PIVOT ARCHITECTURE

Project: **4J Security Improvements Projects (2207)**

Title: **Addendum No. 002**

Date: April 5, 2023

From: KC Eck, PIVOT Architecture

To: Interested Bidders

1. General Information

    1. This Addendum is in response to Bidder questions and some revisions made during the bid walk through.
    2. Email addresses for project contacts:
        a. Ryan Spain spain_r@4j.lane.edu
        b. John Stapleton jstapleton@pivotarchitecture.com
        c. KC Eck keck@pivotarchitecture.com

2. Response to Bidder Questions

DIV 01 General Conditions- Temporary Facilities and Controls Section 01 50 00

1. Will a field office be required at any or all work locations?
   No.
2. Will temporary site enclosure fencing be required at Sheldon HS?
   No. Understand staff/students will be using all three facilities over the summer months. Delineators and caution tape should be sufficient.
3. Will barricades besides delineators and caution tape around interior work areas be required?
   No. Delineators and caution tape should be sufficient. Contractors option for dust barriers regarding a wider area of final clean. Media on return grills.
4. What is the estimated cost of the improvements?
   Early SD design estimate was +/- $300K.
5. Bidders have requested additional site visits. How do we schedule those?
   Email gebb@4j.lane.edu & spain_r@4j.lane.edu to schedule additional site visits if required.

DIV 32 Exterior Improvements-

1. The Project Manual does not include a Section for fencing and gates at Sheldon HS. Please advise.
   Fencing Sections have been added to the Project Manual.

South Eugene High School-

1. Will the General Contractor be responsible for removing existing furniture, desks & equipment? If so and unless noted on 1/A02-B to salvage to owner, will GC dispose of furnishings?

Only items specifically defined on the plans will be the responsibility of the GC. All other FF&E relocation will be by owner. All items identified on plans are to be disposed of by GC unless noted otherwise (some for reuse, or if defined to be returned to owner).

2. General Note C. on A03-B says to refer to wall assembly information- Will that information be provided?
   See updated Sheet A03-B.
3. Floor Plan Detail 1/A03-B shows Door S08 which is not included on the Door Schedule. Please advise.
   See updated Door Schedule on Sheet A03-B.
4. 1/A03-B Plan Note at new office with Door S07 says to blank off existing floor return- Can you provide a finish detail and product information for what is intended?
   See revised note on Sheet A03-B.
5. The 6' tall wing wall shown on Detail 2/A03-B is also shown on Detail 1/A06-B noting to install a full height post with continuous header along top of wall. Can you provide a detail for this condition?
   Discard the option for attaching half height wall to the ceiling. Use Section 09 2116 2.01B for half height wall supports. Once Contractor selects wall brace product coordinate with Architect to confirm attachment to concrete floor. Assume at least one through bolt at each half height wall brace flange per note on 2/A03-B.
6. Reflected Ceiling Plan Detail 1/A04-B notes to provide roller shades in new and existing offices. Arrows point to only (5) locations but I count (9) locations including a HM frame in the wall attached to the underside of soffit. Please confirm quantity of roller shades.
   Shades should be included at all exterior windows of 4 existing offices and 2 new offices. No interior window shades.
7. Is Detail 7/A05-B only at the location called out on 1/A03-B as Elevation Detail 6/A05-B?
   Use at half height wall locations: Casework at new reception desk noted in Detail 7/A05-B and at half height wall noted on Detail 2/A03-B.
8. Can you provide more information for the steel knee brace partial height framing support noted on Detail 7/A05-B?
   See Project Manual Section 09 2116 2.01B for half height wall supports. Install per manufacturer's installation instructions, installation varies based on selected system. See answer to Number 5, above.

Sheldon High School-

1. The Existing Site Plan Sheldon Detail 1/A01-A does not include all areas of work reflected in subsequent drawings. Please advise.
   See updated Sheet A02-A.
2. General Note C. on A02-B says to refer to wall assembly information- Will that information be provided?
   NOTE: We are assuming this is a reference to Note C on Sheet A02-A. See Sheet A02-A for note on wall assembly.
3. Floor Plan Detail 2/A02-A notes a 6" metal stud wall while Detail 7/A03-A notes a 2x stud wall. Please confirm wall type and assembly.
   Use wood stud wall. See wall assembly note on Sheet A02-A.
4. Detail 9/A03-A is the only call out shown on Floor Plan Detail 2/A02-A with the exception of Elevation Details 1-4/A03-A. Please advise.
   NOTE: Plan details and elevation tags are called out on plan views. Section details (such as those shown on Sheet A03-A) are shown on elevation views. Contractor should review all documents to form a complete understanding of the design intent.

5. Detail 5/A03-A does not include anchorage information for the fence where it terminates at the storefront walls at either end. Please advise.
   Fence post attachment to existing concrete slab will be detailed in a forthcoming Addendum 003.
6. Does the PSL header shown on Detail 7/A03-A only occur at the 6'- 3- ¾" span between the two 6 x 6 posts noted on Floor Plan Detail 2/A02-A and called out as 9/A03-A?
   See identified PSL header in Details 1 & 2 / A03-A.
7. Insulation is shown for interior walls on Details 7 & 9/A02-A but nothing is noted on either of those detail drawings. Please advise.
   No insulation required for this wall. See revised Details 7&9 on Sheet A03-A.
8. Detail 7/A03-A does not include any ceiling connection or wood trim information. Please advise.
   Add wood trim at wall/ceiling connection. See revised detail 7/A03-A.
9. At Sheldon Site Work Detail 1/A04-A, I cannot find locations for gates shown on the Door Schedule as G01, G02 & G05. Please advise.
   G01 & G02 are included on 2/A02-A. Left of the stairs.
10. Only Detail 1/A05-A is called out on Site Plans shown on A04-A. Please provide locations for details shown on A05-A & A06-A.
    Details shown for gates are typical. All gates will be constructed to details shown on Sheet A05-A. Plan detail 1/A05-A is called out for clarity in that area.
11. Please explain hatched areas shown on Site Plan Details 1 & 3/A04-A - Should there have been a Detail 2/A04-A included on this sheet?
    Hatched areas are existing parking lot striping. Existing striping has been removed in revised Sheet A04-A. NOTE: fence and ramp have been moved in the revised drawings.
12. Sheldon Site Work Detail 1/A04-A does not include anchorage information for the fence where it terminates at the Mobile Classroom or a bolt and epoxy detail for fence posts. Please advise.
    Fence posts should be imbedded in concrete footings as shown on Sheet A05-A. Post bases should be held back from existing structures a minimum of 1'-0" and the gap filled with a cantilevered fence panel. Typical in all locations. See Note on detail 1/A05-A.
13. Details 2 & 3/A06-A have conflicting concrete wall sizes shown. Please advise.
    Concrete walls should be 8" in width. Note on detail 2/A06-A has been revised.
14. Detail 3/A06-A notes to weld the guardrail pipe to the embedded plate anchor. Heat from this process could damage the concrete- Would alternate guardrail installation options be considered?
    Alternates such as core drilling or imbedding sleeves are acceptable as long as the solution can meet Code for overturning forces at the handrail. Coordinate proposed solution with Architect.
15. Please explain how the pipe handrail post will embed into the footing using Set-XP epoxy as noted on Detail 5/A06-A.
    Core drill in concrete, apply epoxy per mfr installation instructions, imbed pipe. Alternate methods for installing rails are acceptable, see note on #14, above.
16. Are the location paths for saw cutting existing pavement per Keynote 11 on Detail 1/E01-A known and can be detailed on the drawings?
    Saw cut minimally as needed to bring conduits from gates to the nearest building wall. Conduit can be surface mounted where required on building walls, but contractors are expected to run conduits inside ceilings and other building cavity spaces to reach interior panels. Routes are typically chosen by contractors; however the design team will issue some suggested areas for saw cutting in ADD 003.

Churchill High School-

1. Floor Plan Detail 2/A02-C shows Door CH2 which is not included on the Door Schedule. Please advise.
   See revised Door Schedule on Sheet A02-C.
2. A wall framing detail at Door CH2 has not been included. Please advise.
   See revised door location. Door and frames are provided from the manufacturer. Attach per manufacturer's installation instructions.
3. Are the location paths for saw cutting existing pavement per Site General Note C. on Detail 1/E01-C known and can be detailed on the drawings?
   Disregard. No underground anticipated at this location.
4. Keynote 1 on E01-C says to refer to diagram details on a drawing sheet not listed. Please advise.
   See Sheet E12-C for control diagrams.

3. Approved Substitution Request
   1. N/A

4. Alternates
   1. N/A

5. Changes to the Project Manual

   1. ADD Section 321313 Concrete Paving
   2. ADD Section 32313 Chain Link Fencing
   3. ADD Section 087110 Sheldon HS Door Hardware
   4. ADD Section 087110 South HS Door Hardware

6. Changes to the Drawings

   1. REPLACE Sheet A01-A
   2. REPLACE Sheet A02-A
   3. REPLACE Sheet A03-A
   4. REPLACE Sheet A04-A
   5. REPLACE Sheet A05-A
   6. REPLACE Sheet A06-A
   7. REPLACE Sheet A02-B
   8. REPLACE Sheet A03-B
   9. REPLACE Sheet A05-B
   10. REPLACE Sheet A06-B
   11. REPLACE Sheet A02-C

End of Addendum # 002

PIVOT ARCHITECTURE

PRE-BID MEETING SIGN-IN

Project: 4J Security Improvements (2207)

Date: March 30, 2023

Project Participants Present: John Stapleton, PIVOT
KC Eck, PIVOT

Company	Representative	Phone	Email
GBC Construction	Ismael Hernandez	(541) 321-1215	Ismael@gbcconstruct.com
2G CONSTRUCTION	ERIK ZAPATA	541-912-8619 541-689-3850	ezapata@2gconstruction.com 2g@2gconstruction.com
Ed Bradberry	ADT	541-780-3231	edbradberry@ADT.com
Glen Elliott E	EC company	541 805 6046	glen.Elliott@ecpowersl.Fo.com
WILDISH BUILDING CO.	ALEX KING	541-255-7755	ESTIMATING@WILDISH.COM
Convergint Technologies	Romeo LaRiviere	425-282-7394	romeo.lariviere@convergint.com

SECTION 08 7110
DOOR HARDWARE SCHEDULE

South Eugene high School

Manufacturer List

Code	Name
LOC	Locinox
VON	Von Duprin, an Allegion brand
SCH	Schlage, an Allegion brand
IVE	Ives, an Allegion brand
S	Select
LCN	LCN
PHI	Precision
GLY	Glynn Johnson
STE	Steelcraft
RIX	Rixson
ZER	Zero, an Allegion brand

Finish List

Code	Description
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
690	Statuary Bronze, Painted
BLK	Black
US10	Dull Bronze
US28	Aluminum - Clear Anodized
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

HW SET # 01

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HINGE	5BB1HWBSC 5	652	IVE
1	EA	PANIC HARDWARE	LD-9827-EO-LBR	626	VON
1	EA	PANIC HARDWARE	LD-9827-NL-LBR	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	FSIC CORE	23-030 (COORDINATE KEYWAY WITH DISTRICT)	626	SCH
2	EA	SURFACE CLOSER	4040XP EDA WMS	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MAG HOLDER	999M	689	RIX
2	EA	SILENCER	SR64	GRY	IVE

WALL MAGNETS REQUIRE SOLID SURFACE TO MOUNT.
CONTROLLED BY SECURITY SYSTEM, FIRE ALARM SIGNAL, OR LOCKED BY LOCKDOWN SWITCH.
REENTRY BY KEY ONLY, SUBJECT TO AHJ APPROVAL

HW SET # 02

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	ENTRANCE LOCK	ND53P6D RHO	626	SCH
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER

HW SET # 03

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	EA	VANDL STOREROOM LOCK	ND96P6D RHO	626	SCH
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4041T DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR BOTTOM	369AA-Z49	AA	ZER
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY) ACCESS CONTROL - WORK OF DIVISION 28 DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL) POWER SUPPLY - WORK OF DIVISION 28		SCH

COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.

HW SET # 04

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	INSTITUTION LOCK	ND82P6D RHO	626	SCH
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4041T DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY)		SCH
			DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL)		
			POWER SUPPLY - WORK OF DIVISION 28		

COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.

HW SET # 05

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HINGE	5BB1HW 5 X 5 NRP	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	LD-98-EO	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-CON	630	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX 36-083	626	SCH
2	EA	FSIC CORE	23-030 (COORDINATE KEYWAY WITH DISTRICT)	626	SCH
2	EA	OH STOP	100S ADJ	630	GLY
2	EA	SURFACE CLOSER	4041 DEL EDA WMS	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	103A-223	A	ZER
1	EA	WIRE HARNESS	CON-26P VERIFY LENGTH (POWER TRANSFER TO ELECTRIFIED HARDWARE)		SCH
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY)		SCH
1	EA	POWER SUPPLY	PS902 900-2RS 900-BBK		VON
			ACCESS CONTROL - WORK OF DIVISION 28		
			DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL)		
			PROVIDE FACTORY POINT TO POINT DIAGRAMS		
			PROVIDE RISER DIAGRAMS		
			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

120VAC TO POWER SUPPLY. COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.
VERIFY THRESHOLD

SECTION 08 7110
DOOR HARDWARE SCHEDULE

Sheldon High School

Manufacturer List

Code	Name
LOC	Locinox
VON	Von Duprin, an Allegion brand
SCH	Schlage, an Allegion brand
IVE	Ives, an Allegion brand
S	Select
LCN	LCN
PHI	Precision
GLY	Glynn Johnson
STE	Steelcraft
RIX	Rixson
ZER	Zero, an Allegion brand

Finish List

Code	Description
626	Satin Chromium Plated
628	Satin Aluminum, Clear Anodized
630	Satin Stainless Steel
689	Aluminum Painted
690	Statuary Bronze, Painted
BLK	Black
US10	Dull Bronze
US28	Aluminum - Clear Anodized
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

HW SET # 01

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1	EA	VANDL STOREROOM LOCK	ND96P6D RHO	626	SCH
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4041T DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR BOTTOM	369AA-Z49	AA	ZER
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY) ACCESS CONTROL - WORK OF DIVISION 28 DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL) POWER SUPPLY - WORK OF DIVISION 28		SCH

COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.

SET # 02

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	INSTITUTION LOCK	ND82P6D RHO	626	SCH
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4041T DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY)		SCH
			DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL)		
			POWER SUPPLY - WORK OF DIVISION 28		

COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.

HW SET # 03

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HINGE	5BB1HW 5 X 5 NRP	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	LD-98-EO	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-CON	630	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX 36-083	626	SCH
2	EA	FSIC CORE	23-030 (COORDINATE KEYWAY WITH DISTRICT)	626	SCH
2	EA	OH STOP	100S ADJ	630	GLY
2	EA	SURFACE CLOSER	4041 DEL EDA WMS	689	LCN
2	EA	PA MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	103A-223	A	ZER
1	EA	WIRE HARNESS	CON-26P VERIFY LENGTH (POWER TRANSFER TO ELECTRIFIED HARDWARE)		SCH
1	EA	WIRE HARNESS	CON-6W (FROM INCOMING POWER SUPPLY)		SCH
1	EA	POWER SUPPLY	PS902 900-2RS 900-BBK		VON
			ACCESS CONTROL - WORK OF DIVISION 28		
			DOOR CONTACT(S) - WORK OF DIVISION 28 (PROVIDE DOOR/FRAME PREP-COORDINATE WITH ELECTRICAL)		
			PROVIDE FACTORY POINT TO POINT DIAGRAMS		
			PROVIDE RISER DIAGRAMS		
			WEATHERSTRIP BY DOOR/FRAME MANUFACTURER		

120VAC TO POWER SUPPLY. COORDINATE WITH ELECTRICAL, ACCESS CONTROL, AND SECURITY SYSTEM CONTRACTOR.

VERIFY THRESHOLD

HW SET # 04 - Gate

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	GATE HINGE	DINO HINGE	689	LOC
1	EA	PANIC HARDWARE	LD-98-NL-WH	630	VON
1	EA	RIM CYLINDER	20-057 ICX COORDINATE KEYWAY WITH DISTRICT	626	SCH
1	EA	ELECTRIC STRIKE	HES 9600 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH SRI WMS BALANCE OF HARDWARE BY GATE MANUFACTURER	689	LOC

GATE MANUFACTURER TO PROVIDE MOUNTING BOXES/REINFORCEMENT AS NECESSARY FOR INSTALLATION OF SPECIFIED HARDWARE. COORDINATE HARDWARE WITH GATE MANUFACTURER AND CONFIRM THE SPECIFIED HARDWARE CAN BE INCORPORATED. INSTALL ANGLES ON GATE POSTS FOR INSTALLATION OF HINGES/CLOSER.

HW SET # 05 -Gate

Each door or doors to have:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	GATE HINGE	DINO HINGE	689	LOC
1	EA	PANIC HARDWARE	LD-98-NL-WH	630	VON
1	EA	RIM CYLINDER	20-057 ICX COORDINATE KEYWAY WITH DISTRICT	626	SCH
1	EA	ELECTRIC STRIKE	HES 9600 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH SRI WMS	689	LOC
1	EA	ELEC KEYSWITCH	KEYSWITCH	630	SCH
			BALANCE OF HARDWARE BY GATE MANUFACTURER		

FOR CARD READER, WIRING AND INSTALLATION BY OTHERS.
GATE MANUFACTURER TO PROVIDE MOUNTING BOXES/REINFORCEMENT AS NECESSARY FOR INSTALLATION OF SPECIFIED HARDWARE. COORDINATE HARDWARE WITH GATE MANUFACTURER AND CONFIRM THE SPECIFIED HARDWARE CAN BE INCORPORATED. INSTALL ANGLES ON GATE POSTS FOR INSTALLATION OF HINGES/CLOSER.

SECTION 32 1313

CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Curbs.
   2. Sidewalks.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. In- clude statement indicating cost for each product having recycled content.

C. Samples: For each exposed product and for each color and texture specified.

D. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
   1. Cementitious materials.
   2. Mineral Aggregate
   3. Steel reinforcement and reinforcement accessories.
   4. Fiber reinforcement
   5. Admixtures (including Color Pigments)
   6. Curing compounds
   7. Applied finish materials.
   8. Bonding agent or epoxy adhesive.
   9. Joint fillers.

F. Minutes of preinstallation conference.

G. Jointing and scoring layout shop drawing.

1.03 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. ACI Publications: Comply with ACI 301 unless otherwise indicated.

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

E. Mockups: Cast mockups of full-size sections of concrete pavement (1 each type) to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.04 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.01 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   1. Use flexible or curved forms for curves with a radius 100 feet or less.

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

2.02 STEEL REINFORCEMENT

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars**;** zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.

D. Tie bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar sup- ports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.
   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C 150, gray portland cement Type II
      a. Fly Ash: ASTM C 618, Class C.

b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source.
   1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   3. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2.04 CONCRETE - INTEGRAL COLOR

1. Typical concrete mix per 2.03 with color admixture.
2. Integral Color Product: Davis Colors, Premium Color Group, or equal.
3. Color: Tile Red (approval by owner prior to installation)

2.05 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.

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

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.06 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements.

2.07 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, with the following properties:
   1. Compressive Strength (28 Days): 4000 psi.
   2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
   3. Slump Limit: 4 inches, plus or minus 1 inch.
   4. Air Content: 5-1/2 percent plus or minus 1.5 percent for 1-inch (25-mm) nominal maximum aggregate size.

B. Use a qualified testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

2.08 CONCRETE MIXING

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

1. When temperature is between 85 deg F and 90 deg F , reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F , reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

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

B. Proof-roll prepared subbase surface below **concrete paving** to identify soft pockets and areas of excess yielding.
   1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
   3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 31 Section "Earth Moving."

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

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

3.02 EDGE FORMS AND SCREED CONSTRUCTION

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

B. After the forms have been set to correct grade, the grade shall be thoroughly tamped, either mechanically or by hand, at both the inside and outside edges of the base of the forms. Forms shall be staked into place with no less than 3 pins for each 10-foot section. A pin shall be placed at each side of every joint.

C. Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/4 inch at any joint. Forms shall be so set that they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment.

D. The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

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

3.03 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

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

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

3.04 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
   1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints. If sufficient concrete is not available to finish the current panel, the Contractor shall remove the fresh concrete back to the nearest transverse joint.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint or install plastic dowel sleeves per manufacturer's recommendations.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate isolation joints at intervals of 200 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Longitudinal Joints: A longitudinal joint shall be considered a joint parallel with the long dimension of the paving area.
1. Construction: Longitudinal construction joints necessary for lane construction shall be formed against suitable side forms (usually made of steel) with or without keyways, as indicated in the Drawings. Wooden forms may be used under special conditions, when ap- proved by the Engineer. When the concrete is placed using slip-form pavers, the keyway shall be formed in the plastic concrete by means of preformed metal keyway liners which are inserted during the slip-form operations to form the female side of the key and which may be left in place. The dimensions of the keyway forms shall not vary more than plus or minus 1/4 inch from the dimensions indicated and shall not deviate more than plus or minus 1/4 inch from the mid-depth of the pavement. A male keyway may be used providing the keyway and edge tolerances are met. Where butt-type joints with dowels are designated, the dowels for this type shall be painted and greased. The edges of the joint shall be finished with a grooving tool or edging tool, and a space or slot shall be formed along the joint of the dimensions, as indicated, to receive the joint sealing material. Longitudinal construction joints shall be sawed to provide a groove at the top conforming to the details and dimensions indicated on the Drawings. Provisions shall be made for the installation of tie bars as noted on the Drawings.
2. Contraction or Weakened-Plane Type: the longitudinal groove formed or sawed in the top of the slab shall be installed where indicated on the Drawings. The groove shall be formed in the plastic concrete with suitable tools or material to obtain the width and depth specified, or it shall be sawed with approved equipment in the hardened concrete to the dimensions required. When the groove is formed in plastic concrete, it shall be true to line with not more than 1/4 inch variation in 10 feet; it shall be uniform in width and depth; and the sides of the groove shall be finished even and smooth with an edging tool. If an insert material is used, the installation and edge finish shall be according to the manufacturer's instructions. The sawed groove shall be straight and of uniform width and depth. In either case, the groove shall be clean cut so that spalling will be avoided at intersections with transverse joints. Tie bars shall be installed across these joints where indicated on the Drawings.

E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness**,** to match jointing of existing adjacent concrete paving:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooved marks on concrete surfaces.
   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete once concrete has hardened sufficiently such that the cutting action will not tear, abrade, or otherwise dam- age the surface and before developing random contraction cracks. The sawing of any joints shall be discontinued or omitted if a crack occurs at or near the joint location before or during sawing. Concrete panels that have started cracking before or during the saw cut- ting of the joints shall be removed and replaced at no expense to the Owner.
   3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

F. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.05 CONCRETE PLACEMENT

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

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

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

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

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

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

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
   1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

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

J. Screed paving surface with a straightedge and strike off.

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

L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

M. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
   1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

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

O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

P. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.06 SPECIAL FINISHES

A. Monolithic Regular Exposed-Aggregate Finish: Expose coarse aggregate in pavement surfaces as follows:
   1. Immediately after float finishing, spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
   2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
   3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.
   4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.
   5. Heavy Exposed areas: fully expose the basic rock and seed with the larger rounded rock. Exposure of the rounded seed rock shall be no more than ½ thickness of said rock. Seeded area should be about 10% to 15% of the total surface.

B. Seeded Glass Aggregate Finish: Immediately after initial floating, spread a single layer of aggregate uniformly on pavement surface. Tamp aggregate into plastic concrete, and float finish to entirely embed aggregate with mortar cover of 1/16 inch to 1/4 inch.
   1. Spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
   2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.
   3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.

4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

3.07 FLOAT FINISHING

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

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
   2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

C. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a ¼ inch (6mm) radius. Repeat tooling of edges after applying surface finished. Eliminate tool marks on concrete surfaces.

3.08 CONCRETE PROTECTION AND CURING

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

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

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

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

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

3.09 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:
   1. Elevation: ¼ inch .
   2. Thickness: Plus 3/8 inch, minus 1/4 inch.
   3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed ¼ inch.
   4. Joint Spacing: ½ inch .
   5. Contraction Joint Depth: Plus 1/4 inch, no minus.
   6. Joint Width: Plus 1/8 inch, no minus.

7. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
8. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
9. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
10. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.

3.10 FIELD QUALITY CONTROL

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

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. Yd or fraction thereof of each concrete mix placed each day.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
   4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
      a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

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

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

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

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

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

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

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

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

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

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

END OF SECTION

SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Chain-link fences and gates.
   2. Chain-link backstop system.

B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete"
   2. Section 08 71 01 "Door Hardware Schedule" for gate controls.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Fence and gate posts, rails, and fittings.
      b. Chain-link fabric, reinforcements, and attachments.
      c. Accessories: Privacy slats
      d. Gates and hardware.
      e. Gate operators, including operating instructions and motor characteristics.

B. Shop Drawings: For each type of fence and gate assembly.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include accessories, hardware, gate operation, and operational clearances.
   3. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
   4. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: For each type of factory-applied finish.

D. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:
   1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

E. Delegated-Design Submittal:
   1. For structural performance of chain-link fence and gate frameworks, backstop elements, including analysis data signed and sealed by the qualified professional engineer specializing in the associated work and registered in Oregon. responsible for their preparation.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For factory-authorized service representative.

B. Product Certificates: For each type of chain-link fence, operator, and gate.

C. Product Test Reports: For framework strength according to ASTM F1043, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For gate operators to include in emergency, operation, and maintenance manuals.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing fence grounding; member company of NETA or an NRTL.
   1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

B. Emergency Access Requirements: According to requirements of authorities having jurisdiction for gates with automatic gate operators serving as a required means of access.

C. Mockups: Build mockups to set quality standards for fabrication and installation.
   1. Build mockup for typical chain-link fence and gate, including accessories.
      a. Size: 8-foot length of fence.

1.07 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.08 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to comply with performance requirements.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      c. Faulty operation of gate operators and controls.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design chain-link fence and gate frameworks.

B. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.
   1. Design Wind Load: Per Structural Engineer

C. Lightning Protection System: Maximum resistance-to-ground value of 25 ohms at each grounding location along fence under normal dry conditions.

2.02 CHAIN LINK FENCING & GATES:

A. Materials:
   1. Posts, Rails, and Frames: ASTM F1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 30 ksi.
   2. Wire Fabric: ASTM A392 zinc chain link fabric.
   3. Concrete: Ready-mixed, complying with ASTM C94/C94M; normal Portland cement; 2,500 psi strength at 28 days, 3-inch slump; 3/4-inch nominal size aggregate.

B. Components:
   1. Line Posts: 2.38-inch diameter.
   2. Corner and Terminal Posts: 2.88 inch.
   3. Gate Posts: 3.5-inch diameter.
   4. Top, Bottom, and Brace Rail: 1.66-inch diameter, plain end, sleeve coupled. (No Bottom Rails where indicated – Type 1A).
   5. Gate Frame: 1.66-inch diameter for welded fabrication.
   6. Fabric: 2-inch diamond mesh interwoven wire, 9 gauge, 0.1144-inch-thick, top selvage knuckle end closed, bottom selvage knuckle end closed. No protruding edges on selvage. This prevents someone from getting injured by bottom or top edges of fabric.
   7. Tension Wire: 6-gauge thick steel, single strand.
   8. Tie Wire: 11-gauge galvanized steel. No aluminum allowed.
   9. Base Plate: 1/4-inch plate steel, galvanized.

C. Accessories:
   1. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
   2. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners, and fittings; steel.
   3. Hinges: TruClose Series 3 or approved.
   4. Hardware for Single Swinging Gates: 180-degree hinges, 2 for gates up to 60 inches high, 3 for taller gates;
   5. Security hardware per Section 08 71 01

D. Finishes:
   1. Fencing: Components and Fabric: Powder coated components and Vinyl coated fabric over coating of 1.8 oz/sq. ft galvanizing.
      a. Color: Black
   2. Hardware: Powder coated over hot dip galvanized to weight required by ASTM A153/A153M.
      a. Color: Black
   3. Accessories: Same finish as framing.

2.03 FABRICATION:

A. Swing Gates:
   1. Fabricate frames of gates of same material and finish of adjoining fencing. Assemble gate frames by welding prior to galvanizing.

B. Hardware:
   1. Gate Hinges: See accessories section.
   2. Center gate stop and drop rod at double gates. Metal sleeve set in concrete for drop rod.
   3. Provision for Locks: Industrial drop rod type latches for pad lock, locks NIC.
   4. Install framework, fabric, accessories, and gates in accordance with ASTM F567.
   5. Place fabric on outside of posts and rails.
   6. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
   7. Line Post Footing Depth Below Finish Grade: ASTM F567.
   8. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

9. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
10. Provide top rail through line post tops and splice with 6-inch-long rail sleeves.
11. Install center brace rail on corner gate leaves.
12. Install bottom rail between posts when there is a high likelihood of students sitting against.
13. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
14. Position bottom of fabric 2 inches above finished grade (mow strip).
15. Fasten fabric to top and bottom rail, line posts, and braces with tie wire at maximum 15 inches on centers.
16. Attach fabric to all fence elements (posts, braces, tension rods and braces) with specified tie wire at 15 inches on center maximum spacing.
17. Do not attach the hinged side of gate to building wall; provide gate posts.
18. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
19. Hinges: TrueClose series 3 or approved.
20. Panic Hardware:
    a. If identified, coordinate with security hardware per Section 08 71 01

2.04 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

2.05 GROUNDING MATERIALS

A. Comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

B. Connectors and Grounding Rods: Listed and labeled for complying with UL 467.
1. Connectors for Below-Grade Use: Exothermic welded type.
2. Grounding Rods: Copper-clad steel, 5/8 by 96 inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.03 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
1. Install fencing on established boundary lines inside property line.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
      b. Concealed Concrete: Place top of concrete 2 inches below grade as indicated on Drawings to allow covering with surface material.
      c. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
      d. Posts Set into Holes in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.

D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

E. Line Posts: Space line posts uniformly at 96 inches o.c.

F. Post Bracing and Intermediate Rails: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
   1. Locate horizontal braces at mid height of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
   1. Extended along top and bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

H. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

I. Intermediate and Bottom Rails: Secure to posts with fittings.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

K. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.

L. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
   1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

M. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side.

3.04 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.05 GROUNDING AND BONDING

A. Comply with requirements in Section 26 05 26 "Grounding and Bonding for Electrical Systems."

B. Fence and Gate Grounding:
   1. Ground for fence and fence posts shall be a separate system from ground for gate and gate posts.
   2. Install ground rods and connections at maximum intervals of 1500 feet.
   3. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.
   4. Ground fence on each side of gates and other fence openings.
      a. Bond metal gates to gate posts.
      b. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.

C. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a ground rod located a maximum distance of 150 feet on each side of crossing.

D. Fences Enclosing Electrical Power Distribution Equipment: Ground according to IEEE C2 unless otherwise indicated.

E. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
   1. Make grounding connections to each barbed wire strand with wire-to-wire connectors designed for this purpose.
   2. Make grounding connections to each barbed tape coil with connectors designed for this purpose.

F. Connections:
   1. Make connections with clean, bare metal at points of contact.
   2. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   3. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
   4. Make above-grade ground connections with mechanical fasteners.
   5. Make below-grade ground connections with exothermic welds.
   6. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

G. Bonding to Lightning Protection System: Ground fence and bond fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor according to NFPA 780.

H. Comply with requirements in Section 26 41 13 "Lightning Protection for Structures."

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

B. Grounding Tests: Comply with requirements in Section 26 41 13 "Lightning Protection for Structures."

C. Prepare test reports.

3.07 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

3.08 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION