SKANSKA

March 13, 2026

Letter No. 376
BY-CRE-04925

Evelyn Pao, P.E., Project Director
Washington State Department of Transportation
I-405/SR 167 Program
18911 N Creek Pkwy S, Suite 150
Bothell, WA 98011

Project: I-405/Brickyard to SR 527 – Improvement Project
Contract No.: 009727

Subject: Notice of Differing Site Conditions (DSC) 007 – Contaminated Soil at Old Burlington Northern ROW (PCO 156)

References:

1. WSDOT SL-282 (Feb 27, 2026) – Final denial of protest; acknowledgment of §1-04.7 DSC notice intent
2. Skanska LTR-357 (Feb 20, 2026) – Supplemental Information under §1-04.5; notice of intent to file §1-04.7 DSC
3. Skanska SL-344 (Feb 6, 2026) – Formal Protest of WSDOT SL-248 / PCO 156
4. Skanska SL-312 (Jan 7, 2026) – Change Order Request ($196,848.74)
5. Skanska SL-308 (Dec 30, 2025) – Response to WSDOT SL-224
6. WSDOT SL-248 (Jan 23, 2026) – Denial of DSC and Force Account Payment
7. WSDOT SL-224 (Dec 19, 2025) – Initial DSC determination
8. Atlas Technical Consultants – Soil Sampling and Analysis Summary Report (Oct 10, 2025)
9. RFP Appendix E09a5 (Hazardous Materials Report, July 2021) – Site ID 6, King County Parcel No. 0926059170
10. Contract Drawing EC209 – TESC Sheet, Segment 2 (Rev 0, RFC 8/7/2024) – Test Pit Location Overlay
11. Change Order No. 040 (Mar 27, 2025)

Dear Ms. Pao:

Pursuant to GP §1-04.7 (Differing Site Conditions), Skanska USA Civil hereby provides formal notice of a Differing Site Condition encountered during excavation activities within Area 5 of the I-405, Brickyard to SR 527 Improvement Project. This notice is submitted consistent with Skanska LTR-357 (February 20, 2026), in which Skanska advised WSDOT of its intent to file under §1-04.7, and with WSDOT SL-282 (February 27, 2026), which acknowledged and directed Skanska to proceed under this provision.

Skanska submits this notice without waiver of, and expressly preserving, all rights under GP §1-04.5(1) dispute procedures and GP §1-09.11 Claims with respect to the CO 040 / Force Account payment argument previously set forth in SL-344 and LTR-357. The contractual arguments raised in those letters remain active and are being pursued concurrently on a separate track.

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Background

During excavation activities in Area 5 (King County Parks/former BNSF railroad right-of-way), Skanska encountered contaminated soil requiring Class 3 waste handling, off-site hauling, and disposal at Republic Services in Seattle. Atlas Technical Consultants performed soil sampling and analysis, documenting exceedances including arsenic above MTCA Level A and lube oil in Category 3 per Ecology guidance. Total costs incurred are $196,848.74 as documented in Skanska SL-312.

Basis for DSC 007 – Location Outside Disclosed Hazardous Materials Boundary

GP §1-04.7 provides for an equitable adjustment where a contractor encounters subsurface or latent physical conditions differing materially from those indicated in the Contract Documents. Skanska's DSC notice is based on the following:

