

**Invitation for Bid (BID) Interest Form**  
**BID Form #1**

**Instructions:** *If your firm/company is interested in responding to this BID, then BID Form #1 MUST be submitted to the Office of Financial Services immediately following download.* This form is crucial in providing pertinent company information for bidder's list tracking and distribution of any potential addendum.

<b>Awarding Authority:</b>	<i>City of Brockton / Brockton Public Schools</i>
<b>Contract / Bid Number:</b>	<i>2080-0005</i>
<b>Name of Bid:</b>	<b><i>FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM</i></b>

**Fax this BID Interest #1 Form to:**

Brockton Public Schools / Office of Financial Services
Fax: <b>508-580-7587</b>

By submitting this *BID Interest Form* the below identified firm is expressing its interest in the above-referenced public bidding project and is requesting that it be added to the list of firms that will receive any addenda to the *BID* that might occur. ***The Awarding Authority assumes no responsibility for a firm's failure to receive any addenda or other correspondence related to this BID due to the firm's failure to submit a BID Interest Form as directed above or for any other reason.***

<b>Company Name:</b>	
<b>Company Address:</b>	
<b>City/Town, State &amp; Zip:</b>	
<b>Company Telephone #:</b>	
<b>Company Fax #:</b>	
<b>Company Contact Person/Title:</b>	
<b>Contact Person Email Address:</b>	
<b>Date Submitted:</b>	

By: \_\_\_\_\_  
**(Signature of Authorized Representative)**

## **BID FORMS AND SPECIFICATIONS**

### **FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM**

**(Project No. 2080-0005)**

**Honorable Bill Carpenter  
Mayor  
City of Brockton  
Brockton, Massachusetts**

**Advertising Dates:  
Central Register & COMMBUYS  
June 19, 2019**

**Brockton Enterprise  
June 19, 2019**

**Michael P. Thomas  
Interim Superintendent of Schools  
City of Brockton  
Brockton, Massachusetts**

**Bid Opening  
Wednesday, July 3, 2019  
10:15 A.M.**

**Walk Through  
Wednesday, June 26, 2019  
10:00 A.M.**

## **INVITATION TO BID**

### **BROCKTON PUBLIC SCHOOLS BROCKTON, MASSACHUSETTS**

1. Sealed General Bids for **Project No. 2080-0005, FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM**, will be received by the Office of Financial Services for the Brockton Public Schools, 43 Crescent Street, Brockton, MA., 02301, until **Wednesday, July 3, 2019 at 10:15 A.M.** At the noted time, the General Bids for the project will be publicly opened and read.

All procedures shall be in strict accordance with Chapter 149 of the Massachusetts General Laws, sections 1 through 25, inclusive, and/or Chapter 40, Section 4B and/or Chapter 30 section 39M and Chapter 30B, of the General Laws of the Commonwealth of Massachusetts, including all current amendments and guidelines.

Specifications and all other bid documents may be obtained after **1:00 P.M., Wednesday, June 19, 2019** on our website. The hyperlink is <http://www.bpsma.org/departments/purchasing/2020-bids>. Should you require a paper copy you may contact our office.

The contractor must be certified by the Division of Capital Asset Management and Maintenance in Electrical Services. A copy of the DCAMM certification and an Update Statement must be submitted with the bid.

2. All bidders must use the prescribed bid forms available at the above stated address.
3. All Bids must be properly identified as **FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM** and delivered to the Office of Financial Services for the Brockton Public Schools, 43 Crescent Street, Brockton, MA 02301, prior to the official **OPENING**, as stated above, at which time and place they will be opened and read aloud.

All bidders assume the risk of any delay in the mail, or, any other delays which prevent receipt of the bid(s) at the posted bid opening date and time. **Bids received after the official BID OPENING DATE AND TIME will be returned unopened. No facsimile of bids is allowed.**

4. The City of Brockton will reject any or all bids when required to do so by the above referenced General Laws, or, if it deems it to be in the public interest to do so. The Awarding Authority also reserves the right to waive any informality in any bid based on the public interest to proceed in this way. Any bid submitted will be binding for sixty (60) days beyond the **OPENING DATE**.
5. The Awarding Authority also reserves the right to reject any bid if it determines that such bid does not represent the bid of a person competent to perform the work as specified within the conditions and time frame as set forth for completion of the project.
6. Any and all questions relative to these specifications must be submitted in writing to the Awarding Authority at least seven (7) days before the BID OPENING DATE, and written answers shall be sent to all bidders as an addendum.
7. **THE AWARD OF CONTRACT FOR THE PROJECT(S) IS CONTINGENT UPON THE AVAILABILITY OF FUNDING AND APPROVAL OF ALL APPROPRIATE MUNICIPAL BODIES.**

## **INSTRUCTIONS TO BIDDERS**

### **A. BID REQUIREMENTS:**

1. Sealed bids for **FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM**, will be received at the time and place as stated in the "Advertisement/ Invitation for Bids" and in accordance with the bid documents.
2. The General Bid proposal, filled out and signed in longhand by the bidder must be accompanied by a bid deposit equal to five percent (5%) of the amount of the base bid(s) of the project(s). The bid deposit may be in the form of a certified check, bank treasurer's or cashier's check, or a bid bond from a licensed surety company and must be placed in an envelope, sealed, and marked "**GENERAL BID FOR FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM**" and delivered to Office of Financial Services of the Brockton Public Schools, 43 Crescent Street, Brockton, MA, 02301, as stated in the "Invitation to Bid."
3. All bid deposits of General Bidders, except those of the three lowest responsible and eligible General Bidders, shall be returned within five (5) days, Saturdays, Sundays and legal holidays excluded, after the opening of the General Bids. The bid deposits of the three lowest responsible and eligible General Bidders shall be returned upon the execution and delivery of the General Contract, or, if no award is made upon the expiration of the time prescribed in the "Invitation for Bids". If any General Bidder fails to perform their agreement to execute a Contract and furnish a Performance and Payment bond as stated in their General Bid, their bid deposit shall become and be the property of the City of Brockton; provided that the amount of the deposit which becomes the property of the Awarding Authority shall not, in any event, exceed the difference between their bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that in case of death, disability, bona fide clerical or mechanical error of a substantial nature their bid deposit shall be returned to them.
4. No claims for immunity or exceptions predicated upon misunderstanding or failure to correctly interpret the above paragraph will be allowed.
5. The Bid Forms, General Conditions, Addenda (if any), and Sample Contract and any other documents which constitute the Contract Documents will be available as stipulated in the "Invitation to Bid" and shall be incorporated into and be made a part of the contract.
6. Commonwealth of Massachusetts General Laws Section 149, Sections 44A through 44L is incorporated herein by reference. Any inconsistency between the Invitation to Bid, Information to Bidders, Bid Forms, Conditions of the Contract, and any other Contract Documents and these statutes, or any other applicable statutes, bylaws, or regulations existing on the date on which the bids are to be received, shall not be grounds for invalidating the bidding procedures, but, where required by law, such statute, bylaw, or regulation shall be deemed to govern.

### **B. BIDDER'S REPRESENTATION:**

1. Each General Bidder making a bid (Hereinafter called "Bid") represents that:
  - a. The General Bidder has read and understands the Contract documents and the Bid is made in accordance therewith.
2. Failure to so examine the Contract Documents and site will not relieve any Bidder from any obligation under the Bid as submitted.

### **C. GENERAL BIDDER'S QUALIFICATIONS:**

The Awarding Authority, the City of Brockton, will review the qualifications of the apparent low General Bidder after the General Bids are opened. The lowest eligible and responsible General Bidder will be awarded the Contract

provided that the General Bidder meets all the requirements of the bid and scope of services and possesses the skill, ability, and integrity to complete the job to the Awarding Authority's satisfaction.

**D. REQUESTS FOR INTERPRETATION:**

1. All General Bidders shall promptly notify the Awarding Authority of any ambiguity, inconsistency, or error which they may discover upon examination of the Contract Documents, the site(s), and/or local condition(s).
2. All questions about the technical and bid specifications and plans are to be directed to:

Matthew Moore  
Cavanaugh Tocci  
327F Boston Post Road  
Sudbury, MA 01776  
(978)-639-4115.  
[mmoore@cavtocci.com](mailto:mmoore@cavtocci.com)

Written questions due by 2:00 P.M., Tuesday, June 25, 2019.

Walk through on Wednesday, June 26, 2019 at 10:00 at Brockton High School Fine Arts Building, 700 Belmont Street, Brockton, MA 02301. Verbal questions will be answered by 2:00 P.M., Thursday, June 27, 2019.

Mr. Ken Thompson  
Brockton Public Schools  
Director of Facilities  
91 Foster Street  
Brockton, MA 02301  
(508) 580-7503  
(508) 580-7587 (FAX)

3. Interpretation, correction, or change(s) in the Contract Documents will be made by an addendum that will become part of the Contract Documents. Neither the Awarding Authority nor its representative(s) will be held accountable for any oral instructions.
4. An addendum will be mailed or faxed by the Awarding Authority to every individual or firm on record as having taken a set of Contract Documents. Receipt of said addendum must be acknowledged by each Bidder in the appropriate space provided in the Bid Forms. Failure to do so may lead to disqualification of the General Bid by the Awarding Authority. All bidders are, therefore, encouraged to confirm the number of Addenda which have been issued prior to submitting their Bid.
5. Copies of the Addendum will be made available for inspection at the locations listed in the Advertisement as to where Contract Documents are on file.

**E. TAXES/EXEMPTION:**

The Awarding Authority is exempt from payment of the Massachusetts Sales Tax. The City of Brockton under G.L. Chapter 64H, Section 6 (d) and (e) has been issued a Certificate of Exemption by the Massachusetts Department of Revenue.

**F. WITHDRAWAL OF BIDS:**

No General Bidder shall withdraw their Bid for a period of sixty (60) days, Saturdays, Sundays and legal holidays excluded, after the date set for the opening of the General Bids.

**G. SUB-CONTRACTS:**

All work shall be performed by the General Contractor unless other wise necessitated by the work.

**H. PERFORMANCE AND PAYMENT BOND:**

A Performance Bond and a Payment Bond, each equal to one hundred percent (100%) of the total service or project cost and issued by a surety company authorized to do business under the laws of the Commonwealth, and, satisfactory to the Awarding Authority, will be required from the successful Bidder in accordance with regulations relating to Chapter 149 of the General Laws of the State of Massachusetts. The General Contractor has ten (10) days from the date of notification of intent to award the Contract to obtain the required bond. The premium on the bond shall be included as a part of the total Bid cost(s). Forms of bonds are included by reference and executed copies shall be included in the Contract Documents when the Contract is signed.

**I. TIME FOR PERFORMANCE:**

**The substantial completion date must be no later than November 1, 2019, and the final completion date must be no later than November 15, 2019.** The Awarding Authority or its representative shall be informed of any work that is loud in character and may cause undue disturbance to neighboring residents, or work that has the slightest potential for endangering the health and safety of any building occupants or persons in the proximity of the building.

**J. EXAMINE BUILDING:**

1. Examination of any/all of the facilities shall be coordinated through the Director of Facilities for the Brockton Public Schools, Mr. Ken Thompson, (508) 580-7503.
2. Site visits shall occur between the hours of 7:00 A.M. and 4:00 P.M. on regular workdays and must be coordinated in advance with Mr. Ken Thompson.

**K. BUILDING PERMITS:**

1. All General Bidders are advised that all appropriate types of permits are required and that the fees for any permits must be a separate line item on the invoice. Please refer to the Scope of Services for the proper submission of all invoices for payment.
2. The successful General Bidder shall be required to obtain any necessary permit(s) or license(s) prior to as required by any statute, rule or regulation. The City of Brockton will not waive any relevant municipal fees if a proposal for a specific project has been submitted by the contractor for a specific amount. The successful General Bidder shall note that the normal turnaround time for obtaining all necessary permits from the City of Brockton Building Department is one (1) week.
3. The General Bidder is responsible for the filing of any other permits, fees, inspections, etc., as may be required by Federal, State, and local authorities.

**FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO  
LIGHTING AND SOUND SYSTEM**

**To: The Awarding Authority  
City of Brockton/School Department  
43 Crescent Street  
Brockton, MA 02301**

\_\_\_\_\_  
**Company submitting Bid**

\_\_\_\_\_  
**Signature of Authorized Representative of Company**

- A) The undersigned has received and examined the document entitled "**FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM**".
- B) The undersigned warrants that they have complied with all provisions of the Specifications and can furnish the materials, equipment, and labor to carry out all the service as proposed.
- C) The undersigned agrees, that in the event of award of the Contract, they can start work as required, and further agrees that the work will be completed within the time frame agreed upon prior to the signing date of the Contract.
- D) **The following documents are made a condition of this Bid and must be included with the Bid in order for the Bid to be considered as a legitimate and acceptable Bid for consideration of Award of Contract:**
- 1) Page(s) 7 -17 of the Bid Forms with all bid proposals, information, signatures, seals, etc., as required.
  - 2) 5% Bid Deposit in the form of a certified or bank check, treasurer's check, cashier's check, or bid bond from a licensed Massachusetts surety company.
  - 3) Statement of payment of all State taxes (page 8).

**BID FORM**  
**(Must be submitted)**

## **VENDOR TAX CERTIFICATE**

I certify, under the pains and penalties of perjury, that to the best of my knowledge and belief, I have filed all state tax returns and paid all state taxes required under the law.

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***For use by CORPORATIONS ONLY:***

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PROPER CORPORATE NAME

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SIGNATURE OF AUTHORIZED CORPORATE OFFICER

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FEDERAL IDENTIFICATION NUMBER (FEIN)

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***For use by INDIVIDUALS OR COMPANIES OTHER THAN CORPORATIONS ONLY:***

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SIGNATURE OF INDIVIDUAL \*

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SOCIAL SECURITY NUMBER \*\*

\*Approval of contract or other agreement will not be granted unless this certification clause is signed by applicant.

\*\*Your social security number will be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing/payment obligations.

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## **CERTIFICATE OF CORPORATE VOTE**

I, \_\_\_\_\_; clerk/officer of \_\_\_\_\_ hereby notify  
that at a meeting of the Board of Directors/Officials of said corporation/company, held on \_\_\_\_\_  
\_\_\_\_\_ the following vote was passed:

Vote to authorizing \_\_\_\_\_ to sign in behalf of the  
corporation/company with the City of Brockton for \_\_\_\_\_.

---

Signature of Clerk/Officer

**\* PLEASE ATTACH COPY OF OFFICIAL CERTIFICATE OF CORPORATE VOTE.**

**BID FORM**  
**(Must be submitted)**



**FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO**  
**LIGHTING AND SOUND SYSTEM**  
**SCOPE OF SERVICES**

The Contractor shall furnish all labor, materials, equipment and insurance, and perform all work required for **FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM** in strict accordance with the General Conditions, Addenda (if any), and Sample Contract and any other documents which constitute the Contract Documents will be available as stipulated in the "Invitation to Bid" and shall be incorporated into and be made a part of the contract.

**The substantial completion date must be no later than November 1, 2019, and the final completion date must be no later than November 15, 2019.**

**THE CONTRACT SUM**

The Proposed Contract Price is \_\_\_\_\_ dollars  
(words)  
(\$ \_\_\_\_\_)

**BID FORM**  
**(Must be submitted)**

**CITY OF BROCKTON**

I hereby certify, under the pains and penalties of perjury, that I am able to furnish labor in harmony with all other elements of labor employed in the work and that all employees employed on the worksite, or in work subject to the bid, have successfully completed at least 10 hours of OSHA approved training. I agree to submit documentation that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration. I further certify that any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hour in duration shall be subject to immediate removal.

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Typed Name of Person Authorized to Sign Bid

\_\_\_\_\_  
Written Signature of Person Authorized to Sign Bid

\_\_\_\_\_  
Title of Signatory

\_\_\_\_\_  
Company Address

\_\_\_\_\_  
Company Telephone

\_\_\_\_\_  
Company Fax Number

\_\_\_\_\_  
Date

If corporation, this page must be signed and sealed by a duly authorized officer.

If partnership, so state and give names of all partners.

If an individual, so state and sign.

**Documentation of successful completion of said course must be provided with the submission of the first certified payroll report for each employee. Payment requisitions will NOT be reviewed without the required OSHA documentation.**

**BID FORM**  
**(Must be submitted)**

**AFFIDAVIT OF CLERK OF CORPORATION VENDOR**  
**(To be signed and completed by Clerk)**

I, \_\_\_\_\_, certify as follows:  
(Print full name of Clerk)

1. I am the Clerk of \_\_\_\_\_ (print exact name of corporation) which is duly organized and incorporated under the laws of the Commonwealth of Massachusetts (or State of \_\_\_\_\_) and is/is not (circle one) duly registered to do business in the Commonwealth of Massachusetts with a principal place of business at \_\_\_\_\_.

2. That the names, residential addresses and title officers of the above named corporation are as follows:

President	Address
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Vice President	Address
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Treasurer	Address
-----------	---------

Resident/Registered Agent	Address
---------------------------	---------

3. That the above named corporation was incorporated on \_\_\_\_\_.

4. The federal tax identification number of said corporation is \_\_\_\_\_.

5. That the above named corporation is in good standing with the Secretary of the Commonwealth of Massachusetts or the State of \_\_\_\_\_ (if incorporated under the laws of a foreign State) and has filed all federal and state tax returns and paid all federal, state and/or local taxes required under law.

6. \_\_\_\_\_ is authorized to sign contract/agreements on behalf of \_\_\_\_\_ pursuant to a vote of the Board of Directors/Officers on \_\_\_\_\_.

7. I, on behalf of the within corporation, do hereby acknowledge that by this contract, this corporation is transacting business within the Commonwealth of Massachusetts as defined by M.G.L. Chapter 223 A, Section 1, et seq. And is subject to the jurisdiction of its courts. (Pertaining to Non-Massachusetts Corporations Only.)

SIGNED under the pains and penalties of perjury this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature of Clerk of Corporation

**BID FORM**  
**(Must be submitted)**

## **VENDOR REGISTRATION FORM**

### **TO BE COMPLETED BY ALL VENDORS:**

TYPED/PRINTED NAME AND TITLE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

PROPER LEGAL NAME OF BUSINESS ENTITY: \_\_\_\_\_

FEIN or SOCIAL SECURITY NUMBER if FEIN is N/A: \_\_\_\_\_

BUSINESS ADDRESS, CITY, STATE, ZIP: \_\_\_\_\_

TELEPHONE NO: \_\_\_\_\_ FAX NO: \_\_\_\_\_

### **IF CORPORATION:**

1. GIVE YOUR CORRECT CORPORATE NAME:

\_\_\_\_\_

2. STATE AND DATE OF INCORPORATION:

\_\_\_\_\_

3. IF FOREIGN CORPORATION, GIVE MASSACHUSETTS REGISTRATION DATE:

\_\_\_\_\_

**IF FOREIGN BUSINESS ENTITY TRANSACTING BUSINESS IN MA, GIVE NAME/ADDRESS OF  
RESIDENT/REGISTERED AGENT IN MA (REQUIRED):**

\_\_\_\_\_

**IF COMPANY, GIVE the OWNER'S NAME AND TITLE:**

\_\_\_\_\_

**IF PARTNERSHIP, GIVE NAMES AND ADDRESSES OF PARTNERS:**

\_\_\_\_\_

**IF TRUST OR LEGAL ENTITY, GIVE NAMES AND ADDRESSES OF TRUST OR LEGAL ENTITY:**

\_\_\_\_\_

## **MINORITY/WOMEN BUSINESS CLASSIFICATION STATEMENT**

1. Our firm is principally (more than 50%) minority owned.  
YES \_\_\_\_\_ NO \_\_\_\_\_

2. Our firm is principally (more than 50%) woman owned.  
YES \_\_\_\_\_ NO \_\_\_\_\_

3. Our firm is registered with S.O.M.B.A. (State Office of Minority & Business Assistance)  
YES \_\_\_\_\_ NO \_\_\_\_\_

SOMWBA CERTIFICATION CATEGORY: \_\_\_\_\_ / MBE \_\_\_\_\_ WBE \_\_\_\_\_

**BID FORM**  
**(Must be submitted)**

### **Attestation Clause**

Under Chapter 233, Section 35 of the Acts of 1983, political subdivisions and agencies of the Commonwealth must annually furnish to the Commissioner of Revenue a list of all persons who have provided goods, services or real estate space in the aggregate of five thousand dollars (\$5,000.00) or more. Chapter 233 of the Acts of 1983, Sections 35 and 36 require that each provider or vendor of goods and services to any municipal agency must attest that it/he is in compliance of all laws relating to taxes. The Attestation must occur at the time of issuing, renewing, or extending a license, contract or agreement. Any person/company failing to execute this Attestation Clause shall not be allowed to obtain, renew or extend a license, contract or agreement. Each successful bidder shall certify that he is in compliance with Chapter 233 by providing a Social Security Number or Federal Identification Number when a contract is issued.

VENDOR/COMPANY: \_\_\_\_\_

AUTHORIZED SIGNATURE: \_\_\_\_\_

TYPED/PRINTED NAME AND TITLE: \_\_\_\_\_

### **Certificate of Non-Collusion and Certificate of Bona Fide Bid**

As per Chapter 30B, Section 10, any person submitting a bid for the procurement or disposal of supplies or services to any governmental body shall certify in writing, on the bid, as follows:

**The undersigned certifies under the penalty of perjury that this bid has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business partnership, corporation, union, committee, club or other organization, entity, or group of individuals.**

VENDOR/COMPANY: \_\_\_\_\_

AUTHORIZED SIGNATURE: \_\_\_\_\_

### **Assurance of Non-Discrimination Compliance**

Vendor does not subject employees or applicants for employment by this firm to discrimination on the basis of race, color, national origin, handicap, age or sex, in any of the following areas:

1. Recruitment, hiring, upgrading, promotion, whether for full-time employment, consideration for demotion, transfer, layoff, or rehiring.
2. Rates of pay or any other form of compensation and changes in compensation.
3. Job assignments and seniority status.
4. Granting and returning from leaves of absence, leave for pregnancy, or any other leave.
5. Fringe benefits available by virtue of employment, whether or not administered by the recipient.
6. Selection and financial support for training, including apprenticeship, professional meetings, conferences and other related activities, selection for tuition assistance, and selection for sabbaticals and leaves of absence to pursue training.
7. Employer-sponsored activities, including social or recreational programs.
8. Any other term, condition, or privilege of employment.

VENDOR/COMPANY: \_\_\_\_\_

AUTHORIZED SIGNATURE/TITLE/DATE: \_\_\_\_\_

ADDRESS AND TELEPHONE: \_\_\_\_\_

**BID FORM**  
**(Must be submitted)**

**Certificate of Insurance**  
**(Service Contracts Only\*)**

As successful bidder on this Contract, you must supply the City of Brockton with a properly endorsed CERTIFICATE OF INSURANCE. Both the City of Brockton and the Vendor shall be named as co-insured/additional insured and the City shall be named certificate holder, and certificates of insurance shall be furnished to both parties. Reporting of accidents and claims shall be done by the Vendor. This Certificate MUST accompany the Contract. Unless otherwise provided for by the Contract, Vendor shall meet the following insurance requirements:

**WORKERS' COMPENSATION:** The Vendor, before commencing performance of the work required to be done under the Contract, shall provide for the payment of compensation, provided by the General Laws (ter. Ed.) Chapter 152 as amended to all persons to be employed by him/her in connection with said performance and shall continue in full force throughout the period of this Contract.

**PUBLIC LIABILITY:** Within fifteen (15) days after the award of this Contract the Vendor shall, at his/her own expense, procure and maintain insurance for Public Liability in the minimum amount of \$500,000/\$1,000,000 and Property Damage Liability in the minimum amount of \$50,000/\$100,000.

The policies shall contain a provision worded as follows: "The Insurance Company waives any right to subrogation against the City of Brockton which may arise by reason on any payments under this policy."

The policy/policies must contain on the face a notation that it/they cannot be cancelled without at least thirty (30) days notice in writing to the City as owner.

Furthermore, the certificates of all policies shall provide for notice of cancellation of the Contracting officer and the certificates shall indicate that the above provisions have been included.

**\*DESIGN/CONSULTING SERVICES, PLEASE PROVIDE PROOF OF PROFESSIONAL LIABILITY INSURANCE.**

AUTHORIZED SIGNATURE: \_\_\_\_\_

**Indemnification and Release**

The Vendor shall indemnify and hold the City of Brockton harmless from any and all acts & omissions arising out of this contract by the Vendor, its agents, employees or representatives. Furthermore the term Vendor shall include the aforementioned wherever stated in the Contract.

Further, the Vendor shall indemnify and hold harmless the City of Brockton against any/all suits, claims, actions, costs or damages to which the City may be subject to by reason of damages to the property or person of anyone, arising or resulting from fault, negligence, or wrongful omissions by the Vendor. Said indemnification and hold harmless should apply in any event that a claim is brought against the City of Brockton for said acts caused by others.

The Vendor, their agent(s), representatives or employees shall release and hold the City of Brockton harmless for any injury to themselves, corporate officers, agents, representatives or employees in connection with the performance or omission of this Contract or any related sub-contract thereof.

AUTHORIZED SIGNATURE: \_\_\_\_\_

**BID FORM**  
**(Must be submitted)**

## **DEVIATION SHEET**

All deviations and/or substitutions from the original specified items (or equal) must be noted in writing on the Deviation Sheet. Additional pages may be used if necessary. These items shall be approved by the lead department for compatibility, workmanship, and functionality before award of contract.

**PLEASE LIST BELOW:**

COMPANY: \_\_\_\_\_

TYPED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

**BID FORM**  
**(Must be submitted)**

### **VENDOR WORK HISTORY**

A. The undersigned proposes to supply the **FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM.**

B. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon, according to all the requirements of the specifications.

1. Have been in business under present business name for \_\_\_\_\_ years.
2. Are you fully licensed to do business under this contract? \_\_\_\_\_
3. Do you comply with all ordinances and regulations mandated by M.G.L. and the community in which you are located? \_\_\_\_\_
4. Ever fail to complete any work awarded? \_\_\_\_\_
5. Have you been involved in litigation in the past five (5) years? \_\_\_\_\_
6. List at least three (3) state, local or private companies and/or organizations which you have served recently of similar character as required for the above-mentioned.

#### **LOCATION**

#### **PHONE #**

#### **DATE**

#### **DESCRIPTION OF WORK**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

C. Bidders shall indicate firm date of delivery on receipt of contract and subsequent purchase order form the City of Brockton.

DELIVERY DATE: \_\_\_\_\_

COMPANY: \_\_\_\_\_

TYPED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

D. Bidders shall note that this bid reflects all changes in addendum/amendment numbers: \_\_\_\_\_

**BID FORM**  
(Must be submitted)



## **GENERAL CONDITIONS**

### **I. CONDITIONS OF BIDDING**

**A. BID DEPOSIT**

**B. REFERENCE TO PERFORMANCE AND PAYMENT BOND**

### **II. GENERAL WORK DESCRIPTION**

**A. SCOPE OF SERVICES AND REQUIREMENTS**

**B. MATERIAL AND WORKMANSHIP**

**C. WAGES**

**D. PERMITS AND NOTIFICATIONS**

**E. MATERIAL REFERENCES**

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**P. FREEDOM OF EMPLOYMENT TO LODGE, BOARD AND TRADE**

**Q. SAFETY REQUIREMENTS; OSHA TRAINING [M.G.L. c. 30, s. 39S]**

**R. CORI**

## **I. CONDITION OF BIDDING**

- A. BID DEPOSIT:** Each bidder must deposit with his/her bid, a security deposit in the amount of five percent (5%) of the total amount of the base bid, either in the form of a certified check, cashier's check issued by a responsible bank or trust company, or bid bond, payable to the City of Brockton.
- B. PERFORMANCE AND PAYMENT BOND:** A Performance Bond and a Payment Bond, each equal to one hundred percent (100%) of the total service or project cost. These Bonds must be purchased from a surety company authorized to transact business in the Commonwealth of Massachusetts. The premiums for the bond are to be paid by the successful bidder and are to be included in the contract price. The Bonds shall be written in conformance with Massachusetts General Laws, Chapter 149.

## **II. GENERAL WORK DESCRIPTION**

### **A. SCOPE OF SERVICES**

The Brockton Public Schools bid for the FY2020 BROCKTON HIGH SCHOOL AUDITORIUM AND TELEVISION STUDIO LIGHTING AND SOUND SYSTEM. The contracted vendor will be required to submit a service report detailing all work performed and all related time(s) and material(s) costs **at the time of submission of all invoices for payment**. This report will be subject to inspection and review by the Director of Facilities prior to the approval for payment of said invoice(s). **Because all work performed by the Brockton Public Schools is subject to State Wage Rate Laws, all invoices must include a breakdown of per hour labor cost and material(s) costs as separate items so that payment of State Prevailing Wage Rates for all involved trades may be confirmed.**

### **B. MATERIALS AND WORKMANSHIP:**

Unless otherwise specifically provided, all services, workmanship, equipment, materials and articles incorporated in the work covered by the awarded contract are to be of the best grade of their respective kinds for the purpose for which they are intended. Where equipment, materials or articles are "equal" to any particular standard, the Owner shall decide the question of equality.

### **C. WAGES:**

The wages paid to labor on this work shall not be less than the minimum wage rates established by the Director of the Department of Labor Standards

### **D. PERMITS AND NOTIFICATIONS:**

The Contractor shall obtain and pay for all required licenses and permits for the work herein provided in these Specifications. The Contractor is also responsible for the timely filing of all necessary notifications involving environmental issues related to the project with all appropriate Federal, State, and Local authorities.

### **E. MATERIAL REFERENCES:**

Wherever specified, reference to any article, device, product, materials, fixtures, form or type of construction or installation, etc., by name, make or catalog number shall be interpreted as establishing a standard of equality and shall not be construed as limiting competition. The Contractor, in such cases may at his/her option use any article, device, product, materials, fixtures, form or type of construction or installation which in the judgment of the Owner is equal to that named.

### **F. APPROVALS:**

All notices, demands, requests, instructions, approvals and claims must be submitted in writing.

## **G. PAYMENT TO CONTRACTOR:**

Payments are to be made in accordance with the provisions of Chapter 627, paragraph 1 of the Acts of 1961 which provisions are contained in the proposed Contract Form.

## **H. INSURANCE REQUIREMENTS:**

1. Before commencing performance of any work on the project, the Contractor shall furnish evidence of insurance coverage for payment of Worker's Compensation and the furnishing of other benefits under Chapter 152 of the General Laws (the Worker's Compensation Law) to all person to be employed during the work covered by the Contract and shall continue such insurance in full force and effect during the term of this project. Failure to provide and continue in force such insurance and aforesaid benefits shall be deemed a material breach of the Contract covering the project and shall operate as an immediate termination thereof at the election of the Awarding Authority. Said insurance shall be acceptable to the Awarding Authority and the policy shall be submitted to the Awarding Authority for examination as a part of the Contract Documents. Satisfactory certificates of insurance of said insurance shall be filed with the Awarding Authority prior to the commencement of any work by the Contractor on this project.
2. The insurance required shall include all major divisions of coverage and shall be on a comprehensive basis including Premises and Operations, Owner's and Contractor's Protective, Products and Completed Operations, and Owned, Non-owner, and Hired Motor Vehicles. Such insurance shall be written for not less than any limits of liability required by law or the following limits, whichever are greater:

**Employer's Liability:** \$500,000

### **Comprehensive General Liability Insurance:**

Bodily Injury Liability	\$500,000 per person \$1,000,000 per occurrence
Property Damage Liability	\$500,000 per occurrence \$2,000,000 annual aggregate

### **Motor Vehicle Insurance:**

Bodily Injury	\$500,000 per person \$1,000,000 per occurrence
Property Damage Or, Combined Single Limit	\$500,000 per occurrence \$1,000,000

Excess Liability (Umbrella) Insurance: Combined Single Limit	\$2,000,000
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3. The Contractor shall affect and maintain insurance against all risks of physical loss upon all work in place and all materials stored at any work site, whether or not covered by payments made by the Awarding Authority. This insurance shall be in an amount equal to the full replacement cost thereof at all times and shall be for the benefit of the Awarding Authority and the Contractor as their interest may respectively appear. This insurance shall be placed with such company or companies as may be acceptable to the Awarding Authority.
4. In the event that the form of any policy or certificates of insurance required under this Contract or the amount thereof, if not especially specified herein, or the companies writing the same are not satisfactory to the Awarding Authority, the Contractor will secure other policies or certificates in form and amount and with companies satisfactory to the Awarding Authority.

The Contractor shall not cause any policies to be canceled or permit them to lapse, and all insurance policies shall include a clause to the effect that the policy shall not be canceled or changed until fifteen days after the Awarding Authority, as herein defined, and has received written notice thereof as evidenced by return receipt of registered letter. All certificates of insurance shall contain true transcripts from the policy, authenticated by the proper officer of the insurer, evidencing particularly that the Awarding Authority is included as one of those insured, the extent of the insurance, the location and operations to which the insurance applies, the expiration date and the above-mentioned notice of cancellation clause.

5. All insurance shall be written on an occurrence basis, unless the Awarding Authority approves in writing coverage on a claims-made basis.

**I. PATENT INFRINGEMENTS:**

The Contractor shall hold and save the Awarding Authority, its officers, and employees, harmless from liability of any nature or kind, including costs, and expenses for or on account of any, patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the work covered by these Specifications, including its use by the Awarding Authority.

**J. LAWS AND ORDINANCES:**

1. All work to be performed under this Specification shall be in accordance with all applicable laws, State or Federal, and all applicable ordinances, codes, rules and regulations of the Awarding Authority or any public board or officer having jurisdiction, regulation or control over any work to be done hereunder.
2. The building code of the City of Brockton shall be the minimum required for all work, but the Specifications shall govern wherever the Specification requirements are in excess of, greater than, or more stringent than code requirements and are permitted under the code.

**K. PROVISION OF LAW DEEMED INSERTED:**

1. Every provision required by law to be inserted herein, and especially those required by Chapter 149 of the General Laws, as amended, shall be incorporated herein by reference, to the extent that such is not already included herein as if it were set forth herein in its entirety. These documents shall be read and enforced as though such provisions were included herein and, if through mistake or otherwise such provision is not so inserted or is incorrectly inserted, then, upon the application of either party, these documents shall be amended to meet the requirements of the law.
2. In the event of any conflict between the provisions of these documents and the provisions required to be inserted herein, such latter provisions shall control.

**L. INVALID CLAUSES:**

1. If any provision of this Specification shall be such as to render it invalid or illegal, then if it shall not appear to have been made by the parties, it shall not be deemed to form part thereof, but the balance of the Specifications shall remain in force and effect.
2. The titles, headings and notes contained in the Specifications are solely to facilitate reference to various portions of the Specifications and in no way affect, limit or cast light upon the interpretation of the portion to which they refer.

**M. INDEMNITY:**

The Contractor agrees to indemnify and save the Owner harmless from and against any and all costs, loss, expense, liability, damages, or claims for damages, including costs of defending any action on account of any injury or damage to buildings, improvements or property of the City or any person, firm, corporation or association and on

account of any injury (including death) to any person or persons arising or resulting from the work provided for or performed under the Contract documents or from any act, omission or negligence of the Contractor. The foregoing provisions shall not be deemed to be released, waived, or modified in any respect by reason of any insurance provided by the Contractor under the Contract. The Contractor shall furnish insurance to the Awarding Authority for the performance of the provisions of this paragraph.

**N. HOURS OF WORK:**

No laborer, worker, mechanic, foreman, or inspector working within the Commonwealth, in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or a part of the work contemplated by the Contract, shall be required or permitted to work more than eight hours in any one day, except in cases of emergency, the Awarding Authority, being subject to Section 31, of Chapter 149 of the General Laws.

**O. QUALIFICATIONS FOR EMPLOYMENT:**

In the employment of mechanics, teamsters, chauffeurs, and laborers, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement for their employment who are male veterans as defined in Clause 43 of Section 7 of Chapter 4 of the General Laws, and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be found in sufficient numbers, then to citizens of the United States.

**P. FREEDOM OF EMPLOYMENT TO LODGE, BOARD AND TRADE:**

Every employee in the work to be performed under this Contract shall be allowed to lodge, board, and trade where and with whom he elects and no person or his agents or employees shall directly or indirectly require as a condition of employment in said work, that an employee shall lodge, board or trade at a particular place or with a particular person.

**Q. SAFETY REQUIREMENTS; OSHA TRAINING [M.G.L. c. 30, s. 39S]**

The Contractor shall comply and shall cause all subcontractors and persons employed on the Work to comply with all applicable safety requirements. By executing this contract the Contractor hereby certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration. Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration shall be subject to immediate removal.

**R. CORI**

Contractor acknowledges that all employees and workmen who are to perform work under this contract are subject to screening by Owner by means of conducting a Criminal Offender Record Information Search (CORI). Contractor warrants that it will provide workmen whose CORI shows no reason to prohibit contact with children of school age. Each such workman from the awarded vendor shall be required to submit a completed and signed CORI form which will be forwarded along with contract to be signed.

## SECTION 11 0640 - THEATRICAL LIGHTING AND CONTROLS

### PART 1 - GENERAL

#### 1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Examine all other Sections of the Specifications for requirements that affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

#### 1.2 EXAMINATION OF SITE AND DOCUMENTS

- A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Trade Contractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

#### 1.3 SUMMARY

- A. The work of this section includes all labor, materials, equipment and services required for the manufacture, delivery, coordination and installation of performance lighting dimming, control and distribution systems as indicated on the Drawings and schedules.
- B. Section Includes
  - 1. Engineering, manufacture, furnishing, coordination and commissioning of performance lighting dimming and control system including, but not limited to, the following:
    - a. Dimmer racks and modules
    - b. Motorized circuit breaker panels
    - c. Distribution faceplates and devices
    - d. Control faceplates and devices
    - e. Control console software upgrade
    - f. Architectural lighting fixture retro-fit
    - g. System accessories
    - h. Configuration of system
    - i. Coordination and addressing of architectural lighting fixtures
    - j. User training

#### 1.4 RELATED WORK SPECIFIED ELSEWHERE

- A. Carefully examine all of the Contract Documents for requirements which affect the Work of this Section.

- B. Other Specification Sections which directly relate to the Work of this Section include, but are not limited to, the following:
  - 1. Section 27 41 16 – Integrated Audiovisual Systems

#### 1.5 REFERENCES

- A. National Fire Protection Association (NFPA)
  - 1. NFPA70 - National Electrical Code
  - 2. NFPA 110 – Standard for Emergency and Standby Power Systems
- B. American National Standards Institute (ANSI)
  - 1. E1.11-2004 - USITT DMX512-A
  - 2. E1.17-2006, Entertainment Technology – Multipurpose Network Control Protocol Suite (ACN)
  - 3. E1.20-2006, Entertainment Technology – Remote Device Management over USITT DMX512
  - 4. E1.27-1-2006, Entertainment Technology – Standard for Portable Control Cables for Use with ISUTT DMX512/1990 and E1.11 Products
- C. Institute of Electrical and Electronics Engineers (IEEE)
  - 1. 802.3 – Ethernet
  - 2. 802.11 – Wireless LAN
- D. Underwriters Laboratories (UL)
  - 1. 498 – Attachment Plugs and Receptacles
  - 2. 891 - Switchboards
  - 3. 924 – Emergency Lighting and Power Equipment
  - 4. 1008 – Transfer Switch Equipment

#### 1.6 BID SUBMITTALS

- A. Qualifications
  - 1. Manufacturer shall have been continuously engaged in the design and manufacture of performing lighting dimming and control equipment for at least ten (10) years.
  - 2. Bidder shall be a system contractor, normally engaged in the full-time business of lighting system installation. Provide evidence that the bidder has been in business for at least five years prior to bid date and has completed projects of similar size and scope.
  - 3. References, including names and telephone numbers of individuals who may be contacted, showing satisfactory completion of five or more projects similar in scope and type to that specified herein.
  - 4. Evidence of ability and affirmation of intent to meet the guarantee and service requirements stated herein.
  - 5. Each vendor shall include a description of the professional and technical experiences background, qualifications and expertise of the organization's key personnel assigned to this project. The description shall show that bidder possesses the demonstrated skills and experience in specific areas of the project scope. In addition, Bidder shall identify a project manager for the project and shall provide resumes of all personnel who shall be assigned to this project. Bidder shall estimate the percentage of time each individual shall be working on this project.

#### 1.7 DEFINITIONS

- A. Furnish – Purchase and/or fabricate the item and deliver to site.

- B. Install – Perform the physical installation of the item on the site.
- C. Provide – Furnish and install item or items, complete with any and all required accessories.

#### 1.8 SUBMITTALS

- A. Provide all submittals electronically in PDF format.
- B. Product Data
  - 1. Submit complete Bill of Materials including spare parts, quantities, manufacturer and model numbers.
  - 2. Submit manufacturer's catalog cut sheets for all products used in the system.
- C. Shop Drawings
  - 1. Submit 11" x 17" sheets. All sheets shall be the same size. Include title sheet listing all drawings in the submittal.
  - 2. Show all assembly instructions, termination details, cable numbers and other information required to ensure proper installation of the equipment.
  - 3. Show all materials, finishes, metal gauges, dimensional information, electrical and mechanical connections, provision for work by others and related information.
  - 4. Provide drawings showing wiring, addressing and termination scheme for architectural lighting fixtures.
  - 5. Indicate deviations from this Specification and label with minimum 1/4" high text: "Variation from Spec."
  - 6. Revise drawings with changes marked on the reviewed submittal and any changes made during manufacturing or due to coordination with other trades. Send a revised shop drawing to Architect at the time of the first delivery of equipment.
  - 7. Installation of equipment shall not begin until shop drawings have been approved by the Architect.
  - 8. Touch panel layouts.
- D. Quality Assurance/Control
  - 1. Submittals
    - a. Verify wire type, count and routing for all low-voltage wiring between components.
    - b. Confirm conduit sizes and routing within 30 days of contract award.
  - 2. Test Reports
    - a. Prior to scheduling a final checkout the Manufacturer's field technician shall submit to the Architect a letter stating that the system has been installed correctly is fully operational.
- E. Closeout Submittals
  - 1. Prepare and submit complete Operations and Maintenance Manuals.
  - 2. Submit one (1) bound set to the Designer for review. Make revisions as directed by the Designer and submit revised manual as follows:
    - a. One (1) bound paper set to the Owner
    - b. Electronic sets to Owner and Designer.
  - 3. Operations and Maintenance Manual shall contain:
    - a. As-built shop drawings showing all systems, interconnections and components as installed.
    - b. Operating instructions for all equipment
    - c. Compiled list of all periodic maintenance required for all components of the system
    - d. Printed copy of initial system configuration
    - e. Warranty information
    - f. Emergency and regular technical support telephone contact information.



- g. CD or DVD with all applicable software, system configuration information and maintenance and instruction manuals. Provide electronic copies of all submittal documents on flash media device or Owner's preferred media (i.e. download).

#### 1.9 QUALITY ASSURANCE

- A. All work and materials in this section shall comply with the following:
  - 1. National Electrical Code NFPA 70
  - 2. Applicable state and local construction codes
  - 3. Tested by a Nationally Recognized Testing Laboratory such as UL or ETL.
- B. Pre-installation Meetings
  - 1. Attend coordination meetings as required to ensure installation is coordinated with other trades.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, storage and handling shall be coordinated with the School and City Departments.
- B. Packing, Shipping, Handling, and Unloading
  - 1. Securely package all equipment in factory fabricated wooden or cardboard containers for delivery.
  - 2. Package and handle all equipment to prevent breakage, denting and scratching of finishes. Damaged equipment shall not be installed. Replace with new units from manufacturer.
- C. Storage and Protections
  - 1. Store all equipment in a substantially complete, "broom clean", secure and conditioned space.
  - 2. Store all equipment in its original packaging until installation.

#### 1.11 WARRANTY

- A. Warrant systems and equipment to be free from defective components, faulty workmanship and improper adjustment for two (2) years from the date of Owner's final acceptance of system.
- B. During the warranty period repair or replace defective items within ten business days of the defect being reported. If temporary replacement equipment is required it shall be provided to the Owner at no cost.
- C. Correct conditions that could present a safety hazard within forty-eight hours of notification.
- D. The fixture shall be provided with the minimum warranty of 5 years full fixture coverage and 10 years LED array coverage

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. The following are the acceptable manufacturers for the primary dimming and control components of the system:
  - 1. Electronic Theatre Controls (ETC)  
3031 Pleasant View Road  
Middleton, WI 53562

800.688.4116

[www.etcconnect.com](http://www.etcconnect.com)

Provide ETC equipment as a single source manufacturer. All existing lighting system equipment to be reused is ETC. Systems must also be interoperability with existing systems elsewhere within the building.

## 2.2 CONTROL WIRE

- A. Provide all control wiring per manufacturer requirements.
- B. Architectural Control Station
  - 1. Electronic Theatre Controls
    - a. Belden 8471, One #14 AWG stranded, Two #16 AWG
- C. Ethernet
  - 1. Belden 1583A
  - 2. Equal
- D. DMX
  - 1. Belden 9729
  - 2. Equal
- E. Fiber Optic Wiring, Six Fiber
  - 1. Provide multi-mode OM3, six-fiber cable for connection between equipment racks. Terminate all fibers with connectors.
    - a. Belden B9C039
    - b. Equal

## 2.3 DIMMER RACK

- A. General
  - 1. Dimmer rack shall consist of up to 6 dimmer module spaces. Dimmer rack shall be UL Listed and CSA Approved, and shall be so labeled when delivered to job site.
  - 2. Dimmer rack shall have integrated architectural lighting control processor.
- B. Electrical
  - 1. Dimmer racks shall operate at up to 120/208V, three phase, four wire plus ground, 47 to 63 Hz at 200 amps max. Provisions shall be made for optional amp trap devices for fault current protection. Standard AIC fault current protection shall be 100,000.
- C. Electronics
  - 1. Dimmer control electronics shall be contained in one plug-in electronics module.
- D. Physical
  - 1. The dimmer rack shall be a freestanding, deadfront switchboard, substantially framed and enclosed with 16-gauge, formed steel panels. All rack components shall be properly treated, primed and finished. Exterior surfaces shall be finished in fine texture, scratch resistant, gray epoxy paint. Removable top and bottom panels shall facilitate conduit termination on the 48-module rack. Knockouts shall serve the same purpose on 12 and 24 module racks.
  - 2. Racks shall be designed for front access to allow back-to-back or side-by-side installation.
  - 3. Racks shall be designed to allow easy insertion and removal of all modules without the use of tools. Supports shall be provided for precise alignment of dimmer modules into

power and signal connector blocks. With modules removed, racks shall provide clear front access to all load, neutral and control terminations. Racks that require removable panels to access load, neutral or control terminations shall not be acceptable.

4. Module spaces shall be mechanically keyed to accept only the module type (20A, 50A or 100A) specified for that space. Racks that allow modules of varying wattages to plug into the same space shall not be acceptable. The rack shall be configurable to accept mixed dimmer types and sizes throughout the rack.
5. Each rack shall provide a lockable full-height door containing an integral electrostatic air filter that shall be removable for easy cleaning. A single low-noise fan shall be located at the top of each rack. The fan shall draw all intake air through the integral electrostatic air filter, over the surfaces of the module housing and out the top of the rack. The fan shall maintain the temperature of all components at proper operating levels with dimmers under full load, provided the ambient temperature of the dimmer room does not exceed 40°C/104°F. Dimmer racks that do not employ both locking doors and electrostatic air filters shall not be acceptable. The fan shall turn on whenever any dimmer in the system is activated. In the event of an over-temperature condition, only the affected dimmer module(s) shall shut down and a message shall appear on the control module LCD. The fan shall remain on during thermal shutdown of individual dimmer modules.
6. An airflow sensor shall be provided. In the event of inadequate airflow, the affected rack shall shut down until the error is corrected.
7. If the ambient room temperature drops below 0°C/32°F or rises above 40°C/104°F, a warning shall appear on the dimmer rack LCD. If the temperature rises above 46°C/115°F, the rack shall shut down until the condition is corrected.
8. A 3 x .5-inch LED status indicator (beacon) shall be mounted in the rack door. The beacon shall be visible throughout a wide viewing angle. In normal operation conditions, this LED is illuminated. If the rack's control module senses an error condition, the beacon shall flash until the error is corrected. An optional indicator shall be available for remote locations.

E. Dimmer Modules

1. Provide the following modules in quantities as required by the Drawings:
  - a. Dual 10 ampere electronic reverse-phase dimmer module
    - 1) ETC ELV10
  - b. Airflow module
    - 1) ETC AFM
2. Spare Modules
  - a. Provide 10% spare modules of each type in the system. Minimum one spare module per type.

F. Integrated Architectural Lighting Processor

1. Provide unit designed for operation with dimmer rack.
2. Provide unit with Ethernet connection to the lighting control network for configuration and control.
3. Provide unit capable of backing up settings to removable media.
4. Provide unit with two DMX ports, each of which may be configured as input or output.
5. Provide unit with 1024 channels of control.
6. Provide unit and power supplies to support all specified interface stations.

G. Acceptable Products

1. ETC DRd-6-120 w/P-ACP

## 2.4 MOTORIZED CIRCUIT BREAKER PANEL

- A. General
  - 1. Provide Ethernet-controlled AC switching panel with individual circuit over-current protection.
- B. Control
  - 1. Control: Single universe of DMX over Ethernet
  - 2. Provide panel with contact-closed triggered emergency override scene recall.
- C. Electrical
  - 1. Provide with 20A motorized circuit breakers.
  - 2. Provide with main lug inputs, per Drawings.
  - 3. Provide with main breaker to match electrical input shown on Drawings.
  - 4. Provide panel with 100% neutral capacity.
- D. Spare Breakers
  - 1. Provide 10% spare circuit breakers of each type in the system. Minimum one spare breaker per type.
- E. Provide one master and one slave panel.
- F. Provide
  - 1. Sensor IQ

## 2.5 CONSOLE UPGRADE

- A. Provide ETC Ion 512 output channel count upgrade for existing console.
  - 1. ETC Ion 500 Up – Upgrade to a total of 2048 outputs
    - a. Quantity: 1

## 2.6 ARCHITECTURAL CONTROL PANELS

- A. Entry Panel (EP)
  - 1. Provide five-button, station for installation in a one-gang electrical box.
  - 2. Provide back box for surface mount locations.
  - 3. Provide in finish per schedule.
- B. Fader Panel (FP)
  - 1. Provide twelve-button, seven-fader control station for installation in a four-gang electrical box or rack panel.
  - 2. Provide back box for surface mount locations.
  - 3. Provide rack panel for rack-mount locations.
  - 4. Provide in finish per schedule.
  - 5. Custom legend per Drawings.

## 2.7 NETWORK COMPONENTS

- A. Ethernet Switch
  - 1. Provide managed network switch as required for operation of the network system. Provide switches with the following properties:
    - a. Twenty-four (24) managed dual speed auto-sensing ports supporting 1000BaseT, 100BaseT and 10Base-T.
    - b. All ports on the switch shall provide Power Over Ethernet.

- c. Support for multicast Ethernet
  - d. IGMP snooping compatible
  - e. Mount in standard 19 inch equipment rack.
  - f. Provide convection-cooled (no fans) units.
  - g. Acceptable Manufacturers:
    - 1) Cisco
- B. Ethernet Patch Bay
  - 1. Provide Category 5e patch bay as required for termination of all lighting network UTP runs in the equipment rack.
  - 2. Provide patch cords as required for connection to the Ethernet Switch.
  - 3. Mount patch bay in standard 19" equipment rack.
- C. Cable Management
  - 1. Provide rack-mounted brush-type cable management.
  - 2. Mount unit between Ethernet switch and Ethernet patch bay.

## 2.8 CONTROL DEVICES

- A. General
  - 1. Provide back boxes for all surface and pipe mounted devices and all devices that will not fit in a standard electrical gang box.
  - 2. Provide all required mounted hardware for surface and pipe mounted back boxes.
  - 3. Label back boxes and faceplates with unique designations printed on removable adhesive labels to correspond to shop drawings.
- B. Portable One-Port Ethernet Node
  - 1. Ethernet node shall translate Ethernet-based control protocol into DMX-512.
  - 2. Node shall be powered via its Ethernet connection using Power Over Ethernet.
  - 3. Provide 10' Category 5e rough service extension cable with Neutrik Ethercon connectors with each node.
  - 4. Provide 5' long male to male turnaround XLR-type cable to allow node to be used as DMX input.
  - 5. Provide node with c-clamp for mounting to pipe.
    - a. Quantity: 4
- C. Ethernet Taps
  - 1. Provide device with RJ-45 Ethercon receptacles as indicated on Drawings.
  - 2. Provide flush, surface or pipe mount as indicated on the Drawings.
  - 3. Provide tap complete with back box, faceplate and any required mounting hardware.
  - 4. Label receptacle(s) with designation corresponding to termination of network cable in Ethernet patch bay.
  - 5. Provide faceplates in public areas in color per Architect.
- D. Portable House Lighting Console
  - 1. Provide portable lighting control station in table-top enclosure with 7-inch touch panel.
  - 2. Provide with 15-foot permanently attached cable with hard service connector.
  - 3. Provide in finish per Architect selected from manufacturer's full range of standard finishes.
    - a. Quantity: 1
- E. Ethernet Node, Rack Mounted (E4)
  - 1. Ethernet node shall translate Ethernet-based control protocol into DMX-512/RDM.
  - 2. Provide node with four rear-facing DMX outputs.
  - 3. Provide with rack-mount hardware.
- F. Ethernet Node, Eight Port (E8)
  - 1. Ethernet node shall translate Ethernet-based control protocol into DMX-512/RDM.

2. Provide node with eight rear-facing DMX outputs.
3. Provide with rack-mount hardware.

G. Power Loss Sensor

1. Provide UL924 listed power loss sensor kit to trigger DMX Bypass Unit. Provide with rack-mounted restore switch to allow user to manually restore normal operation when normal power returns. Provide with over-current protected sensing circuit.
  - a. ETC EBDK w/ EBDK-SWITCH
  - b. Equal

2.9 LIGHTING CONTROL RACK

- A. Provide wall-mount swing-out equipment rack to contain lighting control network equipment.
- B. Size rack as required by system components plus 6 rack spaces unused and covered with blank panel for future expansion.
- C. Provide with locking front door, rack light and blank panels as required.
  1. Middle Atlantic DWR Series

2.10 DISTRIBUTION DEVICES

- A. Provide dimmed and switched power distribution devices as shown on the Drawings.
  1. All devices shall be constructed of sheet metal. Provide all required mounting hardware.
  2. All devices shall be provided with terminal strips for interconnection to the dimming system wiring.
  3. Outlet and Pigtail Boxes shall be fabricated from 18-gauge cold rolled steel with 16 gauge covers. They shall be finished with fine-textured, scratch-resistant, powder coat. Color per Architect.
  4. Circuit numbers shall be 1.5" labels with white letters on black background. Pigtails and outlets shall be spaced on as shown on the Drawings.
  5. Provide hanger brackets for connector strips as required.
  6. Label back boxes and faceplates with unique designations printed on removable adhesive labels to correspond to shop drawings.
  7. Provide devices with finishes per schedule.
  8. Provide Kellems style mesh strain relief per Drawings.
- B. Provide flexible multi-cable for distribution devices mounted on flown electrics. Provide junction box with terminal strip for attachment to wall. Provide multi-cable of sufficient length to allow for full travel of electric. Provide multi-cable with Kellems style mesh strain-relief at both ends.

2.11 PORTABLE DIMMERS

- A. Dimmer Pack
  1. General
    - a. Provide portable dimmer pack/bar with six 10 ampere dimmers, single-phase power inputs, convenience power outlet, DMX in and through, RDM-enable remote addressing, and c-clamp mounting points.
    - b. Provide with 10/5 SO cable with L21-20P connector.
    - c. Provide each units with 10-foot DMX cable.
  2. Dimmer Pack
    - a. ETC SM4-10-B
      - 1) Quantity: 12
  3. Dimmer Bar

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- a. ETC SB6-10Y-B
  - 1) Quantity: 2

2.12 LED STAGE LIGHTING FIXTURES

A. General

1. Furnish all LED fixtures with installed Edison connector on power cable, c-clamp, 10' DMX cable, and black safety cable.

B. LED Ellipsoidal Reflector Spotlight – Body

1. Provide color-changing LED ellipsoidal body suitable for interchangeable lenses, using 150 watts power (maximum) and with DMX in and through, power in and through and pattern holder. Provide unit with 54,000-hour LED life, RGB color mixing and variable control profiles.
2. Provide fixtures that provides a minimum of 5,300 Lumens while producing 3000 Kelvin white light.
3. Fixture must be lens-tube compatible with existing lens tube inventory, which is to be re-used.
  - a. ETC ColorSource Spot Body
    - 1) Quantity: 70

C. LED Washlight

1. Provide 150-watt LED wash fixture with seven-color mixing, DMX in and thru, power in and thru, hanging yoke.
2. Provide with the following lenses:
  - a. Medium Spread lens
  - b. Wide Spread lens
3. Provide each fixture with 4-leaf barndoor.
  - 1) ETC ColorSource PAR-DB
    - a) Quantity: 40

D. Upper Cyclorama Light

1. Provide cyc light with RGBA color mixing, DMX in and thru, power in and thru, and hanging yoke.
  - a. Altman Spectra Cyc 200 RGBA
    - 1) Quantity: 11

2.13 FOLLOWSPOT

A. Provide 600-watt, LED-source followspot with 7 to 15 degree beam spread, iris, fader plate, 6-color boomerang and casted stand.

1. Robert Juliat Oz 600w LED
2. Or Approved Equal
  - a. Quantity: 2

2.14 ACCESSORIES

A. Template Holders

1. A-size Template Holder
  - a. Quantity: 15

B. Black Safety Cable (spare)

1. Quantity: 25

C. Extension Cables

1. Provide hard-service DMX extension cables with color-coded length marker and knotted tie-line in lengths and quantities below:
  - a. 10 foot: 90



- b. 15 foot: 40
    - c. 25 foot: 15
    - d. 50 foot: 10
  - 2. Ethercon Ethernet Extension Cables
    - a. Provide black heavy-duty Cat5e extension cable with Neutrik Ethercon connectors and quantities below.
    - b. Acceptable Products
      - 1) Lex Products CAT5-EC
      - 2) Equal
        - a) 5 foot: 10
        - b) 10 foot: 10
  - 3. Provide 20A power "thru" cable with Neutrik PowerCon male to Powercon Female, or as appropriate for fixtures.
    - a. 10 foot: 90
    - b. 15 foot: 40
    - c. 25 foot: 15
- D. Lens Storage Bin
  - 1. Provide plastic bin with securable cover to store all diffusion elements associated with theatrical lighting fixtures.

## 2.15 TORMENTOR PIPE

- A. Provide 8-foot long tormentor pipe fabricated from 1-1/2" Schedule 40 steel pipe (1.9" OD) with 8-inch standoff from wall and mounting plates.
- B. Finish: matte black paint
- C. Mount to wall per Owner direction.
  - 1. SSRC 8x8 TP
  - 2. Shop-fabricated equivalent
    - a. Quantity: 2

## 2.16 ARCHITECTURAL LIGHTING FIXTURES

- A. Retrofit Light Engine
  - 1. Provide LED retrofit kits for existing ceiling lighting fixtures. Provide light source that dims to 0% smoothly when on electronic low-voltage reverse-phase dimmers.
  - 2. Provide each kit with Mogul Adapter.
  - 3. Color temperature: 3500k
  - 4. CRI: 80
  - 5. Provide each kit with short 26-degree reflector.
  - 6. Warranty: 3 years
  - 7. Install in existing lighting fixtures.
    - a. Lamp, 500-watt Replacement
      - 1) Canto USA Retro R500
      - 2) Equal
        - a) Quantity: 104
    - b. Lamp, 700-watt Replacement
      - 1) Canto USA Retro R700
      - 2) Equal
        - a) Quantity: 27

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### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas where performance dimming and control equipment is to be installed and verify that conditions are satisfactory for installation, complying with both the Manufacturer's requirement and this specification.

#### 3.2 DEMOLITION

- 1. Demolish and dispose of the following:
  - a. Dimmer racks (house and theatrical)
  - b. Connector strips and faceplates
  - c. Associated materials
  - d. Existing lamps in auditorium architectural downlights.
- 2. Coordinate recycling/disposal practices with School.

#### 3.3 INSTALLATION

- A. Coordinate installation of system with Brockton High School Personnel.
- B. Terminate all low-voltage connections.
- C. Coordinate control with Audiovisual System Contractor:
  - 1. Create presets within control processor for recall by audiovisual control system.
  - 2. Coordinate IP addressing scheme if direct Ethernet connection is made from audiovisual control system to lighting system.
- D. Lighting fixtures:
  - 1. Deliver lighting fixtures to designated area
  - 2. Unpack all fixtures, remove packing materials
- E. Architectural Control
  - 1. Program presets in consultation with Owner and Consultant.
- F. Architectural Lighting Fixtures
  - 1. Address all lighting fixtures.
  - 2. Perform all DMX terminations on DMX-controlled drivers.
  - 3. Implement DMX addressing scheme.
  - 4. Test DMX addressing and RDM functionality of LED drivers.

#### 3.4 TOUCH PANEL THEORY OF OPERATION

- A. Modes
  - 1. Default
    - a. Console or panel control of house and stage lighting.
    - b. All stations active.
  - 2. Show
    - a. Console or panel control of house lighting.
    - b. Establish lower limit on house and aisle light dimming to ensure code-required level of illumination at all times.
    - c. Lockout of entry stations. Reset entry stations to active at 11:00 PM each night.
  - 3. Night
    - a. Allow all lights to be turned off.

- B. Breaker Panel Control
  - 1. Page for control of circuit breakers in groups:
    - a. Distribution devices
    - b. House lights
- C. House Light Control
  - 1. Presets:
    - a. House Full
    - b. House 75%
    - c. House 50%
    - d. House 25%
    - e. House Out
  - 2. Faders
    - a. Individual faders for each zone of house light control
    - b. Ability to create six custom house light scenes.
- D. Stage Lighting Control
  - 1. Fader control of three "specials" for use with presentations
- E. Recall of 16 presets.
  - 1. User shall be able to change name of presets.
  - 2. User shall be able to change content of preset via scene capture.

### 3.5 FIELD QUALITY CONTROL

- A. Post-Completion Inspection Report
  - 1. Test all dimmed and switched power outlets for correct electrical termination and for correct control.
  - 2. Confirm that all architectural lighting fixtures that are controlled by the theatrical dimming system are operational and lamped.
- B. Manufacturers' Field Services
  - 1. Provide the services of a Manufacture-certified field service technician to verify the installation and operation of the control system.

### 3.6 SYSTEM CHECKOUT

- A. After receipt of the Post-Completion Inspection Report, the Architect will schedule an inspection and operational test of the system.
- B. Make all loose equipment specified for the lighting system available at time of checkout.
- C. Provide full and uninterrupted access to stage, auditorium and technical areas required for commissioning tests. Occasional blackouts of the lighting will be required during this checkout.
- D. A Contractor's project representative shall be present during tests.
- E. Provide a Manufacturer's certified field service technician shall be present during all tests and inspections and available for system programming.
- F. Provide personnel to operate equipment and perform adjustments as necessary.
- G. Provide access to equipment as required.

3.7 DEMONSTRATION AND TRAINING

- A. Provide 12 hours of training in three separate sessions, by factory-authorized personnel, for end-users in the operation of the system.

END OF SECTION

## **SECTION 27 41 16 –AUDIO-VIDEO SYSTEMS AND EQUIPMENT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### **1.2 GENERAL PROVISIONS**

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
- C. Throughout this specification, the term "Contractor" shall refer to the Audiovisual Systems Contractor unless otherwise indicated.

#### **1.3 EXAMINATION OF SITE AND DOCUMENTS**

- A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from General Contractor's or Trade Contractor's failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that they are familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

#### **1.4 DOCUMENTS**

- A. Refer to audiovisual system drawings, appendix, and the project construction drawings for information related to the work specified herein.
- B. Audiovisual system documents include this printed specification plus the following drawings:
  - 1. AV series drawings

#### **1.5 RELATED WORK SPECIFIED ELSEWHERE**

- A. Carefully examine all of the Contract Documents for requirements which affect the Work of this Section.

