THE
UNIVERSITY
OF RHODE ISLAND

DIVISION OF
ADMINISTRATION
AND FINANCE

OFFICE OF CAPITAL PROJECTS
Sherman Building, 60 Tootell Road, Kingston, RI 02881 USA p: 401.874.2725 f: 401.874.5599

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SOLICITATION No. 7598654
ADDENDUM No.1

Date: 3/19/19
URI Project Number: KC.L.KCPI.2017.001

DESCRIPTION: Project documents have been modified to include replacement of existing sewer and drain under Hammerschlag Mall.

Base Bid – Includes steam, sewer and drain work to be substantially complete 8/15/19.
Alternate #1 – Includes concrete mall surface and landscaping to be substantially complete 8/15/19.
Alternate #2 – An option to instead install a **temporary** mall surface (by 8/15/19) & postpone the concrete mall surface and final landscaping (1) year (substantial completion 8/15/20).

NOTES: Alternate #2 is a **Cost Difference** (i.e. add/deduct). Refer to ***Revised*** Section 012010 Price and Payment Procedures – Attachment A for detail on alternates #1 and #2 as well as unit quantities that must be included in base bid & alternate #2.

Bid Form and Division 00 and 01 Changes

1. Eliminated "Base Bid A" and "Base Bid B" steam and landscaping accounting breakdowns.
2. Revised Allowances
3. Added Alternates #1 and #2
4. Revised Unit Prices
5. Revised Section 000115 List of Drawings
6. Revised Section 012010 Price and Payment Procedures – Attachment A

Drawing Changes

Base Bid	CU-201	***Revised*** – Elevation change near Carlotti Vault
	UT	***New*** – Replacement of existing Utilities under Mall
	SD-1	***Revised*** – Added details relevant to drawing UT
	SD-3	***New***– Added details relevant to drawing UT

The University of Rhode Island is an equal opportunity employer committed to community, equity, and diversity and to the principles of affirmative action.

	GI-001, CU-100, CU-101, CU-102, CU-301, CU-302, CU-303, CU-501	Unchanged
Alternate #1	IN	***Revised*** – Changes required by the replacement of utilities under Mall.
	EX	
	SE	
	RM	
	TYP	
	LM	
	CL	
	GR	
	SD-1	
	SD-2	

Specification Changes

	Specification	Description of Change
Base	34100 Precast Structural Concrete	Unchanged
Base	221313 Sanitary Sewer	***New***
Base	312319 Control of Water	Unchanged
Base	334100 Storm Utility Drainage Piping	Unchanged
Base	336300 Steam Distribution	Unchanged
Base & Alt #1	310000 Earthwork	***Revised***
Base & Alt #1	321217 Hot Mix Asphalt Paving	Unchanged
Base & Alt #1	321613 Cement Concrete Paving	***Revised***
Base & Alt #1	329222 Lawns and Grasses	***Revised***
Alt #1	311100 Site Preparation	***Revised***
Alt #1	312211 Erosion and Sediment Control	Unchanged
Alt #1	315000 Excavation Support and Protection	Unchanged
Alt #1	321330 Colorized Concrete	***Revised***
Alt #1	323254 Stone Walls	***New***
Alt #1	329119 Landscape Grading	***Revised***
Alt #1	334000 Storm Drainage	Unchanged

End.

Solicitation # : 7598654
Solicitation Title: Hammerschlag Mall Improvements – Phase I University of Rhode Island

BID FORM

To: The Department of Administration, Division of Purchases
One Capitol Hill, Providence, RI 02908

Project: Hammerschlag Mall Improvements – University of Rhode Island

Bidder:

_____
Legal name of entity

_____
Address

_____
Contact name Contact email

_____
Contact telephone Contact fax

1. BASE BID PRICE

The Bidder submits this bid proposal to perform all of the work (including labor and materials) as described in the solicitation for this Base Bid Price, (including the costs for all Allowances, Bonds, and Addenda):

$ _____

(**Base Bid** Price *in figures* printed electronically, typed, or handwritten legibly in ink)

_____
(Base Bid Price *in words* electronically, typed, or handwritten legibly in ink)

- **ALLOWANCES**

The **Base Bid** Price ***includes*** the costs for the following Allowances as defined in Specification Section 01 2010:

1. **Unforseen underground utility conditions** **$100,000.00**

Total Allowances: **$100,000.00**

- **BONDS**

  The Base Bid Price ***includes*** the costs for all Bid and Payment and Performance Bonds required by the solicitation.

- **ADDENDA**

  The Bidder has examined the entire solicitation (including the following Addenda), and the Base Bid Price ***includes*** the costs of any modifications required by the Addenda.

  All Addenda must be acknowledged.

  Addendum No. 1, dated _____
  Addendum No. 2, dated _____
  Addendum No. 3, dated _____

2. ALTERNATES *(Additions to Base Bide Price)*

The Bidder offers to: (i) perform the work described in these Alternates as selected by the State in the order of priority specified below, based on the availability of funds and the best interest of the State; and (ii) increase the Base Bid Price by the amount set forth below for each Alternate (**further defined in Specification Section 01 2000**) selected.

ADD ALTERNATE - 1

HAMMERSCHLAG MALL LANDSCAPING

$ _____

(Amount *in figures* printed electronically, typed, or handwritten legibly in ink)

_____

(Amount *in words* electronically, typed, or handwritten legibly in ink)

ADD ALTERNATE - 2

COST DIFFERENCE – 1 YEAR DEFERMENT OF ALTERNATE #1

$ _____

(Amount *in figures* printed electronically, typed, or handwritten legibly in ink)

_____

(Amount *in words* electronically, typed, or handwritten legibly in ink)

NOTE TO BIDDER: ***INDICATE IF ALTERNATE 2 COST IS AN "ADD" OR "DEDUCT"***

3. UNIT PRICES

1. The **Base Bid** Price ***includes*** the costs for the specified Unit Prices as defined in Specification Section 31000 Earthwork - Measurement and Payment, Paragraph 4.1.C.

2. The **Alternate #1** Price requires the Bidder submit the following predetermined Unit Price as a basis for any change order approved in advance by the State. This Unit Price includes ***all*** costs, including labor, materials, services, regulatory compliance, overhead, and profit.

Unit Price No. 1	**Furnish 4" caliper shade trees to be installed by owner per note on Milone & MacBroom Drawing LM.**	CONTRACTORS UNIT COST
	Each	$, .

3. The **Alternate #2** Price ***includes*** the costs for the specified Unit Prices as defined in Specification Section 012010 Price and Payment Procedures – Attachment A, Paragraph D.2.b.

4. CONTRACT TIME

The Bidder offers to perform the work in accordance with the timeline specified below:

- Start of Construction.....May 20, 2019
- Substantial Completion..... August 15, 2019
- Final Completion.....September 27, 2019

The Final Completion date for Work shall be within **130** calendar days of the Purchase Order from the Division of Purchases**.**

5. LIQUIDATED DAMAGES

The successful bidder awarded a contract pursuant to this solicitation shall be liable for and pay the State, as liquidated damages and not as a penalty, the following amount for ***each*** calendar day of delay beyond the date for substantial completion, as determined in the sole discretion of the State: **Five Hundred Dollars ($500.00) per day**.

BID FORM SIGNATURE(S)

This bid proposal is irrevocable for 60 days from the bid proposal submission deadline.

If the Bidder is determined to be the successful bidder pursuant to this solicitation, the bidder will promptly: (i) comply with each of the requirements of the Tentative Letter of Award; and (ii) commence and diligently pursue the work upon issuance and receipt of the purchase order from the State and authorization from the user agency.

The person signing below certifies that he or she has been duly authorized to execute and submit this bid proposal on behalf of the Bidder.

BIDDER _____

Date: _____

_____
Name of Bidder

_____
Signature in ink

_____
Printed name and title of person signing on behalf of Bidder

#
_____
Bidder's Contractor Registration Number

DOCUMENT 00 0115 - LIST OF DRAWINGS

BASE BID ***(NEW OR REISSUED DRAWINGS SHOWN IN BOLDFACE)***

Consultant	Drawing	Date	Rev Description	Title
Fuss and O'Neill	GI-001	1/14/19		Cover Sheet
	CU-100	1/14/19		Overall Site Plan
	CU-101	1/14/19		Site Plan – Carlotti to Multicultural Pit
	CU-102	1/14/19		Site Access & Control, Landscape Protections and Restoration
	CU-201	**3/8/19**	**Revision 1.**	**Elevation from Vault "H" (Carlottie) to Vault "B-12C (Multicultural)**
	CU-301	1/14/19		Carlottie Steam Vault "H" Plans and Sections
	CU-302	1/14/19		New Human Resources Steam Vault Plan and Sections
	CU-303	1/14/19		Multicultural Steam Vault "B-12C" Plans and Sections
	CU-501	1/14/19		Details
Milone and MacBroom	**UT**	**3/11/19**	**Addendum No 1.**	**Site Plan - Utilities**
	SD-1	**3/11/19**	**Addendum No 1.**	**Site Details**
	SD-3	**3/11/19**	**Addendum No 1.**	**Site Details**

ALTERNATE # 1 Hammerschlag Mall Landscaping ***(ALL DRAWINGS REISSUED)***

Consultant	Drawing	Date	Rev Description	Title
Milone and MacBroom		**3/11/19**	**Addendum No 1.**	**Title Sheet**
	IN	**3/11/19**	**Addendum No 1.**	**Index, Notes and Legends**
	EX	**3/11/19**	**Addendum No 1.**	**Existing Conditions**
	SE	**3/11/19**	**Addendum No 1.**	**Sediment & Erosion Control Plan**
	RM	**3/11/19**	**Addendum No 1.**	**Site Plan - Removals**
	TYP	**3/11/19**	**Addendum No 1.**	**Typical Cross Sections**
	LM	**3/11/19**	**Addendum No 1.**	**Site Plan Landscaping & Materials**
	CL	**3/11/19**	**Addendum No 1.**	**Site Plan Construction Layout**
	GR	**3/11/19**	**Addendum No 1.**	**Site Plan Grading**
	SD-1	**3/11/19**	**Addendum No 1.**	**Site Details (#1, 2 ,3)**
	SD-2	**3/11/19**	**Addendum No 1.**	**Site Details**

END OF DOCUMENT

01 2010 PRICE AND PAYMENT PROCEDURES - Attachment A

A. Allowances

1. Allowance No. 1 - Refer to Bid Form.

B. Testing Allowance

1. All testing costs to be included in base bid.

C. Unit Prices

1. **Base Bid:** Reference Section 31000 Earthwork - Measurement and Payment, Paragraph 4.1.C.for specified quantities to be included in the base bid for the following items:
   a. Unanticipated Unsuitable Soils
   b. Bulk Rock Excavation
   c. Trench Rock Excavation

2. **Alternate #1:** Refer to bid form for unit pricing associated with Alternate #1.

3. **Alternate #2:** Reference this Section, Paragraph D.2.b for specified quantities to be included in Alternate #2 for the following items associated with a temporary mall surface:
   a. Furnish & Install Processed Gravel
   b. Furnish & Install Hot Mix Asphalt
   c. Removal & Dispose Temporary Asphalt
   d. Remove, regrade and compact gravel sub-base

D. Alternates

1. ALTERNATE #1 – HAMMERSCHLAG MALL LANDSCAPING

Substantially complete the scope of work shown on Milone & MacBroom drawings below by **August 15, 2019**.

Drawing	**Rev Date**	**Rev Description**	**Title**
IN	3/11/19	Addendum No 1.	Index, Notes and Legends
EX	3/11/19	Addendum No 1.	Existing Conditions
SE	3/11/19	Addendum No 1.	Sediment & Erosion Control Plan
RM	3/11/19	Addendum No 1.	Site Plan - Removals
TYP	3/11/19	Addendum No 1.	Typical Cross Sections
LM	3/11/19	Addendum No 1.	Site Plan Landscaping & Materials
CL	3/11/19	Addendum No 1.	Site Plan Construction Layout

GR	3/11/19	Addendum No 1.	Site Plan Grading
SD-1	3/11/19	Addendum No 1.	Site Details (#1-#3)
SD-2	3/11/19	Addendum No 1.	Site Details

2. ALTERNATE #2 – ***COST DIFFERENCE*** – 1 YEAR DEFERMENT OF ALTERNATE #1

   a. Include the ***cost difference*** to postpone Alternate #1 to the period starting May 18, 2020 and substantially complete by August 15, 2020.

   b. This alternate shall also include costs to furnish and install a temporary mall surface equal in thickness to the final walkway and be substantially complete by **August 15, 2019**. The cost shall include specified quantities to install, remove, dispose temporary asphalt walkway and re-trim the gravel base for completion of the Alternate #1 scope. The cost shall cover all labor, equipment, material, overhead, and profit. No amount other than the Unit Price provided by the Contractor will be paid by the Owner for the temporary walkway herein defined.

      i. Furnish and Install 290 tons temporary Processed Gravel compacted to 7" thick course. If the total quantity exceeds this amount, the Owner shall pay the excess cost to furnish and install at the unit price of $26 per ton.
      ii. Furnish and Install 120 tons of temporary Hot Mix Asphalt in a 2" thick course. If the total quantity exceeds this amount, the Owner shall pay the excess cost to furnish and install at the unit price of $110 per ton.
      iii. Remove and Dispose 1,070 square yards of asphalt (Item #2 above). If the total quantity exceeds this amount, the Owner shall pay the excess cost to remove and dispose at the unit price of $4 per square yard.
      iv. Remove, regrade and compact 1,070 square yards of gravel sub-base to the grade level necessary to complete the Alternate #1 scope. If the total quantity exceeds this amount, the Owner shall pay the excess cost to remove, regrade and compact at the unit price of $1.50 per square yard.

E. Payroll Reporting

1. Forms for the submission of Certified Payroll Records may be found from the Rhode Island Prevailing Wage Website in either PDF or Excel formats. These forms must be used on monthly submittals.

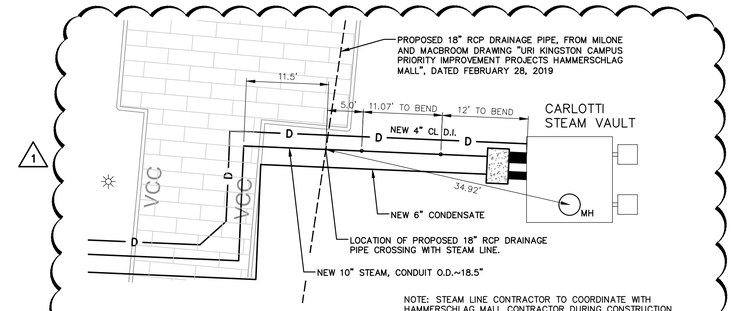
2. Identify Apprenticeship hours required under RIGL 37-13-3.1 for all contracts over $1million in value.

3. A Minority Utilization Report for minority subcontractors must be included. Use the form provided as Attachment B.

F. Warranty Inspection Retainage

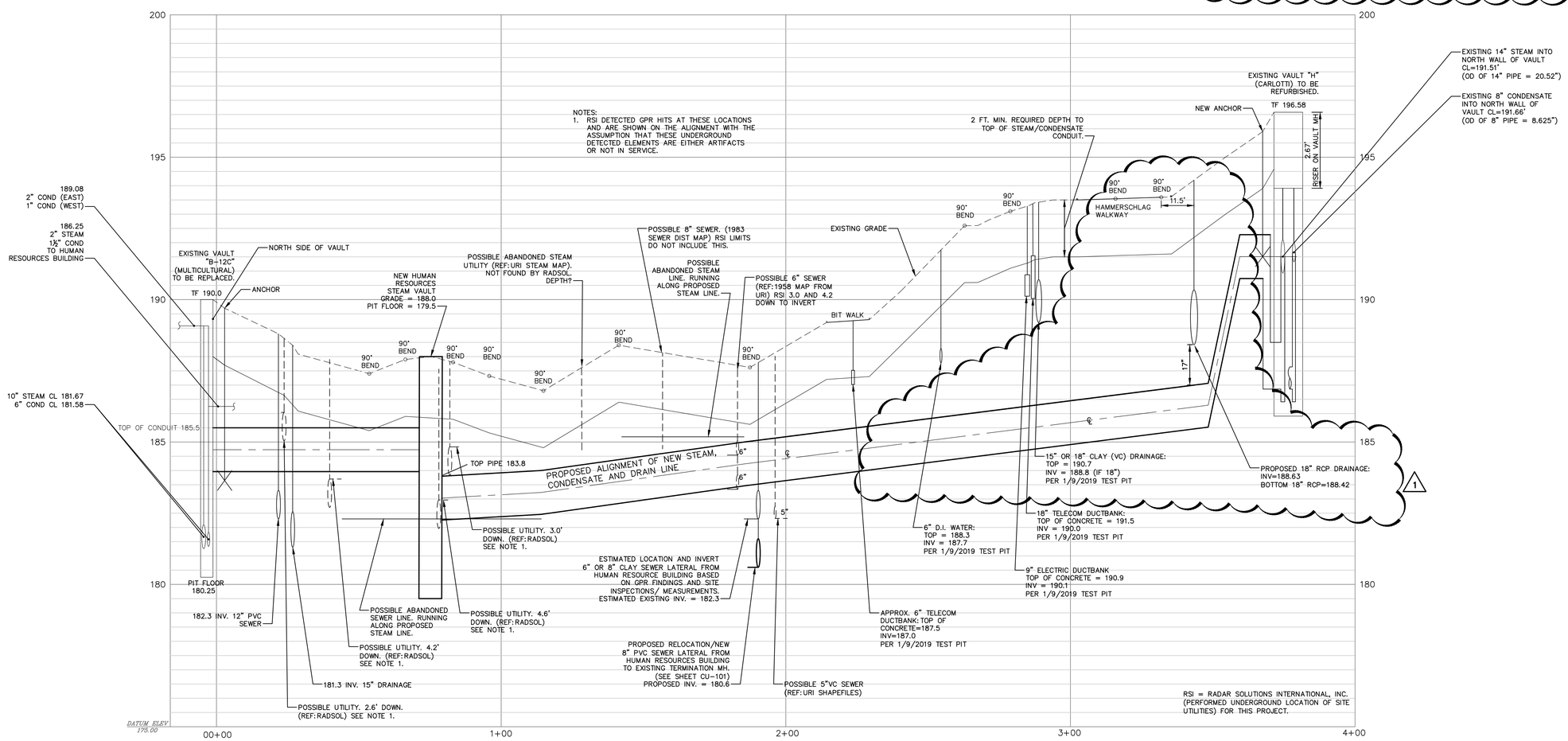
1. One-half of one percent of the cost of the Work will be retained from Final Payment for this purpose.

