RHODE ISLAND COLLEGE

PROJECT MANUAL

South Campus Sewer Improvements Project

Providence, Rhode Island

Tighe&Bond

Issue Date: January 2020

WILLIAM N. HARDY

No. 5047

REGISTERED

PROFESSIONAL ENGINEER

1/22/20

South Campus Sewer Improvements Project
Rhode Island College
Providence, RI

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DIVISION 0 - BIDDING AND CONTRACT REQUIREMENTS

SECTION 00300

GEOTECHNICAL DATA

SECTION 00300

GEOTECHNICAL DATA

PART 1 GENERAL

1.1 SUMMARY

A. For the preparation of Bidding Documents, Engineer has relied upon the following reports and tests of subsurface and latent physical conditions of the site. The location of all bore holes is shown on the Drawings.

1. Soil boring data (attached)

a. The subsurface data are not guaranteed as to accuracy or completeness, nor are they a part of the Contract Documents.

b. Bidders are cautioned that the subsurface data have been utilized for general design purposes only. No explicit or implicit representation is made as to the nature of the materials which may be encountered below the surface of the ground.

c. The making available of this subsurface data to Bidders is not intended to relieve them from their responsibility to familiarize themselves with the subsurface and other site conditions.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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Boring No. **B-1**
Page 1 of 1
File No. R-0236-012
Checked by:

Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Drilling Co. Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted	Acker Soil Scout

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1 / 2"	1 - 3'	21 - 11	0.4	Medium dense, brown, fine to medium SAND, little Gravel		1	
				12 - 10					
5		S-2 / 11"	5 - 7'	8 - 2	ND	Loose, brown, fine SAND, some Silt, trace Gravel, trace glass	Fill		
				2 - 3					
10		S-3 / 3.5"	10 - 11'	12 - 40	ND	Very dense, brown, fine SAND, some Silt, little Gravel, moist			
				75/1.5"					
						End of exploration at ~11 feet and 1.5 inches bgs due to split spoon refusal			Soil Boring Only - No monitoring well installed
15									
20									
25									
30									

Notes: Augered through ~8 inches of asphalt before driving split spoon. First split spoon from 1 - 3'.

1) Rock in tip of split spoon. Minimal recovery

Center of boring ~2'8" north of southern curbline, ~14'4" east of sanitary sewer manhole cover, and ~25'2" from utility pole SA10.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

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Boring No. **B-2**
Page 1 of 1
File No. R-0236-012
Checked by:

Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Drilling Co. Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted	Acker Soil Scout

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1 / 7"	1 - 2'	12 - 22	0.1	Dense, brown, medium to coarse SAND, little Gravel, trace fine Sand	Fill		
		S-2 / 7"	2 - 3'	15 - 11	0.1	Dense, brown, fine Sand, trace medium Sand, trace rock			
						End of exploration at 2.5 feet bgs due to auger refusal.			Soil Boring Only - No monitoring well installed
5									
10									
15									
20									
25									
30									

Notes: Augered through ~8 inches of asphalt before driving split spoon. First split spoon from 1 - 3' bgs.

Center of boring ~2'6" south of northern curb line, ~13'6" south of closest oak tree, and ~36'6" east/southeast of utility pole SA12.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

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Boring No. **B-2a**
Page 1 of 1
File No. R-0236-012
Checked by:

Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Drilling Co. Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted	Acker Soil Scout

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
5		S-1 / 3"	5 - 5.5'	100/3"	0.1	Very dense, tan, fine SAND and rock			
						End of exploration at ~5 feet bgs due to auger refusal. Attempted to advance a split spoon; however, split spoon refusal encountered after ~3 inches.			Soil Boring Only - No monitoring well installed
10									
15									
20									
25									
30									

Notes: Boring is an offset of B-2, approximately 5 feet southeast.

Due to shallow refusal at B-2, forgoed the surficial split spoon to see if auger could be advanced any deeper than 2.5 feet bgs.

Center of boring ~5 feet southeast of B-2.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

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Boring No. **B-3**
Page 1 of 1
File No. R-0236-012
Checked by:

Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Drilling Co. Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted	Acker Soil Scout

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1 / 12"	0 - 2'	7 - 10	ND	Medium dense, orangey-brown, fine SAND, trace medium to coarse Sand	Subsoil		
				14 - 12					
5		S-2 / 5"	5 - 5.5'	11 - 24	ND	Medium dense, brown, fine SAND, some medium to coarse Sand, moist			
		S-3/13"	5.5 - 7'	21 - 19	ND	Dense, tan, fine SAND, little medium Sand and Gravel, dry	Till		
10		S-4 / 15"	10 - 12'	11 - 49	ND	Very dense, tan, fine SAND, little medium Sand and Gravel, moist		1	
				22 - 29					
15						End of exploration at 12 feet bgs.			Soil Boring Only - No monitoring well installed
20									
25									
30									

Notes: Augered through ~6 inches of asphalt before driving split spoon. Called first split spoon 0 - 2'; however, really 0.5 - 2.5'

1) Outside of split spoon completely wet.

Center of boring ~11' east of drainage manhole and ~86'6" south/southeast of

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

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Boring No. **B-4**
Page 1 of 1
File No. R-0236-012
Checked by:

Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Drilling Co.: Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted Acker Soil Scout	

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
		S-1 / 8"	0 - 1'	10 - 20	ND	Dense, brown, fine to coarse SAND, trace gravel	Till		
		S-2 / 8"	1 - 2'	23 - 25	ND				
5				100/2"		No recovery in split spoon.			
						End of exploration at ~5 feet bgs due to auger and split spoon refusal.			Soil Boring Only - No monitoring well installed
10									
15									
20									
25									
30									

Notes: Augered through ~8 inches of asphalt before driving split spoon. Called first split spoon 0 - 2'; however, really 0.5 - 2.5'

Center of boring ~46'10" from lightpole L12.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

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Project: RIC South Campus Sewer
Location: Providence, Rhode Island
Client: Rhode Island College (RIC)

Boring No. **B-4a**
Page 1 of 1
File No. R-0236-012
Checked by:

Drilling Co. Geologic
Foreman: Justin
T&B Rep.: S. Marokhovsky
Date Start: 12/07/18 End: 12/07/18
Location See Exploration Location Plan
GS. Elev. Datum:

	Casing	Sampler
Type		Split Spoon
I.D./O.D.		1-3/8"/2"
Hammer Wt.		140#
Hammer Fall		30"
Rig Make/Model	Track-Mounted Acker Soil Scout	

Groundwater Readings

Date	Time	Depth	Casing	Sta. Time

Depth (ft.)	Casing Blows Per Ft.	Sample No. / Rec.(in)	Sample Depth (ft.)	Blows Per 6"	PID Reading (ppm)	Sample Description	General Stratigraphy	Notes	Well Construction
							Till		
5		S-1 / 6"	5 - 5.5'	64 - 100/2"	ND	White rock, some very dense, tan, fine Sand			
						End of exploration at ~5.5 feet bgs due to auger refusal at 5 feet and split spoon refusal at ~5.5 feet.			Soil Boring Only - No monitoring well installed
10									
15									
20									
25									
30									

Notes: Boring is an offset of B-4, approximately 10 feet north.

Due to shallow refusal at B-4, forgoed the surficial split spoon to see if auger could be advanced to 5 feet bgs.

Center of boring ~10 feet north of B-4 and ~100' southwest of lightpole L22.

Proportions Used

TRACE (TR.)	0 - <10%
LITTLE (LI.)	10 - <20%
SOME (SO.)	20 - <35%
AND	35 - <50%

Density/Consistency

VERY LOOSE	0-4	VERY SOFT	<2
LOOSE	4-10	SOFT	2-4
MEDIUM DENSE	10-30	MEDIUM	4-8
DENSE	30-50	STIFF	8-15
VERY DENSE	>50	VERY STIFF	15-30
		HARD	>30

SECTION 00520

AGREEMENT

AIA® Document A101™ – 2017

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

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address, telephone and facsimile numbers, and website)

State of Rhode Island, acting by and through the Department of Administration, Division of Purchases, on behalf of the User AgencyOne Capitol Hill, Second Floor Providence, Rhode Island 02908-5855
401.578.8100 (telephone); 401.574.8387 (facsimile)
www.puchasing.ri.gov

on behalf of the User Agency:
(Name, legal status, address, telephone and facsimile numbers, and website)

Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel: (401) 456-9885
www.ric.edu

and the Contractor:
(Name, legal status, address, telephone and facsimile numbers, and website)

for the following Project:
(Name, location and detailed description)

600 Mt Pleasant Ave
Providence, RI 02908

The Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and website)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

The parties should complete A101™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Init.
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User Notes: (3B9ADA59)

(Paragraph Deleted)

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. No part of the Work shall be performed by Subcontractors without the Owner's prior written consent.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall
be the later of: (i) the issuance of the Purchase Order by the Owner; and (ii) the
(Paragraph Deleted)

date set forth in a notice to proceed issued by the User Agency.

(Paragraphs Deleted)

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

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User Notes: (3B9ADA59)

[ ] By the following date:

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

Portion of Work	Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

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

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, are specified in the Bid Proposal Form and are included in the Contract Sum.

(Paragraph Deleted)

(Table Deleted)

§ 4.4 Unit prices, if
any, are specified in the Bid Proposal Form and include all costs, including without limitation, labor, materials, services, regulatory compliance, overhead, and profit necessary for the completion of the Work. Unit prices shall be used for both additions to, and deletions from the Work.

(Table Deleted)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

.1 In the event that there is one date for Substantial Completion of the Work, the Contractor shall pay the Owner the sum stipulated in this Section 4.5.1 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work is substantially complete: $_____.

.2 In the event that the Project is scheduled to be completed in phases, and there is more than one date for Substantial Completion of the Work, the Contractor shall pay the Owner an aggregate amount equal to the sums stipulated in this Section 4.5.2 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work for each phase is substantially complete:

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User Notes:

Phase	Liquidated Damages Sum

.3 The Owner and the Contractor have reasonably determined the sums set forth in this Section 4.5 to be a fair estimate of the Owner' actual damages which are difficult to ascertain in the event of delay.

§ 4.6 Other:
(Paragraph Deleted)

The Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work.

ARTICLE 5 PAYMENTS
§ 5.1 Progress Payments
§ 5.1.1 Based upon Applications for Payment submitted to the Design Agent by the Contractor and Certificates for Payment issued by the Design Agent and approved by the Owner in writing, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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

§ 5.1.3 The Owner shall make payment of the certified amount, less retainage, to the Contractor not later than the 30 th working day following written approval by the Owner.

(Paragraph Deleted)

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

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

§ 5.1.6 In accordance with AIA Document A201™–2007, General Conditions of the Contract for Construction as modified by the Owner, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:
- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:
- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Design Agent has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document

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A201–2007 as modified by the Owner;

.3 For Work performed or defects discovered since the last payment application, any amount for which the Design Agent may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2007 as modified by the Owner; and

.4 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due: five (5%) percent.

(Paragraph Deleted)

§ 5.1.7.1.1 Deleted.

(Paragraph Deleted)

§ 5.1.7.2 Deleted.

(Paragraph Deleted)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Paragraph Deleted)

The amount of five (5%) percent shall be retained by the Owner through the date of Substantial Completion of the Work and then after the date of Substantial Completion of the Work in accordance with R.I. Gen. Laws § 37-12-10.1.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2007 as modified by the Owner.

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

§ 5.1.10 Within 10 working days of receipt of any progress payment from the Owner, the Contractor must pay its Subcontractors the full amount included for each such Subcontractor within the Contractor's Application for Payment in accordance with the provisions of AIA A201 - 2007, General Conditions of the Contract for Construction as modified by the
Owner.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less the amount withheld pursuant to § 5.1.7.3, shall be made by the Owner to the Contractor when:

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2007 as modified by the Owner, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Design Agent and approved in writing by the Owner;

.3 the Contractor has submitted its final release and final releases from all of its Subcontractors and suppliers in a form acceptable to the Owner; and

.4 the Contractor has submitted to the Owner all close-out documents, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents.

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§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 working days after the issuance of the Design Agent's final Certificate for Payment and written approval by the Owner.

§ 5.3 Interest
Payments due and unpaid under the Contract shall bear interest from the date payment is due in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 **et seq.**

§ 5.4 Owner's Rights
§ 5.4.1 The Owner shall have the right to deduct from any payments due to the Contractor the amount of any unpaid obligations owed to the State of Rhode Island by the Contractor, including without limitation, any and all unpaid taxes, the amount of any claim against the Contractor arising out of this Agreement, or any amount on account of any other reason permitted by applicable law.

§ 5.5 Pursuant to R.I. Gen. Laws § 44-1-6, the Owner shall withhold payment from the Contractor if the Contractor does not maintain a regular place of business in Rhode Island in the amount of three (3%) percent of the Contract Sum until 30 calendar days after Final Completion and compliance by the Contractor with the requirements of such section. The three (3%) percent withheld pursuant to R.I. Gen. Laws § 44-1-6 is not considered retainage which is held pursuant to § 5.1.7.

(Paragraph Deleted)

ARTICLE 6 DISPUTE RESOLUTION
§ 6.1 Initial Decision Maker
Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision *Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 6.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 6.3 of any Claim arising prior to the date final payment is due.*

§ 6.2 Mediation
For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 6.3, the Contractor shall *have the*
option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of
such option by the Contractor, the Owner and the Contractor shall attempt to select a mediator, and in the event that the Owner and the Contractor cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

(Paragraph Deleted)

§ 6.3 Binding Dispute Resolution
For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, or mediation at the option of the Contractor pursuant to Section 6.2, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 **et seq.**

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007, as modified by the Owner. The Contract may also be terminated by the Owner: (i) in the event of the unavailability of appropriated funds; (ii) in the absence of a determination of continued need; or (iii) as *otherwise provided in the State of Rhode Island Procurement Regulations General Conditions of Purchase or other applicable law.*

§ 7.1.1 Deleted.

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§ 7.2 The Work may be suspended by the Owner as provided in: (i) the State of Rhode Island General Conditions of Purchase Regulation or other applicable law; or (ii) Article 14 of AIA Document A201–2007 as modified by the Owner.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to: (i) the AIA Document A201 – 2007 or other Contract Document as modified by the Owner; and (ii) that provision in the AIA Document A201 – 2007 as modified by the Owner or other Contract Document as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Representatives for the Owner

§ 8.2.1 The Owner's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.2.2 The User Agency's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

Kevin Fitta, P.E., Director Capital Projects
Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel: (401) 456-9885
Email: kfitta@ric.edu

§ 8.2.3 The Design Agent's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.3 The Contractor's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

§ 8.4 Neither the Owner's nor the Contractor's representative nor the Design Agent's representative shall be changed without 10 working days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the Solicitation and elsewhere in the Contract Documents.

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

§ 8.6 Deleted.

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§ 8.7 Other provisions:
§ 8.7.1 The Contractor represents and warrants to the Owner, in addition to any other representations and warranties of the Contractor elsewhere in the Contract Documents:

.1 The Contractor and its Subcontractors are each financially solvent, able to pay their debts as they mature, and possess sufficient working capital to perform their obligations under the Contract Documents.
.2 The Contractor and its Subcontractors are each able to furnish the tools, materials, equipment, and labor required to complete the Project as required under the Contract Documents.
.3 The Contractor and each Subcontractor are authorized to do business in the State of Rhode Island and are properly licensed by all necessary governmental authorities having jurisdiction over them and over the Work and the Project.
.4 The execution of this Agreement and its performance is within its duly authorized powers.
.5 The Contractor has visited the site of the Project, familiarized itself with the local and special conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.
.6 The Contractor possesses the requisite level of experience and expertise in the business administration, construction, and superintendence of projects of the size, complexity, and nature of the Project, and it will perform the Work with the care, skill, and diligence of a contractor possessing such experience and expertise.

§ 8.7.2 The representations and warranties of the Contractor in this Section 8.7 and elsewhere in the Contract Documents will survive the execution and delivery of this Agreement, any termination of this Agreement, and the final completion of the Work.

§ 8.7.3 Any Change Orders or other Modifications must be approved in writing by the Owner.

§ 8.7.4 The Owner is the State of Rhode Island, acting by and through its Department of Administration, Division of Purchases, and therefore, pursuant to the provisions of R.I. Gen. Laws § 34-28-31, mechanics liens may not be placed against the Project.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS
§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as modified by the Owner
.2 Deleted.
.3 AIA Document A201™–2007, General Conditions of the Contract for Construction, as *modified by the* Owner.
.4 Deleted.
.5 Drawings

(Table Deleted)

The Drawings are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.6 Specifications

(Table Deleted)

The Specifications are included in the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.7 Addenda, if

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(Table Deleted)

any, issued pursuant to the Solicitation form a part of the Solicitation and are available on the Division of Purchases website at www.purchasing.ri.gov.

.8 *Supplementary and other Conditions of the Contract, including without limitation, the State of Rhode Island General Conditions of Purchase Regulation.*

.9 Other documents listed below:

(Paragraph Deleted)

.1 The Solicitation, issued by the Owner, including without limitation, the Invitation to Bid, the Instructions to Bidders, the Specifications and Drawings, any Addenda, and the Bid Checklist.

(Paragraph Deleted)

.2 The Bid Proposal, including without limitation, the Bid Form and the Bidder Certification Cover Form.

(Table Deleted)

.3 The Purchase Order issued by the Owner.

§ 9.2 This Agreement and the Contract Documents are subject to, and governed by, the laws of the State of Rhode Island, including all procurement statutes and regulations (available at www.purchasing.ri.gov), and applicable federal and local law, all of which are fully incorporated into this Agreement by this reference.

(Table Deleted)

(Paragraph Deleted)

§ 9.3 In the event of any conflict between or among the Contract Documents, or any Contract Documents and any provision of the State of Rhode Island Procurement Regulations and/or any other provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws shall control.

ARTICLE 10 BENEFITS OF AGREEMENT

§ 10.1 The User Agency is a disclosed third-party beneficiary of this Agreement and shall have all of the rights and benefits hereunder to which such a party is entitled. Nothing contained in this Agreement shall create a contractual relationship with, or a cause of action in favor of, any other third party against the Owner or the User Agency.

§ 10.2 This Agreement shall be binding on the Contractor and its successors and assigns; provided, however, that the Contractor may not assign its rights nor delegate its responsibilities under this Agreement without the Owner's prior written consent.

This Agreement is entered into as of the day and year first written above; provided, however, that this Agreement shall not become a valid, binding, and enforceable contract unless and until the Owner shall have issued a Purchase Order.

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THE STATE OF RHODE ISLAND, acting by and through its Department of Administration, Division of Purchases

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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SECTION 00610

PERFORMANCE BOND

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
The State of Rhode Island, acting by and through the Department of Administration Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401) 574-8387 (facsimile)
www.purchasing.ri.gov

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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(1296446794)

§ **15** If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ **16** Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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SECTION 00615

PAYMENT BOND

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
The State of Rhode Island, acting by and through the Department of Administration Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401) 574-8387 (facsimile)
www.purchasing.ri.gov

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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SECTION 00700

GENERAL CONDITIONS

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

(Paragraphs deleted) The State of Rhode Island, acting by and through the Department of Administration Division of Purchases, on behalf of the User Agency
One Capitol Hill, Second Floor
Providence, Rhode Island 02908-5855
(401) 574-8100 (telephone)
(401 574-8387 (facsimile)
(Paragraph deleted)
www.purchasing.ri.gov

THE USER AGENCY

(Paragraphs deleted)
(Name, address, telephone and facsimile numbers, and web address)

Rhode Island College
600 Mt Pleasant Ave
Providence, RI 02908
Tel: (401) 456-9885
(Paragraph deleted)
www.ric.edu

(Paragraphs deleted)

(Paragraphs deleted)
THE Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and web address)

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (the Agreement) and consist of the Agreement (and the documents enumerated therein), Conditions of the Contract (General Conditions, Supplementary Conditions, if any, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Design Agent.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Design Agent or the Design Agent's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Design Agent or the Design Agent's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Design Agent shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Design Agent's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Design Agent and the Design Agent's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items and services necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; the Contractor shall perform all work reasonably inferable from the Contract Documents as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

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§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In the event of any conflicts or discrepancies among the Contract Documents, the provisions of the Contract Documents will be interpreted in the following order of priority:

.1 Modifications (if any).
.2 The Purchase Order.
.3 The Agreement.
.4 The Solicitation, including any Addenda, and the Specifications and Drawings
.5 The Supplementary Conditions (if any).
.6 The General Conditions.
.7 The Bid Proposal.

§ 1.2.5 In the event of any conflicts or discrepancies between the Contract Documents and the State of Rhode Island Procurement Regulations or any provision of the Rhode Island General Laws, the State of Rhode Island Procurement Regulations and the Rhode Island General Laws will control.

§ 1.2.6 In the event of any inconsistency between the Drawings and Specifications, the better quality or greater quantity of Work shall be provided.

§ 1.2.7 The Owner will be the final decision maker for any and all interpretations.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Owner and the User Agency shall have a perpetual license to utilize the Drawings, Specifications, and other documents, including electronic or digital documents, prepared by the Design Agent and the Design Agent's consultants, for the execution of the Project and shall have and retain all rights to use them and reproduce them for the production and maintenance of the Work described therein. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Design Agent's or Design Agent's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Design Agent and the Design Agent's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express

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authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Design Agent does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 Deleted.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
§ 2.2.1 Deleted.

§ 2.2.2 The Contractor shall secure and pay for permits and fees, necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 If required for the Work in the discretion of the Owner, the Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of any information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Deleted.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK
If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK
If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10 working-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Design Agent's additional services made necessary by such default, neglect, or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Design Agent. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR
§ 3.1 GENERAL
§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Design Agent, or by tests, inspections, or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Owner and the Design Agent any errors, inconsistencies, or omissions discovered by or made known to the Contractor or additional Drawings, Specifications, or instructions required to define the Work in greater detail to permit the proper progress of the Work as a request for information in such form as the Design Agent may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Design Agent and the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Design Agent or Owner may require.

§ 3.2.3.1 Omissions from the Drawings and Specifications of items obviously needed to perform the Work properly, such as attachments, bolts, hangers, and other fastening devices, shall not relieve the Contractor from the obligation to furnish and install such items.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Design Agent issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2, 3.2.3, or 3.2.3.1, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Design Agent for damages resulting from errors, inconsistencies, or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.4.1 The Contractor shall not make any changes without prior written authorization from the Design Agent and the Owner.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Design Agent and shall not proceed with that portion of the Work without further written instructions from the Design Agent. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without

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acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Whenever the Contractor has an obligation to provide labor and materials under the Agreement, the Contractor, at a minimum, shall provide the labor for, and furnish and install and place in operation all items, including without limitation, all proper connections.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Design Agent in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Design Agent and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and the Design Agent that materials and equipment furnished under the Contract will be of first quality, prime manufacture, and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Design Agent, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.6.2 The State of Rhode Island is exempt from payment of any federal or state excise, transportation, or sales tax. The Rhode Island Department of Administration Division of Purchases will furnish Exemption Certificates upon request.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections required by the Rhode Island State Building Code necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded. The Contractor shall be responsible for obtaining the Certificate of Occupancy from the appropriate governmental authorities.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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§ 3.7.3 The Contractor shall promptly notify the Design Agent and the Owner if the Contractor becomes aware that the Contract Documents are not in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Design Agent before conditions are disturbed and in no event later than 21 working days after first observance of the conditions. The Design Agent will promptly investigate such conditions and, if the Design Agent determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Design Agent determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Agent shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Design Agent's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Design Agent. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Design Agent the name and qualifications of a proposed superintendent. The Design Agent may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to the proposed superintendent or (2) that the Design Agent requires additional time to review. Failure of the Design Agent to reply within the 14 working-day period shall constitute notice of no reasonable objection.

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§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within 20 working days after the issuance of the Purchase Order, shall prepare and submit for the Owner's and Design Agent's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals, not less frequently than monthly, as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall certify on the initial schedule and all revised schedules that they comply with the Contract Documents.

§ 3.10.2 The Contractor shall prepare a submittal schedule, within 20 working days after the issuance of the Purchase Order, and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Owner's and the Design Agent's approval. The Owner's and the Design Agent's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Owner and the Design Agent reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Design Agent.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Design Agent and shall be delivered to the Design Agent for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Design Agent is subject to the limitations of Section 4.2.7. Informational submittals upon which the Design Agent is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Design Agent without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Design Agent Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Owner and the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Design Agent that the Contractor has (1) reviewed and approved them, (2) determined and verified

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materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Design Agent.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Design Agent's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Design Agent in writing of such deviation at the time of submittal and (1) the Design Agent has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Design Agent's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Design Agent on previous submittals. In the absence of such written notice, the Design Agent's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Design Agent will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Design Agent. The Owner and the Design Agent shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Design Agent have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Design Agent will review, approve, or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Design Agent for evaluation of resubmittals.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, and any restrictions imposed by the User Agency or the Owner, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably

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withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Design Agent access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Design Agent harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Design Agent. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Design Agent and the Owner.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, the State of Rhode Island, and each executive, legislative, judicial, regulatory, and administrative body of the state, and any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, committee, authority, educational institution, school, water, and fire district, and other agency of Rhode Island state, municipal, and local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic, including without limitation, the User Agency, their elected and appointed officials, members, employees, and agents, the Design Agent, the Design Agent's Consultants, Subconsultants, and Subcontractors, and agents and employees and any of them from and against any and all claims, demands, damages, liabilities, judgments, losses and expenses, including but not limited to attorneys' fees and costs of mediation, arbitration, and/or litigation, arising out of or resulting from performance of the Work, and/or the obligations of the under the Contract Documents, but only to the extent caused by the acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not any such claim, demand, damage, liability, judgment, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 Without limiting the generality of the foregoing, the defense and indemnity set forth in this Section 3.18 includes, without limitation, all liabilities, damages, losses, claims, demands, and actions on account of bodily injury, death, or property loss to a person or entity indemnified hereunder or any other persons or entities, whether based upon statutory (including, without limitation, workers compensation), contractual, tort, or other liability of any person or entity so indemnified.

§ 3.18.4 The remedies set forth herein shall not deprive any person indemnified hereunder of any other indemnity action, right, or remedy otherwise available to any such person or entity at common law or otherwise.

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§ 3.18.5 The Contractor will include the indemnity set forth in this Section 3.18, without modification, in each Subcontract with any Subcontractor.

§ 3.18.6 Notwithstanding any other language in the Contract Documents to the contrary, the indemnity hereunder shall survive Final Completion of the Work and final payment under the Agreement and shall survive any termination of the Agreement.

ARTICLE 4 DESIGN AGENT

§ 4.1 GENERAL

§ 4.1.1 The Design Agent is the person lawfully licensed to practice his or her profession in the State of Rhode Island or an entity lawfully practicing its profession in the State of Rhode Island and identified in the Contract Documents as the Design Agent. The term "Design Agent" means the Design Agent or the Design Agent's authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Design Agent as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Design Agent. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Design Agent is terminated, the Owner shall employ a successor Design Agent as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Design Agent.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Owner with assistance from the Design Agent will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction through the date the Design Agent issues the final Certificate for Payment and continuing until the expiration of the one-year period following Final Completion. The Design Agent will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Design Agent will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Design Agent will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Design Agent will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 On the basis of the site visits, the Design Agent will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Design Agent will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Design Agent will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Design Agent about matters arising out of or relating to the Contract. Communications by and with the Design Agent's consultants shall be through the Design Agent. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Design Agent's evaluations of the Contractor's Applications for Payment, the Design Agent will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

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§ 4.2.6 The Design Agent has authority to reject Work that does not conform to the Contract Documents. Whenever the Design Agent considers it necessary or advisable, the Design Agent will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Design Agent nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Design Agent to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Design Agent will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Design Agent's action will be taken in accordance with the submittal schedule approved by the Design Agent or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Design Agent's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Design Agent's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Design Agent's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Design Agent, of any construction means, methods, techniques, sequences or procedures. The Design Agent's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Design Agent will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Design Agent will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Design Agent will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Design Agent agree, the Design Agent will provide one or more project representatives to assist in carrying out the Design Agent's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Design Agent will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Design Agent will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Design Agent will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Design Agent's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and approved by the Owner.

§ 4.2.14 The Design Agent will review and respond to requests for information about the Contract Documents. The Design Agent's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Design Agent will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

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ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and the Design Agent the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each portion of the Work. The Owner may reply within 14 working days to the Contractor in writing stating (1) whether the Owner or the Design Agent has reasonable objection to any such proposed person or entity or (2) that the Owner or Design Agent requires additional time for review.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Design Agent has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.2.5 MANUFACTURERS AND FABRICATORS

§ 5.2.5.1 Not later than 10 working days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner and the Design Agent the names of the manufacturers or fabricators for certain products, equipment, and systems identified in the Specifications and, where applicable, the name of the installing Subcontractor. The Owner may reply within 14 working days to the Contractor in writing, stating: (i) whether the Owner or the Design Agent has reasonable objection to any such proposed person manufacturer or fabricator; or (ii) whether the Owner or Design Agent requires additional time to review.

§ 5.2.5.2 The Contractor shall not contract with a proposed manufacturer, fabricator, or Subcontractor to whom the Owner or Design Agent has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.5.3 If the Owner or Design Agent has an objection to a manufacturer, fabricator, or Subcontractor proposed by the Contractor, the Contractor shall propose another to whom the Owner or Design Agent has no objection.

§ 5.2.5.4 The Contractor shall not substitute a manufacturer, fabricator, or Subcontractor previously selected if the Owner or Design Agent makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the

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Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Design Agent. Upon the request of the User Agency and/or the Owner, the Contractor shall provide the User Agency and/or the Owner with copies of each subcontract agreement. Each subcontract agreement shall preserve and protect the rights of the Owner and Design Agent under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

(Paragraph deleted)

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 working days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

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§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Design Agent apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement between the Owner and the Contractor; a Construction Change Directive requires agreement by the Owner and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Design Agent alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Contractor and signed by the Owner, Contractor and Design Agent stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Subsequent to the approval of a Change Order as provided in § 7.1.2, whether such Change Order changes the Contract Sum or Contract Time or both, no additional claim related to such Change Order will be considered by the Owner. Any change, once incorporated into a Change Order, is all inclusive, and includes all factors that could have been considered at the time of the Change Order such as Project impact or schedule "ripple" effect.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Design Agent and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

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§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.7.

§ 7.3.4 Deleted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Design Agent of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Design Agent shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.1. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Design Agent may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- **.1** Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- **.2** Costs of materials, supplies and equipment, including cost of delivery;
- **.3** Rental costs of machinery and equipment, exclusive of hand tools; or
- **.4** Costs of premiums for all bonds and insurance and permit fees related to the Work..

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Design Agent. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Design Agent will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Design Agent determines, in the Design Agent's professional judgment, to be reasonably justified. The Design Agent's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Design Agent concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Contractor will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

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.1 For the Contractor, for work performed by the Contractor's own forces, an amount not to exceed ten (10%) percent of the cost.
.2 For the Contractor, for work performed by the Contractor's Subcontractors, an amount not to exceed five (5%) of the amount due to the Subcontractors.
.3 For each Subcontractor, for work performed by the Subcontractor's own forces, an amount not to exceed ten (10%) percent of the cost.
.4 Where the Work represents both additions and deletions and results in a net increase, the allowable overhead and profit shall be in accordance with this Section 7.3.11, but in no event shall the amount exceed fifteen (15%) percent of the net increase in the cost of the Work.
.5 Overhead and profit is to include the Contractor's project management and supervisory costs, all administrative expenses and personnel, change estimate preparation, mobilization, setup & breakdown, meetings, all safety related costs, cleanup costs and storage costs pertaining to the changes in the work.
.6 The fee increase to any permit required by the additional work is allowed to be added to the Change Order costs. However, the Contractor is required to submit proof that the additional fee was paid to the presiding authority.
.7 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.

§ 7.3.12 All proposals with an aggregate cost equal to or in excess of $500.00 shall be accompanied by a detailed itemization of costs, including labor, materials (quantities and prices), and Subcontracts, in a form acceptable to the Owner. In no event will a change order request reflecting an aggregate cost equal to or in excess of $500.00 be approved without such itemization. All suppliers, vendor and subcontractor goods shall also have the detailed itemization as indicated above.

§ 7.4 MINOR CHANGES IN THE WORK
The Design Agent with the prior written approval of the Owner has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be affected by written order signed by the Design Agent and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME
§ 8.1 DEFINITIONS
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

The date of commencement of the Work is the date established in Section 3.1 of the Agreement..

(Paragraph deleted)
§ 8.1.3 The date of Substantial Completion is the date certified by the Design Agent in accordance with Section 9.8.

§ 8.1.4 Deleted.

§ 8.2 PROGRESS AND COMPLETION
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Design Agent, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Within 20 working days of the issuance of the Purchase Order, and promptly if revision is necessary from time to time as a result of a Change Order, the Contractor shall submit to the Owner, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Design Agent and the Owner may require. This schedule, if and when approved by the Design Agent and the Owner in writing, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least 10 working days before the date established for each progress payment, the Contractor shall submit to the Design Agent and the Owner for approval an itemized Application for Payment prepared in accordance with the schedule of values for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or the Design Agent may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 All Applications for Payment for Change Orders must be accompanied by a Notice of Change in Purchase Order issued by the Owner, and if directed by the Owner, by the User Agency.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 The form of Application for Payment shall be AIA Document G702, Application and Certification for Payment, supported by AIA Document G702A, Continuation Sheet.

§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five (95%) percent of the amount due the Contract on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be

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free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work. The Contractor shall immediately satisfy any lien, claim, or encumbrance against the site where the Project is located and indemnify the Owner from and against all resulting costs and expenses, including without limitation, attorneys' fees.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Design Agent will, within 7 working days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Design Agent determines is properly due, or notify the Contractor and Owner in writing of the Design Agent's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Design Agent to the Owner, based on the Design Agent's evaluation of the Work and the data comprising the Application for Payment, that, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Design Agent. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Design Agent has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.4.3 The Contractor must submit all product literature, material and color samples with each Application for Payment, or as otherwise required by the Owner.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Design Agent will withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Design Agent's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Design Agent is unable to certify payment in the amount of the Application, the Design Agent will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Design Agent cannot agree on a revised amount, the Design Agent will promptly issue a Certificate for Payment for the amount for which the Design Agent is able to make such representations to the Owner. The Design Agent may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Design Agent's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- **.7** failure to carry out the Work in accordance with the Contract Documents; or
- **.8** any other failure to comply with the obligations of the Contractor under the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 The Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or

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equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Design Agent and the Design Agent will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Design Agent has issued a Certificate for Payment and the Owner has approved the Certificate for Payment in writing, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Design Agent.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than 10 working days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Design Agent will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Design Agent and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within 7 working days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. The Owner shall have the right to withhold payment(s) to the Contractor in the event that any Subcontractors or material and equipment suppliers have not been properly paid. Neither the Owner nor Design Agent shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Design Agent does not issue a Certificate for Payment, through no fault of the Contractor, within 7 working days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within 7 working days after the date established in the Contract Documents the amount certified by the Design Agent or awarded by binding dispute resolution, then the Contractor may, upon 7 additional working days' written notice to the Owner and Design Agent, make a claim for payment as provided under the provisions of applicable law.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Design Agent a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

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§ 9.8.3 Upon receipt of the Contractor's list, the Design Agent will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Design Agent's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Design Agent. In such case, the Contractor shall then submit a request for another inspection by the Design Agent to determine Substantial Completion. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Design Agent will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment less the amount of five (5%) percent to be retained by the Owner in accordance with R.I. Gen. Laws § 37-12-10.1. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Design Agent as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Design Agent.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Design Agent shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Agent will promptly make such inspection and, when the Design Agent finds the Work acceptable under the Contract Documents and the Contract fully performed, the Design Agent will promptly issue a final Certificate for Payment stating that to the best of the Design Agent's knowledge, information and belief, and on the basis of the Design Agent's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Design Agent's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The Design Agent will perform no more than 2 inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Design Agent for any additional inspections.

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§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Design Agent (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and (6) all other close-out documents required by the Owner, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Design Agent so confirms, the Owner shall, upon application by the Contractor and certification by the Design Agent, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Design Agent prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** claims permitted under the State of Rhode Island General Conditions of Purchase Regulation.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 The Contractor and the Contractor's surety shall be liable for and shall pay the Owner as liquidated damages the sums specified in the Solicitation and Bid Form, or if completed, the amount set forth in Section 3.4 of the Agreement.

§ 9.12 Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and in consultation with the appropriate governmental authorities.

§ 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the User Agency and the Owner reasonable advance notice.

§ 10.2.4.2 If the Contract Documents require the Contractor to handle materials or substances that under certain circumstances may be designated as hazardous, the Contractor shall handle such materials in an appropriate manner.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Design Agent or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Design Agent.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Design Agent in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Design Agent the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Design Agent will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons

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or entities proposed by the Owner. If either the Contractor or Design Agent has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Design Agent have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the extent permitted by the provisions of R.I. Gen. Laws §§ 9-31-1 **et seq.**, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Design Agent, Design Agent's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as is specified in the Solicitation and as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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§ 11.1.1.2 The Contractor's liability insurance shall include all major coverages and be on a comprehensive general liability basis.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance as specified in the Solicitation and as otherwise acceptable to the Owner shall be filed with the Owner and the User Agency prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 working days' prior written notice has been given to the Owner and the User Agency. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, the Design Agent and the Design Agent's consultants as additional insureds for claims caused in whole or in part by the Contractor's acts or omissions during the Contractor's operations; and (2) the Owner, the User Agency, and their elected and appointed officials, members, employees, and agents, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.1.5 The Contractor shall be responsible for the prompt payment to the Owner of any deductible amounts under any insurance policies required under the Contract Documents for claims made pursuant to such policies.

§ 11.2 OWNER'S LIABILITY INSURANCE.

§ 11.2.1 The Contractor shall furnish the Owner and the User Agency, through the Design Agent, an insurance certificate providing Owner's Protective Liability extended to include the interests of the Design Agent, and to protect the Owner, User Agency, and Design Agent from any liability which might be incurred against any of them as a result of any operation of the Contractor or Subcontractors or their employees or anyone for whom either the Contractor or Subcontractors are responsible. Such insurance shall be written for the same limits as the Contractor's commercial general liability insurance and shall include the same coverage.

§ 11.2.2 If the Owner engages separate contractors to perform work for, or in or around, the Project, it shall require in its contracts with each separate contractor that Contractor and its officers, directors, partners, members, employees, and agents shall be: (i) named as additional insureds on a primary, noncontributory basis to any commercial general liability, pollution liability, and excess liability insurance policies; and (ii) provided a waiver of subrogation on all workers compensation and professional liability insurance policies.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the state of Rhode Island, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the User Agency, the Contractor, Subcontractors and Sub-subcontractors in the Project. If the Owner and/or

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the User Agency incur any damages by failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable cost resulting from such failure.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Design Agent's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 Deleted.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Deleted.

§ 11.3.3 Deleted.

§ 11.3.4 Deleted.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 working days' prior written notice has been given to the Owner and the User Agency.

§ 11.3.7 WAIVERS OF SUBROGATION

The Contractor waives all rights against the Owner and the User Agency and any of their subcontractors, sub-subcontractors, agents and employees, and (2) the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Design Agent, Design Agent's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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§ 11.3.8 A loss insured under this property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within 5 working days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Solicitation.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Design Agent's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Design Agent, be uncovered for the Design Agent's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Design Agent has not specifically requested to examine prior to its being covered, the Design Agent may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Design Agent or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Design Agent's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If

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the Contractor fails to correct nonconforming Work within a reasonable time after receipt of notice from the Owner or Design Agent, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one year from the date of Final Completion, the Design Agent will conduct and the Contractor shall attend 2 meetings with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the State of Rhode Island.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to any executive, legislative, judicial, regulatory, or administrative body of the state, or any political subdivision thereof, including without limitation, any department, division, agency, commission, board, office, bureau, authority, school, water, or fire district, or other agency of Rhode Island state or local government that exercises governmental functions, any other governmental authority, and any quasi-public corporation and/or body corporate and politic. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice, or when received, if manually delivered or transmitted by electronic mail or facsimile to the last such address known to the party giving notice.

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§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Design Agent timely notice of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Design Agent, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Design Agent will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Design Agent of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Design Agent's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Design Agent.

§ 13.5.5 If the Design Agent is to observe tests, inspections or approvals required by the Contract Documents, the Design Agent will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

No interest shall be due or payable on account of any payment due or unpaid under the Contract Documents except in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 **et seq.**

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 calendar days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons

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or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped; or

.3 Because the Design Agent has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1

§ 14.1.2 Deleted.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon 7 working days' written notice to the Owner and Design Agent, terminate the Contract and recover from the Owner payment for Work executed.

§ 14.1.4 If the Work is stopped for a period of 60 calendar days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon 7 additional days' written notice to the Owner and the Design Agent, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards or fails to comply with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 otherwise is guilty of breach of a provision of the Contract Documents; or

.5 cancels or the Contractor or the Owner receives notice of cancellation or nonrenewal of any insurance required under the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, 7 working days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Agent's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

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§ 14.3.2 The
(Paragraphs deleted)
Owner shall not be liable to the Contractor or any Subcontractor for claims or damages of any nature caused by or arising out of any delays. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work in accordance with the provisions of Section 8.3.1.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

ARTICLE 15 CLAIMS AND DISPUTES
§ 15.1 CLAIMS
§ 15.1.1 DEFINITION
A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS
Claims by either the Owner or Contractor must be initiated by written notice to the other party. Such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly serviced if delivered in person, by mail, by courier, or by electronic transmission. Claims by either party must be initiated within 21 working days after occurrence of the event giving rise to such Claim or within 21 working days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Design Agent will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

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§ 15.1.5.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.5.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6
(Paragraphs deleted)
Deleted.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 **et seq.**, will serve as the Initial Decision Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 15.2.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 15.3.1 of any Claim arising prior to the date final payment is due.

§ 15.2.2 Deleted.

§ 15.2.3 Deleted.

§ 15.2.4 Deleted.

§ 15.2.5 Deleted.

§ 15.2.6 Deleted.

§ 15.2.6.1 Deleted.

§ 15.2.7 Deleted.

§ 15.2.8 Deleted.

§ 15.3 MEDIATION
§ 15.3.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 15.4.1, the Contractor or the Design Agent shall have the option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of such option by the Contractor or the Design Agent, the Owner and the Contractor or the Design Agent shall attempt to select a mediator, and in the event that the Owner and the Contractor or the Design Agent cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

§ 15.3.2 Deleted.

§ 15.3.3 Deleted.

§ 15.4 BINDING DISPUTE RESOLUTION
§ 15.4.1 For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 15.2.1, or mediation at the option of the Contractor pursuant to Section 15.3.1, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 **et seq.**

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(Paragraphs deleted)
§ 15.4.4 Deleted.

§ 15.4.4.1 Deleted.

§ 15.4.4.2 Deleted.

§ 15.4.4.3 Deleted.

§ 16 COMPLIANCE WITH APPLICABLE LAW

The Contractor and its Subcontractors shall comply with all applicable federal, state, and local laws.

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SECTION 00800

SUPPLEMENTARY CONDITIONS

SECTION 00800

SUPPLEMENTARY CONDITIONS

PART 1 - AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (AIA Document A201 – 2007 from the State of Rhode Island Purchasing Department dated July 2016) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

The address system used in the Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE 1 GENERAL PROVISIONS

SC-1.2.2 Add the following new paragraph immediately after paragraph within § 1.2.2

It shall be the Contractor's responsibility in subcontracting portions of the Work to arrange or group items of Work under particular trades to conform with then-prevailing customs of the trade, and in accordance with applicable requirements of law. The Owner shall have no liability arising out of jurisdictional issues raised or claims advanced by Subcontractors, trade organizations or other interested parties based on the arrangement or subdivision of Work in the Contract Documents. In the event of any claim arising out of any duplication, conflict, inconsistency or discrepancy within the Contract Documents as to the allocation of the Work among the Subcontractors and Contractor's own forces, the Contractor shall be solely responsible for resolving the claim and shall be responsible for ensuring that all the Work is completed regardless of where it appears in the Contract Documents.

ARTICLE 3 CONTRACTOR

SC-3.3.4 Add the following new paragraph immediately after paragraph § 3.3.3

If the Contract Documents refer to particular construction means, methods, techniques, sequences or procedures, or indicate or imply that such are to be used in the Work, such mention is intended only to indicate that the operations of the Contractor shall be such as to produce at least the quality of Work implied by the operations described, but that the actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the responsibility of the Contractor. The Contractor shall notify the Engineer for informational purposes only of the actual construction means, methods, techniques, sequences or procedures, which the Contractor intends to employ on the Work, if those differ from those mentioned in the Contract Documents.

SC-3.4.2 Add the following new paragraph immediately after paragraph within § 3.4.2

The Contractor shall be responsible for determining that all materials and equipment furnished for the Work meet all requirements of the Contract Documents. Any additional cost, or any loss or damage arising from the substitution or proposed substitution of any material, equipment or method for those originally specified shall be borne by the Contractor, including costs of any structural, mechanical. electrical, architectural or other changes necessary to accommodate substitute materials or equipment, and costs of modifying documents and other additional fees of the Engineer or other consultants notwithstanding approval or acceptance of such substitution by the Owner or Engineer unless such substitution was made at the written request or direction of the Owner or Engineer.

SC-3.4.4 Add the following new paragraph immediately after paragraph § 3.4.3

Wherever the terms "or equal", "equal" or the like are used in the Contract Documents it shall be understood that other products other than those specified shall be considered for use in the Work. It is also understood that such products or materials proposed by the Contractor shall, in all respects, be equal to the look, feel, performance, warranty, utility requirements, physical characteristics, maintenance and service life to the specified products or material as determined by the Engineer.

SC-3.6.1 Add the following new paragraph immediately after paragraph § 3.6

The Contractor shall, and shall cause all Subcontractors to, utilize the Owner's exemption from such taxes to the maximum extent legally permitted. The Contractor and the Contractor's Subcontractors shall take into consideration the Owner's tax exempt status, if any, when calculating their bids.

SC-3.12.5 Add the following new paragraph immediately after paragraph within § 3.12.5

No extension of time will be granted arising out of the Contractor's failure to submit Shop Drawings, Product Data, Samples, or other submittals which do not allow adequate time for review by the Engineer and the Engineer's consultants, and also does not allow adequate time for revision and subsequent review, as required.

ARTICLE 4 ARCHITECT

SC-4.1.0 Add the following new paragraph immediately after paragraph § 4.1.

The term Design Agent, Architect and Engineer shall be used interchangeably throughout this document and any documents incorporated by reference herein. The Engineer, Design Agent and Architect shall have the same duties, rights and responsibilities and are one in the same entity.

ARTICLE 7 CHANGES IN THE WORK

SC-7.2.2 Add the following new paragraph immediately after paragraph § 7.2.1

A Change Order duly executed by the Owner, the Engineer and the Contractor shall constitute an all-inclusive settlement on account of the changes in the Work described or referred therein including all direct, indirect, supplemental, consequential and cumulative costs and delays associated in any way therewith, and the Contractor's signature on a Change Order represents a waiver of any and all rights to make any further Claim on account of that instrument or the changes reflected therein. By executing a Change Order the Contractor represents to the Owner that all Subcontractors performing

Work under the Change Order have agreed to the terms of the Change Order, and the Contractor assumes full responsibility for, and shall defend, indemnify and hold harmless the Owner with respect to, any claims from the Subcontractors in connection with the Change Order or the performance of the Work covered by the Change Order.

SC-7.3.7.5 Add the following new paragraph immediately after paragraph § 7.3.7.4

Allowances for overhead and profit, under this Section 7.3.7 and under the other methods of adjustment specified in Section 7.3.3, shall not exceed the percentages specified below, excluding costs of premiums for bonds and insurance, permit fees and taxes, and subject to any other limitations stated in the Agreement. The percentage allowance for Subcontractors stated below shall cover field and office overhead, profit, general conditions and all other indirect costs, and the percentage allowance for the Contractor shall cover the Contractor's field and office overhead, profit, general conditions and any other indirect costs or other expenses of the Contractor. For any such subcontracted work, the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

(a) The Contractor’s markup for Work performed by the Contractor's own forces shall not exceed ten percent (10%) of the direct cost of labor and materials.

(b) For each such Subcontractor, for Work performed by the Subcontractor's own forces, the percentage shall not exceed ten percent (10%) of the direct cost of labor and materials.

(c) The Contractor’s markup for Work performed by the Subcontractor's forces shall not exceed six percent (6%) of the amount due the Sub-subcontractor.

ARTICLE 8 TIME

SC-8.2.3 Add the following new paragraph immediately after paragraph within § 8.2.3

If the Owner determines that the progress of the Work has been materially delayed, or that the date of Substantial Completion, as may be adjusted by Change Order, is in jeopardy of not being met, the Owner shall have the right to require the Contractor to take whatever steps are necessary to recover all or a portion of such delay. To the extent that the Contractor, or anyone for whom the Contractor is directly or indirectly responsible, has caused all or part of such delay the costs associated with such recovery shall be borne by the Contractor, and the activities required to effect such recovery shall not be deemed a Change in the Work.

ARTICLE 9 PAYMENTS AND COMPLETION

SC-9.10.2.1 Add the following new paragraph immediately after paragraph § 9.10.2.

As an express condition precedent to final payment and in addition to the items required in 9.10.2, the Contractor shall submit the following to the Engineer and Owner for review and approval: (1) all warranties and guarantees required by the Contract Documents; (2) Project record documents (As-built drawings, surveys and specifications) as required by the Contract Documents; (3) operation and maintenance manuals required by the Contract Documents; (4) extra stock as required by the Contract Documents; (5) equipment test reports, balancing reports and equipment start-up reports as required by the Contract Documents; (6) instructional sessions as required by the Contract Documents; and (7) any other close-out documents required by the Contract Documents.

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ATTACHMENT A

RHODE ISLAND COLLEGE STANDARD CLOSEOUT PROCEDURES AND FORMS

Capital Projects
Close-Out

I Final Completion Procedures

- Punch List
- Certificate of Insurance
- Inspection -written request for final inspection a minimum of 10 days prior to date the work will be completed
- Architect will prepare a final certificate for payment after inspection or will notify contractor what needs to be completed or corrected before certificate will be issued.
- Completion of site restoration (paving, grass, landscape)
- End user walk-thru/approval

II Close-Out Forms

- Certification of final payment
- A balancing change order will accompany the final pay requisition if applicable
- Consent of Surety form – G707
- Contractor's Release of Owner
- Affidavit of Payment of Debts and Claims form – G706
- Affidavit of Lien Release form – G706A
- MBE Utilization form

III Close-Out Documentation

- Operations and Maintenance Manuals – hard copies, CD - PDF and CAD
- As-built drawings – hard copies & CD
- Training
- Warranties

AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)* Close Out	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR: General Construction	ARCHITECT: ☐
		CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐
		OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

_____
(Surety)

_____
(Signature of authorized representative)

Attest:
(Seal):

_____
(Printed name and title)

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User Notes: (913396818)

CONTRACTOR'S RELEASE OF OWNER

The Contractor known as _____ for the construction of _____ hereby and forever releases the Owner, known as The State of Rhode Island, its officers, agents and (architect and or engineer) _____ from all past, present, and future claims and liability to the Contractor for anything done or furnished for, relating to, or for any act of neglect of the Owner, its engineers and/or architects or any persons relating to or affecting the work.

Contractor's Certification:

_____(contractor)

_____ _____

name, title date

AIA® Document G706™ – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)* Close Out	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐ ARCHITECT: ☐
TO OWNER: *(Name and address)*	**CONTRACT FOR:** General Construction **CONTRACT DATED:**	CONTRACTOR: ☐ SURETY: ☐ OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes: (725692977)

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Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)* Close Out	**ARCHITECT'S PROJECT NUMBER:** **CONTRACT FOR:** General Construction	OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	SURETY: ☐ OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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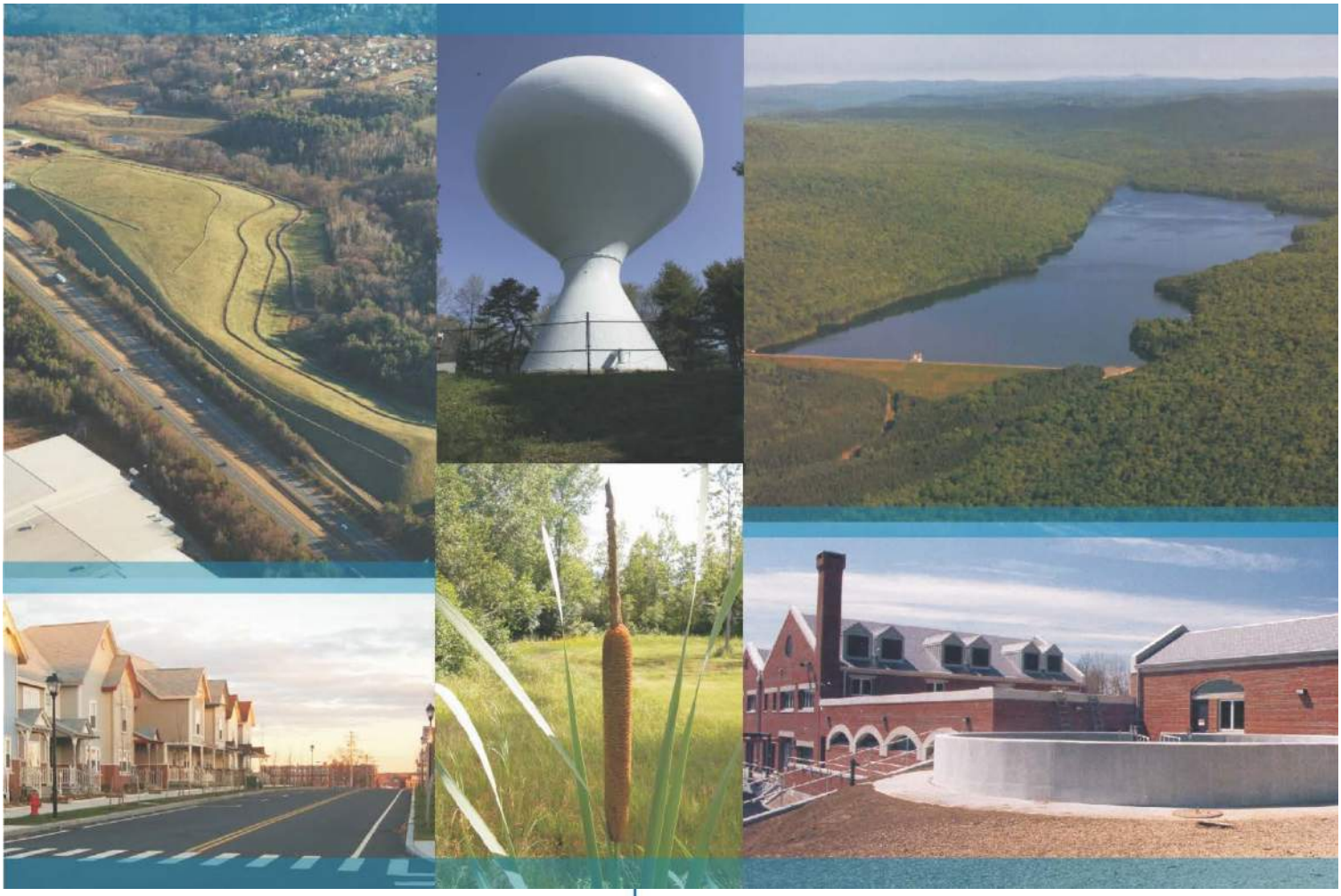
ATTACHMENT B
SOIL MANAGEMENT PLAN



Tighe&Bond

South Campus Sewer Improvements Project

Soil Management Plan

Prepared For:

Rhode Island College
Providence, Rhode Island

January 2020

1 Introduction

2 Soil Management

2.1 Soil Management Procedures 2-2
2.2 Dust Prevention 2-4
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2.4 Groundwater Assessment and Dewatering 2-5
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3 Notification Requirements

4 Site Contacts

Section 1
Introduction

Tighe & Bond has prepared this *Soil Management Plan* (SMP) for Rhode Island College for the management activities specific to the improvements of the existing sewer infrastructure on the campus of Rhode Island College. This document is supplemental to the South Campus Sewer Improvements Project Construction Documents. Tighe & Bond has prepared the following SMP for the excavation, stockpiling, management and potential off-Site disposal and/or re-use of soils at the Site.

During previous soil investigations completed at the college not associated with this investigation, elevated arsenic concentrations have been identified in soil at concentrations above the Rhode Island Department of Environmental Management (RIDEM) Residential Direct Exposure Criterion (RDEC) of 7 milligrams-per-kilogram (mg/kg). According to previous documentation, no other contaminants were detected at levels above the applicable regulatory criteria, and the elevated arsenic was attributed to natural background conditions. RIDEM was notified of the previous arsenic concentrations identified at the college. No analytical data from the proposed areas of excavation associated with this project have been collected to date. If elevated arsenic concentrations of arsenic or other contaminants are identified in soils at the Site above the RDEC, the concentrations may require additional RIDEM notification and management in accordance with RIDEM regulations.

As described in this SMP, the contractor shall assume that soils managed during this project may contain elevated arsenic concentrations unless analytical testing has been completed in accordance with this SMP. In addition, excess soil shall not be transported off- site unless in accordance with the SMP.

Note: Tighe & Bond will not be responsible to provide full-time on-site observation during the South ***Campus*** *Sewer Improvements Project. The term Environmental Professional as used in this document does not refer to Tighe & Bond.*

Section 2
Soil Management

2.1 Soil Management Procedures

The following procedures should be followed during the excavation, stockpiling, management and re-use of soils at the Site. Site activities should also conform to the bid documents associated with the South Campus Sewer Improvements Project . See sections 02110 and 02120 of the technical specifications regarding contaminated soil excavation, transportation, and disposal.

Pre-Excavation Activities

1. A minimum of 72 hours prior to conducting any site grading or excavation, the Contractor shall contact DIGSAFE to obtain a valid DIGSAFE permit to inform public utility owners to locate and mark all underground utilities in the proposed work

zone. Additionally, there are some campus owned utilities that will need to be located utilizing an independent utility location company. The contractor is responsible for coordinating and hiring a sub-contractor to perform the services as Rhode Island College will not perform any utility location. The Site contractor shall coordinate with local authorities to obtain the location of utilities unmarked by DIGSAFE (typically municipal water and sewer lines) at least 72 hours prior to excavation. When Site activities approach the location of any underground utility, the exact location shall be determined by safe and acceptable means. Any underground utility lines exposed in the excavation shall be protected, supported, or removed.

2. Prior to excavation, all staff working at the Site, including the contractor must prepare and familiarize themselves with their Site specific Health and Safety Plan (HASP). Each contractor performing tasks at the Site should have their own HASP applicable to their personnel. Tighe & Bond has not prepared a HASP for Site contractors and assumes no responsibility for the health and safety of Site contractors or their personnel.

Excavation Activities

1. Site activities shall be planned to be completed within a secured area of the Site and access to the Site should be restricted during the project.
2. Soil excavation and grading shall be conducted in accordance with applicable Site permits.
3. If the presence of oil or hazardous materials (OHM) or any other unforeseen condition is identified during excavation activities, Site activities shall immediately stop. Contractors should contact the appropriate Environmental Professional and the Rhode Island College Project Manager prior to continuing Site activities. The appropriate Site contacts are provided in Section 4.
4. Excess excavated soils, that can't be replaced into the excavation will be staged and temporarily stored in a designated area of the property for no more than 90 days. The storage location shall be selected to prevent unauthorized access to the materials.
5. Excess excavated soils will be stockpiled on polyethylene sheeting and/or stored in roll-off containers. Stockpiled or stored soils will be covered with polyethylene sheeting (6 mil minimum) prior to leaving the Site and at the end of each workday. Soil shall be securely stockpiled in order to prevent migration and erosion from the stockpile locations.
6. Soil stockpiles shall be inspected daily; and damage to the covers shall be repaired immediately.
7. The contractor shall take measures to control stormwater run-off of impacted/stockpiled soils, which may include, but are not limited to siltation fences and staked hay bales in the areas of the Site used for stockpiling.

On-Site Reuse Procedures:

Soil generated from Site excavations may be placed back into its original excavation for use as backfill during the Site activities. The contractor shall make all reasonable efforts to backfill soils the corresponding depth and location from which the soils were originally removed.

Decontamination Procedures

Non-disposable equipment used during the soil excavation activities, including excavators, loaders and soil transport vehicles) must be properly decontaminated in accordance with the Contractor's decontamination procedures as appropriate prior to removal from the Site.

2.2 Dust Prevention

The Contractor shall prepare a Dust Prevention Plan prior to beginning work. During excavation activities, dust suppression methods must be utilized when visible windblown dusts are generated. The excessive generation of dust must be managed during soil excavation, stockpiling and loading. If excessive dust generation cannot be controlled or mitigated, the activity shall be discontinued until conditions improve.

The Contractor shall maintain a water truck(s) at the Site to control airborne dust during soil excavation, grading and other site development activities. Initiation of dust control measures will be at the direction of Rhode Island College, and/or the Contractor. The Contractor shall use the water truck when the Site soils become dry and there is potential for airborne dust. The Contractor shall have a sufficient number of operable water trucks to maintain a moist soil surface at all areas of the Site where exposed soils exist. Additionally, the Contractor shall install and maintain the facilities to fill and maintain the water truck(s).

2.3 Confirmatory Soil Sampling

The stockpile locations shall be accessible to the Environmental Professional upon completion of the stockpiling activities to allow for soil sample collection. Soil analytical testing must be performed by a Rhode Island Department of Health approved laboratory. The testing program for off-site soil reuse/disposal must be completed in compliance with the permit requirements of the planned receiving facility. Approval from the Environmental Professional, Rhode Island College Project Manager and the proposed receiving facility representative must be acquired prior to soils leaving the Site.

At a minimum analytical testing shall include the following:

Parameter	Analytical Method
Petroleum Hydrocarbons	EPA Method 8100M
Volatile Organic Compounds	EPA Method 8260
Semi-volatile Organic Compounds	EPA Method 8270
Polychlorinated Biphenyls	EPA Method 8081
Total RCRA 8 Metals	EPA Method 6010 & 7471A
Flashpoint	EPA Method 1010M
Corrosivity (pH)	EPA Method 9045C
Reactivity (Sulfide and Cyanide)	EPA Methods SW-846 7.3.3.2/9014 and SW-846 7.3.4.2/376.2

Soils Classifications

Based on the analytical results, soils may be categorized as the following:

- Non-regulated - results are below the RIDEM Method 1 Residential Direct Exposure Criteria (RDEC). Soils in this category do not require special handling.
- Regulated – results exceed the RDEC. These soils must be managed properly and taken to a permitted receiving facility.
- Hazardous Waste – results exceed United States Environmental Protection Agency (US EPA) Resource Conservation and Recovery Act (RCRA) hazardous waste criteria. These soils are subject to US EPA RCRA regulations and must be transported and disposed of at a RCRA-permitted treatment, storage, disposal (TSD) facility in accordance with applicable regulations.

2.4 Groundwater Assessment and Dewatering

The excavation activities are planned for a maximum of approximately 10 feet below grade and it is not anticipated that groundwater will be encountered planned Site activities. In the event that groundwater is encountered and dewatering is necessary, the contractor will be responsible for the dewatering plan. The contractor's dewatering plan shall comply with best management practices in accordance with the multi-sector general permit as applicable.

2.5 Off-Site Soil Disposal

This SMP proposes the reuse of the stockpiled soils on Site. Soils that cannot be reused on Site are subject to the following procedures:

1. Soil excavated from the Site may not be transported off-Site for re-use or disposal without prior approval from the Environmental Professional, Rhode Island College Project Manager and the proposed receiving facility representative.
2. Prior to off-site shipment, a pre-classification soil sample(s) shall be analyzed in accordance with the selected disposal facilities requirements. Laboratory testing must be completed by the Environmental Professional.
3. Soil analytical testing must be performed by a Rhode Island Department of Health approved laboratory.
4. Soil data may indicate that soil subject to removal from the Site meets the Residential Direct Exposure Criteria (RDEC) for all constituents and may have multiple options for re-use. Soil data will likely contain elevated arsenic concentrations that exceed the RDEC and will be subject to off-Site disposal.
5. No soil shall leave the Site for re-use or disposal without the approval of the Environmental Professional, the Rhode Island College Project Manager and the proposed receiving facility.
6. If soil does not meet the RDEC and cannot be reused on-Site, the soil subject to off-Site disposal must be properly managed and disposed of off-Site at an appropriately licensed facility.
7. If the soils are to be removed from the site, the soil shall be transported under properly executed shipping documentation to an approved disposal facility.
8. The Environmental Professional and Rhode Island College Project Manager shall oversee the preparation of the necessary shipping documents and disposal procedures.
9. Copies of the material shipping records for any soils shipped from the Site must be provided to the Environmental Professional and the Rhode Island College Project Manager. This information will be included in closure reporting and submitted to the RIDEM.

2.6 Implementation Schedule

Site activities are scheduled to begin in the summer of 2020 and be completed by fall of 2020. A detailed project timeline shall be established by the Contractor before the start of construction.

Section 3
Notification Requirements

During previous soil investigations completed at the College elevated arsenic concentrations have been identified in soil at concentrations above the RIDEM Residential Direct Exposure Criterion of 7 milligrams-per-kilogram (mg/kg). Although elevated arsenic has been attributed to natural background conditions, RIDEM was notified of the previous arsenic concentrations identified at the College. No analytical data from the proposed areas of excavation associated with this project have been collected to date. If elevated concentrations of arsenic or other contaminants are identified in soils at the Site above the RDEC, the concentrations may require additional RIDEM notification and management in accordance with RIDEM regulations.

If extenuating Site or soil conditions are discovered beyond those outlined in the SMP, the Environmental Professional and Rhode Island College Project Manager shall be notified immediately.

Section 4
Site Contacts

The following table provides the contact information for the various individuals that the contractor may need to contact during the completion of this project.

Company / Affiliation	Name	Address	Phone Number
Tighe & Bond	Dan Holmes	53 Southampton Road Westfield, MA 01085	(413) 562-1600
Rhode Island College	Kevin Fitta	600 Mount Pleasant Ave. Providence, RI 02908	(401) 456-9885
RIDEM, Office of Waste Management	Jeffrey Crawford	235 Promenade Street Providence, RI 02903	(401) 222-2797
RIDEM Emergency Response	The Office of Compliance and Inspection (normal business hours) The Environmental Police (after hours)	235 Promenade Street Providence, RI 02903	(401) 222-1360; or (401) 222-3070

J:\R\R0236\12 South Campus Sewer Improvements\Design\Specifications\Soil Management Plan\00800-B Soil Management Plan.pdf

ATTACHMENT C
CCTV INSPECTION REPORTS AND VIDEO LOGS

Existing Conditions of Sewer Mains

Campus Area	Street / Location	From MH	To MH	Pipe Material	Joint Spacing (ft)	Pipe Length (ft)	Pipe Dia. (in)	No. of Active Services[1]	Description of Deficiencies[1]
South	Rowley Road	106	107	VC	5	119	8	0	Broken at 36'; low priority fractures at 1' and 78'
South	Lot L	140	141	VC	3	153	10	0	1 break and 1 joint with multiple cracks
South	Lot L	141	142	VC	3	256	12	0	Severe break with deformation 17' long; 2 other breaks at 118' and 249'; numerous fractures and cracks throughout; heavy debris throughout
South	Lot L	142	143	VC	3	261	12	0	15 cracks and fractures, nothing too severe
South	Mary A. Webster Residence Hall Sidewalk	143	144	VC	3	274	12	0	Fracture at 213'; crack at 225' and broken with large rocks sticking into pipe at 228'

[1]Includes all services not currently capped. This number does not include services laterals that are directly connected to manhole structures.

ATTACHMENT D

GEOPHYSICAL SURVEY FOR UTILITIES

GEOPHYSICAL SURVEY
FOR UTILITIES
SOUTH CAMPUS
RHODE ISLAND COLLEGE
PROVIDENCE, RI

January 16th, 2019
File 2018072

Prepared for:
Tighe & Bond
53 South Hampton Road
Westfield, MA 01085

EDWOSB CERTIFICATION AWARD

U.S. Women's Chamber of Commerce

EDWOSB Federal

Certified Economically Disadvantaged Women-Owned Small Business

HAGER GEOSCIENCE, INC.
596 MAIN STREET | WOBURN, MA | TEL: 781.935.8111 | FAX: 781. 935.2717 | WWW.HAGERGEOSCIENCE.COM

1.0 INTRODUCTION

This report details the results of a geophysical survey conducted by Hager GeoScience, Inc. (HGI) for Tighe & Bond (T&B) at the South Campus of Rhode Island College in Providence, Rhode Island. The objective of the survey was to locate potential utilities and the extent of a sewer line.

2.0 DATA ACQUISITION

HGI performed the fieldwork on November 28th and 29th, 2018. Alyson Packhem of T&B was on site to delineate the survey areas. Geophysical data were collected in all accessible portions using ground penetrating radar (GPR) supplemented by precision utility locating (PUL). The survey area and locations of surface features were surveyed in using HGI's Sokkia RTK GNSS GRX2 GPS system.

Surface features, survey grid extents, and GPR traverse locations are shown on Plate 1, an AutoCAD 3D 2019 site overview map created from HGI's field notes, GPS, and the file "HGI_xr_base_survey_MOD.dwg" provided by T&B.

Discussions specific to the geophysical data collection are provided below, while Appendix A contains more general discussions of the methods and their limitations.

2.1 GPR Survey

HGI used a GSSI SIR-4000 digital acquisition system and a 350-MHz antenna to collect GPR data along orthogonal traverses spaced 5 feet apart. The data were displayed in real time on the system's color monitor for initial quality control while being simultaneously recorded on its hard drive. After completion of the GPR survey, the data were downloaded to a PC at the HGI office for processing and analysis using GSSI's RADAN® 7 software. The signal-to-noise ratio allowed for a signal penetration of 5 to 12 feet below grade; it was difficult to reliably detect targets below these depths.

Table 1 below shows the pertinent parameters used for the GPR data collection.

Table 1. GPR Survey Acquisition Parameters

Antenna Frequency (MHz)	Range (ns)	Survey Mode	Scan Rate (per sec)	Scan Rate (per ft)	Sample Rate (per scan)	Effective Signal Depth (ft)
350	140	Wheel	100	28	512	5-12

2.2 Precision Utility Locating

A Ditch Witch Subsite 950 R/T and 3M Dynatel 2250 precision utility locator (PUL) were used in conjunction with the GPR method to provide real-time utility locating. Where utilities were

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physically accessible (e.g., hydrant), the Subsite transmitter box was directly coupled with them in order to propagate a current with a unique frequency along the conductive conduit or utility. A receiver wand was then used to identify the location of the connected utility. The Dynatel was used to sweep the survey area for underground utilities that had no surface features on which to induce a current.

Utilities identified with PUL were marked in the field with spray paint using industry-standard colors.

2.3 GPS

HGI used its Sokkia RTK GNSS GRX2 GPS system to locate the survey grid and select surface features for reference. The Sokkia system provided a relative accuracy of less than 0.164 feet horizontally and 0.328 feet vertically for points in the Rhode Island state plane coordinate system.

3.0 DATA REDUCTION AND ANALYSIS

3.1 GPR Survey

The downloaded GPR data were archived, processed, and analyzed using GSSI's RADAN® 7. Prior to analysis, the raw GPR data required processing to reduce the detrimental effects of site-specific noise associated with interfering background frequency signals and reflections from surface and subsurface structures. The processed records were then used to construct 3D models of the surveyed areas. 3D models are useful for viewing the spatial qualities of the data and identifying subtle spatial features that may not be apparent in individual 2D records. The 3D model was sliced horizontally and vertically to observe patterns of GPR anomalies present in the radar data.

Each 2D record was also individually evaluated for possible anomalies. Preliminary interpretations based on analysis of the individual 2D records were plotted and evaluated in a spatial context using the 3D model. Conversely, spatial anomalies observed in the 3D model were re-examined on the individual records to ensure that all possible anomalies were evaluated. The interpreted individual GPR targets were then exported to AutoCAD, where linear trends and areal anomalies were determined. Due to the non-uniqueness of the reflected GPR signal, the exact identity of features causing anomalies cannot always be determined, and further investigation through excavation or drilling is recommended.

4.0 RESULTS

Plates 2 through 5 show the results of HGI's geophysical survey in the South Campus at Rhode Island College. The plate contents are as follows:

Plate 1: Survey Overview Plot
Plate 2: GPR Interpretation Plot Grid 1 Northern Extent

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Plate 3: GPR Interpretation Plot Grid 1 Western Extent
Plate 4: GPR Interpretation Plot Grid 1 Southern Extent
Plate 5: GPR Interpretation Plot Grid 2 South

Plates 2 thru 4 show the GPR and PUL interpretations for Grid 1, and Plate 5 the GPR and PUL interpretation for Grid 2. Grid 1 is on an unnamed road oriented approximately north-south in front of Mary A. Weber Hall. Grid 2 is south of Grid 1 on the other side of the fence in an abandoned roadway. No GPS could be collected on Grid 2 due to heavy foliage, so HGI-located features in Grid 2 should be used for utilities located in that grid.

As shown on Plates 2 through 4, HGI's geophysical survey detected a number of unknown potential utilities/linear anomalies in Grid 1. GPR-identified utilities were categorized based on their proximity to known utility surface features. The drain and sewer lines appear to be oriented north-south along the unnamed road in front of Mary A. Weber Hall. Steam/gas, water, communications and electric utilities were also mapped in portions of the grid. Multiple anomalous zones, areas with GPR signatures that stand out from the site background, were also detected. These can have causes ranging from debris and changes in fill to potential obstructions.

Grid 2, for which the results are shown on Plate 5, contains a sewer line that oriented north-south, as well as several other possible utilities, shown in magenta.

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APPENDIX A: THE GEOPHYSICAL METHODS

A.1 Ground Penetrating Radar

A.1.1 Description of the Method. The principle of ground penetrating radar (GPR) is the same as that used by police radar, except that GPR transmits electromagnetic energy into the ground. The energy is reflected back to the surface from interfaces between materials with contrasting electrical (dielectric and conductivity) and physical properties. The greater the contrast between two materials in the subsurface, the stronger the reflection observed on the GPR record. The depth of GPR signal penetration depends on the properties of the subsurface materials and the frequency of the antenna used to collect radar data. The lower the antenna frequency, the greater the signal penetration, but the lower the signal resolution.

GPR data are collected using a Geophysical Survey Systems (GSSI) SIR 20/2000/3000/4000 ground penetrating radar system. GPR data are digitally recorded on the internal hard drive or flash memory of the system. System controls allow the GPR operator to filter out noise, attributed to both coupling noise, caused by conductive soil conditions, spurious noise caused by local EMF fields and internal system noise. For shallow surveys, we use antennas with center frequencies ranging from 2000 to 350 megahertz (MHz). For deeper penetration, we use lower frequency antennas ranging from 300 to 15 MHz, depending on the anticipated depth of the target(s) and the degree of signal penetration. All of these antenna configurations can collect data in continuous mode or as discrete point measurements using signal-stacking techniques. Since there is a tradeoff between signal penetration and resolution, the highest frequency antenna that produces the best quality data is used. In some cases, data are collected with several antenna frequencies.

A.1.2 Data Analysis and Interpretation. The horizontal scale of the GPR record shows distance along the survey traverse. In the continuous data collection mode, the horizontal scale on each GPR record is determined by the antenna speed along the surface. When a survey wheel is used, the GPR system records data with a fixed number of traces per unit distance. The GPR record is automatically marked at specified distance intervals along the survey line. The vertical scale of the radar record is determined by the velocity of the transmitted signal and the recording time window or range. The recording time interval, or range, represents the maximum two-way travel time in which data are recorded. The conversion of two-way travel time to depth depends on the propagation velocity of the GPR signal, which is site specific. When little or no information is available about the makeup of subsurface materials, we estimate propagation velocities from handbook values and experience at similar sites or by CDP velocity surveys with a bi-static antenna.

After completion of data collection, the GPR data are transferred to a PC for review and processing using RADAN® 7 software. When appropriate, we prepare 3D models of GPR data, which can be sliced in the X, Y, and Z directions.

The size, shape, and amplitude of GPR reflections are used to interpret GPR data. Objects such as metallic UST's and utilities produce reflections with high amplitude and distinctive hyperbolic

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shapes. Clay, concrete pipes, boulders and other in-situ features may produce radar signatures of similar shape but lower amplitude. The boundaries between saturated and unsaturated materials such as sand and clay, bedrock and overburden generally also produce strong reflections.

A.1.3 Limitations of the Method. GPR signal penetration is site-specific. It is determined by the dielectric properties of local soil and fill materials. GPR signals propagate well in resistive materials such as sand and gravel; however, soils containing clay, ash- or cinder-laden fill or fill saturated with brackish or otherwise electrically conductive groundwater cause GPR signal attenuation and loss of target resolution. Concrete containing rebar or wire mesh also inhibits signal penetration.

The interpreted depths of objects detected using GPR are based on on-site calibration, handbook values, and/or estimated GPR signal propagation velocities from similar sites. GPR velocities and depth estimates may vary if the medium under investigation or soil water content is not uniform throughout the site.

Utilities are interpreted on the basis of reflections of similar size and depth that exhibit a linear trend; however, GPR cannot unambiguously determine that all such reflectors are related. Fiberglass USTs or utilities composed of plastic or clay may be difficult to detect if situated in soils with similar electromagnetic properties, or if situated in fill with other reflecting targets that generate “clutter” or signal scattering and thus obscure other deeper reflectors. Objects buried beneath reinforced concrete pads or slabs may also be difficult, but possible, to detect.

Changes in the speed at which the GPR antenna is moved along the surface causes slight variations in the horizontal scale of the recorded traverse. Distance interpolation may be performed to minimize the error in interpreted object positions. The variation in the horizontal scale of the GPR record may be controlled, to a certain extent, with a distance encoder or survey wheel. The GPR antenna produces a cone-shaped signal pattern that emanates approximately 45 degrees from horizontal front and back of the antenna. Therefore, buried objects may be detected before the antenna is located directly over them. GPR anomalies may appear larger than actual target dimensions.

GPR interpretation is more subjective than that for other geophysical methods. The interpretive method is based on the identification of reflection patterns that do not uniquely identify a subsurface target. Borings, test pits, site utility plans and other ground-truth are recommended to verify the GPR interpretations.

A.2 Precision Utility Locating (PUL)

A.2.1 Description of the Method. HGI uses a Schonstedt MAC-51B, Ditch Witch SUBSITE 950 R/T precision utility locators, and/or a 3M Dynatel 2250 pipe and cable locator for utility location. The locator is a two-part system consisting of a signal transmitter and receiver. In active mode using the transmitter, utilities are traced by inducing a variety of signals onto exposed portions of conduits and piping. Alternatively, in the absence of convenient exposures, signals can be induced onto the lines by placing the transmitter on the ground above the

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suspected utility location. The receiver can also be used without the transmitter as a magnetic locator or to detect signal emissions (e.g., 60 Hertz for electric lines) at specific frequencies.

A.2.2 Limitations of the Method. Mapping subsurface objects, pipes, and utilities using a locator depends on recognizing physical phenomena at the ground surface. These phenomena can be electromagnetic waves or magnetic fields that are interpreted as being caused by subsurface objects. These waves or fields, however, can be attenuated and/or distorted by factors including soil moisture, steel reinforced concrete, and proximity to other surface and subsurface utilities. It has been found that vertical depth resolution beyond 5 feet below grade is questionable.

A.3 RTK GNSS Global Positioning System (GPS)

A.3.1. Description of the Method. The RTK GPS system consists of a base (reference) receiver and a roving receiver. The base receiver remains stationary during a survey and is mounted on a tribrach and tripod. A rover receiver is used to record points remotely and can be mounted on a staff, vehicle, or other object. The base provides real-time corrections to the rover over a radio connection. The system can produce accuracy on a centimeter scale, but the level of accuracy depends on factors that include the geometry of the transmitting satellites and the receivers' view of the horizons. (e.g., the density of buildings and trees). The data can be collected as quickly as 5 Hz or 5 readings per second.

A.3.2 Data Collection and Processing. We perform our GPS surveys using a Sokkia RTK GNSS GRX2. The base station can be set up over a known or unknown point, with the position taken from satellite information. Once the system has achieved a fixed solution for the rover receiver, data points can be collected with survey-grade (centimeter-scale) precision. When GPS points are being collected at a site where the fixed solution is constantly lost and gained, points are checked multiple times for precision. All data points are saved to a Carlson Surveyor 2 field computer.

The GPS data are corrected automatically by the base receiver in the field prior to being recorded. If the base station is located on an unknown point that is later defined, the GPS data can be corrected in the office to fit the real world coordinates.

A.3.3 Limitations of the Method. The quality of the GPS signal is site-specific. The base and rover receiver need to have clear views of the horizon and good satellite geometry to achieve the highest level of accuracy and precision. Although a fixed solution can be achieved in wooded environments or sites with taller buildings, it may take more time to achieve the solutions, the fixed solution may be lost frequently when moving the rover, and in some cases the fixed solution may be wrong. Each of these situations requires longer to locate data points accurately and precisely. When the point is too close to a building, beneath a building overhang, under a tree, or obscured by some other object, a fixed solution may not be possible.

When the base station is set up over an unknown point, the survey data location can be at least several tens of meters from the real world location. The data points will have survey grade

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precision relative to the location of the base station and other data points, but will have a real world accuracy discrepancy.

HGI does not guarantee to produce a surveyor-quality map from its GPS data, as this is not its profession. If survey-level accuracy is critical for a project, we recommend hiring professional surveyors for that purpose.

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Legend

- Survey Extent
- GPR Traverse
- HGI-Located Water Valve
- HGI-Located Catch Basin
- HGI-Located Electric Manhole
- HGI-Located Comm Manhole
- HGI-Located Sewer Manhole
- HGI-Located Unknown Manhole
- HGI-Located Gas Manhole
- HGI-Located Hydrant
- HGI-Located Light Pole

NOTES:
1.) The base map was created from HGI field notes, grid marks, GPS and the file "HGI_xr_base_survey_MOD.dwg" provided by Tighe & Bond.
2.) HGI's contributions to the base map are listed in the legend. All other features are from the file listed above and have been grayed.

Plate 1

January 16th, 2019 | Proj. 2018072

Site Overview Plot
Rhode Island College
Providence, RI

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

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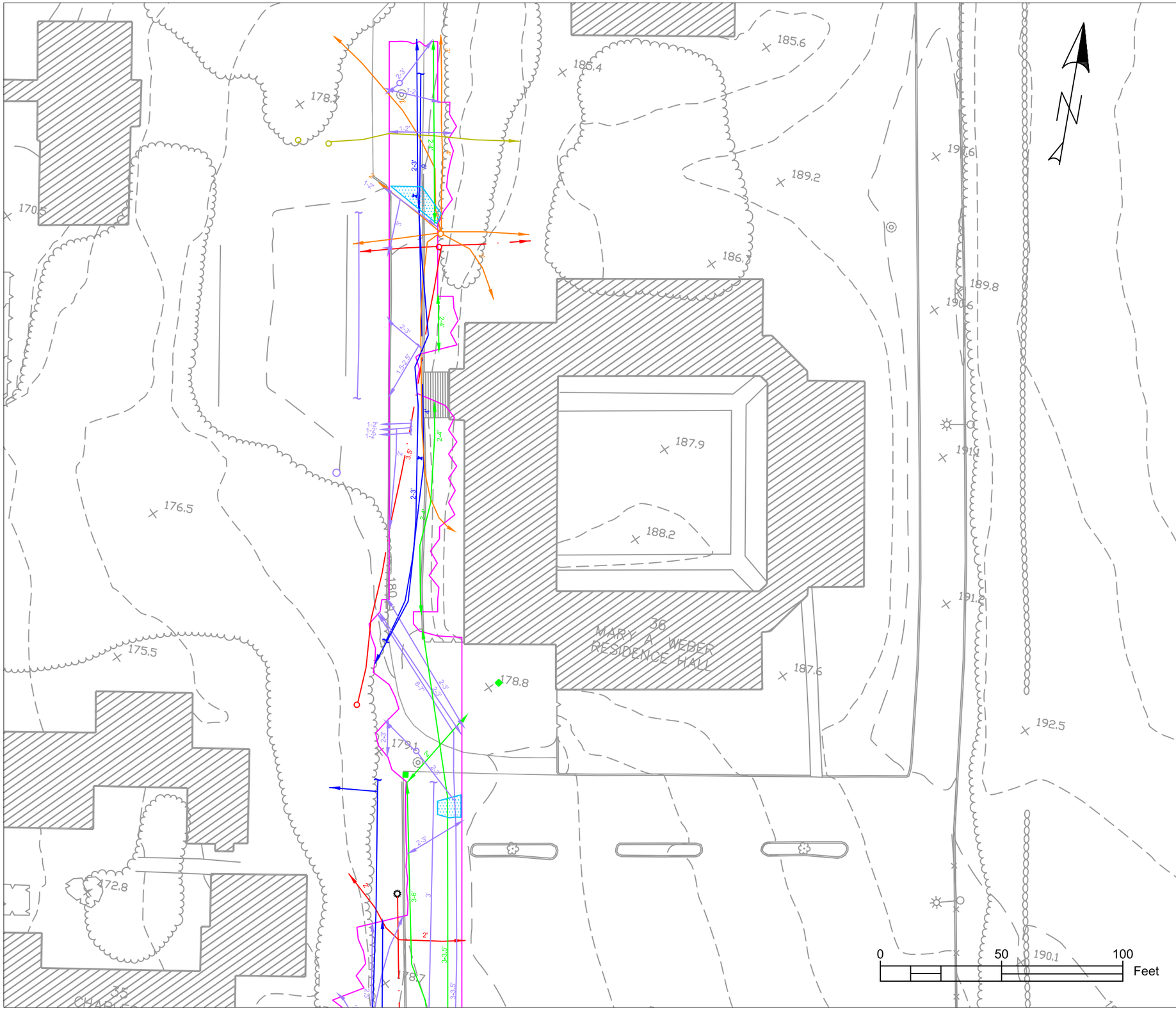

Legend

- Survey Extent
- GPR-Unknown
- GPR-Water
- GPR-Sewer / Drain
- GPR-Anomalous Zone
- PUL-Water
- PUL-Electric
- PUL-Gas / Steam
- PUL-Communications
- HGI-Located Water Valve
- HGI-Located Catch Basin
- HGI-Located Electric Manhole
- HGI-Located Comm Manhole
- HGI-Located Sewer Manhole
- HGI-Located Unknown Manhole
- HGI-Located Gas Manhole
- HGI-Located Light Pole

NOTES:

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Plate 2

January 16th, 2019	Proj. 2018072

GPR Interpretation Plot
Grid 1 Northern Extent
Rhode Island College
Providence, RI

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

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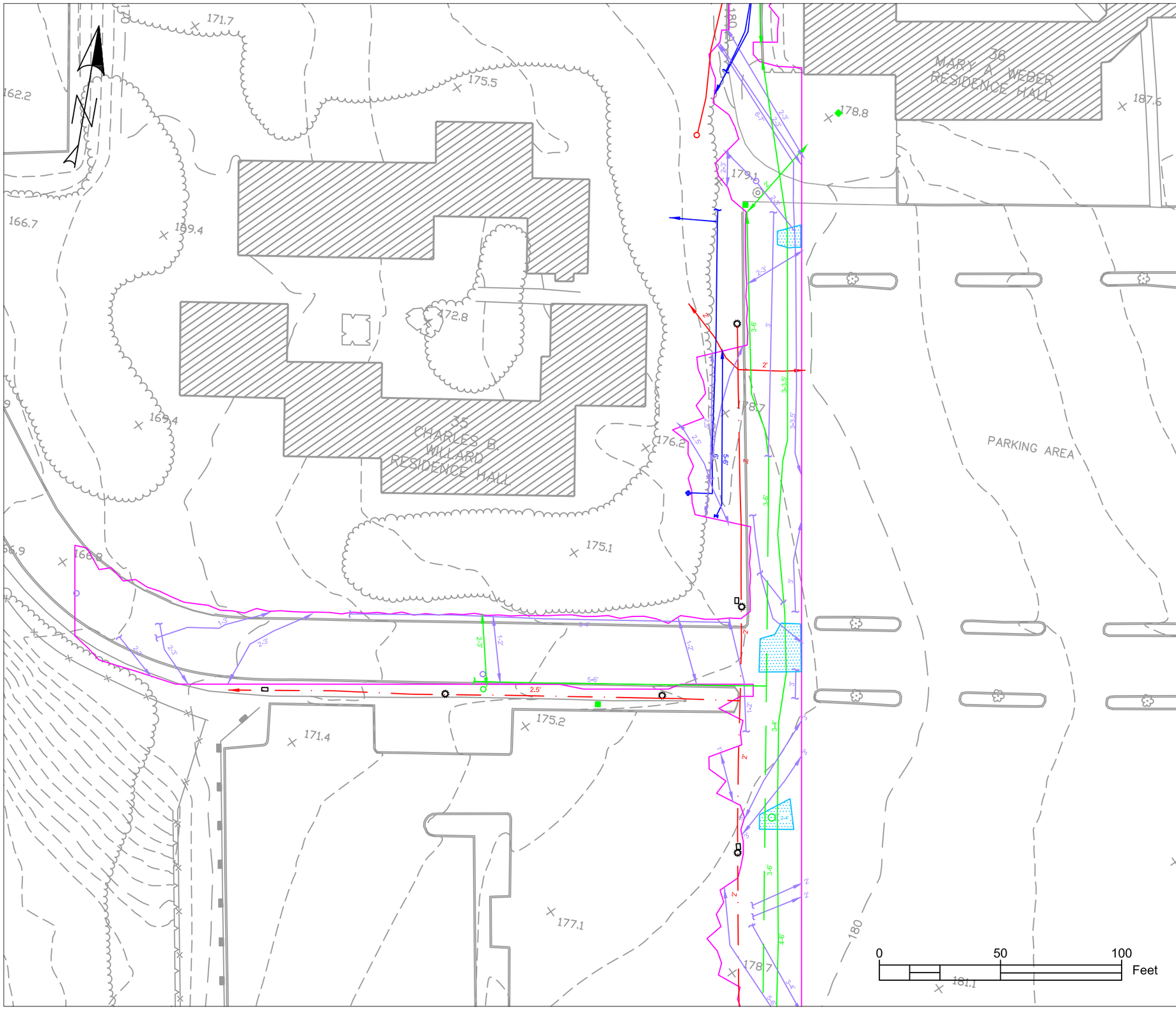

Legend

- Survey Extent
- GPR-Unknown
- GPR-Water
- GPR-Sewer / Drain
- GPR-Anomalous Zone
- PUL-Water
- PUL-Electric
- HGI-Located Water Valve
- HGI-Located Catch Basin
- HGI-Located Electric Manhole
- HGI-Located Sewer Manhole
- HGI-Located Unknown Manhole
- HGI-Located Light Pole

NOTES:

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Plate 3

January 16th, 2019 | Proj. 2018072

GPR Interpretation Plot
Grid 1 Western Extent
Rhode Island College
Providence, RI

Hager GeoScience, Inc.
596 Main Street, Woburn, MA 01801
(781) 935-8111 hgi@hagergeoscience.com

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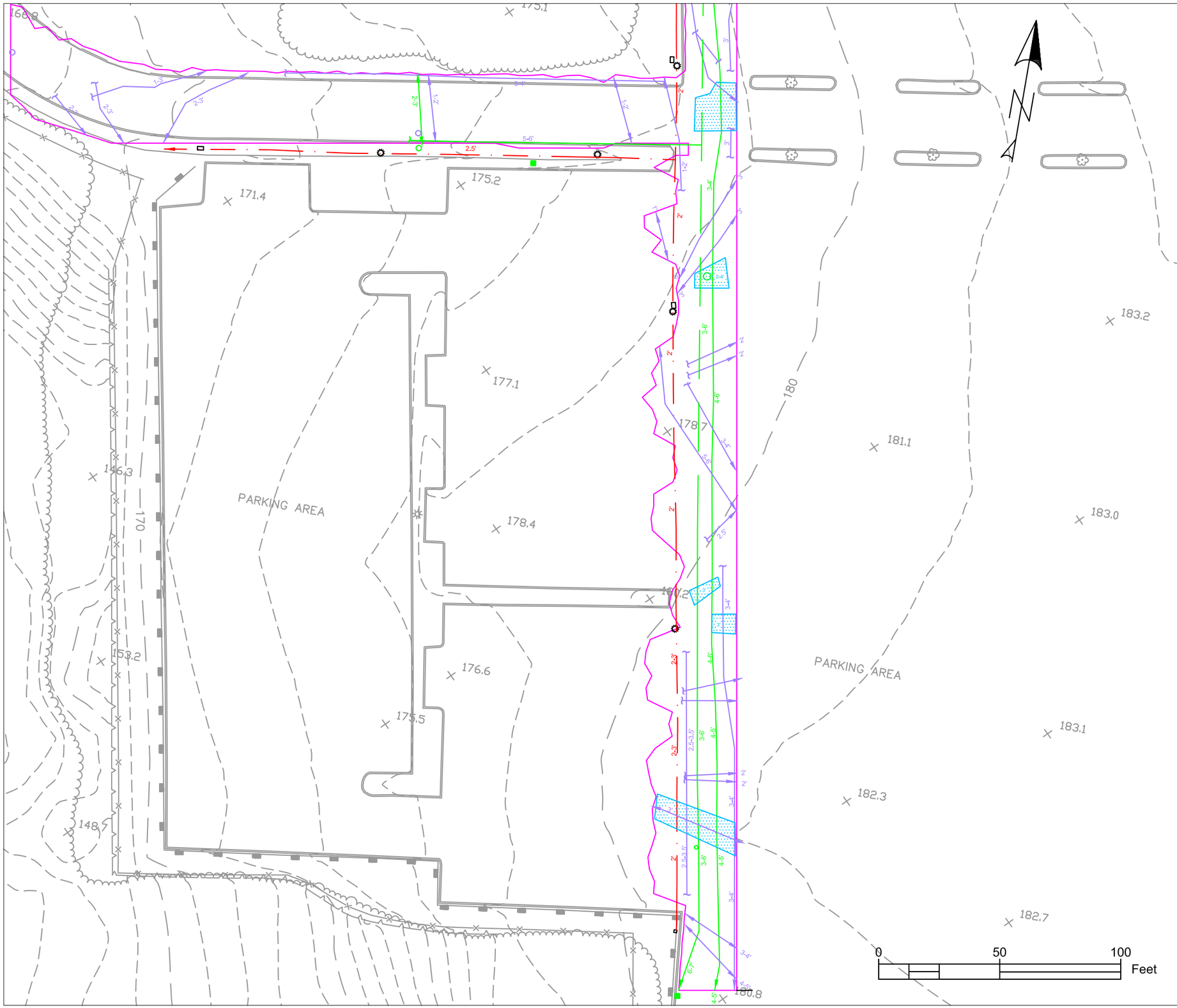

Legend

- Survey Extent
- GPR-Unknown
- GPR-Water
- GPR-Sewer / Drain
- GPR-Anomalous Zone
- PUL-Water
- PUL-Electric
- HGI-Located Water Valve
- HGI-Located Catch Basin
- HGI-Located Electric Manhole
- HGI-Located Sewer Manhole
- HGI-Located Unknown Manhole
- HGI-Located Light Pole

NOTES:

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Plate 4

January 16th, 2019 | Proj. 2018072

GPR Interpretation Plot
Grid 1 Southern Extent
Rhode Island College
Providence, RI

Hager GeoScience, Inc.
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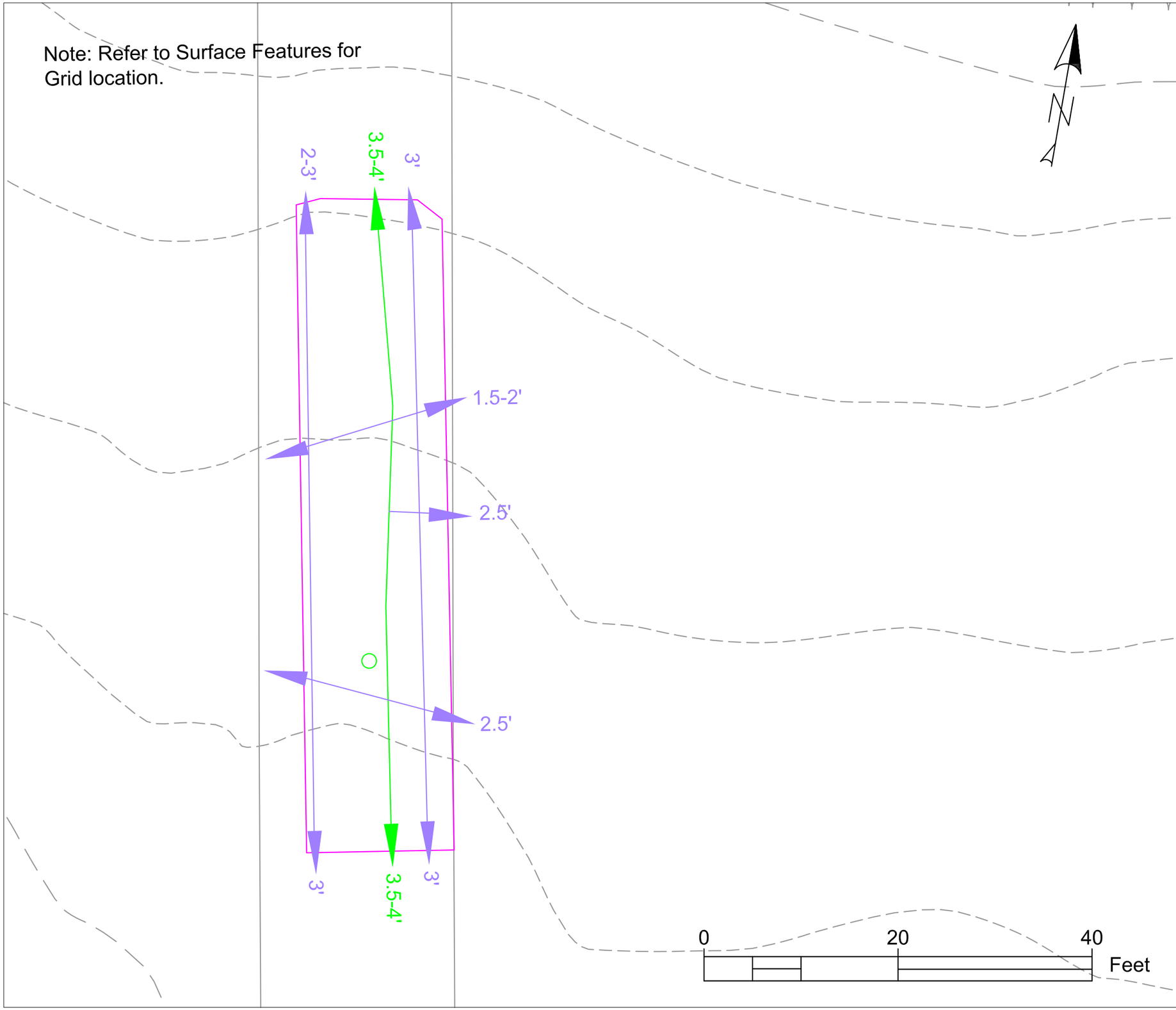

Legend

- Survey Extent
- GPR Unknown
- GPR Sewer / Drain
- HGI-Located Sewer Manhole

NOTES:
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Plate 5

January 16th, 2019 | Proj. 2018072

GPR Interpretation Plot
Grid 2 South
Rhode Island College
Providence, RI

Hager GeoScience, Inc.
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(781) 935-8111 hgi@hagergeoscience.com

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ATTACHMENT E
SEWER FLOW DATA

EST Associates, Inc.

Rhode Island College - Rowley Street

Daily Flow Rate Table

Date / Time (m / d / yyyy)	Average Flow Rate (gpm)	Minimum Flow Rate (gpm)	Time of Minimum Flow Rate (h:mm:ss AM / PM)	Maximum Flow Rate (gpm)	Time of Maximum Flow Rate (h:mm:ss AM / PM)	Total Flow (gpd)
11/16/2018	3.9	0.7	9:30:00 AM	8.0	11:30:00 AM	5,650.5
11/17/2018	2.6	1.7	10:00:00 PM	5.1	1:00:00 AM	3,764.6
11/18/2018	2.4	1.3	6:00:00 AM	3.8	9:30:00 PM	3,514.2
11/19/2018	2.5	1.1	3:15:00 AM	4.2	11:00:00 PM	3,596.2
11/20/2018	2.9	1.8	11:15:00 AM	4.5	11:15:00 PM	4,156.8
11/21/2018	2.1	1.4	5:45:00 AM	3.7	12:30:00 AM	3,087.8
11/22/2018	1.8	1.4	8:45:00 AM	2.7	1:30:00 PM	2,661.7
11/23/2018	1.6	1.3	8:15:00 PM	2.1	2:45:00 PM	2,315.0
11/24/2018	1.6	1.1	11:00:00 AM	2.6	7:15:00 PM	2,318.8
11/25/2018	2.3	1.2	2:15:00 AM	7.5	10:15:00 PM	3,286.3
11/26/2018	2.8	1.2	7:30:00 PM	10.6	10:00:00 PM	4,071.9
11/27/2018	3.7	1.5	4:30:00 AM	12.0	9:45:00 PM	5,304.1
11/28/2018	3.6	2.2	11:45:00 PM	8.0	12:45:00 AM	5,143.4
11/29/2018	3.3	2.3	3:00:00 AM	7.7	12:30:00 PM	4,733.1
11/30/2018	2.8	2.2	6:45:00 AM	3.7	2:00:00 AM	1,367.2
Flow Total (gal)	**Average Flow Rate Total (gpm)**	**Minimum Flow Rate (gpm)**	**Time of Minimum Flow Rate (m / d / yyyy h:mm)**	**Maximum Flow Rate (gpm)**	**Time of Maximum Flow Rate (m / d / yyyy h:mm)**	**Average Total Flow (gpd)**
54,971.6	2.7	0.7	11/16/2018 9:30	12.0	11/27/2018 21:45	3,664.8

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Work of the Contract is shown and described in Drawings and Project Manual entitled:
South Campus Sewer Improvements Project

Rhode Island College
Providence, RI
May 2019

Prepared by Tighe & Bond

2. The Work includes the following major items:

a. Spot repair on approximately 50 linear feet of sanitary sewer main in Sixth Avenue and Dorm Lane adjacent to Mary Weber Residence Hall

b. Approximately 190 linear feet of existing sanitary sewer rehabilitation utilizing cured-in-place lining, including cleaning and CCTV of existing system

c. Approximately 300 linear feet of new sanitary sewer main in Sixth Avenue

d. Two new precast concrete manholes

e. Asphalt pavement trench repair

f. Asphalt sidewalk repair

g. If applicable, disposal of soil containing arsenic or other potential contaminants

B. Related Requirements

1. Section 00800 - Supplementary Conditions

1.2 SUBMITTALS

A. Informational Submittals

1. Submit copies of permits or approvals required for the Work, prior to initiating the Work.

1.3 EXISTING SYSTEM DESCRIPTION

A. The existing sewer system consists of clay pipe at varying diameters and brick manhole structures.

1.4 PROJECT/SITE CONDITIONS

A. Permits

1. Secure all necessary permits for the project, including permits for disposal of construction wastes.

2. Comply with Department of Environmental Management, Office of Waste Management, Remediation Regulations.

3. Comply with the Rhode Island Pollutant Discharge Elimination System General Permit.

4. Obtain required time extensions to permits obtained by the Contractor, if construction authorized by permits has not been completed by the expiration date noted on these permits.

B. Existing Conditions

1. Use of Premises and Off-site Work

a. The Work shall occur on the Owner's property.

b. Land owned by the Owner is available for staging and is shown on the Drawings. Coordinate exact location with owner prior to mobilization.

c. Provide for the disposal of waste materials off-site in accordance with all applicable laws.

d. Adhere to the limits of Work and traffic control plans as indicated, to minimize obstruction to traffic and inconvenience to the Owner, students, faculty, administration, general public, and residents in the vicinity of the Work, and to protect people and property. Keep fire hydrants on or adjacent to the Work accessible to fire fighting equipment at all times.

e. Make temporary provisions for the use of sidewalks and maintain functioning gutters, stormwater systems, drainage ditches, and culverts.

f. Maintain public access to college buildings, businesses, and residences including driveways and parking lots at all times during the Work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Work Schedule
2. Construction Constraints
3. Vehicle Access
4. Available Work Area
5. Site Usage Plan

B. Related Requirements

1. Section 01310 - Coordination
2. Section 01325 - Scheduling of Construction

1.2 SUBMITTALS

A. Incorporate the requirements of this Section in the project schedule submitted under Section 01325.

1.3 WORK SCHEDULE

A. Conduct the Work during daylight hours on Monday through Friday, and within the time between 7:00 a.m. and 5:00 p.m. Work may be performed on weekends and holidays if coordinated with the College at least 3 business days in advance and agreed to by the College. Note that the Contractor shall include any off-hours work needed to meet the contract deadlines (long shifts, extra shifts, weekends, night work, etc.) in the base bid price. If night work is necessary, provide any temporary lighting needed to accomplish the work and make the work site safe. Excessive construction noise is prohibited between the hours of 8:00 p.m. and 7:00 a.m. per city of Providence ordinance. Refer to the following for additional details: http://providenceri.iqm2.com/Citizens/Detail_LegiFile.aspx?MeetingID=1834&ID=1243.

B. Work to commence summer 2020.

C. Lining work may be performed prior to May 9, 2020 while school is in session. If performed prior to May 9, 2020, work must take place at night between 11:00 p.m. and 7:00 a.m. Work is allowed during regular daylight hours (7:00 a.m. to 5:00 p.m.) during the week of March 11, 2020 (Spring Break). Lining work may be performed during regular daylight hours (7:00 a.m. to 5:00 p.m.) after May 9, 2020, but the schedule must be coordinated with the College. The decision to perform the work prior to May 9, 2020, during the week of March 9, 2020, or after May 11, 2020 is at the Contractor's discretion.

D. Work may cease upon written notice from the College 7 days in advance, to accommodate previously scheduled events throughout the Campus. Down time from any cancelled work day is not subject to any delay claims.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION CONSTRAINTS

A. The following are constraints for the Work. Incorporate these constraints into the schedule required to be submitted under Section 01325.

1. All components of the existing campus must remain in operation throughout construction unless otherwise specified herein or in Section 01310.

2. A detour may be used for Sixth Ave and all costs for traffic control devices, detour signage, police details, and the like, as approved by the College and the Engineer, shall be included in the base bid.

3.2 SITE USAGE PLAN

A. Locations of available staging areas are shown on the Drawings.

END OF SECTION

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SECTION 01290

APPLICATION AND CERTIFICATE FOR PAYMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Definition and description of measurement and payment to be used for the Work
2. Payment procedures
3. Payment requests for stored materials

B. Related Requirements

1. Section 01295 - Schedule of Values

1.2 GENERAL

A. The following paragraphs describe payment procedures for the work to be done under the respective items in the Bid Form.

B. Each lump sum and unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.

C. Except as provided for in Section 01295, no separate measurement or payment will be made for Work called for in Division 0 or Division 1 of the Contract Specifications, unless specifically covered under the Bid items listed below. All costs associated with this Work will be considered incidental to the Contract Bid price.

D. Division 2 through Division 3 Work will be measured and paid for at the Contractor's unit Bid price or lump sum Bid price as indicated on the Bid form. Those payable Work items, and related prices as Bid, will be the basis for all compensation to the Contractor for Work performed under this Contract. Work not specifically included as a Bid item, but which is required to properly and satisfactorily complete the Work is considered ancillary and incidental to the Bid item Work, and payment for such Work is considered to be included in the values as Bid for payable items. Compensation for all unit Bid price Work will be made based on the measured quantity of Work under the appropriate Bid items.

1.3 BASE BID PRICE

A. The base bid price shall constitute full compensation for all labor, equipment and materials necessary and required to complete the work specified and also all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent.

B. Item 1 – South Campus Sewer Improvements

1. Measurement

a. There will be no measurement of quantities for lump sum items. Periodic partial payments for this Work, included under the Agreement, shall be based on the percent completion of each work item listed in the Schedule of Values provided under Section 01295 estimated by the Contractor and approved by the Engineer.

2. Payment

a. The lump sum payment shall be full compensation for furnishing all labor, materials, tools, equipment, and services necessary for the construction of the South Campus Sewer Improvements Project, in its entirety as detailed in the Contract Documents.

1.4 UNIT PRICE ITEMS

A. The bidder submits predetermined unit prices as the basis of payment for allowances and any change orders approved in advance by the state.

B. Each unit price stated in the Bid form shall constitute full compensation for all labor, equipment and materials necessary and required to complete the Work specified under that particular item, and also all costs for doing related work as set forth in the Contract Documents or implied in carrying out their intent.

C. Payment of the unit price items will only be made for the actual quantity of Work performed in accordance with the Contract Documents.

D. Item No.1 – Rock Excavation

1. Measurement

a. Measurement for rock excavation will be on a cubic yard basis as measured in the field by the Engineer.

b. Rock with earth overburden shall be stripped of earth and exposed so that the rock can be profiled prior to removal. Excavation between the surface and the top of rock will be paid for under the lump sum item.

2. Payment

a. Payment of the bid price for rock excavation will be full compensation for all excavation, backfill, compaction, removal and proper off-site disposal of the material, and all labor, equipment and materials required for or incidental to the Work.

b. Boulders less than 1 cubic yard will be paid for as part of the lump sum item and will not be paid for as part of rock excavation.

c. Payment for rock excavation will be at the bid price regardless of the depth at which it is encountered.

E. Item No.2 – Removal of Regulated Material

1. Measurement

a. Measurement for the removal of regulated material will be on a cubic yard basis. The volume of the material removed will be the measure of the actual depth removed during excavation, but in no case will this exceed the depth approved by the Engineer. Width measurement limits for payment purposes shall be as shown on the "Trench Paylines" Detail on the Drawings.

b. Measurement will not be based on the bill of laden slips that have either the tonnage or volume of disposed soil.

2. Payment

a. Payment of the Bid price for the removal of regulated materials will be full compensation for testing, removal, hauling, proper disposal, disposal fees, including a bill of laden, and includes all labor, equipment, and materials required for or incidental to the Work.

F. Item No.3 – 8-Inch PVC Pipe

1. Measurement

a. Measurement for mainline PVC gravity pipe will be on a linear foot basis and will be along the ground surface above and parallel to the pipeline from and to the inside face of structures. No deductions will be made for the length of fittings.

b. ¾-inch crushed stone required for PVC gravity pipe bedding and backfill to 6-inches above the pipe will be included as part of the installation cost of mainline PVC pipe.

c. The installation of the 8-inch PVC Pipe shown on the contract documents will not be measured and is included in the base bid price.

2. Payment

a. Payment of the Bid price for mainline PVC gravity pipe will be full compensation for providing and testing of all pipes, ¾-inch crushed stone, excavation, sheeting, backfill, compaction and testing, warning tape, dewatering, bypass pumping, and all labor, equipment and materials required for or incidental to the Work.

G. Items No.4, 5, 6, – CIP Liner for Existing Sewer

1. Measurement

a. Measurement for lining the existing sewer pipe will be on a linear foot basis measured horizontally along the centerline of the sewer lined, from and to the inside face of the structures.

b. The installation of the CIP Liner shown on the contract documents will not be measured and is included in the base bid price.

2. Payment

a. Payment of the Bid price for each linear foot of sewer pipe lined will be full compensation for the installation and curing of the liner, pre- and post-rehabilitation television inspection, cleaning of the pipe, root removal, bypass pumping, reinstating all services, testing and all labor, equipment and materials required for or incidental to the Work.

H. Item No.7 – Manhole Lining

1. Measurement

a. Measurement for lining existing manholes shall be on a vertical foot basis made from the top of the manhole rim to the lowest pipe invert.

b. The installation of manhole liner shown on the contract documents will not be measured and is included in the base bid price.

2. Payment

a. Payment of the bid price for each vertical foot shall be full compensation for complete lining each manhole, including furnishing and mixing materials, bypass pumping, cement patching and plugging, testing and furnishing all labor, tools, equipment and materials required for or incidental to the work.

I. Item No.8 – Asphalt Crack Sealing

1. Measurement

a. Measurement for asphalt crack sealing repair will be on a linear foot basis as measured in the field by the Engineer. Crack sealer to comply with RIDOT specifications.

2. Payment

a. Payment of the Bid price for asphalt crack sealing will be full compensation for all labor, equipment and materials required for or incidental to the work, including preparation for crack sealing.

1.5 PAYMENT PROCEDURES

A. Informal submittal: Unless otherwise directed by the Engineer:

1. Make an informal submittal of request for payment by filling in, with erasable pencil, pertinent portions of EJCDC C-620, Contractor's Application for Payment, plus continuation sheet or sheets.

2. Make this preliminary submittal to the Engineer at the last regular job meeting of each month.

3. Revise the preliminary submittal as approved by the Engineer and incorporate the approved payments into the formal submittal.

B. Formal submittal: Unless otherwise directed by the Engineer:

1. Make formal submittal of request for payment by filling in the agreed data electronically on EJCDC C-620, Contractor's Application for Payment, plus continuation sheet or sheets.
2. Sign and notarize the Application for Payment.
3. Submit the original of the Application for Payment, plus six identical copies of the continuation sheet or sheets, to the Engineer.
4. The Engineer will compare the formal submittal with the approved informal submittal and, if acceptable, will sign the Contractor's Application for Payment, and present the Application to the Owner.
5. Provide a signed and notarized Certificate for Stored Materials and proof of storage in a dry, watertight, heated and insured warehouse facility.

1.6 PAYMENT REQUESTS FOR STORED MATERIALS

A. Requests for payment for stored materials shall be made in accordance with Section 00700 and shall be accompanied by the attached "Certificate for Stored Materials" form. Payment for stored materials shall not exceed the value actually paid by the Contractor for the stored materials as evidenced by the accompanying bill of sale, invoice, or other documentation.

B. Partial payment requests for materials stored or so-called "engineering costs" by equipment manufacturers will not be allowed. All such costs shall be distributed proportionately among the various items of equipment/hardware to be furnished.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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CERTIFICATE FOR STORED MATERIALS

_____
Tighe & Bond Project No.

We, _____, request payment for materials and/or equipment not incorporated in the work included under our firm's contract with _____ as listed below.

We hereby certify under penalty of perjury, that the materials not incorporated in the work have been delivered and are securely stored at the site or at _____ and that we have title to said materials free and clear of all Liens, as evidenced by the attached bill of sale, invoice, or other documentation.

We also certify that an inventory of said materials and/or equipment has been compiled for the purposes of this monthly partial payment request. This list of materials and/or equipment, including unit prices for said material not incorporated in the work for which payment is hereby requested, consisting of _____ pages and dated _____, is signed and attached hereto.

We acknowledge that payments made based on this request for materials and/or equipment not incorporated in the work does not relieve the contractor of its responsibility for furnishing all materials and equipment required for the satisfactory completion of the project pursuant to the contractual requirements.

We further certify that we can and will adequately protect said materials and/or equipment until they are incorporated in the work; that they meet the requirements of the specifications, and that they will be needed for incorporation in the work in the near future.

IN WITNESS WHEREOF, we, the said _____ hereunto set our hand and seal this _____ day of _____, 20__.

_____
Contractor's Firm Name

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

By_____

Title _____

_____
Notary Public

SCHEDULE OF STORED MATERIALS

Job No. _____
Contract No. _____
Contractor: _____
Location: _____
_____

Date _____
Pay Estimate _____

Item	Description	Supplier/Manufacturer	Quantity Stored and not Incorporated	Unit $	Certified Value

Signature: _____
Contractor's Principal

Total Amount Due for Stored Materials _____

Title: _____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE..... $ _____

2. Net change by Change Orders..... $ _____

3. Current Contract Price (Line 1 ± 2)..... $ _____

4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)..... $ _____

5. RETAINAGE:

a. X _____ **Work Completed**..... $ _____

b. X _____ **Stored Material**..... $ _____

c. Total Retainage (Line 5a + Line 5b)..... $ _____

6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)..... $ _____

7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)..... $ _____

8. AMOUNT DUE THIS APPLICATION..... $ _____

9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)..... $ _____

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

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Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	Totals							

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SECTION 01295

SCHEDULE OF VALUES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Schedule of Values

1.2 SUBMITTALS

A. Action Submittals

1. Submit 3 copies of the Schedule of Values for approval within 10 days after the Effective Date of the Agreement.

1.3 SCHEDULE OF VALUES

A. Schedule of Values shall be a detailed breakdown of the lump sum Work items showing values allocated to the various elements of the Work.

B. The format of the Schedule of Values shall be a breakdown by Specification Section and content and shall be submitted on EJCDC C-620, Contractor's Application for Payment. The Engineer may require additional detailed documentation to support the values in the form of executed purchase orders, subcontracts, or other agreements.

C. The Engineer will determine the level of breakdown and detail required. The breakdown shall include materials, installation, and start-up for equipment and controls where applicable. The final document will be the basis of payment requests for the duration of the Contract. No progress payment will be made until the Schedule of Values is approved by the Engineer.

D. An unbalanced Schedule of Values providing overpayment on items of work performed first will not be accepted.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01310

COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Project Management
2. Coordination
3. Project Meetings

B. Related Requirements

1. Section 01140 - Work Restrictions
2. Section 01325 - Scheduling of Construction

1.2 SUBMITTALS

A. Incorporate the requirements of this Section, as well as Work which may impact the existing system operation, or the operations of any adjacent utility, in the project schedule submitted under Section 01325.

B. Informational Submittals

1. Submit to the affected utility company, the Owner, and the Engineer, in writing, all requests for temporary shutdowns of facilities or interruption of operations. No shutdowns of the system or interruptions to existing operations will be permitted except as outlined in this Section. Submit requests at least 2 weeks prior to the beginning of the Work requiring shutdown or interruption. No shutdown shall occur without the approval of the utility company or the Owner.
2. At the pre-construction conference, supply to the Owner the cell phone number of a responsible person who may be contacted during off-hours for emergencies 24 hours a day, seven days a week.
3. Prepare a contact list of phone numbers, including cell phone numbers, and emails for all Project personnel and submit to the Engineer at the pre-construction conference. Include Contractor, Owner, Engineer, and College personnel including police, fire, and ambulance.

1.3 PROJECT MANAGEMENT

A. Retain a full-time Superintendent, satisfactory to the Owner and Engineer. The Superintendent shall not be changed except with the consent of the Owner and Engineer. The Superintendent shall be in full charge of the Work.

B. Complete the Work in a continuous uninterrupted operation. Use sufficient personnel and adequate equipment to complete the Work within the Contract Time.

1.4 COORDINATION

A. Do not interfere with the operation of the existing facilities.

B. Perform all coordination necessary to complete connections to the existing pipeline.

C. Coordinate with appropriate utility companies, as well as with the Owner, where the Work crosses or is adjacent to existing utilities.

1.5 PROJECT MEETINGS

A. Pre-Construction Conference

1. The Contractor shall be prepared to discuss the following subjects at the Pre-Construction Conference. Documentation for these items is required to be submitted within the time frames included in individual specification sections.

a. Project scheduling

b. Sequencing of critical path Work items

c. Shop Drawing procedures

d. Project changes and clarification procedures

e. Use of sites, access to Work areas, office and storage areas, security and temporary facilities

f. Contractor safety plan and representative

g. Progress payments and procedures

h. Required documentation

i. Project personnel contact list

B. Progress Meetings

1. Progress meetings will be held every 2 weeks and at other times as requested by the RIC Project Manager or as required by the Progress of the Work.

2. The Contractor's Superintendent shall attend all progress meetings.

3. At a minimum, progress meetings will review Work progress, schedule, Shop Drawing submission schedule, Applications for Payment, and other matters needing discussion and resolution.

4. Review the schedule with all parties to be affected by upcoming work.

5. Review the monthly construction report required under Section 01325.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Notify DIGSAFE at 1-888-344-7233 at least 72 hours prior to any digging, trenching, rock removal, demolition, borings, backfill, grading, landscaping, or any other earth moving operations.

B. Utilize private utility marking company to mark underground utilities prior to construction.

3.2 COORDINATION WITH THE OWNER'S OPERATIONS

A. Notify the Owner and Engineer, in writing, a minimum of 1 week in advance of commencing Work on site.

B. Notify the Owner and Engineer, in writing, a minimum of 1 week before commencing any work which may affect the Owner's operations.

C. Perform all construction activities so as to avoid interference with operations of the facility and the work of others.

D. Coordinate the following operations with the Owner and the Engineer:

1. Operation of existing water main valves is not anticipated, however, if required, the opening and closing of existing valves will be performed by the Contractor but shall coordinate in advance with the RIC PM.

3.3 SEQUENCE OF CONSTRUCTION

A. Full construction schedule shall be provided and/or updated at least monthly. Pay requisitions will not be processed if an updated schedule is not provided.

3.4 SHUTDOWNS

A. Water service shutdowns as a result of pipeline construction activities are not permitted. Existing water mains owned by other utilities shall not be shut down unless authorized by the Owner. Notify water system customers regarding interruptions in service at least one week in advance. Coordinate with the Owner regarding scheduling such notifications. An existing main shall not be shut off for more than 6 hours.

END OF SECTION

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SECTION 01320

CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Photographs taken at specified intervals before, during and after construction.

1.2 SUBMITTALS

A. Informational Submittals

1. Submit electronic files of each photograph on a CD or USB flash drive.

PART 2 PRODUCTS

2.1 CONSTRUCTION PHOTOGRAPHS

A. Electronic files shall be in .jpg format.

PART 3 EXECUTION

3.1 PROGRESS PHOTOGRAPHY

A. Take construction photographs of active work areas at least every 2 weeks throughout the life of the Contract. The photographs shall be indicative of the work that is currently in progress. A minimum of 3 photographs shall be taken at each scheduled interval at each location where Work is in progress.

B. Take photographs of all utility abandonments.

C. Take photographs of all relocated utility connections.

D. Take photographs of all encountered underground utilities.

END OF SECTION

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SECTION 01321

COLOR AUDIO-VIDEO DOCUMENTATION SURVEY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Pre-construction color video recording of existing surface features.

1.2 DEFINITIONS

A. Zone of Influence is defined as any area within the immediate construction site which may be affected by equipment traffic, material stock piles, temporary staging areas including a minimum 200 feet along each side of adjoining streets to the construction site.

1.3 SUBMITTALS

A. Informational Submittals

1. Submit audio-video recording of preconstruction areas in the manner described in this section. Do not commence with construction activities until the recordings are submitted and approved.

2. Video documentation must occur within 4 weeks prior to the start of work on the subject street. If video documentation is more than 4 weeks prior to the start of work, these areas or streets must be videoed again prior to commencement of work in that area or street, and submitted to the Engineer.

1.4 QUALITY ASSURANCE

A. Personnel shall have at least 3 years experience actively engaged in color audio-video recording documentation and survey projects.

B. Documentation shall be performed during times of good visibility when there is no precipitation or snow cover. The Owner is not responsible for the removal of snow, leaves, debris or parked vehicles.

PART 2 PRODUCTS

2.1 FORMAT

A. Audio-video recording shall be in digital versatile/video disc (DVD) format. Video output from camera(s) used must be capable of producing NTSC-500 lines. Resolution in the Y channel, minimum 500 TV lines at center. Geometric Distortion shall not exceed 2% of picture height at any point in picture area.

2.2 RECORDING INFORMATION

A. The audio-video recording shall have the potential to convey 1 video track and 1 audio track. The video and audio tracks shall be recorded simultaneously as original live recordings and shall not be copies of other audio or video recordings. These recordings shall consist of a fixed elevation video record of the Zone of Influence of construction and the commentary of the videographer making the video record.

B. Video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording, the engineering stationing corresponding to the stationing on the Drawings or as directed

by the Engineer, the name of the street, easement or building being documented, the project name, direction of travel and the viewing side. The date and time shall appear in the upper left hand corner of the picture -- example:

Time 8:35:15

Date 9/20/79

C. The project name, name of street or easement, house or building number, engineering stationing, direction of travel and viewing side shall appear on the lower half of the screen -- example:

N. on First St. W/E

84+20

PART 3 EXECUTION

3.1 CONSTRUCTION AUDIO-VIDEO PROCEDURES

A. Perform audio-video documentation prior to the start of on-site construction activities to depict pre-construction conditions

B. Audio-video documentation shall commence at Station 0+00 and proceed to 100 feet beyond the end of the proposed pipeline route along the pipeline route viewing side to side along the direction of progress.

C. The average rate of speed in the general direction of the conveyance used during recording shall not exceed 50 feet per minute. Panning and zooming rates shall be controlled sufficiently that playback will produce optimum clarity of the objects being viewed.

D. Coverage shall include, but not be limited to, the entire roadway pipeline route, existing driveways, sidewalks, curbs, ditches, streets (including condition of paving for full width), intersections, landscaping, trees, culverts, catch basins, head walls, fences, mailboxes, retaining walls, visible utilities and all buildings and structures located within the Zone of Influence. Include existing faults, fractures, defects or other imperfections exhibited by the above-mentioned surface features.

E. Houses and buildings shall be identified visually by house or building number, when possible, in such manner that the progress of the taping and proposed construction areas may be located by reference to the houses and buildings.

F. Recordings produced under this Contract shall be turned over to the Engineer on an every other day basis so the Owner may review and monitor quality and progress. Any portion of the recording coverage deemed unacceptable by the Owner or Engineer shall be re-recorded at no additional cost to the Owner.

G. DVDs and cases shall be properly identified by recording number, location, project name, and become the property of the Owner. A record of the contents of each DVD shall be supplied by a run sheet identifying each segment in the tape by location, i.e., roll number, street or easement viewing, disc time, viewing side, starting point, traveling direction and ending point.

END OF SECTION

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SECTION 01325

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Progress Schedule

B. Related Requirements

1. Section 01140 - Work Restrictions
2. Section 01310 - Coordination

1.2 PROGRESS SCHEDULE

A. Network Analysis

1. Prepare an electronic network analysis using the critical path method under concepts and methods outlined in the current edition of AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry."

B. Graphically show the order and interdependence of activities, sequence of Work, how the start of a given activity depends on completion of preceding activities, and how completion of an activity may restrain the start of subsequent activities.

C. The Work shall be planned by the Contractor and his Project field superintendent in coordination with all Subcontractors and Suppliers whose Work is shown on the Progress Schedule.

D. Include, at a minimum, the following activities on the Progress Schedule:

1. Project mobilization
2. Submittal and approval of Shop Drawings
3. Procurement of equipment and critical materials
4. Installation of equipment and critical materials
5. Fabrication of special equipment and material, and its installation and testing
6. Progress of as-built drawings
7. Final inspecting and testing
8. Punchlist
9. Final cleanup
10. Other activities that may be critical to the Progress Schedule
11. All activities of the Owner and the Engineer which affect progress and/or affect required dates for completion of the Work

E. Take into consideration Shop Drawing submittal and approval time, the delivery times of equipment and materials, Subcontractors' Work, availability and abilities of

workmen, weather conditions, any restrictions in operations at the Work site, and all other items that may affect completion of the Work within the Contract Time.

F. The Progress Schedule shall reflect the requirements and constraints outlined in Section 01310, Coordination.

G. The Progress Schedule shall reflect Work restrictions outlined in Section 01140.

H. Show information in such detail that duration times of activities will range from one to 15 days. The selection and number of activities shall be subject to the approval of the Owner and Engineer.

I. The Progress Schedule should show preceding and following event numbers for each activity, description of each activity, and activity duration in calendar days.

J. Submit the Progress Schedule on maximum sheet size 30-inches high by the width required.

1.3 SUBMITTALS

A. Informational Submittals

1. Submit four prints of the preliminary Progress Schedule prepared in accordance with Section 00700 and the requirements of this section. Progress schedule must be submitted within 10 days after the Effective Date of the Agreement. Progress Schedule must be approved by the Owner and Engineer before the first progress payment will be made.

2. Revised analyses - Within 10 days after receipt of the review comments, submit four prints of the Progress Schedule revised in accordance with those comments.

3. Periodic reports - On the first progress meeting of each month, submit four prints of the updated Progress Schedule, as well as a report of construction activities in the prior month.

4. Before initiating the Work, submit an estimated monthly rate of Contractor payments for the project. If the payment schedule deviates from the original projection, submit a revised rate of expenditure schedule.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Action Submittals

2. Informational Submittals

1.2 DEFINITIONS

A. Action Submittals – includes written and graphic information submitted by Contractor that requires Engineer's approval.

B. Informational Submittals – includes information submitted by Contractor that does not require Engineer's approval. The Engineer will acknowledge receipt of such documents and provide comments when the submittals lack the detail required by the Contract Documents.

1.3 ACTION SUBMITTALS

A. Shop Drawings

1. Shop Drawings as defined in the General Conditions, and as specified in individual work sections include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shopwork manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as applicable to the Work.

2. Shop Drawings shall be of standardized sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard size drawings shall be

a. 24-inches by 36-inches

b. 22-inches by 34-inches

c. 11-inches by 17-inches

d. 8.5-inches by 11-inches

3. Submit Shop Drawings at the proper time so as to prevent delays in delivery of materials. Coordinate submittals for related or interdependent equipment.

4. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.

5. Check all Shop Drawings regarding measurements, size of members, materials, and details to determine if they conform to the Contract Documents. Shop Drawings found to be inaccurate, not in compliance, or otherwise in error shall be returned to the Subcontractors or Suppliers for correction before submission to the Engineer. Drawings that are current shall be marked with the date, name, and approval stamp of the Contractor.

6. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the Shop Drawings before being submitted for approval.

7. Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be drawn to scale and fully dimensioned.

8. No material or equipment shall be purchased or fabricated until the required Shop Drawings have been submitted and approved. Materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by the Shop Drawings.

9. Until the necessary approval has been given, do not proceed with any portion of the work, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

10. If submitted equipment requires modifications to the structures, piping, layout, or other details shown on the Drawings, details of the proposed modifications must also be submitted for approval. If such equipment and modifications are approved, perform all Work necessary to make such modifications at no additional cost to the Owner.

B. Product Data: Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing, and printed product warranties, as applicable to the Work.

C. Samples and color selection charts: Provide sample, when requested by individual Specification to establish conformance with the Specifications, and as necessary to define color, texture and pattern selections available.

D. Product Substitutions: In accordance with Section 01630.

E. Operation and Maintenance Manuals: In accordance with Section 01770.

F. Schedule of Values: In accordance with Section 01295.

1.4 INFORMATIONAL SUBMITTALS

A. Schedule of Submittals

1. Submit a preliminary Schedule of Submittals within 10 days of the Effective Date of the Agreement in accordance with Section 00700.

B. Schedule of Manufacturers and Suppliers

1. Submit a schedule of manufacturers and Suppliers within 7 days after Notice to Proceed including the names and addresses of the manufacturers and Suppliers of materials and equipment to be incorporated into the Work.

C. Schedule of Major Products

1. Submit a schedule of major products within 30 days after Notice to Proceed including a complete list of major products proposed for use, with specification section number, name of manufacturer, trade name, and model number of each product.

D. Product Listing and Manufacturers Qualifications

1. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards. Specifically identify the products, the anticipated schedule for delivery and storage, and the estimated value thereof for materials which the Contractor intends to request approval for off-site storage.

E. Certificates of Compliance

1. General:

a. Submit sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the Specification section conform with the Contract Documents.

b. Certificates shall be signed by an officer of the manufacturer's corporation and witnessed by a Notary Public.

2. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.

3. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

4. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency, or when specified in individual Specification sections.

5. Manufacturer's Certificate of Compliance: In accordance with individual Specification sections.

F. Application for Payment

1. Submit applications for payment in accordance with Section 01270, Measurement and Payment or Section 01290, Application and Certificate for Payment.

2. Submit schedule of stored materials when requesting payment for materials not yet installed.

G. Construction Photography and Videography: Provide preconstruction, progress, and post-construction photography and videography in accordance with Sections 01320 and 01321.

H. Contract Closeout Submittals: In accordance with Section 01770.

I. Contractor Design Data

1. Written and graphic information
2. List of assumptions
3. List of performance and design criteria
4. Summary of loads or load diagram
5. Calculations
6. List of applicable codes and regulations
7. Name and version of software
8. Information requested in individual Specification section

J. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.

K. Schedules - Submit construction progress schedules and schedule updates in accordance with Section 01325.

L. Statement of Qualifications: Submit evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty subcontractor, trade, specialist, consultant, installer, and other professionals.

M. Submittals Required by Laws, Regulations, and Governing Agencies

1. Submit promptly notifications, reports, certifications, payrolls, and other required information as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to Engineer for Owner's records, one copy of correspondence and transmittals (including enclosures and attachments) between Contractor and governing agency.

N. Test and Inspection Reports

1. Submit test and inspection reports as required by individual Specification sections.
2. Test and inspection reports shall contain signature of person responsible for test or report.
3. Reports shall include identification of product and Specification, project name, date and time of test, type of test, location, test results, corrective action required if report indicates test is not in compliance with Contract Documents, interpretation of test results, and other information as required in individual Specification sections.

O. Equipment Data: Submit information on equipment to be used in the performance of the Work as required by individual Specification sections.

P. Health & Safety Plans: When specified in individual Specification sections, prepare and submit a Health and Safety Plan modified or supplemented to include job-specific considerations.

Q. Submittals stamped by another Professional Engineer: When specified in individual Specification sections, prepare and submit calculations and/or drawings stamped by a Professional Engineer licensed in the State where the work is being performed.

R. Coordination Drawings: When specified in individual Specification sections, prepare and submit drawings to show how multiple system and interdisciplinary work will be coordinated. Examples are conduit routing diagrams, duct layouts, utility coordination drawings, sprinkler plans etc.

S. Work Plans: When specified in individual Specification sections, prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities.

T. Erosion Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of erosion control plans.

U. Traffic Control Plan: When specified in Contract Documents or required by local ordinances or regulations, prepare and submit copies of traffic control plans.

V. Shutdown Requests: Submit notification of any outages required (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless otherwise specified, provide outage requests a minimum of 7 days notice shall be provided.

W. Equipment Data: When specified in other Specification sections, information on equipment used by the Contractor to complete the Work, such as compaction equipment and closed-circuit television inspection equipment.

1.5 PROCEDURES

A. Coordination

1. Prepare and submit documentation in advance of fabrication and product manufacturer, so that the installation will not be delayed, other related work can be properly coordinated, and there is adequate time for review and resubmission, if required.

2. Provide no less than 30 days for review of submittals from the time received by the Engineer. For submittals of major equipment, that require more than 30 days to review, due to complexity and detail or those requiring review by multiple engineering disciplines, Engineer will notify Contractor of the circumstances and identify the anticipated date when the submittal will be returned.

3. Re-submittals will be subject to same review time.

4. No extension of time will be authorized due to failure to provide approvable submittals sufficiently in advance of the Work.

B. Review Shop Drawings, product data, and samples prior to submission and verify and determine:

1. Field measurements

2. Conformance with the Contract Documents. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.

3. Delete or strike out information that is not applicable to the Work.

C. Upload the electronic submittal files via Procore. Access to Procore will be provided by the Engineer. Files must be in .pdf format. The submittals will be returned in electronic .pdf format via Procore.

D. Numbering: Submissions shall be accompanied by a transmittal form referencing the project name and applicable Specification section. Submittals shall be numbered sequentially, with the applicable Specification section and a hyphen preceding the number. (*e.g.* Submittal number 11330-01) Resubmittals shall bear the same transmittal number with a sequential letter suffix commencing with "A". (*e.g.* Submittal number 11330-01A)

E. Provide a copy of the Submittal certification form (copy attached at the end of this section) which shall be attached to every copy of each Submittal as required in Section 00700. Apply the Contractor's stamp and initials or signature certifying that the submission has been thoroughly reviewed for completeness, compliance with the Contract Documents, coordination with adjacent construction and dimensional compatibility. Items submitted without the stamp or that are incomplete will be returned by the Engineer for rework and resubmission.

F. Provide a copy of the PE certification form (copy attached at the end of this section) which shall be attached to every copy of each Submittal stamped by another Professional Engineer. Items submitted without the completed certification form will be returned by the Engineer for resubmission.

G. Distribute copies of reviewed submittals along with the Engineer's transmittal to concerned parties with instructions to promptly report any inability to comply with the provisions or integrate the requirements with interfacing work.

H. Partial and Incomplete Submittals

1. Shop Drawings shall be submitted as a complete package by Specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials, and samples associated with each Specification section be included as a single submittal for the Engineer's review.

2. Engineer will return entire submittals if preliminary review deems it incomplete including:

a. Missing or incomplete Submittal certification form

b. Insufficient number of copies

c. Missing content

3. Partial submittals may be considered, at Engineer's option, only when necessary to expedite the Project.

4. Partial submittals shall be clearly identified as such on the transmittal to identify missing components.

I. Submittals not required by the Specification will be returned without review or action code.

J. Resubmission

1. Make corrections and modifications required by the Engineer and resubmit until approved.

2. Clearly identify changes made to submittals and indicate other changes that have been made other than those requested by the Engineer.

3. A maximum of two re-submissions of each shop drawing will be reviewed, checked and commented upon without charge to the Contractor (total of 3 submittals). Any additional submissions which are required by the Engineer to fulfill the stipulations of the Contract Documents will be charged to the Contractor as described in Section 00700.

K. Distribution

1. Distribute approved Shop Drawings and approved product data to the Project Site and elsewhere as required to communicate the information to Suppliers, Subcontractors, and field personnel.

1.6 ENGINEER'S REVIEW

A. The Engineer will review submittals for design, general methods of construction and detailing. The Engineer's review and approval of submittals shall not be construed as a complete check nor does it relieve the Contractor from responsibility for any departures or deviations from the requirements of the Contract Documents unless he has, in writing, called the Engineer's attention to such deviations at the time of submission. It will not extend to means, methods, technique, sequences, or procedures of construction (except where specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto.

B. The Engineer's review of the submittals shall not relieve the Contractor from the responsibility for proper fitting of the Work, or the responsibility of furnishing any work required by the Contract Documents which may not be indicated on the submittals. The Contractor shall be solely responsible for any quantities shown on the submittals.

C. If the Contractor considers any correction indicated on the submittals to constitute a change to the Contract Documents, the Contractor shall provide written notice to the Engineer at least 7 working days prior to release for manufacture.

D. When the submittals have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

E. Action submittals as defined in paragraph 1.2 will be reviewed and returned under one of the following codes:

1. Approved (Action Code 1) is assigned when there are no notations or comments on the submittal. Equipment or materials may be released for manufacture, provided that it complies with requirements of the Contract Documents.

2. Approved as Noted (Action Code 2) is assigned when there are notations or comments on the submittal, but the equipment or materials may still be released

for manufacture. All notations and comments must be incorporated in the final product. Resubmission is not necessary.

3. Revise and Resubmit (Action Code 3) is assigned when there are notations and comments requiring a resubmittal of the package. Work cannot proceed until the submittal is revised and resubmitted for review.

4. Not Approved (Action Code 4) is assigned when the submittal contains non-specified items or does not meet the requirements of the Contract Documents. It may also be assigned when there is a significant amount of missing material required for the Engineer to perform a complete review. The entire package must be resubmitted, revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.

F. Informational submittals as defined in paragraph 1.2 do not require approval by the Engineer. Such submittals will be returned under one of the following codes:

1. Receipt Acknowledged (Action Code 5) is assigned when the submittal is provided for documentation purposes and is acknowledged as received. Comments may be noted using this action code.

2. Revise and Resubmit (Action Code 6) is assigned when there are notations and comments requiring a resubmittal of the package.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SUBMITTAL CERTIFICATION FORM

PROJECT:_____
ENGINEER:_____ ENGINEER'S PROJECT NO.:_____
CONTRACTOR:_____ CONTRACTOR'S PROJECT NO.:_____

TRANSMITTAL NO.:_____ SUBMITTAL NO.:_____
SPECIFICATION NO.:_____ DRAWING NO:_____
DESCRIPTION:_____
MANUFACTURER:_____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the materials and/or equipment meets or exceeds the project specification requirements; that field measurements, dimensions, quantities, specified performance criteria, installation requirements, materials, catalog numbers and related materials have been verified; that all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the work has been determined and verified; that review includes all information related to the contractor's sole responsibility for means, methods, techniques, sequences, and procedures of construction and safety; and item has been coordinated with the overall project with:

☐ NO DEVIATIONS

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS:

_____
_____
_____
_____
_____
_____

SUBMITTED BY:_____ DATE:_____

GENERAL CONTRACTOR'S STAMP

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Quality assurance and control of the Work
2. Testing and inspection services
3. Product test reports
4. Manufacturer's field service

B. Related Requirements

1. Section 00800 – Supplemental Conditions
   a. Soil Management Plan
2. Section 01451 - Independent Testing Services
3. Testing requirements are described in various Sections of the Project Manual.

1.2 SUBMITTALS

A. Informational Submittals

1. Product test reports

1.3 QUALITY ASSURANCE

A. Monitor quality control over Suppliers, products, services, site conditions, and workmanship to produce Work of specified quality.

B. Comply fully with manufacturer's instructions. Should these instructions conflict with the Specifications, request clarification from the Owner before proceeding.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or requirements indicate higher standards or more precise workmanship.

1.4 TESTING SERVICES FURNISHED BY CONTRACTOR

A. Furnish all testing services required for materials and equipment proposed to be used in the Work, and quality control tests made in the field including:

1. Soil contamination testing indicated in the Soil Management Plan
2. Concrete materials and mix designs
3. Concrete in place
4. Modified proctor analyses for all borrow materials used on the Project
5. Modified proctor analysis of all subgrade material to be compacted during surface preparation and fine grading and compaction work

6. Sieve analyses for all borrow materials used on the Project

7. Soil structure and nutrient analyses for all loam and topsoil used on the Project

8. Compaction tests performed during trench backfilling and compaction, rough grading and site preparation, fine grading and compaction of roadway and sidewalk subgrades, and placement of roadway and sidewalk subbase materials

9. Design of asphalt mixtures

10. Asphalt in place

11. All other tests and engineering data as required in the Contract Documents.

B. An independent commercial testing laboratory, with current Rhode Island certification, shall perform all tests that require the services of a laboratory to determine compliance with the Contract Documents. Independent testing laboratory requirements are defined under Section 01451.

C. Secure and deliver the required number of samples to the laboratory as required by the Contract Documents.

D. Notify Owner and Engineer of time, location and material being sampled.

E. Schedule necessary testing laboratory services.

F. Furnish written reports of each test within 48 hours of completion of testing.

G. Notify the Engineer 48 hours prior to operations requiring inspections and laboratory testing services so the Engineer may witness testing. All failed test areas shall be re-worked and re-tested until passing results are obtained.

H. The Owner may hire its own independent testing laboratory for quality control tests made in the field or laboratory on materials and equipment during and after their incorporation in the Work. Cooperate with the Owner and independent testing laboratory and furnish samples of materials, design, mix, equipment, tools, storage, and assistance as requested.

I. Re-work all failed test areas until passing results are obtained. All re-tests required as a result of the Contractor's failure to perform the work in accordance with the Contract Documents shall be at the Contractor's expense.

1.5 PRODUCT TEST REPORTS

A. Submit 2 copies of product test reports where required by the Contract Documents.

1.6 SUPPLIERS' FIELD SERVICE

A. Provide qualified field service and installation personnel from material and equipment Suppliers to observe site conditions, installation techniques, quality of workmanship, equipment start-up, adjustment, and performance test where required by the Contract Documents. Observations are to be reported and incorporated in the Work procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01451

INDEPENDENT TESTING SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Independent testing services including geotechnical, concrete, grout and mortar, and welding inspection and testing
2. Testing laboratory services

B. Related Requirements

1. Section 00800 – Supplemental Conditions
   a. Soil Management Plan
2. Section 01450 - Quality Control
3. Section 02315 - Excavation, Backfill, Compaction and Dewatering
4. Section 02320 - Borrow Material
5. Section 02740 - Bituminous Concrete Pavement
6. Section 03300 - Cast-in-Place Concrete

1.2 REFERENCES

A. General

1. ASTM E329 – Standard Specifications for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction

B. Soil Testing

1. American Association of State Highway and Transportation Officials (AASHTO)

C. Concrete Testing

1. Cement and Concrete Reference Laboratory (CCRL)

1.3 SUBMITTALS

A. Informational Submittals

1. Qualifications, experience, and certifications of each proposed testing service
2. Certificate of calibration for testing equipment
3. Inspection and test reports

1.4 QUALITY ASSURANCE

A. General

1. Comply with the requirements of Section 01450, Quality Control, for testing and inspection requirements.

2. Testing services shall have the following general qualifications:

   a. Minimum five years as a firm with the type of testing specified.

   b. Ability to provide timely field testing services to minimize the impact of the testing requirements on construction progress.

   c. Certification to perform the specified services in the state in which the Work is to be performed.

3. Testing services proposed by the Contractor shall be subject to review by the Owner and Engineer. Any testing firm not acceptable to the Owner or Engineer will be rejected.

B. All testing agencies and laboratories must meet the requirements of ASTM E329.

C. Testing company shall have been in business for a minimum of the last 5 years providing applicable testing services.

D. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to National Bureau of Standards. Submit copy of certificate of calibration made by accredited calibration agency.

E. Testing shall be in accordance with applicable codes and regulations referenced in individual Specification Sections, and with selected standards of the American Society for Testing and Materials.

F. All costs for testing to be borne by the Contractor.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING SERVICES – GENERAL

A. Provide testing services meeting the following:

1. Provide qualified personnel promptly on notice.

2. Perform inspections required by the Contract Documents. Sample and test materials and observe methods of construction to determine compliance with applicable standards and with the requirements of the Contract Documents.

3. Take specimens and samples for testing, as required in individual Specification Sections. Provide all sampling equipment and deliver all specimens and Samples.

4. Promptly notify the Owner and the Engineer of irregularities or deficiencies in the Work which are observed during performance of services.

5. Promptly submit 2 copies of reports of inspections and tests to the Owner, and one copy to the Engineer including:

   a. Date of test and date results were issued

   b. Project location, title and test number

c. Testing laboratory or agency name and address

d. Name and signature of inspector

e. Date of inspection or sampling

f. Record of temperature and weather

g. Identification of product and Specification Section

h. Type of inspection or test

i. Results of tests and observations regarding compliance with Contract Documents

B. Perform additional tests and services as required to assure compliance with the Contract Documents.

C. Obtain Owner's approval of testing laboratory before performing testing services.

D. Coordinate with testing laboratory.

3.2 GEOTECHNICAL TESTING

A. Provide field testing and laboratory services for geotechnical soil testing required in Sections 02315 and 02320.

3.3 SOIL CONTAINING ARSENIC TESTING

A. Provide field testing and laboratory services for soil testing required in the Soil Management Plan included in Section 00800. Testing to comply with RIDEM requirements.

3.4 CONCRETE TESTING

A. Provide qualified independent field and laboratory testing service to perform the concrete testing.

B. The concrete testing laboratory shall have been inspected by the CCRL within the past five years.

C. The testing laboratory shall be licensed by the State of Rhode Island.

D. Field testing technicians shall have a Grade 1 concrete field technician license as issued by the American Concrete Institute (ACI).

3.5 COORDINATION WITH TESTING LABORATORY

A. Provide testing laboratory personnel access to site and manufacturer's operations.

B. Provide laboratory with representative samples of materials to be tested in required quantities.

C. Furnish labor and facilities:

1. To provide access to Work to be tested.

2. To facilitate inspections and tests.

3. For laboratory's exclusive use for storage and curing of test samples.

4. To provide forms for preparing concrete test beams and cylinders.

D. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Arrange with laboratory and pay for additional inspections, samples, and tests required for Contractor's convenience.

END OF SECTION

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SECTION 01510

TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary water service

1.2 QUALITY ASSURANCE

A. Maintain temporary utilities in proper and safe condition throughout the progress of the Work.

1.3 TEMPORARY WATER SERVICE

A. Water for Construction Purposes

1. The express approval of the Owner shall be obtained before water is used from the Rhode Island College water system. The Owner will allow the use of water on-site for construction purposes at no cost to the Contractor. However, waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use and the Contractor will need to provide its own water supply at no additional cost to the Owner.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01520

CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary sanitary and first-aid facilities

1.2 QUALITY ASSURANCE

A. Maintain temporary construction facilities in proper and safe condition throughout the progress of the Work.

1.3 TEMPORARY SANITARY AND FIRST AID FACILITIES

A. Provide suitably enclosed chemical or self-contained toilets for the use of the labor force employed on the Work. Locate toilets near the Work site and seclude from observation insofar as possible. Service toilets weekly, keep clean and supplied throughout the course of the Work.

B. Enforce proper use of sanitary facilities.

C. Use of the Owner's sanitary facilities by the Contractor is prohibited.

D. Provide a first aid station at the site.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01550

TRAFFIC REGULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Traffic requirements
2. Traffic officers

1.2 SUBMITTALS

A. Informational Submittal

1. For any planned road closure, submit a detailed road closure plan identifying access routes to all building on campus, campus traffic travel direction, signing and temporary parking areas as needed. Plan must include a sequence of construction that details how all areas of campus are to remain accessible during construction activities. Plan must be submitted two weeks prior to road closure for approval by the Owner. No work is to take place prior to approval.

1.3 PAYMENT PROCEDURES

1. Refer to Section 01290, Application and Certificate for Payment for procedures relating to payment for the Work.
2. Owner will pay for traffic officers if they are required only after invoices have been submitted. Contractor is responsible for scheduling the traffic officers, with Owner's approval, and for providing all documentation. No markup will be allowed on traffic officer invoices.
3. Owner will deduct from monies due Contractor for the following abnormal and unreasonable expenses:
   a. Contractor caused delays in the prosecution of work that result in hiring traffic officers for more hours than would have been required during normal prosecution of work.
   b. Reconstruction and/or reinstallation of any portions of the work, as a result of improper initial installation or defective material, for which traffic officers are required.
   c. Traffic officers required at a site where Contractor is not working or outside of Contractor's standard work day as a result of obstructions to traffic that remain in the traveled way.
   d. All other incidents resulting from Contractor's operations requiring traffic officers that would not normally be encountered during the progress of a well-organized project employing proper construction methods.
   e. When traffic officers are requested for the convenience of Contractor and are not otherwise considered necessary to the work.

1.4 REFERENCES

A. Manual of Uniform Traffic Control Devices, U.S. Department of Transportation

1.5 TRAFFIC REQUIREMENTS

A. Sixth Avenue (south of College Road) may be closed if necessary and a detour is provided. All costs for traffic control devices, detour signage, and the like, as approved by the College and Engineer, shall be borne by the Contractor.

B. Arrange construction activity so that all streets shall remain open to at least one-way traffic during periods of actual work, and to unimpeded, two-way traffic during all other periods.

C. Provide a traffic control plan to Engineer for approval showing traffic control signs, barrels, cones, traffic officers, including detour signs, meeting the approval of Engineer, Owner and Campus Police Departments in accordance with the Manual of Uniform Traffic Control Devices.

D. Determine the location of each day's work and implement the approved traffic control plan. If the plan requires the use of traffic officers, notify the Police Department.

E. Contractor shall have no claim of delay if he does not notify the Police Department of his scheduled location in time to arrange for traffic officers.

F. Hand deliver written notice to individual buildings affected by driveway and side road closings or detours a minimum 48 hours in advance. A recommended parking area outside the work limits shall be included in the notice.

1.6 TRAFFIC OFFICERS

A. Uniformed traffic officers shall be required at locations deemed necessary by Owner, working in conjunction with the campus and local Police and Fire Departments, for the protection of the public.

B. The Police Chief or his representative, in consultation with Owner's representative, will determine the number of officers required for the work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01570

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Dust control
2. Mulch
3. Sediment trapping devices

B. Related Requirements

1. Section 02920 – Lawns and Grasses

1.2 SUBMITTALS

A. Informational Submittals

1. Materials proposed for use in dust control
2. Mulch and sediment trapping devices

PART 2 PRODUCTS

2.1 SOIL EROSION AND SEDIMENT CONTROLS

A. Refer to Rhode Island Soil Erosion and Sediment Control Handbook (http://dem.ri.gov/soilerosion2014final.pdf).

2.2 SEDIMENT TRAPPING DEVICES

A. Sediment trapping devices shall be Siltsack®, Dandy Bag II®, or equal.

2.3 MULCH

A. Hay mulch shall consist of mowed cured grass, clover, alfalfa, timothy, oats, or wheat. No salt hay shall be used.

PART 3 EXECUTION

3.1 DUST CONTROL

A. Control dust during the Work. Use a mechanical street sweeper daily.

B. Prevent dust from becoming a nuisance or hazard. During construction, excavated material and open or stripped areas are to be policed and controlled to prevent spreading of the material.

C. Control dust during the work on-site using calcium chloride and/or water.

D. During the Work on-site, all paved road and driveway surfaces shall be scraped and broomed free of excavated materials on a daily basis. The surfaces shall be hosed down or otherwise treated to eliminate active or potential dust conditions and the natural road or wearing surface shall be exposed.

E. Ensure that the existing equipment, facilities, and occupied space adjacent to or nearby areas of the work do not come in contact with dust or debris as a result of concrete demolition, excavation or surface preparation for coatings.

F. Submit for approval materials proposed for use for dust control, prior to start of the Work.

3.2 DRAINAGE AND EROSION CONTROL

A. Control erosion and siltation during the construction through mulching, haybales, siltation fencing, diversion and control of storm water run-off, ponding areas and similar methods.

B. Provide and maintain sediment trapping systems.

C. Discharge surface runoff from any disturbances to the site into silt containment basins. Utilize siltation prevention measures including haybale and geotextile fences before discharge to drainage systems.

D. Install sediment trapping devices in catch basins located in existing paved areas with sediment trapping devices to minimize the transport of sediment through the subsurface stormwater collection system.

3.3 SOIL EROSION AND SEDIMENT CONTROLS

A. Refer to Rhode Island Soil Erosion and Sediment Control Handbook (http://dem.ri.gov/soilerosion2014final.pdf).

3.4 RESTORATION

A. Provide erosion control, seed and mulch and netting for surface restoration of areas disturbed during construction activities.

B. Provide temporary stabilization of disturbed areas that remain inactive greater than 14 consecutive days to minimize erosion. Methods to minimize erosion may include but are not limited to:

1. Spreading straw and/or providing temporary planting stabilization.

2. Installing jute netting.

3. Preparing surfaces to increase the runoff flow path, reduce the runoff flow velocity, or create small storage pockets to retain surface flows. Methods of accomplishing this include using mechanical devices such as track equipment or sheep's foot rollers.

C. Restore the ground surface in brush and/or woodland areas by machine spreading of existing stripped surface soils (loam and humus), liming, fertilizing, seeding and mulching, as well as installing jute netting where required by steep slopes.

D. Salvage existing loam and topsoil and stockpile this material for re-spreading where originally removed. On backfilling, grading shall be returned to preconstruction contours and the stockpile of loam shall be spread over areas disturbed during construction activities.

E. Place mulch on seeded areas. Use jute netting on areas having a slope greater than 3 horizontal to 1 vertical, to anchor the mulch until a satisfactory growth is obtained. If seeding is not possible because of the time of the year, apply mulch and netting to stabilize the area until such time as seed can be sown.

F. Provide grading, refertilizing, reseeding, remulching and/or netting to maintain the restored areas until the Work is accepted by the Owner.

3.5 CLEANING

A. Remove any sediment that builds up around the catchbasins.

B. Clean sediment trapping devices periodically during the Work. Devices shall be cleaned on a weekly basis, or more frequently if the devices become clogged.

C. Clean catchbasins that collect sediment as a result of the Work.

END OF SECTION

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SECTION 01580

TEMPORARY BYPASS PUMPING SYSTEM - WASTEWATER

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary bypass pumping

B. Related Sections

1. Section 02515 – Polyvinyl Chloride (PVC) Pipe and Fittings
2. Section 02952 – Manhole Lining
3. Section 029583 – Pipe Lining

1.2 SUBMITTALS

A. Informational Submittals

1. Submit a specific, detailed description of the proposed pumping system.
2. Submit detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in the Contract Documents. No construction shall begin until all provisions and requirements have been approved.
3. The drawings shall include but not be limited to details of the following:
   a. Staging areas for pumps
   b. Sewer plugging method and types of plugs
   c. Number, size, material, location and method of installation of suction piping
   d. Number, size, material, method of installation and location of installation of discharge piping
   e. Bypass pump sizes, capacity, number of each, and size to be on site
   f. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted)
   g. System curve with suction lift performance
   h. Standby power generator size, location
   i. Downstream discharge plan

j. Method of protecting discharge manholes or structures from erosion and damage

k. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill

l. Method of noise control for each pump and/or generator

m. Any temporary pipe supports and anchoring required

n. Design plans and computation for access to bypass pumping locations indicated on the drawings

o. Calculations for selection of bypass pumping pipe size

p. Schedule for installation of and maintenance of bypass pumping lines

q. A plan showing the location of bypass pumping equipment, and suction and discharge piping

1.3 QUALITY ASSURANCE

A. Employ the services of a company that specializes in the design and operation of temporary bypass pumping systems. Demonstrate that the bypass pumping equipment is automated and is capable of functioning without the assistance of an operator.

B. The bypass pumping company shall have a minimum experience of 10 years designing and supplying wastewater bypass systems.

C. Demonstrate sufficient inventory to perform normal rentals, including this project, and maintain at least 100% reserve equipment for this project for immediate delivery.

D. Demonstrate sufficient service and repair parts in stock to fulfill any service or repair of all rental equipment within 3 hours of any service call.

E. Demonstrate sufficient service staff and trucks to mobilize to repair or service equipment within 1 hour of a service call, 24 hours per day, 7 days per week.

F. Provide a list of cell phone and pager numbers to call for twenty-four hour service.

G. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

H. Obtain required approvals for placement of the temporary pumping equipment and piping system adjacent to the existing sewer main.

I. No construction shall begin until the related project submittals are approved and all provisions of the work have been coordinated with the Owner, Engineer, and property owner.

1.4 SYSTEM REQUIREMENTS

A. Design, install, operate, and subsequently remove a temporary bypass pumping system to divert the existing sewage flow around the work area for the duration of the project.

B. Bypass pumping equipment shall be automated and capable of functioning without the assistance of an operator.

C. Pumping equipment shall be capable of operating for an extended period of time running dry. After this period of time, the pump shall have the capability of pulling a 25 inch Hg vacuum without adjustment or repair.

D. The entire bypass system including all pumps, pipe, hose, valves, and fittings shall be provided by one bypass pumping company who is responsible for the operation of the entire system.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Pumps shall be centrifugal, end suction, fully automatic self-priming low noise pumps that do not require the use of foot-valves, vacuum pumps, diaphragm pumps, or isolation valves in the priming system. Pumps must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flow pumps and shall immediately develop 25 inch Hg vacuum without adjustment or repair or employ level control devices to regulate on/off or variable speed of the pump. Hydraulic, submersible, electric, or wellpoint type pumps are prohibited. Pumps shall be low noise sound attenuated, critically silenced units.

B. Seals shall be high pressure, mechanical self-adjusting type with silicon carbide faces capable of withstanding suction pressures to 100 psi running. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. Pump shall be capable of running dry, with no damage, for extended periods of time. All metal parts shall be of stainless steel. Elastomers shall be Viton. Pump end shall be manufactured to meet ISO 9002 certifications.

C. The pumps shall be gas or diesel powered.

D. Back-up pumps and/or standby electric generator system may be fossil fuel engine driven.

E. Provide the necessary start/stop controls for each pump.

F. Include one stand-by pump of each size to be maintained on site and a standby power source.

G. Pump shall not be connected by a common suction manifold. The use of PVC or Steel Pipe with Dresser Couplings will not be accepted. All pipe or hose will be rated for 25 inch Hg Vacuum.

H. In order to prevent the accidental spillage of flows, all discharge systems must be constructed of high density polyethylene pipe with fused joints or quick disconnect pipe with positive restrained joints, and leak proof connections. Discharge hose will only be allowed by specific permission of the engineer. PVC pipe with glued joints, aluminum "irrigation pipe", steel pipe or PVC pipe with Dresser couplings will not be accepted. All joints must be 100% restrained. All discharge pipe must have a minimum working pressure of 50 psi. All force main connections shall be made by using flanged composite hose with a working pressure of 150 psi.

I. Allowable piping materials will be fused, high density polyethylene pipe, acceptable disconnect pipe, or flanged composite pressure class hose. SDR of discharge piping shall be suitable for the calculated discharge pressures. The vendor fusing the pipe must have a minimum of 5 years experience fusing HDPE pipe of the same diameter required for the project.

2.2 SYSTEM DESCRIPTION

A. General

1. Comply with applicable permits outlined in Section 00800.

B. Design Requirements:

1. Bypass pumping systems shall have sufficient capacity to pump a peak flow equal to the capacity of the existing gravity sewer main.

2. Provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping systems will be required to be operated 24 hours per day.

3. Have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure. Also, a back-up power supply source shall be provided.

4. Bypass pumping system shall be capable of bypassing the flow around the work area and of releasing any amount of flow up to full available flow into the work area as necessary for satisfactory performance of work.

5. Make all arrangements for bypass pumping during the time when the pump station is shut down for any reason. System must overcome any line pressure on discharge.

C. Performance Requirements:

1. There must be no interruption in the flow of sewage throughout the duration of the Project. Provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with the Work, carry it past the Work and return it to the existing sewer downstream of this work.

2. Provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.

3. Maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

4. The bypass system shall not require excavation to reduce the suction lift without the specific approval of the engineer prior to the bid.

5. Protect water resources, wetlands, and other natural resources in accordance with the appropriate project permits.

6. Meet noise limits of 69dbA @ 30 feet. All diesel driven standby pumps and/or back-up power supplies shall be sound attenuated. The use of Critical Silenced Canopy pumps or acoustical enclosures for sound attenuation is required.

7. The pumps shall not be benched down to make the suction lift unless approved by the Engineer prior to Bid.

PART 3 EXECUTION

3.1 PREPARATION

A. Precautions

1. Locating existing utilities in the area where the Contractor selects to locate the bypass pipelines. Locate bypass pipelines to minimize any disturbances to existing utilities and obtain approval of the pipeline locations from the Owner, Engineer. Pay all costs associated with relocating utilities and obtaining all approvals.

2. During all bypass pumping operation, protect the existing sewer lines, pump station, force main, and all gravity sewer lines from damage inflicted by any equipment. Be responsible for all physical damage to the existing facilities caused by human or mechanical failure.

3.2 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test:

1. Perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. Give the Engineer 24 hour notice prior to testing.

B. Inspection:

1. Inspect the bypass pumping system regularly (every 2 hours) to ensure that the system is working correctly.

C. Maintenance Service:

1. Ensure that the temporary pumping system is properly maintained and a responsible operator is on hand at all times when pumps are operating.

D. Extra Materials:

1. Keep spare parts for pumps and piping on site as required.

2. Maintain adequate hoisting equipment for each pump and accessories on the site.

E. Installation and Removal

1. Remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures only at the access locations indicated on the Drawings and as many as may be required to provide adequate suction conduit.

2. Make connections to the existing sewer and construct temporary bypass pumping structures only at locations approved by the submittals.

3. Plugging or blocking of sewage flows shall incorporate primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits

the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

4. When working inside manhole or force main, exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible oxygen-deficient atmospheres, and confined spaces.

5. The pipeline must be located off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the contractor must place the bypass pipelines in trenches and cover with temporary pavement. Adhere to any and all applicable project permits.

6. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Engineer, remove all the piping, restore all structures, pipelines and property to pre-construction condition, and restore all pavement surfaces. Adhere to any and all applicable project permits.

END OF SECTION

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SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Products and Materials
2. Product Delivery Requirements
3. Packaging, Handling and Storage Requirements
4. Inspection of Offsite Work

1.2 QUALITY ASSURANCE

A. Review all contract Drawings and Specifications with respect to specific system characteristics, applicability of materials and equipment for the intended purposes, sizes, orientation, and interface with other systems, both existing and proposed, and certify that the materials and equipment proposed will perform as specified prior to submitting shop drawings.

B. Provide sworn certificates as to quality and quantity of materials where specified or requested by the Engineer.

C. Obtain concurrence of the Engineer prior to processing, fabricating, or delivering material or equipment.

1.3 PRODUCTS AND MATERIALS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by a single manufacturer unless specified otherwise.

B. Use only new and first quality material in the Work. Material shall conform to the requirements of these Specifications and be approved by the Engineer. If, after trial, it is found that sources of supply that have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from other approved sources.

C. Immediately remove defective materials and equipment from the site, at no additional cost to the Owner. The Contractor may be required to furnish sworn certificates as to the quality and quantity of materials before materials are incorporated in the Work.

D. Engineer has the right to approve the source of supply of all material prior to delivery.

1.4 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

D. Progressively deliver materials and equipment to the Site so there will be neither delay in progress of the Work nor an accumulation of material that is not to be used within a reasonable time.

E. Deliver products to the Site in their manufacturer's original container, with labels intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to the manufacturer, grade, quality, source, and other pertinent information.

1.5 PACKAGING, HANDLING AND STORAGE REQUIREMENTS

A. Provide storage and handling of all materials and equipment required for the Work.

B. Except as otherwise indicated in the Contract Documents, determine and comply with the manufacturer's recommendations on product storage, handling, and protection. Provide manufacturer's documentation on recommended storage procedures when requested by the Engineer.

C. Properly store and protect all equipment immediately upon its arrival. All equipment shall be stored in a clean, dry, heated, secured, and insured indoor facility satisfactory to the Engineer. Equip drive motors with thermostatically controlled strip heaters. Outdoor storage with plastic, canvas, plywood or other cover will not be allowed except where specific approval for designated items not containing electrical components or bearings is obtained from the Engineer. This approval does not relieve the Contractor of responsibility for proper protection of materials.

D. Familiarize workmen and subcontractors with hazards associated with materials, equipment, and chemicals specified herein and take all necessary safety precautions.

E. Areas available on the construction site for storage of material and equipment shall be as shown on the Drawings or approved by the Owner.

F. Materials and equipment to be incorporated in the Work shall be handled and stored by the manufacturer, fabricator, supplier, and Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind to the material or equipment.

G. Protect finished surfaces including floor surfaces, stairs, joints, and soffits of passageways from damage until accepted by the Engineer.

H. Promptly remove materials from the site of the Work which have become damaged or are unfit for the use intended or specified. The Contractor will not be compensated for the damaged materials or their removal costs.

I. Handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required. Provide suitable and adequate storage room for materials and equipment during the progress of the Work, and be responsible for the protection, loss of, or damage to materials and equipment furnished, until the final completion and acceptance of the Work.

J. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

K. All materials and equipment to be incorporated in the Work shall be placed so as to not damage any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Keep materials and equipment neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to the Owner.

L. No material or equipment will be permitted to be stored in any of the Owner's facilities, unless otherwise approved by the Engineer.

M. Do not store material or equipment in any wetland or environmentally sensitive area. Stockpile sites shall be level, devoid of mature stands of natural vegetation, and removed from drainage facilities and features, wetlands, and stream corridors.

N. Contractor shall be fully responsible for loss or damage to stored materials and equipment.

O. No item judged rusty, corroded or otherwise damaged during storage will be accepted. Any electrical or instrumentation item determined by the Engineer to be damaged shall be removed from the Site and replaced by a completely new item in first class condition. Items not properly stored will not be considered for any partial payment.

P. Provide protective and preventive maintenance during storage consisting of manually exercising equipment where required, inspecting mechanical surfaces for signs of corrosion or other damage, lubricating, applying any coatings as recommended by the equipment manufacturer as necessary for its protection and other precautions as necessary to assure proper protection of equipment stored.

Q. Treat ferrous surfaces not receiving finish coats of paint with rust preventive coating, and protect non-ferrous metal work and devices with suitable wrappings.

1.6 INSPECTION OF OFFSITE WORK

A. The Owner and Engineer will inspect Work performed away from the construction site during fabrication, manufacture, or testing, or before shipment. Give 2 weeks written notice regarding the place and time where such fabrication, manufacture, testing, or shipping will be done.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01630

PRODUCT SUBSTITUTION DURING CONSTRUCTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Product substitution procedures

1.2 CONTRACTOR'S OPTIONS

A. For materials or equipment (hereinafter products) specified only by performance or reference standard, select product meeting that standard, by any Supplier. To the maximum extent possible, provide products of the same generic kind from a single source.

B. For products specified by naming several products or manufacturers, select any one of the products or Suppliers named, which fully complies with the Drawings and Specifications. Another "or-equal" product can also be considered by the Engineer if it complies with the provisions in Section 00700. If a product proposed by the Contractor does not qualify as an "or-equal" item, then it can be considered as a proposed substitute item, and the Contractor must comply with the requirements of Article 7.05, Section 00700.

C. For products specified by naming products or manufacturers and followed by words indicating that no "or-equal" item or substitution is permitted, there is no option and no substitution will be allowed.

D. Where more than one choice is available as a Contractor's option, select product that is compatible with other products already selected or specified.

1.3 SUBSTITUTIONS

A. If in the Engineer's sole discretion a product proposed by the Contractor does not qualify as an "or-equal" item under the provisions in Section 00700, it can be considered a proposed substitute item. Submit information required in Section 00700 for proposed substitutes.

B. The Engineer will consider written requests from the Contractor for substitutions within 30 days after the Notice to Proceed. After this period, requests will be considered only in case of unavailability of product or other conditions beyond control of the Contractor.

C. Submit 3 copies of request for substitutions. Submit a separate request for each proposed substitution. In addition to the submittal requirements outlined in Section 00700, include the following in each substitution request:

1. For products or Suppliers:

a. Product identification, including Supplier & manufacturer's name and address.

b. Manufacturer's literature with product description, performance and test data, and reference standards.

c. Samples, if appropriate.

d. Name and address of similar projects on which product was used, and date of installation.

2. For construction methods (if specified):

a. Detailed description of proposed method.

b. Drawings illustrating method.

3. Such other data as the Engineer may require to establish that the proposed substitution is equal to the product, Supplier or method specified.

D. The substitution request shall include written certification and statements that are outlined in Section 00700.

E. A request constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.

2. Will provide same or better guarantees, warranties or bonds for proposed substitution as for specified product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives all claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse Owner for review or redesign services associated with re-approval by authorities having jurisdiction.

F. A proposed substitution will not be accepted if:

1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.

2. It will delay completion of the Work.

3. It is intended or implied on a Shop Drawing and is not accompanied by a formal request for substitution from the Contractor.

G. The Contractor is responsible for all costs relating to substitution requests.

H. Approval of a substitution does not relieve the Contractor from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

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SECTION 01720

FIELD ENGINEERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Establishment of lines, benchmarks, and elevations required to layout and construct the Work

2. Property line survey and delineation

1.2 SUBMITTALS

A. Informational Submittals

1. Submit the qualifications of the Registered Professional Engineer and/or Registered Land surveyor to be hired to perform various portions of the Work, as applicable.

2. Submit documentation verifying the accuracy of field engineering work.

3. Submit 4 copies of final record drawings of field engineering layouts and as-built survey.

4. Submit certificate signed by registered (licensed) engineer or surveyor certifying that elevations and locations of Work are in conformance with Contract Documents. Explain deviations.

1.3 RECORDS

A. Maintain a complete, accurate log of control and survey work as it progresses.

1.4 QUALITY ASSURANCE

A. Employ a qualified engineer, registered with the State of Rhode Island as a Professional Engineer or a competent surveyor, registered with the State of Rhode Island as a Land Surveyor, as required for the particular characteristics of the work being performed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROCEDURES

A. The Registered Professional Engineer or Land Surveyor provided shall establish and maintain lines, elevations and reference marks needed during the progress of the Work and shall re-establish stakes and marks placed by the Engineer that are lost or destroyed through the course of the Work. Verify such work by instrument or other appropriate means.

B. The Engineer shall be permitted at all times to check the lines, elevations and reference marks, set by the Contractor, who shall correct any errors disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish the responsibility of the Contractor for the accurate and satisfactory construction and completion of the entire Work.

C. Make, check, and be responsible for measurements and dimensions necessary for the proper construction of and the prevention of misfittings in the Work.

D. Furnish all protective stakes and temporary structures for marking and maintaining points and lines for the building of the Work, and give the Engineer such facilities and materials for verifying said lines and points as he may require.

E. Revisions to the layout and elevations of the Work as defined by the Contract Documents shall be approved by the Engineer.

F. Maintain and prepare final record drawings of field engineering layouts and as-built survey conducted after completion of the Work. As-builts shall be updated on a weekly basis and available for review by Owner and Engineer at any time.

END OF SECTION

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SECTION 01725

PRESERVATION AND RESTORATION OF PROJECT FEATURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Protection and replacement of trees, shrubs, signs, property markers, fences, and related project features.

2. Taking precautions, providing programs, and taking actions necessary to protect public and private property and facilities that are outside the demolition scope from damage.

1.2 DEFINITIONS

A. Underground Structures

1. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.

2. Underground structures known to the Engineer are shown on the Drawings to the extent that locations are available. This information is shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete. The Contractor shall be responsible for checking on the actual locations of water, sewer, gas electric and telephone service connection lines to avoid potential interferences.

B. Surface Structures

1. Surface structures are defined as existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 REPAIR/RESTORATION

A. Trees, shrubs, and similar items shall not be removed except where indicated on the drawings, or as approved by the Owner. Items to be removed shall be clearly marked as directed by the Engineer. If objects not to be removed are damaged or removed, they shall be repaired or replaced to their original condition.

B. Trees and shrubs on private property, which are removed or damaged by the Contractor shall be replaced in kind.

C. Signs, fences, property markers, walls, guard rails and other public or private property that are outside the demolition scope shall be replaced in kind if damaged. Supports and protective devices required shall be provided.

D. Underground and Surface Structures

1. In the event of damage, injury or loss to existing utilities and structures that were not indicated to be removed or abandoned, whether shown on the Drawings or not, make all reasonable efforts to facilitate repairs and to mitigate the impact of such events upon the utility or structure owner's normal operations. Restore the existing utility or structure to the condition required by the owner of the utility or structure or at least to the condition found immediately prior to the Work. In the event that the utility owner elects to make the repairs, provide all reasonable access and assistance, and reimburse the utility owner for the cost of repairs. If utility service is interrupted due to damage to facilities, alternate facilities shall be provided.

2. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers and curbs which are temporarily removed to facilitate the Work shall be replaced and restored to their original condition at the Contractor's expense unless otherwise indicated in other sections of these specifications.

3. Wherever water, sewer, gas or petroleum mains, electric or telephone lines, cables or other utilities and structures are encountered and may be in any way interfered with, inform the Engineer and the appropriate utility company. Cooperate with the Engineer and utility company in the protection, removal, relocation, and replacement of structures and facilities.

4. Prior to proceeding with any construction, notify in writing owners of utilities and structures within the vicinity of the proposed Work.

5. Materials used for relocation or replacement of utilities and structures shall be of an equivalent material, type, class, grade and construction as the existing or as approved by the respective owners thereof, unless otherwise shown or specified.

6. When any survey monument or property marker, whether of stone, concrete, wood or metal, is in the line of any trench or construction work and may have to be removed, notify the Engineer in advance of removal. Under no circumstances shall any monument or marker be removed or disturbed by the Contractor or by any of his Subcontractors, employees or agents, without the permission of the Engineer. Monuments or markers removed or disturbed shall be reset by a land surveyor licensed in the State where the Work is located at the Contractor's expense. Should any monuments or markers be destroyed through accident, neglect or as a result of the Work under this Contract, the Contractor shall, at his own expense, employ a land surveyor licensed in the State where the Work is located to re-establish the monument or marker.

E. Replace in-kind any damaged traffic loop detection wiring in a timely fashion. In general, traffic signal wiring damaged by the Contractor shall be replaced and placed in service no later than 24-hours after being taken out of service.

3.2 PROTECTION

A. The construction of certain portions of the project may require excavation within the root systems of trees. Roots with a diameter of 2 inches or more within the excavation shall not be cut. If necessary, excavation shall be made with small powered equipment or by hand to comply with this requirement. It may be necessary to excavate from more than one direction to avoid damage to the roots.

B. The trunks of trees that are to remain and are within the swing radius of the excavating machine bucket when fully extended shall be wrapped with burlap and 2 inch by 4 inch protective wood slats (8 inch spacing maximum) wired around the circumference of the trees to protect them from damage.

C. Tree limbs shall not be cut except upon written approval of the Owner and the Engineer. Tree limbs cut shall be painted with approved forestry paint manufactured specifically for that purpose.

D. Underground and Surface Structures

1. Sustain in their places and protect from direct or indirect injury underground and surface structures designated to remain within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, satisfy the Engineer that the methods and procedures to be used have been approved by the party owning same.

2. Pay utility service company charges related to the temporary support of utility poles if required to complete the Work.

3. Assume risks associated with the presence of underground and surface structures within or adjacent to the limits of the Work. The Contractor shall be responsible for damage and expense for direct or indirect injury caused by his Work to any structure. Immediately repair damage caused by the Work to the satisfaction of the owner of the damaged structure.

END OF SECTION

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SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Documentation required for the transfer of the completed Work to the Owner
2. Final Cleaning

1.2 SUBMITTALS

A. Closeout Submittals

1. As-built drawings
2. Evidence of payment and release of liens
3. Consent of Surety form – G707
4. Contractor's Release of Owner
5. Affidavit of Payment of Debts and Claims form – G706
6. Affidavit of Lien Release form – G706A
7. MBE Utilization form
8. Warranties
9. List of Subcontractors, service organizations, and principal vendors

1.3 SUBSTANTIAL COMPLETION

A. Refer Section 00700, General Conditions, for procedures relating to obtaining Substantial Completion. Refer to 00520, Agreement, for Contract Times.

1.4 PROJECT CLOSEOUT DOCUMENTS

A. Refer to 00800 Attachment A for Rhode Island College standard closeout procedures and required forms.

B. As-Built Drawings - Submit electronic and hard copy of as-built drawings for review, approval, or comment. As-builts shall be updated on a weekly basis and available for review by Engineer and Owner throughout the project. The as-built drawings shall show the completed work, including all deviations from the original Drawings. As-built drawings shall depict the location of all piping and valves installed under this Contract, as well as field changes. Take swing ties to all underground work from a minimum of two horizontal locations. Vertical dimensions to all below grade work shall also be obtained. All fittings, bends, valves and other appurtenances shall be shown. At a minimum, the following information shall be shown on the as-built drawings.

1. Ties to all buried fittings, services and structures from two horizontal measurements to permanent surface reference points, and depth below permanent

grade. Permanent surface reference points are manholes, catch basins, power poles, and above-grade structures.

2. Ties to all surface structures (including manholes, cleanouts, etc.) from two horizontal measurements to permanent surface reference points. Re-station surface structures if stationed on Drawings.

3. Ties to other utility crossings, abandoned pipelines, and sewer service stubs, from two horizontal measurements to permanent surface reference points include depth below permanent grade and spacing between crossing utilities.

4. Invert and rim elevation of all gravity pipelines and structures including manholes.

5. Depth of ledge at changes in profile but not more than 25-foot intervals.

6. Changes to pipe size and materials.

C. Provide warranties and bonds for items so listed in pertinent sections of the Project Manual.

D. As specified in Section 00700, provide evidence that all Work, materials and equipment will pass to Owner free and clear of any Liens or other title defects upon final payment. Such evidence may take the form of receipts or releases from all Subcontractors and Suppliers and an affidavit from Contractor as to the completeness of the receipts and releases as described in Section 00700.

1.5 FINAL PAYMENT

A. Refer to Section 00700, General Conditions, for procedures relating to final inspection and payment.

B. The Contract shall be considered complete and final payment made, only when:

1. All provisions of the Contract Documents have been strictly adhered to.

2. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CLEANING

A. Remove and entirely dispose of material or debris that has washed, flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the Contract work limits. Leave ditches, channels, drains, pipes, structures, and watercourses in a clean and neat condition upon completion of the Work.

B. Restore or replace any public or private property damaged or removed during the course of the Work. Property shall be returned to a condition at least equal to that existing immediately prior to the beginning of operations. Complete all highway or driveway, walk, and landscaping work using suitable materials, equipment and methods. Perform restoration of existing property, signs or structures promptly as work progresses; do not leave restoration work until the end of the Contract Time.

END OF SECTION

DIVISION 2 - SITE CONSTRUCTION

SECTION 02110

CONTAMINATED SOIL EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Excavation, handling, stockpiling, and temporary storage of Contaminated Soil
2. Movement and placement of Contaminated Soil into a temporary controlled stockpile area
3. Decontamination of tools, equipment, and vehicles and the collection, management and disposal of resulting liquids and/or solids
4. Other work involving the handling of contaminated materials which may be required including but not limited to miscellaneous facility component removal, removal of obstructions, excavation support systems, and any incidental work related thereto

B. Related Sections

1. Section 00800 – Supplemental Conditions
   a. Soil Management Plan
2. Section 01450 – Quality Control
3. Section 02120 - Transportation and Disposal of Contaminated Soil
4. Section 02315 - Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

A. DEM-DSR-01-93 RI Department of Environmental Management Remediation Regulations: http://www.dem.ri.gov/pubs/regs/regs/waste/remreg04.pdf

1.3 DEFINITIONS

A. Natural Soil: Soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.

B. Contaminated Soil: Soils or fills determined by analytical results to contain oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by DEM-DSR-01-93.

C. Special Handling: Methods used to excavate, collect, grade, load, move, transport, stockpile, dispose, or otherwise manage a contaminated material or Contaminated Soil are such that (1) the spillage, loss, co-mingling, or uncontrolled deposition of such material is minimized, (2) personal exposure to contaminants present in such a material are minimized, (3) the adverse impacts to the community and the surrounding environment from contaminants present in such material are minimized, (4) all applicable regulatory requirements applicable to such activity are satisfied.

1.4 QUALITY ASSURANCE

A. All contaminated material excavated or otherwise collected, consolidated and managed during the course of the work will require Special Handling in accordance with these specifications, Contractor Health and Safety Plan, and all applicable permits, approvals, authorizations, and Regulations.

B. Perform the handling of contaminated materials with equipment and techniques in accordance with the performance requirements defined in this specification.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Provide all employees and subcontractor(s) with personal protective equipment and protective clothing consistent with the levels of protection for this work as indicated in Contractor's Health and Safety Plan.

B. Perform all contaminated material handling operations in accordance with standard engineering practices applicable to such activity, according to RI DEM regulations, and according to the provisions of Contractor Health and Safety Plan. Utilize methods which consider the health and safety of all Contractor and subcontractor personnel, support personnel, Engineer and his representatives, and the surrounding environment.

C. All site health and safety controls shall be fully established and in operation prior to beginning any contaminated material handling activity. Site controls shall include but not be limited to work zones properly barricaded, decontamination facilities, air monitoring, and all support equipment and supplies including personal protective equipment.

D. Minimize the spread of contaminated materials during handling. Transport vehicles used to move Contaminated Soil at the Project Site shall be free from leaks. Trucks or other conveyances deemed unacceptable for use by Engineer shall not be used for the movement of contaminated materials.

E. Keep work areas, including but not limited to, areas adjacent to excavations, roadways leading to and from excavation areas, driveways, parking areas, and public roadways free of contaminated materials. If such materials are deposited, spilled, or spread, such material shall be removed promptly, and properly disposed of to the satisfaction of Engineer no later than the end of each working day or as requested by Engineer.

F. Owner is the generator and will sign all manifests and bills of lading. Except for materials required to be transported under manifest, transport all Contaminated Soil material under bills of lading (prepared by Engineer) regardless of the chemical quality of the soils.

3.2 EXCAVATION OF CONTAMINATED MATERIALS

A. Perform excavation in accordance with the requirements of Section 02315, Excavation, Backfill, Compaction and Dewatering, and this section.

B. Excavate contaminated soil to approximately 5 feet below grade and horizontal limits identified by the Engineer.

C. Separate rock/boulders that are 12" or greater in size from excavated contaminated materials at the point of excavation, prior to the movement of contaminated materials from excavation areas.

D. Engineer will continually evaluate field conditions to determine if additional excavation is required to achieve remedial objectives. This evaluation may require Engineer to work in close proximity to Contractor's excavation equipment, and may require frequent pauses in the work. Contractor shall work in a cooperative manner at all times during these operations to ensure the safety of Engineer, and to allow for thorough field evaluations to be conducted.

1. When contaminated material excavation is undertaken, Engineer will make the final determination as to the limits of excavation required to achieve remediation objectives. Such limits may be greater than or less than the limits identified in 3.2A and shall be based upon actual conditions encountered at the time of excavation.

2. If required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation shall be required based upon field observations.

E. Minimize the spread and loss of contaminated materials during excavation activities.

1. Following excavation, transport contaminated materials directly to the temporary controlled stockpile area for stockpiling. Excavated contaminated materials shall not be placed directly on the ground.

F. Employ methods necessary to isolate contaminated materials from non-contaminated soils to the degree practicable.

G. Segregate construction debris from excavated contaminated materials at the point of excavation, prior to the movement of contaminated materials from excavation areas. Engineer may evaluate debris during excavation to determine if such material can be designated uncontaminated general demolition material.

H. Open excavations represent a substantial hazard. Contractor shall implement measures as appropriate to secure open excavations while awaiting Engineer's confirmation test results from soils (refer to Item 3.5) or any other period when excavations remain open.

I. Implement measures to divert surface water around excavation sites to prevent water from directly entering into open excavations.

3.3 BACKFILL

A. Backfill excavations in accordance with Section 02315, Excavation, Backfill & Compaction and Dewatering.

B. Backfill excavations as soon as possible after Engineer has indicated that test results confirm remediation objectives have been achieved and backfilling may proceed.

3.4 UNFORESEEN CONTAMINATED MATERIALS

A. In the event that unforeseen contaminated materials are encountered during the course of the work, permit the Engineer sufficient time to devise an appropriate course of action based upon the conditions present. Unforeseen contaminated materials excludes naturally occurring arsenic in the soil.

1. Until such appropriate course of action is devised, Contractor shall secure the work area in question such that it does not pose a health and safety risk.

2. Engineer will provide Contractor with a scope of work and performance requirements for the collection, consolidation, removal or excavation of

unforeseen contaminated material. Contractor shall then undertake contaminated material remediation with equipment and techniques established by Contractor in accordance with said scope of work and performance requirements.

B. Contaminated material remediation shall be performed in accordance with scope of work outlined in Item 3.4.A.2 and in accordance with this specification.

3.5 CONFIRMATION TESTING BY ENGINEER

A. At such time the Engineer is satisfied that the limits of contaminated material have been reached, appropriate confirmation sampling to confirm remediation objectives have been achieved and no additional contaminated material excavation or removal is required.

B. Contractor is hereby notified that laboratory turnaround time for the analysis of confirmation samples may be up to 5 working days from date of collection. No claim for delay will be considered based upon Contractor failing to accommodate the laboratory turnaround time as defined herein.

C. Engineer will inform Contractor if test results confirm remediation objectives have been achieved and backfilling may proceed.

D. Should the results of Engineer's testing indicate additional contaminated material excavation or removal is required, Engineer will define those areas beyond the limits originally indicated where additional contaminated material excavation or removal shall be required.

3.6 STORAGE OF EXCAVATED MATERIALS

A. Excavated contaminated material shall be temporarily stockpiled on-site. Stockpile contaminated soils in an area designated by the Engineer in such a manner to protect existing site surface, materials and structures from contamination, runoff and erosion. Place the contaminated soil on a minimum of 6 mil polyethylene sheeting and at the end of each day the stockpiled soil shall be covered with 6 mil polyethylene sheeting and secure the covering to prevent the stockpile from becoming uncovered due to winds.

3.7 DUST CONTROL

A. Implement fugitive dust suppression to prevent unacceptable levels of dust resulting from handling operations associated with contaminated materials. Dust suppression methods shall be subject to approval from Engineer. Supervise fugitive dust control measures and monitor airborne particulate matter as required.

END OF SECTION

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SECTION 02120

TRANSPORTATION AND DISPOSAL OF CONTAMINATED SOIL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Transportation and disposal of Contaminated Soil or materials collected, consolidated, excavated, and generated during performance of the Work.

2. Coordination, loading, transportation and disposal of contaminated materials.

B. Related Sections

1. Section 00800 – Supplemental Conditions

a. Soil Management Plan

2. Section 02110 – Contaminated Soil Excavation

1.2 REFERENCES

A. DEM-DSR-01-93 RI Department of Environmental Management Remediation Regulations: http://www.dem.ri.gov/pubs/regs/regs/waste/remreg04.pdf

1.3 DEFINITIONS

A. Disposal: The discharge, deposit, injection, dumping, spilling, leaking, incineration or placing of any contaminatd material or otherwise hazardous substance into or on any land or water so that such hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

B. Generator: Any person, by site, whose act or process produces hazardous waste, or whose act first causes an oil or hazardous material to become subject to regulation.

C. Regulated Waste: Non-Resource Conservation and Recovery Act (RCRA) hazardous wastes such as oils, petroleum products or residuals, chemical liquids, chemical gases or vapors, non-Toxic Substances Control Act (TSCA) polychlorinated biphenyls (PCBs), waste chemical solids, including soils, and other contaminated material wastes not defined as RCRA Hazardous, TSCA-regulated, or Special Waste.

D. Manifest: An approved form used as a shipping document to identify the quantity, composition, and the origin, routing, and destination of regulated or hazardous waste from the site of generation to the point of disposal, treatment, storage, or use.

E. Shipping Paper: An invoice, bill of lading, or other shipping document serving a similar purpose; other than a hazardous waste manifest used to document the conveyance of materials between different locations, including regulated wastes when applicable.

F. Treatment: Any method, technique or process, including neutralization, incineration, stabilization or solidification, designed to change the physical, chemical or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste less hazardous, non-hazardous, safer to transport, amenable to

storage, or reduced in volume, except such method or technique as may be included as an integral part of a manufacturing process at the point of generation.

G. TSCA/RCRA Landfill: This type of landfill is permitted to accept soil that contains PCB at levels of 50 ppm to 500 ppm, acceptable for landfill disposal as defined in 40 CFR Part 761; soil that is classified as either a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261 but meets the treatment standards established in 40 CFR Part 268 - Land Disposal Restrictions; and all other soil classified as a hazardous material in DEM-DSR-01-93. This type of landfill shall be approved to operate under a Federal Part B operating permit and shall be permitted to accept material with PCB concentrations up to 500 ppm under TSCA. The landfill shall be designed with a double composite liner meeting minimum RCRA design requirements. The landfill shall operate a leachate collection system and shall also operate a leak detection well system. The landfill shall be capable of stabilizing soils for meeting requirements of the USEPA's present rules required under the 1984 amendments to RCRA, banning the land disposal of hazardous material.

H. RCRA Landfill: This type of landfill is permitted to accept soil that contains PCBs levels below 50 ppm; soil that is classified as either a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261 but meets the treatment standards established in 40 CFR Part 268 - Land Disposal Restrictions and all other soil classified as a hazardous material in DEM-DSR-01-93. This type of landfill shall be approved to operate under a Federal Part B operating permit. The landfill shall be designed with a double composite liner meeting minimum RCRA design requirements. The landfill will operate a leachate collection system and will also operate a leak detection well system. The landfill shall be capable of stabilizing soils for meeting requirements of the land ban.

I. Non-RCRA Out-of-State Lined Landfill: This type of landfill shall be state approved or permitted to accept soil that is defined as a hazardous material in 310 CMR 30.00, but is not classified as either a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261; soil containing PCBs below 50 ppm; and all other soil not permitted or unsuitable for in-state disposal or recycling.

J. Out-of-State Recycling Facility: This type of facility shall be state approved or permitted to accept soil that is defined as a hazardous material in 310 CMR 30.00, but is not classified as either a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261; soil containing PCBs below the facility's permitted level; and all other soil not permitted or unsuitable for in-state disposal or recycling.

K. In-State Recycling Facility: This type of facility shall be approved by the State of Rhode Island to accept soil that is classified as petroleum contaminated soil, that would be classified as a hazardous material in 310 CMR 30.00 if not managed under M.G.L. c.21 E and 310 CMR 40.00; and is not classified as a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261.

L. In-State Landfill Facility (Reuse as Cover Material): This type of facility shall be approved by the State of Rhode Island to accept soil that is classified as petroleum contaminated soil, that would be classified as a hazardous material in DEM-DSR-01-93; and is not classified as a RCRA characteristic waste or RCRA listed waste as defined in 40 CFR Part 261.

1.4 SUBMITTALS

A. Submit all pertinent information relating to the transport and disposal of materials specified herein, within 14 days after issuance of the Notice to Proceed and prior to transport and disposal. The information submitted be in one package and shall include the following, as a minimum:

1. Information for proposed treatment/disposal facility or facilities including the following:

   a. General Information

      1) Facility Name

      2) Facility Address

      3) Name of Contact Person

      4) Title of Contact Person

      5) Telephone Number of Contact Person

      6) Permit Number

   b. The facility shall specify the volume of material that can be accepted from the Project on a weekly and a total basis.

   c. The facility shall provide written confirmation that they are permitted to accept and will accept the classified contaminated materials the general quality and quantity described by these specifications.

   d. The facility shall provide a listing of all current and valid permits, licenses, letters of approval, and other authorizations to operate that they hold, pertaining to the receipt and treatment/disposal of the contaminated materials described by these specifications.

2. Rhode Island Transporter Identification Number and expiration date.

3. Name and address of all hazardous material transporters to be used to transport materials including proof of permit, license, or authorization to transport hazardous material in all affected states.

B. Upon receipt of final approval from treatment/disposal facility to accept contaminated materials, submit copy of said approval.

C. Within ten (10) working days after the off-site transportation of contaminated materials, submit copies of all paperwork related to transportation of contaminated materials. Such paperwork may include, but not be limited to receipts, weight tickets, and disposal certificates.

1. Provide certified tare and gross weight slips for each load received at the designated treatment/disposal facility which shall be attached to copy of related manifest or bill of lading.

D. Prior to receiving progress payment, submit documentation certifying that all materials were transported to, accepted, and disposed of, at the selected treatment/disposal facility. The documentation shall include the following, as a minimum.

1. Documentation for each load from the site to the disposal facility, including all manifests and any other applicable transfer documentation.

2. All documentation for each load shall be tracked by the original manifest or bill of lading document number assigned at the project site at time of signature by authorized Engineer.

1.5 REGULATORY REQUIREMENTS

A. Obtain all Federal, State and local permits, approvals, or authorizations required for the transport and disposal of contaminated materials. Adhere to all requirements of such permits, approvals, or authorizations.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Sample, test, or analyze contaminated material for approval of final disposal. Engineer will sample and analyze contaminated soil.

B. Contaminated materials to be disposed of include, but are not limited to contaminated soil, rock, miscellaneous contaminated debris, petroleum fuels, petroleum residuals, concrete, and other materials from remediation, demolition and decontamination operations.

C. All contaminated materials excavated, consolidated, or otherwise managed during the course of the work will require special handling in accordance with these specifications, the Contractor's Health and Safety Plan, and all applicable permits, approvals, authorizations, and regulations.

D. Dispose of contaminated materials at facilities approved by Owner or Engineer.

E. All Contractor personnel shall wear personal protective equipment and protective clothing consistent with the levels of protection for this Work as indicated in the Site Health and Safety Plan.

F. Contractor shall select treatment/disposal facilities to receive contaminated materials from the Project which are established, fully operational, and in full compliance with all applicable Federal, State, and local regulations.

G. Perform collection of characterization (except soils) samples and laboratory analyses to satisfy the acceptance criteria for selected receiving facility(s).

H. Remove all contaminated materials from the project site and legally dispose of materials.

3.2 CHARACTERIZATION FOR DISPOSAL-CONTAMINATED SOIL

A. Contaminated soil characterization sampling will be conducted by the Engineer.

B. The Engineer will collect soil samples. Such samples may be collected from within Excavation Areas, or following deposition of Contaminated Soil in the Temporary Controlled Stockpile Area.

1. Contractor is responsible for all laboratory charges associated with samples collected by the Engineer.

3.3 DISPOSAL COORDINATION AND TRANSPORT

A. Contractor is solely responsible for coordinating treatment/disposal facility approval, scheduling, loading, transport, and ultimate disposal of contaminated materials at treatment/disposal facility. No claim for delay will be considered based upon Contractor's facility failing to meet Contractor's production schedule. No payments will be made for rejected loads.

3.4 MANIFESTS AND SHIPPING PAPERS

A. Owner is designated as the "Generator" and will sign all Manifests and Shipping Papers. Manifests and Shipping Papers shall be prepared by Contractor twenty four (24) hours in advance of shipment of contaminated materials. Authorized Owner's representative will sign as "Generator" as each load of contaminated material leaves the Project Site. Contractor shall forward appropriate original copies of Manifests or Bills of Lading to Engineer on the same day the contaminated materials leave the Project Site.

3.5 TRANSPORT OF CONTAMINATED MATERIAL

A. Transport contaminated materials off-site after all treatment/disposal facility documentation has been completed and the material accepted by said facility.

B. Transport contaminated materials from the site to treatment/disposal facility in accordance with all United States Department of Transportation (DOT), USEPA, Rhode Island regulations and other regulations of all affected states.

C. The Hauler(s) shall be licensed in all states affected by transport.

D. Provide to Engineer copies of all weight slips, both tare and gross, for every load weighed and disposed of at the accepted disposal facility. The slips shall be tracked by the original manifest document number that was assigned by Engineer at the site. Owner will only make progress payments upon receipt of these weight slips.

E. Minimize the potential for development of free liquid during transport. Do not load wet soils for transport. If free liquid does develop during transport, Contractor shall be responsible for proper collection and disposal of same.

F. Soil located in the Temporary Stockpile Area shall be removed from the Project Site in accordance with the requirements of this section.

END OF SECTION

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SECTION 02210

SUBSURFACE INVESTIGATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Soils subsurface investigation at the site, the use of data resulting from the investigation, and conditions warranting additional soils investigation.

2. Pipe and utility subsurface investigations that are required in order to properly locate, plan for and/or connect to the various existing pipelines.

B. Related Sections

1. Section 00300 – Geotechnical Data

2. Section 02920 - Lawns and Grasses

3. Section 02315 - Excavation, Backfill, Compaction, and Dewatering

4. Section 02740 - Bituminous Concrete Pavement

1.2 REFERENCES

A. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.560 through 1926.562 including Appendices A through F

1.3 QUALITY ASSURANCE

A. The entire test pit excavation must be observed by the Engineer.

1.4 SITE CONDITIONS

A. Soils Investigation

1. Copies of the soil boring logs are included in Section 00300. Exploration locations are shown on the Drawings.

2. Use of the Data

a. The Drawings indicate conditions as they are believed to exist based upon limited subsurface explorations. Investigations and field tests must be conducted to verify the conditions that exist which may affect the Work. All investigations must be conducted under the Engineer's observation.

B. Pipeline and Utility Investigations

1. The Drawings show available data relative to existing underground pipe and utilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATION

A. Obtain all available information on buried structures and utilities in the vicinity of the investigation.

B. Coordinate Work such that all affected property, structure, and utility owners are aware of the Work prior to its commencement.

C. Schedule subsurface investigations such that they do not interfere with other Work or traffic and in advance of other Work in that location.

D. Provide the Engineer with 24-hour notice prior to commencement of subsurface investigations.

3.2 SUBSURFACE INVESTIGATIONS

A. Prior to test pitting operations, delineate the general scope of the excavation or boring on the paved surface of the ground using white paint, or stakes or other suitable white markings on non-paved surfaces and coordinate with the appropriate agencies. Pre-marking will not be acceptable if such marks can interfere with traffic or pedestrian control or are misleading to the general public. Pre-marking will not be required of any continuous excavation that is over 500 feet in length

B. Excavate test pits as indicated, or as requested by the Owner. Expose the top of the pipeline, and adjacent utilities, at each test pit location.

C. Contactor may, at his expense and with permission by the Owner, perform additional explorations not ordered by the Engineer.

D. Perform test pits in accordance with the requirements of Section 02315. Excavate the bottom 2 feet of the test pit (or in close proximity to known or anticipated utilities) by hand. Excavate to top of pipelines by hand. Test pits shall be braced, sheeted and dewatered or as otherwise required for safe excavation and examination of the structure or utility to be exposed.

E. Measure the depth to the top of the pipeline, as well as to adjacent utilities, from the ground surface, at each test pit location. Record location, depth and size of pipelines and utilities uncovered during the test pits. Record any other pertinent information which is learned as a result of excavating the test pit.

F. Excavate test pits of an appropriate size with equipment suitable for the location and character of the pit to be excavated.

G. All subsurface investigations shall be conducted in accordance 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F.

H. After observation by the Engineer, backfill and compact the test pits in accordance with Section 02315.

I. Borings or other drilled probes shall be filled in their entirety with grout upon completion.

J. Repair damage to any structure, utility, or private or public property or Site feature damaged during the Work to the satisfaction of the Engineer.

K. Repair paved surfaces in accordance with Section 02740.

L. Repair lawn areas or grass surfaces in accordance with 02922.

END OF SECTION

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SECTION 02280

PIPELINE AND UNDERGROUND STRUCTURE ABANDONMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Abandonment of pipe
2. Abandonment of manholes and catch basins

B. Related Sections

1. Section 02320, Borrow Material
2. Section 02515, PVC Pipe and Fittings

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this section.

B. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a safe timely manner.

C. Comply with the directions of the Engineer and the requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Gravel borrow shall meet the requirements of Section 02320, Borrow Material.

B. Concrete shall have a 28-day compressive strength of 3000 psi and a maximum stone size of 1½ inches.

PART 3 EXECUTION

3.1 ABANDONING SANITARY SEWERS

A. Abandon existing pipelines and manholes upon completion of installation and successful testing of the new pipelines, manholes and appurtenances.

B. Seal gravity pipes that are to be abandoned at each end with a concrete plug not less than 1½ times the pipe diameter long in the barrel of the pipeline. For example, a 10-inch diameter pipe will require that a minimum 15-inch long plug be installed. This should be performed at the manhole unless the existing manhole is to be removed. Similarly, open ends of pressure sewers to be abandoned shall be sealed with a concrete plug no less than 1½ times the pipe diameter long in the barrel of the pipeline.

C. Abandonment of manholes shall be done by carefully removing the frames, grates and covers. Upper portions of the masonry shall be removed to a depth four-feet below the finished grade and the remaining structure shall be completely filled with gravel borrow

placed in 6-inch layers and thoroughly compacted. Punch holes in base of structure to allow for adequate drainage. Dispose of masonry materials removed.

3.2 REPAIR/RESTORATION

A. Match surface repairs to its immediate surrounding area. Complete this work in accordance with the applicable specification section.

END OF SECTION

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SECTION 02315

EXCAVATION, BACKFILL, COMPACTION AND DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Excavation, backfill and compaction for subsurface utilities
2. Removal, handling and disposal of rock not covered under Section 02410
3. Earth retention systems
4. Excavation, backfill and compaction for the abandonment of existing pipe
5. Temporary dewatering systems

B. Related Sections

1. Section 01570 - Temporary Controls
2. Section 02210 - Subsurface Investigations
3. Section 02320 - Borrow Materials
4. Section 02410 - Rock Excavation
5. Section 02740 – Bituminous Concrete Pavement

1.2 REFERENCES

A. ASTM D1557-07 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))

B. ASTM D1556-07 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

C. ASTM D2487-06e1 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D. ASTM D6938-08a - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

E. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F

1.3 DEFINITIONS

A. Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

B. Earth Retention Systems - Any structural system, such as sheeting and bracing or cofferdams, designed to retain in-situ soils in place and prevent the collapse of the sides of an excavation in order to protect employees and adjacent structures.

C. Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

D. Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include earth retention systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

E. Registered Professional Engineer - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

F. Shield System - A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

G. Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

H. Temporary Dewatering System – A system to lower and control water to maintain stable, undisturbed subgrades at the lowest excavation levels. Dewatering shall be provided for all pipelines, structures and for all other miscellaneous excavations.

I. Trench - A narrow excavation (in relation to its length) made below the surface of the ground, of at least three feet in depth. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

1.4 SUBMITTALS

A. Drawings and calculations for each Earth Retention System required in the Work. The submittal shall be in sufficient detail to disclose the method of operation for each of the various stages of construction required for the completion of the Earth Retention Systems.

1. Submit calculations and drawings for Earth Retention Systems prepared, signed and stamped by a Professional Engineer registered in the state where the work is performed.

B. Performance data for the compaction equipment to be utilized

C. Construction methods that will be utilized for the removal of rock

D. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:

1. For suitable soil materials removed during Excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.

2. For borrow materials; perform tests at frequency specified in Section 02320, Borrow Materials.

E. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled or at a minimum of one test per lift. The Engineer will determine the locations and lifts to be tested. The Contractor shall plan his operations to allow adequate time for laboratory tests and to permit taking of field density tests during compaction.

1. Methods and equipment proposed for compaction shall be subject to prior review by the Engineer. Compaction generally shall be done with vibrating equipment. Static rolling without vibration may be required by the Engineer on sensitive soils that become unstable under vibration. Displacement of, or damage to existing utilities or structure shall be avoided. Any utility or structure damaged thereby shall be replaced or repaired as directed by the Engineer.

2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.

a. Any costs associated with correcting and retesting as a result of a failure to meet compaction requirements shall be borne by the Contractor.

3. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than the project requirements, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.

4. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where trenches are so narrow that trench walls impact the attenuation of the gamma radiation, when adjacent to concrete that impacts the accuracy of determining moisture content, or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.

F. Dewatering plan for the excavation locations. Design shall include calculations and drawings stamped and signed by a Professional Engineer registered in the state where the work is performed.

1.5 QUALITY ASSURANCE

A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), and other State and local requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.

B. Employ the services of a dewatering specialist or firm when well points, deep wells, recharge systems, or equal systems are required. Specialist shall have completed at least 5 successful dewatering projects of equal size and complexity and with equal systems.

1.6 PROJECT CONDITIONS

A. Notify Dig Safe and obtain Dig Safe identification numbers.

B. Utilize private utility marking company to locate underground utilities prior to construction.

C. Notify utility owners in reasonable advance of the work and request the utility owner to stake out on the ground surface the underground facilities and structures. Notify the Engineer in writing of any refusal or failure to stake out such underground utilities after reasonable notice.

D. Make explorations and Excavations to determine the location of existing underground structures, pipes, building connection services, and other underground facilities in accordance with Section 02210.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Fill material is subject to the approval of the Engineer and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.

B. Satisfactory fill materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP. Additional requirements are included in Section 02320.

C. Satisfactory fill materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones over 6 inches in diameter. Unless otherwise stated in the Contract Documents, organic matter shall not exceed minor quantities and shall be well distributed.

D. Satisfactory fill materials shall not contain frozen materials nor shall backfill be placed on frozen material.

E. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material, if processed to the required gradation and compacted to the required degree of compaction. In no case shall salvaged materials be substituted for the required gravel base.

2.2 DEWATERING MATERIALS

A. Provide haybales and silt fence in accordance with Section 01570.

B. Provide silt filter bags (Dandy Dewatering Bag, Dirtbag, JMP Environ-Protection Filter Bag, or equal) of adequate size to match flow rate.

C. Provide dewatering equipment and materials for engineered dewatering systems.

PART 3 EXECUTION

3.1 PREPARATION

A. Public Safety and Convenience

1. Adhere to the State of Rhode Island requirements for all excavation work.

2. Take precautions for preventing injuries to persons or damage to property in or about the Work.

3. Provide safe access for the Owner and Engineer at site during construction.

4. Do not obstruct site drainage, natural watercourses or other provisions made for drainage.

3.2 CONSTRUCTION

A. Earth Retention Systems

1. Provide Earth Retention Systems necessary for safety of personnel and protection of the Work, adjacent work, utilities and structures.

2. Maintain Earth Retention Systems for the duration of the Work.

3. Sheeting

a. Systems shall be constructed using interlocking corner pieces at the four corners. Running sheet piles by at the corners, in lieu of fabricated corner pieces, will not be allowed.

b. Drive sheeting ahead of and below the advancing excavation to avoid loss of materials from below and from in front of the sheeting.

c. Sheeting is to be driven to at least the depth specified by the designer of the earth retention system, but no less than 2 feet below the bottom of the Excavation.

4. Remove earth retention system, unless designated to be left in place, in a manner that will not endanger the construction or other structures. Backfill and properly compact all voids left or caused by the withdrawal of sheeting.

a. Remove earth retention systems, which have been designated by the Engineer to be left in place, to a depth of 3 feet below the established grade.

B. Excavation

1. Perform excavation to the lines and grades indicated on the Drawings. Backfill unauthorized over-excavation in accordance with the provisions of this Section.

2. Excavate with equipment selected to minimize damage to existing utilities or other facilities. Hand excavate as necessary to locate utilities or avoid damage.

3. Sawcut the existing pavement in the vicinity of the excavation prior to the start of excavation in paved areas, so as to prevent damage to the paving outside the requirements of construction.

4. Perform excavation in such a manner as to prevent disturbance of the final subgrade. The Engineer or Owner may require the final six inches of excavation be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner, at no additional cost if subgrade disturbance is considered excessive as judged by the Engineer or Owner.

5. During excavation, material satisfactory for backfill shall be stockpiled in an orderly manner at a distance from the sides of the excavation equal to at least one half the depth of the excavation, but in no case closer than 2 feet.

    a. Excavated material not required or not suitable for backfill shall be removed from the site.

    b. Perform grading to prevent surface water from flowing into the excavation.

    c. Pile excavated material in a manner that will endanger neither the safety of personnel in the excavation nor the Work itself. Avoid obstructing sidewalks and driveways.

    d. Hydrants under pressure, valve pit covers, valve boxes, manholes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed.

6. Grade or create berms or swales to direct surface water from excavations to appropriate structures designed to accommodate storm water. If no structures exist, direct water to areas that minimize impacts to adjacent structures and properties.

7. Make pipe trenches as narrow as practicable and keep the sides of the trenches undisturbed until backfilling has been completed. Provide a clear distance of 12 inches on each side of the pipe.

8. Perform the excavation in such a manner as to prevent disturbance of the final subgrade. If excessive subgrade disturbance is occurring, as judged by the Owner or Engineer, then the final 6 inches of the excavation shall be performed by hand, with the use of a smooth-faced bucket, or other means acceptable to the Engineer or Owner.

    a. Grade the excavation bottom to provide uniform bearing and support for the bottom quadrant of each section of pipe.

    b. Excavate bell holes at each joint to prevent point bearing.

    c. Remove stones greater than 6 inches in any dimension from the bottom of the trench to prevent point bearing.

9. If satisfactory materials are not encountered at the design subgrade level, excavate unsatisfactory materials to the depth directed by the Engineer and properly dispose of the material. Backfill the resulting extra depth of excavation with satisfactory fill materials and compact in accordance with the provisions of this Section.

C. Contaminated Soils

1. Contractor to test based on results to follow the requirements within DEM regulations. If material is required to be removed from site, disposal procedures under the regulations shall be followed. See Department of Environmental Management, Office of Waste Management, Remediation Regulations, Section 1Z Special Requirements most recent amendment. In addition, adhere to requirements of Sections 02110 and 02120.

D. Backfill and Compaction

1. Unless otherwise specified or indicated on the Drawings, use satisfactory material removed during excavation for backfilling trenches. The Engineer may require stockpiling, drying, blending and reuse of materials from sources on the Project.

2. Spread and compact the material promptly after it has been deposited. When, in the Engineer's judgment, equipment is inadequate to spread and compact the material properly, reduce the rate of placing of the fill or employ additional equipment.

3. Prior to backfilling or placement of structures, excavated subgrades shall be proof compacted with either 10 passes of a 10-ton vibratory drum roller for open excavations or 6 passes of a large, reversible, walk behind vibratory compactor capable of exerting a minimum force of 2,000 pounds in trench or pit excavations. Soft or weak spots shall be over-excavated and replaced with compacted Granular Fill or compacted Crushed Stone wrapped in a non-woven geotextile, as directed by the Owner or their representative. If proof compaction will prove detrimental to the subgrade due to the presence of groundwater, static rolling may be allowed at the discretion of the Engineer or Owner.

4. Soil bearing surfaces shall be protected against freezing and the elements before and after concrete placement. If construction is performed during freezing weather, structures shall be backfilled as soon as possible after they are constructed. Insulating blankets or other means shall be used for protection against freezing at the discretion of the Engineer or Owner.

5. When excavated material is specified for backfill and there is an insufficient amount of this material at a particular location on the Project due to rejection of a portion thereof, consideration will be given to the use of excess material from one portion of the Project to make up the deficiency existing on other portions of the Project.

   a. Use borrow material if there is no excess of excavated material available at other portions of the Project.

6. Backfilling and compaction methods shall attain 92% of maximum dry density at +/- 2% optimum moisture content as determined in accordance with ASTM D1557.

7. Do not place stone or rock fragment larger than six inches in greatest dimension in the backfill.

8. Maximum loose lift height for backfilling existing or borrow material shall be 12 inches, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. In no case shall loose lift height for backfilling exceed 3 feet.

9. Do not drop large masses of backfill material into the trench endangering the pipe or adjacent utilities.

10. Install pipe in rock excavated trenches on a dense graded stone bedding with a minimum depth of 6 inches. Shape the stone bedding at the pipe bells to provide uniform support. Encase the pipe in the dense graded crushed stone bedding to a grade 6 inches over the top of the pipe and 12 inches on each side of the pipe.

11. Backfill from the bottom of the trench to the centerline of the pipe with the specified material. This initial backfill is to be placed in layers of no more than 6 inches and thoroughly tamped under and around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously.

12. Electrical conduit not encased in concrete, shall be backfilled with sand borrow conforming to the requirements of Section 02320. The backfill shall be placed in the trench for its full width and shall extend to 12 inches over the conduit.

13. Where excavation is made through permanent pavements, curbs, paved driveways, or paved sidewalks, or where such structures are undercut by the excavation, place the entire backfill to sub-grade with granular materials and compact in 6 inch layers. Use approved mechanical tampers for the full depth of the trench. If required, sprinkle the backfill material with water before tamping so as to improve compaction. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required to correct the problem, and shall then be refilled and properly compacted with the surface restored to required grade at no additional expense.

14. The Contractor shall not place backfill against or on structures until they have attained sufficient strengths to support the loads to which they will be subjected, without distortion, cracking, or other damage. As soon as possible after the structures are adequate, they shall be backfilled with suitable backfill material.

15. Place and compact backfill around manholes, vaults, pumping stations, gate boxes or other structures in six inch layers, from a point one foot over the pipe. Exercise care to protect and prevent damage to the structures.

16. Install impervious trench dams where stone borrow is used for pipe bedding to prevent groundwater from following along the stone bedding. Install dams every 100 feet.

E. Test Pit Excavation

1. General requirements of test pits are specified in Section 02210.

F. Dewatering

1. Obtain construction dewatering permits, as required by the State of Rhode Island.

2. Provide, operate and maintain adequate pumping, diversion and drainage facilities in accordance with the approved dewatering plan to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. Locate dewatering system components so that they do not interfere with construction under this or other contracts.

3. Conduct operations so as to prevent at all times the accumulation of water, ice and snow in excavations or in the vicinity of excavated areas so as to prevent water from interfering with the progress or quality of the work.

4. Take actions necessary to ensure that dewatering discharges comply with permits applicable to the Project. Dispose of water from the trenches and excavations in such a manner as to avoid public nuisance, injury to public health or the

environment, damage to public or private property, or damage to the work completed or in progress.

5. Repair any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain all the areas of work in a suitable dry condition.

6. Exercise care to ensure that water does not collect in the bell or collar holes to sufficient depth to wet the bell or collar of pipes waiting to be jointed.

7. Take precautions to protect new work from flooding during storms or from other causes. Control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, provide temporary ditches for drainage. Upon completion of the work, all areas shall be restored to original condition.

8. Brace or otherwise protect pipelines and structures not stable against uplift during construction.

9. Do not excavate until the dewatering system is operational and the excavation may proceed without disturbance to the final subgrade.

10. Unless otherwise specified, continue dewatering uninterrupted until the structures, pipes, and appurtenances to be installed have been completed such that they will not float or be otherwise damaged by an increase in groundwater elevation.

11. Temporarily lower the groundwater level at least two feet below excavations to limit potential "boils,"loss of fines, or softening of the ground. If any of these conditions are observed, submit a modified dewatering plan to the Engineer within 48 hours. Implement the approved modified plan and repair any damage incurred.

12. When subgrades are soft, weak, or unstable due to improper dewatering techniques, remove and replace the materials in accordance with Section 02320 at no cost to the Owner.

13. Notify the Engineer immediately if any settlement or movement is detected of survey points adjacent to excavations being dewatered. If settlement is deemed by the Engineer to be related to the dewatering, submit a modified dewatering plan to the Engineer within 24 hours. Implement the approved modified plan and repair any damage incurred to the adjacent structure at no cost to the Owner.

14. Dewatering discharge:

    a. Install sand and gravel, or crushed stone, filters in conjunction with sumps, well points, and/or deep wells to prevent the migration of fines from the existing soil during the dewatering operation.

    b. Do not discharge water into any sanitary sewer system.

    c. Provide separately controllable pumping lines.

    d. The Engineer reserves the right to sample discharge water at any time.

15. Install erosion/sedimentation controls for velocity dissipation at point discharges onto non-paved surfaces.

16. Removal

    a. Do not remove dewatering system without written approval from the Engineer.

    b. Backfill and compact sumps or ditches with screened gravel or crushed stone in accordance with Section 02320.

    c. Remove well points and deep wells. Backfill abandoned well holes with cement grout having a water cement ratio of 1 to 1 by volume.

3.3 PROTECTION

A. Protection of Existing Structures

1. All existing foundations, conduits, wall, pipes, wires, poles, fences, property line markers and other items which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from damage by the Contractor. Should such items be damaged, they shall be restored by the Contractor to at least as good condition as that in which they were found immediately before the Work began.

B. Accommodation of Traffic

1. Streets and drives shall not be unnecessarily obstructed. The Contractor shall take such measures at his own expense to keep the street or road open and safe for two-way traffic unless otherwise indicated.

2. Construct and maintain such adequate and proper bridges over excavations as may be necessary or as directed for the safe accommodation of pedestrians and vehicles. Provide substantial barricades at crossings of trenches, or along the trench to protect the traveling public.

3. Where deemed necessary, such additional passageways as may be directed shall be maintained free of such obstructions. All material piles, open excavations, equipment, and pipe which may serve as obstructions to traffic shall be protected by proper lights, signage, or guards as necessary.

4. All traffic controls shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

C. Erosion and Sedimentation Control

1. Take all necessary steps to prevent soil erosion.

2. Plan the sequence of construction so that only the smallest practical area of land is exposed at any one time during construction.

3. Temporary vegetation and/or mulching shall be used to protect critical areas exposed during construction as judged by the Engineer.

END OF SECTION

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SECTION 02317

UNDERGROUND WARNING TAPE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Underground Warning Tape

1.2 SUBMITTALS

A. Shop Drawing Submittals

1. Product Data

PART 2 PRODUCTS

2.1 MATERIALS

A. Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector.

B. Tape shall be 6 inches wide.

C. Tape shall be as manufactured by Seton Name Plate Corp., New Haven, CT; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Neligh, NE; Mercotape, Hachensach, NJ; or equal.

D. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

Type of Utility	Color	Warning Message
Sanitary Sewer	Green	CAUTION - SANITARY SEWER BURIED BELOW

E. The tape shall be of the type specifically manufactured for marking and locating utilities.

PART 3 EXECUTION

3.1 INSTALLATION

A. All buried pipe and fittings shall be installed with metallic-lined underground warning tape located no more than 24 inches below final grade to allow detection by a metal detector.

END OF SECTION

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SECTION 02320

BORROW MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Processed Gravel Borrow
2. Granular Fill
3. Sand Borrow
4. Stone Borrow
5. Ordinary Borrow

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction and Dewatering

1.2 REFERENCES

A. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

B. ASTM C117 - Standard Test Method for Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing

C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

D. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb./ft3)

E. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)

F. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

G. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.3 SUBMITTALS

A. Representative Samples of borrow materials taken from the source. Tag, label, and package the Samples as requested by Engineer. Provide access to the borrow site for field evaluation and inspection.

B. Provide sieve analysis (ASTM C136) and permeability analysis (ASTM D2434) from certified soils testing laboratory for all borrow materials. Take and test a sample, at no additional cost to the Owner for each 1,500 c.y. of borrow material placed.

C. Provide modified proctor analysis (ASTM D1557) from certified soils testing laboratory for all borrow materials.

D. The Engineer reserves the right to require more frequent testing than that which is specified above should the borrow characteristics change.

1.4 QUALITY ASSURANCE

A. No borrow shall be placed prior to the approval of Samples by the Engineer.

1.5 PROJECT/SITE CONDITIONS

A. Existing Conditions

1. Comply with any environmental requirements and restrictions.

2. Keep all public and private roadway surfaces clean during hauling operations and promptly and thoroughly remove any borrow or other debris that may be brought upon the surface before it becomes compacted by traffic. Frequently clean and keep clean the wheels of all vehicles used for hauling to avoid bringing any dirt upon the paved surfaces.

PART 2 PRODUCTS

2.1 PROCESSED GRAVEL BORROW

A. The compacted Processed Gravel Borrow to be used for gravel access roads and pavement subbase, or other area where a firm, free-draining subgrade is needed shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

B. Gradation requirements shall conform to the following:

Sieve	**Percent Passing**
3”	100
1 ½”	70 – 100
¾”	50 – 85
No. 4	30 – 60
No. 200	0 - 10

C. Stockpile the processed materials in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

2.2 GRANULAR FILL

A. Granular Fill to be used as fill material to achieve gravel base grade beneath structures, pavement, or other area requiring structural fill shall consist of inert material that is hard, durable stone and sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

B. Gradation requirements for Granular Fill shall conform to the following:

	Percent by Weight Passing Through	
Sieve Size	**Minimum**	**Maximum**

2/3rds loose lift thickness	100	--
No. 10	30	95
No. 40	10	70
No. 200	0	15

2.3 SAND BORROW

A. Sand Borrow material shall be supplied from an off-site borrow area approved by the Engineer. Testing of the off-site Sand Borrow shall be at the Contractor's expense.

B. Sand Borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable, rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by ASTM-C117 shall not exceed 10% by weight.

C. Material shall consist of a clean, non-plastic, granular material conforming to the requirements of a SW, SP or SM under the Unified Soil Classification System (USCS) (ASTM D2487).

D. The material shall have the characteristics that when placed and compacted, the soil particles will bind together so as to form a solid, stable surface capable of supporting rubber-tired vehicular traffic during wet weather periods as well as extended dry weather periods. The borrow material shall not contain fines to the extent that the surface layer becomes "greasy" when wet.

E. The material shall not contain stones larger than 3/8 inch in diameter.

F. Material consisting of frozen clogs, ice and snow will be rejected.

G. All sand borrow material to be used shall be subject to approval by Engineer, and Engineer reserves the right to reject any borrow material from the job that does not meet the above requirements.

2.4 STONE BORROW

A. Crushed Stone Borrow

1. Crushed stone borrow shall consist of one of the following materials:

a. Durable crushed rock consisting of the angular fragments obtained by breaking and crushing solid or shattered natural rock, and free from a detrimental quantity of thin, flat, elongated or other objectionable pieces. A detrimental quantity will be considered as any amount in excess of 15% of the total weight. Thin stones shall be considered to be such stones whose average width exceeds 4 times their average thickness. Elongated stones shall be considered to be stones whose average length exceeds 4 times their average width.

b. Durable crushed gravel stone obtained by artificial crushing of gravel boulders or fieldstone with a minimum diameter before crushing of 8 inches.

2. The crushed stone shall be free from clay, loam or deleterious material and not more than 1.0% of satisfactory material passing a No. 200 sieve will be allowed to adhere to the crushed stone.

3. The crushed stone shall have a maximum percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T-96) as follows:

   a. For Class 1 Bit. Conc. 30%**

   b. For Cement Concrete Aggregate 45%***

   c. Crushed Stone for Subbase 45%

   **Crushed stone for this use shall consist of crushed or shattered natural rock only. Crushed gravel stone will not be permitted.

   ***Except for 5000 psi or greater cement concrete and prestressed concrete which shall be 30%.

4. The crushed stone shall conform to the grading requirements shown in the following grading Table.

	Percent by Weight Passing Through	
Sieve Size	**Minimum**	**Maximum**
¾" Crushed Stone		
1"	100	--
¾"	90	100
½"	10	50
3/8"	0	20
No. 4	0	5

B. Dense Graded Stone Borrow

1. The crushed stone used for backfill shall be a dense graded mixture and conform to the following gradation requirements.

Sieve Size (Square Openings)	**Percent by Weight Passing Through**	
	Minimum	**Maximum**
5/8″	100	100
½″	85	100
3/8″	15	45
#4	0	15
#8	0	5

2.5 ORDINARY BORROW

A. Ordinary borrow shall have the physical characteristics of soils designated as type GW, GP, GM, SW, SP or SM, under USCS and shall not be specified as gravel borrow, sand borrow, special borrow material or other particular kind of borrow. It shall have properties such that it may be readily spread and compacted for the formation of

embankments. The borrow shall not include rocks with a major dimension greater than 8 inches.

PART 3 EXECUTION

3.1 INSTALLATION

A. Prior to the placement of borrow material, site preparation shall be completed as required by the Contract Documents, and approved by the Engineer.

B. Ensure that all materials are properly stockpiled on site to prevent contamination by other materials.

C. Place borrow material over the entire area in uniform lifts and compact in accordance with Section 02315.

D. Utilize on-site soils prior to using off-site borrow provided on-site soils meet the requirements of the specifications.

E. Utilize gravel borrow in all locations where a surface treatment has not been specified but requires a firm finish surface.

F. Processed gravel for pavement subbase is intended to provide a stable foundation for driveways, sidewalk and roadway repair where a gravel base has been specified.

G. Borrow shall be used as a replacement for unsuitable materials where poor soil conditions are encountered during the progress of the work, where approved by the Engineer. Borrow type will be determined by the Engineer. Borrow material used as a replacement for unsuitable soil is not intended to be an aid to dewatering.

H. Shape borrow used for pipe foundation material so that it supports the pipe properly and will not damage the pipe, bells, collars, or the pipe fittings.

I. Place all borrow to keep it free of other materials and to prevent segregation.

END OF SECTION

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SECTION 02410

ROCK EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Rock excavation for trenches and structures.

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction and Dewatering

1.2 DESCRIPTION

A. Removal of boulders greater than 1 cubic yard in volume is included under this Section of work. Removal of boulders under 1 cubic yard in volume is not considered part of this work and is considered a part of the work specified under Section 02315.

B. Rock excavation shall mean solid ledge rock or solid concrete which in the opinion of the Engineer requires for its removal, drilling and blasting, wedging, sledging, firing, or breaking up with power operated hand tools.

C. Material removed solely with a power-operated excavator or loose, previously blasted ledge, broken stone, weathered rock, cemented gravel, hardpan, glacial till, concrete, asphalt or masonry which may be encountered during trenching operations is not considered rock excavation.

1.3 SUBMITTALS

A. Construction methods that will be utilized for the removal of rock on the project.

B. Qualifications of professional blasting Consultant and a pre-blast survey.

C. A description of the proposed method for blasting, prior to beginning any blasting operations, detailing the proposed methods of blasting including the type of information to be included in the blasting monitoring seismograph reports.

1. Seismograph reports shall include plan of drilling, amount and type of loadings, kind and distribution of blasting caps, delays used and amount of explosive per day, order of firing, distance and direction of recording station from blast area, type of ground at recording station, time of readings displacements and frequency, copy or record, and brief discussion on vibratory effects.

D. Conduct preblast structure survey prior to start of blasting.

1. Conduct preblast structure survey on structures within areas affected by work that may be damaged by blasting. Include aboveground structures within at least 200 feet of areas to be blasted.

2. The purpose of the survey is to document existing conditions of structures prior to blasting. The survey is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as a result of blasting.

3. Record information for each structure surveyed:

a. Age and type of construction

b. Location and character of cracks

c. Evidence of settlement and leakage

d. Other pertinent information

4. Record preblast survey information on forms prepared specifically for preblast surveys.

5. Supplement written records with photographs or videotape recording.

6. Submit copies of written records and photographs or videotapes to respective property owner, as well as to the Engineer, prior to the start of blasting.

E. Blasting records - For each blast, document the following:

1. Location of blast in relation to Project Stationing or coordinate systems and elevation.

2. Date and times of loading and detonation of blast.

3. Name of person in responsible charge of loading and firing.

4. Details of blast design, as previously specified.

5. Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.

6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.

7. Comments by blaster in charge regarding damage to existing facilities, adjacent property, or completed work, misfires, fly rock occurrences, unusual results, or unusual effects.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 BLASTING

A. Comply with OSHA, State and Local regulations when blasting and handling explosives.

1. Providence Fire Department approval is required for all blasting operations. A pre-blast survey must be completed. The Fire Chief or his designated representative must witness the survey.

B. Assume full responsibility for the safety of the blasting operations and perform the work in a manner that will ensure the safety of personnel and that of existing structures, adjacent buildings, and completed new construction. The Contractor will be held responsible for claims for damage to property and underground structures. Repair in kind utilities, pipelines or house services damaged while conducting pre-drilling and blasting activities. Repair and maintain roadway and paved surfaces that are cracked or damaged during the course of pre-drilling and blasting. The pay limits for paving repair shall be as noted, regardless of the limits of necessary roadway repairs due to blasting.

C. Comply with current OSHA regulations as well as engage the services of a qualified, professional blasting Consultant who will design, review, evaluate and modify the blasting operations. Design the initial blasts and conduct test blasts (minimum four tests) until regular production controlled blast patterns are developed that produce the desired rate of excavation while meeting the requirements for vibration and air blast control specified. Periodically, or when requested by the Engineer, review the blasting operations and make such changes in the blasting operations as are required to produce a controlled blasting operation meeting the requirements of these specifications. Review by the Engineer of the Contractor's blast design shall not relieve the responsibility for obtaining adequate rock breakage.

D. Provide adequate notice to residents that may be affected by the use of explosives. In residential areas, provide the following:

1. Certificate of Insurance to cover a blasting operation.

2. Evidence that residential homes have been reviewed to satisfy all parties that pre-construction conditions are well documented.

E. Blasting Design Criteria

1. Exercise care in the drilling and blasting operations so that the remaining rock remains stable and to reduce overbreak to a minimum.

2. Control blasting by limiting the charge per delay to that which produces limited levels of ground vibrations as herein specified. Hire a qualified testing agency to measure the radial particle velocities using a seismograph. Peak radial particle velocity shall be the measure of the level of vibration.

3. The charge weight per delay used in blasting shall be such that the peak radial particle velocity shall not exceed 2.0 inches per second measured on the foundation material, rock, or overburden at the nearest structure. The Contractor shall modify the size and type of explosives used to meet this criteria or other limiting criteria.

4. For areas where controlled blasting is required, the charge weight per delay shall be such that the peak radial particle velocity shall not exceed 1.0 inch per second.

5. Air blast overpressures from blasting operations shall not exceed 0.02 psi.

6. The maximum depth of lift to be removed at any one time shall not exceed 6 feet.

7. Use blasting mats, chained logs, warning signs, guards, etc., in accordance with the best practice.

8. All blasting operations shall be done by electrical detonation.

9. Restrict blasting to daylight hours. In no case will blasting operations be permitted before 8:00 AM or after 5:00 PM.

10. These criteria may be adjusted by the Owner, if the blasting procedures based on monitoring results or in the opinion of the Owner are likely to be disruptive to nearby businesses, people, or to cause damage to structures. These changes may require the Contractor to revise blast design and reduce the size of charges.

F. In areas where the Contractor is allowed to pre-drill and blast ledge or rock formations without first removing the over-burden, the Contractor shall be required to firmly establish a profile of the solid ledge or rock that cannot be ripped free by the excavating

machine. The actual pay quantities will be based on the Engineers' determination of the actual profile and extent of the rock formations drilled and blasted by the Contractor and his verification of the rock formations once the trench has been opened.

G. Minimum excavation and clearance within rock trenches shall be per Section 02315.

H. The use of perchlorate containing explosives is prohibited.

3.2 BACKFILL

A. Backfill must be with material from the excavation or where the excavated material is considered unsuitable for backfill, with material wasted from other area of the job or, when directed by the Engineer in writing, with ordinary borrow. No stones, rocks, or boulders shall be used as backfill.

B. Minimum pipe bedding requirements shall be per Section 02315.

END OF SECTION

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SECTION 02503

TESTING OF SANITARY SEWER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Testing of Gravity Sewer Systems

B. Related Sections

1. Section 02515 – Polyvinyl Chloride (PVC) Pipe and Fittings
2. Section 02530 - Manholes
3. Section 02958 – Television Inspection of Pipelines

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING OF GRAVITY SEWER SYSTEMS

A. Test all gravity sewers for allowable leakage by low pressure air test or by an infiltration/exfiltration water test as described herein.

B. No building shall be connected to a newly installed sewer until the sewer has been satisfactorily tested.

1. Low Pressure Air Test

a. After completing backfill of a section of pipe including laterals, conduct a line acceptance test using low-pressure air. Perform the test under the supervision of the Engineer.

b. Seal-test pneumatic plugs before use in the actual test installation. Lay one length of pipe on the ground and seal at both ends with the pneumatic plugs to be checked. Introduce air into the plugs to 25 psig. Pressurize the sealed pipe to 5 psig. Satisfactory pneumatic plugs will hold against this pressure without bracing and without movement of the plugs out of the pipe.

c. After a manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs have been checked, place a plug in each end of the line (at each manhole), and inflate the plugs to 25 psig. Introduce low pressure air into this sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater that may be over the pipe. Allow a minimum of two minutes for the air pressure to stabilize. After the stabilization period (3.5 psig minimum pressure in the pipe), disconnect the air hose from the control panel to the air supply. The portion of the line being tested has passed the test if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any groundwater that may be over the pipe) is

not less than the time shown for the given diameters and lengths in Table 1 at the end of this Section.

d. Air tests shall cover a 1.0 psig pressure drop; 0.5 psig pressure drop tests are not acceptable.

e. In areas where groundwater is known to exist, install a one-half inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. The nipple shall be installed at the time the sewer line is installed. Immediately prior to the line acceptance test, determine the elevation of the groundwater by removing the pipe cap, blowing air through the pipe nipple to remove any obstructions, and then connecting clear plastic tube to the nipple. Hold the hose vertically and measure the height after the water has stopped rising in this plastic tube. Divide the height in feet by 2.3 to establish the pressure in pounds per square inch (psig) that will be added to all readings. (For example, if the height of water is 11.5 feet, then the added pressure will be 5 psig. This increases the 3.5 psig to 8.5 psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound per square inch and the timing remain the same.)

f. The maximum starting test pressure should not exceed 9 psig, regardless of groundwater level above the pipe. If the groundwater level is such that the added pressure would be greater than 5.5 psig (12.7 feet), the pipe section may be tested using a starting pressure of 9 psig.

g. Each pipe nipple installed to measure groundwater levels should be recapped subsequent to the air testing procedure to prevent future infiltration.

h. As an alternative to installing a pipe nipple in a manhole to measure the height of groundwater, excavate a test pit over the pipe to determine the height of groundwater.

2. Infiltration/Exfiltration Test

a. Where new sewers are installed in areas having a high groundwater level, conduct an infiltration test for a minimum of four hours under the supervision of the Engineer. Isolate various sections of the sewer using of watertight plugs, and measure the quantity of water entering the pipe during a predetermined time. If the conditions are such that groundwater table varies depending on surrounding influence and time of the year, or if the table elevation is unknown at the time of testing, excavate test holes as directed by the Engineer.

b. Where lines are installed in relatively dry areas, conduct an exfiltration test. Isolate various sections of the line using watertight plugs, and fill the line with water to a predetermined level. Determine the loss of water in a predetermined time by measuring the quantity of water required to refill the line to the original level.

c. The Engineer will determine the length of new sewer to be tested at one time, depending on the grade of the sewer.

d. Include losses through manholes in determining the loss in a sewer line. For an exfiltration test, fill manholes to the bottom of the cone or flat top section and allow the level to stabilize before beginning the test. Refilling to the reference line may be required before commencing the test.

e. The maximum acceptable loss, through either infiltration or exfiltration, shall not exceed 100 gallons per mile per 24 hours per inch of diameter of the pipe tested. When two or more pipeline sections are tested at the same time, the allowable leakage for the shortest section shall be used as the acceptable loss for the entire length being tested.

C. Vacuum Test for Manholes - Gravity Sewer Lines

1. After a manhole has been constructed, conduct a manhole acceptance test using the following vacuum test procedure:

a. Plug all lift holes with an approved non-shrink grout.

b. Plug all pipes entering the manhole, taking care to securely brace the plug from being drawn into the manhole.

c. Place the test head at the inside of the top of the precast concrete cone section and inflate the seal in accordance with the manufacturers' recommendations.

d. Draw a vacuum of 10 inches of mercury and shut off the vacuum pump. With the valves closed, measure the time for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than:

1 min. 0 sec. for 0-ft. to 10-ft. deep manholes

1 min. 15 sec. for 10-ft. to 15-ft. deep manholes

1 min. 30 sec. for 15-ft. to 25-ft. deep manholes

e. If the manhole fails the initial test, make repairs with a non-shrink grout. Re-test until a satisfactory test is obtained.

D. Allowable Deflection Test for flexible pipe types including polyvinyl chloride (PVC), high-density polyethylene (HDPE), or polypropylene (PP)

1. Pipe deflection measured not less than 45 days after the backfill has been completed shall not exceed 5 percent. Deflection shall be computed by multiplying the amount of deflection (average outside diameter less twice the average wall thickness diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

2. Deflection shall be measured with a rigid mandrel (Go-No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Submit drawings of the mandrel with complete dimensions for each diameter of pipe to be tested. Hand-pull the mandrel through all sewer and drain lines.

3. Uncover any section of pipe not passing the mandrel and replace the bedding and backfill to prevent excessive deflection. Replace sections of the pipe as

necessary. Retest repaired pipe immediately upon backfilling of trench until acceptable.

4. Retest the repaired section of pipeline again, from manhole to manhole, after the 45-day backfill period, until acceptable.

E. Test Failures

1. In case leakage or deflection exceeds the above specified amount, locate the failure and repair it in accordance with applicable Sections of this Contract.

2. Pipelines with shear-type breaks, "fishmouths" or damaged gaskets, cracked bells or couplings, hairline fractures, or structural damage shall be replaced. Mechanical sleeve couplings, poured concrete collars or similar repairs are not permitted. The use of pressure grouting repair techniques will not be allowed without the written consent of the Engineer.

3. After repairs have been made, re-test the line and repeat the process of repairing and re-testing until satisfactory test results, as specified in this Section, are obtained.

F. Alignment of Gravity Sewers and Drains

1. Lay gravity sewers and drains accurately to line and grade.

2. After the pipe is laid and backfill complete, TV inspect the interior of the pipe from manhole to manhole. If excessive deviation in either the horizontal or vertical alignment is observed by the Engineer, the alignment is considered unacceptable.

3. If the alignment is unacceptable due to horizontal displacement, the Contractor will be allowed to construct intermediate manholes at his own expense. If the alignment is unacceptable due to vertical displacement, remove and replace the pipe to the proper grade.

END OF SECTION

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SECTION 02515

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. PVC Gravity Pipe and Fittings

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction, and Dewatering
2. Section 02317 – Underground Warning Tape
3. Section 02320 – Borrow Material
4. Section 02503 – Testing of Sanitary Sewer and Storm Drainage Systems

1.2 REFERENCES

A. ASTM D2241 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR)

B. ASTM D2412 - Standard Test Method for External Loading Properties of Plastic Pipe by Parallel-Plate Loading

C. ASTM D2444 - Standard Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)

D. ASTM D3034 - Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

E. ASTM D3139 - Standard Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

F. ASTM D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

G. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

H. ASTM F679 - Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

1.3 SUBMITTALS

A. Submit specifications and shop drawings for materials and equipment furnished under this Section.

B. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified herein.

1.4 QUALITY ASSURANCE

A. Each type of PVC pipe and fittings shall be from a single manufacturer. Alternatively, the pipe manufacturer shall provide certification that the fittings are suitable for installation with the pipe.

B. Inspection of the pipe will also be made by the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job site.

PART 2 PRODUCTS

2.1 MATERIALS

A. Gravity Pipe

1. Polyvinyl chloride (PVC) pipe shall be of the size indicated on the Drawings or as specified and shall conform to the latest revision of ASTM D3034, Type SDR 35 for diameters less than or equal to 15 inch diameter and ASTM F679 for pipe greater than 15 inch diameter. Standard laying lengths shall not exceed 14.0 feet.

2. Joints shall be elastomeric gasket joints and shall provide a watertight seal. Gaskets shall be in accordance with ASTM F477. Assembly of joints shall be in accordance with ASTM D3212.

3. The minimum "pipe stiffness" (load divided by change in inside diameter in direction of load application) at 5% deflection shall be at least 46 psi for pipe tested in accordance with ASTM D2412.

4. No shattering or splitting shall be evident when 150 ft.-lbs. and 210 ft.-lbs. is impacted on 4 inch and 6 inch diameter pipe, respectively, in accordance with ASTM Method of Test D2444.

5. Pipe lengths and fittings to be used on the project shall be clearly marked on the outside in bold type with the name of the manufacturer, pipe size, pipe material, pipe class, and ASTM designation.

6. Gravity Pipe Building Connections

a. Gravity pipe building connection wyes and tees are to be laid in the run of the main pipeline. The wyes and tees shall be the same material as the main line and shall conform in material, joints and class with the line into which they are to be laid.

b. Eighth and sixteenth bends and end plugs are to be of the same material and class or strength designation as the pipe for the house connection.

c. Unless noted on the Drawings, house service piping shall be 6 inch diameter and shall be of the same material as the main line PVC pipe.

7. Lateral Service Chimneys

a. Pipe and fittings shall be 6 inch diameter and be of the same material as the main line PVC pipe.

b. Construct service chimneys with precast concrete sections. Cast-in-place chimneys will not be acceptable.

c. Concrete chimneys shall be designed so that the weight of the chimney is not transferred onto the main line pipe or tee.

d. Concrete used for construction of chimneys shall be 5,000 psi at 28 days.

PART 3 EXECUTION

3.1 HANDLING PIPE AND FITTINGS

A. Take care in loading, transporting, and unloading to prevent injury to the pipe. Do not drop pipe or fittings. Examine pipe and fittings before installing, and no piece shall be installed that is found to be defective.

B. If any defective pipe is discovered after it has been installed, remove and replace it with a sound pipe in a satisfactory manner. Thoroughly clean pipe and fittings before installing, keep clean until they are used in the work, and conform to the lines, grades and dimensions required when installed.

C. Pipe ends requiring cutting shall be cut square without damage to the remaining pipe. Bevel cut pipe ends 1/8 inch at approximately 30 degrees to provide proper assembly of the joint. Beveling can be done with a coarse file or portable grinder.

D. Support stored pipe from below at not more than 3 foot intervals to prevent deformation. Do not stack pipe higher than 6 feet. Store pipe and fittings in a manner which will keep them at ambient outdoor temperatures. Provide temporary shading as required to meet this requirement. Simply covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted.

3.2 INSTALLATION

A. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this required check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. Install piping and fittings true to alignment and grade. If necessary, each length of pipe shall be cleaned out before installation.

C. Excavation, trenching and back filling procedures shall be in accordance with Section 02315.

D. All PVC gravity pipe shall be installed on a bed of 3/4-inch crushed stone borrow meeting the requirements of Section 02320 and have a minimum depth of 6 inches. The 3/4-inch crushed stone borrow shall also completely encase the pipe and cover the pipe to a grade 6 inches over the top of the pipe for the entire width of the trench. Bell holes shall be made in the 3/4-inch crushed stone borrow bedding such that the pipe shall be uniformly supported throughout the entire length of the barrel section.

E. All pipe shall be tested in accordance with Section 02503.

F. Deflections in Pipe Alignment

1. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint, and shall be approved by the Engineer.

2. Prior to deflecting the pipeline, the spigot of the pipeline should be marked flush with the bell end to assure that the spigot is not withdrawn excessively as the result of the deflection. After the pipe is deflected, an adequate depth of jointing material must remain on the side where the spigot is away from home and an

adequate width of caulking space must remain on the opposite side of the pipe at the face of the bell.

3. The maximum deflection recommended by the manufacturer when using any pipe system must be observed when deflecting a pipeline.

4. In general, all radius curves called for on the Drawings or permitted at the time of construction are to be made using full lengths of pipe. The use of short lengths of pipe and extra joints in order to make a smaller radius turn will not be allowed without the written approval of Engineer.

G. Unsuitable Laying Conditions

1. No pipe shall be laid in water, in an unsuitable trench or during unsuitable weather conditions.

END OF SECTION

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SECTION 02530

MANHOLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Precast concrete manholes
2. Cast iron manhole frames and covers

B. Related Sections

1. Section 02503 – Testing of Sanitary Sewer Systems
2. Section 02315 – Excavation, Backfill, Compaction and Dewatering
3. Section 02320 – Borrow Material

1.2 REFERENCES

A. AASHTO – American Association of State Highway and Transportation Officials, Standard Specifications for Highways and Bridges, most recent edition

B. ASTM C32 - Standard Specification for Sewer and Manhole Brick (made from clay or shale)

C. ASTM A48 – Standard Specification for Gray Iron Castings

D. ASTM C150 – Standard Specification for Portland Cement

E. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes

F. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections

G. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets

H. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals

I. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

1.3 SUBMITTALS

A. Submit Shop Drawings, showing all details of construction, including, but not limited to, structure dimensions, reinforcing, joints, and pipe connections to structures.

B. Submit on all materials and products included in this specification, including, but not limited to, manhole rungs, manhole frames and covers, dampproofing coating, brick masonry, mortar, and non-shrink water-proof grout.

C. Submit weights of manhole frames and covers.

D. Submit design calculations including verification of adequate anti-flotation features and lateral earth pressures. Calculations shall verify that the manhole structure has been

designed to withstand the burial depth, submergence due to flooding, flotation, and dead and live loads.

1.4 QUALITY ASSURANCE

A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the Owner. Such inspection may be made at the place of manufacture, or at the Site after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. Materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, at no additional cost to the Owner.

B. At the time of inspection, the materials will be carefully examined for compliance with the latest ASTM designation specified and these Specifications, and with the approved manufacturer's drawings. Manhole sections will be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, and soundness. The surface shall be dense and close-textured.

C. Imperfections in manhole sections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs will be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at 7 days and 5,000 psi at 28 days, when tested in 3 inch by 6 inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

D. Personnel shall have confined space entry training as appropriate for the work to be performed.

E. Manholes shall be designed for lateral earth pressures and to resist flotation.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE MANHOLE SECTIONS

A. Precast concrete barrel sections and transition top sections, shall conform to ASTM C478 and the following requirements:

1. The wall thickness shall not be less than 5 inches for 48 inch diameter reinforced barrel sections, 6 inches for 60 inch diameter reinforced barrel sections and 7 inches for 72 inch diameter reinforced barrel sections.

2. Top sections shall be eccentric except that flat top sections shall be used where shallow cover requires a top section less than 4 feet as shown on the Drawings.

3. Barrel sections shall have tongue and groove joints.

4. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after fabrication and/or repair, whichever is longer.

5. Precast concrete barrel sections with precast top slabs and precast concrete transition sections shall be designed for a minimum of AASHTO HS20-44 loading plus the weight of the soil above at 120 pcf.

6. The date of manufacture and the name and trademark of the manufacturer shall be clearly marked on each precast section.

7. Precast concrete bases shall be monolithically constructed. The thickness of the bottom slab of the precast bases shall not be less than the barrel sections or top slab whichever is greater. Precast concrete bases shall be constructed with a 6 inch extended base, unless otherwise shown on the Drawings.

8. Knock out panels for piping shall be provided in precast sections at the locations shown on the Drawings. They shall be integrally cast with the section, 2½ inches thick and shall be sized as shown on the Drawings. There shall be no steel reinforcing in knock out panels.

9. The side wall height of the base section shall be a minimum of 12 inches above the top of the pipe coming into the manholes.

2.2 BRICK MASONRY

A. Bricks shall be good, sound, hard and uniformly burned, regular and uniform in shape and size, of compact texture. Underburned or salmon brick will not be acceptable and only whole brick shall be used unless otherwise permitted. In case bricks are rejected by the Engineer, they shall be immediately removed from the site of the work and satisfactory bricks substituted, at no additional cost to the Owner.

1. Bricks for the channels and shelves shall comply with the latest specifications of ASTM C32 for Sewer Brick, Grade SM.

2. Bricks for building up and leveling manhole frames shall conform to ASTM C32 Grade MS.

3. Poured concrete inverts will not be allowed.

B. Mortar used in the brickwork shall be composed of one part Type II portland cement conforming to ASTM C150 to two parts sand to which a small amount of hydrated lime not to exceed 10 lbs. to each bag of cement shall be added.

C. Sand used shall be washed, cleaned, screened, sharp and well graded as to different sizes and with no grain larger than will pass a No. 4 sieve. Sand shall be free from vegetable matter, loam, organic or other materials of such nature or of such quantity as to render it unsatisfactory.

D. Hydrated lime shall conform to ASTM C207, Type S.

2.3 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B or ASTM A48, Class 35B.

B. Manhole covers shall have a diamond pattern, pickholes and the word "SEWER", cast in 3 inch letters. Manhole frame and covers shall be manufactured by East Jordan Iron Works; Mechanics Iron Foundry; Neenah Foundry or equal.

C. Manhole frames and covers shall comply with the detail shown on the Drawings.

D. Manhole frames and covers shall be designed for a minimum of AASHTO HS20-44 loading.

2.4 JOINTING PRECAST MANHOLE SECTIONS

A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

2.5 MANHOLE RUNGS

A. Manhole rungs shall be drop front design, 14 inches wide with an abrasive step surface, steel reinforced, copolymer, polypropylene, plastic. Manhole rungs shall conform to OSHA requirements.

2.6 FLEXIBLE PIPE TO-STRUCTURE CONNECTORS

A. The flexible pipe-to-structure connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.

B. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.

C. The external bands shall be made entirely of 304 series non-magnetic stainless steel.

D. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.

E. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:

1. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.

2. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.

3. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

2.7 DAMPPROOFING

A. Dampproofing is required for all sanitary sewer structures.

B. Provide two coats of bituminous dampproofing on outer surfaces of precast manholes at the rate of 20-25 square feet per gallon in accordance with manufacturer's instructions.

C. Dampproofing coating shall be a factory-applied asphalt compound specially made to adhere to below grade concrete structures.

D. The dampproofing shall be Sonoshield semi-mastic, as manufactured by BASF; Dehydratine 4 by Euclid Chemical; RIW Marine Liquid by Toch Brothers; or equal.

2.8 NON-SHRINK, WATER-PROOF GROUT

A. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Installation

1. Construct manholes to the dimensions shown on the Drawings and as specified. Protect all work against flooding and flotation.

2. Set precast concrete barrel sections so as to be plumb and with sections in true alignment with a ¼ inch maximum tolerance to be allowed.

3. Install the precast sections in a manner that will result in a watertight joint. Seal the joints of precast concrete barrel sections with the preformed flexible joint sealant used in sufficient quantity to fill 75% of the joint cavity. Fill the outside and inside precast section joints with non-shrink grout and finish flush with the adjoining surfaces. Plug holes in the concrete barrel sections required for handling or other purposes with a non-shrink, water-proof grout or concrete and rubber plugs, and finish flush on the inside.

4. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides.

B. Pipe Connections

1. Stubs

   a. Connect pipe stubs for future extensions to the structures as shown on the Drawings and close the stub end by a suitable watertight plug.

2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE pressure pipe, steel, etc), use flexible pipe-to-structure connectors.

3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal, HDPE drainage pipe, etc):

   a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, water-proof grout.

   b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

C. Manhole Rung Installation

1. Steel reinforced copolymer polypropylene plastic steps shall be press fitted by hand driven hammer into preformed holes in cured precast sections, on 12 inch centers, by the precast concrete manufacturer.

D. Brickwork

1. Mix mortar only in such quantity as may be required for immediate use and use before the initial set has taken place. Do not retain mortar for more than one and one-half hours and constantly work over with a hoe or shovel until used. Anti-freeze mixtures will not be allowed in the mortar. No masonry shall be laid when the outside temperature is below 40°F unless provisions are made to protect the mortar, bricks, and finished work from frost by heating and enclosing the work with tarpaulins or other suitable material. The Engineer's decision as to the adequacy of protection against freezing shall be final.

2. Construct channels and shelves of brick as shown on the Drawings. The brick channels shall correspond in shape with the lower half of the pipe. The top of the shelf shall be set at the elevation of the crown of the highest pipe and shall be sloped 1 inch per foot to drain toward the flow through channel. Construct brick surfaces exposed to sewage flow with the nominal 2 inch by 8 inch face exposed (i.e., bricks on edge).

3. Set manhole covers and frames in a full mortar bed and bricks, a maximum of 12 inches thick for conical tops and 6 inches thick for flat top sections, utilized to assure frame and cover are set to the existing grade. Reset the manhole frames and covers to final grade prior to placement of final paving.

3.2 LEAKAGE TEST

A. Leak test sewer manholes in conjunction with the pipeline in accordance with Section 02503.

3.3 CLEANING

A. Clean new manholes of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 02534

SANITARY SEWER SERVICE RECONNECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Connecting new sanitary sewer service pipe to existing sanitary sewer service pipe.
2. Investigation work required to locate the existing sewer services.

B. Related Sections

1. Section 02210 – Subsurface Investigations
2. Section 02515 - Polyvinyl Chloride (PVC) Pipe and Fittings
3. Section 02958 – Television Inspection of Pipelines

1.2 SUBMITTALS

A. Submit material specifications and shop drawings for all materials furnished under this section.

B. Submit the pipe repair methods proposed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Straight pipe, adapters and fittings are to be of a type and class equivalent to the lateral pipe. Pipe materials shall conform to Section 02515.

B. Furnish adapter couplings as necessary to connect one pipe material to another or to connect one pipe size to another. The adapter couplings shall be constructed of elastomeric plastic with stainless steel clamp bands on each end, they shall be used only for the specific function intended as per the manufacturer's recommendations. The couplings shall be capable of sealing against infiltration, exfiltration and roots. The couplings shall be as manufactured by Can-Tex Industries, Clow Corporation, Fernco Joint Sealer Co., General Engineering Co. or equal.

PART 3 EXECUTION

3.1 SERVICE INVESTIGATIONS

A. Television inspect the sewer segments highlighted on the Drawings, in accordance with Section 02958, in order to identify the location of the existing sewer services along the main sewer line.

B. If the location of the existing sewer service at the property line is unknown, identify the service location by one or more of the following methods, with approval of Engineer:

1. Insert a transmitter into the service pipe through a clean-out or other access point inside the building that sends a signal to a receiver at the ground surface. Clean service pipe as necessary to complete work. Mark out the service location from

the main line sewer to the property line using marking paint, stakes, or other means.

2. Dig test pits to locate existing sewer services. If necessary, break into existing building connection pipes to determine the source of flow in the pipe. Repair the broken pipe until such time as connection to the new sewer is completed. Supply all materials needed to completely repair all pipes broken. Test pit work shall be carried out in accordance with Section 02210.

3. Perform smoke testing, dye water testing, or other investigation methods to determine the location, source, and type of flow in certain pipes within the project area.

C. Supply all materials to completely repair all pipes broken.

D. There may be delays while existing buildings are accessed, testing is accomplished, record ties are taken, and repair materials are obtained. Contractor's crew will be required to stand by, at the contractor's expense, during these delays and to assist Engineer in contacting the homeowners and taking record ties.

E. Control and/or divert flow using portable pumps, plugs, etc. during this work, as required to prevent the discharge of wastewater flow to the ground surface and to prevent flow backups into buildings.

3.2 INSTALLATION

A. Perform pipeline installation in accordance with Section 02515.

B. Complete service reconnection work on the day on which it was started.

C. Control and/or divert flow using portable pumps, plugs, etc. during this work, as required to prevent the discharge of wastewater flow to the ground surface and to prevent flow backups into buildings.

D. Provide written notification to each property owner at least 24 hours prior to the reconnection of the house service so that the owner may make arrangements to suspend use of the service during reconnection.

E. After the section of pipeline has been satisfactorily tested and when the Engineer informs the Contractor that the system is ready for operation, reconnect all service connections to the new sewer.

END OF SECTION

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SECTION 02535

BREAKING INTO EXISTING MANHOLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Breaking through the walls and inverts of existing manholes.
2. Connecting new pipes to existing structures.
3. Ancillary work associated with making the new connections to the existing structures.

B. Related Sections

1. Section 02515 – Polyvinyl Chloride (PVC) Pipe and Fittings
2. Section 02530 – Manholes

1.2 REFERENCES

A. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets.

B. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

1.3 SUBMITTALS

A. Submit shop drawings showing pipe connection details.

1.4 QUALITY ASSURANCE

A. Personnel shall have confined space entry training as appropriate for the work to be performed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Flexible Pipe-to-Structure Connectors

1. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.
2. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.
3. The external bands shall be made entirely of 304 series non-magnetic stainless steel.
4. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.
5. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:

a. Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.

b. Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.

c. Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

B. Non-shrink, water-proof grout

1. Non-shrink, water-proof grout shall be Hallemite; Waterplug; Embeco; or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. Core drill into existing structures in such a fashion as to make an opening of suitable size to accommodate the connecting pipe without excessive damage to the existing structure.

B. Manholes

1. For manholes, break out and rebuild existing inverts as required to provide an adequate base under the new channels being installed, and shaped to provide smooth continuous hydraulic flow through the manhole.

2. Control existing flows as required during the period of construction. No sewage or drainage will be permitted to flow directly against concrete or other masonry work until it is at least 48 hours old.

a. Temporary handling of sewage or drainage flows may be accomplished by inserting pipes from the inlet to the outlet of the manhole and by using temporary plugs, where appropriate, provided that such pipes do not interfere with satisfactory completion of the work and shaping of the inverts, nor cause excessive backing-up in the existing system upstream of the diversion. In cases where this type of temporary handling of flows is not possible, provide the necessary dams, plugs, etc., as required in upstream manholes, and pump the flow around the structure under construction.

b. When sewage is pumped or otherwise diverted around a particular structure, it shall be discharged back into the sewage system through existing downstream manholes. Under no circumstances shall sewage be permitted to run onto the surface of the ground.

C. Pipe Connections

1. Rebuild and tightly close existing manhole walls and inverts to provide an integral, water-tight structure around the new pipes.

2. For pipes with smooth exterior surfaces (PVC, ductile iron, HDPE, steel, etc), use flexible pipe-to-structure connectors.

3. Where flexible pipe-to-structure connectors cannot be used, such as pipes with rough, irregular or corrugated exterior surfaces (concrete, corrugated metal or HDPE, etc):

a. After the new pipe has been set in place, completely fill the hole around the new pipe and structure with non-shrink, water-proof grout.

b. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the exterior wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

END OF SECTION

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SECTION 02740

BITUMINOUS CONCRETE PAVEMENT AND CURB REPAIR

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. New bituminous concrete pavement
2. Cutting and preparing existing driveway pavement, sidewalks, and curbs
3. Temporary bituminous concrete trench repair
4. Full width bituminous concrete overlay.

B. For the purposes of this Section, Hot Mix Asphalt (HMA) and bituminous concrete have the same meaning.

C. Related Sections

1. Section 02315 - Excavation, Backfill, Compaction and Dewatering
2. Section 02320 – Borrow Material
3. Section 02760 – Pavement Markings

1.2 REFERENCES

A. State of Rhode Island Department of Transportation “Standard Specifications for Road and Bridge Construction”, 1997 Edition as amended.

B. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1990 Edition, as amended

1.3 SUBMITTALS

A. Job mix formula for each mix specified under this Section.

B. Certificate indicating the mixes specified meet or exceed the requirements specified herein.

PART 2 PRODUCTS

2.1 MATERIALS

A. Bituminous concrete paving shall conform to the requirements of Part 400, Bituminous Pavements, of the above referenced State of Rhode Island Department of Transportation "Standard Specifications for Road and Bridge Construction", 1997 edition, as amended.

B. Calcium chloride shall meet requirements of AASHTO M-144 and shall be spread wherever directed to control dust conditions. Engineer may direct Contractor to employ sprinkling of water in lieu of calcium chloride for dust control.

C. Tack coat shall conform to the requirements of Section 403, Asphalt Emulsion Tack Coat of the above-referenced Specifications.

D. Gravel borrow used for pavement subbase shall be in accordance with Section 02320 under Processed Gravel Borrow for Pavement Subbase.

PART 3 EXECUTION

3.1 PAVING – GENERAL

A. Install bituminous concrete pavement in accordance with Sections 300 and 400 of the State of Rhode Island Department of Transportation "Standard Specifications for Road and Bridge Construction", 1997 edition, as amended.

B. Place binder course as soon as possible after the gravel base has been prepared, shaped and compacted.

C. Place and compact binder course and base course by steel-wheeled rollers of sufficient weight to thoroughly compact the bituminous concrete.

D. Maintain pavement under this Contract during the guarantee period of one year and promptly (within 3 days of notice given by Engineer) refill and repave areas which have settled or are otherwise unsatisfactory for traffic.

E. All pavement thicknesses referred to herein are compacted thicknesses. Place sufficient mix to ensure that the specified thickness of pavement occurs wherever called for.

F. In no case will pavement be placed until the gravel base is dry and compacted to at least 95% maximum density at optimum moisture content.

G. All manhole frames, catchbasin frames and utility boxes are to be set to the grade of the binder course until such time as the top course is placed. Then reset the frames to the grade of the top course. All excavated materials removed for raising of the frames and utility boxes are to be replaced with concrete. This ring of concrete shall be filled flush with the surrounding binder course.

H. Furnish and spread calcium chloride on disturbed surfaces to control dust conditions as directed by Engineer.

I. The contact surfaces of curbings, castings, and other structures shall be painted with a tack coat prior to placement of paving.

J. Along curbs, structures and all other places not accessible with a roller, the paving mixture shall be thoroughly compacted with tampers. Such tampers shall not weigh less than 25 pounds and shall have a tamping face no more than 50 square inches in size. The surface of the mixture after compaction shall be smooth and true to the established line and grade.

K. When the air temperature falls below 50ºF, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials and placing and compacting the mixtures.

L. No mixtures shall be placed when the air temperature is below 40ºF, or when the material on which the mixtures are to be placed contains frost or has a surface temperature Engineer considers too low.

M. No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate suitability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

N. All bituminous concrete pavement shall be placed to the grades and in accordance with the cross-sections and details shown on the Drawings.

O. Existing drainage patterns shall not be altered by the new pavement construction unless otherwise shown on the Plans or directed by Engineer.

P. Maintain binder course in a condition suitable for traffic throughout the construction period. Defects shall be repaired within 3 days of notification. Cold patch utilized during winter months shall be removed and replaced with hot mix prior to placement of top course.

Q. When directed by Engineer, prepare the binder course for placement of the top course. The binder course shall be regraded, placing additional bituminous concrete where settling has occurred, repairing the existing surface and replacing broken or damaged sections at no additional cost to Owner. The binder course surface shall be in all respects acceptable to Engineer before the final pavement is placed. The surface shall then be broom cleaned.

R. Following preparation of the binder course, apply the tack coat at 0.10 gallons per square yard and place the top course. The tack coat shall be applied if a period of greater than 30 calendar days has elapsed between completion of the binder course and application of the top course.

S. Apply joint adhesive to all longitudinal joints for proper adhesion of the new bituminous concrete pavement to the existing.

T. Pavement markings damaged during the course of the work shall be repaired in accordance with Section 02760.

3.2 ROADWAYS AND PAVED AREAS

A. Unless otherwise shown on the Drawings, new pavement shall be laid in two courses, a 2-inch binder course and a 1½-inch top course. It shall be laid on a 12-inch processed gravel base.

B. Place binder course as soon as possible after the gravel subbase has been prepared, shaped and compacted.

3.3 TEMPORARY BITUMINOUS CONCRETE TRENCH REPAIR

A. Prior to the excavation, sawcut the existing pavement in the vicinity of the work to prevent damage to the pavement outside of the specified paylines and/or the requirements of construction. Sawcut shall be straight and neat in appearance, jogs and angled cuts will not be allowed, any milled areas adjacent to the trench patch area shall have the edges sawcut.

B. Immediately after completing the backfill, or in no event later than the end of the work day, place and compact a 13.5-inch gravel subbase in 2 even lifts to match the existing asphalt grade. The Contractor will be allowed to backfill trenches to grade with gravel during the work week, but will be required to install the temporary pavement on the trenches by the end of each work week.

C. All pavement edges that have been damaged shall be sawcut again if necessary to re-establish a straight clean line between the existing pavement and trench patch.

D. All structures shall be set to the existing roadway elevations.

E. A 2-inch thick temporary bituminous concrete top course shall be placed and compacted so that the upper surface shall provide the proper roadway cross-section. The placement of temporary trench repair shall be completed weekly. Contractor to plan paving schedule to accommodate inclimate weather and still meet the weekly paving requirements.

F. Until such time as the final paving is performed, the Contractor shall maintain all temporary trench repairs by filling any holes that may develop and by adding additional bituminous material to maintain the surface of the trench even with the adjacent pavement.

G. No pavement used as trench repair shall remain as part of a final or permanent repair.

H. After a period of 90 days has elapsed since placement of the temporary patch, or such other period as directed by the Engineer, proceed with the permanent pavement trench repair.

3.4 PERMANENT BITUMINOUS CONCRETE TRENCH REPAIR

A. Permanent trench repairs may only occur after the 90-day settlement period has passed, or 24 hours after backfill using Controlled Density Fill as approved by the Engineer.

B. At the time of permanent patching, the Contractor shall remove all temporary bituminous concrete trench repair and gravel materials to a depth of 3.5-inches below the adjacent grade. Contractor shall then sawcut the existing pavement beyond the edges of the trench to expose one foot of undisturbed soils and remove pavement on either side of the trench. Sawcut shall be straight and neat in appearance, jogs and angled cuts will not be allowed.

C. Following removal of temporary trench repair and additional gravel, compact the trench to meet requirements as specified in Section 02315.

D. All structures shall be set to the existing roadway elevations. Structures shall be left flush with the existing roadway until the top course is placed. No structure shall be raised until such time as the final paving is to be done.

E. The edges of the existing pavement where the joints are to be formed shall be thoroughly coated with tack coat to ensure adhesion between the two pavements.

F. A 2-inch thick bituminous concrete binder, shall then be placed and compacted to a point 1.5 inches below the adjacent road grade.

G. If the period of time is greater than one week between the placement of the binder course and the placement of the top course, apply tack coat on the binder prior to placing the top course. The tack coat shall be RS-1 emulsion and be applied at a rate of 0.05 gallons per square yard.

H. Contractor shall then place and compact a 1.5-inch thick bituminous concrete Top Course, using a paving screed so that the upper surface is flush with the existing roadway after compaction.

I. The final surface shall be properly graded and cambered to provide a smooth surface of proper cross-section and blended into all adjacent existing pavements. Any permanent pavement repair that in the opinion of the Engineer does not meet this requirement, or that will form puddles 1/16-inch deep or greater shall be repaired or replaced at the Contractor's expense.

3.5 QUALITY CONTROL

A. All roller operators shall use infrared pistol thermometers to measure the temperature of the mat during rolling operations.

END OF SECTION

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SECTION 02760

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. All labor, materials, accessories, service and equipment necessary to furnish and apply all pavement striping, parking stalls, and traffic markings as indicated on the Drawings and as specified herein.

a. Replacement of pavement markings disturbed as part of construction activities

b. Replacement of pavement markings in permanent pavement repair areas

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment

1. There is no individual payment item for pavement markings. This item is incidental to the pavement repair items and payment shall be included within those Bid items. Refer to Sections 00410 (Form for General Bid) and 01290 (Application and Certificate for Payment).

B. Related Sections

1. Section 02740 - Bituminous Concrete Pavement

1.3 REFERENCES

A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.

B. Rhode Island Department of Transportation – Standard Specifications for Road and Bridge Construction, 2004

1.4 SUBMITTALS

A. Submit manufacturers literature and material specifications for all materials furnished under this Section including, but not limited to, the following:

1. Pavement marking paint

2. Paint application system and equipment

B. Submit affidavit stating submitted materials comply with the above-noted Standards.

1.5 WARRANTY

A. Provide a written one-year unconditional guarantee against fading, chipping, peeling, wearing, etc.

PART 2 PRODUCTS

2.1 MATERIALS

A. Waterborne Pavement Marking Paint

1. In accordance with the Rhode Island Department of Transportation – Standard Specifications for Road and Bridge Construction, 2004, as amended, pavement marking paint shall conform to the requirements of Section T.20.03.3 for waterborne pavement markings.

2. All paint for parking stall and traffic markings shall be fast drying white or yellow traffic paint complying with the applicable paragraphs of the Standard Specifications. The paint shall be capable of being applied to bituminous and portland cement concrete pavements with striping equipment that does not require heating above ambient temperatures.

3. The following additional pavement marking paint requirements shall be met:

   a. The total nonvolatile content shall not be less than 70% by weight.

   b. Pigment shall be 45-55% by weight.

   c. Weight per gallon shall not be less than 12.5 pounds.

   d. Drying time to no pickup shall be 15 minutes.

4. No reflective glass beads will be required.

5. The material shall not lift from the pavement in the freezing weather, and shall not smear or spread under normal traffic conditions or at temperature below 120 degrees F.

6. The paint shall not deteriorate by contact with sand, sodium, chloride, calcium chloride or other chemicals used against the formation of ice on the pavement, because of the oil content of pavement materials, or from gasoline, grease and oil drippings from vehicles.

PART 3 EXECUTION

3.1 PREPARATION

A. Protect the building, walks, pavement, curbing, trees, shrubs, mulch, etc. from over-spray of paint and damage.

B. Clean and sweep all areas to be striped or re-striped of all sand, dirt, grease, oil, etc. Large areas of tar, grease or foreign materials may require sand blasting, steam cleaning or power brooming to accomplish complete removal.

C. Application of markings shall not proceed until authorization is received from Engineer.

D. Bituminous concrete pavements shall have been in place for at least 7 days prior to the application of pavement markings.

3.2 INSTALLATION

A. Installation shall be by skilled workers who are experienced and normally employed in the Work of installing pavement markings.

B. All permanent pavement repair areas shall be repainted to match the original pavement markings.

C. Painting shall be in accordance with Rhode Island Department of Transportation – Standard Specifications for Roads and Bridges Construction, 2004, as amended.

D. All stripes shall be applied one coat with brush, spray or marking machine over dry clean pavement only.

E. All paint shall be installed at a rate of not more than 300 linear feet of 4- inch wide lines per gallon of paint (approximately 0.016 inch dry film thickness).

F. If material is applied to the pavement by an extrusion method, one side of the shaping die shall be the pavement and the other three sides are contained by, or are part of, suitable equipment for controlling the flow of paint.

G. Where entire areas are to be cross-hatched as directed by the Drawings, the 4-inch-wide straight white parallel stripes 36 inches on center shall be laid out and painted in solid lines.

H. After application and proper drying time, the material shall show no appreciable deformation or discoloration under traffic conditions and in air and/or road temperature ranging from 0 - 120 degrees F.

I. The stripe shall maintain its original dimensions and placement. The exposed surface shall be free from tack. Cold ductility of the material shall permit normal movement with the pavement surface without chipping or cracking.

J. No paint or pavement marking material shall be heated above the temperature allowed per manufacturer's instructions.

K. All painting shall be performed in a neat and workmanlike manner.

L. Lines shall sharp and clear with no feathered edging or fogging.

M. If, for any reason, material is spilled or tracked on the pavement or any markings applied by Contractor, in Engineer's judgment, are not acceptable, then the Contractor shall remove such material by a method that shall not damage the roadway surface and is acceptable to Engineer, clean and prepare the surface for a reapplication of markings, and reapply the markings as directed.

N. Application Requirements

1. Marking paint shall be applied at a rate of 100 to 115 square feet per gallon.

2. Material application temperature shall be from 40°F to 120°F.

3. No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Engineer.

4. Minimum finished paint thickness shall be 15 mils.

3.3 PROTECTION

A. Markings shall remain protected until sufficiently dry to bear traffic on roadways that are open to traffic.

B. Precautions shall be taken to prevent tracking by tires of the striping equipment.

C. Traffic cones used for protection of markings shall be not less than 28 inches in height.

END OF SECTION

SECTION 02775

PORTLAND CEMENT CONCRETE SIDEWALKS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Sidewalks

B. Related Sections

1. Section 02315 - Excavating, Backfilling, Compaction and Dewatering
2. Section 02320 - Borrow Material

1.2 REFERENCES

A. ACI 301 (American Concrete Institute) - Specifications for Structural Concrete for Buildings.

B. ACI 304 (American Concrete Institute) - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

C. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

D. ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

E. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.

F. ASTM C33 - Concrete Aggregates.

G. ASTM C94 - Ready Mix Concrete.

H. ASTM C150 - Portland Cement

I. ASTM C260 - Air-Entraining Admixtures for Concrete.

J. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

K. ASTM C494 - Chemical Admixtures for Concrete.

L. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

M. ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

N. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.

1.3 SUBMITTALS

A. Submit concrete mix proposed for use, indicating design strength, supplier, batch quantities, and constituents. Provide test report copies indicating prior satisfactory performance in accordance with ACI 301.

B. Submit data and descriptive literature for concrete constituents including admixtures, aggregate tests, bond breaker, bonding agent, and repair grout.

C. Submit detailed methods proposed for curing and protection of concrete. This submittal shall be made not less than 10 days prior to the placement of any concrete.

D. Submit a truck load ticket for every concrete delivery. Ticket information shall include batch time and date, weights of all constituents, quantity of admixtures, water added at the batch plant and moisture content of coarse and fine aggregates.

E. Maintain an accurate daily record of the locations and quantity of concrete placed.

1.4 QUALITY ASSURANCE

A. Provide inspection of cast-in-place concrete work, and testing, including slump tests, air content, and standard compression testing. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Engineer. Such inspection and testing shall not relieve Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of this Section.

B. Provide notification prior to the start of any phase of concrete placement work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of concrete placements and at least 36 hours in advance of other inspections (forms, rebar, etc.).

C. Facilitate inspection and testing, and furnish the following:

1. Safe access to the work at all times to allow proper inspection of the work

2. Full and ample means and assistance for sampling and testing materials and proper facilities for inspection of work in plant and at project site

3. Covered box large enough to contain twenty-four standard concrete cylinders. At temperatures below 60°F, box shall be electrically heated and thermostatically controlled to maintain inside temperature of 60º to 80°F. Cylinders shall be placed in box immediately after molding and shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.

4. Access by the Engineer or his representative to the batch plant supplying the concrete at any time.

D. Compression tests shall consist of one set of 4 cylinders for each test made, cured, and tested by testing laboratories during progress of job. 6 cylinders shall be required for each test made with concrete mix containing fly ash or ground granulated blast furnace slag. One set of cylinders shall be taken for every 100 cubic yards of concrete or fraction thereof placed in any one day.

1. 1 cylinder of each set shall be tested for 7-day compressive strength; 2 cylinders shall be tested for 28-day compressive strength. The remaining cylinder shall be tested for 56-day compressive strength if either one of the 28-day tests are below the specified strength, otherwise the 56-day test will be eliminated.

2. For modified mix with fly ash or ground granulated blast furnace slag, 1 cylinder of each set shall be tested for 7-day compressive strength, 2 cylinders shall be tested for 28-day compressive strength and 2 cylinders shall be tested for 56-days compressive strength. The remaining cylinder shall be tested for 84-day

compressive strength if either one of the 56-day tests are below the specified strength, otherwise the 84-day test will be eliminated.

3. The Contractor shall pay for the services of an approved testing laboratory to test the cylinders. Compression strength test of cylinders shall conform to ASTM C39, latest revision. The cost of all testing work under this Section will be borne by the Contractor. The testing laboratory will submit certified copies of the test results directly to the Engineer and the Owner within 24 hours after tests are made.

4. Sampling, molding, curing and testing of cylinders shall conform to ASTM requirements. Specimens shall be cured under laboratory conditions. The Engineer may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength.

5. Report of tests shall include: name of project, date and location of concrete placement, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, type of fracture, and type of curing.

E. Slump test, to check consistency, shall be made from the sample used to mold cylinders. Additional slump tests may be taken of every batch delivered to job site.

F. Tests for determination of air content shall be made as required to verify conformance with the specifications.

G. The strength level of the concrete mix shall be considered satisfactory if both of the following criteria are satisfied:

1. Every arithmetic average of any three consecutive strength tests equals or exceeds the specified design strength.

2. No individual strength test (average of two cylinders from the same test group) falls below the specified design strength by more than 500 psi when the specified design strength is 5000 psi or less or by more that 10 percent of the specified design strength when the design strength is more than 5000 psi.

H. When tests of control specimens fall below these requirements, the Engineer will require 56-day or 84-day cylinder tests or core specimens taken from concrete in question and tested in accordance with ASTM C42. If these specimens do not meet strength requirements, the Engineer has the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance, and durability of structure. Additional testing, load tests, strengthening or removal and replacement of parts or structure and any costs associated with delay of project shall be at no additional cost to the Owner.

I. Any material or workmanship which is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.

J. If arrangements for corrections and/or replacements are not made within seven days after notice of rejection, the Owner has the right to have corrections and/or replacement made and charge cost thereof and any costs associated with delay of project against balance of monies withheld.

K. Acceptance of work and admixtures at the batch plant shall not prevent final rejection at job site upon arrival or after it has been installed, if work is found to be defective.

PART 2 PRODUCTS

2.1 MATERIALS

A. Portland cement concrete shall be an Air-Entrained 4,000 psi, ¾-inch mix with slump of 2-4 inches.

B. Gravel borrow for the sidewalk base shall be in accordance with Section 02320 - Borrow Material.

C. Sheet membrane curing compounds shall meet the requirements of ASTM C 309.

PART 3 EXECUTION

3.1 PREPARATION

A. Shape the subgrade parallel to the proposed surface and compact thoroughly. Fill depressions with suitable material and compact again until the surface is smooth and hard.

B. Install a gravel base to a depth of 8 inches on top of the subgrade. Fine grade the gravel base and compact thoroughly with approved mechanical tampers.

C. Place Portland cement panels 4 inches thick for sidewalks and 6 inches thick for driveways and driveway aprons in accurately set, smooth wooden or steel forms of sufficient strength to resist springing out of shape. The gravel base shall be fine graded and recompacted immediately ahead of pouring the concrete. Sidewalks shall match the top of the existing adjacent sidewalk panels.

D. Completely remove mortar and dirt from forms that have been previously used. The forms shall be well staked and thoroughly graded and set to the established lines with their upper edge conforming to the grade of the finished walk. Oil forms before placing concrete.

3.2 INSTALLATION

A. Reinforce the concrete slab with welded wire fabric, 6x6-W4 x W4.

B. Place concrete to half the desired depth at which point the welded wire fabric shall be placed or raised to the surface. The remaining concrete can then be placed. Care should be exercised to avoid walking in areas with reinforcing

C. No finish work shall be performed while free water is present. After water sheen has disappeared and concrete has started to stiffen, edging operations, where required, shall be completed. After edging and joining operations, the surface shall be floated. Immediately following floating, the surface shall be steel-troweled. Following troweling, the concrete sidewalk shall be given a broom finish.

D. Cure the concrete by covering with burlap or other acceptable material that shall be kept moist for at least five (5) days after placing the concrete.

END OF SECTION

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SECTION 02922

HYDROSEEDING & MULCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Loam
2. Lime
3. Fertilizer
4. Seed
5. Water
6. Sod

1.2 SUBMITTALS

A. Results of vegetative support material nutrient analysis and recommendation for limestone and fertilizer application rates.

B. Product data and specifications for the Bonded Fiber Matrix

C. Product data and specifications for the fertilizer and lime.

D. Product data for seed mixtures.

E. Based on results of vegetative support material nutrient analysis to be provided by the Owner, submit recommendation for limestone and fertilizer application rates.

1.3 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Deliver lime in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.4 TESTS

A. A certified statement shall be furnished to the Engineer by the Contractor prior to the start of work, stating the number of pounds of limestone, fertilizer, seed, and mulch, per 100 gallons of water and shall also specify the number of square yards of seeding that can be covered with the solution specified above.

PART 2 PRODUCTS

2.1 LOAM

A. Loam shall consist of fertile, friable, natural topsoil typical of the locality without admixture of subsoil, refuse or other foreign materials and shall be obtained from a well-drained arable site. It shall be such a mixture of sand, silt and clay particles as to exhibit sandy and clayey properties in and about equal proportions. It shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter. Topsoil as delivered to the site or stockpiled shall have pH between 6.0 and 7.0 and shall contain not less than 5 percent or more than 8 percent organic matter as determined by loss of ignition of moisture-free samples dried at 100 degrees Celsius. The topsoil shall meet the following mechanical analysis:

	PERCENTAGE FINER
1-in screen opening	100
No. 10 mesh	95 to 100
No. 270 mesh	35 to 75
0.002 mm*	5 to 25

*Clay size fraction determined by pipette or hydrometer analysis.

B. Place a minimum of 4 inches of loam.

2.2 LIME

A. Lime shall consist of pulverized limestone obtained by grinding either calcareous or dolomitic limestone so that 100% of the material will pass a No. 1 sieve, 80% shall pass a 100-mesh sieve and 45% shall pass a 200-mesh sieve. The ground limestone shall have a neutralizing value satisfactory to the Engineer. Lime as herein described shall be applied at the rate of not less than 50 pounds per 1,000 square feet, or higher, depending upon soil requirements as determined above.

2.3 FERTILIZER

A. Fertilizer shall be a commercial grade, chemical fertilizer for lawns, the elements of which are derived from organic sources and shall contain the percentages by weight recommended in the laboratory analyses.

B. The availability of the various elements shall conform to the standards of the "Association of Official Agricultural Chemists". A minimum of 50% of the nitrogen content by weight shall be derived from organic materials.

C. All fertilizer shall arrive on the job site in standard size bags, bearing the manufacturer's name, the content, weight and guaranteed analysis.

D. The Contractor shall be responsible in every respect for the fertilizer, and it shall be stored in a weatherproof enclosure on dunnage in such a manner that its effectiveness will not be impaired.

E. Fertilizer shall be applied to areas acceptable to the Engineer as ready for seed at a rate recommended by a state and/or federally supported soil experiment lab.

2.4 SEED

A. Seed shall be of the previous year's crop.

B. Required ranges:

1. Purity > 90%
2. Germination > 80%
3. Crop < 0.5%
4. Weed < 0.3%
5. Noxious Weed – 0%
6. Inert < 8%

C. The standard seed mixture shall be applied at a minimum rate of 175 lbs./acre, 4 lbs/1,000 s.f.

D. Grass seed shall conform to the following mixture in proportion by weight and weed content and shall pass the minimum percentages of purity and germination as indicated.

LAWN AREA SEED MIX	% WEIGHT
"Rebel II" Tall Fescue	70%
"Baron" Kentucky Bluegrass	10%
"Palmer" Perennial Ryegrass	20%

E. All seed shall comply with State and Federal seed laws.

F. A sworn certificate indicating each variety of seed, weed content, germination of seed, net weight, date of shipment and manufacturer's name shall accompany each seed shipment. Regardless of approval by the Engineer to sow the seed, complete responsibility for satisfactory results shall rest entirely on the Contractor.

2.5 WATER

A. Provide water for hydroseeding.

B. Make arrangements with Rhode Island College to obtain water for hydroseeding.

2.6 MULCH

A. Mulch shall be virgin wood fiber mulch applied at a rate of 1,500-lbs/acre or hay mulch applied at a rate of 3,500-lbs/acre.

2.7 SOD

A. All sod shall be from the same crop and shall be a Kentucky bluegrass/fescue blend and commercially grown from the same grower. Approved blends shall be:

1. 40 percent Kentucky Bluegrass
2. 30 percent Rye
3. 30 percent Fescue
4. Established height 1-1/2 inches

B. Sod shall be vigorous, well-rooted, free of insects and disease, weeds, stones and burned spots.

C. Notify Engineer of sod grower and grass type prior to delivery date and submit delivery date for viewing and approval of sod delivered.

D. Sod furnished shall be living sod containing at least 70% thickly matted grasses as specified and free from noxious weeds.

E. Sod shall be cut and delivered within 24 hours. It shall be free from noxious weeds and grasses. It shall have a soil layer no less than ½ inch and no more than 1 inch in thickness and shall have enough moisture to allow for proper rolling and handling.

PART 3 EXECUTION

3.1 HYDROSEEDING & MULCHING

A. Tracking of the vegetative support layer prior to hydroseeding shall be completed in accordance with Section 02921 and Part 3.1(I) below.

B. Lime, fertilizer, seed, and mulch shall be simultaneously applied in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of limestone, fertilizer, seed, and mulch shall be equal in quantity to those specified above.

C. Seed shall be sown only between the periods from April 15th to June 1st, and from August 15th to October 1st.

D. If as a result of rain, the prepared seedbed becomes eroded, the Contractor shall rework the topsoil until it is smooth and re-hydroseed such reworked areas.

E. No seeded area will be acceptable until it is covered with a satisfactory, healthy stand of quality grass of the variety specified. A satisfactory stand of grass, as determined by the Engineer, shall consist of a uniform stand of at least 60% established permanent grass species, with a uniform count of at least 100 plants per square foot. If the results of the spray operation are unsatisfactory, the Contractor will be required to repeat the hydroseeding process as needed to achieve a thick stand of grass.

F. The Contractor shall protect seeded areas from damage and shall repair and maintain all areas at his own expense at no additional cost to the Owner until a certificate of final acceptance is issued by the Engineer. The Contractor shall repair and reseed all defective or non-growth grass areas during the following season.

G. After side slopes have received vegetative support material, they shall be traversed by a bulldozer to create ridges running perpendicular to the slope to impede the travel of stormwater runoff. The tracking shall be done prior to hydroseeding.

H. The Contractor is fully responsible for providing adequate amounts of water to the seeded areas to provide an adequate growth.

I. All areas to be seeded shall be hydroseeded. Hand seeding will not be allowed.

3.2 SOD

A. Sod shall be laid in place expediently after delivery to the Site, but no later than 24 hours after arrival.

B. Sod shall be rolled flat with roller.

C. All sodded areas are to be fertilized following the same Specifications for general seeding areas.

D. During periods of higher than optimal temperature for species being specified and after all unevenness in the soil surface has been corrected, lightly moisten the soil immediately prior to laying the sod.

E. Lay the first row of sod in a straight line with subsequent rows placed parallel to and butted tightly against each other. Stagger lateral joints. Exercise care to ensure that the sod is not stretched or overlapped and that all joints are butted tight to prevent voids.

F. As sodding is completed in any one section, roll the entire section by making four passes with a hand roller weighing not more than 100 lbs/ft of width.

G. Irrigation of Sod

1. Contractor shall be responsible for all pre-plant and post-plant irrigation procedures and practices until the turf is established and accepted by the Engineer.

2. Prior to placement of sod, the soil shall be irrigated and moisture applied to a minimum depth of 1½".

3. Immediately after planting, irrigate plantings sufficiently to seal the soil around them. Keep the seeded areas moist by frequent light applications of irrigation water, at a minimum 4 times daily, and until sufficient rooting has occurred and new leaf tissue sprouting is in evidence.

3.3 MAINTENANCE AND PROVISIONAL ACCEPTANCE

A. Keep all planted areas watered and mowed and in good condition, all areas if and when necessary until a good, healthy, uniform growth is established over the entire area and shall maintain all these areas in an approved condition until final acceptance.

B. The Engineer will inspect all work for provisional acceptance at the end of the 10 week maintenance period, upon the written request received at least 10 days before the anticipated date of inspection. The maintenance period must occur during the growing season between March 31 and October 1 and shall include a minimum of three mowings.

C. A satisfactory turf will be defined as:

1. No bare spots larger than 2 sq. ft.

2. No more than 10 percent of total area with bare spots larger than 1 sq. ft.

3. No more than 15 percent of total area with bare spots larger than 6-in. square.

D. After the inspection has occurred but prior to provisional acceptance, a soil test shall be performed to determine if additional soil fertilization should occur. If necessary additional fertilized not to exceed 30 lbs/1,000 sq. ft. of 20-10-10 shall be applied as directed by the Engineer.

E. Furnish full and complete written instructions for maintenance of the planted areas to the Owner at the time of provisional acceptance.

F. The inspection by the Engineer will determine whether maintenance shall continue. Continue maintenance until all areas of the site meet the minimum requirements specified above.

G. After all necessary corrective work and clean-up has been completed, and maintenance instructions have been reviewed by the Owner, the Engineer will certify in writing the provisional acceptance of the turf areas. Maintenance of all turf areas shall cease on receipt of provisional acceptance.

3.4 GUARANTEE PERIOD AND FINAL ACCEPTANCE

A. All seeded areas shall be guaranteed for not less than 1 full year from the time of final acceptance.

B. At the end of the guarantee period, inspection will be made by the Engineer upon written request submitted at least 10 days before the anticipated date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the Engineer shall certify in writing the final acceptance of the seeded areas.

END OF SECTION

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SECTION 02952

MANHOLE LINING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Restoration and corrosion barrier composite liner for sewer manholes applied to the manhole benches, walls and corbels. Liner shall not be required for the manhole inverts.

B. Related Sections

a. Section 01550 – Traffic Regulation

b. Section 01580 – Temporary Bypass Pumping System – Wastewater

c. Section 02958 – Television Inspection of Pipelines

1.2 REFERENCES

A. ACI 305R – Hot Weather Concreting.

B. ACI 503R – Use of Epoxy Compounds for Coating Concrete.

C. ASTM C 78 – Flexural Strength of Concrete (Using Simple Beam With Third-Point Loading).

D. ASTM C 109 – Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).

E. ASTM C 157 – Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

F. ASTM C 190 – Tensile Strength of Hydraulic Cement Mortars (discontinued)

G. ASTM C 876 – Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete.

H. ASTM D 4138 – Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means.

I. International Concrete Repair Institute (ICRI) Technical Guideline No. 03730 – Surface Preparation Guidelines for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion.

J. National Association of Corrosion Engineers International, NACE RP 0188 – Discontinuity (Holiday) Testing of Protective Coatings.

1.3 SUBMITTALS

A. Manufacturer's product data, including physical properties, surface preparation, application instructions, and curing.

B. Manufacturer's test reports of in-place testing performed by an independent testing agency.

C. Qualifications of applicator, including:

1. Certification stating applicator is licensed and experienced in the application of the specified products.

2. List of a minimum of 5 recently completed Restoration and Corrosion Barrier Composite Liner projects, including project name and location, names of owner and engineer, and description of products used, substrates, and application procedures.

D. Certification that liner material is suitable for extended contact with municipal sewage and is chemically resistant to sewer gases.

E. Additional references, upon request of the Engineer.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications:

1. Licensed and experienced in the application of the specified products.

2. Applicators shall be trained for the application of the specified products.

B. The manufacturer shall have at least 5 years experience in the manufacture of the lining system being provided for this project. Similarly, the installer shall have at least 5 years experience installing the lining system being provided for this project.

C. The manufacturer shall have supplied and provided the installation for at least 10 lining projects of similar size and project conditions. The job locations and persons to contact for references shall be provided upon request by the Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:

1. Store materials in accordance with manufacturer's instructions.

2. Keep containers sealed until ready for use.

3. Store materials in a cool dry environment.

C. Protect materials during handling and application to prevent damage.

1.6 ENVIRONMENTAL CONDITIONS

A. Do not apply materials under the following conditions:

1. Temperatures exceeding the manufacturer's recommended maximum or minimum allowable.

2. Dusty or smoke-laden atmosphere.

3. Overflowing water.

1.7 SAFETY

A. The liner installer's personnel shall have Confined Space Entry training.

1.8 WARRANTY

A. Prior to the expiration of the 1-year warranty period, during a period of high groundwater and low sewage flow, CCTV inspect all manholes lined as part of the Work. Notify the Owner and Engineer as to the proposed time period for the CCTV inspection.

B. Make all necessary repairs to remedy defects or failures of the Work occurring within one year following the date of acceptance of the Work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Madewell Products Corporation, PO Box 902, Roswell, Georgia 30077

B. AP/M Permaform, P.O. Box 555, Johnston, IA 50131

C. FOSROC, Inc., 150 Carley Court, Georgetown, KY 40324

D. Or Equal

2.2 COMPOSITE LINER

A. General

1. Materials shall be from a single manufacturer.

2. Materials shall be compatible with substrate and with each other.

B. Hydraulic Cement Mortar

1. Hydraulic cement mortar shall be Mainstay ML-10, as manufactured by Madewell Products Corporation, or equal, fast-setting mortar used to stop leaks through cracks and holes.

2. Composition: Blend of hydraulic cements and fillers.

3. Compressive Strength (ASTM C 109)

a. 1 Day: 3,500 psi

b. 7 Days: 4,900 psi

c. 28 Days: 5,500 psi

4. Tensile Strength (ASTM C 190)

a. 7 Days: 290 psi

b. 28 Days: 575 psi

5. Working Time: 45 to 90 seconds at 77 degrees F.

C. Restoration Mortar

1. Restoration mortar shall be Mainstay ML-72 Sprayable Microsilica Cement Mortar, as manufactured by Madewell Products Corporation, or equal, low shrinkage, high strength polymer modified, sprayable microsilica mortar.

2. Composition: Blend of cements, microsilica, thermoplastic fibers, densifiers, polymer admixtures, and modifiers.

3. Compressive Strength (ASTM C 109)

a. 2 Days: 3,875 psi

b. 7 Days: 4,550 psi

c. 14 Days: 5,640 psi

d. 28 Days: 6,190 psi

4. Flexural Strength (ASTM C 78)

a. 7 Days: 825 psi.

b. 28 Days: 985 psi.

5. Tensile Strength (ASTM C 190)

a. 7 Days: 290 psi.

b. 28 Days: 575 psi.

6. Shrinkage (ASTM C 157) Modified

a. 28 Days: 0.04 percent.

7. Uniaxial Tensile Bond Strength, ACI 503R, Appendix A

a. 28 Days: Greater than 500 psi. Bond strength governed by substrate strength.

8. Color: Dark gray.

D. Epoxy Corrosion Barrier

1. Epoxy corrosion barrier shall be Mainstay DS-5 Epoxy, as manufactured by Madewell Products Corporation, or equal.

2. Composition: 100 percent solids, modified epoxy sprayable Mortar.

3. Thickness: Minimum of 100 mils in 1 or 2 coats.

4. Number of Components: 2.

5. Finish: Gloss.

6. Color: White.

E. Flexible Joint Sealant

1. Flexible joint sealant shall be ParsonPoxy FG, as manufactured by Parson Environmental Products, or equal.

2. Composition: 100 percent solids, trowel applied.

3. Thickness: minimum of 100 mils in 1 or 2 coats

4. Number of components: 2

5. Finish: Gloss.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive restoration mortar. Notify the Engineer in writing if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

B. Provide the Engineer with a minimum of 3 days advance notice of completion of surface preparation and start of application.

C. Before application of each material, surfaces to be lined will be inspected by the Engineer. Correct defects or deficiencies before application of subsequent material.

D. Inspection by the Engineer or the waiver of inspection of any portion of the work shall not relieve the Contractor of responsibility to perform the work as specified.

3.2 SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer's instructions.

B. Cleaning: Clean surfaces by water or abrasive blasting, or hand or power tools as required to remove all unsound concrete, contaminants, dirt, debris, and deteriorated reinforcing steel.

C. Inspection:

1. Inspect cleaned surfaces to identify and mark corroded reinforcing steel, and to locate cracks, leaks, and joints.

2. If indicated, perform electrical potential testing in accordance with ASTM C 876.

D. Replace or treat corroded reinforcing steel, repair cracks and leaks, and treat joints in accordance with manufacturer's instructions and as approved by the Engineer.

E. Refer to ICRI Technical Guideline No. 03730 – Surface Preparation Guidelines for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion.

F. Apply Madewell 1312P epoxy putty, or equal, after cleaning reinforcing steel to protect the steel from contamination and re-rusting.

G. Prepare surfaces to have a minimum profile of 1/16 inch, with aggregate exposed.

H. Inspect surfaces for soundness.

I. Saturate all surfaces thoroughly with clean water.

J. Apply restoration mortar as soon as water sheen is no longer visible (saturated surface dry).

K. Hydrostatic Leak Correction:

1. Stop visible hydrostatic leaks by application of hydraulic cement mortar after completion of surface preparation.

a. Mix only 1 to 2 pounds of mortar at a time.

b. Add water to form a viscous mass with consistency of modeling clay.

c. Apply by hand or trowel.

d. Press mixed material firmly into place, starting at top of leak and working downward.

2. Inject flowing leaks or cracks using a suitable polymer gel or foam approved by the Engineer. Remove excess or spilled material from concrete surface before application of restoration mortar.

L. Prior to application of restoration mortar, place covering over invert to prevent restoration material and epoxy corrosion barrier from entering the wastewater flow stream. Remove covering after work is complete.

M. Maintain uninterrupted wastewater flow at all times during the work.

3.3 APPLICATION OF RESTORATION MORTAR

A. Apply restoration mortar in accordance with manufacturer's instructions.

B. Apply by 1 of the following methods:

1. Low pressure, low volume spray equipment.

2. Wet mix shotcrete equipment.

3. Hand trowel into place.

C. Apply uniformly to substrate to the specified thickness.

D. Do not trap air in corners, behind exposed reinforcing steel, or between lifts.

E. Mortar Thickness: Apply a minimum thickness of 1 inch above peaks of existing profile after surface preparation.

F. Finishing: Finish surface with wood float, sponge float, broom, or brush to produce a textured surface to apply Corrosion Barrier Mortar.

G. Hot Weather Application:

1. Follow manufacturer's instructions to reduce evaporation rate of surface moisture until Corrosion Barrier Mortar can be applied.

2. If applying mortar under conditions such as high temperatures of mortar, substrate, or air, high winds; and low humidity; alone or in combination; rapid evaporation of surface moisture can occur and cause plastic shrinkage cracking. Apply Epoxy Corrosion Barrier or primer/sealer a maximum of 1 hour after placing Restoration Mortar.

3. If conditions prevent application of Epoxy Corrosion Barrier or primer, refer to ACI 305R-91, Figure 2.1.5 to estimate the evaporation rate of surface moisture from the mortar, based on temperatures, relative humidity, and wind velocity. Cover with plastic film or wet burlap to limit evaporation rate to a maximum of 0.1 pounds per square foot per hour.

H. Cold Weather Application:

1. Follow manufacturer's instructions for minimum application temperature and minimum number of days to protect from freezing.

2. During cold weather (a period when for more than 3 successive days the average daily outdoor temperature drops below 40 degrees F) place restoration mortar at a minimum temperature of 55 degrees F and protect mortar from freezing for a minimum period of 3 days at a temperature between 55 and 75 degrees F. Gradually reduce mortar temperature during the protection period so that the final 24 hours is held as close to 55 degree F as practical.

3. During periods not defined as cold weather, but when freezing temperatures may occur, protect the mortar against freezing as specified for cold weather for the first 24 hours after application.

3.4 APPLICATION OF EPOXY CORROSION BARRIER AND FLEXIBLE JOINT SEALANT

A. Apply Epoxy Corrosion Barrier and flexible joint sealant in accordance with manufacturer's instructions.

B. Apply Epoxy Corrosion Barrier and flexible joint sealant as soon as possible after finishing of restoration mortar.

C. Do not allow surface contamination to the finished restoration mortar before application of Epoxy Corrosion Barrier and flexible joint sealant.

D. Corrosion Barrier Mortar and flexible joint sealant thickness: apply a minimum thickness of 100 mils.

E. The flexible joint sealant shall be applied from the manhole frame to 3 feet below the frame.

3.5 CURING OF EPOXY CORROSION BARRIER AND FLEXIBLE JOINT SEALANT

A. Foot Traffic: Allow a cure time of 24 hours at 70 degrees F.

B. Curing Conditions:

1. Continue to protect Composite Liner from freezing throughout protection periods specified for cold weather application.

2. Shelter Composite Liner from direct impingement of water until 1 to 3 hours after application of Epoxy Corrosion Barrier, depending on substrate temperatures, after which cure sufficiently to be undamaged by water impingement or immersion at ordinary velocities.

C. Immersion Service: Reach a tack-free condition before being immersed.

3.6 FIELD QUALITY CONTROL

A. Field Quality Control Testing: Performed by the Contractor.

B. Check application for required minimum dry film thickness (MDFT).

C. Coated surfaces that fail to meet MDFT requirements will be rejected by the Engineer.

D. Destructive Dry Film Thickness Tests, ASTM D 4138:

1. Perform minimum of 1 set of tests for every 500 square feet of surface lined, and consist of 5 spot measurements taken within 2 feet of each other.

2. Average of the 5 measurements to equal minimum specified thickness, although individual measurements may underrun this amount by a maximum of 40 percent.

3. Recoat test areas with corrosion barrier mortar.

E. Spot Adhesion Testing of Restoration and Corrosion Barrier Composite Liner to Substrate:

1. Perform minimum of 1 uniaxial pull-off adhesion test for every 500 square feet of surface lined.

2. Remove and replace areas not meeting required 145 psi at 28 days minimum adhesion requirement.

F. Visual and Electrical Inspection for Holidays in Epoxy Corrosion Barrier:

1. Visual Inspection: Perform visual inspection for holidays in epoxy Corrosion Barrier. Mark areas identified for repair and reapplication of Epoxy Corrosion Barrier.

2. Electrical Inspection: Perform spark testing in accordance with NACE RP 0188 or as recommended by the manufacturer. Mark areas identified for repair and reapplication of Epoxy Corrosion Barrier.

3. Areas Marked for Repair or reapplication of Epoxy Corrosion Barrier. Sand or grind down to substrate, clean, spray with primer/sealer, and recoat with specified Epoxy Corrosion Barrier.

END OF SECTION

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SECTION 02953

PIPE LINING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Structural rehabilitative cured-in-place pipe (CIPP) liner

B. Related Sections

1. Section 01550 – Traffic Regulation
2. Section 01580 – Temporary Bypass Pumping System - Wastewater
3. Section 02958 – Television Inspection of Pipelines

1.2 REFERENCES

A. ASTM D790 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

B. ASTM F1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

C. ASTM D2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

D. ASTM D5813 - Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

E. 29 CFR 1910.146 – Permit Required Confined Spaces

1.3 SUBMITTALS

A. Submit material specifications, certified material testing results in accordance with ASTM F1216, D2990, and D5813, Material Safety Data Sheets, and shop drawings for all materials and equipment furnished under this Section.

B. Submit samples of public notifications.

C. Submit certification that liner material is suitable for extended contact with municipal sewage and is chemically resistant to sewer gases.

D. Submit a detailed description of the installation procedures that will be used. The description shall include, but not be limited to, bypass pumping plans, liner shot sequence plans, segment-specific liner inversion/cure methods, information on whether the liner will be wetted out on-site or offsite, wet-out quality control program (if onsite), and cool-down procedures. Verify that these procedures are recommended by the manufacturer.

E. Submit a contingency plan that includes methods and equipment to be used in the event that liner defects are encountered, and a description of backup equipment available to the installation crew, such as air compressors, lateral reinstatement cutters, etc.

F. Submit on measurements of the host pipes taken prior to lining.

G. Submit calculations for the liner thickness determination stamped by a Professional Engineer.

H. Submit typed pre-construction and post-construction television logs, 2 color copies of the pre-construction video and 2 color copies of the post-construction video saved onto CD-R/WR or DVD-R media. The electronic file names must be labeled to identify the sewer segment televised by street and upstream and downstream manholes.

I. Submit references upon request.

J. Submit results of liner testing as described in Section 3.8.

K. Upon request, submit pressure and temperature logs or "thermocouple logs" after completion of each cured-in-place liner installation.

L. Upon request, submit copies of cured-in-place liner order sheets after delivery to the site to the Resident Project Representative.

M. Submit liner samples cut out of the actual liner installations to an independent testing laboratory as described in paragraph 3.8 of this Section.

1.4 QUALITY ASSURANCE

A. The manufacturer shall have at least 10 years of experience in the manufacture of the lining system being provided for this Project. Similarly, the installer shall have at least 10 years of experience installing the lining system being provided for this Project.

B. Supervisory personnel shall have at least 5 years of experience in providing the required services and shall be present at the Site during all CIPP Work.

C. The installer shall have completed at least 10 lining projects of similar size and project conditions. Provide the Engineer with a list of these projects, including the location and a contact person for each.

D. If the installer elects to wet-out the liner on-site, the Contractor shall employ a Quality Control Program to ensure proper distribution of the resin. Both the Owner and the Engineer shall be notified a week in advance before commencing this work.

E. The liner installer's personnel shall have a 10-hour construction and safety training, confined space entry and other training as appropriate for the Work to be performed. The confined space entry shall be in accordance with the requirements and protocol as specified in 29 CFR 1910.146, Permit Required Confined Spaces, and ASTM D 4276-84.

1.5 PROJECT CONDITIONS

A. Lining may need to be performed off hours as all buildings are public and restroom use cannot be restricted.

B. Existing Conditions

1. The sewers to be lined as part of this project were television inspected in May 2014. The report and videos for this work is included in the Attachments to Supplementary Conditions.

2. It is the Contractor's responsibility to review all available information prior to bidding, including the television inspection logs and videos, so that the host pipe conditions can be ascertained.

1.6 WARRANTY

A. Prior to the expiration of the 1-year warranty period, during a period of high groundwater and low sewage flow, clean and CCTV inspect all cured-in-place pipes installed as part of the Work. Notify the Owner and Engineer as to the proposed time period for the CCTV inspection.

B. Make all necessary repairs and replacements to remedy defects, breaks, or failures of the Work occurring within one year following the date of acceptance of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Liner material shall be compatible with municipal sewage. The liner shall be chemically resistant to withstand exposure to sewer gases. The liner shall be fabricated to a size that, when installed, will neatly fit the internal circumference of the existing (host) pipeline. Allow for circumference stretching during installation. The minimum length shall be that necessary to effectively span the required distance. The installer shall verify the pipe lengths and diameters in the field before installation.

B. Liner shall be a polyester or vinylester felt tube impregnated with a polyester or vinylester resin and catalyst (CIPP liner).

C. The liner shall be constructed of material which, when installed, shall provide a structurally sound lining able to withstand all imposed static, dynamic and hydrostatic loads, independent of the load-bearing capacity of the host pipe.

D. Determine the liner thickness required for the existing site conditions and base the determination on providing a 50-year design life. Calculations for the determination of liner thickness shall be signed and stamped by a professional engineer registered in the state in which the Work is to be performed. The finished cured initial physical characteristics of the liner shall meet or exceed those specified below (assume long-term CIPP physical properties will be reduced by a minimum of 50% from the initial values).

Initial Structural Properties

Property	**Standard**	**Minimum Value**
Flexural Strength	ASTM D-790	4,500 psi
Flexural Modulus	ASTM D-790	250,000 psi

E. Use the available information described below to design the sewer liner, and collect any additional information needed to complete the liner design:

1. Boring logs (Section 00300)
2. Boring locations (Drawings)
3. Sewer depths (Drawings)
4. The May 2014 television inspection report
5. The May 2014 television inspection video (available for viewing at the Tighe & Bond office)

F. The flow capacity of the lined sewer shall have a final capacity equal to or greater than the original sanitary sewer (host pipe).

G. Curing equipment shall be capable of monitoring and controlling adequate flow, pressure, and temperature to properly cure the liner according to the manufacturer's recommended curing procedures.

H. CIPP liners shall comply with ASTM F1216 and be based on the following design criteria:

1. No bonding to the host pipe
2. Fully deteriorated host pipe
3. Factor of safety of 2
4. Long-term flexural strength – 50% of initial (minimum)
5. Long-term flexural modulus - 50% of initial (minimum)
6. Ovality of 2% of the pipe circumference (minimum)
7. Constrained Soil Modulus in accordance with AASHTO LRFD Section 12
8. Groundwater is at the existing surface grade at each liner location
9. AASHTO HS-20 live loads
10. Soil Load of 120 pounds per cubic foot
11. Minimum service life of 50 years

I. The liner shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness.

J. The wall color of the interior pipe surface shall not be dark or non-reflective, which could inhibit proper television inspection.

K. Sewing of liner pieces together to form the desired length for a particular run will not be allowed without the prior written approval of the Owner.

L. Holes made in the liner during the wet-out process or for other reasons shall be identified, marked and repaired prior to delivery to the job site. Puncture marks or tears must be brought to the Owner's attention for approval before insertion into the pipeline.

M. Based on a review of the Contract Documents and the pre-lining video, determine whether there is excessive infiltration or voids in the sewer segment to be lined, requiring the use of a preliner tube to control resin loss and liner thickness. If a preliner tube is determined to be necessary, provide preliner tube. Preliner tube shall be a reinforced plastic sheet formed into a tube fit into the host pipe being lined, continuous from manhole to manhole. Alternatively, grout pipe to halt infiltration.

PART 3 EXECUTION

3.1 PUBLIC NOTIFICATION

A. Implement a public notification program that includes, at a minimum, contacting each building connected to the sewer to be lined and informing them of the work to be performed and when the sewer will be off-line. The program shall include the preparation and distribution of written notices that describe the work, the schedule, and

how the work will affect the building occupants. The notices shall include a local telephone number for the Contractor that building occupants may call if they have questions on the work or need to relay problems that arise related to the work. The notices shall also indicate that odors traveling through the sewer pipe and into buildings may be generated during the lining work. Notices shall be approved by the Owner prior to distribution.

B. Prepare and distribute two notices to each home/business owner that will be affected by the lining work, as described below:

1. One week in advance of the lining work.

2. 24 hours in advance of the lining work.

C. Example one week and 24-hour notices have been appended at the end of this Section for reference.

D. If the lining work, including service reinstatement, is not performed within the schedule indicated in the written notice, contact the home/business owners to notify them of the schedule change.

3.2 WATER FOR CONSTRUCTION PURPOSES

A. Water will be made available to the Contractor from nearby hydrants for pipeline cleaning and installation of the liner.

B. Operation of hydrants shall only be performed with permission from the Owner.

C. Contractor shall provide backflow preventer that is approved by the Owner when water is drawn from Owner's hydrants.

D. No separate payment will be required for the use of Campus water.

3.3 CLEANING AND PRE-LINING TELEVISION INSPECTION

A. Cleaning of the existing sewer line shall, at a minimum, restore 95% of the sewer's original carrying capacity.

B. Clean sewer sections using a hydraulically propelled, high-velocity jet, or mechanically powered equipment where root intrusion and/or service pipe intrusions are to be removed. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all lines. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel.

C. Take special precautions so as to prevent flooding of the upstream manholes and prevent damage to public or private property.

D. No material is permitted to be disposed of, or stored, at the Site. All material shall be properly disposed of off-site, in compliance with local, state and federal regulations.

E. After cleaning, television inspect the sewer pipe in accordance with Section 02958. During inspection, service connection locations shall be carefully noted and logged as well as conditions that may prevent the proper installation of the liner. The Engineer shall be immediately notified in writing of unsuitable conditions.

F. Furnish two copies of the inspection reports and videos, for review and approval.

3.4 CUTTING OF PROTRUDING LATERALS

A. Cut protruding laterals where the protrusion prohibits the passage of equipment necessary to perform the specified work.

B. Use equipment specifically designed for this application.

C. Protruding laterals shall be cut to the contour of the pipe.

D. All pieces of pipe cut from the lateral shall be removed from the sewer mains. Debris will not be allowed to remain in the pipe.

E. For each lateral cut, record the pipe reach and station as measured during the performance of the work.

3.5 LINING

A. Provide traffic control in accordance with Section 01550.

B. Field verify all proposed liner lengths prior to construction.

C. Ensure that the correct liner is installed in each sewer main being rehabilitated.

D. During the lining procedure, isolate the sewer section at the upstream manhole by using a sewer plug. Take special precautions so as to prevent flooding of the upstream sewer system and damage to public or private property. If pumping or bypassing is required, supply the pumps, conduits, and other equipment necessary to divert the entire flow, in accordance with Section 01580.

E. The liner insertion shall be done according to the manufacturer's recommended installation procedures. Make field measurements as needed to ensure correct fit of liner.

F. After liner insertion is completed, cure the liner according to the manufacturer's recommended curing procedures using heat and pressure. The liner shall be expanded until pressed tightly against the existing (host) pipe wall with a concave dimple appearing at each service connection. Curing pressures shall not exceed 15 psi.

G. The lining shall have the ability to expand at least 2 inches larger than the host pipe diameter without splitting or rupturing.

H. CIPP liner installation shall comply with ASTM F1216. Installation, reformation and processing shall cause no degradation of the liner physical properties.

I. For water inversion/cure installations, cool the cured-in-place liner to a temperature below 100 degrees Fahrenheit before releasing the static head. The cool down procedure may include the introduction of cool water into the inversion standpipe to replace water being drained from a small hole in the liner made at the downstream end.

J. For air inversion/steam cure installations, cool the cured-in-place liner to a temperature 113 degrees Fahrenheit before relieving the internal pressure. The cool down procedure may also include the introduction of cool water into the inversion standpipe to replace the mixture of air and steam being drained from a small hole in the liner made at the downstream end.

K. Temperature or “thermocouple” logs shall be collected at the upstream and downstream manholes during the curing process to document that proper temperature, and cure times have been achieved.

L. The finished pipe shall be continuous (jointless) over the entire length of a lining run and be as free as commercially practicable from visual defects such as foreign inclusion, dry spots, pinholes, delamination, and wrinkles.

M. If the liner fails to form correctly (e.g., a section of liner does not cure fully, a liner lift, etc.) remove the failed liner and replace it with a new liner.

N. After the liner has formed, the ends of the liner shall be cut away neatly at both manholes. Provide a smooth transition between liner and existing manhole invert.

O. If, due to broken or misaligned pipe at the manhole wall, the new pipe fails to make a tight seal, apply a seal at the joint. The seal shall be of a resin mixture compatible with the pipe and shall be as recommended by the manufacturer. Other types of seals may be considered, and shall be submitted to the Owner for consideration. Seals shall be approved by the Owner prior to installation.

P. Reconnect the existing active sewer service connections only after the manufacturer's minimum recommended curing time has elapsed and the pipe leakage testing has been performed. This shall be done without excavation, and by means of a television camera and cutting device that reestablishes the service to at least 90% of the previous capacity. If service connections cannot be fully reopened within a lined sewer segment due to work-day time constraints, the Contractor may be allowed to open each active service connection to a minimum of 75% of the full pipe diameter before the end of the work day, upon approval of the Owner. These service connections must be opened to 90% of the full pipe diameter by no later than the end of the next working day. Brush the opened lateral to a smooth finish, free from any burrs.

Q. Do not reopen capped or inactive lateral connections. Confirm the locations of all capped or inactive laterals during the pre-lining television inspections and confirm with the Owner which laterals are to be abandoned.

R. Prevent any escape of vapors from exceeding regulatory or guidance concentrations for contaminants within an occupied building or structure.

3.6 BYPASS OF FLOW

A. Provide pumping equipment to bypass the flow around sections of sewer to be lined, where necessary, in accordance with Section 01580.

3.7 INSPECTION/TESTING

A. General

1. Test CIPP liner samples in accordance with ASTM F1216.

2. An independent testing laboratory shall test the cured-in-place pipe samples and the results shall be sent directly to the Engineer and Owner.

B. CIPP Liner

1. Collect, prepare and test liner samples for each sewer main segment being rehabilitated for flexural properties in accordance with ASTM F1216, Section 8.1.

a. For liner samples less than 18 inches in diameter or equivalent, collect a restrained pipe sample by placing a section of PVC pipe at the end of the lined segment and inverting the liner through the section of PVC pipe.

Select PVC pipe to match the inside diameter of the sewer main being lined as closely as possible.

b. For liner samples greater than 18 inches in diameter or equivalent, prepare plate samples from the same tube and resin as the liner being installed at the time of wet-out. Cure the plate samples for the same duration and under the same conditions as the liner being installed.

2. Measure wall thickness of liner samples.

3. Provide information on chemical resistance of liner per ASTM F1216.

3.8 CLEAN-UP

A. Upon acceptance of the installation work and testing, restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

3.9 POST-LINING TELEVISION INSPECTION

A. Perform post-lining television inspection, with inspection report and videos, on the completed pipe segments, in accordance with Section 02958. Furnish two copies of the inspection reports and videos to the Engineer for review and approval.

B. Use a pan-and-tilt video camera for the post-construction television inspection.

C. Verify that the services have been reestablished to at least 90% of their capacity after completion of pipe lining.

END OF SECTION

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<u>*SPECIAL NOTICE*</u>

(ONE WEEK PRE NOTIFICATION)

This is to notify you that Rhode Island College will be rehabilitating the sewer mains on Campus using a trenchless constuction method called "cured-in-place" pipe lining. This rehabiliation will provide a new, jointless sewer pipe for your area that minimizes root and water infiltration problems, improves flow, and provides for a more structurally sound pipe without the need for excavation. In order to perform this work, there will be a temporary disruption of sewer service to your building for a period of approximately _____ hours.

During this period your building's service connection will be completely sealed off from the mainline in the street. Please limit the use of water going down your drains to an absolute minimum, and do not use washing machines or dishwashers. If you must shower, leave the water in the tub until your service has been restored. Any sump pumps connected to the sewer system must be disconnected and/or discharged elsewhere; to avoid possible damage to the pipe liner, or backups into your basement. <u>Failure to follow these instructions may cause your discharge to backup into the building.</u>

The "cured-in-place" pipe lining work is scheduled to begin and end on the week of :_____

If work progresses into the evening hours, there will be some noise and bright lighting associated with the process. On residential streets, the set-up of equipment may cause some adjustments in parking and neighborhood driving patterns, however every effort will be made to make this inconvenience as slight as possible.

During certain phases of the operation, you may detect an odor. Odors are most likely to occur in houses of buildings with dry or non-existent traps. In most cases, any odors can be minimized by pouring several gallons of water down your unused plumbing fixtures (sinks, showers, toilets, etc.) and basement floor drains, or opening your windows.

You will be notified with another notice similar to this one approximately twenty-four hours prior to the actual installation in your neighborhood. A third notice will be distributed to you at the conclusion of the work, indicating that it is safe to resume using your sewer service.

If you have any questions or concerns regarding this project, please contact our Office at _____between ____AM-_____PM, Monday through Friday.

Thank you for your cooperation.

<u>*SPECIAL NOTICE*</u>

(24-HOUR PRE NOTIFICATION)

This notification is to remind you that sewer mains on Campus will be rehabiliated utilizing a trenchless construction method called "cured-in-place" pipe lining. To accomplish this there will be temporary disruption of sewer service to your building for approximately _____hours.

This interruption in service will occur from:

_____Through: _____

(Time/Day/Date) (Time/Day/Date)

To avoid the possibility of sewage backing up into the building during this period, please minimize the quantity of liquids going down your drains.

<u>DO NOT USE WASHING MACHINES OR DISHWASHERS. PLEASE LIMIT SINK AND SHOWER/BATH USAGE TO A BARE MINIMUM</u>

During certain phases of the operation, you may detect an odor. Odors are most likely to occur in buildings with dry or non-existent traps. In most cases, any odors can be minimized by pouring several gallons of water down the unused plumbing fixtures (sinks, showers, toilets, etc.) and basement floor drains, or opening your windows.

If you have a sump pump that discharges to the sewer, it must be disconnected during the installation process.

A final notice will be distributed to you at the conclusion of the work, indicating it is safe to resume using your sewer service.

If you have any questions or concerns regarding this project, please contact our Office at _____between ____AM-_____PM, Monday through Friday or our emergency contact cellular number _____.

If you have any questions or concerns during the course of our installation period, please do not hesitate to ask for the Site Supervisor or Crew Foreman at the job site.

Thank you for your cooperation.

NOTE: THE ABOVE DOES NOT AFFECT THE WATER SERVICE AT YOUR BUILDING

SECTION 02955

CLEANING OF UNDERGROUND PIPING AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Removal of dirt, rocks, sand and other material within underground piping
2. Removal of dirt, rocks, sand and other material within underground structures
3. Root removal within underground piping and structures

B. Related Sections

1. Section 02532 – Manhole Lining
2. Section 02533 – Pipe Lining

1.2 SUBMITTALS

A. Proposed cleaning procedures

B. Proposed cleaning equipment

C. Proposed root removal methods and equipment

D. Product data on the chemical root treatment material

E. A specimen product label indicating EPA approval of the chemical root product for sanitary sewers

F. The manufacturer's recommended guidelines for proper mixing ratios for maximum daily usage of the chemical root product

G. The chemical root product manufacturer's recommended application methods

1.3 QUALITY ASSURANCE

A. Contractor shall have at least 5 years experience cleaning underground piping and structures.

B. Contractor shall have successfully completed a minimum of 10 projects where piping and structures of similar size and condition to those on this project were cleaned.

C. Contractor shall have Confined Space Entry training.

PART 2 PRODUCTS

2.1 CLEANING EQUIPMENT

A. High-Velocity Jet (Hydrocleaning) Equipment

1. All high-velocity pipe cleaning equipment shall be constructed for ease and safety of operation.
2. The equipment shall have a selection of two or more high-velocity nozzles.

3. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned.

4. Equipment shall also include a high-velocity gun for washing and scouring structure walls and floors. The gun shall be capable of producing flows from a fine spray to a solid stream.

5. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

B. Mechanically Powered Equipment

1. Mechanically powered equipment includes power rodding machines, bucket machines and winches using root cutters and porcupines.

2. Machines shall be belt-operated or shall have an overload device.

3. Machines with direct drive that could cause damage to the pipe are not allowed.

4. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be made of heat-treated steel. The machine shall be fully enclosed and have an automatic safety clutch or relief valve.

C. Vacuum-Operated Equipment

D. Other cleaning equipment approved by the Engineer

2.2 CHEMICAL ROOT TREATMENT PRODUCT

A. Chemical root treatment product shall be EPA certified and labeled for use in sanitary sewer piping and structures and acceptable to the state agencies having jurisdiction over its use.

B. The active ingredient in the chemical root treatment shall be an aquatically approved, nonsystemic herbicide which will kill roots at low concentrations but will not permanently affect parts of the plant distant from the treated roots. The active ingredient shall be spontaneously detoxified by natural chemical/biochemical processes following its use.

C. The active ingredient in the chemical root treatment for inhibiting root regrowth shall inhibit root cell growth on contact but shall not be transported so as to damage other portions of the plant. The material shall form a persistent chemical barrier suppressing the growth of root tips. The material shall be sufficiently stable under conditions of use to provide protection for 12 months but shall be subject to decomposition in wastewater treatment plants without disturbing plant processes.

D. To improve transportation of the active ingredients into root tissues, the root treatment material shall contain emulsifiers to degrease root masses and remove fatty acids from root tissue and surfactants to convert an aqueous solution of the root treatment agent into a volatile foam when using the proper aeration equipment. This method insures root treatment material is held in line until chemical reaction is complete and roots are fully exposed to chemical.

E. The chemical root treatment material shall be composed of two dry components which, when mixed together and come into contact with water foam immediately. Extra equipment such as a foam machine should not be required.

PART 3 EXECUTION

3.1 CLEANING OF PIPES AND STRUCTURES

A. Clean the structures and piping to be lined by hand; by using hydraulically propelled, high-velocity jet; vacuum-operated equipment; mechanically powered equipment; or other methods/equipment approved by the Engineer. The methods used shall be capable of removing dirt, rocks, sand, roots, and other materials and obstructions from the piping and structures.

B. If cleaning of an entire pipe length cannot be completed from one end, set up the equipment at the other end of the pipe and then again attempt to clean the pipe section.

C. Restore pipes to a minimum of 95% of their original hydraulic capacity.

D. Remove and dispose of all dirt, rocks, sand, roots, and other materials within the structures and piping to be cleaned.

E. During pipe cleaning operations, take precautions in the use of equipment to prevent damage to public and private property.

F. When hydraulically propelled cleaning tools or flows which retard the flow in the pipe are used, take precautions to insure that the water pressure created does not cause damage or flooding of public or private property. When possible, use the flow in the pipe to provide the necessary pressure for hydraulic cleaning devices. When additional water from hydrants is necessary, conserve water and do not use unnecessarily.

3.2 CHEMICAL ROOT TREATMENT

A. Mix and apply root treatment product under the supervision of a state-certified pesticide (herbicide) applicator, as required by law.

B. Take precautions to protect all persons, vegetation, animals, and property.

C. Preparatory Procedures

1. Do not clean lines prior to chemical root treatment unless extensive grease, root masses, or debris preclude proper application of material (chemical root treatment is less effective when the root tips are damaged or removed through cleaning).

D. Flow Control

1. Maintain uninterrupted sewer flow during the work. Provide bypass pumping as required.

E. Mixing Procedures

1. Deliver materials to site in undamaged, unopened containers bearing the manufacturer's original labels.

2. Mix root treatment material at time of application.

3. The water used shall be clear and free of acid, alkali, oxidizing agents, oil, or other organic materials.

4. Mixing water temperature shall be between 40 degrees F and 80 degrees F.

5. Mix root treatment material immediately, before injection of foam in pipeline.

F. Application Procedures

1. The volume of foam shall be sufficient to completely fill the air space above the flow within the pipe section and shall be sufficient to attach to and permeate the root masses.

2. The hose insertion method shall be used to inject the foam. Apply at sufficient pressure to penetrate a minimum of 5 feet into the service connections.

3. Pipe cleaning shall be scheduled for no less than 6 weeks after root treatment.

4. Perform chemical root treatment in accordance with the manufacturer's recommendations.

END OF SECTION

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SECTION 02956

PIPE SPOT REPAIRS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Cured-In-Place Lining Spot Repairs

B. Related Sections

1. Section 01550 – Traffic Regulation
2. Section 01580 – Temporary Bypass Pumping System - Wastewater
3. Section 02958 – Television Inspection of Pipelines
4. Section 00800, Attachment – Television Inspection Logs

1.2 REFERENCES

A. ASTM D790 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

B. ASTM D4276 – Standard Practice for Confined Area Entry

C. ASTM F1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

D. ASTM D2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

E. ASTM D3681 - Standard Test Method for Chemical Resistance of "Fiberglass" (Glass–Fiber–Reinforced Thermosetting-Resin) Pipe in a Deflected Condition

F. ASTM D5813 - Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

1.3 SUBMITTALS

A. Submit manufacturer's catalog cuts, specifications, design calculations stamped by a professional engineer licensed in the state in which the work is occurring, and installation instructions for the repair sleeve, resins, etc.

B. Submit information on manufacturer's and installer's qualifications.

C. Submit typed pre-construction and post-construction television inspection logs and 2 color copies of the pre-construction and post-construction television inspection videos provided on CD-R/WR or DVD-R media.

D. Submit curing temperature and pressure logs for each spot repair liner.

1.4 DELIVERY, STORAGE AND HANDLING

A. Lining materials shall be delivered to and stored within the Contractor's work limits.

B. Special care shall be exercised during delivery and storage to avoid damage to the products.

C. Products shall be stored so as to avoid unnecessary handling and in locations where they will not interfere with the Owner's operation, construction operations or public travel.

1.5 QUALITY ASSURANCE

A. The manufacturer shall have at least 10 years of experience in the manufacture of the cured-in-place liner being provided for this project as a spot repair. Similarly, the installer shall have at least 10 years of experience installing the cured-in-place liner being provided for this project as a spot repair. Supervisory personnel shall have not less than 3 years of experience in providing the required services and shall be present at the job site during all work related to the required services.

B. The manufacturer shall have supplied and provided the installation for at least 10 cured-in-place lining spot repair projects of similar size and project conditions. The job location and person to contact for references shall be provided upon request by the Engineer.

C. The liner installer's personnel shall have a 10-hour construction and safety training, confined space entry and other training as appropriate for the Work to be performed. The confined space entry shall be in accordance with the requirements and protocol as specified in 29 CFR 1910.146, Permit Required Confined Spaces, and ASTM D 4276-84.

1.6 PROJECT CONDITIONS

A. Existing Conditions

1. The sewer segments identified for cured-in-place lining spot repairs as part of this project were television inspected in May 2014. The inspection logs are included in the Attachments to the Supplementary Conditions.

2. Videos of the May 2014 television inspections are available for review at the office of Tighe & Bond, 300 West Exchange Street, Suite 300, Providence, RI. An appointment must be scheduled with the Engineer from Tighe & Bond (401-455-4347 or ALPackhem@tighebond.com) for review of the videos.

1.7 WARRANTY

A. All pipe lining spot repair work shall be warrantied against infiltration, faulty workmanship, and materials for one year from the date that the project is accepted by the Owner.

B. Prior to the expiration of the warranty period, during periods of high groundwater, and at a time to be approved by the Engineer, television-inspect each of the lining spot repairs for defects. Repair any defects found and seal the annular space between the

repair sleeve and the host pipe until there are no visible leaks through television inspection.

PART 2 PRODUCTS

2.1 MATERIALS

A. Repair Sleeve

1. The sleeve shall be of a type that allows for rehabilitation of clay, concrete, ductile iron pipe or pipe constructed of any other materials.

2. The sleeve shall consist of one or more layers of absorbent textile, for example, needle punched felt or circular knit, fiberglass or similar textile materials that meet the requirements of ASTM Fl216 and the Requirements and Test Methods sections of ASTM D5813. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe segments, and flexibility to fit irregular pipe sections. The wetout tube shall meet Resin Impregnation Requirements of ASTM F1216, and shall have a uniform thickness that when compressed at installation will meet or exceed the design thickness after cure.

3. The sleeve shall be fabricated with a 2 inch ring of compressible textile material at the upstream and downstream ends, to create a smooth transition between the sleeve and the host pipe. The compressible textile material will compress to meet the host pipe at its leading end and match the wall thickness of the tube at its opposite end.

4. The cured sleeve shall be fabricated to fit tightly in the approximate inside circumference of the existing sewer line but not to deform unduly in areas of lateral connections or at other locations.

5. The sleeve shall be fabricated from materials which, when cured, will be chemically resistant to domestic sewage gases, including hydrogen sulfide, carbon monoxide, carbon dioxide, methane, dilute sulfuric acid, external exposure to soil bacteria and any chemical attack which may be due to materials in the ground.

6. The sleeve will be made of fiberglass material and wetted out on-site prior to insertion. It should be wrapped and securely tied around the packer. The packer should be capable of stretching to fit irregular sections and negotiating shallow bends.

7. The fiberglass composite sleeve shall meet the minimum requirements given in Table 1 per ASTM F1216.

TABLE 1
Minimum Initial Structural Properties

Property	Standard	Minimum Value
Flexural Strength	ASTM D790	4,500 psi
Flexural Modulus	ASTM D790	250,000 psi
Chemical Resistance	ASTM F1216	Pass

B. Resin

1. The resin shall comply with the following:

a. The resin/liner system shall conform to the ASTM D2990 10,000 hour test; and ASTM D3681 using a 10,000 hour test period.

b. The resin shall be a corrosion resistant polyester, vinyl ester, epoxy resin, or silicate and catalyst system that when properly cured within the composite liner assembly, meets the requirements of ASTM F1216, the physical properties herein, and those, which are to be utilized in the design of the cured-in-place liner.

c. The resin shall produce a cured-in-place liner, which will comply with the structural and chemical resistance requirements of ASTM F1216.

C. Design Criteria

1. CIP liners shall comply with ASTM F1216 and shall be based on the following design criteria:

a. Factor of safety of 2

b. Creep Retention Factor of 50%

c. Ovality of 2%

d. Constrained Soil Modulus in accordance with AASHTO LRFD Section 12

e. Groundwater is at the existing surface grades at each liner location

f. AASHTO H-20 live loads

g. Soil Load of 120 pounds per cubic foot

h. Minimum service life of 50 years

PART 3 EXECUTION

3.1 PUBLIC NOTIFICATION

A. Implement a public notification program that includes, at a minimum, contacting each home and business connected to the sewer to be lined and informing them of the work to be performed and when the sewer will be off-line. The program shall include the

preparation and distribution of written notices that describe the work, the schedule, and how the work will affect the home/business owner. The notices shall include a local telephone number for the Contractor that home/business owners may call if they have questions on the work or need to relay problems that arise related to the work. The notices shall also indicate that odors traveling through the sewer pipe and into homes/buildings may be generated during the lining work. Notices shall be approved by the Owner prior to distribution.

B. Prepare and distribute two notices to each home/business owner that will be affected by the lining work, as described below:

1. One week in advance of the lining work.

2. 24 hours in advance of the lining work.

C. Example one week and 24-hour notices have been appended at the end of Section 02953 for reference

D. If the lining work, including service reinstatement, is not performed within the schedule indicated in the written notice, contact the home/business owners to notify them of the schedule change.

3.2 WATER FOR CONSTRUCTION PURPOSES

A. Water will be made available to the Contractor from nearby hydrants for pipeline cleaning and installation of the liner.

B. Operation of hydrants shall only be performed with permission from the Owner.

C. Contractor shall provide backflow preventer that is approved by the Owner when water is drawn from Owner's hydrants.

D. No separate payment will be required for the use of Campus water.

3.3 CLEANING AND PRE-LINING TELEVISION INSPECTION

A. Cleaning of the existing sewer line shall, at a minimum, restore 95% of the sewer's original carrying capacity.

B. Clean sewer sections using a hydraulically propelled, high-velocity jet, or mechanically powered equipment where root intrusion and/or service pipe intrusions are to be removed. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all lines. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel.

C. Take special precautions so as to prevent flooding of the upstream manholes and prevent damage to public or private property.

D. No material is permitted to be disposed of, or stored, at the Site. All material shall be properly disposed of off-site, in compliance with local, state and federal regulations.

E. After cleaning, television inspect the sewer pipe in accordance with Section 02958. During inspection, service connection locations shall be carefully noted and logged as

well as conditions that may prevent the proper installation of the liner. Immediately notify the Engineer of unsuitable conditions in writing.

F. Furnish two copies of the inspection reports and videos, for review and approval.

3.4 CUTTING OF PROTRUDING LATERALS

A. Cut protruding laterals where the protrusion prohibits the passage of equipment necessary to perform the specified work.

B. Use equipment specifically designed for this application.

C. Protruding laterals shall be cut to the contour of the pipe.

D. All pieces of pipe cut from the lateral shall be removed from the sewer mains. Debris will not be allowed to remain in the pipe.

E. For each lateral cut, record the pipe reach and station as measured during the performance of the work.

3.5 INSTALLATION

A. Provide traffic control in accordance with Section 01550.

B. Provide bypass pumping as required in accordance with Section 01580.

C. Clean and television-inspect sewer pipes to be spot repaired prior to installation activities.

D. The spot repair installation method shall be a trenchless technology. Excavation, pavement cutting, patching and other surface feature disturbances and restoration shall not be required.

E. The installation of the cured-in-place lining spot repair shall be in accordance with the manufacturer's written instructions and as herein specified. This shall include the preparation, installation, curing, and finish operation required for the completion of the pipe rehabilitation process.

F. Each repair sleeve have a minimum length of three (3) linear feet, and the length of sleeve shall cover the area of cracking and/or displaced joints with a minimum of 12 inches overlap onto sound pipe.

G. The edge of the sleeve shall taper at both ends.

H. No significant interior pipe volume change shall occur due to installation of the sleeve.

I. Wet and thoroughly cover the fiberglass with resin to ensure that all fibers have been covered with the resin.

J. Tie the resin-impregnated sleeve around an inflatable flow-through packer and winch the liner into the required section of the sewer. Protect uncured materials from damage while being drawn through the sewer.

K. Once the packer is in position, pump air into the packer, breaking the ties and molding the fiberglass cloth to the sewer wall. The surplus resin shall be forced into any cracks in the pipe.

L. If epoxy resin is being used, steam shall be injected into the packer to cure the resin. The temperature and pressure of the packer shall be continually monitored to ensure that they remain within the recommended ranges. If silicate resin is being used, ambient curing shall be in accordance with the manufacturer's recommendations.

M. The packer shall be left in position until the patch has cured for the prescribed amount of time and the resin has completely hardened. The packer will then be deflated and removed.

N. The pipe shall be television inspected after installation of the cured-in-place lining spot repair in accordance with Section 02958 to verify that it has been properly installed.

O. After the project is complete, provide the Engineer with a color video showing the rehabilitated sections of the sewer segments repaired. A copy of the temperature and pressure logs for each cure shall be submitted to the Engineer.

P. Reconnect the existing active sewer service connections only after the manufacturer's minimum recommended curing time has elapsed and the pipe leakage testing has been performed. This shall be done without excavation, and by means of a television camera and cutting device that reestablishes the service to at least 90% of the previous capacity. If service connections cannot be fully reopened within a lined sewer segment due to work-day time constraints, the Contractor may be allowed to open each active service connection to a minimum of 75% of the full pipe diameter before the end of the work day, upon approval of the Owner. These service connections must be opened to 90% of the full pipe diameter by no later than the end of the next working day. Brush the opened lateral to a smooth finish, free from any burrs.

Q. Do not reopen capped or inactive lateral connections. Confirm the locations of all capped or inactive laterals during the pre-lining television inspections and confirm with the Owner which laterals are to be abandoned.

R. Prevent any escape of vapors from exceeding regulatory or guidance concentrations for contaminants within an occupied building or structure.

3.6 FIELD QUALITY CONTROL

A. Final Inspection

1. Make a final video inspection of the segment of the sewer repaired to ensure that a smooth, continuous liner free of holes, dry spots, or other visual defects has been provided. The repair shall be watertight. No water seepage will be allowed between the existing host pipe and the sleeve at either end of the sleeve or in the area where a connection has been reinstated. Furnish two copies of the inspection reports and videos to the Engineer for review and approval.

2. Repair any defects in the installed cured-in-place lining spot repairs. Excavation shall only be performed upon approval of the Owner.

3. Remove all material cut out of the sleeve from the sewer.

END OF SECTION

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SECTION 02958

TELEVISION INSPECTION OF PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Closed-circuit television (CCTV) inspection of pipelines

B. Related Sections

1. Section 02515 – Polyvinyl Chloride (PVC) Pipe and Fittings
2. Section 02952 – Manhole Lining
3. Section 02953 – Pipe Lining

1.2 SUBMITTALS

A. Manufacturer's product data for the television inspection equipment, including camera, television monitor, carriage, recording device, signal conductor cable, etc.

B. Information on database/software that will be used to store and review inspection data.

C. Sample of television inspection log that will be used. Provide a legend for all abbreviations, symbols, codes, etc. used on the logs.

D. Documentation submittals

1. Two printed copies of the television inspection reports, provided weekly during the course of the CCTV inspection work.
2. Two copies of the television inspection video and voice audio recordings saved onto CD-R/RW or DVD-R media, provided weekly during the course of the CCTV inspection work.

1.3 QUALITY ASSURANCE

A. Personnel shall have confined space entry and other training as appropriate for the work to be performed.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Provide all equipment necessary to complete the video inspections with voice audio recordings, including, but not limited to, inspection studio, television camera, and video capture equipment.

B. The inspection equipment shall be capable of inspecting a minimum of 700 feet of pipe where entry into the pipe can only be made from one end. The equipment shall be capable of providing a picture of acceptable quality at these maximum lengths, regardless of the vibration caused by normal movement of the camera and the length of the signal conductor cable between the camera and the recording device.

C. The inspection equipment shall be capable of clearly televising the interior of a six inch diameter pipe and all larger sizes.

D. The television camera used for the inspection shall be one specifically designed and constructed for such inspection.

E. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe.

F. The camera shall be waterproof and operative in 100% humidity conditions.

G. The camera, television monitor, and other components of the video system shall be capable of producing a high quality color image with clear definition of pipe internal features.

H. A pan and tilt camera shall be used for the television inspection to provide the ability to view into the laterals to determine the accessibility of the lateral by the lateral inspection system (LIS) camera.

I. The pan and tilt camera shall be capable of 360 degree rotational scan. The tilt arc shall not be less than 225 degrees and the viewing angle shall be a minimum of 300 degrees. The lens position shall be operated remotely. Cameras incorporating mirrors for viewing sides or cameras using exposed rotating heads are not acceptable.

J. The camera shall be an auto-iris type with remote controlled manual override. The adjustment of focus and iris shall provide a minimum focal range of from 6 inches in front of the camera lens to infinity.

K. The distance along the pipe in focus from the initial point of observation shall be a minimum of twice the vertical height of the pipe.

L. The illumination must be such as to allow an even distribution of light, which will produce a clear picture around the pipe perimeter, regardless of diameter and without the loss of contrast, flare out of picture, or shadowing. The lighting system shall also minimize reflective glare and the intensity shall be fully adjustable. The camera lighthead shall include a high-intensity side viewing lighting system to allow illumination of internal sections of lateral pipe connections.

M. The television studio shall be insulated against noise and extremes in temperature and shall be large enough for two people for the purpose of viewing the television monitor while the inspection is in progress. The television studio shall be mounted on a mobile vehicle which allows safe and orderly movement of the inspection equipment.

N. The television monitor screen shall be not less than 17 inches, measured on the diagonal.

O. The television camera, monitor, and other components of the video system shall be capable of receiving and transmitting a picture having not less than 500 lines of resolution.

P. The camera shall be mounted on a self-propelled vehicle or skid assembly that is able to ride over obstructions and cushion the camera against shock. The skid shall also have guards to keep the camera in line in the event of a turnover due to an obstruction.

Q. The television inspection equipment shall meet the following criteria:

1. Color: The following colors shall be clearly differentiated: white, yellow, cyan, green, red, blue, and black.

2. Linearity: The background grid shall show squares of equal size, without convergence or divergence over the whole picture. The center circle shall appear round and have the correct height and width relationship.

3. Resolution: The live picture shall be displayed on a monitor capable of providing a clear, stable image free of electrical interference with a minimum horizontal resolution not less than 500 lines.

4. Color Consistency: To ensure that the camera shall provide similar results when used with its own illumination source, the lighting shall be fixed in intensity prior to commencing the survey. In order to ensure color consistency, generally no variation in illumination shall take place during the survey.

R. The monitor display shall incorporate an automatically updated record in feet and tenths of a foot of the distance along the pipe from the cable calibration point to the center point of the camera. Use a suitable metering device which enables the length of the pipe being inspected to be accurately measured to within ±0.2 feet.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean sewers to be video-inspected, where necessary to allow for inspection of the sewer, using hydraulically propelled, high-velocity jet or mechanically powered equipment.

B. Reduce flow level in pipe being inspected by bypass pumping or by jetting to meet the requirements described below, unless otherwise agreed to:

Maximum Depth of Flow for Television Inspection

6 inch to 10 inch pipe	20% of pipe diameter
12 inch to 24 inch pipe	25% of pipe diameter
Greater than 24 inch pipe	30% of pipe diameter

C. Alternatively, perform television inspection during off-peak hours when flow depths are lower.

3.2 INSPECTION

A. Television inspect pipes to be lined as shown on the Drawings.

B. Move the camera through the pipe at a moderate rate, stopping where necessary to permit proper documentation of all pertinent features/defects. In no case will the television camera be pulled at a speed greater than 30 feet per minute.

C. Use manual winches, power winches, TV cable, powered rewinds or other devices to move the camera through the pipe that do not obstruct the camera view or interfere with proper documentation of the pipe conditions. All winches shall be stable with either locking or ratcheting drums.

D. If, during the inspection operation, the television camera will not pass through the entire pipe section from one direction, set up equipment so that the inspection can be performed from the opposite direction, if possible.

E. When manually operated winches are used to pull the television camera through the pipe, use portable radios, telephones or other suitable means of communication between members of the crew located at each end of the pipe section being inspected to insure good communications.

F. The importance of accurate distance measurements is emphasized. Measurement for location of pipe features/defects shall be by means of a meter device. Marking on the cable or a similar method will not be allowed. Accuracy of the distance meter shall be checked by use of a measuring wheel, tape, or other suitable distance measuring device.

G. Record the following pipe features/defects, at a minimum, and report them on the inspection logs in accordance with National Association of Sewer Service Companies (NASSCO) developed Pipeline Assessment Certification Program (PACP) methodology:

1. Pipe diameter and material of construction.

2. Joint spacing and the location of joints which appear to be damaged, incorrectly installed, shifted, open, or in any way deficient.

3. Location, size and orientation (clock position) of connecting pipes (such as building services in a sewer).

4. Description of severity and location of pipe structural deficiencies such as cracks, breaks, collapses, corrosion/erosion, etc.

5. Description of severity and location of pipe obstructions (such as sediment, roots or grease).

6. Description of severity and location of grade concerns, such as pipe sags, especially in gravity pipes.

7. The locations where infiltration is entering the pipe and/or connecting pipes and an estimated infiltration rate at each location.

H. Position the camera at the location of connecting pipes, and pan/tilt appropriately in order to obtain a clear view of the interior of the connecting pipe. Make note of any defects or infiltration visible within the connecting pipes.

I. Indicate direction of survey and distance to each feature/defect from the beginning of the inspection.

J. Provide an audio description of each feature/defect observed.

K. Report on the logs weather conditions, ground conditions, and surface cover.

L. Repair pipe damaged as a result of the inspections at no cost to the Owner.

M. Position camera head to reduce risk of picture distortion and along the longitudinal axis of the pipe. In circular pipes, position camera lens centrally, ±10% of the vertical sewer dimension. In non-circular pipes, position camera lens at mid-height and centered horizontally.

3.3 DOCUMENTATION

A. Television Inspection Logs

1. Prepare television inspection logs describing features/defects identified and their locations.

B. Video Recordings

1. Provide continuous digital video recordings of the inspection view as it appears on the television monitor. The image recorded shall be equal to or better than the quality of the original picture on the television monitor.

2. Provide a visual and voice audio description record of the pipe features/defects observed recorded simultaneously as original live recordings.

3. The audio portion of the recording shall be sufficiently free of electrical interference and background noise to produce an oral report that is clear, complete, and easily discernable. The audio portion of the video report shall include the location and identification of the pipe section inspected, the direction of travel, a description of the features/defects encountered, and the distance traveled.

4. Provide digitally formatted television inspection video/audio recordings saved onto CD-R/WR or DVD-R media with individual digital files for each recording completed. CDs and DVDs shall be properly identified by video numbers, locations, and project name.

5. Video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information as described below:

    a. At the start of each pipe section inspected:

        1) Size and length of pipe and pipe material

        2) Pipe section reference number

        3) Date of inspection

        4) Road name/location (city/town)

        5) Direction of inspection (upstream or downstream)

        6) Starting time of inspection

    b. Continuously during the inspection:

        1) Automatic update of the camera's position, in feet and tenths of feet from the beginning of the pipe section

        2) Upstream and downstream locations (manholes reference numbers for sewers and drains).

END OF SECTION

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