1.6 SCOPE OF WORK

- A. Furnish and install sound, video, and communication systems as shown on drawings and as specified herein, complete with all apparatus, equipment, power supplies, wiring, labor, and services necessary to ensure a complete working system. Verify completeness of equipment listed and correctness of type numbers. Furnish and install supplementary equipment needed to meet system requirements, without claim for added payment.
- B. The plans, specifications, and other Contract Documents are to be considered together and are intended to be mutually complementary, so that any work shown on the plans though not specified in the specifications, and any work specified in the specifications though not shown on the plans, is to be executed by the Contractor as a part of this contract. Should a conflict occur in or between or among any parts of the Contract Documents that are entitled to equal preference, the better quality or greater quantity shall govern, unless the Owner's authorized representative directs otherwise. Figured dimensions shall take precedence over scaled dimensions.
- C. To meet these performance requirements:
  - 1. Furnish all equipment, including any items not specified but required to provide a completed system. Verify the completeness of equipment listed in this Section and the correctness of type numbers.
  - 2. Use all equipment specified in the manner specified. Clarify any misunderstandings prior to bid submission, and offer alternates as appropriate.
  - 3. Verify each component's conformance with its manufacturer's published specifications and other requirements as stated in this Section.
  - 4. Check in detail each item of equipment provided, each portion of the installation, and the complete installation to ensure that the intent of this Section is achieved.
- D. The work includes, but is not limited to, the following:
  - 1. Submission of shop drawings prior to fabrication.
  - 2. Verification of dimensions and conditions at the job site.
  - 3. Installation in accordance with these specifications, manufacturer's recommendations, and all applicable code requirements.
  - 4. Setup and adjustment of signal processing, system tests and adjustments, written report, demonstration for approval, participation in acceptance tests, and final adjustments as required.
  - 5. Programming and documenting of all software controlled devices including initial setup of presets in all devices.
  - 6. Coordination with the Electrical contractor
  - 7. Coordination with the Lighting contractor.
  - 8. Coordination with Tel/Data Contractor and other Low Voltage Contractors
  - 9. Coordination with Owner's Audio-Visual Personnel
  - 10. Coordination with the Owner's IT department and installers
  - 11. Performance standards, without claim for additional payment
  - 12. System documentation.
  - 13. Instruction of owner's operating personnel.
  - 14. Maintenance services for one year.
  - 15. Warranty.

1.7 FORMAT OF BID RESPONSE

- A. Submit bids clearly identifying separate prices for each of the following. For Paragraph 1 below, furnish prices good for not less than 60 days from the date of submittal of this bid. For Paragraph 2 below, furnish price good for not less than one year from the date of submittal of this bid.
  - 1. Base price to furnish and install video, audio, and audiovisual equipment and systems as identified in this Section, excluding that equipment identified in the documents as Add Alternate. Provide both overall system price plus unit pricing for each item of equipment.
  - 2. Addition to base price if warranty and service (Paragraph 1.25 of this Section) is extended from one year to two years.
- B. Identify any and all pricing dependencies, wherein the price of one item or group of items is dependent the quantity of another item. Similarly identify any and all dependencies in the pricing or terms of services (e.g. warranty, user instruction), wherein the price or terms of any service is dependent on the quantity of any equipment item.
- C. Identify the project team by name, role in the project, and relevant experience. Identify senior manager with overall project responsibility, operations manager, or other individual responsible for labor scheduling, project manager responsible for project coordination, project engineer, and on-site supervisor.
- D. Identify the party providing graphical design and programming services for remote control systems. Similarly identify the party providing graphical design and programming for digital audio processing systems. Indicate experience and relevant qualifications for each.
- E. Provide a tentative project schedule, showing major milestones, and with sufficient detail to indicate that the required installation period is reasonable and will be met.
- F. Explanation of any suggested substitute equipment or methods, identifying the impact on equipment, installation, and change in overall price. State the system price as specified, and any change in price due to this substitution. State clearly the benefit offered by this substitution. Provide manufacturer's specifications or other descriptive literature as appropriate. If requested, make samples available, at no cost to the Owner.
- G. Acknowledge receipt of all bid addenda.

1.8 BIDDER QUALIFICATIONS

- A. With bid submittals, include bidder qualifications:
  - 1. Evidence that the bidder has been in business for at least five years prior to bid date, and that the principal line of business of the bidder is the sale and installation of commercial-grade audiovisual systems.
  - 2. References, including names and telephone numbers of individuals who may be contacted, showing satisfactory completion of three or more projects similar in scope and type to that specified herein, and with similar schedules.
  - 3. Provide additional evidence of satisfactory completion of audio-visual system installations involving suspended loudspeakers and complex control system integration.
  - 4. Number of full-time technicians the Bidder has in his employ that hold CTS certification as installers, as issued by InfoComm International.
  - 5. Each vendor shall include a description of the professional and technical experiences background, qualifications and expertise of the organization's key personnel assigned to



this project. The description shall show that bidder possesses the demonstrated skills and experience in specific areas of the project scope. In addition, Bidder shall identify a project manager for the project and shall provide resumes of all personnel who shall be assigned to this project. Bidder shall estimate the percentage of time each individual shall be working on this project.

6. Discussion of any subcontract labor the Bidder plans to assign to this project, and whether any subcontract labor will be working on the job-site. Identify all subcontractors to be working on the job-site.
7. Evidence of ability and affirmation of intent to meet the warranty and service requirements stated herein.

#### 1.9 SUBSTITUTIONS

- A. Furnish explanation of any suggested substitute equipment or methods, identifying the impact on equipment, installation, and change in overall price. State the system price as specified, and any change in price due to this substitution. State clearly the benefit offered by this substitution. Provide manufacturer's specifications or other descriptive literature as appropriate. If requested, make samples available, at no cost to the Owner.

#### 1.10 EXISTING CONDITIONS

- A. Verify all existing conditions. Refer to the Owner for coordination and clarification before the bid date of any discrepancies concerning existing conditions, drawings, and specifications. Clarify with the Owner all locations including conduit and cable routings. Where discrepancies occur and pre-bid instructions have not been obtained, abide by the Owner's decision.
- B. Provide all additional conduit and cable required for the installation. Refer to drawings of other Sections for identification of conduit and cable provided by other trades.
- C. Furnish, install, and terminate all required wire and cable into conduit provided by other trades.
- D. Comply with all requirements regarding the use of cable with respect to spread of fire. Refer to General Construction drawings for identification of air plenum and other spaces having special cabling requirements. Field survey the jobsite to determine spaces having special cabling requirements. It is the responsibility of the Contractor to provide wiring that is in compliance with all applicable building codes of the authority(ies) having jurisdiction.
- E. Comply with all requirements regarding the proper installation of equipment for seismic considerations. It is the responsibility of the Contractor to employ installation methods that are in compliance with all applicable building codes of the authority(ies) having jurisdiction.
- F. Perform any work related to firestopping under the direction of an individual certified by Hilti as having successfully completed the Life Safety for Contractors firestop course. Provide evidence of course completion upon request.

#### 1.11 FEES, PERMITS, AND NOTICES

- A. Perform all work in compliance with all applicable requirements of the authority(ies) having jurisdiction. Take out and maintain all construction permits, pay all fees, and file all notices, all at no additional cost to the Owner.

- B. Where mounting or rigging systems require the design or design approval of a licensed Structural Engineer, pay all associated fees and expenses. Make no claim for additional payment.

#### 1.12 COORDINATION

- A. Employ labor compatible with all on-site trades.
- B. Attend regular project meetings as scheduled by the General Contractor or Architect.
- C. Adhere to rules of the jobsite, such rules including but not limited to those regarding safety, personal identification, hours of access, elevator use, and parking.
- D. Provide a weekly status report to the Owner's authorized representative, identifying work performed during the previous week, work anticipated during the upcoming week, and any anticipated shortages of material or equipment.
- E. Supply low-voltage wire for, and make terminations at, low-voltage control devices not in contract, including but not limited to projection screens and lighting dimming systems.
- F. Coordinate with the Owner and other trades to achieve complete systems in all respects, but with particular note of the following:
  - 1. Backboxes for ceiling-mounted loudspeakers
  - 2. Electric projection screens
  - 3. Above-ceiling supports for video/data projectors (furnished and installed within the work of this Section)
  - 4. Personal computers (furnished and installed by others)
  - 5. Writing and tack boards (furnished and installed by others)

#### 1.13 MATERIAL AND EQUIPMENT

- A. Provide materials and equipment conforming to the applicable requirements of:
  - 1. Underwriter's Laboratories
  - 2. National Electrical Code
  - 3. American National Standards Institute
  - 4. Federal Communications Commission
- B. References shall meet the latest edition of that standard.
- C. Provide materials and equipment new and free from use, and covered by the applicable manufacturer's warranty.
- D. Notify the Owner if, in the Contractor's opinion, superior performance can be obtained from alternate materials or equipment from that identified in this specification.
- E. Certain items of equipment are specified by manufacturers' type numbers to indicate an acceptable standard of quality and performance. Substitutions of equal equipment beyond the alternatives listed will be permitted only if such equipment is listed in an addendum to this specification. Address requests for listing of substitutions to the Architect. With any request for substitution, include measured data proving the equivalence of the proposed substitute in

quality and performance. The Architect shall be the final judge of the validity of the data submitted.

- F. Provide only current-model materials and equipment. Do not provide obsolete or discontinued models unless specifically directed to do so in the Equipment section of this Section. Review all materials and equipment immediately prior to installation, and inform the Owner's authorized representative of any obsolete or discontinued items.

#### 1.14 DELIVERY, STORAGE AND HANDLING

- A. All equipment shall be appropriately packed for shipment.
- B. All shipping costs to the job site are the responsibility of the Audiovisual Contractor. Determination of the shipping method and company is the responsibility of the Audiovisual Contractor in order to meet the published project schedule.
- C. Completed systems shall be shipped FOB inside and in place.
- D. Note that drop shipment of equipment to the Owner's site directly from the manufacturer, or other supplier will not be allowed.
- E. Upon delivery all materials shall be stored under cover in a clean and dry location. Materials which are damaged during shipping, storage or handling or are otherwise not suitable for installation shall be removed from the job site and replaced, at no additional cost to the Project, with acceptable materials.

#### 1.15 CLEANUP AND TRASH DISPOSAL

- A. Maintain a clean and safe working area free from debris and waste materials. Clean work areas daily.
- B. Except for items to be reused or returned to the Owner, or as otherwise directed, remove trash and packing materials from the jobsite, and dispose of offsite in a legal manner. Do not allow trash to accumulate at the jobsite.

#### 1.16 SUBMITTALS

- A. Submittal Requirements and Procedures
  - 1. Provide submittals in accordance with requirements of Section 01 33 00 – Submittal Procedures and as detailed herein.
- B. Submittal Format
  - 1. Unless directed otherwise, provide submittals electronically in PDF and CAD formats. Provide documents in full size and suitable for printing by the reviewer. Clearly identify each document within its file name.
- C. Alternates
  - 1. With system bid price, submit prices for equipment and installation of additional or reduced quantities of equipment as stated herein. Unless otherwise stated, all items herein are part of the base bid system. Input and output jacks, test points, terminal

blocks and wiring for add or deduct alternate equipment should be included in the Alternate.

D. Staffing

1. Key Project Personnel
  - a. Provide names, resumes, addresses, mobile and office phone numbers, and e-mail addresses of key project personnel.
2. Field Supervisor
  - a. Before beginning installation, submit the name of the employee who will be the on-site field supervisor through the completion of this project.

E. Milestone Dates

1. Submit tentative list of milestone dates, including but not limited to the following, noting any important dependencies and adjustments to be made in the event of delays:
  - a. Dates for each Submittal
  - b. Shop fabrication completion
  - c. Initial shipment of equipment to site
  - d. Start of installation on site
  - e. Second shipment of equipment to site
  - f. Additional shipments of equipment to site
  - g. Control system programming completion
  - h. Field testing
  - i. Correction of punch list items
  - j. Training

F. Equipment List

1. Before ordering equipment or beginning work, submit to the Owner's authorized representative for approval a detailed list showing quantities and manufacturer and model number for items of equipment to be used in assembling these systems, including all items of equipment, accessories, and installation materials specified herein. For each item, indicate quantity to be employed within each room or subsystem, and total quantity. Order this list in sequence as the referenced equipment appears in the specification, with references to specification paragraph numbers or equipment schedule line numbers, if applicable. Provide this list not later than 30 calendar days after execution of the contract. With this list, provide a statement of assurance that the system design has been reviewed in its entirety, and that the Equipment List defines all equipment and materials necessary for the project.

G. Product Literature

1. With the equipment list, attach product literature for all items of equipment submitted, identifying the function, connections, weight, dimensions, mounting method, electrical and cooling requirements, and other descriptive information for each item, and including a color photograph. Where literature serves more than one item (e.g. varying sizes, finishes, channel counts, etc.), mark to indicate intended item. Order these data sheets alphabetically by manufacturer or in sequence as the referenced equipment appears in the specification. Do not organize by space where the referenced equipment is employed. Provide manufacturers' published data sheets; do not provide third-party catalog pages or HTML pages.

H. Review of Electrical and Network Infrastructure

1. Within 30 days after execution of the contract, provide a written statement indicating that empty conduits, junction boxes, data outlets, and electrical power systems needed to support the work of this Section have been reviewed and found to be acceptable. Identify any deficiencies.
2. Review and confirm that audiovisual system conduit as shown on the Drawings and where applicable, as built drawings, is sufficient and appropriately sized for system.
3. Note where conduit system is not sufficient and indicate any additional conduit required for system.

I. Shop Drawings

1. Submit the following items for approval by the Owner's authorized representative before starting work. Provide full-size drawings, with text size not smaller than 10-point when printed at full scale. Submit all drawings in a single submittal, unless specified otherwise.
  - a. Functional Diagrams
    - a) Detailed equipment and signal flow block diagrams showing proposed interconnections between all equipment
    - 2) Equipment types and model numbers
    - 3) Diagrams showing internal signal routing for digital signal processing devices
    - 4) Termination, grounding, and other wiring details
    - 5) Other wiring diagrams as require by the project
  - b. Audio Digital Signal Processor (DSP) Programming
    - 1) Submit programming file(s) and printed PDF diagrams showing proposed internal signal routing, processing, and control within audio DSP systems
  - c. Equipment Rack Elevations Drawings
    - 1) Show locations of all rack-mounted components within equipment rack
    - 2) Indicate equipment types and model numbers.
    - 3) Indicate any custom assemblies, with references to assembly details.
    - 4) Indicate generic functional descriptions of all components.
  - d. Patch Panel Layout Drawings
    - 1) Show locations of all patch points and labeling.
  - e. Cable Schedules and Drawings
    - 1) Schedule complete with all wiring requirements for the project
    - 2) Drawings showing cable pull assemblies
  - f. Receptacle and Device Plan Drawings
    - 1) Drawings showing locations of all system equipment and access points, including all connection panel, control panel, and equipment locations.
  - g. Equipment Installation Drawings
    - 1) Drawings showing locations and mounting methods for all wall and ceiling mounted equipment. Show geometry of any projection systems.
  - h. Loudspeaker Installation Drawings
    - 1) Drawings of loudspeaker mounting arrangements
    - 2) Drawings of anchoring system for loudspeaker suspension.

- i. Video Projection Drawings
    - 1) Drawings of projector mounting arrangements and sight line studies showing proper alignment and dimensions with the projection screen and projection equipment.
  - j. Stamped Drawings
    - 1) Drawings of all final assemblies of loudspeaker and projector suspension equipment stamped by a licensed structural engineer.
  - k. Panel Drawings
    - 1) Drawings showing layouts and finishes of control and connection panels, with operational labels, identification tags, and all other details to be provided for fabrication.
    - 2) Layouts of hardware control panels showing pushbutton labeling
    - 3) Panel schedule listing all panels individually with size, mounting condition (surface or flush), back box size and panel finish color
    - 4) Drawings of custom panel details
  - l. Custom Millwork and Metalwork Drawings
    - 1) Drawings showing fabrication details of custom millwork and metalwork items, including projector and loudspeaker stands and mounts, control panel enclosures, projection benches, etc.
- J. Control Panel Design Documentation
- 1. Provide the following for each graphical user interface employed in the system. Provide in a timely manner so that reasonable review comments do not affect project schedule.
    - a. Preliminary color layouts of control panel pages with narrative annotations demonstrating the following:
      - 1) Graphical standard
      - 2) System functionality
      - 3) Navigation between pages
      - 4) Button functions
    - b. Fully-functional control panel emulated within programming environment (AMX, Crestron, Extron, etc.) or alternately, physical touch panel with supporting control system hardware. Provide fully-programmed panel for review of layout, legends, colors, status feedback, page flips, and other factors by the Owner's authorized representative.
- K. Touch Screen Control Panels
- 1. Submit the following for approval prior to programming
  - 2. First Submittal
    - a. Timing:
    - b. Line drawings of touch panel layouts with button functions listed.
    - c. Detailed narrative and demonstration mockup/simulation of all touch panel programming based on design process specified herein.
    - d. Three fully designed sample screens for evaluation of graphical look.
  - 3. Second Submittal
    - a. Timing:

- b. After approval of first touch panel submittal, submit electronic color images of touch panel layouts.

L. Radio Frequencies List

- 1. List of radio frequencies used by system. Coordinate frequency usage with Owner's designated representative prior to submitting shop drawings.

M. Finishes and Samples

- 1. Obtain Consultant and Architect approval of all panel and furniture finishes prior to fabrication. The Architect will specify exact finishes.
- 2. Submit samples of the following to the Owner's authorized representative for review and approval:
  - a. Cable marking materials
  - b. Panels
  - c. Custom loudspeaker grilles
  - d. Custom loudspeaker cabinet finishes
  - e. Any other exposed equipment specified for the project, as requested by the Owner.

N. Other

- 1. Descriptions of proposed functionality, operating procedures, or implementations not identified in this Section.

O. Copies

- 1. If and only if requested, submit up to five (5) printed copies of all required submittals. Otherwise, submit one (1) electronic copy.

1.17 CLOSEOUT DOCUMENTATION

- A. Report of Post-Completion Tests. Prepare a report on the post-completion tests defined in this section identifying the failure of any subsystems to perform as required in this Section.
- B. System Documentation. Submit a draft of the final system documentation for approval prior to its publication. Provide draft copies of all items on-site for inspection during the demonstration and acceptance testing of the system; submit final copies thereafter.
- C. Training Materials. Submit a draft outline of the training program and preliminary copies of any materials to be distributed during the training program.
- D. Acceptance Test. Submit a draft of the final system acceptance test for approval prior to its performance.

1.18 FUNCTIONAL REQUIREMENTS

A. Auditorium

1. Sound Amplification Systems

- a. Reinforcement of speech and music from wired microphone receptacles and wireless microphone systems to listeners in the Auditorium through a centralized group of loudspeakers located above the stage
- b. Supplemental reinforcement of audio signals to listeners in the front of the Auditorium through front-fill loudspeakers installed in the face of the stage apron
- c. Supplemental reinforcement of audio signals to listeners in the rear seating section of the Auditorium through electronically delayed loudspeakers
- d. Reinforcement of stereo audio through left and right loudspeaker clusters located above the stage.
- e. Operator controlled mixing of microphone signals using a mixing console located on the Control Room counter or on a table at the front of house mix location
- f. Automatic mixing of dedicated wired microphone inputs and wireless microphone systems (lavalier and handheld) using an automatic mixer system
- g. Playback of pre-recorded audio material using a rack mounted computer, analog stereo inputs, and a Bluetooth audio receiver located in an equipment rack located in one of the stage wings
- h. Recording from ceiling-suspended microphones and main audio system signals using Owner-Furnished recording devices
- i. Monitoring of audio mixing console signals through control room monitor loudspeakers on control room countertop.
- j. Preset switching and routing for preset event modes and loudspeaker configurations
- k. Assistive listening system using portable wireless FM receivers
- l. Muting of all audio signals in response to fire alarm control signal from fire alarm system (if required by AHJ)

2. Equipment Racks

- a. Main equipment racks located within Control Room
- b. Stage manager equipment rack in stage wing (see drawings for location)

3. Television Studio System

- a. Aggregate signals from Auditorium for mixing, broadcast and recording.
- b. Capture audio and video signals generated in studio for recording and broadcast.
- c. Video and audio tie lines from locations throughout the Auditorium to patch panels in the AV equipment racks
- d. Recording from remotely controlled cameras



1.19 AUDIO SYSTEMS PERFORMANCE REQUIREMENTS

- A. The overall space-average acoustical frequency response criterion, as measured within the coverage area of the permanently-installed loudspeakers, is within  $\pm 3$  dB of a spectrum which is flat from the low-frequency limit band listed below to 2500 Hz and slopes downward thereafter at a rate of 3 dB per octave to 12,500 Hz. Test signals shall be broad-band "pink" noise applied to any system input, measured using 1/3-octave filters centered on ANSI preferred frequencies.

Loudspeaker Type	Low-Frequency Limit
Central Cluster	40 Hz
Full Range Playback	80 Hz
Fill Loudspeakers	150 Hz

- B. The spatial level uniformity criterion, throughout the coverage area of the system, is that amplified sound levels shall not vary more than  $\pm 4$  dB as measured using a test signal consisting of an octave band of "pink" noise centered at 4,000 Hz.
- C. Measurements of system performance will be made using a calibrated ANSI or IEC precision sound level meter set for "slow" meter damping and flat response, 4 feet above the floor (seated ear height) within the system coverage area. All interior finishes and furnishing shall be in place, and system gain shall be adjusted to provide levels of at least 70 dB or 10 dB above background noise levels, whichever is higher, at the measuring locations for these tests.
- D. To meet the acoustical performance criteria, be responsible for setting the initial adjustments of loudspeakers, equalizers and other signal-processing equipment, pads, and gain controls and, under the direction of the Owner's authorized representative, during demonstration and acceptance testing, making the final adjustment of these items.
- E. Adjust all equalizers to realize maximum gain and optimal tonal balance from the sound system throughout the audience area.
- F. Output level of all program sources arriving at switching or routing equipment shall be within  $\pm 0.25$  dB of each other as measured at the input to the switcher or router. Provide pads, line amplifiers or other gain control devices as required to achieve this specification.
- G. The audio system shall meet or exceed the following electrical specifications, measured at any outlet in the system.
1. Signal to Noise Ratio: Not poorer than 60 dB peak noise to RMS signal.
  2. Frequency Response:  $\pm 3.0$  dB, 20Hz to 20 KHz.
  3. Total Harmonic Distortion: 1%, 20Hz to 20 KHz.

1.20 VIDEO SYSTEMS PERFORMANCE REQUIREMENTS

- A. Provide systems that meet the performance requirements stated in this section. Perform any work required to modify the performance of the system in order to meet these requirements. Perform whatever tests are necessary to confirm compliance with these requirements, before commencement of acceptance testing.
1. Analog Video Signal Distribution and Cabling
    - a. The video distribution and cabling system shall meet or exceed the following electrical specifications, measured at any point in the system. Compliance with

these specifications shall be determined by introducing a standard video reference signal at points normally used for origination (e.g., camera, media player, workstation) and measuring the signal characteristics at points normally serving as destinations (e.g., monitor, projector, media encoder). Note that these are end-to-end performance requirements to be met under all conditions of switcher re-entrance.

- b. For purposes of this paragraph, the distribution and cabling system shall consist of workstation interfaces, wideband equalizing and distribution amplifiers, wideband video switchers, and all interconnecting cabling.

- 1) Frequency Response (analog & digital systems): +/-0.5 dB, DC to 100 MHz (+/- 0.5 dB, DC to 5.0 MHz for NTSC encoded composite video signals). +/- 3.0dB for digitally encoded HD-SDI signals.
- 2) Jitter Amplitude (digital systems): Less than 0.2 unit intervals at HD-SDI rate.
- 3) Risetime: 250 V/microsec minimum.
- 4) Crosstalk: 45 dB minimum below nominal signal level at 5.0 MHz, 35 dB minimum below nominal signal level at 100 MHz.
- 5) Signal to Noise Ratio: 60 dB minimum, peak noise to RMS signal, unweighted DC to 100 MHz.
- 6) Signal Gain: 1.00 terminated into 75 ohms.
- 7) Line and Field Tilt: Less than 2%.
- 8) Differential Gain: Less than 3%.
- 9) Differential Phase: Less than 3 degrees.
- 10) Color Timing (where applicable): Within 2 degrees at 3.58 MHz.
- 11) Input Return Loss: 40 dB minimum at 5.0 MHz.
- 12) Path Length Inequality (for Y/C and RGB cable sets where the signals are not subject to subsequent matrixing or encoding): Within 12" of cable, or 1.6 nsec.

- c. Where cable length results in the deterioration of gain and frequency response characteristics and cable compensation equipment is not specified, the system shall be adjusted for best performance. The Contractor shall demonstrate that any inability to meet gain and frequency response specifications is due solely to length of cable.

2. Digital Signal Distribution and Cabling

- a. Provide digital signal distribution system with the following features:

- 1) EDID management
- 2) HDCP compliant
- 3) HDMI, DVI and DisplayPort signal transport
- 4) Troubleshooting tools
- 5) Support for video formats up to and including 1920x1200.
- 6) Manufacturer-approved cabling

3. Displays (Monitors and Projectors)

- a. All displays shall meet manufacturers' published specifications for brightness, contrast, focus, convergence, linearity, distortion, and purity, across the entire range of horizontal and vertical scan frequencies of which the display is capable. In the absence of such specifications, no convergence, linearity, distortion, or purity errors shall be visible from a viewing distance equal to the image width, and brightness, contrast, and focus shall meet standard performance guidelines.
- b. Projectors shall be installed and adjusted so that the resultant images are free from all keystone distortion, barrel distortion, and vignetting.

- c. Projectors shall exhibit correct color balance, both at black and at peak white, and proper gray scale tracking.
- d. All displays shall meet manufacturers' published specifications for horizontal and vertical scan frequency ranges. Where appropriate, adjustments shall be made to allow for automatic scan locking across specified ranges. Image quality specifications discussed above shall be met throughout the horizontal and vertical scan frequency ranges.

## 1.21 REMOTE CONTROL SYSTEMS PERFORMANCE REQUIREMENTS

### A. General Requirements

- 1. Provide programming and otherwise configure control system to achieve fully functional system. Coordinate with the Owner. In addition to all other operating controls, ensure that the conditions in this section are met.
- 2. Provide programming and otherwise configure control system to achieve control as identified below. Sections below do not define panel layouts; refer to functional requirements and drawings.
- 3. Maximum system delays, under all conditions of control system loading, shall be as follows:
  - a. 250 milliseconds, from control panel command initiated by operator, to control panel indication acknowledging receipt of command.
  - b. 250 milliseconds, from control panel command to projection screens, volume controls, and media playback devices; to control system command issued to controlled device.
  - c. 1000 milliseconds, from control panel command to assign a source to the video projector and sound system, to control system commands issued to projector and switchers.
- 4. Reliability
  - a. Operation shall be 100% reliable. Occasional spurious operation shall not be accepted.
  - b. Every control panel pushbutton shall work as intended when pressed just once. The excuse of "Try it again" shall not be acceptable.
  - c. Equipment shall remain operable from its own front panel even when under control from the remote control system. For example, unused outputs on a video router shall be available for manual operation even when other outputs are being switched by the control system.
  - d. When a portable control panel is disconnected and re-connected, the panel shall return to normal operation with system status correctly indicated for all functions. If necessary, an initialization pushbutton may be used to force a panel update.
- 5. Usability
  - a. A sub-page or individual function which appears on two different pages shall operate in the same way on each page.
  - b. Feedback (tally) shall be accurate 100% of the time. If true feedback cannot be achieved, then feedback generated by the control system must be 100% accurate. If such feedback cannot be accurately generated, then momentary tally (to confirm pushbutton press only) shall be used.
  - c. Every function required for proper operation of the audiovisual system shall be under the control of the remote control system, regardless of whether or not that function is in use. For example, a video document camera may have an Internal/External mode function, permitting the display of an external device such

as a notebook computer. If the user inadvertently selects External mode, the document camera will be inoperable. The Internal/External mode function shall therefore be under control of the remote control system, so that when the document camera is selected for display, Internal mode is forced.

- d. Functions with an inherent delay (eg. video projector turn-on and warm-up) shall be accompanied by an indication of time remaining until ready (touch panels only). Otherwise, there shall be no perceptible delay either in system response or in status indication.
- e. Ramping functions (such as volume control) shall operate smoothly, with a ramp rate of approximately 5 seconds from minimum to maximum. System response to ramping commands shall be immediate, and there shall be no perceptible delay in the response of any bargraph indicator.

6. Control Panel Graphics

- a. A conservative graphical standard suitable for an educational application shall be developed and adhered to. This standard shall include the following:
  - 1) Limited color palette, generally with colored pushbuttons on a light background
  - 2) No background texture or wallpaper
  - 3) Limited number of typefaces and type sizes for legends
  - 4) Pushbuttons properly aligned horizontally and vertically
  - 5) Consistent and logical use of color - ie. green for normal condition, red for alert.
  - 6) There shall be no perceptible delay in control panel page flips. Page flips shall be executed without any spurious flashes of unwanted pages or sub-pages.
  - 7) Control panel pushbuttons shall not be present for functions which will not be required (eg. DVD record) or which are not supported in the application (MCU functions for a video codec without an integral MCU).
  - 8) In absence of specific direction from Owner or Consultant use Crestron "Standard" Theme or similar as a basis for touch panel graphics.
- b. Develop panel graphics within an independent graphics design program, Adobe PhotoShop or similar, that provides 32-bit color selection and color matching, color and grey scale shading, infinitely-variable light source direction and intensity, and custom typefaces. Import panel graphics thus developed into Crestron VisionTools or AMX TPDesign panel creation software. Do not perform initial graphics development within these Crestron or AMX applications.

7. User Interface Development

- a. Interview end-users and other individuals as determined by the Owner and the Owner's authorized representative to identify requirements for graphical user interfaces on touch screen control panels. Following such interviews, develop conceptual layouts of panel graphics and navigation, and identify functions to be available on each menu page. Adhere to relevant standards or templates as directed. Review with the Owner and the Owner's authorized representative before beginning software development.
- b. Provide all programming and related services as required to implement a fully operable system.
- c. Coordinate with the drawings and with other paragraphs in this section.

8. Other

- a. Configure control system hardware and programming so that the system will recover from a loss of power to any portion of the system or to the system as a whole without operator intervention. Configure so that control system does not lockup during loss of power, and that manual operation of equipment is possible under all conditions.
- b. Provide resistive pull-ups or other means as required to reliably interface to low-voltage remote control systems provided by others, including (but not limited to) projection screens.
- c. Provide other hardware and programming not specifically enumerated herein in order to provide a complete and functioning system that meets the performance requirements identified in this Section.

B. Remote Control System Functional Requirements

1. The system shall provide a "session finished" function, which resets the room to its default state. All media shall be stopped and ejected, projectors powered down, playback audio muted, projection screens raised, etc.
2. There shall be no "system off" state, and there shall be no need to turn the system on. Operating controls and sound amplification shall remain operable at all times. Video projectors shall be powered only when projection is requested.
3. Source pushbuttons shall be present for all possible sources at all times. The system shall determine the presence or absence of signal, and if absent, indicate to the user that the selected source is not available.
4. Except for the following, there shall be no dependent actions. Each action available to the user shall be directly selected by the user when the user desires.
5. The remote control system shall provide control of power sequencing through remotely controllable power outlets, either standalone or integrated within power management and distribution devices.
6. Audio overflow between rooms shall be enabled at the source room for selection at the receiving room(s). Touch screen controls to select overflow from other rooms shall be greyed out unless overflow has been enabled at the source room.

C. Control Panel Functional Requirements

1. General
  - a. Control panels shall be password protected.
  - b. Control panels shall have a hidden function allowing access to protected pages for more technical functions. Technical user pages shall be password protected.
  - c. Control panels shall include manual controls for independent manual operation of video projection screens and video projectors.
  - d. Mirrored operation of all Auditorium touch screen control panels
    - 1) Lectern
    - 2) Stage Rack
    - 3) Control Room/Portable

1.22 NETWORKING

- A. Implement Quality of Service on all Ethernet switches as recommended by Digital Audio Networking Best Practices and TV Studio Networking Best Practices
- B. Coordinate IP addressing scheme with Owner for possible connection of AV network to Owner's building network.

- C. Specified Ethernet switches are expected to be integrated into VLAN/IP addressing scheme.

#### 1.23 DOCUMENTATION

- A. Provide all documentation identified below. Maintain all of this documentation (except for additional copies beyond the quantities identified here which the Contractor may keep at their office) on-site for use by the Owner, Contractor, or other parties as authorized by the Owner.
- B. Provide draft copies of all documentation for inspection during the demonstration and acceptance testing of the system. Provide finished copies, in the required quantities, before the start of the warranty period.
- C. Provide documentation that conforms to room names or numbers as approved by the Owner. Where applicable, show Owner's room numbers rather than builder's room numbers.
- D. Provide (in addition to other elements required by the Training Program) the following articles.
  - 1. Complete Technical Manuals. Provide five copies of detailed technical manuals, tab indexed, containing both the information necessary for the performance of routine maintenance by the Owner's staff, as well as that needed for corrective maintenance and upgrading by the Contractor's (or other qualified) technicians. To this end, include the following information:
    - a. Table of contents.
    - b. General system descriptions and block diagrams.
    - c. Detailed system descriptions.
    - d. Detailed as-built system wiring diagrams and cable schedules.
    - e. Simplified line diagrams showing the essential parts of the completed installation, by room, and their functional relations, including all jacks, keyed by number to patch panels.
    - f. List of settings and adjustments for semi-fixed controls and configuration settings.
    - g. Lists of equipment incorporated, including manufacturer, model number, and serial number where applicable.
    - h. List of all IP addresses assigned to components within the system.
    - i. Electronic copy of source code in uncompiled, editable form for any custom-written software or scripts, including but not limited to remote control system operating software, touch screen control panel page design, and audio system design within audio digital signal processing system. Terms for provision of this source code shall be substantially similar to those identified within the Sample Software License attached as Appendix B.
      - 1) In addition to providing this source code with project documentation, provide additional copy to the Owner's design consultant.
      - 2) In addition to providing this source code with project documentation, and where file structure of host device (eg. control processor) permits, save copy of code within the host device for access by technicians during service. Provide additional memory as required.
    - j. Schedule of required preventive maintenance.
    - k. Lists of any special tools or test equipment necessary for system maintenance.
    - l. Lists of consumables (fuses, lamps, etc.) and spare parts, and recommended stock levels for each.
    - m. Lists of manufacturers with addresses and telephone numbers.
    - n. Manufacturer's specifications, operating instructions, and service information sheets, arranged alphabetically by manufacturer. However, if the system incorporates fewer than five of a particular equipment item, extra copies of these

documents shall not be required. Bind these documents separately from the other sections of the manuals described above.

- o. Completed warranty cards from all equipment furnished.
2. Simplified Line Diagram. Show the essential parts of the completed installation and their functional relations. Include all receptacles, labeled as on the receptacle plates, and all jacks, numbered according to their position on the system patch panel ("A", "B", etc. for horizontal rows, and "1", "2", etc. for vertical columns). Bind one copy of the diagram into each instruction manual. Mount one copy of the diagram behind clear plastic on the wall near the equipment rack, or as directed. Reduce the mounted copy to 11" x 17" maximum size; ensure that it is legible at that size.
3. Electronic Drawings Files. Provide electronic copies of all as-built drawings in AutoCAD (current release) format on flash media device or Owner's preferred media.
4. Operating Manuals. Provide five copies of complete instructions for operating all audiovisual systems in all modes of operation and as necessary to fulfill all functional requirements. Include both detailed step-by-step instructions for the inexperienced user and summary instructions suitable for quick reference. Provide self-contained documents specific to the application; do not refer to manufacturers' instruction sheets. Provide in format (e.g. 3-ring binder, laminated card, etc.) as directed.
5. Provide electronic copies of all submittal documents as PDF files on flash media device or Owner's preferred media (i.e. download).

#### 1.24 OWNER INSTRUCTION

- A. Upon completion of the installation, conduct a training program, to provide the Owner's staff with operating, basic preventive maintenance, and system-level troubleshooting knowledge of all equipment subsystems. Provide 15 hours of instruction consisting of three sessions of 3 hours each plus three 2 hours sessions. Conduct this training program at the project location, or at a location selected by the Owner. Schedule at the mutual convenience of the Owner and Contractor, after demonstration and acceptance testing. Schedule multiple sessions over a one-year period across both Fall and Spring school sessions.
- B. Provide training materials free from any copyright restrictions, and upon request from the Owner, furnish a reproducible set of these materials.
- C. In addition, and upon request from the Owner, provide a fully qualified technician to attend and provide support during two events using the facility. Provide this technician upon reasonable notice, at any time during the first semester of system operation.
- D. Approximately six months after completion of the installation, conduct a follow-up training program, consisting of one four-hour session. Conduct this training program at the project location, and schedule at the mutual convenience of the Owner and Contractor.
- E. Approximately six months after completion of the installation, the Contractor shall provide remote a control systems review making any minor changes as the Owner may request based on the configuration at system sign-off.

1.25 WARRANTY, MAINTENANCE, AND SUPPORT PROGRAM

A. Duration of Program

1. Provide complete warranty, maintenance, and support program for a period of one year from the date of final acceptance of the system, regardless of the terms stated by equipment manufacturers. Final acceptance shall be deemed to include clearing all punch list items and delivering final documentation.
2. Provide extended warranty for any item of equipment warranted by its manufacturer for more than one year. Provide extended warranty of comparable nature (i.e. parts only, parts & labor, on-site vs. depot repair, etc.) and comparable duration to the manufacturer's warranty.
3. Provide with bid annual cost to extend the preventive maintenance agreement from two to five years after completion.

B. Warranty

1. Guarantee all equipment and installations to be free of faulty workmanship and defective components for the duration of the program. Cover all electrical, electronic, mechanical, optical, and other equipment provided under this Section, and all mounting, connecting, wiring, adjusting, and other installation work. During this time, replace defective material and repair faulty workmanship at no charge to the Owner.
2. Guarantee all Contractor-provided programming for the duration of the program. During this time, correct any programming errors or conditions that prevent the system from performing as specified.
3. Install, align, and service all equipment employing technicians authorized by the respective manufacturers. Perform no work in any manner nor with any labor that voids manufacturer warranties. Where modifications to standard equipment are required, assume manufacturer's warranty.
4. Provide telephone response by qualified support technician within one hour of receiving a service request, and within four hours by the arrival of a technician, if required. Maintain a 24-hour-per-day, 365-day-per-year telephone response facility for receipt of service calls; provide this telephone and on-site service irrespective of time of day, 365 days per year.
5. Video projectors and other electronic devices whose performance deteriorates due to drift during the program shall be considered defective and requiring alignment or other repair at no charge to the Owner.
6. Provide the warranty service specified above at the Owner's location. Regardless of the terms of any manufacturer's warranty, do not require any carry-in service.
7. If any equipment item found to be faulty cannot be repaired quickly, and will thus be unavailable for use by the Owner for a period greater than 24 hours, and upon request from the Owner, make available a functional replacement unit at no charge. Install this replacement unit in a timely fashion so that system operation is restored within a 24 hour period from the initial failure. Permit such replacement unit to remain available to the Owner until the original unit is repaired and reinstalled.
8. At the completion of the program, provide to the Owner a record of all work performed and parts replaced.

C. Preventive Maintenance

1. For the duration of the program, provide maintenance service after final acceptance of the installation. During this period, provide at least two visits annually to the site for preventive maintenance and general system checking. During these visits, install any software or firmware upgrades to the extent these upgrades are made available at no



charge from the manufacturer and are approved in advance by the Owner. Schedule these visits at approximately six month intervals.

2. In addition to preventive maintenance, provide one further visit, scheduled upon the Owner's request, to replace the lamps within any video/data projectors. Employ new lamp as made available by the Owner; coordinate the return and refurbishment of any lamp modules.

D. Content and Use Licenses

1. For the duration of the program, provide or perform all services required as part of manufacturer's annual maintenance agreements or other manufacturer-imposed conditions. Maintain all content and software use licenses. Continue or extend all specified manufacturer support agreements and extended warranties, including those support agreements and extended warranties shown as line items within the Equipment Schedule. Pay all costs and fees; provide complete services package so that no charges are incurred by the Owner during the term of the program. To the extent that any manufacturer requires direct invoicing to the Owner, carry such costs within the contract price, with the understanding that such costs may be assigned to the Owner upon further discussion.

## PART 2 - EQUIPMENT

### 2.1 INSTALLATION MATERIALS, CABLES, AND INSTALLATION COMPONENTS

#### A. Audio Input Lines

1. Use cable with a foil-shielded pair of stranded #22 AWG conductors, with a stranded shield drain wire. For single pair, use a miniature cable, nominal outside diameter 0.135". Use of multi-pair cable is optional. Provide plenum rated equivalent as required.
  - a. Belden 8451
  - b. Liberty 22-1P-EZ
  - c. West Penn 452

#### B. Audio Portable Cables

1. For line and microphone level audio umbilical cords use cable with stranded #20 AWG conductors, braided shield, and EPDM rubber jacket.
  - a. Belden 8412
  - b. Equal

#### C. Loudspeaker Wiring

1. Provide unshielded loudspeaker wiring for connection to loudspeakers and loudspeaker receptacles. For lines in rigid conduit or electrical tubing, use stranded or solid conductors. For lines in flexible conduit or electrical tubing and for all wiring to equipment within equipment racks, use only stranded conductors.
2. Use color-coded #12 AWG conductors for all loudspeakers and electronically-delayed loudspeakers except for 70 V ceiling-mounted loudspeakers and loudspeaker receptacles.
  - a. Belden 8477
  - b. West Penn 227
  - c. Approved Equal
3. For all ceiling-mounted loudspeaker wiring using 70.7 Volt lines provide color-coded #18 AWG loudspeaker wiring.
  - a. Belden 8461
  - b. West Penn 224
  - c. Approved Equal
4. Use color-coded #14 AWG conductors for all loudspeaker receptacle wiring.
  - a. Belden 8473
  - b. West Penn 226

#### D. 75 Ohm Video Input/Output Lines

1. Provide video lines with a maximum loss of 20dB at 750 MHz for single run.
2. For cable length runs between 0 and 300 feet:
  - a. Canare L-5CFB
  - b. Belden 1505A
  - c. West Penn 819
3. For cable length runs between 300 and 500 feet:

- a. Canare L-7CFB
  - b. Belden 1694A
  - c. West Penn 6350
- 4. For multi-cable RGBHV runs under 100 feet:
  - a. Belden 1279P
  - b. Extron MHR-5
  - c. West Penn 255CRGB
- E. Category Wiring
  - 1. Provide shielded Category 6 8-conductor twisted pair cable with 23 AWG solid conductors and bandwidth of 350 Mhz for computer data and audiovisual transport wiring.
    - a. Belden DataTwist series
    - b. Equal
- F. HDBT Wiring
  - 1. Provide shielded Category5e 8-conductor twisted pair cable tested to 350 Mhz and suitable for use with the supplied video distribution system.
    - a. Crestron DM-CBL-8G
    - b. Equal
- G. Fiber-Optic Wiring, Two Fiber
  - 1. Provide multi-mode, OM3, two-fiber cable for connection from wall plates to patch bays.
    - a. Belden B9C037
    - b. Equal
- H. Fiber Optic Wiring, Six Fiber
  - 1. Provide multi-mode OM3, six-fiber cable for connection between equipment racks. Terminate all fibers with connectors.
    - a. Belden B9C039
    - b. Equal
- I. Antenna Wiring
  - 1. Provide coaxial antenna wiring for connections from wireless transmitters and receivers to antenna connection panels.
    - a. Belden 7810A
    - 1) Equal
- J. Microphone and Line Level Patch Panel
  - 1. Provide programmable patch panels to fulfill the requirements shown on the functional diagram. Wire jacks with bridging and normalled-through connections as detailed. Use patch panels which include designation strips with transparent plastic label covers; vertical strips at each side and a three-line (minimum) horizontal strip for each row of jacks. Place jacks close to each other on the patch panel which are shown close to each other on the functional diagram. Locate each bridging jack above the associated normalled-through jack. Use bantam type tip-ring-sleeve jacks with cross-bar palladium or Western Electric #1 gold alloy switching contacts. Both factory-wired and shop-wired

patch panels are acceptable. Insulation-displacement terminals are included with the factory-wired patch panels specified herein; other terminal strips or terminal blocks may be substituted, including both solder and screw types. Supply two-foot long red patch cords with nickel-plated plugs. Attach patch cord holder to side of rack or wall near jack field.

- a. Acceptable patch panel:
  - 1) Audio Accessories WEP262-SH
  - 2) BittreeB48DC-NNPIT/E3 M20U12L
  - a) Quantity: As required per drawings
- b. Acceptable patch cord:
  - 1) Audio Accessories LFR-24
  - 2) Bittree LPC 24 00-110
  - a) Quantity: 20
- c. Acceptable patch cord holder:
  - 1) Audio Accessories MAXI
  - 2) Pomona 4408
  - a) Quantity: 4

K. Video Patch Panel

- 1. Provide 75 ohm patch panels for video signals.
  - a. Acceptable patch panel:
    - 1) Audio Accessories 432D4P/SVJ-2TX
    - 2) Bittree B48T-2WTHD
    - 3) ADC equal
    - a) Quantity as required per drawings
  - b. Acceptable patch cord:
    - 1) Audio Accessories VPC-24
    - 2) Bittree VPCM 24 00 – 75
    - 3) ADC equal
    - a) Quantity: 10
  - c. Acceptable looping plug:
    - 1) ADC LP-S1625 Standard Size HD Looping Plug
    - 2) Equal
    - a) Quantity: 8

L. Category Patch Panel

- 1. Provide 24-port rack-mount shielded category 6 patch panel. Provide one 2-foot patch cable per wired port on patch bay.
  - a. Leviton 4S255-S24 w/ 6ASHD-S6A snap-in jacks
  - b. Hubbell Equal
  - 1) Quantity: as required per drawings

M. Fiber Optic Patch Panel, Singlemode ST

1. Provide 12-port rack-mount singlemode fiber optic patch panel with ST connectors. Provide ST connectors with captive dust caps. Provide one 2-foot patch cable per wired port on patch bay.
  - a. Acceptable patch panel:
    - 1) Camplex HF-OPRP-1
    - 2) Approved equal
    - a) Quantity: per drawings
  - b. Acceptable patch cord:
    - 1) Camplex
    - 2) Equal
    - a) Quantity: 10

N. Connectors

1. Connectors from the following manufacturers shall be considered acceptable. Install connectors appropriate for the installed cable and equipment interface.
  - a. ADC
  - b. Amp
  - c. Amphenol
  - d. Canare
  - e. H.H. Smith
  - f. Kings
  - g. Neutrik
  - h. Pomona
  - i. Switchcraft
  - j. Trompeter
  - k. Approved equal

O. Input Connection Plates

1. All plates are black anodized aluminum with engraved or laser etched white lettering unless otherwise noted.
  - a. Wall-mounted plates: custom color/finish by architect OR stainless/brushed aluminum
  - b. Wall-mounted plates in stage areas (behind proscenium): black
  - c. Wall-mounted plates at catwalk and overhead areas: black
  - d. Wall-mounted plates in Control Room: black
  - e. Floor-Box Mounted plates: black

P. Press Feed

1. Provide jacks and transformer as shown to combine low-impedance line level outputs and match them to inputs of consumer-type ("Hi-Fi") recording equipment. Provide three-pin receptacles to interface "pro-level" recording equipment to same low-impedance line level outputs. Locate in audio equipment rack. Provide custom assembly on panel using the following components:
  - a. Phono Receptacles

- 1) Use female phono ("RCA") panel mounted jacks, as shown below, which are insulated from the mounting panel and which use D-holes or other positive means to prevent jack rotation. Provide sufficient clearance so that inserted plugs do not short to the plate.

- b. Three-pin Receptacle
- c. Provide three-pin receptacle with black finish, for connection to "pro-level" equipment.

Q. Microphone Extension Cable

1. Provide 25-foot long rubber-covered flexible microphone extension cables. Fit each flexible extension cable with black three conductor XLR microphone receptacles. Provide one microphone cable per microphone.
  - a. Wireworks C25
  - b. Pro Co M25
  - c. Approved equal assembly
- 1) Quantity: As required by number of microphones provided.

R. Isolation Transformer

1. Jensen Transformer JT-11SSP-6M
2. ProCo LOT-1
  - a. Quantity: As required

S. Dual Line Output Transformer

1. Jensen Transformer DIN-2LO-11FL
2. Equal

T. Dual Two-Way Microphone Splitter

1. Jensen Transformer DIN-MS-2P
2. Equal

U. Audio Combiner

1. Provide passive audio combiner network. Provide with power supply as required. Mount in equipment rack.
  - a. RDL STD series
  - b. Equal

V. Terminal Blocks

1. Provide DIN-rail mounted terminal blocks where indicated on functional diagrams for microphones and line level lines.
  - a. Acceptable manufacturers:
    - 1) Wago
    - 2) Entrelec
    - 3) Equal

2. Provide DIN-rail terminal blocks, barrier strips or euro-style blocks for loudspeaker level lines.

W. Surface Mount Electrical Gang Boxes

1. Provide surface mount electrical gang boxes for all surface and pipe mount audiovisual devices in project. Coordinate mounting condition and requirements with electrical contractor. Provide in black or white as required to match faceplate.
  - a. FSR SMWB Series
  - b. Leviton BKBX Series
  - c. Electronic Theatre Controls Equal

X. Rack-Mounted Power Strips

1. For racks with sequenced power control provide modular vertical power strips complete with outlet modules, internal wiring and connectors, internal jumpers, wiring to external circuits, external wiring junction boxes, blank plates, and mounting hardware as required to deliver a complete, fully enclosed, and functional assembly.
  - a. Middle Atlantic MPR Series

Y. Loudspeaker Rigging and Suspension Equipment

1. See Paragraph 2.5F Loudspeaker Rigging and Suspension Equipment.

2.2 AUDITORIUM AUDIO INPUT EQUIPMENT

A. Wireless Microphone System

1. Provide all antennas, transmitters, and receivers by a single manufacturer.
2. Provide digital wireless microphone system with AES 256-bit encryption, Dante audio networking, allow up to 16 active transmitters on one 6 Mhz TV channel, switching diversity.
3. Provide all required power supplies and accessories to achieve intent of Drawings.
4. Provide complete with rack-mounting kits.
5. Provide with rack shelves for charging stations.
6. Provide antenna with all required hardware to mount to wall and point at stage.
  - a. Four-Channel Receiver
    - 1) Shure ULXD4Q
    - 2) Equal
    - a) Quantity: 1
  - b. Handheld Transmitter
    - 1) ULXD2/SM58
    - 2) Equal
    - a) Quantity: 2
  - c. Belt Pack Transmitter
    - 1) ULXD1
    - 2) Equal
    - a) Quantity: 2
  - d. Lavalier Microphone

- 1) Shure MX150/O
    - 2) Equal
      - a) Quantity: 2
  - e. Rechargeable Battery
    - 1) Shure SB900
    - 2) Equal
      - a) Quantity: 2
  - f. Charging Station w/ power supply
    - 1) Shure SBC200-US
    - 2) Equal
      - a) Quantity: 2
  - g. Charging Station w/o power supply
    - 1) Shure SBC200
    - 2) Equal
      - a) Quantity: 1
  - h. Remote Antenna Amplifier
    - 1) Shure UA834
    - 2) Equal
      - a) Quantity: 2
  - i. Active Directional Antenna
    - 1) Shure UA874
    - 2) Equal
      - a) Quantity: 2
  - j. Wall-Mount for Active Directional Antenna
    - 1) Atlas Sound AD-19B (black)
    - 2) Equal
      - a) Quantity: 2
- B. Lectern Microphone
  - 1. Provide microphone with shock isolation. Supply microphone with 18-inch long flexible extension tube, stand clamps and foam windscreen. These microphones are intended for general use at lecterns, or on stands for reception of speech or music at distances of approximately 12 to 24 inches from source to microphone. For units without electronic vibration isolation provide additional shock-mount stand adapter. Install one microphone on lectern. Second microphone is provided for portable use.
    - a. Countryman Isomax 4RF, M4HP5RF24EB
    - b. Clock Audio C 35E-RF
    - c. Equal
      - 1) Quantity: 2
- C. Microphone Stagebox (16 Input Channel, 4 Return Channel 25'-0")
  - 1. Provide 16 channel analog microphone snake with 4 XLR return channels with extruded aluminum stage box and color coded multipair cable with durable Matt PVC Outer Jacket
    - a. Proco Sound SMA1604FBX-25
    - b. Whirlwind Audio Equal



- c. Wireworks Equal
    - 1) Quantity: 1
- D. Microphone Stagebox (12 Input Channel, 4 Return Channel 50'-0")
  - 1. Provide 16 channel analog microphone snake with 4 XLR return channels with extruded aluminum stage box and color coded multipair cable with durable Matt PVC Outer Jacket
    - a. Proco Sound SMA1204FBX-50
    - b. Whirlwind Audio Equal
    - c. Wireworks Equal
      - 1) Quantity: 1
- E. Microphone Stagebox (8 Input Channel, 4 Return Channel 50'-0")
  - 1. Provide 16 channel analog microphone snake with 4 XLR return channels with extruded aluminum stage box and color coded multipair cable with durable Matt PVC Outer Jacket
    - a. Proco Sound SMA0804FBX-50
    - b. Whirlwind Audio Equal
    - c. Wireworks Equal
      - 1) Quantity: 1
      - 2)

## 2.3 AUDITORIUM PLAYBACK EQUIPMENT

- A. Computer
  - 1. Provide small form-factor computer with current and compatible windows operating system. Provide with 27" LCD monitor, 2 TB hard drive, 8 GB RAM. Dual output HDMI or Display Port output. Provide with wireless keyboard and mouse. Provide with Ethernet-audio enabled network interface and any required license for receiving and transmitting digital audio to the digital audio network. Load with DSP software and dashboard program setup for control over audio DSP, amplifier monitoring and audiovisual system diagnostics
    - a. Dell i5 7050 Micro w/ Dante Virtual sound card and Dante Via.
    - b. HP Equal w/ Dante Virtual Sound Card and Dante Via
      - 1) Quantity: 2 Stage Rack & Control Booth
- B. Wireless Keyboard and Mouse
  - 1. Provide RF wireless keyboard and separate wireless mouse, with both transmitters served by single 2.4GHz RF receiver. Provide system rated for 100 foot range.
    - a. Gyration Air Mouse Go Plus with Compact Keyboard
    - b. SMK Link Equal
      - 1) Quantity: 1 Set
- C. AV Input Plate, Network
  - 1. Provide Dante-based input/output plate with 2-channel Bluetooth audio input, pairing button, RCA and 3.5 mm stereo analog input, 3.5mm stereo analog output. Provide unit that that receives power and signal via Power Over Ethernet.
    - a. Atterotech unD6IO-BT
    - b. Equal
      - 1) Quantity: 1

2.4 AUDITORIUM AUDIO CONTROL AND AMPLIFICATION EQUIPMENT

A. 32-Channel Digital Audio Mixing Console (Owner Provided)

1. Provide digital audio mixing console with 64x64 MADI interface and a minimum of 32 analog microphone inputs and 2 stereo line input pairs. Provide with a minimum of 6 auxiliary outputs. Provide any additional switches, input cards, etc. necessary for the function of the console as shown on the functional diagrams. Provide for location of mixing console on countertop in control room and at front of house mix location.

- a. Soundcraft Perform S3 (Existing)
- b. Equal

1) Quantity: 1

B. Digital Audio Mixing Console Option Cards

1. Provide MADI compatible Option Cards with 64x64 Capacity. Provide cards compatible with mixing console and stage box connections. Replace existing cards.

- a. Soundcraft CAT 5 MADI

1) Quantity: 2

C. Digital Audio Mixing Console Network Cable (25 Foot)

1. Provide heavy-duty flexible portable network cable for patching digital audio mixing console to wall panel network ports.

- a. Lex Products Ethercon RJ45 Cable, 25'

1) Quantity: 2

D. Digital Audio Mixing Console Network Cable (50 Foot)

1. Provide heavy-duty flexible portable network cable for patching digital audio mixing console to wall panel network ports.

- a. Lex Products Ethercon RJ45 Cable, 50'

1) Quantity: 2

E. Digital Audio Mixing Console Patch Cables (3 Foot)

1. Provide heavy-duty flexible portable network cable for patching digital audio mixing console to wall panel network ports.

- a. Lex Products Ethercon RJ45 Cable, 3'

1) Quantity: 8

F. Digital Mixing Console Input/Output Box (Stage Box)

1. Provide rack-mountable remote I/O device compatible with digital mixing console. Provide device with 32 analog microphone inputs with console-controllable pre-amplifiers, 8 analog line level outputs on 3-pin XLR connectors which connects to the digital mixing console over Digital Audio Protocol. Provide device which can simultaneously receive channels and send channels of full bit rate digital audio over the single UTP connection.

Provide all required input card, switches, etc, to connect I/O to console per functional diagrams.

- a. Soundcraft Mini Stagebox 32R
- b. No equal
  - 1) Quantity: 1 Stage Rack

G. Digital Mixing Console Input/Output Box (Stage Box)

- 1. Provide rack-mountable remote I/O device compatible with digital mixing console. Provide device with 16 analog microphone inputs with console-controllable pre-amplifiers, 8 analog line level outputs on 3-pin XLR connectors which connects to the digital mixing console over digital audio protocol. Provide device which can simultaneously receive channels and send channels of full bit rate digital audio over the single UTP connection. Provide all required input card, switches, etc, to connect I/O to console per functional diagrams.
  - a. Soundcraft Mini Stagebox 16R
  - b. No equal
    - 1) Quantity: 1 Control Booth

H. Audio Network I/O Interface

- 1. Provide 1RU rack-mounted Audio Network interface for use with secondary analog mixing console or analog interface with existing mixing console. Provide device with minimum of 16 digital channels and 16 analog line level outputs on 3-pin XLR connectors which connects to the digital mixing console over Digital Audio Network. Provide device which can simultaneously receive channels and send channels of full bit rate digital audio over the single UTP connection through a network switch..
  - a. Atterotech Synapse-D16MIO w/ Gator Case GR-2L and Custom Rack Panel
  - b. Focusrite RedNet Equal w/ Gator Case GR-2L and Custom Rack Panel
    - 1) Quantity: 1

I. Audio Master Clock

- 1. Provide Audio Master Clock. Provide system compatible with Mixing console and Audio Network interface.
  - a. Black Lion audio Micro Clock MKIII XB
    - 1) Quantity: 1

J. Audio Network Master Clock

- 1. Provide Audio Master Clock compatible with external Audio Master clock and audio Network. Provide system compatible with audio network within performing arts area.
  - a. Studio Technologies Mode 5401 Dante Master Clock
    - 1) Quantity: 1

K. Digital Signal Processor

1. Provide digital signal processing system with inputs and outputs as shown on drawings, and the following functions. Provide all required devices, accessories, switches and cables to achieve a complete working system.
  - a. Feedback suppression
  - b. Nine bands of parametric equalization per signal input group
  - c. Crossover
  - d. Compressor
  - e. Digital delay
  - f. Signal limiting
  - g. Digital audio signal routing
  - h. Signal flow as shown on sound system functional drawing(s)
  - i. Volume control
  - j. Dante digital audio networking
2. Manufacturers
  - a. Basis of Design: Symetrix Radius
    - 1) Symetrix Radius NX 12x8
      - a) Quantity: 1
    - 2) Symetrix xIn 12
      - a) Quantity: 1
    - 3) Symetrix xOut 12
      - a) Quantity: 1
    - 4) Additional Symetrix components as required to provide specified functionality
  - b. Acceptable Alternates:
    - 1) Equivalent system using QSC Q-SYS components
    - 2) Equivalent system using Biamp Tesira components

L. Ethernet Switch

1. Provide SNMP capable, POE enabled, managed, gigabit Ethernet switches as required to support a Dante audio network and NDI network with functionality equivalent to networks shown on drawings and control system network. Provide Ethernet products compliant with IEEE 802.3.
  - a. HP Aruba
  - b. Cisco

M. Digital Signal Processor Preset Descriptions

1. Provide digital signal processing settings as described below. Exact determination of digital processor settings is an iterative process and final settings should be determined and documented with careful field measurements. Configure the default mode (with no muting) when master power switch is turned on. Configure so that all inputs are routed to appropriate outputs unless complete routing/rewiring of the internal DSP software devices is required. Presets are described below as parameter changes that do not

require a muting and reinitializing of the digital signal processor. Provide access to muting presets through control system if included with project.

a. Presets required:

- 1) Eight Presets Minimum

N. Digital Signal Processor Control Surface

1. Provide digital signal processing control surface with motorized faders for individual volume controls and master volume. Provide with control of wireless and wired microphones as shown on drawings. Exact determination of settings is an iterative process. Determine settings with owner.

- 1) Mystery Electronics EM12 with Rack mount

O. Power Amplifier Serving Main Loudspeakers

1. Provide four-channel power amplifier with balanced bridging inputs and variable-speed fan(s). Provide amplifier which is 2-rack space units high. Provide amplifier which supplies at least 1200watts (nominal) per channel at 8-ohms. Provide amplifiers with switchable low and high impedance output modes per channel.

- a. Crown DCi 4|1250
- b. Lab.gruppen C68:4
- c. Equal

- 1) Quantity: 2

P. Power Amplifier Serving Front-Fill Loudspeakers

1. Provide four-channel power amplifier with balanced bridging inputs and variable-speed fan(s). Provide amplifier which is 2-rack space units high. Provide amplifier which supplies at least 300-watts (nominal) per channel at 8-ohms and at least 600-watts (nominal) per channel at 4-ohms. Provide amplifiers with switchable low and high impedance output modes per channel.

- a. Crown DCi 4|300
- b. Lab.gruppen C16:4
- c. Equal

- 1) Quantity: 1

Q. Power Amplifier Serving Underbalcony Loudspeakers

1. Provide 8-channel power amplifier with balanced bridging inputs and variable-speed fan(s). Provide amplifier which is 2-rack space units high. Provide amplifier which supplies at least 300-watts (nominal) per channel at 8-ohms and at least 300-watts (nominal) per channel at 4-ohms. Provide amplifiers with switchable low and high impedance output modes per channel.

- a. Crown DCi 8|300
- b. Lab Gruppen C 20:8X

- 1) Quantity: 1

## 2.5 AUDITORIUM LOUDSPEAKER COMPONENTS

### A. Loudspeaker Manufacturer

1. All loudspeakers shall be supplied by the same manufacturer, except where that manufacturer does not make one of the specified loudspeakers.

### B. Central Cluster Line Array Loudspeaker

1. Provide 2-way full range compact line array loudspeaker with dual 8-inch low-frequency drivers with 2-inch voice coils, and three high-frequency compression driver with 1.4-inch voice coil. Provide with all necessary suspension hardware to achieve mounting position and geometry as shown on Drawings, including supplemental steel as required to create rigging points above loudspeaker. Provide loudspeaker and mounting hardware with finish as directed by architect. Provide with all required inter-box link power and signal cables.
  - a. Fulcrum FL283
  - b. Vue AudioTeknik Equal
  - 1) Quantity: 5

### C. Line Array Loudspeaker Suspension Hardware

1. Provide suspension frame hardware for suspension of line array loudspeakers. Provide components from same manufacturer and compatible with line array loudspeaker provided.
  - a. Fulcrum Acoustics Fly bar kit and Pull up bar kit
  - b. Equal
  - 1) Quantity: 1

### D. Front Fill Loudspeaker

1. Provide compact 2-way loudspeaker with 5-inch concentric driver.
  - a. Tannoy AMS5ICT – Black with Yoke Mounts
  - b. Equal
  - 1) Quantity: 4

### E. Rear Fill/Underbalcony Loudspeaker

1. Provide compact 2-way loudspeaker with 5-inch concentric driver.
  - a. Tannoy AMS5ICT – Black with Yoke Mounts
  - b. Equal
  - 1) Quantity: 6

### F. Loudspeaker Rigging and Suspension Equipment

1. Provide loudspeaker rigging for loudspeaker clusters and suspended loudspeakers. Suspend loudspeaker components from brackets and any necessary suspension frames to minimize total number of attachment points to building or other structure. Provide with a sufficient number of suspension points to allow field adjustment of loudspeaker aiming, +/-5 degrees minimum in all axes.

2. During fabrication and installation verify that adequate clearance from all other hanging components and structural steel is provided.
3. Provide any additional rigging hardware necessary for the safe and proper installation of the loudspeakers.
4. Provide safety cables to prevent individual loudspeaker cluster components from falling in case of failure or loosening of the primary component support.
5. Paint all exposed components as directed by the Owner's authorized representative.
6. Manufacturers
  - a. Ape Rigging
  - b. Polar Focus
  - c. Approved Contractor-fabricated assembly (submit evidence of successful completion of previous projects with bid)
7. Submit all drawings of the complete final loudspeaker rigging assemblies to a licensed structural engineer and obtain stamped copies of the drawings. Drawings must detail all connections from attachment to building structure to loudspeaker.

G. Control Room Monitor Loudspeaker

1. Provide active 2-way compact monitor loudspeaker with 8-inch low-frequency driver and dome tweeter. Provide with table stand to elevate loudspeaker above mixing console.
  - a. PreSonus Sceptre S-8
  - b. Dynaudio LYD 8

1) Quantity: 2

H. Desktop Stand for Control Room Monitor Loudspeaker

1. Provide desktop stand to elevate control room monitor loudspeaker above mixing console.
  - a. IsoAcoustics
  - b. Equal

1) Quantity: 2

2.6 AUDITORIUM LEFT/RIGHT STEREO LOUDSPEAKER SYSTEM

A. Left/Right Cluster Line Array Loudspeaker

1. Provide 2-way full range compact line array loudspeaker with dual 8-inch low-frequency drivers with 2-inch voice coils, and three high-frequency compression driver with 1.4-inch voice coil. Provide with all necessary suspension hardware to achieve mounting position and geometry as shown on Drawings, including supplemental steel as required to create rigging points above loudspeaker. Provide loudspeaker and mounting hardware with finish as directed by architect. Provide with all required inter-box link power and signal cables.
  - a. Fulcrum FL283
  - b. Vue AudioTeknik Equal

1) Quantity: 10 (5 per side)

B. Line Array Loudspeaker Suspension Hardware

1. Provide suspension frame hardware for suspension of line array loudspeakers. Provide components from same manufacturer and compatible with line array loudspeaker provided.
  - a. Fulcrum Acoustics Fly bar kit and Pull up bar kit
  - b. Equal

C. Power Amplifier Serving Main Loudspeakers

1. Provide four-channel power amplifier with balanced bridging inputs and variable-speed fan(s). Provide amplifier which is 2-rack space units high. Provide amplifier which supplies at least 1200watts (nominal) per channel at 8-ohms. Provide amplifiers with switchable low and high impedance output modes per channel.
  - a. Crown DCi 4|1250
  - b. Lab.gruppen C68:4
  - c. Equal
  - 1) Quantity: 3

2.7 AUDITORIUM EQUIPMENT RACKS AND ACCESSORIES

A. Gangable Floor-Standing Equipment Rack

1. Locate in equipment rack closet in control room. Use modular rack with bolt-together frame, side panels, locking rear door, and vented, locking front door, which accepts extra panel-mounting angles. Fill in unused rack space with blank solid panels, per industry best practices for air flow. Recess rack rails to allow front doors to close when patch cords are in use. Provide rack, accessories, and filler panels in smooth (not wrinkle) matte black finish. Provide rack with minimum 30-inch depth.
  - a. Middle Atlantic WRK-XX32 Series Assembly
  - b. Lowell Manufacturing LGR-XX32
  - 1) Quantity: 2

B. Cooling Fan for Gangable Floor-Standing Equipment Rack

1. Provide cooling fan compatible with and from same manufacturer as Gangable Floor-Standing Equipment Rack specified above. Provide with thermostatic automatic fan control.
  - a. Middle Atlantic MW-4QFT-FC
  - b. Lowell Manufacturing equivalent
  - 1) Quantity: 2

C. Swing-Out Equipment Rack (Stage Equipment Rack)

1. Provide wall-mounted equipment rack with pivoting center section, floor base, and vented, lockable front door. Fill in unused rack space with blank solid panels, per industry best practices for air flow. Provide rack, accessories, and filler panels in smooth (not wrinkle) matte black finish. Provide with thermostatically controlled fan kit.
  - a. Middle Atlantic DWR-18-26PD
  - b. Lowell Manufacturing equivalent
  - 1) Quantity: 1



D. Cooling Fan for Swing-Out Equipment Rack

1. Provide cooling fan compatible with and from same manufacturer as Swing-Out Equipment Rack specified above. Provide with thermostatic automatic fan control.
    - a. Middle Atlantic DWR-FK32 w/ FC-2-215-1CA
    - b. Lowell Manufacturing equivalent
- 1) Quantity: 1

E. Vertical Modular Power Raceway – Gangable Floor-Standing Equipment Rack

1. Furnish equipment racks with permanently-mounted 3-conductor AC power receptacles with sufficient outlets to meet system needs plus at least 2 spares per rack. Provide raceway configured with separately circuited receptacle groups as required to distribute load across multiple circuits. Provide whip with plug to match for connection to power outlet box as indicated on the power plan drawings. Provide with all power modules, wiring jumpers, wiring tails, blank covers, and other accessories required to produce a fully contained assembly configured per the Drawings and as required to meet all specified functionality.
    - a. Middle Atlantic MPR-9A w/ (4) RLM-20IGA and (4) M-20IGA modules
    - b. Juice Goose CQ-PD1-4, CQ2200, CQ2000 (special order IG version)
    - c. Equal
- 1) Quantity: As required (minimum 1 per rack)

F. Vertical Modular Power Raceway – Swing-Out Equipment Rack

1. Furnish equipment racks with permanently-mounted 3-conductor AC power receptacles with sufficient outlets to meet system needs plus at least 2 spares per rack. Provide raceway configured with separately circuited receptacle groups as required to distribute load across multiple circuits. Provide whip with plug to match for connection to power outlet box as indicated on the power plan drawings. Provide with all power modules, wiring jumpers, wiring tails, blank covers, and other accessories required to produce a fully contained assembly configured per the Drawings and as required to meet all specified functionality.
    - a. Middle Atlantic MPR-3A raceway w/ (1) RLM-20IGA and (2) M-20IGA modules
    - b. Juice Goose equivalent
    - c. Equal
- 1) Quantity: 1

G. High Density Vertical Power Strip

1. Furnish equipment racks with permanently-mounted 3-conductor AC power receptacles with sufficient outlets to meet system needs plus at least 2 spares per rack. Provide raceway configured with 24 20A outlets. Connect to remotely controlled outlets per the Drawings and as required to meet all specified functionality.
    - a. Middle Atlantic PD-2420SC-NS
    - b. Juice Goose equivalent
- 1) Quantity: As required (minimum 1 per rack)

H. System Power Control

1. Provide a relay-controlled power switching system with a master power switch and power-on indicator for the system. Connect the master power switch to control each receptacle in the rack except for one spare receptacle. Label unswitched receptacles "UNSWITCHED". Connect power for rack illumination to bypass the system master power switch. Provide a means to cycle the system power amplifiers on sequentially at intervals of approximately one second whenever the power switch is activated. Connect to remote control system and other power controllers per the Drawings.
  - a. Middle Atlantic USC-6R
  - b. Atlas Sound SACR-191
  - c. Juice Goose CQ1520
  - 1) Quantity: 1
- I. Uninterruptible Power Supply
  1. Provide 1000VA minimum rack-mounted UPS system to provide power-surge and power-loss protection to digital signal processor system.
    - a. Middle Atlantic UPS-1000R
    - b. APC SUA1000RM2U
    - c. Powerware 5125 1000 RM
    - 1) Quantity: 1
- J. Rack Work Light
  1. Provide locally switched utility lighting. Connect to unswitched receptacle. Mount in back of equipment rack.
    - a. Atlas Sound RWL-2
    - b. Equal
    - 1) Quantity: 3
- K. Rack Lighting
  1. Littlite Raklite RL-10-D-LED
  2. Equal
    - a. Quantity: 3
- L. 2 Rack Unit Locking Storage Drawer
  1. Provide 2 rack space locking rack mounted drawer.
    - a. Middle Atlantic D2-LK
    - b. Raxxess SDR-2 w/ lock
    - 1) Quantity: 2
- M. Rack Shelf for Small Devices
  1. Middle Atlantic UFA-14.5 w/ UFA-2 faceplate
    - a. Quantity: 3

## 2.8 TELEVISION STUDIO SYSTEM

### A. Main Console Desk

1. Provide customized modular desk with rack components, wire managements and posts for monitor arms.
  - a. Winsted E-SOC Control Station with units configured as shown on drawings
  - b. Equal
    - 1) Quantity: 1

### B. Portable Equipment Rack

1. Provide movable rack with large casters, side panels, locking rear door, and vented, locking front door, which accepts extra panel-mounting angles. Fill in unused rack space with blank solid panels, per industry best practices for air flow. Provide rack, accessories, and filler panels in smooth (not wrinkle) matte black finish. Provide rack with minimum 30-inch depth.
  - a. Middle Atlantic PTRK-2126MDK
  - b. Marshall Furniture Equal
  - c. Spectrum Industries Furniture Equal
    - 1) Quantity: 1

### C. Pan/Tilt/Zoom Camera

1. Provide NDI-capable, HD-SDI equipped, audio-embedding, HD video camera with automated pan/tilt/zoom operation. Provide with all required connecting cables and power supplies. Provide camera in black per owner.
  - a. Panasonic AW-HN40HK Provide with 5 year warranty
  - b. Sony Equal
    - 1) Quantity: 4

### D. Camera Controller

1. Provide IP-based camera controller for remote pan/tilt/zoom cameras.
  - a. Panasonic AW-RP50
  - b. Sony Equal
    - 1) Quantity: 1

### E. Pipe Mount for PTZ Camera

1. Provide all mounting hardware required to mount PTZ camera securely to 1.9" OD lighting pipe.
  - a. Quantity: 4

### F. Wall Mount for PTZ Camera

1. Provide steel wall mount for pan/tilt/zoom camera.
  - a. Panasonic FEC-40WMK
  - b. Equal
    - 1) Quantity: 4

### G. Rack-Mount Multi-Monitor

1. Provide rack-mount unit with four LED backlighted 4 inch high resolution displays. Provide each display with HD-SDI inputs
  - a. Datavideo TLM-434H
  - b. Marshall V-MD434-3GSDI
  - c. Equal
    - 1) Quantity: 1

- H. Control Room Video Monitor
  - 1. Provide 24-inch diagonal flat-panel LCD with matte screen, 16:9 aspect ratio, 1920x1080 resolution, HDCP support, 3G-SDI and HDMI input. Provide unit from one of the following manufacturers..
    - a. JVC ProHD DT-N24F
      - 1) Quantity: 2
- I. Control Room Video Monitor
  - 1. Provide 24-inch diagonal flat-panel LCD with matte screen, 16:9 aspect ratio, 1920x1080 resolution, HDCP support, and HDMI input. Provide unit from one of the following manufacturers..
    - a. Samsung S24E650BW
      - 1) Quantity: 2
- J. HD-SDI to HDMI Converter Scaler
  - 1. Provide HD-SDI to HDMI scaler support input resolutions up to 2018x1080p/60Hz.
    - a. Decimator Design Decimator 2
    - b. Equal
      - 1) Quantity: 4
- K. DVI Distribution Amplifier 1x2
  - 1. Provide a minimum of 1 input by 2 outputs DVI distribution amplifier.
    - a. Extron DVI DA4
    - b. Equal
      - 1) Quantity: 1
- L. HDMI Distribution Amplifier 1x4
  - 1. Provide a minimum of 1 input by 4 outputs HDMI distribution amplifier.
    - a. Extron DA4 HD 4K
    - b. Equal
      - 1) Quantity: 1
- M. Broadcast Switcher
  - 1. Provide broadcast switcher with the following features:
    - a. NDI Inputs: 16
    - b. HD-SDI inputs: 4
    - c. HD-SDI outputs: 4
    - d. Local video outputs: 3
    - e. Stream outputs: 2
    - f. 4k UHD support
    - g. Balanced analog audio input and output
    - h. Clip ingestion from watched folders
    - i. Multi-screen, multi-view output
    - j. Key layers:3
    - k. Internal storage: 2 x 3 TB minimum
    - l. Software audio mixer
    - m. Clip server
    - n. CG Graphics
    - o. Pan/tilt/zoom camera control
    - p. Dante audio
    - q. Telestrator
    - r. Test and title package
    - s. ISO recording
    - t. Small control panel with joystick camera control

2. Provide unit with keyboard and mouse.
  - a. NewTek TriCaster TC1 Base Bundle w/ Advanced Edition Software (Academic)
  - b. Equal
    - 1) Quantity: 1
- N. NDI Camera Interface
  1. Provide devices to convert HDMI and HD-SDI signals to NDI.
    - a. NewTek NC1 Studio I/O Module
      - 1) Quantity: 1
- O. Ethernet Switch
  1. Provide SNMP capable, managed, gigabit Ethernet switches as required to support a Dante audio network with functionality equivalent to audio network shown on drawings and control system network. Provide Ethernet products compliant with IEEE 802.3.
  2. Provide switch with single-mode fiber, LC connector interfaces to create ring topology, per Drawings.
  3. Create VLANs per drawings.
    - a. HP Aruba
      - 1) Quantity: 1
- P. HD-SDI To Fiber
  1. Provide a 4K capable (minimum) HD-SDI to Fiber Converter
  2. Provide for portable use at camera tripod areas within auditorium
    - a. AJA FiDO Single Channel 3G to ST Fiber
    - b. Equal
      - 1) Quantity: 6
- Q. Fiber to HD-SDI
  1. Provide a 4K capable (minimum) Fiber Converter to HD-SDI
  2. Provide for TV Studio use and extension from Auditorium
    - a. AJA FiDO-2R Dual Channel Fiber to SDI converter/receiver
    - b. Equal
      - 1) Quantity: 3
- R. Tripod Mounted Camera
  1. Provide HD-SDI camera shoulder mounted style, HD video camera. Provide with included lens.
    - a. JVC GY-HM620U ProHD Mobile News Camera
      - 1) Quantity: 3
- S. Studio Viewfinder for Camera
  1. Provide studio viewfinder compatible with camera and variable zoom/focus controller
    - a. JVC DT-X73F with all required power supplies and cables
      - 1) Quantity: 3
- T. Camera Mount for Studio Viewfinder
  1. Provide camera mount for studio viewfinder
    - a. JVC SAK-LCD7
      - 1) Quantity: 3
- U. Variable Speed zoom/focus controller

1. Provide variable zoom and focus controller compatible with stand and camera
    - a. JVC HZ-HM800VZRKIT with all required power supplies and cables
      - 1) Quantity:3
  - V. Studio Tripod 17.5 lb Capacity
    1. Provide Studio Tripod compatible with camera and with 17.5 lb capacity
      - a. Benro S8
      - b. Manfrotto Equal
        - 1) Quantity:2
  - W. Studio Tripod 22.5 lb Capacity
    1. Provide Studio Tripod
      - a. Benro S8
      - b. Manfrotto Equal
        - 1) Quantity:1
  - X. Studio Tripod Dolly
    1. Provide tripod dolly
      - a. Benro
      - b. Manfrotto Equal
        - 1) Quantity: 3
  - Y. Tripod Pan Bar
    1. Provide Tripod Pan Bar
      - a. Brenro
      - b. Manfrotto Equal
        - 1) Quantity: 3
- 2.9 TELEVISION STUDIO AUDIO EQUIPMENT
- A. Wired and Wireless Microphone System
    1. Connect existing audio systems to existing audio console
  - B. Lavalier Microphone, Wired
    1. Provide omni-directional lavalier microphone.
      - a. Audio-Technica AT899
        - 1) Quantity: 4
  - C. Audio Network I/O Interface
    1. Provide 1RU rack-mounted Audio Network interface for use with existing mixing console  
Provide device with minimum of 16 digital channels and 16 analog line level outputs.
      - a. Atterotech Synapse-D16MIO
      - b. Focusrite RedNet Equal
        - 1) Quantity: 1
  - D. Control Room Monitor Loudspeaker
    1. Provide active 2-way compact monitor loudspeakers with 3 inch low-frequency driver and dome tweeter. Provide with table stand to elevate loudspeaker above mixing console.

2. Provide with short table stand to elevate loudspeakers above mixing console.
  - a. Genelec 6010B
  - b. M-Audio Studiophile AV 40
  - c. Equal
    - 1) Quantity: 2

E. Ethernet Switch

1. Provide SNMP capable, managed, gigabit Ethernet switches as required to support a Dante audio network with functionality equivalent to audio network shown on drawings and control system network. Provide Ethernet products compliant with IEEE 802.3.
  - a. HP Aruba
  - b. Cisco
    - 1) Quantity: 1

2.10 TELEVISION STUDIO CABLES

A. Extension Cables

1. Power Cables
  - a. Provide 12/3 SO edison extension cables with color-coded length marker and knotted tie line in length as quantities below
    - 1) 25 foot: 5
    - 2) 50 foot: 2
2. Ethernet Cables
  - a. Provide black heavy-duty Cat5e extension cable with snagless RJ-45 connectors and quantities below.
    - 1) 5 foot: 25
    - 2) 10 foot: 10
    - 3) 25 foot: 15
    - 4) 50 foot: 10
3. Microphone Cables
  - a. Provide 25-foot long rubber-covered flexible microphone extension cables. Fit each flexible extension cable with black three conductor XLR microphone receptacles. Provide one microphone cable per microphone.
    - 1) Wireworks C25
    - 2) Pro Co M25
    - 3) Approved equal assembly
      - a) 10 foot: 5
      - b) 25 foot: 5
      - c) 50 foot: 10
4. HD-SDI Cables
  - a. Provide black heavy-duty RG-6 HD-SDI extension cable with BNC connector and quantities listed below.
    - 1) 10 foot: 5
    - 2) 25 foot: 5
    - 3) 50 foot: 10

2.11 TELEVISION STUDIO TELEPROMPTER

- A. Provide a complete teleprompter system including Stand Mounted Provide Cat # based cabling system with USB power connection to production system.
- B. Tally Light Controller
  1. Provide tally light controller with power distribution. Locate in control room equipment rack.
    - a. MetaSETZ TLC-8S

- 1) Quantity: 1
  - C. Camera Mount Tallylight
    - 1. Provide Tallylight compatible with controller and with camera mount
      - a. metaSETZ TL-2-C
    - 1) Quantity: 4
  - D. Tallylight Adapters and Cables
    - 1. Provide Cat 6 cables with RJ45 connectors, 1/8 jacks to Intercom cable adapters and standard XLR cables for use with Tally light and Intercom system
      - a. Quantity: As Needed
- 2.12 TELEVISION STUDIO TALLY LIGHT SYSTEM
- A. Provide a production system controlled Tally Light system. Provide Cat # based cabling system with USB power connection to production system.
  - B. Tally Light Controller
    - 1. Provide tally light controller with power distribution. Locate in control room equipment rack.
      - a. MetaSETZ TLC-8S
    - 1) Quantity: 1
  - C. Camera Mount Tallylight
    - 1. Provide Tallylight compatible with controller and with camera mount
      - a. metaSETZ TL-2-C
    - 1) Quantity: 4
  - D. Tallylight Adapters and Cables
    - 1. Provide Cat 6 cables with RJ45 connectors, 1/8 jacks to Intercom cable adapters and standard XLR cables for use with Tally light and Intercom system
      - a. Quantity: As Needed



2.13 TELEVISION STUDIO PRODUCTION INTERCOM

- A. Provide a single-channel production intercom system as shown on the Drawings. Homerun circuits as enumerated to the power supply in equipment rack. Connect circuits to power supply output channels as shown. Connect power cable to "unswitched" receptacle in equipment rack. Provide single channel belt-packs, headsets and extension cables compatible with the production intercom systems specified below. Provide all equipment from the same manufacturer.
- B. Main Station
  - 1. Provide dual channel production intercom power supply. Locate in main equipment rack in Control Room.
    - a. Clear-Com PS-702
    - b. RTS PS-2001L
      - 1) Quantity: 1
- C. 1-Channel Belt-Pack Station
  - 1. RTS BP-1002
  - 2. Clear-Com RS-701
    - a. Quantity: 5
- D. Headset
  - 1. RTS PH-1
  - 2. Clear-Com CC-300
    - a. Quantity: 5
- E. Intercom over IP Interface
  - 1. Provide partyline over IP interface for production intercom system.
    - a. Clear-Com LQ-2W2
    - b. Equal
      - 1) Quantity: 2
- F. Intercom Extension Cable
  - 1. Provide twenty-five foot long rubber-covered flexible microphone extension cables. Fit each flexible extension cable with black three conductor XLR microphone receptacles. Provide color-coded shrink-wrap tubing to designate these extension cables separate from the microphone extension cables.
    - a. Wireworks C25
    - b. Pro Co M25
    - c. Whirlwind Equivalent
      - 1) Quantity: 5

2.14 AUDITORIUM VIDEO SYSTEM INPUT EQUIPMENT

A. Custom Multimedia Enabled Lectern

1. Provide custom lectern with all related audio, video and control equipment securely installed.
  2. Provide lectern with the following features:
    - a. Standard 19-inch equipment rack mounting
    - b. Locking casters
    - c. Space for two laptops to sit on work surface
    - d. Space for cable management (specified below)
    - e. Pull-out drawer for document camera.
    - f. Reading light
    - g. Clock
    - h. Gooseneck microphone
    - i. AC power distribution
    - j. Locking storage drawer or compartment
    - k. Angled mount for touch panel.
    - l. Custom school logo on front of lectern
  3. Wood Species and Finish: per Architect
  4. Hardware Finish: per Architect
  5. Acceptable Manufacturers:
    - a. Miller's Millwork
    - b. Marshall Furniture
- 1) Quantity: 1

B. Lectern Equipment

1. Integrate specified equipment within lectern specified above. Coordinate installation with Owner's Designated Representative. Secure all equipment neatly within lectern. Provide a means for coiling, storing, and securing excess umbilical cabling within lectern. Provide with all required power supplies and distribution.
2. Cable Management
  - a. Provide cable management enclosure mounted in lectern. Provide with cables and cable umbilical as shown on the functional diagram. Label all cables near connector with function. Install in top of lectern as directed by Owner's Designated Representative.
  - b. Provide unit with the following:
    - 1) Two 120V AC Power Outlets
    - 2) Two powered USB outlets
    - 3) HDMI cable with retractor
    - 4) UTP network cable with retractor
    - a) Extron Cable Cubby 1202 assembly
    - b) Equal
    - c) Quantity: 1
3. Gooseneck Microphone Mount
  - a. Provide gooseneck microphone mount flush-mounted in top of lectern. Provide with finish chosen from manufacturer's standard options as directed by Architect.

- 1) FSR T3-MJ-XXX
    - 2) Equal
      - a) Quantity: 1
4. Cables
  - a. HDMI
    - 1) Extron HDMI Ultra/15
    - 2) Crestron CBL-HD-20
      - a) Quantity: 2
  - b. UTP Network Cable
    - 1) Lex Products Ethercon RJ45 Cable, 25'
    - 2) Equal
      - a) Quantity: 1
5. Umbilical Cord
  - a. Provide 25-foot long umbilical cord for lectern with power, data, and signal cables bundled within a flexible synthetic mesh, clearly labeled and provided with appropriate strain relief. All cables in the umbilical should be designed for hard usage and repeated handling. Use of cables designed for installation in conduit will not be accepted.
    - 1) Quantity: 1

## 2.15 AUDITORIUM VIDEO SYSTEM PROCESSING AND CONTROL EQUIPMENT

### A. Manufacturer

1. Basis of Design: Crestron DigitalMedia
2. Acceptable Alternate: AMX Enova/DXLink Series
3. Acceptable Alternate: Extron DTP Series

### B. Integrated Audiovisual Matrix Switcher and Controller

1. Provide audiovisual matrix switcher and integrated system control processor with the following properties:
  - a. Local HDMI inputs: 4
  - b. Local RGB inputs: 2
  - c. Remote category cable digital video inputs: 2
  - d. Local HDMI outputs: 2
  - e. Remote category cable digital video outputs: 2
  - f. Bidirectional RS-232 ports: 2
  - g. Logic inputs: 4
  - h. IR Outputs: 4
  - i. Program audio output
  - j. Ethernet support
  - k. HDCP key management
  - l. EDID management
  - m. Fast HDMI switching
  - n. CEC signal management
  - o. HDBT-compatible projector output

- p. iPad control license or application credit
- q. Integrated wireless presentation system
  - 1) Crestron DMPS3-4K-350-C-AIRMEDIA
  - 2) Extron Equal
  - 3) AMX Equal
- a) Quantity: 1

C. PoE+ Power Supply for Integrated Audiovisual Matrix Switcher and Controller

- 1. Provide PoE+ power supply compatible with integrated audiovisual matrix switcher and controller.
  - a. Crestron PW-4830DUS
  - b. Extron Equal
  - c. AMX Equal
- 1) Quantity: 1

D. HDMI Wall Plate Transmitter

- 1. Provide one-gang digital transport input panel with support for HDMI, DVI and DisplayPort video signal formats. Provide unit with support for HDMI and analog stereo audio signal formats. Provide device which transports all video signals digitally to the A/V switcher over a single CAT5e cable. Provide with cover plate suitable for wall box or floor box as required.
  - a. Crestron DM-TX-4K-100-C-1G (color per Architect)
  - b. AMX Equal
- 1) Quantity: 2

E. HDMI Wall Plate Transmitter, Point-to-Point

- 1. Provide one-gang digital transport input panel with support for HDMI, DVI and DisplayPort video signal formats. Provide device which transports all video signals digitally to a compatible receiver over a single CAT5e cable. Provide with cover plate suitable for wall box or floor box as required.
  - a. Crestron HD-TX-101-C-1G-E (color per Architect)
  - b. Extron Equal
- 1) Quantity: 2

F. HDMI Transmitter, Point-to-Point

- 1. Provide digital transport device with support for HDMI, DVI and DisplayPort video signal formats. Provide device which transports all video signals digitally to a compatible receiver over a single CAT5e cable.
  - a. Crestron HD-TX-101-C-E
  - b. Extron Equal
- 1) Quantity: 1

G. HDMI Wall Plate Receiver, Point-to-Point

1. Provide digital transport receiver with HDMI output compatible with transmitters specified above.
  - a. Crestron HD-RX-101-C-E
  - b. Extron Equal
  - 1) Quantity: 3

H. DigitalMedia Scaling Receiver

1. Provide scaling Digital Media receiver with HDMI output and bi-directional RS232 port.
  - a. Crestron DM-RMC-4K-SCALER-C
  - b. Extron Equal
  - 1) Quantity: 2 Includes Spare

2.16 AUDITORIUM VIDEO SYSTEM OUTPUT EQUIPMENT

A. Video Projector

1. Provide lampless video projector with 12,000 ANSI lumen output (minimum), laser phosphor light engine, 2500:1 contrast ratio (minimum), HDBaseT input, and a native aspect ratio of 16:10 and minimum resolution of 1920x1200 (WUXGA). Provide projector with motorized zoom lens and recallable zoom, focus and lens shift presets. Verify final throw distance to projection screen, screen size and geometry before ordering lens. Provide video projector with color as directed by Architect.
  - a. Sony VPL-FHZ120L w/ lens (color by Architect)
  - b. Christie Digital D13WU-HS w/ lens
  - c. Panasonic PT-RZ12KU w/ lens
  - d. Equal
  - 1) Quantity: 1

B. Video Projector Mount

1. Provide adjustable ceiling mount for video projector.
  - a. Chief Manufacturing RPMAUW w/ hardware as required
  - b. Christie OneMount
  - c. Panasonic equal
  - 1) Quantity: 1

C. Control Room Video Monitor

1. Provide 24-inch diagonal flat-panel LCD with matte screen, 16:9 aspect ratio, 1920x1080 resolution, HDCP support, and HDMI input. Provide unit from one of the following manufacturers.
  - a. Samsung SAS24E650BW
  - b. HP equal
  - c. NEC equal
  - d. LG equal
  - 1) Quantity: 1

2.17 AUDITORIUM CONTROL SYSTEM EQUIPMENT

A. Touch Screen Control Panel

1. Provide 7" diagonal touch screen control panel. Provide touch panel that can be controlled and powered by a single Category cable.
  - a. Crestron TSW-760-B-S (black)
  - b. AMX Equal
  - 1) Quantity: 3

B. Tabletop Kit for Touch Screen Control Panel

1. Provide tabletop mounting kit for 7" diagonal touch screen control panel. Permanently mount one touch screen control panel on lectern using tabletop mount.
  - a. Crestron TSW-760-TTK-B-S (black)
  - b. AMX Equal
  - 1) Quantity: 2

C. Rack Mount Kit for Touch Screen Control Panel

1. Provide rack mount kit for 7" diagonal touch screen control panel. Mount one touch screen control panel in Stage Equipment Rack using rack mount kit.
  - a. Crestron TSW-560/760-RMK-1
  - b. AMX Equal
  - 1) Quantity: 1

D. Cables

1. Provide serial interface cables, infrared emitters, and line amplifiers as required to control devices shown on the Drawings.

### PART 3 - EXECUTION

#### 3.1 SYSTEM INSTALLATION

- A. Supply racks, wire, conduits, and raceways required to provide a complete system. Unless specifically instructed to the contrary, install all system wiring in steel conduit. Do not exceed 30% fill in conduits. Insulate all conduit from the equipment rack(s); connect conduits mechanically and electrically to the system ground point. Coordinate with the Owner and the Owner's authorized representative.
- B. If and only if directed to do so by the Owner's authorized representative, omit conduit for loudspeaker wiring above accessible ceilings; attach loudspeaker wiring neatly to building structure or other firm support. Allow no loudspeaker wiring to rest on suspended ceiling material or touch any heat sources.
- C. Where conduit or EMT is not indicated on drawings, install cable exposed and supported on J-hooks that maintain proper cable bend radius and prevent kinking or crimping. Do not lay cable directly on ceiling or on floor in under-floor application; secure with hook-and-loop cable wrap; do not secure with tie-wraps.
- D. Use separate wiring pathways for microphone-level circuits (below -20 dBm), video and line-level audio circuits (up to +30 dBm), loudspeaker circuits (above +30 dBm), control circuits, and power circuits. Space all low-voltage pathways far from power circuits per conduit separation distances table shown on drawings.
- E. Do not splice lines in conduit. Use only cables which are insulated from the conduit and from each other for the entire conduit length. Connect each input receptacle by an individual, insulated line to the system equipment rack.
- F. Terminate all conductors. Use appropriate connectors for video cables and for audio cables which mate to equipment connectors. Use appropriately-sized crimp-on spade lugs for unconnectorized audio or remote-control wiring unless conductors are to be inserted into setscrew-type terminal blocks. If conductors are to be inserted into setscrew-type terminal blocks, tightly twist wire strands together.
- G. Adhere to industry standards for wiring terminations, conductor color coding, and connector pin assignments.
- H. Secure equipment firmly in place, including projectors, control panels, loudspeakers, conduit, amplifiers, racks, cables, etc. For all overhead mounted devices, provide secondary attachment to provide support in case of failure of primary support. Make fastenings and supports adequate to support their loads with a safety factor of at least three.
- I. To each accessory or loose piece of equipment (e.g. computer interface, interconnection cable, handheld remote control), permanently affix or attach a machine-printed label or tag showing the item's assigned room name or number, as approved by the Owner, in neat numerals at least 3/8 inch high.
- J. Provide video and audio patch panels with minimum 33% spare capacity (one unused patch panel hole for every three jacks). Fill all unused holes with hole plugs.
- K. Assemble and install equipment racks to permit access to connections and adjustments on rear of rack mounted components and to permit removal of components for servicing. For any

components which, for purposes of adjustment or calibration, must be removed from an equipment rack while in use, provide adequate service loops in all connecting cables.

- L. Install work neatly, with boxes, equipment, etc. plumb and square.
- M. Install the system in cooperation with other trades in order to achieve coordinated progress and satisfactory final results. Watch for conflicts with work of other trades on the job. Execute, without claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or preserve symmetry and a pleasing appearance.
- N. Wire all equipment racks and fabricate all equipment subassemblies at off-site facilities. Fully test all equipment subassemblies before delivery to the jobsite. Limit work at the jobsite to mounting, interconnecting, and system-level testing of equipment.
- O. Certify to the Owner the satisfactory performance of completed equipment assemblies before shipping to the installation site. Permit the Owner or his authorized representative to witness the off-site testing of such equipment assemblies.
- P. Clearly, consistently, logically, and permanently mark switches, connectors, jacks, relays, receptacles, electronic equipment, and other equipment. Engrave and paint-fill all panel and receptacle markings, directly on the material on which controls or receptacles are mounted. Fill engraving with black or white paint, whichever contrasts best with panel finish, or as directed by the Owner's authorized representative. Use no hand-lettering, embossed tape (e.g. Dymo labels), or any adhesive-attached or otherwise mechanically-attached labels for any labels visible to operators or the public during normal operation. Use adhesive-attached or screw-attached engraved labels on manufactured assemblies, such as amplifiers, which would otherwise require disassembly for direct engraving. Use Kroy or similar "letter quality" or "near letter quality" mechanically-produced lettering for patch panel labels. Insert patch panel labels into clear plastic-covered label holders.
- Q. Where data communications cables connect directly to A/V equipment and are concealed from view, affix project standard data jack label to A/V equipment in visible location.
- R. Permanently mark cables with an identifying label within 1-12" of each end, employing a consistent identifying scheme. Use printed adhesive cable markers to mark cables, or other labels intended for the purpose. Allow no un-marked cables in the system.
- S. Install all switching devices and connectors for circuits where hazardous voltages are present within metal enclosures. Provide positive electrical ground for all such enclosures. Provide protective covers, clearly marked to indicate nominal voltage levels, on all terminal strips where such voltages are present.
- T. Exercise care in wiring to avoid damage to cables and other equipment. Maintain bend radius of minimum 10 times cable diameter for all coaxial, multiconductor, and fiber optic cables. Use terminal strips or blocks in all audio and control lines entering or leaving the system equipment rack(s). Make all joints and connections with rosin-core solder or with mechanical connectors appropriate for the application. Execute all wiring installation in strict adherence to standard industry practices.
- U. Provide strain relief for all connections to portable equipment, where those connections are made on terminal blocks, Phoenix connectors, or by similar means without inherent strain relief. Provide similar strain relief to connections within floor boxes where cabling may flex when serviced. Provide this strain relief by mechanically attaching cables to case of equipment. Do not use adhesive-backed plates.



- V. Take precautions to prevent electromagnetic and electrostatic interference.
- W. Install all equipment to provide safe operation.
- X. Provide ventilation as required to maintain equipment within the manufacturer's specified temperature limits.
- Y. Except for coaxial and RF relays, install all relays in sockets or in an otherwise removable manner. Do not solder directly to relay terminals.
- Z. Mount central loudspeaker cluster components using metal supports (3/8" minimum diameter metal rod) such that loudspeakers may be reoriented +/-5 degrees for optimum coverage, but will maintain precise orientation after adjustment. Provide safety cables to prevent individual loudspeaker cluster components from falling in case of failure or loosening of the primary component support. Paint all exposed components as directed by the Owner's authorized representative.
- AA. Ground each audio cable shield at one point and one point only. Terminate shields at the "floating" end with insulating collars or plastic tape. Connect all electronics grounds to a common point on the equipment rack(s). Ground this point and the rack(s) to the building main service ground point using a ground cable sized for a DC resistance of less than 0.1 ohm. For example, for a ground run of 150 ft., use a No. 8 AWG conductor; run ground conductor in conduit. Use "isolated ground" receptacles for all system power. Connect these receptacle grounds together and ground them separately from all other power system grounds to the building main service ground point using a ground cable sized for a DC resistance of less than 0.1 ohm.
- BB. Locate audio, video, control, and other receptacles as directed by the Owner's authorized representative. Except for receptacles mounted in equipment cabinets, in floor boxes, or designated as surface-mounted, flush-mount other receptacles on cover plates in gang boxes recessed in vertical surfaces. Provide plate finish as approved by the Owner's authorized representative.
- CC. Field verify all junction box sizes prior to fabricating cover plates. Except where specifically dimensioned, control and connection plate layouts shown on drawings are not scaled. Size plates as necessary to hide joints and gaps between backboxes and surrounding wall.
- DD. Where cover plates are not fitted with connectors, provide bushed hole(s) through cover plate in sizes and quantities required. Do not allow cables to enter or exit boxes without cover plates installed.
- EE. For all A/V connections provide receptacle plates and panels consistent with architectural specifications. Prior to installation submit to the Architect for approval samples of proposed plates, receptacles, and panels.
- FF. Neatly gather cables exiting at base of lectern, teaching station, or other item of movable furniture. Cover cables with seamless loose fitting sleeve of expanded braided polyester, Alpha Wire GRP-series or similar. Provide harness of length as shown on drawings. Secure at base of furniture with strain relief.
- GG. Paint or provide approved factory finishes for all system components exposed to public view, as directed by the Owner's authorized representative.

- HH. If any item of equipment includes exposed controls which are not used in system operation, and if those controls cannot be locked, capped, or concealed behind a security cover, mount said item of equipment recessed behind a blank rack panel.
- II. Provide interior lighting for all equipment racks. Provide a single 120VAC fixture inside the rack at the top, located to provide general illumination of the rear of all equipment items. Provide a switch for this fixture inside the rack. Equip each rack with a permanently-mounted 3-conductor isolated grounded AC power strip(s) with sufficient outlets to meet system needs plus at least four (4) spares.
- JJ. Provide steel blank and vent panels on all equipment racks to fill any unused rack spaces, per industry best practices for optimizing airflow. Use panels with factory-applied finishes to match the color of the rack itself unless otherwise directed by the Owner's authorized representative.
- KK. Terminate all unused inputs and outputs. Where termination of video signals is required, use terminators specified and set termination switches (if any) on equipment to OFF. On system functional drawings, indicate the locations of all terminators.
- LL. Provide protective flush covers for all floor-mounted connections when not in use.
- MM. Identify all communications systems requiring licensing, including wireless microphones, wireless intercoms, wireless assistive listening systems, microwave transmission systems, and other systems. Initiate the licensing procedure for each such system and identify, in general form, the steps to be followed by the Owner to complete the licensing process. Perform this work in a timely manner so that appropriate licenses are in place at the time of system acceptance by the Owner.
- NN. Save all unused products accessories and turn over to Owner at checkout.

### 3.2 PROTECTION AND REPAIR OF EXISTING FINISHES AND STRUCTURES

- A. Cut and patch all holes required for this installation.
- B. Make good all materials and finishes cut into or damaged during installation.
- C. Maintain clean and safe working conditions. Clean the premises where dirtied, and clean all equipment, removing all dirt, dust, stains, and fingerprints. The Contractor is liable for any damage caused by his employees and subcontractors to the property of others.

### 3.3 ELECTRONIC TEST EQUIPMENT

- A. Provide the following test equipment for use during initial tests and adjustments and during acceptance testing and final adjustment of the systems.
  - 1. Continuously Variable Sine Wave Generator - 20 Hz to 20,000 Hz range within +/-1 dB with less than 0.5% THD at 1 volt output into 600 ohms.
  - 2. AC Voltmeter with frequency response within +/-1 dB from 20 to 20,000 Hz, 0.0001 volts to 100 volts, minimum input impedance 0.1 megohm.
  - 3. Multimeter (VOM) (may be included with AC Voltmeter).
  - 4. Impedance Measuring Device, capable of measuring at 1,000 Hz and within each loudspeaker's passband (at center of passband or at least one octave removed from crossover frequency), minimum range 0 to 1,000 ohms.

5. Light meter, capable of measuring illuminance (footcandles) and luminance (footlamberts).
6. NTSC color video test signal generator, capable of generating SMPTE color bars, multiburst, modulated ramp or staircase, and window signals, and with both composite and Y/C outputs.
7. Wideband video distribution amplifier, one input 3 output (minimum), with frequency response not worse than -3dB at 100 MHz.
8. NTSC color video monitor with blue-only capability.
9. RGB test signal generator, capable of generating the SMPTE RP 133 test pattern over the entire range of horizontal and vertical scan frequencies of video projector(s) specified.
10. RGB test signal generator, capable of generating color bars and white text (or alignment pattern) on black background over entire range of horizontal and vertical scan frequencies of video projector(s) specified. Provide generator with analog RGBHV or VGA output, and with digital HD-SDI and either DVI-D or HDMI output.
11. RGB video monitor capable of 15.75KHz horizontal scan frequency and 60Hz vertical scan frequency.
12. Real Time Audio Analyzer: Shall provide a pink noise generator, a calibrated microphone and graphic representation of the audio spectrum in 1/3-octave increments.
13. Network cable Analyzer: Certification-grade cable analyzer suitable for testing up to TIA Category 6A cable and testing cable length, bandwidth, and attenuation.
14. Fiber Optic Cable Analyzer: Certification-grade optical power and fiber optic test kit suitable for testing fiber length, bandwidth, and attenuation.
15. Connectors, adaptors, cables, etc. to permit flexible interconnection of test equipment and convenient, reliable connection to receptacles, patch panels and amplifier terminal strips.
16. Laptop personal computer with software as required for adjustment of digital equalizers, scan converters, and other devices, and for reprogramming remote control system.
17. Test media for each type of playback device (Blu-Ray, DVD, audio CD, flash media device, etc.) Ensure content is suitable for public presentation and free from license restrictions. Where applicable, also provide blank media for recording.
18. Table to support test equipment at system equipment rack, minimum 30" square. (Required only during acceptance testing.)

- B. In addition to the test equipment identified above, ensure the availability of the manufacturers' product information as well as draft copies of system documentation to support system testing, alignment, and troubleshooting.

### 3.4 SHOP AND FACTORY TESTING

- A. The Audiovisual Contractor shall perform preliminary tests at their shop or factory before the system is shipped to the Owner's site. The Owner's Authorized Representative, Owner's Project Manager, Consultant or other designated representative may be present for these tests. These tests shall include Contractor provided equipment and any Owner provided equipment (equipment that the Owner shipped to the assembly site). The tests shall include equipment provided by other Vendors, if applicable, plus all installation service and materials.

### 3.5 INITIAL POST-COMPLETION TESTS

- A. Perform the following tests upon completion of the installation and before demonstration and acceptance testing with the Owner and the Owner's authorized representative.
- B. Remote Controls

1. Exercise every control pushbutton (physical or virtual) on every unique remote control panel in the system. Ensure system response is as specified, and if not specified, ensure reasonable system response. Ensure control panel tally and status indications as specified and reasonable.
2. Confirm that control system reports true feedback from controlled device where true feedback has been specified.
3. Check for reliable control system operation and freedom from erratic operation and random failures.
4. Confirm that portable wired panels operate at all connection locations. Confirm that wireless panels operate reliably throughout their intended range.
5. Ensure that subsystems properly communicate with each other (e.g. studio to control room, or auditorium to equipment room), and that operation is logical and consistent.
6. Ensure that system control via web browser or mobile device functions properly.

C. Sound Amplification System

1. Test every installed peripheral device and all connection points, and confirm correct input and output cabling and connections. Ensure that signals applied to input connection points reach mixing and amplification equipment, and that signals reach all output devices. Ensure proper stereo separation and polarity.
2. Set system gain structure for optimal signal to noise ratio. Match levels of like devices throughout the system. Ensure noise-free operation at all levels of amplification.
3. Ensure proper response of system volume controls. Set levels so that system cannot be driven into feedback, and that normal operating levels are established with volume controls at mid-range.
4. Set equalization, compression/limiting, delay, and other processing parameters to meet intended system functioning.
5. Test for correct operation of matrix mixers, reconfigurable signal processing devices, and other system elements during changes in system operating modes. Ensure that signal routing is properly set for each operating mode.
6. Test every patch point on system patch panels for correct wiring and labeling. Ensure that patch normalling is as specified.
7. Make test recordings on all recording devices. Playback these recordings and confirm recording signal quality.

D. Video System

1. Test every input device and connection, every output device and connection, and all intermediate switching and processing, and ensure proper signal paths. Ensure no cross-connection of channels in component systems.
2. Using standard reference signals, ensure proper image quality on all displays. Confirm the absence of smearing, streaking, dropouts, noise, or other visible errors. Confirm proper setup and communication of display identification data (EDID) and digital rights management (HDCP) parameters.
3. Ensure proper management and display of analog signals. Ensure that displays properly synchronize to applied computer sources, without shifts in position or brightness. Test over the full range of frequencies for which the display is designed.
4. Confirm proper image alignment for projectors. Confirm correct aspect ratio, center and corner focus, legibility, image size, image height above floor, and grey scale tracking.
5. Adjust gains through switchers and processing devices so that a given signal traveling through different signal paths shows imperceptible differences between paths. Likewise ensure color and brightness matching of adjacent displays where applicable.

E. Category Cabling

1. Verify that all jacks have been terminated properly and conform to ANSI/TIA/EIA-568-C.

2. Provide list of cable runs each with associated bandwidth and length information, as well as pass/fail for ANSI/TIA/EIA-568-C compliance.
- F. Fiber Optic Cabling
  1. Verify that all jacks have been terminated properly and conform to ANSI/TIA/EIA-568-C and related ANSI/TIA/EIA fiber optic standards.
  2. Provide list of fiber runs each with associated bandwidth and length information, as well as pass/fail for ANSI/TIA/EIA-568-C compliance.
- G. 75 Ohm Coax Video Cabling
  1. Verify that all jacks have been terminated properly and meet SMPTE SDI, HD-SDI, and 3G-SDI standards 259M, 274M, 292M, 296M, 344M, 327M, and 424M.
  2. Provide list of cable runs each with associated bandwidth and length information, as well as pass/fail for SMPTE SDI, HD-SDI, and 3G-SDI standards 259M, 274M, 292M, 296M, 344M, 327M, and 424M.
- H. General
  1. Physically inspect the system for completeness and workmanship. Ensure that specified labeling has been applied.
  2. Ensure that the preparation of final documentation is underway, and that draft copies are available at the jobsite.
  3. Ensure all loose and portable equipment has been delivered or otherwise accounted for.
- I. Summary Tests
  1. Review system functional description, and ensure that all specific system requirements can be met.
- J. Report
  1. Upon completion of the above tests, submit written certification that the installation conforms to the requirements stated herein, is complete in all respects, and is ready for inspection and testing by the Owner's authorized representative.

### 3.6 DEMONSTRATION AND ACCEPTANCE TESTING

- A. Conduct tests to establish to the satisfaction of the Owner and the Owner's authorized representative that the system performs as required. Before beginning the acceptance testing, have reasonable assurance that such testing shall produce satisfactory results. Conduct testing in the presence of the Owner's authorized representative as well as the Owner, Architect, and General Contractor at their option, at a time mutually agreed to by all parties.
- B. Under the direction of the Owner's authorized representative, conduct tests as outlined below. Furnish any and all equipment and media necessary to perform these tests, and furnish evidence of proper calibration of all test equipment. Provide technical staff (system programmer, DSP programmer) to assist.
  1. System Performance Tests. Conduct spot checks of system performance to ensure performance requirements (Paragraph 1.20 of this Section) are met. Perform such tests as necessary to establish confidence that spot test results are representative of system performance as a whole.
  2. Operating Tests. Include tests to verify that system functional requirements (Paragraph 1.18 of this Section) are met, and that user controls operate properly.

3. Equipment Tests. Confirm the proper functioning of significant equipment items, and confirm required system control over these items.
  4. Final Adjustments. Make control adjustments as directed by the Owner's authorized representative. Provide covers, caps, or shaft-locks for controls not used in system operations. Make a record of these control settings for inclusion with the final documentation.
  5. Listening and Viewing Tests. Include subjective evaluations by persons listening and viewing from various positions under various operating conditions. Conduct such tests to verify system functioning under normal operating conditions.
- C. If the need for adjustment or modification becomes evident during testing, either continue testing, or interrupt testing to permit corrective action, as directed by the Owner's authorized representative. Perform retesting following any corrective action to the extent directed by the Owner's authorized representative.
- D. In addition to Contractor-directed testing, assist as required with specific testing as conducted by the Owner's authorized representative.

## APPENDIX A – Touch Screen Control Panel Pages Functional Requirements

### A.1 AUDITORIUM TOUCH SCREEN CONTROL PANEL PAGES

- A. Splash Screen w/ school supplied logo image
  - 1. Display message indicating current operating mode with request for user to confirm continuing in current mode or to change operating modes.
  - 2. Presentation Mode Changes:
    - a. Video Presentation
      - 1) Power on video projector
      - 2) Deploy projection screen
      - 3) Mute audio mixing console inputs
      - 4) Unmute microphone inputs
  - 3. Production Mode
    - a. Mute automatic mixer output within audio DSP
    - b. Unmute mixing console inputs
- B. Video Presentation and Production Mode Home Page buttons and functions
  - 1. Projection Screen Source Selection
    - a. Sources on left hand side of page
    - b. Source Buttons
      - 1) Computer HDMI inputs fly-out menu button
      - 2) Blu-ray Player
      - 3) Wireless Presenter
      - 4) Pan/Tilt/Zoom camera
    - c. Video preview window in center of screen
      - 1) Send to Video Projector button
        - a) Route selected source to video projector
  - 2. Audio Source Selection fly-out menu button
  - 3. Active video projector source indication
  - 4. Playback Controls fly-out menu button
  - 5. Playback controls of active playback device in center of screen, when applicable
  - 6. Video projector mute toggle button
  - 7. Camera Controls Page button
  - 8. Advanced Controls Page button
  - 9. Speech and Program volume/mute controls on right hand side of page (greyed out in Production Mode)
  - 10. Lighting Controls Quick Access Presets Banner
    - a. Quick access presets across top of screen
      - 1) Full Lighting
      - 2) Presentation
      - 3) All Lighting Presets (Lighting Controls Page button)
- C. Computer HDMI inputs fly-out menu

1. Auditorium floor plan with graphic representation of:
  - a. All input locations
  - b. Locations w/ connected devices
  - c. Locations w/ connected device actively routed to projection screen
  - d. Source Locations
    - 1) Stage Apron Left HDMI
    - 2) Stage Apron Right HDMI
    - 3) Mid Aisle HDMI
    - 4) Control Room HDMI
    - 5) Control Room HDMI Rack Panel
  - e. Touch sensitive selection of floor plan input location graphics described above
- D. Audio Source Selection fly-out menu
  1. Follow projector source (default)
  2. Stage Rack CD Player
  3. Stage Rack Bluetooth
  4. Stage Rack 3.5mm
  5. Stage Rack RCA
- E. Playback Controls fly-out menu
  1. Stage Rack Blu-ray player
    - a. Transport controls, disc menu, player menu setup, return, menu navigation
  2. Stage Rack CD player
    - a. Transport controls – play/pause, fast forward, fast reverse, stop, eject disc
- F. Camera Controls Page buttons and functions
  1. Camera video preview in center of screen
  2. Pan and tilt arrow pad controls, high and low speed settings
  3. Zoom in/out controls, high and low speed settings
  4. Camera preset selection (8 presets)
  5. Press and hold storing of camera presets
- G. Advanced Controls Page buttons and functions
  1. Do Not Disturb toggle button
    - a. Mute all pages except emergency page
  2. Lobby Chime button
    - a. Trigger audience recall chime.
  3. Video Projection Controls Page button
  4. Advanced Audio Controls Page button
  5. Control Room Preview monitor source selection fly-out menu button
  6. Advanced Video Routing Page Button
- H. Control Room Preview monitor source selection fly-out menu



1. Default – preview monitor follows projector
  2. Break-away option – route any source to preview monitor
    - a. Fly-out routing menu
    - b. See source list above
  3. Indication of which source has been routed to preview monitor
- I. Video Projection Controls Page buttons and functions
1. Video Projector
    - a. Power on/off
    - b. Reset to saved settings
    - c. Light engine hour usage readout for projector
    - d. Video projector mute toggle button
  2. Projection Screen
    - a. Up, down, stop
- J. Advanced Audio Controls Page buttons and functions
1. Individual microphone level and muting controls for all automatic mixer microphone inputs
  2. Muting and unmuting of loudspeaker groups (default is all zones unmuted)
    - a. Central Cluster Loudspeakers on/off
    - b. Side-Fill Loudspeakers on/off
    - c. Front-Fill Loudspeakers on/off
    - d. Rear-Fill Loudspeakers on/off
    - e. Subwoofer System on/off
    - f. Lobby Loudspeakers on/off
  3. Lobby Volume/Mute Control
    - a. Default muted at system startup
  4. Backstage Monitoring Volume/Mute Control
    - a. Default muted at system startup
  5. Aux-Fed Sub on/off
    - a. Default off at system startup
  6. Analog Mixing Console Inputs on/off
    - a. Re-route audio DSP to use analog mono/left/right inputs in place of digital mixing console mono/left/right signals when selected.
    - b. Default off at system startup
- K. Advanced Routing Page buttons and functions
1. Full access to all inputs and outputs with matrix switcher style source/destination/take sequence
  2. Option for audio breakaway
- L. Lighting Controls Page

1. Eight presets
2. Push and hold preset selection button to rename preset with soft keyboard entry

M. All Pages

1. Mode description at top of page
2. Speech and Program volume/mute controls on right hand side of page (greyed out in Production Mode)
3. Back button
4. Exit button

N. Additional functions, pages, and buttons per functional diagrams

APPENDIX B - Sample Software License

A. License Grant

1. (Vendor) hereby grants a license for use of the software described above. Use of this software is limited to the specific room(s) and/or contract(s) listed and subject to the terms listed below.
2. The Software may be used only in the specific locations defined in the above mentioned project and may not be ported to other locations or systems without the express written consent of (Vendor.)

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2. All stated or implied Warranties regarding the Software are considered null and void if the Software is modified by entities other than (Vendor) or its assigns. No reimbursement for pre-paid warranty or service contracts will be due.

E. Transfer

1. This license will automatically terminate upon the disassembly of the System cited above, unless the System is reassembled in its original configuration in another location.

F. Termination

1. (Vendor) may terminate this license upon notice for failure to comply with any of these License Terms. Upon termination, you must immediately destroy all forms of the Software, together with all copies and/or modifications.

G. Indemnity

1. If any or all parts of these Terms are breached, the Licensee agrees to pay indemnity to (Vendor) in an amount commensurate with the development costs of the Software as determined by (Vendor.)

Licensee: \_\_\_\_\_

Signed: \_\_\_\_\_

Specific Location: \_\_\_\_\_

Date: \_\_\_\_\_

END OF SECTION 27 41 16

AV SHEET LIST	
SHEET NUMBER	Sheet Title
AV0.00	AV LEGEND, KEYS, AND CONDUIT RISER
AV1.01	AV PLAN, AUDITORIUM FIRST FLOOR
AV1.01A	AV PLAN, AUDITORIUM FIRST FLOOR, DETAIL
AV1.02	AV PLAN, AUDITORIUM SECOND FLOOR
AV1.02A	AV PLAN, AUDITORIUM SECOND FLOOR, DETAIL
AV1.03	AV PLAN, TV STUDIO SECOND FLOOR
AV2.01A	AUDITORIUM AV SYSTEM, FIRST & SECOND FLOOR, PLANS
AV2.01B	AUDITORIUM AV SYSTEM, FIRST & SECOND FLOOR, DETAILS
AV2.01C	AUDITORIUM AV SYSTEM, FIRST & SECOND FLOOR, DETAILS
AV3.00	AUDITORIUM AND TV STUDIO AV SYSTEM DEVICE KEYS
AV3.01	AUDITORIUM AV FUNCTIONAL DIAGRAM 1
AV3.02	AUDITORIUM AV FUNCTIONAL DIAGRAM 2
AV3.03	AUDITORIUM AV FUNCTIONAL DIAGRAM 3
AV3.04	AUDITORIUM AV FUNCTIONAL DIAGRAM 4
AV4.01	TV STUDIO AV FUNCTIONAL DIAGRAM 1
AV4.02	TV STUDIO AV FUNCTIONAL DIAGRAM 2
AV4.03	TV STUDIO AV FUNCTIONAL DIAGRAM 4.13
AV5.01	AUDITORIUM & TV STUDIO PLATE DETAILS
AV5.02	AUDITORIUM & TV STUDIO RACK ELEVATIONS
AV6.01	AUDITORIUM AV SYSTEM SECTIONS & ELEVATIONS
TL1	THEATRICAL LIGHTING PLAN, FIRST FLOOR
TL2	THEATRICAL LIGHTING PLAN, SECOND FLOOR
TL3	THEATRICAL LIGHTING PLAN, SECOND FLOOR CEILING PLAN
TL4	THEATRICAL LIGHTING CONDUIT RISER
TL5	THEATRICAL LIGHTING ELEVATIONS AND DEMOLITION PLAN
TL6	THEATRICAL LIGHTING DEVICE SCHEDULE
TL7	THEATRICAL LIGHTING PLATE & PANEL DETAILS

CONDUIT DEVICE KEY	
	ONE-GANG ELECTRICAL BOX FOR BASIC MIXER MICROPHONE CONNECTION. MOUNT PER ARCHITECTURAL ELEVATION.
	TWO-GANG ELECTRICAL BOX FOR CAMERA CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.
	ONE-GANG STANDARD ELECTRICAL BOX. PROVIDE FOR CONNECTIONS TO "PAN/TILT/ZOOM" REMOTE VIDEO CAMERA. MOUNT PER ARCHITECTURAL ELEVATION.
	THREE-GANG STANDARD ELECTRICAL BOX. PROVIDE FOR CONNECTIONS TO "PAN/TILT/ZOOM" REMOTE VIDEO CAMERA. MOUNT PER ARCHITECTURAL ELEVATION.
	6"x6"x24" LONG WIREWAY WITH SCREW COVER, SURFACE-MOUNTED ON WALL ABOVE EQUIPMENT RACK. FOR CONNECTION TO AUDIOVISUAL EQUIPMENT RACK.
	FRONT FILL LOUDSPEAKER. STUB CONDUIT INTO CAVITY ROUGHED IN BEHIND FASCIA OF STAGE APRON.
	4" SQUARE STANDARD ELECTRICAL BOX WITH SCREW COVER SURFACE-MOUNTED AT CEILING ABOVE CENTRAL LOUDSPEAKER CLUSTER. FOR WIRING TO CENTRAL CLUSTER LOUDSPEAKERS.
	4" SQUARE STANDARD ELECTRICAL BOX WITH SCREW COVER SURFACE-MOUNTED AT CEILING ABOVE LEFT AND RIGHT STEREO LOUDSPEAKERS. FOR WIRING TO LEFT AND RIGHT STEREO LOUDSPEAKERS.
	TWO-GANG ELECTRICAL BOX FOR STAGE MANAGER. MOUNT ON TOP STAGE MANAGER DESK.
	SEVEN-GANG 3-5/8" DEEP STANDARD ELECTRICAL BOX WITH SCREW COVER FLUSH-MOUNTED IN MILLWORK KNEE WALL AT PROJECT RECEPTACLE HEIGHT. FOR DIGITAL AUDIO MIXING CONSOLE CONNECTION PANEL.
	EXISTING ONE-GANG ELECTRICAL BOX FOR PROJECTION SCREEN LOW-VOLTAGE CONTROL CONNECTION.
	ONE-GANG ELECTRICAL BOX FOR HANGING MICROPHONE CONNECTION LOCATED AT CATWALK.
	EXISTING CEILING-MOUNTED LOUDSPEAKER.
	THREE-GANG ELECTRICAL BOX FOR TOUCH CONTROL PANEL. MOUNT AT PROJECT SWITCH HEIGHT.
	UNDER BALCONY LOUDSPEAKER, SURFACE MOUNTED.
	ONE-GANG ELECTRICAL BOX FOR LOUDSPEAKER ATTENUATOR. MOUNT AT WALL AT PROJECT SWITCH HEIGHT.
	TWO-GANG ELECTRICAL BOX FOR VIDEO PROJECTOR CONNECTIONS. FLUSH-MOUNT AT PROJECTOR LOCATIONS.
	ONE-GANG ELECTRICAL BOX FOR WIRELESS MICROPHONE SYSTEM ANTENNA.
	EXISTING 3-GANG ELECTRICAL BOX WITH FOUR MICROPHONE INPUTS, AN INTERCOM OUTPUT, AND AN SDI CONNECTION.
	EXISTING CONTROL ROOM MIXER LOCATION. DETERMINE SIZE FROM FIELD CONDITIONS.
	12"x12"x4" ELECTRICAL BOX AT STAGE RIGHT FOR AV CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.
	FOUR-GANG ELECTRICAL BOX AT STAGE RIGHT FOR AV CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.
	FIVE-GANG ELECTRICAL BOX AT STAGE APRON FOR AV AND CAMERA CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.
	FOUR-GANG ELECTRICAL BOX FLUSH-MOUNTED FOR AV CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.
	FOUR-GANG ELECTRICAL BOX FLUSH-MOUNTED FOR AV CONNECTIONS. MOUNT PER ARCHITECTURAL ELEVATION.

CONDUIT DEVICE AND EQUIPMENT RACK KEY	
	DESIGNATES WALL MOUNT DEVICE
	LOCATION INDICATOR
	RACK IDENTIFIER
	TYPE OF SYSTEM SERVED
	RACK MOUNTING TYPE

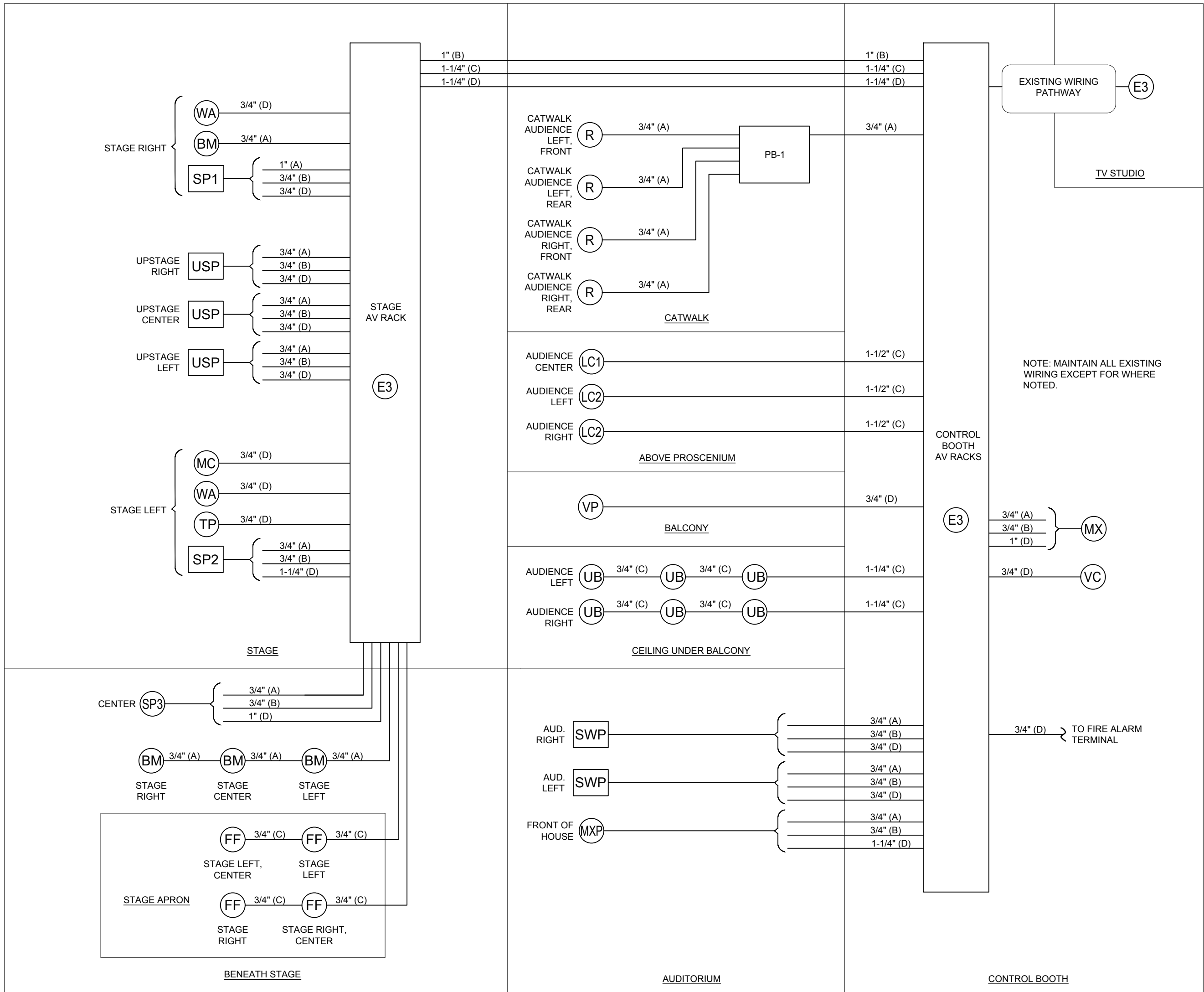
DRAWING NOTES	
1.	ALL CONDUIT TO BE FERROUS METAL (E.G., STEEL). ALL CONDUIT IN PLENUM SPACES TO BE RIGID STEEL.
2.	ALL CONDUIT TO BE 3/4" DIAMETER UNLESS OTHERWISE NOTED.
3.	CONDUIT RUN IN AND BELOW CONCRETE SLABS TO BE PVC COATED STEEL.
4.	RUN HOME RUNS TO JUNCTION BOXES) UNLESS STUB-UP IS SPECIFICALLY CALLED OUT.
5.	INTERMEDIATE MARSHALLING BOXES FOR THE GROUPING OF HOME RUN CONDUITS ARE ACCEPTABLE. CONTRACTOR RESPONSIBLE FOR MAINTAINING CONDUIT CAPACITY AND PULL BOX SIZE. USE 30% FILL FOR CONDUIT SIZE CALCULATIONS.
6.	ON CATWALKS AND GALLERIES SURFACE MOUNT OR PIPE MOUNT DEVICES AS FIELD CONDITIONS DICTATE.
7.	FOR RECESS-MOUNTED GANG BOXES USE RACO 3/4" DEEP STEEL BACK BOXES OR EQUAL.
8.	FOR ALL SURFACE AND PIPE MOUNTED ELECTRICAL GANG BOXES USE FSR 5MMVB SERIES. LEVITON BKBOX SERIES SURFACE MOUNT POWDER-COATED STEEL BOX OR EQUAL BY ELECTRONIC THEATRE CONTROLS. COLOR TO MATCH FACEPLATE.
9.	USE SEPARATE STEEL CONDUITS FOR MICROPHONE-LEVEL CIRCUITS (BELOW -20 DBM), LINE-LEVEL CIRCUITS (UP TO +30 DBM), LOUDSPEAKER CIRCUITS (ABOVE +30 DBM), CONTROL CIRCUITS, DATA CIRCUITS, VIDEO CIRCUITS AND POWER CIRCUITS. USE AUDIO CONDUIT THAT IS SPACED AT LEAST 12 INCHES AWAY FROM POWER CONDUIT. INSULATE ALL CONDUIT FROM THE EQUIPMENT RACK(S). GROUND CONDUIT ONLY TO POWER SYSTEM GROUND. DO NOT SPLICE LINES IN CONDUIT. CONNECT EACH INPUT RECEPTACLE BY AN INDIVIDUAL, INSULATED LINE TO THE SYSTEM EQUIPMENT RACK.
10.	CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL DIMENSIONS AND CONDUIT SIZE.
11.	PROVIDE ALL EMPTY CONDUITS WITH PULL-STRINGS.
12.	PROVIDE PULL BOX AFTER 180 DEGREES OF CONDUIT BEND.
13.	ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER AUDIOVISUAL DRAWINGS FOR DEVICE LOCATION AND ELEVATION.
14.	SPECIALTY BACK BOX PROVIDERS:
FSR, INC.	MYSTERY ELECTRONICS, LLC
244 BERGEN BOULEVARD	6438 MORTON ROAD
WOODLAND PARK, NEW JERSEY 07424	GREENBRIER, TENNESSEE 37073
973.785.4347	800.798.2256
ACE BACKSTAGE CO., INC.	
24946 AVENUE ROCKEFELLER, SUITE 200	
VALENCIA, CALIFORNIA 91355	
661.295.5760	

ELECTRICAL DEVICE KEY	
GENERAL NOTE: SUBSCRIPT AT RECEPTACLE INDICATES CIRCUIT ASSIGNMENT; DO NOT SHARE CIRCUITS BETWEEN ROOMS, AND DO NOT SHARE WITH OTHER LOADS UNLESS INDICATED. WHERE CIRCUIT ASSIGNMENT IS INDICATED, FEED CIRCUITS WITHIN A ROOM FROM A COMMON PANEL AND FROM A COMMON PHASE IN THAT PANEL. WHERE SUBSCRIPT NOT SHOWN, ASSIGN CIRCUITS PER CODE REQUIREMENTS.	
	DUPLEX 120VAC 20A ISOLATED GROUND RECEPTACLE FLUSH MOUNTED IN WALL AT STANDARD RECEPTACLE HEIGHT UNLESS OTHERWISE INDICATED. CIRCUIT AS INDICATED IN NOTE ABOVE.
	DUPLEX 120VAC 20A ISOLATED GROUND RECEPTACLE MOUNTED FLUSH IN CEILING OR FLOOR. CIRCUIT AS INDICATED IN NOTE ABOVE.
	FLEXIBLE CONNECTION TO 120VAC SERVICE. CIRCUIT PER CODE REQUIREMENTS.
	PROJECTION SCREEN SWITCH, FURNISHED WITH PROJECTION SCREEN, AT STANDARD SWITCH HEIGHT UNLESS OTHERWISE NOTED.
	CONDUIT STUB ABOVE CEILING IN ACCESSIBLE LOCATION.
	SINGLE CONDUIT SLEEVE THROUGH WALL ABOVE CEILING, SIZE 2" UNLESS OTHERWISE NOTED.
	L5-20 TWIST-LOCK 120VAC 20A ISOLATED GROUND RECEPTACLE. MOUNT AND CIRCUIT AS INDICATED IN TABLE ABOVE.

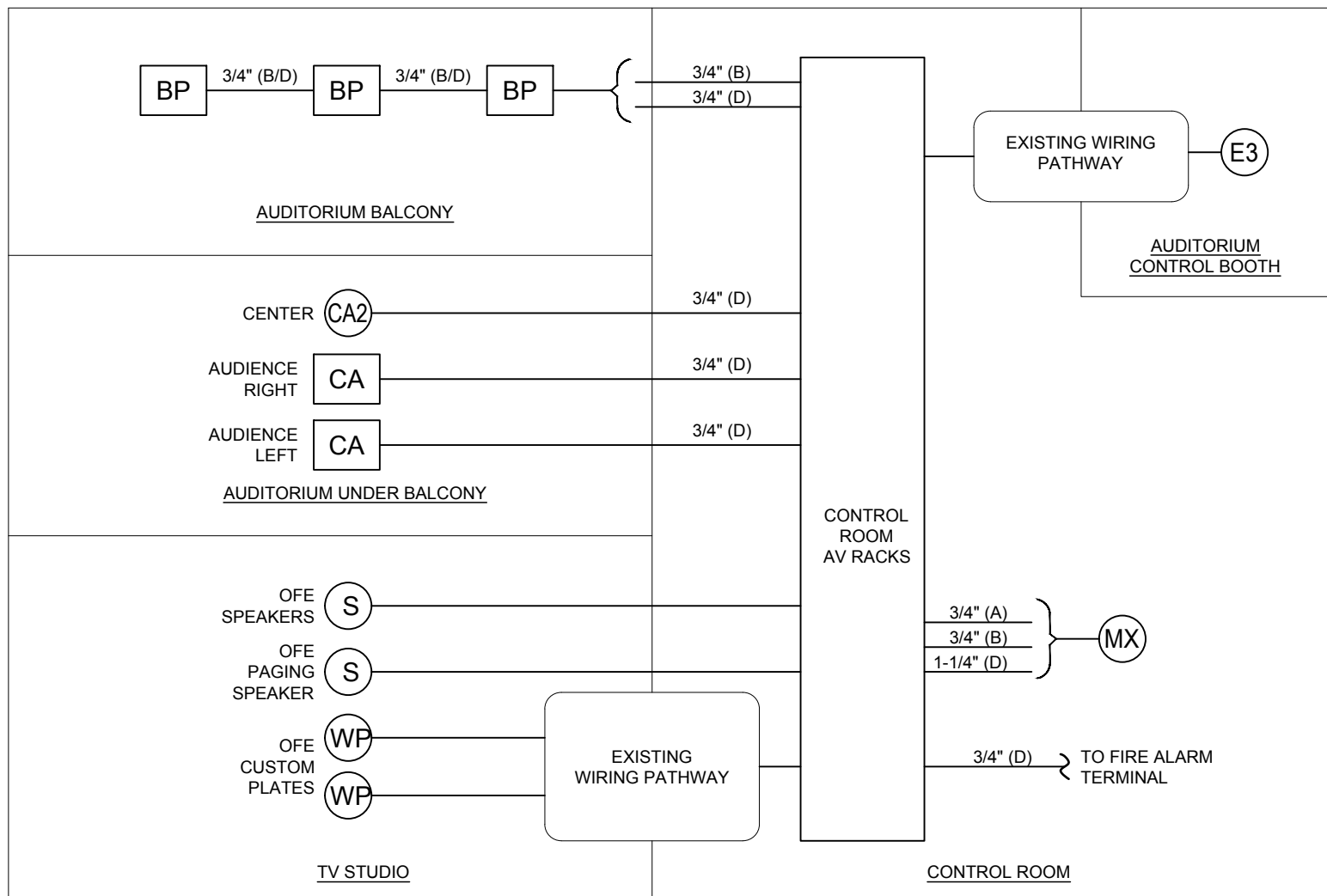
PLAN SYMBOLS LIST	
	VIDEO CAMERA WALL MOUNTED
	"N" INDICATES NETWORK CAMERA
	"P" INDICATES PRODUCTION CAMERA
	"V" INDICATES VIDEO CONFERENCE CAMERA
	VIDEO CAMERA CEILING MOUNTED
	"N" INDICATES NETWORK CAMERA
	"P" INDICATES PRODUCTION CAMERA
	"V" INDICATES VIDEO CONFERENCE CAMERA
	CEILING MOUNTED VIDEO/DATA PROJECTOR
	LCD FLAT PANEL VIDEO MONITOR
	"XX" INDICATES NOMINAL DIAGONAL SIZE
	"S" (IF PRESENT) INDICATES FLANKING LOUDSPEAKERS
	"T" (IF PRESENT) INDICATES TOUCH INTERACTIVE
	LCD FLAT PANEL TELEVISION, "XX" INDICATES NOMINAL DIAGONAL SIZE
	"CM" (IF PRESENT) INDICATES CEILING MOUNTED
	FUTURE LCD FLAT PANEL TELEVISION
	CEILING MOUNTED ELECTRIC PROJECTION SCREEN, IMAGE HEIGHT AND WIDTH AS INDICATED, BY GENERAL CONTRACTOR
	CEILING MOUNTED MANUALLY OPERATED PROJECTION SCREEN, IMAGE HEIGHT AND WIDTH AS INDICATED, BY GENERAL CONTRACTOR

POWER REQUIREMENT TABLE				
LOCATION	SERVING	RECEPTACLES	20A CIRCUITS	NOTES
AUDITORIUM CONTROL ROOM	EQUIPMENT RACK		1	ADJACENT TO RK DEVICE
AUDITORIUM BALCONY	VIDEO PROJECTOR		1	ADJACENT TO VP DEVICE IN CEILING
AUDITORIUM STAGE MANAGER POSITION	AV EQUIPMENT RACK		4	MOUNT IN BACKPAN OF EQUIPMENT RACK
AUDITORIUM MIX POSITION	AV EQUIPMENT		1	AV CONVENIENCE OUTLETS
AUDITORIUM STAGE	AV EQUIPMENT		1	AV CONVENIENCE OUTLETS ADJACENT TO SP AND USP PANELS AND ALONG UPSTAGE WALL
AUDITORIUM STAGE	AV EQUIPMENT			IN FLOOR BOXES
AUDITORIUM STAGE	PROJECTION SCREEN			FLEXIBLE WHIP TO PROJECTION SCREEN

CONDUIT SEPARATION DISTANCES TABLE				
	GROUP A	GROUP B	GROUP C	GROUP E
GROUP A - ANALOG AUDIO	ADJACENT	6"	18"	12"
GROUP B - LINE	6"	ADJACENT	12"	12"
GROUP C - LOUDSPEAKER	18"	12"	ADJACENT	3"
GROUP D - VIDEO, DATA, & CONTROL	12"	12"	3"	ADJACENT
DIMMED LIGHTING	36"	24"	12"	12"
277V AC CIRCUITS	36"	24"	12"	12"
NON-AV LOW-VOLTAGE	12"	6"	ADJACENT	ADJACENT

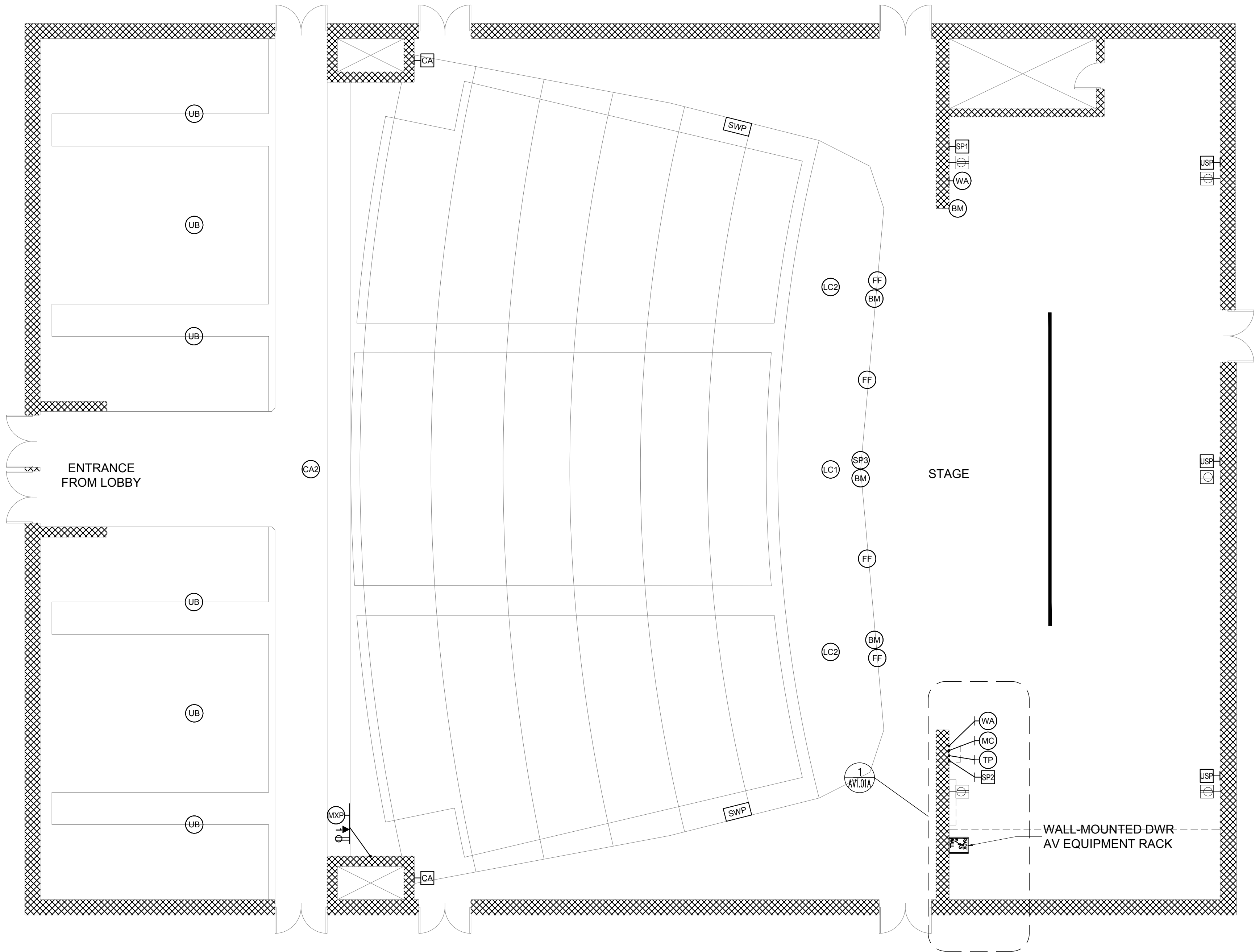


1 CONDUIT RISER DIAGRAM - AUDITORIUM  
NTS



2 CONDUIT RISER DIAGRAM - TV STUDIO  
NTS

CAVANAUGH <span>Tocci</span>		
327 F BOSTON POST ROAD SUDBURY, MA 01776 978.443.7871		
REVISIONS		
NO.	DESCRIPTION	DATE
PROJECT		
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE		
TITLE		
AUDITORIUM SOUND SYSTEM DEVICE KEYS		
PROJECT NUMBER 19014		
DRAWN BY MDB		
SCALE AS NOTED		
DATE 2019.06.10		
AV0.00		



1 AUDIOVISUAL DEVICE PLAN  
1/8" = 1'-0"

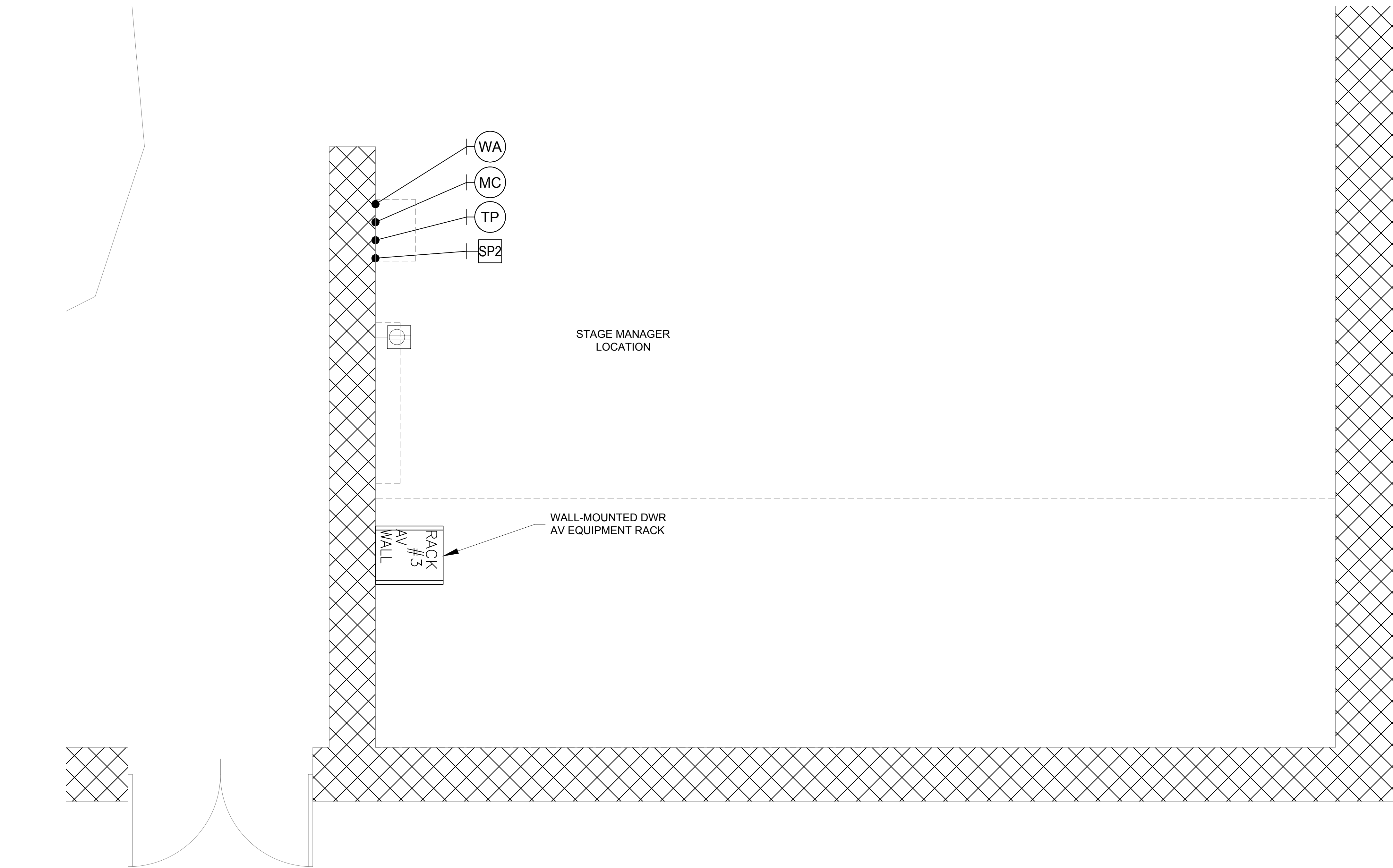
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AV PLAN  
AUDITORIUM  
FIRST FLOOR

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV1.01



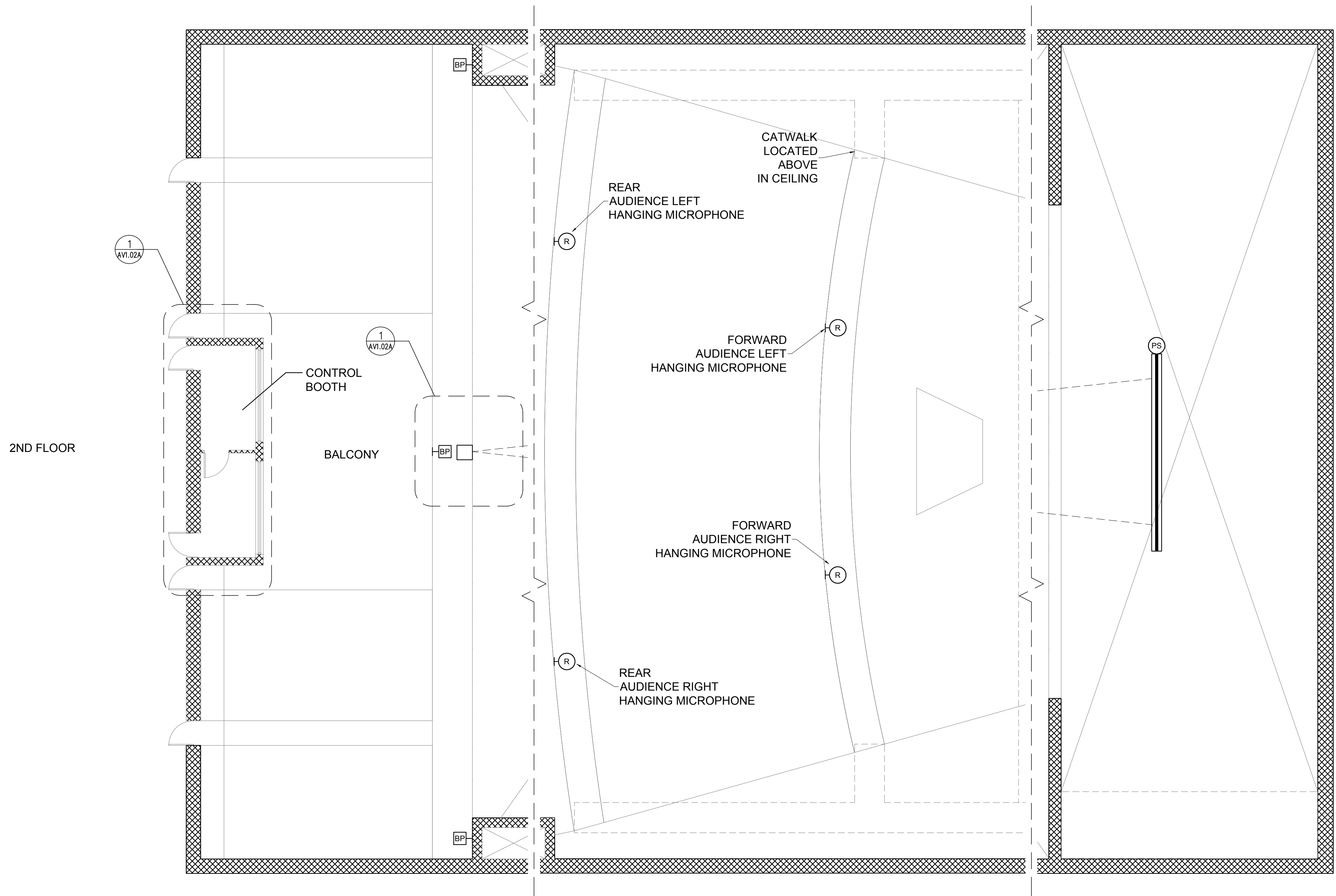
1 AUDIOVISUAL DEVICE PLAN - STAGE MANAGER POSITION, STAGE LEFT  
1/2" = 1'-0"

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE

TITLE
AV PLAN AUDITORIUM FIRST FLOOR STAGE MGMT POSITION

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



1 AUDIOVISUAL DEVICE PLAN - PARTIAL BALCONY  
1/8" = 1'-0"

2 AUDIOVISUAL DEVICE PLAN - PARTIAL CATWALK  
1/8" = 1'-0"

3 AUDIOVISUAL DEVICE PLAN - PARTIAL BALCONY  
1/8" = 1'-0"

REVISIONS		
NO.	DESCRIPTION	DATE

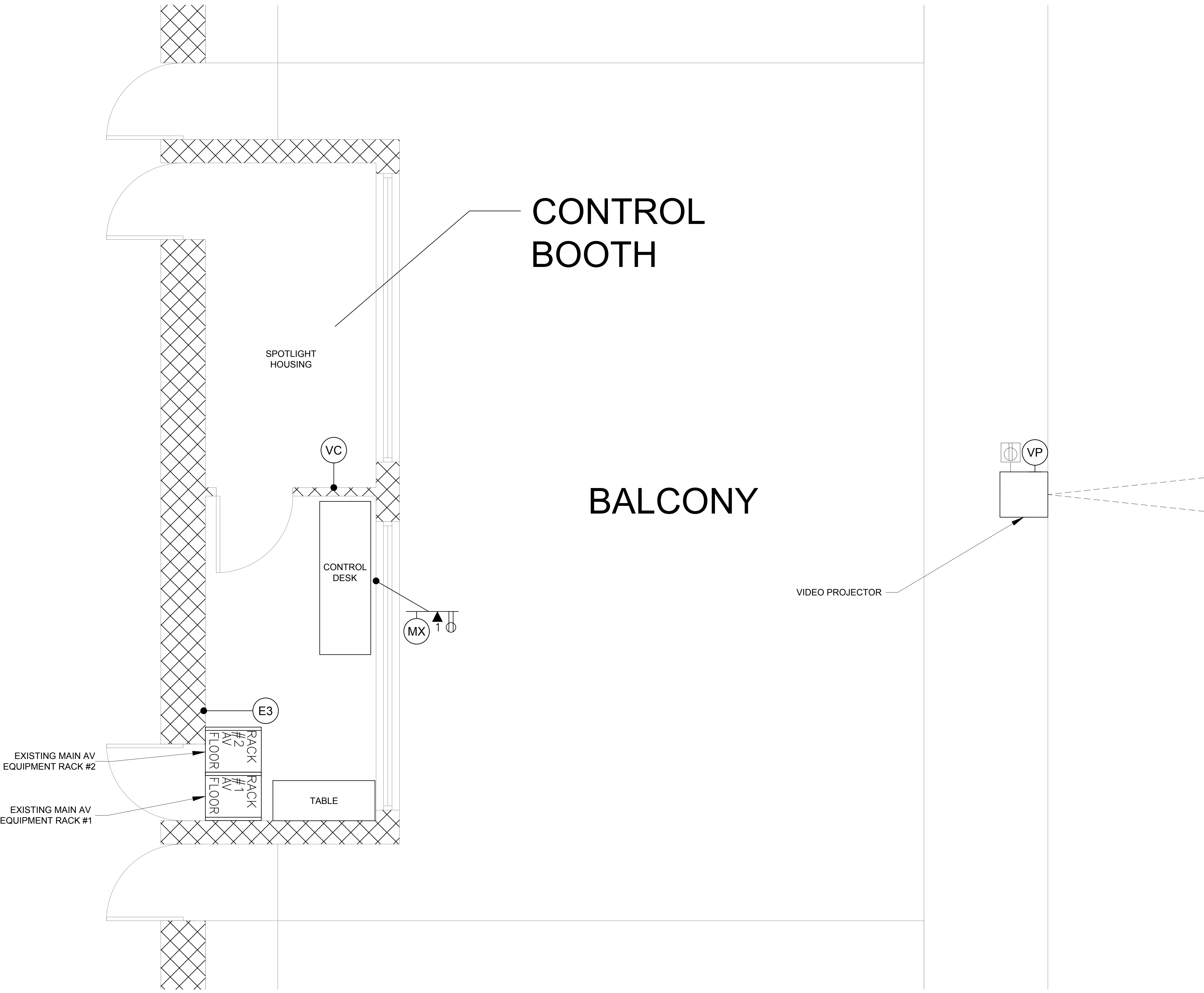
PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AV PLAN  
AUDITORIUM  
SECOND FLOOR

PROJECT NUMBER 19014  
DRAWN BY MDB  
SCALE AS NOTED  
DATE 2019.06.10

AV1.02





1 AUDIOVISUAL DEVICE PLAN - CONTROL ROOM AND BALCONY  
1/2" = 1'-0"

**CAVANAUGH****TOCCI**  
327 F BOSTON POST ROAD  
SUDBURY, MA 01776 978.443.7871

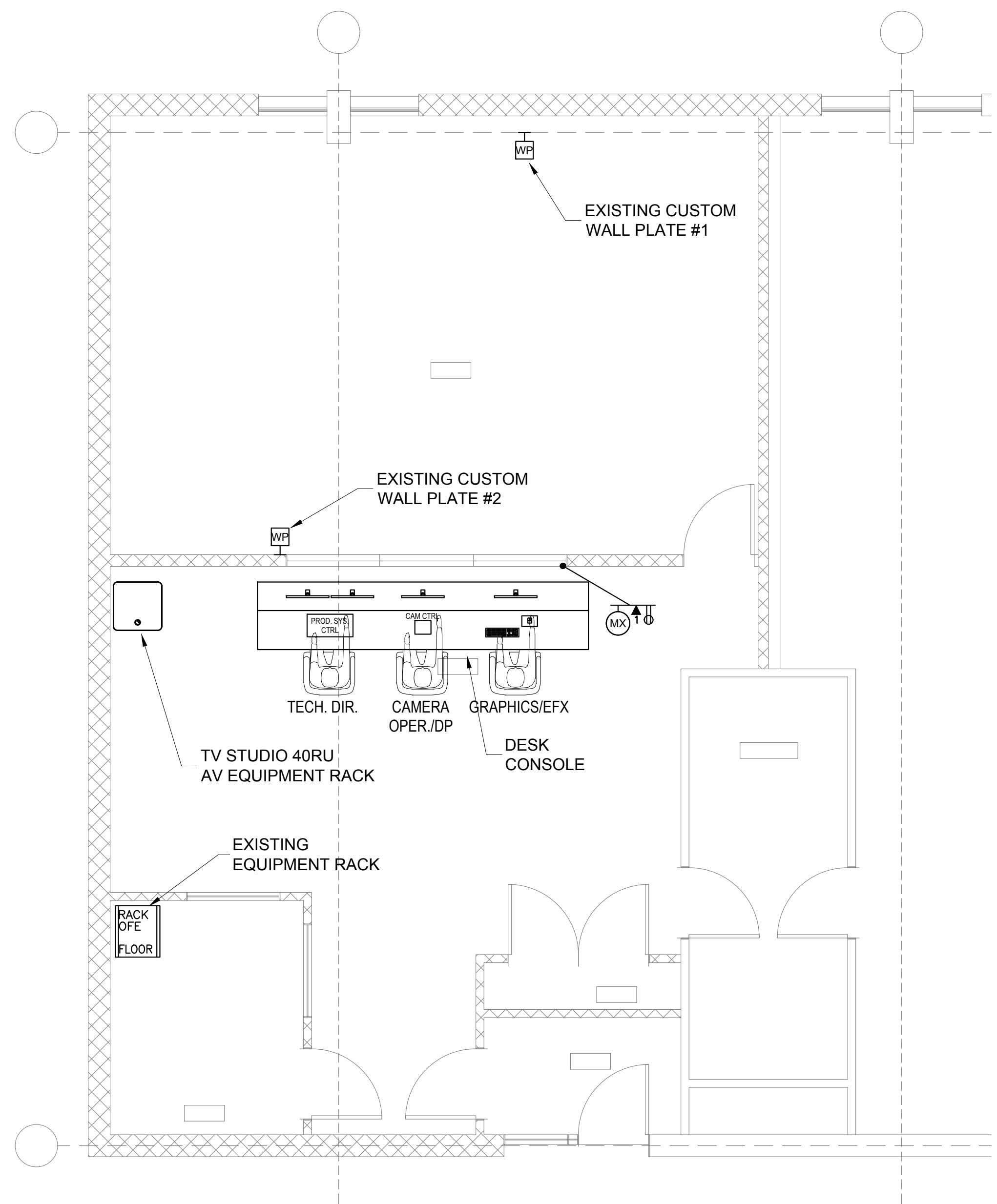
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AV PLAN  
AUDITORIUM  
SECOND FLOOR  
CTRL RM & BALCONY

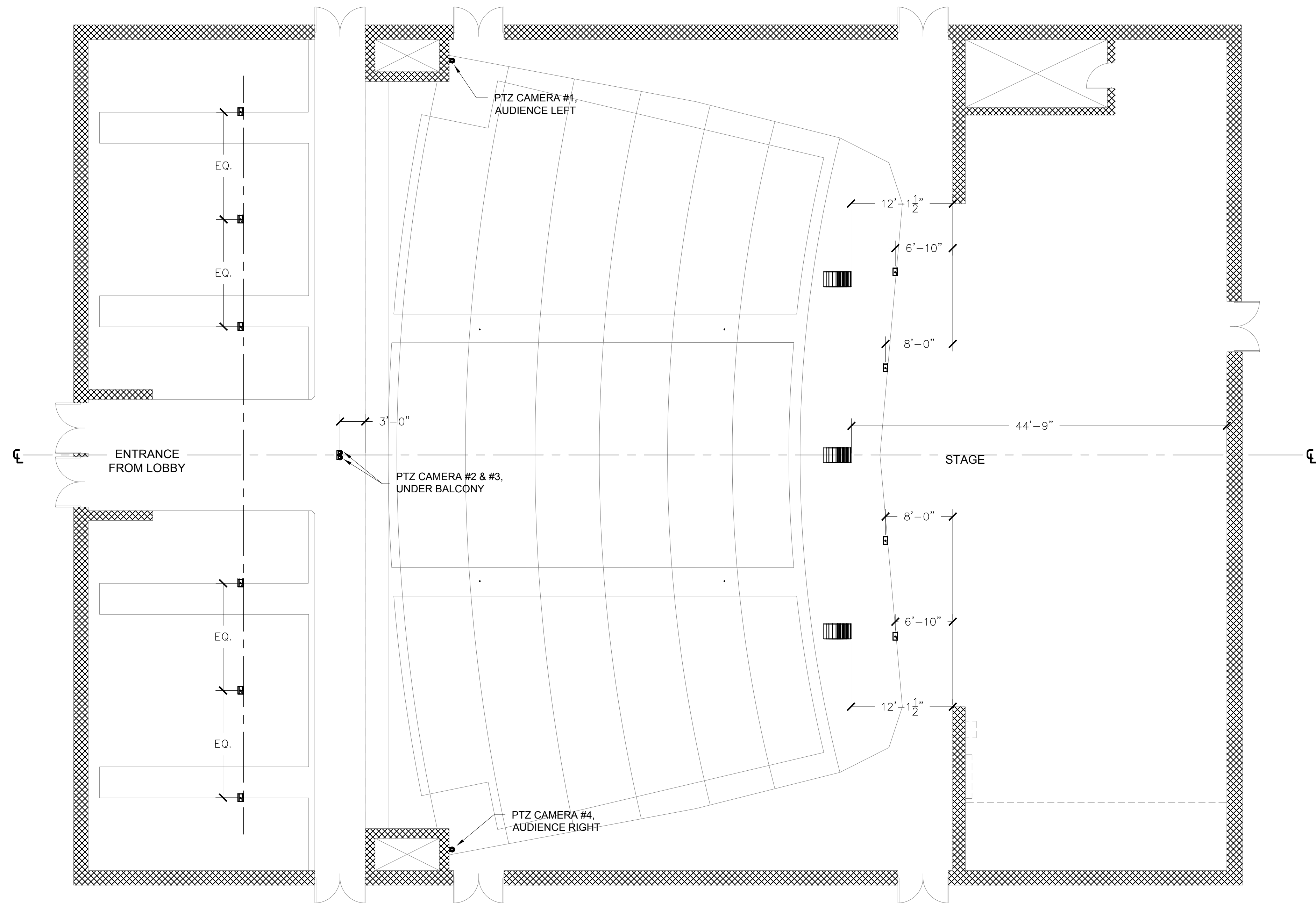
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV1.02A

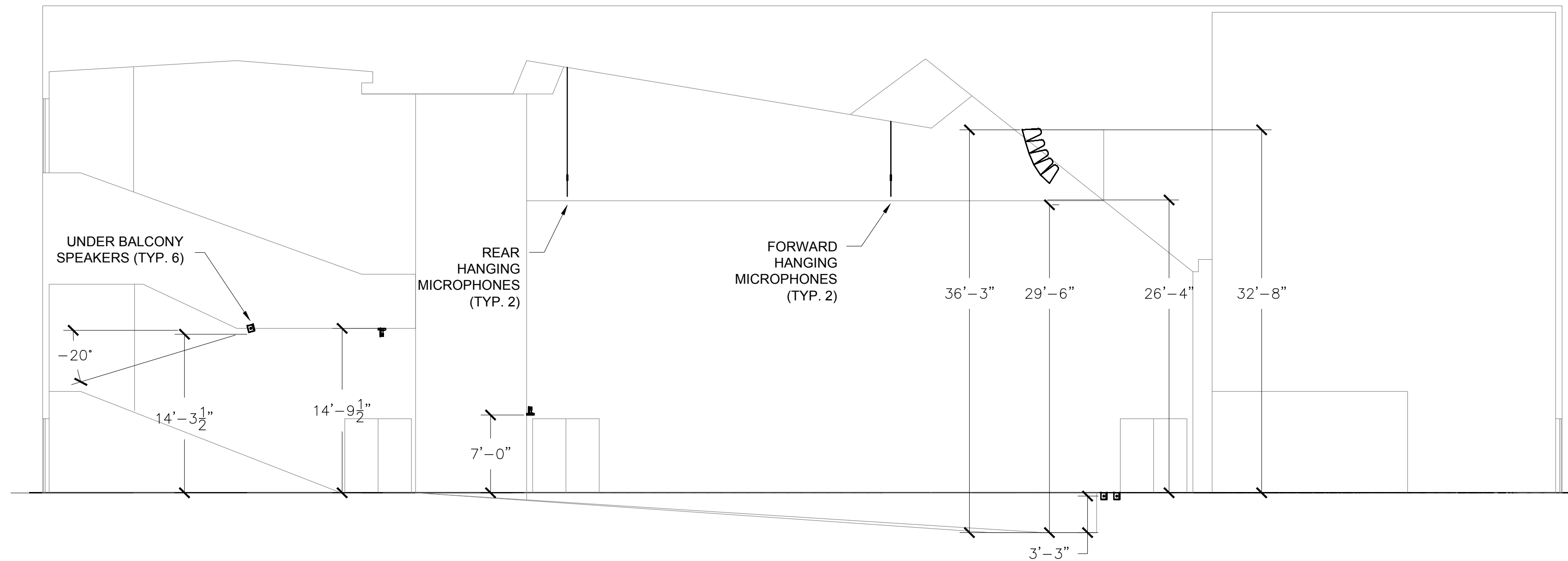


1 AUDIOVISUAL DEVICE PLAN - TV STUDIO  
1/4" = 1'-0"

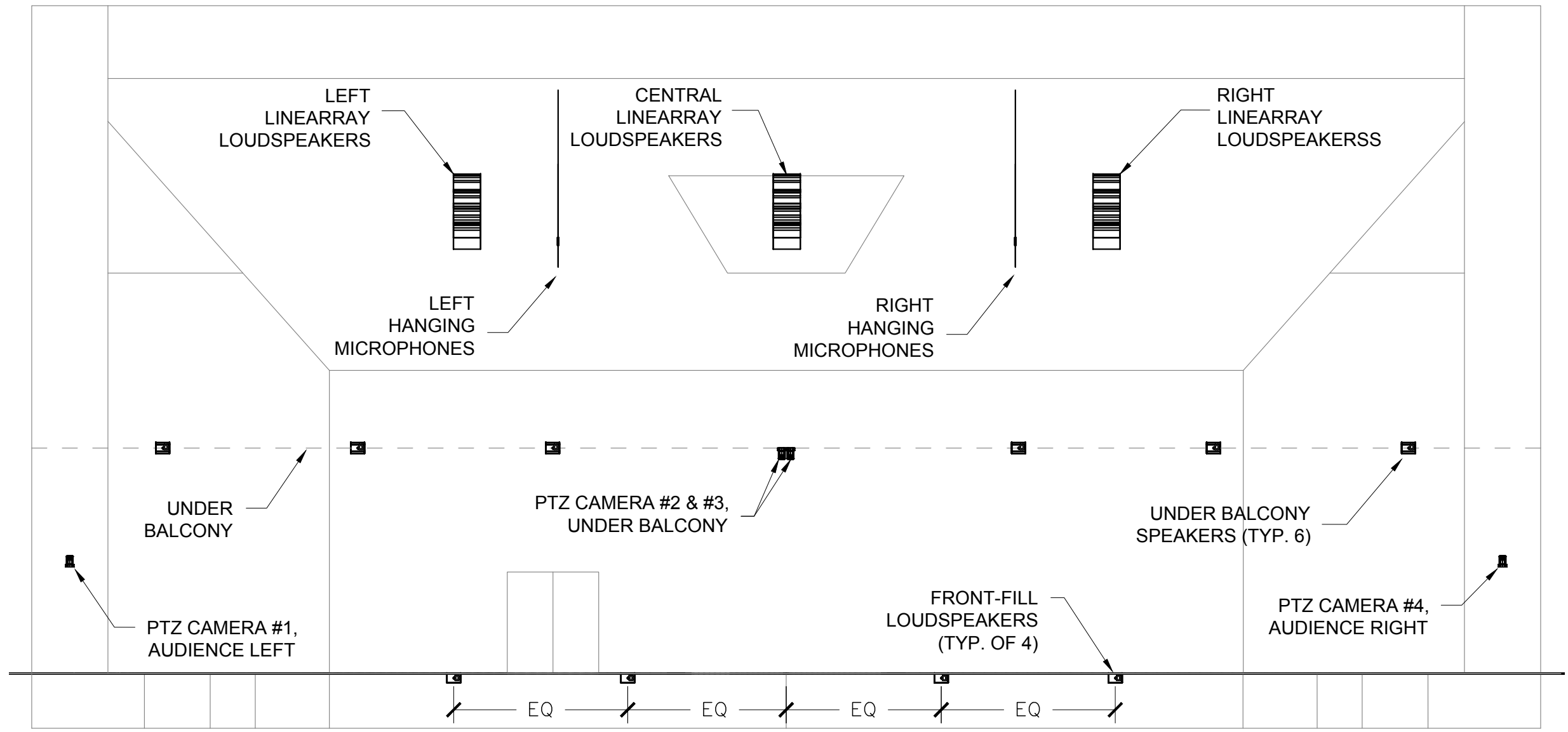
REVISIONS		
NO.	DESCRIPTION	DATE
PROJECT		
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE		
TITLE		
AV PLAN TV STUDIO SECOND FLOOR		
PROJECT NUMBER		19014
DRAWN BY		MDB
SCALE		AS NOTED
DATE		2019.06.10



1 LOUDSPEAKER PLAN  
1/8" = 1'-0"



2 LOUDSPEAKER ELEVATION, WEST  
1/8" = 1'-0"



3 LOUDSPEAKER ELEVATION, NORTH  
1/8" = 1'-0"

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AUDITORIUM AV SYSTEM  
FIRST & SECOND FLOOR  
LOUDSPEAKER  
PLAN

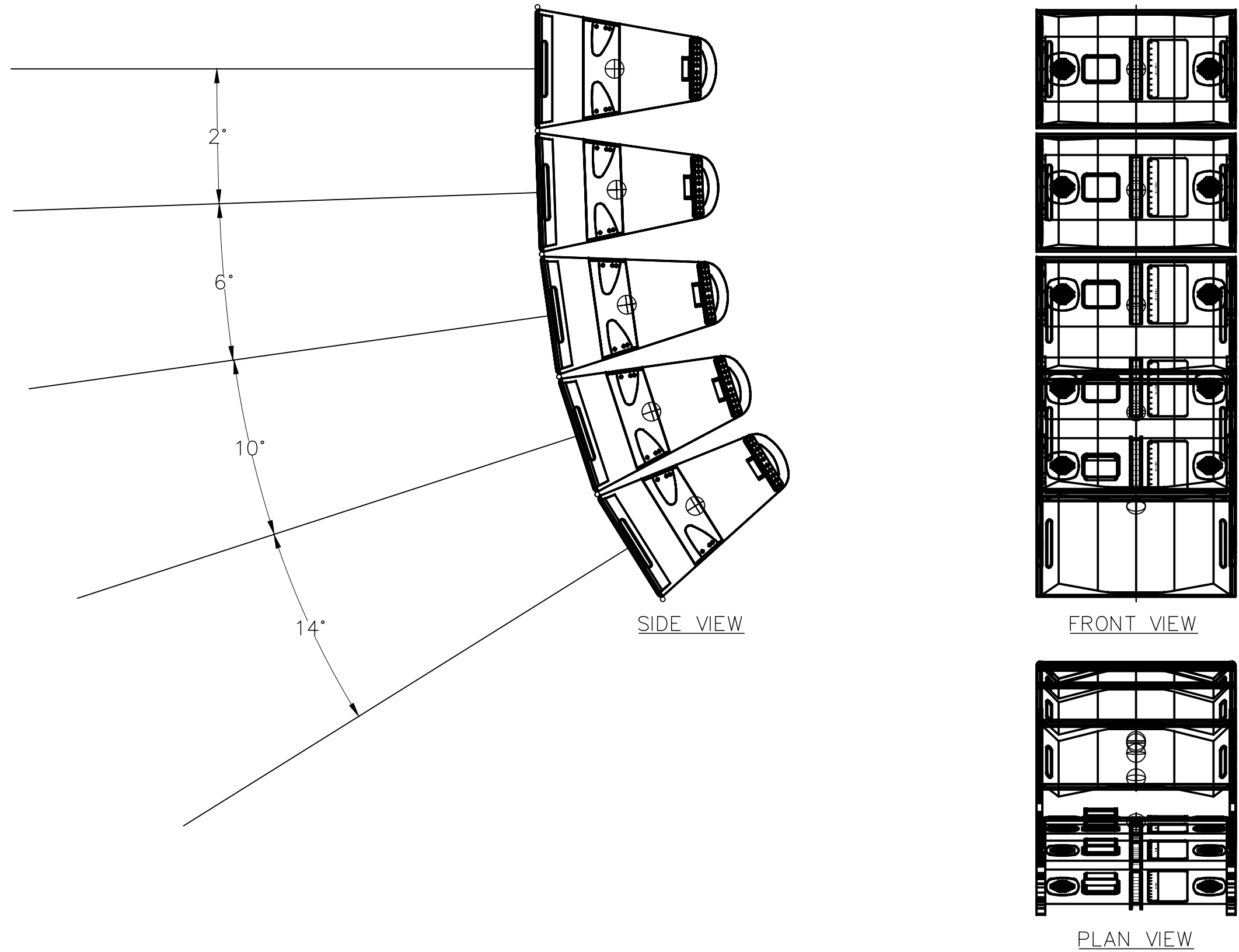
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV2.01A

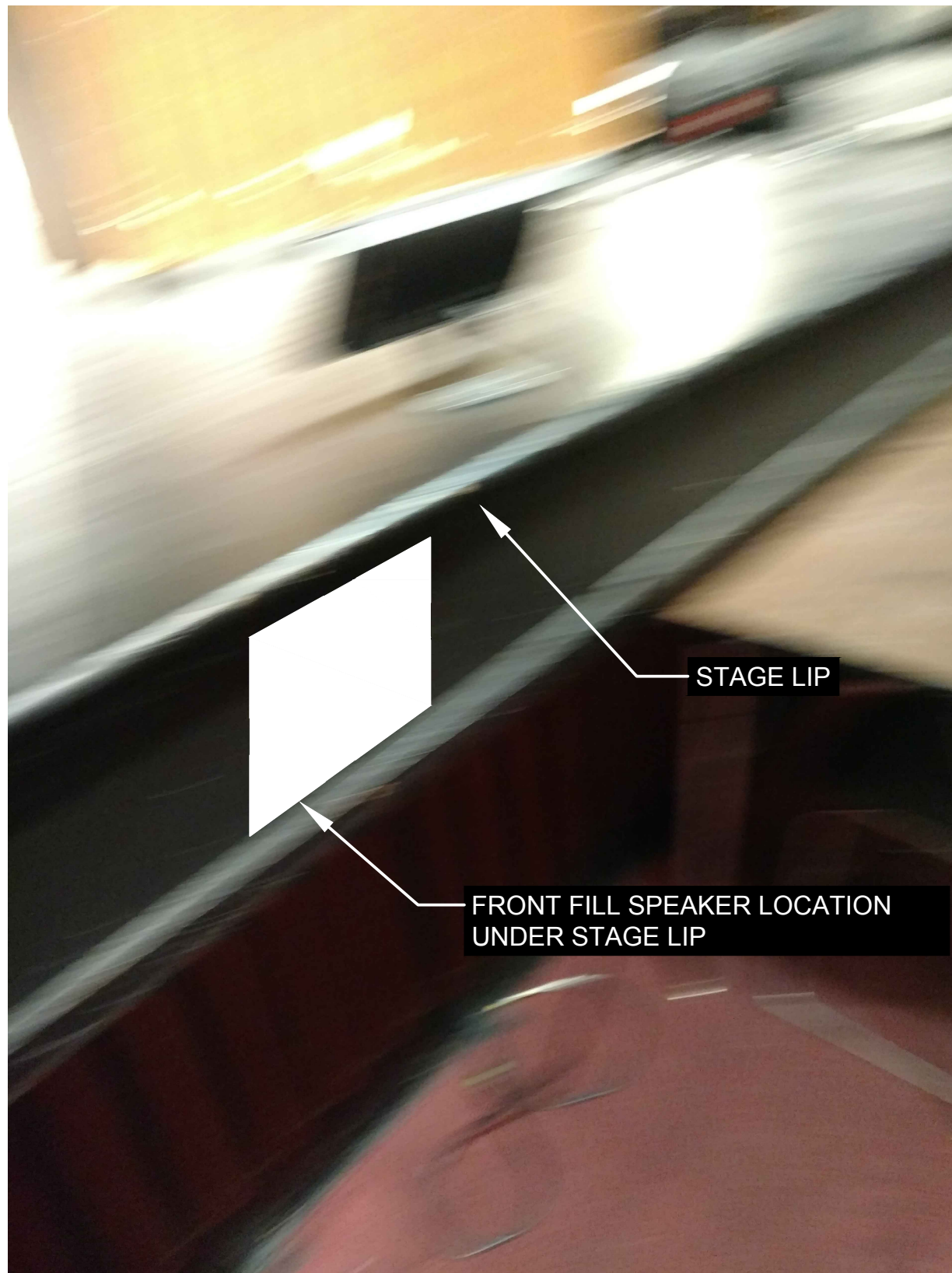


DESCRIPTION			MOUNTING	VERTICAL AIMING
LEFT LINEARRAY CLUSTER – LOUDSPEAKER 1	CENTRAL LINEARRAY CLUSTER – LOUDSPEAKER 1	RIGHT LINEARRAY CLUSTER – LOUDSPEAKER 1	SUSPENDED	0°
LEFT LINEARRAY CLUSTER – LOUDSPEAKER 2	CENTRAL LINEARRAY CLUSTER – LOUDSPEAKER 2	RIGHT LINEARRAY CLUSTER – LOUDSPEAKER 2	SUSPENDED	–2°
LEFT LINEARRAY CLUSTER – LOUDSPEAKER 3	CENTRAL LINEARRAY CLUSTER – LOUDSPEAKER 3	RIGHT LINEARRAY CLUSTER – LOUDSPEAKER 3	SUSPENDED	–6°
LEFT LINEARRAY CLUSTER – LOUDSPEAKER 4	CENTRAL LINEARRAY CLUSTER – LOUDSPEAKER 4	RIGHT LINEARRAY CLUSTER – LOUDSPEAKER 4	SUSPENDED	–10°
LEFT LINEARRAY CLUSTER – LOUDSPEAKER 5	CENTRAL LINEARRAY CLUSTER – LOUDSPEAKER 5	RIGHT LINEARRAY CLUSTER – LOUDSPEAKER 5	SUSPENDED	–14°
NOTES: 1. ALL AIMING ANGLES ARE BASED ON RIGHT HAND COORDINATES. 2. HORIZONTAL AIMING REFERENCE IS AUDITORIUM CENTERLINE FACING AUDIENCE. 3. VERTICAL AIMING REFERENCE IS PARALLEL TO STAGE FLOOR FACING AUDIENCE. 4. HORN ROTATION AXIS IS HORN AXIS, FACING FRONT OF LOUDSPEAKER.				

1 LINEARRAY CLUSTERS LOUDSPEAKER AIMING TABLE  
NTS



2 LINEARRAY CLUSTER LOUDSPEAKER AIMING DETAIL  
1"=1'-0"

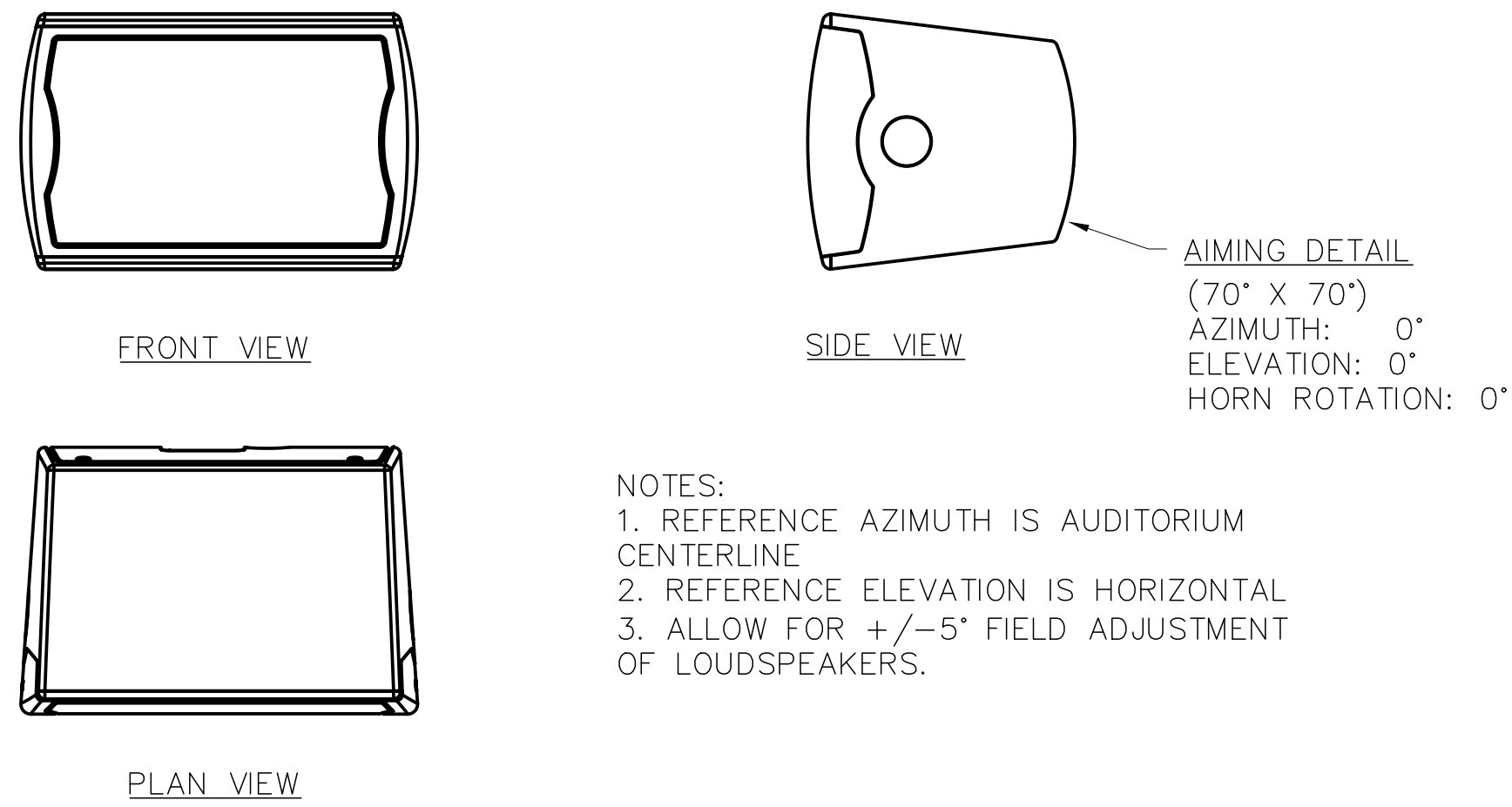


3 FRONT FILL LOUDSPEAKER LOCATIONS  
NTS

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE		
TITLE AUDITORIUM AV SYSTEM FIRST & SECOND FLOOR LOUDSPEAKER DETAILS		
PROJECT NUMBER	19014	
DRAWN BY	MDB	
SCALE	AS NOTED	
DATE	2019.06.10	

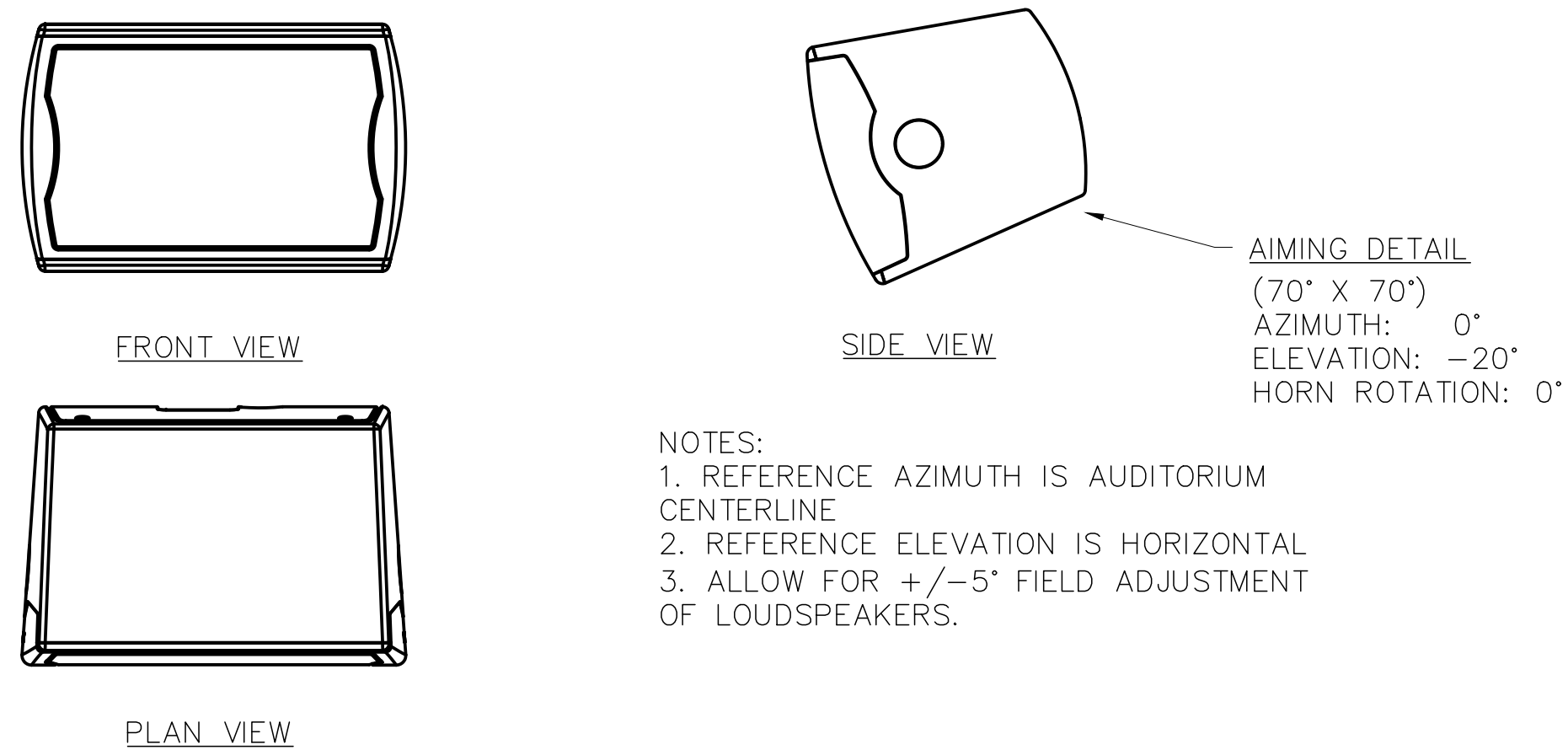




1 LOUDSPEAKER AIMING DETAIL - FRONT FILL LOUDSPEAKERS  
3"=1'-0"

DESCRIPTION	MOUNTING	VERTICAL AIMING
FRONT FILL LOUDSPEAKER #1	BRACKET	0°
FRONT FILL LOUDSPEAKER #2	BRACKET	0°
FRONT FILL LOUDSPEAKER #3	BRACKET	0°
FRONT FILL LOUDSPEAKER #4	BRACKET	0°
NOTES: 1. ALL AIMING ANGLES ARE BASED ON RIGHT HAND COORDINATES. 2. HORIZONTAL AIMING REFERENCE IS AUDITORIUM CENTERLINE FACING AUDIENCE. 3. VERTICAL AIMING REFERENCE IS PARALLEL TO STAGE FLOOR FACING AUDIENCE. 4. HORN ROTATION AXIS IS HORN AXIS, FACING FRONT OF LOUDSPEAKER.		

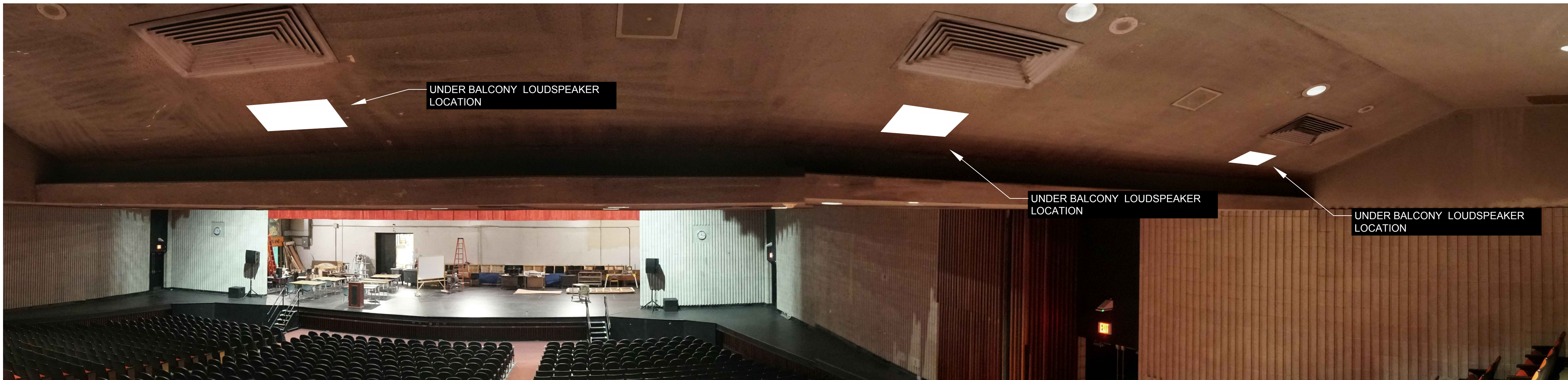
3 LOUDSPEAKER AIMING TABLE - FRONT FILL LOUDSPEAKERS  
NTS



2 LOUDSPEAKER AIMING DETAIL - UNDER BALCONY LOUDSPEAKERS  
3"=1'-0"

DESCRIPTION	MOUNTING	VERTICAL AIMING
UNDER BALCONY LOUDSPEAKER #1	BRACKET	-20°
UNDER BALCONY LOUDSPEAKER #2	BRACKET	-20°
UNDER BALCONY LOUDSPEAKER #3	BRACKET	-20°
UNDER BALCONY LOUDSPEAKER #4	BRACKET	-20°
UNDER BALCONY LOUDSPEAKER #5	BRACKET	-20°
UNDER BALCONY LOUDSPEAKER #6	BRACKET	-20°
NOTES: 1. ALL AIMING ANGLES ARE BASED ON RIGHT HAND COORDINATES. 2. HORIZONTAL AIMING REFERENCE IS AUDITORIUM CENTERLINE FACING AUDIENCE. 3. VERTICAL AIMING REFERENCE IS PARALLEL TO STAGE FLOOR FACING AUDIENCE. 4. HORN ROTATION AXIS IS HORN AXIS, FACING FRONT OF LOUDSPEAKER.		

4 LOUDSPEAKER AIMING TABLE - UNDER BALCONY LOUDSPEAKERS  
NTS



NOTE: UNDER BALCONY LOUDPSPEAKER LOCATIONS ON LEFT SIDE OF AUDIENCE TO MIRROR THE PLACEMENT OF THE LOCATIONS SHOWN ABOVE, WHICH IS THE RIGHT SIDE.

3 UNDER BALCONY LOUDSPEAKER LOCATIONS  
NTS

REVISIONS		
NO.	DESCRIPTION	DATE

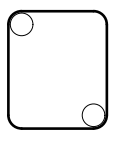
PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AUDITORIUM AV SYSTEM  
FIRST & SECOND FLOOR  
LOUDSPEAKER  
DETAILS

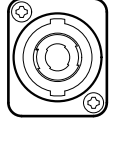
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



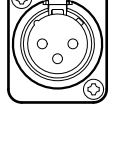
PANEL CONNECTOR KEY



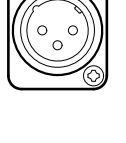
D-PUNCH  
BLANK



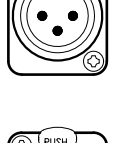
NEUTRIK  
NL4



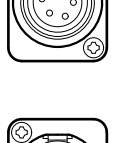
XLR 3-PIN  
FEMALE  
LATCHING



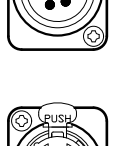
XLR 3-PIN  
FEMALE  
NON-LATCHING



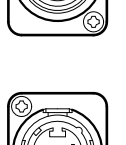
XLR 3-PIN  
MALE



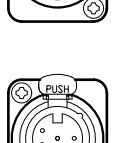
XLR 4-PIN  
FEMALE



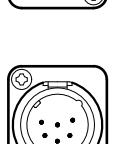
XLR 4-PIN  
MALE



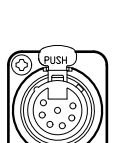
XLR 5-PIN  
FEMALE



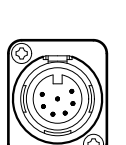
XLR 5-PIN  
MALE



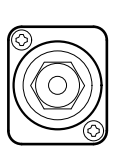
XLR 6-PIN  
FEMALE



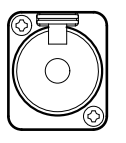
XLR 6-PIN  
MALE



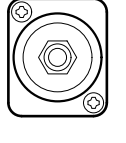
XLR 7-PIN  
FEMALE  
LATCHING



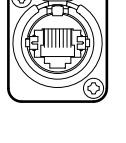
XLR 7-PIN  
MALE



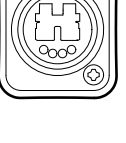
RCA JACK  
D-PUNCH



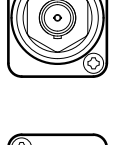
1/4"  
T.R.S. JACK



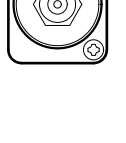
1/8"  
STEREO JACK




ETHERCON  
RJ-45



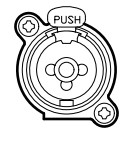
FIBERCON LC



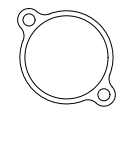
75 OHM  
BNC



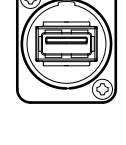
F CONNECTOR  
D-PUNCH



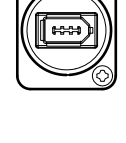
COMBO JACK



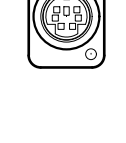
COLOR-CODING  
RING




USB




FIREWIRE/1394A




S-VIDEO




DB-9




DB-15  
VGA



RCA JACK




STRAIGHT TIP  
FIBER OPTIC




DVI


CONNECTOR KEY



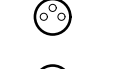
RCA JACK, FEMALE




1/4" T.R.S. JACK, FEMALE




1/8" STEREO JACK, FEMALE




XLR 3-PIN, FEMALE




XLR 3-PIN, MALE




XLR 4-PIN, FEMALE




XLR 4-PIN, MALE




XLR 5-PIN, FEMALE




XLR 5-PIN, MALE




XLR 6-PIN, FEMALE




XLR 6-PIN, MALE



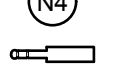
XLR 7-PIN, FEMALE




XLR 7-PIN, MALE




COMBO JACK, FEMALE



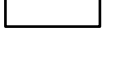
NEUTRIK NL4




1/4" T.R.S. JACK, CABLE MOUNT




1/8" STEREO JACK, CABLE MOUNT




MULTI-PIN (PAIRS INDICATED)



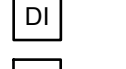
F CONNECTOR



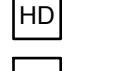
75 OHM BNC



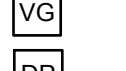
STRAIGHT TIP FIBER OPTIC



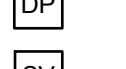
DVI-I




HDMI



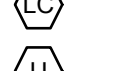
DB-15 VGA



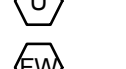
DISPLAYPORT



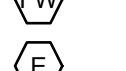
S-VIDEO



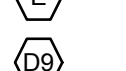
FIBERCON LC CONNECTOR



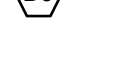
USB



FIREWIRE

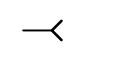


ETHERCON RJ-45

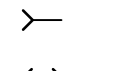


DB-9

DEVICE KEY



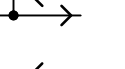
NON-NORMALLED OUTPUT JACK



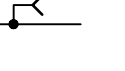
NON-NORMALLED INPUT JACK




FULL-NORMALLED PATCH JACK PAIR




HALF-MONITOR NORMALLED PATCH JACK PAIR



HALF-MONITOR PATCH JACK



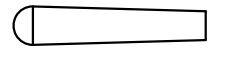
MICROPHONE




HEADSET MICROPHONE



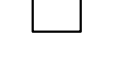
HAND-HELD WIRELESS  
MICROPHONE TRANSMITTER




BELTPACK WIRELESS  
TRANSMITTER WITH LAVALIER  
MICROPHONE




ANTENNA



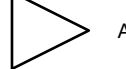
INFRA-RED EMITTER




TRANSFORMER




MOMENTARY SWITCH  
NORMALLY-OPEN



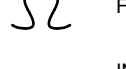
AMPLIFIER / DISTRIBUTION AMPLIFIER



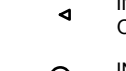
VOLUME CONTROL KNOB



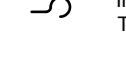
FLEXIBLE CABLE



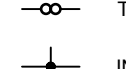
INDICATES REVERSE DIRECTION  
OF SIGNAL FLOW



INDICATES WIRE OR CONDUCTOR  
TIED BACK AND INSULATED




TERMINAL STRIP




INDICATES CIRCUIT CONNECTION

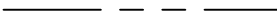
SIGNAL TYPE KEY




MIC/LINE LEVEL AUDIO




DIGITAL AUDIO




LOUDSPEAKER LEVEL




CONTROL / DATA



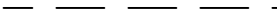
LOW VOLTAGE POWER




OPTICAL FIBER




MATV/RF



LINE LEVEL VIDEO




DIGITAL VIDEO




EXISTING MIC/LINE LEVEL AUDIO

REFERENCE KEY

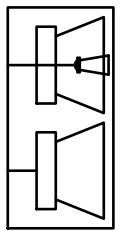


SIGNAL LINK WITHIN SHEET

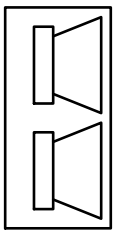


SIGNAL LINK BETWEEN SHEETS

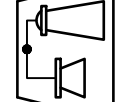
LOUDSPEAKER KEY




3-WAY FULL-RANGE LOUDSPEAKER  
SYSTEM WITH HORN-LOADED HF DRIVER  
AND DUAL 12" LF DRIVERS



DUAL 15" BI-AMPLIFIED SUBWOOFER

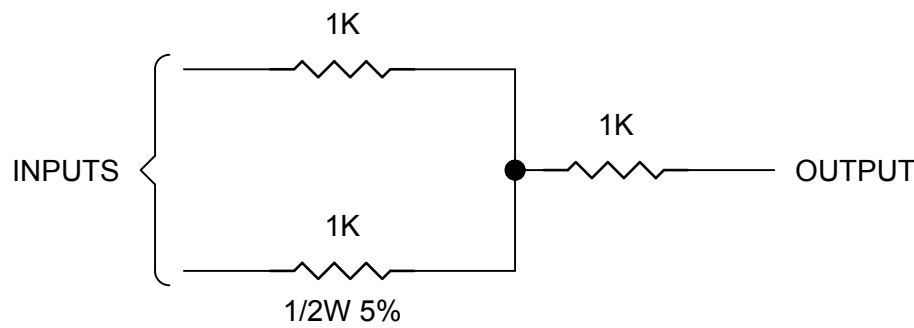


2-WAY FULL-RANGE DOWNFILL  
LOUDSPEAKER SYSTEM WITH  
HORN-LOADED HF DRIVER



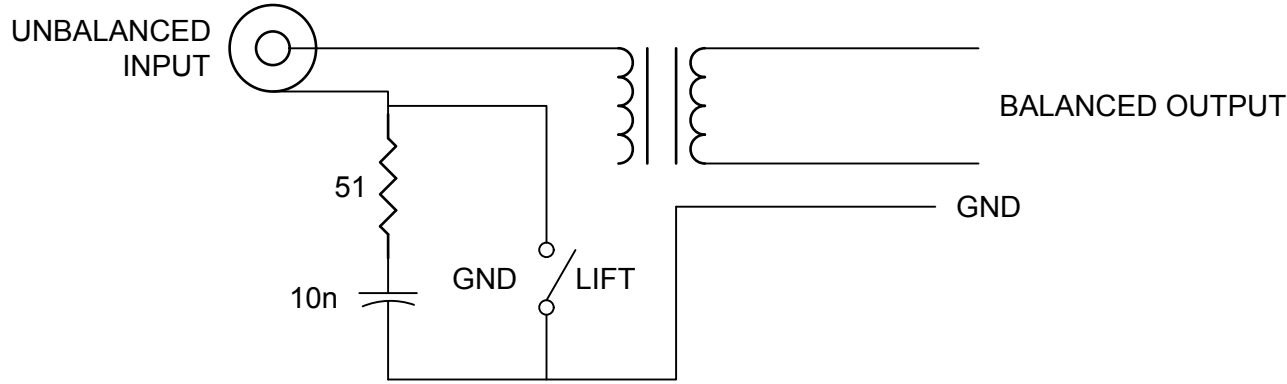
2-WAY SURFACE-MOUNTED FRONT-FILL  
LOUDSPEAKER

RESISTIVE SUMMER DETAIL

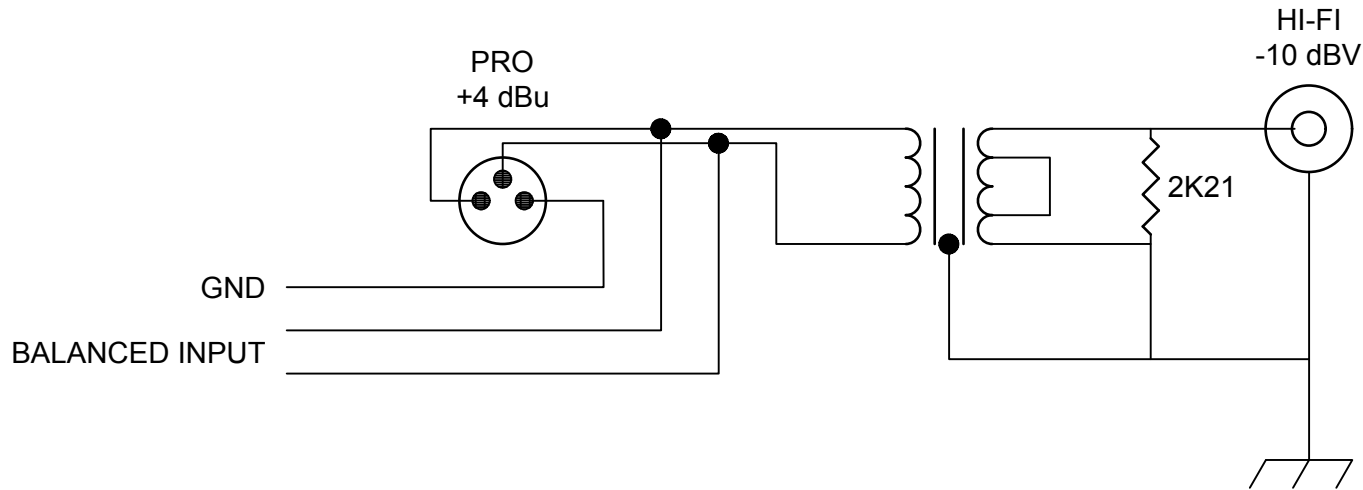


1. FOR BALANCED AUDIO LINES, SUM BOTH SIDES OF INPUTS WITHOUT INVERTING POLARITY.
2. RDL COMBINING NETWORK IS AN ACCEPTABLE SUBSTITUTE.

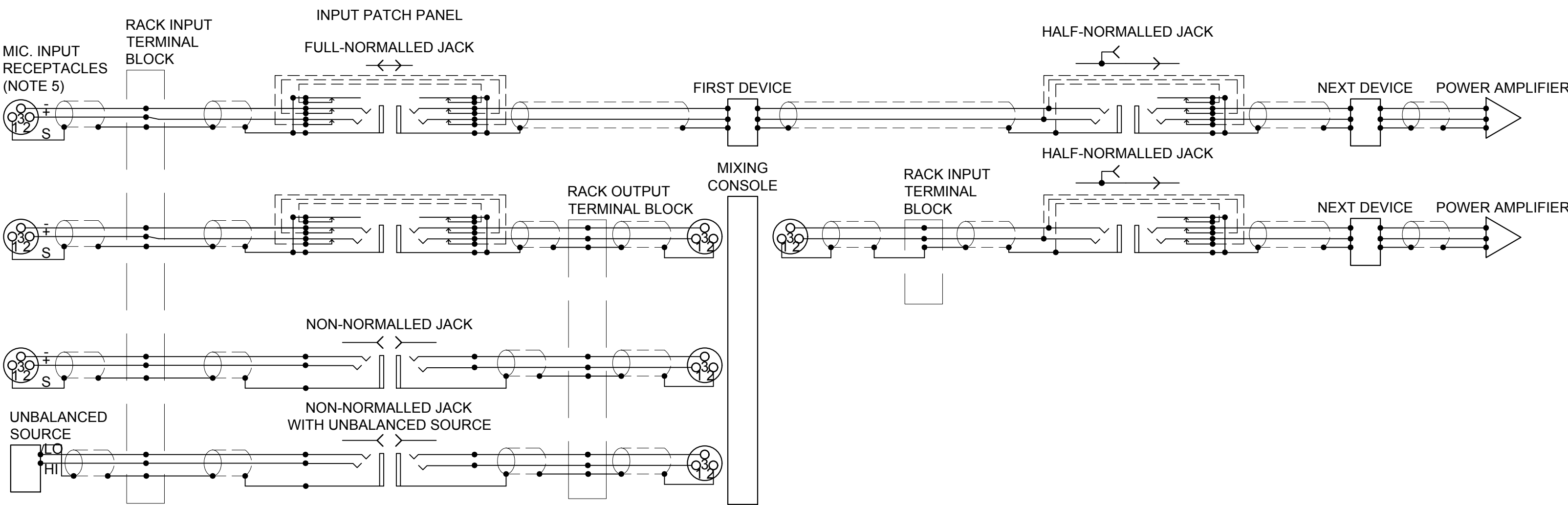
AUDIOVISUAL INPUT DETAIL



PRESS FEED OUTPUT DETAIL



SIGNAL GROUNDING DETAIL



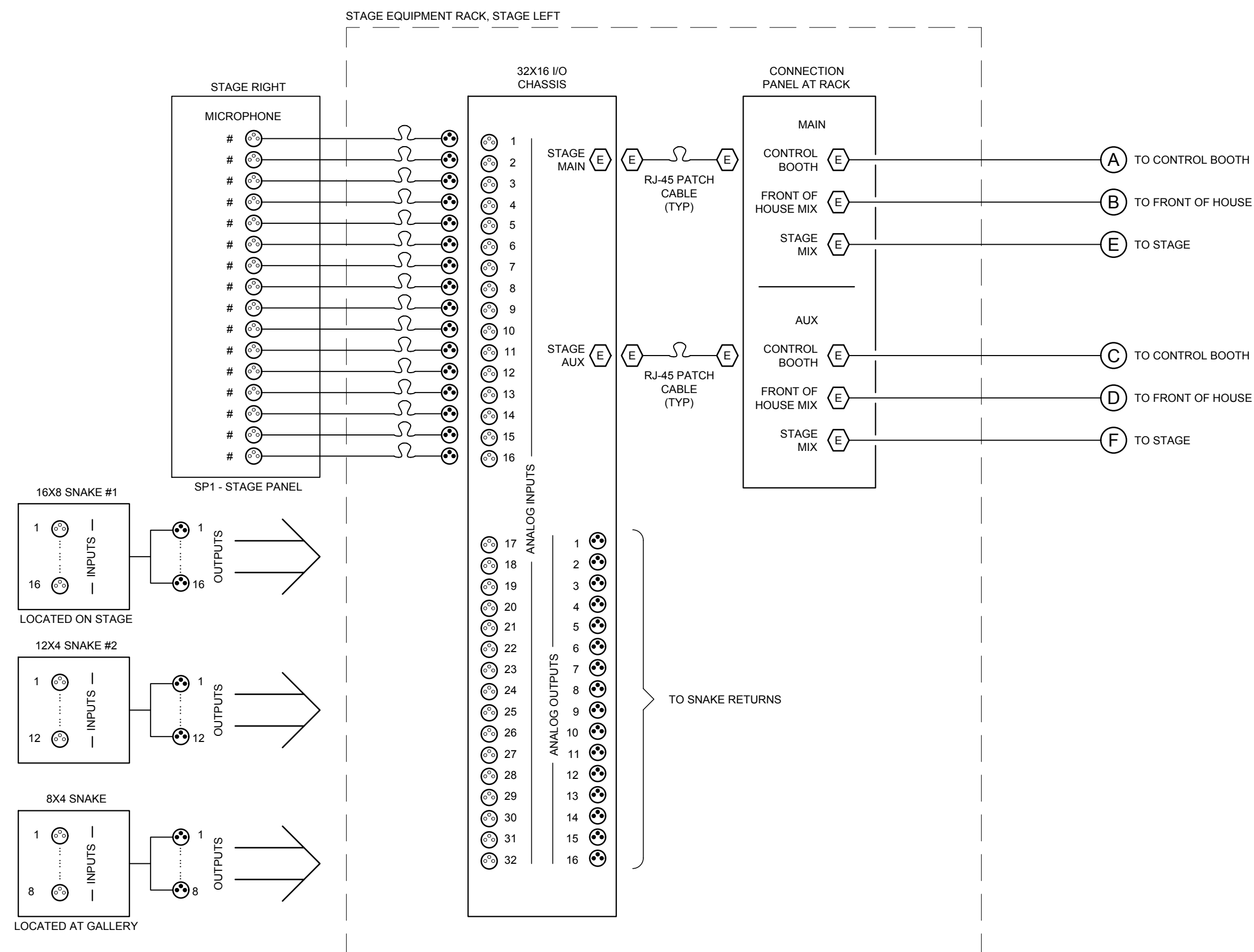
1. ALL LINES ARE BALANCED CIRCUITS, EXCEPT AS NOTED.
2. DASHED LINE INDICATE NORMALLED CONNECTIONS.
3. AUDIO SHIELDS SHALL BE CONNECTED AT DEVICE INPUTS AND OUTPUTS. SHIELDS MAY BE LIFTED AT DEVICE INPUTS TO BREAK GROUND LOOPS.
4. DO NOT BUS SHIELDS, EXCEPT AS SHOWN.
5. DO NOT CONNECT SHIELDS TO DEVICE CHASSIS IF SHIELDS ARE GROUNDED ELSEWHERE AS SHOWN.
6. MAINTAIN ELECTRICAL ISOLATION OF SHIELD FROM CONDUIT, ELECTRICAL BOXES AND PANELS.
7. TYPICAL EQUIPMENT ARRANGEMENT SHOWN. REFERENCE SYSTEM SCHEMATIC DRAWINGS FOR ACTUAL ARRANGEMENT.

REVISIONS		
NO.	DESCRIPTION	DATE

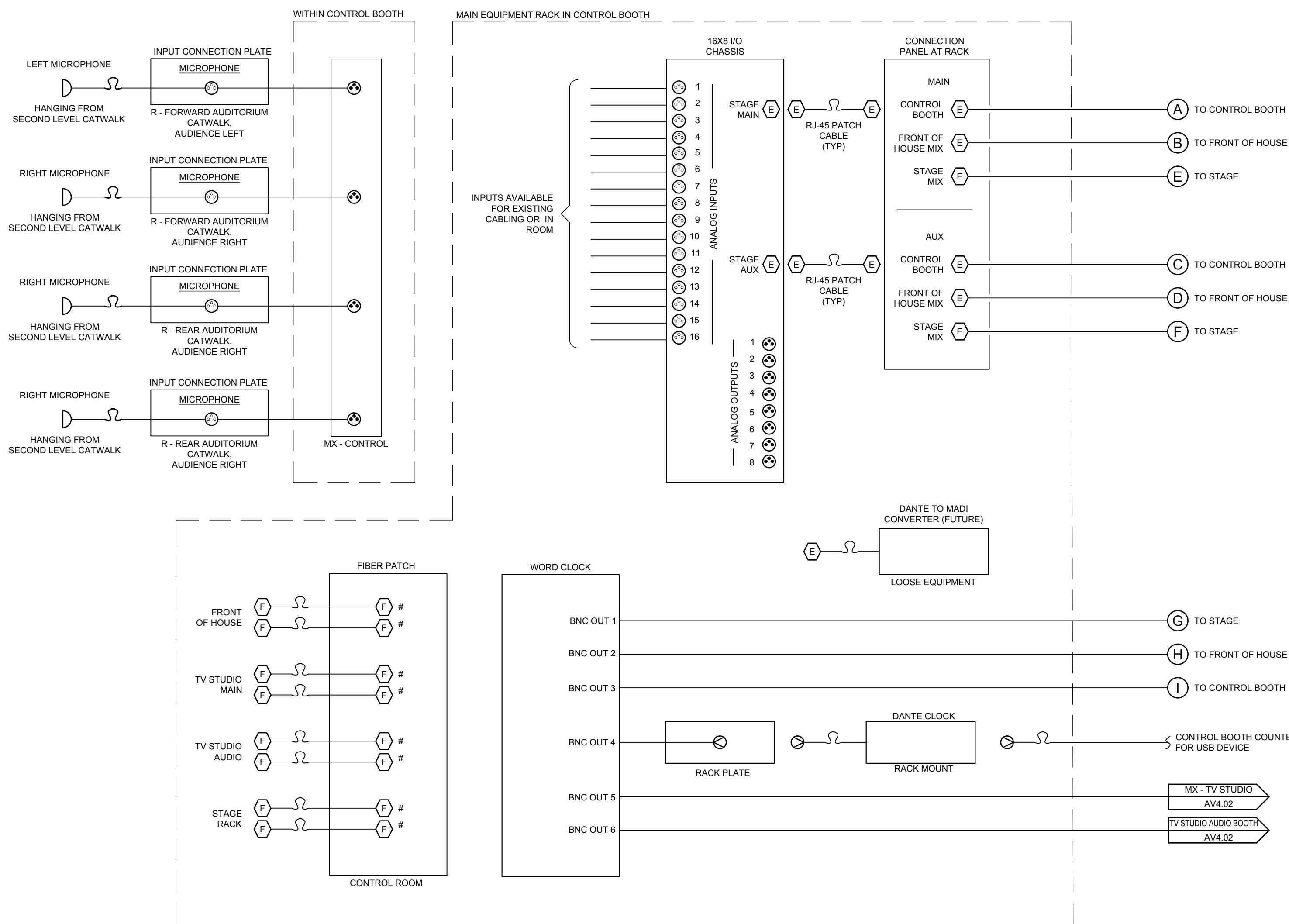
PROJECT	
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE	

TITLE	
AUDITORIUM AND TV STUDIO AV SYSTEM DEVICE KEYS	

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

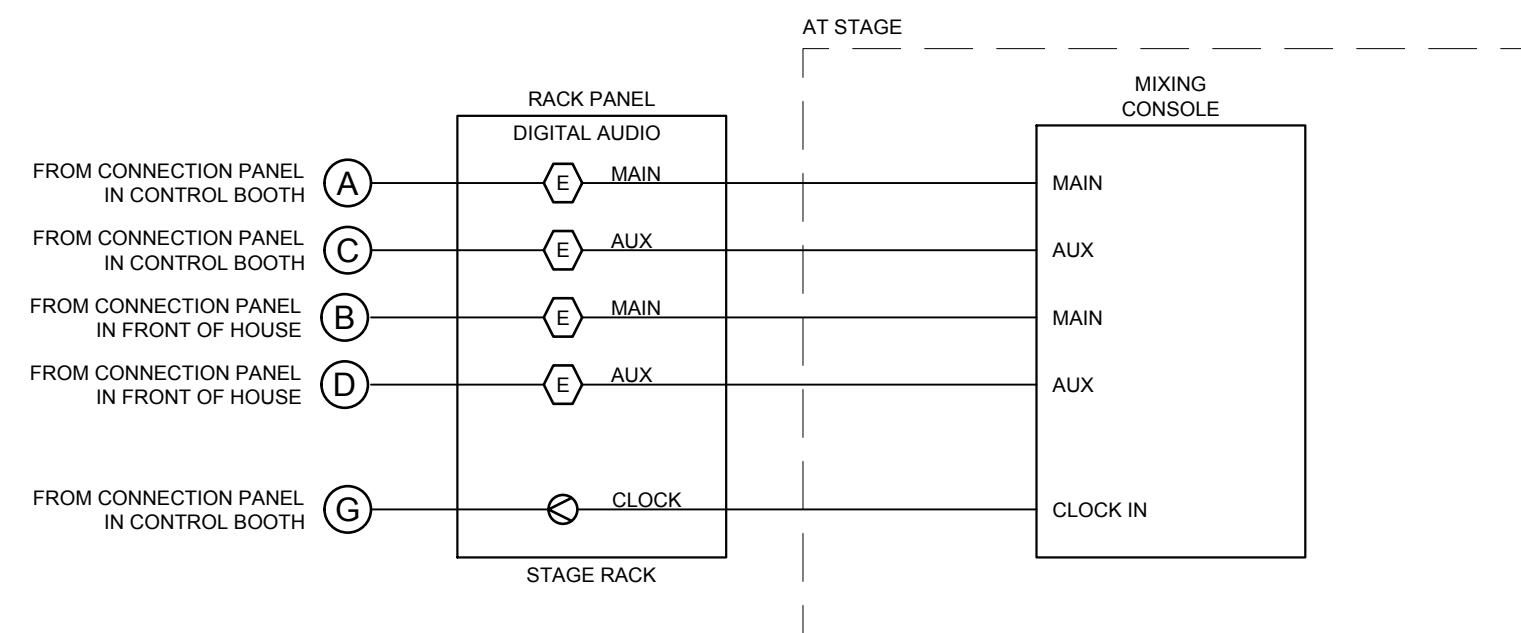


1 AUDIO FUNCTIONAL DIAGRAM - STAGE  
NTS

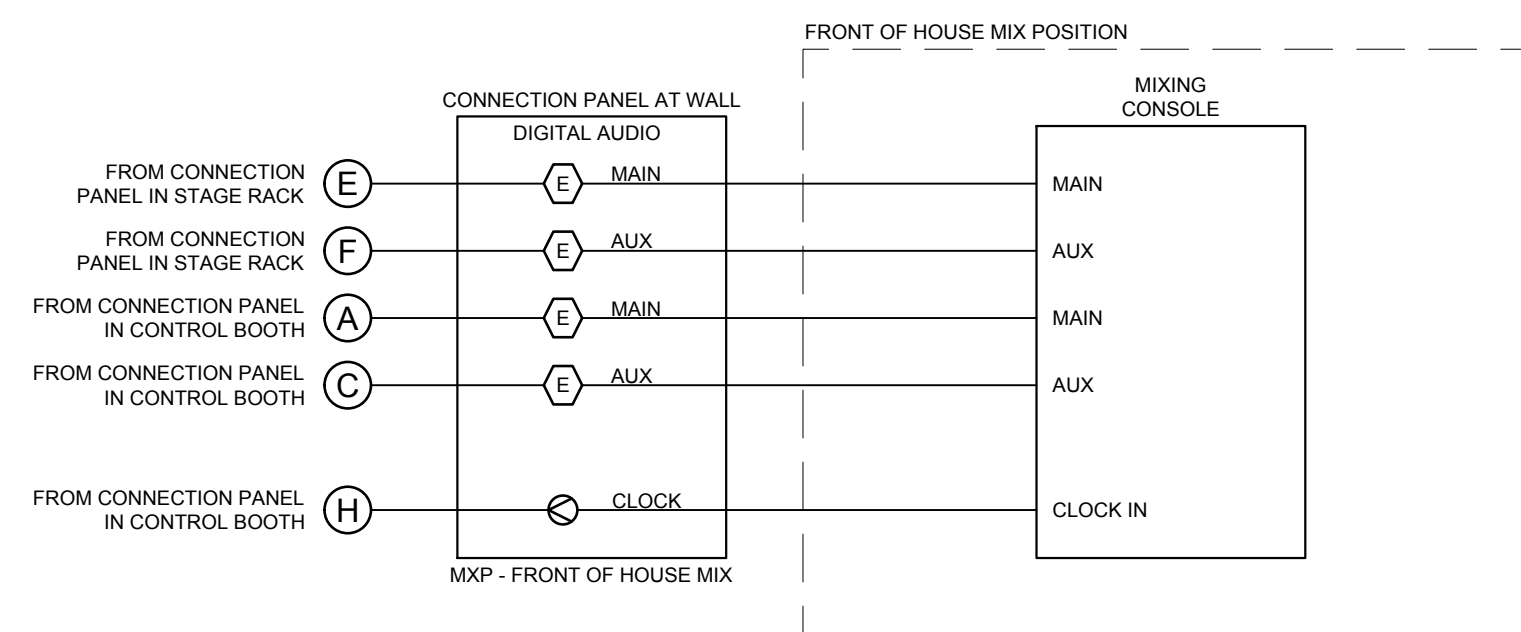


4 AUDIO FUNCTIONAL DIAGRAM - CONTROL BOOTH  
NTS

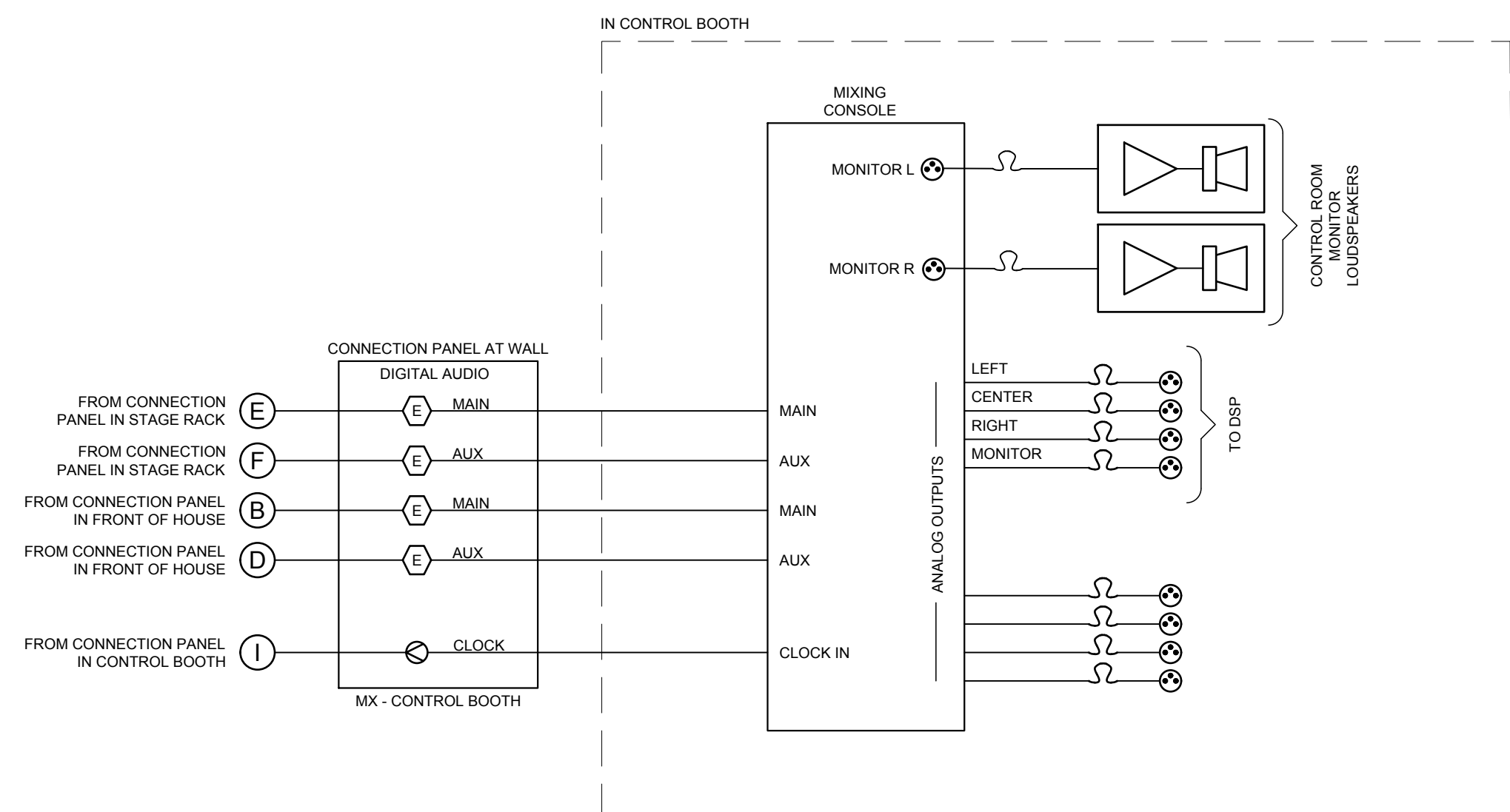
DRAWING NOTES:  
1. ALL EQUIPMENT AND WIRING SHOWN IS NEW TO BE PROVIDED WITH PROJECT UNLESS OTHERWISE NOTED.



2 AUDIO FUNCTIONAL DIAGRAM - STAGE  
NTS



3 AUDIO FUNCTIONAL DIAGRAM - FRONT OF HOUSE  
NTS



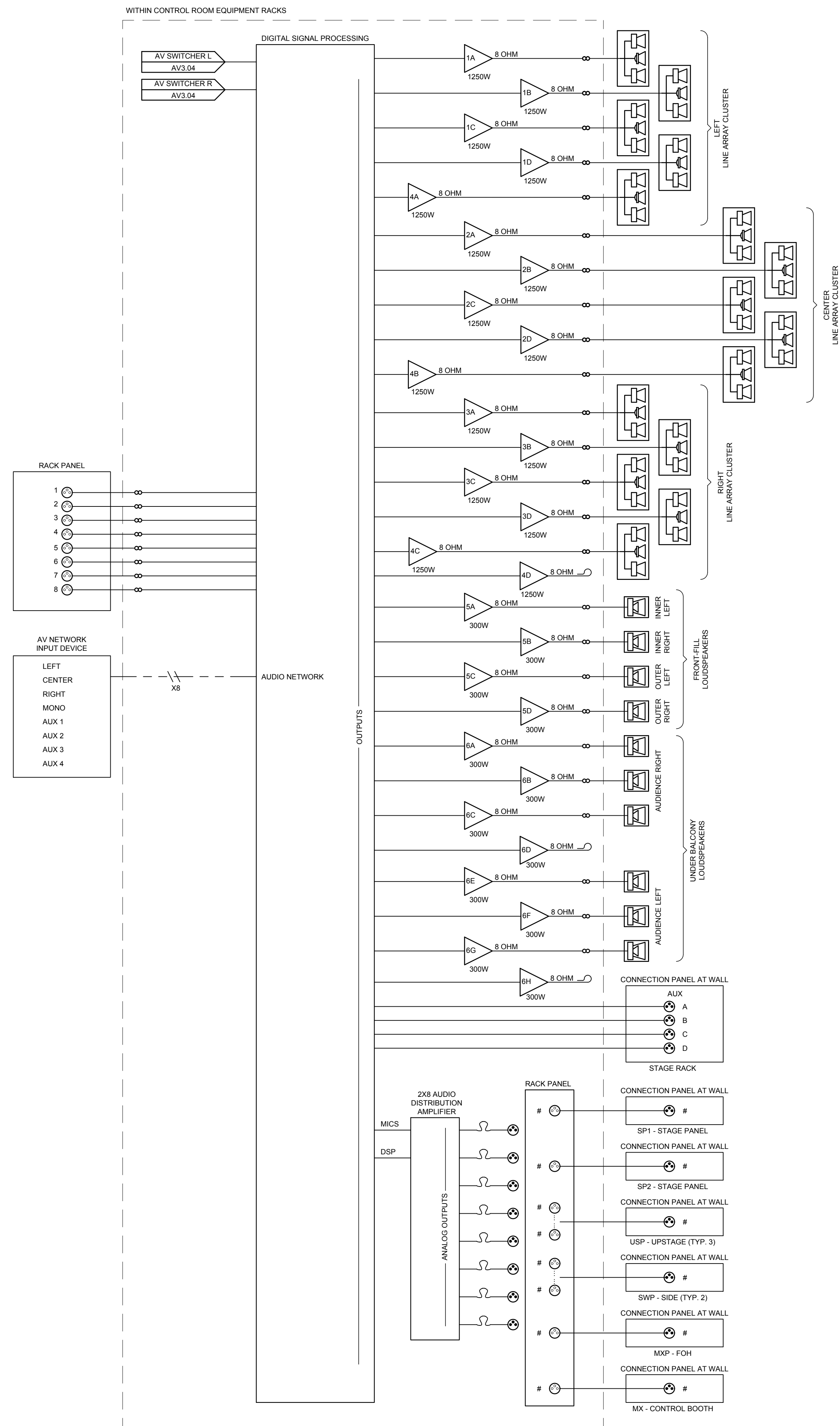
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AUDITORIUM AV SYSTEM  
AUDIO FUNCTIONAL  
DIAGRAM 1

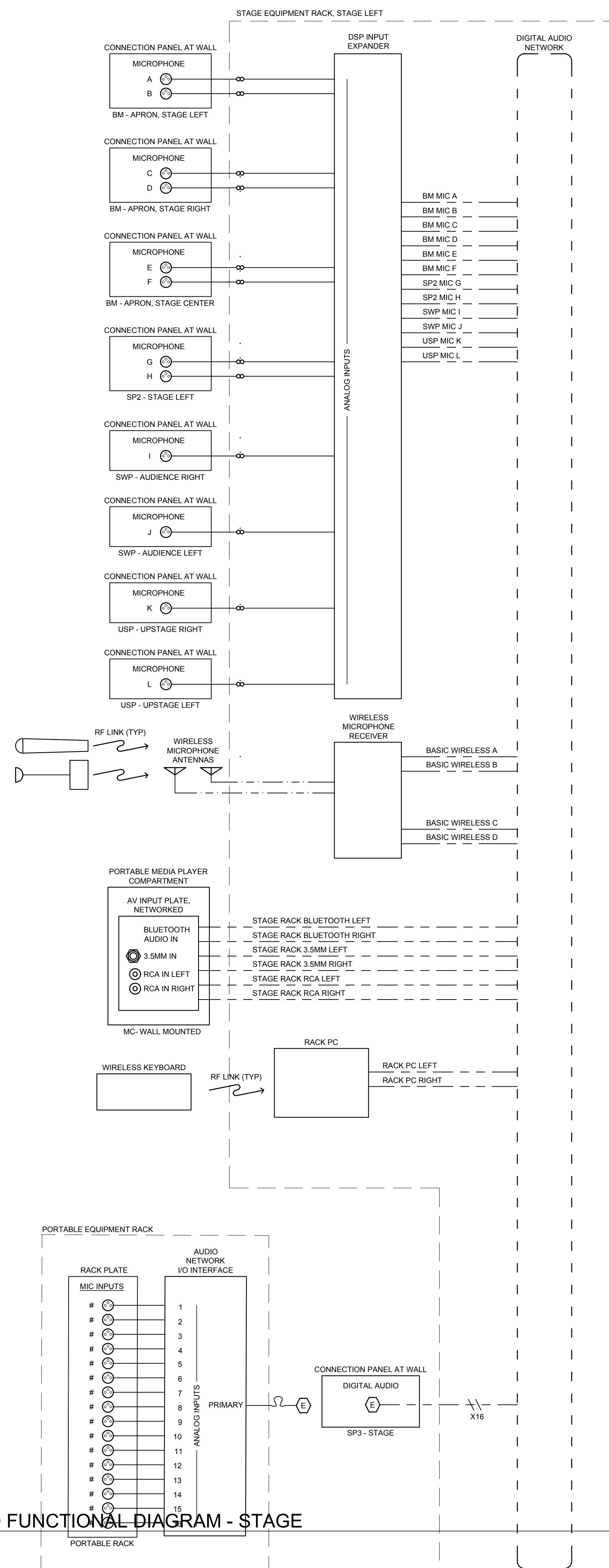
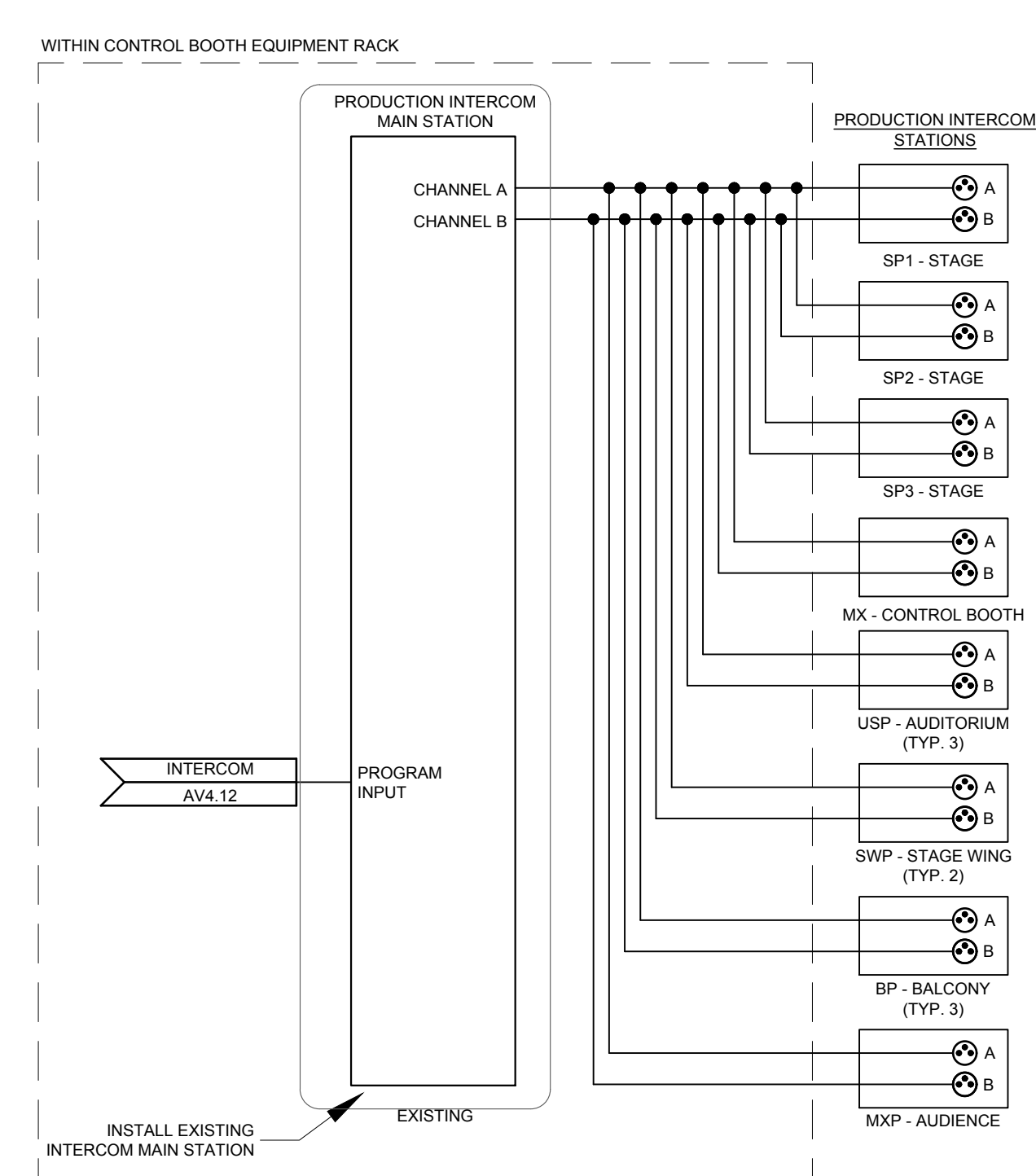
PROJECT NUMBER 19014  
DRAWN BY MDB  
SCALE AS NOTED  
DATE 2019.06.10

AV3.01

1 AUDIO FUNCTIONAL DIAGRAM - CONTROL BOOTH  
NTS

DRAWING NOTES:

1. ALL EQUIPMENT AND WIRING SHOWN IS NEW TO BE PROVIDED WITH PROJECT UNLESS OTHERWISE NOTED.

2 AUDIO FUNCTIONAL DIAGRAM - STAGE  
NTS2 PRODUCTION INTERCOM SYSTEM - AUDITORIUM  
NTS

## REVISIONS

NO.	DESCRIPTION	DATE

## PROJECT

CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

## TITLE

AUDITORIUM AV SYSTEM  
AUDIO FUNCTIONAL  
DIAGRAM 2

PROJECT NUMBER 19014

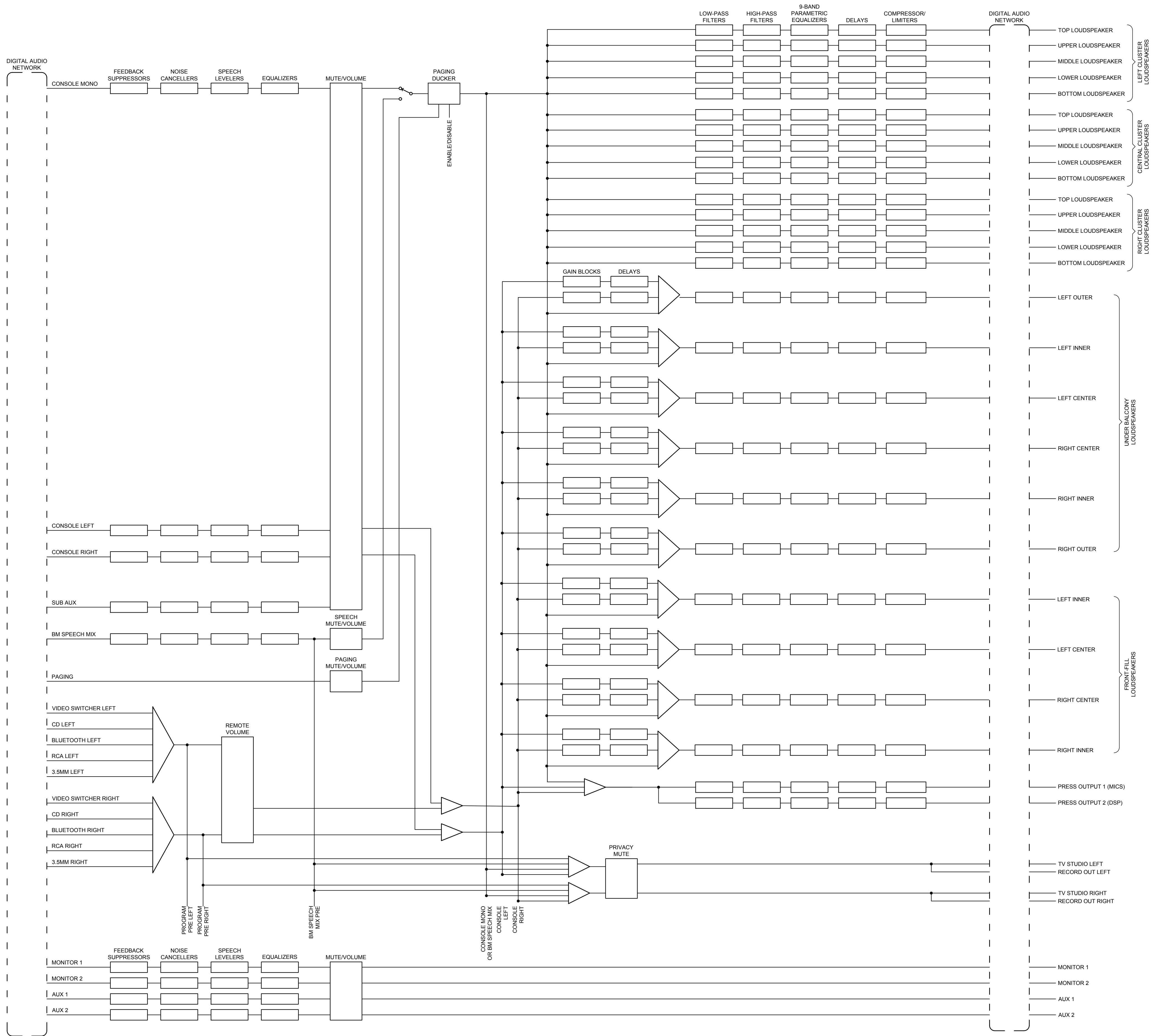
DRAWN BY MDB

SCALE AS NOTED

DATE 2019.06.10

AV3.02





1 DIGITAL AUDIO SIGNAL PROCESSING PROGRAMMING DETAIL  
NTS

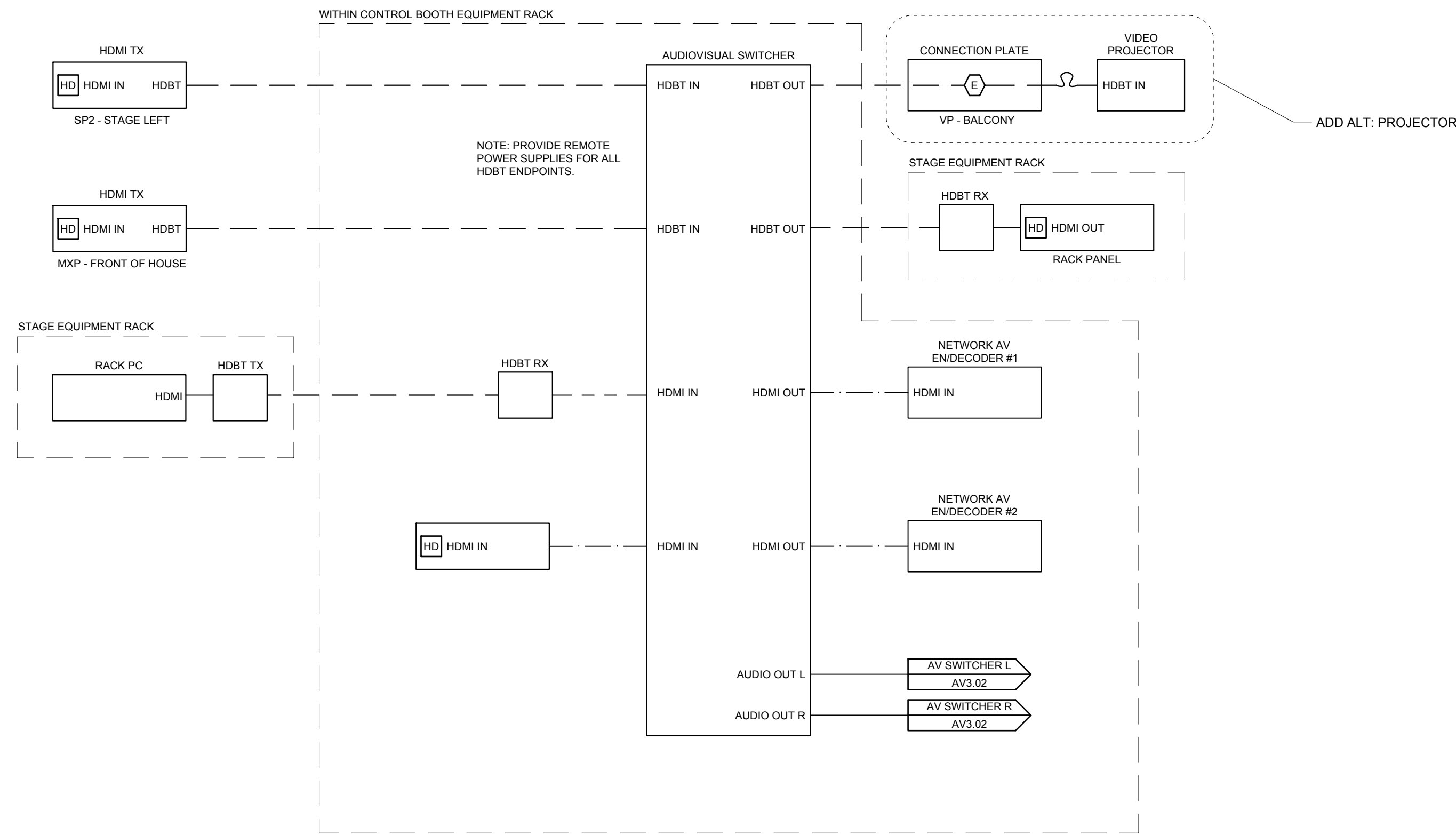
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

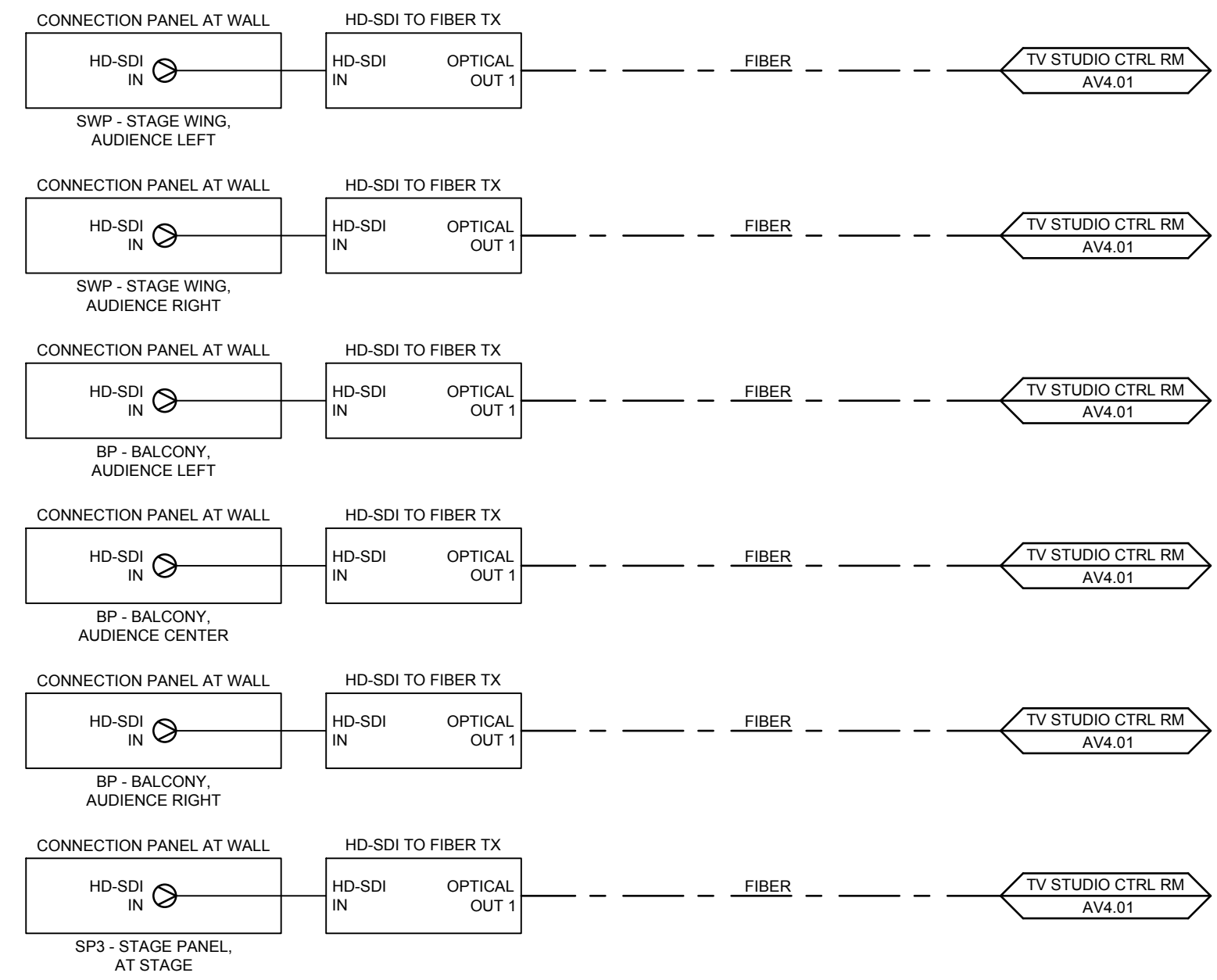
TITLE  
AUDITORIUM AV SYSTEM  
AUDIO DSP  
FUNCTIONAL DIAGRAM

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV3.03



1 VIDEO FUNCTIONAL DIAGRAM - AUDITORIUM  
NTS



2 VIDEO FUNCTIONAL DIAGRAM - AUDITORIUM LOCATIONS  
NTS

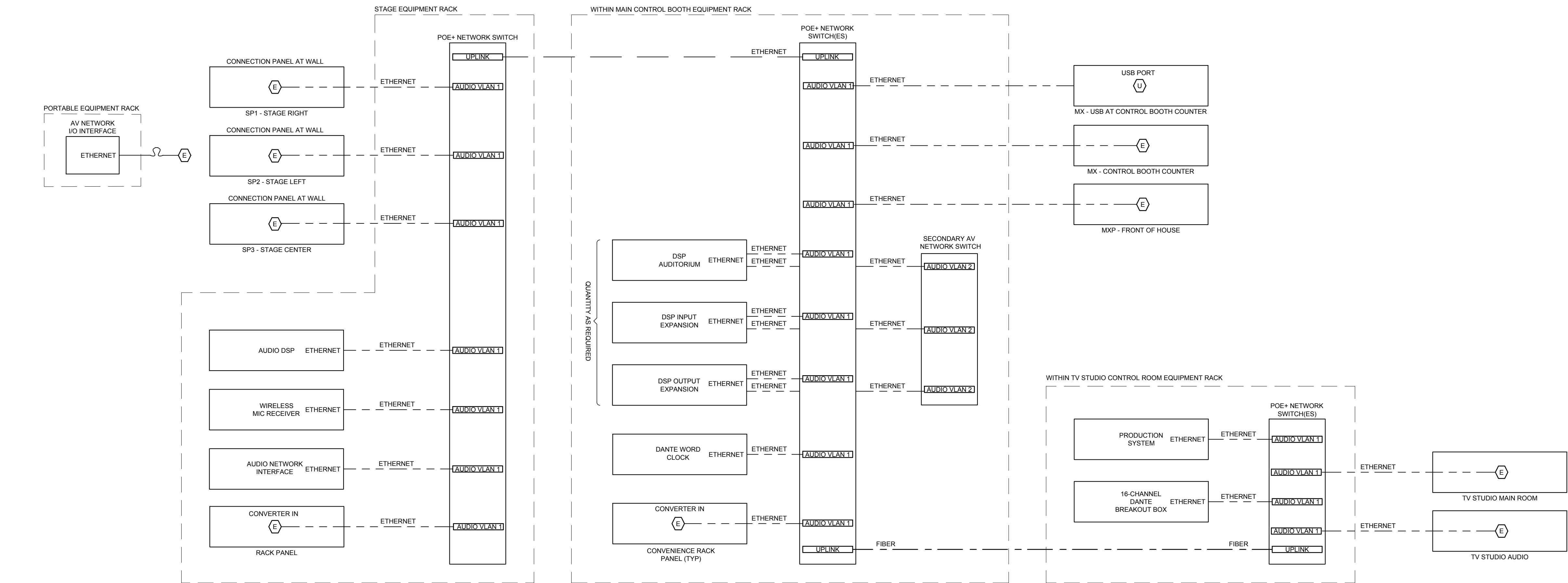
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AUDITORIUM AV SYSTEM  
VIDEO FUNCTIONAL  
DIAGRAM

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV3.04



1 AUDIO NETWORK FUNCTIONAL DIAGRAM - AUDITORIUM & TV STUDIO  
NTS

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
AUDITORIUM  
AND TV STUDIO  
AUDIO NETWORK  
FUNCTIONAL DIAGRAM

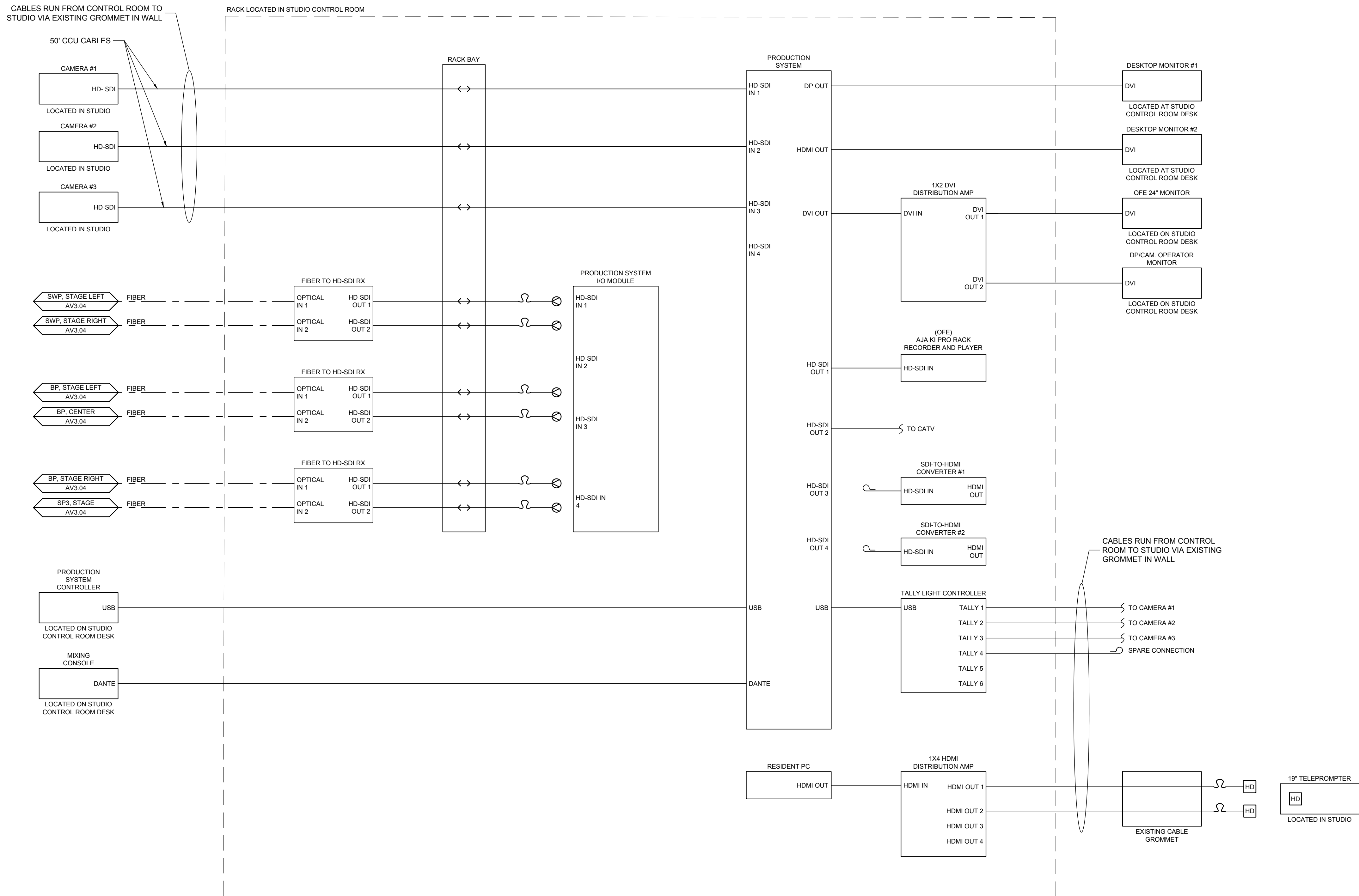
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

AV3.05

1 CC  
NTS

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT	CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE
TITLE	AUDITORIUM AND TV STUDIO CTRL & VIDEO NETWORK FUNCTIONAL DIAGRAM
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



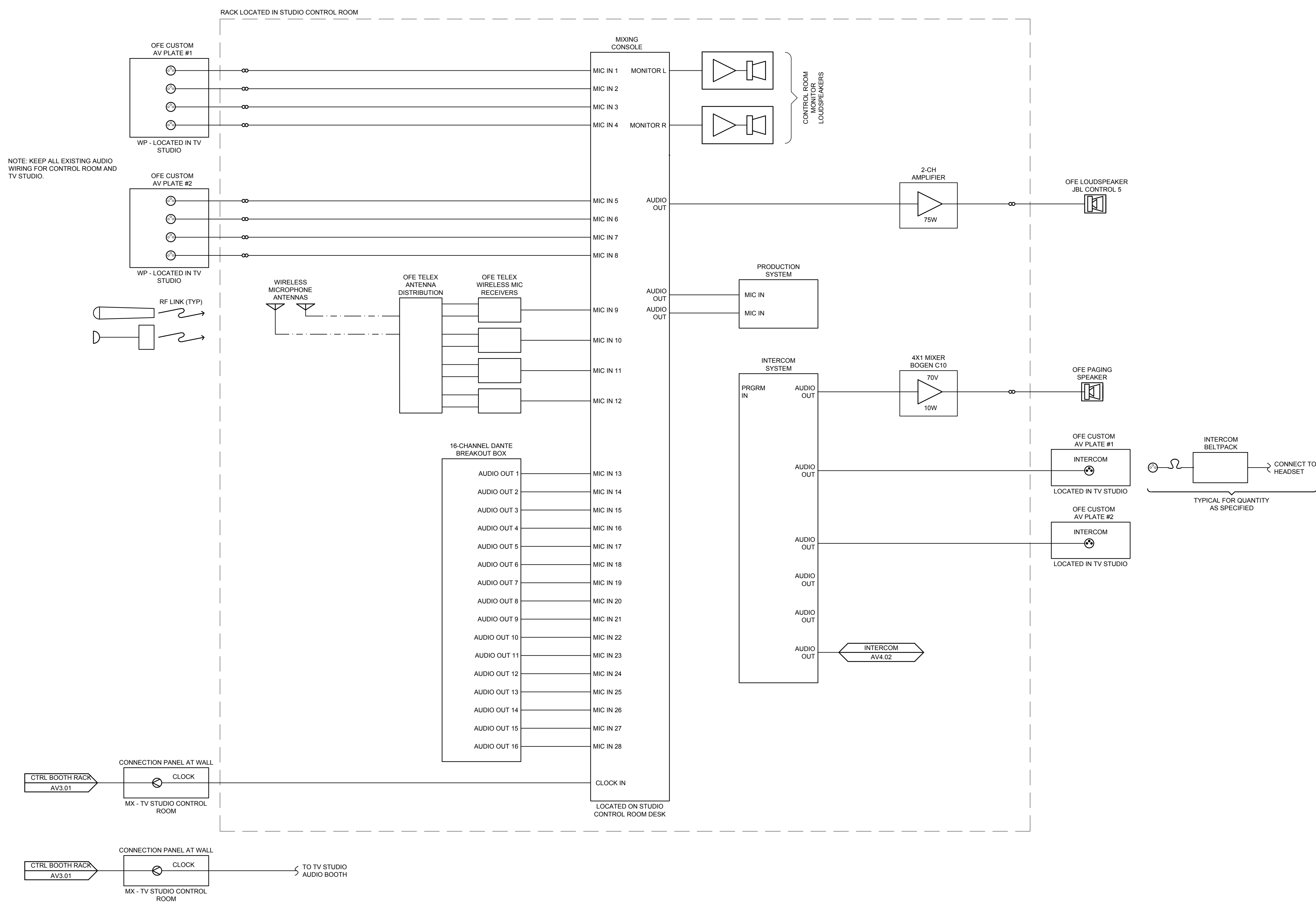
1 VIDEO FUNCTIONAL DIAGRAM - TV STUDIO  
NTS

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
TV STUDIO AV SYSTEM  
VIDEO FUNCTIONAL  
DIAGRAM

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



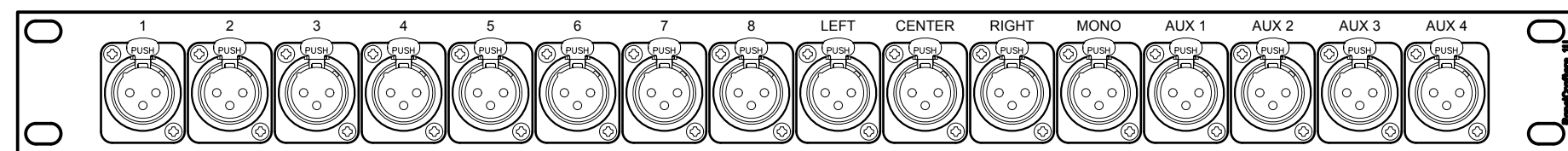
1 AUDIO FUNCTIONAL DIAGRAM - TV STUDIO

NTS

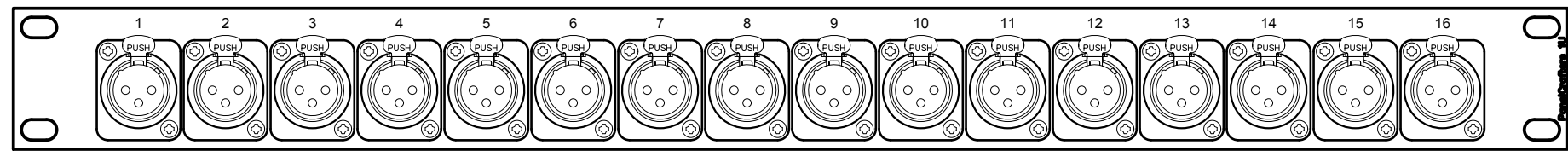
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT	
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE	
TITLE	
TV STUDIO AV SYSTEM AUDIO FUNCTIONAL DIAGRAM	

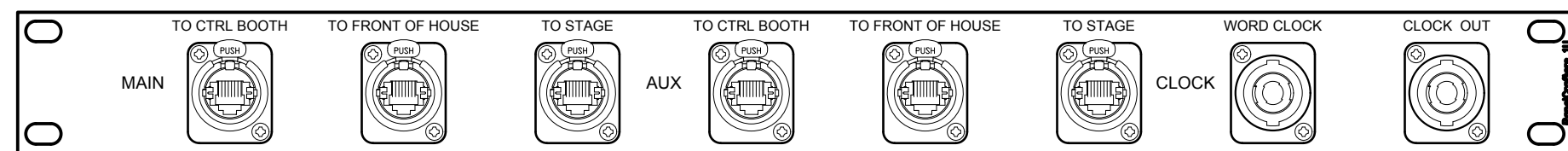
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



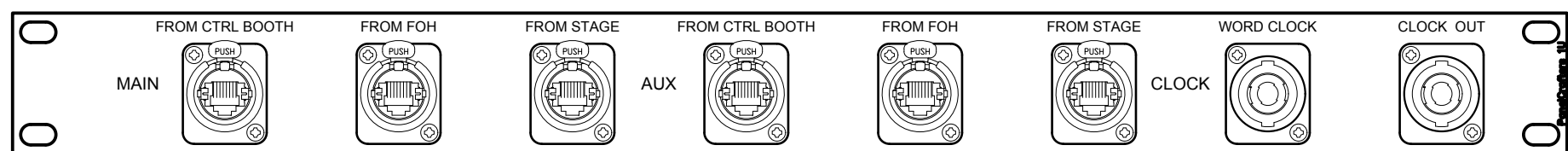
1 STAGE EQUIPMENT RACK - INPUT RACK PANEL  
6" = 1'-0"



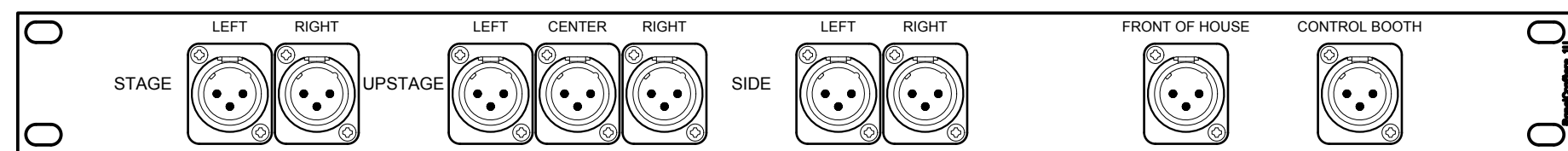
3 PORTABLE EQUIPMENT RACK - MICROPHONE INPUT RACK PANEL  
6" = 1'-0"



5 STAGE & MAIN EQUIPMENT RACK - AUDIO NETWORK RACK PANEL I (QTY. 2)  
6" = 1'-0"



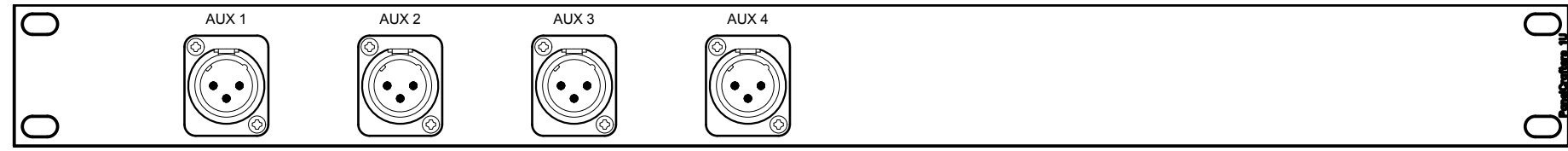
6 STAGE EQUIPMENT RACK - AUDIO NETWORK CONNECTION PANEL II  
6" = 1'-0"



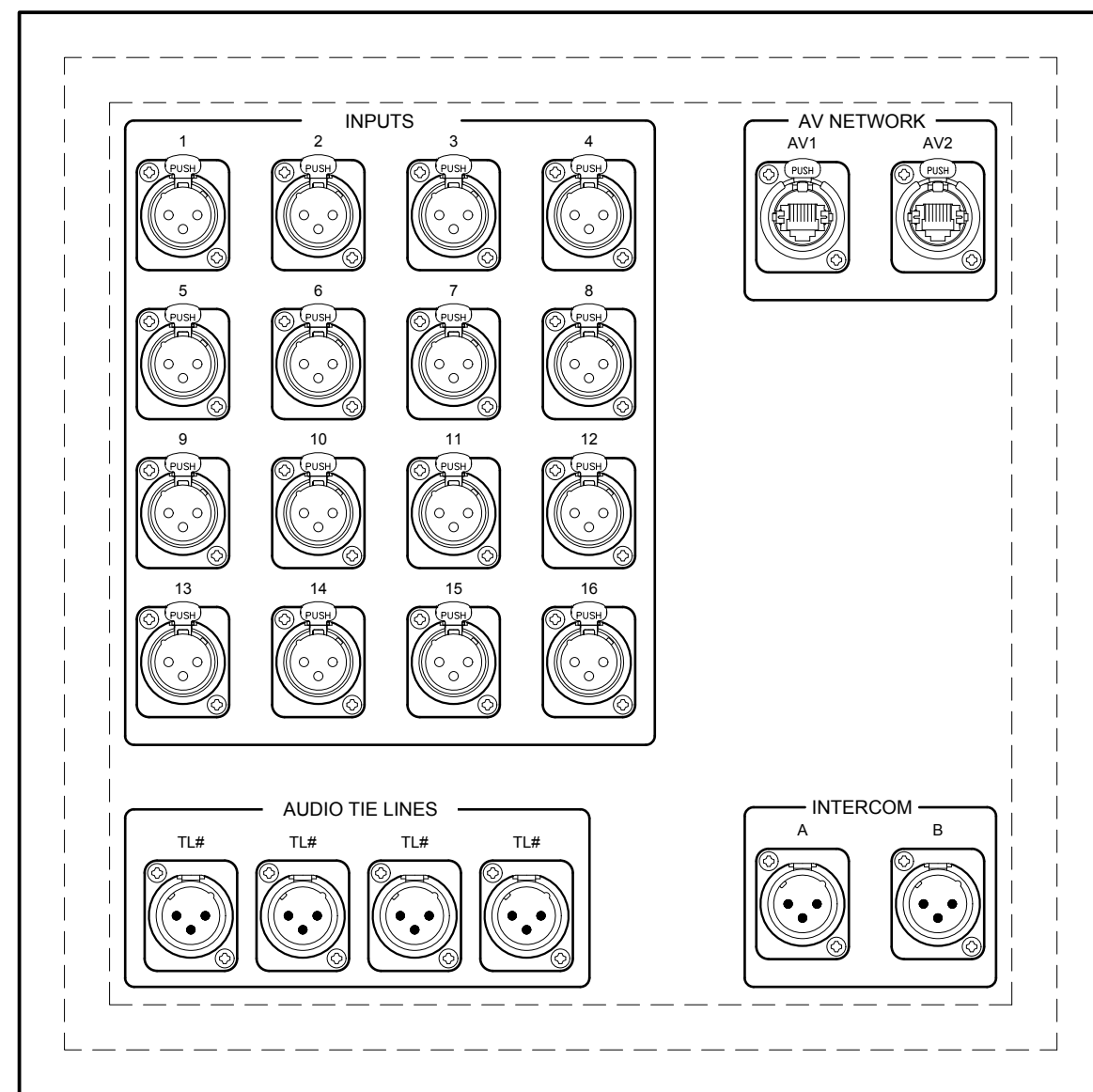
7 STAGE EQUIPMENT RACK - PRESS FEED RACK PANEL  
6" = 1'-0"



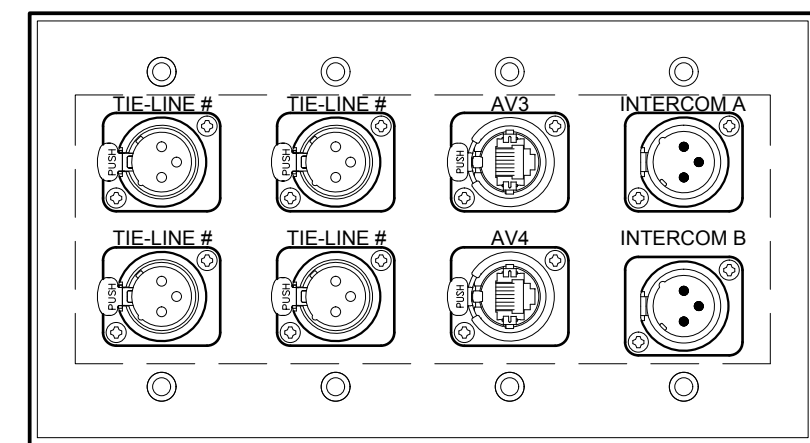
2 MAIN EQUIPMENT RACK - HANGING MICROPHONE RACK PANEL  
6" = 1'-0"



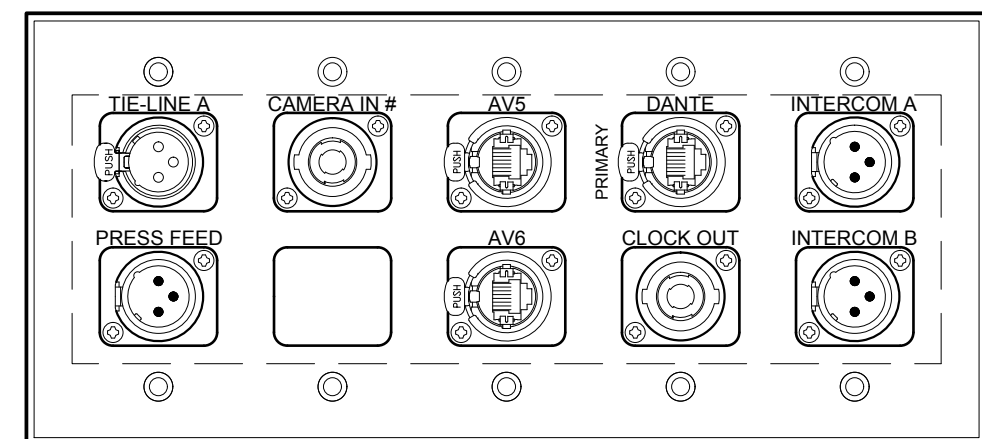
4 STAGE EQUIPMENT RACK - AUX RACK PANEL  
6" = 1'-0"



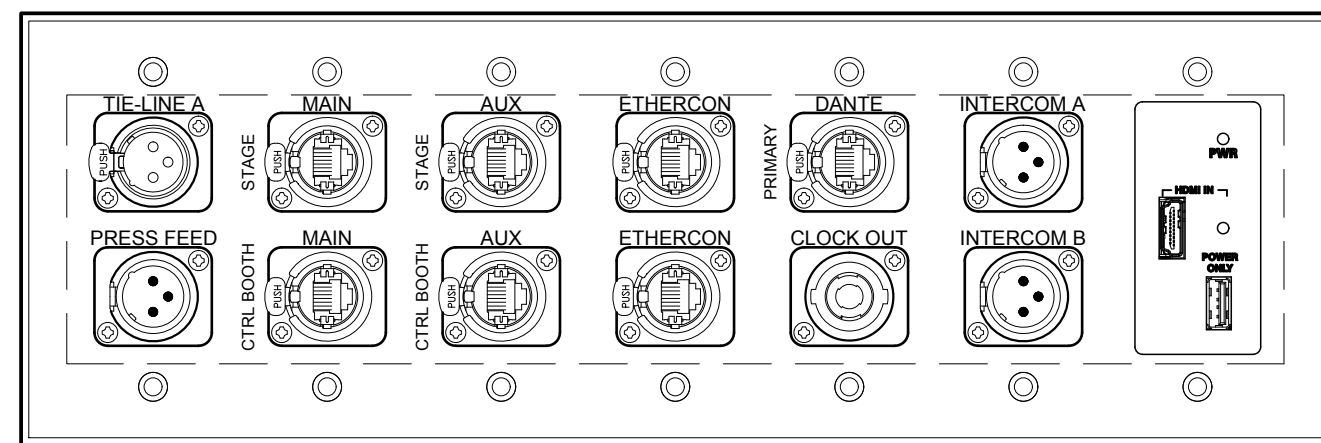
8 FACEPLATE DETAIL - SP1  
6" = 1'-0"



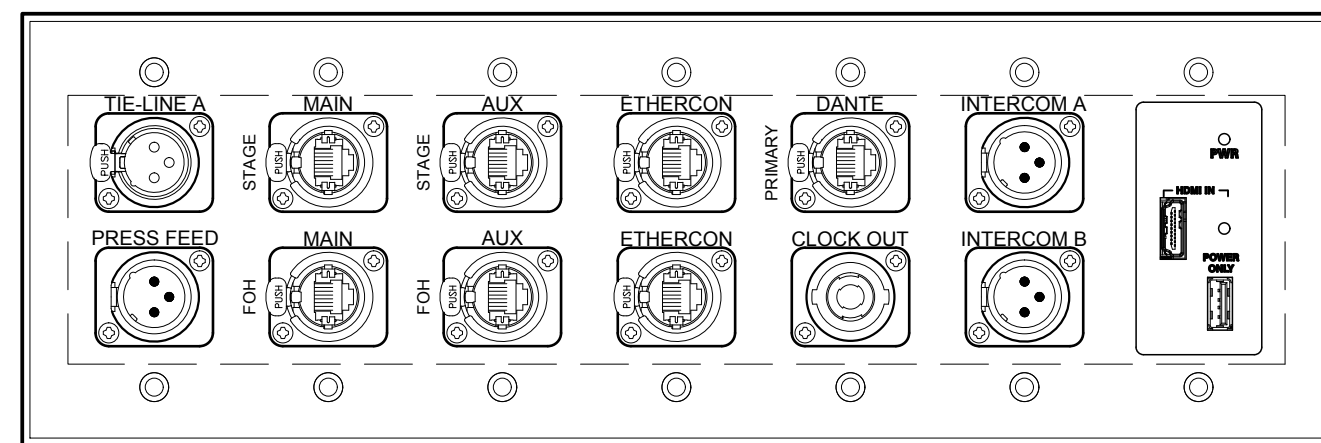
9 FACEPLATE DETAIL - SP2  
6" = 1'-0"



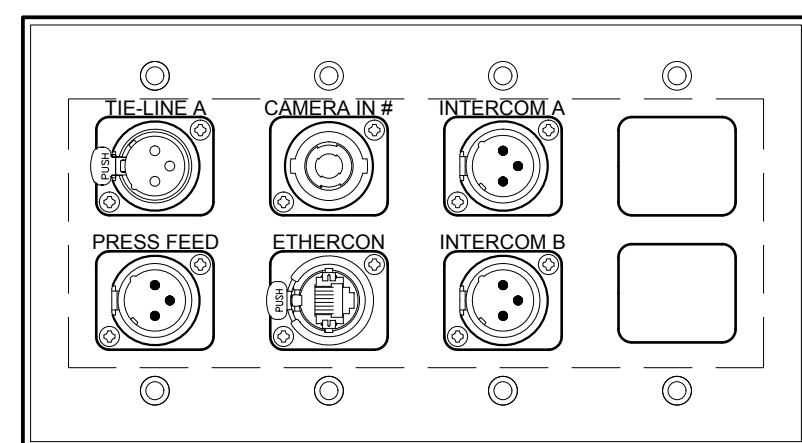
10 FACEPLATE DETAIL - SP3  
6" = 1'-0"



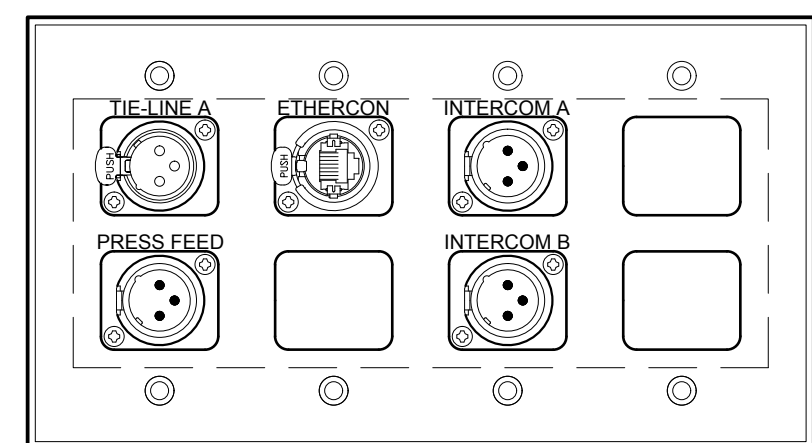
11 FACEPLATE DETAIL - MX  
6" = 1'-0"



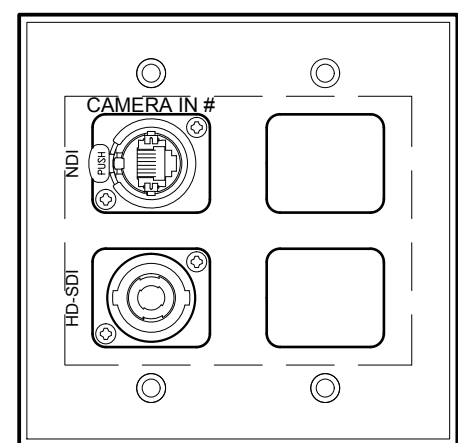
12 FACEPLATE DETAIL - MXP  
6" = 1'-0"



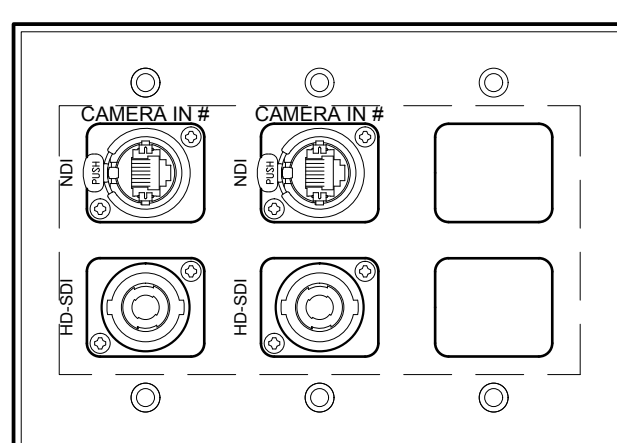
13 FACEPLATE DETAIL - SWP  
6" = 1'-0"



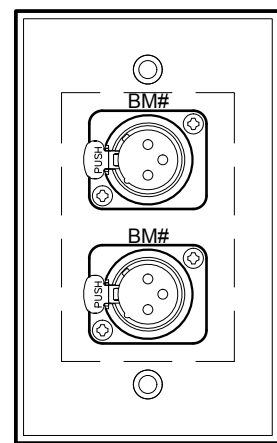
14 FACEPLATE DETAIL - USP  
6" = 1'-0"



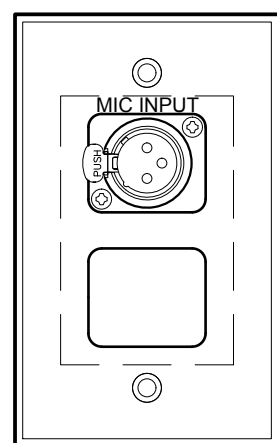
15 FACEPLATE DETAIL - CA  
6" = 1'-0"



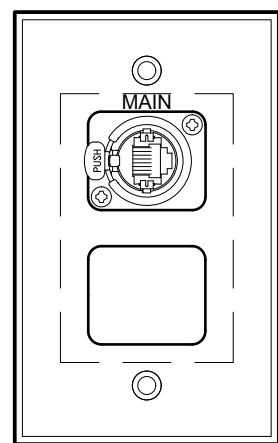
16 FACEPLATE DETAIL - CA2  
6" = 1'-0"



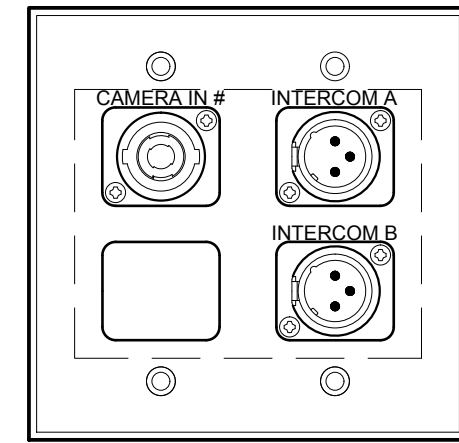
17 FACEPLATE DETAIL - BM  
6" = 1'-0"



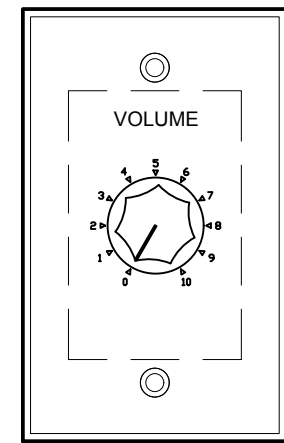
18 FACEPLATE DETAIL - R  
6" = 1'-0"



19 FACEPLATE DETAIL - VP  
6" = 1'-0"



20 FACEPLATE DETAIL - BP  
6" = 1'-0"

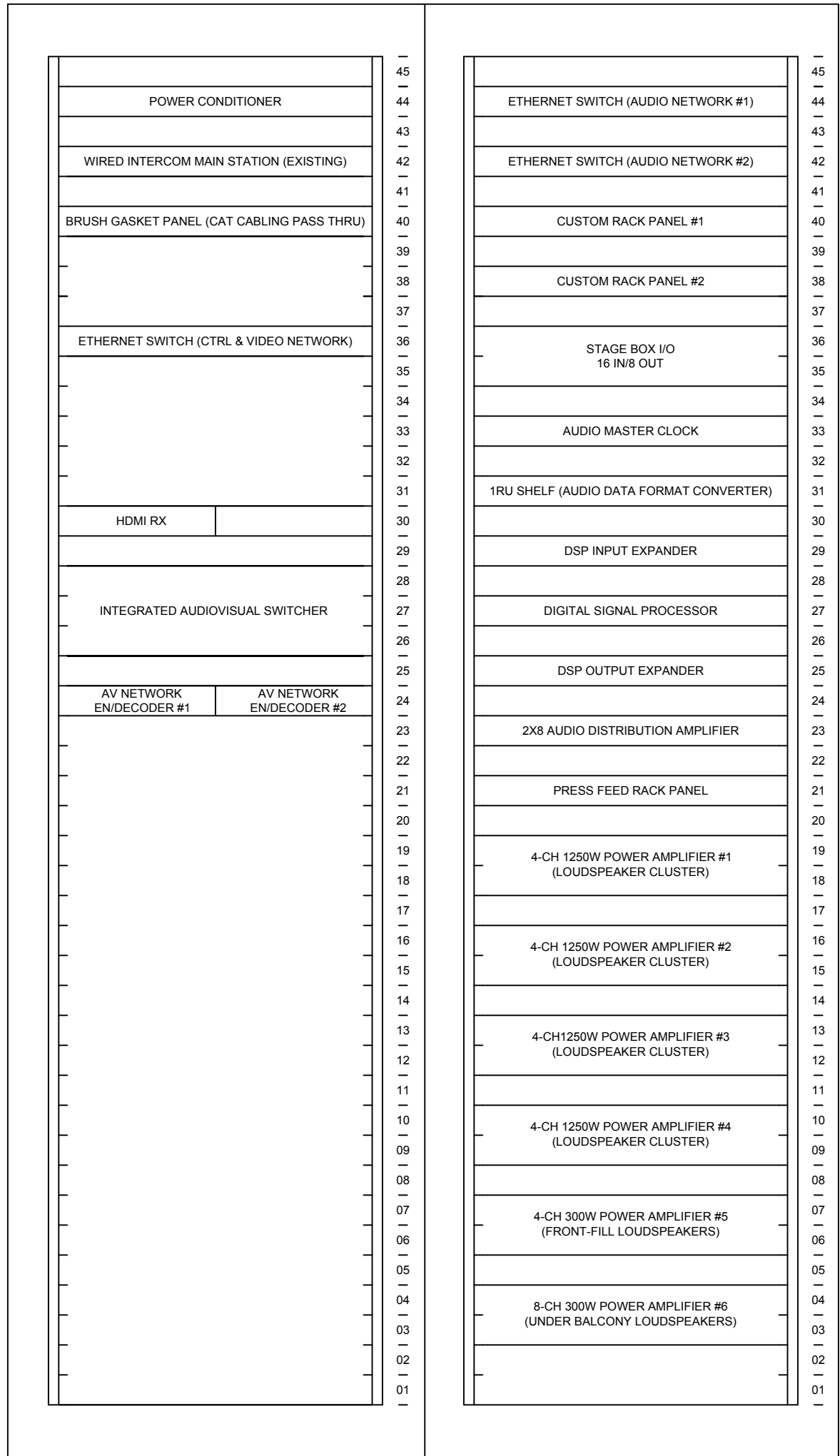


21 FACEPLATE DETAIL - VC  
6" = 1'-0"

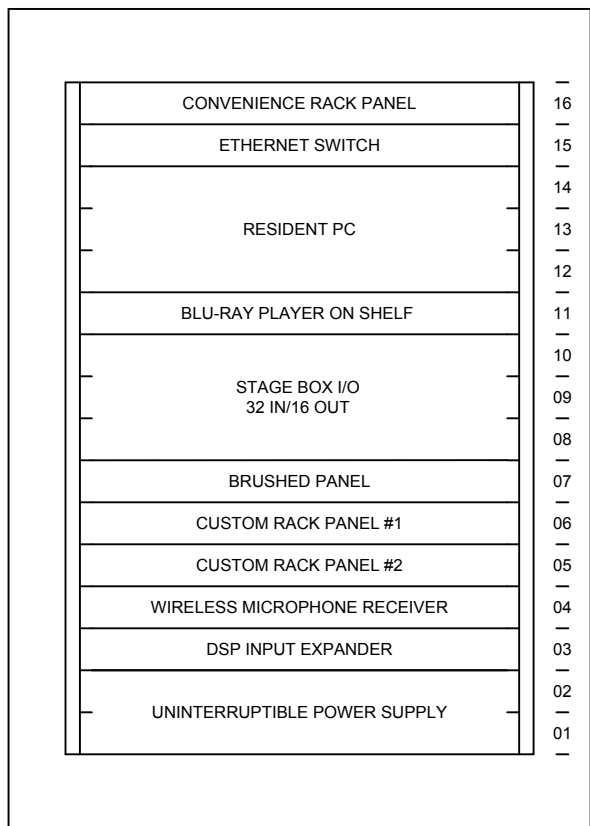
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT	
CITY OF BROCKTON BROCKTON HIGH SCHOOL AUDITORIUM UPGRADE	
TITLE	
AUDITORIUM AND TV STUDIO PLATE DETAILS	

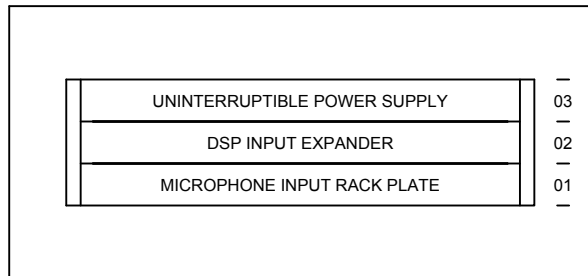
PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



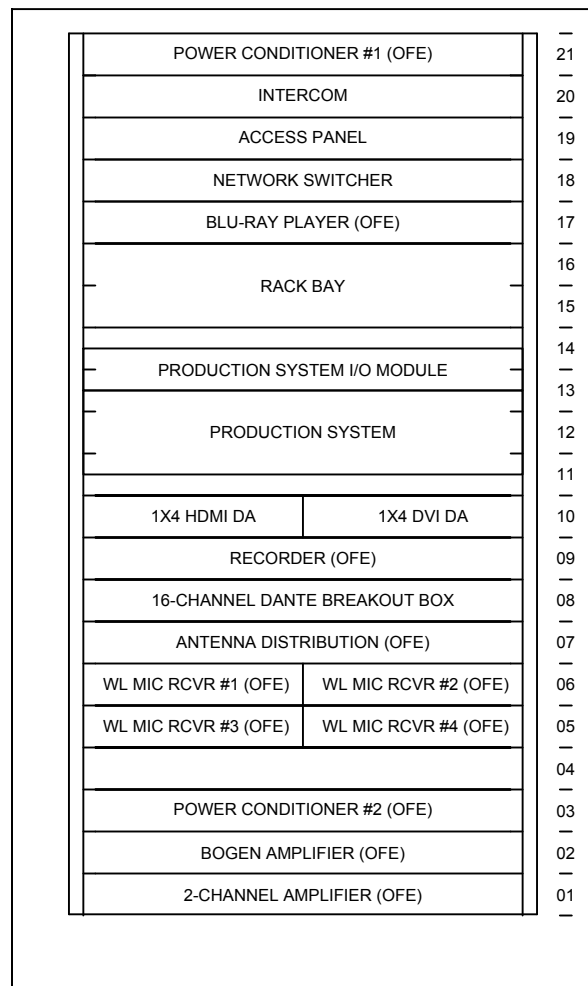
1 MAIN EQUIPMENT RACK  
1-1/2" = 1'-0"



2 STAGE EQUIPMENT RACK  
1-1/2" = 1'-0"



3 PORTABLE EQUIPMENT RACK  
1-1/2" = 1'-0"



4 TV STUDIO EQUIPMENT RACK  
1-1/2" = 1'-0"

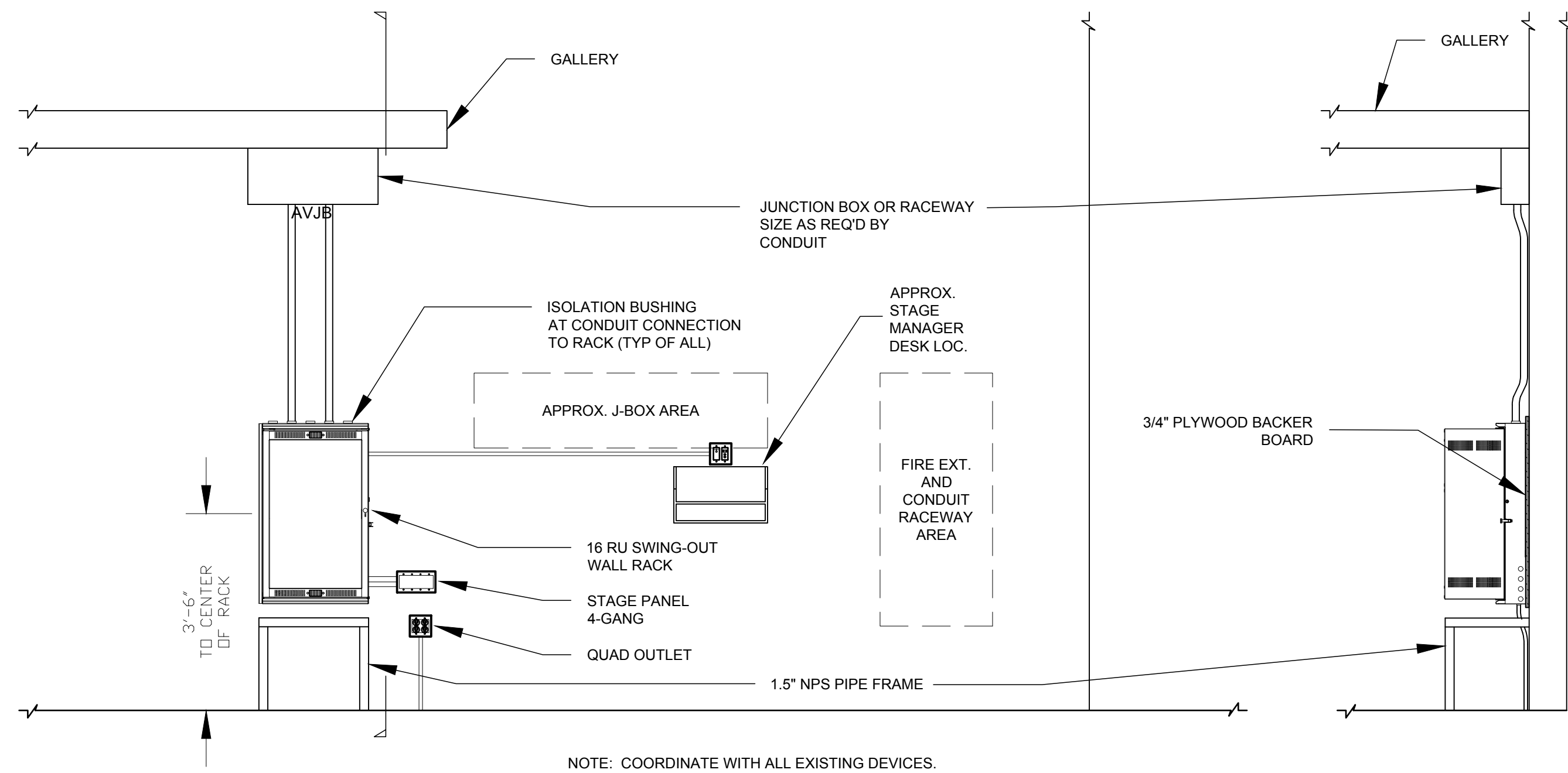
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

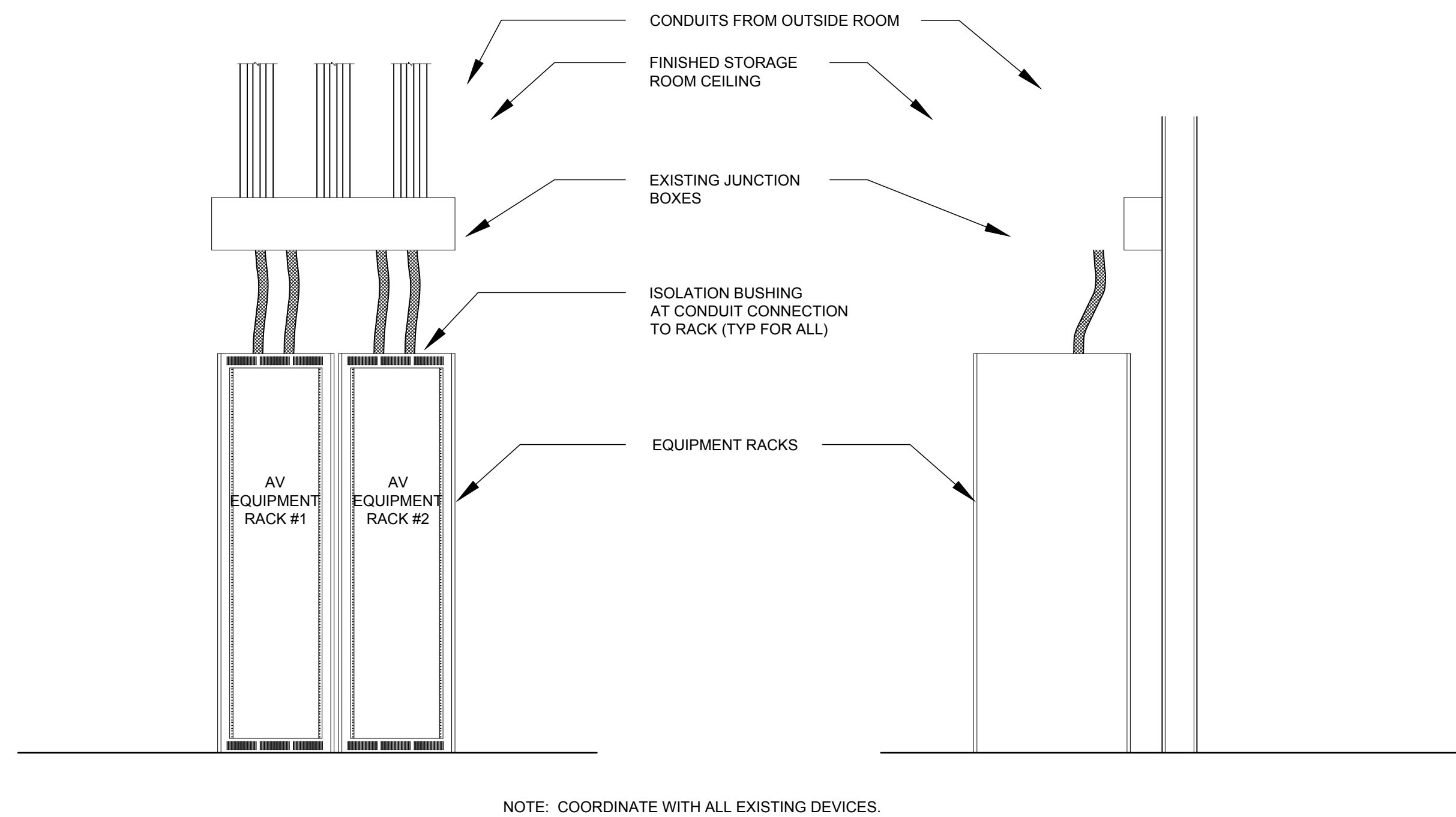
TITLE  
AUDITORIUM  
AND TV STUDIO  
RACK ELEVATIONS

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10





1 EQUIPMENT RACK ELEVATION DETAIL - AUDITORIUM STAGE  
1/2"=1'-0"



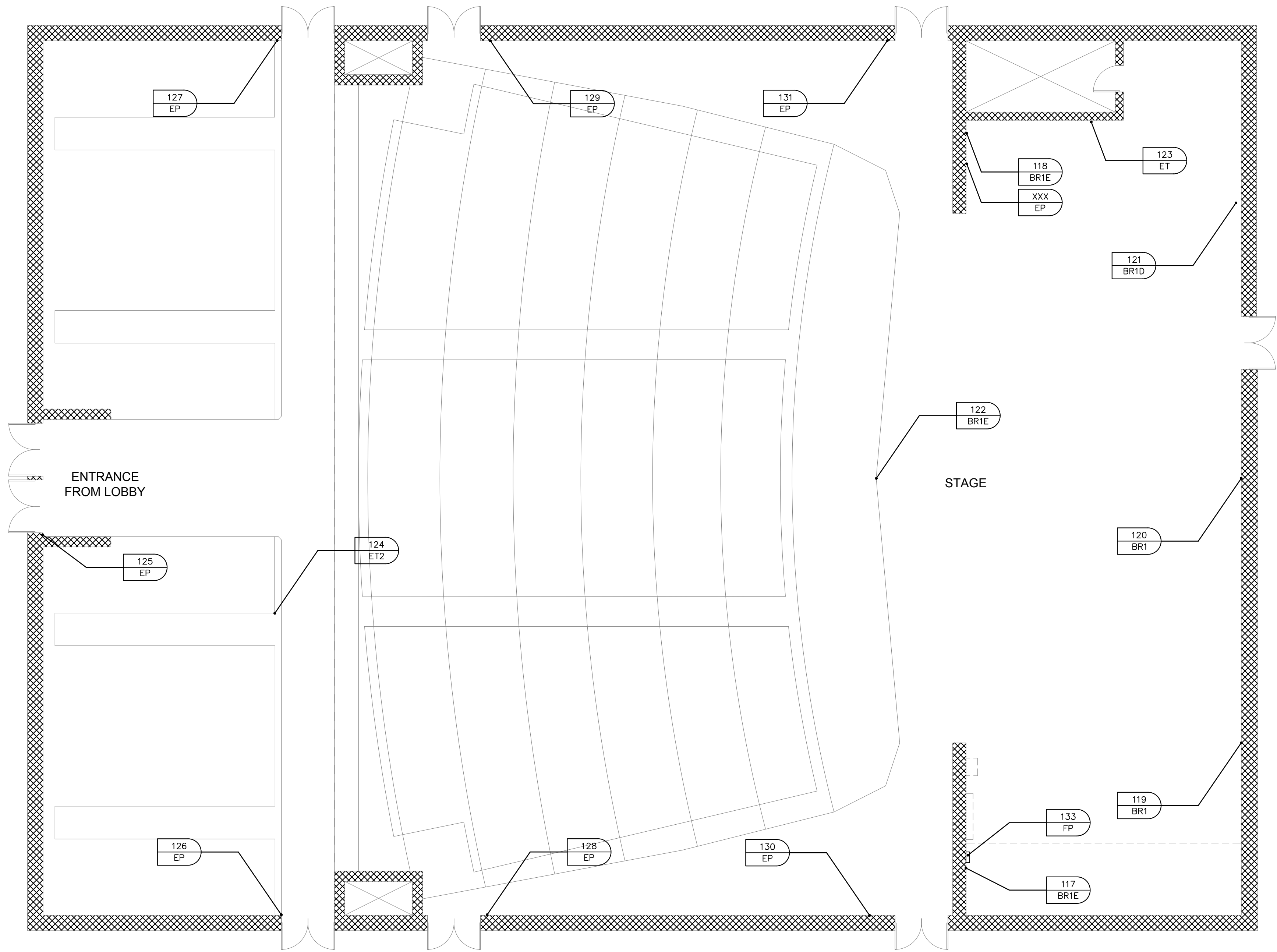
2 EQUIPMENT RACK ELEVATION DETAIL - AUDITORIUM CONTROL BOOTH  
1/2"=1'-0"

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

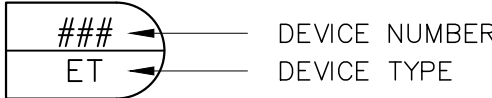
TITLE  
AUDITORIUM AV SYSTEM  
SECTIONS AND  
ELEVATIONS

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



1 FIRST FLOOR - THEATRICAL LIGHTING  
1/8" = 1'-0"

DEVICE KEY



REFERENCE SCHEDULE FOR QUANTITY  
AND CAPACITY OF CIRCUITS IN DEVICE

DEVICES



ETHERNET TAP  
ONE-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



DUAL ETHERNET TAP  
TWO-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



CONSOLE CONNECTION PANEL  
THREE-GANG DEVICE, MOUNT AT  
PROJECT RECEPTACLE HEIGHT.



ENTRY STATION SINGLE GANG DEVICE  
MOUNT AT PROJECT SWITCH HEIGHT  
UNLESS OTHERWISE NOTED.



FADER PANEL FOUR-GANG DEVICE  
MOUNT AT SWITCH HEIGHT UNLESS  
OTHERWISE NOTED.



ARCHITECTURAL LIGHTING  
PROCESSOR  
RACK MOUNTED.



ETHERNET SWITCH AND PATCHBAY  
RACK MOUNTED



FADER PANEL  
MOUNT AT PROJECT SWITCH HEIGHT



BOX WITH RECEPTACLES  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



BOX WITH RECEPTACLES, DMX OUTPUT  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT UNLESS OTHERWISE NOTED



BOX WITH RECEPTACLES, ETHERNET  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET. MOUNT TO EXISTING PIPE  
BATTENS.

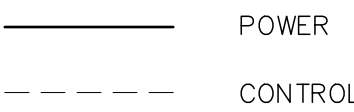


STRIP WITH PIGTAILS



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET

RISER DIAGRAM WIRING KEY



CONTROL WIRING LEGEND

TYPE	WIRE TYPE(S)	SIGNAL
A	(1) BELDEN 8471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG	ARCH. CTRL.
B	(1) BELDEN 1583A	NETWORK
C	(1) BELDEN 9729	DMX

NOTES

- ALL CIRCUITS HOME-RUN TO DIMMER ROOM FOR TERMINATION IN DIMMER RACK OR RELAY PANEL. NO COMMON NEUTRALS PERMITTED. EACH CIRCUIT MUST HAVE A DEDICATED NEUTRAL RUN TO THE DIMMER RACK.
- ALL DEVICES MOUNTED AT 18" AFF UNLESS OTHERWISE NOTED.
- ALL EXPOSED SURFACES ON STAGE DEVICES FINISHED MATTE BLACK UNLESS OTHERWISE NOTED.
- PROVIDE BRACKETS AND HARDWARE FOR MOUNTING CONTROL AND DISTRIBUTION DEVICES AS REQUIRED.
- ALL LOW-VOLTAGE CONTROL WIRING INSTALLED IN METAL CONDUIT.
- FINAL CONTROL WIRING TYPES AND TOPOLOGY TO BE CONFIRMED BY MANUFACTURER.

CAVANAUGHTOCCI

327 F BOSTON POST ROAD  
SUDBURY, MA 01776 978.443.7871

REVISIONS

NO.	DESCRIPTION	DATE

PROJECT

CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE

THEATRICAL LIGHTING  
PLAN  
FIRST FLOOR

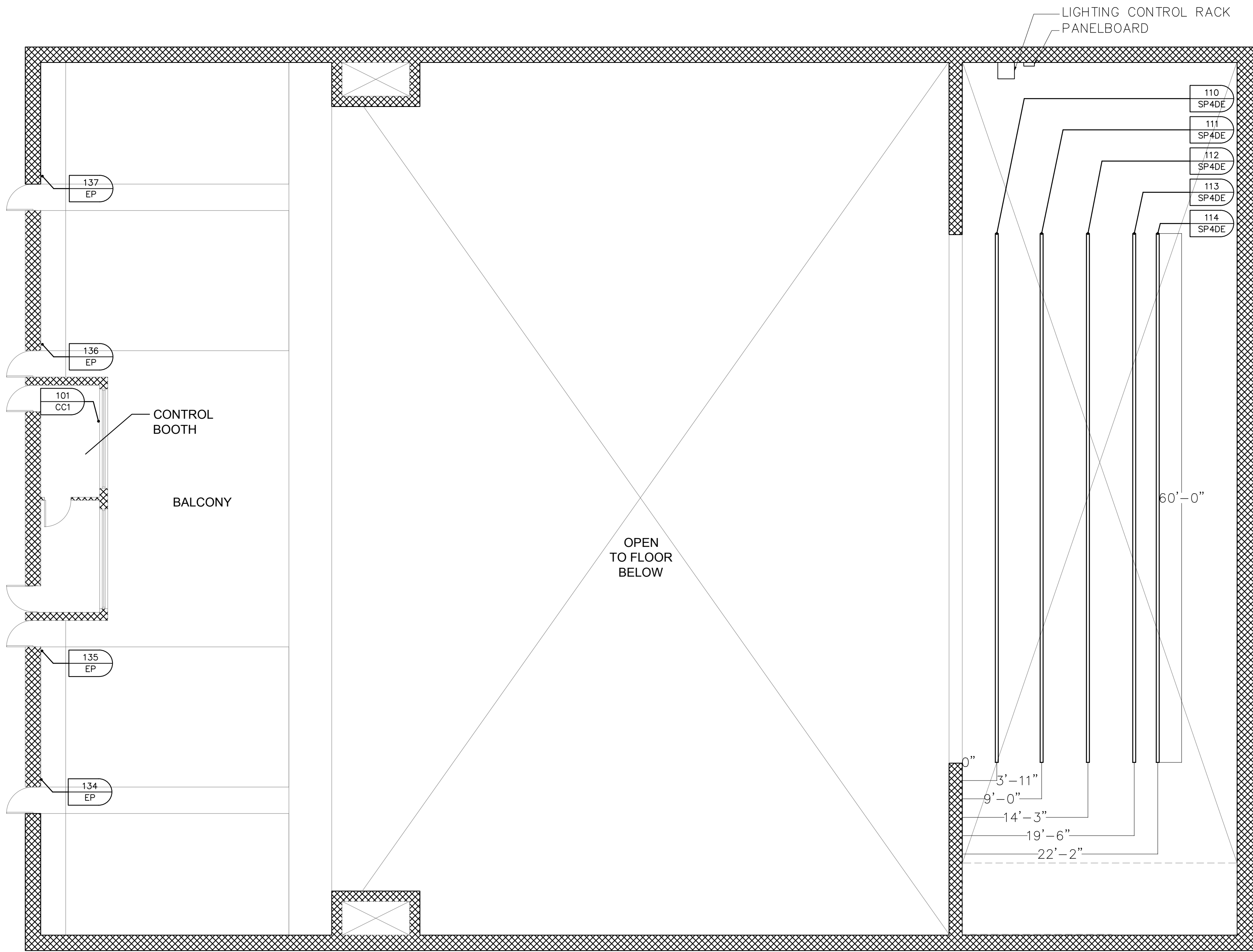
PROJECT NUMBER 19014

DRAWN BY MDB

SCALE AS NOTED

DATE 2019.06.10

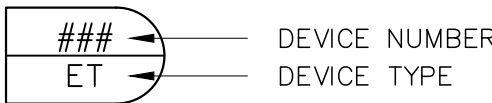
TL1



1 SECOND FLOOR - THEATRICAL LIGHTING

1/8" = 1'-0"

DEVICE KEY

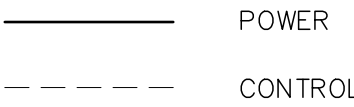


REFERENCE SCHEDULE FOR QUANTITY AND CAPACITY OF CIRCUITS IN DEVICE

DEVICES

- ### ET ETHERNET TAP ONE-GANG DEVICE MOUNT AT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED.
- ### ET2 DUAL ETHERNET TAP TWO-GANG DEVICE MOUNT AT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED.
- ### CC1 CONSOLE CONNECTION PANEL THREE-GANG DEVICE MOUNT AT PROJECT RECEPTACLE HEIGHT.
- ### EP ENTRY STATION SINGLE GANG DEVICE MOUNT AT PROJECT SWITCH HEIGHT UNLESS OTHERWISE NOTED.
- ### FP FADER PANEL FOUR-GANG DEVICE MOUNT AT SWITCH HEIGHT UNLESS OTHERWISE NOTED.
- ### AP ARCHITECTURAL LIGHTING PROCESSOR RACK MOUNTED.
- ### ES ETHERNET SWITCH AND PATCHBAY RACK MOUNTED
- ### FP FADER PANEL MOUNT AT PROJECT SWITCH HEIGHT
- ### BR1 BOX WITH RECEPTACLES MOUNT AT PROJECT RECEPTACLE HEIGHT
- ### BR1D BOX WITH RECEPTACLES, DMX OUTPUT MOUNT AT PROJECT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED
- ### BR1E BOX WITH RECEPTACLES, ETHERNET MOUNT AT PROJECT RECEPTACLE HEIGHT
- ### SP4DE STRIP WITH PIGTAILS, DMX OUTPUT, ETHERNET. MOUNT TO EXISTING PIPE BATTENS.
- ### SP2 STRIP WITH PIGTAILS
- ### SP2DE STRIP WITH PIGTAILS, DMX OUTPUT, ETHERNET

RISER DIAGRAM WIRING KEY



CONTROL WIRING LEGEND

TYPE	WIRE TYPE(S)	SIGNAL
A	(1) BELDEN 8471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG	ARCH. CTRL.
B	(1) BELDEN 1583A	NETWORK
C	(1) BELDEN 9729	DMX

NOTES

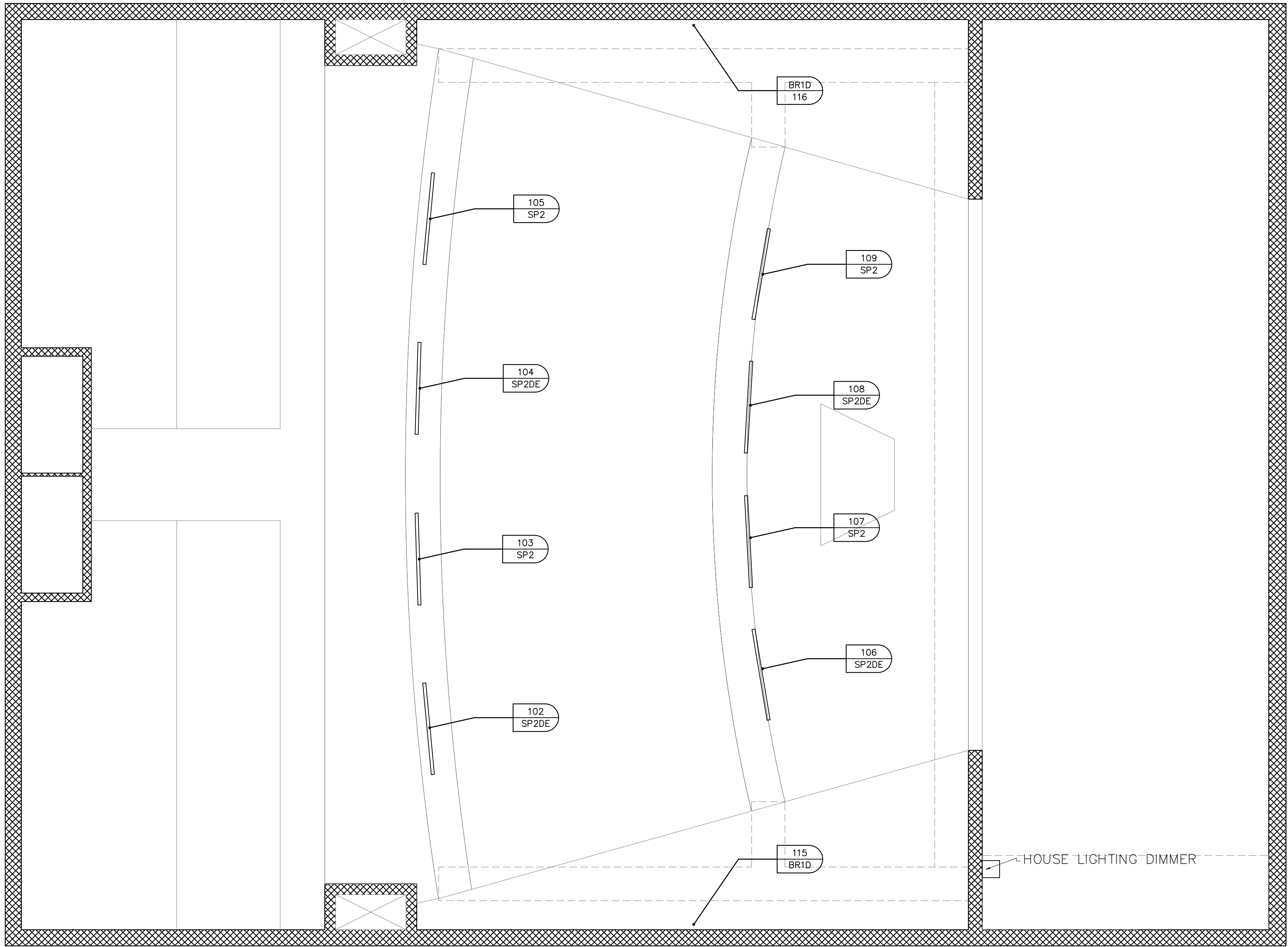
- ALL CIRCUITS HOME-RUN TO DIMMER ROOM FOR TERMINATION IN DIMMER RACK OR RELAY PANEL.
- NO COMMON NEUTRALS PERMITTED. EACH CIRCUIT MUST HAVE A DEDICATED NEUTRAL RUN TO THE DIMMER RACK.
- ALL DEVICES MOUNTED AT 18" AFF UNLESS OTHERWISE NOTED.
- ALL EXPOSED SURFACES ON ONSTAGE DEVICES FINISHED MATTE BLACK UNLESS OTHERWISE NOTED.
- PROVIDE BRACKETS AND HARDWARE FOR MOUNTING CONTROL AND DISTRIBUTION DEVICES AS REQUIRED.
- ALL LOW-VOLTAGE CONTROL WIRING INSTALLED IN METAL CONDUIT.
- FINAL CONTROL WIRING TYPES AND TOPOLOGY TO BE CONFIRMED BY MANUFACTURER.

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

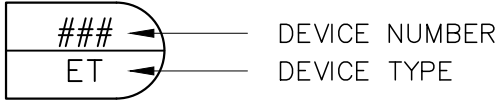
TITLE  
THEATRICAL LIGHTING  
PLAN  
SECOND FLOOR

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10



1 SECOND FLOOR, CEILING - THEATRICAL LIGHTING  
1/8" = 1'-0"

DEVICE KEY



REFERENCE SCHEDULE FOR QUANTITY  
AND CAPACITY OF CIRCUITS IN DEVICE

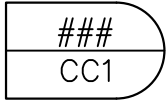
DEVICES



ETHERNET TAP  
ONE-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



DUAL ETHERNET TAP  
TWO-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



CONSOLE CONNECTION PANEL  
THREE-GANG DEVICE. MOUNT AT  
PROJECT RECEPTACLE HEIGHT.



ENTRY STATION SINGLE GANG DEVICE.  
MOUNT AT PROJECT SWITCH HEIGHT  
UNLESS OTHERWISE NOTED.



FADER PANEL FOUR-GANG DEVICE.  
MOUNT AT SWITCH HEIGHT UNLESS  
OTHERWISE NOTED.



ARCHITECTURAL LIGHTING  
PROCESSOR  
RACK MOUNTED.



ETHERNET SWITCH AND PATCHBAY  
RACK MOUNTED



FADER PANEL  
MOUNT AT PROJECT SWITCH HEIGHT



BOX WITH RECEPTACLES  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



BOX WITH RECEPTACLES, DMX OUTPUT  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT UNLESS OTHERWISE NOTED



BOX WITH RECEPTACLES, ETHERNET  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET. MOUNT TO EXISTING PIPE  
BATTENS.

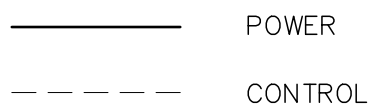


STRIP WITH PIGTAILS



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET

RISER DIAGRAM WIRING KEY



CONTROL WIRING LEGEND

TYPE	WIRE TYPE(S)	SIGNAL
A	(1) BELDEN 8471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG	ARCH. CTRL.
B	(1) BELDEN 1583A	NETWORK
C	(1) BELDEN 9729	DMX

NOTES

- ALL CIRCUITS HOME-RUN TO DIMMER ROOM FOR TERMINATION IN DIMMER RACK OR RELAY PANEL.
- NO COMMON NEUTRALS PERMITTED. EACH CIRCUIT MUST HAVE A DEDICATED NEUTRAL RUN TO THE DIMMER RACK.
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- ALL EXPOSED SURFACES ON ONSTAGE DEVICES FINISHED MATTE BLACK UNLESS OTHERWISE NOTED.
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- ALL LOW-VOLTAGE CONTROL WIRING INSTALLED IN METAL CONDUIT.
- FINAL CONTROL WIRING TYPES AND TOPOLOGY TO BE CONFIRMED BY MANUFACTURER.

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REVISIONS

NO.	DESCRIPTION	DATE

PROJECT

CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE

THEATRICAL LIGHTING  
SECOND FLOOR  
CEILING PLAN

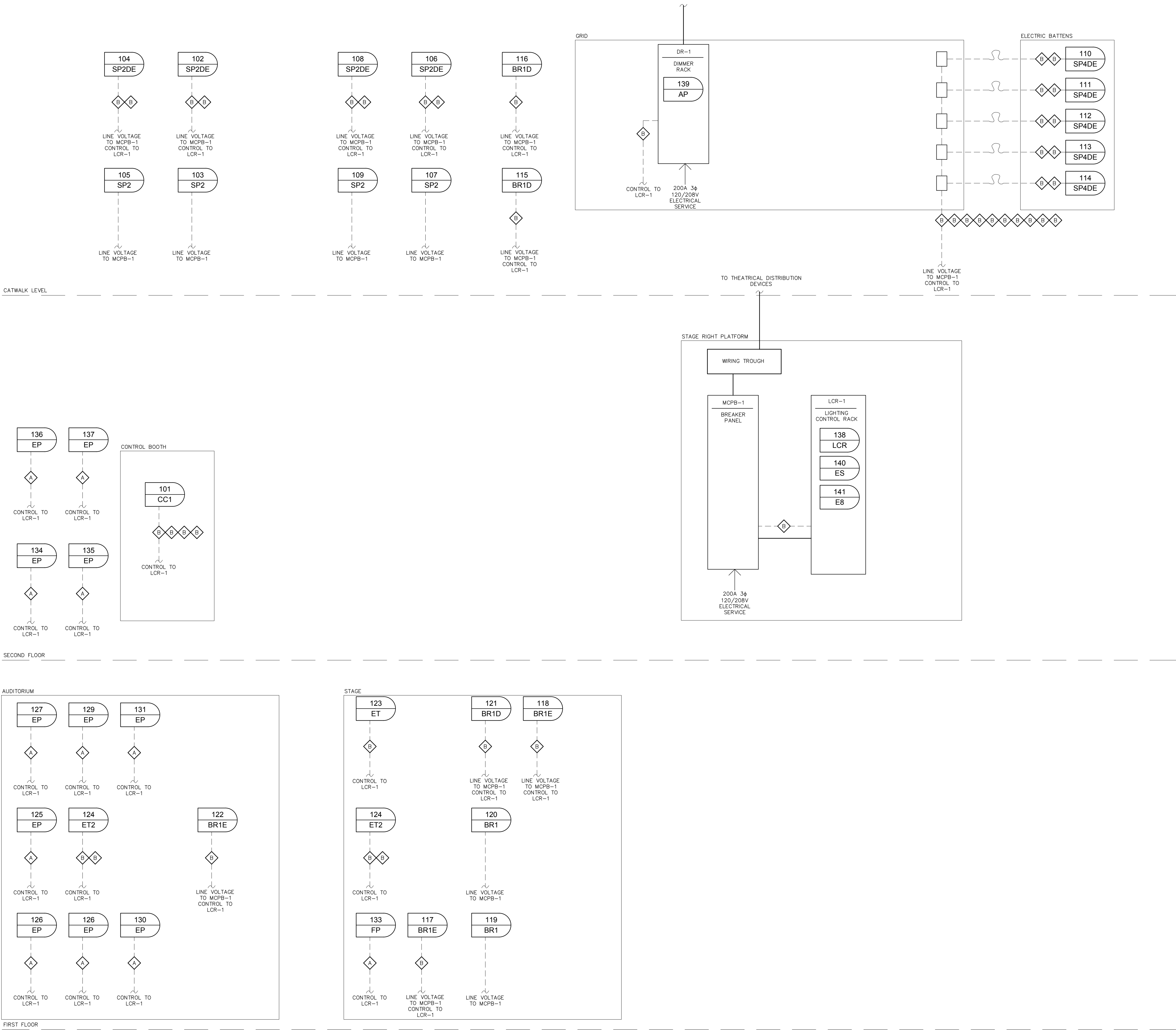
PROJECT NUMBER 19014

DRAWN BY MDB

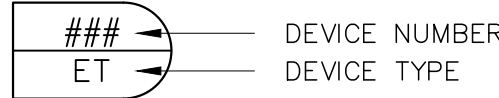
SCALE AS NOTED

DATE 2019.06.10

TL3



DEVICE KEY

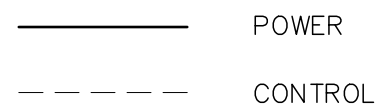


REFERENCE SCHEDULE FOR QUANTITY AND CAPACITY OF CIRCUITS IN DEVICE

DEVICES

- ### ET: ETHERNET TAP ONE-GANG DEVICE MOUNT AT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED.
- ### ET2: DUAL ETHERNET TAP TWO-GANG DEVICE MOUNT AT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED.
- ### CC1: CONSOLE CONNECTION PANEL THREE-GANG DEVICE MOUNT AT PROJECT RECEPTACLE HEIGHT.
- ### EP: ENTRY STATION SINGLE GANG DEVICE MOUNT AT PROJECT SWITCH HEIGHT UNLESS OTHERWISE NOTED.
- ### FP: FADER PANEL FOUR-GANG DEVICE MOUNT AT SWITCH HEIGHT UNLESS OTHERWISE NOTED.
- ### AP: ARCHITECTURAL LIGHTING PROCESSOR RACK MOUNTED.
- ### ES: ETHERNET SWITCH AND PATCHBAY RACK MOUNTED.
- ### FP: FADER PANEL MOUNT AT PROJECT SWITCH HEIGHT.
- ### BR1: BOX WITH RECEPTACLES MOUNT AT PROJECT RECEPTACLE HEIGHT.
- ### BR1D: BOX WITH RECEPTACLES, DMX OUTPUT MOUNT AT PROJECT RECEPTACLE HEIGHT UNLESS OTHERWISE NOTED.
- ### BR1E: BOX WITH RECEPTACLES, ETHERNET MOUNT AT PROJECT RECEPTACLE HEIGHT.
- ### SP4DE: STRIP WITH PIGTAILS, DMX OUTPUT, ETHERNET. MOUNT TO EXISTING PIPE BATTENS.
- ### SP2: STRIP WITH PIGTAILS.
- ### SP2DE: STRIP WITH PIGTAILS, DMX OUTPUT, ETHERNET.

RISER DIAGRAM WIRING KEY



CONTROL WIRING LEGEND

TYPE	WIRE TYPE(S)	SIGNAL
A	(1) BELDEN 8471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG	ARCH. CTRL.
B	(1) BELDEN 1583A	NETWORK
C	(1) BELDEN 9729	DMX

NOTES

- ALL CIRCUITS HOME-RUN TO DIMMER ROOM FOR TERMINATION IN DIMMER RACK OR RELAY PANEL. NO COMMON NEUTRALS PERMITTED. EACH CIRCUIT MUST HAVE A DEDICATED NEUTRAL RUN TO THE DIMMER RACK.
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- PROVIDE BRACKETS AND HARDWARE FOR MOUNTING CONTROL AND DISTRIBUTION DEVICES AS REQUIRED.
- ALL LOW-VOLTAGE CONTROL WIRING INSTALLED IN METAL CONDUIT.
- FINAL CONTROL WIRING TYPES AND TOPOLOGY TO BE CONFIRMED BY MANUFACTURER.

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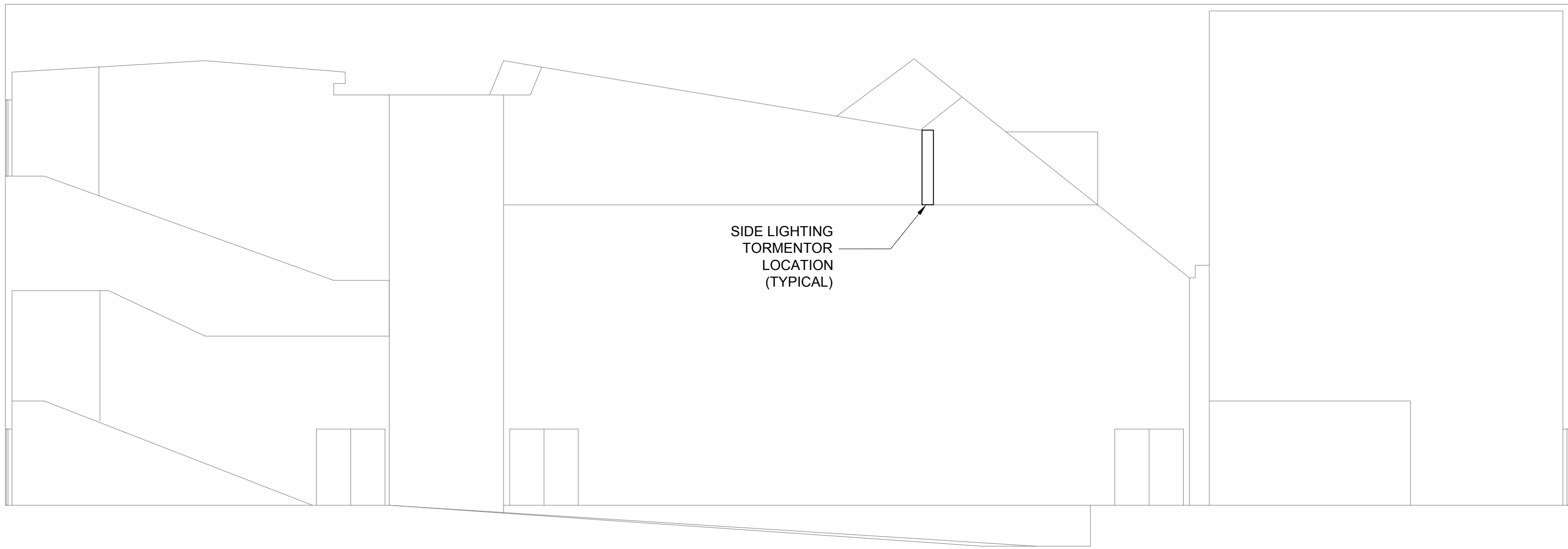
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

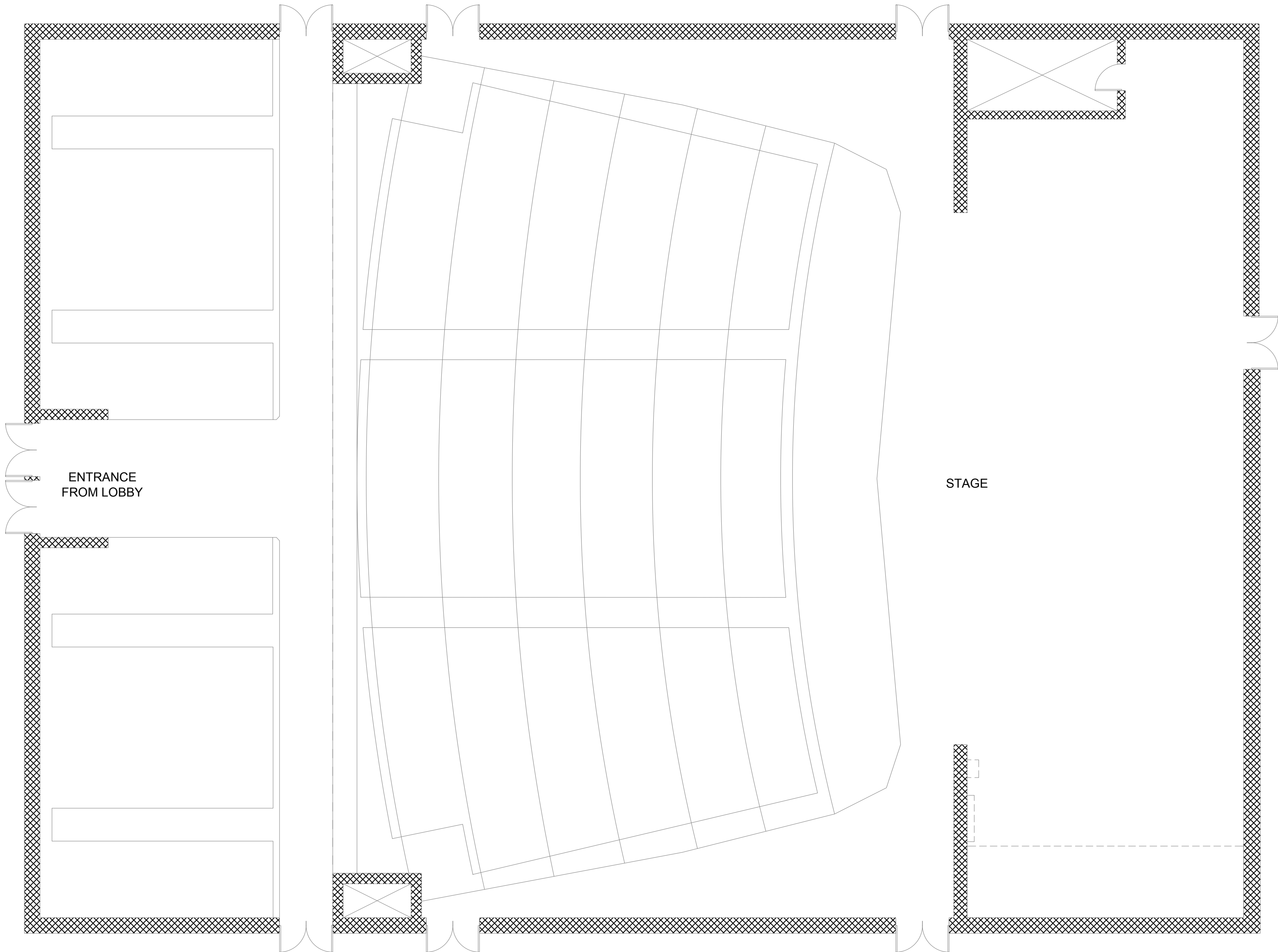
TITLE  
THEATRICAL LIGHTING  
CONDUIT RISER

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

TL4

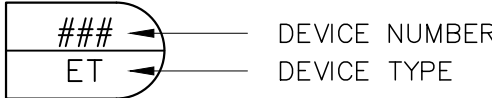


1 THEATRICAL LIGHTING - WEST ELEVATION  
1/8" = 1'-0"



2 THEATRICAL LIGHTING - DEMOLITION PLAN  
1/8" = 1'-0"

DEVICE KEY



REFERENCE SCHEDULE FOR QUANTITY  
AND CAPACITY OF CIRCUITS IN DEVICE

DEVICES



ETHERNET TAP  
ONE-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



DUAL ETHERNET TAP  
TWO-GANG DEVICE  
MOUNT AT RECEPTACLE HEIGHT  
UNLESS OTHERWISE NOTED.



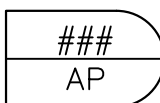
CONSOLE CONNECTION PANEL  
THREE-GANG DEVICE. MOUNT AT  
PROJECT RECEPTACLE HEIGHT.



ENTRY STATION SINGLE GANG DEVICE.  
MOUNT AT PROJECT SWITCH HEIGHT  
UNLESS OTHERWISE NOTED.



FADER PANEL FOUR-GANG DEVICE.  
MOUNT AT SWITCH HEIGHT UNLESS  
OTHERWISE NOTED.



ARCHITECTURAL LIGHTING  
PROCESSOR  
RACK MOUNTED.



ETHERNET SWITCH AND PATCHBAY  
RACK MOUNTED



FADER PANEL  
MOUNT AT PROJECT SWITCH HEIGHT



BOX WITH RECEPTACLES  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



BOX WITH RECEPTACLES, DMX OUTPUT  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT UNLESS OTHERWISE NOTED



BOX WITH RECEPTACLES, ETHERNET  
MOUNT AT PROJECT RECEPTACLE  
HEIGHT



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET. MOUNT TO EXISTING PIPE  
BATTENS.

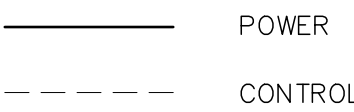


STRIP WITH PIGTAILS



STRIP WITH PIGTAILS, DMX OUTPUT,  
ETHERNET

RISER DIAGRAM WIRING KEY



CONTROL WIRING LEGEND

TYPE	WIRE TYPE(S)	SIGNAL
A	(1) BELDEN 8471 (1) #14 AWG. STRANDED WIRE (2) #16 AWG	ARCH. CTRL.
B	(1) BELDEN 1583A	NETWORK
C	(1) BELDEN 9729	DMX

NOTES

- ALL CIRCUITS HOME-RUN TO DIMMER ROOM FOR TERMINATION IN DIMMER RACK OR RELAY PANEL.
- NO COMMON NEUTRALS PERMITTED. EACH CIRCUIT MUST HAVE A DEDICATED NEUTRAL RUN TO THE DIMMER RACK.
- ALL DEVICES MOUNTED AT 18" AFF UNLESS OTHERWISE NOTED.
- ALL EXPOSED SURFACES ON ONSTAGE DEVICES FINISHED MATTE BLACK UNLESS OTHERWISE NOTED.
- PROVIDE BRACKETS AND HARDWARE FOR MOUNTING CONTROL AND DISTRIBUTION DEVICES AS REQUIRED.
- ALL LOW-VOLTAGE CONTROL WIRING INSTALLED IN METAL CONDUIT.
- FINAL CONTROL WIRING TYPES AND TOPOLOGY TO BE CONFIRMED BY MANUFACTURER.

REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

TITLE  
THEATRICAL LIGHTING  
ELEVATIONS AND  
DEMOLITION PLAN

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

DEVICE	LOCATION	BOX TYPE	MOUNTING	FINISH	COMMENTS	DMX OUT	ETHERNET	1P SWITCHED		DIMMED	
								QTY	CIRC#	QTY	CIRC#
101	CONTROL BOOTH	CC1	SURFACE				2				
102	2ND CATWALK	SP2DE	SURFACE			1	1	2	1 - 2		
103	2ND CATWALK	SP2	SURFACE					2	3 - 4		
104	2ND CATWALK	SP2E	SURFACE				1	2	4 - 5		
105	2ND CATWALK	SP2	SURFACE					2	6 - 7		
106	1 CATWALK	SP2DE	SURFACE			1	1	2	8 - 9		
107	1 CATWALK	SP2	SURFACE					2	10 - 11		
108	1 CATWALK	SP2E	SURFACE				1	2	12 - 13		
109	1 CATWALK	SP2	SURFACE					2	14 - 15		
110	1 ELECTRIC	SP4DE	PIPE					4	16 - 19		
111	2 ELECTRIC	SP4DE	PIPE					4	20 - 23		
112	3 ELECTRIC	SP4DE	PIPE					4	24 - 27		
113	4 ELECTRIC	SP4DE	PIPE					4	28 - 31		
114	5 ELECTRIC	SP4DE	PIPE					4	32 - 35		
115	HR TORM	BR1D				1		1	36 - 36		
116	HL TORM	BR1D				1		1	37 - 37		
117	SL WALL	BR1E					1	1	38 - 38		
118	SR WALL	BR1E					1	1	39 - 39		
119	UPSTAGE LEFT	BR1	SURFACE					1	40 - 40		
120	UPSTAGE CENTER	BR1	SURFACE					1	41 - 41		
121	UPSTAGE RIGHT	BR1D	SURFACE					1	42 - 42		
122	PIT WALL	BR1E	SURFACE			1		1	43 - 43		
123	BOH	ET					1				
124	FOH	ET2					2				
125	CENTER ENTRY	EP									
126	UPPER HOUSE RIGHT	EP									
127	UPPER HOUSE LEFT	EP									
128	MID HOUSE RIGHT	EP									
129	MID HOUSE LEFT	EP									
130	NEAR HOUSE RIGHT	EP									
131	NEAR HOUSE LEFT	EP									
132	BOH	EP									
133	STAGE LEFT	FP	SURFACE								
134	UPPER HOUSE ENTRY	EP									
135	UPPER HOUSE ENTRY	EP									
136	UPPER HOUSE ENTRY	EP									
137	UPPER HOUSE ENTRY	EP									
138	LIGHTING CONTROL RACK	LCR						1	44 - 44		
139	DIMMER RACK	AP			ARCHITECTURAL PROCESSOR		1				
140	LIGHTING CONTROL RACK	ES			ETHERNET SWITCH						
141	LIGHTING CONTROL RACK	E8			DMX GATEWAY						
HL	HOUSE LIGHTS									12	1 - 12

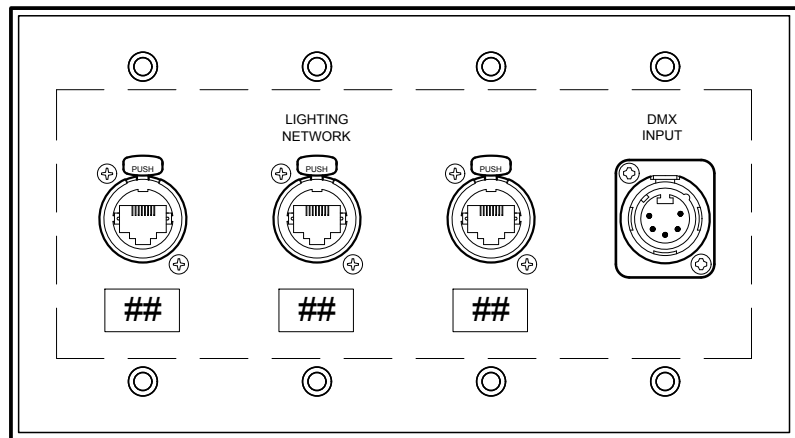
REVISIONS		
NO.	DESCRIPTION	DATE

PROJECT  
CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

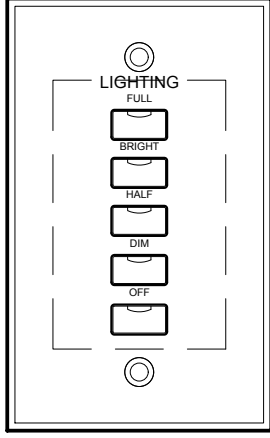
TITLE  
THEATRICAL LIGHTING  
DEVICE SCHEDULE

PROJECT NUMBER	19014
DRAWN BY	MDB
SCALE	AS NOTED
DATE	2019.06.10

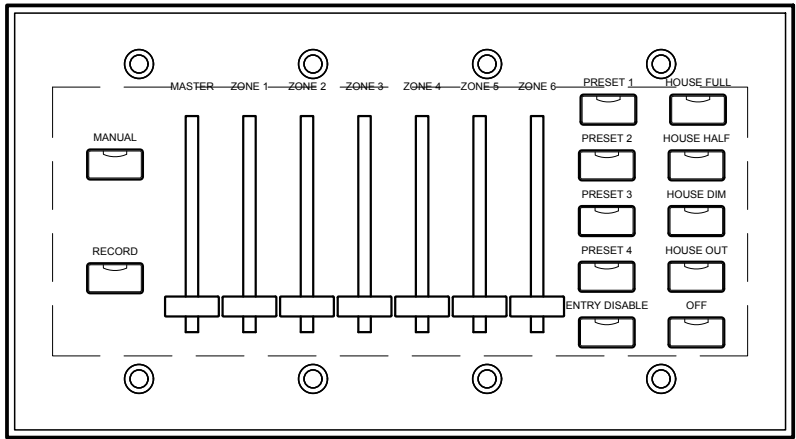




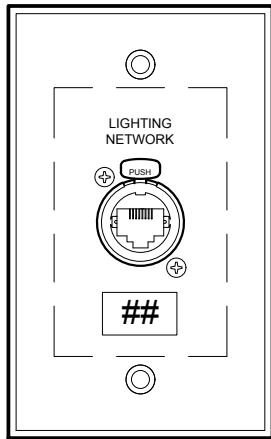
1 DEVICE DETAIL - CC1  
6"=1'-0"



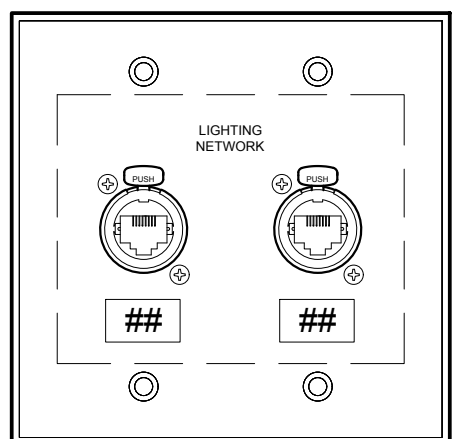
2 DEVICE DETAIL - EP  
6"=1'-0"



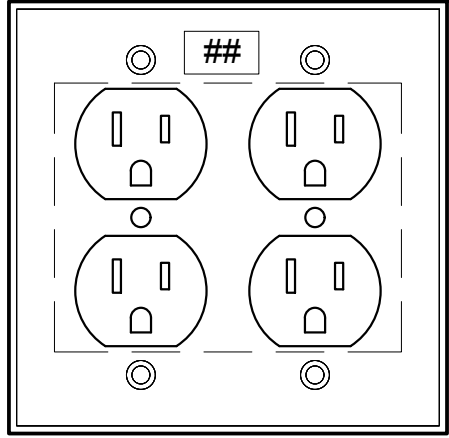
2 DEVICE DETAIL - FP  
6"=1'-0"



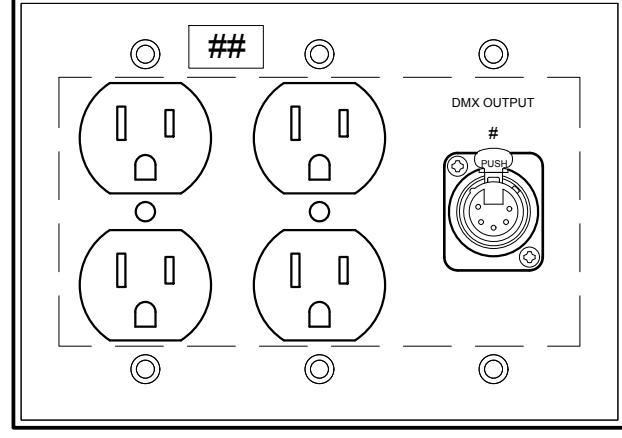
1 DEVICE DETAIL - ET  
6"=1'-0"



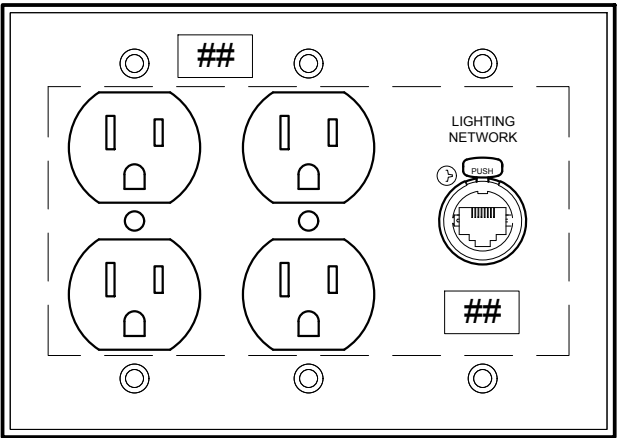
2 DEVICE DETAIL - ET2  
6"=1'-0"



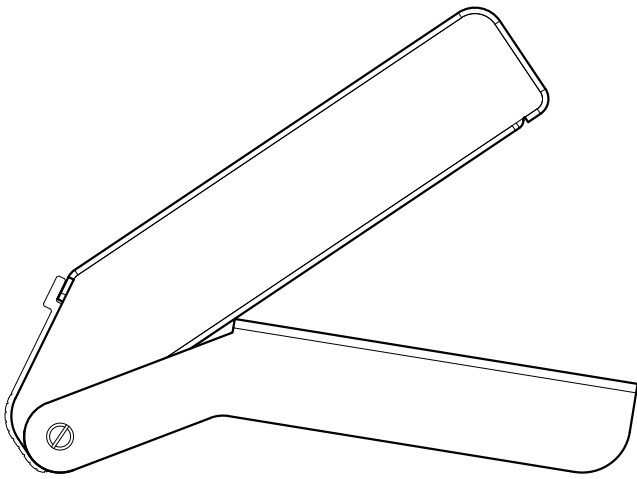
2 DEVICE DETAIL - BR1  
6"=1'-0"



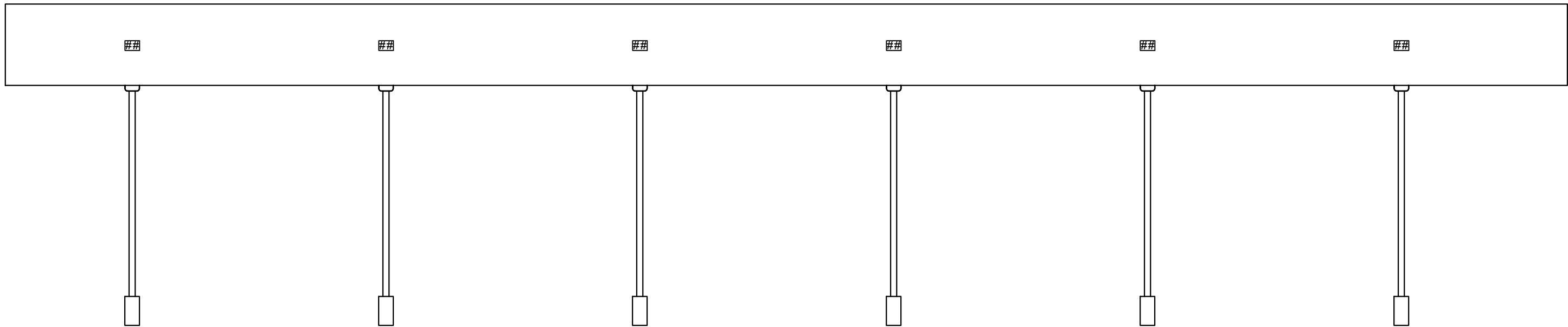
2 DEVICE DETAIL - BR1D  
6"=1'-0"



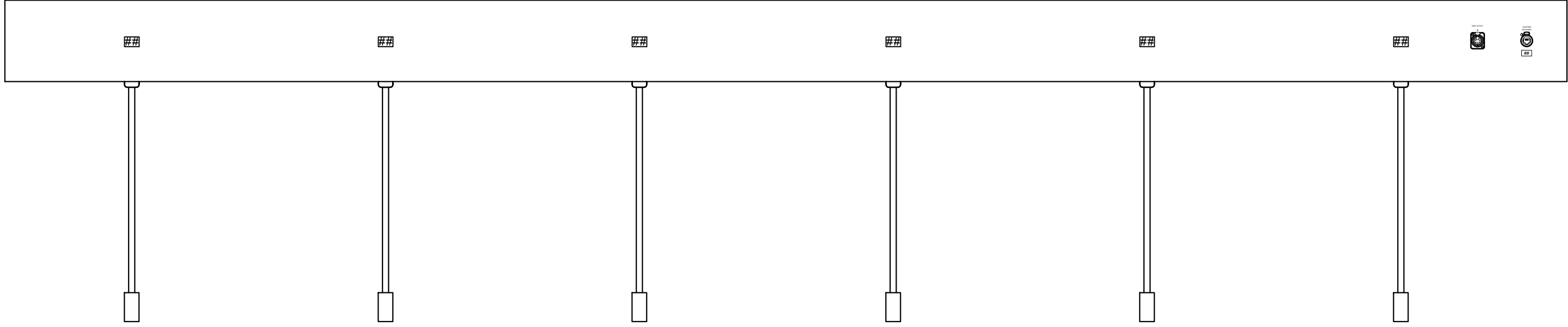
2 DEVICE DETAIL - BR1E  
6"=1'-0"



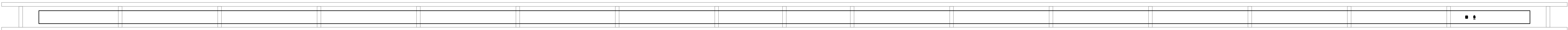
10 DEVICE DETAIL - TP - PORTABLE  
6"=1'-0"



10 DEVICE DETAIL - SP2  
1-1/2"=1'-0"



10 DEVICE DETAIL - SP2DE  
1-1/2"=1'-0"



10 DEVICE DETAIL - SP4DE  
1/2"=1'-0"

NO.	DESCRIPTION	DATE

CITY OF BROCKTON  
BROCKTON HIGH SCHOOL  
AUDITORIUM  
UPGRADE

THEATRICAL LIGHTING  
PLATE AND  
PANEL  
DETAILS

19014

MDR

AS NOTED

2019.06.10





CHARLES D. BAKER  
Governor

KARYN E. POLITO  
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT  
DEPARTMENT OF LABOR STANDARDS

**Prevailing Wage Rates**

**As determined by the Director under the provisions of the  
Massachusetts General Laws, Chapter 149, Sections 26 to 27H**

ROSALIN ACOSTA  
Secretary  
WILLIAM D MCKINNEY  
Director

**Awarding Authority:** City of Brockton/Brockton Public Schools

**Contract Number:**

**City/Town:** BROCKTON

**Description of Work:** Additions and/or alteration work for the Brockton Public Schools.

**Job Location:** Various locations

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Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.25	\$11.91	\$12.70	\$0.00	\$58.86
	08/01/2019	\$34.25	\$12.41	\$12.70	\$0.00	\$59.36
	12/01/2019	\$34.25	\$12.41	\$13.72	\$0.00	\$60.38
	06/01/2020	\$35.15	\$12.41	\$13.72	\$0.00	\$61.28
	08/01/2020	\$35.15	\$12.91	\$13.72	\$0.00	\$61.78
	12/01/2020	\$35.15	\$12.91	\$14.82	\$0.00	\$62.88
	06/01/2021	\$35.95	\$12.91	\$14.82	\$0.00	\$63.68
	08/01/2021	\$35.95	\$13.41	\$14.82	\$0.00	\$64.18
	12/01/2021	\$35.95	\$13.41	\$16.01	\$0.00	\$65.37
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.32	\$11.91	\$12.70	\$0.00	\$58.93
	08/01/2019	\$34.32	\$12.41	\$12.70	\$0.00	\$59.43
	12/01/2019	\$34.32	\$12.41	\$13.72	\$0.00	\$60.45
	06/01/2020	\$35.22	\$12.41	\$13.72	\$0.00	\$61.35
	08/01/2020	\$35.22	\$12.91	\$13.72	\$0.00	\$61.85
	12/01/2020	\$35.22	\$12.91	\$14.82	\$0.00	\$62.95
	06/01/2021	\$36.02	\$12.91	\$14.82	\$0.00	\$63.75
	08/01/2021	\$36.02	\$13.41	\$14.82	\$0.00	\$64.25
	12/01/2021	\$36.02	\$13.41	\$16.01	\$0.00	\$65.44
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.44	\$11.91	\$12.70	\$0.00	\$59.05
	08/01/2019	\$34.44	\$12.41	\$12.70	\$0.00	\$59.55
	12/01/2019	\$34.44	\$12.41	\$13.72	\$0.00	\$60.57
	06/01/2020	\$35.34	\$12.41	\$13.72	\$0.00	\$61.47
	08/01/2020	\$35.34	\$12.91	\$13.72	\$0.00	\$61.97
	12/01/2020	\$35.34	\$12.91	\$14.82	\$0.00	\$63.07
	06/01/2021	\$36.14	\$12.91	\$14.82	\$0.00	\$63.87
	08/01/2021	\$36.14	\$13.41	\$14.82	\$0.00	\$64.37
	12/01/2021	\$36.14	\$13.41	\$16.01	\$0.00	\$65.56
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$97.80	\$9.90	\$21.15	\$0.00	\$128.85
	08/01/2019	\$102.78	\$9.90	\$21.15	\$0.00	\$133.83
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$35.14	\$7.85	\$14.44	\$0.00	\$57.43
	12/01/2019	\$36.00	\$7.85	\$14.44	\$0.00	\$58.29
	06/01/2020	\$36.89	\$7.85	\$14.44	\$0.00	\$59.18
	12/01/2020	\$37.78	\$7.85	\$14.44	\$0.00	\$60.07
	06/01/2021	\$38.70	\$7.85	\$14.44	\$0.00	\$60.99
	12/01/2021	\$39.61	\$7.85	\$14.44	\$0.00	\$61.90
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	06/01/2019	\$36.40	\$12.50	\$8.50	\$0.00	\$57.40
	12/01/2019	\$37.40	\$12.50	\$8.50	\$0.00	\$58.40
	06/01/2020	\$38.40	\$12.50	\$8.50	\$0.00	\$59.40
	12/01/2020	\$39.40	\$12.50	\$8.50	\$0.00	\$60.40

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ASPHALT RAKER <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
	For apprentice rates see "Apprentice- LABORER"					
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
	12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
	06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
	12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
	06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
	12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43
	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
	12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
	06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
	12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
	06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
	12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43
	For apprentice rates see "Apprentice- OPERATING ENGINEERS"					
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
	For apprentice rates see "Apprentice- LABORER"					
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i>	06/01/2019	\$35.14	\$7.85	\$14.44	\$0.00	\$57.43
	12/01/2019	\$36.00	\$7.85	\$14.44	\$0.00	\$58.29
	06/01/2020	\$36.89	\$7.85	\$14.44	\$0.00	\$59.18
	12/01/2020	\$37.78	\$7.85	\$14.44	\$0.00	\$60.07
	06/01/2021	\$38.70	\$7.85	\$14.44	\$0.00	\$60.99
	12/01/2021	\$39.61	\$7.85	\$14.44	\$0.00	\$61.90
	For apprentice rates see "Apprentice- LABORER"					
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2019	\$44.71	\$7.07	\$17.72	\$0.00	\$69.50
	01/01/2020	\$46.10	\$7.07	\$17.98	\$0.00	\$71.15

**Apprentice - BOILERMAKER - Local 29****Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$29.06	\$7.07	\$11.52	\$0.00	\$47.65
2	65	\$29.06	\$7.07	\$11.52	\$0.00	\$47.65
3	70	\$31.30	\$7.07	\$12.40	\$0.00	\$50.77
4	75	\$33.53	\$7.07	\$13.30	\$0.00	\$53.90
5	80	\$35.77	\$7.07	\$14.18	\$0.00	\$57.02
6	85	\$38.00	\$7.07	\$15.07	\$0.00	\$60.14
7	90	\$40.24	\$7.07	\$15.95	\$0.00	\$63.26
8	95	\$42.47	\$7.07	\$16.84	\$0.00	\$66.38

**Effective Date - 01/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
2	65	\$29.97	\$7.07	\$11.69	\$0.00	\$48.73
3	70	\$32.27	\$7.07	\$12.59	\$0.00	\$51.93
4	75	\$34.58	\$7.07	\$13.49	\$0.00	\$55.14
5	80	\$36.88	\$7.07	\$14.38	\$0.00	\$58.33
6	85	\$39.19	\$7.07	\$15.29	\$0.00	\$61.55
7	90	\$41.49	\$7.07	\$16.18	\$0.00	\$64.74
8	95	\$43.80	\$7.07	\$17.09	\$0.00	\$67.96

**Notes:****Apprentice to Journeyworker Ratio:1:4**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	02/01/2019	\$53.55	\$10.75	\$20.66	\$0.00	\$84.96
BRICKLAYERS LOCAL 3 (QUINCY)	08/01/2019	\$54.90	\$10.75	\$20.80	\$0.00	\$86.45
	02/01/2020	\$55.54	\$10.75	\$20.80	\$0.00	\$87.09
	08/01/2020	\$56.89	\$10.75	\$20.95	\$0.00	\$88.59
	02/01/2021	\$57.53	\$10.75	\$20.95	\$0.00	\$89.23
	08/01/2021	\$58.93	\$10.75	\$21.11	\$0.00	\$90.79
	02/01/2022	\$59.52	\$10.75	\$21.11	\$0.00	\$91.38

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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**Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Quincy**

**Effective Date - 02/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.78	\$10.75	\$20.66	\$0.00	\$58.19
2	60	\$32.13	\$10.75	\$20.66	\$0.00	\$63.54
3	70	\$37.49	\$10.75	\$20.66	\$0.00	\$68.90
4	80	\$42.84	\$10.75	\$20.66	\$0.00	\$74.25
5	90	\$48.20	\$10.75	\$20.66	\$0.00	\$79.61

**Effective Date - 08/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.45	\$10.75	\$20.80	\$0.00	\$59.00
2	60	\$32.94	\$10.75	\$20.80	\$0.00	\$64.49
3	70	\$38.43	\$10.75	\$20.80	\$0.00	\$69.98
4	80	\$43.92	\$10.75	\$20.80	\$0.00	\$75.47
5	90	\$49.41	\$10.75	\$20.80	\$0.00	\$80.96

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

BULLDOZER/GRADER/SCRAPER	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN	06/01/2019	\$40.75	\$7.85	\$15.55	\$0.00	\$64.15
LABORERS - FOUNDATION AND MARINE	12/01/2019	\$41.75	\$7.85	\$15.55	\$0.00	\$65.15
	06/01/2020	\$42.74	\$7.85	\$15.55	\$0.00	\$66.14
	12/01/2020	\$43.72	\$7.85	\$15.55	\$0.00	\$67.12
	06/01/2021	\$44.74	\$7.85	\$15.55	\$0.00	\$68.14
	12/01/2021	\$45.75	\$7.85	\$15.55	\$0.00	\$69.15
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER	06/01/2019	\$39.60	\$7.85	\$15.55	\$0.00	\$63.00
LABORERS - FOUNDATION AND MARINE	12/01/2019	\$40.60	\$7.85	\$15.55	\$0.00	\$64.00
	06/01/2020	\$41.59	\$7.85	\$15.55	\$0.00	\$64.99
	12/01/2020	\$42.57	\$7.85	\$15.55	\$0.00	\$65.97
	06/01/2021	\$43.59	\$7.85	\$15.55	\$0.00	\$66.99
	12/01/2021	\$44.60	\$7.85	\$15.55	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING TOP MAN <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2019	\$39.60	\$7.85	\$15.55	\$0.00	\$63.00
	12/01/2019	\$40.60	\$7.85	\$15.55	\$0.00	\$64.00
	06/01/2020	\$41.59	\$7.85	\$15.55	\$0.00	\$64.99
	12/01/2020	\$42.57	\$7.85	\$15.55	\$0.00	\$65.97
	06/01/2021	\$43.59	\$7.85	\$15.55	\$0.00	\$66.99
	12/01/2021	\$44.60	\$7.85	\$15.55	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
CARPENTER <i>CARPENTERS -ZONE 2 (Eastern Massachusetts)</i>	03/01/2019	\$42.35	\$9.90	\$17.50	\$0.00	\$69.75

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 03/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.18	\$9.90	\$1.73	\$0.00	\$32.81
2	60	\$25.41	\$9.90	\$1.73	\$0.00	\$37.04
3	70	\$29.65	\$9.90	\$12.31	\$0.00	\$51.86
4	75	\$31.76	\$9.90	\$12.31	\$0.00	\$53.97
5	80	\$33.88	\$9.90	\$14.04	\$0.00	\$57.82
6	80	\$33.88	\$9.90	\$14.04	\$0.00	\$57.82
7	90	\$38.12	\$9.90	\$15.77	\$0.00	\$63.79
8	90	\$38.12	\$9.90	\$15.77	\$0.00	\$63.79

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
Step 1&2 \$30.69/ 3&4 \$36.59/ 5&6 \$53.59/ 7&8 \$59.55

**Apprentice to Journeyworker Ratio:1:5**

CARPENTER WOOD FRAME <i>CARPENTERS -ZONE 2 (Wood Frame)</i>	04/01/2019	\$27.52	\$7.07	\$7.86	\$0.00	\$42.45
	10/01/2019	\$27.95	\$7.07	\$7.86	\$0.00	\$42.88
All Aspects of New Wood Frame Work						

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - CARPENTER (Wood Frame) - Zone 2**
**Effective Date - 04/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.51	\$7.07	\$0.00	\$0.00	\$23.58
2	60	\$16.51	\$7.07	\$0.00	\$0.00	\$23.58
3	65	\$17.89	\$7.07	\$7.86	\$0.00	\$32.82
4	70	\$19.26	\$7.07	\$7.86	\$0.00	\$34.19
5	75	\$20.64	\$7.07	\$7.86	\$0.00	\$35.57
6	80	\$22.02	\$7.07	\$7.86	\$0.00	\$36.95
7	85	\$23.39	\$7.07	\$7.86	\$0.00	\$38.32
8	90	\$24.77	\$7.07	\$7.86	\$0.00	\$39.70

**Effective Date - 10/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.77	\$7.07	\$0.00	\$0.00	\$23.84
2	60	\$16.77	\$7.07	\$0.00	\$0.00	\$23.84
3	65	\$18.17	\$7.07	\$7.86	\$0.00	\$33.10
4	70	\$19.57	\$7.07	\$7.86	\$0.00	\$34.50
5	75	\$20.96	\$7.07	\$7.86	\$0.00	\$35.89
6	80	\$22.36	\$7.07	\$7.86	\$0.00	\$37.29
7	85	\$23.76	\$7.07	\$7.86	\$0.00	\$38.69
8	90	\$25.16	\$7.07	\$7.86	\$0.00	\$40.09

**Notes:**

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80  
Step 1&2 \$19.45/ 3&4 \$26.96/ 5&6 \$34.19/ 7&8 \$36.95

**Apprentice to Journeyworker Ratio:1:5**
**CEMENT MASONRY/PLASTERING**  
*BRICKLAYERS LOCAL 3 (QUINCY)*

01/01/2019	\$47.50	\$12.50	\$22.41	\$0.30	\$82.71
07/01/2019	\$48.24	\$12.50	\$22.41	\$0.30	\$83.45
01/01/2020	\$49.64	\$12.50	\$22.41	\$0.30	\$84.85

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Quincy)**
**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.75	\$12.50	\$15.41	\$0.00	\$51.66
2	60	\$28.50	\$12.50	\$17.41	\$0.30	\$58.71
3	65	\$30.88	\$12.50	\$18.41	\$0.30	\$62.09
4	70	\$33.25	\$12.50	\$19.41	\$0.30	\$65.46
5	75	\$35.63	\$12.50	\$20.41	\$0.30	\$68.84
6	80	\$38.00	\$12.50	\$21.41	\$0.30	\$72.21
7	90	\$42.75	\$12.50	\$22.41	\$0.30	\$77.96

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.12	\$12.50	\$15.41	\$0.00	\$52.03
2	60	\$28.94	\$12.50	\$17.41	\$0.30	\$59.15
3	65	\$31.36	\$12.50	\$18.41	\$0.30	\$62.57
4	70	\$33.77	\$12.50	\$19.41	\$0.30	\$65.98
5	75	\$36.18	\$12.50	\$20.41	\$0.30	\$69.39
6	80	\$38.59	\$12.50	\$21.41	\$0.30	\$72.80
7	90	\$43.42	\$12.50	\$22.41	\$0.30	\$78.63

**Notes:**

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

**Apprentice to Journeyworker Ratio:1:3**

CHAIN SAW OPERATOR LABORERS - ZONE 2	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES OPERATING ENGINEERS LOCAL 4	06/01/2019	\$49.18	\$12.00	\$15.60	\$0.00	\$76.78
	12/01/2019	\$50.33	\$12.00	\$15.60	\$0.00	\$77.93
	06/01/2020	\$51.43	\$12.00	\$15.60	\$0.00	\$79.03
	12/01/2020	\$52.58	\$12.00	\$15.60	\$0.00	\$80.18
	06/01/2021	\$53.68	\$12.00	\$15.60	\$0.00	\$81.28
	12/01/2021	\$54.83	\$12.00	\$15.60	\$0.00	\$82.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2019	\$32.28	\$12.00	\$15.60	\$0.00	\$59.88
	12/01/2019	\$33.07	\$12.00	\$15.60	\$0.00	\$60.67
	06/01/2020	\$33.82	\$12.00	\$15.60	\$0.00	\$61.42
	12/01/2020	\$34.60	\$12.00	\$15.60	\$0.00	\$62.20
	06/01/2021	\$35.35	\$12.00	\$15.60	\$0.00	\$62.95
	12/01/2021	\$36.14	\$12.00	\$15.60	\$0.00	\$63.74



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE)	01/01/2019	\$50.36	\$8.15	\$20.85	\$0.00	\$79.36
<i>PAINTERS LOCAL 35 - ZONE 2</i>	07/01/2019	\$50.66	\$8.20	\$21.45	\$0.00	\$80.31
	01/01/2020	\$50.96	\$8.20	\$22.10	\$0.00	\$81.26
	07/01/2020	\$52.06	\$8.20	\$22.10	\$0.00	\$82.36
	01/01/2021	\$53.16	\$8.20	\$22.10	\$0.00	\$83.46

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date -** 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.18	\$8.15	\$0.00	\$0.00	\$33.33
2	55	\$27.70	\$8.15	\$5.64	\$0.00	\$41.49
3	60	\$30.22	\$8.15	\$6.15	\$0.00	\$44.52
4	65	\$32.73	\$8.15	\$6.66	\$0.00	\$47.54
5	70	\$35.25	\$8.15	\$17.78	\$0.00	\$61.18
6	75	\$37.77	\$8.15	\$18.29	\$0.00	\$64.21
7	80	\$40.29	\$8.15	\$18.80	\$0.00	\$67.24
8	90	\$45.32	\$8.15	\$19.83	\$0.00	\$73.30

**Effective Date -** 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.33	\$8.20	\$0.00	\$0.00	\$33.53
2	55	\$27.86	\$8.20	\$5.78	\$0.00	\$41.84
3	60	\$30.40	\$8.20	\$6.30	\$0.00	\$44.90
4	65	\$32.93	\$8.20	\$6.83	\$0.00	\$47.96
5	70	\$35.46	\$8.20	\$18.30	\$0.00	\$61.96
6	75	\$38.00	\$8.20	\$18.83	\$0.00	\$65.03
7	80	\$40.53	\$8.20	\$19.35	\$0.00	\$68.08
8	90	\$45.59	\$8.20	\$20.40	\$0.00	\$74.19

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN	06/01/2019	\$39.80	\$7.85	\$15.35	\$0.00	\$63.00
<i>LABORERS - ZONE 2</i>	12/01/2019	\$40.80	\$7.85	\$15.35	\$0.00	\$64.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR	06/01/2019	\$40.80	\$7.85	\$15.35	\$0.00	\$64.00
<i>LABORERS - ZONE 2</i>	12/01/2019	\$41.80	\$7.85	\$15.35	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS	06/01/2019	\$40.55	\$7.85	\$15.35	\$0.00	\$63.75
<i>LABORERS - ZONE 2</i>	12/01/2019	\$41.55	\$7.85	\$15.35	\$0.00	\$64.75
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER	06/01/2019	\$40.80	\$7.85	\$15.35	\$0.00	\$64.00
<i>LABORERS - ZONE 2</i>	12/01/2019	\$41.80	\$7.85	\$15.35	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$40.55	\$7.85	\$15.35	\$0.00	\$63.75
For apprentice rates see "Apprentice- LABORER"	12/01/2019	\$41.55	\$7.85	\$15.35	\$0.00	\$64.75
DEMO: WRECKING LABORER <i>LABORERS - ZONE 2</i>	06/01/2019	\$39.80	\$7.85	\$15.35	\$0.00	\$63.00
For apprentice rates see "Apprentice- LABORER"	12/01/2019	\$40.80	\$7.85	\$15.35	\$0.00	\$64.00
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$65.20	\$9.90	\$21.15	\$0.00	\$96.25
For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2019	\$68.52	\$9.90	\$21.15	\$0.00	\$99.57
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$46.57	\$9.90	\$21.15	\$0.00	\$77.62
For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2019	\$48.94	\$9.90	\$21.15	\$0.00	\$79.99
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$69.86	\$9.90	\$21.15	\$0.00	\$100.91
For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2019	\$73.41	\$9.90	\$21.15	\$0.00	\$104.46
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$97.80	\$9.90	\$21.15	\$0.00	\$128.85
For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2019	\$102.78	\$9.90	\$21.15	\$0.00	\$133.83
ELECTRICIAN <i>ELECTRICIANS LOCAL 223</i>	03/01/2019	\$41.64	\$9.90	\$13.15	\$0.00	\$64.69
	09/01/2019	\$42.26	\$10.15	\$13.54	\$0.00	\$65.95
	03/01/2020	\$42.87	\$10.40	\$13.94	\$0.00	\$67.21

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - ELECTRICIAN - Local 223**
**Effective Date - 03/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.66	\$9.90	\$0.50	\$0.00	\$27.06
2	42	\$17.49	\$9.90	\$0.52	\$0.00	\$27.91
3	45	\$18.74	\$9.90	\$0.58	\$0.00	\$29.22
4	48	\$19.99	\$9.90	\$4.64	\$0.00	\$34.53
5	50	\$20.82	\$9.90	\$4.68	\$0.00	\$35.40
6	55	\$22.90	\$9.90	\$5.04	\$0.00	\$37.84
7	60	\$24.98	\$9.90	\$5.34	\$0.00	\$40.22
8	65	\$27.07	\$9.90	\$5.64	\$0.00	\$42.61
9	70	\$29.15	\$9.90	\$5.93	\$0.00	\$44.98
10	75	\$31.23	\$9.90	\$6.18	\$0.00	\$47.31

**Effective Date - 09/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.90	\$10.15	\$0.51	\$0.00	\$27.56
2	42	\$17.75	\$10.15	\$0.53	\$0.00	\$28.43
3	45	\$19.02	\$10.15	\$0.57	\$0.00	\$29.74
4	48	\$20.28	\$10.15	\$4.93	\$0.00	\$35.36
5	50	\$21.13	\$10.15	\$4.97	\$0.00	\$36.25
6	55	\$23.24	\$10.15	\$5.33	\$0.00	\$38.72
7	60	\$25.36	\$10.15	\$5.64	\$0.00	\$41.15
8	65	\$27.47	\$10.15	\$5.94	\$0.00	\$43.56
9	70	\$29.58	\$10.15	\$6.25	\$0.00	\$45.98
10	75	\$31.70	\$10.15	\$6.50	\$0.00	\$48.35

**Notes:**

Steps are 750 hours

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR	01/01/2019	\$59.47	\$15.58	\$17.51	\$0.00	\$92.56
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2020	\$61.42	\$15.73	\$18.41	\$0.00	\$95.56
	01/01/2021	\$63.47	\$15.88	\$19.31	\$0.00	\$98.66
	01/01/2022	\$65.62	\$16.03	\$20.21	\$0.00	\$101.86

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.74	\$15.58	\$0.00	\$0.00	\$45.32
2	55	\$32.71	\$15.58	\$17.51	\$0.00	\$65.80
3	65	\$38.66	\$15.58	\$17.51	\$0.00	\$71.75
4	70	\$41.63	\$15.58	\$17.51	\$0.00	\$74.72
5	80	\$47.58	\$15.58	\$17.51	\$0.00	\$80.67

**Effective Date - 01/01/2020**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.71	\$15.73	\$0.00	\$0.00	\$46.44
2	55	\$33.78	\$15.73	\$18.41	\$0.00	\$67.92
3	65	\$39.92	\$15.73	\$18.41	\$0.00	\$74.06
4	70	\$42.99	\$15.73	\$18.41	\$0.00	\$77.13
5	80	\$49.14	\$15.73	\$18.41	\$0.00	\$83.28

**Notes:**

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER	01/01/2019	\$41.63	\$15.58	\$17.51	\$0.00	\$74.72
ELEVATOR CONSTRUCTORS LOCAL 4	01/01/2020	\$42.99	\$15.73	\$18.41	\$0.00	\$77.13
	01/01/2021	\$44.43	\$15.88	\$19.31	\$0.00	\$79.62
	01/01/2022	\$45.93	\$16.03	\$20.21	\$0.00	\$82.17

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

FENCE & GUARD RAIL ERECTOR	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
LABORERS - ZONE 2	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY	05/01/2019	\$43.68	\$11.50	\$15.60	\$0.00	\$70.78
OPERATING ENGINEERS LOCAL 4	11/01/2019	\$44.68	\$11.50	\$15.60	\$0.00	\$71.78
	05/01/2020	\$45.83	\$11.50	\$15.60	\$0.00	\$72.93
	11/01/2020	\$46.83	\$11.50	\$15.60	\$0.00	\$73.93
	05/01/2021	\$47.98	\$11.50	\$15.60	\$0.00	\$75.08
	11/01/2021	\$48.98	\$11.50	\$15.60	\$0.00	\$76.08
	05/01/2022	\$50.13	\$11.50	\$15.60	\$0.00	\$77.23

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2019	\$45.17	\$11.50	\$15.60	\$0.00	\$72.27
	11/01/2019	\$46.18	\$11.50	\$15.60	\$0.00	\$73.28
	05/01/2020	\$47.33	\$11.50	\$15.60	\$0.00	\$74.43
	11/01/2020	\$48.34	\$11.50	\$15.60	\$0.00	\$75.44
	05/01/2021	\$49.50	\$11.50	\$15.60	\$0.00	\$76.60
	11/01/2021	\$50.51	\$11.50	\$15.60	\$0.00	\$77.61
	05/01/2022	\$51.67	\$11.50	\$15.60	\$0.00	\$78.77
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	05/01/2019	\$22.48	\$11.50	\$15.60	\$0.00	\$49.58
	11/01/2019	\$23.07	\$11.50	\$15.60	\$0.00	\$50.17
	05/01/2020	\$23.74	\$11.50	\$15.60	\$0.00	\$50.84
	11/01/2020	\$24.33	\$11.50	\$15.60	\$0.00	\$51.43
	05/01/2021	\$25.01	\$11.50	\$15.60	\$0.00	\$52.11
	11/01/2021	\$25.61	\$11.50	\$15.60	\$0.00	\$52.71
	05/01/2022	\$26.28	\$11.50	\$15.60	\$0.00	\$53.38
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 223</i>	03/01/2019	\$41.64	\$9.90	\$13.15	\$0.00	\$64.69
	09/01/2019	\$42.26	\$10.15	\$13.54	\$0.00	\$65.95
	03/01/2020	\$42.87	\$10.40	\$13.94	\$0.00	\$67.21
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS</i> <i>LOCAL 223</i>	03/01/2019	\$35.25	\$9.90	\$11.14	\$0.00	\$56.29
	09/01/2019	\$35.78	\$10.15	\$11.45	\$0.00	\$57.38
	03/01/2020	\$36.27	\$10.40	\$11.78	\$0.00	\$58.45
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$39.54	\$12.00	\$15.60	\$0.00	\$67.14
	12/01/2019	\$40.49	\$12.00	\$15.60	\$0.00	\$68.09
	06/01/2020	\$41.40	\$12.00	\$15.60	\$0.00	\$69.00
	12/01/2020	\$42.35	\$12.00	\$15.60	\$0.00	\$69.95
	06/01/2021	\$43.26	\$12.00	\$15.60	\$0.00	\$70.86
	12/01/2021	\$44.21	\$12.00	\$15.60	\$0.00	\$71.81
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i>	06/01/2019	\$22.50	\$7.85	\$14.44	\$0.00	\$44.79
	12/01/2019	\$23.50	\$7.85	\$14.44	\$0.00	\$45.79
	06/01/2020	\$23.50	\$7.85	\$14.44	\$0.00	\$45.79
	12/01/2020	\$24.50	\$7.85	\$14.44	\$0.00	\$46.79
	06/01/2021	\$24.50	\$7.85	\$14.44	\$0.00	\$46.79
	12/01/2021	\$24.50	\$7.85	\$14.44	\$0.00	\$46.79
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE I</i>	03/01/2016	\$42.13	\$9.80	\$17.62	\$0.00	\$69.55

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - FLOORCOVERER - Local 2168 Zone I**
**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.07	\$9.80	\$1.79	\$0.00	\$32.66
2	55	\$23.17	\$9.80	\$1.79	\$0.00	\$34.76
3	60	\$25.28	\$9.80	\$12.25	\$0.00	\$47.33
4	65	\$27.38	\$9.80	\$12.25	\$0.00	\$49.43
5	70	\$29.49	\$9.80	\$14.04	\$0.00	\$53.33
6	75	\$31.60	\$9.80	\$14.04	\$0.00	\$55.44
7	80	\$33.70	\$9.80	\$15.83	\$0.00	\$59.33
8	85	\$35.81	\$9.80	\$15.83	\$0.00	\$61.44

**Notes:** Steps are 750 hrs.

% After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)

Step 1&amp;2 \$30.55/ 3&amp;4 \$36.49/ 5&amp;6 \$53.33/ 7&amp;8 \$59.33

**Apprentice to Journeyworker Ratio:1:1**
**FORK LIFT/CHERRY PICKER**
*OPERATING ENGINEERS LOCAL 4*

06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

**GENERATOR/LIGHTING PLANT/HEATERS**
*OPERATING ENGINEERS LOCAL 4*

06/01/2019	\$32.28	\$12.00	\$15.60	\$0.00	\$59.88
12/01/2019	\$33.07	\$12.00	\$15.60	\$0.00	\$60.67
06/01/2020	\$33.82	\$12.00	\$15.60	\$0.00	\$61.42
12/01/2020	\$34.60	\$12.00	\$15.60	\$0.00	\$62.20
06/01/2021	\$35.35	\$12.00	\$15.60	\$0.00	\$62.95
12/01/2021	\$36.14	\$12.00	\$15.60	\$0.00	\$63.74

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

**GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS)**
*GLAZIERS LOCAL 35 (ZONE 2)*

01/01/2019	\$39.86	\$8.15	\$20.85	\$0.00	\$68.86
07/01/2019	\$40.16	\$8.20	\$21.45	\$0.00	\$69.81
01/01/2020	\$40.46	\$8.20	\$22.10	\$0.00	\$70.76
07/01/2020	\$41.56	\$8.20	\$22.10	\$0.00	\$71.86
01/01/2021	\$42.66	\$8.20	\$22.10	\$0.00	\$72.96

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - GLAZIER - Local 35 Zone 2**
**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.93	\$8.15	\$0.00	\$0.00	\$28.08
2	55	\$21.92	\$8.15	\$5.64	\$0.00	\$35.71
3	60	\$23.92	\$8.15	\$6.15	\$0.00	\$38.22
4	65	\$25.91	\$8.15	\$6.66	\$0.00	\$40.72
5	70	\$27.90	\$8.15	\$17.78	\$0.00	\$53.83
6	75	\$29.90	\$8.15	\$18.29	\$0.00	\$56.34
7	80	\$31.89	\$8.15	\$18.80	\$0.00	\$58.84
8	90	\$35.87	\$8.15	\$19.83	\$0.00	\$63.85

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.08	\$8.20	\$0.00	\$0.00	\$28.28
2	55	\$22.09	\$8.20	\$5.78	\$0.00	\$36.07
3	60	\$24.10	\$8.20	\$6.30	\$0.00	\$38.60
4	65	\$26.10	\$8.20	\$6.83	\$0.00	\$41.13
5	70	\$28.11	\$8.20	\$18.30	\$0.00	\$54.61
6	75	\$30.12	\$8.20	\$18.83	\$0.00	\$57.15
7	80	\$32.13	\$8.20	\$19.35	\$0.00	\$59.68
8	90	\$36.14	\$8.20	\$20.40	\$0.00	\$64.74

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**
**HOISTING ENGINEER/CRANES/GRADALLS**
*OPERATING ENGINEERS LOCAL 4*

06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - OPERATING ENGINEERS - Local 4**
**Effective Date - 06/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$26.50	\$12.00	\$0.00	\$0.00	\$38.50
2	60	\$28.91	\$12.00	\$15.60	\$0.00	\$56.51
3	65	\$31.32	\$12.00	\$15.60	\$0.00	\$58.92
4	70	\$33.73	\$12.00	\$15.60	\$0.00	\$61.33
5	75	\$36.14	\$12.00	\$15.60	\$0.00	\$63.74
6	80	\$38.54	\$12.00	\$15.60	\$0.00	\$66.14
7	85	\$40.95	\$12.00	\$15.60	\$0.00	\$68.55
8	90	\$43.36	\$12.00	\$15.60	\$0.00	\$70.96

**Effective Date - 12/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$27.13	\$12.00	\$0.00	\$0.00	\$39.13
2	60	\$29.60	\$12.00	\$15.60	\$0.00	\$57.20
3	65	\$32.06	\$12.00	\$15.60	\$0.00	\$59.66
4	70	\$34.53	\$12.00	\$15.60	\$0.00	\$62.13
5	75	\$37.00	\$12.00	\$15.60	\$0.00	\$64.60
6	80	\$39.46	\$12.00	\$15.60	\$0.00	\$67.06
7	85	\$41.93	\$12.00	\$15.60	\$0.00	\$69.53
8	90	\$44.40	\$12.00	\$15.60	\$0.00	\$72.00

**Notes:**
**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK)	02/01/2019	\$46.50	\$13.20	\$24.12	\$2.52	\$86.34
SHEETMETAL WORKERS LOCAL 17 - A	08/01/2019	\$48.10	\$13.20	\$24.12	\$2.56	\$87.98
	02/01/2020	\$49.75	\$13.20	\$24.12	\$2.61	\$89.68
	08/01/2020	\$51.35	\$13.20	\$24.12	\$2.66	\$91.33
	02/01/2021	\$53.00	\$13.20	\$24.12	\$2.71	\$93.03
	08/01/2021	\$54.75	\$13.20	\$24.12	\$2.76	\$94.83
	02/01/2022	\$56.50	\$13.20	\$24.12	\$2.81	\$96.63

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS)	03/01/2019	\$41.64	\$9.90	\$13.15	\$0.00	\$64.69
ELECTRICIANS LOCAL 223	09/01/2019	\$42.26	\$10.15	\$13.54	\$0.00	\$65.95
	03/01/2020	\$42.87	\$10.40	\$13.94	\$0.00	\$67.21

For apprentice rates see "Apprentice- ELECTRICIAN"



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2019	\$46.50	\$13.20	\$24.12	\$2.52	\$86.34
	08/01/2019	\$48.10	\$13.20	\$24.12	\$2.56	\$87.98
	02/01/2020	\$49.75	\$13.20	\$24.12	\$2.61	\$89.68
	08/01/2020	\$51.35	\$13.20	\$24.12	\$2.66	\$91.33
	02/01/2021	\$53.00	\$13.20	\$24.12	\$2.71	\$93.03
	08/01/2021	\$54.75	\$13.20	\$24.12	\$2.76	\$94.83
	02/01/2022	\$56.50	\$13.20	\$24.12	\$2.81	\$96.63
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	09/01/2018	\$42.04	\$10.00	\$18.20	\$0.00	\$70.24
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	09/01/2018	\$42.04	\$10.00	\$18.20	\$0.00	\$70.24
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 2</i>	06/01/2019	\$35.14	\$7.85	\$14.44	\$0.00	\$57.43
	12/01/2019	\$36.00	\$7.85	\$14.44	\$0.00	\$58.29
	06/01/2020	\$36.89	\$7.85	\$14.44	\$0.00	\$59.18
	12/01/2020	\$37.78	\$7.85	\$14.44	\$0.00	\$60.07
	06/01/2021	\$38.70	\$7.85	\$14.44	\$0.00	\$60.99
	12/01/2021	\$39.61	\$7.85	\$14.44	\$0.00	\$61.90
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2018	\$47.09	\$12.50	\$15.60	\$0.00	\$75.19
	09/01/2019	\$49.59	\$12.50	\$15.60	\$0.00	\$77.69

**Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston**

**Effective Date -** 09/01/2018

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.55	\$12.50	\$11.40	\$0.00	\$47.45
2	60	\$28.25	\$12.50	\$12.24	\$0.00	\$52.99
3	70	\$32.96	\$12.50	\$13.08	\$0.00	\$58.54
4	80	\$37.67	\$12.50	\$13.92	\$0.00	\$64.09

**Effective Date -** 09/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.80	\$12.50	\$11.40	\$0.00	\$48.70
2	60	\$29.75	\$12.50	\$12.24	\$0.00	\$54.49
3	70	\$34.71	\$12.50	\$13.08	\$0.00	\$60.29
4	80	\$39.67	\$12.50	\$13.92	\$0.00	\$66.09

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	03/16/2019	\$46.66	\$8.00	\$23.50	\$0.00	\$78.16
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**Apprentice - IRONWORKER - Local 7 Boston**

**Effective Date -** 03/16/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$28.00	\$8.00	\$23.50	\$0.00	\$59.50
2	70	\$32.66	\$8.00	\$23.50	\$0.00	\$64.16
3	75	\$35.00	\$8.00	\$23.50	\$0.00	\$66.50
4	80	\$37.33	\$8.00	\$23.50	\$0.00	\$68.83
5	85	\$39.66	\$8.00	\$23.50	\$0.00	\$71.16
6	90	\$41.99	\$8.00	\$23.50	\$0.00	\$73.49

**Notes:**

\*\* Structural 1:6; Ornamental 1:4

**Apprentice to Journeyworker Ratio:\*\***

JACKHAMMER & PAVING BREAKER OPERATOR	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
LABORERS - ZONE 2	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

LABORER	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
LABORERS - ZONE 2	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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**Apprentice - LABORER - Zone 2**

**Effective Date - 06/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$20.63	\$7.85	\$14.44	\$0.00	\$42.92
2	70	\$24.07	\$7.85	\$14.44	\$0.00	\$46.36
3	80	\$27.51	\$7.85	\$14.44	\$0.00	\$49.80
4	90	\$30.95	\$7.85	\$14.44	\$0.00	\$53.24

**Effective Date - 12/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.15	\$7.85	\$14.44	\$0.00	\$43.44
2	70	\$24.68	\$7.85	\$14.44	\$0.00	\$46.97
3	80	\$28.20	\$7.85	\$14.44	\$0.00	\$50.49
4	90	\$31.73	\$7.85	\$14.44	\$0.00	\$54.02

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER: CARPENTER TENDER LABORERS - ZONE 2	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER LABORERS - ZONE 2	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER LABORERS - ZONE 2	06/01/2019	\$34.59	\$7.85	\$14.39	\$0.00	\$56.83
	12/01/2019	\$35.45	\$7.85	\$14.39	\$0.00	\$57.69
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER LABORERS - ZONE 2	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	02/01/2019	\$40.91	\$10.75	\$18.97	\$0.00	\$70.63
	08/01/2019	\$41.99	\$10.75	\$19.11	\$0.00	\$71.85
	02/01/2020	\$42.50	\$10.75	\$19.11	\$0.00	\$72.36
	08/01/2020	\$43.58	\$10.75	\$19.26	\$0.00	\$73.59
	02/01/2021	\$44.09	\$10.75	\$19.26	\$0.00	\$74.10
	08/01/2021	\$45.21	\$10.75	\$19.42	\$0.00	\$75.38
	02/01/2022	\$45.68	\$10.75	\$19.42	\$0.00	\$75.85

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental  
Unemployment    Total Rate**

**Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.46	\$10.75	\$18.97	\$0.00	\$50.18
2	60	\$24.55	\$10.75	\$18.97	\$0.00	\$54.27
3	70	\$28.64	\$10.75	\$18.97	\$0.00	\$58.36
4	80	\$32.73	\$10.75	\$18.97	\$0.00	\$62.45
5	90	\$36.82	\$10.75	\$18.97	\$0.00	\$66.54

**Effective Date - 08/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.00	\$10.75	\$19.11	\$0.00	\$50.86
2	60	\$25.19	\$10.75	\$19.11	\$0.00	\$55.05
3	70	\$29.39	\$10.75	\$19.11	\$0.00	\$59.25
4	80	\$33.59	\$10.75	\$19.11	\$0.00	\$63.45
5	90	\$37.79	\$10.75	\$19.11	\$0.00	\$67.65

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

MARBLE MASONS,TILELAYERS & TERRAZZO MECH	02/01/2019	\$53.57	\$10.75	\$20.66	\$0.00	\$84.98
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2019	\$54.92	\$10.75	\$20.80	\$0.00	\$86.47
	02/01/2020	\$55.55	\$10.75	\$20.80	\$0.00	\$87.10
	08/01/2020	\$56.90	\$10.75	\$20.95	\$0.00	\$88.60
	02/01/2021	\$57.54	\$10.75	\$20.95	\$0.00	\$89.24
	08/01/2021	\$58.94	\$10.75	\$21.11	\$0.00	\$90.80
	02/01/2022	\$59.51	\$10.75	\$21.11	\$0.00	\$91.37

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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**Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile**

**Effective Date - 02/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.79	\$10.75	\$20.66	\$0.00	\$58.20
2	60	\$32.14	\$10.75	\$20.66	\$0.00	\$63.55
3	70	\$37.50	\$10.75	\$20.66	\$0.00	\$68.91
4	80	\$42.86	\$10.75	\$20.66	\$0.00	\$74.27
5	90	\$48.21	\$10.75	\$20.66	\$0.00	\$79.62

**Effective Date - 08/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.46	\$10.75	\$20.80	\$0.00	\$59.01
2	60	\$32.95	\$10.75	\$20.80	\$0.00	\$64.50
3	70	\$38.44	\$10.75	\$20.80	\$0.00	\$69.99
4	80	\$43.94	\$10.75	\$20.80	\$0.00	\$75.49
5	90	\$49.43	\$10.75	\$20.80	\$0.00	\$80.98

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES)	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2)	04/01/2019	\$38.87	\$9.90	\$18.50	\$0.00	\$67.27
MILLWRIGHTS LOCAL 1121 - Zone 2						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Apprentice - MILLWRIGHT - Local 1121 Zone 2</b>						
<b>Effective Date - 04/01/2019</b>						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$21.38	\$9.90	\$5.31	\$0.00	\$36.59
2	65	\$25.27	\$9.90	\$15.13	\$0.00	\$50.30
3	75	\$29.15	\$9.90	\$16.10	\$0.00	\$55.15
4	85	\$33.04	\$9.90	\$17.06	\$0.00	\$60.00
<b>Notes:</b>						
Steps are 2,000 hours						
<b>Apprentice to Journeyworker Ratio:1:5</b>						
<hr/>						
MORTAR MIXER	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
LABORERS - ZONE 2	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS)	06/01/2019	\$23.11	\$12.00	\$15.60	\$0.00	\$50.71
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$23.68	\$12.00	\$15.60	\$0.00	\$51.28
	06/01/2020	\$24.23	\$12.00	\$15.60	\$0.00	\$51.83
	12/01/2020	\$24.80	\$12.00	\$15.60	\$0.00	\$52.40
	06/01/2021	\$25.35	\$12.00	\$15.60	\$0.00	\$52.95
	12/01/2021	\$25.93	\$12.00	\$15.60	\$0.00	\$53.53
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS)	06/01/2019	\$27.57	\$12.00	\$15.60	\$0.00	\$55.17
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$28.24	\$12.00	\$15.60	\$0.00	\$55.84
	06/01/2020	\$28.89	\$12.00	\$15.60	\$0.00	\$56.49
	12/01/2020	\$29.57	\$12.00	\$15.60	\$0.00	\$57.17
	06/01/2021	\$30.21	\$12.00	\$15.60	\$0.00	\$57.81
	12/01/2021	\$30.89	\$12.00	\$15.60	\$0.00	\$58.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
OPERATING ENGINEERS LOCAL 4	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS)	01/01/2019	\$50.36	\$8.15	\$20.85	\$0.00	\$79.36
PAINTERS LOCAL 35 - ZONE 2	07/01/2019	\$50.66	\$8.20	\$21.45	\$0.00	\$80.31
	01/01/2020	\$50.96	\$8.20	\$22.10	\$0.00	\$81.26
	07/01/2020	\$52.06	\$8.20	\$22.10	\$0.00	\$82.36
	01/01/2021	\$53.16	\$8.20	\$22.10	\$0.00	\$83.46

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental  
Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.18	\$8.15	\$0.00	\$0.00	\$33.33
2	55	\$27.70	\$8.15	\$5.64	\$0.00	\$41.49
3	60	\$30.22	\$8.15	\$6.15	\$0.00	\$44.52
4	65	\$32.73	\$8.15	\$6.66	\$0.00	\$47.54
5	70	\$35.25	\$8.15	\$17.78	\$0.00	\$61.18
6	75	\$37.77	\$8.15	\$18.29	\$0.00	\$64.21
7	80	\$40.29	\$8.15	\$18.80	\$0.00	\$67.24
8	90	\$45.32	\$8.15	\$19.83	\$0.00	\$73.30

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.33	\$8.20	\$0.00	\$0.00	\$33.53
2	55	\$27.86	\$8.20	\$5.78	\$0.00	\$41.84
3	60	\$30.40	\$8.20	\$6.30	\$0.00	\$44.90
4	65	\$32.93	\$8.20	\$6.83	\$0.00	\$47.96
5	70	\$35.46	\$8.20	\$18.30	\$0.00	\$61.96
6	75	\$38.00	\$8.20	\$18.83	\$0.00	\$65.03
7	80	\$40.53	\$8.20	\$19.35	\$0.00	\$68.08
8	90	\$45.59	\$8.20	\$20.40	\$0.00	\$74.19

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SIGN, PICTORIAL & DISPLAY)	06/01/2013	\$25.81	\$7.07	\$7.05	\$0.00	\$39.93
PAINTERS LOCAL 35 - ZONE 2						



**Apprentice - PAINTER SIGN - Local 35 Zone 2****Effective Date - 06/01/2013**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$12.91	\$7.07	\$0.00	\$0.00	\$19.98
2	55	\$14.20	\$7.07	\$2.45	\$0.00	\$23.72
3	60	\$15.49	\$7.07	\$2.45	\$0.00	\$25.01
4	65	\$16.78	\$7.07	\$2.45	\$0.00	\$26.30
5	70	\$18.07	\$7.07	\$7.05	\$0.00	\$32.19
6	75	\$19.36	\$7.07	\$7.05	\$0.00	\$33.48
7	80	\$20.65	\$7.07	\$7.05	\$0.00	\$34.77
8	85	\$21.94	\$7.07	\$7.05	\$0.00	\$36.06
9	90	\$23.23	\$7.07	\$7.05	\$0.00	\$37.35

**Notes:**

Steps are 4 mos.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) \*

\* If 30% or more of surfaces to be painted are new construction,  
NEW paint rate shall be used. *PAINTERS LOCAL 35 - ZONE 2*

01/01/2019	\$41.26	\$8.15	\$20.85	\$0.00	\$70.26
07/01/2019	\$41.56	\$8.20	\$21.45	\$0.00	\$71.21
01/01/2020	\$41.86	\$8.20	\$22.10	\$0.00	\$72.16
07/01/2020	\$42.96	\$8.20	\$22.10	\$0.00	\$73.26
01/01/2021	\$44.06	\$8.20	\$22.10	\$0.00	\$74.36

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New****Effective Date -** 01/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.63	\$8.15	\$0.00	\$0.00	\$28.78
2	55	\$22.69	\$8.15	\$5.64	\$0.00	\$36.48
3	60	\$24.76	\$8.15	\$6.15	\$0.00	\$39.06
4	65	\$26.82	\$8.15	\$6.66	\$0.00	\$41.63
5	70	\$28.88	\$8.15	\$17.78	\$0.00	\$54.81
6	75	\$30.95	\$8.15	\$18.29	\$0.00	\$57.39
7	80	\$33.01	\$8.15	\$18.80	\$0.00	\$59.96
8	90	\$37.13	\$8.15	\$19.83	\$0.00	\$65.11

**Effective Date -** 07/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.78	\$8.20	\$0.00	\$0.00	\$28.98
2	55	\$22.86	\$8.20	\$5.78	\$0.00	\$36.84
3	60	\$24.94	\$8.20	\$6.30	\$0.00	\$39.44
4	65	\$27.01	\$8.20	\$6.83	\$0.00	\$42.04
5	70	\$29.09	\$8.20	\$18.30	\$0.00	\$55.59
6	75	\$31.17	\$8.20	\$18.83	\$0.00	\$58.20
7	80	\$33.25	\$8.20	\$19.35	\$0.00	\$60.80
8	90	\$37.40	\$8.20	\$20.40	\$0.00	\$66.00

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, REPAINT)

PAINTERS LOCAL 35 - ZONE 2

01/01/2019	\$39.32	\$8.15	\$20.85	\$0.00	\$68.32
07/01/2019	\$39.62	\$8.20	\$21.45	\$0.00	\$69.27
01/01/2020	\$39.92	\$8.20	\$22.10	\$0.00	\$70.22
07/01/2020	\$41.02	\$8.20	\$22.10	\$0.00	\$71.32
01/01/2021	\$42.12	\$8.20	\$22.10	\$0.00	\$72.42

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**
**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.66	\$8.15	\$0.00	\$0.00	\$27.81
2	55	\$21.63	\$8.15	\$5.64	\$0.00	\$35.42
3	60	\$23.59	\$8.15	\$6.15	\$0.00	\$37.89
4	65	\$25.56	\$8.15	\$6.66	\$0.00	\$40.37
5	70	\$27.52	\$8.15	\$17.78	\$0.00	\$53.45
6	75	\$29.49	\$8.15	\$18.29	\$0.00	\$55.93
7	80	\$31.46	\$8.15	\$18.80	\$0.00	\$58.41
8	90	\$35.39	\$8.15	\$19.83	\$0.00	\$63.37

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.81	\$8.20	\$0.00	\$0.00	\$28.01
2	55	\$21.79	\$8.20	\$5.78	\$0.00	\$35.77
3	60	\$23.77	\$8.20	\$6.30	\$0.00	\$38.27
4	65	\$25.75	\$8.20	\$6.83	\$0.00	\$40.78
5	70	\$27.73	\$8.20	\$18.30	\$0.00	\$54.23
6	75	\$29.72	\$8.20	\$18.83	\$0.00	\$56.75
7	80	\$31.70	\$8.20	\$19.35	\$0.00	\$59.25
8	90	\$35.66	\$8.20	\$20.40	\$0.00	\$64.26

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (TRAFFIC MARKINGS)	06/01/2019	\$34.39	\$7.85	\$14.44	\$0.00	\$56.68
LABORERS - ZONE 2	12/01/2019	\$35.25	\$7.85	\$14.44	\$0.00	\$57.54
	06/01/2020	\$36.14	\$7.85	\$14.44	\$0.00	\$58.43
	12/01/2020	\$37.03	\$7.85	\$14.44	\$0.00	\$59.32
	06/01/2021	\$37.95	\$7.85	\$14.44	\$0.00	\$60.24
	12/01/2021	\$38.86	\$7.85	\$14.44	\$0.00	\$61.15

For Apprentice rates see "Apprentice- LABORER"

PAINTER / TAPER (BRUSH, NEW) *	01/01/2019	\$39.86	\$8.15	\$20.85	\$0.00	\$68.86
* If 30% or more of surfaces to be painted are new construction,	07/01/2019	\$40.16	\$8.20	\$21.45	\$0.00	\$69.81
NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	01/01/2020	\$40.46	\$8.20	\$22.10	\$0.00	\$70.76
	07/01/2020	\$41.56	\$8.20	\$22.10	\$0.00	\$71.86
	01/01/2021	\$42.66	\$8.20	\$22.10	\$0.00	\$72.96

**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW****Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.93	\$8.15	\$0.00	\$0.00	\$28.08
2	55	\$21.92	\$8.15	\$5.64	\$0.00	\$35.71
3	60	\$23.92	\$8.15	\$6.15	\$0.00	\$38.22
4	65	\$25.91	\$8.15	\$6.66	\$0.00	\$40.72
5	70	\$27.90	\$8.15	\$17.78	\$0.00	\$53.83
6	75	\$29.90	\$8.15	\$18.29	\$0.00	\$56.34
7	80	\$31.89	\$8.15	\$18.80	\$0.00	\$58.84
8	90	\$35.87	\$8.15	\$19.83	\$0.00	\$63.85

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.08	\$8.20	\$0.00	\$0.00	\$28.28
2	55	\$22.09	\$8.20	\$5.78	\$0.00	\$36.07
3	60	\$24.10	\$8.20	\$6.30	\$0.00	\$38.60
4	65	\$26.10	\$8.20	\$6.83	\$0.00	\$41.13
5	70	\$28.11	\$8.20	\$18.30	\$0.00	\$54.61
6	75	\$30.12	\$8.20	\$18.83	\$0.00	\$57.15
7	80	\$32.13	\$8.20	\$19.35	\$0.00	\$59.68
8	90	\$36.14	\$8.20	\$20.40	\$0.00	\$64.74

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, REPAINT)

PAINTERS LOCAL 35 - ZONE 2

01/01/2019	\$37.92	\$8.15	\$20.85	\$0.00	\$66.92
07/01/2019	\$38.22	\$8.20	\$21.45	\$0.00	\$67.87
01/01/2020	\$38.52	\$8.20	\$22.10	\$0.00	\$68.82
07/01/2020	\$39.62	\$8.20	\$22.10	\$0.00	\$69.92
01/01/2021	\$40.72	\$8.20	\$22.10	\$0.00	\$71.02

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**
**Effective Date - 01/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.96	\$8.15	\$0.00	\$0.00	\$27.11
2	55	\$20.86	\$8.15	\$5.64	\$0.00	\$34.65
3	60	\$22.75	\$8.15	\$6.15	\$0.00	\$37.05
4	65	\$24.65	\$8.15	\$6.66	\$0.00	\$39.46
5	70	\$26.54	\$8.15	\$17.78	\$0.00	\$52.47
6	75	\$28.44	\$8.15	\$18.29	\$0.00	\$54.88
7	80	\$30.34	\$8.15	\$18.80	\$0.00	\$57.29
8	90	\$34.13	\$8.15	\$19.83	\$0.00	\$62.11

**Effective Date - 07/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.11	\$8.20	\$0.00	\$0.00	\$27.31
2	55	\$21.02	\$8.20	\$5.78	\$0.00	\$35.00
3	60	\$22.93	\$8.20	\$6.30	\$0.00	\$37.43
4	65	\$24.84	\$8.20	\$6.83	\$0.00	\$39.87
5	70	\$26.75	\$8.20	\$18.30	\$0.00	\$53.25
6	75	\$28.67	\$8.20	\$18.83	\$0.00	\$55.70
7	80	\$30.58	\$8.20	\$19.35	\$0.00	\$58.13
8	90	\$34.40	\$8.20	\$20.40	\$0.00	\$63.00

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**
**PANEL & PICKUP TRUCKS DRIVER**
*TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*

06/01/2019	\$34.08	\$11.91	\$12.70	\$0.00	\$58.69
08/01/2019	\$34.08	\$12.41	\$12.70	\$0.00	\$59.19
12/01/2019	\$34.08	\$12.41	\$13.72	\$0.00	\$60.21
06/01/2020	\$34.98	\$12.41	\$13.72	\$0.00	\$61.11
08/01/2020	\$34.98	\$12.91	\$13.72	\$0.00	\$61.61
12/01/2020	\$34.98	\$12.91	\$14.82	\$0.00	\$62.71
06/01/2021	\$35.78	\$12.91	\$14.82	\$0.00	\$63.51
08/01/2021	\$35.78	\$13.41	\$14.82	\$0.00	\$64.01
12/01/2021	\$35.78	\$13.41	\$16.01	\$0.00	\$65.20

**PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK)**
*PILE DRIVER LOCAL 56 (ZONE 1)*

For apprentice rates see "Apprentice- PILE DRIVER"

08/01/2018	\$46.57	\$9.90	\$21.15	\$0.00	\$77.62
08/01/2019	\$48.94	\$9.90	\$21.15	\$0.00	\$79.99

**PILE DRIVER**
*PILE DRIVER LOCAL 56 (ZONE 1)*

08/01/2018	\$46.57	\$9.90	\$21.15	\$0.00	\$77.62
08/01/2019	\$48.94	\$9.90	\$21.15	\$0.00	\$79.99

**Classification**

Effective Date    Base Wage    Health    Pension    Supplemental  
Unemployment    Total Rate

**Apprentice - PILE DRIVER - Local 56 Zone 1**
**Effective Date - 08/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.29	\$9.90	\$21.15	\$0.00	\$54.34
2	60	\$27.94	\$9.90	\$21.15	\$0.00	\$58.99
3	70	\$32.60	\$9.90	\$21.15	\$0.00	\$63.65
4	75	\$34.93	\$9.90	\$21.15	\$0.00	\$65.98
5	80	\$37.26	\$9.90	\$21.15	\$0.00	\$68.31
6	80	\$37.26	\$9.90	\$21.15	\$0.00	\$68.31
7	90	\$41.91	\$9.90	\$21.15	\$0.00	\$72.96
8	90	\$41.91	\$9.90	\$21.15	\$0.00	\$72.96

**Effective Date - 08/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.47	\$9.90	\$21.15	\$0.00	\$55.52
2	60	\$29.36	\$9.90	\$21.15	\$0.00	\$60.41
3	70	\$34.26	\$9.90	\$21.15	\$0.00	\$65.31
4	75	\$36.71	\$9.90	\$21.15	\$0.00	\$67.76
5	80	\$39.15	\$9.90	\$21.15	\$0.00	\$70.20
6	80	\$39.15	\$9.90	\$21.15	\$0.00	\$70.20
7	90	\$44.05	\$9.90	\$21.15	\$0.00	\$75.10
8	90	\$44.05	\$9.90	\$21.15	\$0.00	\$75.10

**Notes:**
**Apprentice to Journeyworker Ratio:1:5**

PIPELAYER	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
LABORERS - ZONE 2	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

PLUMBER & PIPEFITTER	09/01/2018	\$42.04	\$10.00	\$18.20	\$0.00	\$70.24
PLUMBERS & PIPEFITTERS LOCAL 51						

**Apprentice - PLUMBER/PIPEFITTER - Local 51**

**Effective Date - 09/01/2018**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$16.82	\$10.00	\$2.50	\$0.00	\$29.32
2	50	\$21.02	\$10.00	\$2.50	\$0.00	\$33.52
3	60	\$25.22	\$10.00	\$7.85	\$0.00	\$43.07
4	70	\$29.43	\$10.00	\$12.56	\$0.00	\$51.99
5	80	\$33.63	\$10.00	\$15.70	\$0.00	\$59.33

**Notes:**

Steps 2000hrs. Prior 9/1/05; 40/40/45/50/55/60/65/75/80/85

**Apprentice to Journeyworker Ratio:1:3**

PNEUMATIC CONTROLS (TEMP.) PLUMBERS & PIPEFITTERS LOCAL 51	09/01/2018	\$42.04	\$10.00	\$18.20	\$0.00	\$70.24
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For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR LABORERS - ZONE 2	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER LABORERS - ZONE 2	06/01/2019	\$35.39	\$7.85	\$14.44	\$0.00	\$57.68
	12/01/2019	\$36.25	\$7.85	\$14.44	\$0.00	\$58.54
	06/01/2020	\$37.14	\$7.85	\$14.44	\$0.00	\$59.43
	12/01/2020	\$38.03	\$7.85	\$14.44	\$0.00	\$60.32
	06/01/2021	\$38.95	\$7.85	\$14.44	\$0.00	\$61.24
	12/01/2021	\$39.86	\$7.85	\$14.44	\$0.00	\$62.15

For apprentice rates see "Apprentice- LABORER"

POWER SHOVEL/DERRICK/TRENCHING MACHINE OPERATING ENGINEERS LOCAL 4	06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
	12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
	06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
	12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
	06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
	12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

PUMP OPERATOR (CONCRETE) OPERATING ENGINEERS LOCAL 4	06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
	12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
	06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
	12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
	06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
	12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$32.28	\$12.00	\$15.60	\$0.00	\$59.88
	12/01/2019	\$33.07	\$12.00	\$15.60	\$0.00	\$60.67
	06/01/2020	\$33.82	\$12.00	\$15.60	\$0.00	\$61.42
	12/01/2020	\$34.60	\$12.00	\$15.60	\$0.00	\$62.20
	06/01/2021	\$35.35	\$12.00	\$15.60	\$0.00	\$62.95
	12/01/2021	\$36.14	\$12.00	\$15.60	\$0.00	\$63.74
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 653</i>	08/01/2008	\$19.76	\$7.16	\$4.21	\$0.00	\$31.13
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofers Waterproofing &Roofers Damproofg) <i>ROOFERS LOCAL 33</i>	02/01/2019	\$43.36	\$11.50	\$15.90	\$0.00	\$70.76

**Apprentice - ROOFER - Local 33**

**Effective Date -** 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.68	\$11.50	\$3.69	\$0.00	\$36.87
2	60	\$26.02	\$11.50	\$15.90	\$0.00	\$53.42
3	65	\$28.18	\$11.50	\$15.90	\$0.00	\$55.58
4	75	\$32.52	\$11.50	\$15.90	\$0.00	\$59.92
5	85	\$36.86	\$11.50	\$15.90	\$0.00	\$64.26

**Notes:** \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1  
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.  
(Hot Pitch Mechanics' receive \$1.00 hr. above ROOFER)

**Apprentice to Journeyworker Ratio:\*\***



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROOFER SLATE / TILE / PRECAST CONCRETE <i>ROOFERS LOCAL 33</i>	02/01/2019	\$43.61	\$11.50	\$15.90	\$0.00	\$71.01
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2019	\$46.50	\$13.20	\$24.12	\$2.52	\$86.34
	08/01/2019	\$48.10	\$13.20	\$24.12	\$2.56	\$87.98
	02/01/2020	\$49.75	\$13.20	\$24.12	\$2.61	\$89.68
	08/01/2020	\$51.35	\$13.20	\$24.12	\$2.66	\$91.33
	02/01/2021	\$53.00	\$13.20	\$24.12	\$2.71	\$93.03
	08/01/2021	\$54.75	\$13.20	\$24.12	\$2.76	\$94.83
	02/01/2022	\$56.50	\$13.20	\$24.12	\$2.81	\$96.63

**Apprentice - SHEET METAL WORKER - Local 17-A**

**Effective Date -** 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$19.53	\$13.20	\$5.89	\$0.00	\$38.62
2	42	\$19.53	\$13.20	\$5.89	\$0.00	\$38.62
3	47	\$21.86	\$13.20	\$11.13	\$1.39	\$47.58
4	47	\$21.86	\$13.20	\$11.13	\$1.39	\$47.58
5	52	\$24.18	\$13.20	\$12.08	\$1.48	\$50.94
6	52	\$24.18	\$13.20	\$12.33	\$1.49	\$51.20
7	60	\$27.90	\$13.20	\$13.70	\$1.64	\$56.44
8	65	\$30.23	\$13.20	\$14.65	\$1.74	\$59.82
9	75	\$34.88	\$13.20	\$16.56	\$1.94	\$66.58
10	85	\$39.53	\$13.20	\$17.96	\$2.12	\$72.81

**Effective Date -** 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	42	\$20.20	\$13.20	\$5.89	\$0.00	\$39.29
2	42	\$20.20	\$13.20	\$5.89	\$0.00	\$39.29
3	47	\$22.61	\$13.20	\$11.13	\$1.41	\$48.35
4	47	\$22.61	\$13.20	\$11.13	\$1.41	\$48.35
5	52	\$25.01	\$13.20	\$12.08	\$1.51	\$51.80
6	52	\$25.01	\$13.20	\$12.33	\$1.52	\$52.06
7	60	\$28.86	\$13.20	\$13.70	\$1.67	\$57.43
8	65	\$31.27	\$13.20	\$14.65	\$1.77	\$60.89
9	75	\$36.08	\$13.20	\$16.56	\$1.98	\$67.82
10	85	\$40.89	\$13.20	\$17.96	\$2.16	\$74.21

**Notes:**

Steps are 6 mos.

**Apprentice to Journeyworker Ratio:1:4**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.54	\$11.91	\$12.70	\$0.00	\$59.15
	08/01/2019	\$34.54	\$12.41	\$12.70	\$0.00	\$59.65
	12/01/2019	\$34.54	\$12.41	\$13.72	\$0.00	\$60.67
	06/01/2020	\$35.44	\$12.41	\$13.72	\$0.00	\$61.57
	08/01/2020	\$35.44	\$12.91	\$13.72	\$0.00	\$62.07
	12/01/2020	\$35.44	\$12.91	\$14.82	\$0.00	\$63.17
	06/01/2021	\$36.24	\$12.91	\$14.82	\$0.00	\$63.97
	08/01/2021	\$36.24	\$13.41	\$14.82	\$0.00	\$64.47
	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.83	\$11.91	\$12.70	\$0.00	\$59.44
	08/01/2019	\$34.83	\$12.41	\$12.70	\$0.00	\$59.94
	12/01/2019	\$34.83	\$12.41	\$13.72	\$0.00	\$60.96
	06/01/2020	\$35.73	\$12.41	\$13.72	\$0.00	\$61.86
	08/01/2020	\$35.73	\$12.91	\$13.72	\$0.00	\$62.36
	12/01/2020	\$35.73	\$12.91	\$14.82	\$0.00	\$63.46
	06/01/2021	\$36.53	\$12.91	\$14.82	\$0.00	\$64.26
	08/01/2021	\$36.53	\$13.41	\$14.82	\$0.00	\$64.76
	12/01/2021	\$36.53	\$13.41	\$16.01	\$0.00	\$65.95
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2019	\$58.98	\$9.47	\$19.60	\$0.00	\$88.05
	10/01/2019	\$60.48	\$9.47	\$19.60	\$0.00	\$89.55
	03/01/2020	\$61.98	\$9.47	\$19.60	\$0.00	\$91.05
	10/01/2020	\$63.48	\$9.47	\$19.60	\$0.00	\$92.55
	03/01/2021	\$64.98	\$9.47	\$19.60	\$0.00	\$94.05

**Classification**

Effective Date    Base Wage    Health    Pension    Supplemental  
Unemployment    Total Rate

**Apprentice - SPRINKLER FITTER - Local 550 (Section A) Zone 1**
**Effective Date - 03/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$20.64	\$9.47	\$9.10	\$0.00	\$39.21
2	40	\$23.59	\$9.47	\$9.10	\$0.00	\$42.16
3	45	\$26.54	\$9.47	\$9.10	\$0.00	\$45.11
4	50	\$29.49	\$9.47	\$9.10	\$0.00	\$48.06
5	55	\$32.44	\$9.47	\$9.10	\$0.00	\$51.01
6	60	\$35.39	\$9.47	\$10.60	\$0.00	\$55.46
7	65	\$38.34	\$9.47	\$10.60	\$0.00	\$58.41
8	70	\$41.29	\$9.47	\$10.60	\$0.00	\$61.36
9	75	\$44.24	\$9.47	\$10.60	\$0.00	\$64.31
10	80	\$47.18	\$9.47	\$10.60	\$0.00	\$67.25

**Effective Date - 10/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$21.17	\$9.47	\$9.10	\$0.00	\$39.74
2	40	\$24.19	\$9.47	\$9.10	\$0.00	\$42.76
3	45	\$27.22	\$9.47	\$9.10	\$0.00	\$45.79
4	50	\$30.24	\$9.47	\$9.10	\$0.00	\$48.81
5	55	\$33.26	\$9.47	\$9.10	\$0.00	\$51.83
6	60	\$36.29	\$9.47	\$10.60	\$0.00	\$56.36
7	65	\$39.31	\$9.47	\$10.60	\$0.00	\$59.38
8	70	\$42.34	\$9.47	\$10.60	\$0.00	\$62.41
9	75	\$45.36	\$9.47	\$10.60	\$0.00	\$65.43
10	80	\$48.38	\$9.47	\$10.60	\$0.00	\$68.45

Notes: Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

STEAM BOILER OPERATOR OPERATING ENGINEERS LOCAL 4	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN OPERATING ENGINEERS LOCAL 4	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TELECOMMUNICATION TECHNICIAN	03/01/2019	\$35.25	\$9.90	\$11.14	\$0.00	\$56.29
<i>ELECTRICIANS LOCAL 223</i>	09/01/2019	\$35.78	\$10.15	\$11.45	\$0.00	\$57.38
	03/01/2020	\$36.27	\$10.40	\$11.78	\$0.00	\$58.45

**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 223**

**Effective Date -** 03/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

**Notes:** See Electrician Apprentice Wages

Steps are 750hrs

Telecom Apprentice Wages shall be the same as the Electrician Apprentice Wages

**Apprentice to Journeyworker Ratio:2:3\*\*\***

TERRAZZO FINISHERS	02/01/2019	\$52.49	\$10.75	\$20.66	\$0.00	\$83.90
<i>BRICKLAYERS LOCAL 3 - MARBLE &amp; TILE</i>	08/01/2019	\$53.84	\$10.75	\$20.80	\$0.00	\$85.39
	02/01/2020	\$54.48	\$10.75	\$20.80	\$0.00	\$86.03
	08/01/2020	\$55.83	\$10.75	\$20.95	\$0.00	\$87.53
	02/01/2021	\$56.47	\$10.75	\$20.95	\$0.00	\$88.17
	08/01/2021	\$57.87	\$10.75	\$21.11	\$0.00	\$89.73
	02/01/2022	\$58.46	\$10.75	\$21.11	\$0.00	\$90.32

**Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile**

**Effective Date -** 02/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.25	\$10.75	\$20.03	\$0.00	\$57.03
2	60	\$31.49	\$10.75	\$20.03	\$0.00	\$62.27
3	70	\$36.74	\$10.75	\$20.03	\$0.00	\$67.52
4	80	\$41.99	\$10.75	\$20.03	\$0.00	\$72.77
5	90	\$47.24	\$10.75	\$20.03	\$0.00	\$78.02

**Effective Date -** 08/01/2019

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.92	\$10.75	\$20.80	\$0.00	\$58.47
2	60	\$32.30	\$10.75	\$20.80	\$0.00	\$63.85
3	70	\$37.69	\$10.75	\$20.80	\$0.00	\$69.24
4	80	\$43.07	\$10.75	\$20.80	\$0.00	\$74.62
5	90	\$48.46	\$10.75	\$20.80	\$0.00	\$80.01

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2019	\$41.00	\$7.85	\$15.55	\$0.00	\$64.40
	12/01/2019	\$42.00	\$7.85	\$15.55	\$0.00	\$65.40
	06/01/2020	\$42.99	\$7.85	\$15.55	\$0.00	\$66.39
	12/01/2020	\$43.97	\$7.85	\$15.55	\$0.00	\$67.37
	06/01/2021	\$44.99	\$7.85	\$15.55	\$0.00	\$68.39
	12/01/2021	\$46.00	\$7.85	\$15.55	\$0.00	\$69.40
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2019	\$39.72	\$7.85	\$15.55	\$0.00	\$63.12
	12/01/2019	\$40.72	\$7.85	\$15.55	\$0.00	\$64.12
	06/01/2020	\$41.71	\$7.85	\$15.55	\$0.00	\$65.11
	12/01/2020	\$42.69	\$7.85	\$15.55	\$0.00	\$66.09
	06/01/2021	\$43.71	\$7.85	\$15.55	\$0.00	\$67.11
	12/01/2021	\$44.72	\$7.85	\$15.55	\$0.00	\$68.12
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	06/01/2019	\$39.60	\$7.85	\$15.55	\$0.00	\$63.00
	12/01/2019	\$40.60	\$7.85	\$15.55	\$0.00	\$64.00
	06/01/2020	\$41.59	\$7.85	\$15.55	\$0.00	\$64.99
	12/01/2020	\$42.57	\$7.85	\$15.55	\$0.00	\$65.97
	06/01/2021	\$43.59	\$7.85	\$15.55	\$0.00	\$66.99
	12/01/2021	\$44.60	\$7.85	\$15.55	\$0.00	\$68.00
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$15.60	\$0.00	\$75.29
	12/01/2019	\$48.83	\$12.00	\$15.60	\$0.00	\$76.43
	06/01/2020	\$49.91	\$12.00	\$15.60	\$0.00	\$77.51
	12/01/2020	\$51.05	\$12.00	\$15.60	\$0.00	\$78.65
	06/01/2021	\$52.14	\$12.00	\$15.60	\$0.00	\$79.74
	12/01/2021	\$53.28	\$12.00	\$15.60	\$0.00	\$80.88
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$35.12	\$11.91	\$12.70	\$0.00	\$59.73
	08/01/2019	\$35.12	\$12.41	\$12.70	\$0.00	\$60.23
	12/01/2019	\$35.12	\$12.41	\$13.72	\$0.00	\$61.25
	06/01/2020	\$36.02	\$12.41	\$13.72	\$0.00	\$62.15
	08/01/2020	\$36.02	\$12.91	\$13.72	\$0.00	\$62.65
	12/01/2020	\$36.02	\$12.91	\$14.82	\$0.00	\$63.75
	06/01/2021	\$36.82	\$12.91	\$14.82	\$0.00	\$64.55
	08/01/2021	\$36.82	\$13.41	\$14.82	\$0.00	\$65.05
	12/01/2021	\$36.82	\$13.41	\$16.01	\$0.00	\$66.24
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2019	\$51.88	\$7.85	\$15.95	\$0.00	\$75.68
	12/01/2019	\$52.88	\$7.85	\$15.95	\$0.00	\$76.68
	06/01/2020	\$53.87	\$7.85	\$15.95	\$0.00	\$77.67
	12/01/2020	\$54.85	\$7.85	\$15.95	\$0.00	\$78.65
	06/01/2021	\$55.87	\$7.85	\$15.95	\$0.00	\$79.67
	12/01/2021	\$56.88	\$7.85	\$15.95	\$0.00	\$80.68
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2019	\$53.88	\$7.85	\$15.95	\$0.00	\$77.68
	12/01/2019	\$54.88	\$7.85	\$15.95	\$0.00	\$78.68
	06/01/2020	\$55.87	\$7.85	\$15.95	\$0.00	\$79.67
	12/01/2020	\$56.85	\$7.85	\$15.95	\$0.00	\$80.65
	06/01/2021	\$57.87	\$7.85	\$15.95	\$0.00	\$81.67
	12/01/2021	\$58.88	\$7.85	\$15.95	\$0.00	\$82.68
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2019	\$43.95	\$7.85	\$15.95	\$0.00	\$67.75
	12/01/2019	\$44.95	\$7.85	\$15.95	\$0.00	\$68.75
	06/01/2020	\$45.94	\$7.85	\$15.95	\$0.00	\$69.74
	12/01/2020	\$46.92	\$7.85	\$15.95	\$0.00	\$70.72
	06/01/2021	\$47.94	\$7.85	\$15.95	\$0.00	\$71.74
	12/01/2021	\$48.95	\$7.85	\$15.95	\$0.00	\$72.75
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2019	\$45.95	\$7.85	\$15.95	\$0.00	\$69.75
	12/01/2019	\$46.95	\$7.85	\$15.95	\$0.00	\$70.75
	06/01/2020	\$47.94	\$7.85	\$15.95	\$0.00	\$71.74
	12/01/2020	\$48.92	\$7.85	\$15.95	\$0.00	\$72.72
	06/01/2021	\$49.94	\$7.85	\$15.95	\$0.00	\$73.74
	12/01/2021	\$50.95	\$7.85	\$15.95	\$0.00	\$74.75
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.54	\$11.91	\$12.70	\$0.00	\$59.15
	08/01/2019	\$34.54	\$12.41	\$12.70	\$0.00	\$59.65
	12/01/2019	\$34.54	\$12.41	\$13.72	\$0.00	\$60.67
	06/01/2020	\$35.44	\$12.41	\$13.72	\$0.00	\$61.57
	08/01/2020	\$35.44	\$12.91	\$13.72	\$0.00	\$62.07
	12/01/2020	\$35.44	\$12.91	\$14.82	\$0.00	\$63.17
	06/01/2021	\$36.24	\$12.91	\$14.82	\$0.00	\$63.97
	08/01/2021	\$36.24	\$13.41	\$14.82	\$0.00	\$64.47
	12/01/2021	\$36.24	\$13.41	\$16.01	\$0.00	\$65.66
WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i>	06/01/2019	\$34.64	\$7.85	\$14.44	\$0.00	\$56.93
	12/01/2019	\$35.50	\$7.85	\$14.44	\$0.00	\$57.79
	06/01/2020	\$36.39	\$7.85	\$14.44	\$0.00	\$58.68
	12/01/2020	\$37.28	\$7.85	\$14.44	\$0.00	\$59.57
	06/01/2021	\$38.20	\$7.85	\$14.44	\$0.00	\$60.49
	12/01/2021	\$39.11	\$7.85	\$14.44	\$0.00	\$61.40
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$15.60	\$0.00	\$75.78
	12/01/2019	\$49.33	\$12.00	\$15.60	\$0.00	\$76.93
	06/01/2020	\$50.43	\$12.00	\$15.60	\$0.00	\$78.03
	12/01/2020	\$51.58	\$12.00	\$15.60	\$0.00	\$79.18
	06/01/2021	\$52.68	\$12.00	\$15.60	\$0.00	\$80.28
	12/01/2021	\$53.83	\$12.00	\$15.60	\$0.00	\$81.43
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS &amp; PIPEFITTERS LOCAL 51</i>	09/01/2018	\$42.04	\$10.00	\$18.20	\$0.00	\$70.24
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Outside Electrical - East</b>						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$27.14	\$7.75	\$1.81	\$0.00	\$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$38.45	\$7.75	\$9.53	\$0.00	\$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$31.66	\$7.75	\$9.44	\$0.00	\$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$38.45	\$7.75	\$13.61	\$0.00	\$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$33.92	\$7.75	\$10.21	\$0.00	\$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$20.35	\$7.75	\$1.61	\$0.00	\$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	09/03/2017	\$45.23	\$7.75	\$16.61	\$0.00	\$69.59

**Apprentice - LINEMAN (Outside Electrical) - East Local 104**

**Effective Date -** 09/03/2017

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$27.14	\$7.75	\$3.31	\$0.00	\$38.20
2	65	\$29.40	\$7.75	\$3.38	\$0.00	\$40.53
3	70	\$31.66	\$7.75	\$3.45	\$0.00	\$42.86
4	75	\$33.92	\$7.75	\$5.02	\$0.00	\$46.69
5	80	\$36.18	\$7.75	\$5.09	\$0.00	\$49.02
6	85	\$38.45	\$7.75	\$5.15	\$0.00	\$51.35
7	90	\$40.71	\$7.75	\$7.22	\$0.00	\$55.68

**Notes:**

**Apprentice to Journeyworker Ratio:1:2**

TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$30.73	\$4.70	\$3.17	\$0.00	\$38.60
TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77
TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	02/04/2019	\$28.93	\$4.70	\$3.14	\$0.00	\$36.77

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TREE TRIMMER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$18.51	\$3.55	\$0.00	\$0.00	\$22.06
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.						
TREE TRIMMER GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$16.32	\$3.55	\$0.00	\$0.00	\$19.87
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.						
<b>Rental of Equipment - East</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.25	\$11.91	\$0.00	\$0.00	\$46.16
	08/01/2019	\$34.25	\$12.41	\$0.00	\$0.00	\$46.66
	12/01/2019	\$34.25	\$12.41	\$0.00	\$0.00	\$46.66
	06/01/2020	\$35.15	\$12.41	\$0.00	\$0.00	\$47.56
	08/01/2020	\$35.15	\$12.91	\$0.00	\$0.00	\$48.06
	12/01/2020	\$35.15	\$12.91	\$0.00	\$0.00	\$48.06
	06/01/2021	\$35.95	\$12.91	\$0.00	\$0.00	\$48.86
	08/01/2021	\$35.95	\$13.41	\$0.00	\$0.00	\$49.36
	12/01/2021	\$35.95	\$13.41	\$0.00	\$0.00	\$49.36
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.32	\$11.91	\$0.00	\$0.00	\$46.23
	08/01/2019	\$34.32	\$12.41	\$0.00	\$0.00	\$46.73
	12/01/2019	\$34.32	\$12.41	\$0.00	\$0.00	\$46.73
	06/01/2020	\$35.22	\$12.41	\$0.00	\$0.00	\$47.63
	08/01/2020	\$35.22	\$12.91	\$0.00	\$0.00	\$48.13
	12/01/2020	\$35.22	\$12.91	\$0.00	\$0.00	\$48.13
	06/01/2021	\$36.02	\$12.91	\$0.00	\$0.00	\$48.93
	08/01/2021	\$36.02	\$13.41	\$0.00	\$0.00	\$49.43
	12/01/2021	\$36.02	\$13.41	\$0.00	\$0.00	\$49.43
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.44	\$11.91	\$0.00	\$0.00	\$46.35
	08/01/2019	\$34.44	\$12.41	\$0.00	\$0.00	\$46.85
	12/01/2019	\$34.44	\$12.41	\$0.00	\$0.00	\$46.85
	06/01/2020	\$35.34	\$12.41	\$0.00	\$0.00	\$47.75
	08/01/2020	\$35.34	\$12.91	\$0.00	\$0.00	\$48.25
	12/01/2020	\$35.34	\$12.91	\$0.00	\$0.00	\$48.25
	06/01/2021	\$36.14	\$12.91	\$0.00	\$0.00	\$49.05
	08/01/2021	\$36.14	\$13.41	\$0.00	\$0.00	\$49.55
	12/01/2021	\$36.14	\$13.41	\$0.00	\$0.00	\$49.55
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$97.80	\$9.90	\$0.00	\$0.00	\$107.70
	08/01/2019	\$102.78	\$9.90	\$0.00	\$0.00	\$112.68
For apprentice rates see "Apprentice- PILE DRIVER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BULLDOZER/GRADER/SCRAPER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$0.00	\$0.00	\$59.69
	12/01/2019	\$48.83	\$12.00	\$0.00	\$0.00	\$60.83
	06/01/2020	\$49.91	\$12.00	\$0.00	\$0.00	\$61.91
	12/01/2020	\$51.05	\$12.00	\$0.00	\$0.00	\$63.05
	06/01/2021	\$52.14	\$12.00	\$0.00	\$0.00	\$64.14
	12/01/2021	\$53.28	\$12.00	\$0.00	\$0.00	\$65.28
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$49.18	\$12.00	\$0.00	\$0.00	\$61.18
	12/01/2019	\$50.33	\$12.00	\$0.00	\$0.00	\$62.33
	06/01/2020	\$51.43	\$12.00	\$0.00	\$0.00	\$63.43
	12/01/2020	\$52.58	\$12.00	\$0.00	\$0.00	\$64.58
	06/01/2021	\$53.68	\$12.00	\$0.00	\$0.00	\$65.68
	12/01/2021	\$54.83	\$12.00	\$0.00	\$0.00	\$66.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$32.28	\$12.00	\$0.00	\$0.00	\$44.28
	12/01/2019	\$33.07	\$12.00	\$0.00	\$0.00	\$45.07
	06/01/2020	\$33.82	\$12.00	\$0.00	\$0.00	\$45.82
	12/01/2020	\$34.60	\$12.00	\$0.00	\$0.00	\$46.60
	06/01/2021	\$35.35	\$12.00	\$0.00	\$0.00	\$47.35
	12/01/2021	\$36.14	\$12.00	\$0.00	\$0.00	\$48.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$65.20	\$9.90	\$0.00	\$0.00	\$75.10
	08/01/2019	\$68.52	\$9.90	\$0.00	\$0.00	\$78.42
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$46.57	\$9.90	\$0.00	\$0.00	\$56.47
	08/01/2019	\$48.94	\$9.90	\$0.00	\$0.00	\$58.84
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$69.86	\$9.90	\$0.00	\$0.00	\$79.76
	08/01/2019	\$73.41	\$9.90	\$0.00	\$0.00	\$83.31
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2018	\$97.80	\$9.90	\$0.00	\$0.00	\$107.70
	08/01/2019	\$102.78	\$9.90	\$0.00	\$0.00	\$112.68
For apprentice rates see "Apprentice- PILE DRIVER"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i>	06/01/2019	\$22.50	\$7.85	\$0.00	\$0.00	\$30.35
	12/01/2019	\$23.50	\$7.85	\$0.00	\$0.00	\$31.35
	06/01/2020	\$23.50	\$7.85	\$0.00	\$0.00	\$31.35
	12/01/2020	\$24.50	\$7.85	\$0.00	\$0.00	\$32.35
	06/01/2021	\$24.50	\$7.85	\$0.00	\$0.00	\$32.35
	12/01/2021	\$24.50	\$7.85	\$0.00	\$0.00	\$32.35
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$32.28	\$12.00	\$0.00	\$0.00	\$44.28
	12/01/2019	\$33.07	\$12.00	\$0.00	\$0.00	\$45.07
	06/01/2020	\$33.82	\$12.00	\$0.00	\$0.00	\$45.82
	12/01/2020	\$34.60	\$12.00	\$0.00	\$0.00	\$46.60
	06/01/2021	\$35.35	\$12.00	\$0.00	\$0.00	\$47.35
	12/01/2021	\$36.14	\$12.00	\$0.00	\$0.00	\$48.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
HOISTING ENGINEER/CRANES/GRADALLS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83

**Apprentice - OPERATING ENGINEERS - Local 4****Effective Date - 06/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$26.50	\$12.00	\$0.00	\$0.00	\$38.50
2	60	\$28.91	\$12.00	\$0.00	\$0.00	\$40.91
3	65	\$31.32	\$12.00	\$0.00	\$0.00	\$43.32
4	70	\$33.73	\$12.00	\$0.00	\$0.00	\$45.73
5	75	\$36.14	\$12.00	\$0.00	\$0.00	\$48.14
6	80	\$38.54	\$12.00	\$0.00	\$0.00	\$50.54
7	85	\$40.95	\$12.00	\$0.00	\$0.00	\$52.95
8	90	\$43.36	\$12.00	\$0.00	\$0.00	\$55.36

**Effective Date - 12/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$27.13	\$12.00	\$0.00	\$0.00	\$39.13
2	60	\$29.60	\$12.00	\$0.00	\$0.00	\$41.60
3	65	\$32.06	\$12.00	\$0.00	\$0.00	\$44.06
4	70	\$34.53	\$12.00	\$0.00	\$0.00	\$46.53
5	75	\$37.00	\$12.00	\$0.00	\$0.00	\$49.00
6	80	\$39.46	\$12.00	\$0.00	\$0.00	\$51.46
7	85	\$41.93	\$12.00	\$0.00	\$0.00	\$53.93
8	90	\$44.40	\$12.00	\$0.00	\$0.00	\$56.40

**Notes:****Apprentice to Journeyworker Ratio:1:6**

LABORER

LABORERS - ZONE 2

06/01/2019	\$34.39	\$7.85	\$0.00	\$0.00	\$42.24
12/01/2019	\$35.25	\$7.85	\$0.00	\$0.00	\$43.10
06/01/2020	\$36.14	\$7.85	\$0.00	\$0.00	\$43.99
12/01/2020	\$37.03	\$7.85	\$0.00	\$0.00	\$44.88
06/01/2021	\$37.95	\$7.85	\$0.00	\$0.00	\$45.80
12/01/2021	\$38.86	\$7.85	\$0.00	\$0.00	\$46.71

**Classification**
**Effective Date**
**Base Wage**
**Health**
**Pension**
**Supplemental  
Unemployment**
**Total Rate**
**Apprentice - LABORER - Zone 2**
**Effective Date - 06/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$20.63	\$7.85	\$0.00	\$0.00	\$28.48
2	70	\$24.07	\$7.85	\$0.00	\$0.00	\$31.92
3	80	\$27.51	\$7.85	\$0.00	\$0.00	\$35.36
4	90	\$30.95	\$7.85	\$0.00	\$0.00	\$38.80

**Effective Date - 12/01/2019**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.15	\$7.85	\$0.00	\$0.00	\$29.00
2	70	\$24.68	\$7.85	\$0.00	\$0.00	\$32.53
3	80	\$28.20	\$7.85	\$0.00	\$0.00	\$36.05
4	90	\$31.73	\$7.85	\$0.00	\$0.00	\$39.58

**Notes:**
**Apprentice to Journeyworker Ratio:1:5**

OILER (OTHER THAN TRUCK CRANES,GRADALLS) OPERATING ENGINEERS LOCAL 4	06/01/2019	\$23.11	\$12.00	\$0.00	\$0.00	\$35.11
	12/01/2019	\$23.68	\$12.00	\$0.00	\$0.00	\$35.68
	06/01/2020	\$24.23	\$12.00	\$0.00	\$0.00	\$36.23
	12/01/2020	\$24.80	\$12.00	\$0.00	\$0.00	\$36.80
	06/01/2021	\$25.35	\$12.00	\$0.00	\$0.00	\$37.35
	12/01/2021	\$25.93	\$12.00	\$0.00	\$0.00	\$37.93
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) OPERATING ENGINEERS LOCAL 4	06/01/2019	\$27.57	\$12.00	\$0.00	\$0.00	\$39.57
	12/01/2019	\$28.24	\$12.00	\$0.00	\$0.00	\$40.24
	06/01/2020	\$28.89	\$12.00	\$0.00	\$0.00	\$40.89
	12/01/2020	\$29.57	\$12.00	\$0.00	\$0.00	\$41.57
	06/01/2021	\$30.21	\$12.00	\$0.00	\$0.00	\$42.21
	12/01/2021	\$30.89	\$12.00	\$0.00	\$0.00	\$42.89
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II OPERATING ENGINEERS LOCAL 4	06/01/2019	\$47.69	\$12.00	\$0.00	\$0.00	\$59.69
	12/01/2019	\$48.83	\$12.00	\$0.00	\$0.00	\$60.83
	06/01/2020	\$49.91	\$12.00	\$0.00	\$0.00	\$61.91
	12/01/2020	\$51.05	\$12.00	\$0.00	\$0.00	\$63.05
	06/01/2021	\$52.14	\$12.00	\$0.00	\$0.00	\$64.14
	12/01/2021	\$53.28	\$12.00	\$0.00	\$0.00	\$65.28
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PANEL & PICKUP TRUCKS DRIVER <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.08	\$11.91	\$0.00	\$0.00	\$45.99
	08/01/2019	\$34.08	\$12.41	\$0.00	\$0.00	\$46.49
	12/01/2019	\$34.08	\$12.41	\$0.00	\$0.00	\$46.49
	06/01/2020	\$34.98	\$12.41	\$0.00	\$0.00	\$47.39
	08/01/2020	\$34.98	\$12.91	\$0.00	\$0.00	\$47.89
	12/01/2020	\$34.98	\$12.91	\$0.00	\$0.00	\$47.89
	06/01/2021	\$35.78	\$12.91	\$0.00	\$0.00	\$48.69
	08/01/2021	\$35.78	\$13.41	\$0.00	\$0.00	\$49.19
	12/01/2021	\$35.78	\$13.41	\$0.00	\$0.00	\$49.19
POWER SHOVEL/DERRICK/TRENCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$48.18	\$12.00	\$0.00	\$0.00	\$60.18
	12/01/2019	\$49.33	\$12.00	\$0.00	\$0.00	\$61.33
	06/01/2020	\$50.43	\$12.00	\$0.00	\$0.00	\$62.43
	12/01/2020	\$51.58	\$12.00	\$0.00	\$0.00	\$63.58
	06/01/2021	\$52.68	\$12.00	\$0.00	\$0.00	\$64.68
	12/01/2021	\$53.83	\$12.00	\$0.00	\$0.00	\$65.83
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$32.28	\$12.00	\$0.00	\$0.00	\$44.28
	12/01/2019	\$33.07	\$12.00	\$0.00	\$0.00	\$45.07
	06/01/2020	\$33.82	\$12.00	\$0.00	\$0.00	\$45.82
	12/01/2020	\$34.60	\$12.00	\$0.00	\$0.00	\$46.60
	06/01/2021	\$35.35	\$12.00	\$0.00	\$0.00	\$47.35
	12/01/2021	\$36.14	\$12.00	\$0.00	\$0.00	\$48.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROLLER/SPREADER/MULCHING MACHINE <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$0.00	\$0.00	\$59.69
	12/01/2019	\$48.83	\$12.00	\$0.00	\$0.00	\$60.83
	06/01/2020	\$49.91	\$12.00	\$0.00	\$0.00	\$61.91
	12/01/2020	\$51.05	\$12.00	\$0.00	\$0.00	\$63.05
	06/01/2021	\$52.14	\$12.00	\$0.00	\$0.00	\$64.14
	12/01/2021	\$53.28	\$12.00	\$0.00	\$0.00	\$65.28
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.54	\$11.91	\$0.00	\$0.00	\$46.45
	08/01/2019	\$34.54	\$12.41	\$0.00	\$0.00	\$46.95
	12/01/2019	\$34.54	\$12.41	\$0.00	\$0.00	\$46.95
	06/01/2020	\$35.44	\$12.41	\$0.00	\$0.00	\$47.85
	08/01/2020	\$35.44	\$12.91	\$0.00	\$0.00	\$48.35
	12/01/2020	\$35.44	\$12.91	\$0.00	\$0.00	\$48.35
	06/01/2021	\$36.24	\$12.91	\$0.00	\$0.00	\$49.15
	08/01/2021	\$36.24	\$13.41	\$0.00	\$0.00	\$49.65
	12/01/2021	\$36.24	\$13.41	\$0.00	\$0.00	\$49.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.83	\$11.91	\$0.00	\$0.00	\$46.74
	08/01/2019	\$34.83	\$12.41	\$0.00	\$0.00	\$47.24
	12/01/2019	\$34.83	\$12.41	\$0.00	\$0.00	\$47.24
	06/01/2020	\$35.73	\$12.41	\$0.00	\$0.00	\$48.14
	08/01/2020	\$35.73	\$12.91	\$0.00	\$0.00	\$48.64
	12/01/2020	\$35.73	\$12.91	\$0.00	\$0.00	\$48.64
	06/01/2021	\$36.53	\$12.91	\$0.00	\$0.00	\$49.44
	08/01/2021	\$36.53	\$13.41	\$0.00	\$0.00	\$49.94
	12/01/2021	\$36.53	\$13.41	\$0.00	\$0.00	\$49.94
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	06/01/2019	\$47.69	\$12.00	\$0.00	\$0.00	\$59.69
	12/01/2019	\$48.83	\$12.00	\$0.00	\$0.00	\$60.83
	06/01/2020	\$49.91	\$12.00	\$0.00	\$0.00	\$61.91
	12/01/2020	\$51.05	\$12.00	\$0.00	\$0.00	\$63.05
	06/01/2021	\$52.14	\$12.00	\$0.00	\$0.00	\$64.14
	12/01/2021	\$53.28	\$12.00	\$0.00	\$0.00	\$65.28
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$35.12	\$11.91	\$0.00	\$0.00	\$47.03
	08/01/2019	\$35.12	\$12.41	\$0.00	\$0.00	\$47.53
	12/01/2019	\$35.12	\$12.41	\$0.00	\$0.00	\$47.53
	06/01/2020	\$36.02	\$12.41	\$0.00	\$0.00	\$48.43
	08/01/2020	\$36.02	\$12.91	\$0.00	\$0.00	\$48.93
	12/01/2020	\$36.02	\$12.91	\$0.00	\$0.00	\$48.93
	06/01/2021	\$36.82	\$12.91	\$0.00	\$0.00	\$49.73
	08/01/2021	\$36.82	\$13.41	\$0.00	\$0.00	\$50.23
	12/01/2021	\$36.82	\$13.41	\$0.00	\$0.00	\$50.23
TREE TRIMMER <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$18.51	\$3.55	\$0.00	\$0.00	\$22.06
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.						
TREE TRIMMER GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$16.32	\$3.55	\$0.00	\$0.00	\$19.87
This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.						
VAC-HAUL/CATCH BASIN CLEANING <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2019	\$34.54	\$11.91	\$0.00	\$0.00	\$46.45
	08/01/2019	\$34.54	\$12.41	\$0.00	\$0.00	\$46.95
	12/01/2019	\$34.54	\$12.41	\$0.00	\$0.00	\$46.95
	06/01/2020	\$35.44	\$12.41	\$0.00	\$0.00	\$47.85
	08/01/2020	\$35.44	\$12.91	\$0.00	\$0.00	\$48.35
	12/01/2020	\$35.44	\$12.91	\$0.00	\$0.00	\$48.35
	06/01/2021	\$36.24	\$12.91	\$0.00	\$0.00	\$49.15
	08/01/2021	\$36.24	\$13.41	\$0.00	\$0.00	\$49.65
	12/01/2021	\$36.24	\$13.41	\$0.00	\$0.00	\$49.65

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

\*\* Multiple ratios are listed in the comment field.

\*\*\* APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

\*\*\*\* APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.