Procurement #: 44751>

CITY OF PROVIDENCE, RHODE ISLAND

Department: Public Property

RFP Title: CONLEY STADIUM PARKING LOT CONSTRUCTION

Opening Date: 05/06/2024

Addendum #: 2

Issue Date: 04/16/2024

The purpose of this addendum is to to provide direct uploads of the project plans and specifications (see attached)

Providence City Hall
25 Dorrance Street
Providence, RI 02903

100% SUBMISSION

Prepared for The City of Providence:

CONSTRUCTION DOCUMENTS for:

CONLEY STADIUM PARKING LOT IMPROVEMENTS

434 MOUNT PLEASANT AVENUE | PROVIDENCE, RHODE ISLAND

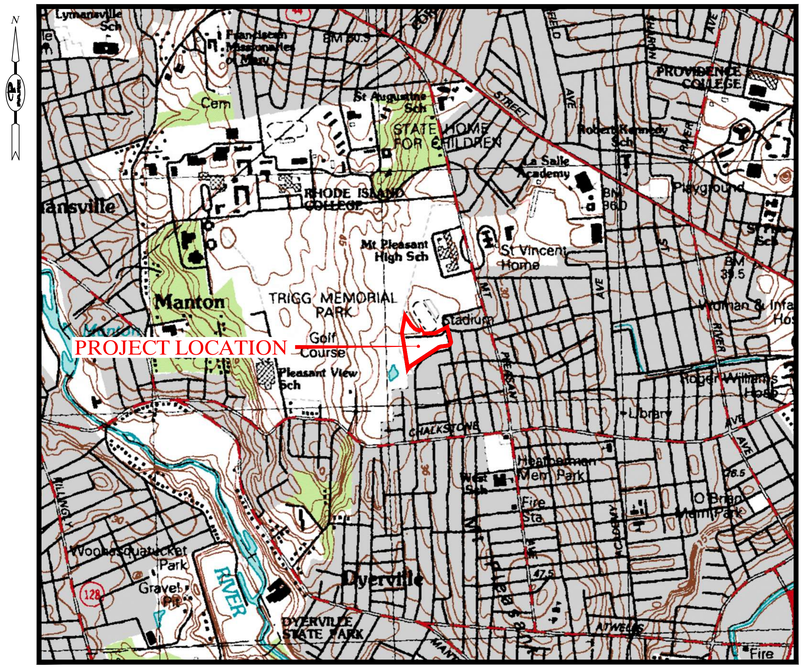
ASSESSOR'S PLAT 128 LOT 2; ASSESSOR'S PLAT 129 LOT 22

FEBRUARY 2024

HONORABLE
BRETT P. SMILEY
MAYOR

COUNCILMAN
BRYAN PRINCIPE
MAJORITY WHIP

Drawing Index



LOCUS PLAN

SCALE: 1" = 1000'

0" 1"

BAR IS ONE INCH ON ORIGINAL 24" X 36" DRAWING

AERIAL PLAN

SCALE: 1" = 300'

0" 1"

BAR IS ONE INCH ON ORIGINAL 24" X 36" DRAWING

Owner/Applicant

CITY OF PROVIDENCE
MAYOR, BRETT P. SMILEY
25 DORRANCE STREET
PROVIDENCE, RI 02903
(401) 421-7740

Civil Engineer

PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE, LINCOLN, RI 02865, 401-334-4100
10 LINCOLN ROAD, SUITE 210, FOXBORO, MA 02035, 508-543-1755
14 BOBALA ROAD, SUITE 2B, HOLYOKE, MA 01040, 413.507.3448

Prepared by:

PARE CORPORATION

REFERENCE

1. DIGITAL AERIAL PHOTOGRAMMETERIC MAPPING PROVIDED BY AEROTECH CORP. IN SEPT. 25, 2018; DATE OF MAPPING MAY 02, 2018; PROJECT NO. AERO1456; CONTOUR INTERVAL 1 FOOT.
2. PARCEL LINES SHOWN WERE IMPORTED FROM AVAILABLE GIS DATA FROM CITY OF PROVIDENCE AND SHALL BE CONSIDERED APPROXIMATE.
3. EXISTING UNDERGROUND DRAINAGE AND UTILITY INFORMATION COMPILED FROM RECORD PLANS AND SITE INVESTIGATION PERFORMED BY PARE CORPORATION IN OCTOBER 2018 AND DECEMBER 2018.
4. WETLANDS SHOWN ON PLAN SET WERE DELINEATED BY PARE CORPORATION ON SEPTEMBER 27, 2018 AND LOCATED USING A HANDHELD GPS UNIT WITH SUBMETER ACCURACY. ADDITIONAL WETLAND LOCATION GPS DATA WAS GATHERED ON DECEMBER 6, 2018 TO VERIFY STREAM LOCATION.

SURVEY NOTES

1. HORIZONTAL DATUM: RHODE ISLAND STATE PLANE COORDINATE SYSTEM NAD 83; VERTICAL DATUM: NAVD 88.

GENERAL NOTES

1. THE STATE OF RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED AUGUST 2013 WITH ALL REVISIONS AND ADDENDA, AND THE RHODE ISLAND STANDARD DETAILS ARE MADE A PART HEREOF AS FULLY AND COMPLETELY AS IF ATTACHED HERETO. ALL WORK SHALL CONFORM TO THE RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AMENDED AUGUST 2013 OR LATEST REVISION. THE LATEST REVISION OF THE STANDARD SPECIFICATIONS MAY BE OBTAINED AT THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION.
2. THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS, PAY ALL FEES AND POST ALL BONDS ASSOCIATED WITH THE SAME, AND COORDINATE WITH THE ENGINEER AND OWNER'S REPRESENTATIVE AS REQUIRED.
3. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AND/OR BARRIERS AROUND ALL OPEN EXCAVATED AREAS IN ACCORDANCE WITH OSHA FEDERAL, STATE, AND LOCAL REQUIREMENTS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER PRIOR TO INSTALLATION OF ANY PORTION OF THE WORK WHICH WOULD BE AFFECTED. NO FIELD ADJUSTMENTS IN THE LOCATION OF SITE ELEMENTS SHALL BE MADE WITHOUT THE ENGINEER'S APPROVAL.
5. IF ANY DEVIATION OR ALTERATION OF THE WORK PROPOSED ON THESE DRAWINGS IS REQUIRED, THE CONTRACTOR SHALL IMMEDIATELY CONTACT AND COORDINATE WITH THE ENGINEER AND OWNER, PRIOR TO INITIATION OF SAID WORK.
6. ANY AREA OUTSIDE OF THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.
7. ALL SITE WORK SHALL MEET OR EXCEED THE SITE WORK SPECIFICATIONS PREPARED FOR THIS PROJECT.
8. ALL UTILITIES (LOCATION AND ELEVATION) DEPICTED WERE COMPILED FROM AVAILABLE RECORD PLANS AND SITE INVESTIGATION AND SHALL BE CONSIDERED APPROXIMATE ONLY.
9. NO EXCAVATION SHALL BE DONE UNTIL UTILITY COMPANIES ARE PROPERLY NOTIFIED IN ADVANCE. NOTE THAT NOT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL RESPECTIVE UTILITY COMPANIES TO VERIFY AND LOCATE EXISTING UTILITIES.
10. RESTORE ANY PARKING AREAS DISTURBED DURING CONSTRUCTION TO PRE-CONSTRUCTION CONDITIONS AT NO COST TO THE OWNER. PARKING AREA GRAVEL DEPTH SHALL MATCH EXISTING GRAVEL DEPTH AND FINISH GRADE SHALL MATCH EXISTING TOPOGRAPHY.

LAYOUT NOTES

1. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL EMPLOY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF RHODE ISLAND TO ESTABLISH CONTROL ON THE SITE AND TO PERFORM FIELD MEASUREMENTS AS REQUIRED TO LAYOUT THE SITE IMPROVEMENTS.
2. CONTRACTOR TO PERFORM BENCHMARK FIELD LEVEL VERIFICATION AND COORDINATE LAYOUT CHECK PRIOR TO CONSTRUCTION. CONTRACTOR SHALL CONTACT ENGINEER IF ANY DISCREPANCIES ARE FOUND.
3. ALL LINES ARE PERPENDICULAR OR PARALLEL TO THE LINES FROM WHICH THEY ARE MEASURED UNLESS OTHERWISE INDICATED.

DEMOLITION NOTES

1. ALL NOTED UTILITIES TO BE REMOVED AND DISPOSED OF, RELOCATED OR CAPPED REPRESENT ALL KNOWN SITE CONDITIONS TO BE DEMOLISHED. CONTRACTOR TO COORDINATE ALL UNFORESEEN CONDITIONS WITH THE ENGINEER, OWNER AND/OR RESPECTIVE UTILITY COMPANIES PRIOR TO PROCEEDING WITH WORK.
2. WATER, SEWER, DRAINAGE, GAS, AND OTHER SITE UTILITIES SERVICING THE EXISTING FACILITIES ARE TO REMAIN ACTIVE THROUGHOUT CONSTRUCTION.

GRADING AND UTILITY NOTES

1. ALL UTILITIES DEPICTED (LOCATION AND ELEVATION) WERE COMPILED FROM AVAILABLE RECORD PLANS AND SHALL BE CONSIDERED APPROXIMATE ONLY. BEFORE COMMENCING SITE WORK IN ANY AREA, CONTACT "DIG SAFE" AT 1-888-DIG-SAFE (1-888-344-7233) TO ACCURATELY LOCATE UNDERGROUND UTILITIES. ANY DAMAGE TO EXISTING UTILITIES OR STRUCTURES DEPICTED OR NOT DEPICTED ON THE PLANS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. COSTS TO REPAIR SUCH DAMAGES SHALL BE THE CONTRACTOR'S RESPONSIBILITY. NO EXCAVATION SHALL BE DONE UNTIL UTILITY COMPANIES ARE PROPERLY NOTIFIED.
2. ALL WORK PERFORMED AND ALL MATERIALS FURNISHED SHALL CONFORM WITH THE LINES AND GRADES ON THE PLANS AND SITE WORK SPECIFICATIONS.
3. AT ALL LOCATIONS WHERE EXISTING PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE. BLEND NEW PAVEMENT SMOOTHLY INTO EXISTING BY MATCHING LINES, GRADES AND JOINTS.
4. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION OF PRIVATE UTILITIES BY THE UTILITY COMPANIES, AS REQUIRED.
5. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION SHALL BE PROVIDED ON A SKETCH TO SCALE OF THE EXISTING UTILITY WITH TIES TO KNOWN POINTS, PHOTOS AND FURNISHED TO THE ENGINEER FOR RESOLUTION.
6. PROPOSED GAS, ELECTRIC, AND COMMUNICATIONS ROUTING ARE SUBJECT TO REVIEW AND APPROVAL BY APPROPRIATE UTILITY COMPANIES.
7. DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES BY PROVIDING TEMPORARY SUPPORTS OR SHEETING AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
8. EXCAVATION REQUIRED WITHIN THE PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE OWNER.
9. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MIN. OF 1/8" PER FOOT UNLESS SPECIFIED OTHERWISE.

STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE NOTES

DURING CONSTRUCTION

1. THE CONTRACTOR SHALL INSPECT THE DRAINAGE SYSTEM ON A WEEKLY BASIS AND REMOVE ANY SEDIMENT THAT HAS ACCUMULATED.
2. THE CONTRACTOR SHALL REMOVE SEDIMENT AND DEBRIS FROM THE DRAINAGE SYSTEM ON A ROUTINE BASIS, IMMEDIATELY FOLLOWING SITE STABILIZATION, AND PRIOR TO PROJECT COMPLETION AND ACCEPTANCE.
3. THE CLOSED DRAINAGE SYSTEM AND ASSOCIATED STRUCTURES SHALL BE CLEANED AND FLUSHED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTION AND MAINTENANCE OF THE DRAINAGE SYSTEM UNTIL ACCEPTANCE OF THE SYSTEM BY THE ENGINEER AND THE CITY OF PROVIDENCE. FOLLOWING ACCEPTANCE OF THE INSTALLED DRAINAGE SYSTEM, THE OWNER OF THE SITE SHALL BE RESPONSIBLE FOR THE LONG-TERM INSPECTION AND MAINTENANCE OF THE SYSTEM.
4. PRIOR TO FINAL ACCEPTANCE BY THE OWNER AND FINAL PAYMENT TO THE CONTRACTOR, THE FOLLOWING MINIMUM ITEMS SHALL BE COMPLETED IN ADDITION TO ITEMS LISTED ELSEWHERE IN THESE PLANS AND SPECIFICATIONS:
   - ALL DRAINAGE STRUCTURES, BOTH NEW AND THOSE AFFECTED BY THIS CONSTRUCTION, SHALL BE CLEANED AND CLEARED OF ACCUMULATED DEBRIS.
   - STORMWATER BASINS SHALL BE IN GOOD WORKING ORDER, CLEAR OF DEBRIS, AND DRAINING IN ACCORDANCE WITH THESE PLANS AS VERIFIED BY THE OWNER.
5. ANY ACCUMULATION OF PONDED WATER IN AREAS WITHIN THE LIMITS OF DISTURBANCE, OTHER THAN DESIGNATED AREAS, SHALL BE REMOVED ACCORDINGLY AND PREVENTED IN THE FUTURE.

POST CONSTRUCTION

1. ALL CLEANING AND MAINTENANCE OF DRAINAGE SYSTEM BEST MANAGEMENT PRECTICES (BMPS) SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
2. TRASH, LITTER, SEDIMENT AND OTHER DEBRIS SHALL BE REMOVED FROM ANY STORMWATER FACILITY AT LEAST TWICE A YEAR, PREFERABLY SPRING AND FALL, AT THE OWNER'S EXPENSE.

EROSION AND SEDIMENTATION CONTROL NOTES

1. THE CONTRACTOR AND RELEVANT SUBCONTRACTORS SHALL READ AND UNDERSTAND THE RIPDES GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (GENERAL PERMIT) AND THE SITE SPECIFIC SOIL EROSION AND SEDIMENT CONTROL PLAN (SESC) PREPARED FOR THE PROJECT. ALL EROSION CONTROL SHALL BE IN ACCORDANCE WITH THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST REVISION.
2. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE CONDITIONS ISSUED FOR THE PROJECT BY RIDEM AND BE RESPONSIBLE FOR CONFORMANCE WITH ALL PERMIT REQUIREMENTS AND CONSTRUCTION DOCUMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING OR INSTALLING ALL TEMPORARY SEDIMENT AND EROSION CONTROLS AS SHOWN ON THESE PLANS AND SHALL MAINTAIN ALL EROSION CONTROL MEASURES AS NECESSARY DURING THE ENTIRE CONSTRUCTION PERIOD.
4. EROSION AND SEDIMENT CONTROLS SHALL BE INSTALLED, CLEARLY VISIBLE, AND IN OPERATION AS SHOWN ON THE EROSION CONTROL PLAN PRIOR TO INITIATING ANY LAND CLEARING ACTIVITY AND/OR OTHER CONSTRUCTION RELATED WORK.
5. INSTALLATION OF THE EROSION AND SEDIMENTATION CONTROLS AS ILLUSTRATED IS INTENDED TO REPRESENT THE MINIMUM EROSION AND SEDIMENTATION CONTROL FACILITIES NECESSARY TO MEET ANTICIPATED SITE CONDITIONS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
6. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EACH STORM EVENT OF 0.25 INCH OR GREATER DURING CONSTRUCTION TO ENSURE THAT CHANNELS, DITCHES AND PIPES ARE CLEAR OF DEBRIS AND THAT THE EROSION CONTROL BARRIERS ARE INTACT. IDENTIFIED DEFICIENCIES SHALL BE CORRECTED IMMEDIATELY.
7. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
8. THE CONTRACTOR SHALL CLEAN AND MAINTAIN EROSION CONTROL BARRIER WHEN SEDIMENT ACCUMULATES TO ONE HALF THE HEIGHT OF THE BARRIER. MATERIAL COLLECTED FROM THE SEDIMENTATION BARRIERS SHALL BE REMOVED AS NECESSARY AND DISPOSED IN AN UPLAND AREA.
9. THE CONTRACTOR SHALL SCHEDULE HIS WORK TO ALLOW THE FINISHED SUB GRADE ELEVATIONS TO DRAIN PROPERLY WITHOUT PONDING. SPECIFICALLY, ALLOW WATER TO ESCAPE WHERE PROPOSED CURB MAY RETAIN RUNOFF PRIOR TO APPLICATION OF SURFACE PAVING. PROVIDE TEMPORARY POSITIVE DRAINAGE, AS REQUIRED, TO STABILIZED DISCHARGE POINTS.
10. PERIMETER SEDIMENT CONTROLS SHALL REPRESENT THE LIMIT OF WORK. WORKERS SHALL BE INFORMED THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THE LIMIT OF WORK AT ANY TIME THROUGHOUT THE CONSTRUCTION PERIOD.
11. THE CONTRACTOR SHALL MAINTAIN A SUFFICIENT RESERVE OF VARIOUS EROSION CONTROL MATERIALS ONSITE AT ALL TIMES FOR EMERGENCY PURPOSES OR ROUTINE MAINTENANCE.
12. DEWATERING WASTE WATERS PUMPED FROM EXCAVATIONS SHALL BE CONVEYED BY HOSE TO AN UPLAND AREA AND DISCHARGED INTO STRAW BALE CORRALS OR SEDIMENTATION BAGS.
13. THE CONTRACTOR SHALL NOT REMOVE ANY TEMPORARY SEDIMENT CONTROL BARRIERS UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED.
14. CONSTRUCTION SITE WASTE MATERIALS SHALL BE PROPERLY CONTAINED ONSITE AND DISPOSED OFF SITE AT A LOCATION IN ACCORDANCE WITH THE LOCAL AND STATE REGULATIONS.
15. RIP-RAP OR OTHER ENERGY DISSIPATERS SHALL BE USED WHERE NECESSARY TO PREVENT SCOUR.
16. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 14 DAYS UPON COMPLETION OF WORK IN THAT AREA.
17. ALL DRAINAGE STRUCTURES SHALL BE CLEARED OF ACCUMULATED SEDIMENT PRIOR TO ACCEPTANCE OF FINAL PROJECT.
18. NEWLY VEGETATED AREAS SHALL BE MAINTAINED REGULARLY TO ENSURE STABLE VEGETATED SURFACES.
19. EROSION AND SEDIMENTATION CONTROLS SHALL BE UTILIZED AS SHOWN ON THE PLANS. POTENTIAL EROSION AND SEDIMENTATION PROBLEMS ASSOCIATED WITH THE CONSTRUCTION OF THE PROJECT SHALL BE AVOIDED THROUGH THE PROJECT SCHEDULING AND THE USE OF APPROPRIATE STANDARD CONTROLS (RHODE ISLAND SOIL EROSION AND SEDIMENTATION CONTROL HANDBOOK) AS ILLUSTRATED ON THE PROJECT PLANS.
20. WHERE EROSION CONTROLS ARE NEEDED ON IMPERVIOUS SURFACES, THE CONTRACTOR SHALL PROVIDE SAND BAG EROSION CONTROL BARRIER.
21. TEMPORARY DIVERSION MAY CONSIST OF A DITCH OR SWALE, OR MAY BE ACHIEVED USING WOOD CHIPS, COIR LOGS, OR SIMILAR MATERIALS.
22. TEMPORARY SEDIMENT TRAPS (TST) AND TEMPORARY DIVERSION SWALES (TDS) SHALL BE SIZED BY THE CONTRACTOR USING THE PARAMETERS CONTAINED IN THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK.

SEDIMENT FOREBAY INSPECTION, MAINTENANCE, AND REPAIR NOTES

FOLLOWING CONSTRUCTION, THE COMPLETION OF THE INSPECTION AND MAINTENANCE REQUIREMENTS BELOW SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.

1. SEDIMENT FOREBAY SHALL BE INSPECTED TWICE ANNUALLY AND AFTER EVERY STORM OF 2.7" INCH OR GREATER FOR TRASH, DEBRIS, SEDIMENT, EROSION, STANDING WATER, AND OVERALL PERFORMANCE. DEFECTS SHALL BE REPAIRED BY THE OWNER.
2. SEDIMENT FOREBAY SHALL BE CLEANED IF SEDIMENT REACHES HALF THE DESIGN DEPTH.
3. SEDIMENT FOREBAY CHECK DAMS SHALL BE REPLACED IF DRAWDOWN TIMES WITHIN THE SEDIMENT FOREBAY EXCEED 48 HOURS FOLLOWING THE STORM EVENT.
4. ALL SEDIMENTS REMOVED SHALL BE DISPOSED OF AT AN APPROVED AND PERMITTED LOCATION.
5. VEGETATION SHALL NOT EXCEED 18" IN HEIGHT IN THE SEDIMENT FOREBAYS.

SAND FILTER INSPECTION, MAINTENANCE, AND REPAIR NOTES

FOLLOWING CONSTRUCTION, THE COMPLETION OF THE INSPECTION AND MAINTENANCE REQUIREMENTS BELOW SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.

1. THE SAND FILTER SHALL BE INSPECTED AFTER EVERY STORM OF 2.7" INCH OR GREATER IN A 24 HOUR PERIOD, FOR TRASH, DEBRIS, SEDIMENT, EROSION, STANDING WATER, AND OVERALL PERFORMANCE. DEFECTS SHALL BE REPAIRED BY THE OWNER.
2. THE SAND FILTER SHALL BE INSPECTED FOLLOWING THE FIRST 6 MONTHS AFTER CONSTRUCTION FOLLOWING THE FIRST TWO STORM EVENTS OF 1" OR MORE.
3. THE OWNER SHALL MOW GRASS WITHIN THE SAND FILTER THREE TIMES ANNUALLY. THE VEGETATION SHALL NOT EXCEED 12" IN HEIGHT.
4. IN SPRING, THE OWNER SHALL TRIM VEGETATION AND REMOVE DEAD VEGETATION FROM THE SAND FILTER.
5. REMOVE ACCUMULATED SEDIMENT FROM THE SAND FILTER TWICE ANNUALLY, ONCE IN THE LATE SPRING AND ONCE IN THE EARLY FALL, OR IF SEDIMENT EXCEEDS 1" IN THE SAND FILTER.
6. IF PONDING EXCEEDS 48 HOURS, REMOVE AND REPLACE FILTER MEDIA.

EXISTING LEGEND

PROPERTY LINE
ABUTTER
MAJOR CONTOUR
MINOR CONTOUR
× 67.6 SPOT ELEVATION
DRAINAGE LINE
APPROXIMATE GAS LINE
APPROXIMATE WATER LINE
APPROXIMATE SEWER LINE
CHAIN LINK FENCE
GUARD RAIL
SIGN
CATCH BASIN
CURB INLET
HYDRANT
MANHOLE
LIGHT POLE
FIELD LIGHTING
POST
ROCK STONE
UNKNOWN OBJECT
UTILITY POLE
UTILITY POLE
VALVE
TREES
SHRUB
TREE LINE
BASKETBALL HOOP
A-6 A-7 WETLAND FLAGS

PROPOSED LEGEND

EDGE OF PAVEMENT
CURBING
CONTOUR
SPOT ELEVATION X 200.00
DRAIN LINE
WATER LINE
DRAIN MANHOLE (DMH)
OUTLET CONTROL STRUCTURE (OCS)
CATCH BASIN (CB)
HOT MIXED ASPHALT
PERMEABLE PAVEMENT
CONCRETE WALK/PAD
EROSION CONTROL
LIMIT OF DISTURBANCE LOD
SAWCUT
TREELINE
GRADE TO DRAIN GTD
TREE PROTECTION DEVICE (SEE DETAIL)
REMOVE AND DISPOSE PIPE

ABBREVIATIONS

ADA	= AMERICANS WITH DISABILITIES ACT
ALT.	= ALTERNATE
A.P.	= ASSESSOR'S PLAT
ASSF	= AREA SUBJECT TO STORM FLOWAGE
BM	= BENCHMARK
BMP	= BEST MANAGEMENT PRACTICE
BOT.	= BOTTOM
BC	= BOTTOM OF CURB (FINISHED GRADE ON LOW SIDE OF CURB)
CI	= CAST IRON
CB	= CATCH BASIN, 4' DIA. UNLESS OTHERWISE NOTED
CLDI	= CEMENT-LINED DUCTILE IRON
CL.	= CLASS
CLF	= CHAIN LINK FENCE
CO	= CLEANOUT
CONC.	= CONCRETE
CC	= CONCRETE CURB, VERTICAL
DEMO	= DEMOLITION
DIA	= DIAMETER
DIV	= DIVERSION
DMH	= DRAIN MANHOLE
EOP	= EDGE OF PAVEMENT
ELEV,EL	= ELEVATION
EX, EXIST.	= EXISTING
FT	= FOOT
FND.	= FOUNDATION
GTD	= GRADE TO DRAIN
GRAN.	= GRANITE
HDPE	= HIGH DENSITY POLYETHYLENE PIPE
HMA	= HOT MIX ASPHALT
HYD	= HYDRANT
I.D.	= INNER DIAMETER
INV.	= INVERT
LOD	= LIMIT OF DISTURBANCE
LP	= LOW POINT
MUTCD	= MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION
MAX.	= MAXIMUM
MIN.	= MINIMUM
MON.	= MONITORING
NAD	= NORTH AMERICAN DATUM
NAVD	= NORTH AMERICAN VERTICAL DATUM
NTS, N.T.S.	= NOT TO SCALE
OCS	= OUTLET CONTROL STRUCTURE
OSHA	= OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OWS	= OIL WATER SEPARATOR
PERF.	= PERFORATED
PE	= POLYETHYLENE
PVC	= POLYVINYL CHLORIDE
R=X'	= RADIUS
RCP	= REINFORCED CONCRETE PIPE
RIDEM	= RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
RIDOT	= RHODE ISLAND DEPARTMENT OF TRANSPORTATION
RIPDES	= RHODE ISLAND POLLUTION DISCHARGE ELIMINATION SYSTEM
R.I. STD.	= RHODE ISLAND STANDARD
SMH	= SEWER MANHOLE
SESC	= SOIL EROSION AND SEDIMENT CONTROL
TDS	= TEMPORARY DIVERSION SWALE
TST	= TEMPORARY SEDIMENT TRAP
TP	= TEST PIT
TC	= TOP OF CURB
TYP.	= TYPICAL
UP	= UTILITY POLE
VGC	= VERTICAL GRANITE CURB
VC	= VITRIFIED CLAY
w/	= WITH

SYMBOL LEGEND

ATG	= ADJUST TO GRADE
CFS	= COMPOST FILTER SOCK (SEE DETAIL)
CG	= CLEAR AND GRUB VEGETATION
CM	= SAWCUT AND MATCH
CP	= CEMENT CONCRETE PAD (SEE DETAIL)
CTE	= CONNECT TO EXISTING
DFP	= DEMOLISH FLEXIBLE PAVEMENT
ETR	= EXISTING TO REMAIN, PROTECT DURING CONSTRUCTION
HMAW	= HOT MIXED ASPHALT WALK (SEE DETAIL)
PP	= PERMEABLE PAVEMENT (SEE DETAIL)
R&D	= REMOVE AND DISPOSE
R&R	= REMOVE AND RESET
RS	= RIPRAP SPILLWAY (SEE DETAIL)
RTLD	= REFER TO LANDSCAPE DRAWINGS
SFCD	= SEDIMENT FOREBAY CHECK DAM (SEE DETAIL)
TDS	= TEMPORARY DIVERSION SWALE
TIP	= TEMPORARY INLET PROTECTION
TRM	= TURF REINFORCEMENT MAT
TST-#	= TEMPORARY SEDIMENT TRAP (SEE DETAIL)
9.9.0	= R.I. STD. CONSTRUCTION ACCESS DETAIL
43.1.0PM	= PROVIDENCE STD. CEMENT CONCRETE SIDEWALK DETAIL (MODIFIED)

PARE

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

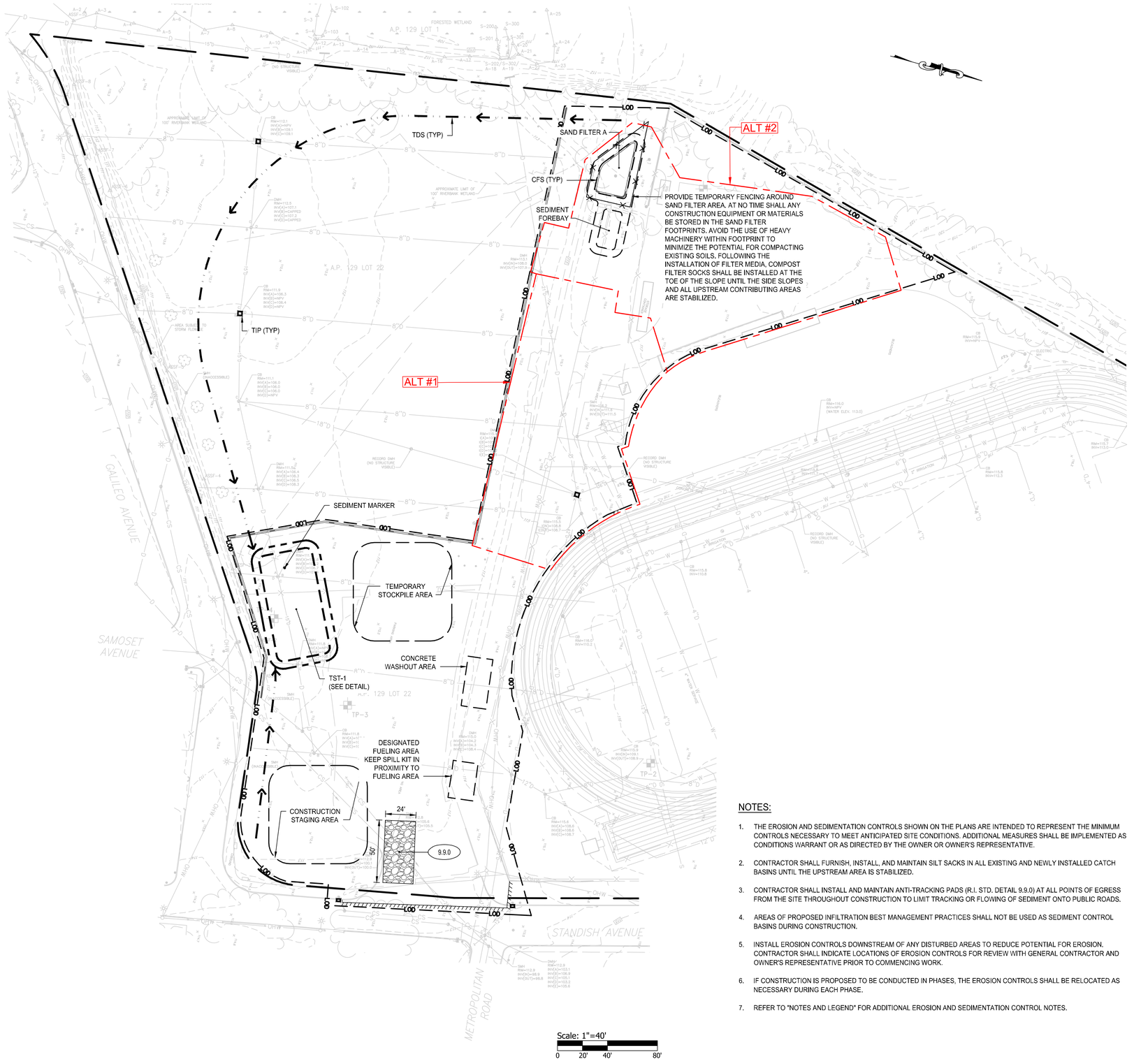
REVISIONS:

PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	NOT TO SCALE
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:
NOTES & LEGEND

DRAWING NO.:
C0.1

SHEET NO. 2 OF 13



LEGEND

- TDS - TEMPORARY DIVERSION SWALE/BERM
- TST LIMITS OF WET STORAGE AREA
- TST LIMITS OF DRY STORAGE AREA

NOTES:

1. THE EROSION AND SEDIMENTATION CONTROLS SHOWN ON THE PLANS ARE INTENDED TO REPRESENT THE MINIMUM CONTROLS NECESSARY TO MEET ANTICIPATED SITE CONDITIONS. ADDITIONAL MEASURES SHALL BE IMPLEMENTED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.
2. CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN SILT SACKS IN ALL EXISTING AND NEWLY INSTALLED CATCH BASINS UNTIL THE UPSTREAM AREA IS STABILIZED.
3. CONTRACTOR SHALL INSTALL AND MAINTAIN ANTI-TRACKING PADS (R.I. STD. DETAIL 9.9.0) AT ALL POINTS OF EGRESS FROM THE SITE THROUGHOUT CONSTRUCTION TO LIMIT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS.
4. AREAS OF PROPOSED INFILTRATION BEST MANAGEMENT PRACTICES SHALL NOT BE USED AS SEDIMENT CONTROL BASINS DURING CONSTRUCTION.
5. INSTALL EROSION CONTROLS DOWNSTREAM OF ANY DISTURBED AREAS TO REDUCE POTENTIAL FOR EROSION. CONTRACTOR SHALL INDICATE LOCATIONS OF EROSION CONTROLS FOR REVIEW WITH GENERAL CONTRACTOR AND OWNER'S REPRESENTATIVE PRIOR TO COMMENCING WORK.
6. IF CONSTRUCTION IS PROPOSED TO BE CONDUCTED IN PHASES, THE EROSION CONTROLS SHALL BE RELOCATED AS NECESSARY DURING EACH PHASE.
7. REFER TO "NOTES AND LEGEND" FOR ADDITIONAL EROSION AND SEDIMENTATION CONTROL NOTES.

PARE

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

REVISIONS:

PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	1" = 40'
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

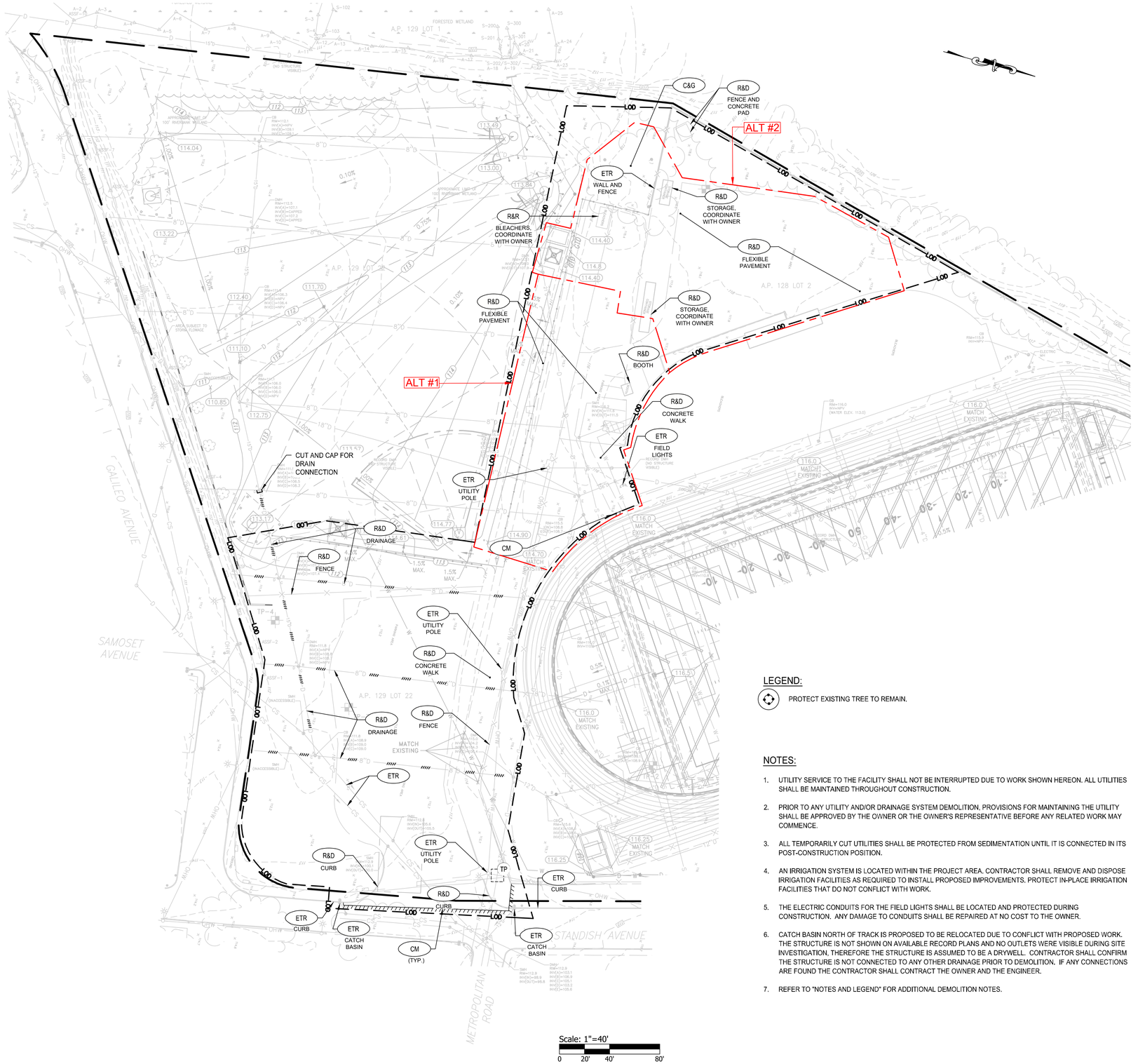
DRAWING TITLE:

EROSION AND SEDIMENT CONTROL PLAN

DRAWING NO.: C1.0

SHEET NO. 3 OF 13

P:\JOBS\23 JOBS\23029.00 Providence - Conley Stadium Parking - 81\DWG\Erosion & Sediment Control Plan.dwg



LEGEND:

PROTECT EXISTING TREE TO REMAIN.

NOTES:

1. UTILITY SERVICE TO THE FACILITY SHALL NOT BE INTERRUPTED DUE TO WORK SHOWN HEREON. ALL UTILITIES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
2. PRIOR TO ANY UTILITY AND/OR DRAINAGE SYSTEM DEMOLITION, PROVISIONS FOR MAINTAINING THE UTILITY SHALL BE APPROVED BY THE OWNER OR THE OWNER'S REPRESENTATIVE BEFORE ANY RELATED WORK MAY COMMENCE.
3. ALL TEMPORARILY CUT UTILITIES SHALL BE PROTECTED FROM SEDIMENTATION UNTIL IT IS CONNECTED IN ITS POST-CONSTRUCTION POSITION.
4. AN IRRIGATION SYSTEM IS LOCATED WITHIN THE PROJECT AREA. CONTRACTOR SHALL REMOVE AND DISPOSE IRRIGATION FACILITIES AS REQUIRED TO INSTALL PROPOSED IMPROVEMENTS. PROTECT IN-PLACE IRRIGATION FACILITIES THAT DO NOT CONFLICT WITH WORK.
5. THE ELECTRIC CONDUITS FOR THE FIELD LIGHTS SHALL BE LOCATED AND PROTECTED DURING CONSTRUCTION. ANY DAMAGE TO CONDUITS SHALL BE REPAIRED AT NO COST TO THE OWNER.
6. CATCH BASIN NORTH OF TRACK IS PROPOSED TO BE RELOCATED DUE TO CONFLICT WITH PROPOSED WORK. THE STRUCTURE IS NOT SHOWN ON AVAILABLE RECORD PLANS AND NO OUTLETS WERE VISIBLE DURING SITE INVESTIGATION, THEREFORE THE STRUCTURE IS ASSUMED TO BE A DRYWELL. CONTRACTOR SHALL CONFIRM THE STRUCTURE IS NOT CONNECTED TO ANY OTHER DRAINAGE PRIOR TO DEMOLITION. IF ANY CONNECTIONS ARE FOUND THE CONTRACTOR SHALL CONTRACT THE OWNER AND THE ENGINEER.
7. REFER TO "NOTES AND LEGEND" FOR ADDITIONAL DEMOLITION NOTES.

PARE

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

REVISIONS:

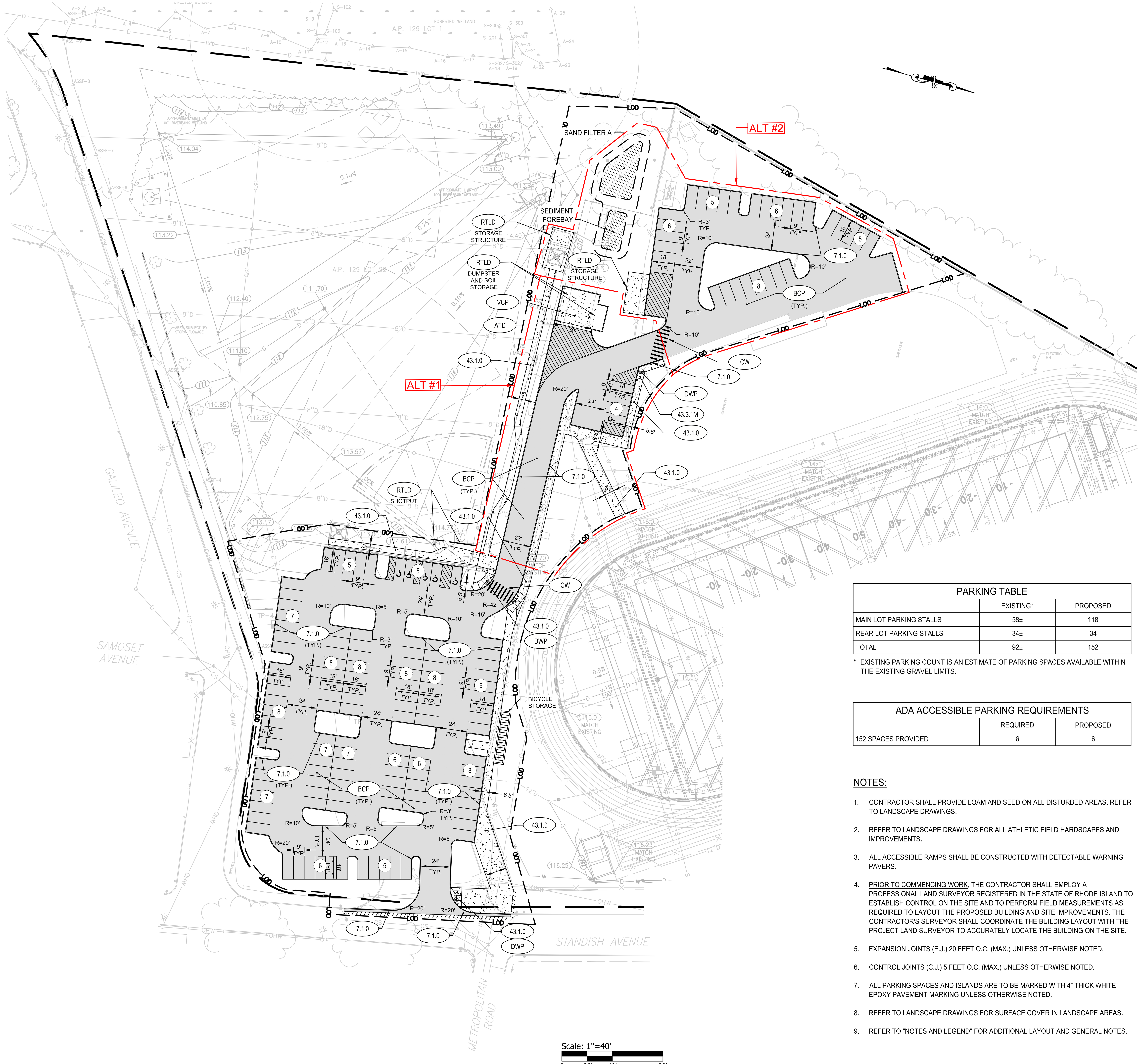
PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	1" = 40'
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:

DEMOLITION PLAN

DRAWING NO.: C2.0

SHEET NO. 4 OF 13



PARKING TABLE		
	EXISTING*	PROPOSED
MAIN LOT PARKING STALLS	58±	118
REAR LOT PARKING STALLS	34±	34
TOTAL	92±	152

* EXISTING PARKING COUNT IS AN ESTIMATE OF PARKING SPACES AVAILABLE WITHIN THE EXISTING GRAVEL LIMITS.

ADA ACCESSIBLE PARKING REQUIREMENTS		
	REQUIRED	PROPOSED
152 SPACES PROVIDED	6	6

NOTES:

1. CONTRACTOR SHALL PROVIDE LOAM AND SEED ON ALL DISTURBED AREAS. REFER TO LANDSCAPE DRAWINGS.
2. REFER TO LANDSCAPE DRAWINGS FOR ALL ATHLETIC FIELD HARDSCAPES AND IMPROVEMENTS.
3. ALL ACCESSIBLE RAMPS SHALL BE CONSTRUCTED WITH DETECTABLE WARNING PAVERS.
4. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL EMPLOY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF RHODE ISLAND TO ESTABLISH CONTROL ON THE SITE AND TO PERFORM FIELD MEASUREMENTS AS REQUIRED TO LAYOUT THE PROPOSED BUILDING AND SITE IMPROVEMENTS. THE CONTRACTOR'S SURVEYOR SHALL COORDINATE THE BUILDING LAYOUT WITH THE PROJECT LAND SURVEYOR TO ACCURATELY LOCATE THE BUILDING ON THE SITE.
5. EXPANSION JOINTS (E.J.) 20 FEET O.C. (MAX.) UNLESS OTHERWISE NOTED.
6. CONTROL JOINTS (C.J.) 5 FEET O.C. (MAX.) UNLESS OTHERWISE NOTED.
7. ALL PARKING SPACES AND ISLANDS ARE TO BE MARKED WITH 4" THICK WHITE EPOXY PAVEMENT MARKING UNLESS OTHERWISE NOTED.
8. REFER TO LANDSCAPE DRAWINGS FOR SURFACE COVER IN LANDSCAPE AREAS.
9. REFER TO "NOTES AND LEGEND" FOR ADDITIONAL LAYOUT AND GENERAL NOTES.

PARE

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DRAWN BY:	AWB
APPROVED BY:	JAJ

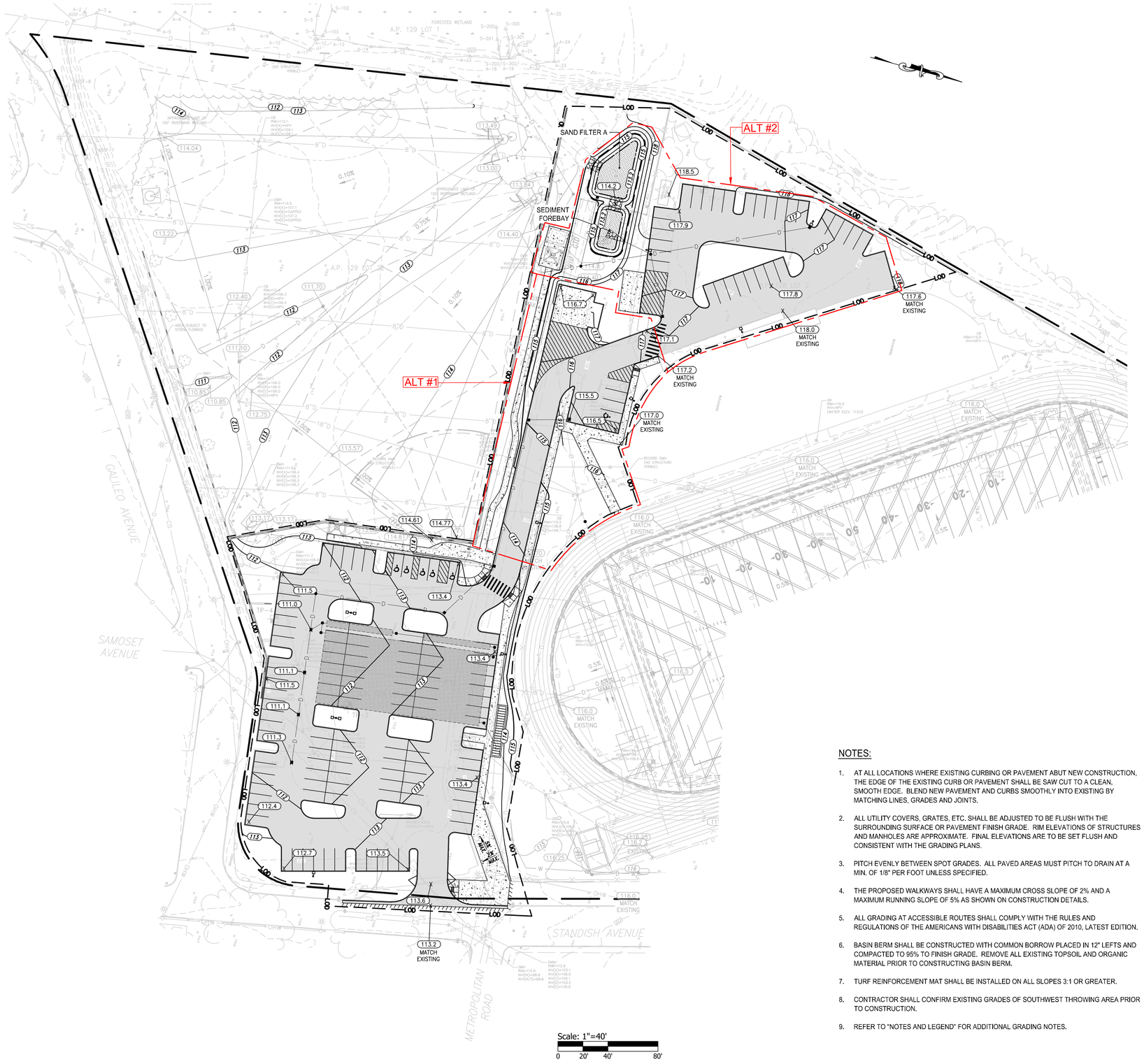
DRAWING TITLE:

GENERAL PLAN

DRAWING NO.:

C3.0

SHEET NO. 5 OF 13



NOTES:

1. AT ALL LOCATIONS WHERE EXISTING CURBING OR PAVEMENT ABUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE. BLEND NEW PAVEMENT AND CURBS SMOOTHLY INTO EXISTING BY MATCHING LINES, GRADES AND JOINTS.
2. ALL UTILITY COVERS, GRATES, ETC. SHALL BE ADJUSTED TO BE FLUSH WITH THE SURROUNDING SURFACE OR PAVEMENT FINISH GRADE. RIM ELEVATIONS OF STRUCTURES AND MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH AND CONSISTENT WITH THE GRADING PLANS.
3. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MIN. OF 1/8" PER FOOT UNLESS SPECIFIED.
4. THE PROPOSED WALKWAYS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM RUNNING SLOPE OF 5% AS SHOWN ON CONSTRUCTION DETAILS.
5. ALL GRADING AT ACCESSIBLE ROUTES SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE AMERICANS WITH DISABILITIES ACT (ADA) OF 2010, LATEST EDITION.
6. BASIN BERM SHALL BE CONSTRUCTED WITH COMMON BORROW PLACED IN 12" LEFTS AND COMPACTED TO 95% TO FINISH GRADE. REMOVE ALL EXISTING TOPSOIL AND ORGANIC MATERIAL PRIOR TO CONSTRUCTING BASIN BERM.
7. TURF REINFORCEMENT MAT SHALL BE INSTALLED ON ALL SLOPES 3:1 OR GREATER.
8. CONTRACTOR SHALL CONFIRM EXISTING GRADES OF SOUTHWEST THROWING AREA PRIOR TO CONSTRUCTION.
9. REFER TO "NOTES AND LEGEND" FOR ADDITIONAL GRADING NOTES.

PARE

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CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

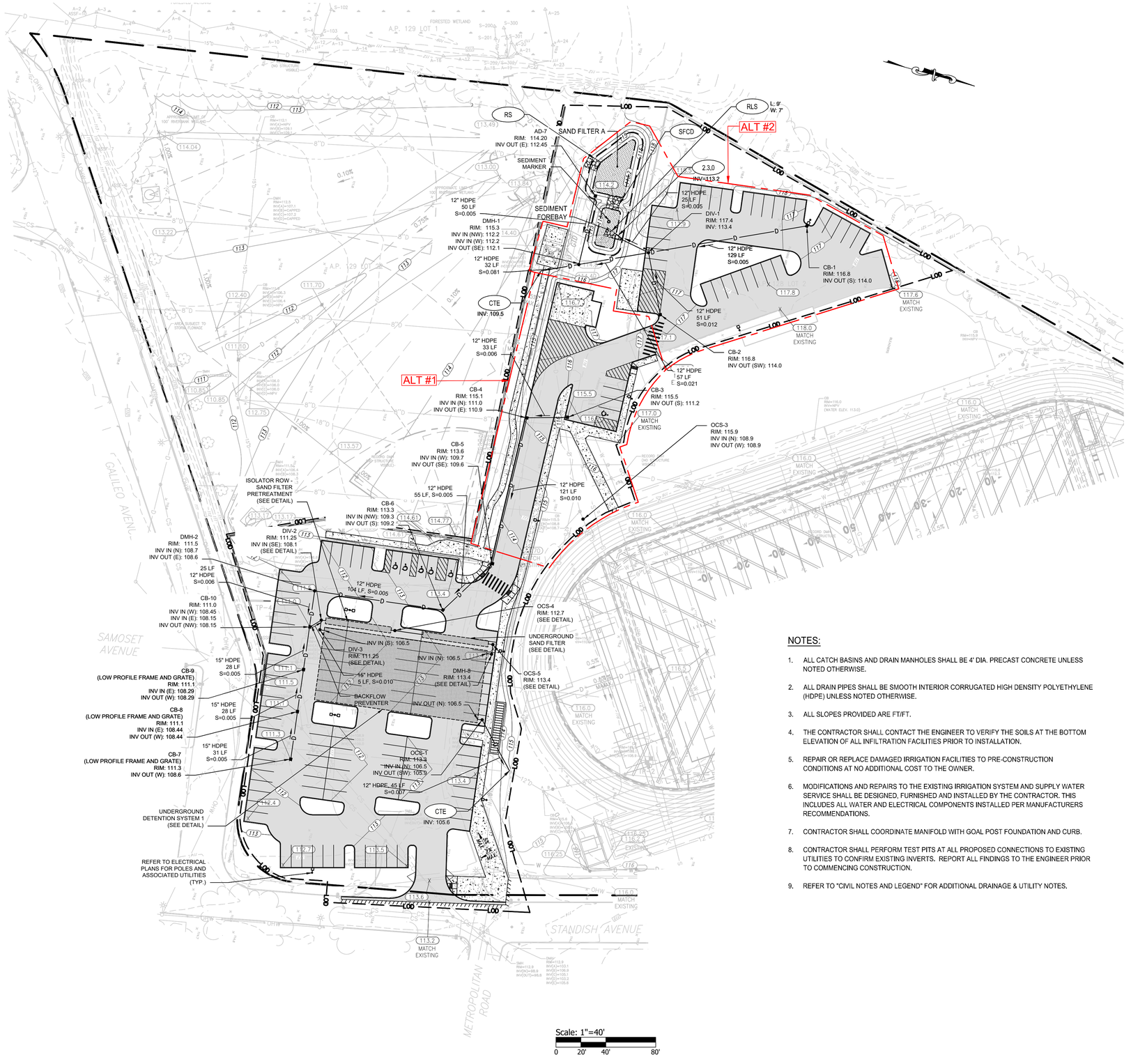
DRAWING TITLE:

GRADING PLAN 1

DRAWING NO.: C4.1

SHEET NO. ___ OF 13

C:\JOBS\23 Jobs\23029.00 Providence - Conley Stadium Parking - #1\DWG\Grading Plan.dwg



NOTES:

1. ALL CATCH BASINS AND DRAIN MANHOLES SHALL BE 4' DIA. PRECAST CONCRETE UNLESS NOTED OTHERWISE.
2. ALL DRAIN PIPES SHALL BE SMOOTH INTERIOR CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) UNLESS NOTED OTHERWISE.
3. ALL SLOPES PROVIDED ARE FT/FT.
4. THE CONTRACTOR SHALL CONTACT THE ENGINEER TO VERIFY THE SOILS AT THE BOTTOM ELEVATION OF ALL INFILTRATION FACILITIES PRIOR TO INSTALLATION.
5. REPAIR OR REPLACE DAMAGED IRRIGATION FACILITIES TO PRE-CONSTRUCTION CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
6. MODIFICATIONS AND REPAIRS TO THE EXISTING IRRIGATION SYSTEM AND SUPPLY WATER SERVICE SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR. THIS INCLUDES ALL WATER AND ELECTRICAL COMPONENTS INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
7. CONTRACTOR SHALL COORDINATE MANIFOLD WITH GOAL POST FOUNDATION AND CURB.
8. CONTRACTOR SHALL PERFORM TEST PITS AT ALL PROPOSED CONNECTIONS TO EXISTING UTILITIES TO CONFIRM EXISTING INVERTS. REPORT ALL FINDINGS TO THE ENGINEER PRIOR TO COMMENCING CONSTRUCTION.
9. REFER TO "CIVIL NOTES AND LEGEND" FOR ADDITIONAL DRAINAGE & UTILITY NOTES.

PARE

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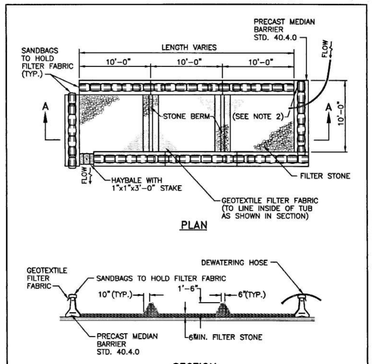
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:

DRAINAGE AND UTILITY PLAN

DRAWING NO.: C5.0

SHEET NO. 7 OF 13

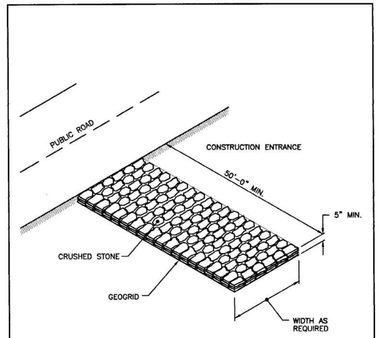


NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 208 OF THE R.I. STANDARD SPECIFICATIONS.
2. PROVIDE ADDITIONAL SAND BAGS AS REQUIRED TO FILL SPACE BETWEEN ADJACENT BARRIERS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE

DEWATERING BASIN — JUNE 15, 1998 (ISSUE DATE) — R.I. STANDARD 9.7.0

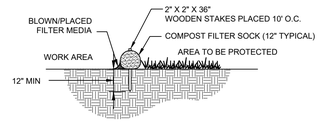


NOTE:
SHALL BE IN ACCORDANCE WITH SECTION 211 OF THE R.I. STANDARD SPECIFICATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE

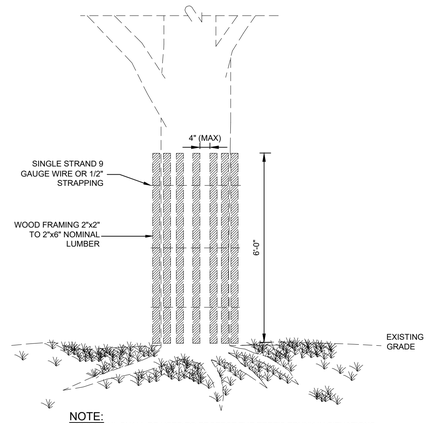
CONSTRUCTION ACCESS — JUNE 15, 1998 (ISSUE DATE) — R.I. STANDARD 9.9.0



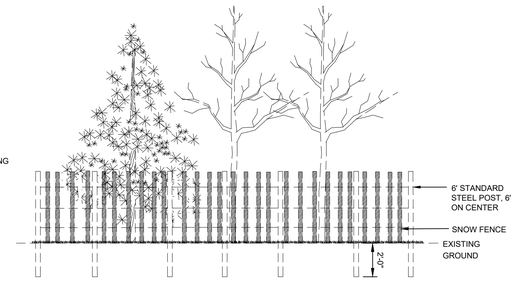
NOTES:
1. ALL MATERIAL TO MEET SPECIFICATIONS.
2. SILT SOCK FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE REMOVED OR DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
4. MANUFACTURERS CAN INCLUDE SILTSOXX, CORR LOGS, STRAW WATTLES, OR APPROVED EQUIVALENT.

CFS — COMPOST FILTER SOCK
NOT TO SCALE

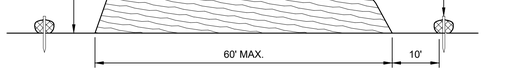
NOTE:
ANY MANUFACTURER'S NAMES AND/OR MODEL NUMBERS IDENTIFIED HEREIN ARE INTENDED TO ASSIST IN ESTABLISHING A GENERAL LEVEL OF QUALITY, CONFIGURATION, FUNCTIONALITY, AND APPEARANCE REQUIRED. THIS IS NOT A PROPRIETARY SPECIFICATION AND IT SHOULD BE NOTED THAT "OR APPROVED EQUAL" APPLIES TO ALL PRODUCTS DENOTED HEREIN. IT IS UNDERSTOOD THAT ALL MANUFACTURERS WILL HAVE MINOR VARIATIONS IN CONFIGURATION, APPEARANCE, AND PRODUCT SPECIFICATION TO ENCOURAGE OPEN AND COMPETITIVE INVOLVEMENT FROM MULTIPLE MANUFACTURERS THAT ARE ABLE TO SUPPLY SIMILAR PRODUCTS.



TREE PROTECTION DEVICE
NOT TO SCALE

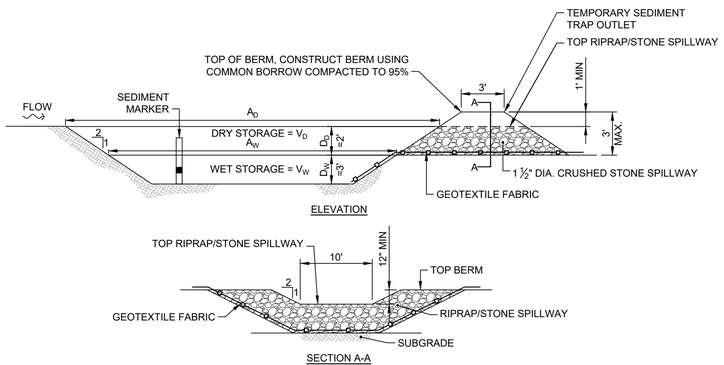


TREE GROUP PROTECTION
NOT TO SCALE



NOTES:
1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A PLAN SHOWING THE PROPOSED LOCATION OF ALL STOCKPILE AREAS.
2. STOCKPILE AREA SHALL NOT EXCEED SPECIFIED DIMENSIONS WITHOUT APPROVAL FROM ENGINEER.
3. STOCKPILED ERODIBLE MATERIAL THAT WILL NOT BE USED FOR GREATER THAN 14 DAYS SHALL BE STABILIZED WITH TEMPORARY VEGETATION IMMEDIATELY FOLLOWING PLACEMENT. USE RIDOT STD. M.18.10.5 SEED MIX.

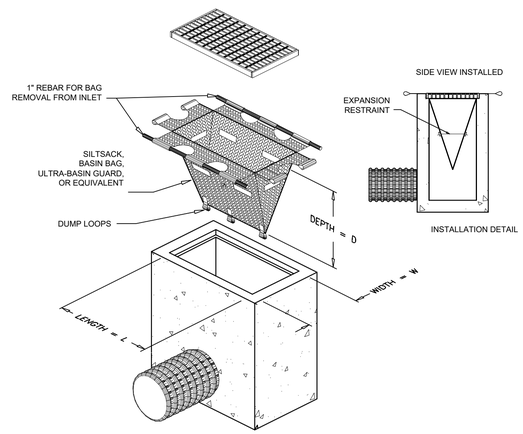
ERODIBLE MATERIAL STOCKPILE
NOT TO SCALE



	L_W (FT)	W_W (FT)	A_W (SF)	V_W (CF)	V_D (CF)	TOTAL STORAGE $V_W + V_D$ (CF)
TST 1	86	43	3,698	9,430	8492	17992
TST 2	82	41	3,362	8,573	7,772	16,345

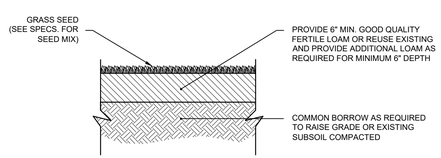
NOTES:
1. TEMPORARY SEDIMENT TRAPS SHALL BE CLEANED OR REMOVED EVERY 6 MONTHS.
2. RIPRAP SHALL MEET RIDOT STANDARD SPECIFICATION M.10.03.2.
3. STONE SHALL MEET RIDOT STANDARD SPECIFICATION M.01.09 TABLE I, COLUMN V (FILTER STONE).
4. SEDIMENT MARKER SHALL BE INSTALLED SUCH THAT TOP OF BLACK ENAMEL BAND IS 1.5' FROM THE BOTTOM OF THE SEDIMENT TRAP.
5. REFER TO SOIL EROSION AND SEDIMENT CONTROL PLANS FOR LIMITS OF A_D AND A_W.

TST — TEMPORARY SEDIMENT TRAP DETAIL
NOT TO SCALE



NOTES:
1. INLET PROTECTION SHALL BE CLEANED OF SILT AND DEBRIS ON A REGULAR BASIS AS REQUIRED.
2. INSPECTIONS SHALL BE DONE AFTER EACH RAIN EVENT AND AT A MINIMUM EVERY TWO WEEKS.

TIP — TEMPORARY INLET PROTECTION
NOT TO SCALE



LOAM AND SEED
NOT TO SCALE

PARE

SEAL OF THE CITY OF PROVIDENCE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

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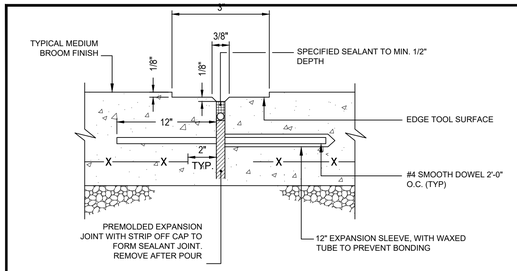
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:
DETAILS 1

DRAWING NO.:
C6.1

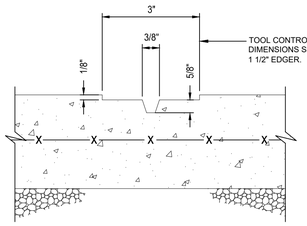
SHEET NO. 8 OF 13



EXPANSION JOINT AT 20' O.C. (TYP)

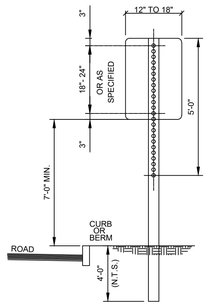
NOTES:

1. EXPANSION JOINTS (E.J.) 20' O.C. UNLESS OTHERWISE NOTED.
2. CONTROL JOINTS (C.J.) 5' O.C. UNLESS OTHERWISE NOTED.
3. WHERE EXISTING AND NEW CONCRETE SIDEWALKS MEET, SAWCUT EXISTING WALK AND INSTALL EXPANSION JOINT AND DOWELS AS SHOWN. DRILL EXISTING CONCRETE WALK EDGE TO RECEIVE STEEL DOWELS AT EXPANSION JOINT.



CONTROL JOINT AT 5' O.C. (TYP)

EXPANSION AND CONTROL JOINTS FOR SIDEWALK PAVING
NOT TO SCALE

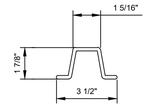


NOTE:

5/16" x 2-1/2" GALVANIZED BOLTS & WASHERS

STEEL SPECIFICATION - A.S.T.M. DESIGNATION A499-64 ZINC (HOT GALVANIZED) SPECIFIED BY-A.S.T.M. A 123.

WT./FT.	3.00	#
Mom. Ix-x	0.484in	4
Sec Mod x-x	0.569in	3
Mon Iy-y	0.886in	4
Sec Mod y-y	0.506in	3



PARKING SIGNS SHALL BE SET AT AN ANGLE OF NOT LESS THAN 30° NOR MORE THAN 45° A LINE PARALLEL TO THE FLOW OF TRAFFIC.

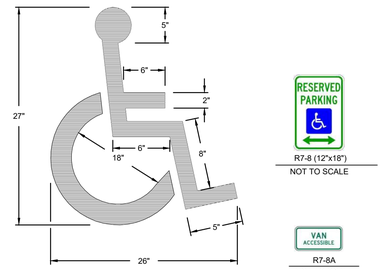
SIGN MOUNTING NOTES:

1. ALL LAG SCREWS, BOLTS AND WASHERS SHALL BE GALVANIZED 5/16"x2 1/2" LONG UNLESS OTHERWISE NOTED.
2. WASHERS SHALL BE 0.07" THICK.
3. ALL SIGN COLORS, RADII AND BORDERS AS SPECIFIED IN "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."

ACCESSIBLE SIGN NOTES:

1. ALL ACCESSIBLE PARKING AND SIGNAGE SHALL BE IN CONFORMANCE WITH THE RULES & REGULATIONS AS SPECIFIED BY THE AMERICAN DISABILITES ACT (ADA)
2. SIGN(S) SHALL BE LOCATED SO THEY CANNOT BE OBSCURED BY A VEHICLE PARKED IN THE SPACE.
3. FOR ACCESSIBLE VAN SPACE USE SIGN AS DETAILED.
4. FOR ACCESSIBLE SPACE FOR AUTOMOBILES USE ONLY HANDICAPPED PARKING SIGN.

SIGN MOUNTING
NOT TO SCALE

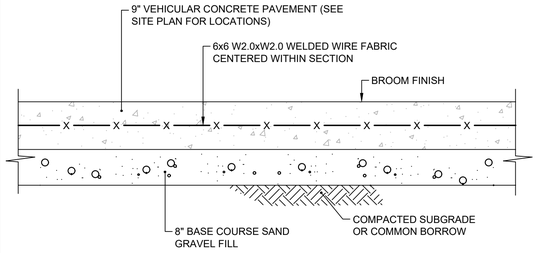


NOT TO SCALE

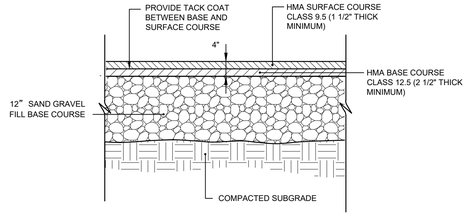
NOTE:

1. ALL ACCESSIBLE PARKING AND SIGNAGE SHALL BE IN CONFORMANCE WITH THE RULES & REGULATIONS OF THE ARCHITECTURAL BARRIERS BOARD.

SHP ACCESSIBLE PAVEMENT MARKING
NOT TO SCALE



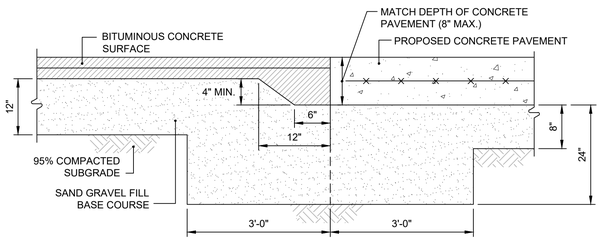
VCP VEHICULAR CONCRETE PAVEMENT
NOT TO SCALE



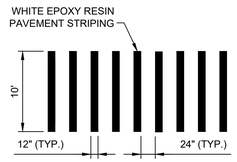
NOTE:

1. SUBMIT JOB MIX FORMULAS TO ENGINEER FOR APPROVAL PRIOR TO PLACEMENT.

BCP BITUMINOUS CONCRETE PAVEMENT
NOT TO SCALE



ATD ASPHALT TURNDOWN DETAIL
NOT TO SCALE



CW TYPICAL CROSSWALK DETAIL
NOT TO SCALE

NOTES:

1. COORDINATE PAVEMENT MARKING COLORS WITH OWNER.
2. ALL PARKING PAVEMENT MARKINGS SHALL BE EPOXY RESIN, CONFORMING TO THE SPECIFICATIONS.

TYPICAL PARKING STALL
NOT TO SCALE

NOTE:

1. WHERE STALLS ABUT SIDEWALK, PARKING SIGNS SHOULD BE PLACED AT BACK EDGE OF SIDEWALK.
2. STRIPING SHOULD BE WHITE IN COLOR

SHP ACCESSIBLE PARKING STALLS @ 90°
NOT TO SCALE

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

City of Providence
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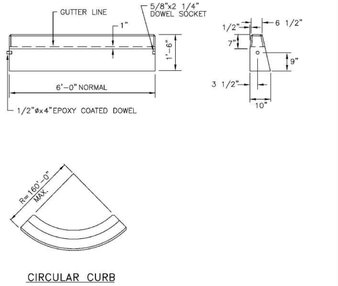
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:
DETAILS 2

DRAWING NO.:
C6.2

SHEET NO. 9 OF 13



CIRCULAR CURB

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'-0".
3. EXPOSED SURFACES TO HAVE A SPONGE FLOAT FINISH.
4. CIRCULAR CURB IS REQUIRED ON CURVES WITH RADII OF 160'-0" OR LESS. STRAIGHT CURB TO BE USED ON CURVES OF MORE THAN 160'-0"RADIUS.
5. EXPOSED EDGES TO HAVE A 3/4" CHAMFER.

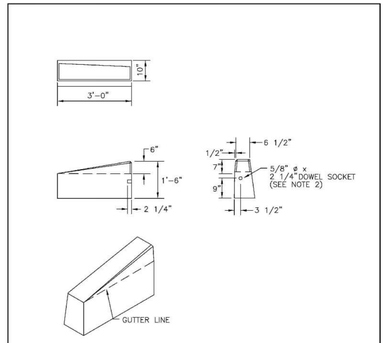
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Mar. 05

PRECAST CONCRETE CURB

R.I. STANDARD 7.1.0

JUNE 15, 1998 ISSUE DATE



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. DRAWING SHOWS TRANSITION CURB FOR ONE DIRECTION. FOR OTHER DIRECTION USE OPPOSITE HAND AND INCLUDE A 1/2" ø x 4" EPOXY COATED DOWEL.
3. EXPOSED SURFACES TO HAVE A SPONGE FLOAT FINISH.
4. EXPOSED EDGES TO HAVE A 3/4" CHAMFER.
5. LEFT AND RIGHT SECTIONS SHALL BE INSTALLED AS REQUIRED.

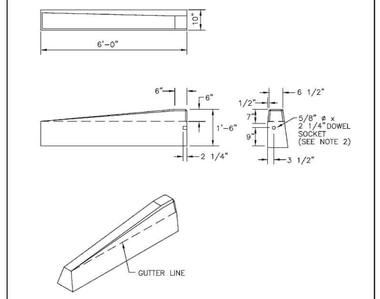
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Mar. 05
2	MJP	06/01/10

3'-0" PRECAST CONCRETE TRANSITION CURB

R.I. STANDARD 7.1.1

JUNE 15, 1998 ISSUE DATE



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. DRAWING SHOWS TRANSITION CURB FOR ONE DIRECTION. FOR OTHER DIRECTION USE OPPOSITE HAND AND INCLUDE A 1/2" ø x 4" EPOXY COATED DOWEL.
3. EXPOSED SURFACES TO HAVE A SPONGE FLOAT FINISH.
4. EXPOSED EDGES TO HAVE A 3/4" CHAMFER.

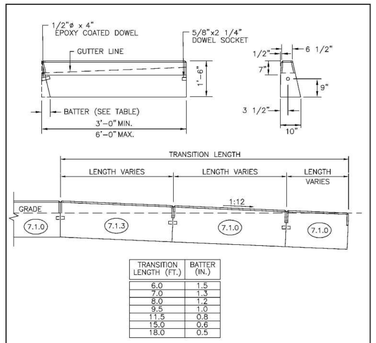
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Mar. 05

6'-0" PRECAST CONCRETE TRANSITION CURB

R.I. STANDARD 7.1.2

JUNE 15, 1998 ISSUE DATE



TRANSITION LENGTH (FT.)	BATTER (IN.)
6.0	1.5
7.0	1.3
8.0	1.2
9.5	1.0
11.5	0.8
15.0	0.6
18.0	0.5

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. CIRCULAR CURB IS REQUIRED ON CURVES WITH RADII OF 160'-0"OR LESS. STRAIGHT CURB TO BE USED ON CURVES OF MORE THAN 160'-0"RADIUS.
3. EXPOSED EDGES TO HAVE A 3/4"CHAMFER.
4. EXPOSED SURFACES TO HAVE A SPONGE FLOAT FINISH.
5. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR CURB FILLER PIECES TO BE 3'-0" (GREATER LENGTHS PREFERRED).

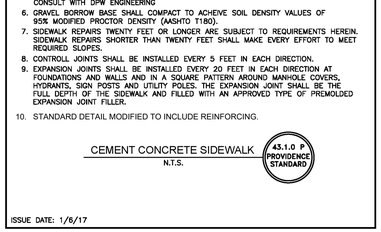
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Mar. 05

PRECAST CONCRETE WHEELCHAIR RAMP TRANSITION CURB

R.I. STANDARD 7.1.3

JUNE 15, 1998 ISSUE DATE

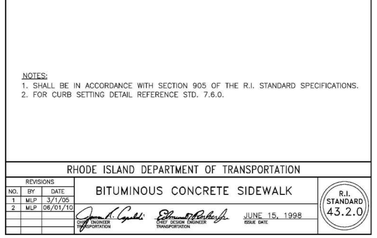


NOTES
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. SEE CURB SETTING DETAIL WHERE APPLICABLE.
3. RUNNING SLOPE OF SIDEWALK SHALL NOT EXCEED 8.3% (1:12). TYPICALLY, RUNNING SLOPE SHALL MATCH ROAD SLOPE.
4. CROSS SLOPE OF SIDEWALK SHALL NOT EXCEED 2% (1:50).
5. SIDEWALK MAY BE SUBJECT TO GRASS STRIP INSTALLATION. CONSULT WITH DPW ENGINEERING
6. GRAVEL BORROW BASE SHALL COMPACT TO ACHIEVE SOIL DENSITY VALUES OF 95% MODIFIED PROCTOR DENSITY (AASHTO T180).
7. SIDEWALK REPAIRS TWENTY FEET OR LONGER ARE SUBJECT TO REQUIREMENTS HEREIN. SIDEWALK REPAIRS SHORTER THAN TWENTY FEET SHALL MAKE EVERY EFFORT TO MEET REQUIRED SLOPES.
8. CONTROLL JOINTS SHALL BE INSTALLED EVERY 5 FEET IN EACH DIRECTION.
9. EXPANSION JOINTS SHALL BE INSTALLED EVERY 20 FEET IN EACH DIRECTION AT FOUNDATIONS AND WALLS AND IN A SQUARE PATTERN AROUND MANHOLE COVERS, HYDRANTS, SIGN POSTS AND UTILITY POLES. THE EXPANSION JOINT SHALL BE THE FULL DEPTH OF THE SIDEWALK AND FILLED WITH AN APPROVED TYPE OF PREMOLDED EXPANSION JOINT FILLER.
10. STANDARD DETAIL MODIFIED TO INCLUDE REINFORCING.

CEMENT CONCRETE SIDEWALK
N.T.S.

43.1.0 P PROVIDENCE STANDARD

ISSUE DATE: 1/6/17



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. FOR CURB SETTING DETAIL REFERENCE STD. 7.6.0.

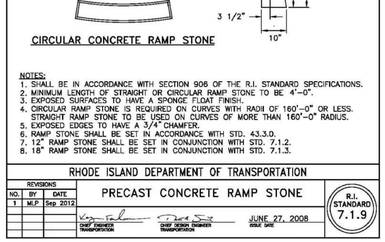
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	3/1/06
2	MJP	06/01/10

BITUMINOUS CONCRETE SIDEWALK

R.I. STANDARD 43.2.0

JUNE 15, 1998 ISSUE DATE



CIRCULAR CONCRETE RAMP STONE

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR RAMP STONE TO BE 4'-0".
3. EXPOSED SURFACES TO HAVE A SPONGE FLOAT FINISH.
4. CIRCULAR RAMP STONE IS REQUIRED ON CURVES WITH RADII OF 160'-0" OR LESS. STRAIGHT RAMP STONE TO BE USED ON CURVES OF MORE THAN 160'-0" RADIUS.
5. EXPOSED EDGES TO HAVE A 3/4" CHAMFER.
6. RAMP STONE SHALL BE SET IN ACCORDANCE WITH STD. 43.3.0.
7. 12" RAMP STONE SHALL BE SET IN CONJUNCTION WITH STD. 7.1.2.
8. 18" RAMP STONE SHALL BE SET IN CONJUNCTION WITH STD. 7.1.3.

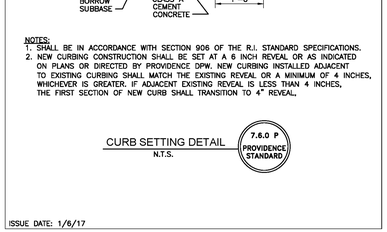
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Sep. 2012

PRECAST CONCRETE RAMP STONE

R.I. STANDARD 7.1.9

JUNE 27, 2008 ISSUE DATE

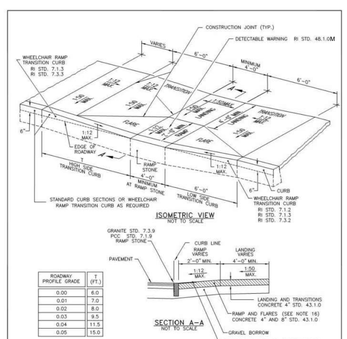


NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 906 OF THE R.I. STANDARD SPECIFICATIONS.
2. NEW CURBING CONSTRUCTION SHALL BE SET AT A 6 INCH REVEAL OR AS INDICATED ON PLANS OR DIRECTED BY PROVIDENCE DPW. NEW CURBING INSTALLED ADJACENT TO EXISTING CURBING SHALL MATCH THE EXISTING REVEAL OR A MINIMUM OF 4 INCHES, WHICHEVER IS GREATER. IF ADJACENT EXISTING REVEAL IS LESS THAN 4 INCHES, THE FIRST SECTION OF NEW CURB SHALL TRANSITION TO 4" REVEAL.

CURB SETTING DETAIL
N.T.S.

7.6.0 P PROVIDENCE STANDARD

ISSUE DATE: 1/6/17



ROADWAY PROFILE GRADE	(FT.)
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE RI STANDARD SPECIFICATIONS.
2. WHEN ANY OBSTRUCTION LOCATED IN THE SIDEWALK FALLS WITHIN A CROSSWALK AREA, THE WHEELCHAIR RAMP SHALL BE PLACED SUCH THAT IT FALLS OUTSIDE OF THE CROSSWALK, AND IT IS TO BE CENTERED WHENEVER POSSIBLE.
3. AT NO TIME IS ANY PART OF THE WHEELCHAIR RAMP TO BE LOCATED OUTSIDE OF THE CROSSWALK, AND IT IS TO BE CENTERED WHENEVER POSSIBLE.
4. DRAINAGE FACILITIES ARE TO BE LOCATED UP-GRADE OF ALL WHEELCHAIR RAMPS.
5. LOCATION OF WHEELCHAIR RAMPS IS AS SHOWN ON CONTRACT DRAWINGS.
6. ALL RESTRICTIONS ON THE SIDEWALK CROSS SLOPE EXCEED 1:50 EXCEPT WITHIN THE RAMP AREA.
7. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 4'-0" SHALL BE MAINTAINED.
8. THE WHEELCHAIR RAMP SLOPE AND SIDE SLOPES (TRANSITIONS), MUST NOT BE STEEPER THAN 1:12. HOWEVER, THESE SLOPES MAY BE 1:10 WHERE THE ROAD PROFILE GRADE IS 5% OR LESS.
9. WHERE THE ROAD PROFILE EXCEEDS 5% THE HIGH SIDE TRANSITION LENGTH (T) SHALL BE EIGHTEEN FEET (18'-0").
10. IN NO CASE, WHERE A STOP LINE IS WARRANTED, SHALL A RAMP BE PLACED BEHIND THE STOP LINE.
11. THE ENTRANCE OF THE WHEELCHAIR RAMP SHALL BE FLUSH WITH THE ROADWAY.
12. THE WHEELCHAIR RAMP SHALL BE CENTERED RADIALLY OPPOSITE THE RADIUS POINT WHEN POSSIBLE.
13. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'-0" (GREATER LENGTHS PREFERRED).
14. ALL REQUIRED CUTTING OF CURB PIECES TO BE PAID FOR UNDER COST OF CURB.
15. DETECTABLE WARNINGS TO BE PAID FOR UNDER SECTION 642 OF THE RI STANDARD SPECIFICATIONS.
16. 8" CONCRETE DEPTH FOR RADIUS WHEELCHAIR RAMPS ONLY. USE 4" DEPTH FOR TANGENT (MID-BLOCK) LOCATIONS.

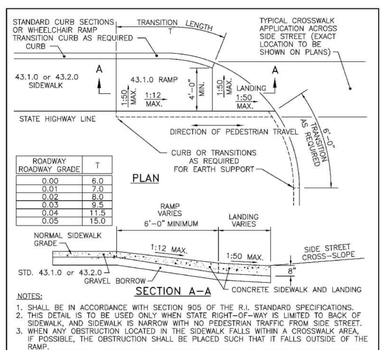
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Dec. 2005
2	MJP	Sep. 2012

WHEELCHAIR RAMP

R.I. STANDARD 43.3.0

JUNE 15, 1998 ISSUE DATE



ROADWAY ROADWAY GRADE	T
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 905 OF THE R.I. STANDARD SPECIFICATIONS.
2. THIS DETAIL IS TO BE USED ONLY WHEN STATE RIGHT-OF-WAY IS LIMITED TO BACK OF SIDEWALK, AND SIDEWALK IS NARROW WITH NO PEDESTRIAN TRAFFIC FROM SIDE STREET.
3. WHEN ANY OBSTRUCTION LOCATED IN THE SIDEWALK FALLS WITHIN A CROSSWALK AREA, IF POSSIBLE, THE OBSTRUCTION SHALL BE PLACED SUCH THAT IT FALLS OUTSIDE OF THE RAMP.
4. AT NO TIME IS ANY PART OF THE WHEELCHAIR RAMP TO BE LOCATED OUTSIDE OF THE CROSSWALK, AND IT IS TO BE CENTERED WHENEVER POSSIBLE.
5. DRAINAGE FACILITIES ARE TO BE LOCATED UP-GRADE OF ALL WHEELCHAIR RAMPS.
6. LOCATION OF WHEELCHAIR RAMPS IS AS SHOWN ON CONTRACT DRAWINGS.
7. ALL REQUIRED CUTTING OF CURB PIECES TO BE PAID FOR UNDER COST OF CURB.
8. WHERE THE ROAD PROFILE EXCEEDS 5% THE TRANSITION LENGTH (T) SHALL BE EIGHTEEN FEET (18'-0").
9. THE ENTRANCE OF THE WHEELCHAIR RAMP SHALL BE FLUSH WITH THE ROADWAY.
10. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'-0"(GREATER LENGTHS PREFERRED).
11. AN UNOBSTRUCTED PATH OF TRAVEL WITH A MINIMUM WIDTH OF 4'-0" SHALL BE MAINTAINED.

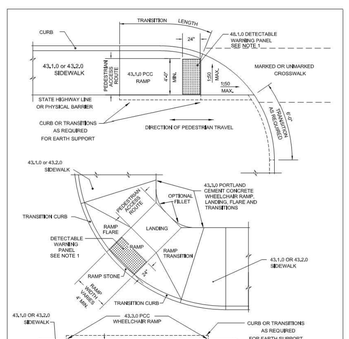
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Dec. 2005
2	MJP	Sep. 2012

WHEELCHAIR RAMP FOR LIMITED RIGHT-OF-WAY AREAS

R.I. STANDARD 43.3.1

JUNE 15, 1998 ISSUE DATE



NOTES
1. CONTRACTOR SHALL PROVIDE DETECTABLE WARNING PAVERS. PLASTIC PANEL WILL NOT BE ACCEPTED.

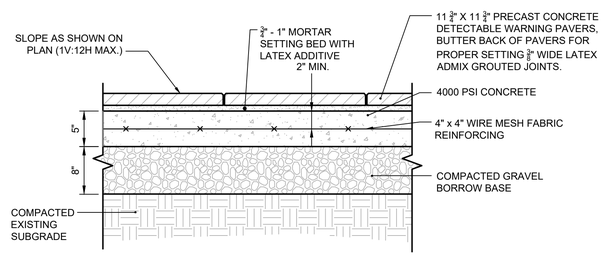
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS		
NO.	BY	DATE
1	MJP	Sep. 2012
2	MJP	Dec. 2012

DETECTABLE WARNING PANEL PLACEMENT

R.I. STANDARD 48.1.0M

JUNE 15, 1998 ISSUE DATE



NOTE:
1. PROVIDE EXPANSION AND CONTROL JOINTS IN CONCRETE BENEATH CONCRETE PAVERS.

DWP DETECTABLE WARNING PAVERS
NOT TO SCALE

PARE

CITY SEAL OF THE CITY OF PROVIDENCE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

REVISIONS:

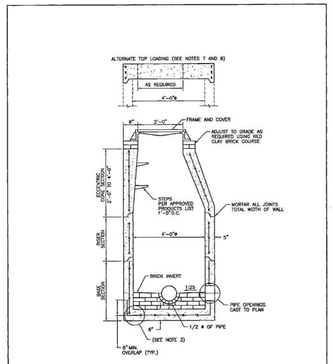
PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	AS NOTED
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

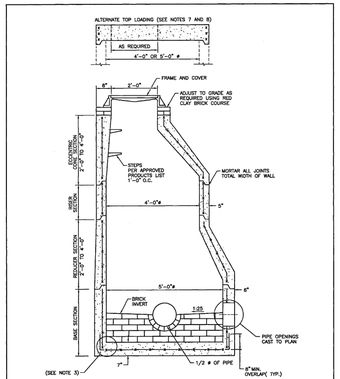
DRAWING TITLE:
DETAILS 3

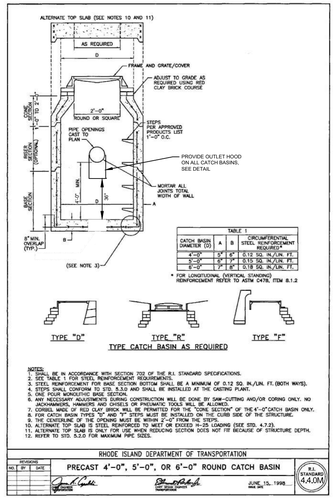
DRAWING NO.:
C6.3

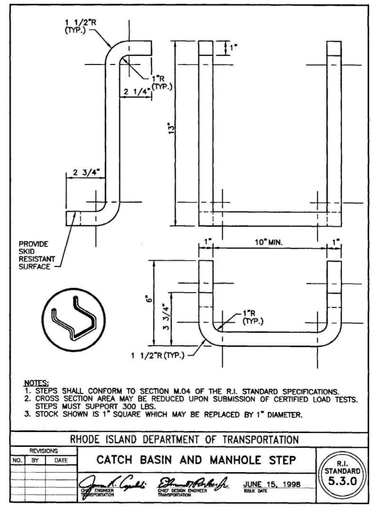
SHEET NO. 10 OF 13

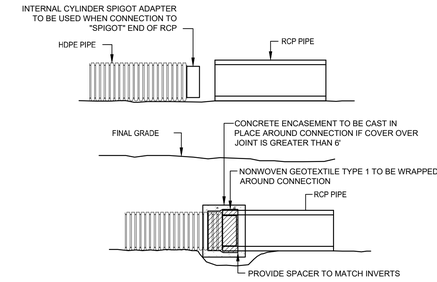
J:\JOBS\23 Jobs\23029.00 Providence - Conley Stadium Parking - 434 Mount Pleasant Ave\







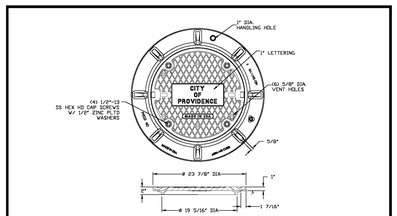




NOTES:

1. INTERNAL CYLINDER ADAPTER TO BE WELDED TO HDPE, OUTSIDE DIAMETER TO BE INSERTED INTO INSIDE DIAMETER OF CONCRETE PIPE.
2. NON-WOVEN GEOTEXTILE TO BE WRAPPED AROUND CONNECTION WITH FULL SEAM OVERLAP TO PROVIDE FULL PROTECTION FROM SOIL INTRUSION.
3. CONNECTION TO BE MADE IN ACCORDANCE WITH PIPE MANUFACTURER'S REQUIREMENTS.
4. INTERNAL CYLINDER SPIGOT ADAPTER NOT REQUIRED IF HDPE IS CONNECTED TO "BELL" END OF RCP.

HDPE/RCP PIPE JOINT
NOT TO SCALE

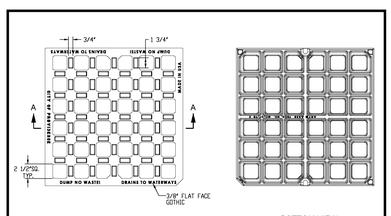


NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE MATERIALS SHALL BE GRAY IRON AND SHALL BE ASTM A48 CERTIFIED.
3. SHALL BE EJ PRODUCT 240834801 OR APPROVED EQUAL.

HEAVY DUTY MANHOLE FRAME AND COVER-24 INCH
6.2.1 P PROVIDENCE STANDARD

ISSUE DATE: 1/8/17

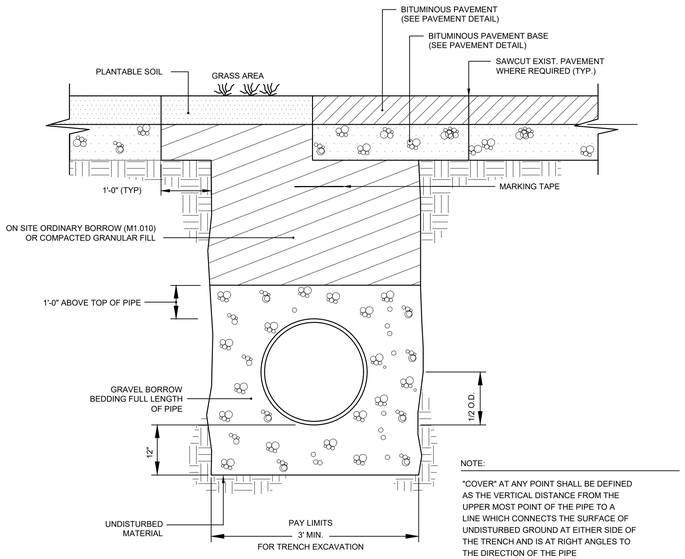


NOTES:

1. MATERIALS SHALL CONFORM TO SECTION M.04 OF THE RHODE ISLAND STANDARD SPECIFICATIONS.
2. THE GRATE MATERIAL SHALL BE DUCTILE IRON. MATERIALS SHALL BE ASTM A536 CERTIFIED.
3. OPEN AREA OF GRATE SHALL BE EQUAL TO OR GREATER THAN 217 SQUARE INCHES.
4. SHALL BE EJ PRODUCT 5520002Z OR APPROVED EQUAL.

STANDARD CAPACITY GRATE
6.3.0 P PROVIDENCE STANDARD

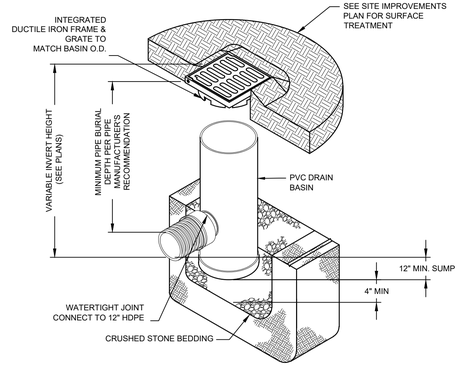
ISSUE DATE: 1/8/17



NOTE:

"COVER" AT ANY POINT SHALL BE DEFINED AS THE VERTICAL DISTANCE FROM THE UPPER MOST POINT OF THE PIPE TO A LINE WHICH CONNECTS THE SURFACE OF UNDISTURBED GROUND AT EITHER SIDE OF THE TRENCH AND IS AT RIGHT ANGLES TO THE DIRECTION OF THE PIPE

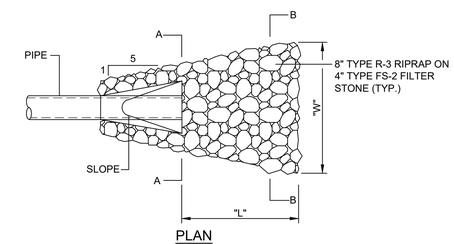
TYPICAL TRENCH FOR DRAINAGE INSTALLATION
NOT TO SCALE



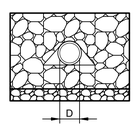
NOTES:

1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05 AND ADA COMPLIANT
2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
3. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE.

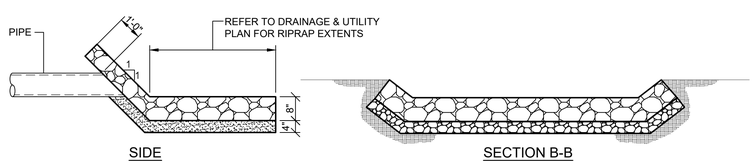
AD
12" AREA DRAIN BASIN
NOT TO SCALE



PLAN



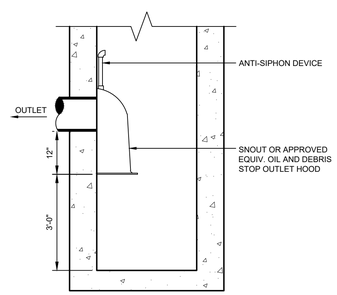
SECTION A-A



SIDE ELEVATION

SECTION B-B

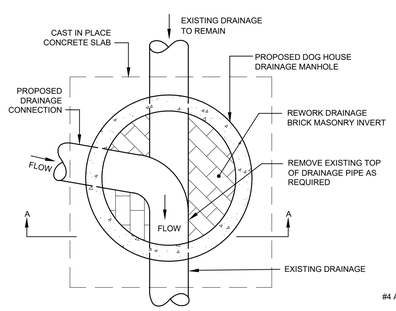
RLS
RIPRAP LEVEL SPREADER
NOT TO SCALE



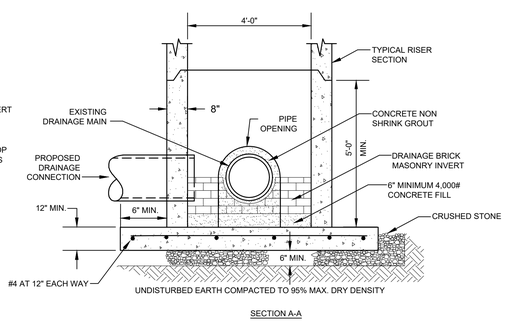
NOTE:

1. TO BE INSTALLED IN ALL NEW AND EXISTING CATCH BASINS WITHIN THE LIMIT OF DISTURBANCE.

OUTLET HOOD DETAIL
NOT TO SCALE



PLAN



SECTION A-A

DOG HOUSE MANHOLE BASE
NOT TO SCALE

PARE

SEAL OF THE CITY OF PROVIDENCE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

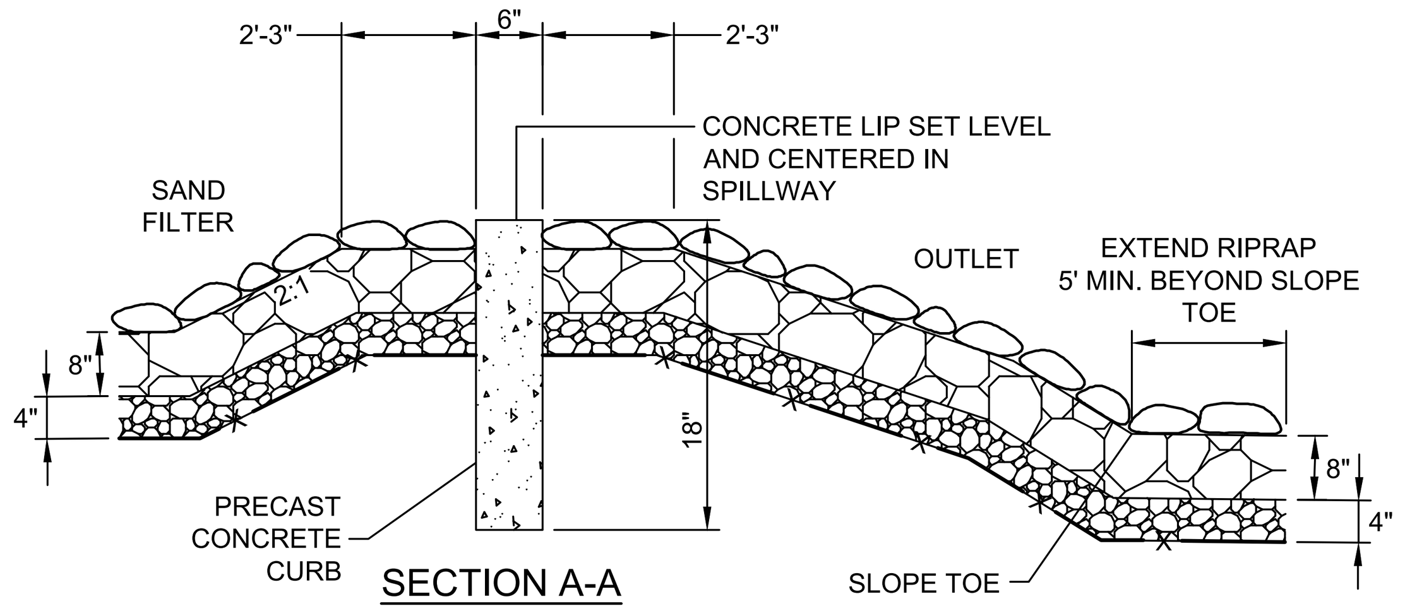
REVISIONS:

PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	AS NOTED
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:
DETAILS 4

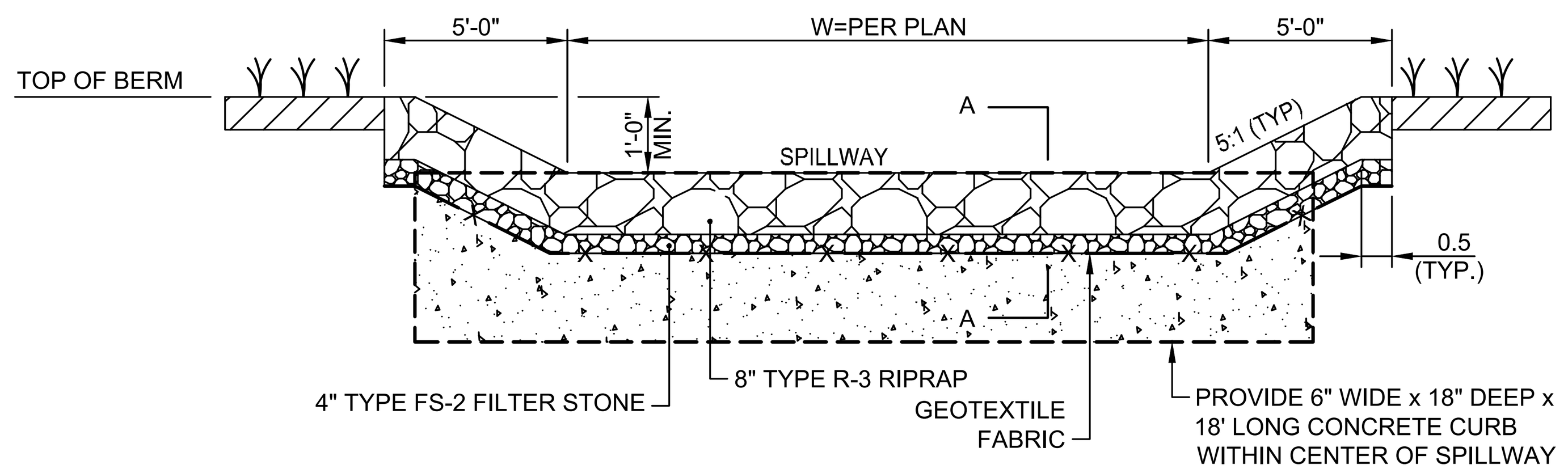
DRAWING NO.:
C6.4

SHEET NO. 11 OF 13

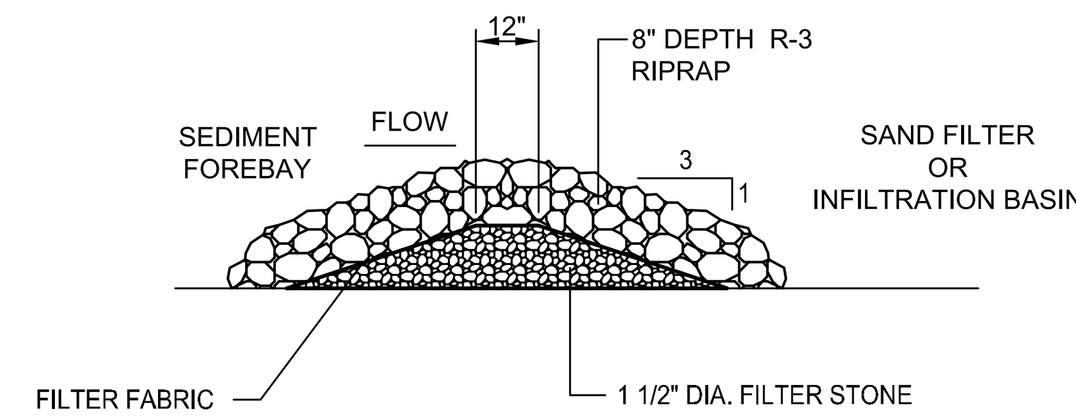


SECTION A-A

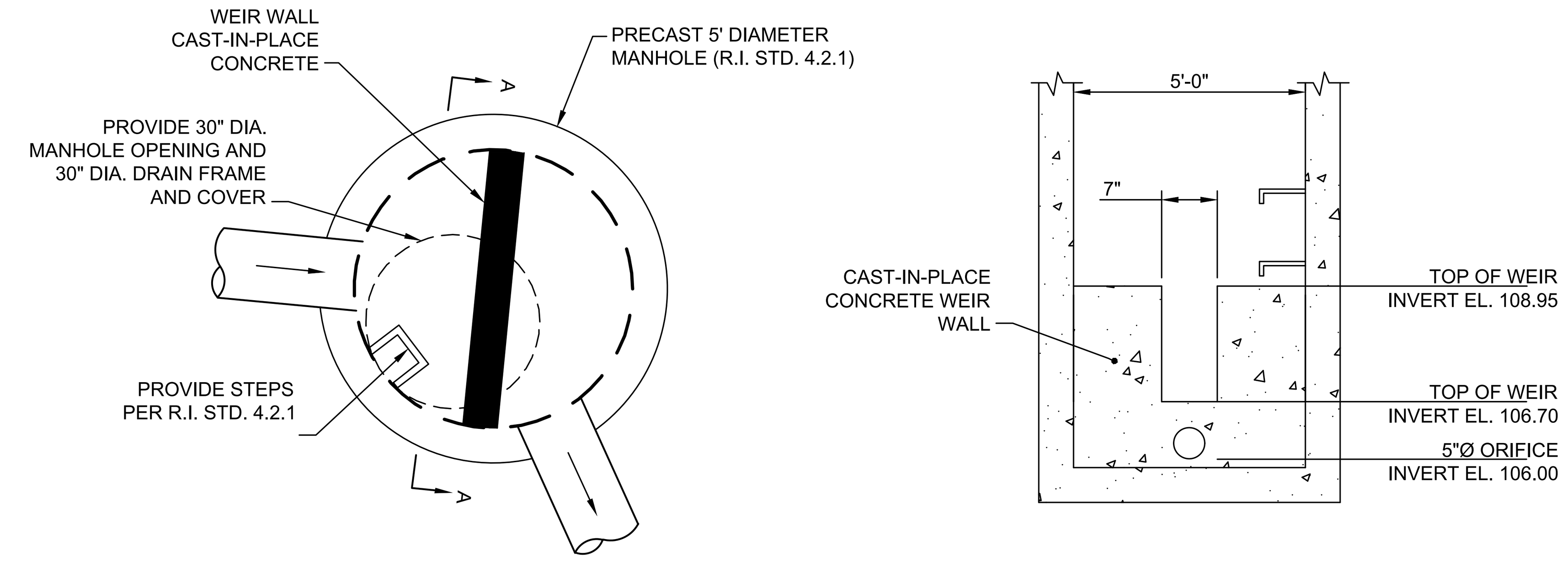
NOTE:
CONTRACTOR SHALL FILL VOIDS BETWEEN CURB SECTIONS WITH MORTAR



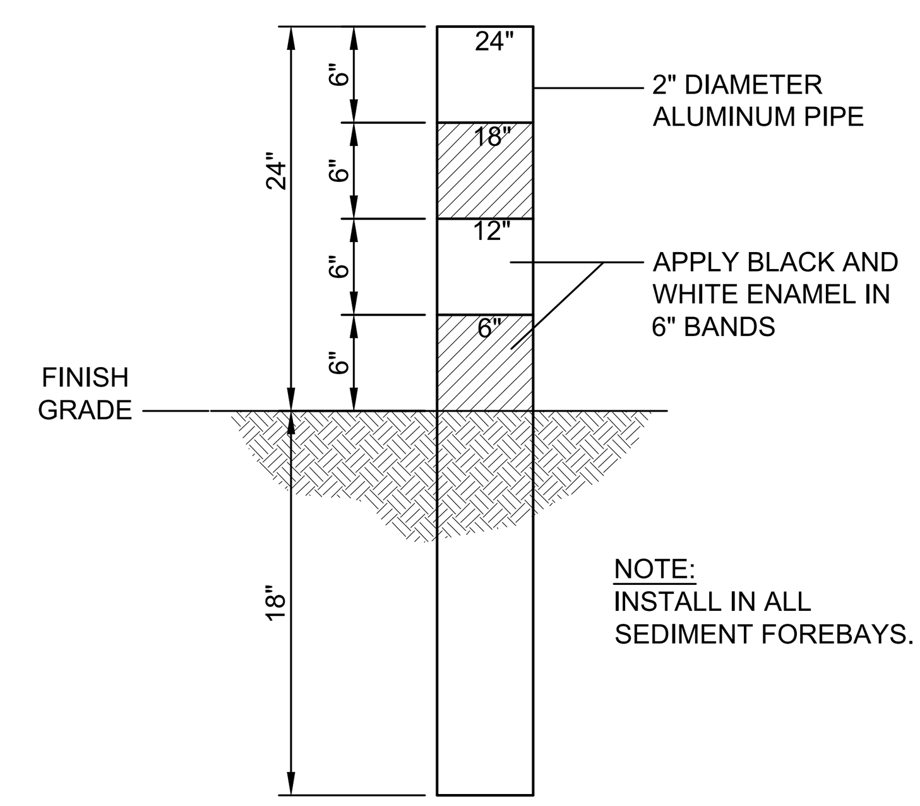
RS **RIPRAP SPILLWAY DETAIL**
NOT TO SCALE



SFCD **SEDIMENT FOREBAY CHECK DAM**
NOT TO SCALE



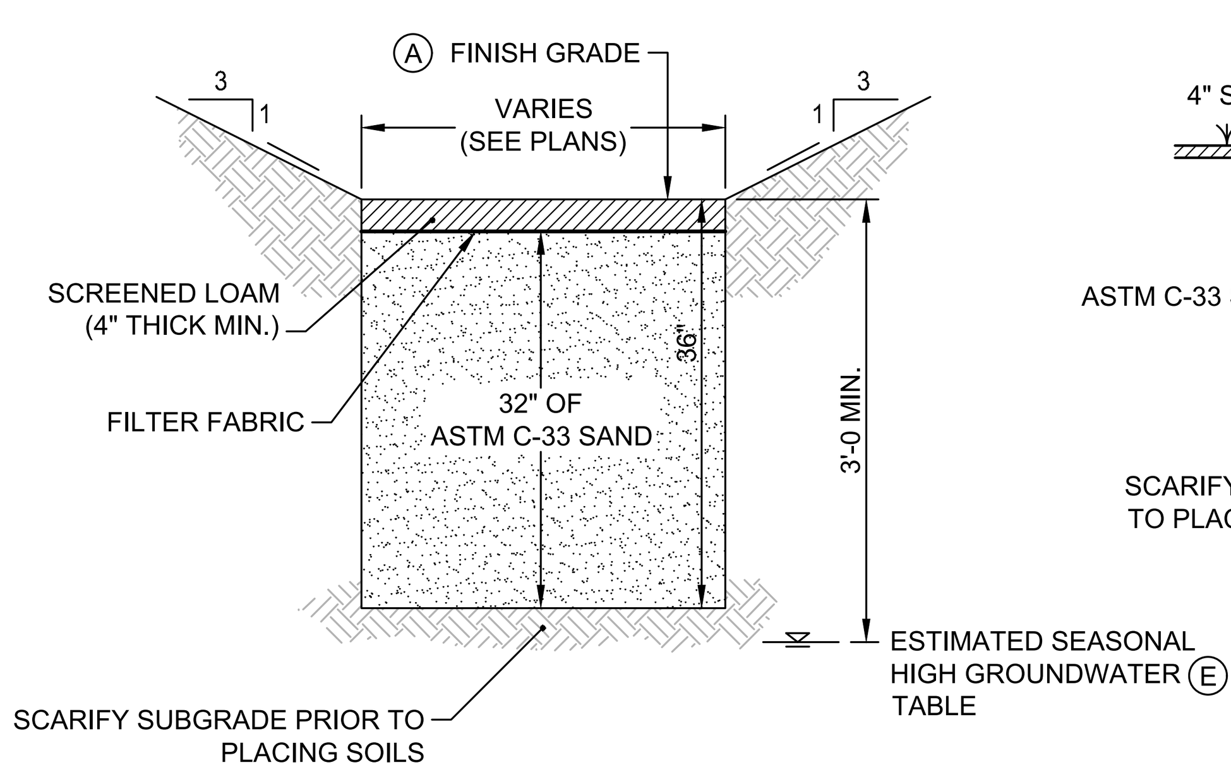
OUTLET CONTROL STRUCTURE (OCS-1) DETAIL
NOT TO SCALE



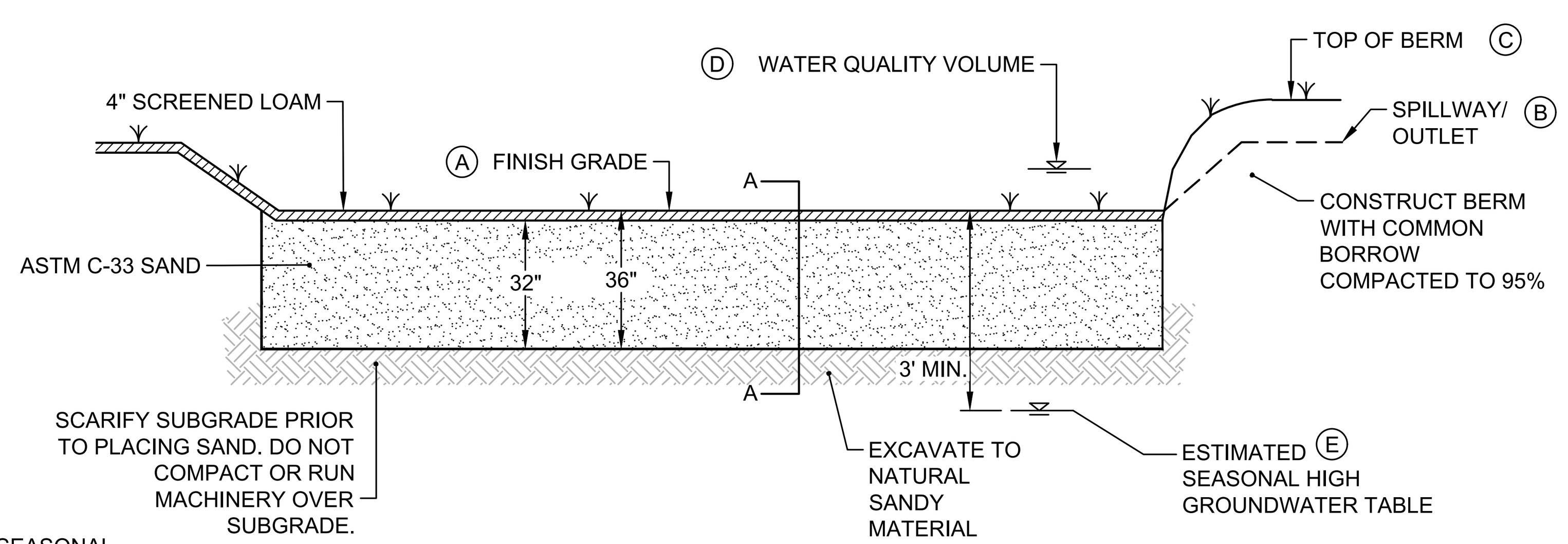
SEDIMENT MARKER DETAIL
NOT TO SCALE

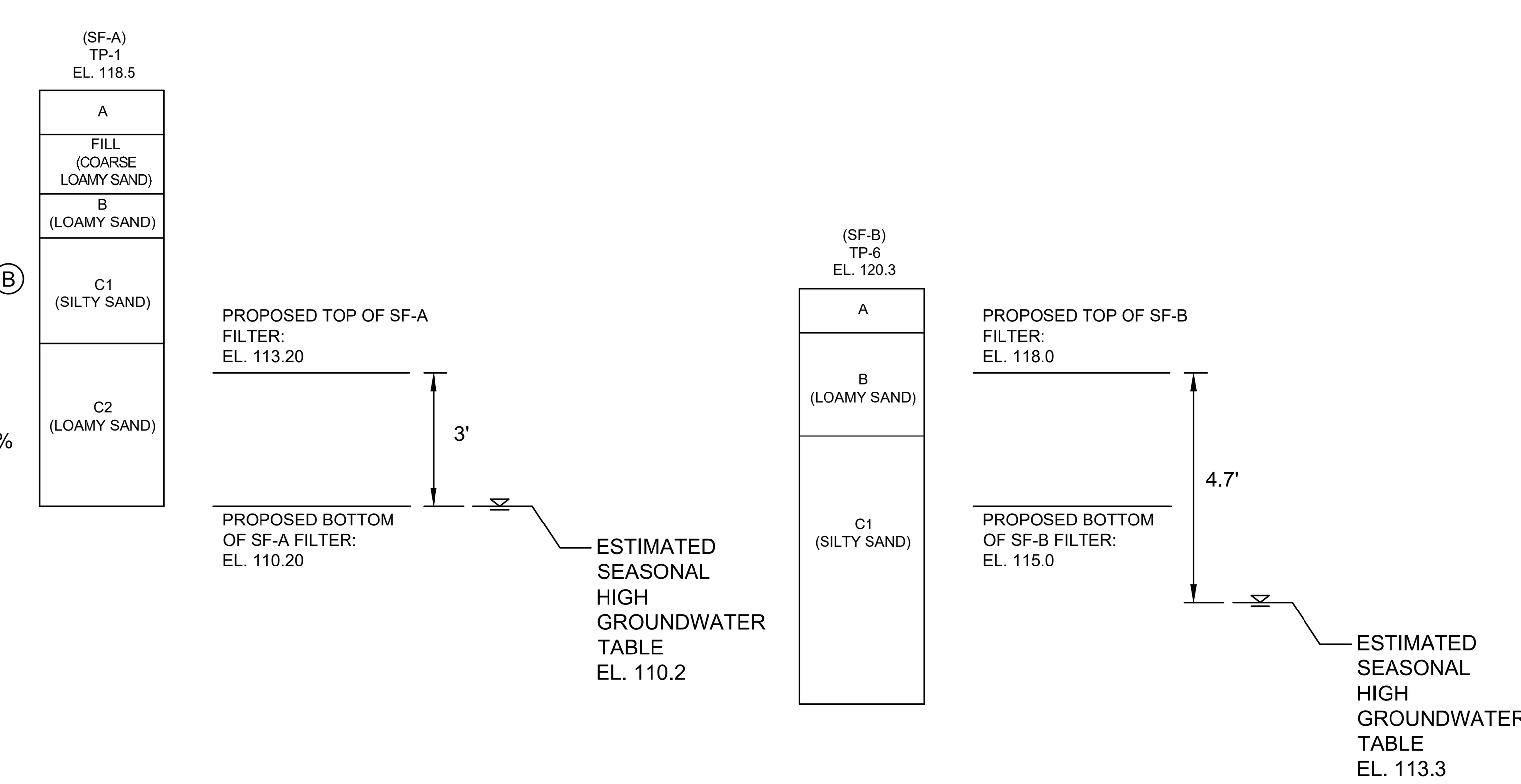
SAND FILTER NOTES:

1. ABSOLUTELY NO RUNOFF SHALL ENTER THE SAND FILTER AREA UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED.
2. CONSTRUCTION EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE SAND FILTER AREA TO MINIMIZE COMPACTION OF THE SOILS.
3. IF NECESSARY, UTILIZE LIGHT-TRACKED EQUIPMENT WHEN EXCAVATING WITHIN THE SAND FILTER AREA TO AVOID COMPACTION OF THE BASIN FLOOR.
4. INITIAL EXCAVATION SHALL BE CARRIED TO WITHIN 1 FOOT OF THE SUBGRADE ELEVATION. FINAL EXCAVATION TO THE BASIN SUBGRADE SHALL BE DEFERRED UNTIL ALL UPSTREAM DISTURBED AREAS HAVE BEEN STABILIZED OR PROTECTED.
5. CONTRACTOR SHALL CONTACT THE ENGINEER 48 HOURS PRIOR TO EXPOSING THE SUBGRADE TO COORDINATE ENGINEER'S OBSERVATION OF SUBGRADE.
6. CONSTRUCTION OF THE SYSTEM SHALL NOT COMMENCE UNTIL ENGINEER OBSERVES SUBGRADE AND BACKFILL MEDIA AND GRANTS PERMISSION TO PROCEED.
7. SEED WITHIN SAND FILTER SHALL BE NATIVE SEED MIX PER R.I. STD. M.18.10.6.
8. SCREENED LOAM PLACED ABOVE THE SAND FILTER MEDIA SHALL CONFORM TO "LOAMY SAND" PER USDA TEXTURAL CLASSIFICATION SYSTEM.



SECTION A-A





	SF-A	SF-B
(A)	113.20	118.00
(B)	114.20	119.00
(C)	115.20	120.50
(D)	113.64	117.40
(E)	110.20	113.30

SAND FILTER DETAIL
NOT TO SCALE

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

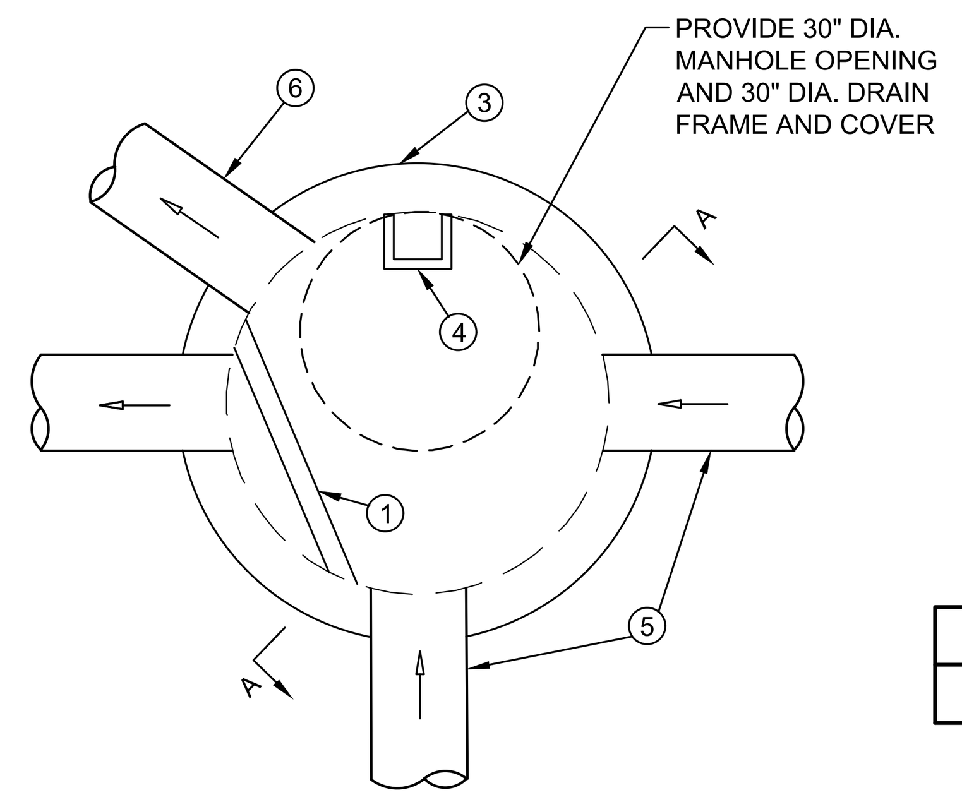
REVISIONS:

PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	AS NOTED
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ

DRAWING TITLE:
DETAILS 5

DRAWING NO.:
C6.5

SHEET NO. 12 OF 13

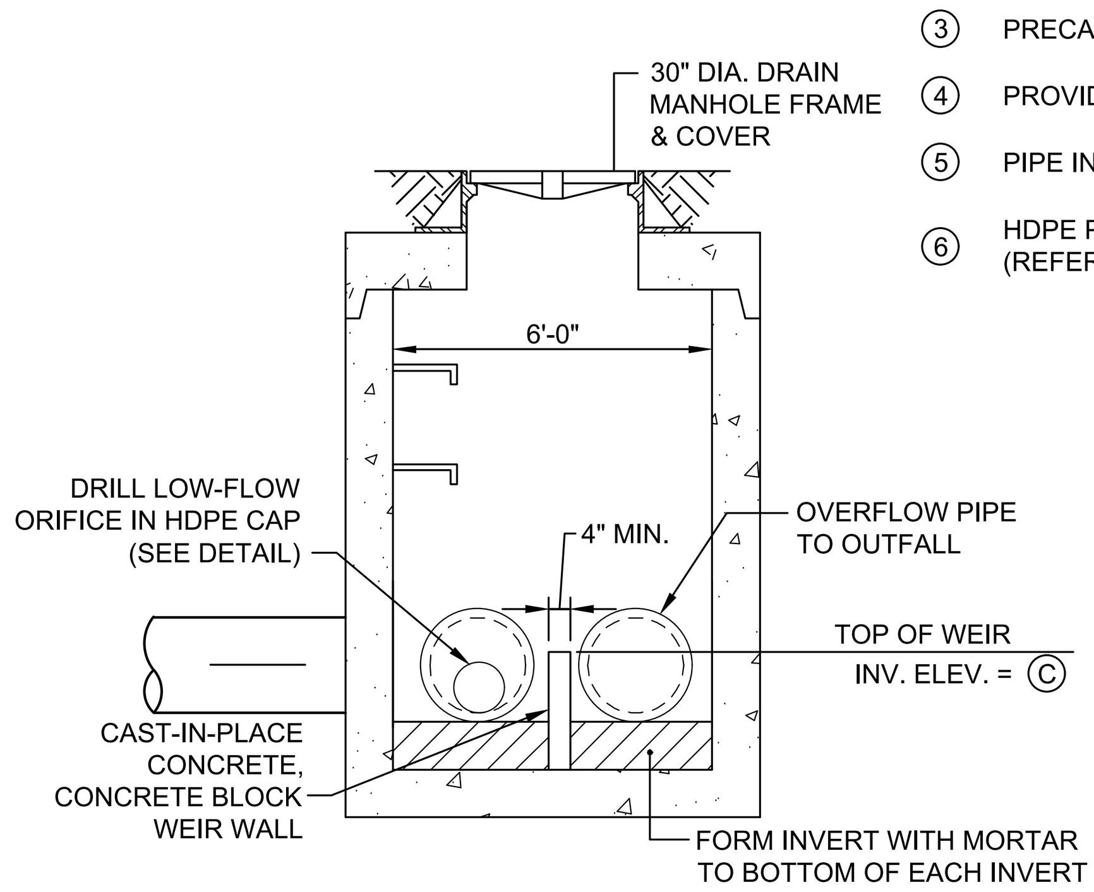


	A	B	C
DIV-1	113.40	4	113.64

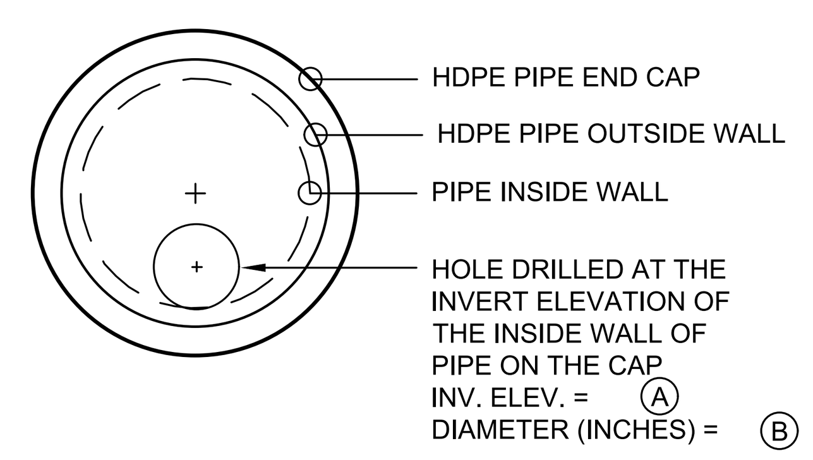
DIV-1

TYPICAL NOTES LEGEND

1. CAST IN PLACE CONCRETE DIVERSION WEIR WALL (4" WIDE)
2. OVERFLOW PIPE TO OUTFALL
3. PRECAST 6' DIAMETER MANHOLE (RIDOT STANDARD 4.2.2)
4. PROVIDE STEPS PER RIDOT STANDARD 4.2.1
5. PIPE IN
6. HDPE PIPE WITH CAP AND LOW FLOW WATER QUALITY ORIFICE (REFER TO CAP DETAIL) TO SAND FILTER



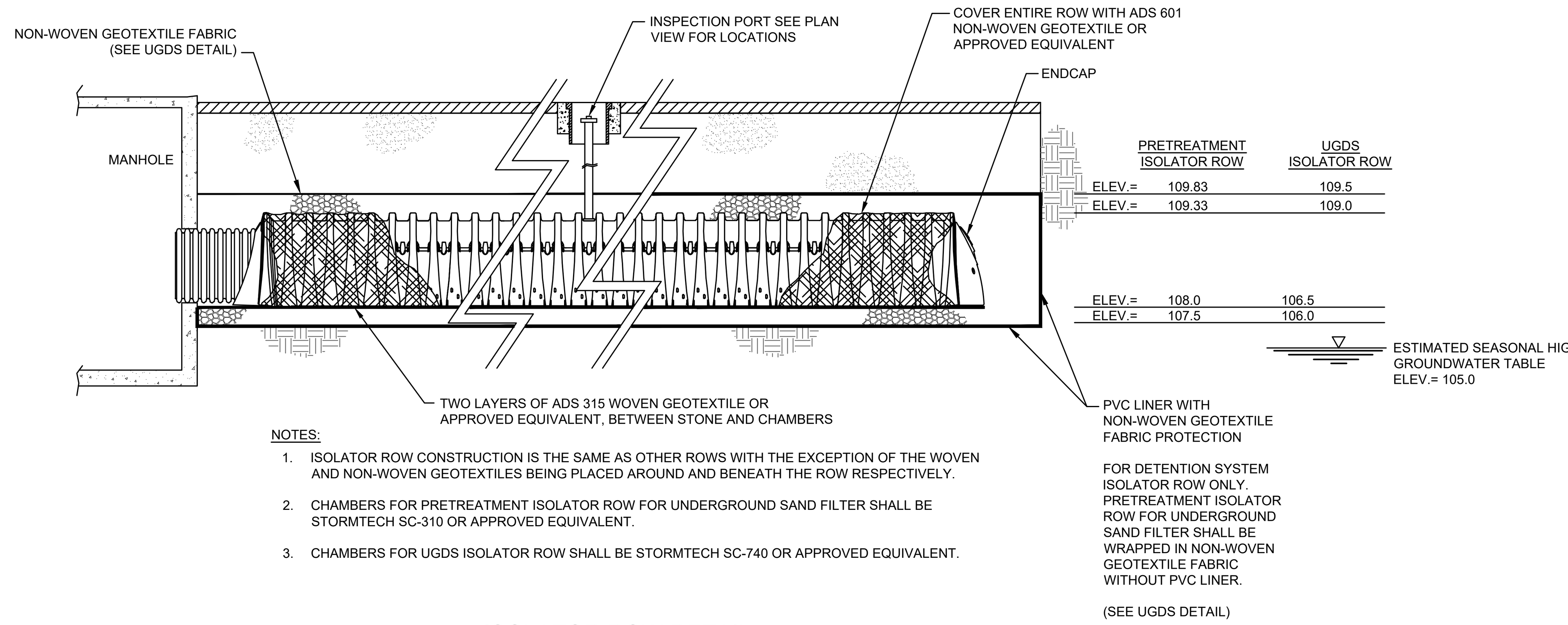
SECTION A-A DIVERSION WEIR WALL ELEVATION



CAP ELEVATION

TYPICAL DIVERSION MANHOLE DETAIL

NOT TO SCALE

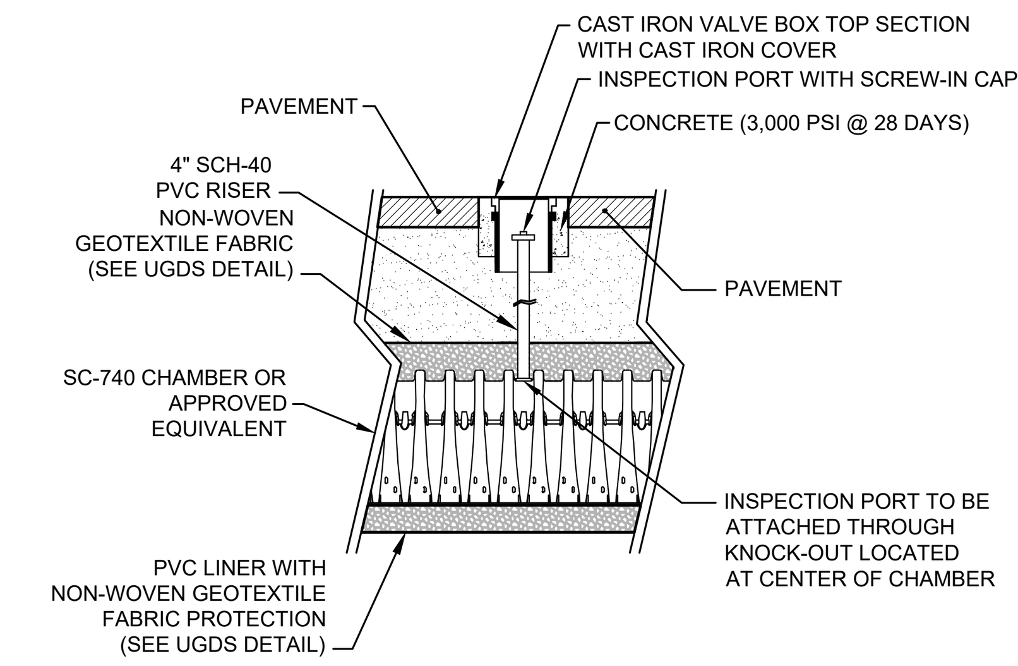


NOTES:

1. ISOLATOR ROW CONSTRUCTION IS THE SAME AS OTHER ROWS WITH THE EXCEPTION OF THE WOVEN AND NON-WOVEN GEOTEXTILES BEING PLACED AROUND AND BENEATH THE ROW RESPECTIVELY.
2. CHAMBERS FOR PRETREATMENT ISOLATOR ROW FOR UNDERGROUND SAND FILTER SHALL BE STORMTECH SC-310 OR APPROVED EQUIVALENT.
3. CHAMBERS FOR UGDS ISOLATOR ROW SHALL BE STORMTECH SC-740 OR APPROVED EQUIVALENT.

ISOLATOR ROW DETAIL

NOT TO SCALE



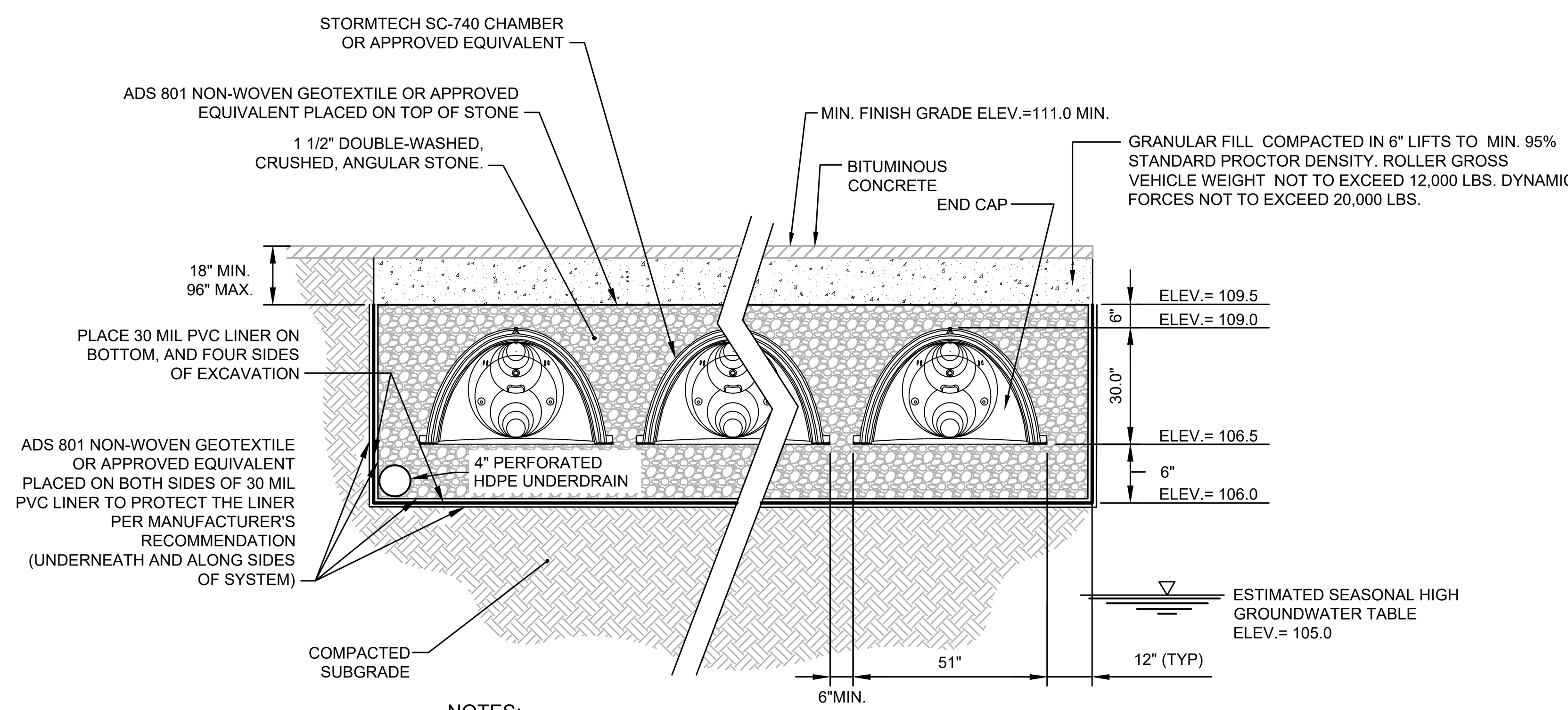
INSPECTION PORT DETAIL

NOT TO SCALE

SCALE ADJUSTMENT GUIDE

0" 1"

BAR IS ONE INCH ON ORIGINAL DRAWING

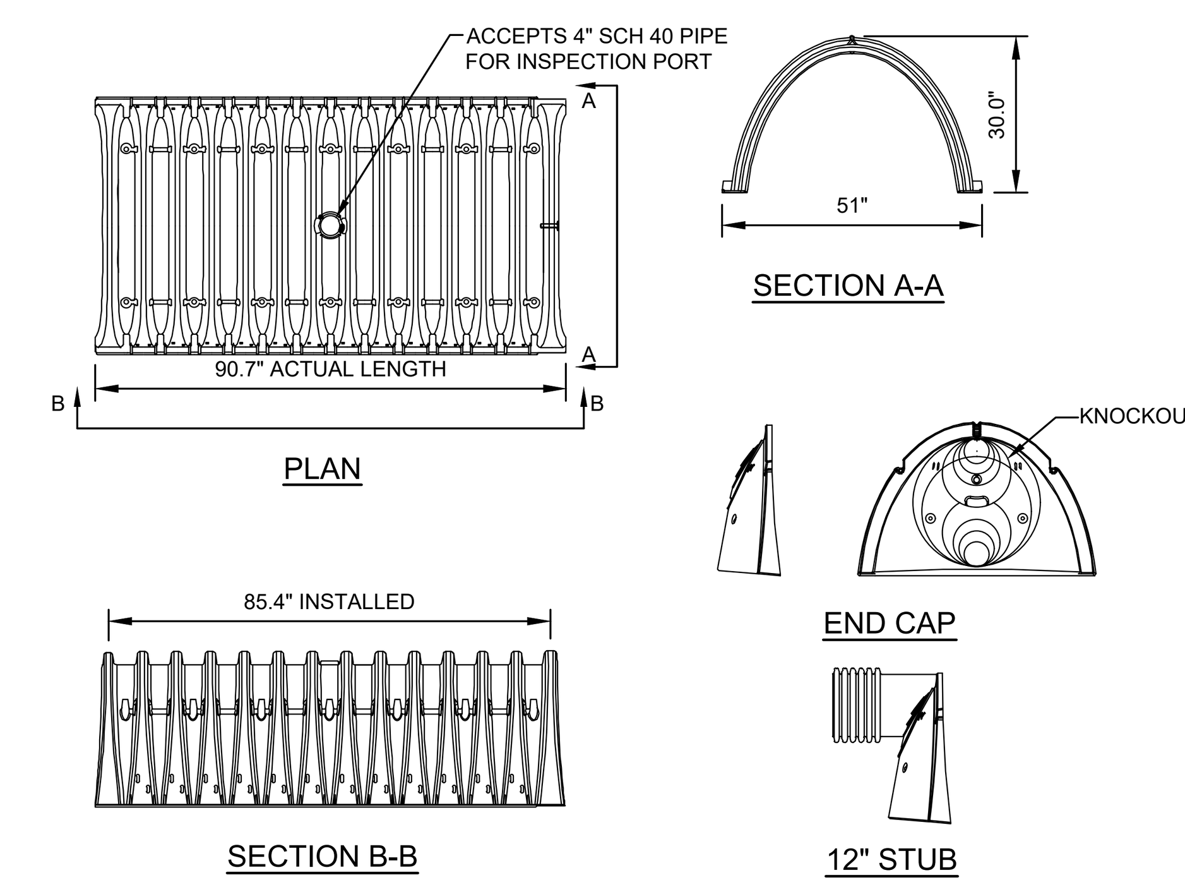


NOTES:

1. ONCE CONTRACTOR HAS SUBGRADE EXPOSED, THE ENGINEER SHALL BE CONTACTED FOR OBSERVATION.
2. CONSTRUCTION OF THE SYSTEM SHALL NOT COMMENCE UNTIL ENGINEER OBSERVES SUBGRADE AND CRUSHED STONE AND GRANTS PERMISSION TO PROCEED.

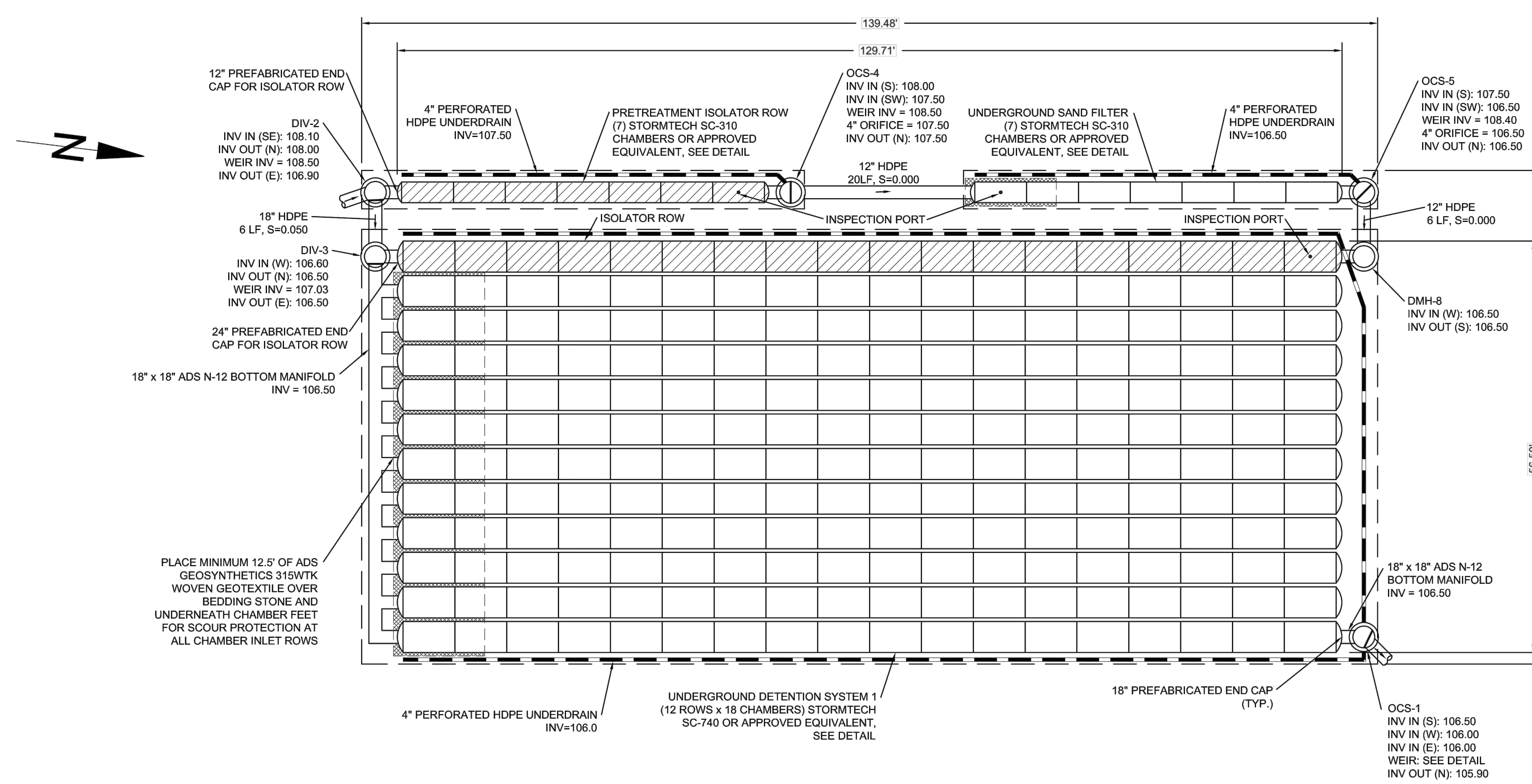
UNDERGROUND DETENTION SYSTEM (UGDS) DETAIL

NOT TO SCALE



DETENTION SYSTEM SINGLE CHAMBER DETAIL

NOT TO SCALE



UNDERGROUND DETENTION SYSTEM PLAN VIEW

NOT TO SCALE

PARE

City of Providence
Conley Stadium Parking Lot Improvements
434 Mount Pleasant Avenue
Providence, Rhode Island

REVISIONS:

PROJECT NO.:	23029.00
DATE:	FEBRUARY 2024
SCALE:	AS NOTED
DESIGNED BY:	CW
CHECKED BY:	JAJ
DRAWN BY:	AWB
APPROVED BY:	JAJ
DRAWING TITLE:	DETAILS 6
DRAWING NO.:	C6.6
SHEET NO.	13 OF 13

SEISMIC RESTRAINT NOTE

A. GENERAL: IT IS THE INTENT OF THIS SEISMIC SPECIFICATION TO KEEP ALL ELECTRIAL BUILDING SYSTEM COMPONENTS IN PLACE DURING A SEISMIC EVENT. ALL ELECTRICAL SYSTEMS MUST BE INSTALLED IN STRICT ACCORDANCE WITH SEISMIC CODES, COMPONENT MANUFACTURER'S AND BUILDING CONSTRUCTION STANDARDS. WHENEVER A CONFLICT OCCURS BETWEEN THE MANUFACTURER'S OR CONSTRUCTION STANDARDS, THE MOST STRINGENT SHALL APPLY.

B. THIS CONTRACTOR SHALL ENGAGE A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE JURISDICTION OF THIS PROJECT TO REVIEW THE ENTIRE INSTALLATION TO DETERMINE ALL SEISMIC RESTRAINT REQUIREMENTS AND METHODS. CONTRACTOR SHALL SUBMIT A REPORT OUTLINING THE STRUCTURAL ENGINEER'S REVIEW AS WELL AS SEISMIC RESTRAINT SHOP DRAWINGS AND SUPPORTING CALCULATIONS PREPARED BY THE PROFESSIONAL STRUCTURAL ENGINEER FOR REVIEW BY THE ARCHITECT.

C. SEISMIC RESTRAINTS SHALL BE DESIGNED IN ACCORDANCE WITH SEISMIC FORCE LEVELS AS DETAILED IN THE APPLICABLE BUILDING CODE.

1. ALL EQUIPMENT, CONDUIT AND PULL BOXES SHALL BE ADEQUATELY RESTRAINED TO RESIST SEISMIC FORCES. RESTRAINT DEVICES SHALL BE DESIGNED AND SELECTED TO MEET SEISMIC REQUIREMENTS AS DEFINED IN THE LATEST ISSUE OF THE BOCA NATIONAL BUILDING CODE IN ACCORDANCE WITH THE APPLICABLE SEISMIC ZONE.

2. ANCHOR BOLT CALCULATORS, SIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER, SHALL BE SUBMITTED SHOWING ADEQUACY OF THE BOLT SIZING AND TYPE. STAMPED CALCULATIONS SHALL ALSO BE FURNISHED FOR ANCHORS ON RESTRAINT DEVICES, CABLES, ISOLATORS AND RIGIDLY MOUNTED EQUIPMENT.

TYPICAL FIRE STOPPING NOTES

A. GENERAL: FIRE STOPPING SHALL BE PROVIDED BY THIS CONTRACTOR FOR ALL FLOOR, CEILING AND FIRE RATED WALL PENETRATIONS FOR CONDUIT, SLEEVES AND/OR CABLING AS REQUIRED BY JOB CONDITIONS.

B. THE CONTRACTOR SHALL PROVIDE A FIRE STOP SYSTEM IN ACCORDANCE WITH THE FOLLOWING:

1. THE SYSTEM SHALL CONSIST OF A WATERBASED SEALANT AND SUITABLE DAMMING MATERIALS (WHERE REQUIRED) AND BE INSTALLED PER MANUFACTURER'S REQUIREMENTS.
2. THE SEALANT SUPPLIED SHALL BE A TWO STAGED INTUMESCENT AND CAPABLE OF EXPANDING UP TO 8 TIMES ITS ORIGINAL VOLUME.
3. THE SEALANT SUPPLIED SHALL CONTAIN NO ASBESTOS, NO FIBERGLASS, AND NO SOLVENTS NOT CORROSIVE MINERAL SALTS OF ANY KIND.
4. THE SEALANT SHALL FORM A SURFACE CAPABLE OF BEING SANDED AND PAINTED TO MATCH SURROUNDING SURFACES AND SHALL BE IMPERVIOUS TO WATER WHEN DRY.
5. THE FIRE STOP SYSTEM SHALL BE TESTED TO THE TIME/TEMPERATURE REQUIREMENTS OF ASTM E119 AND SHALL BE UL1479 (ASTM E814) AND CLASSIFIED FOR UP TO 3 HOURS.
6. THE FIRE STOP SEALANT SHALL BE SPECSEAL SEALANT AS MANUFACTURED BY SPECIFIED TECHNOLOGIES, INC. OR APPROVED EQUAL.
7. SPECIAL CARE SHALL BE TAKEN WITH ELECTRICAL SYSTEMS NOT TO COMPROMISE ANY OF THE BUILDING FIRE PARTITIONS, FLOORS, WALLS OR MEMBRANES. PROVIDE ALL FIRESTOPPING REQUIRED TO COMPLY WITH THE BUILDING CODE, THE ELECTRICAL CODE AND THE UL LISTING OF EACH ASSEMBLY. COORDINATE LOCATIONS AND TYPES OF MEMBRANES WITH ARCHITECT.

TYPICAL ELECTRICAL NOTES

1. FURNISH LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY FOR THE PROPER AND COMPLETE INSTALLATION OF ALL ELECTRIC WORK SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED.
2. ALL ITEMS NOT SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE ELECTRICAL INSTALLATION, SHALL BE FURNISHED AND INSTALLED AS PART OF THIS PROJECT.
3. ALL ELECTRICAL INSTALLATIONS AND GROUNDING SHALL BE IN STRICT ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE LOCAL, STATE AND NATIONAL CODES.
4. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS.
5. MATERIALS AND WORKMANSHIP SHALL BE THE BEST OF THEIR RESPECTIVE KIND AND IN FULL ACCORDANCE WITH THE MOST MODERN ELECTRICAL CONSTRUCTION STANDARDS. ALL MATERIAL SHALL BE NEW, UNLESS OTHERWISE NOTED AND FREE OF ANY DEFECTS.
6. THE ELECTRICAL CONTRACTOR SHALL CLEAN AT THE END OF EACH DAY ALL AREAS WORKED IN. EMPTY BOXES, RUBBISH, AND OTHER CONSTRUCTION MATERIALS OF NO USE SHALL BE REMOVED FROM THE BUILDING.
7. ALL WORK SEQUENCES SHALL BE COORDINATED WITH THE G.C. AND SHALL BE COORDINATION WITH OTHER BUILDING TRADES AND G.C. BUILDING SCHEDULES.
8. ALL BRANCH CIRCUITS RATED AT 120 VOLTS, 20 AMPERES EXCEEDING 75 FEET SHALL BE MINIMUM #10 AWG.
9. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL UTILITY POWER COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE UTILITY POWER COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ORDERING ANY ELECTRICAL EQUIPMENT, SUCH AS, SWITCHGEAR, PANELS, TRANSFORMERS, DISCONNECT SWITCHES, ETC... E.C. SHALL CONFIRM METERING SEQUENCE (HOT OR COLD) AND MAKE THE APPROPRIATE PROVISIONS FOR THE APPROVED METERING SEQUENCE ARRANGEMENT. A.I.C. RATINGS, GROUNDING, BONDING, RACEWAYS, ETC... SHALL BE IN ACCORDANCE WITH THE UTILITY COMPANY'S STANDARDS.
10. THE ELECTRICAL CONTRACTOR (E.C.) SHALL COORDINATE WITH THE LOCAL TELEPHONE COMPANY AND PROVIDE ALL MATERIAL & LABOR REQUIRED TO COMPLY WITH THE TELEPHONE COMPANY'S REQUIREMENTS AND STANDARDS, PRIOR TO ODERING ANY ELECTRICAL EQUIPMENT, SUCH AS, TERMINAL BOARDS, GROUNDING, RACEWAYS, ETC...
11. ALL RECEPTACLE WITH "WP" DESIGNATION SHALL BE PROVIDED WITH A WEATHER-PROOF WHILE IN-USE ENCLOSURE. (TYPICAL)
12. ELECTRICAL CONTRACTOR TO ALLOW TIME FOR DIRECTIONAL ADJUSTMENT OF ALL LIGHT FIXTURES AS DIRECTED BY OWNER.
13. ALL RECEPTACLES SHALL BE LABELED INDICATING THEIR RESPECTIVE PANEL & CIRCUIT NUMBER.
14. AT EXISTING FLOOR SLABS AND WALLS TO BE CORE-DRILLED OR CUT, THE CONTRACTOR SHALL FIND AND MARK ALL EXISTING REINFORCING, PIPING, CONDUIT & FEEDERS, ETC IN BOTH FACES LOCATED BY MEANS OF X-RAY, PACH-OMETER, OR PROFOMETER. SUBMIT DRAWING SHOWING LOCATIONS OF EXISTING REBAR, PIPING AND/OR CONDUIT AND PROPOSED CORES AND/OR CUTS FOR REVIEW.
15. ALL PENETRATIONS FOR POWER RECEPTACLES, JUNCTION BOXES, TELEPHONE/DATA OUTLETS, SWITCHES, BACKBOXES, ETC., LOCATED IN EXTERIOR WALLS SHALL BE PROVIDED WITH APPROPRIATE CAULKING AND GASKETS TO SEAL OFF AND PREVENT AIR LEAKAGE. FOLLOW CAULKING AND GASKET MANUFACTURERS INSTALLATION GUIDELINES TO ENSURE CORRECT AND EFFECTIVE INSTALLATION.

(EQUIPMENT) SIZING CIRCUIT

AMP / POLE PANEL / SERVICE	POLES	TYPE (XHHW) COPPER CONDUCTORS
15A, 20A	1 (or) 2	2#12 + 1#12 GND. IN 3/4" CONDUIT
15A, 20A	3	3#12 + 1#12 GND. IN 3/4" CONDUIT
25A, 30A	1 (or) 2	2#10 + 1#10 GND. IN 3/4" CONDUIT
25A, 30A	3	3#10 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	1 (or) 2	2#8 + 1#10 GND. IN 3/4" CONDUIT
35A, 40A	3	3#8 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	1 (or) 2	2#6 + 1#10 GND. IN 3/4" CONDUIT
45A, 50A, 55A	3	3#6 + 1#10 GND. IN 3/4" CONDUIT
60A	2	2#4 + 1#10 GND. IN 1" CONDUIT
60A	3	3#4 + 1#10 GND. IN 1" CONDUIT
70A	3	3#4 + 1#8 GND. IN 1" CONDUIT
80A	3	3#3 + 1#8 GND. IN 1-1/4" CONDUIT
90A	3	3#2 + 1#8 GND. IN 1-1/4" CONDUIT
100A, 110A	3	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
125A, 150A	3	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
175A	3	3#2/0 + 1#6 GND. IN 2" CONDUIT
200A	3	3#3/0 + 1#4 GND. IN 2" CONDUIT

(PANEL / SWITCHBOARD / SERVICE) FEEDER SIZING

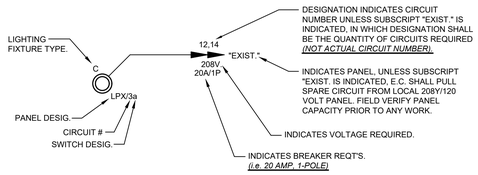
AMPERES	POLES	TYPE (XHHW) COPPER CONDUCTORS
30A	3	4#10 + 1#8 GND. IN 3/4" CONDUIT
60A	2	3#4 + 1#8 GND. IN 1" CONDUIT
60A	3	4#4 + 1#8 GND. IN 1-1/4" CONDUIT
100A	2	3#1 + 1#6 GND. IN 1-1/4" CONDUIT
100A	3	4#1 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	2	3#1/0 + 1#6 GND. IN 1-1/2" CONDUIT
125A, 150A	3	4#1/0 + 1#6 GND. IN 2" CONDUIT
200A	2	3#3/0 + 1#4 GND. IN 2" CONDUIT
200A	3	4#3/0 + 1#4 GND. IN 2" CONDUIT
225A	3	4#4/0 + 1#2 GND. IN 2-1/2" CONDUIT
300A	3	4#350kcmil + 1#2 GND. IN 3" CONDUIT
400A	3	4#600kcmil + 1#1/0 GND. IN 3-1/2" CONDUIT
600A	3	2 SETS OF: (4#350kcmil + 1#2 GND.) IN TWO (2) 3" CONDUITS
800A	3	2 SETS OF: (4#600kcmil + 1#1/0 GND.) IN TWO (2) 3-1/2" CONDUITS
1000A	3	3 SETS OF: (4#400kcmil + 1#1/0 GND.) IN THREE (3) 3" CONDUITS
1200A	3	3 SETS OF: (4#600kcmil + 1#1/0 GND.) IN THREE (3) 3-1/2" CONDUITS
1600A	3	4 SETS OF: (4#600kcmil + 1#1/0 GND.) IN FOUR (4) 3-1/2" CONDUITS
2000A	3	5 SETS OF: (4#600kcmil + 1#1/0 GND.) IN FIVE (5) 3-1/2" CONDUITS
2500A	3	6 SETS OF: (4#600kcmil + 1#1/0 GND.) IN SIX (6) 3-1/2" CONDUITS
3000A	3	7 SETS OF: (4#700kcmil + 1#1/0 GND.) IN SEVEN (7) 4" CONDUITS

NOTES FOR ALUMINUM EQUIPMENT

1. THESE DRAWINGS ARE BASED ON THE USE OF COPPER IN CONDUCTORS, TRANSFORMER WINDINGS, SWITCHBOARDS, DISTRIBUTION PANELBOARDS, BRANCH CIRCUIT PANELBOARDS, LOAD CENTERS, DISCONNECT SWITCHES & CIRCUIT BREAKERS.
2. ALTHOUGH PERMITTED BY CODE, THIS OFFICE DOES NOT RECOMMEND THE USE OF ALUMINUM ELECTRICAL EQUIPMENT.
3. USE OF ALUMINUM CONDUCTORS, TRANSFORMERS WITH ALUMINUM WINDINGS AND SWITCHBOARDS, DISTRIBUTION PANELBOARDS, BRANCH CIRCUIT PANELBOARDS, LOAD CENTERS, DISCONNECT SWITCHES & CIRCUIT BREAKERS WITH ALUMINUM BUSS IS AT THE DISCRETION & DECISION OF THE OWNER.
4. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO DETERMINE ALL CONDUCTOR AND CONDUIT SIZES, PER NEC, SHOULD ALUMINUM BE USED.
5. IF ALUMINUM EQUIPMENT IS USED IN ANY OF THE ELECTRICAL COMPONENTS OF ITEM "3" ABOVE, THE FOLLOWING PROCEDURE SHALL BE FOLLOWED:
   A. INSTALLATION SHALL BE IN ACCORDANCE WITH IEEE STD. 241-1990, PARAGRAPH 8.7.2
   B. WHEN CUTTING CABLE, AVOID NICKING THE STRANDS.
   C. UNPLATED CONTACT SURFACES SHALL BE CLEANED WITH WIREBRUSH, STEEL WOOL, EMERY CLOTH OR SIMILAR ABRASIVE TOOL OR MATERIAL.
   D. PLATED SURFACES SHALL BE CLEANED WITH AN APPROVED SOLVENT.
   E. APPLY JOINT COMPOUND TO THE CONDUCTOR IF THE CONNECTOR DOES NOT ALREADY HAVE IT.
   F. USE ONLY CONNECTORS SPECIFICALLY TESTED AND APPROVED FOR USE ON ALUMINUM CONDUCTORS.
   G. REFER TO ANSI/UL486B-1982.
   H. ON MECHANICAL CONNECTORS, TIGHTEN THE CONNECTOR WITH A SCREWDRIVER OR WRENCH TO THE REQUIRED TORQUE. REMOVE EXCESS COMPOUND.
   I. ON COMPRESSION CONNECTORS, CRIMP THE CONNECTOR USING THE PROPER TOOL AND DIE. REMOVE EXCESS COMPOUND.
   J. ALWAYS USE JOINT COMPOUND THAT IS COMPATIBLE WITH THE INSULATION AND AS RECOMMENDED BY THE MANUFACTURER.
   K. WHEN MAKING AN ALUMINUM-TO-COPPER CONNECTION THAT IS EXPOSED TO MOISTURE, PLACE THE ALUMINUM CONDUCTOR ABOVE THE COPPER. IF THERE IS NO EXPOSURE TO MOISTURE, THE RELATIVE POSITION OF THE TWO METALS IS NOT IMPORTANT.
   L. WHEN USING INSULATED CONDUCTORS OUTDOORS, EXTEND THE CONDUCTOR INSULATION OR COVERING AS CLOSE TO THE CONNECTOR AS POSSIBLE TO MINIMIZE WEATHERING THE JOINT. OUTDOOR JOINTS SHALL BE COMPLETELY PROTECTED BY TAPE OR OTHER MEANS. WHEN OUTDOOR JOINTS ARE COVERED OR PROTECTED, THE PROTECTION SHALL COMPLETELY EXCLUDE MOISTURE.
6. WHEN ALUMINUM FEEDERS ARE INCLUDED AS VE ITEMS, IT IS RECOMMEND THAT ALUMINUM BE USED ONLY FOR DISTRIBUTION FEEDERS LARGER THAN 100 A PROVIDED THAT COMPRESSION ALCU PIN TERMINATIONS ARE UTILIZED. VOLTAGE DROP CALCULATIONS SHALL BE REVISED UTILIZING ALUMINUM CONDUCTORS. IT IS NOT RECOMMEND THAT ALUMINUM FEEDERS BE UTILIZED FOR ROTATING (MOTORS) OR VIBRATING TRANSFORMERS OR EQUIPMENT.

ABBREVIATIONS

A	AMPERES
ADA	AMERICANS WITH DISABILITIES ACT
AMPS	AMPERES
AFF	ABOVE FINISHED FLOOR
A/C	AIR CONDITIONING
AWG	AMERICAN WIRE GAGE
C	CONDUIT
C/B	CIRCUIT BREAKER
CF	COMPACT FLUORESCENT
CLG	CEILING
℄	CENTERLINE
DN	DOWN
DWG	DRAWING
E.C.	ELECTRICAL CONTRACTOR
EQ	EQUAL
ETR	EXISTING TO REMAIN
ER	EXISTING TO BE REMOVED
ERL	EXISTING TO BE RE-LOCATED
F.A.	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLR	FLOOR
G.C.	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERUPTER.
G	GROUND
GND	GROUND
HVAC	HEATING, VENTILATING, & & AIR CONDITIONING
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LTG	LIGHTING
MAX	MAXIMUM
M.C.	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MIN	MINIMUM
MTD	MOUNTED
NAC	F.A. NOTIFICATION APPLIANCE CIRCUIT EXPANDER PANEL
NEC	NATIONAL ELECTRICAL CODE
NTS	NOT TO SCALE
P	POLE
P.C.	PLUMBING CONTRACTOR
PNL	PANEL
RE	RE-LOCATED DEVICE OR EQUIPMENT SHOWN IN NEW LOCATION
TYP	TYPICAL
UL	UNDERWRITERS LABATORY
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
W	WATTS
WP	WEATHER-PROOF



NOTES:

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN CONTRACT. INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT ON PLANS, AND VICE VERSA, SHALL APPLY OR SHALL BE PROVIDED AS THOUGH EXPRESSLY REQUIRED ON BOTH. IT IS NOT INTENDED THAT EVERY JUNCTION BOX, OFFSET, FITTING OR COMPONENT BE SPECIFIED OR SHOWN ON DRAWINGS; HOWEVER, CONTRACT DOCUMENTS REQUIRE PROVISION OF ALL COMPONENTS AND MATERIALS NECESSARY FOR COMPLETE AND OPERATIONAL ELECTRICAL INSTALLATION, WHETHER OR NOT INDICATED OR SPECIFIED.
2. BRANCH CIRCUIT WIRING MAY NOT BE GRAPHICALLY SHOWN ON DRAWINGS AND MAY BE SHOWN BY CIRCUIT NUMBERS BESIDE FIXTURES, DEVICES AND EQUIPMENT. PROVIDE COMPLETE WIRING SYSTEM WHETHER OR NOT SHOWN GRAPHICALLY. WIRING IS SHOWN BY CONDUIT RUNS ON DRAWINGS WHERE SPECIFIC ROUTING IS REQUIRED OR FOR OTHER SPECIAL REASONS. ONLY ROOMS WITH MULTIPLE SWITCHING HAVE "SWITCH CONTROL LETTERS" ASSIGNED. PROVIDE THHN CONDUCTORS IN AREAS WITH HIGH AMBIENT TEMPERATURES SUCH AS BOILER ROOMS, INCINERATOR ROOMS, MECHANICAL EQUIPMENT ROOMS ETC., FOR SIZES LARGER THAN NO. 10 AWG.

TYPICAL CIRCUITING DETAIL
NOT TO SCALE

CERTIFICATION :

RAYMOND W. DUSSEAULT III
No. 7139
REGISTERED PROFESSIONAL ENGINEER (ELECTRICAL)

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REFER TO ALL DRAWINGS FOR COMPLETE SCOPE OF WORK.

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REV. NO.	DATE	DESCRIPTION

PROJECT NAME:

Conley Stadium Athletic Facilities Improvements

434 Mount Pleasant Ave Providence, RI

ENGINEERING design SERVICES INCORPORATED
141 Industrial Highway Slatersville, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL LEGENDS & NOTES

JOB NO.: 21380ES
DRAWN BY: TMW
CHECKED BY: RWD
DATE ISSUED: 12.29.2023
SCALE: AS NOTED

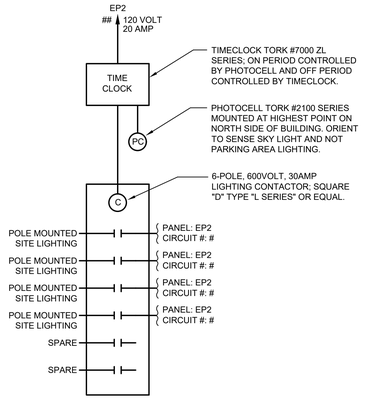
ISSUED FOR CONSTRUCTION

SHEET NO.:

E100

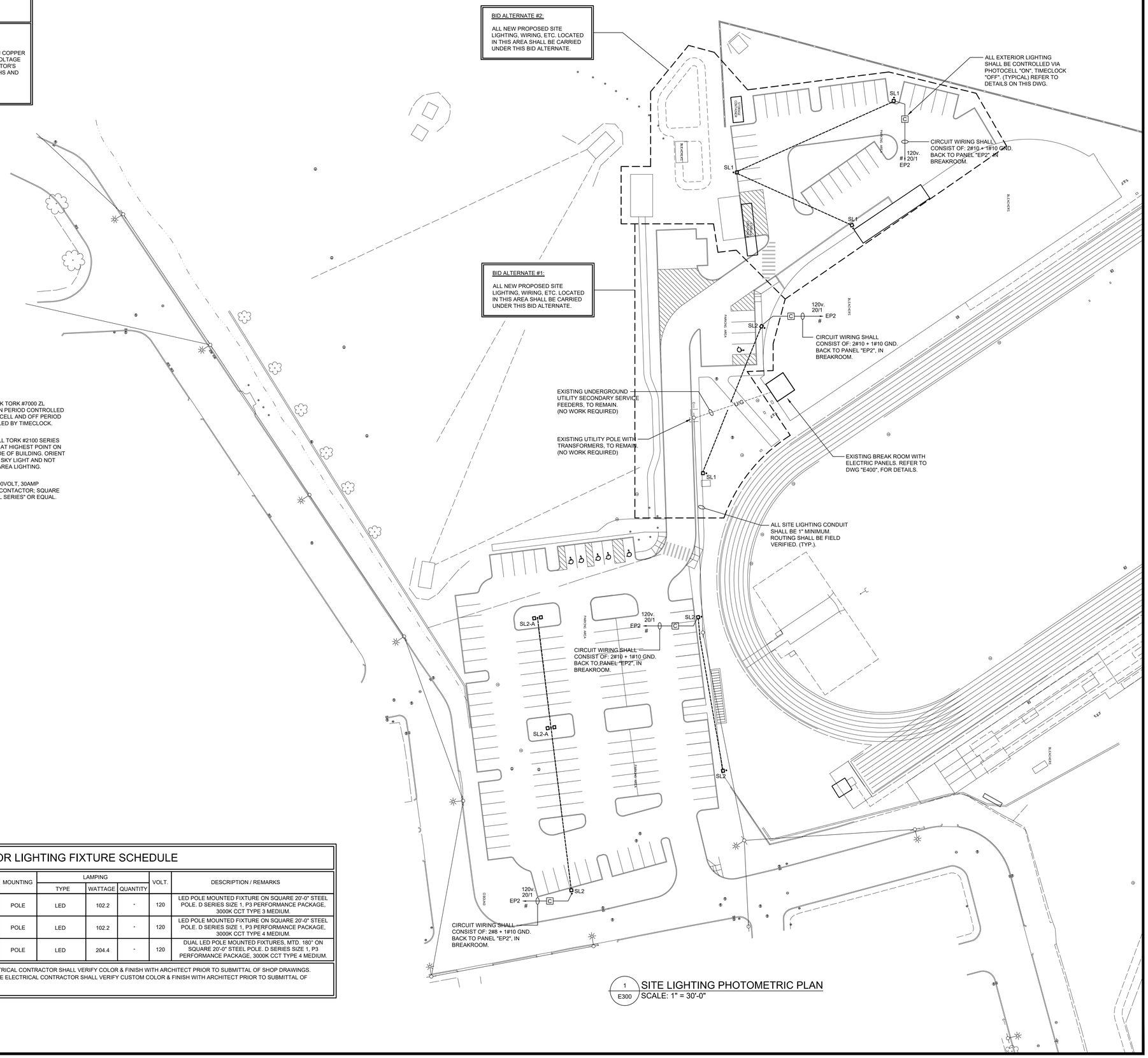
SITE LTG. CKT. / WIRE SCHEDULE

CIRCUIT LENGTH	CIRCUIT. WIRE SIZE	DESCRIPTION
UP TO 600'	#8	WIRE GAUGE RATINGS ARE BASED ON COPPER CONDUCTOR WITH LESS THAN 3% VOLTAGE DROP. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO VERIFY LENGTHS AND ROUTING OF EACH CIRCUIT.
600' TO 1000'	#6	
1000' TO 1300'	#4	



EXTERIOR LIGHTING CONTROL DIAGRAM #1

NOT TO SCALE



1 / E300 SITE LIGHTING PHOTOMETRIC PLAN

SCALE: 1" = 30'-0"

EXTERIOR LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG No.	MOUNTING	LAMPING			VOLT.	DESCRIPTION / REMARKS
				TYPE	WATTAGE	QUANTITY		
SL1	LITHONIA LIGHTING	DSX1 LED P3 30K 80CRI T3M (VOLTAGE) MOUNTING CONTROL (XX) FINISH	POLE	LED	102.2	-	120	LED POLE MOUNTED FIXTURE ON SQUARE 20'-0" STEEL POLE. D SERIES SIZE 1, P3 PERFORMANCE PACKAGE, 3000K CCT TYPE 3 MEDIUM.
SL2	LITHONIA LIGHTING	DSX1 LED P3 30K 80CRI T4M (VOLTAGE) MOUNTING CONTROL (XX) FINISH	POLE	LED	102.2	-	120	LED POLE MOUNTED FIXTURE ON SQUARE 20'-0" STEEL POLE. D SERIES SIZE 1, P3 PERFORMANCE PACKAGE, 3000K CCT TYPE 4 MEDIUM.
SL2-A	LITHONIA LIGHTING	DSX1 LED P3 30K 80CRI T4M (VOLTAGE) MOUNTING CONTROL (XX) FINISH	POLE	LED	204.4	-	120	DUAL LED POLE MOUNTED FIXTURES, MTD. 180° ON SQUARE 20'-0" STEEL POLE. D SERIES SIZE 1, P3 PERFORMANCE PACKAGE, 3000K CCT TYPE 4 MEDIUM.

CBA = COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
CC = CUSTOM COLOR TO BE SELECTED BY ARCHITECT (THE ELECTRICAL CONTRACTOR SHALL VERIFY CUSTOM COLOR & FINISH WITH ARCHITECT PRIOR TO SUBMITTAL OF SHOP DRAWINGS.

CERTIFICATION :

RAYMOND W. DUSSEAULT III
STATE OF RHODE ISLAND
No. 7139
REGISTERED PROFESSIONAL ENGINEER (ELECTRICAL)

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141 Industrial Highway, Slatersville, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL SITE LIGHTING PLAN

JOB NO.:	21380ES
DRAWN BY:	TMW
CHECKED BY:	RWD
DATE ISSUED:	12.29.2023
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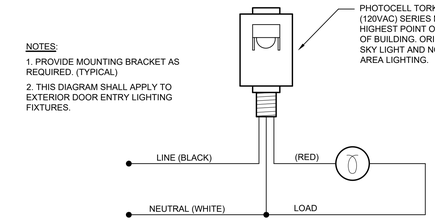
SHEET NO.:

E200

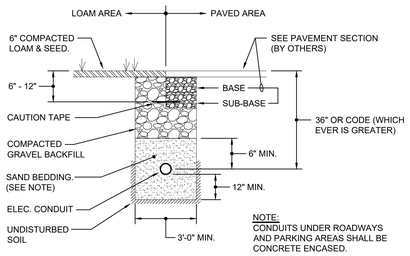


NOTES:

1. PROVIDE MOUNTING BRACKET AS REQUIRED. (TYPICAL)
2. THIS DIAGRAM SHALL APPLY TO EXTERIOR DOOR ENTRY LIGHTING FIXTURES.

SITE LIGHTING CONTROL DIAGRAM
PHOTOCELL ONLY

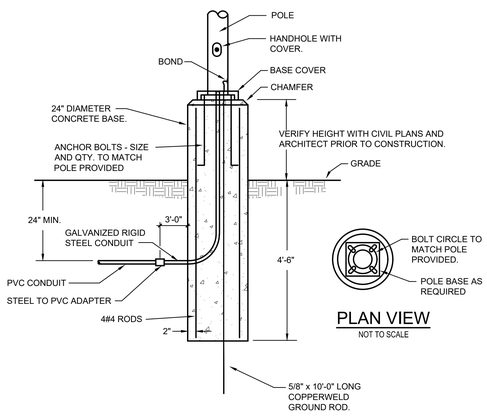
NOT TO SCALE



NOTE:
CONDUITS UNDER ROADWAYS AND PARKING AREAS SHALL BE CONCRETE ENCASED.

SITE LIGHTING / POWER / SECURITY
CONDUIT TRENCH DETAIL

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

TYPICAL POLE BASE DETAIL

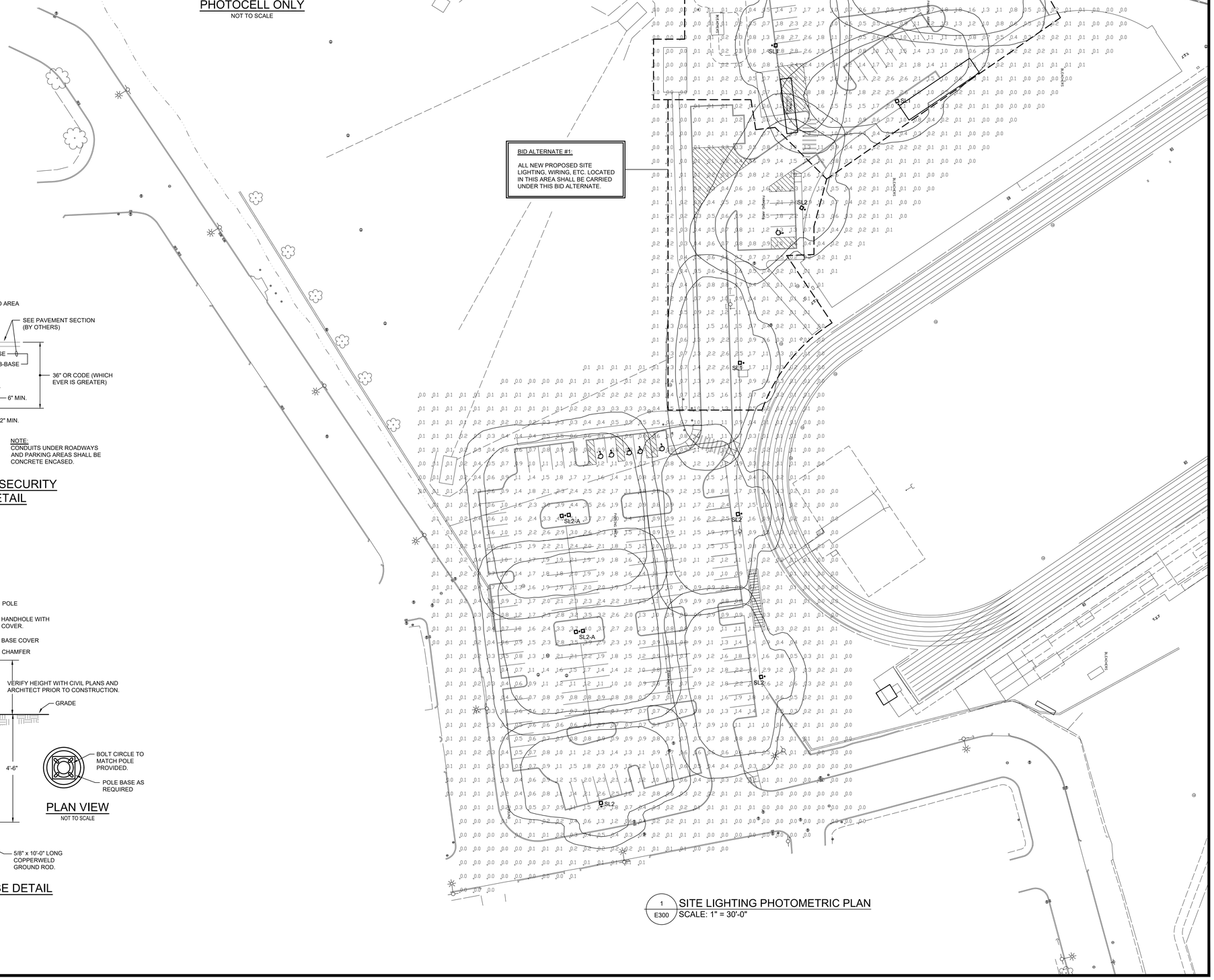
NOT TO SCALE

BID ALTERNATE #2:

ALL NEW PROPOSED SITE LIGHTING, WIRING, ETC. LOCATED IN THIS AREA SHALL BE CARRIED UNDER THIS BID ALTERNATE.

BID ALTERNATE #1:

ALL NEW PROPOSED SITE LIGHTING, WIRING, ETC. LOCATED IN THIS AREA SHALL BE CARRIED UNDER THIS BID ALTERNATE.



1 E300 SITE LIGHTING PHOTOMETRIC PLAN
SCALE: 1" = 30'-0"

CERTIFICATION :

RAYMOND W. DUSSEAULT III
No. 7139
REGISTERED PROFESSIONAL ENGINEER (ELECTRICAL)

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434 Mount Pleasant Ave Providence, RI

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141 Industrial Highway Slatersville, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL
SITE LIGHTING
PHOTOMETRIC PLAN

JOB NO.:	21380ES
DRAWN BY:	TMW
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DATE ISSUED:	12.29.2023
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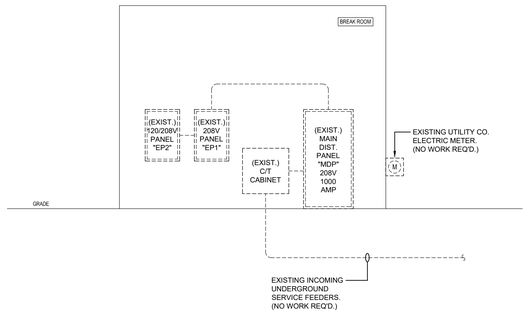
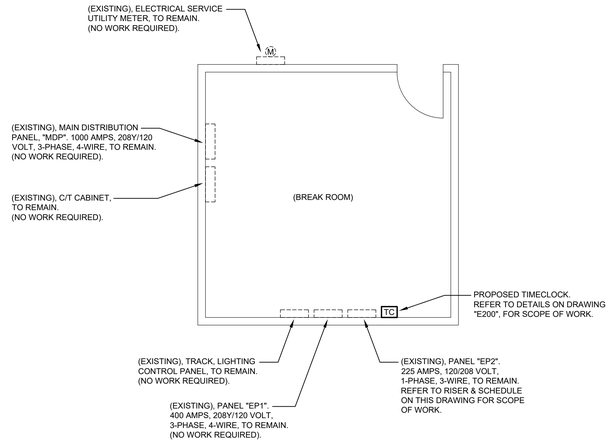
ISSUED FOR CONSTRUCTION

SHEET NO.:

E300





1 / E400 BREAK ROOM FLOOR PLAN
SCALE: 1/4" = 1'-0"

BRANCH CIRCUIT PANELBOARD SCHEDULE

DESIGNATION	BUS AMPS	MAIN	LOCATION	VOLTAGE	PH	BREAKERS						TOTAL POLES	MOUNTING	REMARKS
						USED			SPARE					
						1-POLE	2-POLE	3-POLE	1-POLE	2-POLE	3-POLE			
MDP	1000	1000	(SEE PLANS)	208Y/120	3	-	-	-	-	-	-	??	SURFACE	(EXISTING), PANEL BOARD TO REMAIN. (NO WORK REQUIRED)
EP1	400	MLO	(SEE PLANS)	208Y/120	3	-	-	-	-	-	-	42	SURFACE	(EXISTING), PANEL BOARD TO REMAIN. (NO WORK REQUIRED)
EP2	225	MLO	(SEE PLANS)	120/208	1	(5) 20A	-	-	-	-	-	42	SURFACE	(EXISTING), PANEL BOARD TO REMAIN. PROVIDE NEW BREAKERS AS INDICATED, TO MATCH EXISTING BREAKERS ELECTRICAL CHARACTERISTICS. (TYP.)

NOTES:

1. ALL PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED NAMEPLATE ON THE DOOR INDICATING THE PANELBOARD DESIGNATION, VOLTAGE, RATING OF MCB OR MAIN LUGS AND SOURCE OF SUPPLY. ENGRAVED PLATE SHALL BE AS CALLED FOR IN THE SPECIFICATIONS.
2. ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED (HAND WRITTEN IS NOT ALLOWED) CIRCUIT DIRECTORY INDICATING THE LOAD FED BY EACH CIRCUIT BREAKER AND ITS LOCATION IN THE BUILDING.
3. ALL PANELBOARDS SHALL BE PROVIDED WITH FULL SIZE EQUIPMENT GROUND AND NEUTRAL BUSSES ON EACH SIDE OF THE ENCLOSURE SO AS TO PROVIDE A SEPARATE EQUIPMENT GROUND AND NEUTRAL TERMINAL FOR EACH BRANCH CIRCUIT.
4. SPACES SHALL BE PROVIDED WITH ALL REQUIRED BUSSING, SUPPORTS, CONNECTORS, ETC.. NECESSARY FOR FUTURE INSTALLATION OF CIRCUIT BREAKERS.
5. FLUSH MOUNTED PANELBOARDS SHALL BE PROVIDED WITH FIVE (5) EMPTY 1" EMT CONDUITS INSTALLED UP TO ABOVE ACCESSIBLE CEILING FOR FUTURE USE.
6. ALL PANELBOARDS SHALL HAVE HINGED "DOOR-IN-DOOR" TYPE COVERS.
7. REFER TO THE SPECIFICATIONS FOR ALL OTHER PANELBOARD REQUIREMENTS.
8. ALUMINUM BUSSING *"SHALL NOT"* BE AN ACCEPTABLE SUBSTITUE FOR COPPER BUSSING.
9. SERIES RATED EQUIPMENT *"SHALL NOT"* BE APPROVED.
10. CONFIRM BREAKER COUNTS WITH FLOOR PLANS.

CERTIFICATION :

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REFER TO ALL DRAWINGS FOR COMPLETE SCOPE OF WORK.

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141 Industrial Highway, Slatersville, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL
BREAK ROOM FLOOR PLAN, RISER AND SCHEDULE.

JOB NO.: 21380ES
DRAWN BY: TMW
CHECKED BY: RWD
DATE ISSUED: 12.29.2023
SCALE: AS NOTED

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SHEET NO.:

E400

SECTION 260000 - ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this section.

B. This Contractor shall also include allowances for startup and for making the systems fully operational, and for scope and design contingencies. Future changes in price for items not shown on these drawings will not be allowed if the system itself is shown on these Drawings.

C. Give notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

D. The drawings show the layout of the electrical systems and indicate the approximate locations of outlets, apparatus, and equipment. The runs of feeders and branches as shown on the drawings are schematic only. The exact routing of branch circuits and feeders shall be determined by the structural conditions and possible obstructions. This shall not be construed to mean that the design of the systems may be changed but refers only to exact runs between given points. The Engineer reserves the right to revise the drawings from time to time to indicate changes in the work.

E. The Contractor shall consult and review all contract and reference drawings which may affect the location of any outlets, apparatus and equipment to avoid any possible interference and permit full location of outlets, apparatus and equipment up to the time of rough-in is reserved by the Engineer and such change shall be made without additional expense to the Owner.

F. It shall be the responsibility of this Contractor to see that all electrical equipment such as junction and pull boxes, panelboards switches, controls and such other apparatus as may require maintenance and operation from time to time is made accessible. Although the equipment may be shown on the drawings in certain locations, the construction may disclose the fact that such locations do make its position accessible. In such cases this Contractor shall call the attention of the Engineer to the condition before advancing the construction to a state where a change will reflect additional expense to the Owner.

1.2 SUMMARY

A. This Section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in sections of Division 1.

B. These documents have been prepared with the intention that they call for finished, tested work, in full operating condition and complete with necessary accessories.

C. The contract drawings are generally diagrammatic and convey the scope of work and general arrangement of apparatus and equipment. The locations of all items shown on the drawings or called for in the specifications that are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the best conditions and results must be determined at the project and shall have the approval of the Architect/Engineer before being installed. The Contractor shall follow the drawings in laying out work and shall check drawings of the other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

D. These contract documents are complementary. What is called for by one shall be as binding as if called for by all. Materials or work described in words, which have well-known technical, or trade meaning shall be held to refer to such recognized standards. Incidental devices and accessories needed for complete, operational systems shall be provided even though they may not be indicated or identified in the documents.

E. If apparatus have been omitted, notify the Architects/Engineers of such belief. It is understood that bidder has included all required items and work in his bid, and will not if bid is successful, claim extra compensation for furnishing a complete and satisfactory system. If a particular item is called for or specified more than once in these contract documents, the higher grade shall be considered specified.

F. Should it appear that the character of the work is not sufficiently explained in these specifications or on the drawings, apply to the A/E for further information. Conform to the A/E's decision and directions as shall become part of these contract documents. The A/E reserves the right to be sole interpreter of the drawings and specifications, and all decisions shall be conclusive, final and binding on the parties.

G. Materials called for in these documents shall be new, unused equipment and of the latest recognized standards.

H. The work to be done under Division 16 is shown on the electrical drawings.

1.3 OUTLINE SCOPE OF WORK

A. The work under this contract, without limiting the generality thereof, includes all materials, labor, equipment, services, and transportation, unless otherwise specified, necessary to complete all systems of electrical wiring and equipment required by the drawings and/or as specified herein. It is the intent of this section and accompanying electrical drawings that these systems be furnished complete in every respect. The Electrical Contractor shall furnish all wiring, equipment and labor needed for a complete operating installation.

B. The Electrical Contractor shall fully indemnify the Owner against any damages, removals and alteration work. This is in addition to the requirements of the General Conditions of the Specifications.

C. The Electrical Contractor shall review architectural, interior design and all other trades plans, elevations and details prior to any work and identify any conflicts between furnishings, furniture, art-work, molding, casework, televisions, signage, awnings, canopies, diffusers, fixtures, etc.. and electrical, fire alarm, audio/visual and communications devices shown on the electrical plans and details. The Electrical Contractor shall prepare 8.5” x 11” sketches showing the conflicts and submit to the Architect for resolution prior to any work. Failure of the electrical contractor to coordinate, identify and obtain a field-directive on any conflict herein noted, that results in installed electrical work to be relocated to the Owner/Architects liking shall be the sole-responsibility of the Electrical Contractor. The Electrical Contractor shall assume and cover all costs associated with conflicts not coordinated, identified and submitted to the Architect, inclusive of material, labor, overtime pay, etc.. and shall not affect the project schedule.

1.4 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

B. Refer to equipment specifications in Divisions 2 through 25 for rough-in requirements.

1.5 SURVEYS AND MEASUREMENTS

A. Base measurements, both horizontal and vertical, on established bench marks. Work shall agree with these established lines and levels. Verify measurements at site and check the corrections of same as related to the work.

B. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the A/E.

1.6 EXAMINATION OF SITE

A. Prior to submitting bid, visit the site where the work is to be performed and the materials are to be delivered. Failure in this respect shall not excuse the Contractor from his obligation to supply and install the work in accordance with the plans and specifications and under all conditions, as they exist.

B. By submitting a bid, this Contractor warrants that all specification sections and drawings showing equipment for plumbing, heating, ventilation, air conditioning, electrical, and architectural, have been examined and is familiar with the conditions and extent of work affecting this contract.

1.7 EQUIPMENT AND MATERIALS

A. All equipment and materials for permanent installation shall be the products of recognized manufacturer's and shall be new, unless noted for re-use, without damaged, functional or aesthetic components.

B. New equipment and materials shall:

1. Be Underwriters Laboratories, Inc. (UL) labeled and/or listed where specifically called for, or where normally subject to such UL labeling and/or listing services
2. Be without blemish or defect.
3. Be in accordance with the latest applicable NEMA standards.
4. Be products, which will meet with the acceptance of the agency inspecting the electrical work. Where such acceptance is contingent upon having the products examined, tested and certified by UL or other recognized testing laboratory, the product shall be so examined, tested and certified.

C. For all equipment, which is to be installed but not purchased as part of the electrical work, the electrical work shall include:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven in to any point on the property line at grade level.
3. Their safe handling and field storage up to the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected.
5. Their field make-up and internal wiring as may be necessary for their proper operation.
6. Their mounting in place, including the purchase and installation of all dunnage, supporting members and fastenings necessary to adapt them to architectural and structural conditions.

D. Equipment, which is to be installed but not purchased as part of the electrical work, shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

1.8 ELECTRICAL INSTALLATIONS

A. All materials and labor called for, specified in Division 16 of the specifications, and or shown on the electrical drawings furnished under this contract shall be provided under Division 16 unless called for otherwise in the Division 16 documents. The word “provide” as used in the Division 16 documents, shall mean to furnish, install, connect up, complete with all accessories ready for operation and warranted.

B. Coordinate electrical equipment and materials installation with other building components. Fully coordinate work with that of other trades. Furnish information in writing that is needed for the coordination of clearances, etc., with the work of others, and such information shall be given in a timely fashion so as not to impede the progress of two or more trades. Confer and resolve the conflict immediately. If so directed by the A/E, prepare composite drawings to resolve any space or clearance conflict.

C. Verify all dimensions by field measurements.

D. Arrange for chases, slots, and openings in other building components to allow for electrical installations.

E. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.

H. Where mounting heights are not detailed or dimensioned, the exact location shall be determined by the A/E, install electrical services and overhead equipment to provide the code and/or utility requirements.

I. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

J. Coordinate the installation of electrical materials and equipment above ceilings with suspension systems, mechanical equipment and systems, and structural components.

K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

L. Attention is directed to areas and items indicated on the drawings by the notations "HOLD", "N.I.C.", "BY OTHERS" and words of similar intent. The work indicated in these areas is shown for information and continuity only. Work or items furnished and installed in these areas solely for the convenience of this Contractor or others, without prior written approval of the Owner, shall be removed at the option of the Owner and at the Contractor's expense.

M. Provide all required staging and scaffolding for all the work under this section.

1.9 ALTERATION WORK

A. Maintain continuity of service in areas where occupancy is to be maintained during alterations. If it becomes necessary to disconnect or interrupt service, obtain written consent of the Owner, and only disconnect service at the convenience of, and with the consent of the Owner. A copy of the written request for a shutdown shall be forwarded to the A/E.

1.10 CUTTING AND PATCHING

A. Cutting and patching of electrical equipment, components, and materials specified under Division 16 (conduit, sleeves, equipment, etc.) shall be performed by Electrical Contractor.

B. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 Section: "Cutting and Patching" for definitions, requirements, and procedures.

C. Cutting and patching of existing structures (thru walls, floors, ceilings, etc.) to accommodate equipment, components, and materials of all Contractors, including Mechanical and Electrical Contractors, shall be performed by General Contractor and/or his designated Subcontractor.

D. Cutting and patching of new structures (thru walls, floors, ceilings, etc.) to accommodate installation of ill-timed work or removal and replacement of defective work or work not conforming to requirements of Contract Documents, shall be performed by General Contractor and/or his designated Subcontractor and costs shall be back charged to appropriate trade Contractor.

E. Do not endanger or damage installed work through procedures and processes of cutting and patching.

F. Arrange for repairs required to restore other work, because of damage caused as a result of electrical installations.

G. Arrange to have ducts, raceways, conduit, panelboards, boxes, and such other pertinent parts, set in place ahead of construction work so that they will be built-in with structures and eliminate need for cutting and patching. Failure to conform to this paragraph will require that this Contractor perform any cutting and patching required for his work at his expense. Cutting shall be neatly finished to match adjoining work in a manner acceptable to the A/E. Cutting and patching shall not affect the fire rating of walls or structural parts. Cutting and patching required to correct work, due to error or negligence of the Contractor, or to defects in his material or workmanship, shall be corrected at no additional cost to the Owner. Patching shall meet or exceed quality of adjacent surfaces. Cutting must be accomplished as not to weaken adjacent structural members and must be approved by the Structural Engineer before proceeding.

H. Perform cutting, fitting, and patching of electrical equipment and material required to:

1. Uncover work to provide for installation of ill-timed work.
2. Remove and replace defective work.
3. Remove and replace work not conforming to requirements of the contract documents.
4. Remove samples of installed work as specified for testing.
5. Install equipment and materials in existing structures.
6. Upon written instructions from the A/E, uncover and restore work to provide for A/E observation of concealed work.

I. Cut, remove and legally dispose of selected electrical equipment, components and materials as indicated, including, but not limited to, removal of electrical items indicated to be removed and items made obsolete by the work.

J. Protect the structure, furnishing, finishes, and adjacent materials not indicated or scheduled to be removed. Protect the electrical work and the work of others in a manner best suited to the particular case. Correct any damage done to any work at no additional cost.

K. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

L. Locate, identify, and protect electrical services passing through areas that are to under-go remodeling or demolition. Electrical services serving other areas required to be maintained, and transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.

1.11 SUBMITTALS

A. Within fifteen (15) business days after the date of notice to proceed and before purchasing any materials or equipment, submit for approval a complete list, in six (6) copies, of all materials to be incorporated in the work.

B. Shop drawings/manufacturer's cuts are required for:

1. Wire & Cable.
2. Lighting Fixtures.
3. Wiring Devices and Plates.

C. After the list has been processed, submit complete shop drawings of all equipment. These shop drawings submittals shall be submitted within thirty days after the processing date of the original submittal.

D. All submittals shall be complete and submitted electronically to all applicable parties. No consideration will be given to partial submittals except with prior approval. No consideration will be given to faxed submittals.

E. Explanation of Shop Drawing Stamp:

1. Approved: indicates that we have not found any reason why this item should not be acceptable within the intent of the documents.
2. Approved with Comments: indicates that we have found questionable components which, if corrected or otherwise explained, make the product acceptable.
3. Resubmit for Final Review: indicates that this item should be resubmitted for approval before further processing.
4. Does Not Conform: indicates that the item will not meet the intent of the Contract.

F. No shop drawing stamp or note shall constitute an order to fabricate or ship. Such notification can only be performed by the Project Manager for construction, the Contractor scheduling his own work, or the Owner.

G. Submittal of shop drawings, product data, will be reviewed only when submitted by the Contractor. Data submitted from Sub-contractors and material suppliers directly to the A/E will not be processed.

H. If shop drawing is not in compliance after two submissions, a third submission for the same manufacturer will not be considered for review.

I. Check shop drawings and other submittals to assure compliance with contract documents before submittal to A/E.

J. Review of shop drawings is final and no further changes shall be considered without written application. Shop drawing review does not apply to quantities, dimensions, nor relieve this Contractor of his responsibility for furnishing materials or performing his work in full compliance with these contract drawings and specifications. Review of these shop drawings shall not be considered a guarantee of the measurements of this building or the conditions encountered.

K. General requirements for the substitution of equipment and submittal of shop drawings as follows. If apparatus, systems or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, wiring, supports, or construction, it shall be provided by this Contractor at no additional cost to the Owner. This Contractor shall assume all cost and entire responsibility thereof. The approval of substituted equipment does not relieve the contractor of his/her responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist. It is the contractor's responsibility to submit only those items that meet the specified apparatus, systems and material. Should any non-conformance code items be installed, they shall be replaced by this Contractor at no additional cost to the Owner. The construction means and methods used in the project shall be reviewed and approved through the local building department or a deputy inspector to insure compliance with the current codes, project specifications and general building practices.

1.12 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. If materials of equipment are substituted for specified items that alter the systems shown or its physical characteristics, or which have different operating characteristics, clearly note the alterations or differences and call it to the attention of the A/E. Under no circumstances shall substitutions be made unless identical material or equipment has been successfully operated for at least three consecutive years.

C. All substitution made by the Contractor shall require the Contractor to fully coordinate the substitution with other trades. The Contractor must make any modifications required by the substitution at no additional cost to the Owner. In addition the Contractor must notify the A/E of any changes required and obtain approval for the changes. The review of the shop drawings by the A/E shall not relieve the Contractor from his responsibility as set forth in this specification.

1.13 NAMEPLATE DATA

A. Provide permanent operational data nameplate on each item of power operated equipment, conduits with pull string, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in a readily accessible location.

1.14 DELIVERY STORAGE AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage. All devices shall be stored in a locked room. Assume responsibility for the devices until the date of final inspection.

C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.15 RECORD DOCUMENTS

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.

B. At completion of work prepare a complete set of Record As-Built Drawings in AutoCAD, Computer Aided Drafting (CAD) software, showing all systems as actually installed, including all fire alarm and electrical circuitry. The Record As-Built Drawings computer files shall be made available to the Architect, Engineer and Owner prior to final payment.

C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Electrical Contractor.

D. This trade shall submit the record set for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.

E. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.16 WARRANTIES

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. All work and equipment furnished under this Section shall be guaranteed free from defects in workmanship or materials for a period of one (1) year, unless specifically noted otherwise for a particular system, from the date of final acceptance of the systems as set forth in this Contract. The Subcontractor shall replace any defective work developing during this period, unless such defects are clearly the result of misuse of equipment by persons not under the control of the Subcontractor, without cost to the Owner. Where such defective work results in damage to work of other Sections, all such work shall be restored to its original condition by mechanics skilled in the affected trade, at the expense of the Subcontractor. The Subcontractor shall submit a separate written guarantee stipulating the aforesaid conditions.

C. Prior to or at the time of Substantial Completion for the work and during administrative close-out of the project, submit one (1) copy of all specified warranties and guarantees to the Architect for review, approval and subsequent transmittal to the Owner.

D. Warranties and guarantees, including those specified in excess of the general one (1) year guarantee, shall be complete for all specific materials, systems, sub-systems, equipment, appliances and products specified and required by the Contract Document.

E. Warranties and guarantees shall clearly define what is to be guaranteed; the extent, terms, conditions, time and effective dates.

F. Copies of the same warranties and guarantees shall be included in the “Operating and Maintenance Manual” as specified herein.

1.17 CLEANING

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. Upon completion of work, the Contractor shall clean, polish and leave bright, fixtures and lamps, and shall remove dust, dirt, debris and loose plaster from panelboards, controls, and switchboards. Unused openings in pull boxes, junction boxes, equipment and raceways shall be capped or closed by an approved means. Replace all inoperative lamps.

1.18 DEFINITION OF TERMS

A. "This Contractor" or "E.C." specifically means, the Electrical Contractor working under this section of the specifications.

B. "Concealed" means hidden, in chases, furred spaces, walls, above ceilings or enclosed in construction.

C. "Exposed" means visible in sight or not installed "concealed" as defined above.

D. "Approved Equal" means any equipment or material which is approved by the Engineer and equal in quality, durability, appearance, strength, design and performance to the equipment or material originally specified.

E. "Conduit" shall mean all conduit including fittings, joints, hangers and supports.

F. "Furnish" shall mean to purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the electrical work.

G. "Install" shall mean to perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the electrical work.

H. "Provide" shall mean to furnish and install.

1.19 QUALITY ASSURANCE

A. Obtain services of manufacturer's representatives of electrical equipment, during erection and construction of their respective equipment to insure proper installation of same.

B. A letter is required from each system manufacturer's representative certifying to the A/E that requirements have been checked and are properly installed and operating.

1.20 PERFORMANCE TESTS - ELECTRICAL

A. Test and adjust the electrical systems and equipment during the progress of the work.

B. Upon completion of work and after preliminary tests to assure that all systems are complete and in proper working order, arrange with the A/E to conduct performance tests of the electrical systems. These tests may be witnessed by the A/E prior to acceptance of systems and shall be arranged for the purpose of demonstrating compliance with contract documents. During this period, visually inspect all electrical equipment. Lighting fixtures shall be tested with specified lamps in place for not less than six (6) hours. Check voltages to assure that all transformer taps are properly set.

C. General operating tests shall be performed under as near design conditions as possible, for a period of not less than one (1) hour for each system, and shall demonstrate that all equipment is functioning in accordance with specifications. Furnish all instruments, ladders, test equipment and personnel required for tests. Any equipment or systems found by test to be deficient or unsatisfactory shall be replaced and tests repeated as often as necessary to assure compliance with contract documents.

D. Test all feeders, sub-feeders and all branch wiring for amperage, voltage, phase balance, phase sequence of A,B,C and insulation resistance, then submit the results of this test to the A/E neatly typed in triplicate for review. This test may be conducted at any time up to, through and including, the guarantee period if requested by the A/E, at no additional cost to the Owner.

E. Phase balance the complete electrical system, phase balance all panels as near as loads will permit under normal working conditions.

F. Test all ground conductors for current flow, as near design operating conditions as possible. If any measured current exceeds one (1) ampere, determine and correct the cause. Also, if measured resistance is greater than 5 ohms indoor or 10 ohms outdoor, determine and correct the cause.

G. During the progress or completion of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction, including those of the Electric Company, Fire Department and the Telephone Company.

H. The Contractor shall be responsible for correct voltages, tap settings, trip settings and correct phasing on all equipment. Secondary voltages shall be measured at the line side of the main breakers with the breakers in an open position, at panelboards, and at such other location on the distribution systems and branch circuits as directed by the Engineer.

I. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the drawings and specifications; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

J. A final inspection of the installation to determine compliance with the drawings and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. The electrical contractor shall provide the services of the project electrical foreman for inspection purposes. The foreman shall remove and reinstall wiring devices, junction box covers, panelboard trims, switchboard covers, terminal box covers, ceiling tiles, lighting fixtures, etc. as required to facilitate any inspections required by the Owner's representative.

K. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The components parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and tests shall be corrected promptly by the Contractor, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

L. The Contractor shall visit the site to acquaint himself with existing conditions. No extra compensation will be paid for failure to comply with this paragraph.

M. The Electrical Contractor shall provide supervision, labor, materials, tools, test equipment, and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout this section.

N. The electrical contractor shall pay for all tests including expenses incident to retests occasioned by defects and failures of equipment to meet specifications at no additional cost to the owner.

O. Any defects or deficiencies discovered in any of the electrical work shall be corrected at no cost to the owner.

P. All testing shall be compatible with the manufacturer's installation instructions.

1.21 PERMITS

A. Obtain all required electrical permits and pay all fees for same.

B. Provide to Engineer, in duplicate, a certificate of final inspection from the authority having jurisdiction for the electrical and systems.

1.22 OPERATING, INSTRUCTION, AND MAINTAINANCE MANUALS

A. Refer to Section 01700 - CONTRACT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.

B. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed.

1.23 BIDDERS REPRESENTATION

A. By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
2. The Bidder and workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, or the Owner's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
4. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

1.24 UTILITY COMPANY & AGENCY COORDINATION

A. This section includes, but is not limited to coordination with the following utilities, agencies and authorities having jurisdiction:

1. Local Fire Marshal: This contractor shall verify with the local fire alarm official, the type of master-box or municipal connection required for this project. This contractor shall provide all material & labor to comply with the local municipality. Notify Engineer of discrepancies between the plans and the municipality's standards. No extra compensation will be given for corrections required for failure to coordinate with the municipality, but corrections shall be made.
2. Electrical Inspector: Review plans and specifications with the local electrical and/or wiring inspector(s). Obtain and pay for all permits.
3. Building Inspector: Review plans and specifications with the local building inspector, if not done so by the General Contractor.
4. OSHA Representative: Review plans and specifications with the local OSHA representative, if not done so by the General Contractor.
5. Dig Safe: This contractor shall notify and coordinate with Dig Safe prior to any excavation; digging; trenching; grading; tunneling; augering; boring; drilling; pile driving; plowing-in or pulling-in pipe, cable, wire, conduit, or other sub-structure; backfilling; demolition; and blasting related to this Contractor.

B. The Electrical Contractor shall pay for all permits, inspections, labor, material and fees associated with the various Utility Companies coordination requirements mentioned in this section and for this Contractor's work under this project.

C. The Electrical Contractor shall carry a minimum of $15,000 of utility expenses. In the case the expenses are less than the carried expense, the difference will be credited to the owner. In the case the utility charges are more than the carried expense, the remaining payment shall be coordinated between the Electrical Contractor, General Contractor and Owner.

D. Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structural and other trades and to meet Architectural requirements.

E. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

F. If any electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.

G. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect and Engineer for review and approval.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Minimum Size: ¾-inch, unless otherwise specified.

B. Underground Installations:

1. More than Five Feet from Foundation Wall: Use thick wall nonmetallic conduit concrete encased.
2. Within Five Feet from Foundation Wall: Use rigid steel conduit concrete encased.
3. In or Under Slab on Grade: Use plastic coated conduit.
4. Minimum Size: 1-inch.

C. Outdoor Locations, Above Grade: Use rigid steel conduit.

D. In Slab Above Grade:

1. Use rigid steel conduit.
2. Maximum Size Conduit in Slab: ¾ inch (19 mm); ½ inch (13 mm) for conduits crossing each other.

E. Wet and Damp Locations: Use rigid aluminum conduit.

F. Dry Locations:

1. Concealed and in Cable-Tray: Use metal clad (MC) cable (see Division 1)
2. Exposed: (Unfinished or utility spaces) Use electrical metallic tubing.

G. Metal conduit: Rigid Steel Conduit shall comply with ANSI C80.1 and be heavy wall zinc coated steel. Rigid Aluminum Conduit shall comply with ANSI C80.5. Intermediate Metal Conduit (IMC) shall be rigid steel. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1 and material to match conduit. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

H. Flexible metal conduit shall be interlocked aluminum contruction. Fittings shall comply with ANSI/NEMA FB 1. Acceptable manufacturers are AFC Cable Systems, Electri-Flex Company and Eastern Flexible Conduit Technologies. All flexible conduits shall include a grounding conductor.

I. Electrical metallic tubing (EMT) shall comply with ANSI C80.3; galvanized zinc coated steel tubing. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1; steel, compression or set screw type. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

J. Nonmetal conduit shall comply with NEMA TC 2; Schedule 40 PVC, or as indicated on plans. Fittings and Conduit Bodies shall comply with NEMA TC 3. Acceptable manufacturers are Carlon or approved equal.

K. Flexible nonmetallic conduit (Sealtite) shall be UL and CSA listed for purpose specified and shown. Acceptable manufacturers are Carlon or approved equal.

L. Install conduit in accordance with NECA "Standard of Installation." Install nonmetallic conduit in accordance with manufacturer's instructions.

M. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits. Fasten conduit supports to building structure and surfaces under provisions of Division 1. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports. Do not attach conduit to ceiling support wires.

N. Arrange conduit to maintain headroom and present neat appearance. Route exposed conduit parallel and perpendicular to walls. Route conduit installed above accessible ceilings parallel and perpendicular to walls. Route conduit in and under slab from point-to-point. Do not cross conduits in slab.

O. Maintain adequate clearance between conduit and piping. Maintain 12-inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

P. Cut conduit square using saw or pipe cutter; de-burr cut ends. Bring conduit to shoulder of fittings; fasten securely. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints. All expansion and deflection fittings shall have a ground strap. Provide suitable pull string in each empty conduit except sleeves and nipples. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

S. Ground and bond conduit under provisions of NEC 250.

2.2 DUCT BANK

A. Verify that field measurements are as indicated. Verify routing and termination locations of duct bank prior to excavation for rough-in. Verify locations of manholes prior to excavating for installation. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system. Manhole locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete duct bank system.

B. Underground Warning Tape: Provide 3-inch wide plastic tape 12” below finished grade, colored yellow with suitable warning legend describing buried electrical lines; Model #47586 as manufactured by Seton or equal.

C. Install duct to locate top of duct bank at 30” below finished grade or at depths as indicated on drawings. Install duct with minimum slope of 4-inches per 100-feet. Slope duct away from building entrances.

D. Provide suitable fittings to accommodate expansion and deflection where required. Terminate duct at manhole entries using end bell. Stagger duct joints vertically in concrete encasement 6 inches minimum. Use suitable separators and chairs installed not greater than 4 feet (1200 mm) on centers. Band ducts together before backfilling and placing concrete. Securely anchor duct to prevent movement during concrete placement.

E. Provide suitable pull string in each empty duct except sleeves and nipples. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

F. Backfill trenches as required and under provisions of Division 2. Interface installation of underground warning tape with backfilling specified in Division 2. Install warning tape 12-inches below finished surface.

2.3 BUILDING WIRE & CABLE

A. Building Wire and Cable shall be copper with 600V insulation rated at 75°C minimum, Type XHHW insulation for feeders and branch circuits larger than #3 AWG; Type THHN/THWN insulation for feeders and branch circuits #4 AWG and smaller.

B. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, solid construction where No. 10 AWG and smaller, stranded construction where No. 8 AWG and larger.

C. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.

D. Exterior of wires shall be color coded, so as to indicate a clear differentiation between each phase and between each phase and neutral. In all cases, grounded neutral wires and cables shall be identified by the colors “white” or “gray”. In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made. Colored tape shall be applied for a distance of 6 inches along the wires and cables, or along their entire extensions beyond raceway ends, whichever is less.

E. Final connections to motors shall be made with 18” of neoprene sheathed flexible conduit.

F. Minimum branch circuit conductor size shall be No. 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.

G. Fire alarm and security system wiring shall be No. 16 twisted non-shielded pairs for alarm and trouble circuits and a minimum of #14 AWG for device power, control and alarm annunciation circuits. Fire alarm system riser circuits shall be 2-hour rated, CI type (circuit integrity) cable per NFPA 72 and NEC 760.

H. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.

I. Metal clad sheathed cable NFPA 70, type MC may be used for branch circuitry where shown and where run concealed and not subject to physical damage. All branch circuits shall be run in conduit from the panelboard to the first outlet. All type MC cable used shall contain a full size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used

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CERTIFICATION :

RAYMOND W. DUSSEAULT III
No. 7139
Raymond W. Dusseault III
REGISTERED
PROFESSIONAL ENGINEER
(ELECTRICAL)

THIS DRAWING IS A PART OF AN INTEGRATED SET OF CONSTRUCTION CONTRACT DOCUMENTS. REFER TO ALL DRAWINGS AND SPECIFICATIONS INCLUDING BUT NOT LIMITED TO "GENERAL CONDITIONS" "SUMMARY OF WORK", AND ANY APPLICABLE MANUFACTURERS TECHNICAL SPECIFICATIONS.

REFER TO ALL DRAWINGS FOR COMPLETE SCOPE OF WORK.

THIS DRAWING IS NOT TO BE SCALED OR USED AS AN AS-BUILT.

REV. NO.	DATE	DESCRIPTION

PROJECT NAME:

Conley Stadium
Athletic Facilities
Improvements

434 Mount Pleasant Ave
Providence, RI

ENGINEERING DESIGN SERVICES
INCORPORATED
141 Industrial Highway Slatersville, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL
SPECIFICATIONS
SHEET 1 OF 2

JOB NO.: 21380ES
DRAWN BY: TMW
CHECKED BY: RWD
DATE ISSUED: 12.29.2023
SCALE: AS NOTED

ISSUED FOR CONSTRUCTION

SHEET NO.:

E500

shall have voltage rating of 600 volts, shall have a temperature rating of 75° C, and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape. Fire alarm rated MC cable may be used for fire alarm work where concealed and approved by the Authority Having Jurisdiction.

J. Wiring materials except MI cable shall be manufactured by Triangle, Essex, General Cable, AFC, Southwire or equal.

K. Concealed Dry Interior Locations: Use only building wire Type THHN/THWN or XHHW insulation in raceway, or metal clad cable where concealed and code acceptable.

L. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

M. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

N. Exterior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

O. Underground Installations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

P. Wiring methods, in general, are as follows:

1. Galvanized rigid steel conduit shall be used for telephone system sleeves for main cable runs between floors, closets, etc. and for sweeps, bends, etc. in ductbanks and as specifically noted on the plans. EMT shall be used generally for exposed circuiting in unfinished spaces. Metal clad cable (type MC) may be used for branch circuiting and fire alarm rated MC cable for fire alarm circuiting where run concealed and where code acceptable.
2. To prevent transmittal of vibration to conduit, connections to any vibration producing equipment (i.e. transformers, motors, etc.) shall be terminated by 18 inches of flexible metal conduit. Where flexible connections are exposed to grease and oil, liquid-tight flexible metal conduit shall be used.
3. In general, no splices or joints shall be permitted in either feeders or branches except at outlets or accessible junction boxes. Splices in wire #8 AWG and smaller shall be pigtail type, made mechanically tight. All conduit systems shall be complete.
4. Raceway, boxes, etc., run on walls in wet areas which are subject to being washed down, shall be mounted on the walls with 1/4" stand-offs. All boxes shall be cast type.

Q. Route wire and cable as required to meet the Project Conditions. Install cable in accordance with the NECA "Standard of Installation." Use solid conductor for feeders and branch circuits 10 AWG and smaller. Use stranded conductors for control circuits. Use conductor not smaller than 12 AWG for power and lighting circuits. Use conductor not smaller than 16 AWG for control circuits. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m). Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (160 m). Pull all conductors into raceway at same time. Use suitable wire pulling lubricant for building wire 4 AWG and larger. Protect exposed cable from damage.

R. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system, cables that are not part of the ceiling system cannot be supported from ceiling supports. Do not rest cable on ceiling panels. Use suitable cable fittings and connectors. Neatly train and lace wiring inside boxes, equipment, and panelboards.

S. Clean conductor surfaces before installing lugs and connectors. Make splices, taps, and terminations to carry full ampacities of conductors with no perceptible temperature rise. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape un-insulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

2.4 BOXES

A. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space. All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-inches square shall have hinged covers. Boxes larger than 12-inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

B. Install boxes in accordance with NECA "Standard of Installation." Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.

D. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

E. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

F. Adjust floor box flush with finish flooring material. Adjust flush-mounting outlets to make front flush with finished wall material. Install knockout closures in unused box openings.

2.5 GROUNDING & BONDING

A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70 and the following:

1. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non-metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.
2. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers.
3. Provide grounding bonds for all metallic conduits of the light and power system which terminate in pits below equipment for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually to the ground bus.
4. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified. Accomplish this be equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Exclude the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.
5. Each grounding type bushing shall have the maximum ground wire accommodation available in standard manufacture for the particular conduit size. Connection to bushing shall be with wire of this maximum size.
6. Bonding conductors on the load size of the service device and equipment grounding conductors shall be sized in relation to the fuses or trip size of the overcurrent device supplying the circuit.
7. Perform inspections and tests listed in NETA ATS, Section 7.13. Document test results in Record Documents.

2.6 ELECTRICAL IDENTIFICATION

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background. Locations: Each electrical distribution and control equipment enclosure, communication cabinets. Letter Size: Use 1/8 inch letters for identifying individual equipment and loads. Use 1/4 inch letters for identifying grouped equipment and loads.

B. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background. Use for identification of individual power receptacle faceplates indicating panel & circuit number the outlet is fed from and control device stations. In addition to nameplates as described above, use labels on all panelboards, disconnect switches and enclosed circuit breakers to identify where the equipment is fed from, voltage & phase.

C. Wire markers: Tape, or tubing type wire markers. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection. Power and Lighting Circuits shall be marked with panel and branch circuit or feeder number as indicated on drawings. Control Circuits shall be marked with control wire number indicated on schematic and interconnection diagrams on drawings

D. Conduit markers: Corrosion and abrasion resistant. Location: Furnish markers for each conduit longer than 6 feet (2 m). Spacing: 20 foot on center. Indicate voltage and phase.

E. All panelboards shall be provided with a typed (hand written is not allowed) circuit directory indicating the load fed by each circuit breaker and it's location in the building.

2.7 ENCLOSED CONTACTORS

A. General purpose contactors: NEMA ICS 2, AC general purpose magnetic contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Enclosure per ANSI/NEMA ICS 6, Type as scheduled.

B. Lighting contactors: NEMA ICS 2, magnetic lighting contactor. Coil Voltage as indicated. Poles as indicated. Size as indicated. Contact Rating shall match branch circuit overcurrent protection, considering de-rating for continuous loads.

C. Accessories: Provide Pushbuttons and Selector Switches per NEMA ICS 2, heavy duty type. Provide indicating lights per NEMA ICS 2, push-to-test type. Provide auxiliary contacts per NEMA ICS 2, Class A300 or A600 as required per equipment served.

2.8 INTERIOR LUMINAIRES

A. Lighting fixtures shall be in accordance with identifications as follows:

B. All lamping shall be LED.

C. Finishes shall be as selected by the Architect or as indicated on the plans.

D. Any additional appurtenances required for installation and operation, where same are not covered by the identification used on the drawings, shall be included. Lighting fixtures and equipment shall be furnished complete, wired and assembled, including canopies, lamps and other incidental items. Install specified lamps in each luminaire.

E. Fixtures for use outdoors or in areas designated as damp locations, shall be suitably gasketed and UL listed for such applications.

F. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire

G. Unless noted otherwise, all fixtures shall be 3500K and have a minimum CRI of 85.

H. Include the aiming and/or adjustments of all lighting fixtures requiring same in accordance with instructions issued by the Architect in the field. Aim and adjust luminaries as indicated or as directed by the Owner, Architect or Engineer. Position exit sign directional arrows as indicated. Operate each luminaire after installation and connection. Ensure proper connection and operation.

PART 3 - EXECUTION

3.1 BASIC REQUIREMENTS

A. Adhere to best industry practice and the following:

1. All work shall be concealed.
2. Route circuitry runs embedded in concrete to coordinate with structural requirements.
3. Equip each raceway intended for the future installation of wire or cable with a nylon pulling cord 3/16" in diameter and clearly identify both ends of the raceway.
4. Provide all outlet boxes, junction boxes, and pull boxes for proper wire pulling and device installation. Include those omitted from the drawings due to symbolic methods of notation.
5. Utilize lugs of the limited type to make connections at both ends of cables installed on the line side of main service overcurrent and switching devices. Provide cable limiters for each end of each service entrance cable.
6. Beyond the termination of raceways, fireproof the following:

a. All wires and cables within pad-mounted transformer enclosure.

b. All service feeder cables ahead of main service overcurrent protection devices, and elsewhere where not in raceways.

7. Fireproofing of wires and cables shall be by means of a half-lapped layer of arcproof or by means of sleeving of a type specifically manufactured for the purpose. Ends of tape or sleeving shall be severed with twine. Fireproofing shall be extended up into raceways. After conductors have been finally shaped into their permanent configuration, fireproofing tape or sleeving shall be coated with silicate of soda (water glass). Fireproofing shall be applied in an overall manner to raceway groupings of conductors.
8. Provide all sleeves through fireproof and waterproof slabs, walls, etc., required for electric work.
9. Provide waterproof sealing for the sleeves through waterproof slabs, walls, etc.
10. Provide fireproof sealing for the sleeves through fireproof walls, slabs, etc.
11. Provide fireproof sealing for the openings in fireproof walls, slabs, etc., resulting from removal of existing electrical sleeves, conduits, poke-thru's etc.
12. Bundle wiring passing through pull boxes and panelboards in a neat and orderly manner with plastic cable ties. Cable ties shall be by Ty-Raps as manufactured by Thomas & Betts, Holub Industries Inc., Quick Wrap, Bundy Unirap, or equal.
13. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.

3.2 TESTING REQUIREMENTS & INSTRUCTIONS

A. Where any repairs, modifications, adjustments, tests or checks are to be made, the Contractor shall contact the Engineer to determine if the work should be performed by or with the Manufacturer's Representative.

B. Tests are to:

1. Provide initial equipment/system acceptance.
2. Provide recorded data for future routine maintenance and trouble-shooting.
3. Provide assurance that each system component is installed satisfactorily and can be expected to perform, and continue to perform its specified function with reasonable reliability throughout the life of the facility.

C. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action by the Contractor requires prior Engineer approval, retesting, and inspection.

D. When the electrical tests and inspections specified or required within Division 16 are completed and results reported, reviewed, and approved by the Engineer, the Contractor may consider that portion of the electrical equipment system or installation electrically complete. The Contractor will then affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of the unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "Notification or Substantial Electrical Completion" for approval by the Engineer following Engineer's acceptance of electrical completion. If later in-service operation or further testing identified problems attributable to the Contractor, these will be corrected by the Contractor, at no additional cost to the Authority.

E. Grounding Systems:

1. Perform ground tests using a low resistance, null-balance type ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
2. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values. The Contractor is responsible for the proper installation of the grounding indicated and specified.

3.3 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.

B. Circuits shall be balanced on phases at their supply as evenly as possible.

C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.

D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.

E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one (1) cable for each leg and one (1) neutral cable, if any.

F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:

1. All 20 amp, 120/208 volt, 3-phase, 4-wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.
2. Minimum conductor size shall be No. 12 AWG cooper.
3. Conductors operating at 120 volts extending in excess of 100 ft. or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 AWG cooper throughout.
4. Lighting fixtures and receptacles shall not be connected to the same circuit.

G. Type MC Cable Installation:

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:

a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of type specifically designed for use with cable, i.e., romex connectors not acceptable.

b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co.; not with a hacksaw.

c. Use split "Insulinер" sleeves at terminations.

3.4 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.

B. The finish of threaded steel conduit shall be galvanized only.

C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".

D. Wires for pulling into raceways for feeders shall be limited to "THWN".

E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.

F. Final connections of flexible conduit shall be neoprene sheathed.

G. Apply one (1) layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.

H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:

1. They shall be constructed with continuously welded joints and seams.
2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.

I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.

J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.

K. Panels shall be equipped with doors without exception.

L. The following shall be interpreted as damp or wet locations within building confines:

1. Spaces where any designations indicating weatherproof (WP) or vapor proof appear on the drawings.
2. Below waterproofing in slabs applied directly on grade.
3. Spaces defined as wet or damp locations by Article 100 of the National Electric Code.
4. Parking garage.

3.5 UNDERGROUND CONDUIT DUCT BANKS

A. The electrical work required in conjunction with underground conduit banks shall include providing all conduits.

B. Conduits for underground banks shall be:

1. Trade diameter size as indicated but in no case less than one inch.
2. Polyvinyl chloride Schedule 40 (approved for encased burial) duct, rigid steel conduit for vertical elbows and straight sections used to penetrate equipment pads, building foundation walls and concrete slabs.

C. All conduits indicated as being incorporated into conduit banks unless specifically noted as rigid steel conduits shall be encased in a concrete envelope which accommodates the indicated configuration of conduits and which encompasses dimensions as follows:

1. Outside surfaces of conduits to outside surface of envelope where reinforcement of encasement is required - 6" minimum.
2. Outside surfaces of conduits to outside surface of envelope where no reinforcement of encasement is required - 3" minimum.
3. Spacing between centerlines of conduits assigned to different categories of use primary feeders, secondary feeders, communications and signaling - 10-1/2" minimum.
4. Spacing between centerlines of conduits assigned to the same category of use - 7-1/2" minimum.

D. Install conduit in such a manner as to provide a minimum cover of 30 inches after final grading except the cover may be reduced to a minimum of 18 inches to:

1. Tie into existing work.
2. Pass over other underground utilities.
3. Pass over underground obstructions.
4. Assist in the avoidance of low points.

E. Increase the minimum cover where required by field conditions.

F. Lay conduit to avoid low points during run. Pitch at a minimum of 3 inches per 100 feet away from building.

G. Provide reinforcement for the concrete encasement of a conduit bank where:

1. It passes under or over underground utilities.
2. It passes under or over underground obstructions.
3. Its cover is reduced to less than 30 inches.
4. It runs through foundation walls and other building construction.

H. Install conduit so that adjacent joints are staggered at least 6 inches from one another.

I. Offsets to accommodate field conditions shall be accomplished with two (2) bends of not more than ten (10) degrees each.

J. Plug both ends of all conduit stubs.

K. Seal the end of each conduit run terminating inside a building utilizing a water and gas-tight sealant manufactured specifically for the purpose.

L. Provide a nylon cord for the pulling of cable in each conduit in which no cable is to be installed as part of the electric work.

M. The Electrical Sub-Contractor shall provide all insulated racks as required for proper support of all cables and wires.

N. Provide a continuous nylon warning tape above each full length of duct bank 12 inches below grade.

3.6 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.

B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.

C. Remove and replace any individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, and solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.7 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards, and Local Electric Code.

B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.

C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braces to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spaces shall be used to create a minimum of ¼" air space between the building surfaces and the work. Provide ¾" thick exterior grade plywood painted with two (2) coats of fire-retardant gray paint for mounting of panelboards.

E. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.

F. Nothing shall rest on, or depend for support on, suspended ceiling media.

G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8'. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than they story height, or 15', whichever is smaller.

H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7'. Support such conduits, 1" trade size or larger, at intervals no greater than 10'.

I. Fasten electric work to building structure in accordance with the best industry practice.

J. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.

K. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.

L. As a minimum procedure, where weight applied to building attachment points exceed 100 lbs., but is 300 lbs. or less, conform to the following:

1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel.

3.8 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.

B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.

C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.

D. Join, tap and terminate standard conductors No. 6 AWG and larger by means of solder sleeves, taps, and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.

E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by a means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

3.9 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Delay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.

B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by a 3-1/2" diameter ball mandrel.

C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.

D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a non-deteriorating insulating material manufactured specifically for the purpose.

E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

3.10 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall-mounted outlet boxes shall not be set back-to-back but shall be offset at least 12" horizontally regardless of any indication on the drawings.

B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.

C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)

D. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side, (or the face of any applied raised cover) penetrates through to within 1/8" of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.

E. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.

F. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).

G. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.

H. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.

I. Allow no fixture to be supplied from an outlet box in another room.

J. Multiple local switches indicated at a single location shall be gang-mounted in a single outlet box.

K. Install junction boxes, pull boxes and outlet boxes in conjunction with concealed circuitry.

L. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.

M. Outlet boxes for switches shall be located at the strike side of doors. Indicate door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.

N. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.

O. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.

P. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.

Q. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.11 LOCATING AND ROUTING OF CIRCUITRY

A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:

1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
2. Horizontally and vertically in mechanical equipment spaces.
3. Horizontally and vertically in electric equipment rooms.

B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.

C. All circuitry and raceways shall not be run within slabs. If field conditions requires raceways to be embedded in field-poured structural building construction concrete fill or slab shall conform to the following:

1. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.
2. They shall be routed in such a manner as to coordinate with the structural requirements of the building.
3. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.

E. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:

1. Crossing where uninsulated: 3".
2. Crossing where insulated: 1"
3. Running parallel where uninsulated: 36".
4. Running parallel where insulated: 6".

F. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

3.12 INSTALLING CIRCUITRY

A. The outside surface of circuitry, which is to be embedded in cinder concrete, shall be coated with asphaltum paint.

B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four (4) right angle bends or the equivalent thereof.

C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.

D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return" current conductors of one feeder or circuit shall be laced together so as to minimize induction heating of adjacent metal components.

E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suit the water condition encountered in the field.

END OF SECTION

CERTIFICATION :

RAYMOND W. DUSSEAULT III
STATE OF RHODE ISLAND
No. 7139
REGISTERED PROFESSIONAL ENGINEER (ELECTRICAL)

THIS DRAWING IS A PART OF AN INTEGRATED SET OF CONSTRUCTION CONTRACT DOCUMENTS. REFER TO ALL DRAWINGS AND SPECIFICATIONS INCLUDING BUT NOT LIMITED TO "GENERAL CONDITIONS" "SUMMARY OF WORK", AND ANY APPLICABLE MANUFACTURERS TECHNICAL SPECIFICATIONS.

REFER TO ALL DRAWINGS FOR COMPLETE SCOPE OF WORK.

THIS DRAWING IS NOT TO BE SCALED OR USED AS AN AS-BUILT.

REV. NO.	DATE	DESCRIPTION

PROJECT NAME:

Conley Stadium Athletic Facilities Improvements

434 Mount Pleasant Ave Providence, RI

ENGINEERING DESIGN SERVICES INCORPORATED
141 Industrial Highway Scarborough, RI 02876
Tel (401) 765-7659 Fax (401) 765-2984

SHEET TITLE:

ELECTRICAL SPECIFICATIONS SHEET 2 OF 2

JOB NO.: 21380ES

DRAWN BY: TMW

CHECKED BY: RWD

DATE ISSUED: 12.29.2023

SCALE: AS NOTED

ISSUED FOR CONSTRUCTION

SHEET NO.:

E600

TABLE OF CONTENTS

Specifications

END OF SECTION

Section 31 00 00
EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 GENERAL PROVISIONS

A. Examine all drawings and all other Sections of the Specifications for the requirements therein affecting the work of this trade. Plans, surveys, measurements, and dimensions, under which the work is to be performed are believed to be correct to the best of the Architect's knowledge, but the Contractor shall have examined them for himself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found herein. The contractor shall reconcile all drawings.

B. Where there is a conflict between drawings, the stricter requirement and the interpretation that is most in favor of the owner shall be adopted at no additional cost to the owner.

C. The Contractor shall become thoroughly familiar with the site, consult records and drawings of adjacent structures and of existing utilities and their connections, and note all conditions which may influence the work of this Section.

D. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.

E. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure a steady progress of work under this Contract.

1.3 REFERENCES

A. All work specified in this Section shall conform to "Standard Specifications for Road and Bridge Construction" of the Rhode Island Department of Transportation, latest revision, herein referred to as "State Standards".

1.4 SUMMARY

A. This Section includes all excavation, filling and grading and related items as indicated on the Drawings and/or as specified herein including, but not limited to, the following:

1. Excavating and backfilling for demolition of buildings and structures.
2. Excavating and backfilling for utility trenches.
3. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
4. Geotextiles.

B. This Section also includes earthwork including, but not limited to, the following:

1. Demolish existing buildings and entirely remove debris and existing building foundations and utilities. After demolition, backfill resulting excavation with Structural Fill.
2. Entirely removing topsoil/surficial organic soil, tree stumps, root balls, buried organic soil, asphalt, concrete structures, cobbles, boulders, demolition debris, below ground structures, existing fill, existing bedrock as necessary, and other deleterious matter from within the proposed utility trenches.
3. Improving the existing fill under the subbase of paved areas.
4. Removing and disposing of spoiled material not suitable for fill from the site. No burning on the site shall be permitted.
5. Rehandling, hauling and placing of stockpiled materials for use in refilling, filling, backfilling, grading and such other operations. Stockpiling shall include protection to maintain materials in a workable condition.
6. Furnishing, placing, and compacting fill materials, Including subbase layer under paved areas, ramps, equipment pads, curbs, sidewalks, and other locations required in the drawings.
7. Removing, hauling, stockpiling, rehandling, and placement of materials.
8. Over-excavation to remove unsuitable materials.
9. Proofrolling/proofcompacting of exposed subgrade for fill, slabs, walks, equipment pads, pavements, lawns and grasses, and exterior plants.
10. Backfilling of excavations for walls, utilities, pavements, sidewalks, and landscaped areas with specified on-site and imported materials.
11. Installing seismographs and monitoring vibration at the nearby existing buildings during construction. The cost of vibration monitoring shall be included in the base bid.
12. Disposing off-site of excess or unsuitable materials.
13. Placing bedding, sub-base and base course layers.
14. Protecting existing buildings, utilities, roads, pavements, lawns, planting and other improvements from damage due to construction.
15. Performing material testing, and field density testing as needed.
16. Performing dust control and cleanup.
17. Processing and improving onsite marginal soil, as needed, including by crushing and blending, to meet the specifications herein.

C. Work described in this Section of these specifications shall be included in the base bid and will not be paid for separately.

D. Related Sections include:

1. Section 31 50 00 Excavation Support and Protection
2. Section 31 23 19 Dewatering

1.5 SUBMITTALS

A. Geotextiles:

1. Technical properties including but not limited to tensile strength, puncture strength, mullen burst, elongation, equivalent opening, permittivity, and water flow rate.
2. Provide a 12-by-12-inch sample of geotextiles and the manufacturer's recommended installation procedure.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the following requirements indicated:
1. Gradation Test Results for each on-site and imported soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D6938 and ASTM D1557 for each on-site and imported soil material proposed for fill and backfill.
3. Each submittal shall include the intended use for the material with the appropriate specification section and material name corresponding to the Contract Documents to facilitate review.
4. Bioretention Area soil mix.

C. Copies of permits obtained for excavations that are required by state and local governing authorities and local utility companies shall be submitted to the owner's representative.

1.6 SITE INFORMATION

A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.

B. Plans, surveys, measurements and dimensions, under which the work is to be performed, are believed to be correct to the best of the Engineer's knowledge, but the Contractor shall have examined them for himself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found herein.

C. Data on indicated subsurface conditions are not intended as representations or warrants of continuity of such conditions between soil borings. It is expressly understood that the Owner and Engineer will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The Owner, Architect and Engineer assume no responsibility for the accuracy of the data other than at the particular locations and at the time the explorations were made.

D. The Contractor may request to perform additional test borings and other explorations at no cost to the Owner.

E. It is the responsibility of the Contractor under this Contract to do the necessary excavation, filling, grading, and rough grading to bring the existing grades to subgrade and parallel to finished grades as specified herein and as shown on the Drawings for this Work. The Contractor shall visit the site prior to submitting a bid to become familiar with the extent of the work to be done under this Contract. The Contractor shall be responsible for determining the quantities of earth materials that must be imported or hauled off the site necessary to complete the work under this Section. All imported earth materials required to construct the project shall be included in the Contractor's base bid.

F. The Contractor is allowed to re-use excavated On-Site Common Borrow free of Organic Matter and other unsatisfactory materials as fill in accordance with this specification. All On-Site Common Borrow used as backfill shall be compacted to the required percentage of maximum dry density included in Table 2 below.

1. The Contractor is made aware that On-Site Common Borrow may contain large amounts of silt. Additional efforts required to reuse On-Site Common Borrow are the responsibility of the Contractor and shall result in no additional expense to the Owner or a request for additional time for delays caused by its usage.
2. The Contractor agrees to use this material at his own risk and is responsible for any additional work required to install this material in accordance with the specifications.
3. If project delays will result from the additional time required to re-work On-Site Common Borrow, placed as fill in accordance with the specifications, the Contractor shall remove material that does not meet the compaction requirements and provide imported fill meeting the specifications. This imported material shall be provided at no additional expense to the Owner.
4. Any project delays resulting from additional time required to work this material are the responsibility of the Contractor.

G. The Contractor shall use suitable on-site soils and fill, and soil from off-site sources, as needed. Please note that not all on-site materials will be suitable for reuse, nor will all required material gradations be present on the site. Imported materials are anticipated for this project.

H. Contractor shall protect and adjust moisture condition of all on-site and imported materials for proper installation, compaction, and use. This includes covering, drying, and adding moisture as required to maintain suitable workability of the soil materials. Please note onsite and imported materials will not necessarily be encountered, or delivered in a suitable condition as environmental factors prevalent at the time of construction will impact soil materials.

I. Weather, groundwater or other site conditions may make it difficult to meet compaction and require dewatering, adjustment of moisture content or other methods to achieve stable subgrade and compaction. The Contractor is made aware of this condition and will not be eligible to receive additional compensation for work required to provide the required subgrade and compaction.

1.7 UNIT PRICES

A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the limits specified in PART 3 - EXECUTION.

B. Unit prices for rock excavation include all labor, equipment, and materials required for removal of rock and hauling of rock off-site. Unit prices for rock excavation also include all labor, equipment, and materials required for replacement of rock excavation with approved materials where the rock excavation extends beyond the specified excavation limits. Any excavation beyond the specified excavation limits must be approved by the Owner’s representative prior to removal. Specified excavation limits for rock are specified in Section 3.4 ROCK EXCAVATION.

1.8 DEFINITIONS

A. Backfill: Soil material used for fill and excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and asphalt paving.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil for use as fill or backfill.

E. Boulder: A soil particle with a minimum dimension of 12 inches.

F. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated on the Drawings.
1. Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner's Representative. Additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 6 feet in width and more than 10 feet in length for the installation of utilities, foundations, and footings.
3. Trench Excavation: An excavation of any length where the width is less than twice the depth and where the shortest distance between payment lines does not exceed ten (10') feet. All other excavations shall be defined as open excavations.
4. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner's Representative. Unauthorized excavation, as well as remedial work directed by Owner's Representative, shall be without additional compensation.

H. Fill: Soil materials used to raise existing grades.

I. Imported Material: Material obtained by the Contractor from sources off the site.

J. Influence Area: The area within planes sloped downward and outward at an angle of 60 degrees from the horizontal from (a) 1 foot outside the outermost edge at the base of foundations or slabs; or (b) 1 foot outside the outermost edge at the surface of roadways or shoulder; or (c) 0.5 foot outside the exterior edge at the spring line of pipes and culverts.

K. Optimum Moisture Content: Determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

L. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Owner's Representative.

M. Relative Density: As defined by ASTM D4253 or D4254.

N. Rock: Material in beds, ledges, unstratified masses, conglomerate deposits that cannot be removed, in the opinion of the Engineer, without systematic drilling, ram hammering, blasting, or ripping. Weathered Rock that can be removed by an excavator without hammering or other mechanical means shall not meet the definition of rock.

Rock also includes boulders of rock material that exceed 3 cu. yd. for bulk excavation or 1 cu. yd. diameter for footing, trench, and pit excavation.

1. Trench Rock Excavation: Rock encountered within trench excavation as defined above.

O. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

P. Subbase Course: Course placed between the subgrade and base course for asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or asphalt walk.

Q. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

R. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.

S. Unsuitable Soils: Existing soils that, in the opinion of the Engineer and Owner's Representative, are unsuitable to remain in their existing location that are deposited outside the excavation limits. This does not include topsoil, subsoil, and silty-sand materials.

1. Anticipated unsuitable soils: Unsuitable soils identified in the geotechnical report, drawings, specifications, test pit logs, or boring logs provided as part of the project manual.
2. Unanticipated unsuitable soils: Unsuitable soils not identified in either the geotechnical report, test pits, or boring logs provided as part of the project manual.

T. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

U. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters. Well-graded is used to define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

1.9 IMPORTED MATERIAL ACCEPTANCE

A. All imported earth materials specified in this section are subject to the following requirements:

1. Materials imported to the site by the Contractor for on-site use shall not contain oil and/or hazardous materials.
2. All tests necessary for the Contractor to locate acceptable sources of imported material shall be made by the Contractor. Certification that the material conforms to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory shall be submitted to the Engineer for approval at least 5 calendar days before the material is required for use. All material samples shall be a minimum of 40 pounds and furnished by the Contractor at the Contractor's sole expense. Samples shall be representative and be clearly marked to show the source of the material and the intended use on the project. Sampling of the material source shall be done by the Contractor in accordance with ASTM D75. Tentative acceptance of the material shall be based on an inspection of the source by the Engineer and/or the certified test results submitted by the Contractor to the Engineer at the Engineer's discretion. No imported materials shall be delivered to the site until the proposed source and the Engineer has tentatively accepted material tests in writing. Final acceptance will be based on Quality Control and Quality Assurance tests made on samples of material taken from the completed and compacted course.
3. Gradation tests by the Contractor shall be made on samples taken at the place of production prior to shipment. Samples of the finished product for gradation testing shall be taken as specified in 3.16 FIELD QUALITY CONTROL, or more often as directed by the Owner’s Representative if variation in gradation is occurring, or if the material appears to depart from the Specifications. Test results shall be forwarded to the Engineer within 48 hours of testing.
4. If tests conducted by the Contractor or the Engineer indicate that the material does not meet Specification requirements, material placement will be terminated until corrective measures are taken. Material that does not conform to the Specification requirements and is placed in the work shall be removed and replaced at the Contractor's sole expense. Retesting of material that does not meet specification requirements shall be performed at the Contractor's sole expense.

1.10 QUALITY ASSURANCE

A. Employ a qualified surveyor, registered with the State of Rhode Island as a Professional Land Surveyor, as required for all layout and to establish grades for the work being performed.

1. Prior to commencing work, Contractor’s surveyor shall perform a benchmark level verification to confirm vertical and horizontal control of the site. Notify Owner and Owner’s Representative prior to commencing work if discrepancies are found.

B. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 543 shall be hired to provide required testing of earthwork materials at the Owners Expense. Contractor shall pay for all testing required for preparation of submittals for imported soils.

C. All temporary shoring and bracing shall be designed, detailed, and stamped by a Professional Engineer registered in the State of Rhode Island. Refer to SECTION 31 50 00 - EXCAVATION SUPPORT AND PROTECTION.

D. Pre-excavation Conference: Conduct conference at Project site prior to the start of construction. Date and time to be specified by the Owner's Representative.

E. The Contractor is responsible to furnish and install bioretention soil that will drain in accordance with the RIDEM requirement of 48-hours following all rain events. Contractor shall warranty bioretention soil and performance of bioretention area for one year following substantial completion and stabilization of the upstream area. In the event the bioretention area does not drain, the Contractor shall remove bioretention soil or filter media, remove plantings, scarify subgrade, replace bioretention soil or filter media, and provide new plantings at no additional cost to the Owner.

1.11 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Owner and Architect not less than two weeks in advance of proposed utility interruptions in writing. Renotify 72 hours in advance of proposed utility interruptions.
    a. Notifications shall be made to the Owner's Representative.
    b. Do not proceed with utility interruptions without Owner's written permission.
    c. All power shutdowns shall be coordinated with the Owner.
2. Contact "Dig Safe" at 1-888-Dig Safe to verify locations of existing underground utilities in areas of proposed excavation prior to commencing any excavation effort.

B. Demolish and completely remove from site existing underground utilities indicated to be removed on the Drawings. Coordinate with utility companies to shut off services if lines are active.

1.12 EXCAVATION SAFETY

A. The Contractor shall be solely responsible for making all excavations in a safe manner. Contractor shall comply with all Local and State OSHA requirements. Per Geotechnical Report Section 4.6 excavations less than 20 feet deep shall have a maximum allowable slope of 1.5 horizontal to 1 vertical (1.5H:1V).

B. Provide appropriate measures to attain a stable base, retain excavation side slopes and prevent earth slides to ensure that persons working in or near the excavation are protected.

1.13 LAYOUTS AND GRADES

A. All line and grade work not presently established at the site shall be laid out by a survey team under the supervision of a Registered Land Surveyor or Professional Engineer employed by the Contractor in accordance with Drawings and Specifications. The Contractor shall supply all additional layout and grade control

as necessary to properly implement and construct the work. The Contractor shall establish permanent benchmarks and replace as directed any which are destroyed or disturbed.

B. The words “finished grades” as used herein shall mean final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the building shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.

C. Employ a Registered Land Surveyor to survey the bottom of the excavation for unanticipated unsuitable soils throughout the building footprint and utility trenches. Excavations shall be surveyed at the corners, high and low points, and a maximum spacing for survey points of 20 feet in each direction on a grid.

1.14 TOLERANCES

A. All material limits shall be constructed within a vertical tolerance of 0.1 foot and a horizontal tolerance of 1 foot except where dimensions or grades are shown or specified as minimum. All grading shall be performed to maintain slopes and drainage as shown. No reverse slopes will be permitted.

1.15 DRAINAGE

A. The Contractor shall control the grading in areas under construction on the site so that the surface of the ground will properly slope to prevent accumulation of water in excavated areas and adjacent properties.

B. The Contractor shall excavate interceptor swales and ditches where necessary prior to the start of major earthmoving operations to ensure minimal erosion and to keep areas as free from surface water as possible.

C. Should surface, rain, or ground water be encountered during the operations, the Contractor shall furnish and operate pumps or other equipment, and provide all necessary piping, stone, geotextile fabric, and other materials to keep all excavations clear of water at all times and shall be responsible for any damage to work or adjacent properties for such water. All piping exposed above ground surface for this use, shall be properly covered to allow foot traffic and vehicles to pass without obstruction.

D. Presence of ground water in soil will not constitute a condition for which an increase in the contract price may be made. Under no circumstances place concrete fill, lay piping, or install appurtenances in excavation containing free water. Keep utility trenches free of water until pipe joint material has hardened and backfilled to prevent flotation.

E. Groundwater levels shall be maintained at a minimum of 1 foot below the bottom of excavations during construction. Placement of reinforcing steel or concrete in standing water is not permitted.

F. Where sump pumps are used, the crushed stone placed in sump pump pits shall be wrapped in geotextile fabric. Alternatively, the crushed stone shall be entirely removed after the sump pump is no longer in use and the sump pump pit shall be restored with suitable backfill.

1.15 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

A. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with compacted approved material in accordance with this Specifications. Fill that cannot be compacted within 48 hours because of its saturated or wet condition shall be removed and replaced with compacted approved material in accordance with this Specifications. Costs of removal of disturbed material and replacement with approved material shall be borne by the Contractor.

B. The Contractor shall place a 6-inch layer of Crushed Stone or 6-inch layer of Granular Fill/Structural Fill over natural soil to stabilize areas disturbed during construction.

1. The placement of the Crushed Stone layer or Granular Fill/Structural Fill as well as material costs shall be borne by the Contractor. A geotextile fabric shall be used to separate the crushed stone from the natural soil when the natural soil is below the groundwater table, and from the overlying fill when directed by the Geotechnical Engineer at no additional cost to the Owner.

PART 2 – PRODUCTS

2.1 SOIL MATERIALS

A. General: The Contractor may reuse excavated on-site material for fill and backfilling where the material excavated is satisfactory and conforms with the below specified gradation requirements. The Contractor is to provide imported soil materials with satisfactory properties conforming with the below specified gradation requirements when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soils being free of rock or gravel larger than 3 inches in any dimension, debris, broken pavement, waste, frozen materials, vegetation, and other deleterious matter and conform to the criteria listed below:

1. Gradations of satisfactory soils are as shown in the Table below:

TABLE 1 – SOIL GRADATIONS

Sieve Size	Sand Gravel Fill (Structural Fill)	Granular Fill (Ordinary Fill)	1-1/2 inch Crushed Stone ***	3/4 inch Crushed Stone***	Coarse Sand	ASTM C33 Sand	Stone Dust
3-inch*	100	60-100	-	-	-	-	-
1-1/2-inch*	80-100	-	85-100	100	-	-	-
1-inch	-	55-100	-				
¾-inch	-	-	10-40	90-100	-	-	-
½-inch	50-100	-	0-8	10-50	-	-	-
3/8-inch	-	-	-	-	100	100	-
No. 4	30-85	40-75	-	0-5	95-100	95-100	100
No. 8	-	-	-	-	-	80-100	-
No. 16	-	-	-	-	50-85	50-85	40-100
No. 20	15-60	-	-	-	-	-	-
No. 30	-	-	-	-	-	25-60	-
No. 40	-	5-45	-	-	-	-	-
No. 50					2-10	5-30	
No. 60	5-35						
No. 100						0-10	
No. 200	0-10**	0-10	<1	<1			0-8

* The maximum recommended stone size is three inches where placed as base course below slabs and pavement; elsewhere, maximum stone size shall be 2/3 of the loose lift thickness.

** 0-5% Under sidewalks, slabs, exterior stairs, ramps and pads.

*** When crushed stone is required or is used for the convenience of the Contractor, it shall be wrapped in a geotextile fabric for separation. Geotextile fabric shall not be used under retaining walls.

2. Common Borrow shall be imported or excavated onsite material free of roots, sod, rubbish, debris, frozen materials, broken pavement, or other deleterious or organic matter, and conform to the following requirements.
   a. Imported Common Borrow shall conform to the specified gradation of Granular Fill in Table 1.
   b. Onsite Common Borrow shall conform to the specified gradation of Granular Fill in Table 1, but may contain no more than 15-percent by weight passing the No. 200 sieve. Onsite Common Borrow shall not be placed as foundation wall backfill, as pavement base or subbase courses, as retaining wall backfill, or locations where free-draining backfill are required.
   c. Stones from excavated onsite material retained on a 3-inch sieve, less than 6-inches in diameter, and not exceeding two-thirds of the thickness of the horizontal layers placed after compaction can be placed for construction. Materials meeting these criteria shall not be included in the analysis for gradation. Materials exceeding this size shall not be placed in backfill below paved areas.
3. Subbase Material shall be free of rock or gravel larger than 3 inches in any dimension, debris, broken pavement, waste, frozen materials, vegetation, and other deleterious matter and conform to the gradation for Granular Fill in Table 1 within this specification.

4. Base Course shall be material free of rock or gravel larger than 3 inches in any dimension, debris, broken pavement, waste, frozen materials, vegetation, and other deleterious matter and conform to the gradation for Sand Gravel Fill in Table 1 within this specification.
5. Riprap shall conform to RI Standard M.10.03.
6. Filter stone shall conform to RI Standard M.10.03.1.
7. Drainage Stone or Crushed Stone or 1 ½" Crushed Stone shall be imported material conforming to the gradation for 1 ½" Crushed Stone in Table 1 and having a maximum percentage loss of 12 percent as determined by the sodium sulfate test, AASHTO T104, and comply to the gradation provided in the table above
8. Sand Gravel Bedding and Granular Fill Bedding shall conform to the Sand Gravel Fill and Granular Fill gradations, respectively, specified above except that 100% by weight must pass the 1 ½" sieve.
9. Gravel Borrow shall conform to the Sand Gravel Fill Gradation in the Table above.
10. Structural Fill and Common Borrow shall have a plasticity index of less than 6 and shall conform to the gradation requirements in the Table above.
11. Fill placed within the footprint of the proposed building shall meet the requirements of Structural Fill.
12. Contractor shall avoid mixing the existing soils with unsuitable material. Should reusable materials be encountered during excavation, they shall be excavated and stockpiled separately for compliance testing.
13. Onsite soils with fines contents of 15% or greater shall have strict moisture control implemented during compaction. The Contractor shall be prepared to remove and replace such soils if pumping occurs.
14. Based on the Geotechnical Report the existing fill is not suitable for reuse as Structural Fill. Some of the existing fill free of organic matter may be reused as Common Borrow.
15. All materials to be used as fill, including blended materials, shall first be tested for compliance with applicable gradation specifications.
16. Offsite pulverized pavement and crushed concrete shall not be acceptable for fill material except as specified herein.

C. Bioretention soil shall be sandy loam, loamy sand, loam (USDA), or a loam/sand mix.

1. The soil shall be free of stones, stumps, roots, other woody material over 1-inch in diameter, or brush/seeds from noxious weeds.
2. Following soil characteristics, by volume.
    a. 3 to 5 % Organic Matter
    b. 0 to 2% Clay
    c. 8 to 12% Silt
    d. 85 to 88% Sand.
3. Bioretention soil shall be tested for following criteria
    a. pH range, 5.2 – 7.0
    b. magnesium, not to exceed 32 ppm

c. phosphorus P2O5, not to exceed 69 ppm

d. potassium K2O, not to exceed 78 ppm

e. soluble salts, not to exceed 500 ppm

4. Each bioretention area shall have a minimum of one test. Each test shall consist of both the standard soil test for pH, phosphorus, and potassium and additional tests of organic matter, and soluble salts.

5. Bioretention mulch layer shall be shredded hardwood mulch that is well aged (stockpiled or stored for at least six (6) months), uniform in color, and free of other materials, such as weed seeds, soil, roots, etc.

D. Unsatisfactory Soils are defined as soils not conforming to the satisfactory soils criteria unless otherwise approved by the Engineer.

E. The Contractor is responsible for furnishing and install bioretention soil that will drain in accordance with the RIDEM requirement of 72-hours following all rain events. Contractor shall warranty bioretention soil and performance of bioretention area for one year following substantial completion and stabilization of the upstream area. In the event the bioretention area does not drain, the Contractor shall remove bioretention soil, remove plantings, scarify subgrade, replace bioretention soil or filter media, and provide new plantings at no additional cost to the Owner.

2.2 GEOTEXTILES

A. Permanent Turf Reinforcement Mat: Provide North American Green SC250 permanent turf reinforcement mat or approved equivalent. The permanent turf reinforcement matting shall meet the following minimum properties per the Erosion Control Technology Council Type 5A and Federal Highway Administration's FP-03 Section 713.18.

Test	Method	Nonwoven(1)
Performance Test Unvegetated Shear Stress (lb/ft^2)	ASTM D-6460	2.0 min
Performance Test Vegetated Shear Stress (lb/ft^2)	ASTM D-6460	6.0 min
Seedling Emergence (%)	ASTM D-7322	250 min
Tensile Strength (lb/ft)	ASTM D-6818	150 min
Material Mass / Unit Area (oz/yd^2)	ASTM D-6566	8.0 min
Thickness (in)	ASTM D-6525	0.25 min
UV Stability (% @ 500 hrs)	ASTM D-4355	80

B. Filter Fabric: Non-woven geotextile shall be nonwoven and needle punched pervious sheets of polyester, polyethylene, nylon, or polypropylene filaments formed into a uniform pattern conforming to the MIRAFI 140N or approved equivalent. The geotextile shall have minimum properties as stated in the following table, when measured in accordance with the referenced standards.

Test	Method	Nonwoven(1)

Grab Tensile Strength (lbs)	ASTM D-4632	120
Puncture Strength (lbs)	Modified ASTM D-3787 Using 5/16-inch flat tipped rod	65 min
Mullen Burst (lbs/in^2)	ASTM D-3786	225 min
Elongation at Required Strength (%)	ASTM D-4632	50 min
Equivalent Opening (US Standard Sieve)	ASTM D-4751	70-100
Permittivity (sec-1)	ASTM D-4491 with 60 mm Falling Head	1.7 min
Water Flow Rate (gal/min/ft^2) at 50 mm Constant Head	(2)	80-120

(1) All numerical values represent minimum/maximum average roll valves (i.e., the average of minimum test results on any roll in a lot should meet or exceed the minimum specified values).

(2) Water flow rate in gal/min/ft^2 shall be determined by multiplying permittivity in sec^{-1} as determined by ASTM D-4491 by a conversion factor of 74.

C. A geotextile fabric shall not be used between crushed stone and soil fill material at the base of retaining walls. Where separation between crushed stone and soil fill material is required, the crushed stone shall be choked by means of a soil filter.

D. A geotextile fabric shall be used to separate crushed stone used as a drain within or behind MSE and modular retaining walls and the backfill/natural soil.

2.3 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, not less than 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 PREPARATION

A. Furnish, install, and maintain shoring, sheeting, bracing, and sloping necessary to support the sides of earth and rock excavations, and to keep and prevent any movement which may damage adjacent structures, pavements, and utilities, damage or delay the work, or endanger life and health. Furnish, install, and maintain shoring, sheeting, bracing, and sloping as required by OSHA and other applicable government regulations and agencies.

B. All temporary shoring and bracing shall be designed, detailed, and stamped by a Professional Engineer registered in the State of Rhode Island.

C. Provide excavation support and protection in accordance with SECTION 31 50 00 EXCAVATION SUPPORT AND PROTECTION.

D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent building area and walkways.

E. The use of onsite, excavated material may require stockpiling to allow the material to dry prior to placement. Provide erosion-control measures as specified in the drawings and as required by the Owner's Representative to prevent erosion of piles during wet weather periods.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. The Geotechnical Report prepared for this project indicates that groundwater is present within the limits of excavation. The Contractor is made aware of this condition and shall include dewatering within his Lump Sum Bid.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system, specified in SECTION 31 23 19 DEWATERING, to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required at no additional expense to the Owner.

3.3 WORK IN FREEZING WEATHER

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees Fahrenheit.

B. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operation. Prior to terminating operations for the day, the final layer of fill, after compaction, shall be rolled with a smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks and compaction equipment.

C. The Contractor shall not place a layer of compacted fill on snow, ice, or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory materials will be required as directed by the Owner's Representative.

D. Do not excavate to full indicated depth when freezing temperatures may be expected, unless work can be completed to subgrade or piping can be installed and backfilled the same day. Protect the excavation from frost if placing of concrete or piping is delayed.

E. The Contractor shall keep the operations under this Contract clear and free of accumulation of snow within the limits of Contract Lines as required to carry out the work.

3.4 ROCK EXCAVATION

A. General

1. Rock excavation includes the removal of rock to the lines and grades shown on the plans and as specified within this Section and the disposal of the Rock off site by legal methods.
2. The Contractor shall obtain all necessary permit and licenses and pay all fees at no additional cost to the Owner.
3. All rock excavation shall be included within the original Contract Sum based upon the quantities provided in PART 4 - MEASUREMENT AND PAYMENT. Payment for rock excavation shall be adjusted in accordance with 4.1B.1 Quantities and Payment of Rock Excavation.
4. Unit prices for rock excavation include all labor, equipment, and materials required for removal of rock and hauling of rock off-site. Unit prices for rock excavation also include all labor, equipment, and materials required for replacement of rock excavation with approved materials where the rock excavation extends beyond the specified excavation limits. Any excavation beyond the specified excavation limits must be approved by the Owner's Representative prior to removal. Specified excavation limits for rock are specified in 3.4 ROCK EXCAVATION.
5. Rock capable of removal through standard excavation procedures shall be removed from the excavation, measured by the Contractor, and verified by the Owner's Representative.
6. The dimensions and quantity of the uncovered rock in place and the rock removed from the trench shall be measured by a Licensed Land Surveyor registered in the State of Rhode Island at the Contractor's expense. All survey information shall be supplied to the Owner's Representative for verification of the quantity. Survey information shall include the existing rock surface topography, the removed rock surface topography and the rock removal limits as specified herein.
7. If a change in the work occurs, which includes the excavation of additional rock outside the original contract limits, the Contractor shall uncover all rock to be removed. Upon uncovering rock in excavations that cannot be removed by standard excavation measures, the Contractor shall expose all faces of rock in the area that requires excavation and notify the Owner. The dimensions and quantity of the rock in place and the rock removed from the trench shall be measured by a Licensed Land Surveyor registered in the State of Rhode Island at the Contractor's expense. All survey information

shall be supplied to the Owner's Representative for verification of the quantity.

8. Rock shall be removed by mechanical means and methods.
9. Granular fill shall not be placed directly on rock surfaces containing voids. Suitably sized crushed stone or a geotextile for separation shall be placed on the fractured surface prior to placing the fill to limit migration of smaller particles into the voids.
10. In areas requiring rock excavations outside the limit of work, disturbed rock material shall be removed and replaced with Structural Fill or crushed stone within the footprint of the proposed building, and with Common Borrow beneath the pavement subbase of the proposed parking lots and driveways.

B. Rock Removal Limits

1. The Contractor shall remove rock to elevations, which will allow the installation of all foundations, footings, utilities, structures, trees and plantings, shown in the drawings.
2. The Contractor shall remove rock to a minimum of 30 inches below finished grade or 24 inches below the bottom of pavement and sidewalk areas, whichever is greater in paved areas and sidewalk areas and a minimum of 24 inches below finished grade in landscaped areas.
3. Around proposed utilities, the Contractor shall remove rock to the lines and subgrade elevations indicated on drawings and as dictated within this specification. The Contractor shall remove sufficient rock to permit the installation of permanent construction without exceeding the greater of 24 inches wider than pipe or 36 inches wide. The Contractor shall remove rock to at least 12" below the pipe invert.
4. Voids that result from boulder removal beneath paved areas shall be backfilled with compacted Common Borrow.

C. Rock Excavation for the Removal of Utilities and Utility Structures

1. Remove rock directly above and to the sides of piped utilities and utility structures proposed for removal without exceeding the following dimensions:
   a. 12 inches outside of concrete structures, walls, and footings.
   b. 12 inches from either edge of piped utility and 12 inches below piped utility
   c. 6 inches outside of edge of concrete cast against grade.
   d. 12 inches beneath bottom of concrete pads or slabs on grade.
2. Upon uncovering rock within a trench that cannot be removed by standard excavation measures, the Contractor shall expose all faces of rock within the trench and notify the Owner. The dimensions of the rock in place shall be measured by survey instrument by a RI Licensed Land Surveyor at the Contractor's expense and verified by the Owner's Representative.
3. Rock capable of removal through standard excavation procedures shall be removed from the trench, measured by the Contractor, and verified by the Owner's Representative.

3.5 EXCAVATION, GENERAL

A. Excavate to subgrade elevations. Material to be excavated will be classified as earth or rock. Do not excavate rock until it has been classified and quantified by the Contractor's land surveyor, and verified by the Owner's Representative

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with existing fill, buried organic soil, boulders, and other materials not classified as rock or unauthorized excavation.

2. The removal of buried organic soils shall extend laterally beyond the construction area a minimum distance as directed by the Owner's Representative. Buried organic soil shall be removed at least to a depth of 2' beneath the bottom of the subbase layer within proposed paved areas and under sidewalks. The exposed subgrade shall be proofrolled with a loaded rubber tire truck. Where soft zones are encountered, or deep ruts (deeper than 2 feet) the soft and rutting material shall be removed and replaced with Common Borrow. Contractor shall perform test pits at the start of construction to assess the presence and extent of buried organic soil.

3. The Contractor shall include in the Base Bid three (3) eight-hour days of test pits commencing at the start of construction to assess the presence of and the extent of buried organic soil. Contractor shall coordinate dates when the Engineer is available to observe test pits. Engineers reserve the right to stagger test pits over the course of the project and not complete in three consecutive days.

B. All topsoil and unsuitable or excess materials shall be stripped from areas of new construction or regrading. The removal shall extend beyond the construction area a minimum distance as directed by the Owner's Representative. Materials suitable for reuse shall be stored in locations and approved by the Owner's Representative that will not interfere with construction operations.

C. After the surficial topsoil is entirely removed from within the proposed paved areas and under sidewalks, the existing fill should be improved by compacting the exposed surface with at least six (6) overlapping passes of a vibratory roller compactor impacting a dynamic effort of at least 40 kips. Where soft zones of soil are observed, the soft soil should be removed, and the grade should be restored using Ordinary Fill to the bottom of the proposed subbase layer.

D. All excess and unsuitable materials shall be legally disposed of off-site by the Contractor.

E. Tree stumps, root balls, and roots larger than ½ inch in diameter shall be removed and the cavities filled with suitable material and compacted.

F. Topsoil, root balls, and other deleterious material shall be entirely removed from within the paved areas and sidewalks.

G. A minimum of 12" of Sand Gravel Fill or 4 inches of lean concrete shall be placed at the bottom of excavation to serve as a working mat.

3.6 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures

for placing and removing concrete formwork, for installing services and other construction, and for inspections.

B. All unsuitable and fill materials shall be removed from the proposed building area to a limit defined by a 1-horizontal to 1-vertical slope extending downward and outward from two feet outside the edges of the building footing to firm undisturbed glacial till or bedrock. Boulders encountered within these areas shall be removed to a depth of at least 12 inches below the bottom of footings. Voids that result from boulder excavations shall be backfilled with Granular Fill and compacted.

C. The existing Fill and buried organic soil referenced in the Geotechnical Report shall be entirely removed from within the proposed building footprint and site structures and should be replaced with Structural Fill. The removal should extend beyond the footprint of the proposed building a distance equal to the distance between the bottom of the proposed footings and the top of the natural sand and gravel or silt or 5 feet, whichever is greater.

D. Cobbles and boulders shall be removed at least 6 inches from beneath footings, and 24 inches beneath the bottom of proposed slabs. The resulting excavations shall be backfilled with compacted Structural Fill under the building.

E. Due to the high susceptibility of the natural soil for disturbance under foot and vehicular traffic, the Contractor shall place a minimum of 12 inches of Structural Fill or 4 inches of lean concrete at the bottom of the excavation to serve as a working mat.

F. The base of the footing excavations in granular soil shall be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade before placing the required 6 inches of Structural Fill.

G. The subgrade of the slab shall be compacted using a vibratory roller compactor imparting a minimum of 40 kips of force to the subgrade before placing Structural Fill.

H. The surficial topsoil, asphalt, concrete, existing fill, buried organic soil, and other deleterious matter shall be entirely removed from within the footprint of the proposed building and site structures before the start of foundation work.

I. To reduce the potential of increasing lateral pressures on retaining walls, fill placed within 3 feet of walls, if any, shall be compacted using a small plate compactor imparting a maximum dynamic effort of 4 kips. The fill within 3 feet of walls shall be placed in maximum 8-inch loose lifts.

J. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grade to leave solid base to receive other work.

1. Based upon the characteristics of the on-site soils, the influence area below footings is defined as the area under footings extending from 2-feet outside the bottom edge of footing downward at an angle of 1 horizontal to 1 vertical.
2. Construction staging for the proposed building shall be scheduled such that construction can proceed systematically and safely to avoid excavations within the influence areas of newly installed or existing footings. Where it will be necessary to excavate within influence areas, temporary support systems

will be required to retain the surrounding soil and safely support structure loads. The scheduling process shall consider the construction of structures within the project area and the construction of third-party structures that are adjacent to the project area.

3. The earth slope along the bottom of sloped footings (i.e., subgrade or bearing surface) shall not exceed a slope of 2 horizontal and 1 vertical to allow a stable subgrade to be provided prior to the placing of concrete

4. In fill areas within the building footprint, the soil subgrade shall be surface compacted with a minimum of six passes of a vibratory roller having a drum weight of at least 10,000 pounds and a dynamic force of at least 20,000 pounds. In the event that subgrade soils within the building area become disturbed during construction, they shall be over-excavated and replaced with one foot of compacted Sand Gravel Fill or six inches of ¾-inch Crushed Stone placed on a layer of filter fabric to stabilize the subgrade. The base of the footing excavations in granular soil shall be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade before placing the required 6 inches of Sand Gravel Fill. The subgrade of the slab shall be compacted using a vibratory roller compactor imparting a minimum of 40 kips of force to the subgrade before placing Sand Gravel Fill.

5. If the subgrade is wet, the Contractor shall over-excavate all footing excavations by 6 inches and place a working mat of ¾-inch Crushed Stone compacted to 95% underlain by filter fabric (Mirafi 140N or approved equivalent). Stone shall extend 2 feet beyond the edge of the footing on all sides. This working mat shall be provided by the Contractor in wet conditions at no additional expense to the Owner.

6. For footings supported on a minimum of 6 inches of Sand Gravel Fill places directly over natural sand and gravel or silt, the net allowable bearing pressure shall be a minimum of 4 kips per square foot.

7. Exterior footings and footings in unheated areas shall be placed at a minimum depth of 3 feet and 4 inches below the final exterior grade to provide adequate frost protection. Interior footings in heated areas may be designed and constructed at a minimum depth of 2 feet below finish floor grades.

K. Over-excavation by the Contractor, excavation below the proposed bottom of excavation, shall be backfilled in 6-inch lifts with compacted Sand Gravel Fill. In wet conditions, over excavation shall be backfilled in 6-inch lifts with 3/4-inch Crushed Stone and a layer of filter fabric approved by the Engineer and compacted to 95% until the proposed subgrade elevation is reached and the subgrade stabilized.

L. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

M. Buried organic soil shall be removed entirely from within the proposed building footprint and beneath structures.

3.7 SUBGRADE INSPECTION

A. Notify Owner’s Representative when excavations have reached required subgrade.

B. The Geotechnical Engineer shall observe the exposed subgrades prior to fill and concrete placement to verify that the exposed bearing materials are suitable for the design soil bearing pressure. If soft or loose pockets are encountered in the footing excavations, the soft or loose materials shall be removed, and the bottom of the footing shall be placed at a lower elevation on firm soil, or the resulting excavation shall be backfilled with Structural Fill or crushed stone wrapped in geotextile fabric for separation.

C. If the Owner's Representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

D. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic- tired equipment to identify soft pockets and areas of excess yielding. Do not proof- roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Continue this process until the area has been proof-rolled 6 times. Limit vehicle speed to 3 mph.
2. Proof-roll with a vibratory roller with a static weight of no less than 10,000 lbs and a dynamic effort of at least 40,000 lbs.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the Owner's Representative, and replace with compacted Structural Fill within the building footprint and Common Borrow beneath the subbase of paved areas.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Owner's Representative, without additional compensation.

F. The site soils are frost susceptible. Special measures shall be taken to prevent the subgrade from freezing including, but not limited to, the use of heat blankets or excavating the final six inches of soil just before pouring concrete. Footings shall be backfilled as soon as possible after footing construction. Filling operations shall be halted during freezing weather.

G. The Contractor shall keep subgrades properly drained and free of ponded water. Subgrades shall be protected from machines and foot traffic to reduce disturbance.

3.8 EXCAVATION OF UNSUITABLE MATERIALS

A. The Contractor shall notify the Owner's Representative and Engineer when excavations uncover potential unsuitable materials.

B. Payment for all excavation and disposal of Unanticipated Unsuitable Soils within the limit of excavation shall be included as part of the original Contract Sum.

C. Excavation and disposal of Unanticipated Unsuitable Soils outside the limit of excavation shall be paid for in accordance with the Unit Prices included in PART 4 - MEASUREMENT AND PAYMENT of this specification.

1. Unit prices for unanticipated unsuitable soils excavation include all labor, equipment, and materials required for removal of unsuitable soils, hauling of unsuitable soils off-site, and disposal. Unit prices for unanticipated unsuitable soil also include all labor, equipment, and materials required for replacement of unsuitable soil excavation with approved materials. Any unanticipated

unsuitable soil excavation must be approved by the Engineer and Owner's Representative prior to removal.

2. The dimensions and quantity of the Unanticipated Unsuitable Soils excavated shall be measured by a Professional Land Surveyor registered in the State of Rhode Island at the Contractor's expense. The Surveyor shall measure the elevations of the unsuitable materials prior to excavation and the surface topography following excavation. All survey information shall be supplied to the Owner's Representative for verification of the quantity. Survey information shall include the topography of the uncovered suitable soil surface prior to excavation and the topography of the final soil surface following excavation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

B. Concrete required to fill unauthorized excavation shall be furnished and installed at the expense of the Contractor.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations in locations approved by the Owner. Do not store within drip line of remaining trees.

3.11 BACKFILL GENERAL

A. The Contractor shall notify the Engineer and Owner's Representative a minimum of 2 days prior to backfilling utility trench to schedule inspection.

B. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation
2. Surveying locations of underground utilities for Record Documents
3. Testing and inspecting underground utilities
4. Removing concrete formwork
5. Removing trash and debris
6. Removing temporary shoring and bracing, and sheeting
7. Receiving approval from the respective Utility Company, and the Owners Representative following inspection

C. Place backfill on subgrades free of mud, frost, snow, or ice.

D. After rough grades have been established, but before placement of compacted "Granular Fill", exposed surfaces should be visually inspected and probed by the Owner's Representative. Frozen, wet, or loose soils and other undesirable materials should be removed.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact initial backfill conforming to the specified material requirements to the height specified on the Drawings over the utility pipe or conduit. To reduce the potential for damage to utilities, placement and compaction of fill immediately above the utilities shall be performed in accordance with the manufacturer's recommendations.

C. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

D. Place and compact final backfill of satisfactory soil to final subgrade elevation.

E. Bedding and backfill material shall be placed and compacted in maximum 6" lifts.

F. Where bedding/backfill material consists of crushed stone, crushed stone shall be wrapped in geotextile fabric.

G. Bottom of utility trenches shall be compacted to a firm and unyielding condition. Where soft or pumping material is encountered, it shall be removed and replaced with Common Borrow.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material that contains frozen material. Fill shall not be placed on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
3. The Contractor shall furnish water for compaction. Water for compaction from sources other than potable sources shall be as approved by the Owner's Representative.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Compaction shall be completed with a vibratory roller having a static weight of 10,000 lbs and a dynamic weight of 20,000 lbs.

C. The Contractor shall use caution when compacting near existing utilities including electric and communications duct banks. Any damage to existing utilities or structures resulting from compaction operations shall be repaired at the expense of the Contractor.

D. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

E. The Contractor is allowed to re-use excavated On-Site Common Borrow as fill in accordance with this specification. All On-Site Common Borrow used as backfill shall be compacted to the required percentage of maximum dry density included in the Minimum Compaction Requirements Table Below.

F. The Contractor is made aware that on-site Common Borrow is silty. The Contractor agrees to use this material at his own risk and is responsible for any additional work required to install this material in accordance with the specifications. In the event that project delays result from the additional time required to re-work On-Site Common Borrow placed as fill in accordance with the specifications, the Contractor shall remove material that does not meet the compaction requirements and provide imported fill meeting the specifications. This imported material shall be provided at no additional expense to the Owner. Any project delays resulting from additional time required to work this material are the responsibility of the Contractor and shall be made up elsewhere on the project.

G. Compact soil materials to not less than the following percentages of maximum dry density:

MINIMUM COMPACTION REQUIREMENTS TABLE	
Location	Percent of Maximum Dry Density [1]
Backfill below footings, within the building area and below slabs [2]	95
Backfill for foundation walls and frost walls	95
Backfill within pavement base and subbase layers	95
Backfill below pavement subbase layers	95
Around and above utilities within the building area	95
Around and above utilities in paved areas	95
Backfill behind retaining walls	95 [3]
Backfill within landscaped areas	90

[1] Maximum dry density as determined by the Modified Proctor test (ASTM D 1557)

[2] Building area is described as an area extending downward and outward from the outside edge of the footing at a 1H:1V slope.

[3] During compaction of fill placed behind retaining walls, care shall be taken so as to maintain uniform elevation along both sides within the embedded areas, and to not overstress the wall by applying too much compactive energy at the top of the wall.

3.15 SUBBASE AND BASE COURSE

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. Place subbase and base course on subgrade in 6-inch lifts and compact as specified.

C. Buried organic soil shall be removed at least to a depth of 2 feet beneath the bottom of the subbase layer of paved areas and sidewalks. The exposed subgrade shall be proofrolled with a loaded rubber tire truck. Where soft zones are encountered or deep ruts (deeper than 2 feet), the soft and rutting material should be removed and replaced with Ordinary Fill.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor shall engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed every 100 feet to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by the Owner's Representative.
2. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
3. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
4. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

D. When the testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specify tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Owner's Representative; reshape and recompact.

C. Where settling occurs remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by the Owner's Representative. If directed by the Owner, Contractor shall remove surplus satisfactory material from the site and dispose of in a legal manner.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3.19 GEOTEXTILES

A. Install Geotextiles in accordance with Manufacturer's recommendations.

3.20 BIORETENTION

A. Do not compact the base of the bioretention area.

B. If the biorentention base soils show signs of compaction, then utilize a primary tilling operation such as a chisel plow, ripper, or subsoiler to refracture the soil profile through the 12-in compaction zone.

C. Do not use heavy equipment within the bioretention basin.

D. Backfill bioretention soil in lifts of 12" to 18", loosely compacted.

E. Mix approximately ½ the specified mulch layer into the bioretention soil to a depth of approximately 4 inches.

F. Grade bioretention materials with light equipment.

G. Absolutely no runoff shall be allowed to enter the bioretention area until all contributing drainage areas have been stabilized.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Payment for earthwork to the lines and grades outlined in this Section or shown on the Drawings, whichever is deeper, including, but not limited to, all design, submittals, materials, labor, equipment, and all other incidentals associated with this work shall be included in the Contractor's Base Bid, i.e., shall be part of the lump sum bid cost and shall not be paid for using unit prices.

B. Unit prices for rock excavation include all labor, equipment, and materials required for removal of rock and hauling of rock off-site. Unit prices for rock excavation also include all labor, equipment, and materials required for replacement of rock excavation with approved materials where the rock excavation extends beyond the specified excavation limits. Any excavation beyond the specified excavation limits must be approved by the Owner's Representative prior to removal. Specified excavation limits for rock are specified in 3.4 ROCK EXCAVATION.

1. Quantities and Payment of Rock Excavation

a. The Contractor shall include in the Base Bid 10 cubic yards of trench rock and its removal from site.

1) The Unit Price for Trench Excavation rock removal as specified herein shall not exceed $235.00 per cubic yard.

C. Unit prices for unanticipated unsuitable soils excavation include all labor, equipment, and materials required for removal of unsuitable soils, hauling of unsuitable soils off-site, and disposal. Unit prices for unanticipated unsuitable soil also include all labor, equipment, and materials required for replacement of unsuitable soil excavation with approved materials. Any unanticipated unsuitable soil excavation must be approved by the Owner's Representative prior to removal.

1. Quantities and Payment of Unanticipated Unsuitable Soil Conditions:

a. If unanticipated unsuitable materials are encountered beyond the limits of excavation as specified in the Drawings and Specifications, the Contractor shall notify the Owner's Representative in writing. The Contractor shall carry excavation deeper and replace the excavated material with appropriate specified material or concrete as directed by the Owner's Representative or Geotechnical Engineer.

b. Removal of topsoil, subsoil, and rock layer as specified in this specification will not be considered as unanticipated unsuitable soil conditions. Similarly, removal of these materials within paved areas as specified herein will not be considered unanticipated unsuitable soil conditions.

c. The Geotechnical Report indicates Fill and Sand layers within the limit of disturbance. Removal of these materials will not be considered as unanticipated unsuitable soils. Similarly, removal of these materials within paved areas as specified herein will not be considered unanticipated unsuitable soil conditions.

d. Only changes in the work authorized in advance by the Owner's Representative in writing shall constitute an adjustment in Contract Price.

e. Material that is too wet or too dry for compaction of the particular material in place as determined by the Owner's Representative or the Geotechnical Engineer and/or Soil Testing Company and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall be removed and replaced with approved material as directed by the Owner's Representative or Geotechnical Engineer at no additional cost to the Owner.

f. The Contractor shall follow a construction procedure, which permits visual identification of firm natural ground.

g. The Contractor shall carry in the Base Bid 100 cubic yards for removal of unanticipated unsuitable materials and replacement with suitable compacted fill material measured in place, as directed herein. The Base Bid shall cover all costs related to such excavation, removal off site, and replacement with compacted fill of approved material, overhead, and profit. No amount other than the Unit Price provided by the Contractor will be paid by the Owner for excavation herein defined.

1) The Unit Price for unanticipated unsuitable soil materials removal as specified herein shall not exceed $45.00 per cubic yard.

D. All quantities of unanticipated unsuitable soils and rock excavated are to be measured in place by a Professional Land Surveyor registered in Rhode Island as described above and verified by the Owner's Representative prior to removal.

E. The Contractor shall submit signed slips showing quantities of Unanticipated Unsuitable Soils and Rock removed from excavations at the end of each workday, with a total quantity mutually agreed upon. Slips shall be signed by the Owner's on- site representatives at the end of each day signifying that the quantities are accurate. The Owner has the right to inspect individual loads, slips and quantities as they arrive at or leave from the site and as they are weighed out at the stone quarry. These quantities are for reference only and will not be used to calculate payment with the unit prices above.

End of Section

Section 31 11 00
SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. The work of this Section includes the following:
   1. Provisions for protection of all existing utilities from damage particularly at heavy construction vehicle crossings.
   2. Removal, disposal, capping or plugging of drainage, sewer, gas, steam, and water piping at the locations specified on the drawings.
   3. Removal and disposal of flexible pavement, curbing, concrete entrance ramps, and concrete walks at the locations specified on the drawings.
   4. Removal and disposal of catch basins, manholes, cisterns, utility structures.
   5. Removal and disposal of steps, stairs, signs, and fence.
   6. Cleaning and maintenance of the site and stormwater management system.

B. Related Sections include the following:
   1. Section 31 00 00 Earthwork

1.4 DEFINITIONS

A. Cleaning as described in Subsection 212.01.2a of the State Standards.

B. Maintenance as described in Subsection 212.01.2b of the State Standards.

C. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

D. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.5 MATERIAL OWNERSHIP

A. Cleared materials shall become Contractor's property and shall be removed from Project site.

B. The Owner reserves the right to claim ownership over any materials removed from the site, including earthwork. The materials claimed by the Owner shall be stockpiled on the site as directed.

1.6 SUBMITTALS

A. Shop Drawings:

1. Submit drawings or details indicating proposed provisions for protection of existing gas line and utilities as the work requires. These utilities must be protected from damage particularly by heavy construction equipment driving over the top of them.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner, Owner’s Representative, and Architect not less than two weeks in advance of proposed utility interruptions in writing. Renotify in writing 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.
3. Underground utilities were compiled from available record plans and visible aboveground locations and are considered approximate only. Prior to commencing any excavation effort, the Contractor shall contact “Dig Safe” at 1-888-Dig Safe to verify locations of existing underground utilities in areas of proposed excavation.
4. The Contractor shall locate existing utilities within the project area using Ground-Penetrating Radar or other nondestructive survey methods. The Contractor shall be responsible for any existing utilities or structures within the project area depicted and not depicted on the plans. Any damage to existing working utilities or structures not intended to be removed shall be restored to original condition at no additional cost to the Owner.
5. The Contractor shall conduct a Ground-Penetrating Radar survey within the building footprint. Any subsurface features found as a result of the scan shall be removed and disposed.

B. The Contractor is responsible to schedule the work and determine any required temporary utility lines and connections required to keep the existing facilities in operation. The cost to furnish and install temporary utility lines and connections shall be included in the Contactor’s base bid.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with the utility companies to shut off services if lines are active.

D. Contractor shall not operate existing water gate valves and hydrants. Only utility company employees or designated personnel are authorized to operate Water System valves and hydrants.

E. All abandoned underground utilities shall be designated on as-built drawings by the Contractor of record and provided to the Owner and Engineer in AutoCAD electrical format prior to completion of the project. All as-built drawings, (underground and above ground) shall be dimensioned from permanent benchmarks such as existing buildings and include depths at various points throughout the extent of the work, and invert elevations at all structures.

F. Do not commence site operations until temporary erosion and sedimentation control measures are in place.

G. Removal of all asbestos piping or structures, if found, shall be in accordance with Subsection 201.03.8 of the State Standard Specifications.

H. Contractor shall be responsible to monitor weather and adjust erosion, sediment, and dewatering controls as required to prevent temporary flooding from damaging property within the limit of work and all areas upstream and downstream of the site.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Contractor shall provide all materials and equipment in suitable and adequate quantity as required to accomplish the work shown and specified.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction. The Contractor shall employ a Professional Land Surveyor registered in the State of Rhode Island to perform a benchmark and field verification survey prior to commencing work. The Contractor is responsible to provide horizontal and vertical layout of all proposed work.

B. Locate and clearly flag trees and vegetation to remain or to be relocated. Review trees with Owner and Landscape Architect prior to removal.

C. Protect existing site improvements to remain from damage during construction.

D. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 REMOVE AND DISPOSE SEWER, DRAINAGE, AND OTHER GRAVITY UTILITY PIPING

A. All pipe or conduit designated to be removed shall be so-removed and legally disposed of off-site. Drain pipes or other pipes, ducts, etc., cut and deemed advisable to remain in the earth shall be plugged with concrete, except that metal drain pipes may be sealed with screw type plugs or caps. Drain pipes or other pipes that are cut for a new connection shall be temporarily capped and sealed water tight to prevent sediment or water from entering the utility.

B. The Contractor shall cooperate with the Owner and utility companies so that the demolition work may be performed in accordance with their regulations and with the approval of the Owner.

C. Removal of all asbestos cement pipe, if found, shall be in accordance with Subsection 201.03.8 of the State Standard Specifications.

3.3 REMOVE AND DISPOSE WATER

A. Only utility company employees or designated personnel are authorized to operate Water System valves and hydrants.

B. Once valves are closed, pipe shall be cut and cleaned prior to being capped with a watertight heavy-duty cap.

C. Cap shall be thoroughly cleaned of any dust, dirt or deposits prior to installation.

D. Install concrete thrust block as required. If the cap and thrust block will be later removed for a connection, install the thrust block to not damage the water main upstream of the cap.

3.4 REMOVE AND DISPOSE CONCRETE UTILITY STRUCTURES

A. All concrete utility structures designated to be removed shall be so-removed and legally disposed of off-site. The Contractor shall cooperate with the Owner and utility companies so that the demolition work may be performed in accordance with their regulations and with the approval of the Owner’s Representative.

3.5 REMOVE AND DISPOSE GAS

A. All gas mains, services, valves, and appurtenances shall be removed and demolished in accordance with National Grid, the utility company, requirements. Contractor shall coordinate all work adjacent to gas with National Grid prior to commencing work.

3.6 REMOVE AND DISPOSE FLEXIBLE PAVEMENT, CURBING, CONCRETE RAMPS, AND CONCRETE WALKS

A. In accordance with Subsections 201.03.7, and 201.03.10 of the State Standard Specifications.

3.7 DISPOSAL

A. Disposal: Remove surplus soil material, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property. Any potentially contaminated soil material encountered, as specified by the State of Rhode Island Department of Environmental Management rules and regulations, shall be brought to the Rhode Island Resource Recovery Corporation or another appropriately licensed waste facility for legal disposal.

B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.8 CLEANING AND MAINTENANCE OF STORM DRAIN SYSTEM

A. The Contractor shall remove sediment and debris from the existing drainage system prior to commencing work.

B. During construction the Contractor shall be responsible to clean sediment and debris from the existing and recently installed drainage system.

C. Prior to project completion the complete drainage system shall be cleaned of all debris and sediment.

End of section

Section 31 23 19
DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 of the Rhode Island Department of Transportation Standard Specifications Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. This Section includes construction dewatering for all earthwork, demolition, excavation, trenching, utility trenches and utility structure installation.

B. Related Sections include the following:

1. Section 31 00 00 – Earthwork.
2. Section 31 50 00 – Excavation Support and Protection.

1.4 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.

B. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.

C. Prevent surface water from entering excavations by grading, dikes, or other means.

D. Accomplish dewatering without damaging existing buildings adjacent to excavation.

E. Remove dewatering system if no longer needed.

F. The groundwater level shall be maintained at 12” beneath the bottom of excavation or deeper until the excavation is backfilled to at least 2 feet above the groundwater level.

1.5 SUBMITTALS

A. Shop Drawings for Information:

1. For dewatering system. Show arrangement, locations, and details of dewatering locations; locations of erosion controls, dewatering basins, and tanks.
2. Qualifications as described herein.

3. Include a written report outlining control procedures to be adopted if dewatering problems arise.
4. The dewatering submittal shall include a plan clearly showing locations, depth, and size of deep stationary pumps.

B. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.

C. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.
1. At no time is discharge to be allowed to enter an existing drainage structure without sedimentation controls. Any damage caused by dewatering will be repaired in full to match existing conditions at the Contractor's expense.
2. At no time is discharge allowed to enter the existing sanitary sewer system.

B. Qualifications
1. The design, installation and operation of any dewatering system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Engineer that he specializes in the design and operation of dewatering systems. The vendor shall provide at least five (5) references of projects of similar size and complexity in dewatering performed by his firm within the past three years within New England.
2. The Contractor may hire a Professional Engineer Registered in the State of Rhode Island to prepare dewatering system.

1.7 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the Owner's Representative and then only after arranging to provide temporary utility services according to requirements indicated.

B. Make additional test borings and conduct other exploratory operations necessary for dewatering.

C. Contractor shall be responsible to monitor weather and adjust dewatering controls as required to prevent temporary flooding from damaging property within the limit of work and all areas upstream and downstream of the site.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Contractor shall provide any equipment and materials necessary for dewatering at the Contractor's own expense. This includes any equipment and materials to capture, convey, remove sediment, and discharge groundwater.

B. If required, the Contractor shall provide tanks capable of removing sediment from dewatering discharge as required to ensure a clean discharge from the site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

B. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

C. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

D. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

E. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

F. Provide erosion controls in accordance with the Rhode Island Soil Erosion and Sediment Control Handbook.

G. Dewatering basins capable of handling the flows directed to them shall be supplied whenever dewatering is required.

H. If required, the Contractor shall provide tanks capable of removing sediment from dewatering discharge as required to ensure a clean discharge from the site.

I. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils and no additional expense.

3.2 INSTALLATION

A. Install dewatering system utilizing pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, utilities, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required. The groundwater level shall be maintained at 12 inches beneath the bottom of excavation or deeper until the excavation is backfilled to at least 2 feet above the groundwater level.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of drains, sewers, utilities and other excavations.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others.

E. Provide sumps, dewatering basins, sedimentation tanks, and other flow-control devices to avoid erosion and sedimentation.

F. Direct discharges to storm drains will be unacceptable unless proper sediment and siltation removal devices are installed prior to discharge to the storm water conveyance system.

G. Any discharge of water, generated from a dewatering operation, into wetlands or an open water body will not be permitted.

H. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

I. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

J. Damage including, but not limited to, erosion or sedimentation, resulting from untreated dewatering discharges shall be restored to meet or exceed the existing condition. All remedial work shall be completed in accordance with local and State Environmental Regulations and Requirements at no additional cost to the Owner.

3.3 PROPERTY LOSES FROM REMOVAL OR DISTURBANCE OF GROUNDWATER

A. Any structure, including but not limited to embankments, buildings, streets, and utilities that become unstable or vulnerable to settlement due to removal or disturbance of groundwater will be supported immediately by the Contractor. Support shall include but not be limited to bracing, underpinning, or compaction grouting.

B. All loss or damage arising from removal or disturbance of groundwater, including but not limited to claims for subsidence and the loss of structure support, that may occur in the prosecution of the work shall be sustained and borne by the Contractor. If the Contractor needs to correct the damage resulting from his operations, the Owner may, 30 days after notifying the Contractor in writing, proceed to repair, rebuild or otherwise restore such damaged property as may be deemed necessary, and the cost thereof shall be deducted from compensation which may be or become due the Contractor under this Contract.

C. Materials that are unstable as a result of inadequate construction dewatering, excessive subgrade disturbance, or other means and methods used by the Contractor are not considered unsuitable materials. This includes materials that were stable and have become unstable. Such materials should be removed and replaced with suitable backfill at no additional cost to the Owner.End of Section

Section 31 32 00
EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

B.

1.3 SUMMARY

A. The work of this Section includes the following:
   1. Provision of temporary erosion and sediment controls and permanent site stabilization, specifically compost filter socks, baled straw erosion checks, temporary diversions, temporary sediment traps, and catch basin inlet protection as indicated on the drawings or as directed by the Owners Representative.
   2. Maintenance and cleaning of erosion and sedimentation controls specifically compost filter socks, baled straw erosion checks, temporary diversions, temporary sediment traps, and catch basin inlet protection as necessary or as directed by the Owner’s Representative.

B. Related Sections include the following:
   1. Section 31 00 00 Earthwork.
   2. Section 31 23 19 Dewatering

1.4 DEFINITIONS

A. Cleaning as described in Subsection 212.01.2a of the State Standards.

B. Compost Filter Sock: Three-dimensional tubular filtration device constructed by filling a mesh tube with a compost filter media.

C. Landscaping materials including but not limited to, loam and seed as described in Landscape Plans and Specifications.

D. Maintenance as described in Subsection 212.01.2b of the State Standards.

1.5 SUBMITTALS

A. Shop Drawings:
   1. Product information depicting that the products furnished meet the project specifications.

2. Provide a Phasing Plan for each phase of the proposed work. Use the Soil Erosion and Sediment Control Plan prepared for the project and approved by RIDEM to prepare a Phasing Plan for each construction phase depicting the location of the following:
    a. portions of the site that will be exposed
    b. areas that will be temporarily seeded
    c. construction entrances
    d. laydown areas
    e. general temporary grading scheme
    f. temporary diversions or swales
    g. temporary sediment traps
    h. perimeter sediment barriers,
    i. dewatering areas
    j. concrete washout areas
    k. designated fueling areas

1.6 PROJECT CONDITIONS

A. Do not commence operations which disturb the ground surface until temporary erosion and sedimentation control measures are in place.

B. The Contractor is responsible to follow the “Soil Erosion and Sediment Control Plan” prepared for this project. This Plan has been reviewed by RIDEM and is subject to the RIPDES program. The Contractor is required to meet all conditions of this permit document.
    1. The Contractor shall provide Phasing Plans depicting the information requested herein and any other pertinent information. The Contractor is responsible to update this Phasing Plan prior to expanding the work area and exposing additional portions of the site.

C. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division.
    1. Erosion controls and the first Phasing Plan shall be discussed at this meeting.

D. The Project site includes several outfalls directly to a stream. Contractor shall regularly monitor stream to confirm sediment is not discharged through the existing drain system to the stream.

E. Should sediment migrate from the site during construction, Contractor shall be responsible to remove sediment, and fully restore downstream areas to meet or exceed existing conditions.

F. In the event the RIDEM issues a notice of violation to the project, Contractor shall be fully responsible to pay all fee and fines in addition to paying for all engineering and permitting services required to satisfy RIDEM and the Owner that issues are resolved.

G. Contractor shall furnish and install all materials and provide temporary measures needed to prevent erosion and sediment from leaving the site during construction until the site is stabilized. Contractor is made aware that this will require more work than depicted on the Plans and will include in the Lump Sum Bid.

H. Contractor shall be responsible to monitor weather and adjust erosion and sediment controls as required to prevent temporary flooding from damaging property within the limit of work and all areas upstream and downstream of the site.

PART 2 - PRODUCTS

2.1 EROSION AND SEDIMENTATION CONTROL MEASURES

A. Compost Filter Sock.
1. Materials shall be in accordance with AASHTO Designation: MP 9-06. Compost material shall meet applicable Federal and State Regulations.
2. For compost filter socks 18” or less in diameter, wooden stakes shall be 1 inch by 1 inch, at 10-foot intervals on center, and of a length that shall project into the soil 1 foot leaving 3 to 4 inches protruding above the filter sock.
3. For compost filter socks greater than 18” in diameter, wooden stakes shall be 2 inch by 2 inch, at 10-foot intervals on center, and of a length that shall project into the soil 1 foot leaving 3 to 4 inches protruding above the filter sock.

B. Strawbales as described in Subsection 206.02.1 and 206.02.2 of the State Standards.
1. Haybales are not acceptable.
2. Provide strawbales in substitution for haybales in conformance with Subsection 206.02.1 of the State Standards.
3. Strawbales shall have a minimum cross section measuring 18” x 18” with a minimum 36” length.
4. Wood stakes shall be oak and conform to the dimensions shown on the plans.

C. Temporary Turf Reinforcement Mat
1. Temporary turf reinforcement mats shall be North American Green Product SC150 or approved equivalent.
2. Temporary turf reinforcement mat shall be degradable after 12 to 24 months
3. Provide a temporary turf reinforcement mat designed to stabilize a 3:1 slope or greater.

D. Filter Fabric
1. See Geotextiles in Division 2 Section 31 00 00 “Earthwork” for specification.

E. Loam
1. In accordance with Section M.18.01 of the State Standards.

F. Seed Mixtures
1. In accordance with Section M.18.10 of the State Standards.

G. Temporary Seed
1. Provide temporary seeding in accordance with Section M.18.10.5 Temporary Seed Mix of the State Standards.

H. Temporary Sediment Traps, Swales, and Diversions
1. Refer to Section 310000 Earthwork for soil materials and excavation.
2. Provide temporary seeding.
3. Provide turf reinforcement mat as required to stabilize side slopes.

I. Construction Accesses

1. Construction Accesses shall comply with RIDOT Standard Specification Section 211.

PART 3 - EXECUTION

3.1 PROVISION OF COMPOST FILTER SOCKS

A. Trenching is not required, for typical installation; therefore, soil should not be disturbed upon installation. Compost filter socks shall be placed over the top of ground and wooden stakes shall be driven through the center of the filter socks to anchor them to the ground. To ensure optimum performance, heavy vegetation shall be cut down or removed and extremely uneven surfaces shall be graded to ensure that the compost filter sock uniformly contacts the ground surface.

B. Compost filter socks may be vegetated by incorporating seed into the compost prior to placing it in the tube.

C. The ends of the compost filter sock shall be directed upslope, to prevent stormwater from running around the end of the sock.

3.2 PROVISION OF BALED STRAW EROSION BARRIERS AND CHECK DAMS

A. In accordance with Subsection 206.03.1 of the State Standards.

B. Baled hay is not permissible.

C. Baled straw shall be utilized in place of baled hay.

3.3 TURF REINFORCEMENT MAT

A. Install turf reinforcement mat on all exposed cut/fill slopes with a slope 3:1 or greater to protect against rainfall and wind erosion and hold moisture content to enhance vegetation growth in seed where shown in the plans.

B. Install erosion control lining in the required locations immediately after the areas has been seeded.
   1. Place the turf reinforcement mat over the seed mulch to fit against the contours of the area. It shall be applied without stretching, lie smoothly but loosely, and be free of wrinkles and bunches. Roll the material in place and in the direction of the flow of surface water. Anchor the up-grade end of the erosion lining in a narrow trench 6” deep. Firmly tamp the trench backfill in place.
   2. In ditches and on slopes, provide check or junction slots at no greater than 50’ intervals.
   3. Where the turf reinforcement mat comes into contact with the edges of catch basins or other structures, place a tight fold in the edge of the material and bury it a minimum of 6” into the soil.
   4. Install staples no more than 6” apart at all anchor, junction or check slots.
   5. Where two lengths of turf reinforcement mat are joined, the end of the upgrade strip shall overlap the downgrade by a minimum of 6” strip and the two strips shall be anchored together.

3.4 MAINTENANCE AND CLEANING OR EROSION AND POLLUTION CONTROLS

A. In accordance with Subsection 212.03 of the State Standards.

B. Repair all erosion controls until substantial completion and request inspection and approval of the condition of the protection from the Owner's Representative.

3.5 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the Drawings.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Following stabilization of the site and the receipt of permission from the Owner's Representative, the Contractor shall remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.6 DISPOSAL

A. Disposal: Remove surplus soil material, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property. Any potentially contaminated soil material encountered, as specified by the State of Rhode Island Department of Environmental Management rules and regulations, shall be brought to the Rhode Island Resource Recovery Corporation or another appropriately licensed waste facility for legal disposal.

B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.7 PREPARATION

A. Restore damaged improvements to their original condition, as acceptable to Owner.

3.8 TEMPORARY SEEDING

A. In accordance with Subsection L.02 for Type 3 Temporary Seeding of the State Standards:

3.9 CONSTRUCTION ACCESSES

A. In accordance with Section 211 Construction Accesses of the State Standards.

End of Section

Section 31 50 00
EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. This Section includes temporary excavation support and protection systems.

B. Related Sections include the following:
   1. Section 31 23 19 - Dewatering.
   2. Section 31 00 00 - Earthwork.

1.4 PERFORMANCE REQUIREMENTS

A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
   1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.
   2. Prevent surface water from entering excavations by grading, dikes, or other means.
   3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

B. The Contractor assumes all responsibility for the excavation support systems used. In the event of a failure, all resulting damages are the responsibility of the Contractor.

1.5 SUBMITTALS

A. Shop Drawings for Information: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.
   1. Include Shop Drawings signed and sealed by a qualified Registered Professional Engineer licensed in the State of Rhode Island.
   2. Working drawings and details on the excavation support proposed by the Contractor shall be provided along with detailed calculations showing the design of the bracing and sheeting proposed also stamped by a Registered Professional Engineer licensed in the State of Rhode Island.

3. Working Drawings and design calculations, at a minimum, shall indicate the following:
    a. Design criteria.
    b. Details, arrangement and method of assembly and disassembly of proposed system and sequence of construction.
    c. Connection details.
    d. Method of preloading the bracing.
    e. Full excavation depth.
    f. Loads on support system for various stages of excavation and bracing removal.
    g. Expected equipment loads.
    h. Maximum design load carried by various members of support system, and preload values.
    i. Depths below main excavation to which support system will be installed.
    j. Methods of resolving difficulties arising from misalignment of soldier piles or steel sheetpiling exposed during excavation, and criteria for implementing procedures.
    k. Design calculations, for various stages of excavation and bracing removal.
    l. Existing utility facilities. After checking locations by field investigations, revise drawings to show actual locations of facilities and excavation supports interference with proposed Work, and measures proposed to overcome such interferences.
    m. Manufacturer’s product data.
4. Design Computations: The Contractor shall also submit complete computations for the design of the sheeting and bracing system(s) proposed to be installed.
    a. The design shall be in accordance with sound engineering practice and modern, accepted principles of soil mechanics.
    b. The design shall include the effects of all surcharge which may be reasonably anticipated.
    c. The minimum factor of safety for each of the design conditions required to be considered shall be 1.50.

B. Qualification Data for Installer and Professional Engineer.

C. Submittal Review:
1. The design and layout will be reviewed by the Engineer as to type and suitability, providing that the arrangements presented by the Contractor are satisfactory, but such review will not relieve the Contractor of the sole responsibility for the adequacy of the system, nor shall it be construed as a guarantee that the Contractor's proposed equipment, materials and methods for sheeting and bracing will be adequate for the work required at the locations of and for the work required by this contract.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

B. The Contractor may make test borings and conduct other exploratory operations necessary for excavation support and protection.

C. Survey adjacent structures and improvements adjacent to the excavation support system to monitor settlement. Employ a qualified professional engineer or land surveyor to establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations during construction.

D. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Owner's Representative if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

1.7 QUALITY CONTROL

A. Provide in accordance with the requirement as specified in Division 1 Specification Sections.

B. Support of Excavation shall be of sufficient strength to safely sustain all loads from the sides of the excavations, together with all water pressure and reasonable surcharge.

C. The Contractor shall, at all times, be entirely responsible for the adequacy of sheeting and bracing used:

1. to permit the satisfactory and safe installation and construction of the work;
2. to provide adequate protection against damage to all existing utilities, structures, and completed portions of the work; and
3. to prevent injury to persons.

D. The Contractor shall control, and pitch, the grading to prevent water from running into the excavated areas of the structures, or to prevent damage to other structures or work already accomplished.

1. Welding Operations – in accordance with AWS D1.1

1.8 DESIGN CRITERIA

A. This design criteria applies where the Contractor is responsible for design of the excavation support:

1. Design the excavation support system in accordance with the earth pressures and other detailed criteria indicated.
2. Design the excavation support system to support the earth pressures, decking system and AASHTO HS20 traffic loads if any, utility loads, equipment and construction loads, and other surcharge loads to allow the safe and expeditious construction of the permanent structures without movement or settlement of the ground, and to prevent damage to, movement or settlement of, adjacent buildings, structures, or utilities.

3. Design sheet pile and soldier pile and lagging excavation support systems to penetrate to a depth below the bottom of excavation adequate to prevent lateral and vertical earth movement, and permit lowering of the indicated bottom of excavation at least two feet without any change in the support system as installed except for additional lagging and bracing for soldier pile and lagging systems.
4. Design the bracing system to furnish sufficient reaction against the side banks to maintain stability in such banks. Obtain such reaction by timely stressing to predetermined locations until the necessary reaction is produced against the banks, or by such other methods that may be necessary to prevent displacement of ground and movement of structures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel:
1. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
2. Steel sheet piling – ASTM A328,: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

B. Lagging:
1. Timber Lagging: use sound, well-seasoned Douglas Fir of rectangular cross section, Grade 2 or better. Timber shall be stamped and certified ALOPB LP-22 by the American Preserves Bureau.
2. Moisture Content shall not exceed 20%.
3. Minimum fiber stress in bending perpendicular to the grain shall be 1200 psi.

C. Timber Sheeting:
1. Any species of wood sheets that will satisfactorily withstand all driving and construction stresses and the loads, to which the members will be subjected, may be used for sheeting and bracing.
2. Wood sheeting shall not be less than three (3) inches nominal thickness.
3. All timber sheeting and bracing shall be free from worm holes, windshakes, loose knots, decayed or unsound portions of other defects which might impair its strength or tightness.

D. Other Materials:
1. The Contractor shall provide all hardware and fastenings necessary to accomplish satisfactory installation of all sheeting and bracing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Sheeting and bracing shall be of sufficient strength to sustain all loads from the sides of the excavations, together with all water pressure and surcharge.

B. The Contractor shall be entirely responsible for adequacy of sheeting and bracing used, and shall take all precautions necessary to prevent movement of material

along the sides of excavations, and to prevent the intrusion of water beyond that which his pumping or well point system can control.

C. Sheeting shall be permanently left in place where indicated or directed.

D. It is expressly understood and agreed that whenever sheeting and bracing is used, it shall not relieve the Contractor of the sole responsibility for any damages, delays, or injury due to installation or failure of the sheeting or bracing, or the settling of the backfill, the pipeline, or the adjacent ground.

3.2 TIMBER SHEETING

A. Sheeting shall be driven to sufficient depth below the deepest excavation level to maintain sufficient restraint of the adjacent soil and to prevent movement of the sheeting or excessive intrusion of groundwater.

B. If voids occur behind the sheeting, they shall be filled immediately with proper material from earth excavation or other sources to the satisfaction of the Engineer.

C. Withdrawal of sheeting shall be carefully performed to prevent movement of material along the sides of the backfilled excavations, to prevent damage to utilities, structures, or the work, and to avoid injury to persons.

D. Unless otherwise permitted, sheeting shall be withdrawn in lifts of not more than four (4) feet, and all voids shall be filled immediately with selected materials and thoroughly compacted.

3.3 STEEL SHEET PILING

A. Install in plumb position with each pile interlocked with adjoining piles for its entire length so as to form a continuous diaphragm throughout the length of each run of wall, being tightly against original ground. Use vibratory pile driver to install sheeting to depth required for design. The equipment and methods of installation, cutting, and splicing shall conform to the approved Working Drawings.

B. Steel sheet piling located within a one to one slope from the bottom of the foundation element shall not be removed.

3.4 SOLDIER PILES AND LAGGING

A. Provide bored holes for soldier piles adequate to accommodate pile sections shown on approved Working Drawings. Extend holes to necessary depth below level of subgrade. When pre-boring is to occur within two feet of a utility, uncover utility and install a steel drill casing to a level at least six inches below bottom of utility prior to pre-boring.

B. Carry bottom of sheeting system to a depth below main excavation adequate to prevent lateral movement and to obtain adequate vertical support. In areas where additional excavation is required below main excavation subgrade, prevent movement of main excavation supports.

C. Encase soldier piles with 2500 psi concrete up to lowest point of excavation adjacent to pile location. Fill remainder of hole with lean concrete, completely encasing pile.

D. Use timber lagging secured in place to soldier piles.

E. Follow excavation closely with placement of lagging. Do not allow height of unlagged face of excavation to exceed five feet in rock and predominately clayey soils, or three feet in sandy soils. Extend lagging to final subgrade. Decrease height as required to prevent ground movement.

F. Do not permit height of unlagged face to exceed 15 inches if water flows from face of excavation, or if soil (of any type) in face moves towards excavation area. Decrease unlagged face height as required to prevent ground movement.

G. Carefully perform excavation for installation of lagging to minimize formation of voids. Separate lagging members only as necessary to permit packing behind them.

H. Pack behind lagging as installation progresses; establish tight contact between excavation face and lagging. Pack openings between lagging members with straw or other suitable material to allow free drainage of water without loss of soil or sand packing.

I. If unstable material is encountered during excavation, take suitable measures to contain unstable material in place and prevent ground displacement, which may cause damage.

J. Maintain sufficient quantity of material on hand for lagging, bracing and other operation for protection of Work and for use in case of accident or emergency.

3.5 SUPPORT SYSTEMS WITH INTERNAL BRACING

A. Use walers, struts, and rakers as necessary to provide internal support of excavation faces retained by soldier piles. Internal columns are unacceptable.

B. When walers are used, obtain tight bearing between wales and wall, and ample bearing area with starpack for load transfer.

C. Provide struts as indicated and intermediate bracing as needed to enable struts to carry maximum design load without distortion or buckling.

D. Provide diagonal bracing as needed for stability of system.

E. Include web stiffeners, plates or angles as needed to prevent rotation, crippling or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly.

F. Install and maintain internal bracing support members in tight contact with each other and with surface being supported. Attach struts to wales using direct end bearing vertical plate (shimmed) connections at all levels.

G. Design internal bracing support members for maximum forces occurring during excavation or removal stages.

H. Preloading:

1. Preload internal bracing members, including struts, (except deck beams), shores and similar members, to 50 percent of design compression load occurring during excavation phase.
2. Use procedures that produce uniform loading on bracing members without inducing appreciable eccentricities or overstressing and distortion.

3. Make provisions for permanently fixing each member with steel shims or wedges welded into place.
4. Accomplish preloading by jacking supports in place against soldier piles or wales.
5. Do not use wooden wedges to preload bracing member.
6. Include in preloading system means to determine, within five percent, amount of preload induced into bracing members.

I. If decking beams are not required, or if decking beams are not designed to support excavation loads, install uppermost tier of bracing at vertical distances not more than eight feet below top of excavation.

J. Install tiers of internal bracing with a vertical distance between them and level of excavation below of not greater than 15 feet. Reduce maximum vertical distance to nine feet where ground movement and settlement shall be minimized to prevent damage, where indicated or as directed.

K. Excavate below point of support as indicated. Install bracing, and preload immediately after installation and before continuing excavation.

L. When removing struts, increase vertical spacing provided invert slab has been place for at least ten days and support system is adequate to support, safely, adjacent structures and works.

M. Vertical spacing of bracing may be increased when removing struts, provided support system is adequate to support adjacent structures and works.

3.6 REMOVAL OF SUPPORTING SYSTEM

A. When removing excavation support system, do not disturb or damage adjacent buildings structures, construction, or utility facilities. Fill voids immediately with lean concrete or with approved backfill compacted to the density as specified in Section 31 00 00, “Earthwork”.

B. Except as specified herein and below, remove sheeting system to a depth of at least six feet below the ground surface.

C. Remove material of supporting system from the Worksite immediately.

End of Section

Section 32 12 17
HOT MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. This Section includes the following:
   1. Hot mix asphalt paving.
   2. Heavy-duty hot mix asphalt paving.
   3. Pavement patching.
   4. Asphalt surface treatments.
   5. Curbing.

B. Related Sections include the following:
   1. Section 31 00 00 "Earthwork" for aggregate subbase and base courses and for aggregate pavement shoulders.
   2. Section 32 17 23 “Pavement Markings” for pavement marking paint.

1.4 DEFINITIONS

A. DOT: Rhode Island Department of Transportation

B. HMA: Hot Mix Asphalt

1.5 DESIGN REQUIREMENTS

A. Use all means necessary to protect pavement materials before, ongoing, and after installation, and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary as directed by the Owner’s Representative at no additional expense to the Owner.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated include technical data, gradation, and composition of materials proposed.

B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

C. Qualification Data: For manufacturer.

D. Material Test Reports: For each paving material.

E. Conformance Certificates: For each paving material, signed by manufacturers.

F. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international graphics symbol, spaces dedicated to people with disabilities.

1.7 QUALITY ASSURANCE

A. The manufacturer shall be a paving-mix manufacturer registered with and approved by the Rhode Island Department of Transportation.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548.

C. Regulatory Requirements: Comply with the State Standards.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
3. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
4. Asphalt Surface Course: Minimum surface temperature of 40 deg F at time of placement.
5. Shall not be placed on frozen ground.
6. Surface courses shall not be placed between November 15th - April 1st.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Conform to State Standards.

B. Surface course shall not include reclaimed asphalt pavement materials.

2.2 HOT MIX ASPHALT SURFACE COURSE

A. HMA: RIDOT HMA Class 9.5 mix; Conform to Subsection 401.02 and Item M.03 of the State Standards.

B. Heavy-Duty HMA: RIDOT HMA Class 12.5 mix; Conform to Subsection 401.02 and Item M.03 of the State Standards

C. Surface course shall not include reclaimed asphalt pavement materials.

2.3 HMA SIDEWALK: RIDOT HMA Class 9.5 mix; Conform to Subsection 401.02 and Item M03 of the State Standards.

2.4 HOT MIX ASPHALT BASE COURSE

A. HMA: RIDOT HMA Class 12.5 mix; Conform to Subsection 401.02 and Item M.03 of the State Standards.

B. Heavy-Duty HMA: RIDOT HMA Class 19 mix; Conform to Subsection 401.02 and Item M.03 of the State Standards.

2.5 TACK COAT

A. Conform to Asphalt Emulsion Tack Coat as specified in Section 403 of the State Standards

2.6 GRAVEL BASE COURSE

A. Conform to Sand Gravel Fill as specified in Section 310000 – Earthwork

B. Contractor may re-use cold recycled base course from reclaimed pavement. Supplement reclaimed processed material with material conforming to Sand Gravel Fill as specified in Section 31 00 00 – Earthwork as required.

2.7 GRAVEL SUBBASE COURSE

A. Refer to plans and Section 31 00 00 – Earthwork.

B. Contractor may re-use cold recycled base course from reclaimed pavement. Supplement reclaimed processed material with material conforming to Sand Gravel Fill as specified in Section 31 00 00 – Earthwork as required.

2.8 SUBGRADE

A. Reuse on-site material, or Common Borrow, as specified in Section 31 00 00 - Earthwork.

2.9 CURBING

A. Granite curbing shall conform to Subsection 906.02.1, and Item M.09.01 of the State Standards.

B. Precast concrete curbing shall conform to Subsection 906.02.2, and Section 601 of the State Standards.

C. Lot curb shall conform to Subsection 906.02.2, and Section 601 of the State Standards. Lot curb shall conform to the detail provided.

D. Provide concrete curb lock on all curbing.

2.10 COARSE AGGREGATE

A. ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.

2.11 FINE AGGREGATE

A. ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.12 TEMPORARY TRENCH PATCHING

A. Conform to Section 410.02 of the State Standards.

PART 3 - EXECUTION

3.1 CONTRACTOR REQUIREMENTS

A. The Contractor shall perform and complete the construction work within the limits indicated in a continuous manner so that the pavement placement work may proceed without delay.

B. The Contractor shall, at all times, prior to acceptance of the work by the Engineer, maintain the completed work in a safe and satisfactory condition. All maintenance and repairs to the completed work shall be subject to the approval of the Engineer and the controlling municipal and State authorities. All maintenance and repairs of the completed work shall be provided by the Contractor at no additional cost to the Owner.

C. Equipment used in the work will be subject to approval by the Engineer and shall be maintained in a satisfactory condition at all times. Unless otherwise permitted, compaction shall be performed by use of suitable power rollers. Finished surfaces of new asphaltic surface courses shall finish even with adjacent existing pavement surfaces and be free from surface irregularities.

D. It shall be the responsibility of the Contractor to obtain from the controlling municipal authorities all required permits for cutting roadway pavements and to perform the work in accordance with all customs and requirements of the controlling authorities, in addition to those specified herein, and at no additional expense to the Owner.

E. Existing pavements outside of the indicated work limits which are damaged as a result of the Contractor's operations, including base courses, tack coats and surface courses, shall be replaced by the Contractor in accordance with the requirements specified herein for the respective type of pavement; in a satisfactory manner and at no additional cost to the Owner.

F. In case of settlement or other defects in new or replaced pavements, the Contractor shall cut out, replace, restore, or repair the damaged pavements at no additional expense to the Owner. This requirement shall remain in effect for 2 years after the acceptance of the work by the Owner. The pavement area to be replaced, repaired or restored, shall extend from edge of pavement to edge of pavement, a minimum of 20 feet on either side of the defect; final pavement course shall be feathered to provide a smooth finish detail.

G. The Contractor shall furnish a bond for the 2-year duration to the Owner insuring that the corrective repairs will be performed if necessary.

H. This contract shall not be considered complete until the replacement, restoration and repair of pavements has been provided in a manner satisfactory to the Owner's Representative, and in accordance with the requirements specified herein.

3.2 CURBING

A. Granite curbing shall be installed or reset in accordance with Subsection 906.03.1 of the State Standards.

B. Precast concrete curbing shall be installed in accordance with Subsection 906.03.2 of the State Standards.

C. Lot curb shall be installed in accordance with Subsection 906.03.2 of the State Standards and shall conform to the detail provided.

D. All curbing in all locations shall be installed with concrete curb lock prior to backfill to lock curb in place at all locations on-site. Curb lock shall be 3,000 psi concrete.

3.3 SUBGRADE PREPARATION

A. Prepare subgrade by shaping and compacting to proper grade. Remove all soft and yielding material from the subgrade and replace with suitable material. Compact thoroughly using approved types of rollers or tampers. Insure that all areas are stable and dry.

B. Saw cut edges of existing pavement along even lines to obtain undisturbed, clean and sound vertical edges of original pavement.

C. Do not store or stockpile materials on the subgrade.

D. Buried organic soil shall be removed at least to a depth of 2' beneath the bottom of the subbase layer within proposed paved areas and under sidewalks. The exposed subgrade shall be proofrolled with a loaded rubber tire truck. Where soft zones are encountered, or deep ruts (deeper than 2 feet) the soft and rutting material shall be removed and replaced with Common Borrow. Contractor shall perform test pits at the start of construction to assess the presence and extent of buried organic soil. Refer to Section 31 0000.

3.4 GRAVEL BASE COURSE AND SUB-BASE COURSE PLACEMENT

A. Place materials in the proper lift depths and perform compaction as specified in the earthwork section. Make proper allowance for asphalt courses.

B. All compaction shall be performed with approved equipment well suited to location and material being compacted. Use heavy vibratory rollers where heavy equipment is authorized.

C. Do not operate heavy equipment closer to a foundation than a horizontal distance equal to height of backfill above bottom of foundation. Compact remaining area with hand tampers suitable for material being compacted. Place and compact backfill around pipes with care to avoid damage.

3.5 HOT MIX ASPHALT BASE COURSE

A. Provide a HMA Base Course in the compacted thickness as shown on the drawings.

B. The HMA Base Course shall be provided in accordance with the applicable requirements of the State Standards, Section 401, Subsection 401.02 and Item M.03 for materials; and Item 401.03 for construction methods.

3.6 HOT MIX ASPHALT SURFACE COURSE

A. Place HMA Surface Course in compacted thickness as shown on drawings. The finished pavement surface shall conform to the proposed grades of the roadway or as directed and shall be flush with all existing pavements unless otherwise indicated.

B. The HMA Surface Course shall be provided in accordance with the applicable requirements of the State Standards, Section 401, Subsection 401.02, and Item M.03 for materials, and Subsection 401.03 for construction methods.

C. A tack coat conforming to the Rhode Island State Standards shall be applied to the base course prior to the placement of the surface course.

3.7 COMPACTION

A. The Contractor shall conform to the State Standards for pavement operations, including compaction (401.03.10).

B. Immediately after the HMA mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The surface shall be rolled when the mixture is in the proper condition and when rolling does not cause undue displacement, cracking and shoving.

C. The number, weight and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. Rolling shall be continued until all roller marks are eliminated and the minimum densities have been obtained based upon 95 percent of theoretical maximum laboratory densities made in the proportions of the job-mix formula and will be determined using nuclear density gauge or in-place cores.

D. Steel-Tired, Static Weight Rollers: The maximum roller speeds for steel-tired static-weight rollers for various operations shall not exceed three miles per hour. The wheels of steel-wheel rollers shall be kept moist and clean to prevent adhesion of the fresh material, but an excess of water will not be permitted.

E. Vibratory Rollers: The maximum roller speed for vibratory rollers shall be that which provides impact spacing less than the compacted lift thickness. When vibratory rollers are used in the static mode, roller speed shall not exceed three miles per hour.

F. When an approved vibratory roller is used for breakdown rolling in a vibratory mode, intermediate rolling will not be required. When the vibratory roller is used for finish rolling it shall be used in the static mode. Rolling shall progress continuously until the specified density of the corresponding theoretical maximum density obtained at the plant has been attained. Finish rolling shall continue until all roller marks are eliminated.

G. Unless otherwise directed, rolling shall start longitudinally at the sides and gradually progress toward the center of the pavement except on super-elevated curves where the rolling shall begin on the low side and progress to the high side,

overlapping on successive trips by at least one-half the width of tandem rollers and uniformly lapping each preceding track.

H. The motion of the rollers shall be slow enough at all times to avoid displacement of the hot mixture. Any displacement resulting from reversing the direction of the rollers or from any other cause shall be satisfactorily corrected.

I. When the base course fails to comply with the density requirements herein specified additional compaction might be applied when permitted and as directed, to attain the required density. If satisfactory density cannot be attained the Contractor shall be required to remove and replace, at his own expense, any affected area that is proven to be structurally inadequate and/or incapable of maintaining material integrity.

J. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective, shall be removed and replaced with fresh hot mixture, which shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of material shall be removed and replaced.

K. In the event of dispute as to the creditability of the results, density shall be determined from cores taken from the pavement.

3.8 TACK COAT

A. Tack coat shall be installed in accordance with Section 403 of the State Standards except that the tack coat should be applied to the base course prior to the placement of the surface course regardless of the time elapsed between placement of the base and surface course.

3.9 TEMPORARY TRENCH PATCHING

A. Install temporary trench patch in accordance with Section 410 of the State Standards.

End of Section

Section 32 17 23
PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. This Section includes the following:
   1. Pavement-marking paint.

B. Related Sections include the following:
   1. Section 32 12 17 Hot Mix Asphalt

1.4 DEFINITIONS

A. DOT: Rhode Island Department of Transportation

1.5 SUBMITTALS

A. Product Data: For each type of product indicated include technical data and composition of materials proposed.

B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

C. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international graphics symbol, spaces dedicated to people with disabilities.

D. Qualification Data: For manufacturer.

E. Material Test Reports: For each paving material.

F. Conformance Certificates: For each paving material, signed by manufacturers.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the State Standards.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.8 PROJECT CONDITIONS

A. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 50 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 PAVEMENT MARKINGS

A. Pavement markings shall be composed of epoxy resin conforming to the State Standards.

B. Pavement markings shall be “yellow” or “white” in color as specified on the Drawings.

C. Pavement marking stripes shall measure 4 inches in width or as specified on the Drawings.

D. Waterborne pavement markings are not acceptable.

PART 3 - EXECUTION

3.1 PAVEMENT MARKINGS

A. Epoxy Resin Pavement Markings shall be installed in accordance with Section T.20 of the State Standards.

End of Section

Section 33 40 00
STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. All work specified in this Section shall conform to “Standard Specifications for Road and Bridge Construction” of the Rhode Island Department of Transportation, latest revision, herein referred to as “State Standards”.

1.3 SUMMARY

A. This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:
   1. Pipe
   2. Area Drains
   3. Precast concrete drain manholes
   4. Precast concrete catch basins
   5. Subdrainage
   6. Cleanouts
   7. Flared End Section
   8. Sidewalk Grate

1.4 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. HDPE High Density Polyethylene.

C. RCP Reinforced Concrete Pipe

D. PE: Polyethylene

1.5 SUBMITTALS

A. The Contractor shall submit for approval, manufacturer’s printed recommendations for the storage, protection, handling, installation and testing of stormwater piping, fittings and appurtenances, which shall be strictly adhered to by the Contractor.

B. Shop Drawings: For the following:
   1. Manholes: Include plans, elevations, sections, details, and frames and covers. Include design calculations, and concrete design-mix report for cast-in-place manholes.

2. Catch Basins: Include plans, elevations, sections, details, and frames, covers, and grates.
3. Area Drain: Include plans, elevations, sections, details, and frames, covers, and grates.
4. Trench Drain: Include plans, elevations, section details and grates.
5. Pipe of all materials.
6. Flared End Section: Include plans, elevations, and section details.
7. Sidewalk Grate: Include plans, elevations, and section details.

C. Conformance Certificate: Each shipment of castings and concrete manholes and catch basins shall be accompanied with the manufacturer's notarized certification and cylinder testing results that materials meet specified requirements.

D. Record Drawings: All installed underground utilities shall be designated on as-built drawings by the contractor of record and provided to the Owner and Engineer in AutoCad electrical format prior to completion of the project. All as-built drawings, (underground and above ground) shall be dimensioned from permanent benchmarks such as existing buildings and include depths at various points throughout the extent of the work, and invert elevations at all structures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

B. Handle catch basins and manholes according to manufacturer's written rigging instructions.

C. Use only nylon-protected slings to handle pipe. The use of hooks or bare cables will not be permitted.

D. Avoid damage to castings from impact, abrasion, or corrosion during handling and storage.

E. Do not store PVC piping and fittings in the sunlight for extended periods of time. Store pipe in accordance with manufacturer's recommendations.

F. Ship rubber gaskets in cartons and store in a clean area away from grease, oil, ozone producing electric motors, heat and the direct rays of the sun.

G. Use all means necessary to protect precast concrete units and materials before, during and after installation and to protect the installed work and materials for all other trades.

H. In case of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative at the Contractor's expense.

I. Pipe, pipe fittings, and other associated appurtenances damaged during deliver handling or storage shall be replaced at no additional cost to the Owner.

1.7 PROJECT CONDITIONS

A. The Contractor shall provide means of stormwater management during construction to control runoff and protect downstream areas from damage resulting from stormwater runoff.

B. The Contractor is responsible for any damage resulting from stormwater runoff during construction, including damage from flooding. Contractor shall be responsible to monitor weather conditions and schedule work to avoid damage upstream and downstream of the project site. Provide temporary drainage where required without additional cost to the Owner.

1.8 QUALITY CONTROL

A. All precast concrete shall be the product of a manufacturer who has demonstrated capability to produce precast concrete products of the quality specified. A manufacturer must be able to show that he has experienced personnel, physical facilities, established quality control procedures, and a management capability sufficient to execute the work of this contract. When requested by the Owner's Representative, the Contractor shall submit written evidence of the above requirements.

B. Experienced plant personnel shall closely supervise the manufacturing process, and daily records of concrete strength shall be kept and submitted to the Owner's Representative for control.

C. Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly trained and experienced in the installation of the precast concrete structures and shall direct all work performed under this Section.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Profile Gravity Sewer Pipe and Fittings: ASTM F 794 pipe, with bell-and-spigot ends; ASTM D 3034 fittings, with bell ends.

B. The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusion or other injurious defects. The pipe shall be as uniform as commercially practical in color, capacity, density and other physical properties.

C. Joints shall be bell and spigot. For SDR-35 PVC pipe, the bell shall consist of an integral wall section with a solid cross section rubber ring factory-assembled, securely locked in place to prevent displacement. Joints shall conform to ASTM Standard D 3212. For SCH 40 PVC piping, joints shall be glued with PVC cement approved by the manufacturer.

D. All fittings and accessories shall have dimensions as recommended by the manufacturer and have bell and/or spigot configurations compatible with that of the pipe.

E. Pipe shall pass impact resistance test in accordance with ASTM D 2444 and minimum pipe stiffness test at 5% deflection in accordance with ASTM D 2412.

F. The normal length of 12-inch size and smaller pipe shall be 12.5 feet.

G. Pipe and fittings shall be manufactured in the United States of America and shall be accompanied by the manufacturer's certificate of compliance, in addition to meeting the performance tests specified hereinafter.

H. PVC pipe shall be SCH 40 where pipe has less than 2 feet of cover or as directed by the Owner's Representative.

I. PVC perforated pipe shall conform to ASTM/ANSI D 2729 or ASTM F 810. Perforations shall be 5/8" holes on 5" centers.

2.2 HIGH-DENSITY POLYETHYLENE PIPE AND FITTINGS

A. High-Density Polyethylene Pipe and fittings shall be ADS N-12 IB ST Smooth Interior Pipe, ADS N-12 IB ST High Capacity Large Diameter Pipe or approved equivalent. Joints shall be soil-tight and include a rubber gasket on the spigot end of the pipe. When installed into the bell end, the joint shall be sealed.

B. Pipe shall conform to AASHTO M294 (Type 'S') for the specified diameters and strength classes.

C. Pipe shall be rated to withstand H-20 Loading Criteria with 18" of cover.

2.3 REINFORCED CONCRETE PIPE

A. Reinforced-Concrete Pipe and Fittings: ASTM C 76 (ASTM C 76M), with bell-and-spigot ends and sealant joints with ASTM C 990 (ASTM C 990M), bitumen or butyl-rubber sealant.

B. Pipe shall conform to AASHTO M170 for the specified diameters and strength classes. The minimum cement content shall be 564 pounds per cubic yard.

C. Strength class of reinforced concrete pipe shall be Class III unless specified otherwise on the drawings.

D. Joint of reinforced concrete pipe shall be made with flexible watertight rubber gaskets and the remaining exterior void of the joint shall be sealed with Portland cement mortar.

2.4 FLEXIBLE PIPE COUPLINGS

A. Flexible Couplings: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end as manufactured by Fernco Inc. or approved equivalent.

2.5 CLEANOUTS

A. Cast-Iron Cleanouts: Frame and cover shall be able to withstand HS-20 loading criteria.

B. PVC cleanouts: PVC body with PVC cap and screw type cover set no more than 6" below cast iron frame and cover. The cast iron cover shall be set to finish grade and secured with concrete as shown in the Drawings. Frame and cover shall be able to withstand H20-44 loading criteria.

2.6 AREA DRAINS

A. Area drain shall be formed of PVC pipe stock meeting ASTM D1784 utilizing a thermoforming process to reform the pipe stock to the specified configuration. Drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system.

B. Joints shall use elastomeric seals and conform to ASTM D3212, latest revision. Flexible elastomeric seals shall conform to ASTM F477.

C. Frame and grates shall be 24” dia. ductile iron grates made specifically for each area drain. Casting shall conform to ASTM A536 grade 70-50-05.

D. Area Drains shall be rated to withstand HS-20 loading criteria and construction traffic.

E. Area drains shall be equipped with a sump and outlet tee as specified on the plans and details.

2.7 MANHOLE AND CATCH BASIN MATERIALS

A. Cement shall be Portland cement conforming to ASTM C150, Type III, high early strength.

B. Aggregate: shall conform to ASTM C330 and shall be graded, crushed stone with a resulting unit weight of concrete of up to one hundred fifty-five (155) pounds per cubic foot, and a minimum unit weight of not less than one hundred forty-eight (148) pounds.

C. Water: shall be clear and free of injurious and deleterious substances.

D. Concrete: shall have a minimum strength of 5000 psi at twenty-eight (28) days and a strength of 3000 psi at the time of form release.

E. During the process of manufacturing of the units not less than two (2) test cylinders shall be tested at time release of the form and two (2) at age twenty-eight (28) days.

F. All compression test cylinders shall be made, cured and stored in accordance with ASTM C31. Cylinders shall be tested in accordance with ASTM C39.

G. All concrete shall be air entrained as specified per RIDOT Standard Specifications.

H. Admixtures shall only be used after prior approval of the Engineer.

I. All reinforcing bars shall conform to the requirements of ASTM designation: A615, Grade 60.

J. Welded wire fabric shall conform to the requirements of ASTM designation: A185.

2.8 PRECAST CONCRETE MANHOLES, CATCH BASINS AND BRICK

A. Precast Concrete Manhole and Catch Basin sections shall be equal to that shown on the drawings and shall conform to ASTM Specifications C-478 and C-76 Class IV Wall “B”. The horizontal joints between sections shall be sealed using a flexible butyl resin sealant and shall conform to ASTM C-990. In addition, the horizontal joints on the inside and outside of the manhole and catch basin shall be sealed with a “Quick Plug” as manufactured by Parson or approved equal.

B. Brick shall conform to ASTM Specification C-32, except that the table therein is amended to provide that the required minimum compressive strength in pounds per square inch shall be for any individual brick 3,000 or 5,000 for the average of five bricks selected at random. The maximum absorption of water by five-hour boiling

test shall not exceed 16% for any individual brick or 12% for the average of any five bricks selected at random.

C. Unless otherwise noted on the Drawings, manholes less than fifteen (15) feet deep shall have an interior diameter of 48 inches. Manholes fifteen (15) feet and deeper shall have an interior diameter of 60 inches unless otherwise noted. Manholes with an interior diameter of 72 inches shall be utilized where indicated on the Drawings. All catch basins shall have an interior diameter of 48 inches unless specified otherwise.

D. Openings for pipe insertions shall be round and shall be precast or cored only. The diameter of the opening shall be adequate to install a rubber boot seal. The cored or precast opening shall maintain a minimum undisturbed distance of 6” from manhole section joints. Flexible rubber boot shall be neoprene with stainless steel clamps and bands.

E. Weirs for diversion manholes may be constructed with concrete block joined with mortar or cast into the structure. Contractor shall form each weir as depicted on the plans. Provide a watertight seal with no gaps between weir wall and structure wall. Weirs shall be connected to structure wall using epoxy coated steel rebar reinforcement.

2.9 MANHOLE FRAMES AND COVERS

A. Manhole Frames and Covers shall be cast iron and conform to the details on the drawings. Cast iron shall conform to ASTM A-48, Class 25. The underside of the cover and upper side of lip frame must present parallel plane surfaces, and at these points of contact, the frames and covers shall be machined to prevent covers from rocking in the frames under traffic.

B. Covers shall bear evenly in the frame and both frame seats and covers shall be accurately fabricated so that covers are interchangeable for use with any and all frames. Where indicated, frames and covers shall be watertight, and locked. The sizes and weights (medium duty, heavy duty, etc.) are shown on the detail sheets for special manholes.

C. Mortar shall consist of one part cement and two parts clean sand. No lime shall be used.

D. Covers shall have a non-slip surface and shall have the word “DRAIN”, inscribed.

E. Frames and covers shall be installed on the manholes as indicated on the drawings. They shall be well bedded and encased in cement mortar and accurately set to the grades indicated or as directed. Red clay brick with cement mortar shall be used to adjust grade of frame and cover. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

2.10 CATCH BASIN FRAMES AND GRATES

A. Catch Basin Frames and Grates shall be cast iron and conform to the details on the drawings. Cast iron shall conform to ASTM A-48, Class 25. The underside of the grate and upper side of lip frame must present parallel plane surfaces, and at these points of contact, the frames and grates shall be machined to prevent grates from rocking in the frames under traffic.

B. Grate shall bear evenly in the frame and both frame seats and grates shall be accurately fabricated so that grate is interchangeable for use with any and all catch basin frames.

C. Mortar shall consist of one part cement and two parts clean sand. No lime shall be used.

D. Gratings shall have a non-slip surface.

E. Gratings shall be installed on the catch basins as indicated on the drawings. They shall be well bedded and encased in cement mortar and accurately set to the grades indicated or as directed. Red clay brick with cement mortar shall be used to adjust frame and grate. One half inch of cement mortar plaster cast shall be applied to exterior of red clay bricks.

2.11 MANHOLE STEPS

A. Manhole steps shall be manufactured of Copolymer Polypropylene plastic with ½" grade 50 steel reinforcement.

B. Steps shall conform to ASTM D-4101 under Type II.

C. The capacity of each step shall be 1000 lb. at 5-1/8 inch distance from wall and 1500 lb. at 4-inch distance from wall.

D. Steps shall measure 12 inches wide (min.) and extend 5-1/8 inches from wall.

E. Manhole steps shall be provided in each base, riser and top section and shall be integrally cast in each; 12 inches O.C.

2.12 WATERPROOFING FOR UNDERGROUND STRUCTURES

A. Elastomeric waterproofing membrane shall conform to ASTM C836.

B. Waterproofing membrane shall be applied to the exterior of the structure prior to arrival on site. Final waterproof coating shall be applied in the field.

2.13 TRENCH DRAINS

A. Trench Drain - 1 (at the basketball courts) shall be a K300 trench drain system manufactured by ACO or approved equivalent.

B. Trench Drain - 2 (at the loading dock) shall be Flowdrain as manufactured by ACO or approved equivalent.

C. Use 4,000 psi concrete confirming to Section 030000 Concrete.

D. Grates on Trench Drain - 1 and Trench Drain - 2 shall be cast iron and rated to withstand H-20 loading criteria.

E. Trench Drain - 1 grate shall conform to ADA requirements for opening size.

F. Trench Drain - 2 grate shall be bolted to prevent removal by unauthorized personnel.

G. Trench drains shall be rated to withstand H-20 loading criteria.

H. Trench drain system and grates shall be sized to manage the flows specified on the project drawings. Contractor shall submit design documentation showing that the submitted trench drain grate, channel, and outlet(s) products are capable of conveying the design flow.

2.14 GEOTEXTILES

A. Refer to Section 310000 for requirements regarding geotextile filter fabrics.

2.15 FLARED END SECTION

A. Flared end section shall be as depicted on the drawings.

B. Flared end section shall be in accordance with section 701 of the State Standards.

2.16 UNDERGROUND DETENTION SYSTEM

A. The chamber shall be designed to AASHTO LRFD Bridge Design Specifications (Section 12), as applied to material and performance requirements for buried thermoplastic pipes. Design live load shall be the AASHTO HS-25 or HS-20 truck and applies to chamber spacing of 5” (127 mm) or greater.

B. The chamber system shall be comprised of three chamber configurations. The “middle” chambers shall be open-ended to allow unobstructed hydraulic flow, inspection, and maintenance. The “start/end” chambers shall each have an integral end wall designed to resist loading at the start and end of the chamber rows.

C. The underground infiltration system shall have a minimum total storage volume of xxx cubic feet including the stone below and above the chamber with a stone porosity of 33%. The total volume is inclusive of the pretreatment row.

D. The underground infiltration system shall be a minimum of 25 feet from any building with a basement.

E. The nominal dimensions of the “start/end” and “middle” chambers shall be recommended by the manufacture and approved by the engineer.

F. The chamber shall have an arch-shaped section profile with an open bottom.

G. The “start/end” chambers end wall shall be structurally suitable for cutting and inserting inlet pipes up to 24” (610 mm) diameter.

H. The chamber shall be an open-bottom design with slotted or perforated side wall openings for lateral flow and top vent orifices for hydraulic pressure equalization.

I. The chamber shall have a circular cut line for an optional reinforced inspection or cleanout port configured to accept a minimum 4” (102 mm) Schedule 40 pipe.

J. The “end” chambers shall be capable of being cut to shorter lengths to accommodate site specific requirements.

K. The chamber shall be supported by integral structural footings comprised of load dispersing toe ribs and longitudinally aligned stiffening ribs.

2.17 IDENTIFICATION

A. Underground-type line markers for non-metallic pipelines: manufacturer's standard permanent detection tape, bright-colored, continuous printed polyethylene tape with a metallic core for each detection of non-metallic underground installations, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green detection tape with black printing reading "Caution Drain Line Buried Below" as manufactured by Seton or approved equivalent.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 310000 "Earthwork."

3.2 PIPE INSTALLATION

A. Reinforced Concrete Pipe: The method of joining reinforced concrete pipe sections shall be such that the ends are fully entered, and the inner surfaces are reasonably flush and even. Joints shall be made with rubber gaskets and Portland Cement grout. The completed joints shall be protected against rapid drying by suitable covering material.

B. Use only nylon-protected slings to handle pipe. The use of hooks or bare cables will not be permitted.

C. PVC Piping: No machinery shall directly contact the PVC pipe to push the pipe into place. The pipe shall be pushed into place by hand. The use of a hammer or mallet is permitted, with the use of a board to shield the end of the pipe being struck by the hammer. The pipe shall not be directly contacted with a hammer or mallet. Any pipe damaged while being pushed into place or while being laid in the trench shall be removed from the site and replaced at the expense of the Contractor.

D. Pipe shall be inspected before any backfill is placed. Any pipe determined by the Owner’s Representative to be out of alignment, unduly settled, or damaged shall be taken up and re-laid or replaced at no additional cost to Owner.

E. General Locations and Arrangements: Drawing plans and details indicate location and arrangement of underground storm drainage piping. Install piping as indicated, following piping manufacturer's written instructions.

F. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

G. If conflicts between utilities, the Contractor shall stop work on the utilities, contact the Engineer, and await direction from the Engineer.

H. Install piping with 36-inch minimum cover unless otherwise specified on the Drawings.

I. Install piping with a minimum slope as specified on Drawings.

J. Install PVC piping according to ASTM D 2321, ASTM F 1668, and manufacturer’s recommendations.

K. Install reinforced-concrete piping according to ASTM C 1479 and manufacturer's recommendations.

3.3 CLEANOUT INSTALLATION

A. Install cleanouts and riser extension from drain pipe to cleanout at grade. Cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in pipe.

B. Set cleanout frames and covers in earth in a cast-in-place concrete block, 12 by 12 by 8 inches deep. Top of concrete block shall be laid 3" below finished grade. Top of frame shall be set flush with finish grade where laid in earth.

C. Set cleanout frames and covers in bituminous concrete and concrete pavement or slabs with tops flush with pavement surface. Top of concrete block shall be laid at the bottom of the bituminous binder course where laid in pavement surface.

3.4 MANHOLE INSTALLATION

A. Excavation and backfilling requirements for installation of manhole and catch basin structures shall be in accordance with the requirements as specified in Section 310000, Earthwork.

B. Manhole and catch basin barrel and cone sections shall be set so as to be vertical and in true alignment.

C. Where required for future connections, openings shall be cast in the manholes and catch basins at the proper location and shall be sealed with watertight brick bulkheads or plugs.

D. The inverts of all manholes shall be constructed of brick and formed to the details shown on the contract drawings.

E. Concrete Base Slabs for manholes and catch basins shall have a full thickness of 12 inches shall extend 6 inches beyond the outside walls.

F. Bottom riser sections of reinforced concrete manholes and catch basins may be either cast-in-place or precast concrete. The top edges, of cast-in-place bottom sections, shall be formed with a removable steel ring template designed to fit the tongue end of the precast riser sections.

G. Inverts: Where pipe alignment permits, and where directed by the Owner's Representative, the pipe shall be continued through the manhole and the top half carefully and evenly cut away. Where changes in alignment occur, unless otherwise authorized by the Engineer, inverts shall be constructed of brick and mortar with a smooth flow line and an even curve in accordance with the plans.

H. Joints: Pipe joints into manholes and catch basins shall be constructed in accordance with the details shown on the plans. Complete details of the boot manufacture and installation shall be submitted for approval. All areas around pipes passing through walls of manholes and catch basins shall be completely filled with waterproof cement mortar to tightly fill any space through which water can pass. All manhole and catch basin joints between sections shall be sealed with 1" diameter Butyl rubber sealant with hydraulic cement and coated with bitumastic sealant on the exterior.

I. Bricks shall be laid in a workmanlike manner, true to line, and the joints shall be carefully struck and pointed on the inside. Bricks shall be thoroughly wet when laid and each brick shall be laid in mortar so as to form full bed, end and side joints in one operation. The outside of the brickwork shall be neatly plastered with ½" layer of cement mortar as the work progresses. The brickwork shall be satisfactorily bonded to the concrete and cast iron frame. No brick masonry shall be laid in water, or any water allowed to rise on the brickwork until the masonry has set for at least 24 hours.

J. Waterproofing: All exterior surfaces of manholes and catch basins shall receive at least one coat of elastomeric waterproofing.

3.5 AREA DRAIN INSTALLATION

A. Area drains shall be stored out of direct sunlight until they are ready to be installed.

B. Excavation and backfilling requirements for installation of the structures shall be in accordance with the requirements as specified in Section 31 00 00 Earthwork. Use sand gravel fill bedding with no stones larger than 1 ½” dia. Compact backfill uniformly.

C. The area drain basin shall be set level and set so as to be vertical and in true alignment.

D. Joints: Pipe joints into area drains shall be constructed in accordance with the details shown on the plans. Complete details of the boot manufacture and installation shall be submitted for approval.

E. Drain basin body shall be cut at the time of final grade. No brick, stone, or concrete block will be required to set the grate to the final grade height.

3.6 FLARED END SECTION

A. Install in accordance with manufacturer’s recommendations.

B. Install in accordance with section 701 of the State Standards.

C. Install flared end section at the elevations indicated on the plans.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 310000 - Earthwork. Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Contractor shall be fully responsible to complete field quality control.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.

b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.

c. Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

C. If the Owner's Representative requests, the Contractor shall perform the following tests to assure the installation meets the manufacturer's specifications.

1. Contractor shall utilize mandrel on PVC and HDPE to confirm pipe backfill was completed in accordance with the manufacturer's requirements and deflection is acceptable.

2. Contractor shall provide TV inspection to confirm joints are constructed in accordance with manufacturer's requirements.

D. The Contractor shall, at his own expense, replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

E. The Contractor shall repair any defects or corrections required by the Owner's Representative.

3.9 CLEANING

A. The Contractor shall clean interior of piping and structures of dirt, debris, and superfluous materials prior to commencing work, during construction and prior to acceptance of stormwater drainage system.

B. The Contractor shall also clean downstream portions of the stormwater conveyance system which recovered silt deposits from the construction activity.

3.10 RECORD DRAWINGS

A. All installed underground utilities shall be designated on as-built drawings by the contractor of record and provided to the Owner and Engineer in AutoCAD electrical format prior to completion of the project. All as-built drawings, (underground and above ground) shall be dimensioned from permanent benchmarks such as existing buildings and include depths at various points throughout the extent of the work, and invert elevations at all structures.

End of Section