1. Site ID 6 Boundary Definition. As acknowledged by WSDOT in SL-271 and SL-282, Site ID 6 in the Hazardous Materials Report (Appendix E09a5) is defined by King County Parcel Number 0926059170. The Appendix E delineation establishes the geographic boundary of disclosed contamination risk at this location.
2. Contamination Encountered Outside the Disclosed Boundary. The contaminated soil encountered by Skanska during excavation extends beyond the area delineated in Appendix E09a5 for Site ID 6. As depicted in Contract Drawing EC209 (TESC Sheet – Segment 2, Rev 0, RFC 8/7/2024), test pit locations TP-1 through TP-6, with GPS coordinates plotted against the Parcel 0926059170 boundary, confirm that excavation and contamination sampling occurred, in part, outside the disclosed Site ID 6 hazardous materials boundary. See Attachment A – Contract Drawing EC209 with Test Pit Location Overlay. This geographic distinction supports a finding that the conditions encountered were not indicated in the Contract Documents.
3. Material Difference from RFP Representation. The actual contamination encountered – Class 3 soils with arsenic exceedances above MTCA Level A and lube oil in Category 3 – represents a material difference from the vague "suspected" contamination description in Appendix E, Site ID 6. The nature and extent of contamination was not reasonably anticipatable from the Contract Documents.
4. WSDOT's Commitment to Develop Project-Specific GSPs/SPs. Appendix E09a5 stated that WSDOT would "develop GSPs and SPs to address the risk of encountering contamination in the work area." No such provisions were developed or incorporated into the Contract. This omission further distinguishes the actual site condition from what the Contract indicated.

Mapping Overlay – Supplemental No. 2

As committed in Skanska LTR-357, Skanska provides herewith a scaled overlay of test pit locations plotted against the Appendix E Site ID 6 hazard boundary (Parcel 0926059170) and construction limits. Contract Drawing EC209 (TESC Sheet – Segment 2, Rev 0, RFC 8/5/2024) depicts test pit locations TP-1 through TP-6 with GPS coordinates, and confirms that sampling locations and associated excavation occurred, in part, outside the delineated Parcel 0926059170 boundary. See Attachment A.

Request for Equitable Adjustment

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Pursuant to GP §1-04.7, Skanska requests an equitable adjustment for all costs associated with the sampling, pre-characterization, handling, hauling, and off-site disposal of contaminated soils encountered outside the disclosed Hazardous Materials Report boundary, including the $196,848.74 documented in SL-312. Skanska reserves the right to supplement this notice with additional cost documentation as work progresses or as further information becomes available.

Skanska reserves all rights under the Contract and applicable laws to recover all damages incurred in connection with this matter. Nothing in this notice shall be construed as a waiver of any rights, claims, or arguments previously asserted under GP §1-04.5, GP §1-09.6, or Change Order No. 040.

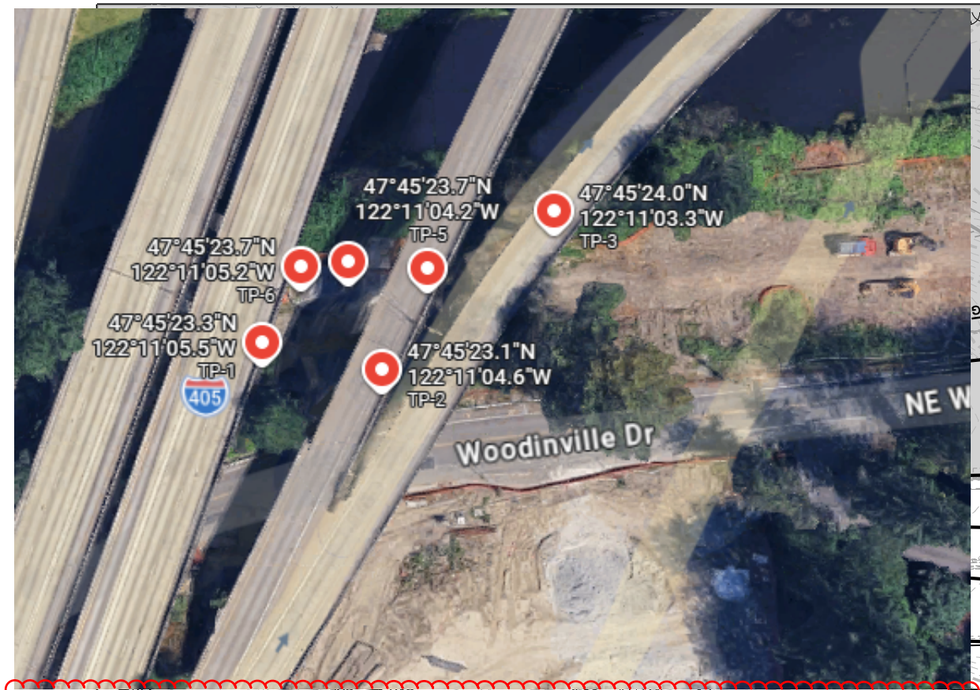
Please contact me if you have any questions or wish to schedule a meeting to discuss.

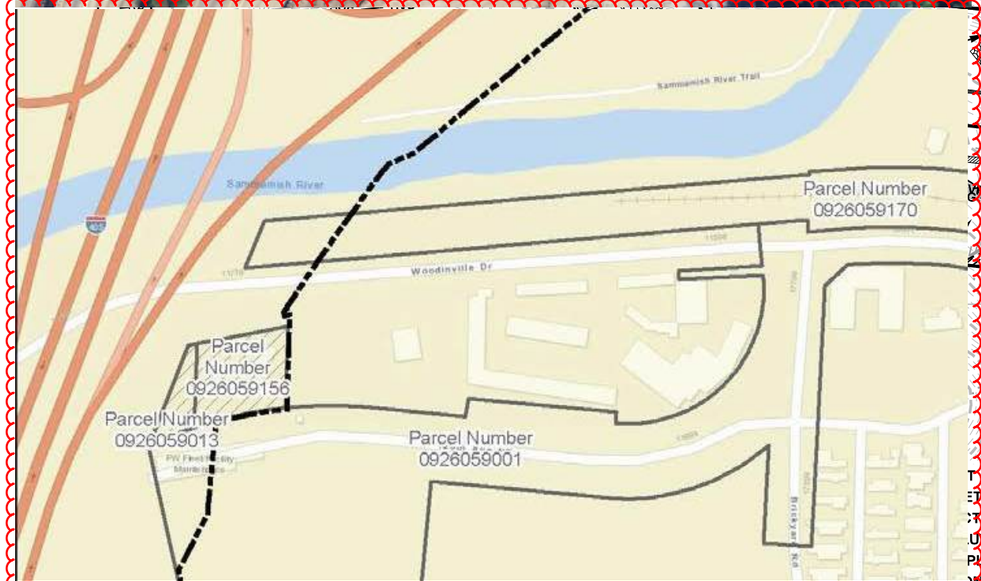
Sincerely,

Patrick Prendergast, Vice President

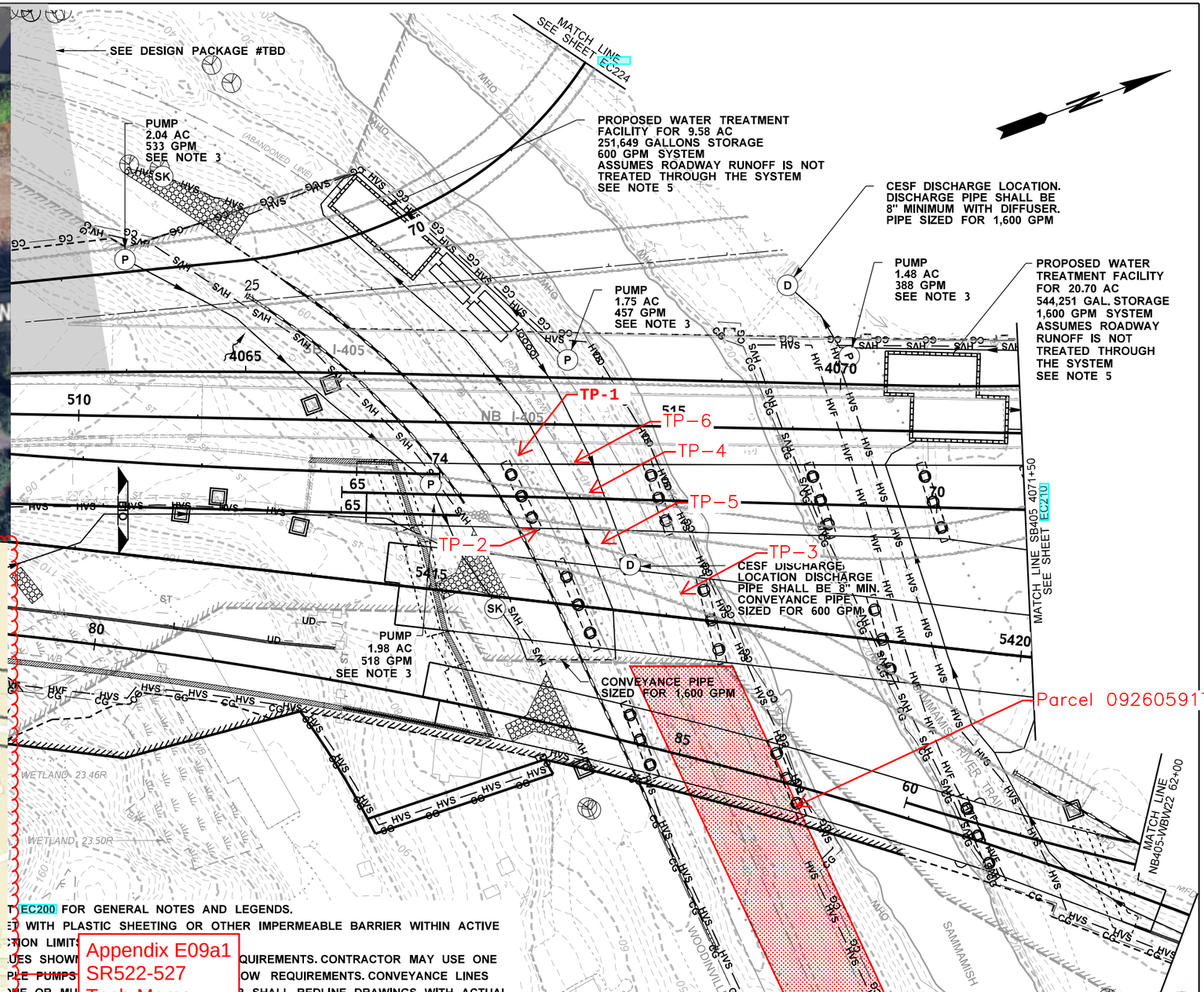
Skanska USA Civil
18911 N Creek Parkway S, Suite 300
Bothell, WA 98011

Attachments:
Attachment A – Contract Drawing EC209, TESC Sheet – Segment 2 (Rev 0, RFC 8/7/2024): Test Pit Location Overlay vs. Appendix E Site ID 6 Boundary (Parcel 0926059170)
Attachment B – Atlas Technical Consultants Soil Sampling and Analysis Summary Report (Oct 10, 2025)
Attachment C – CO 040 Excerpt (for reference)





6	King County Parks/Former BNSF Rail Line	Air Space TCE	King County Parcel # 0926059170 Project	Estimated north to Sammamish River	Partial Acquisition (Air Space only), TCE, construct new bridge for NB off-ramp		TPH, Creosote, Metals	Suspected in soil	Based on history of rail lines, any work in and around rail lines can encounter contamination.	Moderate	As part of obtaining the air space lease and TCE, WSDOT would develop language to limit liability. Develop GSPs and SPs to address risk of encountering contamination in work area. Sample and pre-characterize soil to determine baseline conditions.



T EC200 FOR GENERAL NOTES AND LEGENDS.
T WITH PLASTIC SHEETING OR OTHER IMPERMEABLE BARRIER WITHIN ACTIVE
TION LIMIT
UES SHOWN QUIREMENTS. CONTRACTOR MAY USE ONE
PLE PUMPS OW REQUIREMENTS. CONVEYANCE LINES
NE OR MU R SHALL REDLINE DRAWINGS WITH ACTUAL
D CONVEY
ER RUNOFF FROM UNDISTURBED HILLSIDE IS TO BE CONVEYED BY HVS TO
TORMWATER COLLECTION POINTS. COLLECTED STORMWATER WILL BE CONVEYED
EXISTING INFRASTRUCTURE AND REMAIN OFFSITE.
Y POND LAYOUT WILL BE SUBMITTED AS A TYPE 3E WORKING DRAWING BY
RACTOR PRIOR TO CONSTRUCTION.