END OF ATTACHMENT



2 PROPOSED 18" RCP DRAINAGE AT NEW 10" STEAM LINE

SCALE: 1" = 10'



1 STEAM LINE ELEVATION – FROM VAULT "H" (CARLOTTI) TO VAULT "B-12C" (MULTICULTURAL)

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: ½" = 1'-0"

CARLOTTI TO MULTICULTURAL STEAM LINE BID DRAWINGS

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	3/8/2019	CHANGE STEAM ELEVATION TO AVOID NEW 18" RCP	JBS/FTC	EYL

SEAL

SEAL

SCALE:
HORZ.: AS SHOWN
VERT.:
DATUM:
HORZ.:
VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
317 IRON HORSE WAY, SUITE 204
PROVIDENCE, RI 02908
401.861.3070
www.fando.com

URI

ELEVATION FROM VAULT "H" (CARLOTTI) TO VAULT "B-12C" (MULTICULTURAL)

FARMHOUSE ROAD - STEAM AND CONDENSATE IMPROVEMENTS

KINGSTON RHODE ISLAND

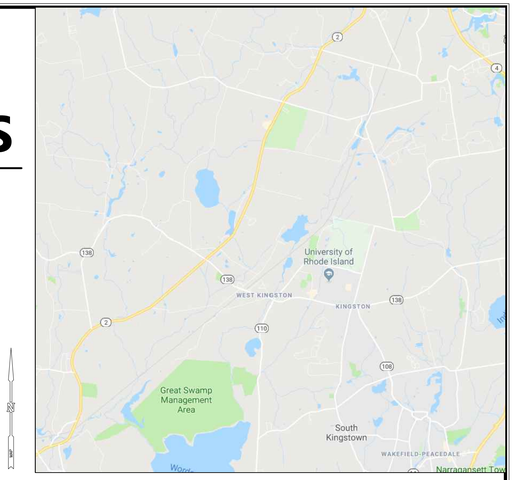
PROJ. No.: 20141310.S10
DATE: 01/14/2019

CU-201

File Path: J:\DWG\P2014\1310\S10\MEP\Civil Utilities\Phase I_Carlotti Drawings\20141310S10_ PRF01_Carlotti.dwg Layout: CU201 Plotted: Fri, March 08, 2019 - 4:01 PM User: fcariochio
Plotter: NONE CTB File: FO.STB
LAYER STATE:
MS VIEW:

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS

HAMMERSCHLAG MALL



LOCATION MAP:

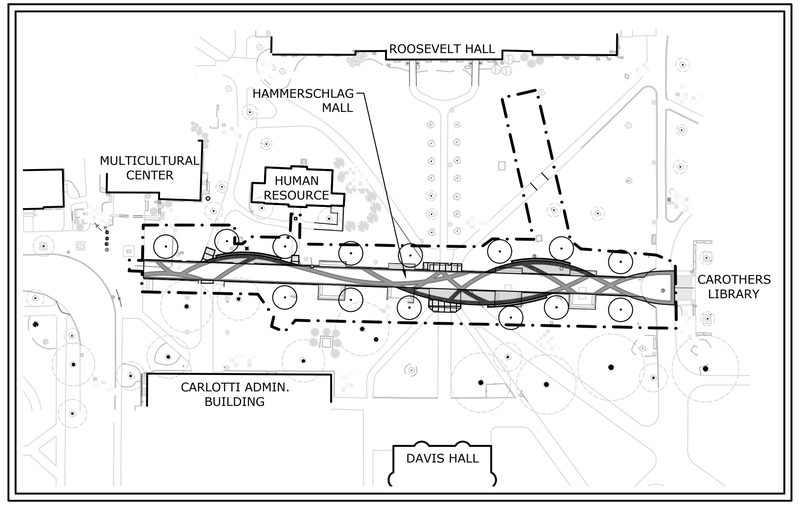
0' 30' 60'
0 1/2" 1"
SCALE 1" = 60'

URI #7575492

45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

BID DOCUMENTS
JANUARY 18, 2019
REVISED: MARCH 11, 2019

MAP



PROJECT SITE VICINITY MAP:

0' 30' 60'
0 1/2" 1"
SCALE 1" = 60'

PREPARED BY:

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

PREPARED FOR:

THE UNIVERSITY OF RHODE ISLAND
KINGSTON, RHODE ISLAND 02881

LIST OF DRAWINGS

NO.	NAME	TITLE
01	--	TITLE SHEET
02	IN	INDEX, NOTES & LEGEND
03	EX	EXISTING CONDITIONS
04	SE	SEDIMENT & EROSION CONTROL PLAN
05	RM	SITE PLAN - REMOVALS
06	TYP	TYPICAL CROSS SECTIONS
07	LM	SITE PLAN - LANDSCAPING & MATERIALS
08	CL	SITE PLAN - CONSTRUCTION LAYOUT
09	GR	SITE PLAN - GRADING
10	UT	SITE PLAN- UTILITIES
11	SD-1	SITE DETAILS
12	SD-2	SITE DETAILS
13	SD-3	SITE DETAILS

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GENERAL NOTES

1. PLANIMETRIC AND TOPOGRAPHIC INFORMATION IS BASED UPON FIELD SURVEY CONDUCTED BY: BRYANT ASSOCIATES, INC., TAKEN FROM A MAP ENTITLED TOPOGRAPHIC SURVEY, PREPARED FOR UNIVERSITY OF RHODE ISLAND AT A SCALE OF 1"=20', DATED: SEPTEMBER 19, 2018.
2. EXISTING UTILITY INFORMATION HAS BEEN SUPPLEMENTED WITH GEOGRAPHIC INFORMATION SYSTEMS (GIS) UTILITY MAPPING AS PROVIDED BY THE UNIVERSITY OF RHODE ISLAND.
3. INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO BEGINNING CONSTRUCTION. CALL "DIG SAFE", 1-888-DIG-SAFE OR 811. ALL UTILITY LOCATIONS THAT DO NOT MATCH THE VERTICAL OR HORIZONTAL CONTROL SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
4. MILONE & MACBROOM INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.
5. ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE URI OFFICE OF CAPITAL PROJECTS (OCP).
6. SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THESE PLANS AND DESCRIBED WITHIN THE SEDIMENT AND EROSION CONTROL NARRATIVE SHALL BE IMPLEMENTED AND MAINTAINED UNTIL PERMANENT COVER AND STABILIZATION IS ESTABLISHED. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL CONFORM TO THE LATEST "RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK", AND IN ALL CASES BEST MANAGEMENT PRACTICES SHALL PREVAIL.
7. ALL DISTURBED AREAS SHALL RECEIVE A MINIMUM OF 6" TOPSOIL, AND BE SEEDED WITH GRASS, AS SHOWN ON THE PLANS.
8. ALL PROPOSED CONTOURS AND SPOT ELEVATIONS INDICATE FINISHED GRADE.
9. ALL CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO UNIVERSITY OF RHODE ISLAND REQUIREMENTS AND TO THE APPLICABLE SECTIONS OF THE STATE OF RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND ADDENDUMS.
10. THE PLANS REQUIRE A CONTRACTOR'S WORKING KNOWLEDGE OF LOCAL, MUNICIPAL, WATER AUTHORITY, AND STATE CODES FOR UTILITY SYSTEMS. ANY CONFLICTS BETWEEN MATERIALS AND LOCATIONS SHOWN, AND LOCAL REQUIREMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE EXECUTION OF WORK. THE ENGINEER WILL NOT BE HELD LIABLE FOR COSTS INCURRED TO IMPLEMENT OR CORRECT WORK WHICH DOES NOT CONFORM TO LOCAL CODE.
11. ALL FUEL, OIL, PAINT, OR OTHER HAZARDOUS MATERIALS SHOULD BE STORED IN A SECONDARY CONTAINER AND REMOVED TO A LOCKED INDOOR AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.
12. COMPLIANCE WITH THE PERMIT CONDITIONS IS THE RESPONSIBILITY OF BOTH THE CONTRACTOR AND THE PERMITTEE.

CONSTRUCTION SEQUENCE

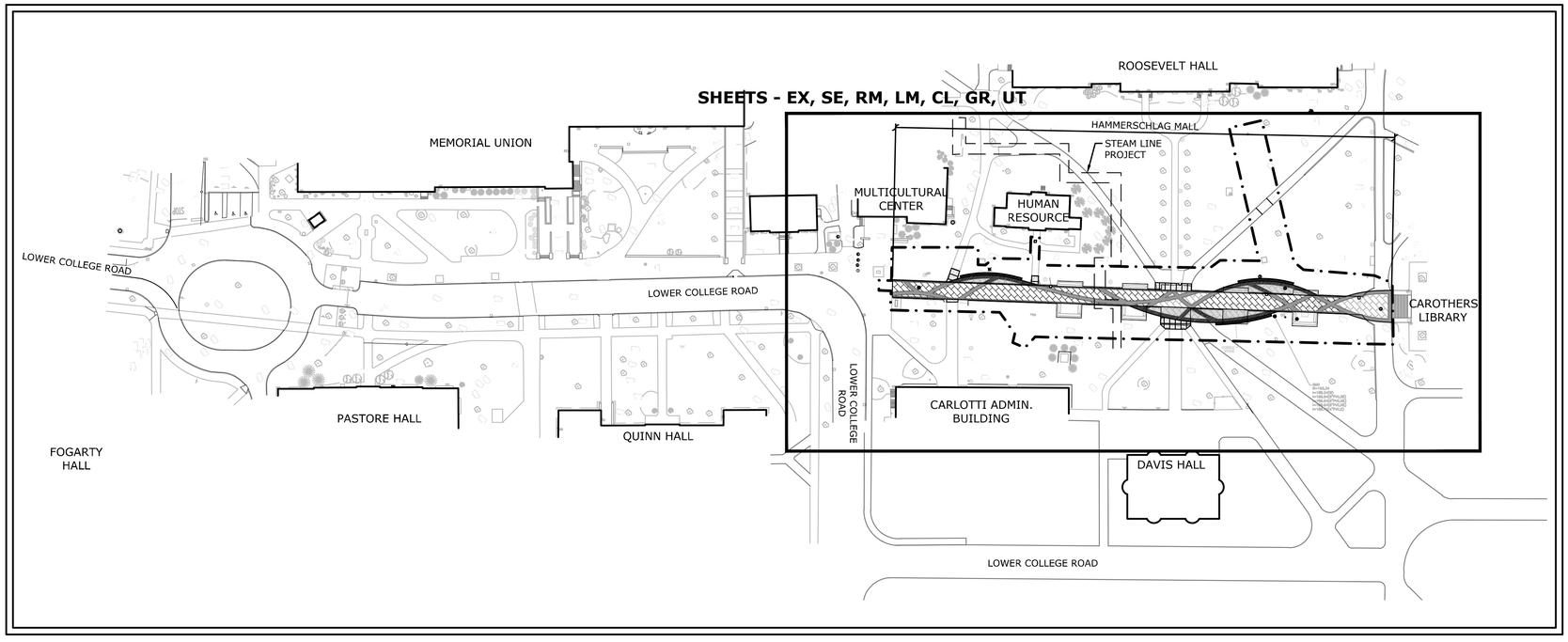
1. PRIOR TO COMMENCEMENT OF WORK A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH UNIVERSITY STAFF, REPRESENTATIVES OF THE CONTRACTOR, AND LANDSCAPE ARCHITECT. AT THIS MEETING, ONE PERSON WILL BE PLACED IN CHARGE OF SEDIMENT AND EROSION CONTROL FOR THE ENTIRE SITE.
2. CONTRACTOR TO STAKE OUT LIMIT OF DISTURBANCE AND VEGETATION TO BE RETAINED. NO DISTURBANCE IS TO TAKE PLACE BEYOND THE LIMITS OF WORK SHOWN.
3. CONTRACTOR TO INSTALL SEDIMENT AND EROSION CONTROLS ALONG THE PERIMETER, AND STABILIZED CONSTRUCTION ENTRANCES. PERIMETER EROSION CONTROL BARRIERS (COMPOSITE FILTER SOCK) SHALL BE INSTALLED IN CONTINUOUS UNINTERRUPTED RUNS AT THE LOCATIONS INDICATED ON THE PLANS AND MAINTAINED IN EFFECTIVE CONDITION UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED WITH VEGETATION.
4. CLEAR AND GRUB SITE AND STOCKPILE TOPSOIL. PLACE COMPOSITE FILTER SOCK AROUND STOCKPILES. ALL STOCKPILES SHALL BE LOCATED WITHIN THE LIMITS OF DISTURBANCE.
5. INITIATE DEMOLITION OPERATIONS AFTER ALL COMPOSITE FILTER SOCKS, TREE PROTECTION AND INLET PROTECTION ARE INSTALLED.
6. INSTALL UNDERGROUND UTILITIES. THE CONTRACTOR MUST COORDINATE SEQUENCE OF CONSTRUCTION WITH STEAM LINE PROJECT TO ENSURE NO DELAYS OCCUR.
7. INSTALL SEAT WALLS, PAVEMENTS, AND ADJUST UTILITY COVERS TO PROPOSED GRADES.
8. SEDIMENT AND EROSION CONTROLS SHALL BE INSPECTED AT LEAST ONCE A WEEK AND WITHIN 24 HOURS OF THE END OF A STORM WITH A RAINFALL AMOUNT OF 0.25 INCH OR GREATER, OR BI-MONTHLY IF NO RAINFALL EVENT OCCURS. ALL CONTROLS SHALL BE MAINTAINED IN ACCORDANCE WITH THE RIDOT STANDARD SPECIFICATIONS AND THE RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK.

OPERATION AND MAINTENANCE PLAN (POST-CONSTRUCTION)

1. THE DRAINAGE SYSTEM AND ALL ASSOCIATED STRUCTURES SHOULD BE INSPECTED AND SEDIMENT REMOVED PRIOR TO FINAL PUNCH LIST. THE SEDIMENT SHALL BE DISPOSED OF IN AN APPROVED LOCATION.
2. CATCH BASINS SHALL BE INSPECTED TWICE ANNUALLY AND AFTER ANY SPILLAGE OF OIL, GAS, OR OTHER CONTAMINANT SPILLS IN THE PROJECT AREA. SUBSEQUENT TO CONTAMINANT SPILLS, THE CATCH BASINS SHALL BE CLEANED IMMEDIATELY AND THE CONTENTS DISPOSED OF AT AN APPROVED OFF-SITE LOCATION.
3. A VEGETATIVE OR IMPROVED COVER SHALL BE MAINTAINED ON ALL EARTH SURFACES TO MINIMIZE SOIL EROSION. USE OF FERTILIZER SHOULD BE MINIMIZED AND APPLIED USING PRUDENT APPLICATION PROCEDURES.
4. STABILIZATION OF DISTURBED AREAS SHALL BE ACHIEVED WITHIN 14 DAYS OF FINAL GRADING. PLANTING OF GRASS SHALL BE ACCOMPLISHED BY THE CONTRACTOR AS EARLY AS POSSIBLE UPON COMPLETION OF GRADING AND CONSTRUCTION.
5. A LOG OF ALL INSPECTION AND CLEANING SHALL BE MAINTAINED BY THE CONTRACTOR AND BE AVAILABLE FOR INSPECTION.
6. AFTER THE COMPLETION OF THE ENTIRE PROJECT TO THE SATISFACTION OF THE URI OFFICE OF CAPITAL PROJECTS (OCP). ALL MAINTENANCE OF THE THE DRAINAGE SYSTEM SHALL THEN BE THE RESPONSIBILITY OF THE UNIVERSITY OF RHODE ISLAND OR THEIR APPOINTED AGENTS.
7. URI FACILITIES SHALL BE RESPONSIBLE FOR ALL REPAIRS, REPLACEMENTS, AND OTHER WORK NECESSARY TO MAINTAIN THE PROPER FUNCTIONING OF STORMWATER MANAGEMENT FACILITIES. ANY REQUIRED REPAIR AND/OR REPLACEMENT OF DRAINAGE STRUCTURES OR FACILITIES SHALL BE PERFORMED PROMPTLY TO ENSURE PROPER FUNCTIONING OF THE SYSTEM.
8. THE CONTRACTOR MUST REPAIR AND OR RESEED ANY AREAS THAT DO NOT DEVELOP WITHIN THE PERIOD OF ONE (1) CALENDAR YEAR AND SHALL DO SO AT NO ADDITIONAL EXPENSE TO THE OWNER.

LEGEND

EXISTING		PROPOSED
70	MAJOR CONTOUR	70
68	MINOR CONTOUR	68
× 70.5	SPOT GRADE	+70.5
	TREE LINE	
	STONEWALL	
	DECIDUOUS TREE	
	CONIFEROUS TREE	
	SHRUB	
	SHRUB	
CR	CURB RAMP	
DWS	DETECTABLE WARNING SYSTEM	
LA	LANDSCAPED AREA	
	GUY WIRE	
RD	ROOF DRAIN	
ER	ELECTRIC RISER	
	LIGHT POLE	
	HYDRANT	
	WATER METER	
WG	WATER VALVE	WV
GG	GAS VALVE	GV
CB	CATCH BASIN	
DMH	DRAIN MANHOLE	D
SMH	SANITARY MANHOLE	S
TMH	TELEPHONE MANHOLE	T
EMH	ELECTRIC MANHOLE	
CO	CLEAN OUT	
	MANHOLE/YARD DRAIN/ AREA DRAIN	
S S S	SANITARY SEWER WITH MANHOLE	SAN
	STORM DRAIN WITH CATCH BASIN	
W	WATER MAIN	
DW	DOMESTIC WATER	
FP	FIRE PROTECTION WATER	
G	GAS MAIN	
E	ELECTRIC LINE	
ETC	ELECTRIC, TELEPHONE, CABLE	
	UTILITY POLE	
	SIGN	
	IRON PIPE	
	MONUMENT	
	EDGE OF PAVEMENT WITH CURB	
	BRICK WALL	
	SEAT WALL	
	SIDEWALK	
	CONTRACT LIMIT LINE	
	BOLLARD	
	GUARD RAIL	
	PICKET FENCE	
	CHAIN LINK FENCE	
X X X X	BARBWIRE FENCE	



CONTEXT MAP

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DESCRIPTION	DATE	BY
ADDENDUM NO.1	3/11/2019	MTD

INDEX, NOTES, & LEGEND

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	GB	RRC
DESIGNED	DRAWN	CHECKED

SCALE: 1"=60'
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 02 OF 13
SHEET NAME: IN

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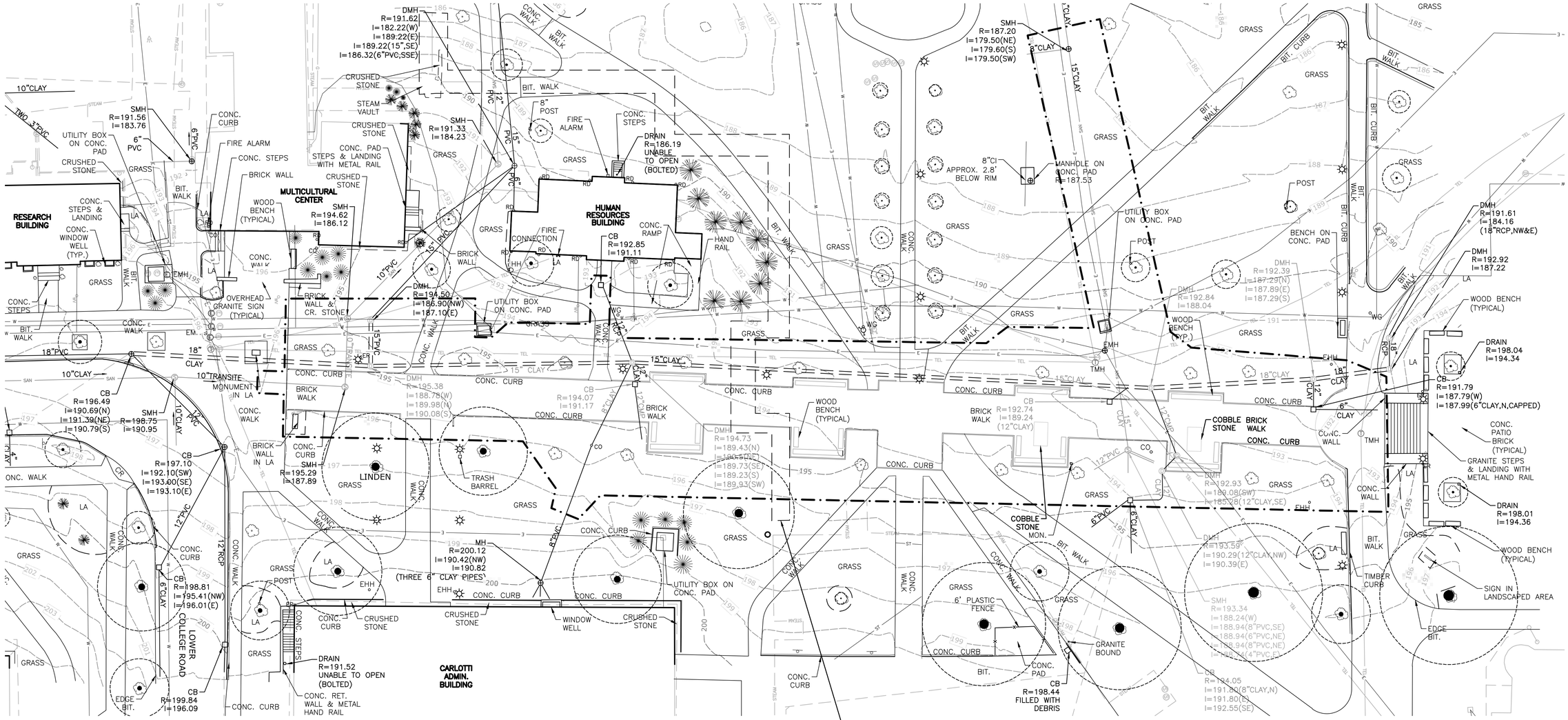

SURVEYOR NOTES:

1. HORIZONTAL DATUM: NAD '83, RI STATE PLANE COORDINATES
   VERTICAL DATUM: NAVD 1988
2. SURVEY CONTROL WILL BE PROVIDED TO THE AWARDED CONTRACTOR.
3. LOCATION OF UNDERGROUND UTILITIES IS BASED ON AVAILABLE INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. ALL UTILITIES MAY NOT BE SHOWN. DIG SAFE SHOULD BE CONTACTED72 HOURS PRIOR TO ANY EXCAVATION.

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EXISTING CONDITIONS

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
DESIGNED	DRAWN	CHECKED

SCALE: 1"=20'

DATE: JANUARY 18, 2019

PROJECT NO.: 6372-01

SHEET NO.: 03 OF 13

SHEET NAME: EX

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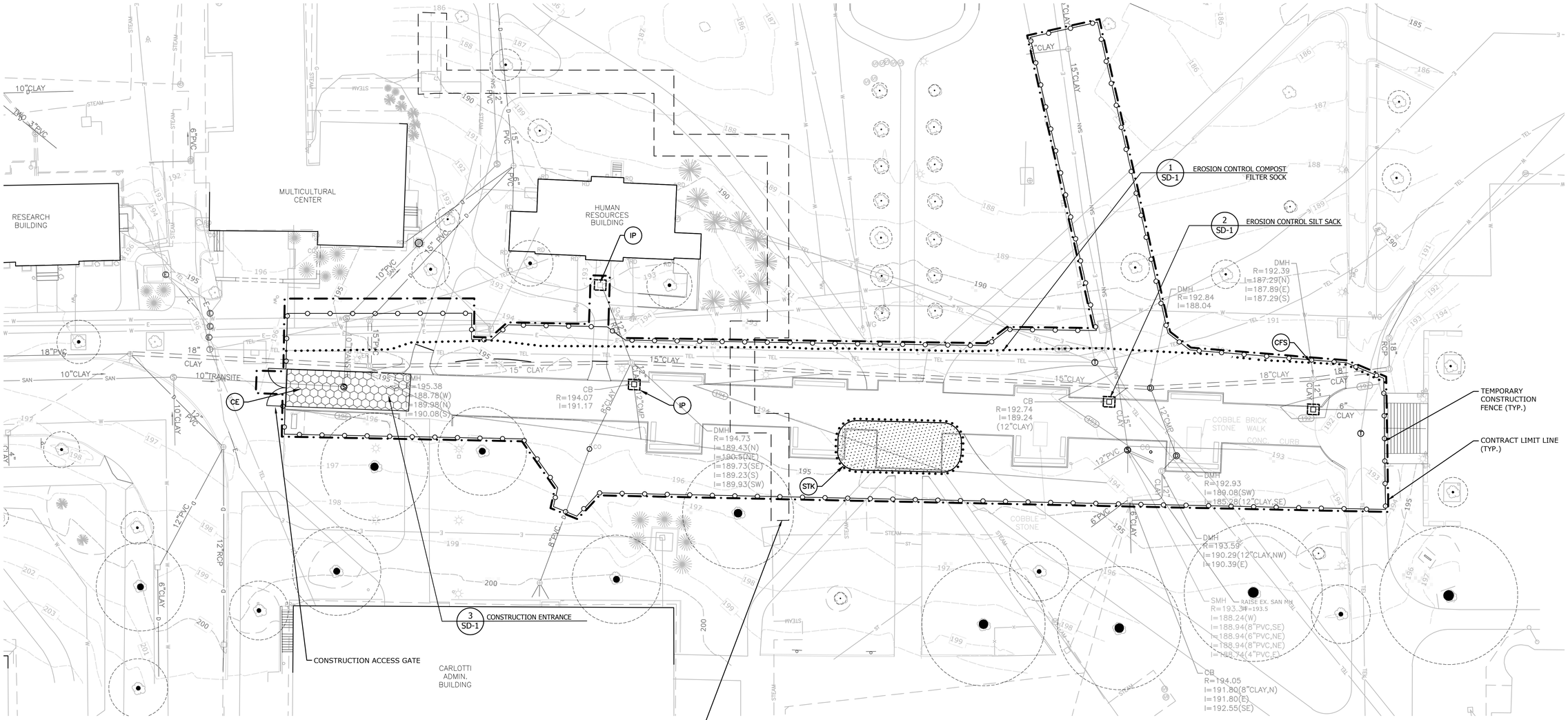

SOIL EROSION AND SEDIMENT CONTROL NARRATIVE

SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THESE PLANS AND DESCRIBED WITHIN THE SEDIMENT AND EROSION CONTROL NARRATIVE SHALL BE IMPLEMENTED AND MAINTAINED UNTIL PERMANENT COVER AND STABILIZATION IS ESTABLISHED. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL CONFORM TO THE "RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK" - AND IN ALL CASES BEST MANAGEMENT PRACTICES SHALL PREVAIL.

1.PURPOSE AND DESCRIPTION OF PROJECT
A.) THE CONSTRUCTION OF WALKWAYS, WALLS AND LANDSCAPE IMPROVEMENTS.
B.) DISTURBED AREA: ±0.48 AC.

2.IDENTIFICATION OF EROSION AND SEDIMENT CONTROL CONCERNS
A.) CUTS AND FILLS ASSOCIATED WITH CONSTRUCTION.
B.) PROTECTION OF ONSITE DRAINAGE SYSTEMS

EROSION CONTROL LEGEND

- CE — CONSTRUCTION ENTRANCE (50 L.F. MIN.)
- CFS — COMPOSITE FILTER SOCK
- IP — INLET PROTECTION
- STK — SOIL STOCKPILE SURROUNDED WITH COMPOSITE FILTER SOCK
- CONTRACT LIMIT LINE
- TEMPORARY CONSTRUCTION FENCE

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SEDIMENT & EROSION CONTROL PLAN

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

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SCALE: 1"=20'
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 04 OF 13
SHEET NAME: SE

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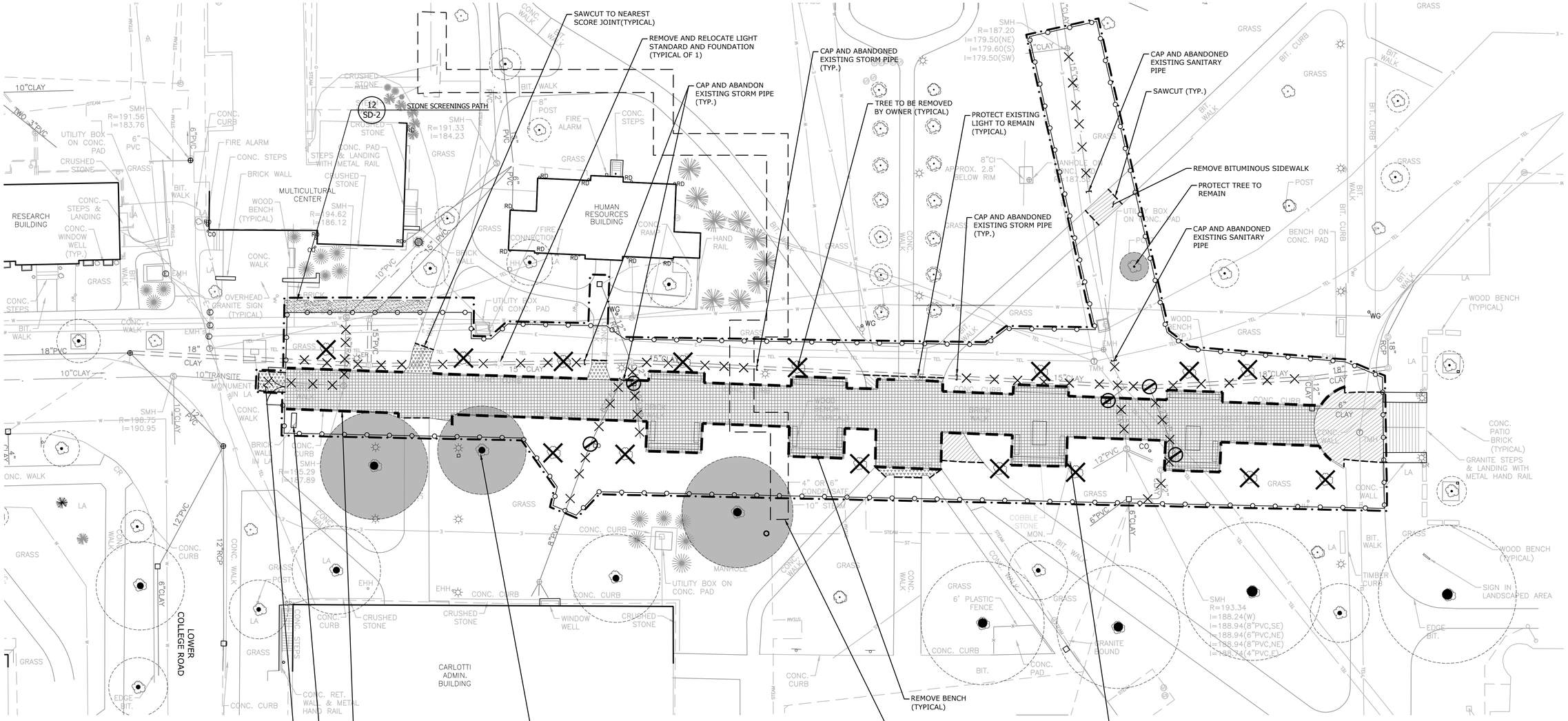

TREE PROTECTION NOTES

1. CONTRACTOR IS RESPONSIBLE TO PROVIDE TREE PROTECTION PER THE CONTRACT SPECIFICATIONS, URI LANDSCAPE MASTER PLAN AND DIRECTION OF OWNER.
2. PRIOR TO ANY WORK ALL TREES TO REMAIN WITHIN THE WORK ZONE OR IN CLOSE PROXIMITY SHALL BE FLAGGED AND VERIFIED WITH THE UNIVERSITY ARBORISTS. THE ARBORISTS SHALL BE CONTACTED A MINIMUM OF 24 HOURS PRIOR TO CONSTRUCTION TO MEET ON SITE AND PROVIDE GUIDANCE ON INSTALLATION OF CONSTRUCTION FENCING AND TREE PROTECTION AREAS. CONTACT SHELEEN CLARKE, ASSISTANT DIRECTOR, UNIVERSITY LANDSCAPE AND GROUNDS, AT (401) 874-5515 TO COORDINATE.
3. ANY EXCAVATION WITH THE DRIP LINE OR CRITICAL ROOT ZONE OF TREES TO REMAIN SHALL BE DONE UNDER THE SUPERVISION OF THE UNIVERSITY ARBORIST. CUTTING OF ROOTS MAY BE PERFORMED BY UNIVERSITY ARBORIST.

REMOVALS NOTES:

1. CONTRACTOR TO REMOVE BRICK AND GRANITE COBBLE STONE AND STOCKPILE IN A LOCATION PER THE DIRECTION OF THE URI OFFICE OF CAMPUS PLANNING (OCP). CONTRACTOR TO TAKE CARE TO NOT DAMAGE BRICK AS IT IS INTENDED FOR REUSE. BRICK TO BE REUSED AS INDICATED ON THE PLANS.
2. REMOVE AND DISPOSE ALL CURBING ASSOCIATED WITH SIDEWALK REMOVAL.
3. INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO BEGINNING CONSTRUCTION. CALL "DIG SAFE", 1-888-344-7233. ALL UTILITY LOCATIONS THAT DO NOT MATCH THE VERTICAL OR HORIZONTAL CONTROL SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE URI OCP FOR RESOLUTION.
4. INFORMATION SHOWN ON THIS DRAWING IS TO BE USED FOR REFERENCE ONLY. THE LOCATION, SIZE AND ELEVATIONS OF UTILITIES AND STRUCTURES AND THE NATURE OF THEIR CONTENTS SHALL BE CONFIRMED IN THE FIELD PRIOR TO DEMOLITION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE URI OCP PRIOR TO DEMOLITION.
5. THE INTENT OF THIS DRAWING IS TO IDENTIFY SPECIFIC DEMOLITIONS. HOWEVER, THE GRAPHIC LEGEND MAY NOT BE A COMPREHENSIVE LIST OF ALL SITE REMOVALS.
6. CONTRACTOR TO COORDINATE ALL PROPOSED UTILITY WORK WITH APPROPRIATE UTILITY COMPANIES. THIS WORK SHALL BE DONE AT THE CONTRACTORS EXPENSE UNLESS OTHERWISE PROVIDED FOR IN THE SPECIFICATIONS. THE CONTRACTOR SHALL REMOVE OR ABANDON THE EXISTING UTILITY SERVICES AS DIRECTED AND TO THE SATISFACTION OF EACH INDIVIDUAL UTILITY COMPANY.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE TIMING OF THE REMOVAL OF EXISTING UTILITIES, PAVEMENTS, AND OTHER INFRASTRUCTURE.
8. ALL UNDERGROUND UTILITIES NOT SHOWN TO BE REMOVED SHALL HAVE SERVICE MAINTAINED AND SHALL BE PROTECTED DURING CONSTRUCTION.
9. WORK SHALL NOT COMMENCE UNTIL APPROVED IN WRITING BY THE URI OCP.
10. CONTRACTOR IS RESPONSIBLE TO OBTAIN PERMITS REQUIRED AND COMPLY WITH ALL REGULATIONS IN THE DEMOLITION AND REMOVAL OF THE DESIGNATED STRUCTURES.
11. INSTALL ALL SEDIMENT AND EROSION CONTROLS PRIOR TO BEGINNING DEMOLITION WORK.
12. EXTENT OF PAVEMENT TO BE REMOVED IS SHOWN ON PLAN. CONTRACTOR SHALL PROTECT AREAS OF PAVEMENT IDENTIFIED TO REMAIN.
13. ANY MATERIALS DEEMED UNSUITABLE BY THE URI OCP SHALL BE DISPOSED OF OFF-SITE IN CONFORMANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
14. CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH THE HANDLING AND DISPOSAL OF ALL MATERIALS.
15. ANY VEGETATION REMOVAL NOT ADDRESSED IN THE PLANS SHALL RECEIVE WRITTEN APPROVAL FROM URI OCP BEFORE ANY VEGETATION IS REMOVED, INCLUDING PRUNING OF TREE CANOPY FOR CONSTRUCTION VEHICLE ACCESS.

REMOVALS LEGEND

- REMOVE CONCRETE SIDEWALK (FULL DEPTH)
- REMOVE BRICK AND COBBLE STONE (FULL DEPTH) STOCKPILE BRICK AND COBBLE STONE
- REMOVE BITUMINOUS WALK (FULL DEPTH)
- STONE SCREENINGS PATH - TEMPORARY ACCESSIBLE ROUTE
- TREE TO BE REMOVED BY OWNER
- TREE PROTECTION
- CONTRACT LIMIT LINE
- REMOVE EXISTING UTILITY STRUCTURES
- REMOVE EXISTING SANITARY/STORM PIPES
- TEMPORARY CONSTRUCTION FENCE
- LIMIT OF EXCAVATION
- SAWCUT PAVEMENT
- REMOVE AND DISPOSE CURB

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SITE PLAN - REMOVALS

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	JJM	RRC
DESIGNED	DRAWN	CHECKED

SCALE: 1"=20'
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 05 OF 13
SHEET NAME: RM

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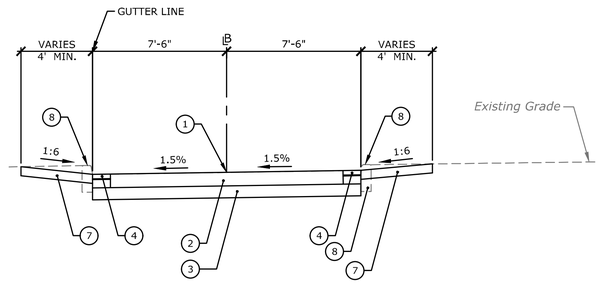
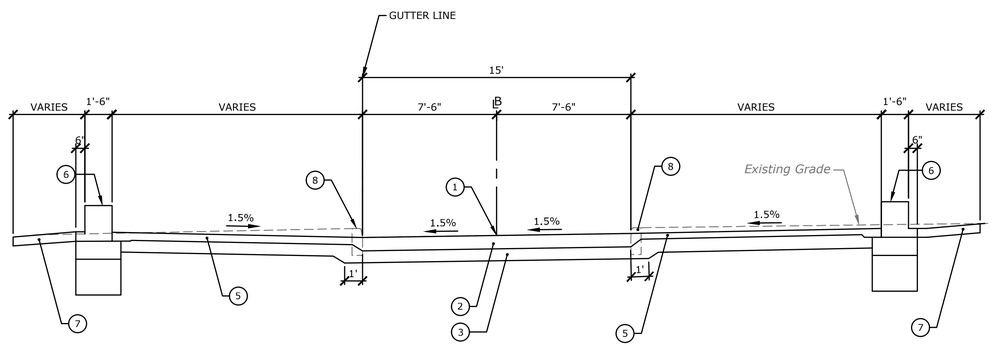


1 TYPICAL CROSS SECTION

NOT TO SCALE

P-SC-6372.01-01



2 TYPICAL CROSS SECTION AT PEDESTRIAN BUMPOUTS

NOT TO SCALE

P-SC-6372.01-02

LEGEND

1. CONSTRUCTION BASELINE
2. * 9" CONCRETE DRIVEWAY
3. 8" COMPACTED GRANULAR FILL
4. CLAY UNIT PAVER
5. * 5" CONCRETE SIDEWALK
6. FIELDSTONE SEATWALL
7. 6" TOPSOIL AND SEED
8. EXISTING CURBING TO BE REMOVED

* PAVEMENT SECTION MAY CONTAIN FULL DEPTH COLORIZED CONCRETE BANDING. SEE SHEET LM FOR EXACT LOCATION

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TYPICAL CROSS SECTIONS

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HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	GB	RRC
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SCALE: 1/4" = 1'-0"

DATE: JANUARY 18, 2019

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SHEET NO.: 06 OF 13

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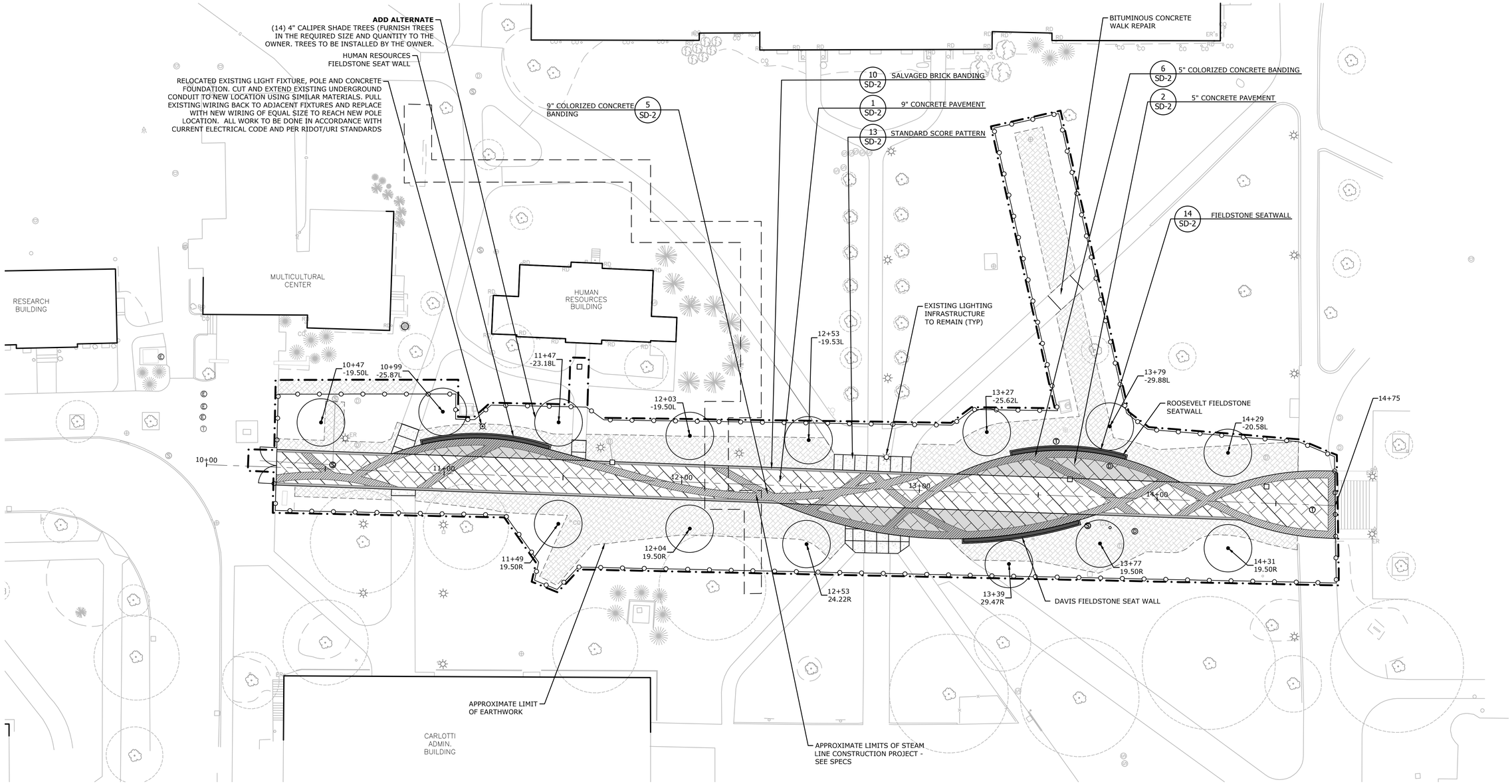

LAYOUT NOTES

1. MILONE AND MACBROOM INC. ACCEPTS NO RESPONSIBILITY FOR MAPS AND DATA THAT HAVE BEEN PREPARED AND SUPPLIED BY OTHERS.
2. CONCRETE WALKS SHALL INCORPORATE EXPANSION JOINTS, SCORE JOINTS, AND CONSTRUCTION JOINTS PER THE SPECIFICATIONS, PLANS AND DETAILS.
3. ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE URI OFFICE OF CAMPUS PLANNING (OCP).
4. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATING WALL FOUNDATION.

PLANTING NOTES

1. SEED ALL DISTURBED AREAS TO LAWN UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL PROVIDE A 6" MINIMUM DEPTH OF SCREENED TOPSOIL, AS SPECIFIED, FOR ALL LAWN AREAS. AS NOTED ON THE DETAILS, SUBGRADE BENEATH PROPOSED LAWN AREAS SHALL BE LOOSENED OR SCARIFIED TO A MINIMUM DEPTH OF 12 INCHES, EXCEPT IN AREAS OF SURFACE TREE ROOTS, WHERE NO SCARIFICATION SHALL BE DONE.
2. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER SEEDING AND SHALL CONTINUE UNTIL ACCEPTANCE BY THE URI OCP AT THE END OF THE WARRANTY PERIOD. MAINTENANCE SHALL INCLUDE WATERING, SEE SPECS FOR MAINTENANCE REQUIREMENTS
3. TAKE NOTE TO PROTECT ROOT ZONES OF EXISTING TREES TO REMAIN DURING CONSTRUCTION AS SHOWN ON PLANS. SEE REMOVALS PLAN AND SPECIFICATIONS.
4. IF PROVIDED, ALL TREES ARE SUBJECT TO INSPECTION AND APPROVAL BY THE URI OCP PRIOR TO AND AFTER DELIVERY TO THE SITE.

MATERIALS NOTES

1. ALL CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO UNIVERSITY OF RHODE ISLAND REQUIREMENTS AND TO THE APPLICABLE SECTIONS OF THE STATE OF RHODE ISLAND DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND ADDENDUMS.
2. COLORIZED CONCRETE BANDING SHALL BE COLOR: CHARCOAL C-24 AS MANUFACTURED BY SIKA CORPORATION OR APPROVED EQUIVALENT.
3. CONTRACTOR TO STOCKPILE NEATLY EXISTING BRICK FOR EVALUATION BY OWNER PRIOR TO REUSE.
4. RESET BRICKS SHALL BE SOUND AND CLEAN. NO BRICKS THAT ARE CRACKED, CHIPPED, BROKEN OR DAMAGED IN ANY WAY SHALL BE INSTALLED. IF ANY DELETERIOUS BRICKS ARE FOUND INSTALLED THEY SHALL BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
5. CONTRACTOR TO POWERWASH BRICK AFTER IT IS SET PER CONTRACT REQUIREMENTS AND PRIOR TO SWEEPING JOINTS.

MATERIALS LEGEND

- 5" CONCRETE PAVEMENT - ANGLED SCORE PATTERN
- 9" CONCRETE PAVEMENT - ANGLED SCORE PATTERN
- 9" COLORIZED CONCRETE BANDING
- 5" COLORIZED CONCRETE BANDING
- FIELDSTONE SEAT WALL
- LAWN ESTABLISHMENT
- BRICK BANDING
- 5" CONCRETE PAVEMENT - STANDARD CONCRETE SCORE PATTERN

PLANT SCHEDULE - ADD ALTERNATE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONT.	COMMENTS
QC	14	Quercus coccinea	Scarlet Oak	4.0" Cal.	B&B	6`-8" MIN. BRANCHING HEIGHT, SPECIMEN QUALITY

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SITE PLAN - LANDSCAPING & MATERIALS

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HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
DESIGNED	DRAWN	CHECKED

SCALE: 1"=20'
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 07 OF 13
SHEET NAME: LM

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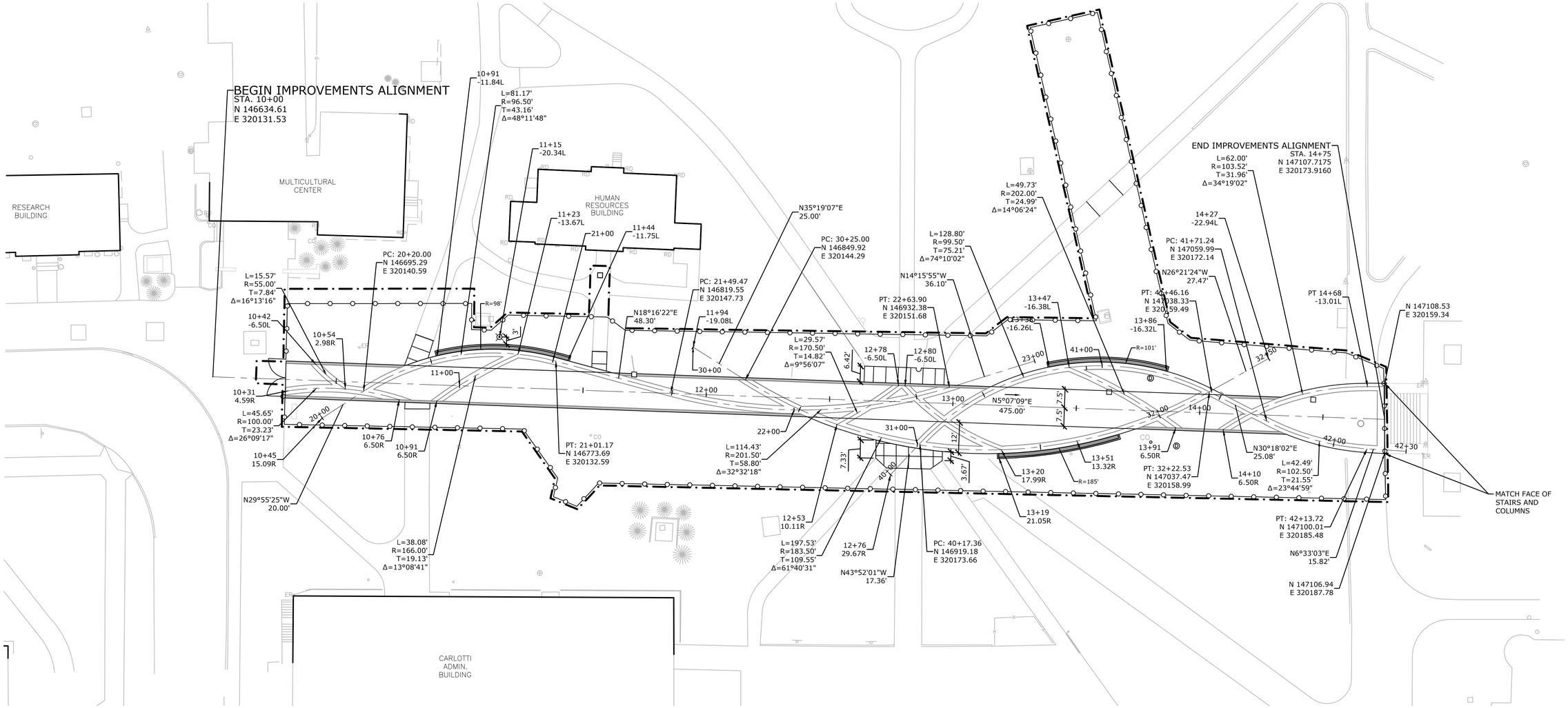

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SITE PLAN - CONSTRUCTION LAYOUT

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL

45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
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SCALE: 1"=20'

DATE: JANUARY 18, 2019

PROJECT NO.: 6372-01

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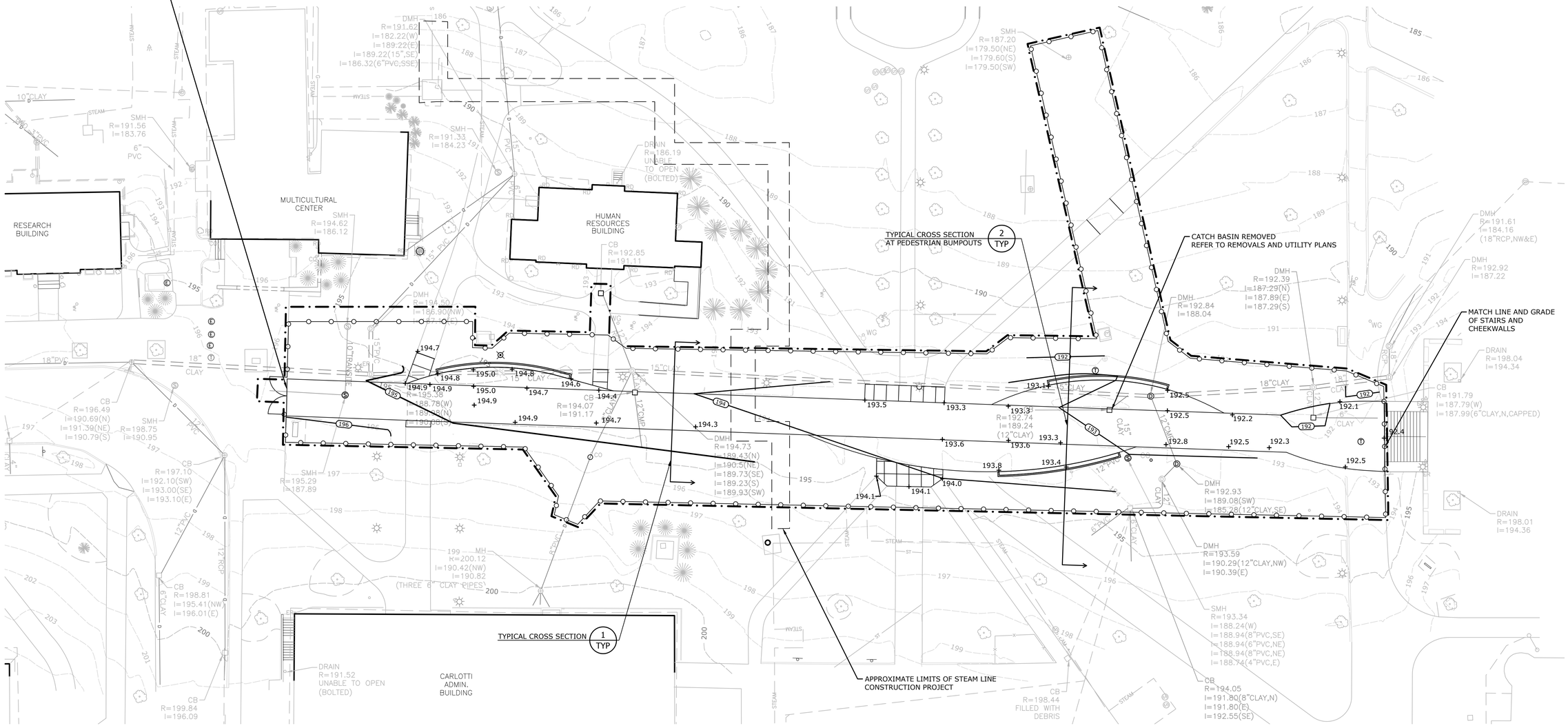

GRADING NOTES:

1. CONTRACTOR TO COORDINATE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS WITH CONCURRENT STEAMLINE RECONSTRUCTION PROJECT.
2. ACCESSIBLE ROUTE SLOPES SHALL BE 1:20 (5%) OR LESS AND THE CROSS SLOPES SHALL NOT EXCEED 1:50 (2%). CHANGES IN LEVELS SHALL NOT BE GREATER THAN 1/2 INCH, AND SLOPES SHALL NOT BE GREATER THAN 1:20.
3. IN ALL CASES IN WHICH PROPOSED ROADS, SIDEWALKS AND CURBING WILL BE TIED INTO EXISTING ROAD/SIDEWALK AND/OR CURBS THE CONTRACTOR SHALL MATCH THE LINE AND GRADE OF THE EXISTING SITE AMENITY TO REMAIN.
4. TAKE NOTE TO PROTECT ROOT ZONES OF EXISTING TREES DURING CONSTRUCTION AS SHOWN ON PLANS.

GRADING LEGEND

× 70.5	EXISTING SPOT ELEVATION
+ 70.5	PROPOSED SPOT ELEVATION
——70——	EXISTING CONTOUR
—124—	PROPOSED CONTOUR
—·—·—	CONTRACT LIMIT LINE
—○—○—	TEMPORARY CONSTRUCTION FENCE

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SITE PLAN - GRADING

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL

45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
DESIGNED	DRAWN	CHECKED

SCALE: 1"=20'
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 09 OF 13
SHEET NAME: GR

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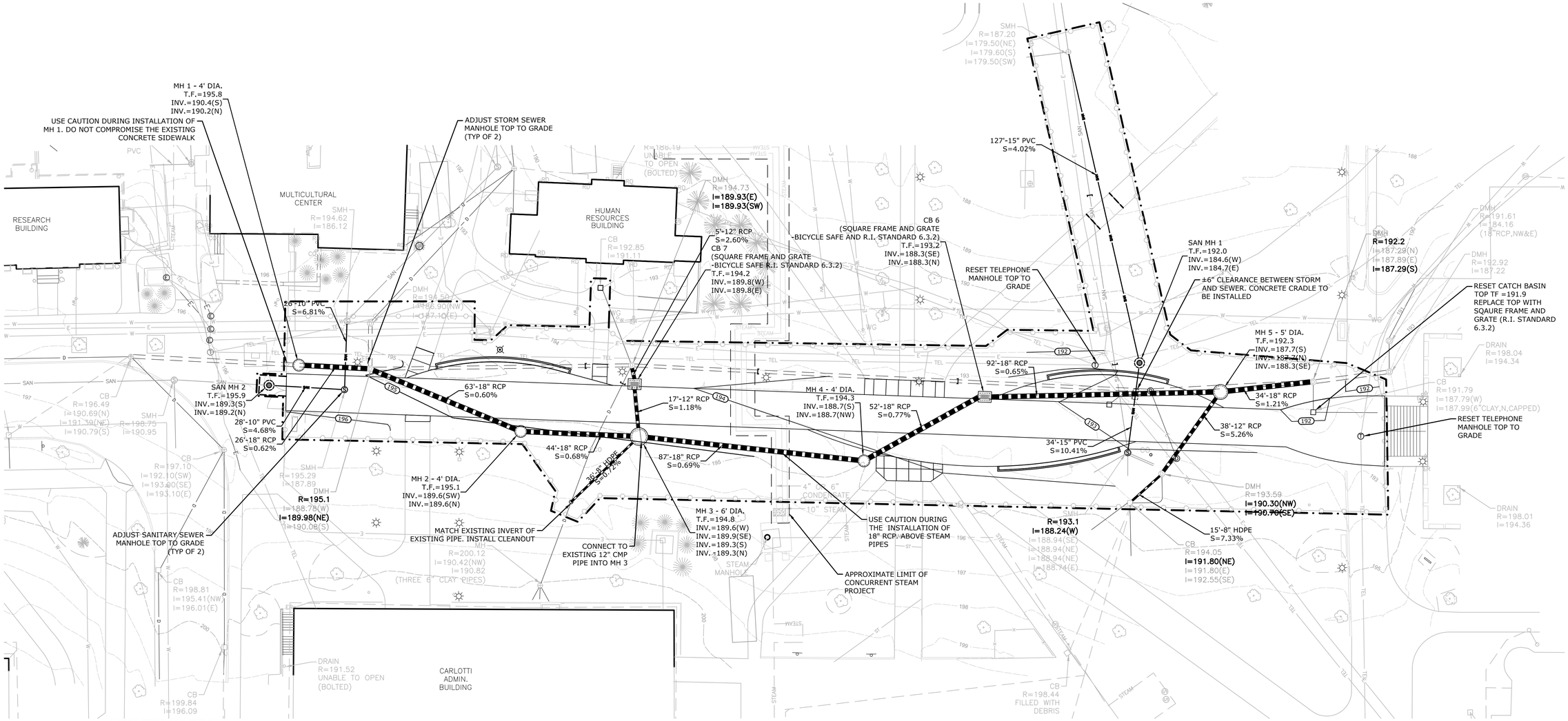

UTILITY NOTES:

1. CONTRACTOR TO COORDINATE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS WITH CONCURRENT STEAMLINE RECONSTRUCTION PROJECT.
2. ALL STORM AND SANITARY PIPING PROPOSED TO BE REPLACED IS TO MATCH EXISTING INVERTS AND SLOPES UNLESS OTHERWISE NOTED.
3. TAKE NOTE TO PROTECT ROOT ZONES OF EXISTING TREES DURING CONSTRUCTION AS SHOWN ON PLANS.
4. CALL DIG SAFE TO BE CONDUCTED AND PAINT MARKINGS TO BE FIELD IDENTIFIED PRIOR TO CONSTRUCTION.
5. ALL PROPOSED PIPE LENGTHS HAVE BEEN MEASURED FROM CENTER-TO-CENTER OF STRUCTURE.
6. LOCATIONS OF ALL EXISTING UTILITIES ARE APPROXIMATE.
7. CONTRACTOR TO OBSERVE WEATHER BEFORE REMOVAL/INSTALLATION OF STORM STRUCTURES AND PIPES. ADEQUATE DIVERSION CHANNERLS/TRENCHES OR PUMP BYPASS SHALL BE PROVIDED TO MAINTAIN STORMWATER FLOW DURING STORM EVENTS.
8. THE CONTRACTOR SHALL MAINTAIN FLOW ENTERING INTO UP GRADIENT SEWER MANHOLE (TF:193.1) DURING CONSTRUCTION OF THE NEW SEWER SYSTEM UNTIL NEW SEWER SYSTEM IS INSTALLED.
9. THE CONTRACTOR SHALL MAINTAIN FLOW ENTERING INTO UP GRADIENT SEWER MANHOLE (TF:198.75) DURING CONSTRUCTION OF THE NEW SEWER SYSTEM UNTIL NEW SEWER SYSTEM IS INSTALLED.
10. THE CONTRACTOR SHALL SUBMIT A SEWAGE HANDLING PLAN, AT LEAST 15 DAYS PRIOR TO THE START OF PROPOSED WORK DESIGNED IN CONJUNCTION WITH A PUMP MANUFACTURER/SUPPLIER.
11. ALL SANITARY SEWER PIPES SHALL BE PVC SDR-35. ALL STORM SEWER PIPES SHALL BE REINFORCED CONCRETE PIPE (RCP) UNLESS OTHERWISE NOTED.
12. COORDINATION SHALL BE MADE WITH SOUTH KINGSTOWN WASTEWATER DIVISION PRIOR TO ANY WORK BEING PERFORMED ON SEWER SERVICES THROUGHOUT THE PROJECT SITE.
13. TESTPITS TO BE PERFORMED BY CONTRACTOR TO DETERMINE THE ELEVATION OF EXISTING TELE/ELETRICITY LINES CROSSING PROPOSED STORM OR SANITARY PIPES. CONTACT ENGINEER IF CONFLICTS BETWEEN EXISTING TELE/ELECTRICITY LINES AND PROPOSED STORM/SANITARY PIPES ARE PRESENT.
14. TESTPIT TO BE PERFORMED BY CONTRACTOR TO DETERMINE THE ELEVATION OF 12" CMP AT LOCATION OF PROPOSED MH 3. CONNECT 12" CMP INTO MH 3.

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SITE DETAILS- UTILITIES

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RJM	ACD	RJM
DESIGNED	DRAWN	CHECKED

SCALE: 1"=20'

DATE: JANUARY 18, 2019

PROJECT NO.: 6372-01

SHEET NO.: 10 OF 13

SHEET NAME: UT

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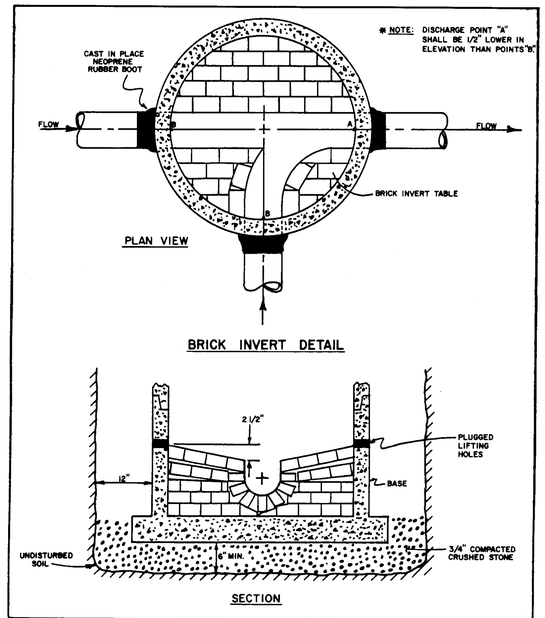
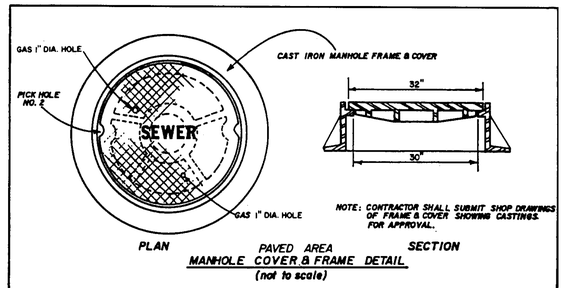
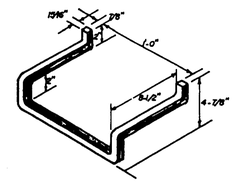


DRAWING NO.	TOWN OF SOUTH KINGSTOWN WASTEWATER DEPT. SPECIFICATIONS FOR SEWER CONSTRUCTION		
WW-1 D-3	SCALE AS NOTED	DATE	APPR.
REV. ϕ	NOTES:		



NOTES:

1. ALL MANHOLES SHALL HAVE CAST IRON MANHOLE FRAME AND COVER AS INDICATED. COVER SHALL HAVE THE WORD "SEWER" CAST ON THE TOP. GRAY IRON CASTING A.A.S.H.O. M105-49, CLASS 30, AMENDED TO DATE. FRAME & COVER SHALL BE LEBARON LC328 OR APPROVED EQUAL.
2. ALL PRECAST CONCRETE MANHOLES AND CONES SHALL BE EQUIPPED WITH ALUMINUM OR STEEL REINFORCED PLASTIC MANHOLE STEPS AS SHOWN.

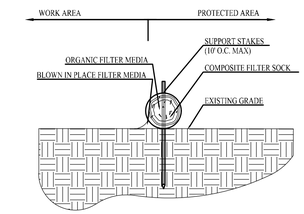


MANHOLE STEP DETAIL
(not to scale)

SOLID FORGED ALUMINUM ALLOY 6061 SAFETY TYPE DROP FRONT DESIGN OR STEEL REINFORCED PLASTIC

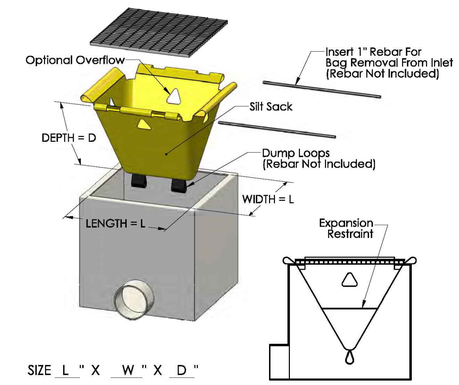
MANHOLE DETAILS

DRAWING NO.	TOWN OF SOUTH KINGSTOWN WASTEWATER DEPT. SPECIFICATIONS FOR SEWER CONSTRUCTION		
WW-1 D-4	SCALE AS NOTED	DATE	APPR.
REV. ϕ	NOTES:		



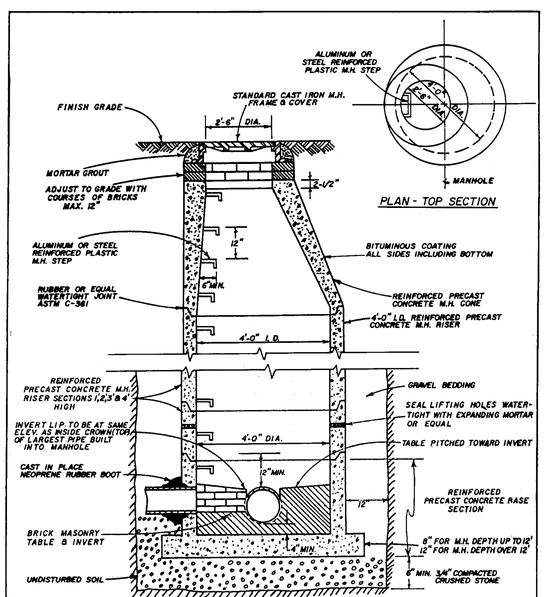
1 EROSION CONTROL COMPOST FILTER SOCK

NOT TO SCALE — P-SC-6372.01-047

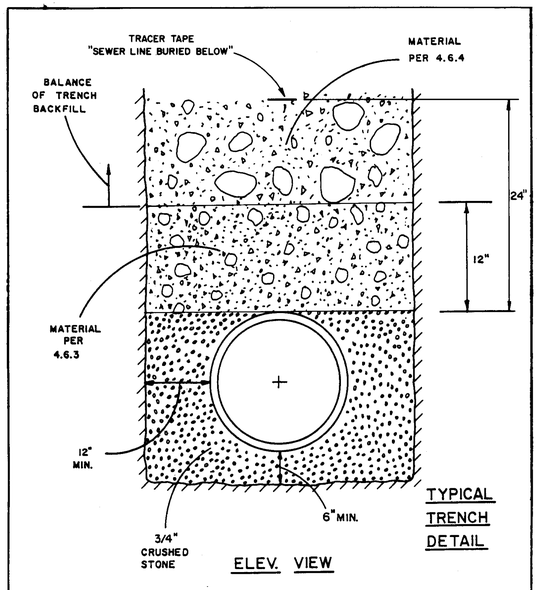


2 EROSION CONTROL SILT SACK

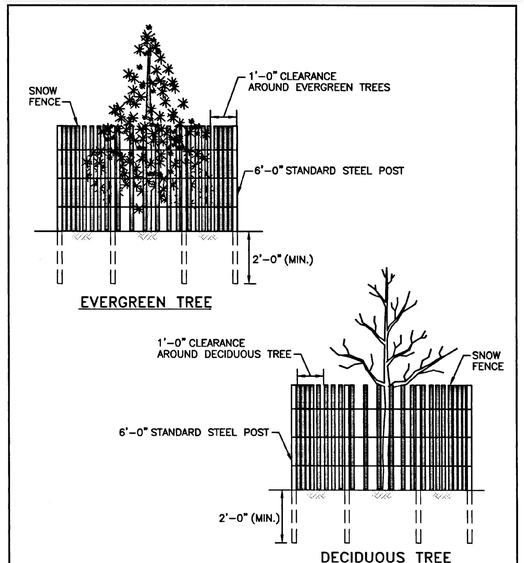
NOT TO SCALE — P-SC-6372.01-58



DRAWING NO.	TOWN OF SOUTH KINGSTOWN WASTEWATER DEPT. SPECIFICATIONS FOR SEWER CONTRACTS			
WW-1 D-6	SCALE 1/2" = 1'-0"	DATE FEB. 1978	DRN PJE	APPR
	NOTES:			



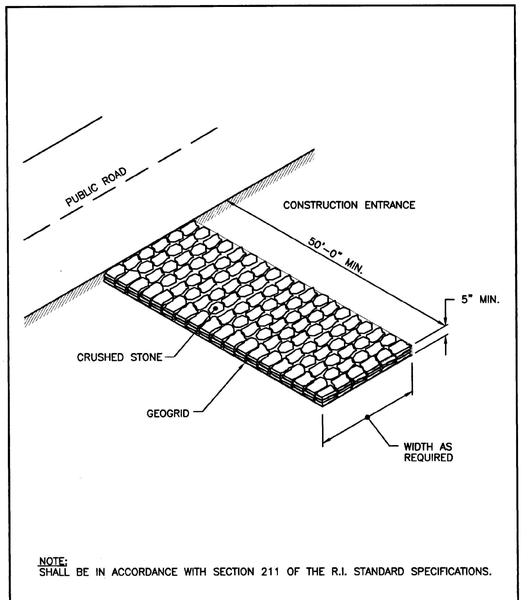
DRAWING NO.	TOWN OF SOUTH KINGSTOWN WASTEWATER DEPT. SPECIFICATIONS FOR SEWER CONSTRUCTION		
WW-1 D-1	SCALE: NO SCALE	DATE	APPR.
REV. ϕ	NOTES:		



NOTE:
SHALL BE IN ACCORDANCE WITH SECTION L.11 OF THE R.I. STANDARD SPECIFICATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS			DRIP LINE TREE PROTECTION DEVICE FOR EXISTING TREES		R.I. STANDARD 51.1.1
NO.	BY	DATE	CHIEF ENGINEER TRANSPORTATION	CHIEF DESIGN ENGINEER TRANSPORTATION	JUNE 15, 1998 ISSUE DATE



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

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS			CONSTRUCTION ACCESS		R.I. STANDARD 9.0
NO.	BY	DATE	CHIEF ENGINEER TRANSPORTATION	CHIEF DESIGN ENGINEER TRANSPORTATION	JUNE 15, 1998 ISSUE DATE

3 CONSTRUCTION ENTRANCE

NOT TO SCALE — P-SC-6372.01-79

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

DESCRIPTION	DATE	BY
ADDENDUM NO.1	3/11/2019	MTD

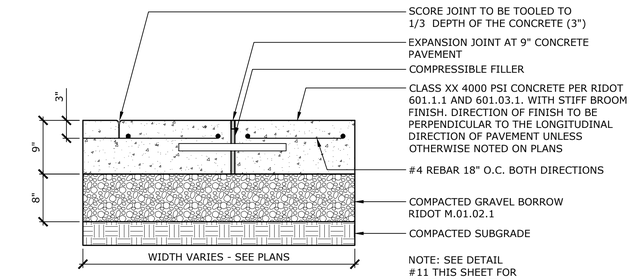
SITE DETAILS

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
DESIGNED	DRAWN	CHECKED

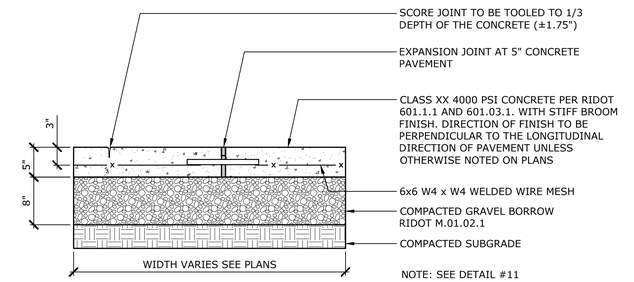
SCALE: NOT TO SCALE
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 11 OF 13
SHEET NAME: SD-1

Copyright Milone & MacBroom, Inc - 2018



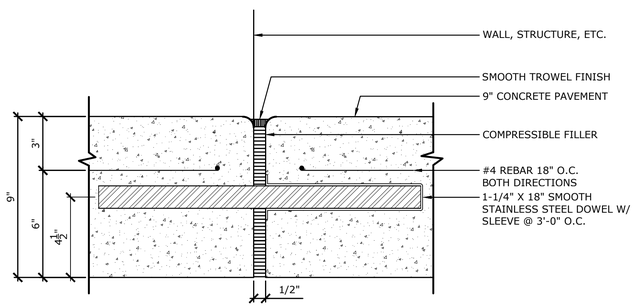
1 9" CONCRETE PAVEMENT

NOT TO SCALE P-SC-6372.01-40



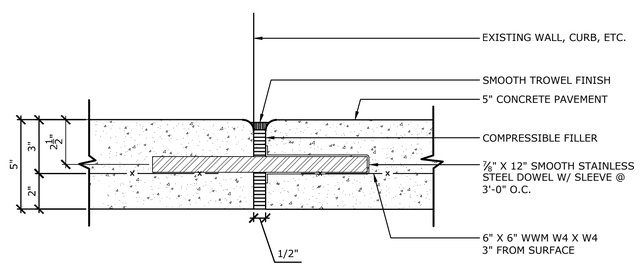
2 5" CONCRETE PAVEMENT

NOT TO SCALE P-SC-6372.01-03



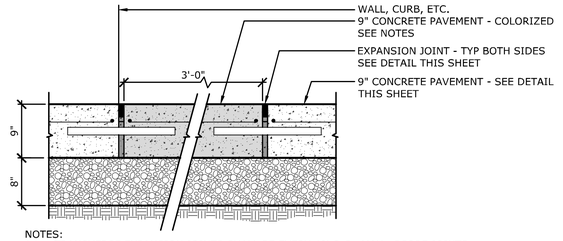
3 EXPANSION JOINT AT 9" CONCRETE PAVEMENT

NOT TO SCALE P-SC-6372.01-80



4 EXPANSION JOINT AT 5" CONCRETE PAVEMENT

NOT TO SCALE P-SC-6372.01-020

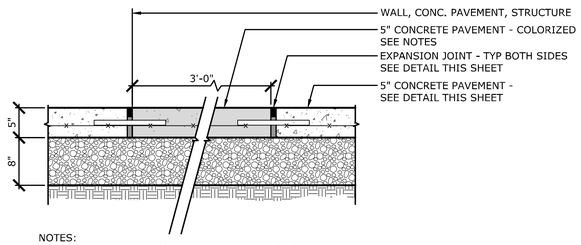


NOTES:

1. TRANSVERSE EXPANSION JOINTS SHALL BE EVERY 40' O.C. MAX. SCORE JOINTS EVERY 8' O.C.
2. CONCRETE AND REINFORCING PER 9" CONCRETE PAVEMENT DETAIL.
3. FULL DEPTH INTEGRAL COLOR TINT TO BE ADDED TO CONCRETE PER SPECIFICATIONS AS MANUFACTURED BY SIKA CORPORATION OR APPROVED EQUIVALENT:
   CONTACT:
   SIKA SCOFIELD SALES
   4155 SCOFIELD ROAD,
   DOUGLASVILLE, GA 30134
   800-800-9900
   WWW.SCOFIELD.COM
4. CONTRACTOR SHALL INSTALL A 10'x10' SAMPLE PANEL FOR APPROVAL BY URI OFFICE OF CAMPUS PLANNING. SAMPLE PANEL SHALL DEMONSTRATE INTEGRAL COLOR, COLOR HARDENER, FLASHING, AND TEXTURE. APPROVED PANEL SHALL BE MAINTAINED AND PROTECTED FOR THE DURATION OF THE PROJECT. SEE SPECIFICATIONS FOR MORE INFORMATION.

5 9" COLORIZED CONCRETE BANDING

NOT TO SCALE P-SC-6372.01-75

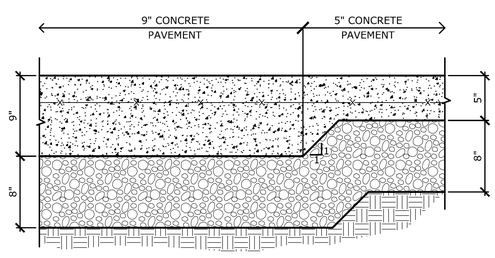


NOTES:

1. TRANSVERSE EXPANSION JOINTS SHALL BE EVERY 40' O.C. MAX. SCORE JOINTS EVERY 8' O.C.
2. CONCRETE AND REINFORCING PER 5" CONCRETE PAVEMENT DETAIL.
3. FULL DEPTH INTEGRAL COLOR TINT TO BE ADDED TO CONCRETE PER SPECIFICATIONS AS MANUFACTURED BY SIKA CORPORATION OR APPROVED EQUIVALENT:
   CONTACT:
   SIKA SCOFIELD SALES
   4155 SCOFIELD ROAD,
   DOUGLASVILLE, GA 30134
   800-800-9900
   WWW.SCOFIELD.COM
4. CONTRACTOR SHALL INSTALL A 10'x10' SAMPLE PANEL FOR APPROVAL BY URI OFFICE OF CAMPUS PLANNING. SAMPLE PANEL SHALL DEMONSTRATE INTEGRAL COLOR, COLOR HARDENER, FLASHING, AND TEXTURE. APPROVED PANEL SHALL BE MAINTAINED AND PROTECTED FOR THE DURATION OF THE PROJECT. SEE SPECIFICATIONS FOR MORE INFORMATION.

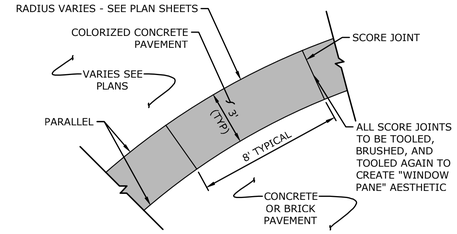
6 5" COLORIZED CONCRETE BANDING

NOT TO SCALE P-SC-6372.01-77



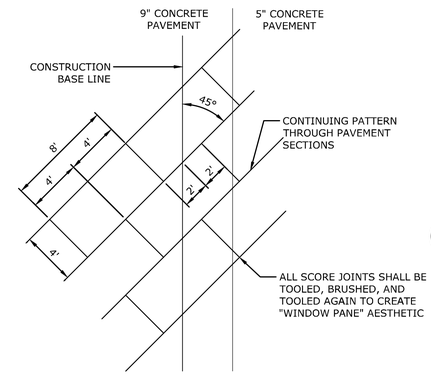
7 9" TO 5" CONCRETE PAVEMENT TRANSITION

NOT TO SCALE P-SC-6372.01-76



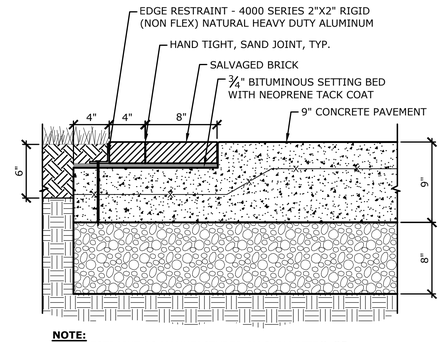
8 3 FT WIDE BANDING DETAIL

NOT TO SCALE P-SC-6372.01-72



9 CONCRETE PAVEMENT SCORING PATTERN

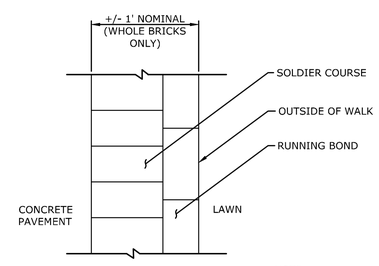
NOT TO SCALE P-SC-6372.01-71



NOTE:
EDGE RESTRAINT AS MANUFACTURED BY CURV-RITE® OR APPROVED EQUIVALENT 1-800-366-2878

10 SALVAGED BRICK BANDING

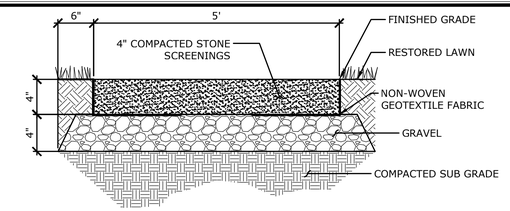
NOT TO SCALE P-SC-6372.01-74



NOTE:
REUSE STOCKPILED BRICKS FROM PROJECT AREA

11 BRICK PAVING PATTERN

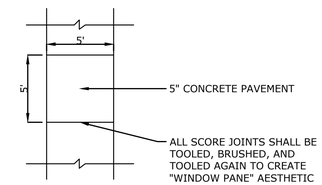
NOT TO SCALE P-SC-6372.01-73



NOTE: CONTRACTOR TO REMOVE STONEDUST PATH FULL DEPTH AND ESTABLISH LAWN UPON REMOVAL OF TEMPORARY CONSTRUCTION FENCE.

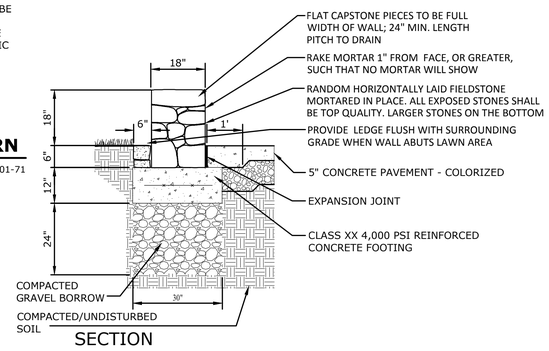
12 STONE SCREENINGS PATH

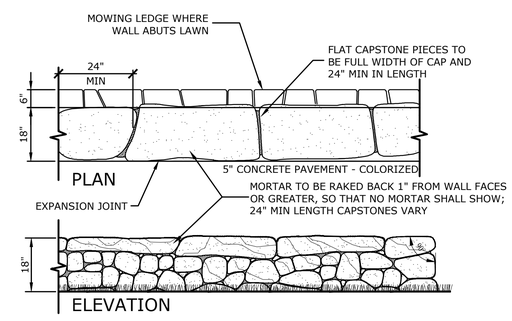
NOT TO SCALE P-SC-6372.01-04



13 STANDARD SCORE PATTERN

NOT TO SCALE P-SC-6372.01-81





1. CONTRACTOR TO PROVIDE AT MOCKUP A SAMPLE PANEL OF 6' LONG X 18" HIGH FOR APPROVAL BY URI OFFICE OF CAMPUS PLANNING.

2. SAMPLE PANEL SHALL DEMONSTRATE DESIRED RANDOM FIELD STONE PATTERN PER DETAIL. APPROVED PANEL SHALL BE MAINTAINED AND PROTECTED FOR THE DURATION OF THE PROJECT. SEE SPECIFICATIONS FOR MORE INFORMATION.

14 FIELDSTONE SEATWALL

NOT TO SCALE P-SC-6372.01-036

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

DESCRIPTION	DATE	BY
ADDENDUM NO.1	3/11/2019	MTD

SITE DETAILS

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	BDK	RRC
DESIGNED	DRAWN	CHECKED

SCALE: NOT TO SCALE
DATE: JANUARY 18, 2019
PROJECT NO.: 6372-01
SHEET NO.: 12 OF 13
SHEET NAME: SD-2

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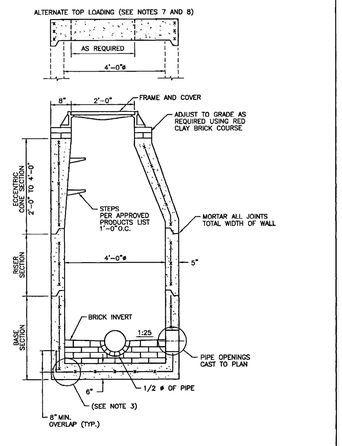


NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED = 0.12 SQ. IN. / LIN. FT. MINIMUM.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN/LIN. FT. (BOTH WAYS).
4. ONE POUR MONOLITHIC BASE SECTION.
5. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
6. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.2).
8. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
9. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.

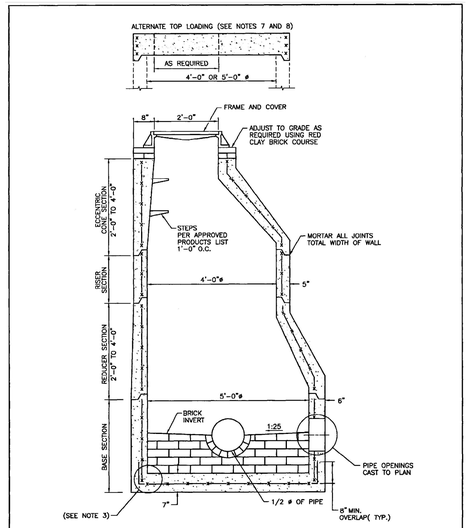
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

PRECAST 4'-0" ROUND MANHOLE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 4.2.0



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED = 0.15 SQ. IN./LIN. FT. MINIMUM.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
4. ONE POUR MONOLITHIC BASE SECTION.
5. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
6. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.0).
8. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
9. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.

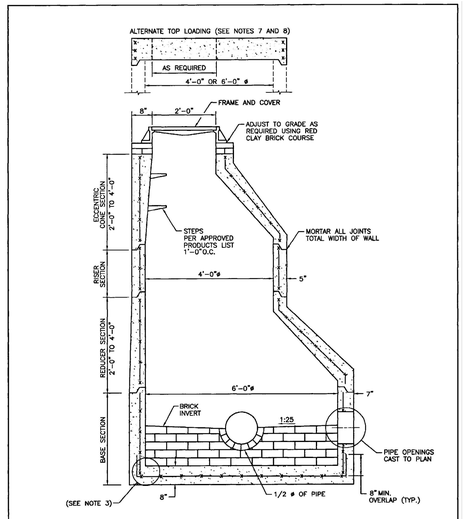
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

PRECAST 5'-0" ROUND MANHOLE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 4.2.1



NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED = 0.15 SQ. IN./LIN. FT. MINIMUM.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
4. ONE POUR MONOLITHIC BASE SECTION.
5. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
6. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
7. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.2).
8. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
9. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.

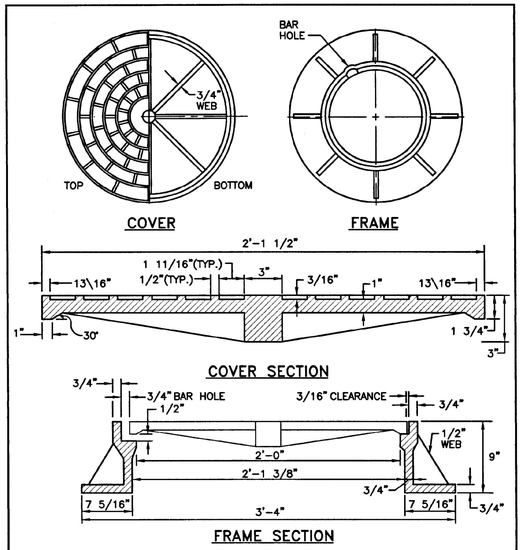
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

PRECAST 6'-0" ROUND MANHOLE

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 4.2.2



NOTES:
1. FRAME AND GRATE SHALL CONFORM TO SECTION M.04 OF THE R.I. STANDARD SPECIFICATIONS.
2. FRAME AND COVER SEATS MUST HAVE MACHINE FINISH.

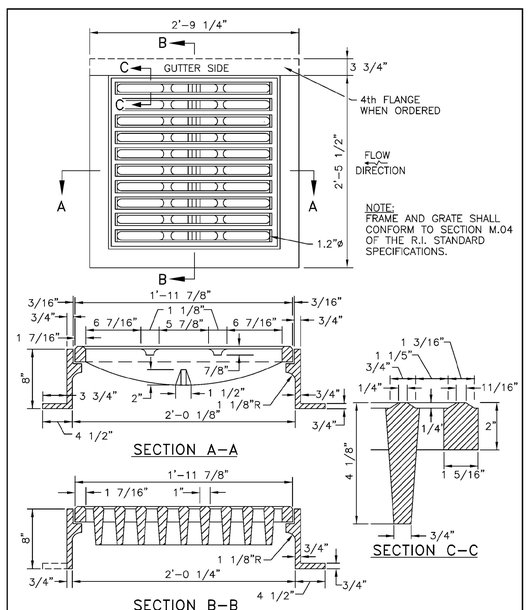
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

HEAVY-DUTY ROUND FRAME AND COVER

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 6.2.1



NOTE:
FRAME AND GRATE SHALL CONFORM TO SECTION M.04 OF THE R.I. STANDARD SPECIFICATIONS.

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE
1 | MLP | 7/21/06

SQUARE FRAME AND GRATE (BICYCLE SAFE)

CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 6.3.2

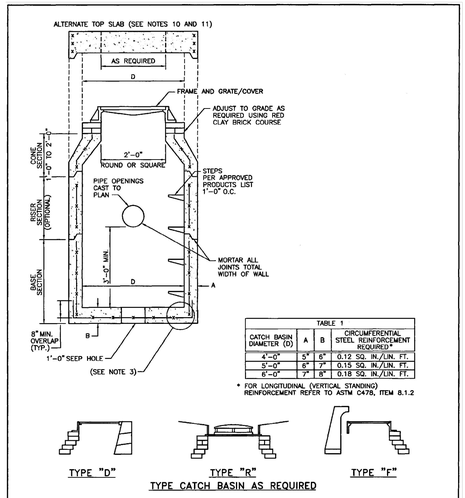


TABLE 1			
CATCH BASIN DIAMETER (D)	A	B	CIRCUMFERENTIAL STEEL REINFORCEMENT REQUIRED*
4'-0"	5"	6"	0.12 SQ. IN./LIN. FT.
5'-0"	6"	7"	0.15 SQ. IN./LIN. FT.
6'-0"	7"	8"	0.18 SQ. IN./LIN. FT.

* FOR LONGITUDINAL (VERTICAL STANDING) REINFORCEMENT REFER TO ASTM C478, ITEM 8.1.2

NOTES:
1. SHALL BE IN ACCORDANCE WITH SECTION 702 OF THE R.I. STANDARD SPECIFICATIONS.
2. SEE TABLE 1 FOR STEEL REINFORCEMENT REQUIREMENTS.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
4. STEPS SHALL CONFORM TO STD. 5.3.0 AND SHALL BE INSTALLED AT THE CASTING PLANT.
5. ONE POUR MONOLITHIC BASE SECTION.
6. ANY NECESSARY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW-CUTTING AND/OR CORING ONLY. NO JACKHAMMERS, HAMMERS AND CHISELS OR PNEUMATIC TOOLS WILL BE ALLOWED.
7. CORBEL MADE OF RED CLAY BRICK WILL BE PERMITTED FOR THE "CONE SECTION" OF THE 4'-0" CATCH BASIN ONLY.
8. FOR CATCH BASIN TYPES "D" AND "R" STEPS MUST BE INSTALLED ON THE CURB SIDE OF THE STRUCTURE.
9. THE CENTERLINE OF THE OPENING MUST BE WITHIN 2'-0" FROM THE STEPS.
10. ALTERNATE TOP SLAB IS STEEL REINFORCED TO MEET OR EXCEED H-25 LOADING (SEE STD. 4.7.2).
11. ALTERNATE TOP SLAB IS ONLY FOR USE WHEN REDUCING SECTION DOES NOT FIT BECAUSE OF STRUCTURE DEPTH.
12. REFER TO STD. 5.2.0 FOR MAXIMUM PIPE SIZES.

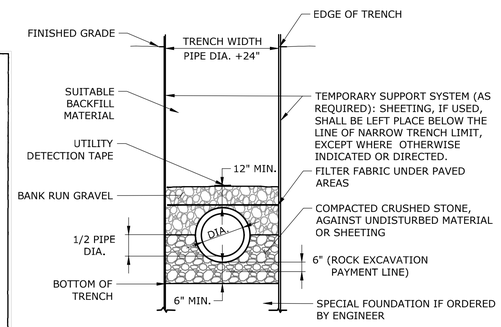
RHODE ISLAND DEPARTMENT OF TRANSPORTATION

REVISIONS: NO. | BY | DATE

PRECAST 4'-0", 5'-0", OR 6'-0" ROUND CATCH BASIN

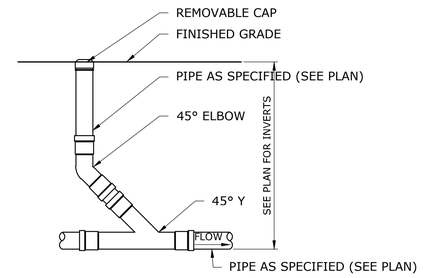
CHIEF ENGINEER TRANSPORTATION — CHIEF DESIGN ENGINEER TRANSPORTATION — JUNE 15, 1998 ISSUE DATE

R.I. STANDARD 4.4.0



UTILITY TRENCH

NOT TO SCALE



SANITARY/STORM CLEANOUT

NOT TO SCALE

MILONE & MACBROOM
99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
WWW.MMINC.COM

DESCRIPTION	DATE	BY
ADDENDUM NO.1	3/11/2019	MTD

SITE DETAILS

URI KINGSTON CAMPUS PRIORITY IMPROVEMENT PROJECTS
HAMMERSCHLAG MALL
45 UPPER COLLEGE ROAD
KINGSTON, RHODE ISLAND

RRC	ACD	RRC
DESIGNED	DRAWN	CHECKED

SCALE: NOT TO SCALE

DATE: JANUARY 18, 2019

PROJECT NO.: 6372-01

SHEET NO.: 13 OF 13

SHEET NAME: SD-3

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SECTION 221313

SANITARY SEWER

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 sanitary sewer outside the building, with the following components:

1. Pipe
2. Temporary connections and/or services
3. Sanitary Manholes

1.4 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

B. PE: Polyethylene

C. DI: Ductile Iron

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. Pipe of all materials.

C. Conformance Certificate: Each shipment of castings and concrete manholes 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 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.

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 2759 or ASTMF 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 DUCTILE IRON PIPE

A. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end used where no connection to fittings is required.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile iron standard pattern or AWWA C153, ductile iron compact pattern.
2. Piping shall have a working pressure rating of 200 psi minimum.
3. Gaskets: AWWA C111, rubber. Gaskets must be in their original packaging.

B. Ductile Iron Pipe shall be Class 52 and shall conform to AWWA C150 and C151, latest revision. Pipe shall have a petroleum-asphaltic on all exterior surfaces.

C. Interior pipe surfaces shall be covered with a double cement-mortar continuous lining not less than 1/16" thick, of materials, and applied in accordance with, ANSI/AWWA C104/A21.4 standards.

D. Ductile Iron Pipe shall be manufactured by one of the following.

1. Pacific States Cast Iron Pipe Company
2. United States Pipe Company
3. Griffin Pipe Products Company
4. American Cast Iron Pipe Company

2.5 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.

B. Area drain frame and grate shall be 24” dia. ductile iron grate made specifically for each 24” diameter area drain. Casting shall conform to ASTM A536 grade 70-50-05.

C. Drywell frame and grate shall be 12” dia. ductile iron grate made specifically for each 12” diameter drywell.

D. Area drains and drywells 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.

2.6 MANHOLE 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.

2.7 PRECAST CONCRETE MANHOLES AND BRICK

A. Precast Concrete Manhole 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 Federal Specifications SS-S-210A and AASHTO M-198B. 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 for sewer brick, 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. 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.

D. 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.

2.8 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.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 310000 – Earthwork.

3.2 PIPING APPLICATIONS

A. Pipe couplings and fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
   1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated
      a. Flexible couplings for same or minor difference OD pipes.
      b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
      c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

B. Gravity-Flow, Nonpressure Sewer Piping:
   1. NPS 3 and NPS 4: NPS 4 PVC sewer pipe and fittings, gaskets, and gasketed joints.

3.3 PIPE INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of

piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. 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 using lubricants, cements, and other installation requirements. Use of a pipe laser between structures is required.

C. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, nonpressure, drainage piping according to the following:
   1. Install piping below frost line.
   2. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
   3. Install piping to the elevations indicated on the Contract Drawings. The Contractor shall notify the Engineer immediately of any discrepancies in elevations prior to pipe installation.

F. Clear interior of piping of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.4 PIPE JOINT CONSTRUCTION

A. Basic piping joint construction is specified in Section 220500 "Common Work Results for Plumbing." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

B. Join gravity-flow, nonpressure, drainage piping according to the following:
   1. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
   2. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
   3. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints.
   4. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-gasket joints.
   5. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

3.5 FIELD QUALITY CONTROL

A. 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. Submit separate report for each system inspection.
   2. 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

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
a. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period
b. Close openings in system and fill with water
c. Purge air and refill with water
d. Disconnect water supply
e. Test and inspect joints for leaks
f. Option: Test ductile-iron piping according to AWWA C600, "Hydrostatic Testing" Section. Use test pressure of at least 10 psig
6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
a. Option: Test plastic gravity sewer piping according to ASTM F 1417
b. Option: Test concrete gravity sewer piping according to ASTM C 924
7. Vacuum Test: Vacuum test sanitary manholes in accordance with ASTM C1244.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.6 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.

3.7 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 221313

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SECTION 310000

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 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 all excavation including, but not limited to, the following:

1. Excavating and backfilling for demolition of pavements.
2. Excavation and backfilling for site walls.

B. Related Sections include:

1. Section 315000 Excavation Support and Protection
2. Section 312319 Control of Water

1.4 SUBMITTALS

A. 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.
   a. All submittals shall clearly indicate the proposed use and the specified material described herein for which they are intended. (e.g Imported Common Borrow, Sand Gravel Fill, etc.)
2. Laboratory compaction curve according to ASTM D 698 ASTM D 1557 for each on-site and imported soil material proposed for fill and backfill.

1.5 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 there from by the Contractor.

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 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.

1. 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 and shall be made up elsewhere on the project.

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. All existing topsoil shall be removed prior to filling. Depth of topsoil varies by location.

1.6 UNIT PRICES

A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the limits specified in Section 3.4 Rock Excavation.

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.

1.7 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 final 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: Excavation 6 feet in width or less for the installation of utilities, foundations, and footings
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 Owner's Representative, 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 2 cu. yd. for bulk excavation or 1 cu. yd. diameter for footing, trench, and pit excavation.

1. Bulk Rock Excavation: Rock encountered within bulk excavation as defined above.
2. 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 test pits or boring logs, 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 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.

1.8 IMPORTED MATERIAL ACCEPTANCE

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

1. Gravel borrow shall be obtained from sources which have been previously tested and

approved by the state. Results and information of such tests shall be provided to the engineer for review.

2. Materials imported to the site by the Contractor for on-site use shall not contain oil and/or hazardous materials.

1.9 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 548 shall be hired to provide required testing of earthwork materials at the Contractor's Expense.

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 315000 – 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.

1.10 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 or Owner's Representative not less than two weeks in advance of proposed utility interruptions in writing. Renotify 72 hours in advance of proposed utility interruptions.
   a. Notifications should be made to David Lamb – URI Utilities Director at (401) 874-7896.
   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 and Dave Lamb, URI Utilities Director, at (401)-874- 7896 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.

1.11 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.

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.

1.12 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 Rhode Island 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.

1.13 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.

1.14 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 insure 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 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.

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. 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 the table above.
   b. Onsite Common Borrow shall conform to the specified gradation of Granular Fill in the table above but may contain no more than 20-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.
2. 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 above within this specification.
3. 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 the table above within this specification.
4. Special Graded Aggregate shall conform to Sand Gravel Fill.
5. Riprap shall conform to RI Standard M.10.03.2.
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 above 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. 1/2" to 1" crushed stone shall conform to 3/4" crushed stone in the table above.
10. 1" Crushed stone shall conform to 1-1/2" crushed stone in the table above.
11. 2" crushed stone shall conform to 1-1/2" crushed stone in the table above.
12. Gravel Borrow shall conform to the Sand Gravel Fill Gradation in the table above.
13. Coarse sand and clean sand shall conform to ASTM C-33 fine aggregate gradation.

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

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 315000 – 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. 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 312319 – Control of Water, 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 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. Payment for rock excavation shall be adjusted in accordance with Part 4.
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 Section 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.

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 on the drawings.
2. The Contractor shall remove rock to a minimum of 30 inches below finished grade in paved 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 6 inches beneath pipe in trench, and the greater of 24 inches wider than pipe or 36 inches wide.

3.4 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 soil, boulders, and other materials not classified as rock or unauthorized excavation.

B. All topsoil and unsuitable or excess materials shall be stripped from areas of new construction or regrading. Materials suitable for reuse shall be stored in a location approved by the University of Rhode Island that will not interfere with construction operations.

C. Existing topsoil shall be stripped and stored on-site before any underlying excavating is begun. Existing topsoil is the property of the University of Rhode Island and shall not be removed from the campus unless authorized in writing by URI. Contractor shall haul material to a location on campus designated by the Owner's Representative.

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

3.5 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. 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, overexcavation 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.

3.6 SUBGRADE INSPECTION

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

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

C. Proof-roll subgrade below 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 4-6 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 weight of 20,000 lbs.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Owner's Representative, and replace with compacted backfill or fill as directed.

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

3.7 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 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.

3.8 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.

3.9 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 University of Rhode Island. Do not store within drip line of remaining trees.

3.10 BACKFILL GENERAL

A. The contractor shall notify the 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 Owner's Representative following inspection.

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

3.11 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.

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

3.12 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 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.

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

Table 2: Minimum Compaction Requirements

Location	Percent of Maximum Dry Density[1]
Backfill within pavement base and sub base layers	95
Backfill below pavement sub base layers	92
Around and above utilities in paved areas	92
Backfill within landscaped areas	85

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

3.14 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.

3.15 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. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area, but in no case fewer than 3 tests.
2. 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.
3. Non-Paved Areas: At each compacted fill and backfill layer, at least 1 test for every 5000 sq. ft. or less of non-paved area, but in no case less than 2 tests.

D. When 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.

3.16 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.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Topsoil is the property of the University of Rhode Island and shall not be removed from the site without the Owner's written permission. Contractor shall haul material to a location on campus designated by the Owner's Representative.

B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by the Owner's Representative.

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

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Payment for earthwork as outlined in this Section or shown on the Drawings, 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.

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.

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

d. 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.

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

f. The Contractor shall carry in the Base Bid 200 cubic yards for removal of unanticipated unsuitable materials and replacement with suitable compacted fill material 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) If the total quantity of unanticipated unsuitable materials and its replacement with compacted fill exceeds the amount included in the Contract as listed above, the Owner shall pay the excess excavation and replacement at the unit price of $50.00 per cubic yard.

2. Quantities and Payment of Rock Excavation

a. The Contractor shall include in his base bid 30 cubic yards of Bulk Rock Excavation, its removal from site, and replacement with a compacted fill of approved material.

1) The Unit Price for Bulk Rock Excavation as specified herein shall not exceed $70.00 per cubic yard.

b. The Contractor shall include in his base bid 30 cubic yards of Trench Rock Excavation, its removal from site, and replacement with a compacted fill of approved material.

1) The Unit Price for Trench Rock Excavation as specified herein shall not exceed $160.00 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

6372-01-01-03-mr819-spec 310000 Earthwork

SECTION 311100

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. Remove and stockpile unit pavers
3. Removal and disposal of flexible pavement, curbing, and bituminous concrete walks at the locations specified on the drawings.
4. Resetting catch basins, manholes, utility structures.
5. Cleaning and maintenance of the site.

B. Related Sections include the following:

1. Section 310000 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. Except for stripped topsoil or other materials indicated to remain on the Owner's property, 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.

C. Stripped Topsoil is the property of the University of Rhode Island and shall not be removed from the site. Contractor shall haul topsoil to a location designated by the Owner.

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 or Owner's Representative not less than two weeks in advance of proposed utility interruptions in writing. Renotify in writing 72 hours in advance of proposed utility interruptions.
   a. Notification should be made to David Lamb – URI Utilities Director at (401) 874-7896.
2. Do not proceed with utility interruptions without Owner's written permission.
   a. All power shut downs shall be coordinated with the Owner and shall be on week-ends between 6:30 a.m. and 7:00 p.m.
3. Underground utilities were compiled from available record plans and aboveground locations and are approximate. The Contractor shall contact "Dig-Safe" at 1-888-DIGSAFE and David Lamb, URI Utilities Engineer at (401) 874-7896 72 hours to mark existing utilities prior to commencing work on any part of the site.

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 University, David Lamb – URI Utilities Director, and utility companies to shut off services if lines are active.

D. Contractor shall not operate existing water gate valves and hydrants. All operation of the water distribution system must be completed by URI personnel.

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.

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 REMOVE AND STOCKPILE UNIT PAVERS

A. The existing paving units shall be carefully removed, cleaned to the satisfaction of the owner, and stored at an approved secure location.

B. Excess unit pavers will remain the property of the owner.

C. Damaged paving units shall be disposed of by the contractor.

3.2 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 Standard Specifications.

3.3 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.

3.4 SALVAGE

A. All materials designated to be removed and salvaged shall be removed from the project limits and transported to the location designated by the Owner. Materials that are damaged during construction shall be replaced at no additional expense to the owner.

3.5 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.

3.6 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

6372-01-01-03-mr819-spec 311100 Site Preparation

SECTION 32 13 30
COLORIZED CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes colorized concrete pavement for the following:

1. Integrally colored concrete slabs-on-grade
2. Integrally colored concrete walkways
3. Curing of integrally colored concrete

B. Related Sections

1. Section 32 13 30 – Colorized Concrete
2. Section 32 16 13 – Cement Concrete Paving

1.3 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 "Specification for Structural Concrete for Buildings."
2. ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
3. ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
5. ACI 305R "Recommended Practice for Hot Weather Concreting."
6. ACI 306R "Recommended Practice for Cold Weather Concreting."

B. American Society for Testing Materials (ASTM):

1. ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
2. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
3. ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."

C. American Association of State Highway and Transportation (AASHTO):

1. AASHTO M194 "Chemical Admixtures."

D. The Portland Cement Association (PCA):

1. PCA PA124 - Finishing Concrete Slabs with Color and Texture.
2. PCA SP021 - Color and Texture in Architectural Concrete.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's complete technical data sheets for the following:

1. Colored admixture
2. Color matching joint material
3. Curing compound
4. Sealing compound

B. Design Mixes: For each type of integrally colored concrete.

C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.

D. Qualification Data: For firms indicated in "Quality Assurance" Article, including list of completed projects.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with 10 years of experience in the production of specified products.

B. Installer Qualifications: An installer with a minimum of 5 years of experience with work of similar scope and quality.

C. Comply with the requirements of ACI 301.

D. Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

E. Notification of manufacturer's authorized representative shall be given at least 1-week before start of Work.

F. Integrally Colored Concrete Mockups and Field Samples:

1. Provide under provisions of Division 1 Section "Quality Control."
2. At location on Project selected by Architect and/or Landscape Architect, place and finish a 10 foot by 10 foot (3 by 3 m) mock up panel for approval.
3. For accurate color, the quantity of concrete mixed to produce the sample should not be less than 3 cubic yards (or not less than 1/3 the capacity of the mixing drum on the ready-mix truck) and should always be in full cubic yard increments. Excess material shall be discarded according to local regulations.
4. Construct mockup panel using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and

expansion joints in sample panels. Mockup shall be produced by the individual workers who will perform the work for the Project.

5. Retain samples of cements, sands, aggregates, and color additives used in mockup for comparison with materials used in remaining work.
6. Accepted mockup provides visual standard for work of Section.
7. Mockup shall remain through completion of work for use as a quality standard for finished work.
8. Remove mockup when directed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Colored Admixture: Comply with manufacturer's instructions. Deliver colored admixtures in original, unopened packaging. Store in dry conditions.

1.7 PROJECT CONDTIONS

A. Integrally Colored Concrete Environmental Requirements:

1. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.
2. Avoid placing concrete if rain, snow, or frost is forecast within 24 hours. Protect fresh concrete from moisture and freezing.
3. Comply with professional practices described in ACI 305R and ACI 306R.

B. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.

1.8 PRE-JOB CONFERENCE

A. One week prior to placement of integrally colored concrete a meeting will be held to discuss the Project and application materials.

B. It is mandatory that the owner, Landscape Architect, General Contractor, Construction Manager, Subcontractor, Ready-Mix Concrete Representative, and a Manufacturer's Representative be present.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. L.M. SCOFIELD COMPANY, Douglasville, Georgia (800) 800-9900. Local Contact: Northeast Regional Sales and Service Representative John D Glover (508) 353 0709.

2.2 MATERIALS

A. Colored Admixture for Integrally Colored Concrete: CHROMIX P® Admixture and CHROMIX L®; L.M. SCOFIELD COMPANY.

1. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are limeproof and ultra-violet resistant.
2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194.

B. Curing and Sealing Compound: Cureseal™ Semi Gloss; L.M. SCOFIELD COMPANY. Curing and sealing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

C. SUBSTITUTIONS: The use of products other than those specified will be considered providing that the Contractor requests its use in writing within 14 days prior to bid date. This request shall be accompanied by the following:
1. A certificate of compliance from material manufacturer stating that proposed products meet or exceed requirements of this Section, including standards ACI 303.1, ASTM C979, ASTM C494 and AASHTO M194.
2. Documented proof that proposed materials have a 10-year proven record of performance, confirmed by at least 5 local projects that the Landscape Architect can examine.

2.3 COLORS

A. Concrete Color[s]:

1. Cement: Color shall be gray.
2. Sand: Color shall be locally available natural sand.
3. Aggregate: Concrete producer's standard aggregate complying with State of Connecticut, Department of Transportation, Standard Specifications, Form 816, 2004 Edition.
4. Colored Admixture: As selected by Architect and/or Landscape Architect from Scofield Color Chart A-312.

B. Curing Compound: Color to match integrally colored concrete.

2.4 CONCRETE MIX DESIGN

A. Minimum Cement Content: 5 sacks per cubic yard of concrete.

B. Slump of concrete shall be consistent throughout Project at 4 inches or less. At no time shall slump exceed 5-inches. If super plasticizers or mid-range water reducers are allowed, slump shall not exceed 8-inches.

C. Do not add calcium chloride or any chlorides to mix.

D. Supplemental admixtures shall not be used unless approved by manufacturer.

E. Do not add water to the mix in the field.

F. Add colored admixture to concrete mix according to manufacturer's written instructions.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install concrete according to requirements of Division 3 Section "Cast-In-Place Concrete."

B. Do not add water to concrete mix in the field.

C. Surfaces shall be finished uniformly with the following finish:

1. Broomed: Pull broom across freshly floated and troweled concrete to produce medium coarse texture in straight lines perpendicular to main line of traffic. Do not dampen brooms.
2. Swirl: Float concrete. Work float flat on surface using pressure in swirling manner to produce series of uniform arcs and twists. Use aluminum or magnesium float to produce medium texture.
3. Trowel: Precautions should be taken to ensure that the surface is uniformly troweled so that it will not be slippery. Do not over-trowel or burnish the surface.

3.2 COLOR MATCHING JOINT MATERIAL

A. Install premolded resilient joint filler (§705-07) where the sidewalk line intersects a building, walk, permanent structure, or other location designated by the Engineer, to within 1-inch of the top of the slab. Caulk the top 1-inch of the joint with color matching caulking compound.

3.3 CURING

A. Integrally Colored Concrete: Apply curing or curing and sealing compound for integrally colored concrete according to manufacturer's instructions using manufacturer's recommended application techniques. Apply curing or curing and sealing compound at consistent time for each pour to maintain close color consistency.

B. Curing and sealing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.

C. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.

D. Do not cover concrete with plastic sheeting.

3.4 TOLERANCES

A. Minor variations in appearance of integrally colored concrete, which are similar to natural variations in color and appearance of uncolored concrete, are acceptable.

END OF SECTION

6372-01-01-03-mr819-spec 321330 Colorized Concrete

SECTION 321613

CEMENT CONCRETE 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”.

B. Existing conditions information taken from plan entitled “Existing Conditions Plan, URI Bike Path” prepared by Diprete Engineering, dated January 8, 2018.

1.3 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Sidewalks
2. Site wall foundations

B. Related Sections include the following:

1. Section 310000 Earthwork for subgrade preparation, grading, and subbase course.

1.4 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.5 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated. Indicate name, source, and description of each material and product.

B. Design Mixtures:

1. Submit prior to start of Work written reports of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been approved by the Engineer.
2. For each concrete pavement mixture, include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Qualification Data: For testing agency.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the aggregates and concrete mix with requirements indicated.

E. Batch Ticket Information: Provide concrete delivery tickets showing job name and location, date and time of delivery, quantity of concrete, quality and type of concrete, admixtures, amount of water added, and all other relevant information as described in ASTM C-94. Submit original batch tickets and 2 copies at the end of each week.

F. Field quality-control test reports.

G. Shop drawings for reinforcing steel shall be submitted. Drawings shall indicated bar sizes, locations, spacings, quantity required, bending and cutting schedules, and supporting and spacing devices.

1. Shop drawing schedule shall allow adequate time for reviews. Reinforcing steel shall not be fabricated or placed before the shop drawings have been reviewed by the Architect and is returned.

H. Shop drawings for proposed construction joint, control joint, and expansion joint placement.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups of approximately 100 square foot size in the location as directed by the Owner's Representative.
2. Notify Owner's Representative a minimum of seven days in advance of dates and times when mockups will be constructed.
3. Obtain Owner's Representative's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Owner's Representative.
6. Approved mockups may become part of the completed Work if approved by the Owner's Representative.

F. Design Requirements

1. Design formwork to support vertical loads and lateral pressures resulting from placement

and vibration of concrete in accordance with the requirements of ACI 301 and ACI 347, and as specified herein.

2. Camber the formwork to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and due to construction loads.
3. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations. Use wedges or jacks, individually or in combination for adjustment.
1. Design forms and falsework to include assumed values of live loads, dead load, weight of moving equipment operated on formwork, concrete mix, height of drop, vibrator frequency, ambient temperature, lateral stability, and other factors pertinent to the safety of the structure during construction.
2. Provide and design forms to conform with expansion and construction joint locations.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Order concrete from batching plant so that trucks arrive at discharge locations when concrete is required. Avoid excessive mixing of concrete or delays in placing successive layers of concrete in forms.

C. Deliver concrete to discharge locations in watertight agitator or mixer trucks without altering the water-cement ratio, slump, air entrainment, temperature, and homogeneity.

D. Concrete not conforming to specification, unsuitable for placement, exceeding the time or temperature limitations or not having a complete delivery batch ticket will be rejected.

1.8 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Weather: Protect concrete from damage and reduced strength or performance due to weather extremes during mixing, placing and curing.

C. Cold Weather: Unless special precautions are taken to protect concrete, do not Work when temperatures are below 40°F or when temperatures are expected to fall below 40°F within 72 hours after placing concrete.

1. Comply with ACI 306 in cold weather.
2. Maintain concrete temperature of at least 60°F. Reinforcement, forms and ground in contact with concrete shall be free of frost.
3. Keep concrete and formwork at least 50°F for at least 96 hours after placing concrete.
4. The use of calcium chloride in any form is not permitted. Non-chloride accelerator shall be used when ambient temperature is below 50°F.
5. Admixture manufacturer shall provide technical assistance at no additional cost. A manufacturer's representative shall be available for consultation by phone or on site upon 72-hour notice.

D. Hot Weather: Concrete, when deposited, shall be less than 85°F. Cool the mix in a manner acceptable to the Engineer if the concrete temperature is higher.

1. Comply with ACI 305 in hot weather.
2. Retarder shall be used when ambient temperature exceeds 80°F.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

C. Forms for Exposed Finish Concrete: Construct formwork for exposed concrete surfaces with smooth faced undamaged plywood or metal, metal-framed plywood faced or other acceptable panel-type facing materials approved by Owner's Representative, to provide continuous, straight, smooth as-cast surfaces, and produce a uniform and consistent texture and pattern on the surfaces. Metal patches on forms for these surfaces will not be permitted. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the drawings.

1. Use overlaid plywood complying with U.S. Product PS-1 "A-C or B-B High Density Overlaid Concrete Form", Class I.
2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
3. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

D. Form Ties:

1. Form Ties: For concrete structures, which will not be in view or buried below finish grade, use carbon steel factory-fabricated, removable or stay in place snap-off type form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units, which will leave no metal closer than 1-1/2" to surface. Provide ties which, when removed, will leave holes not larger than 1" diameter in concrete surface. Patch all holes with non-shrink grout.
2. Form ties and spreaders for walls in areas exposed to view shall be Stainless Steel Cone–Tight Tyscru by Richmond Screw Anchor Co.; Dayton Sure-Grip and Shore Co.; or substitute approved by Engineer with Plastic cone-tight type cones having a 1" setback and a taper from 1" to 1-1/4". Tycone holes shall be sealed with plastic set back plugs, color as selected by Engineer from manufacturer's standard color selection or filled with non-shrink grout. Tyscru ties shall be sized to satisfy loading requirements.
3. In lieu of form ties specified above, fiberglass form tie systems shall be used. Fiberglass form ties shall be standard gray color. The concrete structure shall be finished by grinding the fiberglass form tie flush with the finish surface of the concrete structure.
   a. If tapered architectural holes are required, dummy tapered cones having a 1" setback and a taper from 1" to 1-1/4 shall be fastened to the interior of the formwork to achieve the specified pattern on the finish structure.
4. Form Releasing Agents: Provide commercial formulation form-releasing agents that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds. Volatile organic compound emissions of form coating agent shall not exceed 2.09 pounds per

gallon (350 mg/L grams per liter).

E. Chamfer Strips: Provide ¾-inch triangular fillets to form all exposed concrete corners. Material shall be rubber or polyvinyl chloride type, or smooth clear, sealed softwood.

F. Sleeves: Sleeves for wall and floor penetrations shall be pre-engineered Century-Line sleeves as manufactured by Thunderline Corporation or Engineer approved substitute. Sleeves shall be constructed of high impact thermoplastic with waterstop collar, reinforcing ribs and nailer end caps for positioning forms. Sleeve shall be designed to work with modular mechanical seal for through wall penetrations. Size of sleeves shall be selected according to manufacturer's recommendations for pipe sizes indicated on drawings.

G. Seals: Sleeve/pipe seals shall be Link-Seal modular mechanical seals as manufactured by Thunderline Corporation or approved equivalent. The seal shall be modular, mechanical; type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening. The elastomeric element shall be sized and selected per manufacturer's recommendations and have the following properties as designated by ASTM:

1. For standard service applications: (-40°F to 250°F) EPDM – ASTM D2000 M3 BA510.
2. For hydrocarbon service applications: (-40°F to 210°F) Nitrile – ASTM D2000 M1BF510.
3. For high temperature or fire seal applications: (-60°F to 400°F) Silicone – ASTM D2000 M1GE505.

2.2 STEEL REINFORCEMENT

A. Steel reinforcement required for the construction of sidewalks, walkways, and concrete apron shall conform to the requirements of the State Standards.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

D. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 (Grade 420) deformed bars.

E. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

F. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.

2.3 CONCRETE MATERIALS

A. The Contractor shall insure that the final appearance of the sidewalks is consistent throughout the whole project. Any difference in color, texture, or finish will not be accepted by the Engineer.

1. Any portion of sidewalk or walkway that does not match the color, texture, or finish of previously constructed sidewalks will be removed and replaced with a sidewalk that matches the recently poured sidewalks at the expense of the Contractor.

B. Cementitious Materials conforming to the State Standards shall be provided for the construction

of the proposed sidewalks.

1. The cement factor shall be between 658 lbs/cy and 799 lbs/cy.
2. The maximum water/cementitious ratio is 0.42.
3. The slump shall be between 1 and 3 inches.
4. The minimum compressive strength after 7 days shall be 2,400 lbs with a 28-day compressive strength of 4,000 lbs.

C. Aggregate shall conform to the requirements and gradations specified in the State Standards.

D. Water: ASTM C 94/C 94M.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

H. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

I. Water: Potable.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.5 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to the State Standards, for each type and strength of normal-weight concrete required.

2.6 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce

mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete mixes of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete mixes larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

2.7 PREMOLDED JOINT FILLER

A. Provide premolded–joint filler conforming to ASTM D1752, Type I or Type II.

B. Provide Type III self-expanding cork where specifically indicated.

C. Provide joint filler of same thickness as expansion joint width indicated.

D. Provide maximum length filler manufactured to minimize field splicing.

2.8 JOINT COMPOUNDS

A. Provide joint compound for expansion joints in horizontal surfaces and surfaces inclined less than 30 degrees from the horizontal conforming to ASTM C920, Type S or M, Grade P, Class 25. Use type T in pedestrian and vehicular traffic areas and use type NT in non-vehicular areas.

B. Provide joint compound for expansion joints in walls and surfaces inclined greater than 30 degrees from the horizontal conforming to ASTM C920, Type S or M, Grade NS, Class 25.

C. Provide compatible joint compounds as recommended by manufacturer when they abut each other.

D. Provide compound intended for continuous submergence in liquid containing structures.

2.9 BOND BREAKER FOR JOINT COMPOUNDS

A. Provide polyethylene tape, coated tape or metal foil.

2.10 BACK-UP MATERIAL FOR JOINT COMPOUNDS

A. Provide polyethylene foam or polychloroprene foam rubber.

B. Do not use material impregnated with oil, bitumen, or similar substances.

C. Provide back-up material as recommended by joint compound manufacturer that is compatible with the joint compound and has the same expansion/contraction capability as joint compound.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph (5 km/h).
2. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) require correction according to requirements in Section 310000 Earthwork.

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

D. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

C. General:

1. Construct forms as designed and in accordance with Contractor's approved working drawings conforming to ACI 347, to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, level, and plumb work in finished structures.
2. Provide for openings, offsets, keyways, recesses, moldings, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes.
3. Forms for concrete which accommodate work of other trades, fabricated before the opportunity exists to verify the measurements of adjacent construction, shall be accurately sized and located as dimensioned on the Drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the Contractor shall be responsible for resolution of the conditions as approved by the Engineer, at no cost to the Owner.

D. Fabrication:

1. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage concrete surfaces.
2. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as many inconspicuous locations as possible, commensurate with design requirements. Form intersecting planes to provide true, clean cut corners.

E. Falsework:

1. Erect falsework and support, brace, and maintain it to safely support vertical, lateral, and asymmetrical loads applied until complete structure has attained design strength. Construct falsework so that adjustments can be made for take-up and settlement, and access is provided for inspection.
2. Provide wedges, jacks or chamfer strips to facilitate vertical adjustments. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to product work of required dimensions.

F. Forms for Exposed Concrete:

1. Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes
2. Provide sharp clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or grits to maintain true, square intersections.
3. Use extra studs, walers, and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material, which will produce bow.

G. Corner Treatment:

1. Unless shown otherwise, form chamfers with ¾-inch by ¾-inch strips, accurately formed and surfaced to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

H. Control Joints: Locate as indicated on the Drawings.

1. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and sleeves with the trade requiring such items. Accurately place and securely support items to be built into forms.
2. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove encrusted mortar and grout, chips, wood, sawdust, dirt, and other debris just before concrete is placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.3 REMOVAL OF FORMS

A. Formwork not supporting concrete, such as sides of walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 50 degrees F for 72 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operation, and provided that curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as elevated beams, joists, slabs and other structural elements may not be removed until concrete has attained 70% of its design minimum 28-day compressive strength and has cumulatively cured for no less than 7 days. Concrete shall have sufficient strength to safely support its own weight and construction live loads and lateral pressures. Determine potential compressive strength of in-place concrete testing field-cured specimens representative of the concrete location or members in accordance with State Standards.

C. Form facing material may be removed one day after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

D. Form ties: The concrete structure shall be finished by grinding the fiberglass form ties flush with the finish surface of the concrete structure.

3.4 REUSE OF FORMS

A. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets. Apply new form releasing agent to all form areas that will be in contact with concrete.

B. Do not reuse forms if there is any evidence of surface wear and tear, splits, fraying, delamination or other damage which would impair the quality of the concrete surface or prevent obtaining the specified concrete finish.

3.5 STEEL AND WELDED WIRE FABRIC REINFORCEMENT

A. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

B. Place steel or welded wire fabric in conformance with the construction methods specified within the State Standards.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.6 CONSTRUCTION JOINTS

A. Locate and install construction joints as indicated or, if not indicated, locate so as not to impair the strength and appearance of the structure. Submit proposed construction joint locations for approval.

B. The Contractor shall score the concrete sidewalks in conformance with the scoring pattern shown on the Drawings where specified.

C. Where the scoring pattern is not specified, the Contractor shall score the concrete sidewalk in conformance with the State Standards.

D. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints.

E. Key groove all construction joints unless otherwise indicated. Wall horizontal joints need not be keyed except where specifically indicated.

F. Key grooves shall be one-third the thickness of the thinner member and 1-1/2-in. deep unless otherwise indicated.

G. Use tapered key groove forms to permit form removal without damage to the groove. Taper not to exceed 2 inches per foot.

H. Center waterstops in construction joints unless otherwise indicated. Secure waterstops in position by tie wire to adjacent reinforcing every 12 inches.

I. Consolidate concrete during placement in the vicinity of key groove without damaging or dislodging waterstop.

J. Remove all key groove forms.

K. Clean key groove of laitance, curing compound, foreign materials and protrusions of hardened concrete. Roughen by bush hammer or lightly sandblast to expose coarse aggregate. Blow out debris and dust with oil-free compressed air.

L. Protect exposed key groove and waterstop from damage.

3.7 EXPANSION JOINTS

A. Install expansion joints in accordance with the manufacturers printed instructions and as indicated.

B. Center waterstops in expansion joints unless otherwise indicated. Secure waterstops in position by tie wire to adjacent reinforcing every 12 inches.

C. Consolidate concrete during placement in vicinity of expansion joint without damaging premolded joint filler and waterstop.

3.8 PREMOLDED JOINT FILLER

A. Treat cut surface of premolded joint filler in conformance with manufacturer's printed instructions.

B. Place premolded joint filler against the bulkhead form and fasten to the inside of the form with noncorrosive fasteners. Remove all fasteners when bulkhead form is removed.

C. Prevent disturbance of or damage to premolded joint filler.

D. Fill expansion joint completely with premolded joint filler, except as specified below.

E. Secure wood strips to expansion joint surfaces, which are to receive joint compound.

F. Use tapered wood strips with the smaller width being the same width as the expansion joint and of depth necessary to install the joint compound and back-up materials.

G. Use materials to secure the premolded joint filler and wood strips that will not harm concrete or affect the joint compound bond to concrete.

H. Do not remove wood strips until forms are removed as specified in the Concrete Formwork section.

I. Clean groove of laitance, curing compound, foreign materials and protrusions of hardened concrete. Blow out debris and dust with oil-free compressed air.

3.9 JOINT COMPOUND

A. Seal the dry clean concrete in expansion joints in conformance with manufacturer's printed instruction.

B. Install back-up and bond breaker materials.

C. Prime concrete, fill flush with joint compound or required thickness, tool to concave shape and seal in conformance with manufacturer's printed instructions and ASTM C1193.

D. Prevent spilling joint compound over adjoining surfaces. Use tape adjacent to joint as required. Remove all tape completely from concrete surface after installing joint.

E. Do not prime concrete or install joint compound when compound, air or concrete temperature is less than 40 deg. F. or as required by manufacturer.

3.10 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer or use bonding agent if approved by Owner's Representative.

J. Screed pavement surfaces with a straightedge and strike off.

K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

M. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

N. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

O. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.11 FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

C. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

D. Coordinate special finishes with Owner.

3.12 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
2. Water.
3. Continuous water-fog spray.
4. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
5. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
6. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.13 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch (6 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 5000 sq. ft. (465 sq. m) or fraction thereof of each concrete mix placed each day.
2. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
8. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3-consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

D. Test results shall be reported in writing to Owner, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Owner but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Owner.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.15 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not

comply with requirements in this Section at no expense to the Contractor.

B. Drill test cores, where directed by Owner, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321613

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SECTION 323254

STONE WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

B. Carefully examine all of the Construction Documents for requirements that affect the work of this section. Other specification sections that are directly related to the work of this section include, but are not limited to, the following:

1. Section 013300 – Submittals
2. Section 014000 – Quality Requirements
3. Section 312000 – Earthwork

1.2 SUMMARY

A. Work Included: The work included consists of all labor, materials, and equipment necessary to complete the work of this section, and without limiting the generality thereof, includes:

1. Mortared fieldstone seat walls.

1.3 QUALITY ASSURANCE

A. Materials and methods of construction shall comply with the following standards and association recommendations:

1. American Society of Testing and Materials (ASTM).
2. National Concrete Masonry Association (NCMA).

B. Comply with applicable requirements of local governing authorities and American National Standards Institute, ANSI A41.1, Building Code Requirements for Masonry, for the types of stone masonry construction indicated.

C. Installation: Performed only by experienced stone masons with satisfactory record of performance on completed projects of comparable size and quality.

D. Provide fieldstone from only one quarry to ensure consistent color range and texture.

E. Do not change source or brands of materials or mortar during the course of the work.

F. Mock-up: Prepare field constructed mock-up of seatwall, 6' long, to verify color and finish under sample submittals. The approved sample panel may be a portion of the work to remain in place, if approved by owner. Markup shall include endwall, mow ledge, and foundation.

1.4 SUBMITTALS

A. Product Data:

1. Submit manufacturers' product data for each type of stone, mortar, geotextile, stonework accessory, and other manufactured products.

B. Samples:

1. Submit samples of stone required. Include the source of stone and the full range of exposed color and finish proposed for the work. Provide six pieces of quarried stone samples not less than 8" x 8" in size.
2. Mortar: Submit representative sample of mortar, showing full range of color and finish variations expected. Provide samples of pointing mortar in 4 inch long and ½ inch wide aluminum channels.
3. Sealant samples for each type and color of joint sealant required.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stone Masonry Materials:

1. Deliver, store, and handle cut stone materials in accordance with stone fabricator's recommendations. Use nonstaining materials for blocking and packing. Stack cut stone materials off the ground on nonstaining skids. Protect from damage and soiling.

B. Masonry Accessories: Deliver, store, and handle masonry accessories to prevent weather damage and deterioration.

C. Mortar Materials:

1. Deliver cement, lime, and admixture materials in manufacturer's unopened and undamaged containers with labels intact and legible. Store materials off the ground, under cover, and protect from weather damage and deterioration.
2. Stockpile and handle aggregates to prevent mixing with foreign materials.

1.6 PROJECT CONDITIONS

A. Do not use metal accessories with loose coatings that will reduce bond.

B. Protect partially completed stone masonry against weather damage and moisture when work is not in progress.

C. Brace unsupported and newly-laid masonry. Maintain bracing in place until walls reach design and strength.

D. Cold Weather Construction:

1. Precondition masonry materials to maintain 50 degrees Fahrenheit when installed.
2. Do not install stone masonry work when the temperature of the outside air is below 40 degrees Fahrenheit and falling unless suitable means acceptable to the Landscape Architect are provided to protect work from cold and frost and ensure that mortar will set

without freezing. Comply with International Masonry Industry All-Weather Council cold weather construction and protection recommendations.
3. No masonry work will be permitted when outside air temperature is below 25 degrees Fahrenheit.
4. Do not use frozen materials or materials mixed or coated with ice or frost.
5. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.
6. Do not use antifreeze or calcium chloride in any mortar.
7. Protect completed masonry work against freezing for not less than 4 days after laying.

E. Protect sills, ledges, and projections from mortar droppings. Remove excess mortar and stains as work progresses.

F. Protect adjacent work from damage, soiling, and staining during masonry work operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fieldstone:

1. Stones to be free from cracks, seams, and other structural defects.
2. Minimum 4 inches overall face dimension for individual stone.
3. All cap stones to be full width of wall. Cap stones may vary in length.
4. Stone shall match appearance of recent URI improvements. For reference material, see wall construction at URI Center for Biotechnology and Life Sciences

B. Natural variations in color and markings that are characteristics of the materials and do not impair the strength or appearance are acceptable. Provide only sound stone, free from defects detrimental to appearance and durability.

C. Color range, texture, and finish of stone materials shall be within the range of the Landscape Architect's accepted samples.

D. Stones to be generally horizontal and linear in shape.

2.2 STONE MORTAR MIXES

A. Portland Cement:

1. ASTM C150, Type I, except Type III may be used for cold weather construction.
2. Provide natural color or white cement as required to produce required mortar color.

B. Hydrated Lime: ASTM C207, Type S.

C. Aggregate – Mortar: ASTM C144, except for joints minimum 1/4 inch use aggregate graded with 100% passing No. 16 sieve.

D. Water: Potable.

E. Comply with ASTM C270, Proportion Specifications for Job-mixed Mortar, Type S, as follows:

1. Portland cement, hydrated lime, and sand, with sand max. 3 times sum of volumes of cement and lime, measured in dry, loose condition.
2. Determine exact proportions in accordance with sand-carrying properties of materials within above specified limits, and subject to approval of the Architect, with the Architect reserving the right to establish exact proportions by laboratory tests.

F. Lime Proportion: Max. 1 part hydrate to each part cement with lime content as low as good construction will permit.

G. Do not tint or retemper mortar.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examining substrates and installation conditions. Do not start stone masonry work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Establish lines, levels, and coursing.

B. Clean stone work before setting by thoroughly scrubbing with fiber bristle brushes and clean water. Drench stone with clean water just prior to setting.

C. Damp proof cut stone backs, bonding face and edges, and face surfaces below finish grade with dampproofing material.

D. Ferrous metal: Where stone work will contact ferrous metal surfaces concealed in construction (anchors, supports, structural framing, and similar surfaces) apply a heavy coat of bituminous paint on metal contact surfaces prior to setting stone.

E. Do not use stone units with chips, cracks, voids, stains, or other visible defects.

3.3 INSTALLATION – MORTARED FIELDSTONE WALLS

A. Use selected stone, shaped to provide suitable exposed faces at all angles and ends of walls. Set stone in accordance with drawing details and final shop drawings for stone work.

B. Set stones on full bed of mortar and settle stone in place before mortar has set. No mortar shall be visible at exposed faces of wall.

C. If stone is loosened after mortar has set, remove mortar, clean mortar from stone, and relay stone in fresh mortar.

D. Lay field stone to achieve stratified dressed appearance with fairly level beds with stones laid on horizontal beds parallel to natural bed of stone.

E. Break vertical joints minimum 6 inches with no vertical joint located directly above or below header stones.

F. Set capstones on full bed of mortar and settle stone in place before mortar has set. No mortar shall be visible at exposed faces of wall.

G. Provide nonstaining wood coverings at projecting edges and corners to protect installed stonework. Maintain covering until removed for final cleaning stonework.

3.4 CLEANING

A. Remove and replace stone units that are loose, broken, stained, or otherwise damaged. Provide new matching units, install as specified, and point-up joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints and as required to provide a neat, uniform appearance.

B. Clean stone work not less than 6 days after completion of work, using clean water and stiff bristle brushes. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh filters.

C. Cleaning agents and methods shall be acceptable to the Landscape Architect.

D. Upon completion of the work, remove from site all excess materials, debris, tools, and equipment. Repair damage resulting from stone masonry work operations.

END OF SECTION 323254

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SECTION 329119

LANDSCAPE GRADING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Provide all equipment and materials and do all work necessary to complete the site grading as indicated on the Drawings and as specified.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 015639, TEMPORARY TREE AND PLANT PROTECTION; Protection for plants to remain
2. Section 310000, EARTHWORK; Excavation, backfill, establishment of subgrade elevations
3. Section 329222, LAWNS AND GRASSES

1.4 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. American Society for Testing and Materials (ASTM):

D 1556	Density of Soil in Place by the Sand-Cone Method
D 2167	Density and Unit Weight of Soil In Place by the Rubber-Balloon Method

1.5 EXISTING CONDITIONS

A. 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.

1.6 QUALITY CONTROL

A. The Architect reserves the right to perform on-site observation during the grading operations. The observations may include, but not be limited to the following:

1. Observation of subgrade preparation for slab-on-grade and paved areas.
2. Observation of rough and finish grading operations.

B. All grade breaks shall be staked with grade stakes at each end, any change of direction, and at 20' centers along the length for Architect's review during grading operations.

C. Stake out and indicate finish grades at all spot elevations, 25 ft. intervals along all grade break lines, and in a 25 ft. x 25 ft. grid for the quad lawn for Architect's review and approval during grading operations.

D. Perform field density tests in accordance with ASTM D 1556 or ASTM D 2167.

1. Make at least one field density test of the subgrade for every 2000 sq. ft. of paved area, but in no case less than three tests.
2. In each compacted fill layer, make one field density test for every 2000 sq. ft. of overlaying paved area, but in no case less than three tests.
3. Make at least one field density test of the planting soil for every 2000 sq. ft. of plant bed area, but in no case less than three tests.
4. Make at least one field density test of the planting soil for every 2000 sq. ft. of lawn area, but in no case less than three tests.

E. If, in the opinion of the Architect, based on reports of the testing service and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required until satisfactory results are obtained.

1. The results of density tests of soil-in-place will be considered satisfactory if the average of any four consecutive density tests which may be selected are in each instance equal to or greater than the specified density, and if not more than one density test out of five has a value more than 2% below the required density.

F. The Architect's presence does not include supervision or direction of the actual work by the Contractor, his employees, or agents. Neither the presence of the Architect, nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.

1.7 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The work shall be executed in such manner as to prevent any damage to adjacent property and any other property and existing improvements such as, but not limited to: streets, curbs, paving, utility lines and structures, monuments, bench marks and other public and private property.

B. In case of any damage or injury caused in the performance of the grading work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to the Owner. Existing roads, sidewalks, and curbs damaged during the grading work shall be repaired or replaced to their original condition at the completion of operations. The Contractor shall replace, at his own cost, existing bench marks, monuments, and other reference points which are disturbed or destroyed.

1.8 COORDINATION

A. Prior to start of grading operations, the Contractor shall arrange an on-site meeting with the

Architect for the purpose of establishing Contractor's schedule of operations and scheduling inspection procedures and requirements.

B. As construction proceeds, the Contractor shall be responsible for notifying the Architect prior to start of grading operations requiring inspection and/or testing.

C. The Contractor shall be responsible for obtaining test samples of soil materials proposed to be used and transporting them to the site sufficiently in advance of time planned for use of these materials for testing of materials to be completed. Use of these proposed materials by the Contractor prior to testing and approval or rejection, shall be at the Contractor's risk.

PART 2 - PRODUCTS

2.1 SOURCE OF MATERIALS

A. Material shall be obtained from required on-site excavation, to the extent that suitable material is available, and from off-site sources, to the extent that suitable material is not available from on-site excavation.

B. Refer to following Sections for preparation and placement of planting soils.

1. Section 329222, LAWNS AND GRASSES.

PART 3 - EXECUTION

3.1 GRADING - GENERAL

A. Uniformly grade areas within the limits of site grading under this section, including adjacent transition areas. Smooth finished surfaces within specified tolerances, and between points where elevations are shown, or between such points and existing grades.

B. The degree of finish required will be that ordinarily obtainable from either blade-grader or scraper operations.

1. Ditches: Finish ditches to ensure proper flow and drainage. Conduct final rolling operations to produce a hard, uniform, and smooth cross-section.
2. Grade Breaks located on the plans indicate crisp transitions, not blended or rounded edges. These should be clean, sharp, and uniform in line and curve as indicated on the plans

3.2 ROUGH GRADING

A. General: Rough grading shall include the shaping, trimming, rolling and refinishing of all surfaces of the subbase, shoulders, earth embankments and the preparation of grades as shown on the Drawings. The grade of shoulders and sloped areas may be done by machine methods.

B. Do all cutting, filling and grading to lines and grades indicated on the Drawings. Grade evenly to within the dimensions required for grades shown on the Drawings and specified herein. No stones larger than 4 in. shall be placed in upper 6 in. of fill. Fill shall be left in compacted state at the end of work day and sloped to drain.

1. Architect may make such adjustments in grades and alignments as are found necessaryto avoid special conditions encountered.
2. Provide a smooth transition between adjacent existing grades and new grades.
3. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

C. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
2. Walks: Plus or minus 1 inch (25 mm).
3. Pavements: Plus or minus 1/2 inch (13 mm).
4. Up to 2 in. in 10 ft tolerance shall be permitted on slopes provided the slopes are uniform in appearance and without any abrupt changes.
5. Traffic of men and equipment across soil subgrade areas shall be prohibited following excavation to the required lines and grades.

3.3 FINE GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Finish Grading:

1. Lawn or Unpaved Areas: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
2. Walks: Shape the surface of areas under walks to line, grade and cross-section, with the finish surface not more than 0.00 ft. above or 0.10 ft. below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.
3. Pavements: Shape the surface of the areas under pavement to line, grade and cross-section, with the finish surface not more than 1/2 in. above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross-section as shown on the Drawings.

3.4 MAINTENANCE

A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to the specified tolerances.

C. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, re-shape, and compact to the required density prior to further construction.

3.5 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove waste materials, including excavated material classified as unsatisfactory soil material, trash and debris, and dispose of it legally off the Owner's property.

END OF SECTION

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SECTION 329222

LAWNS AND GRASSES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Provide all materials and equipment, and do all work required to complete the seeding of lawns, including furnishing and placing planting soil, as indicated on the Drawings and as specified.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 329119, LANDSCAPE GRADING

1.4 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Society for Testing and Materials (ASTM):

C 136	Sieve Analysis of Fine and Coarse Aggregates
D 422	Particle-Size Analysis of Soils
E 11	Wire-Cloth Sieves for Testing Purposes

1.5 SUBMITTALS

A. Samples: The following samples shall be submitted:

Material	Quantity (lb.)
Fertilizer	1
Lime	1
Compost	1
Loam borrow	1

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following materials:

Fertilizer

C. Certificates: Labels from the manufacturer's container certifying that the product meets the specified requirements shall be submitted for the following materials:

Commercial fertilizer
Ground limestone

1.6 OWNER'S INSPECTION AND TESTING

A. Work will be subject to inspection at all times by the Architect. The Owner reserves the right to engage an independent testing laboratory to analyze and test materials used in the construction of the work. Where directed by the Architect, the testing laboratory will make material analyses and will report to the Architect whether materials conform to the requirements of this specification.

1. Cost of tests and material analyses made by the testing laboratory will be borne by the Owner when they indicate compliance with the specification, and by the Contractor when they indicate non-compliance.
2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Architect, shall provide such auxiliary personnel and services needed to accomplish the testing work.
3. Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.

1.7 CONTRACTOR'S INSPECTION AND TESTING

A. The Contractor shall engage an independent testing agency, experienced in the testing of agricultural soils and acceptable to the Architect, to perform the topsoil/planting soil tests and analyses specified herein. All costs associated with testing shall be the Contractor's responsibility.

1. Particle size analyis shall include the following gradient of mineral content:

USDA Designation	Size in mm
Gravel	+ 2 mm
Very coarse sand	1-2 mm
Coarse sand	0.5-1 mm
Medium sand	0.25-0.5 mm
Fine sand	0.1-0.25 mm
Very fine sand	0.05-0.1 mm
Silt	0.002-0.05 mm
Clay	< 0.002 mm

2. Chemical analysis shall include the following:
   a. pH and buffer pH
   b. percentage of organic content by oven-dried weight
   c. Nutrient levels by parts per million, including phosphorus, potassium, magnesium, manganese, iron, zinc, and calcium. Nutrient test shall include testing laboratory recommendations for supplemental additions to the soil, if necessary, based on the requirements for ornamental horticultural plants. Recommendations shall include rates at which additives are to be applied.

d. Soluble salt by electrical conductivity of a 1:2 soil/water sample.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver seed in original sealed containers, labeled with analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, location of packaging, and name of seed grower. Damaged packages will not be accepted.

B. Seed shall be stored under cool and dry conditions so that the endophytic seed in the mixture is capable of maintaining a high level of endophytes

1.9 PLANTING SEASON

A. Planting season shall be as follows:

Material	Planting Season	
	Spring	Fall
Seeding	3/15 to 5/15	8/15 to 10/15

B. Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.

C. Planting season may be extended with the written permission of the Architect.

1.10 ACCEPTANCE

A. Acceptance:

1. The Architect will inspect all work for Substantial Completion upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.
2. Acceptance of material by the Architect will be for general conformance to specified requirements, and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents.
3. Upon completion and reinspection of all repairs or renewals necessary in the judgement of the Architect, the Architect will recommend to the Owner that the work of this Section be accepted.

B. Seed areas will be accepted when in compliance with all the following conditions:

1. Roots are thoroughly knit to the soil;
2. All areas show a uniform stand of specified grass in healthy condition;
3. At least 60 days have elapsed since the completion of work under this Section.

PART 2 PRODUCTS

2.1 SEED

A. Seed Mixture for Lawns: See plan.

2.2 PLANTING SOIL

A. Existing Topsoil

1. Existing topsoil from on-site source(s) may be used for planting soil, to the extent available, if it meets the requirements of this Section for planting soil, or if approved by the Architect.
2. Planting soil shall be composed of a natural, fertile, friable soil typical of cultivated topsoils of the locality, suitable for the germination of seeds and support of vegetative growth, with additives, if required, to achieve particle distribution and organic content specifications . Topsoil shall be taken from a well-drained, arable site, free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots, other objectionable, extraneous matter or debris nor contain toxic substances. Planting soil shall have a pH value between 5.5 and 6.5 and organic matter content of 5 to 10% of total dry weight.
3. Planting soil shall have the following mechanical analysis (see paragraph 1.7 for particle sizes):

   Approximate Particle Distribution

Gravel	Less than 10%
Coarse to medium sand	55 – 65%
Fine to very fine sand	15 – 25%
Silt	10– 20%
Clay	15 – 20%

4. Minimum planting soil nutrient levels shall be: Nitrogen @ 5% average of organic matter, Phosphorus @ .02 to .05% average of total soil content, Potassium @ 1.2% average of total soil content.
5. The Contractor shall provide the Architect with planting soil test results, as specified in Paragraph 1.7, before the start of planting operations. If planting soil does not fall within the required particle distribution, organic content, or pH range, it shall be adjusted to meet the specifications through the addition of sand, compost, limestone, or aluminum sulfate to bring it within the specified limits.

2.3 COMPOST

A. Compost shall be derived from organic wastes such as food and agricultural residues, animal manures, mixed solid waste and biosolids (treated sewage sludge) that meet all State Environmental Agency requirements. The product shall be well composted, free of viable weed seeds and contain material of a generally humus nature capable of sustaining growth of vegetation, with no materials toxic to plant growth.

1. Compost shall have the following properties:

Parameters	Range
pH	5.5 – 8.0
Moisture Content	35% - 55%
Soluble Salts	≤ 4.0 mmhos (dS)
C:N ratio	15 – 30:1
Particle Size	< 1”
Organic Matter Content	> 50%
Bulk Density	< 1000 lbs./cubic yard
Foreign Matter	< 1% (dry weight)

2. Compost generator shall also provide minimum available nitrogen and other macro and micro nutrients to determine fertilizer requirements.
3. Compost shall be “AllGro”, distributed by AllGro, 4 Liberty Lane West, Hampton, NH 03842; “Agresoil”, distributed by Agresource, 100 Main Street, Amesbury, MA 01913; or approved equal.
4. Guidelines for quantity of compost required to achieve suitable soil organic content in soil

mixes for ornamental horticultural planting shall be as recommended by the compost manufacturer.

2.4 LIMESTONE

A. Ground limestone shall be an agricultural limestone containing a minimum of 85% total carbonates, by weight. Ground limestone shall be graded within the following limits:

Sieve Size	% Passing by Weight
No. 10	100
No. 20	90
No. 100	60

2.5 WATER

A. Water shall be suitable for irrigation and free from ingredients harmful to seeded areas.

B. Water shall be free of chlorine and other additives that kill soil microbes.

2.6 FERTILIZER

A. Soil amendments shall meet all RIDEM requirements for use within the site, which prohibits broadcast application of chemical fertilizers within the 200' Riverfront Area. Biological soil amendments such as compost, compost tea, and organic microbial inoculants shall be applied as needed to meet the requirements listed under Paragraph 2.3, "Planting Soil."

B. Starter fertilizer shall be HD Scotts Starter Fertilizer or approved equal.

C. Fertilizer shall conform to the following:

1. When applied as a topsoil amendment, fertilizer shall have an analysis that will deliver appropriate amounts of nitrogen, phosphorus, and potassium as required to remedy deficiencies revealed by testing the topsoil.
   a. 50% of nitrogen shall be derived from natural organic source of ureaform.
   b. Available phosphorus shall be derived from superphosphate, bone meal, or tankage.
   c. Potassium shall be derived from muriate of potash containing 60% potash.

D. Fertilizer shall be delivered in manufacturer's standard container printed with manufacturer's name, material weight, and guaranteed analysis.

2.7 SUPERPHOSPHATE

A. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes and containing not less than 20% available phosphoric acid. The superphosphate shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any superphosphate which becomes caked or otherwise damaged making it unsuitable for use, will be rejected.

2.8 WEED CONTROL

A. Weed control for stockpiled topsoil shall be a non-selective weed killer for control of grassy and broadleaf weeds; weed control shall have short residual, allowing seeding operations to occur within 7 days of application.

PART 3 EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Subgrade shall be examined to ensure that rough grading and all other subsurface work in lawn areas and other areas to be seeded is done prior to start of seeding.

B. Existing subgrade shall be loosened or scarified to a minimum depth of 4 in. prior to spreading planting soil Subgrade shall be brought to true and uniform grade and shall be cleared of stones greater than 3 in., sticks, and other extraneous material.

3.2 SPREADING OF PLANTING SOIL

A. Planting soil shall not be spread until it is possible to follow immediately or within 24 hours with seeding operations. If topsoil is spread prior to this time it shall be cultivated to loosen soil prior to seeding.

B. Planting soil shall not be placed when subgrade or topsoil material are frozen, excessively wet, or excessively dry.

C. Planting soil shall be spread in a uniform layer, to a thickness which will compact to the depth required to bring final lawn and grass surfaces to required elevation. Unless otherwise indicated minimum depth of topsoil shall be 6 in..

1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.

D. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches (38 mm) in any dimension, and other objects that may interfere with planting or maintenance operations.

E. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.3 APPLICATION OF FERTILIZER AND CONDITIONERS

A. Fertilizer and conditioners shall be applied at the following rates:

1. Compost - as required by test results of topsoil.
2. Limestone - as required by test results of topsoil.
3. Fertilizer - as required by test results of topsoil.

B. Mixing with planting soil:

1. Fertilizer and conditioners shall be spread over the entire lawn areas at the application rates indicated above.

2. Materials shall be uniformly and thoroughly mixed into the top 4 in. of planting soil by discing, rototilling, or other approved method.

3.4 FINISH GRADING

A. Contractor shall set grade lines for Architect's review and approval.

1. Final surface of topsoil immediately before seeding and seeding shall be within ± 1/2 in. of required elevation, with no ruts, mounds, ridges, or other faults, and no pockets or low spots in which water can collect. Stones, roots, and other debris greater than 1 in. in any dimension, which are visible at the surface, shall be removed and the resulting holes filled with topsoil, leaving a uniform planar surface.

B. Finish grade surface with a drag or rake. Round out all breaks in grade, smooth down all lumps and ridges, fill in all holes and crevices. Rolling with a light roller is acceptable, if the surface is scarified afterward.

1. Lawn: Compaction of topsoil for finish grade shall be 85% to 88%.

C. In the event of settlement, the Contractor shall readjust the work to required finished grade.

3.5 SEEDING

A. Seed shall be applied in two applications; by mechanical spreader.

B. First Application: Seed shall be broadcast by means of an approved mechanical spreader, to give a uniform application at the following rates:

Seed	Application Rate lb./1,000s.f.
Seed Mixture for Lawn	4.0

1. Seed shall be applied in two equal applications for uniform coverage; direction of travel of spreader for second pass shall be perpendicular to that of the first pass. Seeding shall not be done when it is raining or snowing, or when wind velocity exceeds 5 mph.
2. Following seeding the area shall be lightly raked to mingle seed with top 1/8 to 1/4 in. of soil. Area shall then be fine graded. Stones and other debris greater than 1 in. in any dimension which are visible on surface shall be removed.

C. Following seeding and raking, entire area shall be rolled with a hand roller having a weight of 60 to 90 lb./ft. of width, and a minimum diameter of 2 ft. Entire area shall then be watered by use of lawn sprinklers, or other approved means. Initial watering shall continue until the equivalent of a 2 in. depth of water has been applied to entire seeded surface, at a rate which will not dislodge the seed. Watering shall be repeated thereafter as frequently as required to prevent drying of the surface, until the grass attains an average height of 1/4 in. Watering methods and apparatus which may cause erosion of the surface shall not be permitted.

D. Rope off entire seeded area to prevent vehicles and pedestrians from entering area.

3.6 CONTRACTOR MAINTENANCE

A. Maintenance shall include all operations required to produce an established lawn, including but not limited to:
   - Fertilizing
   - Mowing
   - Replanting
   - Watering
   - Weeding

END OF SECTION

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