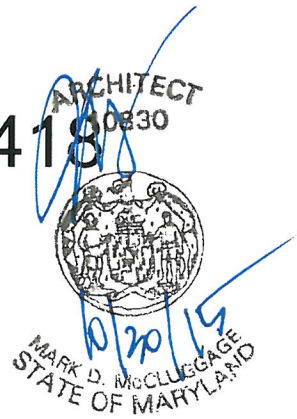
Mark D. McCluggage, AIA, CCS

Taco Bell

MED-40-Modified
Project Manual

7618 New Hampshire Avenue
Takoma Park, Maryland

Store 30496
Site 310439, Entity 427418
Project 15025.000



July 15, 2015

1525 E Douglas · Wichita, KS 67211 · T (316) 265-9367 · F (316) 265-5646 · architects@glmv.com · www.glmv.com

DOCUMENT 00 0010

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Taco Bell

Scope of Work

November 2014

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Title	Description	Supplier	Contacts	Require Plan Set
06200	**Roof Ladder & Hatch (Interior)**	**Precision**	**Steve Fugate** **Phone: (800) 225-7814 x13**	
08341	**Door – Security**	**LockNet**	**Mike Moynahan** **Phone: (800) 887-4307**	
10290-1	**Air Curtain (D/T Window)**	**Marley**	**Connie McCreary** **Phone : (502) 491-4215**	
10290-2	**Air Curtain (Service Door)**	**Marley**	**Connie McCreary** **Phone : (502) 491-4215**	
10400-2	**Exterior Menu Board and Preview Board Housings**	**Everbrite,**	**Everbrite –** Ana Dominguez **Phone:** (414) 529-7140 **e.mail:** adominguez@everbrite.com **Howard - Doug Watson** **Phone: (801) 381-0501** **e.mail: dwatson@howardcompany.com**	X
10400-3	**Exterior Menu Board Panels and Inserts**	**MillerZell**	**Archway Customer Service** **Phone: 800-440-3333** **YBFS Customer Service** **Phone: 888-342-5532**	
10400-5	**Interior Menu Board Frames with Slats & POP**	**Taco Bell Marketing (represents supplier - "Archway")**	**Victoria Kubashack** **Phone: (949)863-4611**	
10430	**Signage (Bldg Signs, Road Signs, Directional Signs)**	**Cummings,** **Everbrite,** **Federal Heath,** **NW Signs**	**Cummings Signs –** Stuart Johnstone – Phone: (615) 244-5555 x249 stuart.johnstone@cummingssigns.com **Everbrite –** Ana Dominguez **Phone:** (414) 529-7140 **e.mail:** adominguez@everbrite.com **Federal Heath –** Michelle Busing – Phone: (800) 527-9495 x373 Mbusing@federalheath.com **NW Sign Industries –** Brent Graber – Phone: (954) 306-8261 bgraber@nwsignindustries.com	X
10536	**Canopies / Trellises**	**Cummings,** **Everbrite,** **Federal Heath,** **NW Signs**	**Cummings Signs –** Stuart Johnstone – Phone: (615) 244-5555 x249 stuart.johnstone@cummingssigns.com **Everbrite –** Ana Dominguez **Phone:** (414) 529-7140 **e.mail:** adominguez@everbrite.com **Federal Heath –** Michelle Busing – Phone: (800) 527-9495 x373 Mbusing@federalheath.com **NW Sign Industries –** Brent Graber – Phone: (954) 306-8261	X

			bgraber@nwsignindustries.com	
10810	**Restroom Accessories**	**Accuserv**	**Buddy Bockweg** **Phone : (877) 707-7378**	
11020-1	**Safe**	**Brinks**	**Brinks Customer Support** Phone: 469-549-6776 ext. 6051, 6112 customercare.compusafe@brinksinc.com, brad.moore@brinksinc.com	
11020-2	**Security System**	**ADT**	**Ralph Mertz** **Phone : (614) 527-3639** **e.mail: rmertz@adt.com**	X
11030-1	**Drive-thru Window**	**Quickserv** **Ready Access**	**Phone : (800) 388-8307** **Phone : (800) 621-5045**	
11030-3	**Drive-thru Clearance Bar / Portal**	**Cummings,** **Everbrite,** **Federal Heath,** **NW Signs**	**Cummings –** Stuart Johnstone **Phone:** (615) 244-5555 x249 **e.mail:** **stuart.johnstone@cummingssigns.com** **Everbrite –** Ana Dominguez **Phone:** (414) 529-7140 **e.mail:** adominguez@everbrite.com **Federal Heath –** Michelle Busing **Phone:** (800) 527-9495 x373 **e.mail: MBusing@FederalHeath.com** **NW Sign Industries –** Brent Graber – Phone: (954) 306-8261 bgraber@nwsignindustries.com	
11030-4	**Drive-thru Sensor Loop**	**Panasonic (ERC PARTS INC)**		
11100-3	**P.O.S. (Point of Sale)**	**IBM, NCR, PAR**	**IBM**: Lisa Gleason (909) 614-1997 (Company & Franchise Option) **NCR**: Lisa Egbart (502) 921-1211 (Franchise Option Only) **PAR**: Mike Miccoli (315) 738-0600 (Franchise Option Only) RSC Support: Garrett Keith 949-863-4518 **Garrett.Keith@yum.com**	X
11100-4	**Credit Card Payment System**	**Hughes Network Systems**	**Joe Kirby – Yum Brands IT Group** **Phone: (972) 338-8610** **e.mail: Joe.kirby@yum.com**	

11300-1	**Order Confirmation Board (OCB)**	**Hyperactive, Texas Digital**	**Hyperactive Installations Contact** Neil Avery – Phone: (412) 322-3060 x228 Email**: navery@gohyper.com** **Texas Digital Installations Contact** Jennifer Kelley – Phone: (979) 446-0220 Technical Service Dept. – Phone : (972) 693-9378 Email: jkelly@txdigital.com	
11300-2	**Drive-thru Speaker & Microphone**	**HME**	**Technical Services Dept.** **Phone : (800) 909-6604 (Opt.3)**	
11300-3	**Price Confirmation Board (PCB)**	**Everbrite**	**Everbrite – Rosey Malchow** **Phone: (414) 529-7171** **e.mail: rmalchow@everbrite.com**	
11300-4	**Order Confirmation Board (OCB) Canopy**	**Hyperactive, Texas Digital**	**Hyperactive Installations Contact** Neil Avery – Phone: (412) 322-3060 x228 Email**: navery@gohyper.com** **Texas Digital Installations Contact** Jennifer Kelley – Phone: (979) 446-0220 Technical Service Dept. – Phone : (972) 693-9378 Email: jkelly@txdigital.com	X
11400-1	**Kitchen Equipment**	**Distributors:** **N. Wasserstrom, RSCS (Restaurant Supply Chain Solutions)**	**N. Wasserstrom -** Rosie Bonlarron phone: (800) 444-4697 ext. 8803 e.mail: rosiebonlarron@wasserstrom.com **RSCS –** Chad Borne phone: (502) 896-5909 e.mail: chad.borne@rscs.com	X
11400-5	**GTO with EVO Production Line**	**Delfield** **Duke** **Carter Hoffman**	**Delfield -** Phone : (800) 733-8829 **Duke -** Phone : (800) 735-3853 **Carter Hoffman** EvO cabinets (847) 362-5500	X
11405-3	**Kitchen Shelving / Workstations**	**I.S.S.**	**Ron Rubenstein** **phone: (949) 291-6147**	
11405-4	**Walk-In Cooler / Freezer (Panelized)**	**I.C.S., Norlake**	**ICS - Lynne Clatterbuck** **Phone : (800) 835-0001 ext. 4126** **e.mail: lynne.clatterbuck@icsco.com** **Norlake - Phil Metz** **Phone: (864) 590-2942** **E.mail: pmetz@norlake.com**	X

11425	**Exhaust Hoods**	**Stratovent** **Gaylord Industries** **Randell**	**Stratovent - Jeff Johnson** **Phone: (800) 474-0037** **e.mail: jeff.johnson@stratovent.com** **Gaylord Industries - Mark Curran** **Phone: (800) 547-9696** **e.mail: markc@gaylordusa.com** **Randell - Daniel "Buck" Seward** **Phone : (800) 676-9040** **e.mail: dseward@difoodservice.com**	X
11430-2	**Drink Dispensers/ Line Sets**	**Pepsi**	**Christine Trevino** **Phone : (949) 863-4352** **Email: Christine.Trevino@pepsi.com**	
11435-6	**Ice Machines**	**Manitowoc**	**Monterey McAteer** **Phone : (800) 334-4875** **Email:** **Monterey.mcateer@manitowoc.com** **Tara Greenwood** **Phone: (800) 334-4875** **Email: tara.greenwood@manitowac.com**	
11680	**Office Computer (Taco System)**	**En Pointe Global Services**	**Sergio Garza** **Phone: (310) 337-5205**	
12100-1	**Artwork**	**Creative Palette,** **Clark and Riggs Printing**	**Clark & Riggs Printing, Inc.** Berlena Montgomery Phone: 502-423-9230 Email: bmontgomery@clarkandriggs.com **Creative Palette** Tom Pritchard Phone: 614-575-1515 Email: tprichard21@hotmail.com	

12400-5	**Décor**	**Custom Seating & FCI** (others listed are for franchise only) NOTE: All company stores will use the *Base decor system*. Franchisees can choose between *Base* or the *Innovation* décor systems.	**DÉCOR PACKAGE** (Does not include circular Innovation soffit) **Custom Seating** (Company & Franchise Supplier) Farrah Ray Phone: (800) 223-7328 e.mail: farrah@customseating.com **FCI** (Company & Franchise Supplier) Mike Davidson Phone: (317) 225-8649 e.mail: Mdavidson@fcius.com **Seating Concepts** (Franchise Supplier only) Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com **MSW** (Franchise Supplier only) Rob Harmon Phone: (417) 673-1901 e.mail: rob@mswinc.com **JBI** (Franchise Supplier only) Dewey Fisher Phone : (800) 228-1250 e.mail: dfisher@jbiinteriors.com **FCC** (Franchise Supplier only) Michelle Gansko Phone: (800) 322-7328 x235 e.mail: michelle.gansko@FCCfurn.com **CMI** (Franchise Supplier only) Lyle Patton Phone: (423) 623-2700 x102 e.mail: lpatton@cmiproducts.com **CIRCULAR RING SOFFIT SYSTEM** (Innovation Only) **GTC** (Company & Franchise Supplier only) Vince Faiella Phone: (614) 252-6342 e.mail: Vince.faiella@gtcawm.com Company CMs to utilize Customer Seating or Facility Concepts. A vendor will be assigned to each CM by the Director of Construction.	X

12430	**Fruitista Machine**	**Equipment Delivery, Install and Activation** **Equipment Manufacturer** **Taco Bell Engineering**	**Equipment Delivery, Install and Activation Company & Franchisees by individual company service vendors** Equipment Manufacturer FBD – Matt Inderlied Phone: (210) 637-2846 or (866) 323-2777 Cornelius – Phone: (630) 539-5057 **Taco Bell Engineering** **Todd Evans – Mgr. Equip. Engineering** **Phone: (949) 863-3760** **Company & Franchisees**	
12440	**Iced Tea**	**Tetley**	**Irina Eyman** **(coordinator for new construction)** **Phone: (203) 929-9349**	
12540-2	**Chairs and Stools – Freestanding**	**MTS, SCI and FCI**	**MTS** (Company & Franchise Supplier) Kendra McClain Phone: 734-847-3875 e.mail: kendramcclain@mtsseating.com **FCI** (Company & Franchise Supplier) Mike Davidson Phone: (317) 225-8649 e.mail: Mdavidson@fcius.com **Seating Concepts** (Franchise Supplier only) Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com	
12540-4	**Chairs and Stools – Freestanding**	**MTS -** (Company & Franchise Supplier for Bold Choice & Innovation) **Custom Seating -** (Company & Franchise Supplier for Bold Choice & Innovation) **Seating Concepts** (Franchise - Bold Choice only) **MSW** (Franchise - Bold Choice only) **JBI** (Franchise - Bold Choice only) **FCC** (Franchise - Bold Choice only)	**MTS** Eric Foster Phone: (734) 847-3875 e.mail: ericfoster@mtsseating.com **Custom Seating** Farrah Ray Phone: (800) 223-7328 e.mail: farrah@customseating.com **Seating Concepts** Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com **MSW** Rob Harmon Phone: (417) 673-1901 e.mail: rob@mswinc.com **JBI** Dewey Fisher	

			Phone : (800) 228-1250 e.mail: dfisher@jbiinteriors.com **FCC** Michelle Gansko Phone: (800) 322-7328 x235 e.mail: michelle.gansko@FCCfurn.com	
13200	**CO2 – Bulk**	**MVE/ NU CO2**	**Cathy Bartusek** **Phone : (952) 882-5185 ext. 5169**	
13700-4	**CCTV**	**MARTCO**	**MARTCO - Adela Kragge** **Phone: (800) 210-5789** **e.mail: adela@martcoinc.com**	X
13800-1	**Lighting Control Panel - Exterior**	**Accuserv**	**Buddy Bockweg** **Phone : (877) 707-7378**	
13800-2	**EXHAUST FAN – MAKE UP AIR INTERLOCK & INTERIOR LIGHTING CONTROL PANEL**	**AIR CARE EXPERTS**	**Chuck McCabe** **Phone : (949) 770-2222** **Fax : (949) 770-5885** **cmccabe@ace-iaq.com.com**	
13900-1	**Fire Suppression System**	**Ansul**	**Pete Matulonis – Business Development** **Phone: (360) 210-7973** **Bill Klingenmaier – Technical Services** **Phone: (715) 735-7411 ext. 3439**	
15410	**Hand Sinks**	**Aero**	**Neil Pittman** **Phone: (973) 473-5300** **Email: npittman@aeromfg.com**	
15470-5	**Water Filter**	**Shurflo**	**Mike Smith** **Phone : (800) 854-3218**	
15480-3	**Water Heater**	**AO Smith (Standard)**	**Chuck Dean** **Phone: (615-584-9321** **e.mail: cdean@hotwater.com**	
15500-1	**HVAC – Test & Balance**	**Test and Balance Corp., Melink Corp., Awarded Global** **(required for all corporate development)**	**Test and Balance Corp.** - Misty Crider Phone: (678) 393-9401 ext. 2237 e.mail: lsextonkeeton@tabconline.com **Melink Corp.** – Jennifer Jackson Phone: (513) 965-7300 e.mail: kjohnson@melinkcorp.com **Air Care Experts** – Chuck McCabe Phone: (949) 770-2222 e.mail: cmccabe@ace-iaq.com	X
15700-1	**HVAC**	**Trane, York International**	**Trane:** Marty Cusick Phone : (866) YUM-VAC or (866) 986-4822 email: mjcusick@trane.com **York International –** Lisa Kuhns Phone: (800) 481-9738 email: lisa.e.kuhns@jci.com	X

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01810-1
COMMISSIONING –Functional Verification & Testing (Portion)

National Supplier:	**YUM! Brands "Zero Defect" Program**
Contact:	AIR CARE EXPERTS Primary Contact: Chuck McCabe (949) 770-2222 Secondary Contact: Nick McCabe (949) 632-5085 Issue Escalation Contact: Chuck McCabe (949) 770-2222 e-mail CMCCABE@ACE-IAQ.COM Approved by YUM Construction (CM) or Remodel Manager (RCM)
Regional / Local Providers:	
Who selects Providers?	YUM Construction (CM) or Remodel Manager (RCM)
Who orders services from Approved Provider?	Determined by CM or RCM Approved Options: General Contractor CM/RCM
Who Coordinates Scheduling of Services?	Determined by CM or RCM Approved Options: General Contractor CM/RCM
Paid for By:	Determined by CM or RCM Approved Options: GC includes cost in the project bid) CM/RCM (includes cost in misc. budget)
Scope of Work CM/RCM:	• **Include cost for FV&T services in project Misc. Budget** • **Contract all FV&T services with YUM approved provider** • **Send project "E & M" sheets to provider (upon ground break)** • **Schedule/Coordinate testing with GC and provider** • **Ensure any/all deficiencies are corrected prior to Restaurant Opening** • **Schedule / Coordinate re-testing (as required) to attain Commissioning Certification** • **Remit full payment to FV&T Provider** • **Include Commissioning Certification Document with Project Close-out**

Scope of Work General Contractor (Optional):	• **Include cost for FV&T services in project bid.** • **Contract all FV&T services with Yum approved provider** • **Send project "E & M" sheets to provider (at time of ground break)** • **Schedule/Coordinate FV&T service** • **Correct any/all deficiencies prior to Restaurant Opening** • **Schedule re-testing (as required) to attain Building Certification** • **Remit full payment to T&B Provider** • **Submit Certification Document w/ Final Draw Request**

Scope of Work Service Provider:	• **Provide the Functional Verification & Testing (FV&T) portion of the Commissioning process**
	• **Coordinate FV&T with CM, GC and subcontractors**
	• **Verify electrical and mechanical plan is current version**
	• **On owners behalf, perform inspection and FV&T of components and systems that are subject to FV& T:**
	  o **Hood Stat Operation**
	  o **RTU – Hood Exhaust Interlock**
	  o **Ansul Interlock**
	  o **Economizer Operation**
	  o **Building Pressurization @ Full Economizer Operation**
	  o **Replacement Air Quantities @ Variable Evaporator Fan Operation**
	  o **Building Pressurization @ Variable Evaporator Fan Operation**
	  o **Thermostat Programming & Operation**
	  o **Smoke Detector Operation**
	  o **Remote Smoke Detector Reset and Enunciation Operation**
	  o **Kitchen Lighting Operation & Interlock**
	  o **Dining Room Lighting Operation & Interlock**
	  o **EF-2 Operation & Interlock**
	  o **RTU Operation**
	  o **RTU Seasonal Operation**
	• **Report all items that do not meet system intent or design**
	• **Provide FV&T reports with correction recommendations**
	• **Provide analysis of field inspection and testing data**
	• **Provide Commissioning Certification document when project meets all functional and efficiency intentions.**

Owner's Scope of Work / General Comments:	-

06200
ROOF ACCESS LADDER & Hatch (T50 Only)

National Supplier	**Precision, Inc.**
Contact:	Steve Fugate Phone: (800) 225-7814 x13 Fax: (423) 586-2091
Manufacturer's Model #	FL184 (Ladder) & PLHG (Hatch)
A&E Item Number	B-049 (Ladder) & B-050 (Hatch)
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop Shipped
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** All hardware necessary to install not provided by supplier. **Install :** Complete installation
Supplier's Scope of Work	**Material:** Provide aluminum roof access ladder and hatch assembly with mounting hardware. **Install:** N/A
Owner's Scope of Work/ General Comments	**General Comments:** General Contractor shall coordinate blocking / mounting locations with Supplier (prior to fabrication).

08341
DOOR - SECURITY

National Supplier	**LockNet**
Contact:	Mike Moynahan Phone: (800) 887-4307 Fax : (859) 887-4958
Manufacturer's Model #	DU3670L52VED
A&E Item Number	N/A
Who orders item from Supplier?	General Contractor
Who Coordinates Shipping?	General Contractor
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	General Contractor/General Contractor
Paid for By	General Contractor
General Contractor Scope of Work	**Material:** Purchase complete security door package including Vision Panel (without Flap) Continuous hinge, heavy duty closer, rain drip, door bottom/sweep, weather-strip, kick plate and panic hardware from Locknet using national account pricing. See Door Schedule, sheet A1.1 for additional detail. **Install :** Complete installation
Supplier's Scope of Work	**Material:** Complete security door package including Vision Panel (without Flap) Continuous hinge, heavy duty closer, rain drip, door bottom/sweep, weather strip, kick plate and panic hardware **Install:** N/A
Owner's Scope of Work/ General Comments	**General Comments:** LockNet security door is required by YUM Loss Prevention. Extended warranty provided by LockNet

10290-1
AIR CURTAIN (DRIVE-THRU WINDOW)

To be used only if required by local jurisdiction

National Supplier	**Marley Engineered Products** 2500 Data Drive Louisville, KY. 40299
Contact:	**Connie McCreary** Phone: (502) 491-4215 Fax: (502) 491-3040
Manufacturer's Model #	E2400-1115FG
A&E Item Number	B-151 (Drive Thru Window)
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Consolidated Package
If shipped in a Consolidated Package, which number?	#1
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner

General Contractor Scope of Work	**Material:** Electrical conduits and conductors as detailed or required. **Install:** Complete installation of air curtain including electrical rough-ins and final connections. Install Owner supplied air curtain micro switch in drive thru window. NOTE: All conduits must be concealed.
Supplier's Scope of Work	**Material:** Complete package. **Install:** N/A
Owner's Scope of Work/ General Comments	**General Comments:** Install only if required by local codes. Standard storefront configuration at the drive-thru window must be modified. See the "option" section for this concept at plans.yum.com for more information

10290-2
AIR CURTAIN (SERVICE DOOR)

To be used only if required by local jurisdiction

National Supplier	**Marley Engineered Products** 2500 Data Drive Louisville, KY. 40299
Contact:	**Connie McCreary** Phone: (502) 491-4215 Fax: (502) 491-3040
Manufacturer's Model #	E4200-1175
A&E Item Number	B-150 (Service Door)
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Consolidated Package
If shipped in a Consolidated Package, which number?	#1
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Electrical conduits and conductors as detailed or required. **Install:** Complete installation of air curtain including electrical rough-ins and final connections. Install Owner supplied air curtain micro switch in service door frame. NOTE: All conduits must be concealed.
Supplier's Scope of Work	**Material:** Complete package. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comments:** Install only if required by local codes. See the "option" section for this concept at plans.yum.com for more information

10400-2
EXTERIOR MENUBOARD AND PREVIEW BOARD HOUSINGS
Preview Board is an Option (only)

National Supplier	**Howard** **Everbrite**
Contact:	**Everbrite –** Nichole Waller Phone: (414) 529-7179 nwaller@everbrite.com **Howard –** Doug Watson – Phone: (801) 381-0501 dwatson@howardcompany.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	C.M. (Company), C.M. or Distributor (Franchise)
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** J-Boxes, conduit, conductors. **Install:** Footings, conduit, conductors and electrical connections for exterior menu board, preview board and speaker post. Provide power for installation by supplier.
Supplier's Scope of Work	**Material:** Anchor bolts, exterior menu boards, preview board, menu board extenders, and order confirmation board if applicable. Provide anchor bolt patterns/template to G.C **Install:** Menu board, Preview Board
Site-Adapt Consultant Scope of Work	**Note:** Coordinate standard foundation design with the Sign Vendor and perform any modifications required by local building code; i.e., soil bearing capacity, footing depth, wind load, etc. The standard (or) modified foundation design is to be provided in the site-adapted construction documents.
Owner's Scope of Work / General Comments	Preview Menu Boards are NOT standard for single brand Taco Bell.

10430
EXTERIOR BUILDING, ROAD & DIRECTIONAL SIGNS
Directional Sign is an Option (only)

National Supplier	**Cummings Signs, Everbrite, Federal Heath, NW Signs**
Contact:	**Cummings Signs –** Stuart Johnstone – Phone: (615) 244-5555 x249 stuart.johnstone@cummingssigns.com **Everbrite –** Ana Dominguez - Phone: (414) 529-7140 adominguez@everbrite.com **Federal Heath –** Michelle Busing – Phone: (800) 527-9495 x373 Mbusing@federalheath.com **NW Sign Industries –** Brent Graber – Phone: (954) 306-8261 bgraber@nwsignindustries.com Company CMs to utilize the Company Regionalization Strategy. Contact Dave Reinhart for more information.
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	C.M. (Company), C.M. or Distributor (Franchise)
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer (Local Installer)
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** J- Boxes, conduit, conductors and miscellaneous listed below. **Install:** Install J-Boxes, conduit, conductors, and blocking as noted on drawings: G.C. to provide complete installation of decorative base/shroud for any monument signs should they occur (example decorative masonry shroud not connected to sign). Accessible Parking Signs: Install foundation as detailed in drawings

Scope of Work

Supplier's Scope of Work	**Material:** Exterior buildings signs, foundations/footings, pole/pylon sign, reader board and accessories, monument sign (optional), and directional signage. **Install:** Exterior Building Signage; Complete installation and electrical connections. Supplier responsible for acquiring signage permits unless otherwise noted. Pole/Pylon sign, reader board and Accessories; Complete installation of engineered foundations. Paint poles. Monument Sign (where occurs); Complete installation of monument sign and foundation excluding installation of a decorative shroud if applicable. Directional Signage; Complete installation and electrical connections of directional signage and foundation.
Site-Adapt Consultant Scope of Work	**Note:** Coordinate standard foundation design with the Sign Vendor and perform any modifications required by local building code; i.e., soil bearing capacity, footing depth, wind load, etc. The standard (or) modified foundation design is to be provided in the site-adapted construction documents.
Owner's Scope of Work / General Comments	**General Comment:** One (1) Directional Sign is OPTIONAL.

10536
CANOPIES/ SLAT WALLS/ FLYING ARCHES

National Supplier	**Cummings Signs, Everbrite, Federal Heath, NW Signs**
Contact:	**Cummings Signs –** Stuart Johnstone – Phone: (615) 244-5555 x249 stuart.johnstone@cummingssigns.com **Everbrite –** Ana Dominguez - Phone: (414) 529-7140 adominguez@everbrite.com **Federal Heath –** Michelle Busing – Phone: (800) 527-9495 x373 Mbusing@federalheath.com **NW Sign Industries –** Brent Graber – Phone: (954) 306-8261 bgraber@nwsignindustries.com Company CMs to utilize the Company Regionalization Strategy. Contact Dave Reinhart for more information.
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	C.M. (Company), C.M. or Distributor (Franchise)
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer (Local Installer)
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** Blocking as detailed and required for awnings, canopies and slat wall. Conduit, conductors and j-boxes as directed by drawings and signage supplier. **Install:** Provide dimension assistance to Supplier's representative if requested by supplier, provide J-Boxes, conduit, wiring, and final electrical connections as noted on drawings. Canopy and Slat Wall Light Fixtures to be supplied by Sign Vendor.

Scope of Work

Supplier's Scope of Work	**Material:** Canopies with diagonal supports and wire ways/ conduit for light fixtures, Slat Wall and Valance Elements (where occurs), Canopy, Slat Wall and Flying Arch permits where required. Supplier to provide site specific blocking and electrical rough-in information to GC and owner's representative. **Install:** Supplier must verify actual field dimensions with Supplier's designated Field Representative or as-built drawings. Complete installation of Canopy, Slat Wall and Flying Arch (where occurs). Fasten canopies to header above openings and diagonal supports to GC installed blocking. **NOTE:** Any connections through EIFS finish must be bushed and sealed per signage vendor drawings and as shown in architectural drawings to prevent damage to insulation and weather-tight envelope of building.
Owner's Scope of Work / General Comments	**General Comments:** Supplier arranges delivery of awnings and exterior image elements to local installer. Local installer delivers to site and installs.

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10810
RESTROOM ACCESSORIES

National Supplier	**Accuserv**
Contact:	**Buddy Bockweg** Phone : (877) 707-7378 Fax : (502) 961-0357 buddy@accuserv.com
Manufacturer's Model #	Varies
A&E Item Number	F-452 (if indicated in Plan Set), B-241, B-265, B-275, B-290 (where occurs), B-291 (where occurs), B-300, B-305, B-405, B-410
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	NA
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contactor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Blocking as noted in drawings and required **Install:** All owner provided Restroom Accessories
Supplier's Scope of Work	**Material:** Restroom Accessories **Install:** N/A
Owner's Scope of Work / General Comments	**Notes:** Restroom Accessories are part of the consolidated package from the distributor.

11100-3
P.O.S.
(POINT OF SALE PACKAGE)

National Supplier	**IBM , NCR and PAR**
Contact:	**Order Installation**: IBM: Lisa Gleason (909) 614-1997 (Company & Franchise Option) NCR: Lisa Egbart (502) 921-1211 (Franchise Option Only) PAR: Mike Miccoli (315) 738-0600 (Franchise Option Only) **Miscellaneous Issues**: **RSC Support**: Garrett Keith - 949-863-4518 - **Garrett.Keith@yum.com** **Help Desk:** (800) SOS-TACO select option "1"
Manufacturer's Model #	N/A
A&E Item Number	Varies. See attached Equipment Matrix
Who orders item from Supplier?	Owner (Material through Distributor)
Who Coordinates Shipping?	Manufacturer (YUM!)
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor (On-site contact)
Installed By	Manufacturer (Local Installer) – Equipment General Contractor – Low voltage & data wiring infrastructure
Warranty Material / Install Paid for By	Owner/Owner Owner
General Contractor Scope of Work	**Material:** Supply all J-boxes, conduit, pull-strings and electrical outlets. **Install : POS/Order entry terminals:** Provide holes in counters for order entry terminals; provide J-Box, I.G. power and conduits as noted on drawings. noted on drawings. **Brackets for Monitors:** Complete installation of monitor brackets. Provide blocking/support. **Bump Pads:** Install conduit/ J-box, I.G outlet, conduit and wiring as noted on drawings. **Cash Register:** Provide J-box, I.G. outlet, conduit and wiring as noted on drawings. **Receipt Printers:** Provide J-Box, I.G. outlet, conduit and wiring as noted on drawings. **Com Wiring:** Provide I.G. power, J-Boxes, conduit and wiring as noted on drawings **Coordination:** G.C. to coordinate scheduling so that permanent power is on prior to installation of Telephone Communications which must be active prior to installation of POS system. G.C. is responsible for reviewing the PAR "Pre-Install Guidelines" (provided by CM) to verify that the building is

	ready. If the POS installer finds incomplete items the G.C. will be charged for the installers return trip. **Install :** Refer to the "New Store Data Cabling Scope of Work" rev 10. **Coordination:** G.C. to coordinate scheduling so that permanent power is on prior to installation of Telephone Communications which must be active prior to installation of POS system. G.C. is responsible for reviewing the supplier "Pre-Install Guidelines (provided by CM) to verify that the building is ready.
Supplier's Scope of Work	**Material:** Supply all system components and materials necessary for a complete installation. **Pre-Install:** supplier reviews site specific plan sheets for compliance with supplier and alerts CM of inconsistencies. **Purchase:** Supplier notifies CM prior to making changes to the purchase order. **Pre-Install Checklist:** Taco Bell IT contacts superintendent to confirm install date and review pre-install checklist. **Install:** Supplier cannot begin their install until TACO PC has been installed. **Monitors:** Complete install of all monitors after G.C.'s work is completed. **Video Controllers:** Complete installation of controllers after G.C.'s work is completed. **Bump Bars:** Installation of bump bar/wiring connection after G.C.'s work is completed. **Cash Registers:** Installation of cash registers after G.C.'s work is completed. **Receipt Printers:** Installation of receipt printers after G.C.'s work is completed. **Wiring & connectors:** Pull communications wiring to POS components. Complete final POS equipment connections and software start-up. **Power Cords:** Complete installation of power cords after G.C.'s work is completed. **Coordination:** supplier to call HELP DESK at the completion of POS installation for system verification. supplier completes "Job Status Form"" at time of each visit, leaves a signed copy with G.C and copies CM via e-mail.
Owner's Scope of Work/ General Comments	**Design Intent:** Owner provides wiring diagram if different from drawings. See "Telephone Communications" for more information. **Note:** All Electrical Power Lines shall be dedicated circuits with isolated ground on the same phase. Data Lines shall not share conduits with electrical power conductors. **Critical Flow Chart :** Permanent Power Available ->\ Telephone Lines Active->\ Pre-installation Survey->\ P.O.S. Installation.

11300-1
ORDER CONFIRMATION BOARD (OCB)

National Supplier	**Hyperactive** – (Company standard & Franchise option) **Texas Digital –** (Company option & Franchise option)
Contact:	**Hyperactive Installations Contact** Neil Avery – Phone: (412) 322-3060 x228 Email**: navery@gohyper.com** **Texas Digital Installations Contact** Jennifer Kelley – Phone: (979) 446-0220 Technical Service Dept. – Phone : (972) 693-9378 Email: jkelly@txdigital.com
Manufacturer's Model #	Hyperactive – HyperView Model 07 Display & Computer Texas Digital accu-view 150 LCD S240 (Data Switch, TB only) S240 (Data switch, Taco Bell only)
A&E Item Number	N/A
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor (pedestal only)
Installed By	See General Contractor & supplier Scope of Work Notes
Warranty Material / Install	Material – Owner Install – General Contractor / 3rd Party
Paid for By	Owner General Contractor See General Contractor & Supplier Scope of Work Notes
General Contractor Scope of Work	**Material:** All conduit, conductors and all other material not supplied by supplier necessary to complete installation. **Install:** Pour footing & place pedestal. Place all power and data conduits, pull power conductors per plans. Make ready for installation of the OCB canopy / cabinet and make ready for pulling data cables and final power connections. Note: Data cables shall not share conduits with power conductors.
Supplier's Scope of Work	**Material:** Order Confirmation board box (pedestal), data switch (Texas Digital) / interior computer (Hyperactive), serial cable(s) and adapter. Speaker and microphone is supplied by HME.

Supplier's Scope of Work *(continued)…*	**Install:** Order Confirmation Board display and data switch/in-house computer (in managers office). Pull serial data cables with adapters (in dedicated conduit). Start-up and test OCB. Train RGM. Speaker and microphone is installed by HME into the OCB-Canopy. See Scope of Work 11300-4 OCB-Canopy (for reference). **Note:** OCB Vendor will provide "Pre-Installation and Site Preparation Requirements".
Owner's Scope of Work / General Comments	**General Comment:** The OCB (Order Confirmation Board) consists of a UL listed video screen unit and HME speakers and microphones, and will be installed into a sign vendor supplied OCB-Canopy. See Scope of Work 11300-4 OCB-Canopy for reference and coordination with sign vendor. Data Lines shall not share conduits with electrical power conductors.

11300-4
ORDER CONFIRMATION BOARD (OCB) - CANOPY

National Supplier	**Cummings, Everbrite, Federal Heath**
Contact:	**Cummings Signs –** Stuart Johnstone – Phone: (615) 244-5555 x249 stuart.johnstone@cummingssigns.com **Everbrite –** Ana Dominguez - Phone: (414) 529-7140 adominguez@everbrite.com **Federal Heath –** Michelle Busing – Phone: (800) 527-9495 x373 Mbusing@federalheath.com Company CMs to utilize the Company Regionalization Strategy.
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	CM, Franchisee or Distributor on behalf of the Franchisee
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	See General Contractor and Supplier Scope of Work Notes
Warranty Material / Install	Material – Owner Install – General Contractor / 3rd Party
Paid for By	Owner / General Contractor (see General Contractor and Supplier Scope of Work Notes)
General Contractor Scope of Work	**Material:** Provide all power conductors and conduit, with stub-up at base of the OCB Canopy, ready for connection to OCB internal components and OCB Canopy Lighting. Also provide a dedicated conduit for future data (by Supplier) with Pull-String in place. **Install:** Footings, conduit, conductors and electrical connections for internal OCB and HME components inside the Canopy Cabinet. Provide power for installation by Supplier.

Scope of Work

Supplier's Scope of Work	**Material:** OCB Canopy, Brackets, Anchor Bolt Pattern and Anchor Bolts. **Install:** OCB Canopy. **Note:** Anchor Bolt and Anchor Bolt Pattern needs to be delivered to the Site prior to the General Contractor pouring the Footing.
Site-Adapt Consultant Scope of Work / General Comments	**Site Adapt:** Coordinate standard foundation design with the sign vendor and perform any modifications required by local building code; i.e., soil bearing capacity, footing depth, wind load, bollard protection, etc. The standard (or) modified foundation design is to be provided in the Civil Drawings. **General Comments:** See Scope of Work sheets 11300-1 and 11300-2 for coordination with the OCB and HME sound suppliers; respectively. The OCB-Canopy will be installed prior to the OCB, Speaker and Microphone. Conduits for electrical and Data shall be stubbed-up inside the base of the OCB Cabinet included with the Canopy.

11400-1
KITCHEN EQUIPMENT

National Supplier	**N. Wasserstrom** **RSCS (Restaurant Supply Chain Solutions)**
Contact:	**N. Wasserstrom -** Rosie Bonlarron phone: (800) 444-4697 ext. 8803 e.mail: rosiebonlarron@wasserstrom.com **RSCS –** Chad Borne phone: (502) 896-5909 e.mail: chad.borne@rscs.com
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor: Notify ECO LAB to order the "Click n Clean" system for the GEN IV Power Soak. Contact: _____ at (___) ____ - _____ for questions about your order.
Shipping Method	Consol. Pkg.
If shipped in a Consolidated Package, which number?	1
Received By	General Contractor
Installed By	General Contractor (See General Comments)
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner

General Contractor Scope of Work	**Material:** All materials required to provide rough-ins as shown on plans and in manufacturer's instructions. **Install:** All receiving, inventory, offloading, installation, rough-in connections, and final utility connections/inspections. G.C. to coordinate calibration and testing of kitchen equipment with local vendors as applicable.
Supplier's Scope of Work	**Material:** Equipment and accessories as scheduled. Installation and startup instructions. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** See "Exhaust Hoods" and "Walk-in Cooler" for additional kitchen equipment information

11400-5
EvO Production Line

National Supplier **Contact:**	**Delfield** **Duke** **Carter Hoffman** Delfield - (800) 733-8829 Duke – (800) 735-3853 Carter Hoffman EvO cabinets – (847) 362-5500
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor /Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner

General Contractor Scope of Work	**Material:** All electrical conduits, conductors and connectors necessary to the point of connection; all filtered waters line(s) necessary to the point of connection. **Install:** Off load and install GTO Production Line as shown in plans and as described in the manufacturer's service and installation / operations manual. Connect electrical service to the production line service panel. Connect reverse osmosis filtered water to pre-pipe water connection at vertical utility chase. Attach EvO cabinets. Mount POS bump bar and monitor brackets. Perform set-up and start-up.
Supplier's Scope of Work	**Material:** Ship complete package including service, installation and operations manual. **Install:** POS installer will mount and connect POS bump bars and monitors. MAPS line vendor to perform start-up.
Owner's Scope of Work / General Comments	**General Comment:** G.C. shall verify all circuits serving POS equipment complies with 14/E3.1. G.C. sends the vendor a signed site prep form stating that the site is ready for start-up. (1-2 week lead-time required).

Scope of Work

Optional Vendor Set-up / Start-up Scope of Work	Duke	Delfield
1. Setup / Startup	X	X
2. Verify all units have been properly fastened	X	X
3. Verify that all doors open and close properly	X	X
4. Install adjustable shelving	X	X
5. Startup all equipment	X	X
6. Check all circuit breakers	X	X
7. Check all receptacles	X	X
8. Verify drywell is an acceptable temperature	X	X
9. Verify the Tri-Channel is an acceptable temperature	X	X
10.Calibrate temperatures if required.	X	X
11.Silicone all open seams	X	X
12.Remove surface scratches (if possible)	X	X
13.Demonstrate operations of the controls to the owner or store manager if available.	X	X
14.Set the Hatco Stager in place		X
15.Set the Pizza Melter(s) in place		X
16.Make water (adjust PSI between 20 & 30 PSI) & drain connections to Pizza Melter(s).		X
17.Install all lid holders, knife holders, bag holders, condiment holders, etc.		X
18.Install adapter bar and templates		X
19.Install catch drawer under taco rail		X
20.Check all valves for leaks		X
21.Check for sharp edges and remove as necessary		X
22.Clean Entire Unit		X

DUKE Notes:
1. All components relating to this equipment should be installed including final connections prior to start-up.
2. The standard startup fee is based on locations within 75 miles of a Duke FASC and normal business hours. Projects beyond a 75 mile radius and outside normal business hours will require a specific quotation as additional charges may apply.
3. Service should be contacted 48-72 hours in advance in order to assure timely startup with a confirmed price.
4. The filtered water connection must be made before vendor will come to the site to do the final start-up.
5. The unit must be completely cleaned before the vendor will come to the site to do the final start-up.

11405-3
SHELVING/ WORKSTATIONS

National Supplier	**I.S.S.**
Contact:	Ron Rubenstein – Phone : (949) 291-6147
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Consol. Pkg.
If shipped in a Consolidated Package, which number?	1
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner

General Contractor Scope of Work	**Material:** N/A **Install:** Assemble shelving and workstations per supplier's instructions and install per plans
Supplier's Scope of Work	**Material:** All components for shelving and workstation assemblies bundled together in clearly marked packaging. Clear assembly instructions including isometric drawing of final assembly. **Install:** N/A
Owner's Scope of Work / General Comments	

11405-4
WALK-IN COOLER/FREEZER (Panelized)

National Supplier	**I.C.S, Norlake**
Contact:	**ICS - Lynne Clatterbuck** Phone : (800) 835-0001 ext. 4126 e.mail: lynne.clatterbuck@icsco.com **Norlake - Phil Metz** Phone: (864) 590-2942 E.mail: pmetz@norlake.com
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer
Installed By	Manufacturer /General Contractor
Warranty Material / Install	Owner/Owner (G.C. is responsible for weather tight installation at building shell)
Paid for By	Owner
General Contractor Scope of Work	**Material:** Provide condensate drains (as shown on plans), power and conduit from building to walk-in condensers. Accessibility to slab provided. **Install:** Off-load and erect in place; seal to slab. Install interior cove base and door trim. Provide final connection to power and condensate drains. Install clear-Vu curtains. Perform start-up.
Supplier's Scope of Work	**Material:** Walk-in Cooler/Freezer complete package. Hold-up button j-boxes installed by cooler supplier. **Install:**. Full vendor off-load, set-up and start-up is available for an additional price (as an option).
Owner's Scope of Work / General Comments	**General Comments:** Hold-up buttons inside coolers and freezer by security supplier. No Clear-Vu curtains in chicken cooler. If the exterior of the walk-in cooler is to be painted, preparation shall consist of power washing to remove dirt and grease.

11425
HOODS

National Supplier	**Stratovent –** Preferred Supplier **Gaylord Industries –** Preferred supplier (Broiler Hood) **Randell –** Alternate Supplier
Contact:	**Stratovent** Jeff Johnson Phone: 800-474-0037 Cell: 251-490-6114 Fax: 919-573-4251 Email: jeff.johnson@stratovent.com **Gaylord Industries** Mark Curran Phone: (800) 547-9696 Fax: (503) 692-6048 Email: markc@gaylordusa.com **Randell** Daniel "Buck" Seward Phone : (800) 676-9040 ext: 4129 Cell: (601) 566-0258 Fax: (256) 722-9577 Email: dseward@difoodservice.com
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Exhaust Duct, Duct Fireproofing as required by code, relays for hood fan interlock circuit. Provide all other materials for complete installation. **Install:** Install hood, duct, duct fireproofing, and all other materials for complete installation. Stainless steel wall panels to be installed without exposed fasteners.

Scope of Work

	Supply, assemble and install exhaust fan interlock per 2/E6.0
Supplier's Scope of Work	**Material:** Hood pre-piped for fire suppression, exhaust fans with insulated steel curbs, louvered steel extensions and hinged base. 6" air gap for Type I hoods. Stainless steel panels per plans. 1" standoffs for stainless panels at Type I hoods. Standoffs not required if wall construction is "non-combustible" (CMU). **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** G.C. responsible for all inspections.

11435-5
ICE MACHINES - PEPSI

National Supplier	**Manitowoc Ice Inc. & Hoshisaki**
Contact:	**Monterey McAteer** **Phone : (800) 334-4875** **Email: Monterey.mcateer@manitowoc.com** **Tara Greenwood** **Phone: (800) 334-4875** **Email: tara.greenwood@manitowac.com**
Manufacturer's Model #	Manitowac SY-1474C
A&E Item Number	S-513
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	Manufacturer (Local Installer)
Warranty Material/ Install	Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** Condenser platform, conduit, conductors **Install:**. G.C. to coordinate and schedule installation of Ice Machines with Pepsi drink system installer.
Supplier's Scope of Work	**Material:** Ice machine condensers, cubers and refrigerant lines. **Install:** Complete installation of system, start up and test.
Owner's Scope of Work / General Comments	**Owner Scope:** C.M. to coordinate work between drink platform Vendor/Supplier and G.C. **General Comment:** Distributor provides purchase orders to manufacturer for applicable Pepsi platform. Both ice machines are purchased by and installation paid for by the owner. Installation by a local installer is paid for at the time of order.

11680
OFFICE COMPUTER (Taco System)

National Supplier	**En Pointe Global Services**
Contact:	Sergio Garza– Phone : (310) 337-5205
Manufacturer's Model #	Varies
A&E Item Number	F-040 F-060
Who orders item from Supplier?	Owner
Who Coordinates Shipping?	Owner
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer (Local Installer)
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** Complete high & low voltage electrical systems per plans including pull strings for communication lines. **Install:** Complete high & low voltage electrical system per plans, including pull strings for communication lines.
Supplier's Scope of Work	**Material:** Server computer, keyboard, monitor, fax, office printer, UPS, power cords, low voltage wire and software. **Install:** Server computer, keyboard, monitor, fax, office printer, UPS, power cords. Place in office. Low Voltage Wire: Pull wire to all PAR & related equipment and make connections. Software: Install software.
Owner's Scope of Work / General Comments	**General Comments:** YUM! Places order when they receive the stores ground break notice. Gaylinn Tenkley at (949) 863-4800 and Carolina Saravia at (949) 863-3656 are responsible for ordering the equipment and coordinating with the POS shipment for company stores. **Note:** Data Lines shall not share conduits with electrical power conductors.

12100
ARTWORK

National Supplier	**Clark and Riggs Printing, Inc., Creative Palette**
Contact:	Clark & Riggs Printing Berlena Montgomery Phone: 502-693-7853 Email: bmontgomery@clarkandriggs.com Creative Palette Tom Pritchard Phone: 614-575-1515 Email: tprichard21@hotmail.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Any mounting / support hardware or adhesive as recommended by manufacturer's installation instructions. **Install:** All owner supplied artwork as produced by vendor.
Supplier's Scope of Work	**Material:** Refer to drawings for number, size and location of Artwork. Contact Artwork Supplier for materials and mounting instructions. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comments:** The supplier provides detailed installation instructions with the wall murals (where applicable). Failure to follow the instructions for wall preparation, adhesive, or installation methods may result in damage to the murals or an unapproved installation. Contact the supplier if additional copies of instructions are needed.

12400-5
DÉCOR (Live Mas & Innovation)

National Supplier	**Custom Seating & FCI** (others listed are for franchise only) NOTE: All company stores will use the ***Base decor system***. Franchisees can choose between ***Base*** or the ***Innovation*** décor systems.
Contact:	**DÉCOR PACKAGE** (Does not include circular Innovation soffit) **Custom Seating** (Company & Franchise Supplier) Farrah Ray Phone: (800) 223-7328 e.mail: farrah@customseating.com **FCI** (Company & Franchise Supplier) Mike Davidson Phone: (317) 225-8649 e.mail: Mdavidson@fcius.com **Seating Concepts** (Franchise Supplier only) Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com **MSW** (Franchise Supplier only) Rob Harmon Phone: (417) 673-1901 e.mail: rob@mswinc.com **JBI** (Franchise Supplier only) Dewey Fisher Phone : (800) 228-1250 e.mail: dfisher@jbiinteriors.com **FCC** (Franchise Supplier only) Michelle Gansko Phone: (800) 322-7328 x235 e.mail: michelle.gansko@FCCfurn.com **CMI** (Franchise Supplier only) Lyle Patton Phone: (423) 623-2700 x102 e.mail: lpatton@cmiproducts.com **CIRCULAR RING SOFFIT SYSTEM** (Innovation Only) **GTC** (Company & Franchise Supplier only) Vince Faiella Phone: (614) 252-6342 e.mail: Vince.faiella@gtcawm.com Company CMs to utilize Customer Seating or Facility Concepts. A vendor will be assigned to each CM by the Director of Construction.
Manufacturer's Model #	Varies
A&E Item Number	N/A

Scope of Work

Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop (Soffit comes separately from GTC)
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Adhesives **Install:** Complete installation of owner supplied décor package including seating, tables, modular counter, window sills, soffit(s), chair rails, and dining room wainscot (roll Marmoleum on 1/8" Luan plywood panels) with all associated trim (J-mold / corner trim). Coordinate alignment of ceiling hung item(s) and core drilled fixtures such as tables and pendant lights (where occurs). Drill 2" holes in service counter for P.O.S. Install light fixtures in soffits as required. **Note:** Secure trim and fully-adhere the Marmoleum panels (supplied by Décor Vendor) onto the wall (gypsum board and/or CMU) as indicated in the drawings. Marmolium "Click" System is not approved. Refer to Décor Sheets for reference
Supplier's Scope of Work	**Material:** Modular front service counter, divider wall, trash and condiment enclosures, table / bases, settees, chair rails, window sill, dining room wainscot (roll Marmoleum adhered to 1/8" Luan plywood panels) with all associated trim (J-mold / corner trim), center U-shape divider with settee, plastic laminated soffits with pilot holes drilled for GC installation of recessed can lights and site-specific core-drill template / seating layout. The Supplier shall prepare the divider wall and service counter for GC installation. **Install:** N/A
Owner's Scope of Work / General Comments	**Décor Vendor Notes:** The Décor Vendor shall fully-adhere the roll Marmoleum on 1/8" Luan plywood panels and provide vertical H-molding painted to match color of panel in their factory and ship panels, to the site, with the décor package.

12430
FRUITISTA MACHINE

National Supplier	**Equipment Delivery, Install and Activation Manufacturer** **Taco Bell Engineering**
Contact:	**Equipment Delivery, Install and Activation** East (except Florida company stores) - ICEE Company & Franchisees ICEE Call Center: 800-423-3872 West (including Florida company stores) – RepTec Company and Franchisees RepTec Call Center: 877-737-8320 e.mail: repairs@reptec.org **Equipment Manufacturer** **FBD** – Matt Inderlied Phone: (210) 637-2846 or (866) 323-2777 e.mail: minderlied@fbdfrozen.co **Cornelius** Phone: (630) 539-5057 **Taco Bell Engineering** Todd Evans – Mgr. Equip. Engineering Phone: (949) 863-3760 e.mail: todd.evans@yum.com
Manufacturer's Model #	Varies, see Sheet A2.0 Equipment Plan for the affected concepts
A&E Item Number	Varies, see Sheet A2.0 Equipment Plan for the affected concepts
Who orders item from Supplier?	**Equipment:** Distributor **Installation & Setup:** General Contractor (notify vendor 2 weeks from desired install date)
Who Coordinates Shipping?	Distributor
Shipping Method	Drop shipped to ICEE or RepTec who then will bring it to the store and install it.
If shipped in a Consolidated Package, which number?	N/A
Received By	Service Agents – ICEE (East) or RepTec (West)
Installed By	Service Agents – ICEE (East) or RepTec (West)
Warranty Material / Install	Owner / General Contractor
Paid for By	Owner

Scope of Work

General Contractor Scope of Work	**Material:** All building infrastructure noted on plans including electrical conduit, wires and outlets. **Install:** None
Supplier's Scope of Work	**Material:** All Fruitista related equipment, including the FBD machine and "Buck&Boost" transformer. Note: The transformer is only needed if the electrical service is not 240volts. Most are 120 volts **Install:** ICEE and/or RepTec will deliver and provide complete installation and start-up including the branch-off of Co2 & filtered water lines from bundled water tubing and final start-up. Fruitista machine shall not be installed until after the Pepsi soft drink machine is installed. Activation: A second trip is required if machine is not activated during Installation. (No water, power and/or product on site). Operations, Area Coach or RGM should schedule directly with ICEE / RepTec after turnover and at least one week prior to opening. RGM to ensure Fruitista product is on hand for activation. There is an additional charge for the second trip.
Owner's Scope of Work / General Comments	**Owner Scope:** Owner Rep shall verify if a Fruitista machine has already been installed before issuing the ground break notice on their "Scrape" or "Relocated" project. If the answer is yes then the Owner Rep shall contact the distributor and cancel the shipment of new Fruitista equipment. The Owner Rep shall also contact the ICEE or RepTec representative and make arrangements to transfer the current Fruitista equipment to the new store. Applies to all Single Brand Taco Bells and Taco Bell Multibrands; Taco Bell Express Concepts are “OPTIONAL”.

12440
ICED TEA

National Supplier	**Tetley**
Contact:	Irina Eyman (coordinator for new construction) Phone: (203) 929-9349 Fax: (203) 929-9263 e.mail: Irina.Eyman@TetleyHarris.com.
Manufacturer's Model #	Varies, see Sheet A2.0 Equipment Plan for the affected concepts
A&E Item Number	TB3Q Brewer with TD0-4 Urn = S544, TD0-4 Urn = S546, TCD-1 Concentrate Dispenser (option), TCD-2 Concentrate Dispenser (option)
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Supplier
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	Supplier (local installer)
Installed By	Supplier / General Contractor
Warranty Material / Install	Supplier / General Contractor
Paid for By	Tetley
General Contractor Scope of Work	**Material:** All electrical conduits, conductors and connectors shown in drawings. **Install:** (2) Drink Machine Tables. Install tubing bundle prior to installation of ceiling tile.
Supplier's Scope of Work	**Material:** The supplier will provide all equipment approved by the DMA where the project is located. Each DMA will select one of four options: 1). Standard = Either sweetened or unsweetened brewed iced tea. 2). Sweetened and Unsweetened brewed iced tea. 3). Extract iced tea. 4). No iced tea. **Install:** Complete installation of ICED TEA equipment. Add a "T" connection from the drink machine bundled tubing filtered water line and connect branched filtered water line to the brewer. Perform all tests and start-up procedures.

Scope of Work

Owner's Scope of Work / General Comments	Tetley & the Distributor will receive the ground break notice for all company & franchisee site specific projects. The distributor will then issue a penny PO to Tetley to initiate the supply & install order process. As noted above DMAs may differ in terms of the type of ICED TEA system they are using so Tetley will take point to confirm the product mix with Ops to insure the proper equipment is ordered and installed on site. Tetley will then contact the "Owner" (Franchisee, CM or Superintendent) and verify if the site is ready to receive the ICED TEA equipment. If the answer is "no" then Tetley will add the site number to a general list for stores to be retrofitted at a later date. Taco Bell Facilities will retrofit all company stores on the list. Franchisees will be required to add ICE TEA at a later date if your DMA has approved the addition of ICE TEA. Franchisees should contact their RAP or FBM for questions about deadlines for retrofitting their stores. If Tetley confirms the site is ready they will have a BUNN representative perform the Supplier Install Scope of Work. The Distributor will provide the "Owner" with the local Tetley contact information for use in coordinating the work on site. The "Owner" will be responsible for communicating and coordinating the work with the project schedule, to provide adequate lead time to install Tetley equipment. A store needs to have the ability to plug the Brewer into a non-POS outlet that has enough capacity remaining for an additional (single phase) 14.5 amp load. If this is not available a new 20 amp will need to be installed to meet the need previously described. Table/Counter space must be available to place the (12"W x22"D) brewer within 6 ft. of the electrical outlet. There must also be space for a minimum of 2 (12"W x 18"D) Urns.

12540-2
CHAIRS AND STOOLS (BRB and Innovation)

National Supplier:	**MTS** (Company & Franchise Supplier) Eric Foster Phone: (734) 847-3875 email: EricFoster@mtsseating.com
Additional Suppliers:	**Facility Concepts** (Franchise Supplier) Mike Davidson Phone: (800) 915-8890 x116 email: mdavidson@facility-concepts.com
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** N/A **Install:**. General Contractor to receive and store freestanding chairs and stools, set in place after final cleanup
Supplier's Scope of Work	**Material:** Freestanding chairs and stools **Install:** N/A
Owner's Scope of Work / General Comments	

12540-2
CHAIRS AND STOOLS (FREE-STANDING)

National Supplier	**MTS, SCI and FCI**
Contact:	**MTS** (Company & Franchise Supplier) Kendra McClain Phone: 734-847-3875 e.mail: kendramcclain@mtsseating.com **FCI** (Company & Franchise Supplier) Mike Davidson Phone: (317) 225-8649 e.mail: Mdavidson@fcius.com **Seating Concepts** (Franchise Supplier only) Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** N/A **Install:**. General Contractor to receive and store freestanding chairs and stools, set in place after final cleanup
Supplier's Scope of Work	**Material:** Freestanding chairs and stools **Install:** N/A
Owner's Scope of Work / General Comments	

12540-3
CHAIRS AND STOOLS (Bold Choice)

Suppliers:	**MTS** (Franchise Supplier) Eric Foster Phone: (734) 847-3875 email: EricFoster@mtsseating.com **Facility Concepts** (Franchise Supplier) Mike Davidson Phone: (800) 915-8890 x116 email: mdavidson@facility-concepts.com **MSW** (Franchise Supplier) Bob Headlee Phone: (417) 673-1901 ext. 21 e.mail: bob@mswinc.com **Custom Seating** (Franchise Supplier) Farrah Ray Phone: (800) 223-7328 e.mail: farrah@customseating.com **JBI** (Franchise Supplier) Dewey Fisher Phone : (800) 228-1250 e.mail: dfisher@jbiinteriors.com **FCC** (Franchise Supplier) Michelle Gansko Phone: (800) 322-7328 x235 e.mail: michelle.gansko@FCCfurn.com **Seating Concepts** (Franchise Supplier) Pat Hankins Phone: (815) 641-7024 e.mail: phankins@seating-concepts.com
Manufacturer's Model #	Varies
A&E Item Number	Varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor

Scope of Work

Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** N/A **Install:**. General Contractor to receive and store freestanding chairs and stools, set in place after final cleanup
Supplier's Scope of Work	**Material:** Freestanding chairs and stools **Install:** N/A
Owner's Scope of Work / General Comments	

13200
CO2 - BULK

National Supplier	**MVE (bulk tank) NU CO2 (CO2 and service)**
Contact:	**MVE (bulk tank)** Cathy Bartusek – Phone : (952) 752-8201 Fax : (800) 247-4446 Ext. 5169 Email: Cathy.bartusek@chart-ind.com **NU CO2 (CO2 and service)** Lynn Heller ext. 3483 or Matt Sebuckat ext. 3472 Phone : (800) 472-2855
Manufacturer's Model #	Varies
A&E Item Number	S580
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** N/A **Install:** Receive tank and schedule installation. Coordinate with drink system installation
Supplier's Scope of Work	**Material:** Bulk tank, fill box supply lines **Install:** Bulk tank, fill box supply lines from fill box to tank, supply lines from tank to syrup rack location.
Owner's Scope of Work / General Comments	**General Comment:** C.M. coordinates installation of tank, fill box, lines and connectors. Installation is performed by local NU CO2 rep. Standard process is for the owner to provide the tank. C.M. to contact YUM! Facility Leader to determine if tank will be rented.

13200
CO2 - BULK

National Supplier	**MVE (bulk tank) NU CO2 (CO2 and service)**
Contact:	**MVE (bulk tank)** Cathy Bartusek – Phone : (952) 752-8201 Fax : (800) 247-4446 Ext. 5169 Email: Cathy.bartusek@chart-ind.com **NU CO2 (CO2 and service)** Lynn Heller ext. 3483 or Matt Sebuckat ext. 3472 Phone : (800) 472-2855
Manufacturer's Model #	Varies
A&E Item Number	S580
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** N/A **Install:** Receive tank and schedule installation. Coordinate with drink system installation
Supplier's Scope of Work	**Material:** Bulk tank, fill box supply lines **Install:** Bulk tank, fill box supply lines from fill box to tank, supply lines from tank to syrup rack location.
Owner's Scope of Work / General Comments	**General Comment:** C.M. coordinates installation of tank, fill box, lines and connectors. Installation is performed by local NU CO2 rep. Standard process is for the owner to provide the tank. C.M. to contact YUM! Facility Leader to determine if tank will be rented.

13800-1
LIGHTING CONTROL PANEL - EXTERIOR

National Supplier	**Accuserv**
Contact:	**Buddy Bockweg** Phone : (877) 707-7378 Fax : (502) 961-0357 buddy@accuserv.com
Manufacturer's Model #	Cooper LT16
A&E Item Number	N/A
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Conductors, conduit, and any items required to provide a complete installation. **Install:** Install pre-assembled control panel enclosure and photo cell; connect contactors to appropriate circuits and fixtures; install control switches as detailed.
Supplier's Scope of Work	**Material:** Exterior lighting control panel enclosure with contactors and timers pre-assembled in enclosure along with switches and photocell. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** The exterior lighting control panel is provided as a contractor assembled kit. The kit is included in the Accuserv lighting package.

13800-2
EXHAUST FAN – MAKE UP AIR INTERLOCK & INTERIOR LIGHTING CONTROL PANEL

National Supplier	**AIR CARE EXPERTS**
Contact:	**Chuck McCabe** Phone : (949) 770-2222 Fax : (949) 770-5885 cmccabe@ace-iaq.com.com
Manufacturer's Model #	TBCB-1
A&E Item Number	N/A
Who orders item from Supplier?	Contractor
Who Coordinates Shipping?	Contractor
Shipping Method	Standard Ground
If shipped in a Consolidated Package, which number?	N/A
Received By	Contractor
Installed By	Contractor
Warranty Material / Install	Contractor/Contractor
Paid for By	Contractor
General Contractor Scope of Work	**Material:** Conductors, conduit, and any items required to provide a complete installation including any local site specific energy control requirements downstream from the Control Box. **Install:** Install pre-assembled control panel enclosure; connect to appropriate circuits and fixtures; install control switches as detailed.
Supplier's Scope of Work	**Material:** Provide an exhaust fan to make up air interlock, Hoodstat connection point and interior lighting control panel enclosure with contactors, time delays, relays and landing points. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** The Exhaust Fan – Make Up Air Interlock & Interior lighting Control Box is provided as a factory assembled control box. The Control Box must be independently ordered by the General/Electrical Contractor. The Control Box only provides switched line voltage to the kitchen and dining room lights. Site specific downstream energy controls may be required based on local requirements and are excluded from the Control Box.

13900-1
FIRE SUPRESSION SYSTEM

National Supplier	**Ansul**
Contact:	**Pete Matulonis – Business Development Manager** Phone: (360) 210-7973 **Bill Klingenmaier – Technical Services Manager** Phone: (715) 735-7411 ext. 3439
Manufacturer's Model #	N/A
A&E Item Number	
Who orders item from Supplier?	General Contractor
Who Coordinates Shipping?	General Contractor
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor (Local Installer)
Warranty Material / Install	General Contractor / General Contractor
Paid for By	General Contractor
General Contractor Scope of Work	**Material:** By Local Installer **Install:** Fire Suppression System must be compatible with specified hoods. Hoods are pre-piped by manufacturer. Tanks, connections & heads by local installer contracted by G.C. G.C. to provide water to fire suppression system (if Piranha). See plumbing sheets. See General Comments below for design intent.
Supplier's Scope of Work	**Material:** N/A **Install :** N/A
Owner's Scope of Work / General Comments	**Design Intent:** See Electrical Drawing Sheet E6.0 for Sequence of Operations.

15410
HAND SINKS

National Supplier	**Aero**
Contact:	Neil Pittman Phone: 973-473-5300 Fax: 973-473-3794 Email: npittman@aeromfg.com
Manufacturer's Model #	HS-Mod
A&E Item Number	N-053
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Consol. Pkg.
If shipped in a Consolidated Package, which number?	1
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Piping for supply lines. **Install:**. Complete installation of Owner supplied materials.
Supplier's Scope of Work	**Material:** Supply hand sink, faucet and foot valve. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** Splash guards to meet code requirements supplied and installed by G.C. See details.

15470-5
WATER FILTER - PEPSI

National Supplier	**Shurflo**
Contact:	Mike smith Phone : (800) 854-3218
Manufacturer's Model #	WB6-M3-22-003
A&E Item Number	
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Manufacturer
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor – See Vendor Scope (Drink System - Pepsi)
Warranty Material / Install	Pepsi/General Contractor
Paid for By	Pepsi
General Contractor Scope of Work	**Material:** Plumbing rough-ins for filter. **Install:** G.C. to mount water filter on wall and connect to water supply line.
Supplier's Scope of Work	**Material:** Water filter and cartridges. **Install:** N/A.
Owner's Scope of Work / General Comments	**Owner Scope:** C.M. to coordinate work between drink platform Vendor/Supplier and G.C. **General Comment:** Distributor provides purchase orders to manufacturer for applicable Pepsi platform.

15480-3
WATER HEATER

Supplier	AO Smith (Standard) Bradford White (Alternate)
Contact:	AO Smith: Chuck Dean – Phone: (615-584-9321 Email: cdean@hotwater.com
Manufacturer's Model #	AO Smith BTH-120 (Standard)
A&E Item Number	B-215
Who orders item from Supplier?	General Contractor (standard). **Note**: The platform still comes from the distributor.
Who Coordinates Shipping?	General Contractor (standard). See "Who orders …" above.
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	General Contractor / General Contractor (Standard) Owner/ General Contractor (if ordered from distributor)
Paid for By	General Contractor (Standard), by Owner if ordered through distributor)
General Contractor Scope of Work	**Material:** Water heater**,** Electric conduit and conductors, gas line, water lines, PVC intake and exhaust flue and all shown on drawings required for operate per manufacturer's specifications (including expansion tank. (standard). Platform supplied by Supplier. **Install:** Complete installation of water heater.
Supplier's Scope of Work	**Material:** Water heater platform (Standard). Omit from contractor package if supplied by GC. **Install:** N/A
Owner's Scope of Work / General Comments	**General Comment:** Bradford White can still be ordered through your distributor but it you will have to tell your distributor you want to purchase this way. *Notify AO Smith or Bradford White contacts above to get national price*.

Technical Service:
AO Smith 800-447-1953 option #1 (24 hour service)
Bradford White 800-334-3393

Information required:
Identify store as YUM and/or store type
Serial # of water heater
Brief description of issue

15500-1
HVAC - TEST and BALANCE

National Supplier:	**YUM! Brands "Zero Defect" Program**
Contact:	TEST AND BALANCE CORPORATION Primary Contact: Misty Crider (678) 393-9401 ext. 2237 Secondary Contact: Angela Arnold (678) 393-9401 ext. 2229 Issue Escalation Contact: Ed Coker (678) 393-9401 ext. 2224 e-mail lsextonkeeton@tabconline.com MELINK CORPORATION Primary Contact: Jennifer Jackson (513) 965-7300 Secondary Contact: Steve Buelterman (513) 965-7300 ext. 113 Issue Escalation Contact: Keith Johnson e-mail kjohnson@melinkcorp.com AIR CARE EXPERTS Primary Contact: Chuck McCabe (949) 770-2222 Secondary Contact: Nick McCabe (949) 632-5085 Issue Escalation Contact: Chuck McCabe (949) 770-2222 e-mail CMCCABE@ACE-IAQ.COM
Regional / Local Providers:	Approved by YUM Construction (CM) or Remodel Manager (RCM)
Who selects Providers?	YUM Construction (CM) or Remodel Manager (RCM)
Who orders services from Approved Provider?	Determined by CM or RCM Approved Options: General Contractor CM/RCM
Who Coordinates Scheduling of Services?	Determined by CM or RCM Approved Options: General Contractor CM/RCM
Paid for By:	Determined by CM or RCM Approved Options: GC includes cost in the project bid) CM/RCM (includes cost in misc. budget)
Scope of Work General Contractor (Optional):	• **Include cost for T&B services in project bid.** • **Contract all T&B services with Yum approved provider** • **Send project "M" sheets to provider (3wks prior to test)** • **Schedule/Coordinate testing** • **Correct any/all deficiencies prior to Restaurant Opening** • **Schedule re-testing (as required) to attain System Certification** • **Remit full payment to T&B Provider** • **Submit Certification Document w/ Final Draw Request**

Scope of Work

Scope of Work CM/RCM (Optional):	• **Include cost for T&B services in project Misc. Budget** • **Contract all T&B services with YUM approved provider** • **Send project "M" sheets to provider (3wks prior to test)** • **Schedule/Coordinate testing with GC and provider** • **Ensure any/all deficiencies are corrected prior to Restaurant Opening** • **Schedule / Coordinate re-testing (as required) to attain System Certification** • **Remit full payment to T&B Provider** • **Include Certification Document with Project Close-out**
Scope of Work Service Provider:	• **Coordinate testing with CM, GC and subcontractors** • **Verify mechanical plan is current version** • **Perform inspection of Mechanical Systems on Owner's behalf** • **Test operation of HVAC equipment in accordance with plans and specifications** • **Ensure thermostatic controls are programmed and functioning properly** • **Perform Test & Balance per ASHRAE Standard 111-2008 to plan specifications** • **Verify ductwork is installed, insulated and sealed per plan and SMACNA standards** • **Evaluate workmanship of mechanical installation** • **Verify and adjust exhaust rates at all hoods** • **Verify Type 1 exhaust system compliance to NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations** • **Confirm building pressurization is correct in all exhaust and replacement air combinations** • **Report all items that do not meet system design** • **Provide T&B reports with correction recommendations** • **Provide analysis of field inspection and testing data** • **Provide T & B report for inclusion with Commissioning process** • **Provide System Certification document when project meets all requirements stated above.**
Owner's Scope of Work / General Comments:	-

15700-1
HVAC (RTU/CURBS)

National Supplier	**Trane, York International**
Contact:	**Trane -** Marty Cusick Phone : (866) YUM-VAC or (866) 986-4822 Fax : (502) 499-7870 Cellular : (502) 558-4879 Email : mjcusick@trane.com **York International** – Lisa Kuhns Phone: (800) 481-9738 email: lisa.e.kuhns@jci.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	General Contractor
Who Coordinates Shipping?	General Contractor
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	General Contractor/General Contractor
Paid for By	General Contractor
General Contractor Scope of Work	**Material:** Purchase RTUs (with factory installed un-powered convenience outlets and HACR circuit breaker), knock-down curbs, and thermostats from Trane using national account pricing. Provide ductwork, smoke detectors, conduit to rooftop units and any other materials required for a complete HVAC system. **Install:** All HVAC equipment. General Contractor (GC) to coordinate Owner's Test & Balance (T&B) Consultant, including scheduling T&B prior to turnover using YUM! Scope of T&B services and YUM! Format. Owner to pay for initial T&B only.
Supplier's Scope of Work	**Material:** N/A **Install :** N/A
Owner's Scope of Work / General Comments	**General Comments:** GC to follow Mechanical Engineered design per the drawings. Provide ductwork and report any discrepancies to Owner. GC to pay for subsequent T&B necessary to verify corrections required by initial T&B. **Owner's Scope:** Provide Construction Manager (CM) with YUM! Scope and Format for T&B services. CM to inform Brand Architect (BA) of reoccurring Issues on T&B reports, BA to copy the Plan Manager. Owner to pay for initial T&B.

16300-1
SWITCHGEAR-OWNER SUPPLIED
(FOR FRANCHISE USE)

National Supplier	**Accuserv**
Contact:	**Buddy Bockweg** Phone : (877) 707-7378 Fax : (502) 961-0357 buddy@accuserv.com
Manufacturer's Model #	Square-D and Cutler Hammer
A&E Item Number	varies
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Breakers and outlet devices required by local jurisdiction if different than specified. Conductors, conduit, lugs, 3-phase motor starters. Disconnects for roof top mounted equipment are supplied by others. Supply C.T. Cabinet if not provided by utility company. **Install:** Install service entrance, main switch panel, branch panels with circuit breakers, conductors from transformer, conductors form MSB to panels, panel rough-ins, and panels. Install all circuit wiring to branch panels and equipment per drawings.
Supplier's Scope of Work	**Material:** Service entrance, MSB, branch panels with circuit breakers as shown on plans. Interior lighting contactors as shown on sheet E6.0 **Install :** N/A
Owner's Scope of Work / General Comments	4-week lead-time 1-year parts warranty

16300-2
SWITCHGEAR - G.C. SUPPLIED
(FOR COMPANY USE ONLY)

National Supplier	**Accuserv**
Contact:	**Buddy Bockweg** Phone: (877) 707-7378 Fax: (502) 961-0357 e.mail: buddy@accuserv.com
Manufacturer's Model #	Square-D, Cutler Hammer
A&E Item Number	varies
Who orders item from Supplier?	General Contractor
Who Coordinates Shipping?	General Contractor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	General Contractor /General Contractor
Paid for By	General Contractor
General Contractor Scope of Work	**Material:** Breakers and outlet devices required by local jurisdiction if different than specified. Conductors, conduit, lugs, 3-phase motor starters. Disconnects for roof top mounted equipment are supplied by others. Supply C.T. Cabinet if not provided by utility company. **Install:** Install service entrance, main switch panel, branch panels with circuit breakers, conductors from transformer, conductors form MSB to panels, panel rough-ins, and panels. Install all circuit wiring to branch panels and equipment per drawings.
Supplier's Scope of Work	**Material:** Service entrance, MSB, branch panels with circuit breakers as shown on plans. Interior lighting contactors as shown on sheet E6.0 **Install :** N/A
Owner's Scope of Work / General Comments	4-week lead-time 1-year parts warranty

16500
LIGHT FIXTURES

National Supplier	
Contact:	**Accuserv Buddy Bockweg (all lighting except back-of-house & Restrooms)** Phone : (877) 707-7378 Fax : (502) 961-0357 buddy@accuserv.com **Genesis Lighting Solutions (Back-of-House & Restrooms only)** Jerry White Phone: 469-444-6105 Fax: 469-322-1925 Jerry.white@aasignlighting.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	Distributor: for Accuserv General Contractor: for Genesis
Who Coordinates Shipping?	Distributor: for Accuserv General Contractor: for Genesis
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Conductors, conduit, j-boxes and other items as required for the complete installation of lighting fixtures. **Install:** All owner provided fixtures and lamps. G.C. is responsible for a complete installation.
Supplier's Scope of Work	**Material:** Interior and exterior light fixtures, lamps, lighting tracks, adapters. Contactors as detailed for interior lighting control. **Install :** N/A
Owner's Scope of Work / General Comments	

16520
LIGHT FIXTURES - SITE

National Supplier	**Accuserv**
Contact:	**Buddy Bockweg** Phone : (877) 707-7378 Fax : (502) 961-0357 buddy@accuserv.com
Manufacturer's Model #	Varies
A&E Item Number	N/A
Who orders item from Supplier?	Distributor
Who Coordinates Shipping?	Distributor
Shipping Method	Drop
If shipped in a Consolidated Package, which number?	N/A
Received By	General Contractor
Installed By	General Contractor
Warranty Material / Install	Owner/General Contractor
Paid for By	Owner
General Contractor Scope of Work	**Material:** Conductors, conduit, foundations and other items as required for the complete installation of lighting fixtures. **Install:** Interior and exterior light fixtures, lamps, anchor bolts, and brackets. Provide excavations and concrete foundations at locations noted on photometric drawings, assemble and install fixtures per plans.
Supplier's Scope of Work	**Material:** Exterior light fixtures, lamps, anchor bolts, brackets and base plate / anchor bolt cover. Photometric drawings and anchor bolt templates. **Install :** N/A
Owner's Scope of Work / General Comments	

16720
TELEPHONE COMMUNICATIONS

National Supplier	**Company Stores :** YUM! Telecom **Franchise Stores :** By owner through local phone service provider
Contact:	**Raul Radu** **Phone : (949) 863-2875** **e.mail: Raul.radu@yum.com**
Manufacturer's Model #	N/A
A&E Item Number	N/A
Who orders item from Supplier?	Owner
Who Coordinates Shipping?	Manufacturer
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer (Local Installer)
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** Provide all J-Boxes, conduits, pull strings and outlets. Permanent power to be in place before installation can begin. Contact YUM! Telecom when permanent power is active. **Install:** Install all J-Boxes, conduits, pull strings and outlets ready for supplier, and confirm that permanent power is active prior to installation. Set backboard for D-Mark panel. Install conduit and pull strings as required (interior and exterior)
Supplier's Scope of Work	**Material:** Supplier to provide all wiring and equipment **Install:** Supplier to install all wiring and telephone equipment
Owner's Scope of Work / General Comments	**General Comments:** YUM! Telecom provides installation and phone equipment for company stores. YUM! Telecom places order when they receive the stores ground break notice. Franchises to order phone lines at their discretion

16820-3
MUSIC SYSTEM

National Supplier	**Muzak**
Contact:	Maleaha Blackwell Phone: (803) 396-3023 (direct) Phone: (800) 331-3340 x10023 (toll-free) Fax: (803) 396-3074 Email: Maleaha_Blackwell@muzak.com
Manufacturer's Model #	N/A
A&E Item Number	F131
Who orders item from Supplier?	Owner
Who Coordinates Shipping?	Manufacturer
Shipping Method	Direct
If shipped in a Consolidated Package, which number?	N/A
Received By	Manufacturer (Local Installer)
Installed By	Manufacturer (Local Installer)
Warranty Material / Install	Owner/Owner
Paid for By	Owner
General Contractor Scope of Work	**Material:** J-Boxes, conduit, phone and electrical wiring.. **Install:** J-Boxes, conduit, phone and electrical wiring per plans. **Note:** Because the DBS dish is sled mounted, the GC scope includes only the installation of the walkway pads below the sled; in accordance with the roof manufacturer's recommendations.
Supplier's Scope of Work	**Material:** Sled mounted DBS antenna, satellite receiver, digital amp, speakers with grilles, speaker wire, coaxial, hardware per national contract. Speakers to be black in open ceiling areas, white in dropped ceilings. **Install:** Complete installation of entire music system. Pre-wire prior to ceiling installation. Provide testing and calibration of entire system to national decibel standards for office volume control. Wire system per national contract wiring diagram. Music to be set to 50s/60s music or custom programming per national contract. Sleds to be placed on roof walkway pads (by roofing contractor). Ballast to be secured to sled w/ steel cables. Route signal cable through nearest pipe hood (as indicated in the plans). No penetrations through roof membrane or curbs allowed.

Scope of Work

Owner's Scope of Work / General Comments	**General Comments:** G.C. is responsible for coordination of installation of entire music system including coordination with local Muzak installer. CM to verify Owner's responsibility for ordering music system from local Muzak contact; Muzak shall be notified at ground break to coordinate installation date.

DOCUMENT 00 3132

GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Related Documents: Provisions established in General and Supplementary Conditions of the Contract, Division 1 General Requirements, and the Drawings are collectively applicable to this Section.

1.2 INVESTIGATION

A. An investigation of subsurface soil conditions at the building site was authorized by Owner, and these investigations were made by the Soils Engineer identified in the Drawings.

1.3 REPORT

A. A copy of the full report is available to all Bidders from the office of the Owner's representative.

B. Report and log of borings are available for Contractor's information but are not a warranty of subsurface conditions, nor are they a part of the Contract Documents.

1.4 RESPONSIBILITY

A. Bidders are expected to examine the site and subsurface investigation reports and then decide for themselves the character of the materials to be encountered.

B. The Owner's Representative and Owner assume no responsibility for variations of subsoil quality or conditions.

PART 2 - PRODUCTS - Not used

PART 3 - EXECUTION - Not used

END OF DOCUMENT

REPORT OF
SUBSURFACE EXPLORATION, LABORATORY TESTING, AND GEOTECHNICAL ENGINEERING ANALYSES

Taco Bell at Langley Park
Tacoma Park, Montgomery County, Maryland

ECS Project No. 02-7394

Prepared For:

MUY BRANDS, LLC
1790 BLANCO ROAD
SAN ANTONIO, TEXAS 78232

October 2, 2014

Mr. Mark Drangel
MUY Brands, LLC
1790 Blanco Road
San Antonio, Texas 78232

October 2, 2014

ECS Project No. 02-7394

Reference: Report of Subsurface Exploration and Geotechnical Engineering Services for **Taco Bell at Langley Park,** Takoma Park, Montgomery County, Maryland.

Dear Mr. Drangel,

As requested, ECS Mid-Atlantic, LLC (ECS) has completed the geotechnical engineering services for the above-referenced project. This work was performed in accordance with ECS Proposal No. 02-14981-PR, dated August 21, 2014.

It has been our pleasure to be of service to MUY Brands and the Design Team for this project. We would appreciate the opportunity to continue our role as Geotechnical Engineer of Record during final design and subsequent construction. If you have any questions with regard to the information contained in the enclosed report, or if we can be of further assistance to you during the planning or construction phases of the project, please contact us.

Most sincerely,

ECS Mid-Atlantic, LLC

Zachary Adcock, E.I.T.
Project Engineer

Hasan M. Aboumatar, Ph.D., P.E.
Principal Engineer

Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No *29553*. Expiration Date: *12/31/2015*

REPORT OF
SUBSURFACE EXPLORATION,
LABORATORY TESTING,
AND GEOTECHNICAL ENGINEERING ANALYSES

Taco Bell at Langley Park
Tacoma Park, Montgomery County, Maryland

ECS Project No. 02-7394

Prepared For:

MUY BRANDS, LLC
1790 BLANCO ROAD
SAN ANTONIO, TEXAS 78232

Submitted by:

ECS Mid-Atlantic, LLC
1340 Charwood Road, Suite A
Hanover, Maryland 21076

October 2, 2014

TACO BELL AT LANGLEY PARK

TABLE OF CONTENTS

INTRODUCTION

Project Location

The project site is located in the northeast quadrant of the intersection of New Hampshire Avenue and Holton Lane in the Takoma Park area of Montgomery County, Maryland. A Site Location Map is provided in the Appendix.

Project Information and Site Conditions

In preparing the subsurface exploration program for this study, ECS was provided with a Site Layout Plan, as prepared by Bohler Engineering and dated February 27, 2014, which depicted the proposed development. We have also reviewed the Guidelines for Environmental Assessments and Geotechnical Engineering Studies prepared for Yum! Brands, dated 2006.

Topographic information was not available at the time of this report. The general site is currently developed with an Aldi store and associated parking areas, and is generally level. Proposed finished grades were not provided at the time this report was prepared, but it is our understanding that the finished grades will be within 2 ft of existing grades. Therefore, minor cuts and fills will be required to establish final grades.

Based on the information provided, we understand that the proposed construction is to consist of a one-story, 2,027 sf Taco Bell restaurant, pylon sign structure, and associated drive lanes and parking areas. In addition, we understand two (2) stormwater management (SWM) facilities are planned at the site; however, specific locations of these SWM facilities were not provided at the time of this report, but we understand that the facilities will be located within pavement areas. Structural loading information was not provided at the time this report was prepared; however, based on our experience with similar structures, we anticipate that maximum column loads will be on the order of 100 kips or less. No other construction, such as site retaining walls, was indicated on the provided plan.

Scope of Services

Our scope of services included drilling four (4) soil test borings, designated as: B-1 and B-2 for the structure, and P-1 and P-2 for the pavement section and pylon, and SWM facilities. The borings were drilled to depths of 15 ft to 30 ft each below existing grades. The approximate boring locations are presented on the Boring Location Plan in the Appendix.

All borings were drilled in general accordance with ASTM D 1586 standards. The scope of work also included visually classifying soil boring samples, performing laboratory testing on selected soil samples from the borings, performing various engineering analyses, and providing this written report of findings, evaluations and recommendations.

The report contains the following information:

a. Information regarding site conditions, including surface drainage, geology, and special site features;
b. Descriptions of the field exploration and laboratory testing procedures used;
c. Boring logs in accordance with the standard practice of geotechnical engineers, showing subsurface strata and descriptions, groundwater conditions, and results of field tests;
d. Results of laboratory tests on summary sheets and on individual test reports;
e. A Site Vicinity Map, a Boring Location Plan, and pertinent Reference Sheets;
f. Recommendations for allowable bearing pressure for conventional spread footing foundations and estimates of predicted foundation settlement;
g. Recommendations for lateral earth pressures likely to develop on below-grade walls, and perimeter drainage systems for below-grade walls, if required;
h. Evaluations and recommendations for geotechnical aspects of design and construction, including general site development, frost depths considerations, ground-supported slabs, stormwater management, pavement, seismic site classification, earthwork considerations, drainage, and other aspects of geotechnical-related design and construction.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

The soil borings were drilled with an ATV-mounted drill rig, using continuous-flight, hollow-stem augers to advance the boreholes. Drilling fluid was not used during advancement of the boreholes.

Representative soil samples were obtained by means of the split-barrel sampling procedure in general accordance with ASTM D 1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches.

The number of hammer blows required to drive the sampler through the second and third 6-inch drive increments is termed the Standard Penetration Test (SPT) value (blow count, or N-value) and is indicated for each sample on the Boring Logs. In the borings, split-barrel sampling was performed at 2.5 ft intervals to depths of 10 ft and at 5.0 ft intervals thereafter.

N-values can be used to provide a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, N-values also provide an indication of consistency for cohesive soils. The indications of relative density and consistency are qualitative, since many factors can significantly affect N-values and prevent direct correlations, including differences among drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

A field log of the subsurface conditions encountered in the borings was maintained by the Drill Crew during the drilling operations. Each recovered soil sample was removed from the sampler and visually classified by the Drill Crew. Representative portions of soil samples were sealed in glass jars and returned to the ECS laboratory for further visual examination and possible laboratory testing.

Laboratory Testing Program

The laboratory testing program included visual classification of the boring samples by an experienced Geotechnical Engineer. The classifications were based on texture and plasticity in accordance with the Unified Soil Classification System (USCS). A brief explanation of the USCS is included in the Appendix of this report. The USCS group symbol for each soil type is indicated in parentheses following the soil descriptions on the Boring Logs.

During the visual classification procedures, the Geotechnical Engineer grouped the various soil types into the major strata noted on the Boring Logs. The stratification lines designating the interfaces between various soil strata on the Boring Logs are approximate. In situ, these transitions will likely be gradual and could occur at slightly different levels from those shown on the Boring Logs.

The limited laboratory testing program included moisture content, percent passing the No. 200 sieve, and Atterberg Limits on selected boring samples to estimate engineering properties of the soils and to help verify the visual classifications. In addition, laboratory testing included gradation analysis by hydrometer for USDA classifications. The results of the laboratory testing are included in the appendix of the report.

The soil samples will be retained in the ECS laboratory for a period of 60 days. After that holding period, the samples will be discarded, unless ECS receives other instructions regarding their disposition.

EXPLORATION RESULTS

Geologic Conditions

The project site is located within the Atlantic Coastal Plain Physiographic Province, which is characterized by marine and river sediments deposited during successive periods of fluctuating sea level and moving shorelines. Generally, the sediments thicken from west to east, towards the Atlantic Ocean. The uppermost sediments are often comprised of interbedded sands, gravels, clays, and silts.

Based on the results of the test borings and a review of the *Geologic Map of Montgomery County, Maryland*, dated 1968, the natural soils at the project site are generally described as the Potomac Group (Kp), which consists of:

"Interbedded quartzose gravels; protoquartzitic to orthoquartzitic argillaceous sands; and white, dark gray and multicolored silts and clays. Thickness 0 to 800 feet."

Subsurface Conditions

In general, the conditions encountered at the ground surface during our field exploration consisted of 1 to 3 inches of asphalt over 6 to 8 inches of gravel, overlying natural soils. The natural soils were generally tannish gray, light brown, pinkish tan, grayish tan, dark brown, dark red, brown tannish brown, and gray. The natural soils consisted generally of Lean Clay (CL), Clayey SAND (SC), Sandy Lean Clay (CL), and Silty SAND (SM) soil types. The N-values recorded in the natural granular soils ranged from 8 blows per foot (bpf) to 17 bpf, indicating loose to medium dense relative densities. The N-Values recorded in the cohesive natural soils ranged from 4 bpf to 15 bpf, indicating soft to stiff consistencies. More detailed descriptions of the encountered subsurface conditions are provided on the boring log in the Appendix.

Water Level Observations

Groundwater level observations were made in the borehole, generally during the drilling operations and at completion of drilling operations, both before and after removal of the drilling augers. Groundwater was encountered in Boring P-1 at a depth of 22 ft below existing grade. Cave-in depths for the borings also were observed after removal of the drilling augers from the boreholes and ranged from 10.2 ft to 18.3 ft below existing grades.

Observations regarding the presence and absence of groundwater levels reflect the conditions at the time of this exploration only. Fluctuations in the locations of groundwater tables or perched water levels could occur as a result of seasonal variations in evaporation, precipitation, surface water run-off, and other factors. Therefore, water levels at future times could vary from those observed at the time of the borings.

ANALYSES AND RECOMMENDATIONS

Foundation Considerations

Based on the soil boring and subsurface conditions encountered, the soils at the footing subgrades of the proposed Taco Bell restaurant and pylon are anticipated to consist of firm natural soils, or new engineered fill material, placed on firm natural soil. Based on our understanding of the proposed construction and the results of the subsurface exploration, the proposed Taco Bell restaurant and pylon can be supported on conventional footings placed on firm natural soils or new fill placed on firm natural soils.

Footings placed on firm natural soils, or on new engineered fill placed on natural soils, can be designed for net allowable bearing pressures not to exceed 2,500 pounds per square foot (psf) for isolated column footings and continuous wall footings. The net allowable soil bearing pressure refers to the pressure that can be transmitted to the foundation bearing soils in excess of the final overburden pressure at the base of a footing

Prior to the placement of reinforcement and concrete for footings, the bases of the footing excavations should be observed, tested, and approved by a qualified representative of the Geotechnical Engineer to verify that soil conditions at each footing location are suitable for the design bearing pressure. If unsuitable soils are encountered at planned subgrade levels for any footing, the unsuitable soils should be undercut to suitable bearing materials. The footing can be directly supported on the competent soils at greater depths or, alternatively, the design footing bearing level can be restored through placement of lean concrete or select engineered fill materials.

If the design bearing level is restored using select engineered fill, then the excavation to remove the unsuitable soils should extend at least 0.5 ft laterally beyond the bottom edge of the footing for each 1 ft of vertical undercut below the footing bearing level. The select engineered fill materials should be placed and compacted as discussed in greater detail later in this report.

Settlement of the building and pylon foundations will be a function of the compressibility of the underlying subgrade soils, the actual applied loads, and other factors. Based on the anticipated maximum column loads in the range of 100 kips or less, the anticipated total settlements of individual footings, designed and constructed as outlined in this report, will be less than 1 inch. Maximum differential settlements within the proposed building are expected to be ½ inch over a horizontal distance of 30 feet.

In order to reduce the possibility of foundation bearing failure and excessive settlement due to local shear or "punching" action, we recommend that continuous footings have a minimum width of 2 feet and that isolated column footings have a minimum lateral dimension of 4 feet. In addition, footings should be placed at a sufficient depth to provide adequate protection against frost heave. We recommend that all footings be placed at a minimum depth of 30 inches below finished grade.

All continuous load-bearing wall foundations should be suitably reinforced. To provide continuity and minimize differential movements, the longitudinal reinforcing steel should be extended into any column footing situated along the walls (exterior or interior) and the foundations constructed as a continuous unit. The reinforcing steel should also be continuous through the building corners. Where top and bottom steel is included in the continuous wall foundations, a minimum footing thickness of 12 inches should be required. Prior to placing any foundation concrete, the steel reinforcement should be examined to ensure that the bars are properly sized and positioned in accordance with the foundation plans and specifications.

Ground Supported Floor Slabs

Building floor slabs may be ground-supported on subgrades prepared in accordance with the recommendations in the sections titled Subgrade Preparation and Fill Placement. It is important that the slab subgrade be firm and stable before the placement of the granular subbase materials, the moisture barrier, and the concrete. Based on the test boring results and the anticipated planned finished floor elevations, the anticipated slab subgrade should generally consist of firm natural soils, or new engineered fill.

The existing subgrade should be thoroughly proofrolled with suitable equipment and/or probed by a qualified representative of the Geotechnical Engineer in an effort to detect unstable or otherwise unacceptable soil conditions. Soils in any excessively unstable areas should be undercut and replaced with new engineered fill. Recommendations for construction of engineered fill are presented in the Fill Placement section of this report.

It is recommended that ground-supported slabs be underlain by a minimum of 4 inches of CR-6 or GA S/B dense-graded aggregate or approved equivalents. Acceptable granular subbase materials should have no aggregate size greater than 1.5 inches, 95 to 100 percent passing the 1 inch sieve, and less than 12 percent by total weight passing the Number 200 sieve. The granular subbase materials will provide a capillary break between the subgrade and the concrete slab, a higher modulus of subgrade reaction, and more uniform support conditions.

All granular materials should be compacted; however, if the granular subbase materials have more than 5 percent fines, those materials should be compacted to a minimum of 98 percent of the maximum dry density as determined by the Standard Proctor compaction test method (ASTM D 698). For structural design purposes, a modulus of subgrade reaction (k) of 120 pounds per cubic inch (pci) may be utilized for the structural design of slabs, provided a 4-inch subbase is utilized and the subgrade has been prepared in accordance with the recommendations presented herein.

In the event there is a significant time lag between the site grading work and the fine grading of concrete slab areas prior to the placement of the subbase stone or concrete, the Geotechnical Engineer should verify the condition of the prepared subgrade. Prior to final slab construction, the subgrade may require scarification and re-compaction to provide firm and stable conditions.

Where moisture vapor seepage through concrete slab is a concern, a moisture vapor barrier, consisting of at least 8 mil polyethylene sheets, should be placed on top of the granular materials before the placement of the concrete. However, with the use of a moisture vapor barrier, special attention should be given to the surface curing of the slab in order to minimize uneven drying of the slab and any associated cracking and curling.

It is recommended that ground-supported slabs be isolated from the foundation footings so that differential movement between the footings and slab will not induce excessive shear and bending stresses in the floor slab.

Where the structural configuration prevents the use of a free floating slab, the slab should be designed with suitable reinforcement and load transfer devices to preclude overstressing of the slab. Slabs must also be provided with proper control joints to minimize the effects of concrete shrinkage and differential settlements. To minimize the widths of any shrinkage cracks that may develop near the surface of the slab, it is recommended that welded-wire mesh reinforcement be provided. The welded-wire mesh should be in located the top half of the slab to be effective.

Below-Grade Walls and Site Retaining Walls

Based upon our understanding of the proposed construction, below-grade walls or site retaining walls are not anticipated. However, the following recommendations are provided to guide the general design of below-grade building walls and site retaining walls for lateral earth pressures, should such design be required.

It is very important with regard to construction of below-grade building walls and site retaining walls that soils within the critical zones behind the walls meet certain criteria with regard to soil type. For below-grade building walls, the critical zone can be considered as the zone between the bottom back edge of the wall footing and an imaginary line extending upward and rearward from the bottom back edge of the wall footing at a 45-degree angle.

It is recommended that all natural soils and backfill soils within the critical zones of the walls should have USCS classifications of Silty SAND (SM) or more granular. Any soils having classifications less granular than Silty SAND (SM) may need to be removed from the critical zones of the walls, as determined by the Geotechnical Engineer at the time of construction. Based upon the results of the borings and anticipated laboratory results, it would appear that the soils at the site should be suitable to remain in-place for use as wall backfill.

Backfill materials for below-grade walls should be placed and compacted in accordance with criteria outlined in the **Earthwork** section of this report. The minimum degree of compaction for backfill soils behind below-grade building walls and conventional retaining walls should be 95 percent of the Standard Proctor maximum dry density (ASTM D 698), unless otherwise approved by the Geotechnical Engineer.

It is important that below-grade building walls that generally are designed for minimal displacements at the top of the wall should not be backfilled until the walls are adequately braced by permanent structural framing.

Conversely, walls that are designed for active earth pressures generally should not be braced during backfill compaction, so that the walls can yield and rotate and develop active earth pressures. For yielding walls, it generally will be best not to place steel framing, or conventional masonry or concrete walls for the buildings, until wall backfilling operations have been completed.

Below-grade building walls and other retaining walls that are rigid and not free to rotate at the top should be designed for at-rest earth pressure conditions. Based on consideration of at-rest earth pressure conditions and typical properties for Silty SAND (SM) or more granular soil types, it is recommended that equivalent fluid pressures on walls from the retained soils be calculated as 60H, in units of pounds per square foot, where H is the height of the wall retaining soils in units of feet.

Walls that are flexible and free to rotate at the top can be designed for active earth pressure conditions. Based on consideration of active earth pressures and typical properties for Silty SAND (SM) or more granular soil types, it is recommended that equivalent fluid pressures on walls from retained soils be calculated as 40H, in units of pounds per square foot, where H is the height of the wall retaining soils in units of feet.

The design criteria presented above for evaluation of horizontal earth pressures on retaining walls are based on the assumption of level backfill conditions and the absence of free water within the wall backfill materials. Lateral pressures induced by sloping backfills and/or by any surcharge loadings adjacent to walls will also need to be considered in the wall designs. In addition, suitable drainage will need to be provided to intercept and to dispose of any surface infiltration and groundwater behind walls.

Sliding resistance for retaining wall footings can be computed using a coefficient of friction of 0.36 for granular soils and 0.30 for silty and clayey soils. Additional resistance to sliding from passive earth pressure resistance also can be considered, if the earth materials considered for passive resistance will remain in place on the low side of the retaining wall. Equivalent fluid pressures for passive earth pressure resistance can be computed as 250D, in units of pounds per square foot, where D is the depth of undisturbed natural soil or engineered fill that will remain in place above the base of the wall footing. Because the frictional and passive earth pressure resistances are based on limit strength conditions, appropriate factors of safety of at least 1.5 should be applied to the designs considering these resistances.

The Geotechnical Engineer can provide additional design guidance regarding these and other aspects of below-grade wall and retaining wall design upon request.

Seismic Classification

Section 1613.3.2 of the IBC 2012 refers to Chapter 20 of ASCE7 for seismic site classification, which is based on various criteria, one of which is the Standard Penetration Resistance, N_{bar}, derived from the Standard Penetration Test Procedure (ASTM D-1586). ASCE7 Table 20.3.1 provides correlations for Site Classes C, D, and E with various ranges of N_{bar} to be calculated for the top 100 feet of the subsurface materials at a site in accordance with procedures described in Section 20.4.2 of ASCE7. In addition, the table presents criteria related to various soil properties for Site Classes E and F. ECS has used Table 20.3.1 of ASCE7 and the procedures outlined in Section 20.4.2 of ASCE7 to evaluate the Site Class for this project site.

Based on our review of the soil test boring results, it appears that the average N_{bar} value should be in the range between 15 bpf and 50 bpf over a depth of 100 ft. This N_{bar} places the project site within the Site Classification of D, according to Table 20.3.1 of ASCE7.

Pavement Construction

Details regarding traffic conditions anticipated for the site were not provided. However, based on our previous experience, it is ECS' opinion that two pavement sections generally should be considered for use – a light-duty pavement section for areas that will be subjected primarily to automobile and light-truck traffic and a medium-duty pavement section for areas that will be subjected to some routine heavier delivery and trash pickup truck traffic, in addition to normal automobile and light-truck traffic.

It is our judgment that traffic conditions associated with light-duty pavements can be represented by approximately 15,000 18-kip equivalent single-axle loads (ESALs) during an approximately 20-year service life, while traffic conditions associated with medium-duty pavements can be represented by approximately 75,000 ESALs during an approximately 20-year service life.

It is ECS' opinion that use of the light-duty pavement section and the medium-duty pavement section most likely will be sufficient for traffic conditions likely to occur at the development. However, traffic loading conditions are an extremely important parameter with regard to pavement design. Therefore, if the traffic condition estimates provided above are considered to be inappropriate for the project, please advise ECS so that revised pavement section designs can be determined for this site. Final decisions regarding pavement sections can be made as project design progresses, when further input regarding likely traffic conditions can be provided by other Design Team members.

Subgrade support conditions are the other major parameter of importance to pavement design and performance. Final grades were not available at the time of this report; However based on the boring results, it is anticipated that the subgrade soil conditions exposed at final subgrade levels when the project site is graded prior to pavement construction will generally consist of Lean Clay (CL) or Sandy Lean Clay (CL) or new fill material. We recommend conducting California Bearing Ratio tests on planned subbase material once the subgrade for the planned parking areas and drive lanes are established.

Based upon our previous experience with similar projects and site conditions, it is our judgment that the typical pavement subgrade soils such as the soils encountered at the site could exhibit a minimum California Bearing Ratio (CBR) value of 3 when compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor test (ASTM D 698). Therefore, for pavement design a CBR value of 3 is considered. If material having a CBR value of less than 3 is encountered at pavement subgrades, it is recommended to over excavate the top 12 inches of this material at the pavement subgrade and replace it with approved fill material. As alternative to over excavation, soil cement mix should be considered. Based on our experience with similar soil, 4% cement mix should be considered.

The pavement sections provided in this report (for budgeting purposes) have been designed based on methodology from the American Association of State Highway and Transportation Officials' (AASHTO) *Guide for Design of Pavement Structures*, 1993. Summarized below are the subgrade strength parameters, the traffic conditions, and other design parameters and criteria considered in these analyses.

CBR value:	3
Traffic for Light-Duty Pavement:	15,000 ESALs
Traffic for Medium-Duty Pavement:	75,000 ESALs
Reliability:	85 percent
Overall Variance:	0.45
Initial Serviceability:	4.2
Terminal Serviceability:	2.0

Using the above-indicated design parameters, we have estimated pavement section designs as shown in the following table:

Pavement Material	**Compacted Material Thicknesses (Inches)***	
	Standard-Duty (15,000 ESALs)	**Medium-Duty (75,000 ESALs)**
Surface Course Asphalt HMA Superpave - 9.5 mm **	1.5	1.5
Base Course Asphalt HMA Superpave –12.5 mm **	2.0	3.0
Graded Aggregate Base GAB	4.0	8.0
Total Pavement Thickness	7.5	12.5
* Compaction: Level 1 (50 Gyrations) ** Binder Type: PG64-22		

Final determinations of pavement sections to be used at the site may not be possible until the time of actual construction, depending on the sequence of grading and availability of materials, when the subgrade soil conditions become exposed in the various site areas. For planning and pricing considerations, however, it is anticipated that the pavement sections shown for a CBR value of 3 should provide a reasonable estimate of the average pavement sections that will be needed for the site.

The standard-duty pavement section shown in the table above should only be considered for use in areas where traffic will consist primarily of automobiles and light trucks and where any regular use by heavier trucks will be prohibited, such as proposed parking lot areas.

The medium-duty pavement section shown in the table above should be considered for the main site entrances and main service drives that may experience some use by heavier vehicles, including the drive-thru lanes.

It is ECS' opinion that the suggested flexible pavement section would not be suitable for the support of heavy, concentrated wheel loads. Therefore, we recommend that rigid Portland cement concrete pavement sections should be provided for any dumpster storage areas and for any unloading zones for deliveries. The Portland cement concrete pavement section should be at least 6 inches thick and should consist of air-entrained Portland cement concrete having a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). A minimum of 4 inches of compacted dense-graded aggregate subbase (CR-6 or GASB) should be placed beneath all rigid concrete pavements. For any dumpster storage areas, the Portland cement concrete slab area should be large enough to support the dumpster and at least the front wheels of the truck used to unload the dumpster.

The State of Maryland is using pavement materials whose characteristics are based on the SuperPave material specifications. We have provided specifications for Superpave materials in the tables above. Please note that it is important to specify the Compaction Level and the Binder Type for SuperPave materials. All pavement materials and construction should be in accordance with the most current version of the *Standard Specifications for Construction and Materials* of the Maryland Department of Transportation, State Highway Administration (SHA), and any applicable Montgomery County standards.

The pavement sections provided in the tables above were developed for the anticipated in-service traffic conditions only and do not provide an allowance for construction traffic conditions. Therefore, if pavements will be constructed early during site development to accommodate construction traffic, consideration must be given to the construction of heavier pavement sections, capable of accommodating the much heavier loads normally associated with construction traffic, as well as the future in-service traffic. ECS can provide additional design assistance with regard to pavements during the final geotechnical study.

Stormwater Management

Based on the provided information, management of stormwater will be necessary for the project. Specific details regarding the location and depth of the planned SWM facilities were not provided; however, we understand that the facilities will be located within pavement areas and the facility bottoms will be on the order of 12 ft or less below existing grades. The subsurface conditions within the planned SWM facilities were evaluated with Borings P-1 and P-2. The details about the soil strata for each boring can be seen on the soil boring logs in the Appendix.

Laboratory classification per USDA was performed for the recovered soil samples from Borings P-1 and P-2. The results are included in the Appendix.

Infiltration feasibility for the planned facilities was evaluated based on the USDA classifications and field infiltration test, in accordance with Montgomery County standards. Montgomery County requirements indicate that infiltration is considered feasible when the infiltration rate for soils at SWM facility inverts exceeds 0.52 in/hr, which corresponds to a USDA classification of Loam or more granular, provided that groundwater or the presence of an impervious layer is at least 4 ft below the facility invert. Groundwater was not encountered in Borings P-2, which extended to 15 ft below existing grades. Groundwater was encountered in Boring P-1 at a depth of 22 ft below existing grades.

Field infiltration was conducted adjacent to Borings P-1 and P-2. The infiltration pipe was terminated in the Clay layer, above the Clayey Sand layer where infiltration is anticipated. The Clay layer did not infiltrate in the field. However, based upon laboratory USDA classification through gradation analysis by hydrometer, both borings were classified more granular than Loam. Boring P-1 at a depth of 8.5 ft to 10 ft below existing grades was classified as Sandy Loam, with a minimum infiltration rate (in/hr) of 1.02 per USDA. Boring P-2 at a depth of 8.5 ft to 10 ft below existing grades was classified as Sand, with a minimum infiltration rate (in/hr) of 8.27 per USDA. Groundwater was encountered at a depth of 22 ft below existing grades in Boring P-1, and was not encountered in Boring P-2. Therefore, based on the boring results and laboratory classifications, infiltration should generally be considered feasible for SWM facilities represented by P-1 and P-2, at depths below 6 ft. A clay layer was encountered in Boring P-1 at a depth of 12 ft. Therefore, infiltration is considered feasible for inverts between 6 ft and 8 ft below existing grades.

Earthwork Operations

The following paragraphs detail our recommendations regarding subgrade preparation and compaction requirements.

Subgrade Preparation

Subgrade preparation should generally include the stripping of any unsuitable surface materials from the planned structure areas. It is recommended that the stripping of unsuitable surficial materials should extend to a minimum of 10 feet beyond the structure area limits, where feasible.

Subsequent to stripping operations, the exposed subgrade soils in the planned building areas should be examined by a qualified representative of the Geotechnical Engineer. The exposed soils should be thoroughly proofrolled by a vehicle having an axle weight of at least 20 tons, such as a fully-loaded tandem-axle dump truck. This procedure is intended to assist in identifying any localized loose or yielding materials. In the event that any yielding materials are encountered during the proofrolling operations, those subgrade soils should either be thoroughly densified in-place, or undercut to firm ground and replaced with controlled, compacted fill to final subgrade elevations.

Fill Placement

Prior to placement of compacted fill, representative bulk samples (about 50 pounds) should be taken of the proposed fill soils and laboratory tests should be conducted to determine Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships for compaction. These test results will be necessary for proper control of construction for new engineered fill.

Upon achieving competent subgrade conditions, the Contractor can place and compact engineered fill to reach final subgrade levels. In general, any materials to be used as structural fill should consist of soil types classified as ML or more granular, in accordance with ASTM D 2487, and should have a Liquid Limit less than 40 and a Plasticity Index less than 15. However, materials used as backfill behind below-grade walls or retaining walls should have classifications of SM, or more granular, in accordance with ASTM D 2487, and should have no more than 30 percent by weight of soil particles finer than the No. 200 sieve. Based on the boring results, most of the on site material should be usable as structural fill.

Finer-grained, more plastic, and organic soil types, if encountered at the site, may be used as fill materials in landscape areas. Any such materials encountered during grading operations should be either stockpiled for later use in landscape fills, or should be placed in approved disposal areas either on-site or off-site.

Prior to the utilization of any on-site or off-site borrow materials, the Geotechnical Engineer should be provided with representative samples in order to determine the suitability of the materials for use as a controlled compacted fill and to develop moisture-density relationships. In order to expedite the earthwork operations, it is recommended that any off-site borrow materials generally should be comprised of SM or more granular soil types.

All structural fill should be placed in loose lifts, which do not exceed 8 inches in thickness, and should be compacted to at least 95 percent of the maximum dry density, as determined by the Standard Proctor Compaction Test (ASTM D 698). Generally, the moisture content of the fill material should be maintained within $\pm$2 percentage points of the optimum moisture content for the fill material, as determined by ASTM D 698. Fill materials in the upper 1 foot of slab and pavement subgrades should be compacted to at least 98 percent of the Standard Proctor maximum dry density. Fill placed in non-structural areas should be compacted to at least 90 percent of the Standard Proctor maximum dry density in order to avoid significant subsidence.

Due to the textural variations of the on-site soils, variations in moisture-density relationships should be anticipated. Such variations must be determined in the field by a qualified representative of the Geotechnical Engineer at the time of construction, so that any necessary changes to fill placement and compaction procedures can be implemented.

The footprint of the proposed building area should be well defined, including the limits of the fill zones at the time of fill placement. Grade controls should be maintained throughout the filling operations. All filling operations should be observed on a full-time basis by a qualified representative of the Geotechnical Engineer to determine that minimum compaction requirements are being achieved.

A minimum of one compaction test per lift should be made per 2,500 square feet of fill lift area, but not fewer than two tests per lift should be made for any lift. The elevations and locations of the field density tests should be clearly identified at the time of fill placement and compaction.

Compaction equipment suitable for the soil types being used as fill should be selected to compact the fill. Theoretically, any equipment type can be used, so long as the required density is achieved. Ideally, a steel drum roller generally will be the most efficient for compaction of granular soil types and for sealing the surface soils, while a sheepsfoot roller or pneumatic-tire roller generally will be most efficient for compaction of cohesive soil types. At the end of each work day, all fill areas should be graded to facilitate surface drainage of any surface runoff associated with precipitation, and should be sealed by use of a smooth-drum roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the Contractor should scarify existing subgrade soils so that a weak plane will not be formed between the new fill and the existing subgrade soils. We recommend that subgrade soils should be scarified to depths of about 4 inches prior to placement of new fill.

Fill materials should not be placed on frozen soils, frost-heaved soils, and/or excessively wet soils. All frozen, frost-heaved, or excessively wet soils should be removed prior to continuation of fill operations. Borrow fill materials should not contain frozen materials at the time of placement. All frozen, frost-heaved, or excavated wet soils should be removed prior to placement of controlled, compacted fill. Moisture contents for excessively wet soils will need to be lowered to the range limits previously discussed.

If any problems are encountered during the earthwork operations, or if site conditions deviate from those indicated by the borings, the Geotechnical Engineer should be notified immediately.

Construction Considerations

The on-site soils contain silt and clay fines that will be sensitive to moisture increases and to construction disturbance. Construction activities in the presence of excessive moisture can lead to softening of the subgrade soils and loss of bearing capacity. Therefore, it will be prudent to schedule earthwork operations during the warmer and drier seasons that generally occur from late spring to early fall. Measures should also be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to provide for drainage of surface water from areas being developed.

A firm working surface for the placement of engineered fill should be established prior to construction of new fills. The moisture content of the fill soils at the time of placement should be carefully controlled to ensure that the required compaction effort can be achieved without excessive pumping or movement of the fill mass. In the event that the earthwork operations are accomplished during the cooler and wetter periods of the year, delays and additional costs should be anticipated. At these times, reduction of soil moisture may need to be accomplished by a combination of mechanical manipulation and the use of chemical additives, such as lime or cement, in order to lower moisture contents to levels appropriate for compaction.

As noted in the **Water Level Observations** section of this report, groundwater was encountered in Boring P-1 at a depth of 22 ft below existing grades; however, groundwater is not anticipated to have a significant effect on construction.

Any groundwater encountered during the construction of the structure should be the results of perched water and should be readily managed by interceptor trenches and localized systems of sumps and pumps. Deeper excavation for utilities may encounter ground water and provision for handling water in excavations should be anticipated.

All foundation excavations must be protected to prevent the disturbance of the subgrade materials and to minimize any potential loss of support capacity. Foundation concrete generally should be placed for foundations during the same day that the foundation excavations are made and approved. Should excavating and placing the foundation concrete the same day not be practical, we recommend that a concrete mud mat, 2 to 3 inches thick, be placed to protect the subgrade soils from moisture changes and disturbance. If protection of the soils is not provided, then undercutting of softened or loosened soils may be necessary prior to the placement of reinforcing steel and foundation concrete.

Prior to the placement of any foundation concrete or mud mat, the subgrade soils must be carefully examined and tested by a qualified representative of the Geotechnical Engineer to confirm the availability of the design soil bearing capacity. To minimize disturbance to the subgrade soils during excavation, we recommend that a bucket without scarifying teeth, in addition to hand excavation methods, be used during the final phases of the excavation for the foundations.

Any cuts or excavations associated with building and utility excavations may require forming or bracing, slope flattening, or other physical measures to control sloughing and/or to prevent slope failures. An examination of the applicable OSHA codes and requirements should be made by the appropriate Contractor to ensure that adequate protection of the excavations and trench walls is provided.

The surface soils contain some silt and fine sands and are considered erodible. The Contractor should provide and maintain good site drainage during earthwork operations to help to maintain the integrity of the surface soils. All erosion and sedimentation shall be controlled in accordance with sound engineering practice and current local requirements. Surface water should be directed away from the construction area, and the site should be sloped at gradients of 1 to 2 percent to reduce the potential for ponding water and the subsequent saturation of the surface soils.

CLOSING

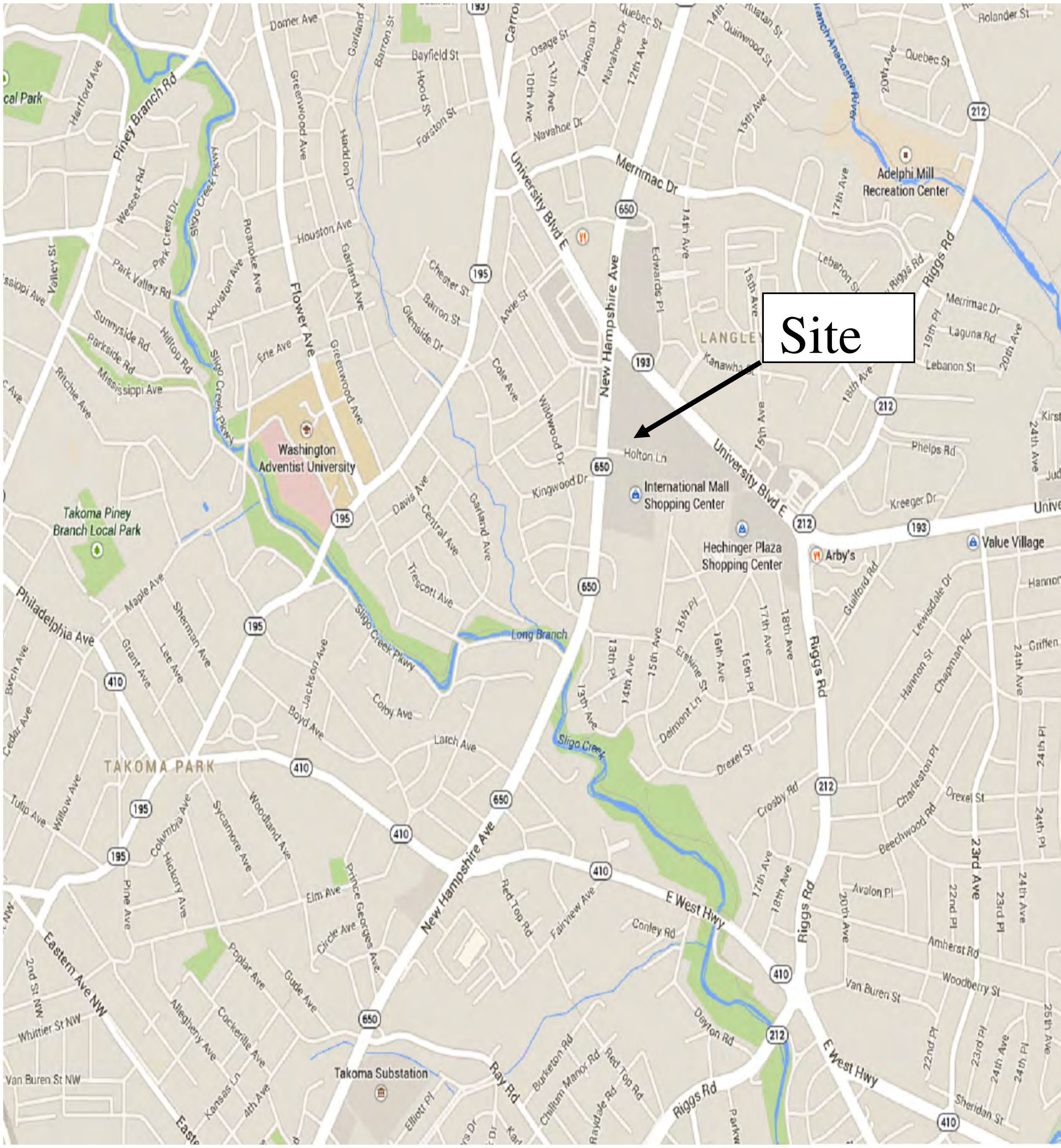
This report has been prepared to provide the Owner and the Design Team with subsurface information and evaluations and recommendations to guide geotechnical-related design and construction for development of the proposed Taco Bell Restaurant in Takoma Park, Maryland. Additional Geotechnical Consulting may be needed as planning and design for the project progress.

The evaluations and recommendations presented in this report are, of necessity, based on the information made available to us at the time of the actual writing of the report and the site conditions, surface and subsurface, that existed at the time the exploratory borings were drilled. Further assumption has been made that the limited exploratory borings, in relation both to the aerial extent of the site and to depth, are representative of general subsurface conditions across the site. If subsurface conditions are encountered that differ significantly from those reported herein, the Geotechnical Engineer should be notified immediately so that the analyses and recommendations presented in this report can be reviewed for validity.

If there are significant changes to the proposed construction from those previously discussed, ECS may need to review the changes to determine whether the evaluations and recommendations of this report will remain valid. ECS should be provided with appropriate plans and other information as project design progresses, so that we can review the information and provide additional geotechnical guidance, as needed. ECS recommends further subsurface investigation at the site prior to final design so that the presence of existing fill materials at the site can be more fully investigated. The Geotechnical Engineer should be retained to prepare, or at least to review, any earthwork specifications to assure that the recommendations of this report have been properly interpreted and included in the construction documents.

APPENDIX

- **Site Location Map**
- **Unified Soil Classification System**
- **Laboratory Test Results**
- **Reference Notes for Boring Logs**
- **Boring Logs**
- **Boring Location Plan**



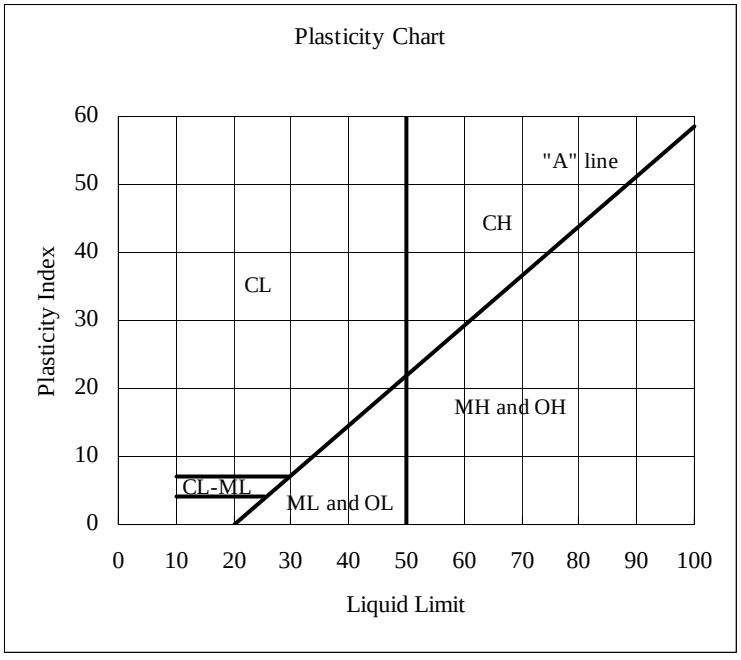
Source: Google Maps
Scale: NTS

NORTH

New Hampshire Avenue & Holton Lane Montgomery County Takoma Park, MD	ECS LLC MID-ATLANTIC	**Figure** Site Location Plan ECS Project 02-7394 August 25, 2014

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP; More than 12 percent GM, GC, SM, SC; 5 to 12 percent Borderline cases requiring dual symbols [b]	$C_u = D_{60}/D_{10}$ greater than 4; $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM [a]	d	Silty gravels, gravel-sand mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ greater than 6; $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM [a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. less than 4	Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
	Highly Organic soils		Pt		Peat and other highly organic soils			



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC,well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

Laboratory Testing Summary

Sample Source	Sample Number	Depth (feet)	MC[1] (%)	Soil Type[2]	Atterberg Limits[3]			Percent Passing No. 200 Sieve[4]	Moisture - Density (Corr.)[5]		CBR Value[6]	Other
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)		
B-1												
	S-2	3.50 - 5.00	4.8									
	S-3	6.00 - 7.50	9.5		35	15	20	35.1				
	S-4	8.50 - 10.00	14.3									
	S-5	13.50 - 15.00	18.8									
B-2												
	S-2	3.50 - 5.00	9.4									
	S-3	6.00 - 7.50	7.8									
	S-4	8.50 - 10.00	6.7									
	S-5	13.50 - 15.00	14.7									
P-1												
	S-2	3.50 - 5.00	17.7									
	S-3	6.00 - 7.50	8.5									
	S-4	8.50 - 10.00	9.1									
	S-5	13.50 - 15.00	20.7									
	S-6	18.50 - 20.00	22.9									
	S-7	23.50 - 25.00	18.7									
	S-8	28.50 - 30.00	15.2									
P-2												
	S-1	1.00 - 2.50	15.4									

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 7394
Project Name: Taco Bell at Langley Park
PM: Zachary L. Adcock
PE: Hasan M. Aboumatar
Printed On: Wednesday, September 24, 2014

ECS MID-ATLANTIC, LLC
1340 Charwood Road, Suite A
Hanover, MD 21076
Phone: (410) 859-4300
Fax: (410) 859-4324

Project Name:	Taco Bell at Langley Park
Project Number	02-7394
Sample ID:	P-1
Depth:	8.5-10 ft
Date:	13 Sep 14

USDA Soil Percentages

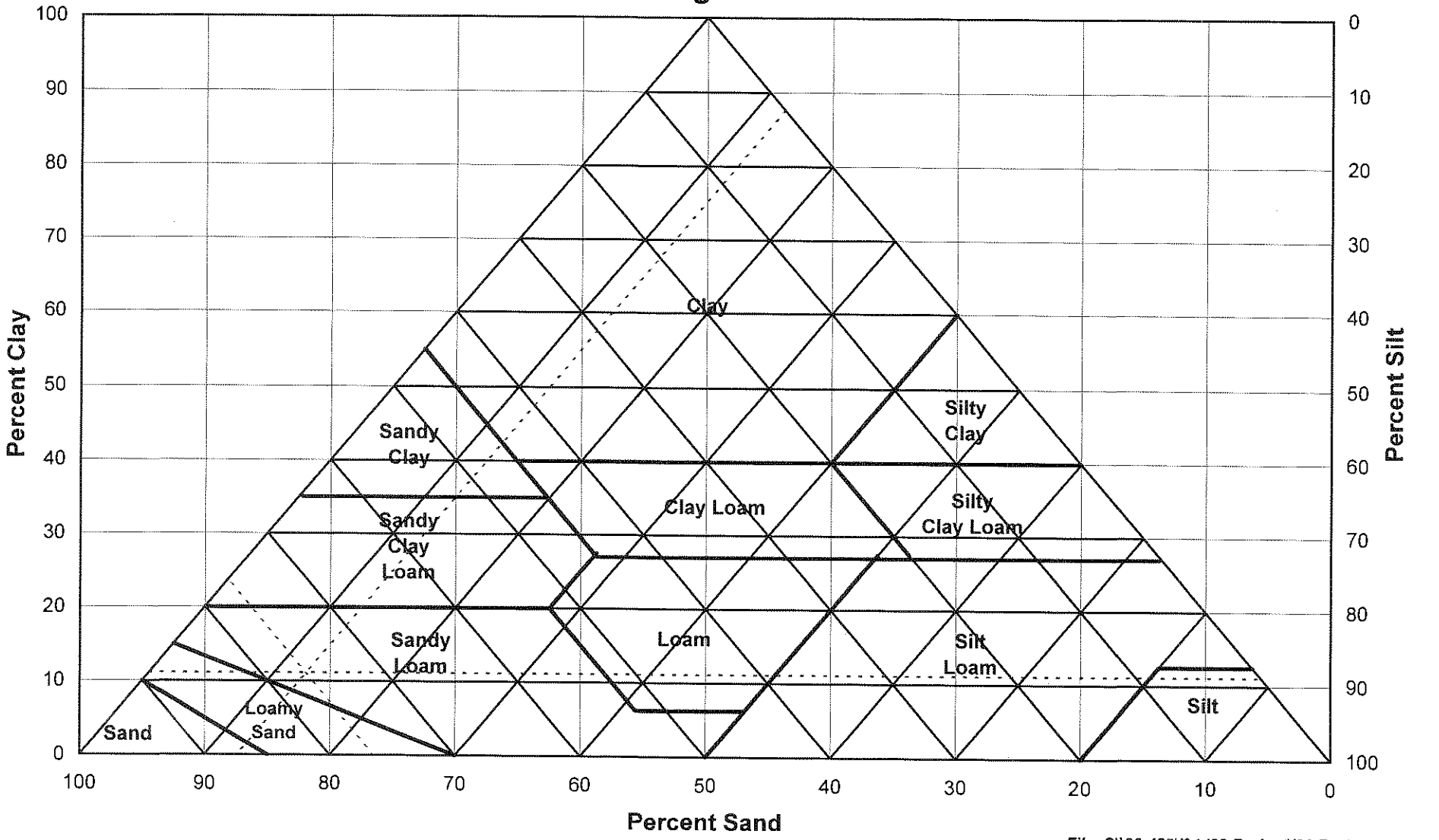
(corrected for gravel)

%Sand	%Silt	%Clay
76.4	12.5	11.1

USDA Class. Sandy Loam

Minimum Infiltration Rate (iph) 1.02

Textural Triangle USDA



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Project Name:	Taco Bell at Langley Park
Project Number	02-7394
Sample ID:	P-2
Depth:	8.5-10 ft
Date:	13 Sep 14

USDA Soil Percentages

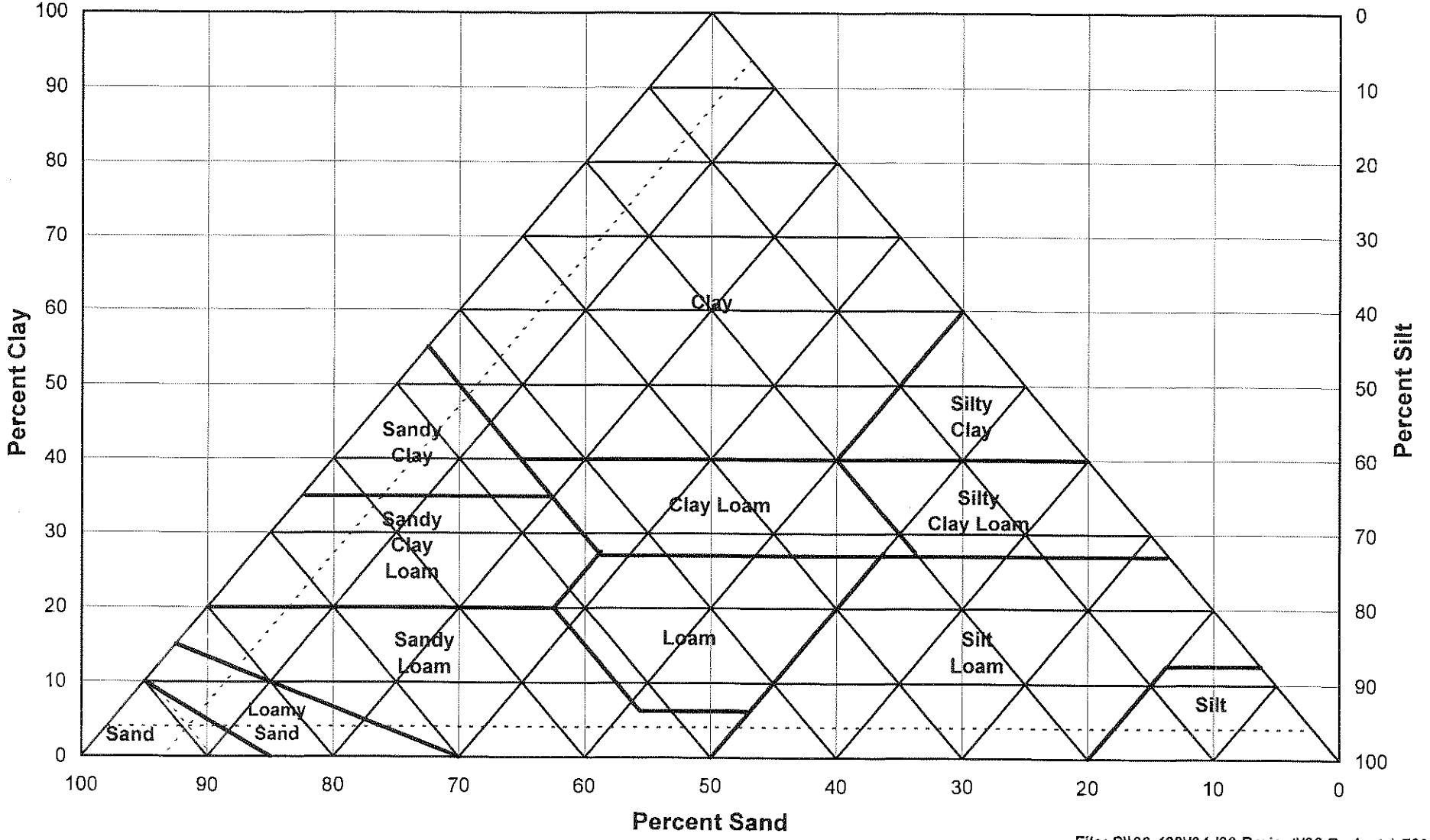
(corrected for gravel)

%Sand	%Silt	%Clay
89.5	6.4	4.1

USDA Class. Sand

Minimum Infiltration Rate (iph) 8.27

Textural Triangle USDA



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REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density		*Relative Properties*	
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

Particle Size Identification		
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to slight	0 – 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00–8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL	Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS	While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD	While Drilling	▽	Est. Groundwater Level	⊽	Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	7394	B-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park	

SITE LOCATION: 7601 New Hampshire Ave, Takoma Park, Montgomery County, Maryland

NORTHING | EASTING | STATION

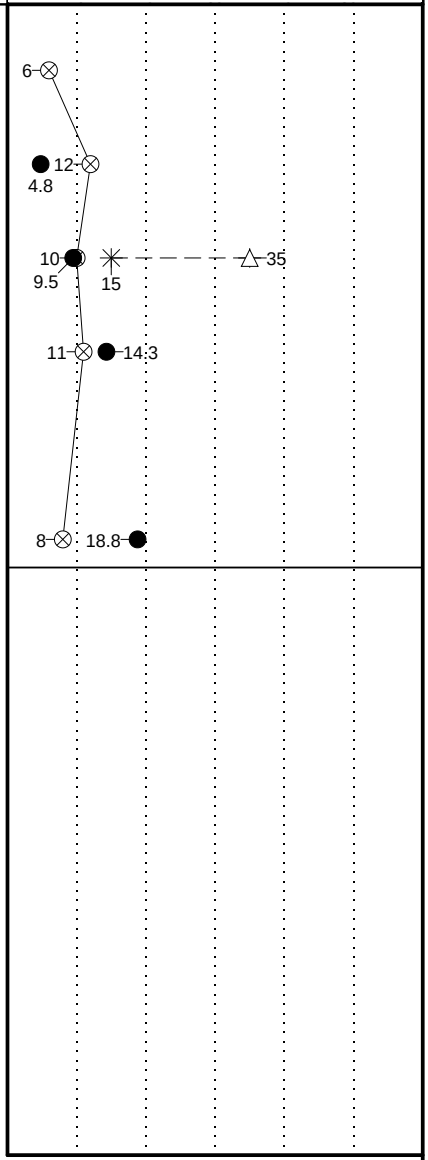
CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL (ENGLISH UNITS)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [1"], Gravel Depth [6"]			
	S-1	SS	18	12	(CL) LEAN CLAY, Trace Sand, Tannish Gray, Moist to Wet, Medium Stiff			2 3 3
	S-2	SS	18	14	(SC) CLAYEY SAND, Light Brown, Moist, Medium Dense			4 5 7
5	S-3	SS	18	18	(CL) SANDY LEAN CLAY, Trace Gravel, Pinkish Tan, Moist, Stiff			4 4 6
	S-4	SS	18	14				4 5 6
10					(SC) CLAYEY SAND, Grayish Tan, Moist to Wet, Loose			
	S-5	SS	18	18				3 3 5
15					END OF BORING @ 15.00'			
20								
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☐	BORING STARTED 09/04/14	
WL(BCR) WL(ACR)	BORING COMPLETED 09/04/14	CAVE IN DEPTH 11.0 @ EOD
WL	RIG CME 750 FOREMAN DALE PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	7394	B-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park	

SITE LOCATION: 7601 New Hampshire Ave, Takoma Park, Montgomery County, Maryland

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

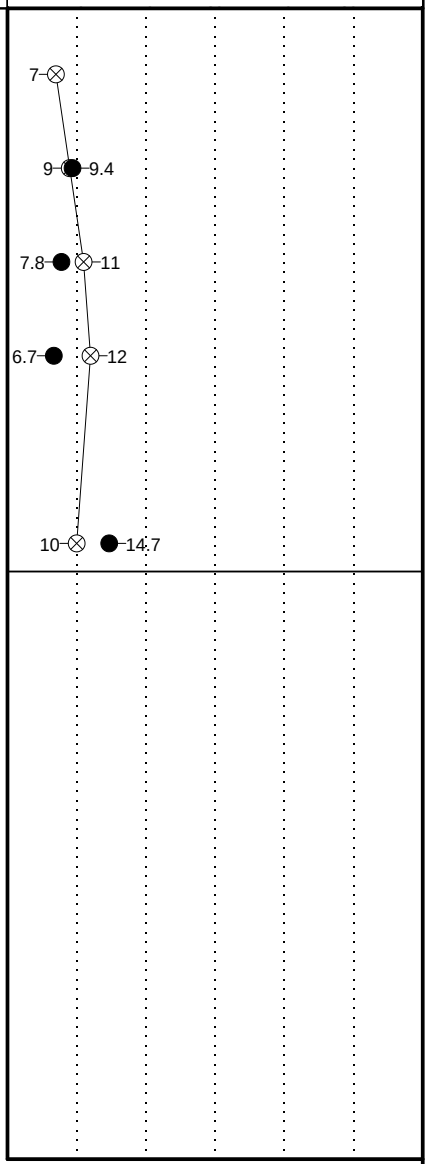
PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [3"], Gravel Depth [6"]			
	S-1	SS	18	12	(CL) LEAN CLAY, Trace Silt, Light Brown, Moist, Medium Stiff			2 2 5
	S-2	SS	18	16	(SC) CLAYEY SAND, Brown, Moist, Loose			3 4 5
5	S-3	SS	18	18	(SM) SILTY SAND, Tan, Moist, Medium Dense			5 5 6
	S-4	SS	18	18				3 5 7
10	S-5	SS	18	18	(SC) CLAYEY SAND, Tannish Brown, Moist, Loose			4 5 5
15					END OF BORING @ 15.00'			
20								
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS ☐ WD ☐	BORING STARTED 09/04/14	
WL(BCR) WL(ACR)	BORING COMPLETED 09/04/14	CAVE IN DEPTH 10.9 @ EOD
WL	RIG CME 750 FOREMAN DALE PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	7394	P-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park	

SITE LOCATION

7601 New Hampshire Ave, Takoma Park, Montgomery County, Maryland

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ——

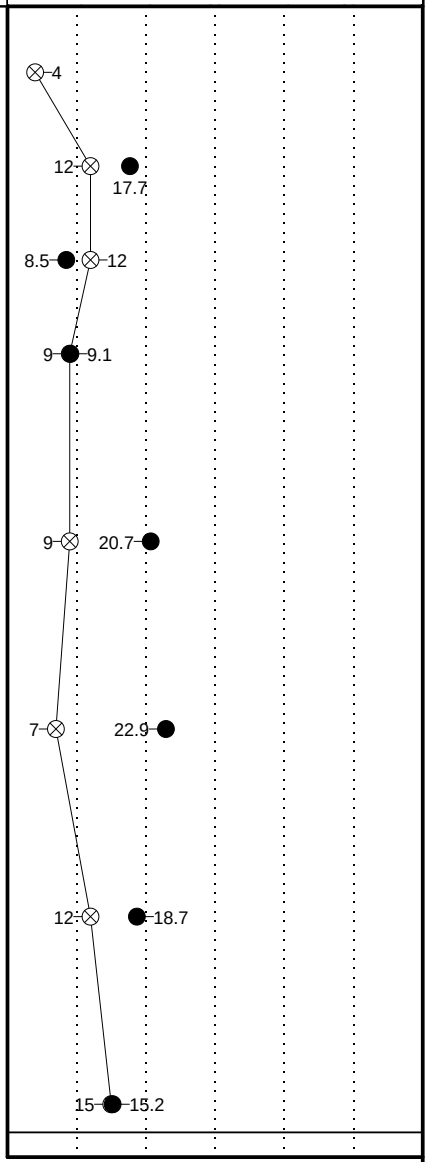
PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION | SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [2"], Gravel Depth [8"]			
	S-1	SS	18	10	(CL) LEAN CLAY, Trace Silt, Brownish Tan, Moist, Soft [Clay Loam]			2 2 2
	S-2	SS	18	8	(CL) SANDY LEAN CLAY, Trace Gravel, Light Brown, Moist, Medium Stiff [Sandy Clay Loam]			3 5 7
5	S-3	SS	18	14	(SC) CLAYEY SAND, Dark Brown, Moist, Loose [Sandy Loam]			5 6 6
	S-4	SS	18	18				4 4 5
10								
	S-5	SS	18	16	(CL) SANDY LEAN CLAY, Tan and Red, Moist, Stiff to Medium Stiff [Sandy Clay Loam]			3 5 4
15								
	S-6	SS	18	12				2 3 4
20						▽		
					(CL) LEAN CLAY, Trace Silt, Gray, Moist to Wet, Stiff [Clay Loam]			
	S-7	SS	18	18				3 5 7
25								
	S-8	SS	18	18				4 6 9
30					END OF BORING @ 30.00'			



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

▽ WL 22.0 WS ☐ WD ☐	BORING STARTED 09/04/14	
▽ WL(BCR) ▼ WL(ACR)	BORING COMPLETED 09/04/14	CAVE IN DEPTH 18.3 @ EOD
▽ WL	RIG CME 750 FOREMAN DALE PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	7394	P-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park	

SITE LOCATION: 7601 New Hampshire Ave, Takoma Park, Montgomery County, Maryland

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - — - REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

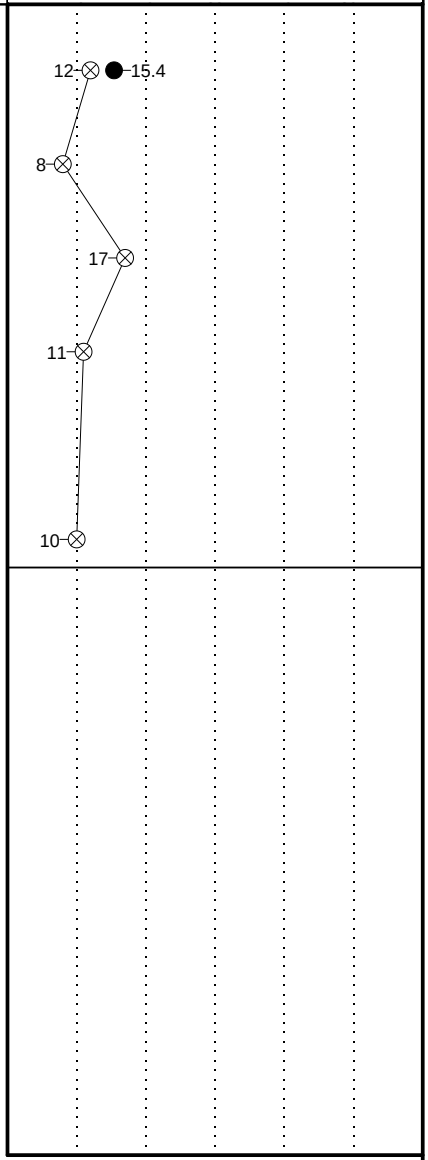
STANDARD PENETRATION BLOWS/FT

ENGLISH UNITS

BOTTOM OF CASING ▰ LOSS OF CIRCULATION

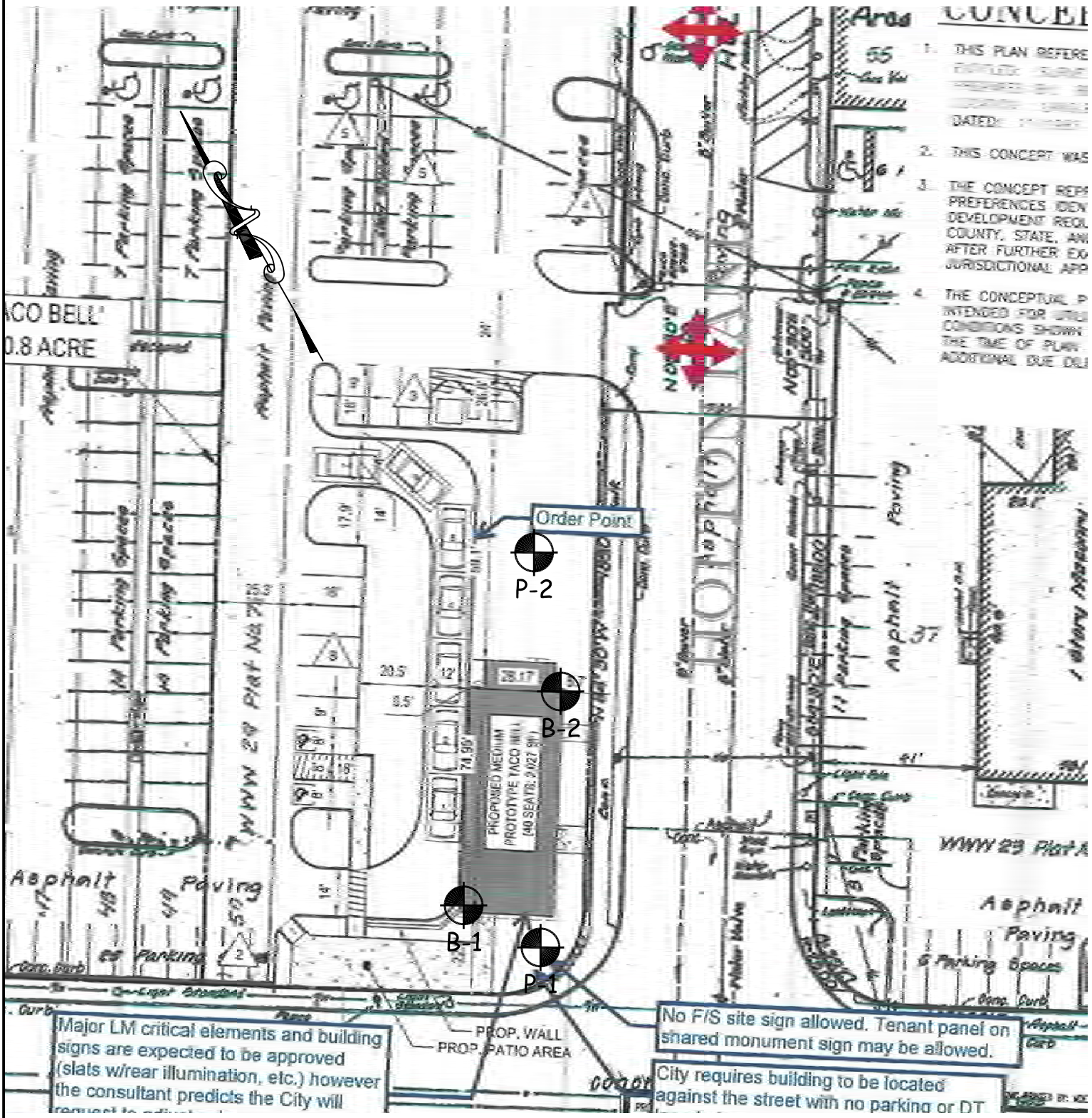
SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [3"], Gravel Depth [8"]			
	S-1	SS	18	10	(CL) SANDY LEAN CLAY, Trace Gravel, Dark Brown, Moist, Medium Stiff to Stiff [Sandy Clay Loam]			3 5 7
	S-2	SS	18	12				4 4 4
5	S-3	SS	18	18	(SC) SAND WITH CLAY, Dark Red, Moist, Medium Dense to Loose [Sand]			6 8 9
	S-4	SS	18	18				5 6 5
10	S-5	SS	18	18				4 4 6
15					END OF BORING @ 15.00'			
20								
25								
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS ☐ WD ☐	BORING STARTED 09/04/14	
WL(BCR) WL(ACR)	BORING COMPLETED 09/04/14	CAVE IN DEPTH 10.2 @ EOD
WL	RIG CME 750 FOREMAN DALE PRICE	DRILLING METHOD HSA



LEGEND

Boring Location

REVISIONS

Boring Location Plan

Taco Bell at Langley Park

MUY Brands

ZLA	ZLA	08/25/14	NTS	7394	1 OF 1

May 1, 2015

Mr. Mark Drangel
MUY Brands, LLC
1790 Blanco Road
San Antonio, TX 78232

ECS Project No. 02-7394

Reference: Addendum No. 1 to Report of Subsurface Exploration and Geotechnical Engineering Services for **Taco Bell at Langley Park,** Takoma Park, Montgomery County, Maryland.

Dear Mr. Drangel,

As requested, ECS Mid-Atlantic, LLC (ECS) has prepared this Addendum No. 1 to our report of subsurface exploration and geotechnical engineering services for the above-referenced project, dated October 2, 2014 to address results of additional subsurface investigation for the currently proposed stormwater management (SWM) facility.

Our understanding of the planned development is based on the information provided to us in your email on April 9, 2015 which included a Title Survey, as prepared by Bohler Engineering and dated December 9, 2015, which depicted the location of the proposed stormwater management (SWM) facility. The currently proposed SWM facility is approximately 400 sf, and is located to the east of the proposed Taco Bell, at the rear of the site.

Scope of Services

Our scope of services included drilling four (4) soil test borings, designated as SWM-1 through SWM-4 for the SWM facilities. The borings were drilled to depths of 15 ft to 20 ft below existing grades. The approximate boring locations are presented on the Boring Location Plan attached to this addendum. In addition, three (3) offset borings were auger drilled to allow the installation of PVC pipes for field infiltration testing. Infiltration testing consists of presoaking the PVC pipe with 24 inches of water 24 – 48 hours in advance of testing. After 24 – 48 hrs, ECS' field engineer returned to the site to perform field infiltration testing, which includes soaking the pipe with 24 inches of water, and observing water level readings each hour for a minimum of 4 hours.

All borings were drilled in general accordance with ASTM D 1586 standards. The scope of work also included visually classifying soil boring samples, performing laboratory testing on selected soil samples from the borings, performing various engineering analyses, and providing this written addendum of findings, evaluations and recommendations.

Subsurface Conditions

In general, the conditions encountered at the ground surface during our field exploration consisted of 12 inches of mulch, overlying natural soils in the undeveloped areas of the site, and 4 to 6 inches of asphalt, overlying natural soils in the existing parking area.

Natural soils were encountered below the topsoil and asphalt in the borings. The natural soils were generally brown, gray, grayish brown, reddish brown, tan, orangish brown and reddish tan. The natural soils consisted generally of Clayey SILT (ML/CL), Silty CLAY (CL/ML), Sandy CLAY (CL), Sandy SILT (ML), SAND with Clay (SP-SC), and Clayey SAND (SC) soil types. N-values recorded in the natural granular soils were in the range of 10 blows per foot (bpf) to 22 bpf, indicating loose to medium dense relative densities. N-values recorded in the natural cohesive soils were in the range of 9 bpf to 25 bpf, indicating stiff to very stiff consistencies.

More detailed information regarding subsurface conditions at the site can be obtained through review of the Boring Logs attached to this addendum.

Results and Recommendations

In order to evaluate the subsurface conditions with the planned SWM facility, ECS performed soil test borings at four (4) locations, denoted as SWM-1 through SWM-4, within the footprint of the proposed facility. Infiltration feasibility for the planned facility was evaluated at Borings SWM-2 through SWM-4, based on visual classification and field infiltration test, in accordance with Montgomery County standards.

Montgomery County requirements indicate that infiltration is considered feasible when the infiltration rate for soils at SWM facility inverts exceeds 0.52 in/hr, which corresponds to a USDA classification of Loam or more granular, provided that groundwater or the presence of an impervious layer is at least 4 ft below the facility invert. Groundwater was not encountered in the borings to the depth explored, which extended 15 ft and 20 ft below existing grades. A Silty CLAY layer was encountered in boring SWM-1, at a depth of 18 ft below existing grade, or at EL 198.

Field infiltration tests were performed adjacent to Borings SWM-2 through SWM-4 at depth of approximately 8 ft below existing grade at SWM-2, 14 ft at SWM-3, and 10 ft at SWM-4. Summary of field infiltration tests are shown in the following table:

Infiltration Test Results for Planned SWM Facility

Boring #	Anticipated Soil at Infiltration Invert (USCS Classification)	Infiltration Invert Depth (ft below existing grade)	Infiltration Elevation	Minimum Field Infiltration Rate (in/hr)
SWM-2	Sandy Loam	8 ft	EL 209	0.0
SWM-3	Sandy Loam	14 ft	EL 203	2.4
SWM-4	Sandy Loam	10 ft	EL 207	1.2

Based on the soil boring results, and field infiltration results, infiltration should be considered feasible, provided the inverts are located in the Clayey SAND (SC) or Sand with CLAY (SP-SC) [Sandy Loam] layer. A CLAY layer was encountered in Boring SWM-1, and extended to a depth of 18 ft below existing grade, or at EL 198.

Based on the field infiltration test results in Borings SWM-3 and SWM-4, the soils exhibited infiltration rates on the order of 1.2 inches per hour (in/hr), to 2.4 inches per hour. Infiltration should generally be considered at an elevation of approximately EL 203 to EL 207.

Closing

This addendum has been prepared to provide the Owner and the Design Team with subsurface information and recommendations regarding the design of the geotechnical aspects of the planned SWM facility design for above-referenced project sites. The findings presented in this addendum are, of necessity, based on the information made available to us at the time of the actual writing of the addendum and the site conditions, surface and subsurface, that existed at the time the core holes were performed.

If you have any questions with regard to the information contained in this addendum, or if you need additional information, please feel free to contact us.

Respectfully,

ECS Mid-Atlantic, LLC

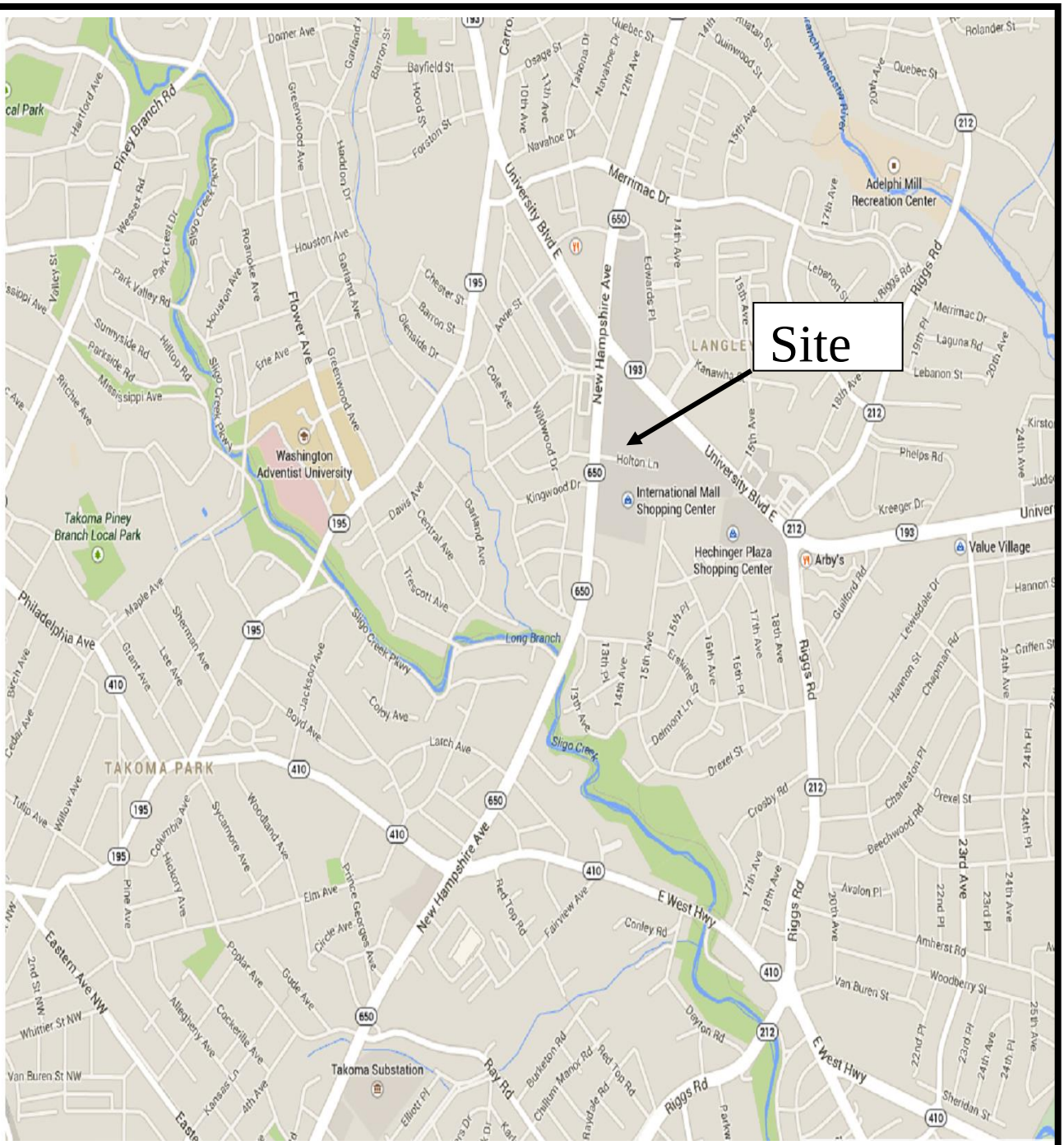
Zachary Adcock E.I.T.
Project Manager

Hasan M. Abouratal, Ph.D., P.E.
Principal Engineer

Professional Certification I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No *29553*. Expiration Date: *12/31/2015*

Attachments: Site Location Map
Unified Soil Classification System
Referenced Note for Boring Logs
Boring Logs
Boring Location Plan



Source: Google Maps
Scale: NTS

NORTH

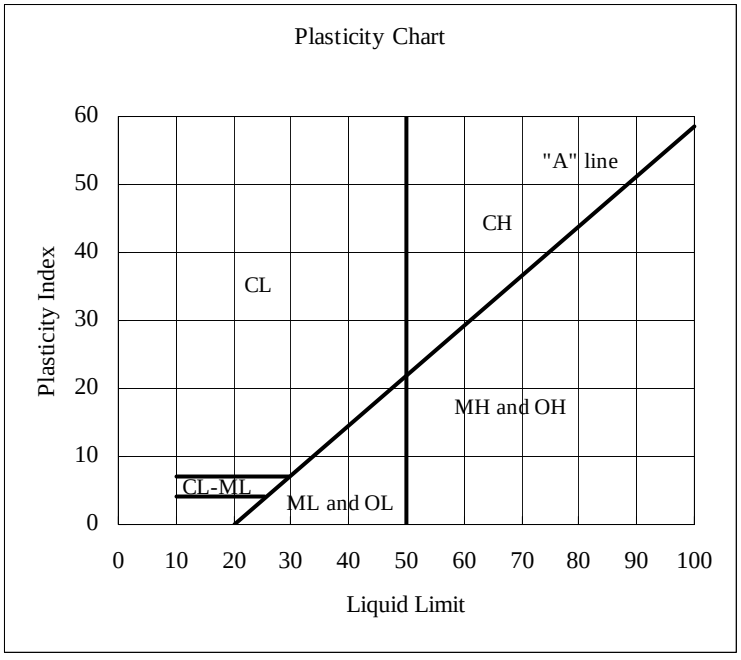
New Hampshire Avenue &
Holton Lane
Montgomery County
Takoma Park, MD

ECS LLC
MID-ATLANTIC

Figure
Site Location Plan
ECS Project 02-7394-B
April 13, 2015

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP; More than 12 percent GM, GC, SM, SC; 5 to 12 percent Borderline cases requiring dual symbols [b]	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM [a]	d	Silty gravels, gravel-sand mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM [a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. less than 4	Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
	Highly Organic soils		Pt		Peat and other highly organic soils			



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC,well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density		*Relative Properties*	
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

Particle Size Identification		
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to slight	0 – 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00–8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL	Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS	While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD	While Drilling	▽	Est. Groundwater Level	⦿▽	Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	02:7394-B	SWM-1	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park Additional SWM	

SITE LOCATION: New Hampshire Ave and Holton Lane, Takoma Park, Montgomery County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC%

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

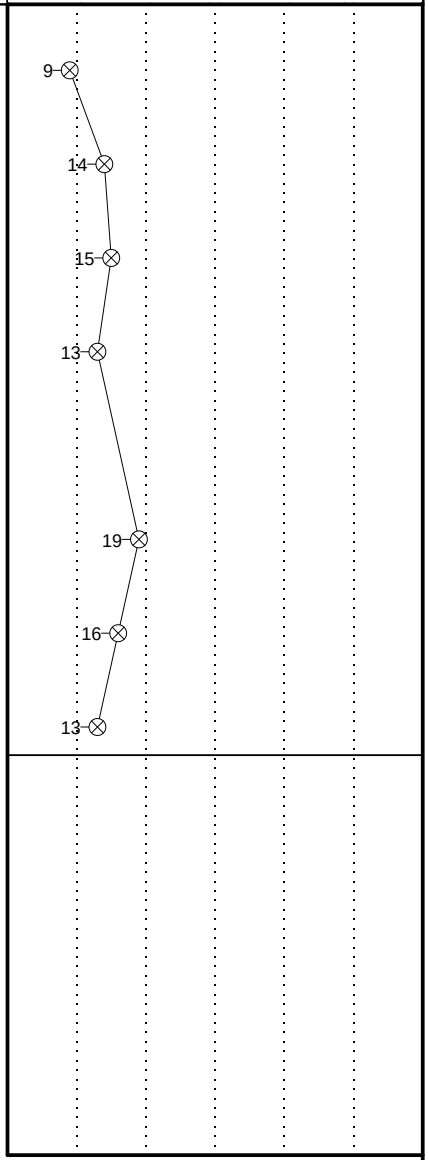
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION 216

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil and Mulch Depth [12"]			
	S-1	SS	18	18	(CL/ML) SILTY CLAY, Gray and Brown, Moist, Stiff [Clay]		215	2 4 5
	S-2	SS	18	18				3 5 9
5	S-3	SS	18	18			210	3 5 10
	S-4	SS	18	18	(CL) SANDY LEAN CLAY, Grayish Brown, Moist, Stiff [Clay]			3 5 8
10							205	
	S-5	SS	18	18	(SP-SC) SAND WITH CLAY, Reddish Brown, Moist, Medium Dense [Sandy Loam]			7 10 9
15	S-6	SS	18	18			200	4 7 9
	S-7	SS	18	18	(CL/ML) SILTY CLAY, Trace Sand, Tan, Moist, Stiff [CLay]			4 6 7
20					END OF BORING @ 20.00'		195	
25							190	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS ☐ WD ☐	BORING STARTED 04/16/15	CAVE IN DEPTH 15.7' @ EOD
WL(BCR) WL(ACR) DRY	BORING COMPLETED 04/16/15	HAMMER TYPE
WL DRY @ EOD	RIG 550 ATV FOREMAN DALE PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	02:7394-B	SWM-2	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park Additional SWM	

SITE LOCATION: New Hampshire Ave and Holton Lane, Takoma Park, Montgomery County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC%

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION 217

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0							
	S-1	SS	18	18		215	3 6 5
	S-2	SS	18	16			6 11 11
5							
	S-3	SS	18	18		210	5 5 6
	S-4	SS	18	18			4 5 5
10						205	
	S-5	SS	18	18			5 6 7
15						200	
20						195	
25						190	
30							

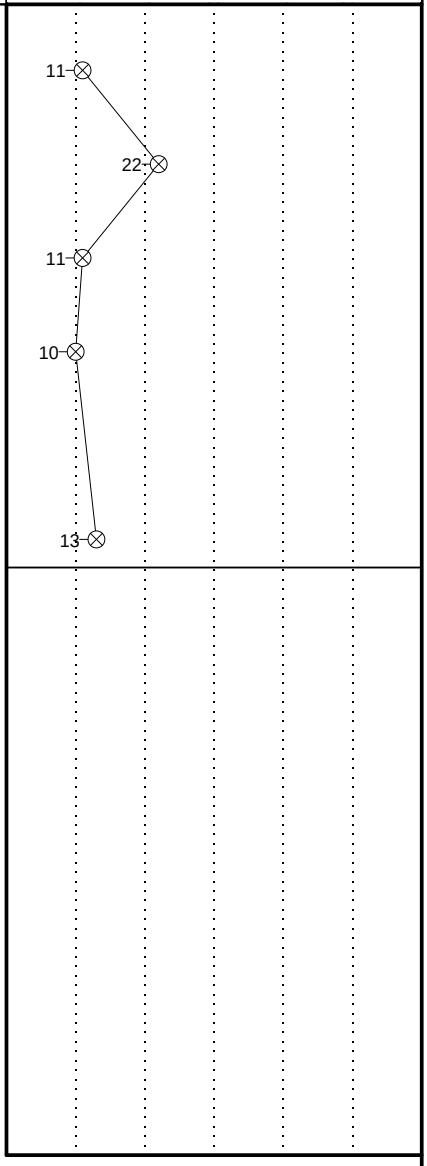
Asphalt Depth [6"]

(CL) LEAN CLAY, Gray, Moist, Stiff [Clay]

(ML) SANDY SILT, Grayish Brown, Moist, Very Stiff

(SC) CLAYEY SAND, Tan and Brown, Moist, Loose to Medium Dense [Sandy Loam]

END OF BORING @ 15.00'



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS ☐ WD ☐	BORING STARTED 04/16/15	CAVE IN DEPTH 11.3' @ EOD
WL(BCR) WL(ACR) DRY	BORING COMPLETED 04/16/15	HAMMER TYPE
WL DRY @ EOD	RIG 550 ATV FOREMAN DALE PRICE	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	02:7394-B	SWM-3	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park Additional SWM	

SITE LOCATION: New Hampshire Ave and Holton Lane, Takoma Park, Montgomery County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION 217

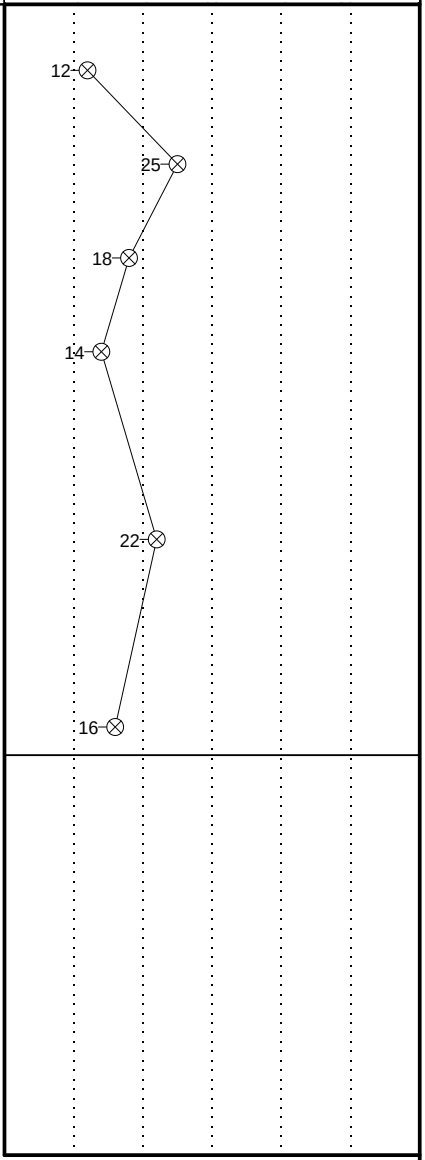
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0							
	S-1	SS	18	16		215	3 5 7
	S-2	SS	18	18			6 9 16
5							
	S-3	SS	18	18		210	5 8 10
	S-4	SS	18	18			4 6 8
10						205	
	S-5	SS	18	18			7 10 12
15						200	
	S-6	SS	18	18			4 7 9
20						195	
25						190	
30							

Asphalt Depth [4"]
(ML/CL) CLAYEY SILT, Dark Tan, Moist, Stiff [Clay]

(CL) SANDY LEAN CLAY, Tan, Moist, Very Stiff to Stiff [Clay]

(SC) CLAYEY SAND, Brown and Tan, Moist, Medium Dense [Sandy Loam]

END OF BORING @ 20.0'



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS ☐ WD ☐	BORING STARTED 04/27/15	CAVE IN DEPTH 16.2' @ EOD
WL(BCR) WL(ACR)	BORING COMPLETED 04/27/15	HAMMER TYPE
WL DRY @ EOD	RIG CME 750 FOREMAN Shane Coombs	DRILLING METHOD HSA

CLIENT	JOB #	BORING #	SHEET
MUY Brands, LLC	02:7394-B	SWM-4	1 OF 1

PROJECT NAME	ARCHITECT-ENGINEER
Taco Bell at Langley Park Additional SWM	

SITE LOCATION: New Hampshire Ave and Holton Lane, Takoma Park, Montgomery County, MD

NORTHING | EASTING | STATION

CALIBRATED PENETROMETER TONS/FT^2

ROCK QUALITY DESIGNATION & RECOVERY
RQD% – — – REC% ———

PLASTIC LIMIT% | WATER CONTENT% | LIQUID LIMIT%

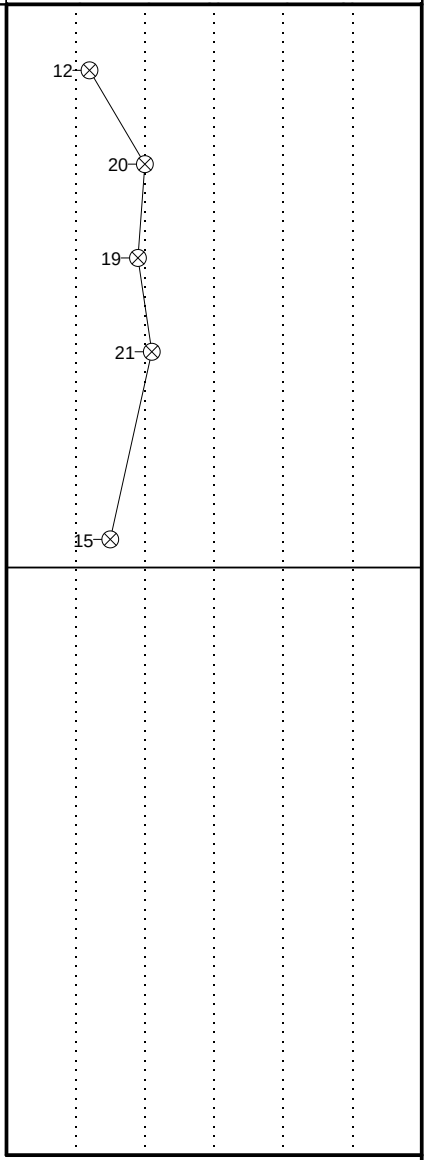
STANDARD PENETRATION BLOWS/FT

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING | LOSS OF CIRCULATION

SURFACE ELEVATION 217

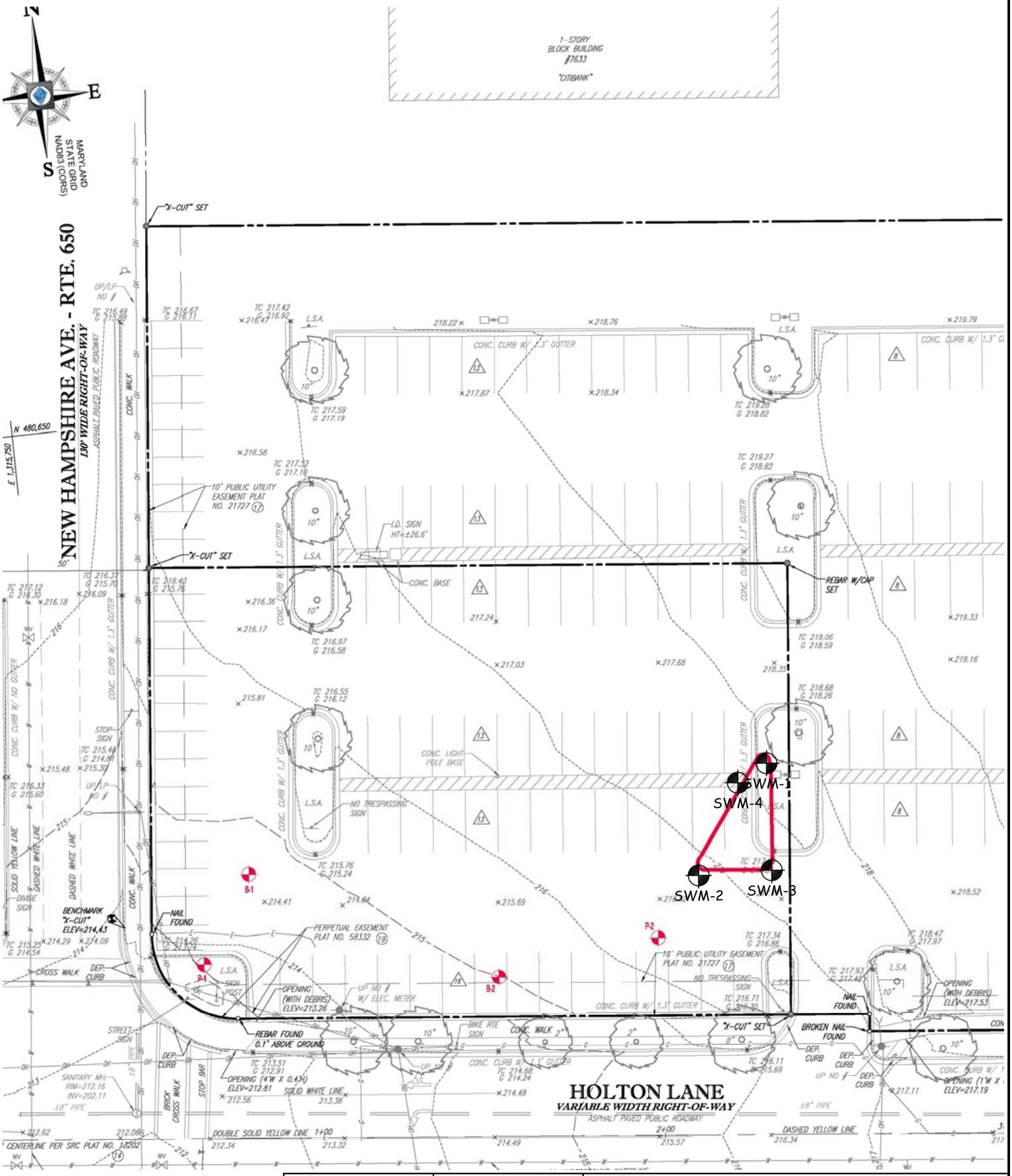
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Depth [4"]			
	S-1	SS	18	18	(CL/ML) SILTY CLAY, Orangish Brown, Moist, Stiff [Clay]		215	3 5 7
	S-2	SS	18	16	(CL) SANDY LEAN CLAY, Brown, Moist, Very Stiff [Clay]			9 12 8
5	S-3	SS	18	18			210	5 9 10
	S-4	SS	18	18	(SP-SC) SAND WITH CLAY, Reddish Tan, Moist, Medium Dense [Sandy Loam]			7 9 12
10							205	
	S-5	SS	18	18				4 6 9
15					END OF BORING @ 15.0'		200	
20							195	
25							190	
30								



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL DRY WS☐ WD☐	BORING STARTED 04/27/15	CAVE IN DEPTH 9.7' @ EOD
WL(BCR) WL(ACR)	BORING COMPLETED 04/27/15	HAMMER TYPE
WL DRY @ EOD	RIG CME 750 FOREMAN Shane Coombs	DRILLING METHOD HSA

ECS MID-ATLANTIC, LLC



LEGEND

- 2015 Boring Location

REVISIONS

Boring Location Plan

Taco Bell at Langley Park – Additional SWM

MUY Brands

ZLA	ZLA	04/28/2015	NTS	7394-B	1 OF 1

DOCUMENT 00 5200

AGREEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements, and the Drawings are collectively applicable to this Document.

1.2 FORM OF AGREEMENT

A. The Owner's customized Construction Contract – Rev 8 – Bonus, last updated on 11/15/02 Between Owner and Contractor will apply to the Work of this Project.

END OF DOCUMENT

SECTION 01 1000

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work covered by Contract Documents.
2. Identification.
3. Project information.
4. National account agreements.
5. Work by Contractor.
6. Work by Owner.
7. Work under separate contracts.
8. Purchase contracts.
9. Owner-furnished products.
10. Access to site.
11. Specification and drawing conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract comprises general construction of a new Taco Bell restaurant for the Owner.

1.3 IDENTIFICATION

A. Owner's Representative: Throughout the Specifications, the term "Owner's Representative" has been used instead of the term "Architect." In some cases the Owner's employee will provide services and responsibilities normally provided by the Architect. The Owner will clarify whether the Architect is acting as the Owner's Representative, or if the Owner's employee is acting as the Owner's Representative for the Project.

1.4 PROJECT INFORMATION

A. Project Identification: Taco Bell MED-40-LM Modified, Store 30496, Site 310439.

1. Project Location: 7618 New Hampshire Avenue, Takoma Park, Texas.

B. Owner: MUY Brad, LLC, 17890 Blanco Road, San Antonio, TX 78232.

1. Owner's Representative: Mark Drangel, mark.drangel@muybrands.com.

C. Architect: GLMV Architecture, Inc., 1525 E. Douglas, Wichita, KS 67211.

1. Contact: Camren S. Onken, RLA, ASLA, LEED AP BD+C, GGP, Senior Vice President, conken@glmv.com, (316) 265-9367.

1.5 NATIONAL ACCOUNT AGREEMENTS

A. Owner has entered into national account agreements with certain vendors. Refer to Scope of Work Drawings.

B. Purchase of products and equipment from these vendors is to be made by the respective subcontractor, with confirmation of the purchase furnished to the Owner.

C. Contractor remains responsible for delivery, storage, rough-in requirements, and installation of purchased products and equipment.

1.6 WORK BY CONTRACTOR

A. Except as specifically noted, provide and pay for:

1. Labor, materials and equipment.
2. Tools, construction equipment and machinery.
3. Water, heat, and utilities required for construction.
4. Other facilities and services necessary for proper execution and completion of Work.

B. Secure and pay for, as necessary for proper execution and completion of Work, and as applicable at time of receipt of bids:

1. Government Fees including inspection fees.
2. Licenses.

C. Give required notices.

D. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of Work.

E. Promptly submit written notice to Owner’s Representative of observed variance of Contract Documents from legal requirements. Assume responsibility for Work known to be contrary to such requirements, without notice.

1.7 WORK BY OWNER

A. General: Cooperate fully with Owner so Work may be carried out smoothly, without interfering with or delaying Work under this Contract or Work by Owner. Coordinate the Work of this Contract with Work performed by Owner.

1.8 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate Contractors so Work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with Work performed under separate contracts.

1.9 PURCHASE CONTRACTS

A. General: Owner has negotiated purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.

1. Contractor's responsibilities are same as if Contractor had negotiated purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.

B. Purchase Contracts Information: Coordinate with the Owner.

1.10 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing. Contractor shall coordinate with the Owner.

1.11 Provide and install heat tape and start-up ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform Work or to retain other Contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.12 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations **scheduled on Drawings**.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times,

and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.4 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 2900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.
b. Description of the Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

1) Labor.
2) Materials.
3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

    1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use forms acceptable to Architect and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
    2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
    3. Include amounts of Change Orders issued before last day of construction period covered by application.
    4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Schedule of unit prices.
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Copies of building permits.
8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
9. Initial progress report.
10. Report of preconstruction conference.
11. Certificates of insurance and insurance policies.
12. Performance and payment bonds.
13. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as Substantially Complete.

1. Include documentation supporting claim that the Work is Substantially Complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project meetings.

1.2 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.

5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

a. Requests for approval of submittals.

b. Requests for approval of substitutions.
c. Requests for approval of Contractor's means and methods.
d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work and Proposal Request, as appropriate.

1.5 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned

parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Lines of communications.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Use of the premises.
    l. Work restrictions.
    m. Working hours.
    n. Owner's occupancy requirements.
    o. Responsibility for temporary facilities and controls.
    p. Procedures for moisture and mold control.
    q. Procedures for disruptions and shutdowns.
    r. Construction waste management and recycling.
    s. Parking availability.
    t. Office, work, and storage areas.
    u. Equipment deliveries and priorities.
    v. Security.
    w. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner and Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Possible conflicts.
    i. Compatibility requirements.
    j. Time schedules.
    k. Weather limitations.
    l. Manufacturer's written instructions.
    m. Warranty requirements.
    n. Compatibility of materials.
    o. Acceptability of substrates.

p. Temporary facilities and controls.
q. Space and access limitations.
r. Regulations of authorities having jurisdiction.
s. Testing and inspecting requirements.
t. Installation procedures.
u. Coordination with other work.
v. Required performance results.
w. Protection of adjacent work.
x. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
   a. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
   b. Submittal of written warranties.
   c. Requirements for preparing operations and maintenance data.
   d. Requirements for delivery of material samples, attic stock, and spare parts.
   e. Requirements for demonstration and training.
   f. Preparation of Contractor's punch list.
   g. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
   h. Submittal procedures.
   i. Coordination of separate contracts.
   j. Owner's partial occupancy requirements.
   k. Installation of Owner's furniture, fixtures, and equipment.
   l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site utilization.
        8) Temporary facilities and controls.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of proposal requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Daily construction reports.
4. Material location reports.
5. Site condition reports.
6. Special reports.

1.2 SUBMITTALS

A. Startup construction schedule.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

E. Material Location Reports: Submit at weekly intervals.

F. Site Condition Reports: Submit at time of discovery of differing conditions.

G. Special Reports: Submit at time of unusual event.

H. Qualification Data: For scheduling consultant.

PART 2 - PRODUCTS

2.1 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 30 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 15 days of date established for commencement of the

Work. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Services connected and disconnected.
16. Equipment or system tests and startups.
17. Partial completions and occupancies.
18. Substantial Completions authorized.

B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Coordinate transmittal of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.

    a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.
        3) Destination (To:).
        4) Source (From:).
        5) Name and address of Architect.
        6) Name of Contractor.
        7) Name of firm or entity that prepared submittal.
        8) Names of subcontractor, manufacturer, and supplier.
        9) Category and type of submittal.
        10) Submittal purpose and description.
        11) Specification Section number and title.
        12) Specification paragraph number or drawing designation and generic name for each of multiple items.
        13) Drawing number and detail references, as appropriate.
        14) Indication of full or partial submittal.
        15) Submittal and transmittal distribution record.
        16) Remarks.
        17) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Contractor.
    e. Name of firm or entity that prepared submittal.
    f. Names of subcontractor, manufacturer, and supplier.
    g. Category and type of submittal.
    h. Submittal purpose and description.
    i. Specification Section number and title.
    j. Specification paragraph number or drawing designation and generic name for each of multiple items.
    k. Drawing number and detail references, as appropriate.
    l. Location(s) where product is to be installed, as appropriate.
    m. Related physical samples submitted directly.
    n. Indication of full or partial submittal.
    o. Submittal and transmittal distribution record.
    p. Other necessary identification.
    q. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in one of the following formats:

    a. PDF electronic file.
    b. Three paper copies of Product Data unless otherwise indicated. Architect will return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Submit Shop Drawings in one of the following formats:

    a. PDF electronic file.
    b. Three opaque copies of each submittal. Architect will retain one copy; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.
    e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

G. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

H. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

I. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

J. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

K. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

L. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

M. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

N. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

O. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

P. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Q. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file or three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

D. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect[or Construction Manager].

C. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

E. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

F. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project;

being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation

of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.

2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC - International Code Council; www.iccsafe.org.
3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://dodssp.daps.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).

5. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas Forest Service; Forest Resource Development and Sustainable Forestry; http://txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.3 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.4 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install lighting for Project identification sign.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for firefighting equipment and access to fire hydrants.

C. Parking: Provide temporary parking areas for construction personnel.

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 7300 "Execution."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

END OF SECTION

SECTION 01 5713

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 NOTICE OF INTENT

A. Contractor and Owner shall jointly submit an EPA Notice of Intent (NOI) prior to construction.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Grass: Materials for seeding and sodding shall conform to Section 02905.

B. Fertilizer: Use commercial grade fertilizers to insure germination and growth. Analysis by weight shall be 16-4-8 or 15-5-10 for Nitrogen, Phosphoric Acid and Potash.

C. Silt Fence: Lundin "Silt Buster", Mirafi "Envirofence" or approved equal.

D. Straw Bales: Standard rectangular hay bales bound by baling wire

E. Sediment Traps: Standard manufacture designed to fit the intended inlet.

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall keep disturbed areas to a minimum required to adequately perform the work. At all times the Contractor shall maintain the site in such a manner that minimizes erosion of the site. The execution of work under this section shall be in conformance with the NPDES rulings and the site Storm Water Pollution Prevention Plan.

3.2 SEEDING

A. Disturbed portions of the site and stockpile areas shall be seeded within 14 days if the phasing of the construction operations are anticipated to leave those portions of the areas unworked for 21 days or more.

B. Seeding operations shall be performed in accordance to the state’s Standard Specifications, using the materials specified and the season in which the seeding operations are to occur.

C. Seeded areas shall be maintained until the project is accepted by the Owner. Maintenance shall include but not be limited to watering, fertilizing, reseeding, mowing and erosion repair as may be required. Grass shall be cut when the average height of the grass reaches 6 inches. Clippings may be mulched back into the seeded areas.

3.3 TEMPORARY AND PERMANENT SWALES

A. Description:

1. Temporary and permanent drainage swales shall be provided as required to carry drainage away from the work area to an approved outfall point.

2. Unless otherwise shown on the drawings, swales shall be earthen "V" shaped channels graded to a sufficient depth and slope to carry the anticipated runoff, but at least 2 feet deep with a slope of 0.1 percent.
3. Swales not designated to remain in place at the completion of the contract shall be cleaned of any muck, debris and other unsuitable material and filled with approved fill before final grading operations begin.
4. Swales shall have erosion control barriers as required.
5. All permanent swales shall be sodded to a minimum width of 10 feet on either side of the centerline of the swale.

B. Maintenance:

1. During the course of construction all temporary swales constructed for this contract shall be maintained so as to allow proper drainage from the construction area. Before Contractor leaves the site at the end of construction, all temporary swales to remain shall be placed in good working condition.
2. Contractor shall work with other contractors at the site in maintaining existing swales and ditches.
3. Where necessary for access to the work areas, adequately sized culverts shall be installed and maintained to provide the access without disturbing the site drainage.
4. Care shall be taken not to rut and damage sodded swales. Damaged swales shall be repaired immediately.
5. Keep sodded swales mowed.

3.4 DRAINAGE DITCHES

A. Drainage ditches shall be hydromulched immediately upon final grading.

B. Erosion of the banks of the drainage ditches shall be repaired immediately and re-stabilized.

C. Sediment barriers shall be placed at intervals along the ditch as shown on the plans and as necessary to help trap sediment on the site. Sediment and other debris trapped by the barriers shall be removed on a daily basis as needed.

D. Ditch side slopes shall not be steeper than 3 feet horizontal to 1 foot vertical.

E. Maintenance of the ditches during construction shall include but not be limited to mowing, re-grading, sediment removal, re-hydromulching, bank repair and debris removal.

F. Sediment removed from the ditches may be respread on the site as directed by the Owner.

3.5 FILL AND CUT SLOPES

A. Fill slopes in all cases shall be no steeper than 3:1 unless specifically stated on the plans or approved by the Owner's soils engineer.

B. When cut slopes exceed 2:1 for depths over 3 feet, proper bracing and shoring per OSHA requirements shall be used and maintained.

C. For permanent slopes, cut or fill, between 2:1 and 10:1, erosion protection shall be provided with hydromulching, sodding, seeding, or other method as approved.

3.6 SEDIMENTATION BASINS

A. Description:

1. Sedimentation ponds shall be provided where designated on the plans.
2. All drainage from cleared areas shall be routed through the sedimentation basin.
3. Contractor will be responsible for the operation and maintenance of the pond during construction.

B. Maintenance:

1. Contractor shall be responsible for maintaining the pond and the outfall and sediment retarding structure in good working condition throughout the time the pond is to be in operation.
2. When sediment and debris fill the pond to over 1/3 its designed capacity, the pond shall be cleaned out.

3.7 EROSION CONTROL BARRIERS

A. Erosion control barriers shall be provided at intervals along swales and ditches as shown on the drawings and as necessary to meet the requirements of the Storm Water Pollution Prevention Plan.

B. The barriers shall be silt fence or hay bales placed as shown on the drawings and details.

C. Barriers shall be maintained in good working condition and replaced when damaged.

END OF SECTION

SECTION 01 5800

PROJECT IDENTIFICATION

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Sign: Construct and install to withstand 60-mph wind velocity.

B. Graphics Painter: Professional sign painter, minimum 2 years' experience.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

D. Permit: Obtain and pay for permit that may be required to display sign on Project site. Coordinate requirements with local jurisdiction.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

A. Support Structure and Framing: Mount 4- by 4-inch posts, set 3 feet into ground, with 4-foot clearance from ground to bottom of sign. Brace each post back to ground with 2- by 4-inch brace and brace both sides of "V" to each other.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 23/32-inch thick, sized to minimize joints.

C. Nails, Bolts, and Fasteners: Types and sizes as required, galvanized or corrosion resistant.

D. Primers and Paints: Exterior type, colors as selected by Owner's Representative, 2 coats consisting of an appropriate primer followed by 1 coat of paint for support structure, framing and sign surfaces.

E. Graphics: Design, sizes, colors, and styles of lettering as selected by Owner's Representative

2.2 FABRICATION

A. Sign: One painted surface.

B. Sign Size: 4 x 8 feet.

1. Refer to Drawings for further information.

C. Required Information:

1. Title of Project and Name of Owner.
2. Names and titles of Owner's Representative and Contractor, painted in black letters on white background.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install project identification sign within 10 days after commencement of construction.

B. Install assembly plumb and level, rigidly braced, framed, and anchored to resist wind load.

C. Maintain signs; repair deterioration and damage.

D. Remove signs, framing, supports, and foundations at completion of Project and restore area.

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.5 SUBSTITUTIONS

A. Limitations:

1. During Bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this Section.
2. Requests for substitutions of products will be considered only within 30 days after date established in Notice to Proceed. Subsequent requests will be considered only in case of product unavailability or other conditions beyond control of Contractor.
3. Substitutions will not be considered:

    a. When indicated on shop drawings or product data submittal without separate formal request.
    b. When requested directly by subcontractor or supplier.
    c. When acceptance will require substantial revision of Contract Documents.

4. Do not order or install proposed substitute products without written acceptance.
5. Only one request for substitution for each product will be considered. When substitution is not accepted, provide specified product.
6. Owner’s Representative will determine acceptability of substitutions.

B. Requests for Substitutions:

1. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents. Utilize substitution request form attached.
2. Identify product by Specifications section and Article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
3. Attach product data as specified in Section 01 3300.

4. List similar projects using product, dates of installation, and names of Owner's Representative and Owner.
5. Give itemized comparison of proposed substitution with specified product, listing variations, and reference to Specifications section and Article numbers.
6. Give quality and performance comparison between proposed substitution and the specified product.
7. Give cost data comparing proposed substitution with specified product, and amount of net change to Contract Sum.
8. List availability of maintenance services and replacement materials.
9. State effect of substitution on construction schedule, and changes required in other work or products.

C. Contractor Representation:

1. Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product or that the cost reduction offered, if any, is ample justification for accepting the offered substitution.
2. Provide same warranty for substitution as for specified product.
3. Coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.
4. Certifies that cost data presented is complete and includes related costs under this Contract.
5. Waives claims for additional costs related to substitution which may later become apparent.

D. Submittal Procedures:

1. Submit 3 copies of request for substitution.
2. Owner's Representative will review Contractor's requests for substitutions with reasonable promptness.
3. During the bidding period, Owner's Representative will record acceptable substitutions in Addenda.
4. After award of Contract, Owner's Representative will notify Contractor, in writing, of decision to accept or reject requested substitution, generally within 14 days.
5. For accepted products, submit shop drawings, product data, and samples under provisions of Section 01 3300.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 7700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SUBSTITUTION REQUEST FORM

DATE: _____

Owner's Representative's Project No: _____

Project: _____

To: _____ From: _____

_____

_____

==========

Contractor (Bidder) hereby request acceptance of the following product or system as substitution in accordance with provisions of Section 01600 of the Specifications:

1. SPECIFIED PRODUCT OR SYSTEM:

   Substitution request for : _____

   Specification Section No : _____ Article: _____

2. SUPPORTING DATA:

   _____ Product data adequate for evaluation of the request for proposed substitution is attached (description of product, reference standard, performance and test data, specifications, drawings, photographs).

   _____ Sample is attached.

   _____ Sample will be sent if requested.

3. QUALITY COMPARISON

	SPECIFIED PRODUCT	SUBSTITUTION
Name, Brand:	_____	_____
Catalog No.:	_____	_____
Manufacturer:	_____	_____
Vendor:	_____	_____
Significant Variations:	_____	_____

(Add Additional Sheets If Necessary)

Maintenance Service Available: Yes _____ No _____

Spare Parts Source: _____

Warranty Provided: Yes _____ No _____ Years _____

By Whom: _____

4. PREVIOUS INSTALLATIONS:
Identification of similar projects on which proposed substitution was used:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:

_____

_____

_____

6. EFFECT OF SUBSTITUTION:
Does the proposed substitution affect other work (adverse or otherwise):
No _____ Yes _____ (if yes, explain)

_____

_____

_____

_____

Substitution Changes Contract Time: No _____ Yes _____
Add/Deduct _____Days

Substitution requires dimensional revisions or redesign of the work: No _____ Yes _____ (if yes, attach explanation data)

Saving of credit to Owner: $ _____

Extra Cost to Owner: $ _____

7. CONTRACTOR'S (BIDDER'S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT DOCUMENTS:

I/we have investigated the proposed substitution. I/we:

- believe that it is equal or superior in all respects including function, appearance and quality to specified product, except as stated above;
- will provide same warranty and servicing requirements as specified for specified product;
- have included complete cost data and implications of the substitution;
- will pay for changes to the building design and special inspection costs caused by the use of this product;
- will coordinate the incorporation of the proposed substitution in the work;
- waive future claims for added cost to Contract caused by the substitution.

Contractor (Bidder): _____

Date: _____ By: _____

Answer all questions and complete all blanks - use "NA" if not applicable. Unresponsive or incomplete request will be rejected.

==========

OWNER'S REPRESENTATIVE'S REVIEW AND ACTION

_____ Resubmit substitution request

_____ Provide more information in the following areas:

_____

_____

_____ Sign Contractor's (Bidder's) Statement of Conformance

_____ Substitution is accepted.

_____ Substitution is accepted, with the following comments:

_____

_____

_____ Substitution rejected.

_____ Substitution Request received too late.

_____ Date: _____

Owner's Representative

SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 SUBMITTALS

A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 3100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.

6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Temporary Support: Provide temporary support of work to be cut.

C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

E. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

F. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than 7 days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

1.2 SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

D. Certificates of Release: From authorities having jurisdiction.

E. Certificate of Insurance: For continuing coverage.

F. Field Report: For pest control inspection.

G. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with construction tools and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 2900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
2. Include the following information at the top of each page:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

3. Submit list of incomplete items in one of the following formats:

a. MS Excel electronic file. Architect will return annotated file.
b. PDF electronic file. Architect will return annotated file.
c. Three paper copies. Architect will return two copies.

1.6 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2- by 11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean transparent materials, including mirrors and glass in doors and windows. Polish mirrors and glass, taking care not to scratch surfaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
l. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
m. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
o. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 5000 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 01 7823

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

1.2 SUBMITTALS

A. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in one of the following formats:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.

C. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

D. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

E. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

F. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

G. Manuals, Electronic Files: If submitting electronic files, submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

H. Manuals, Paper Copy: If submitting paper copies, submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2- by 11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2- by 11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

G. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01 7900

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.2 SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Demonstration and Training Video Recordings: Submit 2 copies within 7 days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals.

1.3 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 4000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.

g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:

   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

   a. Diagnostic instructions.
   b. Test and inspection procedures.

7. Maintenance: Include the following:

   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.

8. Repairs: Include the following:

   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.

d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 7823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.

1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.

2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION

SECTION 03 1000

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements, so that resultant concrete conforms to required shapes, lines, and dimensions.

1.2 QUALITY ASSURANCE

A. Construct and erect concrete formwork in accordance with ACI 301 and 347.

PART 2 - PRODUCTS

2.1 WOOD FORM MATERIALS

A. Plywood: Solid one side grade; sound, undamaged sheets with clean, true edges.

B. Lumber: No. 2 or better grade; with grade stamp clearly visible.

2.2 FORMWORK ACCESSORIES

A. Form Ties: Snap-off metal of adjustable length; cone type; 1-inch break-back dimension; free of defects that will leave holes no larger than 1-1/4-inch diameter in concrete surface.

B. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or affect bond of subsequent surface finish, or impair natural bonding or color characteristics of coating intended for use on concrete;

C. Fillets for Chamfered Corners and other justifications: Wood strips, sizes and configurations as detailed.

D. Formed Construction Joints: Galvanized steel, tongue and groove type, knock-out holes spaced at 6 inches on center, with anchors.

PART 3 - EXECUTION

3.1 EARTH FORMS

A. Earth forms not permitted, except for footings where soil is conducive and approval is received from authorities having jurisdiction and structural engineer.

3.2 ERECTION

A. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

B. Arrange and assemble formwork to permit stripping, so that concrete is not damaged during its removal.

C. Arrange forms to allow stripping without removal of principal shores, where required to remain in place.

D. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.

E. Provide chamfer strips on external corners of beams, and columns where they will be exposed to view after completion of construction.

F. Do not displace or damage vapor barrier placed by Section 03300.

G. Construct formwork to maintain tolerances in accordance with ACI 301.

H. Construct form full depth of concrete to be placed.

3.3 APPLICATION OF FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for work embedded in or passing through concrete.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

D. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

E. Install construction joint device in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

3.5 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

B. Camber slabs and beams as indicated in Drawings and in accordance with ACI 301.

3.6 FORM REMOVAL

A. Do not remove forms, shoring and bracing until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed upon it.

B. Do not damage concrete surfaces during form removal.

C. Do not place wood forms which cannot be retrieved after concrete placement. Use steel forms.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, Documents 63 and 65.

B. Conform to ACI 301 and 318.

PART 2 PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: ASTM A 615, grade billet-steel deformed bars, uncoated, 60-KSI yield grade; ASTM A 706, grade 40 weldable for bars welded to steel members.

B. Welded Steel Wire Fabric: ANSI/ASTM A 185 plain type; in flat sheets; uncoated finish.

C. Contractor's Option: Glass fiber reinforcement, ASTM C 948 collated, fibrillated, polypropylene fibers.

1. Acceptable Products:

a. Forta CR by Forta Corporation.
b. "Fibermesh" by Fibermesh, Inc.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16-gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete including load-bearing pad on bottom to prevent vapor barrier puncture.

2.3 FABRICATION

A. Fabricate in accordance with ACI SP-66, providing concrete cover specified in Section 03 3000.

B. Locate reinforcing splices not indicated on Drawings at points of minimum stress. Indicate location of splices on shop drawings.

C. Weld reinforcing bars in accordance with ANSI/AWS D1.4.

D. Provide sufficient lap of splicing of reinforcement, where required, to permit transfer of stress in accordance with requirements of this specification. Splice wall vertical reinforcement at location of horizontal construction joints.

E. Unless otherwise noted on the drawings to be more, lap reinforcement 36 bar diameters (Class "A" lap) at splices or have dowels of same bar section and spacing as the bars to be

spliced. Lap bars at least 36 diameters (Class “A” lap) at corners and at abrupt changes in direction of walls. Stagger splices in adjacent bars.

PART 3 EXECUTION

3.1 PREPARATION

A. Before placing concrete, clean reinforcement of foreign particles or coatings.

3.2 PLACING

A. Place reinforcement in accordance with CRSI "Placing Reinforcing Bars" and ACI 318, with provisions of ACI 318 governing.

B. Move bars as necessary to avoid interference with other reinforcing steel, conduits, or embedded items.

C. If bars are moved more than 1 bar diameter or enough to exceed tolerances, submit resulting arrangement of bars to Owner’s Representative for review.

D. Place, support, and secure reinforcement against displacement. Do not deviate from alignment or measurement. Place in accordance with approved shop drawings and CRSI recommendations. Do not heat, cut or bend bars without Owner’s Representative's approval.

E. Do not displace or damage vapor barrier required by Section 03 3000.

F. Refer to Section 03 3000 for minimum coverage of concrete unless noted otherwise on the Drawings.

G. Place reinforcement, at time of concrete placing, free of mud, oil, or other materials that adversely affect or reduce bond.

H. Reinforcement with Rust, Mill Scale, or Both: Considered satisfactory, provided minimum dimensions, including height of deformation, and weight of hand-wire-brushed test specimen are not less than ASTM A 615 requirements.

I. Support reinforcement and fasten together to prevent displacement by construction loads of placing concrete. Use No. 16 gage black annealed wire at joints and crosses to accurately position reinforcing in place.

J. Over formwork, use metal or plastic bar chairs and spacers to support reinforcement.

K. Where concrete surface will be exposed to weather in finished structure, use non-corrosive or corrosion protected accessories within ½-inch of concrete surface.

L. Bars having splices not shown on shop drawings will be subject to rejection.

M. Do not bend reinforcement after being embedded in hardened concrete.

N. Do not allow bars to be in contact with dissimilar materials.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301, 304, 305, 306, 309, and 318.

B. Obtain materials from same source throughout the Work.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable building code.

1.3 COORDINATION

A. Notify responsible trades of schedules of concrete pours so as to allow adequate time for installation of their work.

B. Obtain anchor bolts and other miscellaneous steel items to be cast into concrete from material supplier.

C. Coordinate size and location of mechanical equipment concrete pads with applicable trades.

1.4 DELIVERY, STORAGE AND HANDLING

A. Mix and deliver concrete to project ready-mixed in accordance with ASTM C 94.

B. Schedule delivery so that continuity of any pour will not be interrupted for over 15 minutes.

C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C 150, Normal - Type II; air entrained where exposed to the freeze-thaw cycle; gray color.

B. Fine Aggregate: ASTM C 33 clean, hard, durable, natural sand free from silt, loam or clay.

C. Coarse Aggregate: ASTM C 33, hard, durable, uncoated, crushed limestone or other approved aggregate.

D. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C 260

1. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following:

a. W.R. Grace.
b. Master Builders.
c. Sika.

B. Chemical Admixtures: ASTM C 494. Depending upon weather conditions at time of placing, cement-dispersing agent may be supplemented by a set- retarding or set-accelerating agent to improve control of setting and, in the case of hot weather, to minimize surface checking. Introduce admixtures in quantities and according to methods recommended by manufacturers of materials approved for use. Introduce admixtures only after receiving written approval from testing laboratory and Structural Engineer.

2.3 ACCESSORIES

A. Sheet Vapor Barrier:

1. Type: 15 mil film meeting requirements of ASTM E 1745, Class A and B.
2. Water Vapor Transmittance: Maximum 0.006-gram per square foot per hour.
3. Tensile Strength: Minimum 54.2 pounds at 1139 percent strain/MD per ASTM D 638.
4. Tear Resistance: 7.40 pounds per foot MD per ASTM D 1004.
5. Acceptable Products:

a. Stego Wrap Vapor Barrier by Stego Industries, llc, San Juan Capistrano, CA.
b. Comparable products by Reef Industries, Raven Industries, and WR Meadows.

6. Accessories: Rubber based pressure sensitive adhesive polyethylene tape.

a. Acceptable Product: Stego Wrap Red Polyethylene Tape.

2.4 CONCRETE MIX

A. Mix concrete in accordance with ASTM C 94, Alternative No. 2, or ACI 304.

B. Deliver concrete in accordance with ASTM C 94.

C. Select proportions for normal weight concrete in accordance with ACI 301 Method 1. Mix not less than 1 minute after materials are in mixer.

D. Do not transport or use concrete after the following time has expired from time of initial mixing:

1. 90 minutes when ambient temperatures are below 80 degrees F.
2. 75 minutes when ambient temperatures are between 80 and 90 degrees F.
3. 60 minutes when ambient temperatures are over 90 degrees F. Verify supplier of transit-mixed concrete has a plant of sufficient capacity, and adequate transportation facilities to assure continuous delivery at required rate. Frequency of deliveries to project site shall be such as to provide for continuous concrete placement throughout any one pour.

E. Use of calcium chloride is strictly prohibited.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.

B. Correct unsatisfactory work prior to placing concrete.

C. Remove rubbish from formwork immediately prior to placing concrete.

D. Remove ice and excess water from excavations and formwork.

3.2 PREPARATION

A. Install vapor barrier under interior slabs-on-fill and over sand leveling bed, if present. Lap joints minimum 12 inches and seal with special tape of same permeance as vapor barrier. Do not disturb or damage vapor barrier while placing concrete. Repair damaged vapor barrier.

3.3 PLACING CONCRETE

A. Notify testing laboratory a minimum of 24 hours prior to commencement of concrete operations.

B. Place concrete in accordance with ACI 301 and as specified below.

1. Unless protection is provided, do not place concrete in rain, sleet, or snow.
2. Regulate rate of placement so concrete remains plastic and flows into position.
3. Deposit concrete continuously until panel or section is completed. Place as near as possible to its final location; do not rehandle.
4. Consolidation

    a. Comply with requirements of ACI 309.
    b. Use mechanical vibrating equipment for consolidation.
    c. Do not use vibrators to transport concrete in forms.
    d. Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.
5. Cold Weather Placement: Do not place concrete when temperature is below 40 degrees F unless cold weather concrete procedures are followed as specified in ACI 306. Calcium chloride shall not be used.
6. Hot Weather Placement: Exercise special care to prevent high temperature in fresh concrete during hot weather in accordance with ACI 305. Use water reducing set-retarding admixtures in such quantities as especially recommended by manufacturer to assure that concrete remains workable and lift lines will not be visible.

C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

D. Unless noted otherwise on the Drawings, maintain concrete cover around reinforcing in accordance with ACI 318.

E. Place concrete continuously between predetermined construction and control joints.

F. Place floor slabs on fill in pattern indicated on Drawings.

G. Separate exterior slabs on fill from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface.

H. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Owner's Representative upon discovery.

I. Maintain record of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.4 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed formed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

B. Curing Methods: Perform curing of formed concrete by moist curing, or by moisture-retaining cover curing, as herein specified.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by moisture cover curing method.

D. Curing Unformed Surfaces: Cure unformed surfaces, including slabs and other flat surfaces, in accordance with Section 03 3500.

3.5 PATCHING CONCRETE SURFACES

A. It is the intent of these Specifications to provide for grade beams of such quality as to require a minimum of pointing.

B. Exercise care in forming, mixing and placing of concrete to ensure reasonably uniform dense surfaces, free from blemishes, voids, or honeycombs.

C. Repair and patch defective areas with cement mortar and bonding agent mixture immediately after removal of forms, when acceptable to Owner's Representative.

1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.

3.6 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 4000.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

C. Cast-in-Place Concrete:

1. Test Cylinders: Make at least 1 test of each day's pouring or each 50 cubic yards, whichever comes first, on each different portion or section of the Work. Mold and cure specimens in accordance with ASTM C 31, and test in accordance with ASTM C 39. Test cylinders shall be made and tested by the laboratory in accordance with ASTM C 172. Footings, walls, and floor systems constitute different sections. Each test shall consist of 5 specimens, 2 of which shall be broken at 7 days, 2 at 28 days and 1 held in reserve. Determine temperature and air content for each set of test cylinders in accordance with ASTM C 231.
2. Field Quality Control:

a. Determine slump for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C 143.
b. Monitor addition of water to concrete and length of time concrete is allowed to remain in truck.
c. Certify delivery tickets indicating class of concrete, amount of water added during initial batching, and time initial batching occurred.
d. Monitor work being performed in accordance with ACI recommendations as a standard of quality.

3.7 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, rain or running water and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.8 SCHEDULE OF MIXES

A. Refer to Drawings.

END OF SECTION

SECTION 03 3500

CONCRETE FLOOR FINISHING AND CURING

PART 1- GENERAL

1.1 QUALITY ASSURANCE

A. Conform to ACI 301.

1.2 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperature during curing period above 70 degrees F for 3 days or above 50 degrees F for 5 days.

B. Protect from rain or running water.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:

1. Sonneborn Building Products
2. L & M Construction Chemicals
3. Secure, Inc.
4. Dayton Superior
5. Burke

2.2 MATERIALS

A. Sodium Silicate Compounds: Zero-VOC water-based sodium silicate compound in solution. Clear. Non-membrane forming. Compounds in suspension not permitted.

1. Compatible with subsequent coatings and toppings without stripping.
2. Acceptable Products:

a. Sinak S-102, Sinak Corp., San Diego, CA
b. L&M Cure, L&M Construction Chemicals, Omaha, NE.
c. Eucosil, Euclid Chemical Company, Cleveland, OH.
d. Ashford Formula, Crecrete Distribution Inc.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify floor surfaces are acceptable for application of this work.

B. Ensure floor surfaces are depressed to accommodate finish materials.

C. Beginning of installation means acceptance of surfaces.

3.2 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301.

B. Uniformly spread, screed, and float concrete. Do not use grate tampers or mesh rollers. Do not spread concrete by vibration.

C. Manually float surfaces which will receive ceramic tile with full bed setting system.

D. Steel trowel surfaces to receive carpeting, resilient flooring, seamless flooring, thin set ceramic tile, and surfaces to be left exposed.

E. Apply hardener/sealer in accordance with manufacturers instructions on scheduled floor surfaces.

3.3 TOLERANCES.

A. Maintain surface flatness to ACI 302 of Ff30 and levelness of Fl25 for floors to receive carpet, resilient surfaces, thin set tile, and surfaces to be left exposed; maintain flatness to Ff15 and levelness to Fl13 for recessed sub-slabs. Test flatness and levelness in accordance with ASTM E 1155.

B. In areas of floor drains, maintain floor level at walls and slope surface uniformly to drains at 1/8 to 1/4 inch per foot.

3.4 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Perform curing of concrete by curing and sealing compound, or by moisture-retaining cover curing, and by combinations thereof, as herein specified.

1. Provide moisture curing by the following Method 1:

a. Keep concrete surface continuously wet by covering with water.
b. Use continuous water-fog spray.

2. Provide moisture-cover curing by the following Method 2:

a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing compound to exposed interior slabs and to exterior slabs, walks, and curbs as follows:

a. Apply specified curing compound to concrete slabs as soon as final finishing operations are complete, within 2 hours and after surface water sheen has disappeared. Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
c. Apply in accordance with manufacturer’s instructions and ACI 301.
d. Do not apply curing compound on surfaces to receive applied coatings and finishes. Use other methods specified herein.

END OF SECTION

SECTION 04 2100

BRICK MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Exterior, non-load bearing, face brick masonry veneer and supplementary items necessary for installation.

1.2 SUBMITTALS

A. Product Data: Manufacturers technical literature for each type of product indicated, specified or required, including, but not limited to, following:

1. Kind, size, and color of masonry unit.
2. Manufactured accessory product.
3. Cleaning products, including application procedures.

B. Samples for Initial Selection: Mortar samples showing full range of colors expected; make samples using same materials to be used on Project; label samples to indicate type and amount of colorant used.

C. Samples for Verification:

1. Face Brick: Full-size samples for each different unit indicated showing full range of exposed color, texture, and dimensions to be expected.
2. Mortar: Make samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

1.3 QUALITY ASSURANCE

A. Masonry Installer Qualifications:

1. Experience: Company with not less than 10 years' experience in performing specified Work similar to scope of this Project, and with a record of successful in-service performance, and sufficient production capability, facilities and personnel, to produce required Work.
2. Supervision: Installer shall maintain a full time supervisor on job site during times specified Work is in progress and who has minimum 10 years' experience in installing systems similar to type and scope required for this project.

B. Quality Standards: In addition to specified requirements, comply with TMS 402/ACI 530/ASCE 5 for veneered masonry classification and prescriptive requirements, unless local building code has jurisdiction, whichever is more stringent.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Label pallets of masonry units with manufacturers name, product name, and information required to identify products.

B. Storage:

1. Masonry Units: Store on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
2. Cementitious Materials: Store on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
3. Accessories: Store to prevent corrosion and accumulation of dirt and oil.

1.5 PROJECT CONDITIONS

A. Protection During Work: Prevent excess moisture from entering Work in progress.

1. Cover tops of walls, projections, and sills with water-repellent tarps or heavy plastic sheets at end of each day's Work.
2. Cover partially completed masonry when construction is not in progress.
3. Extend cover minimum of 24 inches down both sides and hold cover securely in place.
4. Protect door frames from damage.

B. Stain Prevention: Prevent mortar and soil from staining exposed masonry. Immediately remove mortar and soil from exposed masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, and other adjacent with painted and integral finishes from mortar droppings.
4. Turn scaffolding planks near Work on edge at end of each day to prevent rain from splashing mortar droppings or dirt onto face of exposed masonry.

C. Hot and Cold Weather Requirements: Comply with building code or TMS 602/ACI 530.1/ASCE 6 whichever is more stringent, and following:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen substrates.
3. Remove and replace masonry damaged by frost or freezing conditions.
4. Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Specification Sections.

B. Available Manufacturers and Products: Subject to compliance with requirements of Contract Documents, manufacturers offering products that may be incorporated into Work include, but are not limited to, those listed alphabetically below.

C. Basis of Design: Contract Documents are based on products specified to establish a standard of quality. Other acceptable or available manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and do not change intended aesthetic, functional

and performance requirements as judged by Architect.

2.2 MASONRY UNITS, GENERAL

A. Defective Units: Referenced standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in standard. Do not install units where defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in completed Work or will impair quality of completed masonry.

B. Special Shapes: Provide shapes indicated and as follows for each form of unit required:

1. For applications requiring units of form, color, texture, and size on exposed surfaces that cannot be produced by sawing standard unit sizes.
2. For applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
3. For applications where stretcher units cannot accommodate special conditions including those at corners, movement joints, bond beams, sashes, and lintels.
4. For units without cores or frogs and with exposed surfaces finished for ends of sills, caps, and similar applications that would otherwise expose unfinished unit surfaces.

2.3 FACE BRICK MASONRY UNITS

A. Product Quality Standard: ASTM C 216 or ASTM C 652, Grade SW, Type FBS.

B. Size:

1. Unit Designation: Standard.
2. Brick Size:

a. Width: 3-1/2 to 3-5/8 inches.
b. Height: 2-1/4 inches.
c. Length: 8 inches.

3. Vertical Coursing: Three in 8 inches.

C. Basis of Design:

2.4 LINTELS

A. Steel Loose Lintels: Steel angles and shapes as specified in Division 05 Section “Metal Fabrications.”

2.5 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I; except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C 207, Type S.

C. Masonry Cement and Mortar Cement: Not permitted.

D. Water: Potable.

2.6 REINFORCEMENT, VENEER ANCHORS AND TIES

A. General Type: For attaching masonry veneer to a back-up structure, use two-piece assemblies that

allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall; suitable for attachment conditions indicated. Corrugated ties are not permitted nor will be allowed.

B. Structural Performance Characteristics: Capable of withstanding a 100-pound load in both tension or compression without deforming, or developing play in excess of, 0.05-inch.

C. Materials for Veneer Wall Ties:

1. Hot-Dip Galvanized Carbon-Steel Wire: ASTM A 82 with ASTM A 153, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008 commercial sheet, hot-dip galvanized after fabrication to comply with ASTM A 153, Class B coating.

D. Individual Veneer Wall Ties for Sheathed Steel Studs Walls:

1. Anchor Plate: Minimum 0.0713-inch (14 gauge) uncoated base metal thickness, with raised strap stamped vertically into center to provide a slot between strap and plate for interlocking wire tie, with one screw hole at top and one at bottom; with rubberized asphalt flexible flashing material either adhered to back of plate, or loose for separate mounting.
2. Wire Tie: Minimum 3/16-inch diameter, bent into triangle shaped tie; length as required to extend at least halfway through masonry veneer but with minimum 5/8-inch cover on outside face of masonry.
3. Acceptable Manufacturers and Products:

a. Dur-O-Wal, Inc. - “D/A 210” anchor plate with “Tri-Tie.”
b. Heckman Building Products, Inc. – “315D” anchor plate with “316” wire tie.
c. Hohmann & Barnard, Inc. - “DW-10HS” anchor plate with “Vee Tie.”
d. Wire-Bond – “Type III Anchor” with triangular wire tie.

2.7 EMBEDDED FLASHING MATERIALS

A. Rubberized Asphalt Flashing:

1. Description: Minimum 40 mils thick, cold-applied, self-adhering sheet consisting of cross-laminated polyethylene film laminated to rubberized asphalt adhesive, with release-paper backing.
2. Surface Primer/Conditioner: Products provided by flashing manufacturer.
3. Available Manufacturers and Products:

a. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
b. Grace Construction Products; Perm-A-Barrier Wall Flashing.
c. Henry Co., Bakor, Inc.; Blueskin TWF.
d. Polyguard Products, Inc.; 401 Membrane.
e. Tamko Building Products; TW-Thru Wall Flashing.
f. Williams Products, Inc.; Everlastic MF-40.

B. Sealant for Sheet Metal Flashing: Exterior non-sag silicone sealant – Class 150/50 as specified in Division 07 Section “Joint Sealants.”

2.8 ACCESSORIES

A. Weeps and Vents:

1. Plastic Weep and Vent:

a. Description: One-piece, flexible extrusion made from ultraviolet light resistant

polypropylene copolymer, consisting of honeycomb matrix of multiple cells, designed to fill head joint with outside face held back 1/8-inch from exterior face of masonry.

b. Color: As selected from manufacturer's standard colors available.

c. Acceptable Manufacturers and Products:

1) Advanced Building Products, Inc.; Mortar Maze Weep Vents.
2) Dur-O-Wal, Inc.; Cell Vent, D/A 1006.
3) Heckman Building Products, Inc.; Cell Vent, 85.
4) Hohmann & Barnard, Inc.; QV – Quadro-Vent.

2. Mesh Weep and Vent:

a. Description: Compressed, 200 denier polyester with 90 percent open mesh and bonded with flame retardant adhesive.

b. Color: As selected from manufacturer's standard colors available.

c. Acceptable Manufacturer and Product:

1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

B. Cavity Drainage Material:

1. Description: Composed of either reticulated, nonabsorbent mesh made from polyethylene strands, or, polymer core geomatrix composed of woven nylon strands, molded and shaped in open weave configuration to maintain drainage at weeps without being clogged by mortar droppings, size as required to extend across entire width of cavity.

2. Acceptable Manufacturers and Products:

a. Advanced Building Products, Inc.; Mortar Break II.
b. Mortar Net USA, Ltd.; Mortar Net.
c. Polyguard Products, Inc.; Termi-Net.

C. Bond Breaker Strips:

1. Product Quality Standard: ASTM D 226, Type I.
2. Description: Asphalt-saturated organic roofing felt (No. 15 asphalt felt).

D. Termination Bars:

1. Product Quality Standard: ASTM A 666, Type 304.
2. Description: 1/8-inch-thick by 1-inch-wide continuous stainless steel bar with ¼-inch diameter holes spaced at 16 inches on centers.
3. Available Manufacturers and Products:

a. Advanced Building Products, Inc.; Termination Bar.
b. Hohmann & Barnard, Inc.; T1.
c. Tru-Fast Corp.; TB-75.

2.9 MASONRY CLEANERS

A. Commercial Cleaning Compounds:

1. Description: Manufacturer formulated, general purpose cleaner for removing mortar stains, efflorescence, and other construction related stains from new masonry surfaces, with following suitability requirements:

a. Suitable for masonry units and mortar installed, without discoloring or damaging masonry materials.
b. Suitable for conditions at project site, including, but not limited to, windows, doors, other exterior wall elements, and adjacent walks or landscaping.

2. Available Manufacturers:

a. Diedrich Technologies, Inc.
b. EaCoChem.
c. Prosoco, Inc.

B. Cleaning Restrictions: Following methods are not permitted, nor will they be allowed:

1. Hydrochloric acid.
2. Muratic acid.
3. Pressurized water blasting.
4. Abrasive blasting.

2.10 MORTAR MIXES

A. General: Mix cementitious materials in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency for minimum 3 minutes to 5 minutes; do not hand mix.

1. Admixture Limitation: Do not use admixtures including air-entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, calcium chloride or other admixtures.
2. Cementitious Limitation: Limit cementitious materials in mortar to portland cement and lime.
3. Ingredient Measurement: Measure in a one cubic foot batching box before mixing for component materials not preblended, prepackaged or containerized.
4. Aggregate Moisture Content: Monitor moisture content of aggregates and exercise caution when mixing to avoid over or understanding of mortar.

B. Mortar Mix:

1. Mix Quality Standard: ASTM C 270, Proportion Specification for portland cement-lime mortars, Type N.
2. Mortar Color: Standard gray.
3. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required; limit mineral oxide pigments to maximum 10 percent of cement content by weight, and maximum 2 percent for carbon black pigment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine substrates to which masonry will be placed for compliance with requirements, installation tolerances and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance.

3.2 PREPARATION

A. Substrate Cleaning: Remove construction debris, dust, dirt, mud, oil, and other materials on surfaces that would adversely affect or reduce bond of masonry and mortar.

3.3 INSTALLATION, GENERAL

A. Installation Performance Requirements: Ensure masonry cavity is properly isolated from building interior to prevent water infiltration from infiltrating out of masonry cavity into other components of building such as window and door jambs and building interiors.

B. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. TMS 602/ACI 530.1/ASCE 6, unless local building code has jurisdiction.
2. Applicable portions of BIA “Technical Notes on Brick Construction.”
3. Respective manufacturer’s written installation instructions.
4. Approved submittals.
5. Contract Documents.
6. BIA Technical Notes if no other installation quality standard applies to condition.

C. Openings: Leave for equipment to be installed before completion of masonry; after installation of equipment, complete masonry to match construction immediately adjacent to opening.

D. Masonry Units: Use full-size units without cutting where possible. Cut with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Install cut units with cut surfaces concealed.

E. Blending of Masonry Units: Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures. [If color blending is a critical aspect of Work, manufacturer shall provide instructions for blending.]

F. Mortar Workability: Maintain by remixing or retempering. Discard mortar that has begun to stiffen or is not used within 2.5 hours after initial mixing.

G. Face Brick with High Initial Rate of Absorption (IRA): If initial rate of absorption exceeds 30 grams per minute per 30 square inches according to ASTM C 67, wet face brick and allow to surface dry before laying. Avoid laying face brick with surface film of water that would inhibit mortar bond.

3.4 LINTELS

A. Steel Loose Lintels: Set where indicated or required and where openings are more than 12 inches wide, with not less than 8 inches of bearing at each jamb, unless otherwise indicated.

3.5 LAYING MASONRY WALLS

A. General: Lay out walls in advance for accurate spacing of surface bond patterns, uniform joint thicknesses, accurate location of openings, movement-type joints, returns, and offsets. Avoid using of less than half-size units at corners, jambs, and where possible at other locations.

B. Bond Patterns:

1. Exposed Masonry: One-half running bond.
2. Corners: Bond and interlock each course of each wythe. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: In each course, rack back one-half unit length for one-half running bond; do not tooth. When resuming Work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar.

D. Built-In Work:

1. As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
2. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

3.6 MORTAR BEDDING AND JOINTING

A. General Procedures:

1. Do not disturb previously laid units.
2. Spread mortar for bed joint only so far ahead of laying units that mortar will be plastic when units are laid.
3. Butter end of unit with ample mortar so that head joint is completely filled with mortar when shoved into place.
4. Do not deeply furrow bed joints or slush head joints.
5. Avoid over-plumbing and pounding of corners and jambs to fit stretcher unit after setting in place. Where adjustments must be made after initial setting, remove mortar and replace with fresh mortar.
6. Rock closures into place with both head joints and closure space spread with ample mortar. Shove against adjacent units so that both horizontal and vertical joints are completely filled.

B. Mortar Joint Thickness: Minimum 3/8-inch wide for head and bed joints.

C. Hollow Masonry Units: Lay with face shells fully bedded in mortar and with head joints of depth equal to bed joints; with entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

D. Joint Tooling: Finish joints that will remain exposed with a tool slightly larger than joint width to form a concave profile. Tool joints after mortar has taken its initial set and in such a manner as to squeeze mortar back into joint. Tool vertical joint first.

3.7 MASONRY CAVITIES, WEEPS AND VENTS

A. Clean Cavity: Keep cavities clean of mortar droppings and other materials. Strike joints facing cavities flush.

B. Mortar Protection: Install cavity drainage material at base of cavity to protect bottom of cavity from mortar droppings that would prevent weeps from draining infiltrated water.

C. Weeps: Install weeps at maximum 24 inches on centers in head joints of first course of masonry immediately above embedded flashings.

D. Vents: Install vents at maximum 24 inches on centers in head joints of topmost course of masonry immediately below shelf angles, and at top of each continuous cavity.

3.8 ANCHORING MASONRY VENEER

A. Individual Veneer Wall Tie to Sheathed Steel Studs: Anchor masonry veneer to sheathed steel studs with proper anchors.

1. Unless otherwise indicated, provide an open space not less than 2 inches in width between back of masonry veneer and face of sheathing.
2. Keep open space free of mortar or other rigid materials.
3. Locate anchor plate portion of wall tie to allow maximum vertical differential movement of tie

up and down.

4. Space anchors at 16 inches on center vertically and 16 inches on center horizontally as required for coursing.
5. Install additional anchors within 12 inches of openings and at maximum 8 inches on center around perimeter.
6. Attach each anchor through sheathing to steel studs with 2 metal fasteners each.
7. Embed wall tie, in proper orientation, at least halfway through masonry veneer but with at least 5/8-inch cover on outside face of masonry.
8. Install pencil rod continuous horizontally at seismic locations.

3.9 EMBEDDED FLASHINGS

A. General: Drawings may not necessarily indicate or describe full extent of Work required for completion of embedded flashing.

B. Scheduled Locations: In addition to conditions shown on Drawings, install embedded flashings within masonry cavity at following locations to direct downward flow of infiltrated water within cavity to exterior:

1. Shelf angles with end dams at through-wall openings; and with lap joints.
2. Lintels without end dams or laps.
3. Jambs at through-wall openings, full height from sill to head.
4. Other obstructions.

C. Preparation: Substrate surfaces shall be smooth and free from projections that could puncture flashing.

D. Flashing Installation:

1. Install rubberized asphalt flashing true to line and levels indicated; minimize quantity of lap joints by using longest units possible.
2. At lintels, terminate horizontal flashings at end of lintel with properly folded and constructed end dams with a depth of not less than 1 brick course.

3.10 MASONRY EXPANSION JOINTS

A. General: Install masonry expansion joints materials as Work progresses. Do not allow materials to span masonry expansion joints without provision to allow for in-plane wall or partition movement. Maintain joints free and clear of mortar.

B. Vertical Joints:

1. Locate where indicated but not to exceed 26 feet on center, and within 10 feet, 4 feet preferred, of each side of outside corner. Keep vertical joints straight, true and continuous from top to bottom of masonry.
2. Form open joint of width indicated for installation of sealant and backer rod specified in Division 07 Section “Joint Sealants.”

3.11 TOLERANCES

A. Conspicuous Lines:

1. Vertical: For such conditions as external corners, door and window jambs, reveals, and masonry expansion joints, maximum variation of one of following from plumb:

a. 1/8-inch in 10 feet.
b. ¼-inch in 20 feet.
c. ½-inch overall.

2. Horizontal: For such conditions as exposed lintels, sills, door and window heads, parapets, and reveals, maximum variation of one of following from level:

a. 1/8-inch in 10 feet.
b. ¼-inch in 20 feet.
c. ½-inch overall.

B. Exposed Head Joints:

1. Vertical Alignment: Maximum variation of one of following from plumb:

a. ¼-inch in 10 feet.
b. ½-inch from plumb top to bottom of wall.

2. Thickness: Maximum variation from width indicated of plus or minus 1/8-inch; maximum variation from adjacent bed joint and head joint thicknesses 1/8-inch.

C. Exposed Bed Joints: Maximum variation from width indicated of plus or minus 1/8-inch, with a maximum thickness limited to ½-inch; maximum variation from bed joint thickness of adjacent courses of 1/8-inch.

D. Flush Alignment: Maximum variation of 1/16-inch except due to warpage of masonry units with tolerances specified for warpage of units.

3.12 ADJUSTING

A. Repairs for Damage: Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units and install fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During tooling of joints, enlarge any voids or holes, except weeps and vents, and completely fill with mortar. Point up all joints including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants, where indicated.

3.13 PROTECTION

A. Cleaning: During cleaning operations, protect surrounding areas, landscaping, adjacent surfaces, and vehicles from contact with cleaning products.

1. Clean surfaces prior to installation of windows and doors.
2. Avoid drifting of spray caused by wind.

3.14 CLEANING

A. In-Progress Cleaning: As soon as practical, clean masonry as Work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Protect adjacent and nearby materials, especially windows and glass, to avoid damage.
2. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or

chisels.

3. Test cleaning methods on sample wall panel; leave one half panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
4. Clean masonry by means recommended by cleaning product manufacturer using masonry cleaner specified.

END OF SECTION

SECTION 04 2200

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Concrete masonry units and accessories indicated, specified, or required for installation.

1.2 DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells for loadbearing assemblies designed by Structural Engineer to support axial (gravity) loads and lateral (wind/seismic) loads.

B. Masonry Terminology: Refer to NCMA TEK 1-4 and other referenced quality standards.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturers technical literature for each type of product indicated, specified, or required.

1.4 QUALITY ASSURANCE

A. Masonry Installer Qualifications:

1. Experience: Installer with minimum of 10 years' specialized experience installing Work similar to scope of Project and having record of successful in-service performance.
2. Supervision: Installer shall maintain a competent supervisor who is on jobsite during times specified Work is in progress and who has minimum 10 years' experience in installing systems similar to type and scope required for Project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

B. Storage:

1. Masonry Units: Store on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
2. Cementitious Materials: Store on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
3. Aggregates: Store where grading and other required characteristics can be maintained and contamination avoided.
4. Accessories: Store to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection During Work: Prevent excess moisture from entering Work in progress.

1. Cover tops of walls, projections, and sills with water-repellent tarps or heavy plastic sheets at end of each day's Work.
2. Cover partially completed masonry when construction is not in progress.
3. Extend cover minimum of 24 inches down both sides and hold cover securely in place.
4. Protect door frames from damage.

B. Hot and Cold Weather Requirements: Comply with building code or TMS 602/ACI 530.1/ASCE 6 whichever is more stringent, and following:

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen substrates.
3. Remove and replace masonry damaged by frost or freezing conditions.
4. Use liquid cleaning methods only when air temperature is 40 degrees F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

B. Shapes: Provide shapes indicated and as follows for each form of unit required:

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners, unless otherwise indicated.

2.2 PERFORMANCE REQUIREMENTS

A. Reinforced Masonry:

1. Provide reinforced masonry that develops net-area compressive strengths (f'_m) at 28 days indicated on Structural Drawings.
2. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method).

2.3 STANDARD CONCRETE MASONRY UNITS (CMU)

A. Product Quality Standard: ASTM C 90, with following physical properties:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1,900 psi for 3 units and minimum 1,700 psi for individual unit.
2. Weight Classification: Lightweight.
3. Size (Width): Manufactured to dimensions 3/8-inch less than nominal dimensions.
4. Exposed Faces: Manufacturer’s standard.

5. Faces to Receive Direct Bonded Portland Cement Plaster: Provide coarse textured face units made with gap-graded aggregates.

2.4 LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I; except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C 207, Type S.

C. Types of Cement Not Acceptable:

1. ASTM C 91 masonry cement.
2. ASTM C 1329 mortar cement.

D. Aggregate: ASTM C 144.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.6 JOINT REINFORCEMENT

A. Masonry Joint Reinforcement, General:

1. Product Quality Standard: ASTM A 951.
2. Interior Walls: Mill galvanized, carbon steel.
3. Exterior Walls: Hot-dip galvanized, carbon steel.
4. Wire Size for Side Rods: One of following diameters as indicated on Drawings, required by building code, or required by TMS 602/ACI 530.1/ASCE 6:

a. W1.7 or 9 gauge (0.148-inch).
b. W2.8 or 3/16-inch (0.188-inch).

5. Wire Size for Cross Rods: One of following diameters as indicated on Drawings, required by building code, or required by TMS 602/ACI 530.1/ASCE 6:

a. W1.7 or 9 gauge (0.148-inch).
b. W2.8 or 3/16-inch (0.188-inch).

6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches on centers.
7. Lengths: Not less than 10 feet, with prefabricated corner and tee units.

B. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars Product Quality Standard: ASTM A 615 or ASTM A 996, Grade 60.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler:

1. Product Quality Standard: ASTM D 1056, Grade 2A1.
2. Description: Premolded filler strips formulated from neoprene; compressible up to 35 percent; of width and thickness indicated.

B. Preformed Control Joint Gaskets:

1. Product Quality Standard: ASTM D 2000, Designation M2AA-805.
2. Description: Formed from styrene-butadiene-rubber compound designed to fit standard sash block to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond Breaker Strips:

1. Product Quality Standard: ASTM D 226, Type I.
2. Description: Asphalt-saturated, organic roofing felt (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either 2 loops or 4 loops as needed for number of bars indicated.

2.9 MORTAR AND GROUT MIXES

A. General: Mix cementitious materials in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency for minimum 3 minutes to 5 minutes; do not hand mix.

1. Admixture Limitation: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, calcium chloride, or other admixtures, unless otherwise indicated.
2. Cementitious Limitation: Limit cementitious materials in mortar and grout to portland cement and lime.
3. Ingredient Measurement: Measure in a one cubic foot batching box before mixing for component materials not preblended, prepackaged or containerized.
4. Aggregate Moisture Content: Monitor moisture content of aggregates and exercise caution when mixing to avoid over or understanding of the mortar.

B. Mortar Mix:

1. Mix Quality Standard: ASTM C 270, Proportion Specification for portland cement-lime mortars. Types as follows for applications stated unless another type is indicated:

a. Non-Reinforced Masonry: Type N.
b. Reinforced Masonry: Type S.
c. Other Applications: Type N where another type is not indicated.

2. Mortar Color: Standard gray.

C. Grout for Unit Masonry:

1. Product Quality Standard: ASTM C 476.
2. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
3. Use fine grout in grout spaces less than 2 inches in horizontal dimension.
4. Use course grout in grout spaces 2 inches or more in least horizontal dimension.
5. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine substrates to which masonry will be placed for compliance with requirements, installation tolerances and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with the Contract Documents. Starting Work within a particular area will be construed as acceptance.

3.2 PREPARATION

A. Substrate Cleaning: Remove construction debris, dust, dirt, mud, oil, and other materials on surfaces that would adversely affect or reduce bond of masonry and mortar.

3.3 INSTALLATION, GENERAL

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. TMS 602/ACI 530.1/ASCE 6, unless local building code has jurisdiction.
2. Applicable portions of NCMA TEK's.
3. Respective manufacturer's written installation instructions.
4. Approved submittals.
5. Contract Documents.

B. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

C. Chases and Recesses: Build to accommodate items specified in this and other Sections.

D. Openings: Leave for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

E. Cutting: Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.4 LAYING MASONRY WALLS

A. General: Lay out walls in advance for accurate spacing of surface bond patterns, uniform joint thicknesses, accurate location of openings, movement-type joints, returns, and offsets. Avoid using less than half-size units at corners, jambs, and, where possible at other locations.

B. Bond Pattern for Exposed Masonry:

1. Concealed Masonry: Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inch lap.
2. Corners: Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 8-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop Work by racking back units in each course from those in course below; do not tooth. When resuming Work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar.

D. Built-in Work:

1. As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
2. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
3. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

E. Concrete Masonry Cores Under Loads: Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Mortar Joint Thickness: Minimum 3/8-inch wide for head and bed joints.

B. Hollow Concrete Masonry Units: Lay as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

C. Joint Tooling: Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

1. Make mortar joints straight, clean, and uniform in thickness. Tool joints to produce dense surface well bonded to edges.
2. Joints which are not tight at time of tooling shall be raked out, pointed, and then tooled.
3. Tool when mortar is partially set but still sufficiently plastic to bond.
4. Use a tool which compacts mortar, pressing excess mortar out of joint rather than dragging it out.
5. Tool vertical joint first.

D. Joints at Direct Applied Finishes: Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8-inch on exterior side of walls, ½-inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches on centers.
2. Space reinforcement not more than 8 inches on centers in parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Installation Conditions:

1. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
2. Provide continuity at wall intersections by using prefabricated T-shaped units.
3. Provide continuity at corners by using prefabricated L-shaped units.
4. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL JOINTS

A. General: Install control joint materials as masonry progresses. Do not allow materials to span control joints without provision to allow for in-plane wall or partition movement. Maintain joints free and clear of mortar.

B. Control Joints: Form in concrete masonry using one of following methods:

1. Install preformed control-joint gaskets designed to fit standard sash block.
2. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
3. At structural bond beams, provide dummy groove or raked joint. Do not extend control joints through bond beams.

C. Control Joint Spacing: Locate 3/8-inch wide control joints as indicated but do not exceed 30 feet on centers.

3.8 LINTELS

A. Masonry Lintels: Provide lintels where shown and where openings of more than 24 inches for block-size units are shown without structural steel or other supporting lintels.

1. Provide built-in-place masonry lintels. Use specially formed bond beam units with reinforcing bars placed and filled with coarse grout. Cure precast lintels before handling and installing.

B. Minimum Bearing: Provide 8 inches at each jamb, unless otherwise indicated.

3.9 REINFORCED MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

1. Provide minimum bar lap splice not less than 48 bar diameters unless otherwise indicated.
2. Provide corner bars of same size and spacing as horizontal bars unless otherwise indicated.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height unless otherwise required by local applicable code.
2. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
3. Limit height of vertical grout pours to not more than 60 inches.
4. Fill with grout, vertical cells, bond beams, lintels and other structural members having reinforcement. Secure in place and inspect reinforcing before grouting. Keep mortar droppings out of grout space and puddle or vibrate grout in place.
5. Provide solid bearing under structural members at least 8 inches vertically and at least 16 inches horizontally. Bearing may be solid units, or hollow units with grout. Fill cells in units adjacent to openings.
6. Grout from inside face of masonry and prevent grout from staining masonry face. Protect projecting surfaces from droppings and clean immediately any grout which comes in contact with face of masonry.

3.10 TOLERANCES

A. Conspicuous Lines:

1. Vertical: For such conditions as external corners, door and window jambs, reveals, and expansion joints, maximum variation of one of following from plumb:

   a. ¼-inch in 20 feet.
   b. ½-inch overall.

2. Horizontal: For such conditions as exposed lintels, sills, door and window heads, parapets, and reveals, maximum variation of one of following from level:

   a. ¼-inch in 20 feet.
   b. ½-inch overall.

B. Exposed Head Joints:

1. Vertical Alignment: Maximum variation of one of following from plumb:

   a. ¼-inch in 10 feet.

b. ½-inch from plumb top to bottom of wall.

2. Thickness: Maximum variation from width indicated of plus or minus 1/8-inch; maximum variation from adjacent bed joint and head joint thicknesses 1/8-inch.

C. Flush Alignment: Maximum variation of 1/16-inch except due to warpage of masonry units with tolerances specified for warpage of units.

3.11 ADJUSTING

A. Damaged Units: Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids and holes, except weeps and vents, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

3.12 PROTECTION

A. Protection of Work: When installed at building interiors, provide protection of lower 96 inches portion of [decorative concrete masonry] [pre-faced concrete masonry] in form of rigid panels to prevent damage and to resist staining.

B. Cleaning: During cleaning operations, protect surrounding areas, landscaping, adjacent surfaces, and vehicles from contact with cleaning products.

1. Clean surfaces prior to installation of windows and doors.
2. Avoid drifting of spray caused by wind.

3.13 CLEANING

A. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

END OF SECTION

SECTION 04 7500

MANUFACTURED STONE VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Panelized manufactured stone wall cladding; and accessories indicated, specified, or required to complete installation.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required.

B. Shop Drawings: Detailed drawings showing layout and elevations indicating coursing, trim, flashing, and terminations with other materials.

C. Samples for Verification: Full-size samples for stone units indicated showing full range of exposed color, texture, and dimensions to be expected.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Label pallets of stone units with manufacturers name, product name, and information required to identify products.

B. Storage: Store on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: Boral Stone Products LLC.
2. Style: Tight-Cut.
3. Color: Plum Creek.

2.2 MATERIALS

A. Stone: Glass-fiber-reinforced concrete molded stone-shaped veneer panels that interlock with a tongue and groove system, with embedded nailing strip for attaching to substrate.

B. Nailing Strip: 26-gauge steel with G90 galvanized and factory-applied black paint.

C. Trim: Manufacturer's standard vinyl starter strip and J-channels.

D. Fasteners: Corrosion-resistant galvanized roofing screws with minimum 5/16-inch head diameter and 1/8-inch shank diameter, with length suitable to penetrate framing member minimum 1 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which manufactured stone veneer will be applied for compliance with requirements, installation tolerances and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:

1. Respective manufacturer's written installation instructions.
2. Approved submittals.
3. Contract Documents.

3.3 ADHERING MANUFACTURED STONE UNITS

A. Layout:

1. Lay out walls in advance for accurate spacing of surface bond patterns, uniform joint thicknesses, accurate location of openings, movement-type joints, returns, and offsets.
2. Avoid using of less than half-size units at corners, jambs, and where possible at other locations.

B. Installing Stone:

1. Install starter strips at the base starting point line; fasten every 8 to 10 inches.
2. Install J-channel at windows, doors, material transitions, penetrations and terminations; fasten every 8 to 10 inches.
3. Install stone panels beginning at the bottom and working up.
4. Lap panels in shingle fashion, so that tongue seats completely into groove of lower panel.
5. Stagger panels to avoid alignment of vertical joints.
6. Construct interior and exterior corners according to manufacturer's instructions.

3.4 ADJUSTING

A. Repairs for Damage: Remove and replace stone units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units.

END OF SECTION

SECTION 05 1200

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, base plates, plates, and grouting under base plates.

1.2 SUBMITTALS

A. Shop Drawings: Indicate sizes, spacing, and locations of structural members, openings, connections, cambers, loads, and welded connections.

1.3 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel Members: ASTM A36.

B. Structural Tubing: ASTM A501.

C. Pipe: ASTM A53, Grade B.

D. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153 for galvanized members.

E. Anchor Bolts: ASTM A307.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

H. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.2 FABRICATION

A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 2.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high-strength bolted.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 ERECTION

A. Allow for erection loads. Provide temporary bracing to maintain framing in alignment until completion of erection and installation of permanent bridging and bracing.

B. Field weld components indicated on Drawings and shop drawings.

C. Do not field cut or alter structural members without approval of Architect/Engineer.

D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

E. Grout under base plates.

3.3 FIELD QUALITY CONTROL

A. Field inspection of members, connections, and torquing.

END OF SECTION

SECTION 05 2100

STEEL JOISTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Open web steel joists with bridging, attached seats and anchors.

1.2 SUBMITTALS

A. Shop Drawings: Indicate configuration, sizes, spacing, locations of joists, joist leg extensions, bridging, connections, attachments, and cambers.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with SJI.

B. Utilize Load Tables, and Weight Tables, including headers and other supplementary framing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Open Web Joists Members: SJI Type K Open Web, Longspan LH, or Deep Longspan DLH and Joist Girders.

B. Anchor Bolts, Nuts and Washers: ASTM A307, galvanized to ASTM A153.

C. Primer: SSPC 15, Type 1, red oxide.

D. Supplementary Framing: ASTM A36.

E. Welding Materials: AWS D1.1; type required for materials being welded.

2.2 FABRICATION

A. Provide bottom and top chord extensions as indicated.

B. Drill holes in chords necessary for attachment of wood nailers. Weld threaded lugs to chords for attachment of wood nailers.

2.3 FINISH

A. Shop prime joists. Do not prime surfaces that will be fireproofed, field welded, or in contact with concrete.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 ERECTION

A. Erect and bear joists on supports.

B. Allow for erection loads. Provide temporary bracing to maintain framing in alignment until completion of erection and installation of permanent bridging and bracing.

C. After joist alignment, field weld joist seat to bearing surfaces.

D. Position and field weld joist chord extensions and wall attachments as detailed.

E. Frame floor/roof openings greater than 18 inches with supplementary framing.

F. After erection, prime welds, abrasions, and surfaces not shop-primed except surfaces to be in contact with concrete.

3.3 FIELD QUALITY CONTROL

A. Field inspection of members, connections, and torquing.

END OF SECTION

SECTION 05 3100

STEEL DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Steel deck and accessories; framing for openings up to and including 18 inches; bearing plates and angles.

1.2 SUBMITTALS

A. Shop Drawings: Indicate decking plan, support locations, projections, openings and reinforcement, pertinent details, and accessories.

B. Product Data: Deck profile characteristics and dimensions, structural properties, and finishes.

PART 2 - PRODUCTS

2.1 METAL DECK

A. Deck Type:

1. Type B wide rib deck of carbon steel of specified gage.

B. Sheet Steel: ASTM A446, Grade B Structural Quality; with G30 galvanized coating conforming to ASTM A525.

C. Bearing Plates, Angles: ASTM A36 steel.

D. Welding Materials: AWS D1.1.

E. Touch-Up Primer: Zinc chromate type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Erect metal decking in accordance with manufacturer's instructions.

B. Bear decking on support surfaces with minimum bearing as specified on Drawings. Align and level.

C. Fasten ribbed deck to steel support members at ends and intermediate supports with fusion welds through weld washers at 12 inches o.c. maximum, parallel with the deck flute and at each transverse flute.

D. Weld in accordance with AWS D1.1.

E. Weld male/female side laps at 18 inches o.c. maximum.

F. Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x ¼-inch steel angles. Place angles perpendicular to flutes; extend minimum 2 flutes beyond each side of opening and fusion weld to deck at each flute.

G. Install 6-inch-minimum-wide sheet steel cover plates, of same thickness as decking, where deck changes direction. Fusion weld.

H. Install wet concrete stops at deck edge upturned to top surface of slab.

I. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

J. Install single row of foam flute closures above walls and partitions perpendicular to deck flutes.

K. Position roof sump pans with flange bearing on top surface of deck. Attach at each deck flute.

L. Place cant strips in position and attach.

M. Immediately after welding deck and other metal components in position, coat welds, weld blooms, burned areas, and damaged surface coating, with touch-up prime paint.

END OF SECTION

SECTION 05 4000

COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Load bearing formed steel stud framing.

B. Formed steel joist, purlin, slotted channel framing and bridging.

1.2 SUBMITTALS

A. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work.

B. Indicate stud, floor joist, ceiling joist, roof joist, roof rafter, and roof truss layout.

C. Product Data: Describe materials and finish, product criteria, and limitations.

PART 2 - PRODUCTS

2.1 FRAMING MATERIALS

A. As specified on Drawings.

2.2 ACCESSORIES

A. Bracing, Furring, Bridging, Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered; same finish as framing members.

B. Screws: ASTM A90, hot dip galvanized, self-drilling, self-tapping.

C. Anchorage Devices: Power-actuated or drilled expansion bolts.

D. Welding: In accordance with AWS D1.1 and AWS D1.3.

E. Primer: Touch-up for galvanized surfaces.

2.3 FABRICATION

A. Fabricate assemblies of sizes and profiles required; with framing members fitted, reinforced and braced.

B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.4 FINISHES

A. Studs and Accessories: Galvanize to G90 coating class.

B. Joists, Purlins and Accessories: Galvanize to G90 coating class.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Verify that substrate surfaces are ready to receive work.

3.2 ERECTION OF STUDDING

A. Install components in accordance with manufacturer's instructions.

B. Align floor and ceiling tracks; locate to layout. Coordinate installation of sealant with floor and ceiling tracks.

C. Construct corners using minimum 3-studs. Double-stud wall openings, door and window jambs.

D. Erect load-bearing studs one piece, full length. Splicing of studs is not permitted.

E. Allow for deflection, directly below horizontal building framing for non-load-bearing framing.

F. Attach cross studs/furring channels to studs for attachment of fixtures anchored to walls and for attachment of mechanical and electrical items within walls.

G. Touch-up field welds and damaged prefinished surfaces with primer.

3.3 ERECTION OF JOISTS/PURLINS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Set joists parallel and level, with lateral bracing and bridging.

D. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

E. Provide web stiffeners at reaction points.

F. Touch-up field welds and damaged prefinished surfaces with primer.

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings.

1.2 COORDINATION

A. Coordinate and verify required access door sizes and locations with applicable trades.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sections: ASTM A 36; ASM A992 for wide flanges.

B. Steel Tubing: ASTM A 500, Grade B.

C. Steel Pipe: ASTM A 53, Grade B, Schedule 40.

D. Bolts, Nuts, and Washers: ASTM A 307, Grade A.

E. Welding Materials: AWS D1.1; type required for materials being welded.

2.2 FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Fabricate items with joints tightly fitted and secured.

C. Fit and shop assemble in largest practical sections, for delivery to site.

D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.

F. Make exposed joints butt tight, flush, and hairline.

G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.3 UNIVERSAL PRIMER

A. Manufacturer's standard, lead free primer, capable of providing sound foundation for field-applied top coats despite prolonged exposure.

B. Standard: FS TT-P-645.

C. Maximum Allowable Dry Time: 4 hours to touch; 24 hours to re-coat.

D. Compatible with finish paint system specified in Section 09 9100, as scheduled or noted.

E. Acceptable Products (subject to compatibility with finish coating):

1. Tnemec, Chem Prime 37H-77, Tnemec, Kansas City, MO.
2. Valspar 13-Y-5, Valspar, Baltimore, MD.
3. Carboline Multi-Bond 150, by Carboline Company, St. Louis, MO.

2.4 ZINC-RICH PRIMER

A. Inorganic, zinc-rich, capable of providing sound foundation for field applied top coats despite prolonged exposure, cathodic protection and corrosion resistance.

1. Pigment Content: Minimum 80 percent zinc in dry film by weight.
2. Compatible with finish paint system specified in Section 09 9100.

B. Acceptable Products:

1. Valspar MZ-7 (13-F-12) by Ameron, Baltimore, MD.
2. Tnemec N90-392 Tneme-Zinc, Tnemec Co., Kansas City, MO.

2.5 GALVANIZING

A. Provide hot-dip galvanized coating in accordance with:

1. ASTM A 153 - Iron and Steel Hardware.
2. ASTM A 123 - Rolled, pressed and forged steel shapes, plates, bars and strips 1/8-inch thick and heavier.

B. Galvanizing Repair Paint:

1. Standard: MIL-P-21035 or SSPC-Paint-20.
2. Acceptable Products:

a. Valspar M-Z-2 (13-F-2), Valspar, Baltimore, MD.
b. Tnemec 90-93, Tnemec Co., Kansas, MO.

2.6 FINISH

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.

C. Prime paint interior steel items scheduled with two coats of primer.

D. Galvanize exterior steel items and those touching exterior masonry walls to minimum 2.0 ounces per square foot zinc coating in accordance with ASTM A 386. Finish coating surface to be smooth, without irregularities, drip marks, or other roughness, ready for priming with minimal preparation required.

2.7 STEEL LINTELS

A. Provide at wall opening and recesses.

B. Weld multiple loose lintels to form a single unit.

C. Provide a minimum of 8 inches of bearing at ends unless noted otherwise.

D. Finish: Prime painted.

2.8 PIPE BOLLARDS

A. Type: Standard steel pipe.

B. Fill with standard weight concrete; set in concrete foundations. Ensure concrete at top of pipe is rounded and smooth.

C. Finish: Galvanized.

2.9 VERTICAL LADDERS

A. Type: Vertical steel ladders consisting of following components:

1. Side Rails: 3/8-inch by 2-1/2-inch flat steel bars with eased edges spaced as detailed on Drawings or not less than 18 inches between.
2. Rungs: 1-inch-minimum solid round steel bars spaced 12 inches maximum on center, punched through stringers and plug welded.
3. Provide non-slip surface on top of each rung, either by coating rung with aluminum oxide granules set in epoxy resin adhesive, or by using type of manufactured rung which is filled with aluminum oxide grout.
4. Angle Supports: Support ladders by steel angles bolted to walls and floors to provide minimum of 7 inches from face of wall to centerline of rungs. Locate at 5 feet on center and within 16 inches of top and bottom.
5. Safety Handrails: Extend rails 42 inches above top rung and anchor to structure, if adjacent structure does not extend above top rung, gooseneck extended rails back to structure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects. Adequately reinforce and anchor work in place. Form exterior joints to exclude water.

B. Perform field welding in accordance with AWS D1.1, D1.2 or D1.3 depending on substrate involved.

C. After installation, touch-up field welds, scratched or damaged surfaces with primer.

D. Install stock manufactured items in accordance with manufacturer's directions.

3.2 ERECTION TOLERANCES

A. Maximum Variation From Plumb: ¼-inch per story, non-cumulative.

B. Maximum Offset From True Alignment: ¼-inch.

3.3 SCHEDULE

A. Provide and install items listed in Schedule and shown on Drawings with anchorage and attachments necessary for installation.

B. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

C. Items of Work Custom Fabricated

1. Bumper bollards and guard rails; schedule 40 steel: Galvanized finish.
2. Lintels, ledges, shelf angles, channels and plates not attached to structural framing, for support of metal decking and masonry: Prime paint finish.
3. Miscellaneous Steel Shapes: Channels, wide flange shapes, angles, plates, tubing, connections, and bolts where shown and detailed on Drawings. Hot dip galvanize where exposed to weather or touching exterior masonry after fabrication.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Lumber Grading: Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards. Grading rules of following associations apply to materials furnished.

1. Southern Pine Inspection Bureau (SPIB).
2. West Coast Lumber Inspection Bureau (WCLIB).
3. Western Wood Products Association (WWPA).

1.2 DELIVERY, STORAGE AND HANDLING

A. Store products above ground, on platforms or skids, and covered with waterproof coverings. Provide for adequate air circulation.

B. Do not store seasoned materials in damp or wet locations.

C. Support products in such a way as to prevent warping and distortion.

PART 2 - PRODUCTS

2.1 WOOD MATERIALS

A. General: Where stress rating values are given in lieu of grades, select any quality which will meet structural requirements.

B. Lumber:

1. Grading Rules: PS 20.
2. Moisture Content: 19 percent maximum moisture content after treatment for fire retardant and preservative treated woods.
3. Surfacing: Surface four sides (S4S), unless noted otherwise.
4. Uses, Grades, and Stress Ratings

a. Non-structural Framing (2 to 4 inches thick, 2 to 4 inches wide):

1) Plates, Blocking, Bracing, Nailers: Utility grade.

b. Structural Framing: Refer to structural drawings and structural calculations.

C. Plywood:

1. Grading Rules: PS 1, using Group 1 to 4 species as required for rating.
2. Exposures: Provide exposure ratings as indicated.
3. Thickness: As detailed or noted, or otherwise as required to maintain span capability.
4. Uses, Grades, Ratings:

a. As indicated in Drawings.

2.2 ACCESSORIES

A. Fasteners:

1. Provide fasteners in sizes, spacings, and locations to suit applications. Hot dip galvanize unless noted otherwise.

2.3 WOOD TREATMENTS - SHOP PREPARED

A. Preservative-Treated Wood:

1. Preservative-treat all wood in contact with grade steel or concrete.

2. Use waterborne salt preservatives as follows:

a. AWPB LP-2 above ground.
b. AWPB LP 22 ground contact.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Scribe and cope as required.

3.2 TOLERANCES

A. Framing members: ¼-inch maximum from true position.

B. Surface flatness of floors/roofs: ¼-inch in 10 feet maximum.

END OF SECTION

SECTION 06 1753

PLATE CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Refer to Drawings and governing codes for live and dead load requirements.

1.2 QUALITY ASSURANCE

A. Design trusses under direct supervision of Professional Engineer experienced in structural framing design of trusses registered in state where project is located. Truss designs shall bear the name, seal, and registration number of the licensed professional engineer who supervised the truss structural framing design. Comply with the "National Design Specifications for Stress Graded Lumber and Its Fastenings" as published by N.F.P.A. and "Design Specifications for Light Metal Place Connected Wood Trusses" as published by T.P.I.

B. Lumber Grading Agency: Certified by ALSC.

C. Truss Plates: In accordance with Truss Plate Institute.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for loads, seismic zoning, wind strapping, and other governing load criteria.

B. Conform to applicable code for fire retardant requirements.

C. Conform to UL requirements to achieve rating indicated.

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 3300.

B. Indicate framing system, truss placement, sizes and spacing of members, loads and cambers, bearing and anchor location and loads, bridging and bracing, connecting plates, and framed openings. Submit design calculations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Transport and store trusses according to Truss Plate Institute plublication HIB-91.

B. Protect trusses from warpage and distortion during transit and when stored.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Member of T.P.I. and having minimum experience level indicated.

2.2 MATERIALS

A. Lumber Grading Rules: NFPA. Identify each piece by grade mark of lumber inspection bureau or agency approved by American Lumber Standards Committee board.

B. Steel Connectors: Truss Plate Institute standard ANSI/ASTM A 446 steel, Grade A; galvanized.

C. Fasteners: Galvanized; size and type to suit condition.

D. Wood Blocking: Softwood lumber, construction grade, maximum moisture content of 19 percent.

2.3 FABRICATION

A. Verify dimensions and site conditions prior to fabrication.

B. Cut members accurately to length, angle, and true to line to achieve properly fit, tight joint connections.

C. Jig trusses during fabrication to assure accurate configuration.

D. Build camber into truss.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that supports and openings are ready to receive trusses.

B. Verify sufficient end bearing area.

C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Coordinate placement of bearing items.

3.3 INSTALLATION

A. Install trusses in accordance with manufacturer's instructions, at spacings as indicated on Drawings and approved shop drawings. The load carrying capacity of any one truss shall not be exceeded during the construction period.

B. Place trusses true to line and level in correct location.

C. Provide temporary bracing to hold trusses in place until permanently secured.

D. Place permanent bridging, bracing, and anchors to maintain trusses straight and in correct position before inducing loads.

E. Do not field cut or alter trusses.

F. Place headers and supports to frame openings required.

G. Frame openings between trusses with lumber in accordance with Section 06 1000.

H. Coordinate placement of sheathing with work of this Section.

3.4 TOLERANCES

A. Framing Members: ½-inch maximum from true position.

END OF SECTION

SECTION 06 2000

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings: Dimensioned and detailed drawings, including plans, elevations, large-scale details, attachment devices, and other components of each carpentry item.

1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
2. Show locations and sizes of cutouts and holes.

1.2 QUALITY ASSURANCE

A. Fabricator Qualifications: Company with not less than 5 years' experience with successful production of specified Work similar to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce required Work.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver carpentry only when painting and similar operations that could damage carpentry have been completed in installation areas. If carpentry must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Deliver and install carpentry only when building is enclosed, wet work is complete, and heating, ventilating and air conditioning system is operating and maintaining temperature and relative humidity at occupancy levels during remainder of construction period.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

A. General: Provide materials that comply with requirements of referenced quality standard for each type of carpentry and quality grade specified, unless otherwise indicated.

B. Fiberboard: ANSI A208.2, 47-pound density minimum, Grade 160.

C. Particleboard: ANSI A208.1, Grade M-3, 47-pound density minimum

D. Softwood Plywood (Veneer Core) Material Quality Standard: DOC VPS PS 1, Exposure 1.

E. Lumber: Fabricators option, softwood and hardwood solid wood graded in accordance with grade of Work specified, of quality suitable for construction and finish indicated.

2.2 PLASTIC LAMINATES

A. High-Pressure Decorative Laminates (HPDL): NEMA LD 3.

1. Standard Face Sheet: Grade VGS, 0.028-inch thick.
2. High Wear Face Sheet: Grade HDS, 0.048-inch thick.
3. Cabinet Liner Sheet: Grade CLS, 0.020-inch thick.
4. Backing Sheet: Grade BKL, 0.020-inch thick.

B. Adhesive for Bonding Decorative Laminates: No-added formaldehyde based thermoplastic resin recommended by fabricator to suit application and comply with specified requirements.

2.3 FASTENERS AND ANCHORS

A. General: Material, type, size, and finish required for each substrate for secure anchorage.

B. Screws: ASME B18.6.1.

C. Nails: FS FF-N-105.

D. Wood Dowels: Industrial grade hardwood laterally fluted with chamfered ends and minimum diameter of 0.31-inch.

E. Staples: Not permitted.

F. Glue: Aliphatic resin glue formulated for use on all types of wood; resistant to water, oil, grease, and paint solvents; sandable after drying; complying with VOC limits specified.

G. Biscuits: Die cut from beechwood blanks, and compressed for strength and cross-hatched to improve glue bonding.

H. Hanging Clips: Two piece extruded aluminum zee hanging clips.

I. Acrylic Caulking: Siliconized acrylic caulking custom colored to match adjacent finished surfaces.

2.4 FABRICATION, GENERAL

A. Fabrication Quality Standards: In addition to standards listed elsewhere, comply with following, unless otherwise specified:

1. AWI/AWMAC/WI - Architectural Woodwork Standards, Sections as indicated below.
2. Approved submittals.
3. Contract Documents.

B. Shop Fabrication: Fabricate, assemble, finish, and install hardware to maximum extent possible before shipment to site.

1. Fabricate carpentry to dimensions, profiles, and details indicated.
2. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
4. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. Wood Moisture Content: Comply with requirements of quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

D. Furring, Blocking, Shims, and Hanging Strips: Fabricate from fire retardant treated lumber; sand lightly to remove raised grain on exposed surfaces before fabrication.

2.5 CABINETS

A. Fabrication Quality Standard: AWI/AWMAC/WI - Architectural Woodwork Standards, Section 10:

1. Grade: Premium.
2. Construction Type: A.
3. Interface Style: 1, flush overlay.

B. Finish for Cabinets with Plastic Laminate Cladding:

1. Exposed Surfaces: HPDL standard face sheet, selection as scheduled.
2. Semi-Exposed Surfaces: HPDL cabinet liner sheet, selection as scheduled.
3. Concealed Surfaces: HPDL backing sheet.

C. Body Members (Ends, Divisions, Bottoms and Sub-Tops): Fiberboard or particleboard, ¾-inch minimum thickness.

D. Face Frames, Rails, Kicks and Bases: Hardwood lumber or hardwood plywood, ¾-inch minimum thickness; do not use hardwood plywood if hinge screws enter edge of rail only.

E. Shelves: Plywood supported on shelf rests set in 2 vertical rows of multiple holes:

1. Spans up to 32 inches: ¾-inch minimum thickness.
2. Spans up to 42 inches: 1-inch minimum thickness.

F. Drawer Boxes:

1. Sides, Backs and Sub-Fronts: Depending on scheduled finish, 7-ply hardwood lumber or plywood; ½-inch minimum thickness; joined according to one of following:

a. Glued multiple dovetail.
b. Glued French dovetail.
c. Glued and doweled.

2. Bottoms: Depending on scheduled finish, hardwood plywood; ¼-inch minimum thickness; captured in standing dado shoulder.

G. Drawer Fronts: Fiberboard or particleboard, ¾-inch minimum thickness.

H. Doors: Fiberboard or particleboard; if hinge screws enter only edge of door, provide ¾-inch lumber edges glued to core prior to laminating:

1. Width up to 30 inches and Height up to 60 inches: ¾-inch minimum thickness.
2. Width up to 36 inches and Height up to 72 inches: 1-inch to 1-1/4-inch thickness.
3. Doors Larger Than Sizes Above: 1-3/8-inch or 1-3/4-inch doors; refer to appropriate Section 08 1416 - Flush Wood Doors.

2.6 PLASTIC LAMINATE CLAD COUNTERTOPS

A. Fabrication Quality Standard: AWI/AWMAC/WI - Architectural Woodwork Standards, Section 11: Premium grade.

B. Finish for Countertops and Splashes with Plastic Laminate Cladding:

1. Exposed Surfaces: HPDL high wear face sheet, selection as scheduled.
2. Exposed Splash Surfaces: HPDL standard face sheet, selection as scheduled.
3. Countertop Edges: Stained wood bullnose.
4. Splash Edges: HPDL standard face sheet, selection as scheduled.
5. Concealed Surfaces: HPDL backing sheet.

C. Core Material: Fiberboard, moisture resistant type at countertops containing sinks:

1. Countertops: ¾-inch minimum thickness.
2. Splashes: ½-inch minimum thickness.

D. Fabrication Provisions: Fabricate to eliminate or minimize need for joints that are assembled in field.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which finish carpentry will be installed for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

A. Conditioning: Before installation, condition carpentry to average prevailing temperature and humidity conditions in installation areas.

3.3 INSTALLATION. GENERAL

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. AWI/AWMAC/WI - Architectural Woodwork Standards.
2. Approved submittals.
3. Contract Documents.

B. Grade: Install to comply with requirements for same fabrication grade specified for type of involved.

C. Exposed Lines: Set individual items as follows with no distortions:

1. Horizontal Lines: Level and straight.
2. Vertical Lines: Plumb and true.

D. Fitting:

1. Scribe and cut to fit adjoining work and refinish cut surfaces.
2. Shim as required for conditions with concealed shims.
3. When necessary, apply filler strips for accurate fit with fasteners concealed

E. Attaching to Substrates:

1. Fasten to partition framing or concealed reinforcements.
2. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation.
3. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with carpentry and matching final finish.
4. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.

F. Treating Nail Holes and Wood-to-Wood Joints: Fill with matching wood filler, sand smooth, and finish same as adjacent finishes.

END OF SECTION

SECTION 06 6116

SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Solid surface material fabricated into profiles indicated, specified, or required for installation.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's written installation instructions.

B. Shop Drawings: Dimensioned and detailed plans, elevations, large-scale details, attachment methods, and other components to be incorporated into Work.

C. Samples for Verification: Sample indicating color and pattern of each fabrication specified.

D. Maintenance Data: For inclusion in maintenance manual required by Division 01.

1. Include manufacturer's instructions for maintenance of installed Work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Solid Surfacing Material: ANSI/IPCA SS-1; Homogenous, compression molded material composed of acrylic resins or polyester/acrylic resin blend, fire-retardant filler materials, fiber reinforcement, and coloring agents.

B. Adhesives: No-added formaldehyde based, 1- or 2-part, adhesive capable of creating inconspicuous, non-porous seams; provided by material manufacturer.

C. Sealant: Mildew resistant, FDA compliant, NSF 51 compliant, UL-listed silicone sealant in color that matches material; provided by material manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive solid surfacing fabrications and associated Work for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION

A. Anchorage: Fasten fabrications with adhesive.

B. Seams:

1. Prepare ends and edges of pieces to be joined according to manufacturer’s instructions for position and angle of butted joint.
2. Clean to remove dirt and grease.
3. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's instructions.
4. Clamp until fully cured.
5. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
6. Buff and sand to produce a smooth uniform seamless surface.

C. Joints to Other Substrates: Apply sealant and compress to form bond with surfaces and tool sealant surface to clean, straight lines.

D. Installation Tolerances: Install plumb, level, accurately aligned, and located to a tolerance of 1/8-inch in 8 feet.

END OF SECTION

SECTION 06 8200

GLASS-FIBER REINFORCED PLASTIC PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Glass-fiber reinforced plastic (GRP) wall paneling, trim accessories, and supplementary items necessary to complete their installation.

1.2 SUBMITTALS

A. Samples for Verification: For plastic paneling and trim accessories, in manufacturer's standard sizes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered as substitutions provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

B. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers named alphabetically below. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.

1. Kemlite Company Inc.
2. Marlite.
3. Nudo Products, Inc.

2.2 GLASS-FIBER REINFORCED PLASTIC SHEET PANELING

A. General: ASTM D 5319; gelcoat-finished, glass-fiber reinforced plastic panels.

1. Nominal Thickness: Not less than 0.12-inch.
2. Surface Finish: As indicated on Drawings.
3. Color: As indicated on Drawings.

2.3 ACCESSORIES

A. Trim Accessories: Manufacturer's standard vinyl extrusions designed to retain and cover edges of panels in same color as panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

B. Adhesive: As recommended by plastic paneling manufacturer.

C. Sealant: Sealant as recommended by plastic paneling manufacturer and complying with requirements in Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Remove materials that might interfere with adhesive bond.

B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.

C. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.

D. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

E. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

3.3 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install plastic paneling and trim in a full spread of adhesive.

C. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.

END OF SECTION

SECTION 07 2100

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Glass-fiber blanket.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET

Specifier's Note: Retain following paragraph when engineering analysis indicates a vapor barrier is not necessary. Generally, southern climates will not need a vapor barrier.

A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

Specifier's Note: Retain following paragraph when engineering analysis indicates a vapor barrier is required. Generally, northern climates need a vapor barrier.

B. Glass-Fiber Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.2 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Plate: Perforated, galvanized carbon-steel sheet, 0.030-inch-thick by 2 inches square.
2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105-inch in diameter; length to suit depth of insulation.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.3 ACCESSORIES

A. Adhesive for Bonding Insulation: Product compatible with insulation, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3 inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

Specifier’s Note: Retain one of the three options in brackets in the following paragraph.

    a. Exterior Walls: Set units with facing placed toward [**exterior of construction**] [**interior of construction**] [**as indicated on Drawings**].

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07 2419

WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: EIFS-clad drainage-wall assemblies that are field-applied over substrate.

1.2 SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory, including water-resistive coatings, indicated, specified, or required.

B. Manufacturer Certificates: Signed by EIFS manufacturer certifying the following:

1. EIFS complies with requirements.
2. Substrates to which EIFS is indicated to be attached are acceptable to EIFS manufacturer.
3. Accessory products installed with EIFS whether or not furnished by EIFS manufacturer and whether or not specified in this Section, are acceptable to EIFS manufacturer.

C. Sample Warranty: For manufacturer's special warranty.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.

1. Stack insulation board flat and off the ground.

1.5 FIELD CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 degrees F for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Bond integrity and weathertightness.
    b. Deterioration of EIFS finishes and other EIFS materials beyond normal weathering.

2. Warranty coverage includes the following components of EIFS-clad drainage-wall assemblies:

    a. EIFS finish, including base coats, finish coats, and reinforcing mesh.
    b. Insulation installed as part of EIFS including foam build-outs.
    c. Insulation adhesive.
    d. EIFS accessories, including trim components and flashing.
    e. Water-resistive coatings.
    f. EIFS drainage components.

3. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC219 when tested according to ASTM E 2568.

    a. Wind Loads: Uniform pressure as indicated on Drawings.

3. Impact Performance: ASTM E 2568, Standard 5’-0” above adjacent grade level and Medium within 5’-0” of adjacent grade.
4. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to wind loads, weather, or other in-service conditions.
5. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch-thick EIFS mounted on 1/2 inch thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested according to ASTM D 968, Method A.
6. Mildew Resistance of Finish Coat: Sample applied to 2- by 2-inch clean glass substrate; cured for 28 days and shows no growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274.

2.2 EIFS MATERIALS

A. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water-resistive barriers; compatible with substrate and complying with physical and performance criteria of ASTM E 2570.

B. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; specifically formulated to be applied to back side of insulation in a manner that creates open vertical channels designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall assembly; compatible with substrate; and complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, and polymer-based adhesive specified for base coat.
2. Factory-blended dry formulation of portland cement, dry polymer admixture, and fillers specified for base coat.
3. Factory-mixed noncementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.

C. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type I; and EIFS manufacturer's requirements for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:

1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks.
2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to ASTM E 84.
3. Foam Build-Outs: Provide with profiles and dimensions indicated on Drawings.

D. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. according to ASTM E 2098 and the following:

1. Reinforcing Mesh for EIFS, General: Not less than weight required to meet impact-performance level specified in "Performance Requirements" Article.
2. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd.
3. Detail Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
4. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd.

E. Base-Coat Materials: EIFS manufacturer's standard mixture complying with one of the following:

1. Job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with portland cement.
2. Job-combined formulation of manufacturer's standard polymer-emulsion adhesive and manufacturer's standard dry mix containing portland cement.
3. Factory-blended dry formulation of portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.
4. Factory-mixed noncementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

F. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

G. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following:

1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
2. Colors: If not indicated as selected by Architect from manufacturer's full range.
3. Textures: If not indicated as selected by Architect from manufacturer's full range.

H. Water: Potable.

I. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard cell class for use intended, and ASTM C 1063.

1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
2. Weep Screed/Track: Prefabricated, one-piece type for attachment behind insulation with perforated face leg[extended to form a drip] and weep holes in track bottom, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg; designed to drain incidental moisture that gets into wall construction to the exterior at terminations of EIFS with drainage.

2.3 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

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

1. Begin coating application only after surfaces are dry.
2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Water-Resistive Coating: Apply over sheathing to provide a water-resistive barrier.

1. Tape and seal joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.

3.5 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, and elsewhere as indicated. Coordinate with installation of insulation.

1. Weep Screed/Track: Use at bottom termination edges, including window and door heads.
2. Casing Bead: Use at other locations.

3.6 INSULATION INSTALLATION

A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397 and the following:

1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
3. Allow adhered insulation to remain undisturbed for not less than 24 hours, before beginning rasping and sanding insulation or applying base coat and reinforcing mesh.
4. Apply insulation over substrates in courses with long edges of boards oriented horizontally.
5. Begin first course of insulation from screed/track and work upward. Work from perimeter casing beads toward interior of panels if possible.
6. Stagger vertical joints of insulation boards in successive courses to produce running bond pattern. Locate joints so no piece of insulation is less than 12 inches wide or 6 inches high. Offset joints not less than 6 inches from corners of window and door openings and not less than 4 inches from aesthetic reveals.
7. Interlock ends at internal and external corners.
8. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
9. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
10. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch. Prevent airborne dispersal and immediately collect insulation raspings or sandings.
11. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch.
12. Install foam build-outs and attach to sheathing.
13. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.

14. After installing insulation and before applying field-applied reinforcing mesh, fully wrap board edges. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches over front and back face unless otherwise indicated on Drawings.
15. Treat exposed edges of insulation as follows:

    a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.
    c. At edges trimmed by accessories, extend base coat, reinforcing mesh, and finish coat over face leg of accessories.

16. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier.

3.7 BASE-COAT INSTALLATION

A. Base Coat: Apply to exposed surfaces of insulation and foam build-outs in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.

B. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

C. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches beyond perimeter. Apply additional 9- by 12-inch strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch-wide strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches on each side of corners.

    1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches wide.
    2. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

D. Foam Build-Outs: Fully embed reinforcing mesh in base coat.

3.8 FINISH-COAT INSTALLATION

A. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.

B. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

3.9 CLEANING

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION

SECTION 07 2729

AIR BARRIER COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes vapor-permeable air barrier coatings.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

B. Shop Drawings:

1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Include details of interfaces with other materials that form part of air barrier.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications:

1. Experience: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.
2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and, who is experienced in installing work similar in design, products, and extent to scope of this Project.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.6 WARRANTY

A. Manufacturers Special Warranty: Furnish warranty for a period of 5 years' from date of Substantial Completion agreeing to repair or replace defects, faulty work and failures, signed by an authorized representative using manufacturer's standard form.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered as substitutions provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: STO Corp.
2. Products:

a. Waterproofing Coating: Gold Coat
b. Joint Treatment: Gold Fill.

3. National Account: Contact STO Strategic Accounts at 1.888.786.3437.

2.2 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04-cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 283.

C. Water Penetration Resistance: No water penetration before or after aging when tested according to AATCC 127.

D. Water Penetration Testing: No water penetration when tested according to ASTM E 1233/ASTM E 331.

2.3 MATERIALS

A. Waterproofing Coating: Ready-mixed, flexible, synthetic polymer that forms a membrane when cured.

B. Joint Treatment: Ready-mixed, flexible, synthetic polymer for use with mesh at inside and outside corner and penetrations through sheathing.

C. Mesh: Glass fiber, self-adhesive mesh for use with joint treatment material at inside and outside corner and penetrations through sheathing.

D. Stainless-Steel Sheet: ASTM A 240, Type 304, 0.0187-inch thick, and Series 300 stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.

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

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

A. Sheathing: Place minimum 4-inch-wide mesh at sheathing joints and minimum 9-inch-wide mesh at rough openings and inside and outside corners. Immediately apply joint treatment material by spray or trowel over the mesh and trowel smooth.

3.4 AIR-BARRIER COATING INSTALLATION

A. General: Apply air barrier coating to form a seal and to achieve a continuous air barrier according to air barrier manufacturer's written instructions. Apply air barrier coating within manufacturer's recommended application temperature ranges.

B. Air-Barrier Coatings: Apply a continuous unbroken air barrier coating to substrates according to the following thickness. Apply an increased thickness of air-barrier coating in full contact around protrusions.

1. Total dry film thickness as recommended in writing by manufacturer to meet performance requirements.
2. Apply additional coats as needed to achieve void- and pinhole-free surface.

3.5 FIELD QUALITY CONTROL

A. Manufacturer’s Field Inspection: Manufacturer’s technical representative shall inspect first day’s work to ensure application is proceeding in accordance with manufacturer’s designs, recommendations, instructions and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings and conclusions of inspection.

3.6 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more days than allowed by manufacturer, remove and replace air barrier or install additional, full-thickness, air barrier application after repairing and preparing the overexposed membrane according to air barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 5419

SINGLE-PLY ROOF MEMBRANE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Mechanically fastened polyvinyl-chloride (PVC) roofing system.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

B. Required Attendees:

1. Owner.
2. Architect.
3. Contractor’s superintendent.
4. Roofing subcontractor including superintendent.
5. Mechanical subcontractor including superintendent.
6. Sheet metal subcontractor including superintendent.
7. Electrical subcontractor including superintendent.
8. Manufacturer’s field representative.
9. Others whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

C. Minimum Agenda:

1. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
2. Review roof plans, slope, deck type, drainage, membrane attachment, flashing and associated details.
3. Review these specifications. If manufacturer’s specifications are reviewed, resolve deviations or differences from these specifications.
4. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated, specified, or required.

B. Shop Drawings: Manufacturer’s standard drawings for conditions that will be encountered on the Project.

C. Installer Qualification: Written confirmation from manufacturer that installer is an Authorized Dealer/Contractor.

D. Sample Warranties: For manufacturer's special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is authorized by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components. Allow no unlabeled materials on Project site.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location on raised surfaces. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials to prevent damaged ends.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.7 WARRANTY

A. Special Manufacturer Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, and other components of roofing system.
2. Warranty Period: 15 years from date of Substantial Completion.

B. Special Installer Warranty: Installer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, and other components of roofing system.
2. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a built-up roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-75.
2. Hail-Resistance Rating: SH.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named on the Drawings to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

2.3 PVC ROOFING

A. PVC Sheet: ASTM D 4434, Type IV. A special formulated, permanent, thermoplastic alloy, bonded to a high tenacity, low shrinkage weft inserted polyester fabric with resistance to ultraviolet rays, microorganisms and impervious to most caustic chemicals, animal fats, greases and oils typically found on a restaurant roof

1. Thickness: 40 mils, nominal.
2. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.

C. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1- by 1/8-inch thick; with anchors.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by PVC roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.

Specifier's Note: Add the R-value below based on code requirements.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces. R-value of [ ].

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of ¼-inch per 12 inches (1:48) unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, 30 by 60 inches, with attachment skirts along long side for heat-welding to roofing membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding ¼-inch with insulation.

1. Cut and fit insulation within ¼-inch of nailers, projections, and penetrations.

F. Do not install wet insulation.

G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.5 MECHANICALLY FASTENED ROOFING INSTALLATION

A. Mechanically fasten roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

1. Install sheet according to ASTM D 5082.

B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Start securing the membrane at the highest point and work towards the drains.

D. Pull sheets tight and install as wrinkle free as possible.

E. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

F. Mechanically fasten or adhere roofing securely at terminations, penetrations, and perimeter of roofing.

G. Apply roofing with side laps shingled with slope of roof deck where possible.

H. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed roof-drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.
3. Formed equipment support flashing.

1.2 SUBMITTALS

A. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Include identification of material, thickness, weight, and finish for each item and location in Project.
3. Include details for forming, including profiles, shapes, seams, and dimensions.
4. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.

B. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish: Two-coat fluoropolymer; AAMA 621; fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin.
3. Color: As selected by Architect from manufacturer's full range.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5-mil.

C. Galvanized Steel Sheet: Zinc-coated (galvanized) steel sheet according to ASTM A 653, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792, Class AZ50 coating designation, Grade 40.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 degrees F or higher.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 degrees F or lower.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners[, solder], protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Zinc Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153 or ASTM F 2329.

C. Solder: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape ½-inch wide and 1/8-inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1-inch-deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

H. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Downspouts: Fabricate round downspouts, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricated Hanger Style: Figure 1-35D according to SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from metallic-coated steel sheet.

B. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from metallic-coated steel sheet.

C. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from metallic-coated steel sheet.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and [drill elongated holes for fasteners on] interior leg. Miter corners, fasten and seal watertight.

1. Coping Profile: Figure 3-4A according to SMACNA's "Architectural Sheet Metal Manual."
2. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
3. Fabricate from metallic-coated steel sheet.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from galvanized steel sheet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

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

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than ¾-inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 degrees F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 degrees F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
2. Provide elbows at base of downspout to direct water away from building.
3. Connect downspouts to underground drainage system.

C. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

D. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper discharge.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of ¼-inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 7233

ROOF HATCH

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 PRIMARY METALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality, mill phosphatized for field painting, not less than 0.028-inch-thick (24-gauge) nominal unless otherwise indicated.

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, AZ50 coated.

2.2 ROOF HATCH

A. Roof Hatches: Metal roof-hatch units with single-leaf lid and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, integral metal cant, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

B. Loads: Minimum 40 foot-pounds per square foot external live load and 20 foot-pounds per square foot internal uplift load.

C. Hatch Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.079-inch thick.

D. Construction:

1. Insulation: Glass-fiber board.
2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
4. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
5. Fabricate curbs to minimum height of 12 inches unless otherwise indicated.

E. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive roof hatch and associated work for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION

A. General Requirements:

1. Install roof hatch level, plumb, true to line and elevation.
2. Anchor securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Roof Hatch:

1. Install roof hatch so top surface of hatch curb is level.
2. Securely attach safety railing to roof hatch curb.
3. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.

3.3 REPAIR

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Joint sealants, backing materials, and accessories necessary to complete their installation, including but not limited to:

1. Exterior Pourable Urethane Sealant.
2. Exterior Non-sag Silicone Sealant – Class 150/50.
3. Exterior Non-sag Silicone Sealant – Class 50.
4. Interior Non-sag Silicone Sealant.
5. Interior Non-sag Acrylic Latex Sealant.
6. Interior Non-sag Urethane Sealant.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each joint sealant product and accessory indicated, specified, or required.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing full range of colors available for each product exposed to view.

C. Samples for Verification: Samples for each kind and color of joint sealants in ½-inch-wide joints formed between two 6-inch-long strips of material matching appearance of exposed surfaces adjacent to joint sealants.

D. Warranties: Sample of special warranties.

1.3 QUALITY ASSURANCE

A. Installer Qualifications for Silicone Sealant Installations:

1. Experience: Installer with minimum of 10 years' specialized experience in performing specified Work similar in design, material and extent to scope of Project, and with a record of successful in-service performance.
2. Supervision: Installer shall maintain a competent supervisor who is on jobsite during times specified Work is in progress, and who is experienced in installing systems similar to type and scope required.
3. Manufacturer Acceptance: Installer shall be certified, approved or acceptable to manufacturer to install products.
4. Personnel Training: Installing personnel shall be trained by manufacturer to install products specified.

1.4 FIELD CONDITIONS

A. Ambient Conditions: Proceed with installation of joint sealants under following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

B. Weather Conditions Limitation: Proceed with Work only when existing and forecasted weather conditions will permit installation according to manufacturer's instructions and warranty requirements.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Silicone Sealants: Furnish warranty for a period of 20 years' from date of Substantial Completion agreeing to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified signed by an authorized representative using manufacturer's standard form.

B. Installers Special Warranty: Furnish warranty for a period of 2 years from date of Substantial Completion agreeing to repair or replace joint sealants that do not comply with performance and other requirements specified signed by an authorized representative using manufacturer's standard form.

C. Exclusions: Includes, but not limited to, deterioration or failure of joint sealants from following:

1. Movement of structure caused by structural settlement or errors attributable to design or construction resulting in stresses on sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Sections.

2.2 MATERIALS, GENERAL

A. Compatibility: Joint sealants, backings, and other related materials shall be compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint sealant manufacturer based on testing and field experience.

B. Single Source Responsibility: Furnish each type of joint sealant from single manufacturer.

C. Suitability for Contact with Food: Comply with authorities having jurisdiction for joints in repeated contact with food.

2.3 EXTERIOR ELASTOMERIC SEALANTS

A. Exterior Pourable Urethane Sealant:

1. Product Quality Standard: ASTM C 920, Type M, Grade P, Class 25, Use T.
2. Description: Multi-component, pourable, moisture curing, polyurethane sealant; rated for incline when used on sloped surfaces.
3. Joint Movement Capability: Plus 25 percent, minus 25 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Acceptable Manufacturers and Products:

    a. BASF; Sonolastic SL 2.
    b. May National Associates, Inc.; Bondaflex PUR 35SL.
    c. Pecora Corp.; Urexpan NR-200.
    d. Sika Corp., Construction Products Div.; Sikaflex 1CSL.
    e. Tremco Commercial Sealants & Waterproofing; THC-900/THC-901.

6. Color: As selected from manufacturer's standard colors.

B. Exterior Non-sag Silicone Sealant – Class 150/50:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 150/50.
2. Description: Single component, non-sag, neutral cure, non-staining as determined by pre-construction stain testing, and non-bleeding, silicone sealant.
3. Joint Movement Capability: Plus 150 percent, minus 50 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Acceptable Manufacturers and Products:

    a. Dow Corning; 790 Silicone Building Sealant.
    b. May National Associates, Inc.; Bondaflex Sil 290.
    c. Momentive Performance Materials, GE Silicones; Silpruf LM SCS2700.
    d. Pecora Corp.; 890NST.
    e. Sika Corp., Construction Products Div.; SikaSil 290 WP.
    f. Tremco Commercial Sealants & Waterproofing; Spectrem 1.

6. Color: As selected from manufacturer's standard colors.

C. Exterior Non-sag Silicone Sealant – Class 50:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 50.
2. Description: Single component, non-sag, neutral cure, non-staining as determined by pre-construction stain testing, and non-bleeding, silicone sealant.
3. Joint Movement Capability: Plus 50 percent, minus 50 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Acceptable Manufacturers and Products:

    a. BASF; Sonolastic Omniseal 50.
    b. Dow Corning; 795 Silicone Building Sealant.
    c. May National Associates, Inc.; Bondaflex Sil 295.
    d. Momentive Performance Materials, GE Silicones; Silpruf SCS2000.
    e. Pecora Corp.; 864NST.
    f. Sika Corp., Construction Products Div.; SikaSil 295.
    g. Tremco Commercial Sealants & Waterproofing; Spectrem 3.

6. Color: As selected from manufacturer's standard colors.

7. Color: As selected from manufacturer's custom colors.
8. Color: Custom color determined by Architect.

2.4 INTERIOR ELASTOMERIC SEALANTS

A. Interior Non-sag Silicone Sealant:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25.
2. Description: Single component, non-sag, moisture curing, silicone sealant specially formulated with fungicide for use in sanitary non-porous applications.
3. Acceptable Manufacturers and Products:

    a. BASF; Omniplus.
    b. Dow Corning; 786 Silicone Sealant.
    c. Momentive Performance Materials, GE Silicones; Sanitary SCS1700.
    d. Pecora Corp.; 898.
    e. Sika Corp., Construction Products Div.; Sikasil GP or GN Plus.
    f. Tremco Commercial Sealants & Waterproofing; Tremsil 200.

4. Color: As selected from manufacturer’s standard colors.

B. Interior Non-sag Acrylic Latex Sealant:

1. Product Quality Standard: ASTM C 834, Type and Grade as required by conditions.
2. Description: Single component, non-sag, moisture curing, general purpose, paintable, siliconized acrylic latex sealant.
3. Joint Movement Capability: Plus 7.5 percent, minus 7.5 percent.
4. Acceptable Manufacturers and Products:

    a. BASF; Sonolac.
    b. Pecora Corp.; AC 20.
    c. Tremco Commercial Sealants & Waterproofing; Tremflex 834.

5. Color: As selected from manufacturer’s standard colors.

C. Interior Non-sag Urethane Sealant:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25 or 35.
2. Description: Single component, non-sag, moisture curing, non-staining as determined by pre-construction stain testing if exposed, polyurethane sealant.
3. Joint Movement Capability: Plus 25 percent, minus 25 percent, or plus 35 percent, minus 35 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Acceptable Manufacturers and Products:

    a. BASF; Sonolastic NP 1.
    b. Pecora Corp.; Dynatrol I-XL.
    c. Sika Corp., Construction Products Div.; Sikaflex 1a, 11 FC, or 15 LM.
    d. Tremco Commercial Sealants & Waterproofing; Dymonic or Vulkem 116.

6. Color: As selected from manufacturer's standard colors.

2.5 JOINT SEALANT BACKING

A. Foam Backer Rods:

1. Product Quality Standard: ASTM C 1330, Type C, Type O, Type B.
2. Description: Extruded polyethylene, polyurethane, or polyolefin in either closed-cell structure (Type C), open-cell structure (Type O), or bicellular structure with surface skin (Type B) as defined by ASTM Terminology C 717.
3. Size: Diameter approximately 25 percent larger than joint width, unless otherwise directed by manufacturer.
4. Available Manufacturers and Products:

a. Type C:

1) BASF; Sonneborn, Closed-Cell Backer Rod.
2) Nomaco Inc.; Green Rod or HBR.

b. Type O:

1) Backer Rod Mfg. Inc.; Denver Foam.
2) Nomaco Inc.; Foam-Pak II.

c. Type B:

1) BASF; Sonneborn, Soft Backer Rod.
2) Nomaco Inc.; Dual-Rod or Sof-Rod.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 ACCESSORIES

A. Cleaners for Non-porous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent non-porous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

B. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine substrates to receive joint sealants and associated Work to which joint sealants will be applied for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

A. Cleaning of Joints: Clean out joints immediately before installing joint backings and sealants to comply with joint sealant manufacturer's written instructions and following requirements:

1. Remove foreign material that could interfere with adhesion of joint sealant, including, but not limited to, dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form-release agents from concrete.
4. Clean non-porous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint sealant manufacturer, or as indicated by prior experience, or as required by pre-construction compatibility and adhesion testing. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. ASTM C 1193 for use of joint sealants as applicable to materials, applications, conditions indicated, and following profile configurations:

   a. Fillet: Figure 5.
   b. Bridge: Figure 6.
   c. Butt: Figure 8A (concave tooling), generally hour-glass shape with 2:1 width-to-depth ratio.

2. Substrate material allowed by sealant’s ASTM C 920 Use Classification.
3. Respective manufacturer’s written installation instructions.
4. Approved submittals.
5. Contract Documents.

B. Joint Sealant Backings: Install of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretching, twisting, puncturing, or tearing backings.
3. Remove absorbent sealant backings that have become wet or damaged before sealant application and replace with dry materials.

4. Install bond-breaker tape behind sealants where backings are not used between sealants and backs of joints.

C. Joint Sealants: Install at same time as backings using proven techniques that comply with following:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
4. Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

    a. Remove excess sealant from surfaces adjacent to joints.
    b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    c. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. In-Progress Cleaning: Remove excess sealant or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. General Requirements: Protect during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original Work.

3.6 JOINT SEALANT SCHEDULE

A. Exterior Elastomeric Sealant Schedule:

1. Exterior Pourable Urethane Sealant: Moving joints in exterior concrete walks and drives.
2. Exterior Non-sag Silicone Sealant – Class 150/50: Moving joints on exterior side of exterior insulation and finish system (EIFS) walls.
3. Exterior Non-sag Silicone Sealant – Class 50: Moving joints on exterior side of exterior walls other than exterior insulation and finish system (EIFS) walls.

B. Interior Elastomeric Sealant Schedule:

1. Interior Non-sag Silicone Sealant:

    a. Non-moving joints in moist or damp areas which are susceptible to mildew.
    b. Non-moving joints in kitchens and toilet rooms.
    c. Non-moving joints in repeated contact with food.

2. Interior Non-sag Acrylic Latex Sealant:

   a. Non-moving joints where another type of sealant is not otherwise specified or scheduled.
   b. Minimal moving joints due to temperature change.

3. Interior Non-sag Urethane Sealant: Building joints on interior side of exterior walls where joint movement is anticipated.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow metal doors and frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Standard-Duty Doors and Frames: SDI A250.8, Level 1.

1. Physical Performance: Level C according to SDI A250.4.
2. Doors:

a. Thickness: 1-3/4 inches.
b. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.032-inch.

c. Edge Construction: Model 2, Seamless.
d. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

a. Materials: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042-inch.
b. Construction: Full profile welded.

4. Exposed Finish: Prime.

2.2 FRAME ANCHORS

A. Stud-Wall Type Jamb Anchors: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Clip-type anchors, with two holes to receive fasteners.

2.3 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Frame Anchors: ASTM A 879, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.

D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

E. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.4 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026-inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8-inch in 2 inches.
3. Top Edge Closures: Close top edges of doors with inverted closures of same material as face sheets.
4. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.

C. Hollow-Metal Frames:

1. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor.
2. Stud-Wall Type Jamb Anchors: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c.
3. Door Silencers: Drill stops to receive three door silencers. Keep holes clear during construction.

D. Hardware Preparation: Factory-prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
2. Floor Anchors: Provide floor anchors for each jamb that extends to floor, and secure with postinstalled expansion anchors. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Between Door and Frame Jambs and Head: 1/8-inch plus or minus 1/32-inch.
2. Between Edges of Pairs of Doors: 1/8-inch to ¼-inch plus or minus 1/32-inch.
3. At Bottom of Door: ¾-inch.
4. Between Door Face and Stop: 1/16-inch to 1/8-inch plus or minus 1/32-inch.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 08 1416

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with plastic-laminate faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

1.2 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.

C. Samples for Initial Selection: For plastic-laminate door faces.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than ¼-inch in a 42- by 84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01-inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

B. WDMA I.S.1-A Performance Grade: Heavy Duty.

C. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Blocking: Provide 5-inch top-rail wood blocking in particleboard-core doors indicated to have closers.

2.2 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors:

1. Grade: Custom.
2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
3. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of products.
4. Exposed Vertical Edges: Plastic laminate that matches faces, applied before faces.
5. Core: Particleboard.
6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Section 08 7100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

END OF SECTION

SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior storefront framing.
2. Exterior manual-swing entrance doors.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

B. Wind Loads: As indicated on Drawings.

C. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to ¾-inch, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.

D. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area: Maximum air leakage of 0.06-cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
2. Entrance Doors - Pair of Doors: Maximum air leakage of 1.0-cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 2.86 lbf/sq. ft.

G. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 2.86 lbf/sq. ft.
2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 degrees F, ambient; 180 degrees F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

    a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 degrees F.
    b. Low Exterior Ambient-Air Temperature: 0 degrees F.
    c. Interior Ambient-Air Temperature: 75 degrees F.

2.2 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: Oldcastle Building Envelope.
2. Window Product: AF3000.
3. Door Product: Series 375 - Medium Stile.

B. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers named alphabetically below. If not named, submit as substitution according to Conditions of the Contract and appropriate Division 01 Sections.

1. EFCO Corporation.
2. CR Laurence.
3. Kawneer North America.
4. Oldcastle Building Envelope.

2.3 METAL

A. Aluminum Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221; alloy and temper recommended by manufacturer for type of use and finish indicated.

2.4 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally improved.
2. Glazing System: Retained mechanically with gaskets on 4 sides.
3. Glazing Plane: Center.
4. Fabrication Method: Field-fabricated stick system.
5. Mounting: Nailing flange.

2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch-thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Medium stile; 3-1/2-inch nominal width.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets. Provide nonremovable glazing stops on outside of door.

2.6 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware indicated in door and frame schedule for each entrance door to comply with requirements in this Section.

B. Pivot Hinges: BHMA A156.4, Grade 1.

1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.

C. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Cylinders: As specified in Section 08 7100 "Door Hardware."

E. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

F. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

G. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

H. Silencers: BHMA A156.16, Grade 1.

I. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of ½-inch.

2.7 GLAZING

A. Glazing: Comply with Section 08 8000 "Glazing."

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

2.9 FABRICATION

A. Form components true to details with clean, straight, sharply defined profiles, free from defects impairing strength or durability.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.

3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Fasteners that are concealed from view to greatest extent possible.

D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

2.10 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018-mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018-mm or thicker.

1. Color: [Light bronze] [Medium bronze] [Dark bronze] [Champagne] [Black].

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Seal perimeter and other joints watertight unless otherwise indicated.

B. Set continuous sill members and flashing in full sealant bed as specified in Section 07 9200 "Joint Sealants" to produce weathertight installation.

C. Install components plumb and true in alignment with established lines and grades.

D. Install glazing as specified in Section 08 8000 "Glazing."

E. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8-inch in 10 feet.
2. Level: 1/8-inch in 20 feet.
3. Alignment: Where surfaces abut in line or are separated by reveal or protruding element up to ½-inch wide, limit offset from true alignment to 1/16-inch.
4. Location: Limit variation from plane to 1/8-inch in 12 feet.

END OF SECTION

SECTION 08 5619

PASS-THRU SLIDING WINDOW

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: Quikserv.
2. Product Number: SC4030.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which pass-thru sliding window will be applied for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

3.2 INSTALLATION

A. Install level, plumb, and true to line.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Items commercially known as finish or door hardware required for operation of doors, and accessories necessary to complete installation.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each item of door hardware indicated, specified, or required.

1. Including material descriptions, dimensions of individual components and profiles, finishes, and installation instructions.
2. Index product data sheets according to hardware schedule by use of numbers or letters, or combination.

1.3 QUALITY ASSURANCE

A. Accessibility Requirements: Hardware units and installation shall comply with Americans with Disabilities Act (ADA), ANSI A 117.1, and state and local accessibility standards.

B. Supplier Qualifications:

1. Experience: Architectural door hardware supplier that has record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
2. Staff Hardware Expertise: Experienced professional currently certified by DHI as AHC, CDC, and EHC, and experienced in door hardware installations that are comparable in material, design, and extent to this Project that will be responsible for following activities:

a. Preparation of submittals, including hardware set schedules.
b. Available for consultation to Owner, Architect, and Contractor during course of Work.
c. Finalizing keying requirements with Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

2.2 BUTT HINGES

A. Product Quality Standard: ANSI/BHMA A 156.1, Grade 1, 2 or 3.

B. Basis of Design: As indicated on Drawings.

2.3 CONTINUOUS GEARED HINGES

A. Product Quality Standard: ANSI/BHMA A 156.26, Grade 1, 2 or 3.

B. Description: Extruded-aluminum, pinless, geared hinge leaves; joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings; type required for application.

C. Screws: Phillips flat-head screws with heads to match surface of hinges. Machine screws installed into drilled and tapped holes.

2.4 CYLINDERS

A. Conventional Lock Cylinders: ANSI/BHMA A 156.5, Grade 1.

B. Description: Tumbler type, not less than 6 pins.

C. Permanent Cores: Removable core insert, removable by use of a special key; for use only with core manufacturer's cylinder and door hardware.

2.5 KEYING

A. Door Locks: Keyed, master-keyed, and grand master-keyed as directed by Owner's Representative with control keying for core removable cylinders.

1. Supply 2 keys for each lock.
2. Provide bitting list locks.
3. Provide 10 master keys.

B. Keys:

1. Metal: Brass.
2. Stamping: Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE."

2.6 LOCKS AND LATCHES

A. Product Quality Standards: ANSI/BHMA A 156.13, Grade 1.

B. Basis of Design: As indicated on Drawings.

2.7 EXIT DEVICES

A. Product Quality Standard: ANSI/BHMA A 156.3, Grade 1.

B. Description:

1. Touch bar type, unless scheduled otherwise.
2. Concealed vertical rods.
3. Mortise lock or rim type devices on single doors only.

2.8 PUSH/PULL TRIM

A. Product Quality Standard: ANSI/BHMA A 156.6.

B. Basis of Design: As indicated on Drawings.

2.9 CLOSERS

A. Product Quality Standard: ANSI/BHMA A 156.4. Grade 1.

B. Basis of Design: As indicated on Drawings.

2.10 STOPS AND HOLDERS

A. Product Quality Standard for Stops and Bumpers: ANSI/BHMA A 156.16, Grade 1.

B. Basis of Design: As indicated on Drawings.

2.11 PROTECTIVE TRIM UNITS

A. Product Quality Standard: ANSI/BHMA A 156.6.

B. Description: Minimum 0.050-inch-thick metal plates with beveled top and 2 sides.

C. Fasteners: Exposed fasteners consisting of either machine screws or self-tapping screws.

2.12 THRESHOLDS

A. Product Quality Standard: ANSI/BHMA A 156.21.

2.13 FINISHES

A. Product Quality Standard: ANSI/BHMA A 156.18.

B. Finish: US32D, brushed stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine doors and frames to receive door hardware and associated Work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 Series.

B. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A 250.6.

C. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. Respective manufacturer's installation instructions.
2. ANSI/DHI A 115.IG.
3. Approved submittals.
4. Contract Documents.

B. Mounting Heights: Mount door hardware units at heights as required to comply with governing regulations.

C. Hardware Installation:

1. Set hardware items level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
3. Do not install surface-mounted hardware items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of silicone sealant complying with requirements specified in Division 07 Section "Joint Sealants." Extend full width of opening and notch at door stops.

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Storefront framing and doors.

1.2 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within 10 years' from date of Substantial Completion. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within 10 years' from date of Substantial Completion. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to

manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1-inch, whichever is less.
3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.2 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: PPG
2. Product: Solarban 60.

2.3 GLASS PRODUCTS, GENERAL

A. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Pyrolytic-Coated, Low-Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

G. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than 4 days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C 1396.

1. Thickness: ½-inch.
2. Long Edges: Tapered.

2.2 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Thickness: 5/8-inch.

2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet.
2. Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

C. Locate edge and end joints over supports. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

D. Form control joints with space between edges of adjoining gypsum panels.

E. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

F. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On partitions/walls, apply gypsum panels vertically (parallel to framing), and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

2. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where required.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3: Not used.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
5. Level 5: Not used.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 3000

TILING

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit manufacturer's technical literature for each type of tile, mortar materials, grouting materials, and other products specified.

B. Samples for Verification Purposes: Submit samples for each item listed below of size and construction indicated. Where products involve normal color and texture variations, include sample sets showing the full range of variations expected.

1. Tile: Each type and composition of tile and for each color and finish required, at least 12-inch square, mounted on rigid panel, and with grouted joints using product complying with specified requirements and in color approved for completed Work.
2. Tile Trim and Accessories: Full-size units of each type and for each color required.

1.2 QUALITY ASSURANCE

A. Tile Installer Qualifications:

1. Experience: Company with minimum 10 years' specialized experience installing work similar to scope of this project and having record of successful in-service performance and completion of projects.
2. Field Supervision: Installer shall maintain a full-time supervisor on jobsite during times specified work is in progress who has minimum 10 years' experience similar to type and scope required for this Project.

B. Accessibility Requirements for Floor Tile:

1. Standards: Products and installation shall comply with Americans with Disabilities Act (ADA), ANSI A117.1, and state and local accessibility standards.
2. Floor Tile Slip Resistance: Static coefficient of friction as follows according to ASTM C 1028 without use of abrasive grain:

a. Level Floor Surface: Minimum 0.6.
b. Ramps: Minimum 0.8.
c. Steps: Minimum 0.6.

3. DCOF Slip Resistance

a. Products shall comply with a minimum wet DCOF AcuTest value of 0.42 for ceramic tiles for level interior spaces expected to be walked upon when wet.

1.3 PROJECT CONDITIONS

A. Environmental Limitations: Install tile only when construction in room is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products specified to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and do not change intended aesthetic, functional and performance requirements as judged by Architect.

2.2 CERAMIC TILE PRODUCTS

A. Material Quality Standard: ANSI A137.1, Standard Grade.

B. Ceramic Tile, General: Thin, ceramic surfacing unit made from clay, porcelain, or mixture of ceramic materials, glazed or unglazed, fired above red heat to temperature sufficient to produce specific physical properties and characteristics specified.

C. Factory Blending: For tile exhibiting color variations, blend tile in factory and package so that tile units taken from one package show the same range in colors as those taken from other packages.

2.3 SETTING (MORTAR AND GROUT) MATERIALS

A. Material Quality Standards: ANSI A118 Series indicated.

B. Thin-Set Mortar:

1. Material Quality Standard: ANSI A118.4, with following physical properties:

a. Manufacturer’s premium polymer modified thin-set product; gray color.
b. Integral antimicrobial product added during manufacturing to resist mold and mildew growth.

2. Available Manufacturers and Products:

a. Creative Materials / Bostik; Bostik PM- Polymer Multi-Purpose Thin-Set Mortar
b. Custom Building Products; MagaLite Crack Prevention Mortar.
c. Laticrete International, Inc.; Laticrete 255 MultiMax Multipurpose Thin-Set Mortar.
d. Mapei Corp.; Ultralite Mortar.

C. Latex-Portland Cement Grout - Floors and Walls - Front of the House:

1. Material Quality Standard: ANSI A118.7, with following physical properties:

a. Manufacturer’s premium polymer modified grout product.
b. Integral antimicrobial product added during manufacturing to resist mold and mildew growth.

2. Available Manufacturers and Products:

a. Creative Materials / Bostik; Ceramic Tile Grout- Sanded, mixed with 425 Multi-Purpose Latex Admixture
b. Custom Building Products; Prism Surecolor Grout.
c. Laticrete International, Inc.; Tri-Poly Fortified Sanded Grout, 1500 Series or Tri-Poly Fortified Unsanded Grout, 1600 Series as required with 1776 Grout Admix Plus.

d. Mapei Corp.; Ultracolor Plus.

D. Epoxy Grout - Floors - Back of the House:

1. Material Quality Standard: ANSI A118.3, with following physical properties:

a. 100 percent solids.
b. Chemical-resistant, water-cleanable, multiple component product.
c. Resistant to intermittent exposure to temperatures of up to 212 degrees F.
d. Mold and mildew resistant.

2. Available Manufacturers and Products:

a. Creative Materials/Bostik; EzPoxy 100% Solids Industrial Epoxy Mortar & Grout
b. Laticrete SpectraLock 2000 IG Industrial Epoxy.
c. Mapei Corp.; Kerpoxy IEG.

E. Acceptable Manufacturers:

1. Bonsal American.
2. Bostik, Inc.
3. Custom Building Products.
4. Laticrete International, Inc.
5. Mapei Corp.
6. TEC Specialty Products Inc.

2.4 ELASTOMERIC SEALANTS

A. Sealant Colors: Match color of adjacent grout unless otherwise indicated.

B. Wall Joint Sealant:

1. Material Quality Standard: ASTM C 920, Type S, Grade NS, Class 25, with following physical properties:

a. Integral antimicrobial product added during manufacturing to resist mold and mildew growth.
b. Intended for sealing interior ceramic tile joints and other nonporous substrates.
c. Resistant to in-service exposures of high humidity and temperature extremes.

2. Generic Description: One-part, mildew-resistant, silicone sealant.
3. Available Manufacturers and Products:

a. Degussa Construction Chemicals, Sonneborn; Omniplus.
b. Dow Corning Corp.; 786.
c. Pecora Corp.; 898.
d. Tremco Inc.; Tremsil 200.

C. Floor Joint Sealant:

1. Material Quality Standard: ASTM C 920, Type S, Grade P, Class 25.
2. Generic Description: One-part, self-leveling, polyurethane sealant.
3. Available Manufacturers and Products:

a. Degussa Construction Chemicals, Sonneborn; Sonolastic SL1.

b. Pecora Corp.; Urexpan NR-201.
c. Tremco Inc.; Tremflex S/L.

D. Chemical Resistant Floor Joint Sealant:

1. Generic Description: Two-part, self-leveling, epoxy sealant.
2. Available Manufacturers and Products:

a. Euclid Chemical Co.; Euco 800.
b. L&M Construction Chemical Inc.; Epoflex SL.

E. Backer Rods:

1. Material Quality Standard: ASTM C 1330, Type B.
2. Description: Non-gassing (when punctured), bi-cellular polyethylene or polyolefin foam rod with a surface skin, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
3. Available Manufacturers and Products:

a. Degussa Building Systems, Sonneborn; Soft Backer Rod.
b. Nomaco Inc.; Sof Rod.

F. Backer Tape: Bond-breaking polyethylene or other plastic tape, self-adhesive where applicable, recommended by sealant manufacturer for preventing sealant from adhering to back of joint where such adhesion would result in sealant failure.

2.5 RELATED MATERIALS

A. Underlayments: Trowelable or self-leveling as required by conditions; pre-mixed, latex-modified, portland cement based formulation provided by or specifically approved by setting material manufacturer; include primers if required for concrete substrate condition.

B. Patching Compounds: Trowelable pre-mixed, latex-modified, portland cement based formulation provided by or specifically approved by setting material manufacturer; include primers if required for concrete substrate condition.

C. Tile Cleaner: Neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, provided by or specifically approved by tile and grout manufacturers.

D. Grout Sealer: Silicone product for sealing unglazed tile and grout joints that does not change color or appearance of tile or grout, provided by or specifically approved by tile and grout manufacturers.

E. Glass-Fiber Tape: Self-adhering, alkali-resistant, glass-fiber tape, 10 by 10 or 10 by 20 threads per 1-inch; minimum 2 inches wide.

2.6 MIXING MORTARS AND GROUT

A. General Procedures:

1. Mix to comply with referenced quality standards and manufacturers' written instructions.
2. Add materials, water, and additives in accurate proportions.
3. Use type of mixing equipment, speeds, containers, time, and other procedures to produce uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Conditions: Examine substrate surfaces to which tile will be installed for compliance with requirements, installation tolerances and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with the Contract Documents. Starting work within a particular area will be construed as acceptance.

3.2 PREPARATION

A. Substrate Cleaning: Remove curing compounds, coatings, laitance, efflorescence, concrete dust, dirt, oil, gypsum board dust, paint, and other residue that would adversely affect or reduce bonding.

B. Concrete Floor Preparation:

1. Prepare concrete floor substrates to comply with flatness tolerance of ¼-inch in 10 feet as follows:

a. Fill cracks, holes and depressions with trowelable underlayments and patching compounds.
b. Remove concrete protrusions, bumps, and ridges by sanding or grinding.

2. If substrate does not have fine broom finish, mechanically scarify concrete substrates to not less than ICRI CSP 4 finish.

C. Blending: Verify tile has been factory blended and packaged as specified; if not, either return to manufacturer or blend tiles at site before installing.

D. Penetrations: Prior to installing tile, apply wall joint sealant at penetrations through wall substrates to create water resistant barrier; especially at piping penetrations.

3.3 INSTALLATION, GENERAL

A. Installation Quality Standard: In addition to standards listed elsewhere, perform tile work according to following, unless otherwise specified:

1. ANSI A108 installation method indicated.
2. TCNA installation method indicated.
3. Respective manufacturer’s written installation instructions.
4. Respective manufacturer’s installation written instructions.
5. Approved submittals.
6. Contract Documents.

B. General Requirements:

1. Extend tile into recesses and under or behind equipment and fixtures to form a complete covering without interruptions unless otherwise indicated.
2. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
3. Accurately form intersections and returns.
4. Perform cutting and drilling of tile without marring visible surfaces.
5. Grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints, to form smooth edges.
6. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile by not less than 1/8-inch.

C. Jointing Pattern:

1. Unless otherwise indicated, lay tile in grid pattern.
2. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
3. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
4. Provide uniform joint widths.
5. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

D. Wainscots: Lay out tile to next full tile beyond dimensions indicated, and finish with bullnose shape.

3.4 TILE INSTALLATION

A. Installation Quality Standard: Install tile according to following standards:

1. Thin-set Mortar: ANSI A108.5.
2. Latex-Portland Grout: ANSI A108.10.
3. Epoxy Grout: ANSI A108.9.

B. Tile Installation Quality Standards: Install tile according to following standards:

1. Floors: TCNA F113.
2. Walls: TCNA W244C.

C. Back Buttering: For following installations, obtain minimum 95 percent mortar coverage as in referenced ANSI A108 series of installation standards:

1. Tile floors in wet and limited water exposures.
2. Tile floors composed of tiles 12 inches by 12 inches or larger.
3. Tile floors composed of rib-backed tiles.

D. Tile and Grout Sealer: After grout has cured, apply to unglazed tile and grout joints.

3.5 MOVEMENT JOINTS

A. Wall Joints: Following conditions shall not be grouted; install wall joint sealant and backer rod or tape:

1. Gypsum board assembly control joints.
2. Interior corners of tiled walls.
3. Around substrates and tile at penetrations through tiled substrates.
4. At one side of changes in direction or plane of wall.
5. At joint closest and parallel to changes in substrates supporting tile.

B. Floor Joints:

1. General Requirements:

a. Continue construction, contraction (control), and expansion joints in building structure through tile work.
b. Isolate tile work that abuts a restraining structure or assembly.
c. When metal trim or sealant/backer is used for joint, width shall not be less than width of joint in building structure.
d. Tile should not be placed over building expansion joints.

2. Schedule of Products and Locations:

   a. Latex-Portland Cement Grouted Floors: Install floor joint sealant with backer rod at horizontal joints in mortar and grout setting conditions other than epoxy mortar.
   b. Epoxy Grouted Floors: Install chemical resistant floor joint sealant full depth without backer rod at horizontal joints in epoxy mortar and grout setting conditions.

3. Interior Joint Spacing:

   a. Tile Exposed to Sunlight: 8 to 12 feet on center each way.
   b. Tile Not Exposed to Sunlight: 20 to 25 feet on center each way.

3.6 CLEANING

A. Cleaning:

1. Clean tile surfaces so they are free of foreign matter.
2. Remove grout residue from tile as soon as possible.
3. No sooner than 10 days after installation, clean grout smears and haze from tile according to tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned.
4. Protect metal surfaces and plumbing fixtures from effects of cleaning.
5. Flush surfaces with clean water before and after cleaning.
6. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

3.7 PROTECTION

A. Coverings: When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

B. Traffic Restrictions: Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

END OF SECTION

SECTION 09 5113

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named on the Drawings to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

2.2 ACOUSTICAL PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each basis of design type.

2.3 METAL SUSPENSION SYSTEMS

A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

D. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653, not less than G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.

1. Structural Classification: Heavy-duty system.
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Steel cold-rolled sheet.
5. Cap Finish: Painted in color indicated.

2.4 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636 according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structures.
5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
6. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8-inch in 12 feet. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. Install panels with pattern running in one direction parallel to long axis of space.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 9100

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and field painting of exposed exterior and interior items and surfaces.

1.2 SUBMITTALS

A. Product Data: Manufacturers technical literature for each paint system indicated, specified, or required.

1. Indicate each material and cross-reference specific coating, finish system, and application.
2. Identify each material by manufacturer's catalog number and general classification.
3. Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Detailed Painting Schedule:

1. Furnish "Detailed Painting Schedule" indicating type of surface, type of paint material, and number of coats required, as set forth in "Painting Requirements."
2. Submit brand designation and grade of indicated type produced by approved manufacturer for each application listed or required.

C. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate, 8 by 10 inches.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and field-applied primers for each coating system from the same manufacturer as the finish coats.

1.4 DELIVERY AND STORAGE

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature recommended by manufacturer. Maintain storage containers in a clean condition, free of foreign materials and residue.

1.5 FIELD CONDITIONS

A. Apply paints only when temperatures of surfaces to be painted and surrounding air are between minimum and maximum range recommended by manufacturer.

B. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature and humidity limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products manufactured by Sherwin-Williams Co. to establish a standard of quality. Other acceptable manufacturers, indicated on Drawings, with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

2.2 PAINT MATERIALS, GENERAL

A. Products: As indicated in PART 3 below.

B. Colors: As indicated on Drawings.

2.3 TEXTURE MATERIALS

A. Wall Texture:

1. Description: Unaggregated, water-based, ready mix, vinyl formulation to create textured finish.
2. Basis of Design: USG Corp.; Sheetrock Wall and Ceiling Spray Texture.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive paint and associated Work for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance of surface conditions.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to shop applicators to ensure use of compatible primers.

3.2 PREPARATION

A. General:

1. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted.
2. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
3. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Surface Preparation: Prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition. Clean substrates of substances that could impair the bond of the various coatings.

1. Gypsum Board: Comply with Gypsum Association Publication GA 232.

a. Fill remaining cracks, depressions, holes and other irregularities with spackling compound.
b. Sand rough or high spots left by joint cement or spackling compound without damaging paper face.
c. Remove dust by wiping with damp cloths or vacuuming.

2. Ungalvanized Metal Surfaces:

a. Clean surfaces that have not been shop-coated to remove foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
b. Touch-up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch-up with same primer as the shop coat.

3. Galvanized Metal Surfaces:

a. Clean galvanized surfaces free of oil and surface contaminants.
b. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

C. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Use only thinners approved by paint manufacturer and only within manufacturer’s recommended limits.

D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION, GENERAL

A. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components.
2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

    a. Furred areas.
    b. Ceiling plenums.
    c. Pipe spaces.

3. Finished metal surfaces.
4. Finished mechanical and electrical operating equipment.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

3.4 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
5. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Sand lightly between each succeeding enamel coat on metals.
10. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation.
11. The number of coats and film thickness required are the same regardless of application method.
12. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
13. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
14. Omit primer over metal surfaces that have been shop primed and touchup painted.
15. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
16. Ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
17. Allow sufficient time between successive coats to permit proper drying.

B. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve total dry film thickness of the entire system as recommended by manufacturer.

C. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

D. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

E. Texture Finish: Apply using powered spray equipment to product specified textured finish free of starved spots or other evidence of thin application or of application patterns.

F. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.5 CLEANING

A. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repainting, repairing or replacing. Coordinate corrections with other trades involved.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINT SCHEDULE

A. Gypsum Board Ceilings:

1. 1st Coat: Sherwin-Williams Harmony Low Odor Interior Latex Primer, B11W500.
2. 2nd Coat: Sherwin-Williams Harmony Low Odor Interior Latex Flat, B5 Series.
3. 3rd Coat: Sherwin-Williams Harmony Low Odor Interior Latex Flat, B5 Series.

B. Gypsum Board Walls - Unless Noted Otherwise:

1. 1st Coat: Roller applied latex texturing compound.
2. 2nd Coat: Sherwin-Williams Harmony Low Odor Interior Latex Primer, B11W500.
3. 3rd Coat: Sherwin-Williams Harmony Low Odor Interior Latex Eg-Shel, B9 Series.
4. 4th Coat: Sherwin-Williams Harmony Low Odor Interior Latex Eg-Shel, B9 Series.

C. Gypsum Board Walls - Toilets:

1. 1st Coat: Sherwin-Williams Harmony Low Odor Interior Latex Primer, B11W500.
2. 2nd Coat: Sherwin-Williams Water Based Catalyzed Epoxy, B70W211/B60V25.
3. 3rd Coat: Sherwin-Williams Water Based Catalyzed Epoxy, B70W211/B60V25.

D. Ferrous Metals:

1. 1st Coat: Sherwin-Williams ProCryl Universal Primer, B66-310 Series.
2. 2nd Coat: Sherwin-Williams DTM Acrylic, B66-W1 Series.
3. 3rd Coat: Sherwin-Williams DTM Acrylic, B66-W1 Series.

3.8 EXTERIOR PAINT SCHEDULE

A. Primed Ferrous Metals:

1. 1st Coat: Sherwin-Williams Kem Kromik Universal Metal Primer.
2. 2nd Coat: Sherwin-Williams Incredicoat Latex Semi-Gloss Enamel.
3. 3rd Coat: Sherwin-Williams Incredicoat Latex Semi-Gloss Enamel.

B. Galvanized Ferrous Metals:

1. 1st Coat: Sherwin-Williams Galvite, B50-W3 Series.
2. 2nd Coat: Sherwin-Williams DTM Acrylic, B66-W1 Series.
3. 3rd Coat: Sherwin-Williams DTM Acrylic, B66-W1 Series.

C. Cedar Siding and Trim: Sherwin-Williams Exterior Alkyd Semi-Transparent Stain, A14T00005

END OF SECTION

SECTION 09 9723

EXTERIOR TEXTURED FINISH

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Exterior textured finish system over concrete masonry.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required, details, and installation instructions.

B. Samples for Initial Selection: Full range of manufacturer’s standard colors and textures available.

1.3 QUALITY ASSURANCE

A. Applicator’s Qualifications: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing and temperatures in excess of 90 degrees F. Store away from direct sunlight.

C. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.5 PROJECT/SITE CONDITIONS

A. Maintain ambient and surface temperatures above 40 degrees F during application and drying period, minimum 24 hours after application of materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: Sto Corp.
2. Surface Conditioner: Sto Plex W.
3. Fabric Reinforcement: Sto Mesh.
4. Leveler: Sto BTS-Plus.
5. Waterproofing: Sto Flexyl.

6. Primer: Sto Primer.
7. Finish: As selected from manufacturer's standard products available.

2.2 MATERIALS

A. Surface Conditioner: Water based acrylic surface conditioner suitable for concrete masonry surfaces.

B. Fabric Reinforcement: Nominal 4.5 oz/sq yd, symmetrical, interlaced open-weave glass fiber fabric made with minimum 20 percent by weight alkaline resistant coating.

C. Leveler: Polymer modified cement based leveler for resurfacing concrete masonry surfaces (up to 1/8-inch in 2 coats).

D. Waterproofing: Acrylic based fiber reinforced waterproof membrane mixed with portland cement.

E. Primer: Acrylic based tinted primer.

F. Finish: Acrylic or silicone enhanced textured wall finish

G. Portland Cement: ASTM C 150, Type I.

H. Water: Clean and potable.

2.3 MIXING

A. Mix individual products according to manufacturer's instructions.

B. Do not exceed maximum amount of water in mix ratio.

C. Mix only as much material as can readily be used.

D. Do not use anti-freeze compounds or other additives.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which exterior textured finish will be applied for compliance with requirements, installation tolerances and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 SURFACE PREPARATION

A. Concrete Masonry Units: Provide a surface that is free of surface contamination such as algae, dirt, dust, efflorescence, oil, fungus, grease, mildew or other foreign substances, straight and true to line and plane. Remove projecting joint mortar so it is even with the plane of the wall. Remove grease, oil and dirt by washing with a trisodium phosphate detergent and thoroughly rinsing with clean water. Remove efflorescence by mechanically scraping or abrading the

surface with a wire brush. Refer to ASTM D 4261 for cleaning practice and other cleaning methods that may apply.

3.3 APPLICATION

A. Surface Conditioner: Apply uniformly by roller or spray application to the prepared surface.

B. Resurfacing: Installation over prepared concrete masonry:

1. Pre-moisten concrete masonry units and absorbent concrete prior to the placement of leveler.
2. Apply leveler with sufficient pressure to ensure intimate contact with the prepared substrate and complete coverage to an approximate thickness of 1/8- to ¼-inch. Embed reinforcing mesh in the wet leveler and trowel from the center to the edges of the fabric. Trowel the leveling coat smooth such that the fabric is fully embedded and no fabric color shows through. Overlap fabric seams minimum 2-1/2 inches.
3. Apply second coat with sufficient pressure to ensure intimate contact with the first coat to an approximate thickness of 1/8- to ¼-inch as needed to bring the surface to the desired thickness. Use a rod or straight edge to bring the surface to a true, even plane. Fill depressions in plane with additional leveler.
4. Finished surface must be true, square and level to within ¼-inch in 10 feet.
5. Moist cure after the leveler has set by lightly fogging the surface for at least 48 hours. Fog as frequently as required during the 48 hour period to prevent loss of moisture from the leveler. Avoid eroding the surface with excess moisture. If relative humidity exceeds 75 percent the frequency of moist-curing can be diminished.

C. Waterproofing: Apply to prepared surfaces by trowel to an approximate thickness of 1/16-inch.

D. Primer: Apply evenly with brush, roller or proper spray equipment over the clean, dry surface and allow to dry thoroughly before applying finish.

E. Finish: Apply directly over the primed wall surface. Apply finish by spraying or troweling, depending on the finish specified.

1. Allow the substrate to dry minimum 28 days.
2. Avoid application in direct sunlight.
3. Apply finish in a continuous application, and work to an architectural break in the wall.
4. Do not install separate batches of finish side-by-side.
5. Do not apply finish into or over joints or accessories. Apply finish to outside face of wall only.

END OF SECTION

SECTION 09 9726

INTERIOR TEXTURED FINISH

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior textured finish system over concrete masonry.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required, details, and installation instructions.

B. Samples for Initial Selection: Full range of manufacturer’s standard colors and textures available.

1.3 QUALITY ASSURANCE

A. Applicator’s Qualifications: Company experienced in performing specified work similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and trained and skilled personnel.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in their original sealed containers bearing manufacturer's name and identification of product.

B. Protect coatings (pail products) from freezing and temperatures in excess of 90 degrees F. Store away from direct sunlight.

C. Protect portland cement based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.

1.5 PROJECT/SITE CONDITIONS

A. Maintain ambient and surface temperatures above 40 degrees F during application and drying period, minimum 24 hours after application of materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named below to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

1. Manufacturer: Sto Corp.
2. Fabric Reinforcement: Sto Mesh.
3. Leveler: Sto BTS-Plus.
4. Primer: Sto 801 Primer or Sto 804 Primer.
5. Finish: As selected from manufacturer’s standard products available.

2.2 MATERIALS

A. Fabric Reinforcement: Nominal 4.5 oz/sq yd, symmetrical, interlaced open-weave glass fiber fabric made with minimum 20 percent by weight alkaline resistant coating.

B. Leveler: Polymer modified cement based leveler for resurfacing concrete masonry surfaces (up to 1/8-inch in 2 coats).

C. Primer: Acrylic based tinted primer.

D. Finish: Acrylic or silicone enhanced textured wall finish

E. Portland Cement: ASTM C 150, Type I.

F. Water: Clean and potable.

2.3 MIXING

A. Mix individual products according to manufacturer's instructions.

B. Do not exceed maximum amount of water in mix ratio.

C. Mix only as much material as can readily be used.

D. Do not use anti-freeze compounds or other additives.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which interior textured finish will be applied for compliance with requirements, installation tolerances and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 SURFACE PREPARATION

A. Concrete Masonry Units: Provide a surface that is free of surface contamination such as algae, dirt, dust, efflorescence, oil, fungus, grease, mildew or other foreign substances, straight and true to line and plane. Remove projecting joint mortar so it is even with the plane of the wall. Remove grease, oil and dirt by washing with a trisodium phosphate detergent and thoroughly rinsing with clean water. Remove efflorescence by mechanically scraping or abrading the surface with a wire brush. Refer to ASTM D 4261 for cleaning practice and other cleaning methods that may apply.

3.3 APPLICATION

A. Resurfacing: Installation over prepared concrete masonry:

1. Pre-moisten concrete masonry units and absorbent concrete prior to the placement of leveler.

2. Apply leveler with sufficient pressure to ensure intimate contact with the prepared substrate and complete coverage to an approximate thickness of 1/8- to ¼-inch. Embed reinforcing mesh in the wet leveler and trowel from the center to the edges of the fabric. Trowel the leveling coat smooth such that the fabric is fully embedded and no fabric color shows through. Overlap fabric seams minimum 2-1/2 inches.
3. Apply second coat with sufficient pressure to ensure intimate contact with the first coat to an approximate thickness of 1/8- to ¼-inch as needed to bring the surface to the desired thickness. Use a rod or straight edge to bring the surface to a true, even plane. Fill depressions in plane with additional leveler.
4. Finished surface must be true, square and level to within ¼-inch in 10 feet.
5. Moist cure after the leveler has set by lightly fogging the surface for at least 48 hours. Fog as frequently as required during the 48-hour period to prevent loss of moisture from the leveler. Avoid eroding the surface with excess moisture. If relative humidity exceeds 75 percent the frequency of moist-curing can be diminished.

B. Primer: Apply evenly with brush, roller or proper spray equipment over the clean, dry surface and allow to dry thoroughly before applying finish.

C. Finish: Apply directly over the primed wall surface. Apply finish by spraying or troweling, depending on the finish specified.

1. Allow the substrate to dry minimum 28 days.
2. Avoid application in direct sunlight.
3. Apply finish in a continuous application, and work to an architectural break in the wall.
4. Do not install separate batches of finish side-by-side.
5. Do not apply finish into or over joints or accessories. Apply finish to outside face of wall only.

END OF SECTION

SECTION 10 1400

EXTERIOR SIGNS

PART 1 - GENERAL – Not Used

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following:

1. Best Manufacturing Company, Montrose, Colorado.
2. Mohawk Sign Systems, Schenectady, New York.
3. Nelson-Harkins, Chicago, Illinois.
4. ASI Signs, Dallas, Texas.

2.2 HANDICAPPED PARKING

A. Screen Printed Signs:

1. 18-gauge bonderized steel with blue baked enamel finish and white screen printed copy.
2. Copy and Size:

a. "Handicapped Parking Only" - 12 inches by 18 inches.
b. "Van Accessible" - 12 inches by 6 inches.

3. Acceptable Product: Best Traffic Signs No. SS04 with SS52 as required.

B. Post: Galvanized pipe column minimum 9 feet long.

2.3 DIRECTIONAL SIGNS

A. Screen Printed Signs:

1. Extruded aluminum panels with anodic finish and white screen printed copy.
2. Size and Configuration: As indicated on Drawings.
3. Copy: As indicated on Drawings.
4. Acceptable Product: Best Post and Plank as detailed on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install signs plumb, level and square and in proper planes with other work, at heights as indicated by Owner’s Representative.

B. Anchor each plastic laminate sign with adhesive.

C. Install signs with sufficient amount of foam tape for proper installation.

D. Attach as recommended by sign manufacturer.

E. Anchor each sign with adhesive.

F. Coordinate arrival and installation of graphic signs with hardware installation. Graphic signs function as and are coordinated with the hardware as shown on the Drawings.

3.2 EXTERIOR INSTALLATION - PARKING AND DIRECTIONAL SIGNS

A. Mount posts in 12-inch round by 2'-6"-deep concrete footing.

B. Handicapped Signs: 60 inches to bottom of lowest line (including “Van Accessible”).

END OF SECTION

SECTION 10 2113

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required.

B. Shop Drawings: Detailed and dimensioned plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: 6-inch square of finish.

D. Maintenance Data: For inclusion in maintenance manual required by Division 01.

1. Include manufacturer’s instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.
3. Include name, address, and telephone number of manufacturer's nearest authorized service representative.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Contract Documents are based on products named on Drawings to establish a standard of quality. Other available manufacturers with products having equivalent characteristics may be considered provided deviations are minor and design concept expressed in Contract Documents is not changed, as judged by Architect.

2.2 PRIMARY MATERIALS

A. Stiles and Panels: Solid color reinforced composite material with graffiti resistant surface thermoset and integrally fused into one homogeneous piece.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard continuous, cam type that swings to a closed or partially open position.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.

6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive toilet compartment and associated work for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION

A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to following, unless otherwise specified:

1. Respective manufacturer’s installation instructions.
2. Approved submittals.
3. Contract Documents.

B. Installation, General: Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

END OF SECTION

SECTION 10 2619

CORNER GUARDS

PART 1 - GENERAL (Not Used)

PART 2 - PRODUCTS

2.1 CORNER GUARDS

A. Material and Fabrication: ASTM A 240, Type 304, minimum 0.050 inch thick stainless steel with satin No. 4 non-directional finish; formed to fit wall condition.

1. Wing Size: Nominal 2 by 2 inches.
2. Height: As indicated.
3. Corner Radius: 1/8-inch.
4. Mounting: Construction adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to which corner guards will be applied for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

3.2 INSTALLATION

A. Install level, plumb, and true to line without distortions.

END OF SECTION

SECTION 10 4416

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Portable fire extinguishers and accessories indicated, specified, or required for installation.

1.2 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required. Include rating and classification.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10.

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.4 WARRANTY

A. Special Manufacturer's Warranty: Standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fails in materials or workmanship within 6 years from date of substantial completion.

B. Failures include, but are not limited to, the following:

1. Failure of hydrostatic test according to NFPA 10.
2. Faulty operation of valves or release levers.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

A. General: Type, size, and capacity for each fire protection cabinet indicated.

1. Valves: Manufacturer's standard.
2. Handles and Levers: Manufacturer's standard.
3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type: UL-rated 4A:60B:C, 10 lb capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

C. Mounting Bracket: Manufacturer’s standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:

1. Examine substrates to receive fire extinguishers and associated Work for compliance with requirements and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION

A. Install fire extinguishers in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

END OF SECTION

SECTION 22 0529

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to applicable code for support of plumbing.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Piping: Conform to ASTM F 708.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.2 SUPPORTS

A. Support horizontal and vertical piping against movement.

END OF SECTION

SECTION 22 0700

PIPING INSULATION

PART 1 GENERAL – REQUIREMENTS

1.1 Confirm to Applicable codes.

PART 2 PRODUCTS

2.1 INSULATION

A. Insulation: ASTM C 547 [and ASTM C 795]; rigid molded, noncombustible.

1. 'K' ('Ksi') value: ASTM C 177, 0.24 at 75 degrees F.
2. Maximum Service Temperature: 850 degrees F.
3. Maximum Moisture Absorption: 0.2 percent by volume.

B. Acceptable Manufacturers:

1. Manville.
2. Owens-Corning.

C. Vapor Barrier Lap Adhesive: Compatible with insulation.

D. Insulating Cement/Mastic: ASTM C 195; hydraulic setting on mineral wool.

E. Fibrous Glass Fabric:

1. Cloth: Untreated; 9-oz/sq-yd weight.
2. Blanket: 1.0-lb/cu-ft density.
3. Weave: 5x5.
4. Thickness: 1-inch.

F. Indoor Vapor Barrier:

1. FRK self-sealing jacket.
2. Vinyl emulsion type acrylic, compatible with insulation.

G. Flexible Foam Insulation: ½-inch-thick flexible foam plastic insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with NAIMA National Insulation Standards.

B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

C. Insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

D. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

E. Insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:

1. Application: Piping 1-1/2-inch diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

3.2 SCHEDULES

A. Plumbing Systems: Thickness per this section

END OF SECTION

SECTION 22 1000

PLUMBING PIPING

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Perform Work in accordance with authority having jurisdiction standards. Utilize products as indicated in drawings and as allowed by authorities having jurisdiction.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Welding Materials and Procedures: Conform to ASME SEC IX and applicable State labor regulations.

D. Welders Certification: In accordance with ASME SEC IX.

E. Identify pipe with marking including size, ASTM material classification, ASTM specification, and water pressure rating.

1.2 REGULATORY REQUIREMENTS

A. Perform Work in accordance with authority having jurisdiction plumbing code.

B. Conform to applicable code for installation of backflow prevention devices.

C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

PART 2 PRODUCTS

2.1 BALL VALVES

A. Up To and Including 3 Inches:

1. Acceptable Products:

a. Crane Model 9200 Series.
b. Stockham Model 5206 Series.

B. 2 Inches and Larger:

1. Acceptable Products:

a. Crane Model 9200 Series.
b. Stockham Model 5206 Series.

2.2 GLOBE VALVES

A. Up To and Including 3 Inches:

1. Acceptable Products:

a. Milwaukee Model 572.

b. Crane Model 1702.
c. Stockham Model B-16.

B. 2 Inches and Larger:

1. Acceptable Products:

a. Milwaukee Model 572.
b. Crane Model 1702.
c. Stockham Model B-16.

2.3 WATER PRESSURE REDUCING VALVES

A. Up to 2 Inches: Acceptable Products: Watts Model 223.

B. Over 2 Inches: Acceptable Products: Watts Model 127W.

2.4 RELIEF VALVES

A. Pressure Relief: Acceptable Products: Watts Model 40.

B. Temperature and Pressure Relief: Acceptable Products: Watts Model 40.

2.5 STRAINERS

A. Size 2 inches and Under: Acceptable Products: Watts Model 77S.

B. Size 1-1/2 inches to 4 inches: Acceptable Products: Watts Model 77F.

2.6 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Cast-Iron Pipe: ASTM A 74 service weight, hub and spigot.

1. Fittings: Cast iron.
2. Joints: Caulked joints, lead and oakum.

B. Cast-Iron Pipe: ASTM A 888, no hub.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, neoprene gasket.

C. PVC Pipe: ASTM D 3034 SDR 35 or ASTM D 2665, SCH where allowed by code.

1. Fittings: PVC.
2. Joints: ASTM F 477, elastomeric gaskets.

2.7 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast-Iron Pipe: ASTM A 74 service weight.

1. Fittings: Cast iron.
2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C 564 neoprene gaskets or lead and oakum.

B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.

1. Fittings: PVC.
2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.

2.8 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast-Iron Pipe: ASTM A 74, service weight.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, lead and oakum.

B. Cast-Iron Pipe: ASTM A 888, no hub.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, neoprene gasket.

C. PVC Pipe: ASTM D 2665, Schedule 40, DWV.

1. Fittings: PVC.
2. Joints: ASTM D 2855, solvent weld with ASTM D 2654, solvent cement.

2.9 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Ductile Iron Pipe: AWWA C151.

1. Fittings: AWWA C110, ductile or gray iron, standard thickness.
2. Joints: AWWA C111, rubber gasket with ¾-inch-diameter rods.

B. CPVC Pipe: ASTM D 2846, Schedule 80.

1. Fittings: CPVC ASTM F493, Schedule 80.
2. Joints: ASTM F 493, solvent weld, or ASTM D 2840.

2.10 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Tubing: ASTM B 42, annealed.

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
2. Joints: AWS A5.8, BCuP silver braze, lead-free.

B. CPVC: ASTM D 2846, Schedule 80.

1. Fittings: CPVC, ASTM F 493.
2. Joints: ASTM F 493 or ASTM D 2846, solvent weld.

2.11 WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B 88, Type L, hard drawn.

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B 32, solder, lead-free, Grade 95TA.

B. CPVC: ASTM D 2846, Schedule 80.

1. Fittings: CPVC, ASTM F 493.
2. Joints: ASTM F 493 or ASTM D 2846, solvent weld.

2.12 STORM WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Cast-Iron Pipe: ASTM A 74 service weight.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.

B. Concrete Pipe: ASTM C 76.

1. Fittings: Concrete.
2. Joints: ASTM C 443 (ASTM C 443M), rubber gaskets.

C. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.

1. Fittings: PVC.
2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.

2.13 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast-Iron Pipe: ASTM A 74 service weight.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.

B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.

1. Fittings: PVC.
2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.

2.14 STORM WATER PIPING, ABOVE GRADE

A. Cast-Iron Pipe: ASTM A 74 service weight.

1. Fittings: Cast iron.
2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.

B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.

1. Fittings: PVC.
2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.

2.15 NATURAL GAS PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Polyethylene Pipe: ASTM 1248-65T

1. Fittings: ASTM D 2683 or ASTM D 1248 socket type.
2. Joints: Fusion welded.

2.16 NATURAL GAS PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Steel Pipe: ASTM A 53 Schedule 40 black.

1. Fittings: ASTM A 234/A 234M, forged steel welding type.
2. Joints: ASME B31.2, welded.
3. Jacket: AWWA C105 polyethylene jacket or double layer, half-lapped 0.25-mm polyethylene tape.

2.17 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A 53 Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A 234/A 234M, forged steel welding type.
2. Joints: NFPA 54, threaded or welded to ANSI B31.1.

B. Copper Tubing: ASTM B 88, Type L, hard drawn.

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B 32, solder, lead-free, Grade 95TA.

2.18 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 3 Inches and Under:

1. Ferrous pipe: Class 150 malleable-iron threaded unions.
2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Pipe Size Over 1 Inch:

1. Ferrous pipe: Class 150 malleable-iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Grooved and Shouldered Pipe End Couplings:

1. Housing: Malleable-iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
2. Sealing gasket: "C" shape composition sealing gasket.

D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.19 GLOBE VALVES

A. Up To and Including 3 Inches: MSS SP-80, Class 125, bronze body, bronze trim, handwheel, bronze disc, solder ends.

B. 2 Inches and Larger: MSS SP-85, Class 125, iron body, bronze trim, handwheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends.

2.20 BALL VALVES

A. Construction, 4 Inches and Smaller: MSS SP-110, bronze, 2-piece body, chrome-plated brass ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends.

2.21 PLUG VALVES

A. Construction 2-1/2 Inches and Larger: MSS SP-78, cast-iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged ends. Provide lever operator with set screw.

2.22 WATER PRESSURE REDUCING VALVES

A. Up to 2 Inches: MSS SP-80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, [threaded] [and] [double union] ends.

B. Over 2 Inches: MSS SP-85, cast-iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

2.23 RELIEF VALVES

A. Pressure Relief: AGA Z21.22 certified, bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated.

B. Temperature and Pressure Relief: AGA Z21.22 certified, bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME SEC IV certified and labeled.

2.24 STRAINERS

A. Size 2 inches and Under: Class 150, threaded bronze body 300 psi CWP, Y pattern with 0.8 mm (1/32 inch) stainless steel perforated screen.

B. Size 1-1/2 inches to 4 inches: Class 125, flanged iron body, Y pattern with 1/16-inch, stainless-steel perforated screen.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 0529.

H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 1113.

I. Establish elevations of buried piping outside the building to ensure installed depth is below maximum frost depth.

J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

L. Provide support for utility meters in accordance with requirements of utility companies.

M. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 9100.

N. Excavate in accordance with Section 31 2000 for Work of this Section.

O. Backfill in accordance with Sections 31 2000 for Work of this Section.

P. Install bell and spigot pipe with bell end upstream.

Q. Install valves with stems upright or horizontal, not inverted.

R. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.

S. Install water piping to ASME B31.9.

T. Sleeve pipes passing through partitions, walls and floors.

U. Inserts: Provide inserts for placement in concrete formwork.

3.3 APPLICATION

A. Use grooved mechanical couplings and fasteners only in accessible locations.

B. Install unions downstream of valves and at equipment or apparatus connections.

C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe valves for throttling, bypass, or manual flow control services.

E. Provide plug valves in natural gas systems for shut-off service.

3.4 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to per ¼-inch per foot (2 percent) minimum. Maintain gradients.

B. Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.5 SERVICE CONNECTIONS

A. Provide new sanitary and storm sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide new water service complete with approved backflow preventer and water meter with by-pass valves.

1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

C. Provide new gas service complete with gas meter and regulators.

END OF SECTION

SECTION 22 1600

PLUMBING SPECIALTIES

PART 1 GENERAL – Not Used

PART 2 PRODUCTS

2.1 ROOF DRAINS (when applicable)

A. Assembly: ANSI A112.21.2.

B. Body: Lacquered cast iron with sump.

C. Strainer: Removable cast iron dome.

D. Accessories: Coordinate with roofing type, refer to Section 07 5419.

1. Membrane flange and membrane clamp with integral gravel stop.
2. Adjustable under deck clamp.
3. Roof sump receiver.
4. Waterproofing flange.
5. Controlled flow weir.
6. Leveling frame.
7. Adjustable extension sleeve for roof insulation.
8. Perforated or slotted ballast guard extension for inverted roof.
9. Perforated stainless steel ballast guard extension.

E. Acceptable Product: Josam Model 21500.

2.2 ROOF OVERFLOW DRAINS

A. Lacquered cast iron body and clamp collar [and bottom clamp ring] pipe extended to 2 inches above flood elevation.

B. Acceptable Product: Josam Model 21500.

2.3 FLOOR DRAINS

A. Floor Drain (FD-1):

1. ANSI A112.21.1; lacquered cast iron 2-piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.
2. Acceptable Products: Refer to Drawings.

2.4 FLOOR SINKS

A. Floor Sink (FS-1):

1. Square PVC body with integral seepage pan, PVC interior, aluminum or PVC dome strainer, and loose set PVC grate.
2. Acceptable Product: Refer to Drawings.

2.5 CLEANOUTS

A. Exterior Surfaced Areas (CO-1):

1. Round cast nickel bronze access frame and non-skid cover.
2. Exterior Surfaced Areas (CO-1):
3. Acceptable Product: Josam Model 56000.

B. Exterior Unsurfaced Areas (CO-2):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.
2. Acceptable Product: Josam Model 56010.

C. Interior Finished Floor Areas (CO-3):

1. Lacquered cast iron body with anchor flange, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
2. Acceptable Products: Refer to Drawings.

D. Interior Finished Wall Areas (CO-4):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless-steel access cover secured with machine screw.
2. Acceptable Product: Refer to Drawings.

2.6 HYDRANTS

A. Wall Hydrant:

1. ANSI/ASSE 1019; non-freeze, self-draining type with chrome-plated wall plate hose thread spout, handwheel, and integral vacuum breaker.
2. Acceptable Products: Refer to Drawings.

2.7 BACKFLOW PREVENTERS

A. Refer to schedule on Drawings.

2.8 WATER HAMMER ARRESTORS

A. ANSI A112.26.1; copper construction, piston type sized in accordance with PDI WH-201, precharged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Pipe relief from backflow preventer to nearest drain.

F. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories and sinks.

G. Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or ¾-inch minimum, and minimum 18 inches long.

END OF SECTION

SECTION 22 3436

WATER HEATERS AND CONDITIONING EQUIPMENT

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to AGA, NFPA 54 requirements for water heaters.

B. Conform to ASME Section 8D for manufacture of pressure vessels for heat exchangers.

C. Conform to ASME Section 8D for tanks.

D. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 GAS FIRED WATER HEATERS

A. Acceptable Product: Refer to schedule on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install water heaters in accordance with manufacturer's instructions and to AGA and NFPA 54 requirements. Refer to Drawing Sheet P6.0.

B. Coordinate with plumbing piping and related electrical work to achieve operating system.

END OF SECTION

SECTION 22 4000

PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUBMITTALS FOR REVIEW

A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.2 SUBMITTALS FOR INFORMATION

A. Manufacturer's Instructions: Indicate installation methods and procedures.

PART 2 PRODUCTS

2.1 ACCEPTABLE PRODUCTS

A. Refer to schedule on Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with [screwdriver] stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall carriers and bolts.

E. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 9200, color to match fixture.

F. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.5 CLEANING

A. Clean plumbing fixtures and equipment.

3.6 PROTECTION OF FINISHED WORK

A. Do not permit use of fixtures during construction.

END OF SECTION

SECTION 23 0000

HEATING, VENTILATION AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Furnishing of all labor, materials, tools, transportation, services, and related items necessary to complete the installation of the HVAC system as illustrated on the Drawings, together with all necessary auxiliaries and appurtenances.

B. Items include but are not limited to the following:

1. Packaged rooftop unit.
2. Heat exchanger.
3. Refrigeration components.
4. Unit operating controls.
5. Air filters.
6. Roof curb.
7. Electrical power connections.
8. Operation and maintenance service.
9. Ductwork.
10. Ductwork specialties.
11. Access panels and doors.
12. Ductwork insulation.

C. EER: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Building, except Low-Rise Residential Buildings."

1.2 SUBMITTALS

A. Submit Product Data.

B. Submit Shop Drawings, including mounting and installation details for roof curbs and coordination with roofing system.

1.3 REFERENCES

A. ASHRAE 90.1-2001 - Energy Standard for Buildings. Establishes minimum efficiencies for equipment.

B. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.

C. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.

D. ARI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard. Applies to Gas/Electric Units above 135,000 BTU.

E. ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.

F. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

G. ARI 210/240 - Unitary Air Conditioning Equipment and Air- Source Heat Pump Equipment. Applies to all units below 135,000 Btu.

H. ARI 270 - Sound Rating of Outdoor Unitary Equipment.

I. ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.

J. ANSI/NFPA 70-1995 - National Electrical Code.

1.4 NATIONAL ACCOUNT

A. YUM! Brands, Inc. has entered into a national account agreement with Trane for furnishing the HVAC roof top units specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, contact Trane at number indicated on the Drawings.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Install packaged units, as indicated in the Drawings, in accordance with the Manufacturer's instructions and requirements. Provide related products and accessories from one manufacturer. Store materials in accordance with manufacturer recommendation protecting from dirt, moisture, contaminants and weather.

B. Codes and Standards: Perform all installations in accordance with the latest standards as recognized by ASHRAE, SMACNA and all applicable state and local codes and ordinances.

C. Workmanship: Experienced, well-trained workers competent to complete the work as specified shall perform Labor in conformance with generally accepted trade standards. Install all equipment square and plumb allowing access for proper operation, adjustment and service.

1.6 STRUCTURAL AND SPACE CONDITIONS

A. All work shall avoid obstructions and interference with other trades, preserve headroom and keep openings and passageways clear and free.

1.7 VIBRATION AND NOISE

A. Install each of the various pieces of equipment to operate without objectionable vibration or noise.

1.8 BALANCING AND TESTING

A. Test and Balance shall be performed by a nationally qualified Test and Balance Company contracted directly by the Owner.

B. Contractor shall coordinate testing with the Testing and Balance Company. All systems shall be fully operational prior to commencement of testing. Correct all deficiencies noted in the Test and Balance Report within three days or prior to store opening.

C. Assume responsibility for correcting all items determined to be the result of improper or incomplete installation.

D. Contractor shall be responsible for providing test reports to the local jurisdiction as required for Certificate of Occupancy.

E. Required for all Corporate Development:
YUM! Brands, Inc. “Zero Defect” Test and Balance Program.
National Consultants: Test and Balance Corporation
Melink Corporation
Awarded Global
Refer to the Scope of Works Documents, Section 00 0200, for instructions and contact information. Refer to “Support Tools” on the plans.yum.com website for an outline all applicable information pertaining to the “Zero Defect” Test and Balance Program.

1.9 CLEANUP

A. At the completion of the work, clean the area of all debris such that the Project is left in a neat and clean manner as deemed acceptable by the Owner.

1.10 WARRANTY

A. In addition to honoring all Contractor-supplied equipment manufacturers' warranties, the Contractor shall warrant and correct all defects in Contractor-supplied material and all workmanship for a period of 1 year after acceptance of Project by the Owner. Warranty costs shall include all labor and material associated with the correction of Work covered under this Contract.

PART 2 - PRODUCTS

2.1 ROOF TOP AIR CONDITIONING UNITS, FANS AND AIR OUTLETS

A. Equipment shall be as indicated on the Drawings. Air conditioning unit shall include hard-start kit for low ambient temperature operation.

B. The manufacturer shall include the following items:

1. 5-year compressor warranty - parts only.
2. 10-year heat exchanger warranty - parts only.
3. Factory-installed 2-position motorized damper.
4. Factory-installed hard start kit for low ambient to zero degree operation.
5. Factory-installed hinged access panels.
6. Through the base gas and electrical connections to minimize roof penetrations.
7. Factory-installed circuit breaker.
8. Factory-installed unpowered convenience outlet.
9. Factory-supplied/field-installed supply air smoke detector.

C. The Contractor shall furnish manufacturer complete submittal wiring diagrams of the packaged unit as applicable for field maintenance and service.

2.2 DUCTWORK

A. Rectangular Ducts Fabrication, General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA - HVAC Duct Construction Standards, Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.

B. Kitchen Hood Exhaust Ducts Fabrication, General: Fabricated using 16-gauge, carbon steel sheets for concealed ducts and 16-gauge stainless steel for exposed ducts. Weld and flange seams and joints. Conform to NFPA Standard 96.

C. Flexible Ductwork Fabrication, General:

1. Factory preinsulated, spiral helix steel spring permanently bonded to an interior liner, and sheathed in an exterior reinforced laminated vapor barrier jacket.
2. Precut lengths of flexible duct with continuous inner liner, factory installed female collars and fastening devices at each end.
3. Provide spin-in extractor/ balancing damper assembly complete with a level position indicator and positive locking device, as indicated on the Drawings, round duct takeoffs from rectangular main ducts.

D. Label entire assembly in accordance with UL 181 Class 1 air duct requirements and not have a flame and smoke spread rating in excess of 25/50 respectively.

2.3 DUCT ACCESS PANELS AND DOORS

A. In sheet metal work, hollow core double construction of same or heavier gage material as duct in which installed, products by CESCO, Vent Products, Air Balance, or equivalent.

1. Provide Ventlok or approved hinges and latches on all doors; 100 Series hinges and latches on low pressure system doors up to 18 inches maximum dimension, 200 Series on larger low pressure system doors and 333 Series on high pressure systems.
2. Construct doors up to 18 inches maximum dimension with 1-inch overlap fit and gasket with 3/4-inch by 1/8-inch sponge rubber, fit larger doors against 1-1/2-inch by 1/8-inch flat stock or angle frame and gasket with 3/4-inch by 1/8-inch sponge rubber or felt.
3. Door swing to be opposite airflow direction.

2.4 DUCTWORK SPECIALTIES

A. Volume and Splitter Dampers:

1. Galvanized sheetmetal blade and frame with Ventfabrics Inc., Ventlok operating hardware.
2. For accessible dampers, provide #641 self-locking dial regulators and #644 self-locking dial regulators for insulated ductwork, #637 square end bearing, and #635 spring end bearing, as applicable.
3. For inaccessible dampers, provide #666 or #677 concealed locking damper regulator with bearings as above. For static pressures above 3-inch W.G., provide #640 HiVel dial regulator and #609 HiVel end bearing for accessible dampers.

B. Multi-Louver Volume Dampers:

1. 16-gauge galvanized steel frame. Opposed, 6-inch-wide, 16-gauge galvanized steel blades. Concealed linkage in frame.
2. Titus #AG-35-B, Ruskin #CD35/OBD or equal.

C. Flexible Connections:

1. Provide flexible connectors at the discharge and inlet of fans, air handlers, rotating mechanical equipment, and where shown on the Drawings for proper vibration isolation.
2. Neoprene impregnated glass cloth with 24-gauge galvanized metal frame. Minimum dimensions: 3-inch metal, 3-inch fabric, 3-inch metal.

3. Duro Dyne #MFN4, Ventfabrics "Ventglas", Q Industries, Consolidated Kinetics, Elgen, or equal.

D. Backdraft Dampers:

1. Provide counterweight type complete with frame, end bearings, counterbalance assembly, blades, and linkage.
2. Install at outside air intakes, exhaust outlets, and where shown on Drawings.
3. Pacific Air Products #PRD-100AL, Ruskin #CBS-7 or equal by Swartwout, American Warming, or Vent Products.

2.5 DUCT INSULATION

A. Acceptable Manufacturers: Provide products of the following manufacturers, complying with specified requirements. Equivalent products of other manufacturers will be considered in accordance with the "or equal" provision specified in Section 01 1000 - Summary, and the Construction Contract.

1. Owens-Corning Fiberglas Corp.
2. Johns-Manville Corp.
3. Certainteed Corp.

B. All insulation material shall comply with applicable energy conservation regulations for Project location.

C. Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method.

D. Provide staples, bands, wires, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.

E. Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

2.6 HVAC CONTROLS

A. Shall be as indicated on the Drawings.

B. Electric and electronic HVAC Controls: Components and operating features as indicated on the Drawings.

2.7 ROOF CURB

A. Manufacturer's standard corrosive-resistant-coated, insulated curb with nailer strip, flashing and counterflashing and cadmium-plated hardware.

PART 3 - EXECUTION

3.1 HVAC SYSTEM INSTALLATION, GENERAL

A. Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate mechanical systems, equipment, and materials installation with other building components.

2. Verify all dimensions by field measurements.
3. Arrange for chases, slots, and openings in other building components during progress of, to allow for mechanical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
8. Install systems, materials, and equipment to conform with Drawings and Specifications, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Construction Manager for resolution prior to installation.
9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
11. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.2 AIR CONDITIONING UNIT INSTALLATION

A. Install in accordance with manufacturer's instructions and comply with the following requirements:

1. Provide layout drawings of units, locations and power requirements to electrical installer.
2. Install minimum 30 percent efficiency air filters in unit during installation phase. Do not operate the unit without filters in place.
3. Mount rooftop unit on factory-built roof mounting frame. Install roof mounting frame level. Secure frame to structural framing and rooftop unit on frame as indicated on the Drawings.
4. Install 3-inch-long flexible duct connection at inlets and outlets of units.
5. Install condensate drain piping and traps in accordance with manufacturer's instructions and as shown on the Drawings. All metal piping and supports shall be of same material to prevent electrolysis.
6. Control installers shall install thermostat and all wiring associated with control signals into the units. All thermostats shall be located in manager's office with remote sensors located in appropriate locations in return ductwork.
7. Install all line voltage power wiring and conduit as indicated on the Drawings and as specified in Division 26 - Electrical.
8. Coordinate with Electrical Contractor to install a new set of filters three days prior to Substantial Completion review.

3.4 EXHAUST/SUPPLY FAN INSTALLATION, GENERAL

A. Install fans level and plumb, in accordance with manufacturer's written instructions. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

B. Provide access space around fans for service and maintenance, as indicated on the Drawings and in compliance with applicable Mechanical Code.

C. Clean unit cabinet interiors to remove foreign material and construction dirt and dust.

D. Coordinate with Electrical Contractor to provide electrical power wiring as specified in Division 26 - Electrical.

3.4 DUCTWORK INSTALLATION

A. Ductwork Installation, General:

1. Ductwork is generally diagrammatically indicated on the Drawings and shall be generally installed as indicated. Do not scale Drawings for exact location of ducts.
2. Install ducts to best suit field conditions and to coordinate with other building components. Do not cut structural members without consent of Construction Manager. Check with Structural Drawings prior to locating penetrations.
3. Duct sizes are indicated as net inside dimensions on the Drawings. The indicated dimensions shall be altered at the jobsite for the purpose of avoiding interference and clearance difficulties to other dimensions producing the same air handling characteristics, provided such altered dimensions are approved by the Construction Manager.

B. Hangers and Supports:

1. Securely fasten all ducts to building construction by means of hangers, supports, guides, anchors, and sway braces to maintain duct alignment, to prevent sagging, and to prevent noise and excessive strain on ducts due to movement under operating conditions.
2. Adequately mount and anchor all material and equipment as required. Include lateral bracing as required to prevent horizontal, seismic movement. Refer to applicable Mechanical Code requirements and details on Drawings for seismic requirements.
3. Do not support ducts from fans or other equipment.
4. Power-driven fasteners shall not be used to support ducts.
5. Support round duct, 30 inches and larger, with two hangers at each support point.
6. Hangers and supports shall conform to SMACNA section, "Hangers and Supports." Support horizontal ducts within 2 feet of each elbow and within 4 feet of each branch intersection using double strap hangers on each side of fitting.
7. Support vertical ducts, passing through roofs with two continuous angles screwed to the duct and bearing to the roof structure, and conforming to SMACNA section "Riser Support-From Floor."

C. Seismic Supports and Bracing: Where required, all ductwork and equipment shall be seismically supported and braced per the SMACNA "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems," including Appendix E.

D. Joints Sealing, General:

1. Duct tape shall not be used on duct joints.
2. Transverse joints: All transverse joints including Ductmate type joints on all supply, return, exhaust and outside air intake ducts, sealed using Hardcast Arabol.
3. Interior exposed joints: Seal using water based sealer, Hardcast Iron Grip.
4. Interior concealed joints (above 1-inch W.G. pressure ductwork): Seal using gypsum impregnated tape and adhesive.
5. Interior concealed joints (to 1-inch W.G. pressure ductwork): Seal using water based sealer, Hardcast Iron Grip.
6. Exterior joints (above 1-inch W.G. pressure ductwork): Seal using gypsum impregnated tape and adhesive.
7. Exterior joints (to 1-inch W.G. pressure ductwork): Seal using oil based sealer, Hardcast Galva Grip or equal.
8. Exterior joints: Seal water and to air-tight condition with sealant.

E. Ductwork Painting, General: Where the interior surfaces of ductwork are visible through the blades of supply outlets, return inlets, and exhaust inlets, paint interior visible surfaces with one coat of flat black paint. See Section 09 9100 - Painting.

F. Cleaning: Clean the inside of plenums, casings, enclosures, fans, and accessible ductwork before starting fans.

3.5 DUCTWORK ACCESSORIES, INSTALLATION

A. Provide duct-mounted balancing dampers or attached opposed blade dampers so that each diffuser, grille and register may be individually balanced.

B. Provide unit opposed blade damper where individual duct mounted balancing dampers are not provided.

C. Provide turning vanes in all mitered elbows in all ducts, so that tips are parallel with the sides of the ducts. Vanes shall be single thickness type with extended trailing edge. Tips of acoustical turning vanes on outside radius shall be flush with acoustical lining.

D. Provide flexible connections to completely isolate fans from direct contact with all sheet metal work.

E. Provide access panels or doors, as required, for access to valves, controllers, fire dampers.

3.6 DUCT INSULATION, INSTALLATION

A. Wrapped Ductwork Insulation

1. Application Requirements: Insulate the following ductwork as follows:

   a. HVAC supply ductwork between fan discharge, or HVAC unit discharge, and room terminal outlet.
   b. HVAC return ductwork between room terminal inlet and return fan inlet, or HVAC unit inlet.

2. Insulate each ductwork system specified above with 1-1/2-inch-thick insulation and vapor barrier jacket, application limited to concealed locations.

B. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose and as follows:
   1. Install insulation on pipe and ductwork systems subsequent to painting, testing, and acceptance of tests.
   2. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
   3. Clean and dry pipe or duct surfaces prior to insulating. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
   4. Maintain integrity of vapor-barrier jackets on pipe and ductwork insulation, and protect to prevent puncture or other damage.
   5. Extend pipe and ductwork insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
   6. Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.
   7. Replace damaged insulation that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
   8. Insulation installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.7 CONTROL SYSTEMS, INSTALLATION

A. Installation:

   1. Install systems and materials in accordance with manufacturer's instructions and recommendations, rough-in drawings, and details indicated on the Drawings.
   2. Coordinate with Electrical Contractor to install electrical components and use electrical products complying with requirements of applicable requirements specified in Division 26 - Electrical.
   3. Mount controllers at convenient locations and heights.

B. Control Wiring: The term "control wiring" shall be defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices.

C. Wiring System:

   1. Install complete control wiring system for electric control systems.
   2. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed.
   3. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path.
   4. Fasten flexible conductors bridging cabinets and doors, neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.

D. Start-Up: Start, test and adjust electric control systems in presence of manufacturer's authorized representative. Replace damaged or malfunctioning controls and equipment.

E. Cleaning: Clean factory-finished surfaces. Repair marred or scratched surfaces with manufacturer's touch-up paint.

F. Final Adjustment: After completion of installation, adjust thermostats, control valves, motors and similar equipment specified in this Section. Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

G. Control Sequences:

1. Rooftop Packaged Units:

a. Occupied: Energize rooftop units during occupied cycle via manufacturer supplied thermostat. Modulate outside air and return air dampers in sequence and in conjunction with unit's mechanical refrigeration to maintain desired room temperature via manufacturer supplied thermostat.

b. Unoccupied: Maintain outside air damper closed. Cycle unit fan and unit's heating to maintain reduced room temperature of 60 degrees F with unoccupied thermostat.

2. Power Ventilators: Energize exhaust fans during occupied cycle and de-energize during unoccupied cycle via electronic time clock control.

END OF SECTION

SECTION 23 0513

MOTORS

PART 1 GENERAL

1.1 WARRANTY

A. Provide 3 year manufacturer warranty for motors larger than 1 horsepower.

PART 2 PRODUCTS

2.1 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Motors Less Than 250 Watts, for Intermittent Service: Equipment manufacturer's standard and need not conform to these specifications.

B. Single Phase Motors: PSC where available.

C. Electrical Service:

1. Motors smaller than ½-horsepower: 120 volts, single-phase, 60 Hz.
2. Motors ½-horsepowerp and larger: 208 volts or 460 volts, 3-phase, 60 Hz.

D. Open drip-proof type except where specifically noted otherwise.

E. Design for continuous operation in 40 degrees C environment.

F. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

G. Explosion-Proof Motors: UL approved for hazard classification.

H. Visible Nameplate: Indicating manufacturer's name and model number, motor horsepower, RPM, frame size, voltage, phase, cycles, full load amps, insulation system class, service factor, maximum ambient temperature, temperature rise at rated horsepower, minimum efficiency.

I. Wiring Terminations:

1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.2 SINGLE PHASE POWER - SPLIT PHASE MOTORS

A. Starting Torque: Less than 150 percent of full-load torque.

B. Starting Current: Up to 7 times full-load current.

C. Breakdown Torque: Approximately 200 percent of full-load torque.

D. Drip-proof Enclosure: Class A (110 degrees F temperature rise) insulation, NEMA Service Factory, prelubricated sleeve or ball bearings.

E. Enclosed Motors: Class A (110 degrees F temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

2.3 SINGLE PHASE POWER - PERMANENT-SPLIT CAPACITOR MOTORS

A. Starting Torque: Exceeding one fourth of full-load torque.

B. Starting Current: Up to 6 times full-load current.

C. Multiple Speed: Through tapped windings.

D. Open Drip-proof or Enclosed Air Over Enclosure: Class A (110 degrees F temperature rise) insulation, minimum 1.0 Service Factor, prelubricated sleeve or ball bearings, automatic reset overload protector.

2.4 SINGLE PHASE POWER - CAPACITOR START MOTORS

A. Starting Torque: Three times full-load torque.

B. Starting Current: Less than 5 times full-load current.

C. Pull-up Torque: Up to 350 percent of full-load torque.

D. Breakdown Torque: Approximately 250 percent of full-load torque.

E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with 2 capacitors in parallel with run capacitor remaining in circuit at operating speeds.

F. Drip-proof Enclosure: Class A (100 degrees F temperature rise) insulation, NEMA Service Factor, prelubricated ball bearings.

G. Enclosed Motors: Class A (100 degrees F temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

2.5 THREE PHASE POWER - SQUIRREL-CAGE MOTORS

A. Starting Torque: Between 1 and 1-1/2 times full-load torque.

B. Starting Current: Six times full-load current.

C. Power Output, Locked Rotor Torque, Breakdown or Pull-Out Torque: NEMA Design B characteristics.

D. Design, Construction, Testing, and Performance: Conform to NEMA MG 1 for Design B [energy-efficient] motors.

E. Insulation System: NEMA Class B or better.

F. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast-iron or aluminum with steel inserts.

G. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay with wiring to terminal box.

H. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum AFBMA 9, L-10 life of 200,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.

I. Sound Power Levels: To NEMA MG 1.

J. Part Winding Start Above 254T Frame Size: Use part of winding to reduce locked rotor starting current to approximately 60 percent of full winding locked rotor current while providing approximately 50 percent of full winding locked rotor torque.

K. Nominal Efficiency: To NEMA MG 1, energy-efficient for frame sizes 215T motor sizes 10 and larger.

PART 3 EXECUTION

3.1 INSTALLATION

A. Section 01 4000 - Quality Control: Manufacturer's instructions.

B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 23 0700

DUCTWORK INSULATION

PART 1 GENERAL – Not Used

PART 2 PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

A. Insulation: ASTM C 553; flexible, noncombustible blanket.

1. 'K' ('Ksi') value: ASTM C 518, 0.045 at 0.31 at 75 degrees F.
2. Maximum service temperature: 250 degrees F.
3. Maximum moisture absorption: 0.20 percent by volume.

B. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture vapor transmission: ASTM E 96; 1.3 perm.
3. Secure with pressure sensitive tape.

C. Vapor Barrier Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

2.2 GLASS FIBER RIGID BOARD

A. Insulation: Fiberglass semi-rigid board, 1-inch-thick.

B. Rectangular or Square Duct Insulation: ASTM C 612, Type II.

1. K-value: 0.23 at 75 degrees F mean temperature.
2. All service jacket in compliance with ASTM C 1136, field installed.
3. Secure with pressure sensitive tape.

C. Round Duct Insulation: ASTM C 547, Tpe I.

1. K-Value: 0.23 at 75 degrees F mean temperature.
2. All service jacket in compliance with ASTM C 1136, factory installed.
3. Secure with pressure sensitive tape.

2.3 EXHAUST HOOD DUCT WRAP

A. Flexible Grease and Air Duct Wrap System; UL listed; foil both sides fully encapsulated.

1. Meeting requirements of 1-hour enclosure passing UL Classification “Ventilation Duct Assembly - Nos. V-11 and V-12.”

B. Acceptable Product: Pyroscat Duct Wrap F2E by Vesuvius, Irwin, TN.

C. Other Acceptable Manufacturers: Subject to compliance with requirements herein, products from one of the following manufacturers may be submitted for approval.

1. ETS Schaefer Corporation.
2. Thermal Ceramics.

3. Unifrax Corporation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with NAIMA National Insulation Standards.

B. Insulated ductwork conveying air below ambient temperature:

1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:

1. Provide with or without standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

3.2 SCHEDULES

A. Evaporative Condenser Intake and Exhaust: 1-inch aluminized film.

B. Outside Air Intake Ducts: 2-inch aluminized film.

C. Supply Plenums: 1-inch aluminized film.

D. Supply Ducts: 1-inch aluminized film or 1-inch rigid-insulation with service jacket.

E. Exhaust Hood Duct: Provide installation, clearances, and thickness to meet required fire rating.

END OF SECTION

SECTION 23 3100

DUCTWORK

PART 1 GENERAL – Not Used

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Steel Ducts: ASTM A 525 and ASTM A 527 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A 90.

B. Insulated Flexible Ducts:

1. Two ply vinyl film supported by helically wound spring steel wire; fiberglass insulation; aluminized vapor barrier film.
2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
3. Maximum Velocity: 4000 fpm.
4. Temperature Range: -10 degrees F to 160 degrees F.
5. Acceptable Products:

a. Thermaflex Model M-KE.
b. Flexmaster.

C. Fasteners: Rivets, bolts, or sheet metal screws.

D. Sealant:

1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

E. Hanger Rod: ASTM A 36; galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide [air foil] turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

2.3 MANUFACTURED DUCTWORK AND FITTINGS

A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

C. Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

F. Use crimp joints with or without bead for joining round duct sizes 8 inches and smaller with crimp in direction of air flow.

G. Use double nuts and lock washers on threaded rod supports.

H. Connect terminal units to supply ducts [directly or] with 1-foot maximum length of flexible duct. Do not use flexible duct to change direction.

I. Connect flexible ducts to metal ducts with draw bands.

J. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out. Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.

K. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.3 SCHEDULES

A. Ductwork Material Schedule:

AIR SYSTEM	MATERIAL
Low Pressure Supply	Galvanized Steel
Return and Relief	Galvanized Steel
General Exhaust	Galvanized Steel
Kitchen Hood Exhaust	Galvanized Steel
Dishwasher Exhaust	Stainless Steel
Outside Air Intake	Galvanized Steel
Combustion Air	Galvanized Steel

END OF SECTION

SECTION 23 3300

DUCT ACCESSORIES

PART 1 GENERAL – Not Used

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

A. Multi-blade device with radius blades attached to pivoting frame and bracket, galvanized steel construction, with push-pull operator strap.

2.2 BACKDRAFT DAMPERS

A. Gravity Backdraft Dampers, Size 18 by 18 inches or smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturers standard construction.

B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 16-gauge-thick galvanized steel, with blades of maximum 6-inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90-degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.

1. Less Than 12 Inches Square: Secure with sash locks.
2. Up to 18 Inches Square: Provide 2 hinges and 2 sash locks.
3. Up to 24 by 48 Inches: Three hinges and 2 compression latches [with outside and inside handles].
4. Larger Sizes: Provide an additional hinge.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.4 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 ounces per square yard.
2. Net Fabric Width: Approximately 2 inches wide.
3. Metal: 3 inches wide, 24 gauge galvanized steel.

2.5 VOLUME CONTROL DAMPERS.

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Splitter Dampers:

1. Material: Same gauge as duct to 24 inches size in either direction, and 2 gauges heavier for sizes over 24 inches.
2. Blade: Fabricate of double thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum ¼-inch-diameter rod in self-aligning, universal joint action, flanged bushing with set screw.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inches; 12 by 48 inches.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inches. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

E. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

F. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 3100 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ductwork in accordance with NFPA 96. Provide minimum 8- x 8-inch size for hand access, 18- x 18-inch size for shoulder access, and as indicated. Provide 4- x 4-inch size for balancing dampers only. Review locations prior to fabrication.

D. Demonstrate re-setting of fire dampers to Owner's representative.

E. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.

F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

G. Use splitter dampers only where indicated.

H. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 3700

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Titus.
2. Krueger.
3. Metalaire.

2.2 ROUND CEILING DIFFUSERS

A. Type: Round, stamped or spun, multi-core diffuser to discharge air in 360-degree pattern, with sectorizing baffles where indicated. Diffuser collar shall project not more than one inch above ceiling. Core shall be adjustable for vertical or horizontal throw.

B. Fabrication: Steel with baked enamel off-white finish.

C. Accessories: Radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

D. Acceptable Product: Refer to schedule on Drawings.

2.3 RECTANGULAR CEILING DIFFUSERS

A. Type: Square, stamped, multi-core diffuser to discharge air in 360-degree pattern with sectorizing baffles where indicated.

B. Frame: Inverted T-bar type.

C. Fabrication: Aluminum with baked enamel off-white finish.

D. Accessories: Opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

E. Acceptable Products: Refer to schedule on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9100.

END OF SECTION

SECTION 26 0513

CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: NFPA 70; Type THW insulation for feeders and branch circuits larger than 4/0 AWG; Type THHN/THWN insulation for all others.

2.2 METAL CLAD CABLE

A. Description: NFPA 70, Type MC.

B. Conductor: Copper.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

C. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

A. Concealed Dry Interior Locations, Exposed Dry Interior Locations, Above Accessible Ceilings, Wet or Damp Interior Locations and Exterior Locations use only building wire, Type THHN/THWN insulation, in raceway.

3.4 INSTALLATION

A. Route wire and cable as required to meet Project Conditions.

B. Install cable in accordance with the NECA "Standard of Installation."

C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

D. Use stranded conductors for control circuits and all motor connections.

E. Use conductor not smaller than 12 AWG for power and lighting circuits.

F. Use conductor not smaller than 14 AWG for control circuits.

G. Pull all conductors into raceway at same time.

H. Use suitable wire pulling lubricant for building wire.

I. Protect exposed cable from damage.

J. Support cables above accessible ceiling, using plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.

K. Use suitable cable fittings and connectors.

L. Neatly train and lace wiring inside boxes, equipment, and panelboards.

M. Clean conductor surfaces before installing lugs and connectors.

N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

O. Identify all wire and cable. Identify each conductor with its circuit number or other designation indicated.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NFPA 70 and applicable local codes.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING

PART 1 GENERAL

1.1 GROUNDING SYSTEM DESCRIPTION

A. Motor frames.

B. Metal frame of the building.

C. Noncurrent-carrying metallic parts of electrical equipment.

D. Rod electrode.

E. Buried metallic water piping.

1.2 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms maximum.

1.3 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and applicable local codes.

B. Products: Listed and classified by Underwriters Laboratories, Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 ROD ELECTRODES

A. Material: Copper-clad steel.

B. Diameter: 5/8-inch.

C. Length: 8 feet.

2.2 WIRE

A. Material: Stranded copper.

B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install rod electrodes at locations indicated.

B. The minimum size of grounding conductors shall be in accordance NFPA 70 or local code requirements.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and applicable local codes.

B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Corrosion resistant, galvanized or powder coated.

B. Select materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit, including weight of wire in conduit.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Use precast inserts, expansion anchors, and powder actuated anchors.
2. Steel Structural Elements: Use beam clamps and welded fasteners.
3. Concrete Surfaces: Use expansion anchors.
4. Hollow Masonry,and Gypsum Board Partitions: Use toggle bolts.
5. Sheet Metal: Use sheet metal screws.
6. Wood Elements: Use wood screws.

2.2 FORMED STEEL CHANNEL

A. Description: Galvanized or Powder Coated steel.

B. Acceptable Product: Unistrut Model P 1000.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate and install anchors, fasteners, and supports in accordance with NFPA 70 "Standard of Installation."

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
2. Do not use spring steel clips and clamps.
3. Do not use perforated strap, wire ties, plumbers strap or similar items.
4. Obtain permission from the Architect before using powder-actuated anchors.
5. Obtain permission from the Architect before drilling or cutting structural members.

B. Fabricate supports from structural steel or formed steel members. Rigidly weld members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1-inch off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

F. Rigid steel, IMC and EMT raceways shall be supported at intervals not over 10 feet and within 3 feet of each box, cabinet or fitting. Provide 1 support not over 12 inches from each change in direction.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of the National Electrical Code.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 CABINETS, BOXES, AND FITTINGS, GENERAL

A. Electrical Cabinets, Boxes, and Fittings: Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

2.2 OUTLET, DEVICE, AND SMALL WIRING BOXES

A. General: Conform to UL 514A, "Metallic Outlet Boxes, Electrical," and UL 514B, "Fittings for Conduit and Outlet Boxes." Boxes shall be of type, shape, size, and depth to suit each location and application.

B. Steel Boxes: Conform to NEMA OS 1, "Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports." Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.

C. Service Fittings for Floor Outlet Boxes: Surface mounted horizontal, cast aluminum type 3 inches high, suitable for finished spaces and finished in satin aluminum, except as otherwise indicated. Provide duplex receptacle or 1-inch bushed opening for telephone or other communications service as indicated. Equip fitting for attaching flat to floor box cover.

2.3 PULL AND JUNCTION BOXES

A. General: Comply with UL 50, "Electrical Cabinets and Boxes," for boxes over 100 cubic inches volume. Boxes shall have screwed or bolted on covers of material same as box and shall be of size and shape to suit application.

B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.

C. Hot-Dipped Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.

D. Boxes Approved for Classified Locations: Cast metal of cast nonmetallic boxes conforming to UL 886, "Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations," listed and labeled for use in the specific location classification, and with the specific hazardous material encountered. Conduit entrances shall be integral threaded type.

E. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:

1. Material: Cast aluminum.
2. Cover: Nonskid cover with neoprene gasket, and with suitable stainless steel cover screws.
3. Cover Legend:

F. Fiberglass Handholes: Die molded glass fiber hand holes:

1. Cable Entrance: Pre-cut 6-inch x 6-inch cable entrance at center bottom of each side.
2. Cover: Glass fiber weatherproof cover with nonskid finish.

PART 3 EXECUTION

3.1 INSTALLATION OF OUTLET BOXES

A. Install boxes in accordance with NEC "Standard of Installation."

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.

E. Orient boxes to accommodate wiring devices oriented as specified in Section 26 0583.

F. Maintain headroom and present neat mechanical appearance.

G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

J. Locate outlet boxes to allow luminaries positioned as shown on reflected ceiling plan.

K. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

L. Use flush mounting outlet box in finished areas.

M. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

N. Do not install flush mounting box back to back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

O. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

P. Use stamped steel bridges to fasten flush mounting outlet box between studs.

Q. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

R. Use adjustable steel channel fasteners for hung ceiling outlet box.

S. Do not fasten boxes to ceiling support wires.

T. Support boxes independently of conduit.

U. Use gang box where more than one device is mounted together. Do not use sectional box.

V. Use gang box with plaster ring for single device outlets.

W. Use cast outlet box in exterior locations [exposed to the weather] and wet locations.

X. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

Y. Set floor boxes level.

3.2 INSTALLATION OF PULL AND JUNCTION BOXES

A. Box Selection: For boxes in main feeder conduit runs, use sizes not smaller than 8 inches square by 4 inches deep. Do not exceed 6 entering and 6 leaving raceways in a single box. Cable Supports: Install clamps, grids, or devices to which cables may be secured. Arrange cables so they may be readily identified. Support cable at least every 30 inches inside boxes.

B. Mount pull boxes in inaccessible ceilings with covers flush with the finished ceiling.

C. Size: Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by Article 370 of NEC, or as indicated. Locate boxes strategically and provide shapes to permit easy pulling of future wires or cables of types normal for such systems.

END OF SECTION

SECTION 26 0553

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and applicable local codes.

B. Products: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Locations:

1. Each electrical distribution and control equipment enclosure.
2. Communication cabinets.
3. Starters.
4. Disconnect Switches.

C. Letter Size:

1. 3/8-inch letters for identifying equipment.

D. Note: Embossed adhesive tape shall not be used.

2.2 WIRE MARKERS

A. Description: Tubing type wire markers.

B. Locations: Each conductor at panelboard gutters, pull boxes, and junction boxes and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated.
2. Control Circuits: Control wire number indicated on shop drawings.

2.3 UNDERGROUND WARNING TAPE

A. Description: 2-inch-wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

B. Location: Along length of each underground conduit.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

A. Install nameplate parallel to equipment lines.

B. Secure nameplate to equipment front using rivets.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION

SECTION 26 0583

WIRING CONNECTIONS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and applicable local codes.

B. Products: Listed and classified by Underwriters Laboratories, Inc., for testing firm acceptable to the authority having jurisdiction, as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 CORDS AND CAPS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

C. Cord Construction: NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 2100

ELECTRICAL UTILITY SERVICES

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. For Utility Supplied Services - System Characteristics: 120/208 volts, three-phase, four-wire, 60 Hertz. System voltages shall match utility service.

B. Self-generated voltages shall match system standard voltages.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with Utility Company written requirements.

B. Maintain one copy of each document on site.

1.3 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and IEEE 141.

B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 PAD FOR UTILITY TRANSFORMER

A. Description: Transformer pad sized as required by utility company.

PART 3 EXECUTION

3.1 PREPARATION

A. Arrange with Utility Company to obtain permanent electric service to the Project. Pay for all required permits and fees.

3.2 INSTALLATION

A. Install meter base as required by Utility Company. All wire, conduits, pads, meter bases, weatherheads, and meter not installed by utility company and required for a complete and functional electrical service.

END OF SECTION

SECTION 26 2416

DISTRIBUTION PANELBOARDS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Furnished by Owner.

2.2 SWITCHBOARD

A. Description: NEMA PB 2 switchboard with electrical ratings and configurations as indicated and specified.

B. Ratings:

1. Voltage: 208Y/120 volts.
2. Configuration: Three-phase, four-wire, grounded.
3. Main Bus: As required for the facility.
4. Integrated Equipment Rating: 200,000 rms amperes symmetrical.

C. Main Section Devices: Individually mounted.

D. Distribution Section Main Device: Individually mounted and compartmented.

E. Auxiliary Section Devices: Panel mounted.

F. Bus Material: Aluminum with tin plating, standard size.

G. Bus Connections: Bolted, accessible from front for maintenance.

H. Fully insulate load side bus bars. Do not reduce spacing of insulated bus. Use factory-applied tape wrapping or spray applied 105 degrees C minimum insulating material.

I. Ground Bus: Extend length of switchboard.

J. Molded Case Circuit Breakers: NEMA AB 1, integral thermal and instantaneous magnetic trip in each pole.

1. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
2. Include shunt trip, undervoltage release, and auxiliary contact where required.

K. Line and Load Terminations: Accessible from the front only of the switchboard, suitable for the conductor materials and sizes indicated.

L. Pull Section: Arrange as required for the facility.

M. Enclosure: Type 1 - General Purpose NEMA 3R.

1. Align sections at front and rear.
2. Switchboard Height: 90 inches, excluding floor sills, lifting members and pull boxes.
3. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
4. Mimic Bus: Show bussing, connections and devices in single-line form on the front panels of the switchboard using black color lines on a white plastoid laminated panel, fastened flat against the panel face with rivets.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install switchboard in locations shown on Drawings, according to NEMA PB 2.1.

B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.1.

END OF SECTION

SECTION 26 2419

ENCLOSED MOTOR CONTROLLERS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing enclosed motor controllers with minimum 3 years' documented experience.

B. Acceptable Manufacturers:

1. Square D.
2. General Electric.
3. Siemens.
4. Cutler Hammer.

1.2 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and NEMA ICSI, 2 and 6.

B. Products: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUAL CONTROLLERS

A. All motor controllers shall have an overall unit short circuit current rating that equals or exceeds of maximum fault current at the point of application.

B. Manual Motor Controller: NEMA ICS 6, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, red pilot light, N.O. auxiliary contact, and push button operator.

C. Fractional Horsepower Manual Controller: NEMA ICS 6, AC general-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, red pilot light and toggle operator.

D. Motor Starting Switch: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, without thermal overload unit, with red pilot light and toggle operator.

E. Enclosure: NEMA ICS 6, Type as required to meet conditions of installation.

2.2 AUTOMATIC CONTROLLERS

A. Magnetic Motor Controllers: NEMA ICS 6, AC general-purpose Class A magnetic controller for induction motors rated in horsepower.

B. Coil operating voltage: 120 or 208 volts, 60 Hertz.

C. Overload Relay: NEMA ICS; melting alloy.

D. Enclosure: NEMA ICS 6, Type as required to meet conditions of installation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install enclosed controllers where indicated, in accordance with NECA "Standard of Installation."

B. Install enclosed controllers plumb. Provide supports in accordance with Section 26 0529.

C. Provide fuses for fusible switches.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Neatly type label inside each motor controller door identifying motor served, nameplate horsepower, full-load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.16.2.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 WALL SWITCHES

A. Color: Stainless steel cover plate and grey device.

B. Specification Grade.

C. Manufacturers:

1. Single-Pole Switch: Pass & Seymour Model 20 AC1-I.

2. Double-Pole Switch: Pass & Seymour Model 20 AC2-I.

3. Three-way Switch: Pass & Seymour Model 20AC3-I.

4. Four-way Switch: Pass & Seymour Model 20AC4-I.

5. Indicator Switch Pilot Gang: Pass & Seymour Model 20AC1/3-CPL.

6. Key Switch: Pass & Seymour Model 20AC1/2/4-L.

7. Momentary Switch: Pass & Seymour Model 1250-I.

2.2 RECEPTACLES

A. Color: Stainless-steel cover plate and grey device.

B. All devices to have 20A at 125V rating.

C. Specification Grade.

D. Manufacturers:

1. Single Convenience Receptacle: Pass & Seymour Model 5361

2. Duplex Convenience Receptacle: Pass & Seymour Model 5362.

3. GFCI Receptacle: Pass & Seymour Model 2091-S.

4. Isolated Ground Receptacle: Pass & Seymour Model IG6300.

5. Telephone Jack: Hubbell Model CX244.

2.3 WALL PLATES

A. Decorative Cover Plate: Stainless-steel.

B. Weatherproof Cover Plate: Gasketed cast-metal with hinged gasketed device cover.

C. Shall be furnished and installed for the type of service involved.

D. Manufacturers:

1. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.

a. Hubbell Model WP826MP.

2.4 FLOOR MOUNTED SERVICE FITTINGS

A. Flush Cover Convenience Receptacle:

1. Material: Brass plate with steel box.
2. Configuration: Duplex threaded opening.
3. Manufacturers: Hubbell Model 132529 W/SF2525.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that outlet boxes are installed at proper height.

B. Verify that wall openings are neatly cut and will be completely covered by wall plates.

C. Verify that floor boxes are adjusted properly.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

E. Do not share neutral conductor on load side of dimmers.

F. Install receptacles with grounding pole on bottom.

G. Connect wiring device grounding terminal to outlet box with bonding jumper.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Connect wiring devices by wrapping conductor around screw terminal.

J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

K. Install protective rings on active flush cover service fittings.

3.3 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

END OF SECTION

SECTION 26 5100

INTERIOR LIGHTING

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Conform to requirements of NFPA 101.

C. Products: Listed and classified by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.1 LUMINAIRES

A. Refer to Lighting Fixture Schedule in Drawings. All fixtures are Owner furnished; Contractor installed.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

B. Support luminaires larger than 2- x 4-foot size independent of ceiling framing.

C. Locate recessed ceiling luminaires as indicated on Reflected Ceiling Plan.

D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

E. Exposed Grid Ceilings: Support surface-mounted luminaires on grid ceiling directly from building structure; provide auxiliary members spanning ceiling grid members to support surface-mounted luminaires; fasten surface-mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.

F. Install recessed luminaires to permit removal from below.

G. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

H. Install clips to secure recessed grid-supported luminaires in place.

I. Install wall mounted luminaires and exit signs at height as indicated on Drawings.

J. Install accessories furnished with each luminaire.

K. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets provided under Section 26 0533 using flexible conduit.

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

M. Bond products and metal accessories to branch circuit equipment grounding conductor.

N. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

3.2 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

A. Aim and adjust luminaires as directed.

END OF SECTION

SECTION 26 5600

EXTERIOR LIGHTING

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 LUMINAIRES AND ACCESSORIES

A. General: Furnished by Owner; installed by Contractor.

B. Wiring: Provide electrical wiring within fixtures which is suitable for connection to branch circuit wiring as follows:

1. NEC Type AF for 120 volt, minimum No. 18 AWG.

2.2 POLES

A. General: Furnished by Owner; installed by Contractor.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install poles plumb. Provide double nuts to adjust plumb. Grout around each base.

B. Install lamps in each luminaire.

C. Bond luminaires, metal accessories, and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.

D. All perimeter lighting shall be automatically controlled.

3.2 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

B. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.3 ADJUSTING

A. Aim and adjust luminaires to provide illumination levels and distribution as directed.

END OF SECTION

SECTION 31 1000

SITE CLEARING

PART 1 - GENERAL

1.1 REGULATORY REQUIREMENTS

A. Conform to applicable building code for disposal of debris.

B. Conform with applicable portions of OSHA.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Herbicide: Round-up by Monsanto.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that existing plant life and features designated to remain are tagged or identified.

B. Locate and identify utilities intended to remain.

3.2 PROTECTION

A. Protect plant growth and features remaining as final landscaping. Flag as required to properly identify items to remain.

B. Protect bench marks and existing work from damage or displacement.

C. Protect remaining utilities from damage.

3.3 CLEARING

A. Dilute and apply herbicide in accordance with manufacturer's recommendations.

B. Clear areas required for access to site and execution of Work.

C. Remove trees and shrubs within marked areas. Grub out stumps, roots, and surface rock. Use only hand methods for grubbing inside drip line of trees indicated to remain.

D. Clear undergrowth and deadwood, without disturbing subsoil.

E. Burning debris on site is not permitted.

F. Remove debris, rock, and extracted plant life from site.

3.4 CUTTING CURBS AND GUTTERS

A. Make new openings in curbs and gutters neat, as close as possible to profiles indicated and only to extent necessary for new work.

B. At concrete, paving, and other materials where edges of cuts remain exposed in the completed work, make cuts using power-sawing equipment. Do not overcut at corners of cut openings.

3.5 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.

B. Stockpile in area designated on site to depth not exceeding 8 feet. Protect from erosion. Remove from site excess topsoil not being reused.

3.6 REMOVAL

A. Remove debris from site. Leave site in clean condition ready for earthwork.

END OF SECTION

SECTION 31 2000

EARTHWORK

PART 1 - GENERAL

1.1 BASIS FOR BIDS

A. Base Bids on excavating and filling with materials encountered at site except where special fill or backfill materials are specified herein or indicated on Drawings. No allowance or extra payments will be made by reason of variation in types of soil encountered or variations in their moisture contents. Furnish additional fill material required and included as a part of the Work. Include removal of excess or objectionable materials as a part of the Work.

1.2 QUALITY ASSURANCE

A. Shoring, sheeting, bracing and retention plans, details and other provisions necessary in order to safely excavate trenches for this project shall be prepared by a Professional Engineer registered in the jurisdiction where project is located and employed by Contractor.

B. Contractor is solely responsible for retention plans, details, accessories and execution.

C. Regulatory Requirements: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

D. Testing and Inspection Service: Owner will engage soil testing and inspection service for quality control testing during earthwork operations. Refer to Section 01 4000.

1.3 PROTECTION

A. Protect trees, shrubs, lawns, rock out-croppings and other features remaining as a portion of final landscaping.

B. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from equipment and vehicular traffic.

C. Protect above and below grade utilities which are to remain.

D. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation. Monitor shoring system and surrounding ground surface during construction to detect movement. If movement becomes significant, take contingency steps to brace excavation and adjacent utility lines.

E. Notify Owner’s Representative of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

F. Grade excavation top perimeter to prevent surface water runoff into excavation.

PART 2 - PRODUCTS

2.1 STOCKPILING

A. Material cut or excavated from building areas which is suitable for backfilling may be stored on site to be distributed later.

B. Fill material required to be hauled in may be stockpiled at site until used, provided it is properly handled to prevent contamination with undesirable materials.

C. Stockpile topsoil separate from excavated subsoil.

2.2 SURPLUS MATERIALS

A. Remove excavated materials not to be used in fills and backfills on this project from site immediately.

B. Remove materials containing rubbish, debris, fracture limestone, or rocks.

2.3 SOIL MATERIALS

A. General Fill and Backfill: Suitable existing excavated on-site soil free from vegetation, debris, and other deleterious matter, unless otherwise noted.

B. Fill Beneath Structures: Select sandy clay, inert and non-expansive, having a plasticity index and a liquid limit as indicated in soils investigation report to replace unstable material below structure and to raise subgrade level to elevations required.

1. Base Material in Parking/Drive Areas: As recommended in soils investigation report.

C. Topsoil:

1. Clean natural topsoil free of vegetation, debris and other deleterious matter, and approved by Owner's Representative.
2. Upper 6 inches of topsoil stripped may be used, if suitable, otherwise use imported natural, fertile, friable soil possessing characteristics representative of productive growing soils in the area.

D. Granular Leveling Course under Slabs, Walks, and Decks on Grade: Pit run cushion sand, free of organic matter, clays or other binder materials. Submit samples for approval.

E. Impervious Clay Soil: Clayey material having a plasticity index in excess of 30.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Establish extent of excavation by area and elevation; designate and identify datum elevation.

B. Set required lines and levels.

C. Maintain bench marks, monuments and other reference points.

3.2 PREPARATION

A. Existing Utilities:

1. Before starting excavation, establish location and extent of underground utilities occurring in work area.
2. Notify utility companies to remove and relocate lines which are in way of excavation.
3. Maintain, reroute or extend as required, existing utility lines to remain which pass through work area.

4. Protect utility services uncovered by excavation.
5. Upon discovery of unknown utility or concealed condition, discontinue affected work and notify Owner's Representative.

3.3 ROUGH GRADING

A. Excavation and rough grade to lines and grades shown.

B. Overcut planting and lawn areas to allow a layer of topsoil not less than 6 inches thick.

C. Maintain excavations to drain and be free of excess water. Ponding of water on site will not be permitted.

D. Remove objectionable and excess materials from site when excavated.

3.4 EXCAVATION - GENERAL

A. Excavation Classification: Unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. Unauthorized Excavation:

1. Consists of material removal beyond indicated subgrade elevations or dimensions without specific direction of Owner's Representative.
2. Correct unauthorized excavation, as well as remedial work directed by Owner's Representative, at no additional cost to Owner.
3. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation.
4. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Owner's Representative.
5. Backfill and compact other unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Owner's Representative.

C. Additional Excavation:

1. When excavation has reached required subgrade elevations, notify soils testing laboratory for examination of conditions.
2. If unsuitable bearing materials are encountered at required subgrade elevations, excavate deeper and replace excavated material as directed by soils testing laboratory.
3. Removal of unsuitable material and its replacement as directed will be paid on basis of Contract conditions relative to changes in Work.

D. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding Project site and surrounding area.
2. Do not allow water to accumulate in excavations.
3. If presence of subsurface water is encountered during excavation, provide interior drainage.
4. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.

5. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
6. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas.
7. Do not use trench excavations as temporary drainage ditches.

3.5 STRUCTURAL EXCAVATION

A. Locate and mark existing underground utilities and services before beginning structural excavation.

B. Provide excavation for structures and footings, as required for construction, bracing and removal of forms, applying waterproofing, and to permit inspection.

C. Machine slope banks to angle of repose or less until shored. Do not allow excavation to interfere with normal 45-degree angle bearing splay of any foundation.

D. Ensure bottom of excavation is reasonably level.

E. Maintain excavations in as near their natural moisture conditions as possible.

F. Fill over-excavated areas under structure bearing surfaces in accordance with Owner’s Representative's direction.

G. Do not allow construction equipment to create "pumping" of soils.

H. Remove boulders or cobbles.

3.6 EXCAVATION BENEATH FLOOR SLABS-ON-GRADE

A. If required by soils investigation report, excavate and remove existing soil to a depth below bottom of slab as recommended in report.

3.7 FILLS AND BACKFILLS – GENERAL

A. Verify areas to be backfilled are free of debris, snow, ice or water, and ground surfaces are not frozen.

B. Proofroll exposed subgrade in building and paving areas with heavily loaded dump truck or similar acceptable construction equipment, to detect unsuitable soil conditions. Commence proofrolling operations after a suitable period of dry weather to avoid degrading acceptable subgrade surfaces. Make 4 passes over each section with proofrolling equipment, with the last 2 passes perpendicular to the first 2 passes.

C. Cut out soft areas of subgrade not readily capable of in-situ compaction. Backfill and compact to density equal to requirements for subsequent backfill material.

D. Site backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Make gradual changes in grade. Blend slopes into level areas.

3.8 FILLS WITHIN STRUCTURE

A. Select Fill Beneath Slabs-on-Grade:

1. Scarify exposed subgrade to a depth of 6 inches and re-compact to a density and moisture content as recommended in soils investigation report.
2. Place Select Fill in loose lifts of 8 inches and compact each lift to a density and moisture content as recommended in soils investigation report.
3. Place Select Fill to a minimum depth as indicated in soils investigation report.
4. Prevent excessive loss of moisture during construction.

3.9 FILLS OUTSIDE STRUCTURE

A. Roughen and loosen filled areas before placing of fill materials.

B. Spread suitable fill materials in uniform layers over area not to exceed 8-inch-thick compaction.

C. Wet and work materials as required for proper compaction and thoroughly mix.

D. Compaction: By tamping rollers or by utilizing excavation equipment to spread and compact fill to a uniform density equal to natural density of material before excavating.

E. Areas adjacent to building, or where compacting equipment cannot work: Compact with hand tampers.

F. Compact filled areas to 90 percent Standard Proctor and to lines and grades shown, with allowances for a final layer of topsoil in lawn and planter areas.

G. Base Material beneath Paving: Fill beneath paving with material, placed at density and moisture content as recommended in soils investigation report.

3.10 BACKFILL OUTSIDE STRUCTURE

A. Ensure areas to be backfilled are free from debris, snow, ice and water and that ground surfaces are not in frozen condition.

B. Do not backfill over existing subgrade surfaces which are porous, wet or spongy.

C. Backfill areas to grades, contours, levels and elevations indicated.

D. Backfill systematically and as early as possible to allow maximum time for natural settlement and compaction.

E. After permanent construction is in place, forms and trash removed, subsoil drainage and waterproofing complete and inspections complete, backfill with approved materials and compact to approximate density of natural ground.

F. Place backfill in layers not exceeding 8-inch loose depth, and hand or machine tamp to compaction required.

G. Water may be added to backfill material as an aid to compaction; however, do not allow material to become wet to form a mud or paste.

3.11 REMOVAL OF CONTAMINATED SOIL

A. Prior to Finish Grading: Remove soil contaminated with lime from lawn and plant bed areas. Replace with clean, approved topsoil.

3.12 FINISH GRADING

A. After completion of rough grading and site cleared of construction debris, cover areas disturbed by construction or graded to provide new finish grades with a layer of topsoil not less than 6 inches thick.

B. Provide final grades as shown or as directed by Owner's Representative, slope away from building, and provide drainage for area.

C. Degree of Finish: That ordinarily obtainable with blade grader or scraper operations.

D. Finish Surfaces: No greater than 0.10-foot above or below established grade elevation.

E. Provide uniform rounding at top and bottom of slopes and other breaks in grade. Correct irregularities and areas where water will stand.

F. Uniformly distribute topsoil to required grades; feather back to where grades remain unchanged.

G. Finish lawn and unpaved areas to 1-inch below top of walk and curbs.

3.13 FIELD QUALITY CONTROL

A. Comply with requirements of Section 01 4000.

B. Testing Laboratory Services:

1. Owner will engage soil testing and inspection service for quality control testing during soil stabilization, fill and backfill operations.
2. Submit soil materials proposed for fill and backfill to laboratory for testing.

    a. Laboratory will determine suitability of materials to be used.
    b. Laboratory will submit test results and recommendations.

3. Advise testing laboratory 48 hours minimum in advance of operations.
4. Tests will be executed immediately prior to covering of such compacted areas.
5. When tests indicate compaction does not meet requirements, remove fill and backfill completely, dry out or moisten as necessary and recompact.

    a. Retest recompacted areas.
    b. Repeat until test indicate compliance with specified requirements.
    c. Provide reworking and retesting at no additional cost to Owner.

C. Testing laboratory will inspect soil stabilization operations. Notify laboratory when operations are to begin.

D. Testing laboratory will perform one field density test of each lift per 5,000 square feet of compacted fill materials for building slab and paved areas.

E. For each strata of soil on which footings will be placed, testing laboratory will conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Owner's Representative.

F. Laboratory will perform one series of tests on area being evaluated in accordance with ASTM D 2922 and D 3017, or ASTM D 1556 and D 1557.

G. If during progress of Work tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at no additional cost to Owner.

H. Ensure compacted fills are tested before proceeding with placement of surface materials.

3.14 ADJUSTING

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

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

C. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION

SECTION 31 3116

TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Soil treatment.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
2. Include the EPA-Registered Label for termiticide products.

B. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

C. Sample Warranties: For special warranties.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who is accredited by manufacturer.

1.4 FIELD CONDITIONS

A. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.5 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.

1. Service Life of Treatment: Soil treatment termiticide that is effective for not less than 5 years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

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

3.2 PREPARATION

A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.3 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Soil adjacent to and along the entire inside perimeter of foundations; around plumbing pipes and electric conduit penetrating the slab; and along the entire outside perimeter, from grade to bottom of footing.

B. Post warning signs in areas of application.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.4 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION

SECTION 31 3200

SUBGRADE STABILIZATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Lime stabilization of subgrade beneath site paving.

1.2 COORDINATION

A. Coordinate subgrade preparation with earthwork trades.

1.3 INSPECTION, TESTING AND CONTROL

A. Inspection, testing and control: Conducted by an independent testing laboratory as specified in Section 01 4000.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lime Slurry Injection Material Under Building Slabs-on-Grade:

1. Lime: Hydrated lime or lime slurry conforming to requirements of local paving authority.
2. Fluid to consist of clean fresh water and surfactant.
3. Provide a nonionic surfactant (wetting agent) according to manufacturer's recommendations, but in no case shall proportions be less than 1-gallon (undiluted) per 3,500 gallons of water.

B. Lime Stabilization for Paving Subgrade:

1. Hydrated Lime: Type A (dry): Per. TxDOT Item 264-2 or approved equal.
2. Dry Waste Lime: Equivalent amount to obtain, by laboratory tests, plasticity index equal to that specified and obtained for use of hydrated lime, Type A, lime-stabilized subgrade.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that surfaces have been brought to approximate rough grades plus or minus 0.10-foot. Loosen and pulverize soil to a depth of 6 inches below bottom of designated paving or slab areas, including a distance of one foot outside perimeter of paving.

3.2 STABILIZATION OF PAVING SUBGRADE

A. Lime Stabilization:

1. Prepare rough grade, treat top 6 inches of subgrade by mixing with hydrated lime equal to 6 percent lime or as otherwise required to achieve a soils Plasticity Index of not greater than 12.

2. Construction methods and equipment shall comply to TxDOT Item 260 for Type A treatment.
3. Extend lime stabilization 18 inches beyond exposed pavement edges to reduce shrinkage effects during extended dry periods.
4. Compact subgrade a minimum 95 percent of ASTM D 698 at or within 2 percent of optimum moisture content or as otherwise recommended in soils investigation report.

END OF SECTION

SECTION 31 6900

SPREAD AND CONTINUOUS FOOTINGS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Installation Tolerances:

1. Maximum lateral variation off of centerlines: 2 inches.
2. Plan Dimensions: Plus 3 inches, minus ½-inch.
3. Thickness: Not smaller than scheduled sizes.
4. Top of Footing Elevation: Plus 0 inch, minus 3 inches.

1.2 SCHEDULING/SEQUENCING

A. Coordinate Work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

B. Schedule footing excavations such that reinforcing and concrete can be placed immediately after excavations are completed and inspected.

PART 2 PRODUCTS

2.1 MATERIALS

A. Formwork: Refer to Section 03 1000.

B. Reinforcement: Refer to Section 03 2000.

C. Concrete: Refer to Section 03 3000.

PART 3 EXECUTION

3.1 EXCAVATION

A. Spread and continuous footings: Extend to and penetrate bearing materials shown on Drawings.

B. Exposed subgrade soils: Examined in the field by a geotechnical engineer of the testing laboratory to verify the strength and bearing capacity.

C. Excavations and footings:

1. Size and shape as shown on the Drawings.
2. Bottom of each excavation: Level, undisturbed, free of water, caving material or any other foreign substance.

3.2 FABRICATION AND PLACING OF REINFORCING

A. Steel reinforcing mats: Fabricated in rigid fashion to permit expeditious placement into excavation with minimum time delay.

B. Accurately place reinforcement in excavations, maintaining specified coverage. Secure to prevent displacement during concreting.

3.3 FIELD QUALITY CONTROL

A. Testing Laboratory services: In accordance with Section 01 4000.

B. Inspect each concrete wall and column footing excavation to determine that proper bearing stratum is obtained and utilized for bearing and that excavations are properly clean and dry before placing concrete.

C. Furnish complete footing log showing location, elevation of top of bearing stratum, footing size and depth, condition of material, excavation properly clean and dry before placing concrete, reinforcement in compliance with Contract Documents and any and all observed irregularities, deficiencies or deviations from Contract Documents.

3.4 INSPECTION

A. Schedule footing excavation such that the concrete can be placed immediately after inspection.

3.5 PLACING OF CONCRETE

A. Place concrete so as to prevent segregation. Do not allow concrete to free fall over 5'-0"; provide tremie, chutes or other means of conveyance when drop exceeds this amount.

B. Place concrete as soon as practical after the excavation has been completed.

END OF SECTION

SECTION 32 1216

HOT MIX ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

A. Comply with applicable provisions for design, materials, fabrication, and installation (construction) of component parts in addition to requirements shown or specified herein.

B. Install pavement thicknesses, quantities, and locations of heavy duty and light duty asphalt pavements as recommended by the soils investigation report and as shown on the plan sheets.

1.2 REGULATORY REQUIREMENTS

A. Conform to all local standards and applicable codes and requirements for paving work on public and private property during the execution of this work.

B. Manufacture Hot Mix Asphalt (HMA) shall be manufactured from a state-approved/certified HMA manufacturing facility.

1.3 TESTS REQUIRED of GENERAL CONTRACTOR

A. Test materials during production to validate and/or control the mix supplied and shall be included in the bid cost for providing these HMA items.

B. Submit Recent Quality Control testing of the mixture proposed to be used on the Project to the Owner prior to acceptance of the proposed mix design.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Place HMA in acceptable weather conditions; avoid inclement weather.

B. Adhere to local requirements for temperature constraints; however, in no case shall the base asphalt be placed when the temperature is below 40 percent and the surface asphalt when the temperature is below 45 percent. Additionally, the forecast shall be for rising temperatures for both efforts.

1.5 SUBMITTALS

A. Approved vendor certificate for the state where work is being done.

B. Provide Quality Control manual for material production oversight and testing measures being performed both at the asphalt plant as well as on the jobsite.

C. List/Organizational Chart showing personnel responsible for use of equipment and actions of the crew on the grade while paving and compacting asphalt.

Mix Design Submittal Checklist

Project: _____ **Date:** _____

Supplier: _____ **Mix Design:** _____ Surface / Leveling / Base

Included	Missing	N/A	Required Information
			Contractor to select mix design method: (design shall be less than 24 months old)
			50 Blow Marshall
			50-Gyration Superpave
			Hveem, Low Volume
			Other, Engineers Approval Req'd Before Bidding
			Proper Authorizating Signature for Mix Design
			All Aggregate Types, Gradations & % Crush
			FAA >= 40%
			Plot (0.45 Power Graph) of Final Aggregate Blend
			Bulk Specific Gravity of All Aggregates and Final Blend (Gsb), **Include All Worksheets**
			Optimum Binder Content (Pb)
			Mix Voids at Optimum (Va)
			VMA at Optimum
			Bulk Specific Gravity of Mix at Optimum (Gmb)
			Theoretical Maximum Specific Gravity at Optimum (Gmm)
			Dust to Total AC Ratio
			All Design Data and Associated Design Curves
			Recent Quality Control Production Charts
			Other Information per Specifications

1.6 DEFINITIONS

A. Surface Course: The surface/wearing course shall be installed uniformly, to all finished lines and grades, smooth, durable, skid-resistant, impervious thus protecting lower layers, and stable. Workmanship of the finished surface course shall be of the highest industry standards possible prior to acceptance by the Owner. The surface course shall be built with a maximum aggregate particle size of between ½-inch and ¾-inch. Surface course shall be a nominal 1-½-inch compacted thickness with no thickness less than 2 times the maximum aggregate particle size (MAS).

B. Leveling Course: The course and location of the parking area that requires placement of a variable thickness of HMA to 'true up' the lot prior to placement of the surface course. This course has an 'MAS' no greater than that of the surface course.

C. Base Course: The lower courses of the pavement structure below the surface and leveling course with an 'MAS' of between ¾-inch and 1-inch.

D. Tacking/Priming: The process of applying one coat of emulsified asphalt to all horizontal and vertical surfaces of either an existing pavement for an overlay or between lifts while building an improved or new structure (tacking), or upon the aggregate base (priming).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Tack Coat and Prime Coat: AASHTO M140 or M208 (Reference the Asphalt Institute MS-19 for Handling, Storage and Application criteria).

1. Prime Coat: Prime Coat materials of MS-2, CMS-2, or HFMS-2s.
2. Tack Coat: SS-1, SS-1h, CSS-1 or CSS-1h diluted with an equal amount of water, or agency acceptable product.

B. Performance Graded binder shall meet typical agency specification for low- to medium-volume roadways.

C. Aggregates, mineral filler, and asphalt binder shall meet or exceed the requirements of local specifications for asphalt pavements placed under this contract for qualities and types.

D. The coarse aggregate shall be sound, angular crushed stone, crushed gravel, or crushed slag as allowed by the local state agency. Coarse Aggregate fraction shall have a minimum of 75 percent crushed faces.

E. The fine aggregate shall be well graded, moderately sharp to sharp sands that will prevent tender mixes and scuffing from occurring. Fine Aggregate Angularity (AASHTO T-304, Method A), shall be >= 40 percent.

F. Base mixes shall have a minimum of 45 percent passing the No. 4 sieve.

G. Surface and leveling mixes shall have a minimum of 45 percent passing the No. 8 sieve.

H. Mix Designs shall include a breakdown factor, increase to minus No. 200, introduced during the design stage to mimic production values.

M. VMA is based on the aggregate bulk (dry) specific gravity, G_{sb}, as determined by AASHTO T-84 & T-85.

N. RAP may be used up to 20 percent in the HMA binder and surface courses without approval by the Engineer; mixes greater than 20 percent require engineer's approval. Use a softer grade of PG binder per local requirements when using RAP.

2.2 HOT MIX ASPHALT (HMA)

A. All HMA mix designs shall be performed in accordance with the Asphalt Institute MS-2 and SP-2, current edition. The HMA mix designs developed shall meet the requirements of one of the following for compactive effort:

1. Marshall, 50-Blow,
2. Superpave, 50-Gyration, or
3. Hveem, Low Volume Mix.
4. Alternate design with the Engineer's approval prior to time of Bidding.

B. HMA Mix Designs shall be performed by qualified personnel with proven past experience and successes in the mix design and quality control of asphalt production. Resumes of the signing 'individual-in-charge' may be required by the Owner and shall be supplied if requested. The design shall meet the following requirements and be less than 24 months old; however, the mix design method used shall be the Contractors option, as stated

previously, based on various methods which currently exist around the nation. A completed design shall require submittal of documentation as detailed, requested by the Owner in order for the producer to demonstrate knowledge of design and production criterion.

C. Bidding documents shall include the Contractor's proposed Asphalt Mixture Design sheets. Ref. Mix Design Submittal Checklist sheet at the end of this document. Designs will be for HMA to be placed for each of the uses anticipated on each project; patching, base, leveling, and/or surface course. Different asphalt suppliers shall require different design submittals.

D. All submitted HMA mix designs shall contain at a minimum the following information:

1. All Aggregate Gradations
2. Plot (0.45-power graph) of Final Aggregate Blend
3. Bulk Specific Gravity of All Aggregates and Final Blend (Gsb) including Work sheets for natural as well as reclaimed asphalt pavement (RAP).
4. Optimum Percentage Asphalt Binder (Pb)
5. Mix Air Voids at Optimum (Va)
6. Bulk Specific Gravity of Mix at Optimum (Gmb)
7. Theoretical Maximum Specific Gravity at Optimum (Gmm)
8. Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA)
9. Dust to total AC Ratio
10. All Design Data and associated Design Curves

E. Mix Design Method Requirements Table:

Measures	Superpave	Marshall	Hveem
Stability, pounds	n/a	1,200 min.	30 min.
Flow, 0.01-inch	n/a	8 to 16	n/a
Swell, inches	n/a	n/a	0.030 max.
Air Voids at optimum AC	3.5%	3.5%	3.5%
VMA (base mix)	13.0 min.	13.0 min.	13.0 min.
VMA (surface mix)	14.5 min.	14.5 min.	14.5 min.
VFA	70 to 80	70 to 80	70 to 80
Dust to total AC (design)	0.6 to 1.0	0.6 to 1.0	0.6 to 1.0
Dust to total AC (production)	0.8 to 1.2	0.8 to 1.2	0.8 to 1.2

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify compacted sub-grade or granular base is dry and ready to support paving equipment and imposed loads. Proof roll to check for unstable areas and remove and replace loose material.

B. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Repair pavement failures and perform crack repair according to their respective specification requirements prior to installation of any HMA surface course.

B. Cold-milling and/or grinding may be necessary to ensure that the asphalt edges at concrete abutments such as approaches, sidewalks, curbing, and drainage basins have smooth transitions.

C. After site review, detail whether wedge milling is necessary to assure positive drainage and transition. Install leveling course, if required, on the project per the site details and quantities shown on the plan sheets.

D. Existing surfaces to receive HMA must be clean prior to the installation of any portion of the work. Clean the surface on which the asphalt concrete is to be placed, and keep it free of accumulations of materials that would, in the judgment of the Owner, contaminate the mixture, prevent bonding, or interfere with spreading operations. Methods used may include but not be limited to the use of a sweeper that can wet and vacuum the area free of dirt and debris, clay, and dust, or any other foreign material.

E. Any oil or grease spots shall be scraped and treated to prevent bleeding through the tack coat. Bad oil spills may require removal with a wire brush or other suitable tool. Maintain clean pavements prior to applying emulsified tack coat. When approved sub-grade or pavement courses previously constructed under the Contract become loosened, rutted, or otherwise defective, the Contractor must correct the deficiency according to the contract item or items involved before the spreading of a subsequent pavement course.

F. If shown on the plans, apply prime coat at the diluted rate of 0.30-gallon per square yard over newly placed aggregate base course prior to the installation of the base asphalt. Blotter sand may be used if the prime is applied at too heavy of an application rate to dry up the excess prime coat material.

G. Tack/Prime Coat Distributor Truck must have an insulated tank, heating system and a distributor capable of maintaining a uniform application of emulsified asphalt under pressure throughout the area to be paved. This requires a pump in good working order, full circulating spray bars, and free flowing nozzles. Small, isolated areas may be tacked with a wand.

H. Install tack/prime coat during appropriate weather conditions and protect the tack/prime coat from traffic so as not to wear and track. Allow each installation of the tack/prime coat to 'break,' i.e., turn from brown to black prior to installation of the HMA.

3.3 PLACING ASPHALT PAVING

A. Placement shall not occur when weather is inclement. Adhere to local requirements for temperature constraints however in no case shall the base asphalt be placed when the temperature is below 40^{o} and the surface asphalt when the temperature is below 45 percednt. Additionally, the forecast shall be for rising temperatures for both efforts.

B. Detail and submit to the Owner a paving plan on the site plan sheet prior to placement of asphalt.

C. Apply tack coat at the diluted rate of 0.05-gallon per square yard over newly constructed asphalt leveling or base mixes, 0.10-gallon per square yard over existing asphalt pavements and 0.15-gallon per square yard over milled surfaces. The higher rate shall be used on dry and brittle surfaces. All vertical edges abutting proposed asphalt surfaces shall receive a tack coat. Excessive asphalt applications, drooling, or pooling shall be swept with a broom to ensure proper bonding of the HMA. Immediately install the HMA after the asphalt emulsion has 'broken.'

D. Trucks shall have smooth, clean and tight metal beds that do not have mixture sticking to the truck bed and from which the entire quantity of HMA can be discharged smoothly into the spreading equipment. Trucks shall have a tarp and insulation as needed to protect the asphalt mixture from wind, rain and cold temperatures. Trucks for hauling asphalt mixture shall be in good, safe working condition.

E. Surface course longitudinal joints shall run with the traffic pattern. Therefore, pulling across the driving lanes shall not be allowed unless express permission is given by the Owner.

F. The entire parking lot surface course shall be paved on the same day. The timing and process should be discussed with and approved by the Owner before proceeding with the work.

G. Paving Equipment must be capable of placing, spreading and finishing courses of HMA to the specified thicknesses. HMA shall be free of marks, segregation and be placed to the required uniform elevation with a smooth texture not showing tearing, shoving, or gouging. Auger extensions are required if segregation occurs while pavers are extended beyond the basic screed width. Paving Equipment shall be LeeBoy or ProPaver type or the equivalent. Hand work shall be minimized to ensure the best possible finished surface.

H. Place Hot Mix Asphalt at a minimum temperature of 250 degrees F.

I. Rolling shall start as soon as the HMA can be compacted without displacement. Rolling shall continue until the HMA is thoroughly compacted and all roller marks have disappeared. Compact the HMA to a minimum in-place density of 92.0 percent of the Theoretical Maximum Specific Gravity, G_{mm}.

J. Rollers shall conform to the manufacturer's specifications for all ballasting. At least one vibratory roller shall be required for each project. Rollers shall be of good condition and capable of compacting the HMA to the minimum in-place density required by this Specification.

K. For asphalt repairs work at an existing site, Work in such a manner as to not unduly limit parking or access to the site by customers or employees. Maintain access to at least 50 percent of usable parking spaces during paving.

3.4 CONSTRUCTION JOINTS

A. Minimize construction, longitudinal and transverse joints left open for an extended period of time.

B. Construct parking swale longitudinal joint by paving in a hot fashion with a temperature of not less than 180 degrees F to ensure maximum performance.

C. Compact all joints to provide for a neat, uniform and tightly bonded joint that will meet both surface tolerances and density requirements.

D. Cut true construction or transverse joints if the material has cooled to less than 180 degrees F prior to the placement of the next pass to ensure the best performing joint possible.

3.5 TOLERANCES

A. Smoothness shall meet the requirements of no greater than ¼-inch in 10 feet for base and leveling courses and 3/16-inch in 10 feet for surface course.

B. Thickness of the overall mat shall be within ¼-inch of the specified compacted plan thickness at all locations. The average thickness shall meet the plan thickness shown. The yield for the day and for the entire site shall meet calculated theoretical based on 92 percent of G_{mm} supplied from the Contractors mix design and daily test values. This item shall be calculated by the Contractor and supplied to YUM as final parking lot documentation prior to final payment.

C. Deficient areas shall be defined, removed and replaced, or adjusted to the Design thickness, by methods approved by the Owner's Representative.

D. Completed HMA placement must be laid in order to allow positive drainage away from buildings and towards drainage outlets. Any ponding of water is not acceptable and shall require replacement at the Contractor's expense. Flood the lot as directed by the Owner to determine positive drainage acceptability.

3.6 FIELD QUALITY CONTROL

A. Hot Mix Asphalt (HMA) shall be manufactured from a State-approved/certified HMA manufacturing facility. Work consists of one or more courses of HMA constructed on a prepared foundation. The asphalt concrete consists of a mixture of uniformly graded aggregate and specified type and grade of asphalt binder. The manufacturing facility shall be capable of producing HMA in accordance with the following requirements and all applicable local agency specifications on an ongoing and consistent basis.

B. Ensuring uniform material is produced and selecting the vendor for these asphalt projects will require timely submittal of documents and qualifications to the satisfaction of the Owner. Contractor/material supplier shall demonstrate the existence of the following documents:

1. Approved vendor certificate for the state where work is being done.
2. Quality Control manual for material production oversight and testing measures being performed both at the asphalt plant as well as on the jobsite.
3. List/Organizational Chart showing personnel responsible for use of equipment and actions of the crew on the grade while paving and compacting asphalt.

C. Calibrated equipment and qualified personnel must be accessible at all times during the construction of this HMA. The Contractor shall provide the necessary equipment, materials, and labor to complete the job acceptable to the Owner. Variations in the size and amount of equipment will depend on the size of the area being paved.

D. It is imperative that all documents list a 'Person-in-Charge' who is responsible for the over-site of the previously listed activities. This individual will be the point of contact for the Owner and they shall work with the Owner to ensure timely project completion and specification compliance. This individual shall be knowledgeable in all aspects of asphalt design, production, and installation and shall be an employee of the company holding the contract with the Owner, even if the HMA is being produced and supplied by a separate vendor.

E. Daily maximum theoretical specific gravity values must be made available to the Contractor's density technician for verifying in-place density within 4 hours of start production.

F. Asphalt content, gradation, and bulk specific gravity (G_{mb}) testing shall be done a minimum of once every 400 tons of HMA supplied or every third day for low tonnages that when added together successively do not equal 400 tons.

G. Acceptable average measures are made by use of a correlated nuclear density gauge, Pavement Quality Indicator or PaveTracker (non-nuclear) or by cutting 4 cores per lift, per day and testing per AASHTO T-166, Method C. Additional testing shall be performed on any given day once 400 tons of asphalt is placed.

H. Any average in-place density measure for surface course mixtures that is less than required for the day will result in a reduction in HMA pay equal to the following chart. After reaching the 30 percent reduction mark the pavement shall be removed and replaced by the Contractor or left in place with no compensation due the Contractor. Base and leveling installation of asphalt shall meet local DOT specifications for in-place density measures. Surface course longitudinal joints shall be measured 6 inches from the joint, centered upon core or density gauge, and shall meet the mat density requirements minus 2.0 percent at a minimum. Base and leveling course longitudinal joint density measures shall achieve between 95 to 102 percent of maximum achievable individually, with an average of 98 percent on any given day.

In-Place Density Pay Schedule, Surface Course Mat Density

Pay Factors, % (percent)	In-Place Density, % Maximum Theoretical Specific Gravity, G_{mm}
100	> 92.0%
100 to 0.5 for each 0.1% below 92.0%	91.0% to 92.0%
95 to 1.0 for each 0.1% below 91.0%	90.0% to 91.0%
85 to 1.5 for each 0.1% below 90.0%	89.0% to 90.0%

I. Process Control testing shall be in accordance with state standards for frequency and methods where the Work being performed is done with a minimum of testing meeting the above QC requirements.

J. Protect the HMA until such time that traffic can be placed upon the properly compacted asphalt and show no signs of deformation.

K. If excessive segregation is occurring during placement operations, the Contractor will investigate the cause(s) and make appropriate changes to the satisfaction of the Owner.

3.7 WORK TIMELINES

A. HMA Full-depth Pavements: After placing base asphalt and immediately prior to placing the surface asphalt inspect the entire pavement for low spots, damaged areas, segregated materials, and testing measures taken. Remove and replace any and all deficient sections to meet these specification requirements prior to continuing with work. These efforts shall not delay the overall progress of construction nor delay the opening of the facility.

B. Overlays (a/k/a Resurfacing): The pavement repairs, overlay, and striping shall be accomplished in such a manner as not to unduly limit parking or access to the site by customers or employees.

1. There shall never be less than 50 percent of the usable parking spaces available unless work is performed during off hours or when completion of work is possible prior to hours of operation.

2. Every attempt should be made to complete the surface course placement process in one continuous placement with no cold joints.
3. The timing and process should be discussed with the Owner before proceeding with the Work.

3.8 SITE SPECIFIC IDENTIFICATION

A. Remove and store bumper blocks and other lot accessories during operations, reinstall after work is completed, and replace any and all broken bumper blocks.

B. Remove all waste materials from the site and dispose of according to local ordinances.

C. Complete all work in compliance with ADA requirements.

D. Notify Owner and Store Manager when store traffic can return to lot.

E. Supply Owner with Notarized Certificate of Compliance and total (tons, cu. yds., number) used for all products supplied to the project for each pay item.

F. Supply Owner with yield calculations for all products used on the project. (Example: placement of 1,300 square yards of hot mix asphalt,1-3/4-inch compacted thickness will require 128 tons when the unit weight = 150 pcf.)

References:
Asphalt Institute, Lexington, KY
National Asphalt Pavement Association, Lantham, MD

END OF SECTION

SECTION 32 1313

REINFORCED CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Obtain materials from same source throughout.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.3 TESTS

A. Testing and analysis performed under provisions of Section 01 4000.

B. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.

C. Four concrete test cylinders will be taken for every 50 or less cubic yards of each class of concrete placed each day.

D. One slump test will be taken for each set of test cylinders taken.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Do not place pavement when base surface or ambient temperature is less than 40 degrees F, or if base surface is wet or frozen.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C 150, Air Entraining-Type IA, Portland Cement, gray color.

B. Fine and Coarse Aggregates: ASTM C 33.

C. Water: Clean and not detrimental to concrete.

2.2 FORM MATERIALS

A. Conform to ACI 301. If using metal, use material free of deformities. If using wood, use construction grade lumber, sound and free of warp, minimum 2-inch nominal thickness, except where short radii of curves require thinner forms.

B. Contraction Joint Devices: Galvanized sheet metal, keyed profile, with knock-outs for reinforcing and dowel steel.

2.3 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615; 60 ksi yield grade; deformed billet steel bars, uncoated finish.

B. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A 185; in flat sheets; uncoated finish.

C. Tie Wire: Annealed steel, minimum 16 gauge size.

D. Dowels: ASTM A 615; 40 ksi yield grade, plain steel, uncoated finish.

E. Miscellaneous Reinforcing Accessories: Spacers, chairs, ties, and other devices necessary for properly placing, spacing, supporting, and fastening reinforcement in place.

2.4 ACCESSORIES

A. Form Release Agent: Non-staining, paraffin-based oil.

2.5 JOINT FILLERS

A. Wood: Construction grade, preservative treated yellow pine, sound and free of checks, splits or other defects, ¾-inch thick.

B. Backer Rod: As specified in Section 07 9200.

C. Sealants: 2- or 3-part polyurethane sealants, of grade as required to suit application, meeting ASTM C 920, in manufacturer's custom colors, and as follows: Refer to Section 07 200 for traffic-bearing urethane sealant, Type U-TB.

2.6 ADMIXTURES

A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:

1. W. R. Grace & Co.
2. Euclid Chemical Company.
3. Sika Corporation.
4. Master Builders, Inc.

B. Air Entrainment: ASTM C 260.

C. Chemical Admixture: ASTM C 494, Type A - cement dispersing and water reducing. Use Type D - water reducing and retarding, or Type E - water reducing and accelerating as determined by climatic conditions and as approved by testing laboratory.

2.7 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C 94, Alternate 2.

B. Use accelerating admixtures in cold weather only when approved by testing laboratory. Use of admixtures will not relax cold weather placement requirements.

C. Use set-retarding admixtures during hot weather only when approved by testing laboratory.

D. Add air entraining agent to concrete mix for concrete work exposed to exterior, in amounts of 4 to 7 percent of total concrete volume or as otherwise recommended by testing laboratory.

E. Maintain water-cement ratio to produce a minimum of 3 to maximum of 5-inch slump.

F. Use of calcium chloride and fly ash are strictly prohibited.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify compacted subgrade or stabilized soil is ready to support paving and imposed loads, free of frost, smooth and properly compacted.

B. Verify gradients and elevations of base are correct, and proper drainage has been provided so that water does not stand in the area to receive paving.

3.2 FORMING

A. Construct and remove forms in accordance with ACI 347.

B. Place and secure forms to correct location, dimension, and profile. Adequately brace to withstand loads applied during concrete placement.

C. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

D. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

3.3 INSERTS AND ACCESSORIES

A. Make provisions for installation of inserts, accessories, anchors, and sleeves.

3.4 REINFORCEMENT

A. Accurately place reinforcement in middle of slabs-on-grade.

B. Interrupt every other bar of reinforcement at control and expansion joints.

C. Place reinforcement to achieve slab and curb alignment as detailed.

D. Steel: Free of rust, mill scale, dirt and oil.

E. Provide doweled joints at interruptions of concrete with one end of dowel set in capped sleeve to allow longitudinal movement. Provide support at both ends of dowels.

F. Support reinforcing on bar chairs. Securely saddle tie at intersections. Rigidly secure in place to minimize displacement during concrete pour.

3.5 JOINTS

A. Intentional stoppage of concrete placing allowed only at planned location of either an expansion joint or contraction joint.

B. When stoppage occurs at an expansion joint, install joint assembly with a bulkhead of sufficient section drilled to accommodate required dowels. Provide expansion joints at maximum 40'-0" on center each way in parking lots, 40'-0" on center for curbs and maximum 20'-0" on center each way at pedestrian paving.

C. When stoppage occurs at a contraction joint, install sheet metal joint assembly of sufficient section to prevent deflection, shaped to concrete section. Drill bulkhead to permit continuation of longitudinal reinforcing steel through construction joint.

D. Stoppage at Unintentional Location

1. Immediately upon unintended stoppage of concrete placing, place available concrete to a line and install bulkhead perpendicular to surface of pavement and at required elevation. Place and finish concrete to this bulkhead. Remove and dispose of concrete remaining on subgrade ahead of bulkhead.
2. When placing of concrete is resumed before concrete has set to extent that concrete will stand on removal of bulkhead, rod new concrete with the first; otherwise, carefully preserve joint face.
3. Provide a joint seal space at edges created by a construction joint of this type, as detailed on Drawings.

E. Provide sawed contraction joints in vehicular paving and curbs spaced as detailed on Drawings, but in no case greater than 20 feet on center spacing.

1. Saw joints after completion of finishing operations as soon as concrete has hardened to extent necessary to prevent revealing of joint or damage to adjacent concrete surfaces.
2. Saw joints same day that concrete is placed except that sawing of joints in concrete placed late in day may be delayed until morning of following day.
3. In any event, saw joints within 18 hours after placing concrete.
4. Use a power-driven concrete saw made especially for sawing concrete and maintain in good operating condition.
5. Saw Blades: Make a clean, smooth cut, producing a groove 1/8-inch to 3/16-inch-wide and a depth equal to 1/4 of slab thickness, minimum 1-inch depth.
6. Align joints in vehicular paving with joints in adjacent pedestrian paving.
7. Cut joints through curbs at right angles to back of curb.

F. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1-inch for backing rod and sealant placement. Install sealant over backing rod in accordance with Section 07 9200 and manufacturer's recommendations.

G. Provide ¾-inch-deep scored joints in sidewalks and plazas at intervals as indicated, but in no case spaced greater than width of walk.

3.6 PLACING CONCRETE

A. Hot Weather Placement: ACI 305.

B. Cold Weather Placement: ACI 306.

C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

D. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.7 FINISHING AND CURING

A. After consolidating and screeding, float concrete to gradients indicated. Use a straight edge to level and test surface in longitudinal direction to required grade. Finish edges to provide a smooth dense surface with 1/8-inch radius.

B. Immediately after placement, protect concrete under provisions of Section 01 5000 from premature drying, excessive hot or cold temperatures, and mechanical injury.

C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

D. Finishes:

1. Vehicular Paving: Heavy broom.
2. Sidewalk Paving: Light broom, radiused and trowel joint edges.
3. Curbs and Gutters: Light broom.
4. Inclined Pedestrian Ramps: Broom perpendicular to slope.
5. Curb Ramps for the Disabled:

a. Stamped during final finishing to create raised truncated domes with a diameter of nominal 0.9-inch, a height of nominal 0.2-inch and a center-to-center spacing of nominal 2.35 inches, with a visual contrast to adjoining surfaces.

3.8 FIELD QUALITY CONTROL

A. Field inspection and testing performed under provisions of Section 01 4000.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.9 SCHEDULES (unless noted otherwise recommended by soils investigation report or if otherwise indicated on civil drawings, provide the following minimum strengths and thicknesses)

A. Concrete Sidewalks: 3,000 psi, 28-day concrete compression strength, 4 inches thick, 3-inch minimum and 5-inch maximum slump.

B. Parking Area Pavement and Curbs: 3,000 psi, 28-day concrete compressive strength, 5 inches thick, 3-inch minimum and 5-inch maximum slump.

C. Fire Lane and Frequent Truck Traffic Pavement and Curbs: 4,000 psi, 28-day concrete compressive strength, 6 inches thick, 3-inch minimum and 5-inch maximum slump.

END OF SECTION

SECTION 32 1713

PARKING BUMPERS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Job Conditions:

1. Verify that concrete paving and pavement marking is completed and ready for installation of wheel stops.
2. Coordinate installation of concrete wheel stops with pavement marking layout.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE PARKING BUMPERS

A. Qualities: Precast concrete parking bumpers reinforced, and having 2 pre-drilled pin holes and having 2 cast-in anchor pins.

1. Concrete: Normal weight concrete, minimum 4,000 psi, 28-day compressive strength.
2. Reinforcing: 2 continuous No. 3 deformed reinforcement bars.
3. Size: 8-1/2 inches wide by 6 inches high by 72 inches long.
4. Anchor Pins: 5/8-inch deformed bar, 2 for each wheel stop, extending a minimum of 3 inches below bottom of wheel stop.

B. Standards:

1. Concrete: ASTM C 94.
2. Reinforcing: ASTM A 615, Grade 40.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify layout of parking bumper locations with pavement marking layout.

B. Thoroughly clean surfaces to receive parking bumper free of dirt, sand, oil, grease or other foreign matter.

3.2 INSTALLATION

A. Install a precast parking bumper in each parking space indicated on Drawings.

B. Install with anchors in accordance with manufacturer's instructions.

C. Leave parking bumper securely anchored and in proper alignment.

END OF SECTION

SECTION 32 1723

PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Job Conditions: Do not apply marking paint when weather is foggy or rainy, or ambient or pavement temperatures are below 40 degrees F, nor when such conditions are anticipated during 8 hours after application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Traffic Marking Paint:

1. Type: Solvent borne alkyd resin; durable and weather-resistant; high solids; fast drying; VOC compliant; meeting requirements of Federal Paint Specifications TT-P-115F and TT-P-85E.
2. Application Thickness per Coat: 15 mils wet (7 mils dry).
3. Application Rate per Coat: 300 to 320 linear feet of 4 inches wide line per gallon.
4. Colors:

a. White: Parking stall stripping, directional emblems, restricted parking zone striping, disabled accessibility paths.
b. Blue with White Copy: Disabled parking emblems.
c. Red with White Copy: Fire lanes.

5. Acceptable Products: S275 Traffic Paint Alkyd 4900 Series by ICI Dulux.

2.2 APPLICATION EQUIPMENT

A. Pressurized, self-contained paint machine capable of applying a straight line from 2 to 6 inches wide, with consistent coverage.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Locate markings as indicated on Drawings. Provide qualified technician to supervise equipment and application of markings. Lay out markings using guide lines, templates and forms.

B. Thoroughly clean pavement surfaces free of dirt, sand, gravel, oil and other foreign materials.

C. Allow paving to cure before painting as required by manufacturer of traffic paint.

3.2 APPLICATION

A. Apply in accordance with manufacturer's written instructions.

B. Apply 2 coats to paving where indicated or required by code.

C. Restrict traffic on pavement until stripping if fully cured.

END OF SECTION

SECTION 32 3129

WOOD FENCES AND GATES

PART 1 GENERAL

1.1 COORDINATION

A. Coordinate the installation of the fence with other trades to avoid cutting and patching.

PART 2 PRODUCTS

2.1 MATERIALS

A. Posts: ASTM A 120; Schedule 40 steel pipe, standard weight, one piece without joints; galvanized finish.

B. Wood Rails and Pickets: Western Red Cedar, No. 1 clear grade, rough sawn surface.

C. No treated yellow pine allowed.

2.2 CONCRETE MIX

A. Concrete: ASTM C 94; normal Portland Cement; 2,500 psi at 28 days; 3-inch slump; ¾-inch maximum sized aggregate.

2.3 COMPONENTS

A. As indicated on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set terminal, gate and line posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

B. Attach rails to posts with pre-manufactured, radiused, steel devices. Use minimum 2 lag bolts per device.

C. Attach pickets to each rail with 2 galvanized nails. If power actuated nailers are used, adjust to make sure fasteners are not driven past face of picket.

D. Gate Latching Devises.

1. Crane bolt 1-inch diameter.
2. 3-inch-deep lead cylinder receiver pipe.

END OF SECTION

SECTION 32 8000

IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 COORDINATION

A. Coordinate to ensure that irrigation sleeving and electrical power source is in place.

1.2 OPERATION AND MAINTENANCE DATA

A. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for piping and component requirements.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. The materials chosen for the design of the sprinkler system have been specifically referred to by manufacturer, enabling the Owner to establish the level of quality and performance required by the system design. After award of contract and prior to beginning work, the contractor shall submit for approval three copies of the complete list of materials to be installed. Landscape architect will review submittals, no substitutions will be allowed.

B. Polyvinyl Chloride Pipe (PVC): PVC pipe manufactured in accordance with standards noted herein.

1. Marking and Identification: Continuously and permanently marked with the following information:

a. Class 200 SDR 21 number.
b. ASTM D 2241 standard number.
c. NSF (National Sanitation Foundation) seal.

2. PVC Pipe Fitting: ASTM D 2464 and D 2466, of the same materials as PVC pipe specified and compatible with PVC pipe provided.

C. Solvent Cement: ASTM D 2564 for PVC pipe and fittings.

D. Copper Tubing: Seamless, type 'M' hard drawn, ASTM B 88.

E. Copper Piping: Hard, straight lengths of domestic manufacture only, ASTM B 88, Type 'L'. No copper tube of foreign extrusion, or so-called irrigation tubing (thin wall) allowed.

F. Copper Pipe Fittings: Cast brass or wrought copper, sweat-solder type.

G. Wire: 14 gage, single copper strand minimum. Type UF with 1/64 inches insulation. Underwriters Laboratory (UL) approved for direct underground burial when used in a National Electric Code Class II Circuit (30 volts AC or less).

H. Sprinkler Riser: Sprinkler heads are to be connected to the laterals by poly flex-pipe and associated fittings by Toro or Irritrol.

1. Toro or Irritrol

I. Swing Joints: O-ring seal type
1. Acceptable Product: Lasco.

2.2 ACCEPTABLE PRODUCTS

ITEM	MANUFAC.	MODEL NO.
4" Pop-up Spray Head	Toro	570Z-4P-COM
12" Pop-up Spray Head	Toro	570Z-12P-COM
Spray Head Nozzles	Toro	Precision Series Nozzles
Rotor Sprinkler Head	Toro	T5P
Drip Line	Toro	DL2000
Controllers (Up to 16 Zones)	Toro	Evolution EVO-4OD EMOD-12
Weather Sensor	Toro	Evolution EVO-SC EVO-WS
Controllers (16 to 24 Zones)	Toro	TMC 424E
Weather Sensor (With TMC 424E)	Irritrol	CL-Wireless
Electric Valves	Toro	TPVF100
Gate Valves	NIBCO	
Quick Coupler Valve & Key	Toro	100-SLVLC 100 SLK
Swivel Hose E11	Toro	100 MHS
Backflow Preventer Valve	FEBCO	As Required
10" Round Valve Box	Amtec	181104
Surge Protection Kit	Irritrol	SPD-587

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify location of existing utilities and that they are ready for use.

3.2 PREPARATION

A. Piping layout indicated is diagrammatic only. Layout and stake locations of system components. Route piping to avoid plants and structures. Verify full and complete coverage with a minimum 55% overlap of stated manufacturers diameter.

B. Protect landscaping and other features remaining as final work.

C. Coordinate work which is embedded in concrete or masonry and routed under paved areas according to underground irrigation sleeves.

D. Provide timely delivery and installation at job site.

3.3 TRENCHING

A. Keep trenches free of debris, material, or obstructions that may damage pipe.

B. Leave trench bottoms smooth so pipe will lay flat.

C. Make trenches wide enough to allow 6 inches between parallel lines.

3.4 INSTALLATION

A. General:

1. Perform work only in the presence of a licensed irrigator.
2. Do not install system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in equipment usage, area dimensions, or static water pressure exist that might not have been considered in the engineering. Bring obstructions or differences to the attention of the Owner's Representative. In the event this notifications is not performed, assume full responsibility for any revision necessary.
3. Staking: Prior to installation, place a stake where each sprinkler is to be located. Receive approval of Owner's Representative before proceeding.
4. Piping Layout: Piping layout is diagrammatic. Route piping around trees and shrubs in such a manner to avoid damage to plantings. Do not dig within balls of newly planted trees and shrubs. Hand excavate whenever possible to avoid cutting of roots greater than 1 inch diameter, during construction.
5. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.

B. Pipe Installations:

1. Sprinkler Mains: Install in minimum 4 inch wide trenches with a minimum 12 inches cover.
2. Lateral Piping: Install in minimum 4 inch wide trenches deep enough to allow for installation of sprinkler heads and valves, but in no case with less than 12 inches cover.

3. Provide firm, uniform bearing in trenches for entire length of each pipe to prevent uneven settlement. Wedging or blocking of pipe is not permitted. Remove foreign matter and dirt from inside of pipes before welding, and keep inside of piping clear during and after layout of pipes.
4. Provide for thermal movement.
5. Backfill: Hand-tamp and water-jet to prevent settling. Hand rake trenches and adjoining areas to leave grade in a good or better condition than before installation. Backfill trench and compact as specified in Section 02300. Protect piping from displacement.

C. PVC Pipe and Fittings Assembly:

1. Solvent: Use solvent and procedures recommended by manufacturer to make solvent-welded joints. Thoroughly clean pipe and fittings of dirt, dust and moisture before applying solvent.
2. PVC to Metal Connections: Work metal connections first. Use a non-hardening pipe dope on threaded PVC to metal joints. Use only light wrench pressure.

    a. Acceptable Product: Permatex No. 2.

3. Threaded PVC Connections: Where required, use threaded PVC adapters into which pipe may be welded.

D. Copper Pipe and Fittings Assembly:

1. Clean pipe and fittings thoroughly and buff connections with sand paper to remove residue from pipe.
2. Flux pipe and fitting and solder connection.

E. Electrical Valves:

1. Provide valves in accordance with materials list and size according to Drawings.
2. Provide valves in a level position in accordance with manufacturer's specifications.
3. Provide 10” round plastic or concrete valve box as noted on the Drawings, centered over valve, flush with finish grade, one valve per enclosure. Provide valve box extensions as required.

F. Sprinklers:

1. General: Provide in accordance with materials list, with nozzling in accordance with Drawings. Revise nozzle degree and trajectory if wind conditions affect coverage. Set pop-up heads flush with finish grade.
2. Shrub Heads: High pop sprinklers attached to lateral piping with flexible flex pipe, sufficiently high to water over shrubs and plants when they have reached their ultimate growth, or as otherwise directed by Owner’s Representative.

G. Wiring:

1. Provide wire from automatic sprinkler controls to valves. No conduit required for U.L. wire, except under pavement, unless otherwise noted on Drawings.
2. Make wire connections with waterproof connectors according to manufacturer's recommendations, and only in approved value boxes.
3. Provide wire from controller to each electric valve. Provide a common neutral wire from controller to valves served by a particular controller.

4. Install control wiring. Provide 10 inch expansion coil at each valve to which controls are connected, and at 100 foot intervals. Bury wire beside pipe. Mark valves with neoprene valve markers.

H. Automatic Sprinkler Controllers:

1. Provide and install per manufacturer's recommendations.
2. Locate as shown on Drawings with approval of Owner’s Representative.
3. Complete controller connection to power supply in PVC conduit in accordance with local electrical codes with watertight fittings.
4. Provide lightning protection (ground rod and wire) to nearest available ground location.

3.5 TESTING

A. Prior to backfilling, test mains for a period of 4 hours. If leaks or pressure drops occur, correct defect and repeat test.

3.6 FINAL ADJUSTMENT

A. After installation is complete, make final adjustment of sprinkler system preparatory to Owner’s Representative's final inspection.

B. Completely flush system to remove debris from lines by removing nozzles from heads on ends of lines and operating system.

C. Adjust sprinklers for proper operation and proper alignment for direction of throw.
NOTE: Under no circumstances shall the direction of throw come into contact with any portion of the building and/or exterior cooler/freezer box.

D. Adjust each section of spray heads for operating pressure and balance to other sections by use of flow adjustment on top of each valve.

E. Adjust nozzling for proper coverage. Prevailing wind conditions or slopes may indicate that arc of angle or trajectory of spray should be other than as shown on Drawings. Change nozzles to provide correct coverage.

3.7 CLEANUP

A. Keep premises clean and neat.

B. Replace and/or repair plant material, structures, and installations by others, damaged by work of this section.

3.8 SYSTEM DEMONSTRATION

A. Instruct Owner's personnel in operation and maintenance of system including adjusting of sprinkler heads. Use operation and maintenance material as basis for demonstration.

END OF SECTION

SECTION 32 9000

LANDSCAPING

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Source Quality Control: Furnish certificates of inspection of landscape materials, to accompany shipments, as required by governmental authorities. Comply with applicable Federal, state, county and local regulations governing landscape materials.

1.2 JOB CONDITIONS

A. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.

B. Cooperate with other contractors and trades working in and adjacent to the landscape work areas. Examine drawings which show the development of the entire site and become familiar with the scope of other work required.

C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner's Representative before planting.

D. Scheduling: Plant or install materials only during normal planting seasons for each type of landscape work required. Correlate planting with specified maintenance periods to provide maintenance until occupancy by the Owner.

E. Site Utilities

1. Determine locations of underground utilities, especially site lighting, and perform work in a manner which will avoid possible damage. Do not permit heavy equipment such as trucks to damage utilities. Hand excavate, as required to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.
2. Coordinate work with the irrigation, electrical, and other trades to prevent damage to underground piping or conduit and similar obstruction work located in landscape areas.

F. Protections: Do not move any equipment over existing or newly placed concrete without approval of Owner's Representative. Provide necessary protections such as board-roading as required.

G. Provide water, hoses, other watering equipment and labor necessary for the Work.

H. Do not install plant materials when ground is frozen.

1.3 MAINTENANCE

A. Until final acceptance or in accordance with the Warranty Program (refer to Contract), maintain plantings and trees by watering, cultivating, weeding, controlling pests and diseases, cleaning and replacing as necessary to keep landscape in a vigorous, healthy condition. Rake bed areas as required.

B. In general, provide maintenance as follows:

1. Watering: As necessary to promote growth. Water will be available on site. Provide necessary hoses and other watering equipment required to complete work.
2. Watering Trees: Keep tree balls moistened to depth of tree ball.
3. Weeding: Remove weeds and foreign grass over plant areas at least once every 2 weeks. Herbicides may be used only when approved by Owner's Representative.
4. Mowing and Edging: Mow and edge newly planted turf when growth reaches minimum required height for specified turf type. Maintain at this height.
5. Apply pesticides in accordance with manufacturer's instructions. Remedy damage from use of pesticides.
6. Trimming and pruning: including the removal of clippings and dead or broken branches and treatment of pruned areas and other wounds.
7. Provide disease control if needed.
8. Maintain wrapping, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

PART 2 - PRODUCTS

2.1 PLANTS

A. General:

1. Well-formed No. 1 grade or better nursery stock, in accordance with ANSI Z-60 and as noted hereafter, subject to Owner's Representative's approval.
2. Listed Plant Heights: From top of root ball to nominal top of plant.
3. Provide only healthy, vigorous stock, grown under climatic conditions similar to conditions in the locality of the project and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.

B. Shrub Size: As shown on scheduled. Trees and shrubs of larger size may be used if acceptable to Owner's Representative, in which case, increase size of roots or balls proportionately. Larger-than-specified plant materials shall not exceed original budget intent.

C. Tree Size: Unless otherwise stated, caliper size will refer to trunk diameter as determined in accordance with ANSI Z-60.1.

D. Ornamental and Shade Trees:

1. Healthy, vigorous, full-branched, well-shaped, with trunk diameter and height requirements as specified.
2. Balls: Firm, neat, slightly tapered and well burlapped. Trees with loose or broken balls at time of planting will be rejected.
3. Trees will be individually approved by the Owner's Representative.
4. Ball Diameter: Minimum 10 inches for each 1-inch caliper measured 6 to12 inches above root ball.
5. Containers: Heavy gauge plastic, metal and wooden boxes only.
6. Provide trees with full rounded crowns, meeting height and spread standards after pruning. No flat sided trees or trees with open areas on any side will be acceptable, consistently superior in form and branching, and typical of the growth habit of their species unless otherwise specified.

E. Multi-trunk Trees: Measure multi-trunk tree caliper as follows. Add the caliper of the largest trunk to one-half the caliper of the remaining trunks.

1. Example: An 8-inch caliper, multi-trunk could be 3 trunks of 5-inch/4-inch/2-inch or 5-inch/3-inch/3-inch).

F. Shrubs, Groundcovers, Perennials and (Annuals with Owner's approval only): Nursery grown, healthy, vigorous, and of normal habit of growth for the species.

G. Turf Grass Sod:

1. Green, actively growing, with strong fibrous root system, free of weeds, stones, and foreign grasses of type indicated in Plant Schedule or on Drawings. Sod which is dormant, heat or drought stressed will not be accepted.
2. Cut sod with a minimum of ¾-inch of soil covering the roots.
3. Deliver to the site in no larger than 24-inch-wide rolls or pallets.
4. Do not stack more than 24 hours between time of cutting and time of delivery.

H. Turf Grass Seed: Provide pure grass seed common to location with minimum weed content. Seed needs to be no older than 1 year.

I. Plants:

1. Conform to sizes and quality notes in plant list and as indicated, with the exception of that larger plants than those specified may be used if approved by the Owner's Representative. Use of larger plants shall not increase the contract price.
2. Specified sizes are after pruning.
3. Measure plants with their branches in normal position.
4. Normal, well-developed branches and vigorous, fibrous root systems, conforming to specifications of the last edition of ANSI Z60.1, Standards for Nursery Stock published by the American Association of Nurserymen, Inc. (A.A.N.).
5. Healthy, vigorous and free from defects, decay, girdling roots, sun-scald injuries, abrasions of the bark, plant diseases, and insect pests, their eggs and larvae.
6. Hardy grown under soil type conditions similar to those in the locality of the project.

NOTE: YUM Standard Site Landscaping Design prohibits the installation of planting beds directly adjacent (i.e., within 18 inches) to the building perimeter. If planting beds are required (only by the Jurisdiction Having Authority) directly adjacent to the building perimeter, only those plant varieties that are VASE-SHAPED (i.e., pear-shaped) and open at the base shall be permitted.

J. Upon becoming aware of any condition that will adversely affect the long-term survival of any plant, notify the Owner's Representative before installation of the plant(s).

2.2 SOIL PREPARATION MATERIALS

A. Bedding Soil: Acceptable manufacturer for location.

B. Commercial Fertilizer (if used): Uniform in composition, dry and free-flowing. Deliver fertilizer to site in original unopened containers, each bearing manufacturer's guaranteed statement of analysis.

1. Fertilizer per the Landscape Architect/Landscape Designer's recommendation; do not over-stimulate plantings with nitrogen.

C. Coarse grade Sphagnum Moss, no Peat Moss permitted.

D. Bark Mulch: if wood mulch used (see paragraph 3.6-B below), it must be sterilized and contain no harmful active residues: pesticides, disease organisms and foreign chemicals. Screen to particle size of 1 inch or smaller. Shredded mulch preferred.

E. Refer to Drawings for specific soil preparation materials which may be proprietary in nature. If such materials are indicated, provide only these proprietary materials unless specific approval of substitutions has been granted in accordance with Section 01 6000.

2.3 TOPSOIL

A. Fertile, agricultural soil typical for locality.

2.4 TREE STAKING AND GUYING MATERIALS

A. Hose: New ¾-inch rubber hose.

B. Hardware

1. Wire: No. 10 gauge, galvanized.

C. Stakes: Steel “T” posts, minimum 5 feet in height.

D. Warning Flags: Plastic surveyor's ribbon, international orange, 1 inch wide and 24 inches long, minimum

E. Tree Wrap: Heavy crepe paper, impregnated with insect repellent chemicals.

F. Install staking and guying as indicated on the Drawings.

G. Turnbuckles: Cadmium-plated steel with 3-inch-minimum lengthwise adjustment.

2.5 MISCELLANEOUS PRODUCTS

A. Steel Edging: 4-inch-deep, 1/8-inch-thick, painted dark green with rust-resistant paint and stake loops welded or formed onto backside.

B. Spikes: Similar material as steel edging, 18 inches long.

C. Erosion Fabric: Jute matting, 4-inch open weave.

D. Root Wrapping Materials: Quality burlap.

E. Tree Wound Dressing: Black asphaltic based antiseptic paint.

F. Herbicides – Acceptable Products:

1. Pre-Emergent per Landscape Architect/Landscape Designer: local or regional use.
2. Post-Emergent per Landscape Architect/Landscape Designer: local or regional use.

G. Tree, Shrub, and Plant Bed Mulch: Shredded decomposed pine bark, having a pH between 6.0 and 7.0, sterilized, and containing no harmful active residues, that is, pesticides, disease organisms and foreign chemicals, uniform in size with a medium particle size of 1-1/2 inches, free of sticks, stones, leaves and other debris.

H. Turf Mulches: Hydroseed base, no dry hay or straw permitted.

I. Weed Barrier: spun-bond or woven, polypropylene, needle-punched fabric. 10-year warranty preferred.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine subgrade, verify elevations noted on the Drawings, observe the conditions under which Work is to be performed, and notify Owner's Representative of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Contractor and Owner's Representative.

B. Beginning of installation means acceptance of existing site.

C. Verify location of underground irrigation lines and other utilities.

3.2 SOIL PREPARATION

A. Trees:

1. General: Refer to the Drawings for tree locations.
2. Backfill Soil: Unless noted on drawings, backfill tree planting pits with native topsoil.

a. Topsoil: Free from rocks, construction debris and other foreign materials. Do not use soil amendments.

B. Shrubs and Ground Covers:

1. General: Refer to the Drawings for shrub area locations.

a. Shrub Areas with Ground Cover: Rough grade in bed areas will be left 4 inches low prior to Work of this Section.
b. Shrub Areas without Ground Cover: The rough grade will be left 3 inches low prior to Work of this Section.

2. Soil Mix: General Planting

a. 1 part bedding mix
b. 1 part native soil
c. Add 4 pounds fertilizer per 100 square feet of bed area and cultivate 6 inches deep.

3. Shrub Beds without Ground Cover: Pocket planted with soil mix described above. Fertilize as above.
4. Specimen or Individual Shrubs: Plant in pits twice the diameter and no deeper than the root ball, and backfill with soil mix described above.
5. Refer to the Drawings for other soil preparation details, notes, and requirements.

3.3 TREE PLANTING

A. Location: Refer to Drawings for location of trees. Stake and label position of trees before pits are dug. Receive approval from Owner's Representative before proceeding.

B. General:

1. Excavate pit: During pit excavation, if pit walls are glazed, roughen sides to allow for good root bond with backfill.
2. Center trees with root flare at or above finish grade and with trunk plumb: once tree is positioned, remove any wire/rope at tree trunk base (critical).
3. Remove top 1/3 of ball burlap immediately prior to backfilling pit, 2-hour maximum, and gently roughen exposed soil around ball, being careful not to damage feeder roots.

C. Size of Tree Pits: Plant tree balls in pits slightly larger than tree root ball unless otherwise dictated by the Landscape Architect/Landscape Designer and no deeper than height of ball. In some locations coniferous tress may need to be planted higher than level ground (verify with Landscape Architect/Landscape Designer). Rest root ball on undisturbed soil. During backfilling, do not allow air pockets.

D. Maintain trees in vertical position while backfilling.

3.4 SPACING AND PLANTING SHRUBS AND GROUND COVERS

A. Place plants in position on bed areas or in individual pits before cans or burlap have been removed.

B. Remove top 1/3 burlap from balled and burlapped plants. Plant where located and approved, setting plants with root flares at or slightly above finish grade, and compact soil carefully around each plant ball.

C. Water each plant thoroughly with hoses to eliminate air pockets. Carefully prune plants to remove dead or broken branches and hand-rake bed areas to smooth, even surfaces.

D. Owner’s Representative reserves the right to interchange or shift locations of plants prior to planting.

3.5 STAKING

A. Refer to Drawing details for placement of stakes.

B. No staking required for trees smaller than 1-½-inch caliber.

C. Use 3 or more wires, attached to tree by loops of wire covered by ¾-inch rubber hose, and secured around the lowest crotch. Anchor wire to “T” posts, driven into the ground to a depth of 20 inches.

D. Inspect hose and wire attachments regularly to evidence of girdling or other damage, and adjusted before such damage occurs.

E. Warning Flags: Flag guy wires or cable with plastic surveyor's ribbon to warn pedestrians - do not place guy wires and cable across paths or sidewalks

F. At direction of Owner’s Representative, leave some trees unstaked for reasons of sheltered location or large relative size of root ball.

G. At the direction of Owner’s Representative, stake certain large shrubs for reasons of exposure to prevailing winds or small size of root ball in relation to top growth.

3.6 MULCHING

A. After work of planting has been completed and approved by Owner's Representative, mulch soil in and around tree pit and bed areas with 3-inch thickness of mulch, lightly cultivated into area. Do not disturb watering saucer, and do not cover root flare. Delay this operation until just prior to final inspection.

B. Mulching Material: Mulching material shall be prevalent in location, and free of germination-inhibiting ingredients. Combustible, wood based mulches shall not be used directly adjacent to the building. If the mulch is required adjacent to the building, mulching materials shall consist of pea gravel or crushed stone for a distance of 18 inches from the face of the building. Gravel shall be separated from organic mulches with a metal or commercial grade nylon spike edging. No black or white pumice rock will be permitted

3.7 FINE GRADING

A. Loosen lawn areas and fine rake to break up lumps and produce a smooth, even grade free from unsightly variations, ridges or depressions.

B. Remove and legally dispose off site stones ½-inch or larger, sticks, root or other debris that is exposed during this operation.

C. Fine Grading: Subject to approval by Owner's Representative.

D. Ensure positive drainage away from building at planting areas adjacent to the building.

3.8 LAWN SEEDING

A. Grading and Rolling: Carefully smooth surfaces to be seeded. Roll area to expose soil depressions or surface irregularities.

B. Fertilizing: Spread Turf Starter Fertilizer onto the soil evenly at the rate of 10 pounds per 1,000 square feet of lawn area. Rake in lightly. Be sure soil is level and smooth before seeding. Avoid seeding on dry soil. Apply fertilizer no more than 48 hours prior to seeding.

C. Broadcast Seeding Method With a Hydromulch Cap:

1. Mechanically or chemically eliminate weeds from areas to be seeded.
2. Spread grass seed over entire area to be grassed per landscape architect/landscape designer's specification.
3. Rake seed into soil to a depth of ¼-inch to ½-inch.
4. Apply a Hydromulch cap over seeded area using 50 pounds of wood cellulose fiber per 1,000 square feet.
5. Water seeded areas in a fashion that will keep the seeds moist 24 hours a day, for a period of 15 to 25 days. Do not allow areas to become dry, or water to the extent that seed will be lost by erosion.

D. For Bermuda grass seed (stolen), utilize Hydromulching:

1. Mechanically or chemically eliminate weeds from areas to be seeded.
2. Hydromulch Bermuda grass seed over entire area to be grassed using 2 pounds PLS per 1,000 square feet.
3. Water seeded areas in a fashion that will keep the seeds moist 24 hours a day, for a period of 15 to 25 days. Do not allow areas to become dry, or water to the extent that seed will be lost by erosion.

E. Do not sow immediately following rain, when ground is too dry, or during windy periods.

F. Seed Protection:

1. Identify seeded areas with stakes and string around area periphery. Set string height to 12 inches. Space stakes at maximum 20'-0" on center.
2. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
3. Lay fabric smoothly on surface, bury top end of each section in 6-inch-deep excavated topsoil trench. Provide 12-inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil
4. Secure outside edges and overlaps at 36 inch intervals with stakes.
5. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
6. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

G. Replacement: Replace any areas of grass not showing sufficient growth at the end of 3 weeks after the original application at no additional cost to Owner.

3.9 TURF PLANTING/SPRIGGING

A. Grading and Rolling: Carefully smooth surfaces to be sprigged. Roll area to expose soil depressions or surface irregularities.

B. Fertilizing: Spread Turf Fertilizer onto soil evenly at rate of 1 pound per 100 square feet of lawn area. Rake in lightly. Be sure soil is level and smooth before sprigging. Avoid laying sprigs on dry soil. Apply fertilizer no more than 48 hours prior to planting.

C. Preparation of Sprigs: By manual or mechanical means, shred live, green sod into sprigs.

1. Sprigs: 4 to 6 inches long, and have minimum of 3 nodes.

D. Sprigging Rate: Shred 31 square feet of sod to provide sprigs for 1,000 square feet of lawn.

E. Watering: Do not sprig whole lawn before watering. When a conveniently large area has been sprigged, water lightly preventing drying; continue to lay sprigs, and water until installation is complete.

F. Rolling Sprigs: After laying all sprigs, roll lightly to eliminate irregularities and to form good contact between sprigs and soil. Avoid a very heavy roller or excessive initial watering which may cause roller marks. Hydromulch cap may be substituted for rolling.

G. Replacement: Replace any areas of grass not showing sufficient growth at the end of 4 weeks.

1. Replace per original method application at no additional cost to Owner.

3.10 SOD PLANTING

A. Grading and Rolling: Carefully smooth surfaces to be sodded. Roll area to expose soil depressions or surface irregularities.

B. Fertilizing: Spread turf fertilizer onto soil evenly at rate of 10 pounds per 1,000 square feet of lawn area. Rake in lightly. Be sure soil is level and smooth before laying sod. Avoid laying sod on dry soil. Apply fertilizer no more than 48 hours prior to laying sod.

C. Laying Sod:

1. Moisten prepared surface immediately prior to laying sod.
2. Lay sod within 24 hours after harvesting.
3. Lay first strip of sod slabs along a straight line, using a string in irregular areas.
4. Butt joints tightly, but do not overlap edges.
5. On second strip stagger end joints.
6. Use a sharp knife to cut sod to fit curves, edges, sprinkler heads.
7. Lay smooth. Align with adjoining grass areas. Place top elevation of sod ½-inch below adjoining edging, paving, and curbs.
8. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
9. Prior to placing sod on slopes exceeding 8 inches per foot (or where indicated), place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into ground.

D. Watering: Do not lay whole lawn before watering. When a conveniently large area has been sodded, water lightly to prevent drying. Continue to lay sod and water until installation is complete.

E. Rolling Sod: After laying sod, roll lightly to eliminate irregularities and to form good contact between sod and soil. Avoid a very heavy roller or excessive initial watering which may cause roller marks.

F. Replacement: Replace any areas of grass not showing sufficient growth at the end of 3 weeks per original method of application at no additional cost to Owner.

G. Watering: Continue irrigation regularly to keep soil evenly moist until active growth resumes.

3.11 CLEANUP

A. During work, keep premises neat and orderly including organization of storage areas. Remove trash, including debris resulting from removing weeds or rocks from planting areas, preparing beds, or planting plants, from site daily as work progresses. Keep walkway and driveway areas clean by sweeping or hosing.

END OF SECTION

SECTION 33 1100

WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of piping mains, valves, connections, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.2 QUALITY ASSURANCE

A. Perform Work in accordance with utility company requirements.

PART 2 - PRODUCTS

2.1 PIPE (utilize types of pipe as allowed by local code and as indicated on Drawings)

A. Ductile Iron Pipe: AWWA C150:

1. Fittings: Ductile iron, standard thickness.
2. Joints: ANSI/AWWA C111, rubber gasket with rods.
3. Jackets: ANSI/AWWA C105 polyethylene jacket.

B. Copper Tubing: ASTM B88, Type L, annealed:

1. Fittings: ANSI/ASME B16.18, cast copper, or ANSI/ASME B16.22, wrought copper.
2. Joints: Compression connection or ANSI/AWS A5.8, BCuP silver braze.

C. PVC Pipe: AWWA C900 Class 150 (DR-18) except that lines serving fire sprinker systems must be AWWA C900 class 200 (DR14):

1. Fittings: AWWA C110, ductile or gray iron.
2. Joints: ASTM D 3139 compression gasket ring.
3. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Water Service" in large letters.

2.2 GATE VALVES - Up to 3 Inches

A. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, extension box and valve key.

2.3 GATE VALVES - 3 Inches and Over

A. ANSI/AWWA C500, Iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, extension box and valve key.

B. ANSI/AWWA C509, Iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, [flanged] [mechanical joint] ends, control rod, [post indicator,] extension box [and valve key].

2.4 BALL VALVES - Up to 2 Inches

A. Brass body, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA compression inlet end, compression outlet, with control rod, extension box and valve key.

2.5 SWING CHECK VALVES - From 2 inches to 24 inches

A. ANSI/AWWA C508, iron body, bronze trim, 45-degree swing disc, renewable disc and seat, flanged ends.

2.6 BUTTERFLY VALVES - From 2 inches to 24 inches

A. ANSI/AWWA C504, iron body, bronze disc, resilient replaceable seat, water or lug ends, infinite position lever handle.

2.7 FIRE HYDRANT

A. Hydrant: Type as required by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends and remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.2 BEDDING

A. Excavate pipe trench and hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level fill materials in one continuous layer.

C. Backfill around sides and to top of pipe with fill, tamped in place and compacted.

D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.3 INSTALLATION - PIPE

A. Maintain separation of water main from sewer piping in accordance with code requirements.

B. Install ductile iron piping and fittings to ANSI/AWWA C600.

C. Route pipe in straight line.

D. Install pipe to allow for expansion and contraction without stressing pipe or joints.

E. Install access fittings to permit disinfection of water system performed under Section 33 1300.

F. Slope water pipe and position drain at low points.

G. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main.

3.4 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Set hydrants plumb and locate pumper nozzle perpendicular to roadway.

D. Set hydrants to grade, with nozzles at least 20 inches above ground.

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 1300.

3.6 SERVICE CONNECTIONS

A. Provide water service to utility company requirements with reduced pressure backflow preventer and water meter with bypass valves.

END OF SECTION

SECTION 33 1300

DISINFECTION OF WATER DISTRIBUTION

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.

B. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum 3 years' experience.

C. Testing Firm: Company specializing in examining potable water systems, certified by the State in which the project is located.

D. Submit bacteriologist's signature and authority associated with testing.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable code or regulation for performing the Work of this Section.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, or AWWA B301, Liquid Chlorine.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION

A. Provide and attach required equipment to perform the work of this Section.

B. Introduce treatment into piping system.

C. Maintain disinfectant in system for 24 hours.

D. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water. Monitor system for 2 days, and if water tests do not meet standards, repeat disinfection process.

E. Replace permanent system devices removed for disinfection.

F. Pressure test system. Repair leaks and re-test.

3.3 FIELD QUALITY CONTROL

A. Test samples in accordance with AWWA C651.

END OF SECTION

SECTION 33 3100

SANITARY UTILITY SEWERAGE PIPING

PART 1 - GENERAL

1.1 PROJECT RECORD DOCUMENTS

A. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this Section.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS (utilize types of pipe as allowed by local code and as indicated on Drawings)

A. Cast Iron Soil Pipe: ANSI/ASTM A 74, Service type, bell and spigot end.

B. Cast Iron Pipe Joint Device: ASTM C 564, rubber gasket joint devices.

C. Plastic Pipe: ANSI/ASTM D 2751, SDR 35 (SDR 36 if buried more than 10 feet below grade), Acrylonitrile-Butadiene-Styrene (ABS) material; bell and spigot style solvent sealed joint end.

2.2 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

C. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sewer Service" in large letters.

2.3 CLEANOUTS

A. Lid and Frame: Cast iron construction, hinged lid.

B. Shaft Construction and Concentric Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints, cast steel ladder rungs into shaft sections at 12 inches; nominal shaft diameter of 36 inches.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 3000, leveled top surface to receive concrete shaft sections, sleeved to receive sanitary sewer pipe sections.

D. Conform to standard details of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on [layout] drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with course aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D 2321 and manufacturer's instructions. Seal joints watertight.

B. Begin installation at downstream discharge connection point and make connection where indicated on Drawings.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8-inch in 10 feet.

D. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches

E. Connect to municipal sewer system.

F. Install trace wire continuous over top of non-metallic pipes buried 6 inches below finish grade, above pipe line.

3.5 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.6 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 4000.

B. Request inspection prior to placing bedding.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

SECTION 33 4100

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of pipe runs, connections, cleanouts, and invert elevations.

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this Section.

1.3 FIELD MEASUREMENTS

A. Verify that field measurements and elevations are as indicated.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS (utilize types of pipe as allowed by local code and as indicated on Drawings)

A. Reinforced Concrete Pipe: ANSI/ASTM C76, Class I with Wall Type A; mesh reinforcement; bell and spigot end joints.

B. Reinforced Concrete Pipe Joint Device: ANSI/ASTM C443, rubber compression gasket joint.

C. Plastic Pipe: ANSI/ASTM D 2729, polyvinyl chloride (PVC) material; bell and spigot solvent sealed joint end.

2.2 PIPE ACCESSORIES

A. Pipe Joints: Mechanical clamp ring type, expanding and contracting sleeve, neoprene ribbed gasket for positive seal.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

C. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Storm Sewer Service" in large letters.

2.3 CATCH BASINS

A. Lid and Frame: Cast iron construction, hinged lid.

B. Shaft Construction and Concentric Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 3000.

D. Conform to standard details of authorities having jurisdiction.

2.4 CLEANOUTS

A. Cleanout Lid and Frame: Cast iron construction, hinged lid.

B. Shaft Construction and Concentric Eccentric Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female dry joints.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 3000.

D. Conform to standard details of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with course aggregate.

B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.2 BEDDING

A. Excavate pipe trench in accordance with Section 31 2000 for work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, in accordance with section 31 2000.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.3 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D 2321 and manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8-inch in 10 feet.

C. Install aggregate at sides and over top of pipe. Provide top cover to minimum compacted thickness of 6 inches

D. Connect to municipal storm sewer system.

E. Install trace wire continuous over top of non-metallic pipes, buried 6 inches below finish grade, above pipe line.

3.4 INSTALLATION - CATCH BASINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.

C. Level top surface of base pad to receive concrete shaft sections, sleeved to receive storm sewer pipe sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.5 FIELD QUALITY CONTROL

A. Field inspection and testing performed under provisions of Section 01 4000.

B. Request inspection prior to installation of pipe, and prior to and immediately after placing aggregate cover over pipe.

C. Compaction testing will be performed in accordance with ANSI/ASTM D 1557 or ANSI/ASTM D 698.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.6 PROTECTION

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION