of the final right of way.
 - e) Prepare a final right of way map identifying corners/control points, etc. that were:
 - (1) Destroyed and not replaced (only property corners that are **within** the new right of way and not requested to be reset by property owner).
 - (2) Destroyed and replaced.
 - (3) New set centerline, right of way, etc., control points.
 - (4) All other monumentation that was tied into.
 - (5) Centerline stationing shall show all monumentation and right angle offset distance using a table.
- 6) The final right of way map shall be completed within 180 days of completion of the construction project per ORS 209.150(2b). The 180 days start with the "Second Notice of Completion". The final right of way map must comply with the requirements of ORS 209.250.

PART II - CONSTRUCTION MANUAL

SECTION 1 - QUALITY ASSURANCE

1.1 EMBANKMENT & SUBGRADE

Overview

Soil curves are developed for the material used.
Nuclear density tests are taken at specified frequencies.
Area under nuclear test is excavated to verify or modify the curve used.
Test reports are generated.

Specifications

Section 00165 QA - Quality of Materials
Section 00330 QA - Earthwork

Both sections apply to Multnomah County projects. Quality control is the responsibility of the contractor with verification by ODOT or Multnomah County. QC testing is provided by the contractor at specified, or engineer requested frequencies according to the Special Provisions of the contract. The contractor shall provide certified technicians in all quality control and testing responsibilities. Acceptance based on test results.

Test Methods

Proctor Curve - ODOT TM 104
Speedy Moisture - AASHTO T 217
Family of Curves - AASHTO T 272
Nuclear Compaction - NAQTC TM 7
Curve Correction - AASHTO T 224

Small Quantity

2000 M3 or 2000 M2 with submittal and acceptance of contractor proposal outlining equipment and procedure to assure quality.

1.2 AGGREGATE BASE

Overview

Aggregate is submitted for qualification tests.
Process control testing is done during aggregate production.
Aggregate curves are developed using AASHTO T-99 specification.
Aggregate is placed in 6"- 8" lifts at the appropriate moisture content and compacted.
Nuclear compaction tests are taken at specified frequencies.
Aggregate is sampled on grade to verify quality.
Test reports are generated.

Specifications

Section 00165 QA - Quality of Materials

Contractor responsible for quality control & testing

Section 00640 - Aggregate Base and Shoulders

Aggregate to be 25 mm-0 or 19 mm-0 size.
Aggregate from qualified source.
Process control documentation is required.
Compact until no yielding or deflection is observed.
Acceptance is visual by the engineer.

Section 00641 QA - Aggregate Subbase, Base, and Shoulders

Quality control is the responsibility of the contractor with verification by ODOT or Multnomah County. QC testing is provided by the contractor at specified frequencies according to the Special Provisions. Contractor shall provide certified technicians in all quality control and testing responsibilities. Acceptance based on test results.

Test Methods

Sampling Aggregates - AASHTO T 2
Sieve Analysis - AASHTO T 27 [dry] & AASHTO T 11 [wet]
Sand Equivalent - AASHTO T 176
Aggregate Curve - AASHTO T 99
Nuclear Compaction - NAQTC TM 7

Small Quantity

2000 mg with quality compliance, process control documentation and accepted contractor proposal for quality assurance.

1.3 ASPHALT PAVEMENT

Overview

Aggregate to be used is from qualified source.
Mix design is submitted and approved.
Maximum specific gravity [rice] is developed for the mix.
Asphalt mix is sampled to verify tolerance to mix design.
Asphalt is placed in specified lifts and compacted.
Test reports are generated.

Specifications

Section 00165 QA - Quality of Materials

Contractor responsible for quality control & testing.

Section 00743 - Asphalt Concrete Pavement [commercial mix]

Aggregate from qualified source.
PBA-5 asphalt for all Multnomah County projects.
Job mix formula approved by engineer.
Mix accepted visually by engineer.
Rollers as directed by engineer.
Compaction by minimum 4 roller passes.
Pavement smoothness testing as specified.

Section 00744 - Asphalt Concrete Pavement

Qualified aggregate source.
Approved mix design.
PBA-5 asphalt for Multnomah County projects.
Visual acceptance.

Section 00745 QA - Hot Mixed Asphalt Concrete

Quality control is the responsibility of the contractor with verification testing by ODOT or Multnomah County. QC testing is provided by the contractor at specified frequencies according to the Special Provisions. Contractor shall provide certified technicians in all quality control and testing responsibilities. Acceptance based on test results.

Test Methods

Sampling Bituminous Mixtures - AASHTO T 40
Sampling Bituminous Paving Mixtures - AASHTO T 168
Maximum Specific Gravity [Rice] - AASHTO T 209
Moisture Content - OSHD TM 311 OR NAQTC TM 6
Asphalt Content by Ignition - AASHTO TP 53
Sieve Analysis of Extracted Aggregates - ASSHTO TM 30
Nuclear Compaction Tests - NAQTC TM 8

Small Quantity

2500 MG with approved mix design, prior acceptance within 2 years of the same product, and contractor proposal to assure quality.

1.4 CONCRETE

Overview

Aggregate used from qualified source.
Mix design developed using trial batches to achieve strength requirements.
Concrete is batched and placed according to specification.
Sample is taken for verification testing in air entrainment, slump, temperature & strength.

Specifications

Section 00165 QA - Quality of Materials
Section 00440 QA - Minor Structure Concrete
Section 00540 QA - Concrete Bridges

The above sections apply to Multnomah County projects. Quality control and assurance is the responsibility of the contractor with verification by ODOT or Multnomah County. QC testing is provided by the contractor at specified frequencies according to the Special Provisions of the contract. The contractor shall provide certified technicians in all quality control and testing responsibilities. Frequency and type of test vary according to section. Acceptance is based on test results.

Test Methods

Sampling Concrete - NAQTC TM 2
Temperature of Concrete - NAQTC TM 10
Slump of Concrete - AASHTO T 119
Air Content of Concrete - AASHTO T 152
Making & Curing Concrete Cylinders & Beams - AASHTO T 23

Small Quantity

Section 00440 - 50 M3 with approved mix design and prior acceptance of the same product within 2 years.
Section 00540 - No small quantity

1.5 PIPE BEDDING & BACKFILL

Overview

Trench is excavated according to plans.
Bedding is placed on firm bottom of trench.
Pipe is placed on bedding at elevations designated.
Trench is backfilled and compacted.
Test reports are generated.

Specifications

Section 00165.00 - Quality of Materials

Section 00405 QA - Ditch Excavation, Trench Excavation, Bedding & Backfill

Both sections apply to Multnomah County projects. Multnomah County specifies Granular Bedding & Backfill or controlled low strength material of 1.0 to 1.7 MPa. Quality control is the responsibility of the contractor with verification by ODOT or Multnomah County. QC testing is provided by the contractor at specified, or engineer requested frequencies according to the Special Provisions of the contract. The contractor shall provide certified technicians in all quality control and testing responsibilities. Acceptance based on test results. All pipe requires quality certification.

Test Methods

Granular Material - same as aggregate base

Controlled Low Strength Material - acceptance based on certification and trial batch cylinder reports.

Small Quantity

50 M3 with quality compliance, prior acceptance of the same products within 2 years, and contractor proposal to assure quality control.

Appendix A

Levels of Service - The concept of levels of service uses qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions.

The volume of traffic that can be served under the stop-and-go conditions of LOS F is generally accepted as being lower than that possible at LOS E; consequently, service flow rate E is the value that corresponds to the maximum flow rate, or capacity, on the facility. For most design or planning purposes, however, service flow rates D or C are usually used because they ensure a more acceptable quality of service to facility users.

Levels of service for uninterrupted and interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

Measures of Effectiveness - For each type of facility, levels of service are defined on the basis of one or more operational parameters that best describe the operating quality for the facility type. Although the concept of level of service attempts to address a wide range of operating conditions, limitations on data collection and availability make it impractical to treat the full range of operational parameters for every type of facility. The parameters selected to define levels of service for each facility type are called measures of effectiveness and represent available measures that best describe the quality of operation on the subject facility type. Table B1 presents the primary measures of effectiveness used to define levels of service for each facility type. Each level of service represents a range of conditions, as defined by a range in the parameter(s) presented in the table.

TABLE B1 Primary Measures of Effectiveness for LOS Definition

Type of Facility	Measure of Effectiveness
Freeways	
Basic freeway segments	Density (pc/mi/ln)
Weaving areas	Density (pc/mi/ln)
Ramp junctions	Flow rates (pcph)
Multilane highways	Density (pc/mi/ln)
	Free-flow speed (mph)
Two-lane highways	Time delay (percent)
Signalized intersections	Average control delay (sec/veh)
Unsignalized intersections	Average control delay (sec/veh)
Arterials	Average travel speed (mph)
Transit	Load factor (pers/seat, veh/hr, people/hr)
Pedestrians	Space (sq ft/ped)

Level of Service for Signalized Intersections - Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption,

and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidentals. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during ideal conditions: in the absence of traffic control, in the absence of geometric delay, in the absence of any incidents, and when there are no other vehicles on the road. This delay is called control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In contrast, in previous versions of the HCM (1994 and earlier), delay included only stopped delay.

TABLE B2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay Per Vehicle (Sec)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period. The criteria are given in Table B2. Delay may be measured in the field or estimated using procedures presented in the HCM. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

LOS A describes operations with very low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with Los A, causing higher levels of average delay.

LOS C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with

many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

Relating Capacity and Level of Service - Because delay is a complex measure, its relationship to capacity is also complex. The levels of service in Table B2 were established on the basis of the acceptability of various amounts of delay to drivers. Although local standards may vary, LOS C may be regarded as a desirable design objective. It is important to note that this concept is not related to capacity in a simple one-to-one fashion.

Previously the lower bound of LOS E was defined to be capacity; that is, the v/c ratio is by definition 1.0. However, it is possible, for example, to have delays in the range of LOS F (unacceptable) while the v/c ratio is below 1.0, perhaps as low as 0.75 to 0.85. Very long delays can occur at such v/c ratios when some combination of the following conditions exists: (a) the cycle length is long, (b) the lane group in question is disadvantaged by the signal timing (has a long red time), and (c) the signal progression for the subject movements is poor.

The reverse is also possible: a saturated lane group (i.e., v/c ratio greater than 1.0) may have short delays if (a) the cycle length is short or (b) the signal progression is favorable for the subject lane group, or both.

Thus, the designation LOS F does not automatically imply that the intersection, approach, or lane group is over capacity, nor does a level of service better than E automatically imply that unused capacity is available.

The procedures and methods in this chapter require the analysis of both capacity and LOS conditions to fully evaluate the operation of a signalized intersection. It is imperative that the analyst recognize the unique relationship of these two concepts as they apply to signalized intersections.

Level-of-Service Criteria for Unsignalized Intersections - The level of service for a TWSC intersection is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. LOS criteria are given in Table B3.

Average control delay less than 10 sec/veh is defined as LOS A. Follow-up times of less than 5 sec/veh have been measured when there is no conflicting traffic for a minor-street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions.

The proposed LOS criteria for TWSC intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection would be designed to carry higher traffic volumes than an unsignalized intersection. In addition, a number of driver behavior considerations combine to make delays at signalized intersections less onerous than delays at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at an unsignalized intersection versus that at signalized intersections. For these reasons, it is considered that the control delay threshold for any given level

of service would be less for an unsignalized intersection than it would be for a signalized intersection.

TABLE B3 Level-of-Service Criteria

Level of Service	Delay Range
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Arterial Level of Service - Arterial level of service is based on average through-vehicle travel speed for the segment, section, or entire arterial under consideration. This parameter is the basic measure of effectiveness arterial LOS. The average travel speed is computed from the running time on the arterial segment or segments and the control delay for through movements at all intersections. To ensure that the arterial is of sufficient length so that average travel speed is a reasonable measure of effectiveness, the arterial's length generally should be at least 1 mi in downtown areas and at least 2 mi in other areas.

Arterial level of service is defined in terms of average travel speed of all through vehicles on the arterial. It is strongly influenced by the number of signals per mile and the average intersection control delay. On a given facility, such factors as inappropriate signal timing, poor progression, and increasing traffic flow can substantially degrade arterial level of service. Arterials with medium to high signal densities (more than two signalized intersections per mile) are even more susceptible to these factors, and poor arterial level of service will probably be observed even before substantial intersection problems occur.

The following general statements may be made regarding arterial level of service:

1. LOS A describes primarily free-flow operations at average travel speeds, usually about 90 percent of the free-flow speed for the arterial classification. Vehicles are seldom impeded in their ability to maneuver in the traffic stream. Delay at signalized intersections is minimal.
2. LOS B represents reasonably unimpeded operations at average travel speeds, usually about 70 percent of the free-flow speed for the arterial classification. The ability to maneuver in the traffic stream is only slightly restricted and delays are not bothersome.
3. LOS C represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than in LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the average free-flow speed for the arterial classification.
4. LOS D borders on a range in which small increases in flow may cause substantial increases in approach delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these. Average travel speeds are about 40 percent of free-flow speed.
5. LOS E is characterized by significant delays and average travel speeds of one-third the free flow speed or less. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

6. LOS F characterizes arterial flow at extremely low speeds, from less than one-third to one-quarter of the free-flow speed. Intersection congestion is likely at critical signalized locations, with long delays and extensive queuing.

Table B4 contains the arterial LOS definitions, which are based on average travel speed over the arterial segment being considered (up to and including the entire facility). It should be noted that if demand volume exceeds capacity at any point on the facility, average travel speed may not be a good measure of the arterial level of service. Thus, intersection demand-to-capacity ratios greater than 1.0 will probably result in an unacceptable level of service on the arterial.

TABLE B4 Arterial Levels of Service				
	Arterial Classification			
	I	II	III	IV
Range of free-flow speeds	45 to 55	35 to 45	30 to 35	25 to 35
Typical free-flow speeds	50	40	33	30
Level of Service	Average Travel Speed			
A	≥42	≥35	≥30	≥25
B	≥34	≥28	≥24	≥19
C	≥27	≥22	≥18	≥13
D	≥21	≥17	≥14	≥9
E	≥16	≥13	≥10	≥7
F	<16	<13	<10	<7

Note: Units are miles per hour.

Methodology and LOS Analysis for other type of Facilities - Methodology for LOS analysis for all types of facilities are described in detail in the latest edition of Highway Capacity Manual and shall be used.

STATIONARY LANE CLOSURE REQUIREMENTS OTTCH DIA 320

Stationary Lane Closure with Flagging

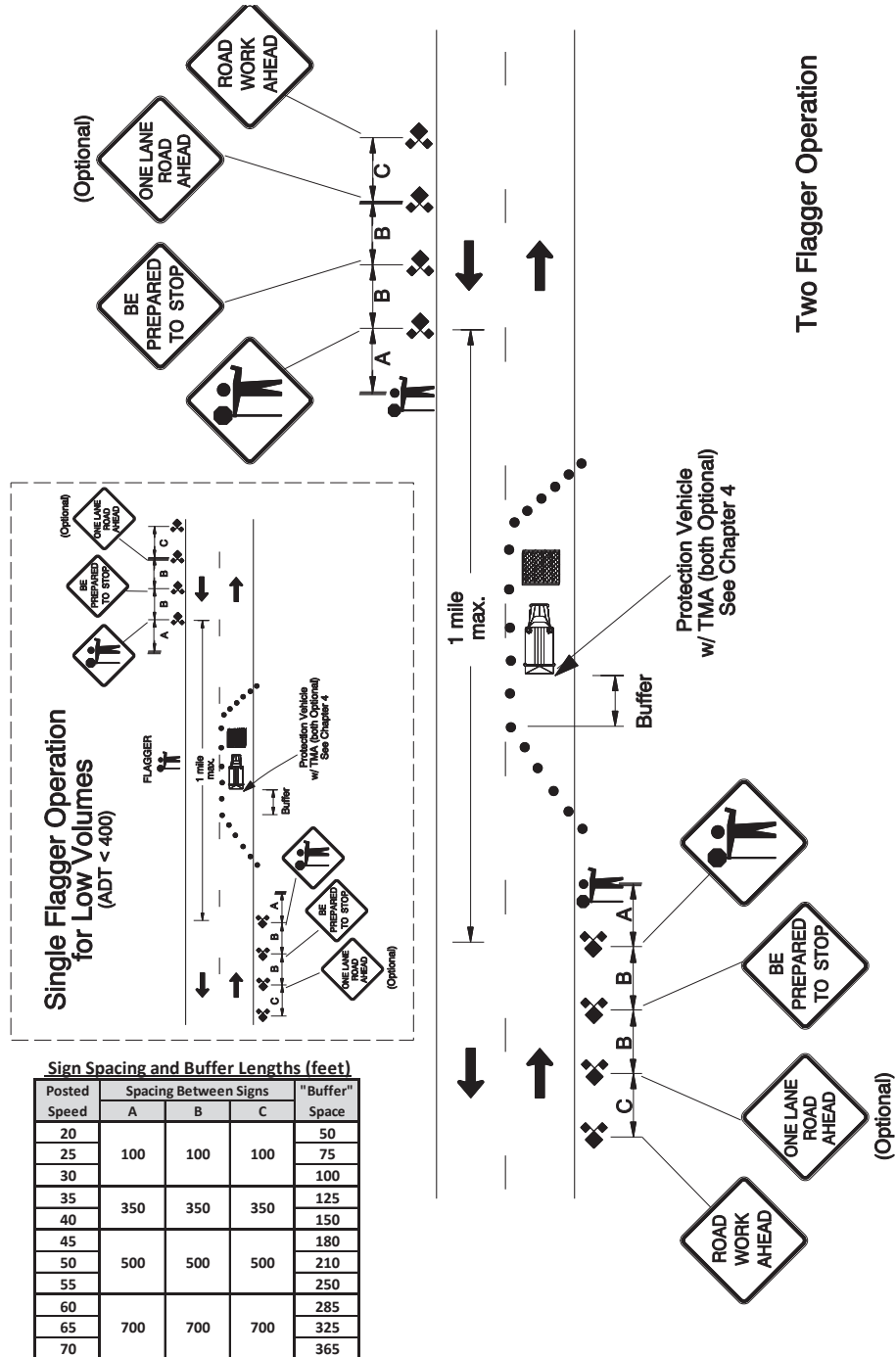
Diagram 320

Diagram 320 covers total closure of one lane of a two-lane, two-way roadway. See the detail inset for the layout if using a single flagger to control both directions of traffic on low volume roads (less than 400 ADT) with good sight distance as discussed below.

1. Use truck-mounted flashing warning lights on work and protection vehicles. See Section 4.3 – Lights and Lighted Signs for exceptions.
2. For added visibility, a truck-mounted arrow board or PCMS in caution mode may be used.
3. Flaggers at each approach are required if any of the following conditions exist:
 - a. Night Operations.
 - b. Work space is over 200 feet in length.
 - c. Sight distance is less than 750 feet from each approach through the lane closure.
 - d. Traffic volumes are greater than 400 ADT.
4. The length between the Flagger Ahead signs **shall** not exceed one mile. Use Diagram 340 – Lane Closure with Pilot Car if exceeding one mile.
5. Cones should be used to outline the work space when curves or other roadway alignments prevent clear direction for the motorists to pass the work space safely.
6. Cones along the work space are recommended when posted speeds are 45 mph or greater, when working under heavy traffic or when travel lanes are narrower than 11 feet.
7. Extended queue signing (see Diagram 5-4) should be used when traffic queues extend beyond the initial advance warning sign.
8. When flagging near an intersection, the “Flagger Ahead” (CW23-2) sign should be visible to traffic entering from any side road. Additional advance warning and Flagger Ahead symbol signs may be placed on the side road(s).
9. Sign set-up and flagger placement shown may be used for intermittent full road closures of 20 minutes or less.
10. The “ONE LANE ROAD AHEAD” (W20-4) sign is optional and should be considered on high volume or high speed roads, or when extended queues are expected.

Stationary Lane Closure with Flagging

Diagram 320



DRAFT AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of the fully executed contract in the year 2026.

BETWEEN the Owner:

(Name, legal status, address, and other information)

Riverdale School District
11733 SW Breyman Ave.
Portland OR, 97219

and the Contractor:

(Name, legal status, address, and other information)

for the following Project:

(Name, location, and detailed description)

Riverdale School District 51J – Offsite Improvements
Multnomah County, Oregon
11733 SW Breyman Ave.
Portland OR, 97219

The Architect:

(Name, legal status, address, and other information)

Humber Design Group, Inc.
110 SE Main Street
Suite 200
Portland, OR 97214

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement.

AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

ARTICLE 1 THE CONTRACT DOCUMENTS

§1.1 The Contract Documents consist of this Agreement, the General Conditions, Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

§ 1.1.1 In the event of conflicts or inconsistencies between or among the Contract Documents, the order of precedence set forth in Section 1.2.4 of the General Conditions shall apply.

§1.2 THE OWNER'S RELIANCE ON THE CONTRACTOR AND SUBCONTRACTORS

§1.2.1 The Owner and Contractor acknowledge and agree that (1) all Work performed by the Contractor and Subcontractors at all tiers shall be performed in the interests of the Owner and for its benefit, (2) the Contractor and Subcontractors at all tiers are authorized by the Owner to exercise their own independent, professional and trade judgments in performing their contractual obligations pursuant to this Section 1.2.1 on behalf of the Owner, (3) the Owner will be relying on the Contractor and Subcontractors at all tiers to perform their obligations consistent with this Section 1.2.1 and (4), as a result, the Contractor and Subcontractors at all tiers shall owe a duty to the Owner to exercise reasonable care and to avoid negligence in performing their obligations under the Contract and on the Project. The Contractor shall cause a provision equivalent to this Section 1.2.1 to be included in all subcontracts with Subcontractors.

§1.3 CONSTRAINTS ON OPERATIONS AT THE PROJECT SITE

§1.3.1 In addition to its other obligations under this Agreement, the Contractor shall:

- .1** perform the Work and conduct its operations at the Project site so as not to interfere with Owner's operations and other activities;
- .2** comply with all criminal background check, safety, drug testing, employee orientation, hazardous materials, hours of operation, space utilization, materials storage and delivery, clean-up and similar such rules, procedures, and requirements relating to working and operating at Owner's facilities.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date to be set forth in a notice to proceed issued by the Owner. The commencement of the Work shall be authorized by the Owner in the notice to proceed, and the Contractor shall commence the Work pursuant to the notice to proceed.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work not later than August 21, 2026, and shall achieve Final Completion of the entire Work not later than sixty nine (69) calendar days after the date required for achievement of Substantial Completion.

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
Not Applicable	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

§ 3.3.4 The Contractor also shall perform the Work in compliance with the Construction Schedule, subject to adjustments therein as provided in the Contract Documents.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.1.1 The Contract Sum includes all sales, consumer, use, and other similar taxes applicable by law to the Work and the Contract or portions thereof, except as set out in Section 3.6 of the General Conditions.

§ 4.1.2 The Contract Sum does not include the cost of the building permit. Such permit shall be paid and reimbursed pursuant to Section 3.7.1 of the General Conditions.

§ 4.2 Alternates

§ 4.2.1 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are currently accepted or not accepted by the Owner as follows:

No.	Description	Accepted or Not Accepted	Deadline For Acceptance	Impact on Contract Sum if Accepted

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. *(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)*

Item	Price	Conditions for Acceptance

--	--	--

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
Median Landscape	\$20,000

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
Not Applicable		

§ 4.4.1 The Contractor acknowledges and agrees that the quantities indicated in Section 4.4, if any, are estimates and that neither the Owner nor the Architect is a guarantor of any particular quantities of unit price Work. In the event the actual quantities differ so significantly from the estimated quantities that application of the agreed unit prices would result in an inequity to either the Owner or the Contractor, the unit prices shall be equitably adjusted.

§ 4.4.2 Unit prices, if any, to be applied to Work under Change Orders or Construction Change Directives shall be as set out in Article 7 of the General Conditions.

§ 4.5 Liquidated Damages

§ 4.5.1 The Contractor acknowledges that the Owner will incur significant damages if the Project is not completed within the Contract Time, including without limitation, damages in the form of: inability to use the Project and all related facilities (i.e., “loss of use”); delay costs for completion of portions of the Project or related projects to be constructed by the Owner or the Owner’s separate contractors; or costs of extended services of the Owner’s project management staff, outside construction management firms, Architect, any separate contractors and consultants, and others performing work or services related to the Project. In consideration of the factors set out in this Section 4.5.1, the Contractor acknowledges and agrees that time is particularly of the essence in the Contractor’s performance of the Work in accordance with the agreed date of commencement of the Work, the agreed dates of Substantial Completion and Final Completion of the Work, and the approved Construction Schedule.

§ 4.5.2 Loss of Use Liquidated Damages

§ 4.5.2.1 The Owner and Contractor acknowledge and agree that if Substantial Completion of the Work is not achieved by the Contract Time for Substantial Completion, the amount of the Owner’s actual loss of use damages (as described in Section 4.5.1 above) will be difficult, impractical, or impossible to determine. Accordingly, the parties agree that if Substantial Completion is not achieved by the agreed date of Substantial Completion as may be adjusted pursuant to the Contract Documents, the Contractor shall pay to the Owner as liquidated damages for the loss of use of the Project the following amounts:

- .1** For the first through seventh calendar days of delay, \$1,000 for each partial day or full day of delay beyond the deadline for Substantial Completion; and
- .2** For the eighth and further calendar days of delay, \$2,500 for each partial day or full day of delay beyond the deadline for Substantial Completion.

§ 4.5.2.2 The parties further acknowledge and agree that the Contractor’s obligation to pay liquidated damages under this Section 4.5 shall be in lieu of the obligation to pay actual delay damages for the loss of use damages. The parties agree that the daily rate agreed to above is reasonable in comparison to the approximate scope of actual delay damages for loss of use that the parties anticipate as of the time of execution of this Agreement, and that the payment of such liquidated damages is not intended to be a penalty or forfeiture. The parties further acknowledge that these liquidated damages are meant to reimburse the Owner only for loss of use delay damages and that Owner reserves the right to claim other types of damages against Contractor resulting from delays, including but not limited to the other delay damages described in Section 4.5.1.

§ 4.5.3 Withholding of Liquidated Damages

Owner may withhold liquidated damages from any progress or final payment.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect and Owner by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and in Article 9 of the General Conditions.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Provided that an Application for Payment is received by the Architect and Owner not later than the **first** day of a month, the Owner shall make payment of the amount certified to the Contractor not later than thirty (30) days after receipt of the Application for Payment. If an Application for Payment is received by the Architect and Owner after the application date fixed above, payment of the amount certified shall be made by the Owner not later than **thirty (30)** days after the Architect and Owner receive the Application for Payment.

(Federal, state, or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™-2017, General Conditions of the Contract for Construction, as modified by the parties (the "General Conditions"), and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of the General Conditions;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of the General Conditions; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%) of each progress payment.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of the General Conditions.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to Subcontractors and suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of the General Conditions, and to satisfy other requirements, if any, which arise or extend beyond final payment;
- .2 a final Certificate for Payment has been issued by the Architect in accordance with Section 9.10 of the General Conditions; and
- .3 the Contractor has fully complied with Section 9.10 of the General Conditions and all other requirements of the Contract Documents for final payment.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate of one percent (1%) per month.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of the General Conditions, the method of binding dispute resolution shall be as set forth in Section 15.4 of the General Conditions.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents. Terms in this Agreement shall have the same meaning as those in the General Conditions.

§ 8.2 The Owner's Representative:

(Name, address, email address, and other information)

Erica Bierman
Turner & Townsend Heery
18840 SW Boones Ferry Rd.
Tualatin, Oregon 97062
erica.bierman@turntown.com
ebierman@riverdale.k12.or.us

§ 8.3 The Contractor's Representative:
(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's Representative shall be changed without ten (10) days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in Exhibit E, Contractor's Insurance Requirements.

§ 8.5.2 The Contractor shall provide bonds as set forth in Exhibit D, and elsewhere in the Contract Documents.

§ 8.6 [Intentionally deleted.]

§ 8.7 Other provisions:

§ 8.7.1 SAVINGS CLAUSE

Should any provision of the Contract, at any time, be held to be invalid or unenforceable for any reason, and if the provisions of the Contract that are essential to each party's interests otherwise remain valid and enforceable, then the remaining provisions of the Contract shall remain in full force and effect and the court shall give the offending provision the fullest meaning and effect permitted by law.

§ 8.7.2 RIGHTS AND REMEDIES

Duties and obligations imposed by the Contract Documents and rights and remedies available under the Contract shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by applicable law.

§ 8.7.3 NO WAIVER

No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach hereunder, except as may be specifically agreed in writing.

§ 8.7.4 PUBLIC CONTRACTING PROVISIONS

ORS Chapters 279A and 279C contain certain requirements for public contracts, including, but not limited to, certain required contract provisions. The required contract provisions are attached as Exhibit C and are incorporated herein by this reference. Furthermore, Contractor and Owner agree to comply with all requirements of ORS Chapters 279A and 279C and other Oregon laws whether or not such provisions are included in Exhibit C and whether or not any such provisions are excised in Exhibit C.

§ 8.7.5 PAYMENT AND PERFORMANCE BONDS

Contractor shall obtain and deliver payment and performance bonds in the form attached as Exhibit D and as required by the General Conditions.

§ 8.7.6 PREVAILING WAGES

This Contract is subject to the State of Oregon BOLI Prevailing Wage Rates, and Contractor shall pay or cause to be paid all workers accordingly.

§ 8.7.7 PRINTING FEES

Contractor shall provide for and pay all costs associated with printing project documents, specifically including permit documents as required or requested by AHJs.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 The General Conditions as modified - 00 72 00 AIA Document A201-2017 GENERAL CONDITIONS
- .3 Drawings: See Exhibit A.
- .4 Specifications: See Exhibit A.
- .5 Invitation To Bid and Addenda:

Item	Dated	Number of Pages

Portions of the Invitation To Bid and Addenda relating to bidding or proposal requirements are not part of the Agreement unless the bidding or proposal requirements are also enumerated in this Article 9.

- .6 Other documents listed below, which are incorporated herein by this reference:

Exhibit A: List of Drawings and Specifications

Exhibit B: Forms of Waivers and Releases

Exhibit C: Provisions from the Public Contracting Code and Public Contracting Rules

Exhibit D: Forms of Payment and Performance Bonds

Exhibit E: Contractor's Insurance Requirements

Exhibit F: Special Provisions Relating to Construction on School District Property.

This Agreement made as of the day of the fully executed contract.

RIVERDALE SCHOOL DISTRICT

OWNER *(Signature)*

« »« »

(Printed name and title)

« »« »

(Date)

CONTRACTOR *(Signature)*

« »« »

(Printed name and title)

« »« »

(Date)

RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS
00 01 13 EXHIBITS A, B, C, D, E, F

EXHIBIT A

LIST OF DRAWINGS AND SPECIFICATIONS

#	DESCRIPTION	SET NAME	DATE
DRAWINGS			
C000	COVER SHEET, GENERAL NOTES & LOCATION MAP	BID SET	05/2026
C050	DEMOLITION PLAN	BID SET	05/2026
C100	CIVIL SITE PLAN - OVERALL	BID SET	05/2026
C101	ENLARGED CIVIL SITE PLANS – ENLARGED SITE PLAN A & B	BID SET	05/2026
C102	ENLARGED CIVIL SITE PLAN – ENLARGED SITE PLAN C	BID SET	05/2026
C200	STANDARD DETAILS – COP P-101, COP P-150, COP P-262, PBOT P-505	BID SET	05/2026
C201	STANDARD DETAILS – PBOT P-506, PBOT P-531, PBOT P-540, PBOT P-547	BID SET	05/2026
C202	STANDARD DETAILS – PBOT P-549, PBOT P-550, PBOT P-551, COP P-700 (FH)	BID SET	05/2026
C203	STANDARD DETAILS – OREGON STANDARD DRAWINGS RD366, TM503, TM840, TM844	BID SET	05/2026
3005	TOPOGRAPHIC SURVEY – 3005 TOPO	BID SET	02/2026
C102	LANDSCAPE ALLOWANCE	BID SET	05/2026
SPECIFICATIONS			
I & II	Multnomah County Design Standards Design Manual Part I & II	BID SET	05/2026
DIA 320	Stationary Lane Closure Requirements OTTCH DIA320	BID SET	05/2026
00 0112	AIA A101-2017 AGREEMENT BETWEEN OWNER and CONTRACTOR	BID SET	05/2026
00 0113	EXHIBITS A, B, C, D, E, F	BID SET	05/2026
00 2113	INVITATION TO BID & BID FORM	BID SET	05/2026
00 7200	A201-2017 GENERAL CONDITIONS	BID SET	05/2026

EXHIBIT B
FORMS OF WAIVERS AND RELEASES

**SUBCONTRACTOR/SUPPLIER
CONDITIONAL WAIVER AND RELEASE
UPON PROGRESS PAYMENT**

The undersigned Subcontractor/Supplier, upon receipt of a check in the sum of _____ Dollars (\$ _____) payable to Subcontractor/Supplier, and when the check has been properly endorsed and has been paid by the bank upon which it is drawn, hereby waives and releases any construction lien claim, stop notice, payment and performance bond claim, and any and all other claims Subcontractor/Supplier has with respect to its Work on the _____ (“Project”) under and related to the prime contract for the Project between _____ (“Contractor”) and Riverdale School District (“Owner”) dated _____, 202__, to the following extent.

This waiver and release is effective as to a progress payment for labor, services, overhead, materials, and equipment furnished and any and all other claims by Subcontractor/Supplier and its subcontractors and suppliers at all tiers during the period commencing on and including _____, 202_ and ending on and including _____, 202_, excluding retainage.

This document may be relied upon by Owner, Contractor, any principal and surety on a bond, and any lender providing financing for the Project; provided that any party intending to rely upon this document should first verify evidence of payment to Subcontractor/Supplier of the full amount set out above.

Date: _____

SUBCONTRACTOR/SUPPLIER

By: _____
(signature)

Name: _____
(printed or typed)

Title: _____

**SUBCONTRACTOR/SUPPLIER
UNCONDITIONAL WAIVER AND RELEASE
UPON FINAL PAYMENT**

The undersigned Subcontractor/Supplier has been paid and has received a final payment in the sum of _____ Dollars (\$ _____), and hereby waives and releases any stop notice, payment and performance bond claim, and any and all other claims Subcontractor/Supplier has with respect to its Work on the _____ (“Project”) under and related to the prime contract for the Project between _____ (“Contractor”) and Riverdale School District (“Owner”) dated _____, 202__, to the following extent.

This waiver and release is effective as to a final payment for labor, services, overhead, materials, and equipment furnished and any and all other claims by Subcontractor/Supplier and its subcontractors and suppliers at all tiers during the period commencing on and including _____, 202_ and ending on and including _____, 202_, including retainage.

This document may be relied upon by Owner, Contractor, any principal and surety on a bond, and any lender providing financing for the Project; provided that any party intending to rely upon this document should first verify evidence of payment to Subcontractor/Supplier of the full amount set out above.

Date: _____

SUBCONTRACTOR/SUPPLIER

By: _____
(signature)

Name: _____
(printed or typed)

Title: _____

**CONTRACTOR
CONDITIONAL WAIVER AND RELEASE
UPON PROGRESS PAYMENT**

The undersigned Contractor, upon receipt of a check in the sum of _____ Dollars (\$ _____) payable to Contractor, and when the check has been properly endorsed and has been paid by the bank upon which it is drawn, hereby waives and releases any construction lien claims, stop notice and any and all claims Contractor has with respect to its Work on the _____ ("Project") under and related to its prime contract for the Project with Riverdale School District ("Owner") dated _____, 202____, to the following extent.

This waiver and release is effective as to a progress payment for labor, services, overhead, materials, and equipment furnished and any and all other claims by Contractor and its architect, consultants, subcontractors and suppliers at all tiers during the period commencing on and including _____, 202__ and ending on and including _____, 202__, excluding retainage.

This document may be relied upon by Owner, any principal and surety on a bond, and any lender providing financing for the Project; provided that any party intending to rely upon this document should first verify evidence of payment to Contractor of the full amount set out above.

Date: _____

CONTRACTOR

By: _____
(signature)

Name: _____
(printed or typed)

Title: _____

**CONTRACTOR
UNCONDITIONAL WAIVER AND RELEASE
UPON FINAL PAYMENT**

The undersigned Contractor upon receipt of a check in the sum of _____ Dollars (\$ _____) payable to Contractor, and when the check has been properly endorsed and has been paid by the bank upon which it is drawn, hereby waives and releases any construction lien claims, stop notice and any and all claims Contractor has with respect to its Work on the _____ ("Project") under and related to its prime contract for the Project with Riverdale School District ("Owner"), dated _____, 202__, to the following extent.

This waiver and release is effective as to a final payment for labor, services, overhead, materials, and equipment furnished and any and all other claims by Contractor or its architect, consultants, subcontractors and suppliers at all tiers during the period commencing on and including _____, 202_ and ending on and including _____, 202_, including retainage.

This document may be relied upon by Owner, any principal and surety on a bond, and any lender providing financing for the Project; provided that any party intending to rely upon this document should first verify evidence of payment to Contractor of the full amount set out above.

Date: _____

CONTRACTOR

By: _____
(signature)

Name: _____
(printed or typed)

Title: _____

EXHIBIT C

PROVISIONS FROM THE PUBLIC CONTRACTING CODE AND PUBLIC CONTRACTING RULES

1. GENERAL

1.1 **INCORPORATION OF ALL CONTRACT PROVISIONS.** The Contract hereby incorporates all contract provisions that are required to be incorporated into contracts with public entities pursuant to (a) the Public Contracting Code (ORS Chapters 279A, 279B and 279C), (b) the Attorney General Model Public Contracting Rules (which are referred to in this Exhibit as the “Rules”) or (c) other applicable law. The provisions incorporated into the Contract under the preceding sentence include, without limitation, any provisions or amendments to provisions that become required after the Contract is executed.

1.2 **DISCLAIMER REGARDING ANY UNLISTED CONTRACT PROVISIONS.** The provisions listed in this Exhibit are not necessarily an exhaustive list of provisions that are required under the Public Contracting Code, the Rules or other applicable law, and the fact that this Exhibit does not list a provision that is required by the Public Contracting Code, the Rules or other applicable law will not (i) prevent or otherwise diminish the incorporation of that unlisted provision into the Contract or (ii) negate or otherwise diminish Contractor’s obligation to comply with applicable laws.

2. PAYMENT.

2.1 **PROMPT PAYMENT.** Contractor shall promptly pay all of its obligations arising out of or in connection with the Work, including, but not limited to, payments (1) to all persons, as due, supplying to Contractor labor, equipment, services or material for the performance of the Work, (2) of all contributions or amounts due the Industrial Accident Fund from Contractor or the Subcontractors incurred in the performance of the Work, and (3) to the Department of Revenue of all sums withheld from employees under ORS 316.167.

2.2 **CONTRACTOR’S OBLIGATIONS TO FIRST-TIER SUBCONTRACTOR.** Contractor shall pay each first-tier Subcontractor for satisfactory performance under its subcontract within 10 days out of amounts the Owner pays to the Contractor under the Contract. Contractor shall provide a first-tier Subcontractor with a standard form that the first-tier Subcontractor may use as an application for payment or as another method by which the Subcontractor may claim a payment due from the Contractor. Contractor shall use this the same form and regular administrative procedures for processing payments during the entire term of the Subcontract. Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor notifies the Subcontractor in writing at least 45 days before the date on which the Contractor makes the change and includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.

2.3 **PROMPT PAYMENT POLICY.** It is the policy of the State of Oregon that all payments due on a public improvement contract and owed by a contracting agency shall be paid promptly. No public contracting agency is exempt from the provisions of ORS 279C.570.

2.4 **CONTRACTOR’S FAILURE TO MAKE PROMPT PAYMENT.** If the Contractor has failed, neglected or refused to pay promptly a person’s claim for labor, equipment, services or materials that the person provides to the Contractor or a Subcontractor in connection with the Project as such claim becomes due, the Owner may pay such claim to the person that provides the labor, equipment, services or materials and charge the amount of the payment against funds due or to become due the Contractor under the Contract. Owner reserves the right to make payments directly or by multiple-payee check and Contractor hereby consents to such direct and multiple-payee check payments. Upon Owner’s request, Contractor shall furnish to Owner the information required to facilitate such payments with each application for

payment, including (1) names, addresses, and telephone numbers of persons making any such claim for labor, equipment, services or material, and (2) a complete listing of outstanding amounts owed to all such persons.

2.5 CONTRACTOR'S AND FIRST-TIER SUBCONTRACTOR'S FAILURE TO MAKE PAYMENT AFTER PAYMENT FROM OWNER; INTEREST PENALTY. If the Contractor or a first-tier Subcontractor fails, neglects or refuses to pay a person that provides labor, equipment, services or materials in connection the Contract within thirty (30) days after receiving payment from the Owner or the Contractor, the Contractor or first-tier Subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period that payment is due under ORS 279C.580(4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.

2.6 CONSTRUCTION CONTRACTORS BOARD COMPLAINT. If the Contractor or a Subcontractor fails, neglects or refuses to make payment to a person that provides labor, equipment, services or materials in connection with the Contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.

2.7 CONTINUING LIABILITY OF CONTRACTOR AND SURETY. Payment by the Owner of a claim in the manner authorized in this Section 2 does not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

3. PUBLIC WORKS PROJECT.

3.1 PREVAILING RATE OF WAGE. The Project is a public works project subject to the prevailing wage rate requirements in ORS 279C.800 to 279C.875. Contractor and the Subcontractors shall comply with ORS 279C.840. Workers in each trade or occupation required for the Work of the Project shall not be paid less than the minimum hourly rate of wage for such workers as detailed in the Specifications for the Contract.

3.2 PUBLIC WORKS BOND. Before starting the Work, Contractor and every Subcontractor shall file with the Construction Contractors Board a public works bond in accordance with ORS 279C.836, unless the Contractor or Subcontractor has elected not to file a public works bond under ORS 279C.836(7) or (8) or is exempt under ORS 279C.836(4) or (9). Before permitting a Subcontractor to start the Work, Contractor shall verify that the Subcontractor has filed a public works bond as required by ORS 279C.836, has elected not to file a public works bond under ORS 279C.836(7) or (8) or is exempt under ORS 279C.836(4) or (9). Contractor shall also ensure that each subcontract entered into by a Subcontractor for the Project shall include a clause obligating each Subcontractor to comply with the requirements of this Section 3.2, such that all subcontracts at all tiers include a requirement to comply with this Section 3.2.

4. COMPLIANCE WITH LAWS/TAX LAWS. Contractor shall comply with all applicable federal, state, and local laws, statutes, codes, regulations, rules, orders, and rulings as well as all applicable construction industry standards, including without limitation those governing labor, materials, equipment, construction procedures, safety, health, sanitation and the environment. Contractor agrees to indemnify, hold harmless, reimburse, and defend Owner from and against any penalties or liabilities arising out of violations of such obligations by Contractor or its Subcontractors at any tier. Contractor must also comply with all Oregon tax laws and shall submit a certification of such compliance in accordance with ORS 305.385(6).

5. CONTRACTOR'S EMPLOYEES AND SUBCONTRACTORS.

5.1 EMPLOYEE DRUG TESTING PROGRAM. Contractor shall certify to Owner that Contractor has initiated, and shall maintain through the completion of the Work of the Project, an employee drug testing program.

5.2 WORK DAY/WORK WEEK. No person shall be required or permitted to labor more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity or emergency or when the

public policy absolutely requires it, in which event, the person so employed for excessive hours shall receive at least time and a half pay for (1) all overtime in excess of eight hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or (2) all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and (3) all work performed on Saturday and on any legal holiday specified in ORS 279C.540.

5.3 NOTICE OF REQUIRED WORK HOURS. The Contractor and each Subcontractor must give notice to its employees in writing, either at the time of hire or before commencement of Work, or by posting a notice in a location frequented by its employees, of the number of hours per day and days per week that the employees may be required to work.

5.4 CLAIMS FOR OVERTIME. Any worker employed by the Contractor shall be foreclosed from the right to collect for any overtime provided in ORS 279C.540 unless a claim for payment is filed with the Contractor within 90 days from the completion of the Contract, provided the Contractor has: (1) caused a circular clearly printed in boldfaced 12-point type and containing a copy of this Section 5.4 to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place that is readily available and freely visible to any or all workers employed on the Work; and (2) maintained such circular continuously posted from the inception to the completion of the contract on which workers are or have been employed.

5.5 WORKERS' COMPENSATION. All employers, including Contractor, that employ subject workers who work under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.

5.6 PROMPT PAYMENT FOR MEDICAL SERVICES. The Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums that the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.

5.7 PROMPT PAYMENT BY CONTRACTOR AND SUBCONTRACTORS; INTEREST PENALTY. Contractor shall include in each subcontract entered into by the Contractor a clause obligating the Contractor (1) to make payment to the Subcontractor for satisfactory performance within ten (10) days out of such amounts as are paid to the Contractor by the Owner under the Contract, and (2) if payment is not made within 30 days after receipt of payment from the Owner, to pay the Subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract as required by the preceding clause, (1) above. The interest penalty shall be for the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made, and computed at the rate specified in ORS 279C.515(2). Contractor shall also include in each subcontract entered into by the Contractor a provision requiring each first-tier Subcontractor to include a payment clause and an interest penalty clause conforming to the standards of this Section 5.7 in each of its subcontracts and to require each of the first-tier Subcontractor's lower-tier Subcontractors to include such clauses in their subcontracts with each lower-tier Subcontractor.

5.8 LICENSING WITH CONSTRUCTION CONTRACTORS BOARD AND LANDSCAPE CONTRACTORS BOARD. Before commencing the Work, Contractor shall ensure that the Subcontractors are duly registered with the Oregon State Construction Contractors Board (and the State Landscape Contractors Board, if applicable), and that no Subcontractor has been declared ineligible to work on a public contract.

6. MATERIAL SALVAGE. To the extent the scope of the Work for the Contract requires demolition, Contractor must salvage or recycle construction and demolition debris, if feasible and cost-effective.

7. **COMPOSTING.** To the extent the scope of the Work for the Contract requires lawn and landscape maintenance, the Contractor must compost or mulch yard waste material at an approved site, if feasible and cost-effective.
8. **RECYCLED MATERIALS.** The Contractor, in performance of the Work, shall give preference to the procurement of goods manufactured from recycled materials.
9. **ENVIRONMENTAL AND NATURAL RESOURCES LAWS.** Pursuant to ORS 279C.525, the following is a list of Federal, State, and Local agencies that have enacted ordinances, rules or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the Contract. The following list may not include all such agencies that have enacted ordinances, rules or regulations relating to the environmental pollution and preservation of natural resources.

Federal Agencies:

Agriculture, Dept. of
Forest Service
Natural Resource Conservation Service
Defense, Dept. of
Army Corps of Engineers
Coast Guard
Environmental Protection Agency
Interior, Dept. of
U.S. Fish and Wildlife Service
Bureau of Land Management
Bureau of Indian Affairs
Bureau of Reclamation
Labor, Dept. of
Occupational Safety and Health Administration
Transportation, Dept. of
Federal Highway Administration

State Agencies:

Agriculture, Dept. of
Consumer and Business Services Dept.
Oregon Occupational Safety and Health Division
Environmental Quality, Dept. of
Fish and Wildlife, Dept. of
Forestry, Dept. of
Geology and Mineral Industries, Dept. of
Human Services, Dept. of
Land Conservation and Development, Dept. of
Natural Resources, Dept. of
State Fire Marshall
State Lands, Dept. of
Water Resources Department

Local Agencies:

City Councils
Circuit Courts
County Commissioners, Boards of
Fire Districts
Planning Commissions

10. RETAINAGE. The withholding of retainage by the Contractor or Subcontractor shall be in accordance with ORS 279C.550 to ORS 279C.570 and OAR 137-049-0820.
11. LIENS. The Contractor shall not permit any lien or claim to be filed or prosecuted against the state, county, school district, municipality, municipal corporation, or subdivision thereof, on account of any labor or material furnished.
12. NOTICE OF CLAIM ON BOND. The notice of claim required by ORS 279C.600 must be sent by registered or certified mail or hand delivered no later than 180 days after the day the person last provided labor or furnished materials or 180 days after the worker listed in the notice of claim by the Commissioner of the Bureau of Labor and Industries last provided labor. The notice may be sent or delivered to the Contractor or Subcontractor at any place the Contractor or Subcontractor maintains an office or conducts business or at the residence of the Contractor or Subcontractor. If the claim is for a required contribution to a fund of any employee benefit plan, the notice required by ORS 279C.600 must be sent or delivered within 200 days after the employee last provided labor or materials. The notice shall be in writing substantially as follows:

To (here insert the name of the Contractor or Subcontractor and the name of the Owner):

Notice hereby is given that the undersigned (here insert the name of the claimant) has a claim for (here insert a brief description of the labor or materials performed or furnished and the person by whom performed or furnished; if the claim is for other than labor or materials, insert a brief description of the claim) in the sum of (here insert the amount) dollars against the (here insert public works bond or payment bond, as applicable) taken from (here insert the name of the principal and, if known, the surety or sureties upon the public works bond or payment bond) for the work of (here insert a brief description of the work concerning which the public works bond or payment bond was taken). Such material or labor was supplied to (here insert the name of the Contractor or Subcontractor).

(here to be signed)

EXHIBIT D
FORMS OF PAYMENT AND PERFORMANCE BONDS

PERFORMANCE BOND

(Bond No. _____)

The undersigned, _____ as Principal and _____ as Surety, a corporation organized and existing under the laws of the state of _____, are held and bound unto Riverdale School District and its heirs, executors, administrators, and assigns as Obligee, in the penal sum of _____ Dollars (\$ _____), lawful money of the United States of America, for the payment of which Principal and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS Principal has entered into a Construction Contract ("Contract") dated _____, 202_ with Obligee for _____ ("Project"), which Contract is made a part hereof as if fully incorporated herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if Principal shall faithfully, punctually and completely perform and abide with the covenants, terms, conditions and provisions of said Contract and any extensions thereof in all respects and within the time prescribed therein, including, but not limited to, the terms of any warranty and guarantee required under the said Contract; shall pay all laborers, mechanics, subcontractors, material and equipment suppliers and all persons supplying to Principal or its subcontractors and suppliers at any tier labor, materials, supplies or equipment for the prosecution of the work or any part thereof; shall fully defend, indemnify and hold Obligee harmless from all cost and damage that Obligee may suffer by reason of Principal's failure to do so; and shall in all respects perform said Contract according to applicable law, then this obligation shall be null and void; otherwise, it shall remain in full force and effect. In the event that Principal shall be, and declared by Obligee to be in default under the Contract, the Surety, at the request of the Obligee, shall promptly remedy the default in a manner acceptable to the Owner.

In any event, this obligation shall remain in full force and effect for the applicable period of limitations or repose, whichever is longer.

Surety acknowledges that Obligee does not owe any duty to Surety to advise, notify or consult with Surety on any matters relating to the Principal or the Project, including, but not limited to, Principal's payments to Subcontractors or Contractor's use of Project funds.

No prepayment or delay in payment and no change, extension, assignment, addition or alteration of any provision of said Contract and no forbearance on the part of Obligee shall operate to relieve Surety from liability on this bond, and Surety hereby consents to any such changes, extensions, additions and alterations without further notice to or consent by Surety.

In the event arbitration, litigation or any other proceeding is brought upon this bond by Obligee and judgment or award is entered in Obligee's favor, Surety shall pay all of Obligee's costs incurred in such arbitration, litigation or other proceeding, including any attorney and expert witness fees.

In the event there is an arbitration clause in said Contract, Surety agrees to participate in and to be bound by any such arbitration to the same extent Principal is bound.

No right of action shall accrue on this bond to or for the use of any person or corporation other than Obligee or its heirs, executors, administrators, successors or assigns.

Executed this ____ day of _____, 202_.

PRINCIPAL

Title

Address

SURETY

Title

Address

COUNTERSIGNED:

Resident Agent

Address

PAYMENT BOND

(Bond No.)

The undersigned, _____ as Principal and _____ as Surety, a corporation organized and existing under the laws of the state of _____, are held and bound unto Riverdale School District and its heirs, executors, administrators, and assigns as Obligees, for the use and benefit of all persons or entities that provide labor, materials, equipment or supplies for use under the Contract described below, in the penal sum of _____ Dollars (\$ _____), lawful money of the United States of America, for the payment of which Principal and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS the Principal has entered into a Construction Contract ("Contract") dated _____, 202_ with Obligees for the _____ project ("Project"), which Contract is made a part hereof as if fully incorporated herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if Principal shall promptly make payment to all persons or entities that provide labor, material, equipment or supplies for use under said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect. In the event that Principal shall be, and declared by Obligees to be in default under the Contract, the Surety, at the request of the Obligees, shall promptly remedy the default in a manner acceptable to the Owner.

In any event, this obligation shall remain in full force and effect for the applicable period of limitations or repose, whichever is longer.

Surety acknowledges that Obligees does not owe any duty to Surety to advise, notify or consult with Surety on any matters relating to the Principal or the Project, including, but not limited to, Principal's payments to Architect, Subcontractors or Principal's use of Project funds.

Principal and Surety hereby jointly and severally agree that any person or entity that provides labor, material, equipment or supplies for use under said Contract and has not been paid in full within the applicable time period set forth in ORS 279C.605 may sue on this bond for the use of such person or entity, prosecute the suit to final judgment for such sums as may be justly due and owing claimant and have execution thereon. Obligees shall not be liable for the payment of any damages, costs or expenses (including attorney fees) awarded in any such suit.

No prepayment or delay in payment and no change, extension, assignment, addition or alteration of any provision of said Contract and no forbearance on the part of Obligees shall operate to relieve Surety from liability on this bond, and Surety hereby consents to any such changes, extensions, additions and alterations without further notice to or consent by Surety.

In the event arbitration, litigation or any other proceeding is brought upon this bond by Obligees and judgment or award is entered in Obligees's favor, Surety shall pay all of Obligees's costs incurred in such arbitration, litigation or other proceeding, including any attorney and expert witness fees.

Except as expressly provided above, no right of action shall accrue on this bond to or for the use of any person or corporation other than Obligee or its heirs, executors, administrators, successors or assigns.

Executed this _____ day of _____, 202_.

PRINCIPAL

Title

Address

SURETY

Title

Address

COUNTERSIGNED:

Resident Agent

Address

EXHIBIT E

INSURANCE REQUIREMENTS

1. Insurance Coverages. The Contractor shall procure and maintain at its expense during the Period of Performance and thereafter as required below the following insurance from one or more companies authorized to do business in the State of Oregon with a policyholder's rating of not less than A-IX in the most recent edition of *Best's Rating Guide*. Except as approved otherwise by the Owner in advance, such insurance shall protect against claims which arise out of or relate to all of the Contractor's services under the Agreement, whether performed by the Contractor or a consultant or a person or entity for which either of them may be responsible.

1.1 Workers' Compensation Insurance, if required by law, with statutory limits.

1.2 Employer's Liability Insurance, if employees are employed for other than secretarial or bookkeeping services, with a limit of not less than \$1,000,000 each accident, \$1,000,000 disease each employee and \$1,000,000 disease policy limit.

1.3 Commercial General Liability Insurance, applicable to all premises and operations, including Bodily Injury, Property Damage, Personal Injury, Contractual Liability, Independent Contractors, Products and Completed Operations, Broad Form Property Damage (including Completed Operations), and coverage for explosion, collapse and underground hazards, with limits of not less than \$1,000,000 per occurrence, \$2,000,000 aggregate applicable specifically to the Project, \$1,000,000 personal and advertising injury and \$2,000,000 Products and Completed Operations.

1.4 Business Automobile Liability Insurance, applicable to owned, non-owned and hired automobiles, with a limit of not less than \$1,000,000 combined single limit each accident.

1.5 Professional Liability Insurance, applicable to all acts and omissions of Contractor and its consultants, with limits of not less than \$1,000,000 per occurrence and \$1,000,000 aggregate.

1.6 Excess/Umbrella Liability Insurance, at least as broad as all liability policies described above, with limits of not less than \$4,000,000 per occurrence and \$4,000,000 aggregate.

2. Deductibles. The Contractor shall pay all deductibles on all policies required by Paragraph 1. The deductible shall not exceed \$10,000.

3. Waivers of Subrogation Re Liability Insurance. The Workers' Compensation and Employer's Liability policies shall be subject to a waiver of subrogation in favor of Owner and its members, partners, officers, directors, agents and employees, and the successors in interest of the foregoing.

4. Cross-Liability Coverages. The Commercial General Liability and Automobile Liability policies shall provide cross-liability coverages as would be achieved under the standard International Organization for Standardization ("ISO") separations of insureds clause.

5. Additional Insureds. The Commercial General Liability and Automobile Liability policies shall name the Owner and its officers, directors, agents and employees, and the successors in interest of the foregoing, as additional insureds, using ISO additional insureds endorsements CG 20 10, CG 20 37, and CA 20 48 or a substitute providing equivalent coverages. Such coverages provided to the additional insureds shall (a) be primary and noncontributory with respect to any insurance or self-insurance retention of the additional insureds, including but not limited to any Excess Liability coverage maintained by the additional insureds, (b) provide the same types and extents of coverages as the coverages provided to the primary insured, and shall not be limited to the "vicarious liability" of the additional insureds, (c) waive all rights of subrogation against the additional insureds, (d) cover all additional insureds that are a partnership or joint venture, if any, as "Named Insureds" as expressly stated in endorsements and (e) be maintained for the same durations as the coverages provided to the primary insured, including but not limited to the continuation of the Products and Completed Operations coverage until three (3) years after final payment to the Owner's prime contractor on the Project, and shall not be limited to "ongoing operations". Notwithstanding the

foregoing, this Paragraph shall not be construed to require the Contractor to provide insurance coverage of the additional insureds in a way or to an extent that results in a violation of ORS § 30.140.

6. Duration of Coverages. The insurance coverages required by Paragraph 1 shall be written on an occurrence basis, except the Professional Liability Insurance. The Professional Liability policy shall provide for a retroactive date of placement prior to or coinciding with the date of commencement under the Agreement. All other policies shall be in effect as of the date of commencement of the Contractor's services under the Agreement. All policies shall be maintained and remain in effect until two (2) years after Final Completion and thereafter when the Contractor is assisting or advising the Owner regarding the correction of defective or nonconforming Work; provided that the Products and Completed Operations policy and the Professional Liability policy shall remain in effect until three (3) years after final payment to the Owner's prime contractor on the Project. The Contractor shall notify the Owner of any claims against the Professional Liability policy, in which event the Owner shall have the right to require the Contractor at its expense to obtain additional Professional Liability Insurance in order to restore the required coverage available for the Project.

7. Proof of Insurance. The Contractor shall file with Owner, upon execution of the Agreement, certificates of insurance acceptable to the Owner as well as copies of all insurance policies, with all riders and endorsements, all separate exclusions, conditions and waivers, and all other amendatory documents attached, evidencing the insurance required by this Exhibit E. These certificates and policies shall contain a provision that coverages afforded under the policies will not be cancelled, materially changed, or allowed to expire until at least thirty (30) days' written notice has been given to the Owner. If any of the required coverages are to renew during the period when such coverage is to remain in effect, or are required to remain in force after final payment to the Owner's prime contractor on the Project, an additional certificate evidencing continuation of such coverage shall be submitted upon renewal or with the Contractor's final invoice.

8. Effect of No or Insufficient Insurance. The Contractor's failure to comply with the requirements of this Exhibit E shall constitute a material breach of the Agreement entitling the Owner to terminate the Agreement for cause. In the alternative, the Owner in its sole discretion may purchase the insurance required of, but not obtained or maintained, by the Contractor pursuant to this Exhibit E and charge such costs thereof to the Contractor. The Owner's rights under this Paragraph shall be in addition to, and without waiver of, its other rights and remedies under the Agreement or applicable law.

9. Limitation of This Exhibit E. Nothing in this Exhibit E shall negate, abridge, or reduce the Contractor's responsibilities or liabilities under the Agreement or applicable law, the meaning and effect of the provisions of this Exhibit E being limited to setting out the Contractor's express obligations with respect to insurance.

EXHIBIT F

SPECIAL PROVISIONS RELATING TO CONSTRUCTION ON SCHOOL DISTRICT PROPERTY.

Contact with Students. “Unsupervised contact” with students means contact that provides the person opportunity and probability for personal communication or touch with students when not under direct District supervision. As required by ORS 326.603, Contractor shall ensure that Contractor, any subcontractors, and their officers, employees, and agents will have no direct, unsupervised contact with students while on District property. Contractor shall work with the District to ensure compliance with this requirement.

Work Performed on District Property. Contractors performing work on District property shall comply with District policies at all times. In all cases personnel on school property shall carry photo identification, acceptable to District, and shall present such identification to anyone on request. Contractor shall ensure that all Project personnel are in compliance with applicable identification, uniform, hardhat sticker, and badge requirements for all Project personnel at no cost to District.

1. As required by schools and other District locations, District may require personnel to sign in before entering District properties.
2. No Smoking. Smoking, vaping, or other use of tobacco is prohibited on all District property.
3. No Drugs or Alcohol. District’s property sites are all designated drug and alcohol-free zones, which designation is enforced by the City of Portland Police.
4. No Weapons or Firearms.
5. Any Conduct whether verbal or non-verbal that could be construed as inappropriate in any way. Including but not limited to cat calls, whistling, staring, winking, sexually suggestive signals or comments, profanity/vulgar language.

All Contractors and their employees whether full time or part time working at District sites must undergo a criminal history verification for disqualifying convictions per ORS 342.143 Criminal history verification checks will be conducted at the Contractor’s expense by an approved third-party vendor. Prior to entry of a Contractor's employees onto a jobsite, the Contractor shall cause its employees and/or subcontractors, if any, to conduct these background checks. Results will be kept on file with the Contractor and copies submitted to the District. Contractor shall pay all fees for processing the background check, production of badging, and hard hat sticker. Badge will identify the employee’s name, the general contractor, and project. The hard hat sticker shall include project name and verification of successful background check completion. Contractor is required to provide submittals to District for review and approval. Approved background check provider: <https://www.criminalinfo.com/index.php>

**RIVERDALE GRADE SCHOOL OFFSITE
IMPROVEMENTS
00 21 13 INVITATION TO BID & BID FORM**

INVITATION TO BID

FOR

RIVERDALE SCHOOL DISTRICT

Date: May 27, 2026

Bids Due: June 10, 2026

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

**RIVERDALE SCHOOL DISTRICT
Riverdale Grade School
Offsite Improvements**

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TERMS AND CONDITIONS FOR INVITATION TO BID

I. GENERAL INFORMATION

A. INTRODUCTION

By way of this Invitation to Bid (“ITB”), Riverdale School District (“District”) is seeking bids (“Bids”) from general contractors for work as identified in the construction documents for the **Riverdale Grade School Offsite Improvements** in Portland, Oregon (the “Project”).

All parties providing Bids in response to this ITB (“Bidders”) must be experienced in the type of work being bid and shall have adequate supervision, labor, materials, and equipment to carry out the work in an expeditious and workmanlike manner.

B. SOLICITATION SCHEDULE

ITB Release	Wednesday, May 27, 2026
Mandatory Pre-Bid Meeting	Tuesday, June 2, 2026, 3:00 PM
Non-Mandatory Pre-Bid Site Walk	Wednesday, June 3, 2026 11:00 AM
Request for Clarification/Solicitation	Thursday, June 4, 2026, 5:00 PM
Issue Last Addendum	Friday, June 5, 2026, 5:00 PM
Bid Due Date	Wednesday, June 10, 2026, 2:00 PM
1st Tier Sub Disclosure	Wednesday, June 10, 2026, 4:00 PM
Notification of Intent to Award	Wednesday, June 11, 2026
Anticipated Award Date	Wednesday, June 18, 2026
Procurement Start Date	Thursday, June 19, 2026
Construction Start Date	Monday, July 7, 2026
Substantial Completion Date	Friday, August 21, 2026

The District may, in its sole discretion, revise these dates.

C. BID MEETING AND SITE VISITS

1. **Mandatory Pre-Bid Meeting.** The non-mandatory pre-bid meeting will be held at the time and date indicated in the Solicitation Schedule virtually on TEAMS. E-mail: ebierman@riverdale.k12.or.us to request TEAMS invite. Unless the District elects, in its sole discretion, to schedule additional pre-bid meetings, this pre-bid meeting will be the only opportunity for interested parties to visit the location of the Project and receive a guided tour of portions of the site and that are part of the work. Information provided as a result of Bidder questions at the meeting will be distributed as addenda, and any statements made by the District's representatives at the pre-bid meeting are not binding on the District unless confirmed by written addendum. **Non-Mandatory Pre-Bid Walk** will be held in accordance with Solicitation Schedule at the corner of S Military and 11733 SW Breyman Ave., Portland OR 97219.
2. **Site Visits.** Bidders should visit the site as many times as needed to become familiar with the local conditions and shall carefully examine and judge for themselves the character of the work conditions. All Bidders shall be conclusively presumed to have knowledge of such in the preparation of the Bid and the execution of the Contract. **All Bidders shall make their intentions of site visits known to Erica Bierman, Senior Project Manager, at ebierman@riverdale.k12.or.us AT LEAST 24 HOURS IN ADVANCE.**

D. REQUESTS FOR CLARIFICATION OF ITB

Bidders are notified that they must examine carefully this ITB, all attachments hereto, and any addenda (collectively "ITB") and become thoroughly familiar with all laws, rules, and regulations that apply. The Bidder who is awarded a Contract shall be conclusively presumed to be aware of any and all aspects affecting the work that would have been reasonably apparent upon the examination called for within this ITB.

Bidders are cautioned not to make any assumptions as to the implied meaning or intent of any part of this ITB. Should a Bidder have any doubt about the meaning of the ITB documents, the Bidder should request clarification or additional information concerning the ITB documents in writing as soon as possible, but in no event will such requests be received by the District later than the time and date indicated in the Solicitation Schedule. Questions regarding this ITB should be sent via email to Erica Bierman Senior Project Manager, at ebierman@riverdale.k12.or.us.

Failure to request clarification or interpretation of ITB will not relieve a Bidder of its responsibilities. Signing of the Bid Form will constitute a representation that the Bidder has thorough comprehension of the full intent and scope of the ITB.

ANY CORRECTIONS OR CLARIFICATIONS MADE IN ANY MANNER OTHER THAN BY A WRITTEN ADDENDUM WILL NOT BE BINDING ON THE DISTRICT AND BIDDERS SHALL NOT RELY THEREON.

E. AMENDMENT OF ITB BY ADDENDA ONLY

If any part of this ITB is amended, all addenda will be posted to Riverdale School District Bid & RFP webpage at: <https://www.riverdaleschool.com/about-us/district-business-budgets>. Each Bidder shall provide written acknowledgement of its receipt of all issued addenda with its Bid by completing the Bid Form (attached hereto as Appendix A). Addenda will be published no later than 6 days before the Bid due date specified in the Solicitation Schedule, unless the published addendum also extends the Bid due date.

F. BID SECURITY

1. At the time the Bid is submitted, a Bid security in the amount of 10% of the total amount of the Bid shall be given to the District. The Bid security shall be: (a) a surety bond from a surety company authorized to do business in the state of Oregon, using the Bid Bond Form attached as Appendix B; (b) an irrevocable letter of credit issued by an insured institution as defined in ORS 706.008; or (c) a cashier's check or certified check. Unsuccessful Bidders shall have their Bid security returned or released when a Contract has been fully executed with the successful Bidder and all required bonds and insurance have been provided by the successful Bidder, or after all Bids have been rejected. The successful Bidder shall have its Bid security returned when all Contract Documents are fully executed and all pre-work requirements (including but not limited to all required bonds and insurance have been provided) have been met.
2. The District reserves the right to retain the Bid security of the next two lowest Bidders until the successful Bidder has executed the Contract and provided all required bonds and insurance or until no more than 90 days after Bid opening, whichever is shorter.

G. WITHDRAWAL OR MODIFICATION OF BIDS

Bidders are expected to submit Bids that are accurate, complete, and responsive to the requirements set forth in this ITB. If, after submitting a Bid, the Bidder finds changes are necessary, the Bidder may withdraw or modify its Bid by delivering a written request to the District at any time before Bids are due, as indicated in the Solicitation Schedule. Such request for modification or withdrawal must comply with the requirements set forth in OAR 137-049-0320. After Bids are due, a Bidder MAY NOT withdraw or modify its Bid in any way. If accepted, a Bid is considered non-cancellable, and the Bidder will be expected to execute the Contract. If for any reason Bidder does not execute the Contract, the District can be expected to take whatever action it believes appropriate, including, but not

limited to, the disqualification of that Bidder from future public contracts and seeking relief pursuant to the terms of the Bidder's Bid bond.

H. CONTRACTOR LICENSING

No Bid shall be received or considered unless the Bidder is licensed by the Oregon Construction Contractors Board. Any Bid received from a Bidder identified by the Oregon Construction Contractors Board as ineligible to hold public contracts in accordance with ORS 701.227 shall be disqualified from consideration.

I. PREVAILING WAGES

The Project is subject to the state prevailing wage rates under ORS 279C.800 to 279C.875. The prevailing wage rates may be found at http://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx.

J. NON-DISCRIMINATION

Using the Certification of Non-Discrimination attached as Appendix E, Bidders must certify that they will not discriminate in obtaining subcontractors, in accordance with ORS 279A.110(4).

K. BIDDER RESIDENCY

Bidder shall indicate on the Bidder Residency Statement attached as Appendix F to the ITB whether Bidder is a "resident bidder" as defined in ORS 279A.120. A "resident bidder" means a bidder that has paid unemployment taxes or income taxes in Oregon during the 12 calendar months immediately preceding submission of the Bid, has a business address in Oregon and has stated whether the Bidder is a "resident bidder" on Appendix F. In determining the lowest responsive Bidder for this Project, a percentage shall be added to the Bid of a non-resident Bidder equal to the percentage, if any, of the preference given to that Bidder in the state in which the Bidder resides. This percentage, if utilized, shall not be added to the dollar value of Contract to be awarded as a result of this ITB.

L. ACCEPTANCE OF CONDITIONS AND CONTRACTUAL REQUIREMENTS

By submitting a Bid, a Bidder expressly represents that the Bidder has read and understands the terms and conditions contained in this ITB, and that the Bidder agrees to be bound by such terms and conditions, including any and all changes to such terms and conditions contained in any and all written addenda. The Bidder further warrants that it takes no exception to any terms, conditions, obligations, or requirements contained in the form of the agreement attached as Appendix I ("Contract"). The term "Contract Documents" as used in this ITB refers to the Contract Documents referenced in the Contract.

The successful Bidder must enter into a Contract with the District in the form included here as Appendix I. The successful Bidder must obtain and maintain insurance and bonding as required by the Contract.

The District may in its sole discretion negotiate any terms, conditions, obligations, or requirements of the Contract.

M. FIRST-TIER SUBCONTRACTOR DISCLOSURE

1. Bidders are required to disclose information about certain first-tier subcontractors (see ORS 279C.370). Specifically, when the subcontract amount of a first-tier subcontractor furnishing labor or labor and materials will have subcontract value that is equal to or greater than 5% of the total project Bid amount or \$15,000, whichever is greater, or \$350,000 regardless of the percentage of the total project Bid amount, the Bidder must disclose on the First-Tier Subcontractor Disclosure Form (attached as Appendix H) the following information about that subcontract either in its Bid submission, or within two hours after Bid closing:
 - a. The subcontractor's name;
 - b. The category of work that the subcontractor would be performing; and
 - c. The dollar value of the subcontract. If the Bidder will not be using any subcontractors that are subject to the above disclosure requirements, the Bidder is required to indicate "NONE" on the accompanying form.

THE DISTRICT MUST REJECT A BID IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THIS INFORMATION BY THE STATED DEADLINE (see OAR 137-049-0360).

2. Compliance with this requirement is a matter of responsiveness. Bids that are submitted by the Bid closing date, but for which the disclosure submittal has not been made by the specified deadline, are not responsive and shall not be considered for award.

N. REQUEST FOR CHANGE OR CLARIFICATION/PROTEST OF CONTENTS OF ITB

The purpose of this request for change or clarification/protest procedure is to permit the District time to correct, prior to the submission of Bids, specifications or procedures that may be improvident or unlawful, or which may unnecessarily restrict competition. This requirement is intended to eliminate, by permitting corrections prior to the submission of Bids, the waste of resources and delay that may result from the untimely detection of errors in the ITB, possible protests, and possible rejection of Bids. The District will consider each protest or request,

amend the ITB accordingly if warranted, and notify in writing by written addenda each prospective Bidder of any change. At its discretion, the District may extend the Bid closing date if the District determines an extension is necessary to consider the protest or request for clarification or change and to issue an addendum, if any, to this ITB.

Accordingly, any prospective Bidder who contends that the terms and conditions of this ITB, including but not limited to the Contract, or any aspect of the selection process: (1) will encourage favoritism in the award of the Contract; (2) will substantially diminish competition; (3) will violate any other statute, regulation (including, but not limited to, OAR chapter 137), policy, or law of any kind; and/or (4) are ambiguous, insufficient, or unfair for any reason must file a written protest to this ITB consistent with the procedures provided for in OAR 137-049-0260, as modified in this ITB. Protests must set forth the basis of the protest or request for clarification along with any proposed changes to the ITB provisions, specifications, or Contract terms. Failure to file a protest by the time and date indicated above will be deemed a waiver of any claim by a Bidder that the selection process violates any of the items (1-4) of the foregoing sentence. Any protest that does not meet these requirements will not be considered.

Requests for change or clarification and/or protests must be received by the District no later than 5:00 p.m., Friday, May 29, 2026.

The District will issue a written disposition of each request for change or clarification and/or protest no less than three business days before Bids are due. If the District agrees with the request or upholds the protest, in whole or in part, the District may, in its sole discretion, issue an addendum reflecting its disposition or take other appropriate action.

O. RESERVATION OF RIGHTS

The District reserves the right, in its sole discretion:

1. to reject all Bids;
2. to reject Bids which it determines to be non-responsive;
3. to reject Bids upon the District's finding that the Bidder:
 - a. has been declared ineligible under ORS 279C.860 by the Commissioner of Bureau of Labor and Industries;
 - b. has been identified by the Oregon Construction Contractors Board as ineligible to hold public contracts in accordance with ORS 701.227; or
 - c. is not responsible;

4. to amend this ITB, including making such changes or corrections in drawings, specifications, or quantities as it may deem necessary or desirable prior to the Bid due date;
5. to extend the deadline for submitting Bids;
6. to determine whether a Bid does or does not substantially comply with the requirements of this ITB;
7. to waive any minor irregularity, informality, or non-conformance with this ITB;
8. to obtain information from or provide information to other public agencies, upon request, regarding the Bidder's performance;
9. to permit a Bidder to submit supplemental information;
10. to negotiate with any Bidder or multiple Bidders in any manner necessary to serve the best interests of the District;
11. at any time prior to the Contract execution (including after the notice of intent to award is issued):
 - a. to reject any Bid that fails to substantially comply with all prescribed ITB requirements and procedures and/or the prescribed public contracting procedures and requirements, including but not limited to the requirement to demonstrate the Bidder's responsibility under ORS 279C.375; and/or
 - b. to reject all Bids received and cancel this ITB upon a finding by the District that there is good cause therefor and that such cancellation would be in the public interest;
12. to hold meetings, exchange correspondence, and obtain data from any source or party, including a Bidder; and
13. in the event any Bidder to whom the Contract is awarded shall fail to execute the Contract or furnish satisfactory bonds or evidence of insurance coverage within the time and in the manner hereinafter specified, to re-award the Contract to another Bidder.

ALL BIDDERS WHO SUBMIT A RESPONSE TO THIS ITB UNDERSTAND AND AGREE THAT THE DISTRICT IS NOT OBLIGATED TO AWARD A CONTRACT TO ANY BIDDER. THE DISTRICT HAS NO FINANCIAL OBLIGATION TO ANY BIDDER. IN ADDITION, EACH BIDDER UNDERSTANDS AND AGREES THAT THE DISTRICT SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES, EXPENSES, AND COSTS INCURRED IN PREPARING A BID,

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

SUBMITTING A BID IN RESPONSE TO THIS ITB, ATTENDING ANY MEETINGS, AND EXECUTING A CONTRACT. EACH BIDDER WHO PREPARES AND SUBMITS A BID IN RESPONSE TO THIS ITB DOES SO SOLELY AT THE BIDDER'S OWN COST AND EXPENSE.

II. SCOPE OF WORK

A. OVERVIEW OF WORK

1. The Project scope of work is generally described herein. Bidders shall use this information to assist in the understanding of the District's desired scope of work, and to delineate between work that is intended to be included within this Contract, and that which is to be provided by others. Bidders shall rely upon their own expertise to determine all work required to perform the Contract.
2. The successful Bidder will be required to do all work which is shown on the drawings and specifications listed on Appendix C ("Drawings and Specifications") or that is reasonably inferable from the Drawings and Specifications as necessary to complete the scope of work.
3. This Project consists of the work described in the Drawings and Specifications and all work incidental, necessary or reasonably inferable from the Drawings and Specifications. The successful Bidder will be expected to provide construction services as required by the Contract, including but not limited to:
 - a. Create a schedule that achieves substantial completion **no later than Friday, August 21, 2026**, with project close out no later than September **30, 2026**, and Final Completion no later than **October 29, 2026**. Substantial completion, shall include all work shown on the Drawings and Specifications and briefly described in the scope of work below. The schedule shall include all major pre-construction, construction, and close-out activities.
 - b. Provide, through itself or subcontractors, the necessary supervision, labor, material, equipment, machinery, temporary utilities, and other temporary facilities to permit the complete construction of the Project in accordance with the Drawings and Specifications.
 - c. Exercise complete and exclusive control over the means, methods, sequences, and techniques of construction.
 - d. Employ only subcontractors who are duly licensed and qualified to perform the work consistent with the Contract. The District may reasonably object to contractor's selection of any subcontractor, provided that the Contract price and/or Contract time(s) shall be

adjusted to the extent that the District's decision impacts contractor's cost and/or time of performance.

- e. Provide materials and labor necessary to complete all aspects of the Project Scope of Work, included in the project documents and briefly described as: all aspects to complete the project as identified in the construction documents for Riverdale Grade School Offsite Improvements located in Portland, OR.

B. RELATED WORK BY THE OWNER OR OTHERS

1. As indicated in the Drawings and Specifications, some portions of the Project may be provided by the District or by a District contractor or vendor. The successful Bidder will be required to coordinate with all aspects of any other projects being performed at or near the Project site and with any other District contractors or vendors.

C. PERMITS AND FEES

1. After execution of the contract, the Contractor shall obtain and pay for all trade permits, fees, and licenses necessary to execute and complete the work of each project. Obtain permits and notify the following agencies at least ten (10) days prior to beginning work. Other permits and notifications may also be necessary. Reference Specification Section 00 31 43 – Building Permit.

D. COORDINATION OF WORK

This Project shall be coordinated in all aspects with any other projects being performed at or near the Project site.

III. OFFER FORMAT AND BID SUBMISSION

A. OFFER FORMAT

1. Formatting Requirements. The following items explain the format requirements for Bid preparation and submission. The District reserves the right to eliminate from consideration any Bid received that does not follow this format.
2. Forms. Bids shall be submitted on unaltered Bid Forms furnished by the District. The following are the forms that must be submitted with each Bid:
 - a. Signed Bid Form (all pages);
 - b. Bid security;

- c. Bidder's Responsibility Information Form (all pages);
 - d. Certification of Non-Discrimination;
 - e. Bidder Residency Statement;
 - f. Non-Collusion Declaration (attached as Appendix G); and
 - g. First-Tier Subcontractor Disclosure Form (submitted within two hours of Bid closing).
3. Signature. The original Bid must bear an original signature signed in ink and dated by the Bidder or a representative legally authorized by the Bidder, further defined as follows:
- a. In the case of an individual Bidder, by such individual Bidder.
 - b. In the case of a partnership or limited liability partnership, the name of the partnership or limited liability partnership must appear on such Bid and it shall be signed in the name of such partnership or limited liability partnership by at least one partner. In addition to such signature, the names of all partners shall be stated in the Bid.
 - c. In the case of a limited liability company, the name of the limited liability company must appear on such Bid and it shall be signed in the name of such limited liability company by at least one member or manager. In addition to such signature, names of all members (and at least one manager, if applicable) shall be stated in the Bid.
 - d. In the case of a corporation, the corporate name must appear on such Bid, and it shall be signed by the president or other authorized officer, and there shall be set forth under the signature of such officer the name of the office he or she holds or the capacity in which he or she acts for such corporation.

The signature must clearly indicate the Bidder's intent to be bound by the terms and conditions specified in this ITB and its Bid.

Wherever a signature is called for in the Contract Documents, the document must be signed; all signatures must be by an authorized person; and all signing must be actual signatures, i.e., not a stamped, printed, typed, or electronic signature. If signatures do not meet these requirements, a Bid may be declared non-responsive.

4. Content. Bids shall be on the form provided and shall not contain any recapitulation of the work to be performed. All blank spaces in the form shall be fully filled, in ink or typewritten, in both words and numbers

where required. No modifications shall be made to the Bid Form. Alterations and erasures shall be initialed by the signatory of the Bid. Bids that are incomplete or that are not in conformity with the law may be rejected by the District in its sole discretion. A Bidder may not make its Bid conditional or contingent upon the District's acceptance of any terms and conditions other than those contained in this ITB. Incomplete Bids may be subject to rejection at the District's discretion.

5. Alternates.

- a. Bidders shall submit a cost for each alternate, if any, identified in the Drawings and Specifications ("Alternate").
- b. Bidders shall state the amount to be added to or deducted from the base Bid for making the changes. If no change in price is required for an Alternate, Bidder shall indicate "NO CHANGE."
- c. Bidders shall include in each Alternate price all costs specifically including, but not limited to, supervision, labor, materials, equipment, tools, permits, taxes, markup, overhead, profit, and incidentals required for a complete installation, regardless of whether they are mentioned in the Alternate description.
- d. The District reserves the right to accept any or all of the Alternates in any order or combination, or to accept no Alternates.
- e. Accepted Alternates will be identified in the Contract with the successful Bidder.

B. BID SUBMISSION

1. Deadline for Submission of Bids. Bids must be received by the time and date indicated in the Solicitation Schedule. Late Bids or modifications will not be accepted.
2. Means of Submission. Interested proposers must submit bid no later than Wednesday, June 10, 2026 2:00PM (PST) pursuant to the provisions of this Solicitation by email only to: ebierman@riverdale.k12.or.us . **BIDS RECEIVED AFTER THIS TIME WILL NOT BE ACCEPTED.**

3. Duration of Bids. Any Bid submitted shall be irrevocable and open for acceptance until the earlier of: (1) the date when the District executes the Contract; (2) the date the District cancels this ITB; or (3) 45 days after the Bid opening. The District may request that Bidders extend, in writing, the time during which the District may consider their Bids. If the Bidder agrees to such an extension, the Bid shall continue as a firm offer, irrevocable, valid, and binding on the Bidder for the agreed-upon extension period. A notice of intent to award the Contract to any Bidder shall not constitute a rejection of any other Bid.
4. Bid Opening. Bids shall be posted with in a few minutes after the time and date deadline for Bid submittal indicated in the Solicitation Schedule.

IV. BID EVALUATION AND AWARD

A. BIDDER'S QUALIFICATIONS AND RESPONSIBILITY

1. Each Bidder shall submit a completed Bidder's Responsibility Information Form (attached as Appendix D) along with its Bid. The Bidder's Responsibility Information Form will be used to evaluate the qualifications of any Bidder whose Bid is under consideration for award.
2. Prior to award and execution of a Contract, the District will evaluate whether the apparent successful Bidder meets the applicable standards of responsibility identified in ORS 279C.375 and OAR 137-049-0390. In doing so, the District may investigate Bidder and request supplemental information in addition to that already required in this document, when the District, in its sole discretion, considers it necessary or advisable. Submission of a signed Bid shall constitute approval for the District to obtain any information that the District deems necessary to conduct the responsibility evaluation.
3. The District may postpone the award of the Contract after announcement of the apparent successful Bidder in order to complete its investigation and evaluation. Failure of the apparent successful Bidder to demonstrate responsibility shall render the Bidder non-responsible and shall constitute grounds for Bid rejection.
4. If a Bidder is found not to be responsible, documentation of the reasoning will be sent to the Oregon Construction Contractors Board. Such documentation will be based upon the criteria set forth in ORS 279C.375(3).

B. BASIS FOR AWARD

1. The Contract shall be awarded to the lowest responsive, responsible Bidder based on the lowest base Bid. Notwithstanding the foregoing, the

District reserves the right to accept Alternates, if any, in any order or combination and to determine the low Bidder on the basis of the lump sum base bid and the Alternates accepted.

2. Solely for the purpose of determining the lowest responsive, responsible Bidder, the District shall add a percent increase to the Bid of a non-resident Bidder, equal to the percent, if any, of preference given to the Bidder in the state in which the Bidder resides. For purposes of determining the percent increases to be applied, the District shall rely on the list published by the Oregon Department of Administrative Services. The District shall not incur any liability to any Bidder by relying on such list.
3. Award shall be subject to preference for goods or services that are manufactured in Oregon, if price, fitness, availability, and quality are otherwise equal.

C. PROCESSING OF BIDS

Neither the release of a Bid security nor acknowledgment that the selection process is complete (whether by posting of a Bid tabulation sheet, issuance of notice intent to award, or otherwise) shall operate as a representation by the District that any Bid submitted was complete, sufficient, lawful in any respect, or otherwise in substantial compliance with the ITB requirements.

D. NOTICE OF INTENT TO AWARD

The notice of intent to award shall serve as notice to all Bidders that the District intends to award the Contract.

V. PROTEST OF AWARD

Adversely affected or aggrieved Bidders may submit protests in writing to Nicole Bassen, Business Manager, Riverdale School District Central Office, 11722 S Breyman Ave., Portland, OR, 97219. The protest must state clearly the grounds for the protest and the legal authority in support thereof. Such protests must be received by the District no later than three calendar days after the notice of intent to award has been issued.

Such protests shall specify the grounds for the protest to be considered by the District. To be an adversely affected or aggrieved Bidder, the Bidder must demonstrate that all lower Bidders are ineligible for award because (a) their Bids were non-responsive, or (b) the District committed a substantial violation of a provision in the ITB or applicable procurement statute or administrative rule, and but not for such substantial violation, the Bidder would have been the lowest responsive, responsible Bidder offering the lowest Bid and would have been awarded the Contract. No protest of the award of the Contract shall be considered if submitted after the deadline established for submitting such protest.

At the request of the protester, a hearing will be conducted before the District staff within seven calendar days after submission of the written protest. The District will either uphold or deny the protest, and a written response will be issued for all properly submitted protests. However, any response by the District is not intended as, and shall not in and of itself constitute, confirmation that the Bidder is, in fact, adversely affected or aggrieved, and therefore entitled to protest an intent to award, or that the protest was timely or properly submitted. After expiration of the protest period and resolution of any protests, the District will proceed with final award of the Contract.

Appendix A
BID FORM

Riverdale School District

**Riverdale Grade School Offsite
Improvements**

Bids due: Wednesday June 10, 2026, at 2:00 p.m.

Name of Bidder: _____

Address of Bidder: _____

Bidder's Oregon Construction Contractors Board License Number: _____

The Bidder is (check one):

☐ a corporation organized and existing under the laws of the state of _____ and
licensed to do business in the State of Oregon;

☐ a Limited Liability Company (LLC) organized and existing under the laws of the State of _____
_____ and licensed in to do business in the State of Oregon.

☐ a partnership organized and existing under the laws of the state of _____
consisting of the following partners: _____

☐ a joint venture organized and existing under the laws of the state of _____
consisting of the following joint ventures: _____

☐ a sole proprietor

The undersigned Bidder acknowledges receipt of and familiarization with the Bidding documents, including but not limited to the project manual, the drawings, the specifications, and other Contract Documents, and the following Addenda:

Addenda:	No. _____	Dated: _____
Addenda:	No. _____	Dated: _____
Addenda:	No. _____	Dated: _____
Addenda:	No. _____	Dated: _____

The Bidder further declares that it has carefully examined Contract Documents for construction of the Project, that it has inspected the site and familiarized itself with local conditions that may affect the cost of the Work and/or the time for performance of the Work, that it has satisfied itself as to quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of quantities of work and materials as included in the Bid is brief and is intended only to indicate the general nature of the Work and to correlate said quantities with detailed requirements in the Contract Documents, and that this Bid is made according to provisions and under terms of the Contract Documents, which are hereby made a part of this Bid.

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

By submitting this Bid, the Bidder agrees:

1. To furnish all material, labor, tools, equipment, management, supervision and utility and transportation services necessary to perform and complete, in a workmanlike manner, all of the Work required for construction of the Work in accordance with the Contract Documents and contained or referenced in the Bidding Documents.
2. To hold the Bid open for 45 calendar days after the date set for receipt of Bids.
3. To accept the provisions of the Instructions to Bidders, including the disposition of Bid security.
4. Within ten (10) days of award, to execute and deliver the Contract, to furnish a performance and payment bonds in accordance with the requirements of the Contract Documents, to deliver the required certificates of insurance, and to perform the other obligations specified in the Contract Documents.
5. To Substantially Complete the Work no later than the date set forth in the Contract.
6. The Bid submitted is in response to the specific language contained in the ITB, and bidder has made no assumptions based on either (a) verbal or written statements not contained in the ITB or addenda, or (b) any ITB previously issued by the District.

Lump Sum Base Bid

LUMP SUM BASE BID: The undersigned Bidder hereby offers to perform all the Work on Riverdale Grade School Offsite Improvements Project in accordance with the Contract Documents for the total fixed lump sum price of:

_____ Dollars (\$_____)
(Show amount in words and in figures; in case of discrepancy, the amount shown in words will govern.)

Bid Alternates

Not Applicable

Contract Unit Bid Prices

Not Applicable

Allowances

\$20,000

Median

Landscape

The undersigned Bidder has enclosed the required Bid security and other items required by the ITB, including but not limited to:

- Bidder's Responsibility Information Form (all pages);
- Certification of Non-Discrimination;
- Bidder Residency Statement; and
- Non-Collusion Declaration.

Dated: _____

Bidder's Company Name

Signature

Name

Title

Bidder's Federal Tax ID Number:

< END OF BID FORM >

**Appendix B
BID BOND**

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and _____
(Here insert full name and address or legal title of Surety)

a Corporation duly organized under the laws of the State of Oregon as Surety, hereinafter called the Surety, are held and firmly bound unto Riverdale School District, as Obligee, hereinafter called the Obligee, in the sum of ten percent (10%) of the total amount of the Bid for work herein described, for the payment of which sum well and truly to be made, as agreed and liquidated damages, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for the Riverdale Grade School Offsite Improvements Project.

NOW, THEREFORE, if the Obligee shall accept the Bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such Bid, and give such good and sufficient payment and performance bonds as may be specified in the Contract Documents for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety and this bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such Bid, and the Surety does hereby waive notice of any such extension.

Signed and sealed this _____ day of _____, 20__.

(Witness)	(Principal)	(Seal)
	(Title)	

(Witness)	(Surety)	(Seal)
	(Title)	

< END OF APPENDIX B >

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

Appendix C
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OTHER RELEVANT DOCUMENTS

1. Drawings: Issued for Bid / 2026-05-08 - Riverdale Site Plan ITB
DRAWINGS PUBLISH 20260527
2. Specifications: Multnomah County Design and Construction Manual
3. 2026-05-08 - Riverdale Site Plan Landscape Allowance
4. 3005 Riverdale School Topo 2026-02-17
5. Stationary Lane Closure Requirements OTTCH DIA320
6. COP LU 23-103216 CU (4240005) – Land Use Decision Executed
20240523
7. DJC Advertisement Riverdale Offsite Improvements publish 20260527
8. 000112 – RIVERDALE A101-2017
9. 002113 – RIVERDALE INVITATION TO BID & BID FORM
10. 007200a_A201-2017 RIVERDALE GENERAL CONDITIONS

< END OF APPENDIX C >

Appendix D
BIDDER'S RESPONSIBILITY INFORMATION FORM

BIDDER MUST COMPLETE ALL PAGES OF THIS FORM.

Bidder Name: _____

CCB #: _____

Use additional pages as needed to provide full and complete responses.

1. **EXPERIENCE:** List the number of years Bidder has been operating its business under its current license. If Bidder's business has been in continuous existence under a current active license and a previous license number, then identify the previous license number. List and briefly describe a minimum of three similar projects performed by Bidder in the past five years that best characterize Bidder's capabilities. Include relevant data such as the type of work involved and project dates. Describe how Bidder meets this experience requirement (use separate sheet if additional space is needed):

2. **LAWSUITS/JUDGMENTS:** Within the past five years, has Bidder had any lawsuits filed against it involving contract disputes? For the purposes of this request, "lawsuits" include demands for arbitration and "judgments" includes arbitration awards. YES/NO

If "YES," indicate dates and ultimate resolution of suit (with regard to judgments, include jurisdiction and date of final judgment or dismissal).

3. **BANKRUPTCY:** Within the past 36 months, has Bidder filed a bankruptcy action, filed for reorganization, made a general assignment of assets for the benefit of creditors, or had an action for insolvency instituted against it? YES/NO

If "YES," supply filing dates, jurisdictions, type of action, ultimate resolution, and dates of judgment or dismissal, if applicable.

4. **LAWSUITS BY CREDITORS:** Within the past 24 months, has Bidder had any lawsuits filed against it by creditors? YES/NO

If "YES," indicate dates and ultimate resolution of suit (with regard to judgments include jurisdiction and date of final judgment or dismissal).

5. **OREGON CONSTRUCTION CONTRACTORS BOARD LICENSING:** Is Bidder licensed with the Oregon Construction Contractors Board at the time Bidder submits a Bid for the work under this ITB? YES/NO

If "YES," indicate Oregon Construction Contractors Board license number and expiration date.

6. ABILITY TO PERFORM WITHIN TIME SPECIFIED: List the project titles, original contract time and change order extensions for three specific projects in the past five years. Bidder shall document that it achieved substantial completion of such three projects of similar size and scope within no more than 105% of the final contracted time for completion (including change ordered adjustments). If the Bidder cannot document three such projects, the Bidder may submit alternative documentation of one or more similar projects where the Bidder did not achieve substantial completion within 105% of the final contract time, a calculation of the total percentage of time over the final contract time necessary to achieve substantial completion, and an explanation as to why the required additional time was beyond the Bidder's control.

7. DEBARMENT: Has Bidder been debarred by any public agency within the past two years? YES/NO

If "YES," identify the public agencies.

8. NON-COMPLETION: Has Bidder failed to complete a contract in the last five years? YES/NO

If "YES," identify the project(s).

9. COMPLETION BY SURETY: Has Bidder ever defaulted on a contract forcing a surety to suffer a loss?
YES/NO

If "YES," identify the project(s).

10. SUSPENSION, DISMISSAL, DEFAULT: Has Bidder been suspended, dismissed, or declared in default from a project during the last five years? YES/NO

If "YES," identify the project(s) and the type of action taken against Bidder.

11. BOND REQUIREMENT: For the project described under this ITB, can Bidder obtain payment bond and performance bond issued by a surety which is authorized to transact surety business in the State of Oregon?
YES/NO

If "YES," identify name of surety, contact name, address, phone number, and email address.

12. SURETY CLAIMS: Have there been any surety claims against Bidder's company on any contracts which have been performed or are in the course of being performed? YES/NO

If "YES," identify the project and explain the nature of the claims.

13. REVOKED LICENSE: Has Bidder's company or any key person in the company had a license revoked by the Oregon Construction Contractors Board? YES/NO

If "YES," explain the underlying reason for the revocation of the license.

14. CRIMINAL OFFENSE: Has Bidder's company or any key person in the company been convicted of a crime involving fraud, material misrepresentation or any crime involving the awarding of a contract for a government construction project or the bidding or performance of a government contract? YES /NO

15. DEMAND ON PERFORMANCE BOND: In the last five years, has an owner ever made a demand on your performance bond? YES/NO

16. TERMINATION OF BONDING/INSURANCE COVERAGE: In the last five years, has a surety or insurance company terminated your or your company's existing bonding and/or insurance coverage due to excessive claims history and/or non-payment of premiums? YES/NO

17. CITATIONS OR ENFORCEMENT ACTIONS: Within the last five years, have you or your company been cited or subject to any enforcement action for violation of any applicable law or regulations related to its performance of a prior construction contract? For the purposes of this section, "applicable law or regulations" includes, without limitation, any building, zoning, environmental, site development, or Oregon Public Contracting Code regulations with which a prior project was required to comply, including non-discrimination regulations and prevailing wage requirements. YES/NO

If "YES," state the date, nature, and final resolution of every such citation or enforcement action.

18. BONDING: What is the largest contract you have had bonded through the surety company named in Question #11 above? Please identify the project name, the nature of the project, the date of the project, and the original contract price.

19. BIDDER INSURANCE: Provide liability insurance certificate showing that your company is covered by liability insurance in amounts required in the contract. Prior to contract execution, successful Bidder must provide the District all Insurance Certificates as specified in the contract.

20. PAY EQUITY TRAINING CERTIFICATION: Do you employ 50 or more full-time workers? YES/NO

If "YES" and your Bid exceeds \$500,000, do you possess an unexpired certificate issued by the Oregon Department of Administrative Services under ORS 279A.167? YES/NO

21. BIDDER REFERENCES FOR COMPARABLE PROJECTS IN SIZE AND SCOPE

Bidder shall provide a list of three different project references with its Bid that can be contacted regarding the quality of workmanship and service that the Bidder provided on projects of comparable size and scope within the past five years. Bidder must provide all information requested below and may use either the form provided in this section or its own form. PLEASE NOTE: If a different form is used, it must still include ALL information required below, including a project description.

Project Reference #1
Names and Dates of Project:
Project Location:
Project Description:
Contact Person #1 Name:
Contact Person #1 Firm Name:
Contact Person #1 Phone, Email:
Contact Person #2 Name:
Contact Person #2 Firm Name:
Contact Person #2 Phone, Email:
Project Reference #2
Names and Dates of Project:
Project Location:
Project Description:
Contact Person #1 Name:
Contact Person #1 Firm Name:
Contact Person #1 Phone, Email:
Contact Person #2 Name:
Contact Person #2 Firm Name:
Contact Person #2 Phone, Email:
Project Reference #3
Names and Dates of Project:
Project Location:
Project Description:
Contact Person #1 Name:
Contact Person #1 Firm Name:
Contact Person #1 Phone, Email:
Contact Person #2 Name:
Contact Person #2 Firm Name:
Contact Person #2 Phone, Email:

< END OF APPENDIX D >

Appendix E
CERTIFICATION OF NON-DISCRIMINATION

The undersigned Bidder is aware that, under ORS 279A.110, a Bidder that competes for or is awarded a public contract may not discriminate against a subcontractor in awarding a subcontract because the subcontractor is a disadvantaged business enterprise, a minority-owned business, a woman-owned business, a business that a service-disabled veteran owns or an emerging small business that is certified under ORS 200.055. Accordingly, the undersigned Bidder hereby certifies as part of its bid submission that it has not discriminated and will not discriminate against a disadvantaged business enterprise, a minority-owned business, a woman-owned business, a business that a service-disabled veteran owns or an emerging small business in awarding a subcontract for this Project.

Bidder's Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Dated: _____

< END OF APPENDIX E >

Appendix F
BIDDER RESIDENCY STATEMENT

Pursuant to ORS 279A.120, Oregon's reciprocal preference law, public contracting agencies shall, for the purposes of determining the lowest responsible Bidder and the awarding of a contract, add a percent increase on the Bid of a non-resident Bidder equal to the percent, if any, of the preference given to that Bidder in the state in which the Bidder resides.

As defined in ORS 279A.120, "Resident Bidder" means a Bidder that has paid unemployment taxes or income taxes in this state in the twelve calendar months immediately preceding submission of the Bid, has a business address in this state, and has stated in the Bid whether the Bidder is a "Resident Bidder." A "non-resident Bidder" is a Bidder who does not meet the definition of a "Resident Bidder" as stated above.

Bidder ____ IS ____ IS NOT a "Resident Bidder" as set forth above.

If a Resident Bidder, enter your Oregon business address below:

If a Non-resident Bidder, enter state of residency:

Bidder hereby certifies that the information provided is true and accurate.

Bidder's Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Dated: _____

< END OF APPENDIX F >

Appendix G

NON-COLLUSION DECLARATIONS

STATE OF _____)
) ss.
County of _____)

I state that I am authorized to make this declaration on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the prices and amount of this bid.

I declare under penalty of perjury that:

1. The prices and amounts of this bid have been arrived at independently and without consultation, communication, or agreement with any other bidder, or potential bidder.
2. That neither the prices nor the amount of this bid and neither the approximate prices nor approximate amounts of this bid have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.
3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit an intentionally high or non-competitive bid or other form of complementary bid.
4. The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other non-competitive bid.
5. My firm, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted of or found liable for any act prohibited by state or federal law in any jurisdiction, including conspiracy or collusion with respect to bidding on any public contract.
6. I state that I understand that the above representations are material and important, and that they will be relied upon by the District in awarding the contract for which this bid is submitted. I understand, and my firm understands, that any misstatement in this declaration is and shall be treated as a fraudulent concealment from the District of the true facts relating to the submission of bids on this contract, and agree that such misstatements could subject the undersigned and my firm to damages.

Name of Firm

Printed Name and Title

Signature _____

< END OF APPENDIX G >

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

Appendix H
FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

Project Name: **Riverdale Grade School Offsite Improvements**

Bid Number: _____

Bid Closing: Date _____, Time _____

This form must be submitted at the location specified in the ITB on the advertised bid closing date and within two hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed.

Subcontractor Name	Category of Work	Dollar Value of Subcontract

(ATTACH ADDITIONAL SHEETS IF NEEDED.)

Failure to submit this form by the disclosure deadline will result in a nonresponsive bid. A nonresponsive bid will not be considered for award.

Bidder's Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Phone Number: _____

Dated: _____

Appendix I

Form of Contract

FORM OF CONTRACT

- A. Modified AIA Document A101 - 2017 "Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum" will be the Contract for this Project.
 - 1. A DRAFT COPY POSTED TO RIVERDALE Website

RELATED DOCUMENTS

- 1. Drawings: Issued for Bid / 2026-05-08 - Riverdale Site Plan ITB DRAWINGS PUBLISH 20260527
- 2. Specifications: Multnomah County Design and Construction Manual
- 3. 2026-05-08 - Riverdale Site Plan Landscape Allowance
- 4. 3005 Riverdale School Topo 2026-02-17
- 5. Stationary Lane Closure Requirements OTTCH DIA320
- 6. COP LU 23-103216 CU (4240005) – Land Use Decision Executed 20240523
- 7. DJC Advertisement Riverdale Offsite Improvements publish 20260527
- 8. 000112 – RIVERDALE A101-2017
- 9. 002113 – RIVERDALE INVITATION TO BID & BID FORM
- 10. 007200a_A201-2017 RIVERDALE GENERAL CONDITIONS
- 11. 000113 EXHIBITS A, B, C, D, E, F

**RIVERDALE SCHOOL DISTRICT
RIVERDALE GRADE SCHOOL OFFSITE IMPROVEMENTS**

00 72 00 A201-2017 GENERAL CONDITIONS

DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Riverdale School District 51J – Offsite Improvements
Multnomah County, Oregon
11733 SW Breyman Ave.
Portland OR, 97219

THE OWNER:

(Name, legal status, and address)

Riverdale School District
11733 SW Breyman Ave.
Portland OR, 97219

THE ARCHITECT:

(Name, legal status, and address)

Humber Design Group, Inc.
110 SE Main Street
Suite 200
Portland, OR 97214

THE CONTRACTOR:

(Name, legal status, and address)

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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6	CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
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10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents consist of the Standard Form of Agreement between the Owner and Contractor (the “Agreement”), the General Conditions, Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction (this or the “Contract”). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior or contemporaneous negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect’s consultants, or (4) between any persons or entities other than the Owner and the Contractor. Nothing in this Section 1.1.2 shall be interpreted or applied so as to negate, abridge, or reduce the status or rights of the Owner as a third-party beneficiary of subcontracts, purchase orders and similar agreements between the Contractor and its Subcontractors and between Subcontractors at all tiers and their Sub-subcontractors.

§ 1.1.3 The Work

The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor or Subcontractors to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including but not limited to plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services and obligations.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, plans, Drawings, Specifications, and other similar materials.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties’ intentions and purposes in executing the Contract.

§ 1.2.1.2 This Contract incorporates all provisions as required by law. Such incorporated provisions will have priority over any conflicting provision herein. Should any provision of the Contract, at any time, be in conflict with any law, statute, code, ordinance, rule, regulation, or lawful order of a public authority, or be unenforceable or inoperative for any reason, then the remaining provisions of the Contract nonetheless shall continue in full force and effect and the court shall give the offending provision the fullest meaning and effect allowed by law.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.3.1 The Owner and Contractor agree that no additions, deletions, or other revisions shall be made to these General Conditions except by means of a written Modification executed by the Owner and Contractor. With respect to any provision of the Contract Documents requiring written approval or written Modification by the Owner, Contractor expressly waives any argument or right, and agrees not to assert, that Owner's alleged knowledge of the circumstances, or other conduct of Owner (including, without limitation, making oral approvals) before, during or after the Project amounts to a waiver by Owner of the written Modification or written approval requirements of the Contract Documents.

§ 1.2.3.2 Reference in the Specifications to an article, device, or piece of equipment in the singular number shall apply to as many such articles as are shown on Drawings or required to complete the installation. Mention in the Specifications or indication on the Drawings of articles, products, materials, operations, or methods requires the Contractor to provide and install such items including but not limited to all necessary plants, labor, and appurtenances. Notes on Drawings are considered Specifications, equal in force to those in the printed text.

§ 1.2.4 In the event of conflicts, inconsistencies, discrepancies, or ambiguities between or among the Contract Documents, interpretations shall be based on the following order of precedence:

- .1 Modifications of the Contract with those of a later date having precedence over those of an earlier date.
- .2 All Statutory Provisions required by ORS 279A and 279C and other applicable statutes and regulations and permits.
- .3 AIA A101-2017 Standard Form of Agreement between Owner and Contractor as modified.
- .4 AIA A201-2017 General Conditions of the Contract for Construction as modified.
- .5 The Drawings with larger scale having precedence over smaller scale, and with notes and schedules thereon having precedence over the remainder.
- .6 Specifications.

§ 1.2.5 In the event of conflicts, inconsistencies, discrepancies, or ambiguities between or among the Drawings, or between or among the Specifications, remaining after application of Section 1.2.4. those Drawings or Specifications of later date shall have precedence over those of earlier date. If a conflict, inconsistency, discrepancy, or ambiguity nonetheless remains, the Contractor shall provide written notice thereof to the Architect and Owner. Thereafter, the Contractor shall proceed as ordered in writing by the Architect. Thereafter, unless otherwise ordered in writing by the Architect, the Contractor shall provide the better quality of, and the greater quantity of, the Work. The provisions of this Section 1.2.5 shall apply only to conflicts, inconsistencies, discrepancies, or ambiguities in express requirements of the Drawings and Specifications and not to interpretations thereof by the Owner or Architect.

§ 1.2.6 The Owner and Contractor acknowledge their intent and agreement that there shall be no binding revisions to the provisions of the Agreement or of these General Conditions made in the Specifications or other Contract Documents as of the time of execution of the Agreement. The Owner and Contractor expressly agree that in the event of conflicts or inconsistencies between or among the Contract Documents, interpretations shall be based on the order of precedence set forth in Section 1.2.4.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and the Owner is the owner of the Instruments of Service, including but not limited to the Drawings and Specifications, and Owner owns all common law, statutory and other reserved rights in their Instruments of Service, including but not limited to copyrights. The Contractor, Subcontractors, and Sub-subcontractors shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Owner’s reserved rights.

§ 1.5.2 The Contractor and Subcontractors are authorized to use and reproduce the Drawings and Specifications provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor and Subcontractors may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, all notices given under the Contract Documents shall be in writing and shall be deemed properly given when delivered in person, delivered by commercial messenger or courier or four (4) days after it is sent postage prepaid by registered or certified mail return receipt requested, as follows:

.1 if to the Owner:

Chris Russo, Riverdale School District Superintendent
crusso@riverdale.k12.or.us

and

Nicole Bassen, Business Manager
nbassen@riverdale.k12.or.us

Riverdale School District
11733 SW Breyman Ave.
Portland OR, 97219

.2 if to the Contractor:

Name
Email

Company Name
Address

.3 if to the Architect:

David Humber
dave.humber@hdgpdx.com

Humber Design Group, Inc.
110 SE Main Street
Portland, Oregon 97214

or to such other address, telecopy number or addressee as any party entitled to receive notice hereunder shall designate to all other parties in the manner provided herein for the service of notice.

§ 1.7 Relationship of the Parties

The Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

§ 1.8 [Intentionally deleted.]

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, provided, however, that changes to the Contract involving Modifications to the Contract Time or Contract Sum must be signed by an authorized representative of Owner. The Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative.

§ 2.1.1.1 The Owner's Representative initially shall be Erica Bierman (Turner & Townsend Heery). The Owner shall provide prompt written notice to the Contractor and Architect of the designation of a different individual as the Owner's Representative.

§ 2.2 [Intentionally deleted.]

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor or Subcontractors under the Contract Documents or applicable law, including but not limited to those required under Section 3.7.1, the Owner shall secure and pay for the building permit and other necessary permits, approvals, easements, assessments, and charges required for construction, use, or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall, after receipt of written request, furnish to the Contractor surveys describing physical characteristics, legal limitations, and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to reasonably rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work. However, the Contractor shall confirm indicated dimensions and other aspects of existing conditions at the Project site as necessary for the proper performance of the Work.

§ 2.3.4.1 Notwithstanding the provisions of Section 2.3.4, the Contractor shall be responsible for determining, prior to commencement of the Work, the locations of all telephone, data, video and internet lines and cables, sewer lines, water pipes, gas pipes, electrical lines and other utility lines, cables, pipes and pipelines, including but not limited to all those that are buried, within and serving the Project site, utilizing utility locating services or other means. The Contractor shall coordinate with utility and other involved third-party representatives regarding utility locations and related issues, and shall hand excavate or otherwise take special precautions so as to perform the Work in such a manner as to avoid damaging, or interrupting the operation of, all utility lines, cables, pipelines and similar public service installations within and serving the Project site, whether above ground or underground.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services. The Contractor shall make its requests for such information or services so as to allow the Owner a reasonable time to respond without delaying the performance of the Work. The Owner shall furnish to the Contractor one (1) reproducible copy of the Drawings and Specifications

at no cost to the Contractor. The Owner also shall make available to the Contractor and Subcontractors copies of the Drawings and Specifications at Owner's designated printing service located in Portland, OR. The Contractor's cost of obtaining up to ten (10) additional copies of the Drawings and Specifications as is required for the performance of the Work shall be included in the Contract Sum; the Contractor's cost of obtaining any additional copies beyond the ten (10) copies shall be at the Contractor's expense without reimbursement by the Owner unless the Owner provides prior written approval for additional copies.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly or substantially fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4.1 The Owner's exercise of its right to stop Work pursuant to Section 2.4 shall not relieve the Contractor from any of its responsibilities and obligations under the Contract Documents.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or substantially fails or neglects to carry out all or a portion of the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor for the reasonable cost of correcting such deficiencies, including, but not limited to the Owner's attorneys' fees and related costs, disbursements and expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. The right of the Owner to correct deficiencies in the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 2.6 Extent of Owner's Rights

§ 2.6.1 In no event shall the Owner have control over, charge of, or any responsibility for the construction means, methods, techniques, sequences, or procedures or for the safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted to the Owner in the Contract Documents.

§ 2.7 Review or Approval by Others

§ 2.7.1 Review or approval by Owner or its agents of Contractor's means, methods, techniques, procedures, or submittals, or of any other aspect of Contractor's work or services shall not relieve Contractor of its sole liability for any damages resulting from or arising out of defects or deficiencies in the Contractor's means, methods, techniques, procedures, or submittals, or of any other aspect of Contractor's work or services.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.1.1 The following individuals shall perform in the following roles for the Contractor during the course of the Project:

- .1 Principal: _____
- .2 Project Manager: _____
- .3 Superintendent: _____

Provided they remain in the employ of the Contractor, the individuals named above shall not be replaced during the course of the Project without the prior written approval of the Owner. The individual performing in the role of Principal shall be a corporate officer of the Contractor. The individuals named as Project Manager and Superintendent shall be replaced during the course of the Project upon written request of the Owner for reasonable cause stated. Persons proposed to replace the individuals named above shall be subject to the prior written approval of the Owner. The Owner's approvals under this Section 3.1.1.1 shall not unreasonably be denied.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.4 The Contractor shall prepare and submit to the Owner and Architect, no less frequently than monthly, written reports on the progress of the Work in such form and in such detail as reasonably required by the Owner. Within seven (7) days of Owner's request, Contractor shall execute and deliver to Owner a certificate addressed to Owner concerning the compliance of the Work with the Contract Documents and applicable laws and regulations, the status of the completion of the Work, and the status of payments and defaults.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. Contractor shall notify the Architect and Owner in writing of any errors, inconsistencies, omissions, or ambiguities in the Contract Documents discovered by the Contractor. The Contractor shall be responsible for any additional costs to Owner resulting from the Contractor's failure to verify existing conditions related to any portion of the Work or to report to the Architect and Owner any errors, inconsistencies, omissions, or ambiguities in the Contract Documents discovered by, or which should have been discovered by, Contractor.

§ 3.2.2.1 The Contractor shall notify the Architect and Owner in writing of materials, systems, procedures, or methods of construction either shown on the Drawings or specified in the Specifications that Contractor discovers are incorrect or inappropriate for the purpose intended, or for which Contractor objects to furnishing the warranties required by the Contract Documents. The Architect and Owner will make a determination of such matters in writing. The Contractor shall be responsible for any additional costs to Owner resulting from Contractor's failure to notify the Architect and Owner of incorrect or inappropriate materials, systems, procedures, and methods that Contractor knows or should know are incorrect or inappropriate. Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Owner and Architect in writing any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

§ 3.2.5 Neither the Owner nor the Architect assumes responsibility for an understanding or representation made by their agents or representatives prior to the execution of the Agreement unless such understanding or representation is expressly stated in the Contract Documents.

§ 3.2.6 Should the Specifications and Drawings fail to particularly describe the material or kind of goods to be used in the performance of the Work, then it shall be the duty of the Contractor to request interpretation or information from the Architect.

§ 3.2.7 The Contractor and designated Subcontractors shall attend and participate with the Owner, designated separate consultants or contractors of the Owner, Architect, designated consultants of the Architect and others deemed necessary by the Owner in a pre-construction meeting scheduled and conducted by the Owner.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor knows or should know that such means, methods, techniques, sequences, or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Owner or Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences, or procedures without acceptance of changes proposed by the Contractor, the Contractor shall not be responsible for any loss or damage resulting from its proper adherence to the written instructions.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors. It is understood and agreed that the relationship of the Contractor to Owner shall be that of an independent contractor. Nothing contained in this Contract shall be deemed or construed to (1) make Contractor or any Subcontractor the agent, servant, or employee of the Owner, or (2) create any partnership, joint venture, or other association between Owner and Contractor or any Subcontractor.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The furnishing of surveys and other information regarding the Project site by the Owner shall not relieve the Contractor from its duties under the Contract Documents.

§ 3.3.5 The Contractor and designated Subcontractors shall attend and participate with the Owner, designated separate consultants or Separate Contractors of the Owner, Architect, designated consultants of the Architect and others deemed necessary by the Owner in periodic construction meetings to be held at the Owner's discretion.

§ 3.4 Labor and Materials

§ 3.4.1 The Contractor shall provide and pay for supervision, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.1.1 The Contractor's obligations under Section 3.4.1 shall include, without limitation, the obligation to pay all Subcontractors and any other person or entity having lien or bond rights regarding the Project due to their performance of the Contractor's obligations under the Contract. The Contractor agrees to keep the Project and the Project site free and clear of any and all Subcontractor claims (lien claims, bond claims or otherwise) filed or served by any person or entity at any tier performing the Work or the Contractor's obligations under the Contract.

§ 3.4.1.2 To the fullest extent permitted by law, the Contractor agrees to indemnify, defend, reimburse, and hold harmless (with counsel approved by the Owner) the Owner and the Architect from, for, and against any and all claims referenced in Section 3.4.1.1, and any actions, suits, or proceedings related to such claims, and any and all related costs and expenses incurred by the Owner or Architect, including, without limitation, attorneys' fees and expert witness and consultant fees.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the

consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 If the Contractor makes requests for substitutions, the Contractor thereby:

- .1 represents that the Contractor and involved Subcontractor(s) has (have) personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 represents that the Contractor and the involved Subcontractor(s) will provide the same warranties for the substitution as would have provided for that specified;
- .3 certifies that the cost data presented is complete and includes all related costs under this Contract, including but not limited to Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent;
- .4 agrees to coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects;
- .5 agrees to be responsible for any redesign costs related to the substitution;
- .6 will install all substantial products in accordance with applicable manufacturer's recommendations; and
- .7 agrees to be responsible for all other costs related to the substitution.

§ 3.4.3 The Contractor shall enforce strict discipline and good order and civil and appropriate conduct among the Contractor's and Subcontractors' employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Contractor shall only employ labor on the Project or in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. Contractor shall be responsible for labor peace on the Project and shall at all times make its best efforts and use its best judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances and shall at all times maintain Project-wide labor harmony. Except as specifically provided in Section 8.3.1, Contractor shall be liable to Owner for all damages suffered by Owner occurring as a result of work stoppages, slowdowns, disputes, or strikes. The Contractor shall not permit at the site of the Work the use of alcohol or tobacco, illegal use of drugs or other controlled substances, verbal or other harassment, lewd or obscene language or behavior, or disregard for the property, privacy, or personal or business interests of the Owner or other occupants of adjacent or nearby parcels, the personnel, visitors, customers, vendors, contractors or suppliers of any of them, or members of the public, or their respective contractors. The Contractor agrees to take prompt and effective corrective action in the event of violations of these standards of conduct. Nothing in this Section 3.4.8 shall establish or imply an employment relationship between the Owner, on the one hand, and the Contractor's and Subcontractors' employees and other persons performing the Work, on the other.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that materials and equipment to be selected by the Contractor or its Subcontractors will be suitable for the purposes intended by the Contract Documents, that the Work will be performed in a workmanlike manner, and will conform to the standards and requirements of the Contract Documents and generally recognized standards of the construction industry, whichever provides the higher standard, and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit, and that all materials and equipment selected by the Contractor or any Subcontractor will be suitable for the purposes indicated in the Contract Documents. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.5.3 Contractor shall obtain for Owner's benefit the same warranty as is set forth in Section 3.5.1 from all Subcontractors. Warranties in the Contract Documents shall survive termination, completion, acceptance, and final payment.

§ 3.5.4 The Contractor hereby assigns to the Owner, effective upon the written demand of the Owner, upon the insolvency, bankruptcy, dissolution, or other incapacity of the Contractor, or automatically upon Final Completion of the Work, any and all Subcontractors' warranties relating to the Work, and further agrees to perform the Work in such manner so as to preserve any and all such warranties.

§ 3.5.5 The Contractor shall collect, assemble in a binder, and submit to the Owner written warranties and related documents provided by Subcontractors, including but not limited to suppliers of equipment, appliances, and other components of the Project, at all tiers. All benefits under such written warranties shall extend to the Owner.

§ 3.6 Taxes

The Contractor shall pay all sales, consumer, use, and other similar taxes that are applicable by law to the Work or the Contract or portions thereof. Such taxes shall be itemized by the Contractor in its Applications for Payment, paid by the Owner as part of its progress and final payments, and remitted by the Contractor to the appropriate governmental agencies. If such taxes are legally enacted or modified after the execution of this Agreement, the Contract Sum shall be equitably adjusted accordingly.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 The Owner shall secure and pay for all plan review fees, building permits, system development charges, and other fees and permits required for issuance of building or right-of-way permits related to the use of the particular site for the Project and the construction of the Project as a whole. The Contractor and Subcontractors shall secure and shall pay for the mechanical, electrical, plumbing, and other similar trade permits as well as licenses required for the performance of the Work by the Contractor and Subcontractors, including but not limited to any licenses required for the handling and disposal of asbestos-containing and hazardous materials. The Contractor's and Subcontractors' costs incurred under this Section 3.7.1, except for the cost of construction contractor registration and licensure fees incurred by the Contractor and Subcontractor, shall be included in the Contract Sum. Upon Final Completion, the Contractor shall deliver to the Owner all original permits, licenses and certificates related to the Work procured by the Contractor and Subcontractors, with photocopies to the Architect.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction and such other costs and damages to the Owner as would have been avoided if the Contractor had performed its obligations.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than twenty-one (21) days after first observance of the conditions. The Owner will promptly investigate such conditions and, if the Owner determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will propose an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Owner determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Owner shall promptly notify the Contractor in writing, stating the reasons. If Contractor disputes the Owner's determination or proposal, Contractor may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such

notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents, allowances shall cover:

- .1 the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts; and
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, supervision not included in supervision and management line items of the initial schedule of values, and other direct expenses contemplated for stated allowance items.

Whenever such costs for allowance items are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order executed by both parties before any excess costs are incurred.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent approved by the Owner and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 [Intentionally deleted.]

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's approval an initial Contractor's construction schedule for the Work. The schedule shall use the critical path method and contain detail appropriate for the Project, including but not limited to (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, and shall provide for expeditious and practicable execution of the Work. During the course of the Work, and not less often than monthly, the Contractor shall submit to the Owner a current, updated version of the initial Contractor's construction schedule. Each updated Contractor's construction schedule shall be in the same form and provide the same detail as the initial Contractor's construction schedule, unless approved otherwise by the Owner. Contractor's schedules shall be submitted in electronic format if requested by Owner. The Contractor's construction schedule shall not be modified without the written approval of the Owner, and otherwise shall conform to any changes in the Contract Time set out in Change Orders. For the purposes of whether any Change Orders or Construction Change Directives shall extend the contractual dates for Substantial Completion and Final Completion, any unused "float" or "slack" time for the whole or any part of the Work as provided in the Contractor's construction schedule shall belong to neither the Owner nor the Contractor but shall be equitably allocated in the interests of the Project. In no event will Contractor be entitled to make an "Early Completion" claim.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's

construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in accordance with the most recent schedules approved by the Owner and Architect.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall maintain at the Project site for the Owner and Architect one (1) copy of the Drawings, Specifications, Addenda, Change Orders, Construction Change Directives and other Modifications in good order and marked currently to indicate field changes and selections made during construction, and otherwise marked to depict the as-built nature and configuration of the Work, and one (1) copy of approved Shop Drawings, Product Data, Samples, and similar required submittals. The Contractor also shall maintain at the Project site for the Owner and Architect one (1) current copy of all subcontracts with Subcontractors, RFIs, DCVRs, RFPs, Requests For Change Proposals and Change Proposals. All documents and items referenced in this Section 3.11 shall be available to the Owner and Architect and shall be delivered to the Architect for submittal to the Owner no later than, and as a condition of, Final Completion of the Work as a record of the Work as constructed. Failure to deliver the complete, record copies shall result in Owner withholding Contractor's retainage until the complete, record copies are delivered.

§ 3.11.2 The marked record Drawings and Specifications referenced shall be marked to show field decisions and selections affecting the Work, including but not limited to information regarding (1) approved or directed deviations from the Drawings and Specifications made during construction, (2) details of Work not previously shown or indicated, (3) changes to existing conditions or existing conditions found to differ from those shown on the Drawings or Specifications and (4) other information that the Architect or Owner reasonably requests. The final set of marked Drawings shall be on CAD disks and in reproducible hardcopy, with each hardcopy sheet stamped "As-Built" and signed by the Contractor. The marked Specifications shall be in PDF format on disk and in reproducible hardcopy, with each hardcopy page stamped "As-Built" and signed by the Contractor.

§ 3.11.3 The Contractor shall duly note Addenda, Change Orders, Construction Change Directives and other Modifications in the appropriate referenced location in the Drawings and Specifications for ease of reference during construction.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Owner or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

§ 3.12.6 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and

verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's or Owner's approval of Shop Drawings, Product Data, Samples, or similar submittals unless the Contractor has specifically informed the Architect and Owner in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's and Owner's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve, or take other appropriate action on submittals only for the limited purpose (unless Owner requests otherwise) of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents; however, the Contractor shall notify the Architect if additional performance or design criteria are required.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for evaluation of any additional resubmittals by Contractor to the extent such resubmittals are not the fault of Owner or Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas and times permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site or adjacent or nearby parcels with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area as well as contiguous roads, streets and sidewalks free from accumulation of waste and excess materials, rubbish, excavated materials and “tracking” caused by operations under the Contract. At completion of the Work, the Contractor shall remove from the surrounding area and contiguous roads, streets and sidewalks waste materials, rubbish, excavated materials, “tracking,” the Contractor’s and Subcontractors’ tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.15.3 The Contractor’s obligations under this Section 3.15 shall include the proper disposal of all such waste materials, rubbish, and disposable surplus materials consistent with and in compliance with all applicable laws, statutes, ordinances, codes, and rules and regulations, including without limitation those relating to hazardous materials and the environment.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect and their consultants with access to the Work in preparation and progress wherever located.

§ 3.16.1 As used in Section 3.16, the term “Owner” shall mean and be limited to the Owner’s Representative referenced in or determined pursuant to Section 2.1.1.1 and other persons and parties authorized by the Owner’s Representative to have access to the Work.

§ 3.17 Royalties, Patents, and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall indemnify, reimburse, and hold harmless the Owner and Architect from, for, and against any loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process, or product is an infringement of a copyright or patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect and Owner.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify, hold harmless, reimburse and defend the Owner and Owner’s agents, employees, officers and directors from, for, and against suits, actions, awards, penalties, liabilities, claims, damages, losses and expenses, whether actual or merely alleged and whether directly incurred or from a third party, including but not limited to attorneys’ and expert witnesses’ fees, and related costs, disbursements, and expenses, arising out of or resulting from performance of the Work including, but not limited to, any such suit, action award, penalty, liability, claim, damage, loss, or expense attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, but only to the extent caused by the negligence, breach of contract, or other wrongful acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they are responsible, or by failure of any such person or entity to perform as required by this Agreement.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers’ compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 To the fullest extent permitted by law, the Contractor’s obligations under this Section 3.18 (i) shall apply

whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder, (ii) shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18 and (iii) shall not be limited to Damages arising from third-party claims.

§ 3.18.4 Contractor shall require each Subcontractor, by subcontract or other agreement, to indemnify, hold harmless, reimburse and defend the Indemnitees to the same extent as required of the Contractor in this Section 3.18.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents may be restricted, modified, or extended as provided or allowed under the agreement between the Owner and Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide such administration of the Contract as described in the Contract Documents during construction until the date the Owner issues the Final Payment to the Contractor. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.2.1 The Contractor acknowledges that the Architect does not have authority to make any decision or give any direction to the Contractor that would impact the Contract Sum or Contract Time without the prior written approval of the Owner.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration

The Contractor shall address all communications to the Owner's Representative with copies to the Architect. The Architect's and Owner's communications by and with Subcontractors shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. Owner and Contractor may communicate with each other directly, provided they endeavor to keep the Architect informed and apprised of all communication. The Contractor shall copy the Owner on all correspondence from the Contractor to the Architect, and the Architect shall copy the Owner on all correspondence to the Contractor.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Owner shall have and the Architect, after consultation with the Owner in each instance, has authority to reject Work that is defective or does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, and after obtaining the Owner's permission in each instance, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the

Architect to the Contractor, Subcontractors, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose (unless Owner requests otherwise) of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Unless Owner requests otherwise, review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review is undertaken solely to satisfy its obligations to the Owner and shall not give rise to any claim by the Contractor or Subcontractors against the Architect or Owner. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct observations to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a contract with the Contractor to perform labor or services for all or a portion of the Work at the site or offsite or to furnish materials or equipment incorporated into or utilized in performing the Work. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or subcontractors of a Separate Contractor, but does include all subcontractors, suppliers, and consultants of the Contractor at all tiers. A subsidiary, affiliate, or related entity of Contractor, if it otherwise qualifies under this Section 5.1.1, may be a Subcontractor.

§ 5.1.2 For ease of reference only, as it is otherwise included within the definition of Subcontractor, a Sub-subcontractor is a person or entity who has a contract with a Subcontractor to perform labor or services for all or a portion of the Work at the site or offsite or to furnish materials or equipment incorporated into or utilized in performing the Work. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 The Contractor, as soon as practicable after execution of the Agreement, shall furnish in writing to the Owner a list of the names of the persons or entities (including but not limited to those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within fourteen (14) days to the Contractor in writing stating (1) whether the Owner has reasonable objection to any such proposed person or entity or (2) that the Owner requires additional time for review. Failure of the Owner to reply within the fourteen (14) day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity previously selected if the Owner makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including but not limited to the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner, (3) include an express provision that such contract shall be assigned to the Owner, at the Owner's discretion, in the event the Owner terminates the Contract and takes over the Work pursuant to Article 14 and (4) state that the Owner is and shall be a third-party beneficiary of such contract. The Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Each subcontract shall state that the Subcontractor agrees to the contingent assignment of the subcontract to the Owner, consistent with Section 5.4.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Subcontractor's portion of the Work has been suspended for more than 30 days, through no fault of Subcontractor, that Subcontractor's Sub-subcontractors, or any of their respective agents or employees, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Contractor shall provide for coordination of the activities of the Owner’s own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Owner shall require its own forces and Separate Contractors to cooperate with Contractor with respect to such coordination. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify in writing the Architect and Owner of any apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner’s or Separate Contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

§ 6.2.2.1 If part of the Contractor’s Work requires that any work being performed by the Owner or any of its Separate Contractors be performed before the Contractor can proceed, the Contractor shall give the Owner and Architect reasonable advance written notice of when such work must be done. In the absence of such written notice, the Contractor shall not be entitled to any additional costs or time arising out of delay caused by the Owner or its Separate Contractors in completing such Work.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor’s delays, improperly timed activities, or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner’s Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive, or order for a minor change in the Work, subject to the limitations stated in this Article 7, and elsewhere in the Contract Documents. Any Change Order or Construction Change Directive changing the materials, layout, configuration, or other physical characteristics of the Work as set out in the Construction Documents shall reference and be accompanied by a written modification of the Construction Documents prepared and issued by the Architect.

§ 7.1.1.1 The Owner and Contractor expressly and explicitly acknowledge and agree that no employee or consultant of the Owner or any other person or entity shall have authority to order, request, approve, cancel, disapprove or take any other binding action on behalf of the Owner with respect to Change Orders, Construction Change Directives and any other documents changing the Work, whether pursuant to this Article 7 or otherwise, except the Owner’s

Representative named or determined pursuant to Section 2.1.1.1. This Section 7.1.1.1 shall not negate, abridge, or reduce the authority of the Architect under Section 7.4.

§ 7.1.2 Owner will not be responsible for additional costs, fees, or time associated with any altered or additional Work unless a Modification is properly and timely prepared and executed as required in the Contract Documents. Contractor hereby waives any argument that Owner's conduct (including, but not limited to, orally approving changes) amounts to a waiver of the prior, written change requirements of the Contract Documents. A Change Order shall be based upon written agreement among the Owner, Contractor, and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone, but only if it does not affect the Contract Sum or the Contract Time.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 In determining the cost or credit to the Contractor in performing changed Work under this Article 7, a Subcontractor's compensation shall include markups for "general conditions" costs, overhead and profit of a total amount no greater than as indicated in Section 7.2.3.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Owner or Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 The form of Change Orders shall be AIA Document G701, Change Order.

§ 7.2.3 In the absence of unit prices or other written agreement, the changed work shall be priced in accordance with the following provisions.

- .1 The Contractor's/Subcontractor's markup on estimated or actual costs shall be limited to the following:
 - Contractor markup for work by Contractor's own forces, materials installed by Contractor, or equipment rentals by Contractor – 15%;
 - Contractor markup for work by Subcontractor forces, materials supplied or installed by Subcontractors, or equipment rentals by Subcontractor – 10%;
 - Subcontractor markup for work by Subcontractor's own forces, materials installed by Subcontractor, or equipment rentals by Subcontractor – 15%;
 - Subcontractor markup for work by lower-tier Subcontractors, material supplied or installed by lower-tier Subcontractors, or equipment rentals by lower-tier Subcontractors – 10%;
 - Under no circumstance shall the cumulative total of all markup on the value of a change in the work exceed 30%, regardless of the markups set forth above;
 - All Change Orders shall include written itemized breakdowns for all charges in a form and in such detail as Owner may require, and all markup shall be explicitly identified for all tiers;
 - As used herein, "markup" shall include all additional costs including but not limited to overhead, profit, supervision, field office personnel, premiums for bonds, premiums for insurance, new-vendor setup, permit fees, taxes, safety programs, small tools, small equipment, fuel charges, general conditions costs, printing, etc.; and
 - If the net value of a change results in a credit to the Owner, the credit shall be the actual net cost with applicable markup using the same amounts as set forth above.

When both additions and deletions covering related work or substitutions are involved in any one change, the markup rules set forth above shall be applied to the net increase or decrease, if any, with respect to the change.

Small tools/equipment means individual tools or equipment having a replacement value less than \$1,500 and the cost of such items is included in the markups set forth above.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly. A Construction Change Directive may state a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Owner shall determine the adjustment on the basis of reasonable cost expenditures and cost savings of those performing the Work attributable to the change, including, but not limited to, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.2.3. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data.

§ 7.3.4.1 For the purpose of this Section 7.3.4, the term “costs” as applied to Subcontractors shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers’ compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including but not limited to adjustment in Contract Sum and Contract Time, or both, or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment accompanied by a Change Order indicating the parties’ agreement, if any, with part or all of such costs. For any portion of such cost that remains in dispute, the Owner and the Architect will make an interim determination for purposes of monthly certification for payment for those costs. That determination of cost shall adjust the Contract

Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs, including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized as well. In no event will a change involving over \$1,000 be approved without such itemization.

§ 7.4 Minor Changes in the Work

The Architect has authority to order in writing with a copy to the Owner minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly. If the Contractor believes a directive for a Minor Change in the Work is in fact not a Minor Change and results in added costs and/or time of performance, the Contractor shall promptly notify the Owner in writing, and may pursue a claim in accordance with Article 15 of these General Conditions as modified. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

§ 7.5 LIMITATIONS ON ADJUSTMENTS IN CONTRACT SUM AND CONTRACT TIME DUE TO CHANGES IN THE WORK

§ 7.5.1 Notwithstanding the provisions of Sections 7.1 through 7.4 and other provisions of the Contract, in no event shall the Contractor be entitled to adjustments in the Contract Sum or Contract Time as a result of changes in the Work to the extent such changes were made necessary by the negligent or other wrongful acts or omissions of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, or by the failure of such persons or entities to perform as required by the Contract.

§ 7.5.2 Nothing in Sections 7.1 through 7.4 or other provisions of these General Conditions shall excuse the Contractor from performing its obligations under (1) Article 15 related to Claims and disputes or (2) Article 8 related to adjustments in the Contract Time. Failure of the Contractor to perform its obligations under those provisions of these General Conditions when required shall result in a waiver of any right it may have to an adjustment in the Contract Sum.

§ 7.6 The Contractor shall keep full and detailed cost accounts and records of all Work compensated on a cost basis pursuant to Change Orders and Construction Change Directives, and shall maintain such accounts and records for three (3) years after final payment or longer if required by law. The Owner and its personnel, consultants and accountants shall have full access to inspect or audit such accounts and records during the course of the Project and the period referenced in this Section 7.6. In the event an audit of such accounts and records determines that the Contractor was paid more or less than the amount actually due for such Work, the appropriate payment shall be made by the appropriate party together with accumulated interest. In the event an audit determines that the Contractor submitted one or more Applications for Payment that resulted in it being paid more than one hundred and two percent (102%) of the amount actually due, the Contractor also shall pay for the cost of the audit.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including but not limited to authorized adjustments, allotted in the Contract Documents for Substantial Completion and Final Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The dates of Substantial Completion and Final Completion are the dates satisfying the requirements of Section 9.8 and 9.10.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a Separate Contractor; by changes ordered in the Work; or by labor disputes not caused or contributed to by the Contractor, Subcontractors, or any person or entity for whose acts or omissions any of them are responsible; or fire, unusual delay in deliveries beyond the Contractor's reasonable control, unavoidable casualties, abnormally adverse weather conditions, cessation of the Work pursuant to Section 10.3.1, or other causes beyond the Contractor's reasonable control; by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Owner agrees may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner and Architect agree.

§ 8.3.1.1 No extensions of the Contract Time shall be allowed for delays or suspensions to the extent caused by the negligent or other wrongful acts or omissions of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, or by the failure of such persons or entities to perform as required by the Contract.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement, subject to authorized adjustments, and is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.1.2.1 Unit prices are inclusive of all costs for the unit price Work, including but not limited to costs of labor, services, materials, equipment, supervision, insurance, bonds and "general conditions," as well as applicable taxes and overhead and profit for that Work.

§ 9.2 Schedule of Values

§ 9.2.1 Promptly after execution of the Agreement, the Contractor shall deliver to Owner an initial schedule of values, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form and supported by the data to substantiate its accuracy required by the Owner and Architect. The schedule of values shall be revised by the Contractor for the Owner's approval as necessary to reflect adjustments in the Contract Sum, allocations of contingencies and other changes in the allocations of the Contract Sum. The current, approved schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.2 Unless otherwise provided in the Contract Documents, the allocation of the Contract Sum under this Section 9.2 shall not constitute a separate stipulated sum for each individual line item in the schedule of values.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten (10) days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for completed portions of the Work based upon the percentage of Work performed pursuant to the current schedule of values approved by the Owner and submitted with the Application for

Payment. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of claims and liens from Subcontractors and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Owner, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor unless such Work has been performed by others whom the Contractor intends to pay. The Contractor shall include a written notice, on Contractor's letterhead, stating the name of and amount owed to such Subcontractor which has requested payment, but which has not been included on the Application for Payment.

§ 9.3.1.3 Each Application for Payment shall be accompanied by waivers and releases executed by Contractor and Subcontractors, using the forms attached as Exhibit B. The waiver and release forms shall be conditional as to the payment sought by the current Application for Payment and shall be unconditional as to the payment received pursuant to the prior Application for Payment. If the Contractor is unable to obtain such executed waiver and release forms and satisfactions from particular Subcontractors, the Contractor as a condition of payment for such Subcontractors' performance of the Work shall provide the Owner with a bond or other form of security acceptable to the Owner to protect the Owner from claims of such Subcontractors. If any such claim remains unsatisfied after payments are made, upon the Owner's demand, and without waiver of any other remedies the Owner may have under the Contract or applicable law, the Contractor shall refund to the Owner all money that the Owner pays in discharging such claim, including but not limited to the Owner's attorneys' fees and costs and disbursements resulting therefrom.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance and in writing by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner upon physical incorporation into the construction at the site or upon Contractor's receipt of payment, whichever occurs first. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Applications for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven (7) days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections or observations to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions

received from Subcontractors and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.3 The Owner shall have the right to perform the Architect's roles, responsibilities, and obligations under this Section 9.4, in which event the provisions of this Section 9.4 and of Article 5 of the Agreement and other related provisions of this Agreement shall be interpreted accordingly with respect to the Contractor's Applications for Payment being reviewed and acting upon by the Owner rather than by the Architect.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including but not limited to loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective or nonconforming Work not remedied or incomplete work;
- .2 third party claims, including but not limited to construction lien claims and bond claims, filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Contractor's employees or Subcontractors for labor, services, materials, or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage or potential damage to the Owner that is caused by or is the responsibility of Contractor or any Subcontractor or other person or entity for which Contractor is responsible;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 repeated or substantial failure to carry out the Work in accordance with the Contract Documents; or
- .8 determination that the Work has not progressed to the point indicated in Contractor's Applications for Payment and already paid by Owner;

§ 9.5.1.1 In withholding or nullifying certification pursuant to Section 9.5.1, the Architect shall designate one hundred fifty percent (150%) of the estimated cost to cure the reason for the withholding or nullification.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding or nullifying certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 Notwithstanding the issuance of a Certificate for Payment by the Architect, the Owner may withhold payment for those reasons set forth in Items .1 through .8 of Section 9.5.1 or for any other breach of the Contract; and the Owner shall not be deemed in breach by reason of withholding payment while any such circumstances or breaches remain uncured. If Owner withholds payment, Owner shall notify Contractor and Architect in writing of Owner's reasons for withholding. Owner may withhold from a payment up to one hundred fifty percent (150%) of the estimated or actual cost associated with the reason for withholding. If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Contractor.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment and the Owner has not yet withheld payment pursuant to Section 9.5.3, the Owner shall make payment in the manner and within the time provided in the Contract Documents, absent any material breaches by Contractor or Owner's good faith belief that a withholding of payment is necessary to protect Owner from Contractor's failure to perform its obligations hereunder.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than ten (10) days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.2.1 Should the Contractor withhold payment from a Subcontractor due to a bona fide dispute, the Contractor shall notify the Owner. The Owner shall then withhold such funds from the Contractor until the dispute is resolved; provided that this Section 9.6.2.1 shall not be construed or applied to prevent the Contractor from receiving payment from the Owner for Work performed by the Contractor or by another Subcontractor when such Work is the subject of a back charge by the Contractor against the Subcontractor involved in the bona fide dispute.

§ 9.6.3 Neither the Owner nor Architect shall have an express or implied obligation to (1) pay or to see to the payment of money to a Subcontractor, or (2) track, monitor, or investigate Contractor's disbursement of Project funds for the benefit of any Subcontractor, surety, creditor, or any other person or entity. The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. The Owner shall have no obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.4 Upon reasonable evidence of the unjustified nonpayment of one (1) or more Subcontractors by the Contractor, the Owner may, after giving reasonable notice and opportunity to cure to the Contractor, make payment of amounts due to Subcontractors by direct payments or by means of multiple-payee checks. Upon request of the Owner, the Contractor shall timely furnish to the Owner such information as the Owner reasonably will need to make such direct or multiple-payee check payments, including but not limited to the names and addresses of the Subcontractor payees and the amounts due to each. In no event shall any direct or multiple-payee payment be construed to create (1) any contract between the Owner and Subcontractors or (2) rights of any Subcontractor against the Owner. In addition, should Contractor neglect or refuse to pay promptly any bill or charge legitimately incurred by it, Owner shall have the right, but not the obligation, to pay the bill directly, and Contractor shall immediately reimburse Owner for same, provided Owner notifies Contractor of its intent to pay such bill directly and Contractor fails to provide Owner, within seven (7) days following Owner's written notice, of an acceptable explanation in writing regarding Contractor's failure to promptly pay the bill or charge legitimately incurred by Contractor. If Contractor does not reimburse Owner prior to the next payment by Owner to Contractor, Owner may offset the amount of the bill against amounts owed by Owner to Contractor hereunder.

§ 9.6.5 [Intentionally deleted.]

§ 9.6.6 A Certificate for Payment, a progress payment, final payment or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work that is defective or not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors shall be held by the Contractor for those Subcontractors who performed Work or furnished materials or equipment, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage, or expense, including but not limited to reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, within seven (7) days after receipt of the

Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven (7) days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven (7) additional days' written notice to the Owner and Architect, stop the Work and thereby suspend or terminate the Contract, unless within such seven (7) additional days payment is made to Contractor of all undisputed amounts and Owner's good faith basis for contesting any disputed amounts is delivered to Contractor. If Contractor so terminates the Contract, Contractor's exclusive remedies will be governed by Article 14 below.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof, which the Owner agrees in writing to accept separately, is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use without any meaningful interference or disruption.

§ 9.8.1.1 For Substantial Completion of the Work or designated portion thereof to be achieved, the Owner also must have received a temporary or final certificate of occupancy and all other governmental approvals necessary and required for the Owner to occupy or utilize the Work or designated portion for its intended purpose. The requirement shall be deemed satisfied if all construction, submittals and other performance by the Contractor required for issuance of the certificate of occupancy and other approvals have been completed but the certificate and approvals have not been issued solely because of factors beyond the reasonable control of the Contractor.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees in writing to accept separately, is substantially complete, the Contractor shall prepare and submit to the Owner and Architect a written punch list of items to be completed or corrected prior to final payment. Failure to include an item on such punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's punch list, the Owner, Contractor and Architect will make an observation to determine whether the Work or designated portion thereof, which the Owner agrees in writing to accept separately, is substantially complete. If the Owner's and Architect's observation discloses any item, whether or not included on the Contractor's punch list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another observation by the Owner, Contractor, and Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof, which the Owner agrees in writing to accept separately, is substantially complete, the Architect will determine the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, shall include a punch list of items remaining to be completed or corrected notwithstanding achievement of Substantial Completion, and shall fix the time within which the Contractor shall finish all items on the punch list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof; provided that with respect to components or portions of the Work for which Substantial Completion is achieved after the date of Substantial Completion of the Work as a whole, such warranties shall commence on the dates of Substantial Completion of such components or portions.

§ 9.8.5 [Intentionally deleted.]

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a punch list to the Owner and Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The

stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly observe the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt by the Owner of the Contractor's written notice that the Work, or designated portion thereof which the Owner agrees in writing to accept separately, is ready for final observation and acceptance and upon receipt of a final Application for Payment, the Owner, Contractor and Architect will promptly make such observation and, when the Owner and Architect find the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and observations, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Should it become necessary for the Owner and Architect to conduct additional observations because of acts or omissions of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, the Owner and Architect will conduct such observations at the Architect's standard hourly rate and such costs will be deducted from monies due to the Contractor.

§ 9.10.1.1 For Final Completion of the Work or designated portion thereof to be achieved, (1) Substantial Completion of the Work or designated portion thereof must have been achieved, (2) the Owner must have received a final certificate of occupancy and all other governmental approvals necessary and required for the Owner to occupy or utilize the Work or designated portion thereof for its intended purpose, (3) the Contractor must have submitted all warranties, operating and maintenance manuals, As-Built Drawings and Specifications, keys and other submittals required for the Work or designated portion thereof and (4) the Contractor otherwise must have fully performed and completed all of its other obligations required for Final Completion under the Contract Documents with respect to the Work or designated portion thereof. Notwithstanding the foregoing, Final Completion shall be deemed achieved if all construction, submittals and other performance by the Contractor required for issuance of the certificate of occupancy and other approvals have been completed but the certificate and approvals have not been issued solely because of factors beyond the reasonable control of the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect and Owner (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of claims arising out of the Contract, to the extent and in such form as may be designated by the Owner, (7) the grounds for Architect withholding certification of payment under Section 9.5.1 or Owner withholding payment under Section 9.5.4 have been removed or no longer exist, and (8) completion of the Work in compliance with the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such claims. If such claims remain unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such claims, including all costs, disbursements, expenses and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, or by issuance of Change Orders affecting Final Completion, and the Owner or Architect so confirms, the Owner shall,

upon application by the Contractor, and without terminating the Contract, make payment of the balance due for that portion of the Work that is fully completed and accepted. If the remaining balance for Work that is not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Owner. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.3.1 The Owner shall retain an amount equal to two hundred percent (200%) of the estimated costs of finally completing the Work as determined by the Owner, if the Owner makes payment in advance of Final Completion pursuant to Section 9.10.3.

§ 9.10.4 The making of final payment shall not constitute a waiver of Claims by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor or a Subcontractor shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract and the entirety of the Work.

§ 10.1.1.1 The Contractor's safety obligations under this Article 10 shall apply, without limitation, to the areas of the Owner's property where the Work is performed, or which are used for any purpose in connection with the performance of the Work, by the Contractor or Subcontractors.

§ 10.1.1.2 The Contractor shall coordinate its safety program with the safety programs of the Separate Contractors and of any other contractors working at the site.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 those performing labor or services or furnishing materials or equipment at the Work site and other persons who may be affected thereby, including, but not limited to, licensees, trespassers, and persons on adjacent or adjoining properties;
- .2 the Work and materials and equipment to be incorporated or utilized therein, whether in storage on or off the site, under care, custody, or control of the Contractor or Subcontractors;
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction;
- .4 other structures contiguous to the Work site and otherwise located at or contiguous to the premises, and trees, shrubs, lawns, walks, pavements, roadways, and utilities serving such structures and premises; and
- .5 the work, materials, equipment, tools, machinery, and facilities of or being utilized by the Owner's own forces or their separate design professionals, consultants, or contractors.

§ 10.2.2 The Contractor shall comply with and give notices required by, and otherwise shall comply with, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including but not limited to posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and give the Owner and Architect reasonable prior notice.

§ 10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons, property damage, or contamination of air, water, soil, materials for the Work or other property resulting from a material or substance, including but not limited to asbestos, lead paint, mold, or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect by telephone or other appropriate means followed by prompt confirmation in writing.

§ 10.3.2 Upon receipt of the Contractor's notification, the Owner, in consultation with the Architect and Contractor, shall obtain the services of a licensed laboratory or other consultant to verify the presence or absence of the hazardous material or substance reported and, in the event such hazardous materials are found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such hazardous materials or who are to perform the task of removal or safe containment of such hazardous materials. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the hazardous materials have been rendered harmless, Work in the affected area shall resume upon the directive of the Owner. By Change Order, the Contract Time shall be extended appropriately, and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the hazardous materials present the risk of bodily injury or death as described in Section 10.3.1 and have not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property but only to the extent that such damage, loss or expense is not due to the fault or negligence or other wrongful acts or omissions of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances, or by the failure of Contractor to perform as required by this Section 10.3.

§ 10.3.5 The Contractor shall indemnify, hold harmless, reimburse, and defend the Owner from, for, and against suits, actions, awards, penalties, liabilities, claims, damages, losses, and expenses, including but not limited to attorneys' fees and expert witness fees and related costs, arising out of or related to (1) remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) the Contractor's failure to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without fault or negligence or other wrongful acts or omissions on the part of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Spill Responsibility

§ 10.4.1 The Contractor is responsible for any and all releases of hazardous substances or materials or environmental pollutants during performance of the Contract which occur as a result of, or are contributed by, actions of its agents, employees, or Subcontractors. The Contractor agrees to promptly remediate such releases to satisfaction of the Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner.

§ 10.4.2 Contractor shall obtain the Owner's written consent prior to bringing onto the Work site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules, or ordinances. Notwithstanding such written consent from the Owner, the Contractor, at all times, shall:

- .1 properly handle, use, and dispose of all environmental pollutants and hazardous substances or materials brought onto the Work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;
- .2 be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials that the Contractor has brought onto the Work site; and
- .3 promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all applicable federal, state, or local statutes, rules or ordinances.

§ 10.4.3 The Contractor shall be liable for any and all costs, expenses, damages, claims, and causes of action, or any of them, related to or arising out of a spill, release, discharge, or leak of (or from) any environmental pollutant or hazardous substance or material, to the extent such spill, release, discharge, or leak was caused or contributed to by the Contractor's (i) fault or (ii) failure to perform in accordance with the Contract Documents. Nothing in this Section 10.4.3 shall limit the Contractor's liability or responsibility under any other provision of the Contract Documents.

§ 10.4.4 The Contractor shall report all reportable quantity releases described in this Section 10.4 to applicable federal, state, and local regulatory and emergency response agencies. Upon discovery, regardless of quantity, the Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to the Owner within forty-eight (48) hours of the telephonic report. Such written report shall contain, at a minimum:

- .1 Description of items released (identity, quantity, manifest number, and all other documentation required by law);
- .2 Whether amount of items released is EPA/DEQ reportable and, if so, when it was reported;
- .3 Exact time and location of release, including a description of the area involved;
- .4 Containment procedures initiated;
- .5 Summary of communications about the release the Contractor has had with members of the press or state officials other than the Owner;
- .6 Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue; and
- .7 Personnel injuries, if any, resulting from, or aggravated by, the release.

§ 10.5 Emergencies

§ 10.5.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.5.2 If Contractor does, or omits to do, anything where safety may be endangered or where damage or injury may result to person or property (including the Work itself), Owner may, in its sole discretion, after one (1) day written notice to the Contractor, or in case of imminent danger, immediately after delivery of written notice to Contractor,

make good all Work, material, omissions, or deficiencies to remove the dangerous condition(s) and prevent damage or injury. Owner may deduct Owner's costs incurred under this Article 10 from the amount included in the Contract Sum due or which may thereafter become due to Contractor. No action taken by Owner under this Section 10.5 shall affect any of the other rights or remedies of Owner granted by the Contract or by law, or relieve Contractor from any consequences or liabilities arising from such acts or omissions. Contractor shall not be responsible for costs of emergency work, unless the emergency was due to the negligence or other misconduct of the Contractor or any Subcontractors, or anyone for whose acts any of them may be liable.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 Contractor and Subcontractors shall comply with the terms of Exhibit E.

§ 11.1.2 [Intentionally deleted.]

§ 11.1.3 [Intentionally deleted.]

§ 11.1.4 [Intentionally deleted.]

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. If requested by Contractor, Owner will provide to Contractor copies of all relevant policies.

§ 11.2.2 Property Insurance

§ 11.2.2.1 The Owner may purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis subject to self-insurance retention and deductibles. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed or materials or equipment supplied by others. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.2.2.1 to be covered, whichever is later. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds.

§ 11.2.2.1.1 The Contractor shall be responsible for property losses to the Work not paid by the insurance discussed in Section 11.2.2.1 due to self-insurance retention and deductibles, to a maximum of Ten Thousand Dollars (\$10,000) per occurrence, except to the extent such losses are caused by (1) the negligent or other wrongful acts or omissions of the Owner, Architect or its consultants, Owner's separate consultants or contractors, or their respective agents or employees or (2) Acts of God.

§ 11.2.2.3 Waiver of Subrogation

§ 11.2.2.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; and (2) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered and actually paid by property insurance obtained pursuant to this Agreement, if any, or other property insurance applicable to the Project, (a) except such rights as they have to proceeds of such insurance and (b) except to the extent such damages are covered by Commercial General Liability or other insurance of the Contractor or one or more Subcontractors. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Separate Contractors, Subcontractors, and sub-Subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.2.2.3 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.2.2.4 A loss insured under the Owner's property insurance shall be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the

Owner, the Contractor shall make payments to its Subcontractors, and by appropriate written agreements shall require its Subcontractors to make payment to their sub-subcontractors in similar manner.

§ 11.3 [Intentionally deleted.]

§ 11.4 [Intentionally deleted.]

§ 11.5 [Intentionally deleted.]

§ 11.6 Performance Bond and Payment Bond

§ 11.6.1 Contractor shall furnish separate bonds covering the faithful performance of the Contract and the payment of obligations arising thereunder. The amount of each bond shall be equal to one hundred percent (100%) of the Contract Sum, and such amount shall be adjusted as the Contract Sum is adjusted pursuant to the Contract Documents. The form of the bonds and the identity of the surety shall be in the form attached as Exhibit D. The surety on such bonds shall be authorized to do business in the State of Oregon and shall have an A.M. Best Financial Strength Rating of A or better.

§ 11.6.2 The Contractor shall deliver the required bonds to the Owner not later than three (3) business days following the Contractor's execution of the Contract.

§ 11.6.3 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

§ 11.6.4.1 Any Change Order, Construction Change Directive, order for a minor change in the Work or other Modification under the Contract shall not be subject to inspection or approval by any surety on any required bond. The surety on such bond, by issuing the bond, expressly waives its right to approve, and consents to, any such Change Order, Construction Change Directive, order or Modification.

§ 11.6.4.2 The surety on any required bond shall be bound to mediate, arbitrate and litigate any disputes between and among it, the Owner, Owner's separate consultants and contractors and their subconsultants and subcontractors, Contractor, Subcontractors, Subcontractors' sureties, Architect, Architect's consultants, and other persons or entities under contract or otherwise engaged to furnish labor, services, materials or equipment for the Project, in the same way and to the same extent that the Contractor shall be bound to mediate, arbitrate and litigate any disputes between and among such parties. The surety shall be bound by the decisions and award/judgment of the arbitrator(s) or court in the same way and to the same extent that the Contractor shall be bound.

§ 11.6.5 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.6.6 With the Owner's prior written approval, the Contractor may require one (1) or more Subcontractors to furnish payment and performance bonds covering faithful performance of the particular subcontract and payment of obligations arising thereunder.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Owner's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be uncovered for the Owner's or Architect's examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or Owner as defective or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including but not limited to additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses and the Owner's attorneys' and consultants' fees and related costs, disbursements and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under the Contract Documents (including but not limited to Section 3.5), and without limiting Owner's other rights and remedies under the Contract Documents or at law, if, within two (2) years after the date of Substantial Completion of the Work or designated portion thereof or which the Owner agrees in writing to accept separately, or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. If the Contractor fails to correct defective or nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5 provided that if payment of the Contract Sum has already been made by the Owner then upon demand the Contractor shall reimburse the Owner pursuant to Section 2.5.

§ 12.2.2.2 The two (2) year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion of the Work as a whole by the period of time between Completion of the Work as a whole and the actual completion of that portion of the Work.

§ 12.2.2.3 The two (2) year period for correction of Work performed by the Contractor pursuant to this Section 12.2 shall only be extended for that period of time that equals the amount of time after Substantial Completion of the Work as a whole that the corrected portions of the Work were defective or nonconforming. Such extensions shall be applicable only to corrected portions of the Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are defective or not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is defective or not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents or applicable law. Establishment of the two (2) year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time nor shall otherwise be deemed to limit the time within which the obligation to comply with the Contract Documents or applicable law may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is defective or not in accordance with the requirements of the Contract Documents, the Owner may do so in writing instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made. Contractor may not rely upon any non-written statements that purport to accept non-conforming Work.

§ 12.4 No earlier than twenty-two (22) months and no later than twenty-three (23) months after the date of Substantial Completion of the Work, the Owner, Architect and Contractor at a time reasonably determined by the Owner shall jointly observe the Project to identify defective or nonconforming Work to be corrected pursuant to Section 12.2, if any. Neither the Contractor's performance of its obligation under this Section 12.4 nor its correction of defective or nonconforming Work identified during the observation required by this Section 12.4 shall negate, abridge or reduce the Contractor's obligations to otherwise correct the same or other defective or nonconforming Work identified either before or after the observation required by this Section 12.4.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Contractor shall not assign its rights or obligations under the Contract as a whole without written consent of the Owner. If Contractor attempts to make such an assignment without such consent, Contractor shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign its rights under the Contract to any person or entity (the "Assignee"). If Owner assigns all of its rights and delegates all of its duties and gives written notice of the assignment to Contractor, Contractor agrees: (a) to regard the Assignee as Owner's successor for all purposes of this Contract, with all of the rights and duties that Owner had before the assignment was made; (b) not to look further to Owner for payment under this Contract; (c) not to look further to Owner for satisfaction of any claims it may have asserted or will assert with regard to the Work; (d) without deleting Contractor's continuing indemnity obligation to Owner, Contractor will include the Assignee as a beneficiary of the indemnity obligations that Contractor owes to Owner under this Contract; and (e) without deleting Owner's additional insured status under this Contract, Contractor will include Assignee as an additional insured under Contractor's liability insurance policies. The Contractor shall execute all consents reasonably required to facilitate such assignment. If requested by Contractor, Owner will provide reasonable evidence that Assignee has made financial arrangements or otherwise has the ability to fulfill the payment obligations under the Contract.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law, in equity, or by any other agreement, and any such rights or remedies shall survive the acceptance of the Work and termination or expiration of the Contract.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority. The Contractor shall give the Owner and Architect timely notice of when and where tests and inspections are to be made so that the Owner and Architect may be present for such procedures. The Owner shall bear costs of all such tests, inspections, or approvals; provided that if defective or nonconforming Work or other fault of the Contractor or one or more Subcontractors results in repeat tests, inspections, or approvals of portions of the Work, the contractor shall reimburse the Owner for the cost of such repeat tests, inspections, or approvals.

§ 13.4.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.4.1, the Owner and Architect will instruct the Contractor to make arrangements for such additional testing, inspection or approval, by an entity acceptable to the Owner and Architect, and the Contractor shall give timely notice to the Owner and Architect of when and where tests and inspections are to be made so that the Owner may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor, and promptly delivered to the Owner and Architect.

§ 13.4.5 [Intentionally deleted.]

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 The conducting of any inspection, test, or observation and the receipt of any approval shall not operate to relieve the Contractor from its obligations under the Contract Documents unless specifically so stated by Owner, in writing. The Owner's and Architect's observations, reviews, or approvals of tests and inspections shall not relieve the Contractor from its responsibility for construction means, methods, and techniques, nor shall it relieve Contractor of its responsibility to strictly adhere to the Contract Documents.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the entire Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 The Owner has not made a required payment within the time stated in the Contract Documents; or
- .4 The Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters critical to the progress of the Work.

§ 14.1.2 [Intentionally deleted.]

§ 14.1.3 If a basis for termination described in Section 14.1.1 exists, the Contractor may, upon seven (7) days' written notice to the Owner, and if the Owner fails to cure such reason during the seven (7) day period, terminate the Contract in whole or in part and recover from the Owner payment for Work executed based on a final progress payment on account of the Contract Sum supported by an Application for Payment for the portion of the Work performed through the date of termination.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract, in whole or in part pursuant to Section 14.2.2, if the Contractor

- .1 substantially refuses or fails to supply enough properly skilled workers or enough proper materials or equipment;
- .2 fails to make payment to its employees or fails to make payment to its Subcontractors for materials, services, equipment or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 substantially disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;
- .4 fails to carry out the Work pursuant to the Contract Documents;
- .5 fails to comply with the current Contractor's construction schedule;
- .6 submits one (1) or more Applications for Payment in which the Contractor overstates the amount to be paid, by the Owner; or
- .7 otherwise is guilty of material breach of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' notice, terminate the Contract in whole or in part and may:

- .1 Exclude the Contractor from the site and take possession of all or a portion of materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of some or all subcontracts, purchase orders and similar agreements pursuant to Section 5.4; and

- .3 Finish the Work or a portion thereof by whatever reasonable means and method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract in whole or in part for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment for the terminated Work until that Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including but not limited to compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall survive termination of the Contract. In no event, however, shall Contractor be entitled to payment of overhead, profit, markup, or any other payment on account of Work not performed.

§ 14.2.5 In the event the Owner terminates the Contract for cause and such termination subsequently is determined in a final judgment to have been wrongful, the termination shall automatically be converted to a termination for the Owner's convenience pursuant to Section 14.4.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, with or without cause or prior notice, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include application of reasonable overhead and profit on actual costs incurred. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, and also except for Work not covered by the termination, terminate all existing subcontracts and purchase orders and similar agreements and enter into no further subcontracts and purchase orders, and similar agreements.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed and termination expenses as follows: (1) a final progress payment on account of the Contract Sum supported by an Application for Payment for the portion of the Work performed through the date of termination, and (2) reimbursement of the Contractor's reasonable demobilization costs and other costs directly incurred relating to the termination which are not otherwise included in the actual cost incurred under Item (1). In no event, however, shall Contractor be entitled to payment of overhead, profit, markup, or any other payment on account of Work not performed.

§ 14.5 TERMINATION AND SUSPENSION BY THE OWNER

§ 14.5.1 In the event the Owner terminates or suspends the Contract, the Contractor shall cooperate with the Owner and all other persons and entities performing work or services on the Project as necessary and required to facilitate the efficient and proper performance and completion of (1) the overall Project, if the Owner completes the entire Project, or (2) the portion of the Project the Owner completes, if the Owner completes less than the entire Project. In the event of a termination, whether for cause or convenience, Owner reserves the right to recover damages arising out of or related to Contractor's performance of the Contract, regardless of whether (a) such performance occurred before or after the effective date of termination or (b) Owner provided Contractor with the opportunity to cure.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than ten (10) years after the date of Substantial Completion of the Work. For all claims by Owner against Contractor, the applicable period of limitations shall not commence to run and any alleged cause of action shall not be deemed to have accrued, whether such claims or actions involve strict liability, indemnity, intentional tort or other tort, breach of contract, breach of implied or express warranty, or any other legal or equitable theory, unless and until the party making the claim is fully aware of all three (3) of the following: (a) the identity of the party(ies) responsible; (b) the magnitude of the damage or the injury; and (c) the cause(s) of the damage or injury. The discovery rule provided herein applies in lieu of any other applicable statute or related case law. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by Contractor must be initiated by written notice to the Owner within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Contractor first recognizes or reasonably should have first recognized the condition giving rise to the Claim, whichever is later. Failure of Contractor to deliver the notice within the time set out in this Section 15.1.3.1 shall result in a complete and final waiver of the Claim and all rights and remedies arising therefrom.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.5 Claims for Additional Cost

If the Contractor knows or has a reason to know before performing a particular portion of the Work that it will have a Claim for an increase in the Contract Sum for performing that portion of the Work, written notice as provided herein shall be given by the Contractor before proceeding to execute that particular portion of the Work. Otherwise, a Claim for an increase in the Contract Sum shall be made as required by Section 15.1.3. Notice under this Section 15.1.5 shall contain sufficient detail and substantiating data to permit evaluation of the Claim by the Owner. No such Claim shall be valid unless so made. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.5.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given to the Owner. Such notice shall include detailed documentation of the cause or event resulting in the need for the extension of time, and a schedule analysis based upon the approved Contractor's construction schedule, showing the impact of the cause or event on the critical path of the approved Contractor's construction schedule. No Claim under this Section 15.1.6 shall be valid unless so made. If a Claim for additional cost related to this Claim is to be asserted, it shall be made as provided in Section 15.1.3.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.2 MEDIATION

§ 15.2.1 Any Claim, dispute or other matter in question arising out of or related to this Contract shall be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

§ 15.2.2 Request for mediation shall be filed in writing with the other party to this Contract. The request may be made concurrently with the filing of a demand for arbitration or the institution of legal or equitable proceedings but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 15.2.3 If the parties cannot agree on the choice of a mediator, the parties shall apply to the local state court to appoint a mediator. The mediator shall not also serve as an arbitrator.

§ 15.2.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place specified in Section 15.3.4, unless another location is mutually agreed upon. Written and signed agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.3 CONSOLIDATED ARBITRATION/LITIGATION

§ 15.3.1 Any Claim, dispute or other matter in question arising out of or related to this Contract shall be decided by arbitration in the place where the Project is located. The demand for arbitration shall be filed in writing with the other party to this Contract.

§ 15.3.2 The parties shall mutually select the arbitrator(s) and the rules applicable to the arbitration process. The parties shall agree on the method for arbitrator selection. For disputes with under \$1,000,000 at issue not including attorneys' fees and legal costs, a single arbitrator shall be selected. For disputes with over \$1,000,000 at issue not including attorneys' fees and legal costs, a panel of three arbitrators shall be selected. If the parties cannot agree on the choice of arbitrator(s), method of selection or the rules, the parties shall apply to the local state court to appoint the arbitrator(s) and select the rules.

§ 15.3.3 The arbitration shall include, by consolidation or joinder or in any other manner, any additional persons or entities if (1) such persons or entities are materially involved in a common issue of law or fact in dispute and (2) such persons or entities are either contractually bound to arbitrate or otherwise consent to arbitration. If another involved person or entity will not consent to arbitration, Owner, in its sole discretion, has the option to elect consolidated litigation to resolve the dispute. The venue for such litigation shall be the place specified in Section 15.3.4, and the outcome shall be decided by the judge only (bench trial). Both parties expressly waive their right to a jury trial. If another involved party will not consent to a bench trial, Owner, in its sole discretion, has the option to elect a consolidated jury trial. It is understood that the purpose of this Section 15.3.3 is to allow Owner to determine the best means of achieving a single consolidated proceeding that will minimize duplicative processes and minimize the risk of inconsistent results, in the following order of preference: (1) a consolidated arbitration of all significant parties, if possible; (2) alternatively, a consolidated bench trial of all significant parties, if possible; or (3) alternatively, and as a last resort, a consolidated jury trial of all significant parties.

§ 15.3.4 The agreements contained in this Section 15.4 and its subsections shall be specifically enforceable in accordance with applicable law in any court having jurisdiction. Any award rendered by an arbitrator or panel shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction. The arbitrator or panel is specifically empowered to award attorneys' fees and costs to the extent allowed by contract or law.

§ 15.3.5 The parties shall participate in discovery to the same extent allowed by the Federal Rules of Civil Procedure ("FRCP") as may be amended by local rules of the nearest United States District Court in the state where the Project is located. Discovery shall not be more limited because the matter is being arbitrated.

§ 15.3.6 Within 30 days after selection of the arbitrator(s), the parties shall mutually select a Discovery Master. The Discovery Master shall not be the arbitrator or a member of the panel of arbitrators. The Discovery Master shall be an attorney who by reputation is familiar with the FRCP and who is knowledgeable about current best practices in discovery, including but not limited to the collection and production of electronic records. For technical issues regarding the adequacy of a party's collection and production of electronic records, the Discovery Master shall be empowered to retain and rely upon technical assistance from another vendor at the mutual expense of the parties, which vendor shall have authority to visit the offices of the party(ies), interview employees, and take other reasonable investigative steps necessary to ascertain whether the manner of collection and production has been appropriate from a technical perspective. The Discovery Master shall be empowered to decide the proper scope of discovery consistent with FRCP and best practices for discovery of electronic records. The Discovery Master shall also be empowered to issue orders directing the parties to comply and, if compliance is not obtained, to order appropriate sanctions. The orders and rulings of the Discovery Master shall be provided to the arbitrator or panel,

but in all cases shall be final and not subject to arbitrator review. In the event the parties are not able to mutually agree on selection of the Discovery Master, each party shall offer two candidates to the arbitrator or panel, and the arbitrator or panel will select the Discovery Master. The arbitrator(s) shall not know which party proposed the candidates. No selection shall be final until disclosures regarding the Discovery Master's relationships and dealings with the parties, their witnesses and their attorneys have been provided and the parties have had an opportunity to object based on the disclosures. If all four of the original candidates are exhausted either due to affirmative rejection by the arbitrator(s) or as a result of the objection process, four more candidates shall be proposed, and the process will repeat until a Discovery Master is chosen.

§ 15.3.4 Forum

Any mediation or trial court suit or action arising out of or relating to this Agreement shall be commenced and conducted in Portland, Oregon.

§ 15.4 [Intentionally deleted.]

§ 15.5 Attorneys' Fees

§ 15.5.1 Should any arbitration or legal proceeding be commenced in connection with any Claim, dispute or other matter in question arising out of or relating to the Contract or the breach thereof, to obtain a construction of or to enforce any provision of the Contract, to rescind the Contract, or to enforce or collect any award obtained during arbitration or any judgment or decree of any court relating to the Contract, the prevailing party shall be entitled to recover its attorneys' and expert witnesses' fees and related costs, disbursements and expenses incurred prior to and during the trial or arbitration, on review for appeal, on appeal, on review for or on reconsideration, regardless of when such reconsideration should be sought or granted, as the arbitrator(s) or court shall adjudge reasonable.

§ 15.6 Miscellaneous

§ 15.6.1 Operation and Maintenance Manuals

As part of the Work, Contractor shall submit one (1) hard copy and two (2) electronic media copies (on memory stick, CD or DVD and in standard Microsoft or Adobe format) completed operation and maintenance manuals for review by the Owner's Representative prior to any pay request for retainage. No retainage payments will be made by the Owner until the O & M Manual has been received. The O & M Manual shall contain a complete set of all submittals; all product data as required by the Specifications; training information; a telephone list of consultants, manufacturers, installers, and suppliers; manufacturer's printed data; balance reports; record and shop drawings; schematic diagrams of systems; appropriate equipment indices; warranties; bonds; and other information and documents relevant to operations or maintenance of the Project. The Owner's Representative shall review and return one (1) O & M Manual for any modifications or additions required. Prior to submission of its final Application for Payment, complete and approved sets of O & M Manuals shall be delivered to the Owner's Representative by the Contractor.

§ 15.6.2 Training

As part of the Work, and prior to submission of the request for final payment, the Contractor shall schedule with the Owner's Representative training sessions for all equipment and systems related to the Work, as required in the Specifications. The Contractor shall schedule training sessions at least two (2) weeks in advance of the date of training to allow the Owner's personnel adequate notice. The O & M Manual shall be used as a basis for training. Training shall be a formal session, held after the equipment or system is completely installed and operational in its normal operating environment.

§ 15.6.3 Other Contractor Responsibilities

The Contractor shall be responsible for returning to the Owner all items issued during construction such as keys, security passes, site admittance badges, and all other pertinent items. The Contractor shall be responsible for notifying the appropriate utility companies to transfer utility charges from the Contractor to the Owner. The utility transfer date shall not be before Substantial Completion and, at Owner's discretion, may not be until Final Completion.