Appendix E09a1
SR522-527
Tech-Memo

RELEASED FOR CONSTRUCTION
8/7/2024

TIME	3:21:09 PM
DATE	8/2/2024
PLOTTED BY	JeffStewart
DESIGNED BY	J. STEWART
ENTERED BY	J. STEWART
CHECKED BY	S. HARRISON
PROJ. ENGR.	J SLAVICEK
REGIONAL ADM.	L HODGSON

REVISION	DATE	BY
REV 0 RFC SEG 2 DESIGN PACKAGE	8/5/24	JS

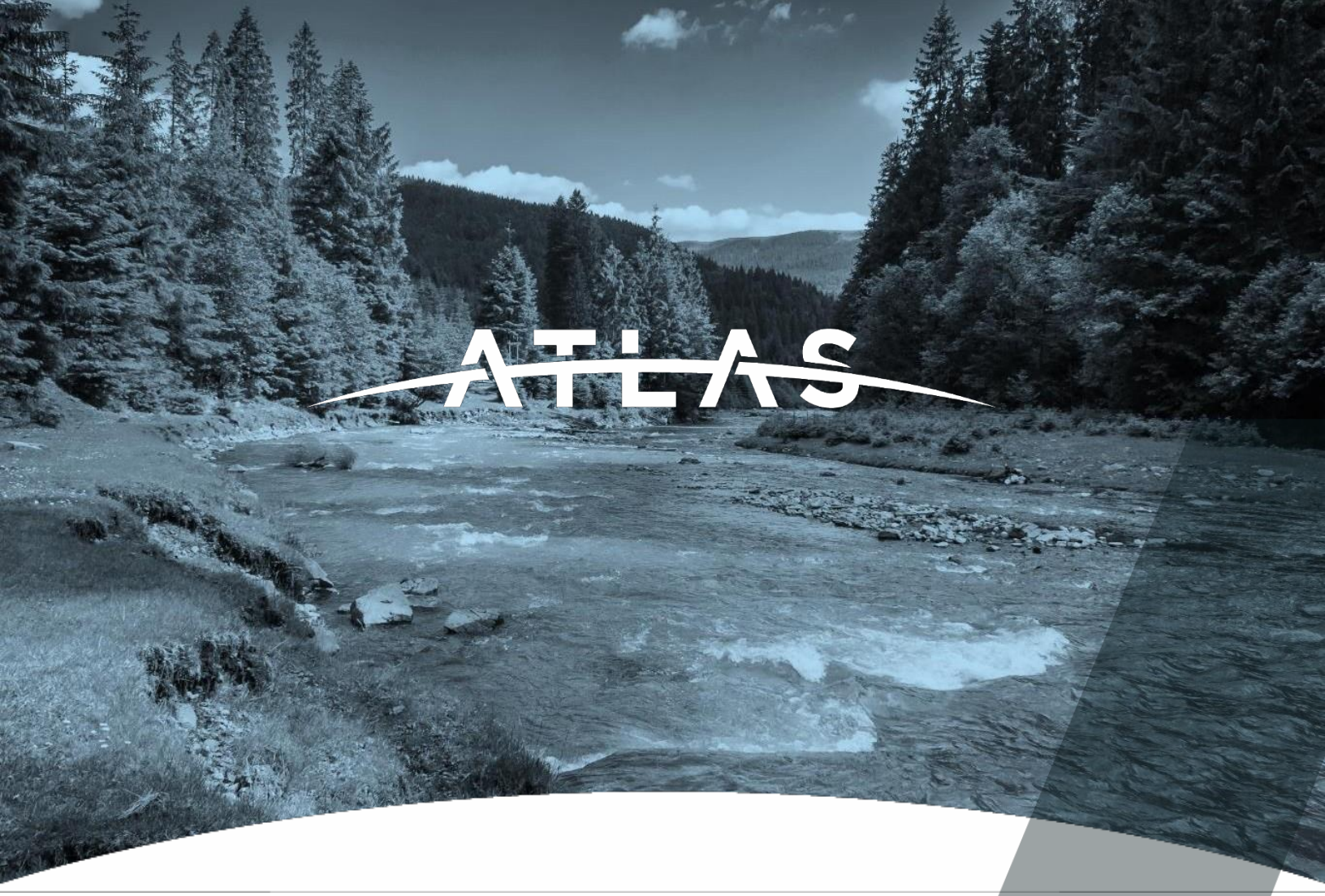
REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	
JOB NUMBER		
22AB17		
CONTRACT NO.		LOCATION NO.
9727		XL5446

JOSHUA HASKELL PARK, STATE OF WASHINGTON, 49210, REGISTERED PROFESSIONAL ENGINEER
8/7/2024 DATE
P.E. STAMP BOX

AECOM
OSG O'Neill Service Group AN ATLAS COMPANY
Washington State Department of Transportation
SKANSKA

I-405
BRICKYARD TO SR527 IMPROVEMENT PROJECT
TESC SHEET - SEGMENT 2

PLAN REF NO EC209
SHEET OF SHEETS



SOIL SAMPLING AND ANALYSIS SUMMARY REPORT

I-5, SR 522 VICINITY TO SR 527 ETL

PREPARED FOR:

Adrian Zoodsma Skanska
18911 North Creek Parkway S,
Suite 300 Bothell, WA 98011

PREPARED BY:

Atlas Technical Consultants LLC
17619 NE 67th Ct, Suite 100
Redmond, WA 98052

Oct. 10, 2025

October 10, 2025

Mr. Zoodsma
SKANSKA
18911 North Creek Parkway S, Suite 300
Bothell, WA 98011

Subject: **Soil Sampling and Analysis Summary Report**
I-405, SR 522 Vicinity to SR 527 ETL
King County Parks/former BNSF Rail Line Parcel, Bothell, WA

Dear Mr. Zoodsma

Atlas is pleased to present this report describing our findings and recommendations associated with the in-situ soil sampling performed at the King County Parks/former BNSF Rail Line Parcel, Bothell, Washington (Herein referred to as A5).

If you have any questions, please call us at (407) 733-4367.

Respectfully submitted,
Atlas Technical Consultants LLC

Mike Foster
Environmental Compliance Manager

Mika Miyamoto
Deputy Environmental Compliance Manager

Attachment: Soil Sampling and Analysis Summary Report

Distribution: Adrian Zoodsma, Travis Cox, Scott Turner

EXECUTIVE SUMMARY

Based on the analytical results of the sampling event conducted on September 24, 2025, the stockpiles at the railroad grade were determined to be Class 2 and Class 3 soils. Based on Washington Department of Ecology (herein: Ecology)'s 2016 Guidance for Remediation of Petroleum Contaminated Sites, Table 12.1, Class 2 soils are soils with residual levels of petroleum hydrocarbons that could have adverse impacts on the environment in some circumstances. Class 3 soils contain moderate levels of petroleum hydrocarbons that could have adverse impacts on the environment unless re-used in carefully controlled situations. Soil in Class 2 and Class 3 soils can be reused in specific circumstances if they meet all criteria outlined in Ecology's 2016 Guidance, Tables 12.2, including that soils should not be placed in or directly adjacent to wetlands or surface water.

All samples met Class 2 soil criteria, with exception of the sample collected from TP-2, at 4 feet below ground surface (ft bgs); these results met Class 3 criteria. In this sample, arsenic also exceeded MCTA Level A Cleanup Standards (20 milligrams per kilogram), at 23.6 milligrams per kilogram.

During excavation, Atlas recommends either segregating excavated soils into Class 2 and Class 3 and managing them as separate piles, or excavating and stockpiling all soils together for disposal as Class 3 soils. If the second option is selected, Atlas recommends submitting current results to a permitted landfill, and completing any additional characterization required prior to disposal.

1. BACKGROUND, PURPOSE, AND SCOPE OF SERVICES

The Washington State Department of Transportation (WSDOT) acquired a temporary construction easement on the King County/Former BNSF rail line parcel in Bothell, Washington (Herein referred to as the parcel) for the purpose of constructing the I-405, Brickyard to SR527 Improvement Project (Project). The parcel is situated on the south bank of the Sammamish River, underneath the I-405 bridges. This area is a former BNSF railroad right of way. Railroad materials are known to contain petroleum, creosote, and heavy metals, and a previous investigation adjacent to the currently proposed excavation identified petroleum and heavy metals on-site. While the major components of the rail line have long been removed from this area, residual contaminants are still present in soils and further identification of contaminant concentrations can support future management of soils at the site.

Based on the Appendix E09 - Hazardous Material Reports of the RFP regarding the former rail line facility, the site was considered a low impact risk due to the defined limitations of the Project. Initially, the parcel was only to be used for staging and minor activities. Based on recommendations and requirements from project materials, if construction activities requiring excavation are proposed or implemented, any soil generated during these activities must be characterized to determine its use in accordance with Washington State Department of Ecology.

Skanska requested Atlas perform in-situ soil sampling to determine the presence of, and extent of, contamination within the proposed excavation area underneath the westbound SR-522 to southbound I-405 collector-distributor bridge. An estimated 3000 cubic yards (CY) of soil is planned for disposal or re-use.

The Scope of services provided is summarized below, outlined in the Sampling and Analysis Plan (SAP), submitted September 15, 2025 for King County South Sammamish Parcel.

- Collect discrete in-situ soil samples at six different locations along the proposed excavation boundary within the King County Parks/former BNSF rail line parcel boundary
- Submit samples for laboratory analysis.
- Review available data.
- Compare soil analytical results to appropriate regulatory limits.
- Prepare a summary report describing the findings and recommendations regarding this sampling event.

See **Figure 1** for a site map of the stockpile locations on the parcel.

2. FIELD ACTIVITIES

On September 24th, 2025, soil sampling activities were conducted according to the procedures outlined in the SAP Section 4.0 Field Screening and Soil Sampling Procedures. Atlas met Skanska excavator operators and site workers to conduct test-pit excavations at the six locations outlined in the approved SAP. While excavating to depth, Atlas recorded visual, olfactory observations, as well as soil type, texture, color, and other relevant soil characteristics in a field log. Atlas used a calibrated photo-ionization detector (PID) to collect organic vapor readings from soils via the baggie headspace screening method at regular intervals, and recorded values in parts-per-million by volume (ppmv). Based on observations during excavation, Atlas selected depths to collect discrete soil samples.

A total of twelve (12) discrete soil samples were collected; three samples were collected from test-pits 4 through 6 at a maximum depth of 7 feet below ground surface (ft bgs), and one sample was collected from test pits 1 through 3, at a maximum depth of 4 ft bgs (**Table 1**).

The samples were packaged in the appropriate sampling containers, placed in a cooler on ice, then transported to the Alliance Technical Group laboratory in Seattle, WA for analysis. Soil samples were analyzed for gasoline, diesel range, and lube oil total petroleum hydrocarbons by Washington Department of Ecology Method NWTPH-Dx and -Gx, for polyaromatic hydrocarbons (PAHs) by EPA Method 8270E-SIM, for select volatile organic compounds (benzene, toluene, ethylbenzene, toluene, and total xylenes – BTEX) by EPA Method 8260D, and RCRA 8 Metals by EPA Method 6020B. A chain of custody was completed and transmitted along with the samples to the analyzing laboratory for documentation of delivery and receipt by the laboratory. Sampling locations and the associated screening results are documented on the attached **Figure 1** and in the Field Log which is included as **Appendix I**.

3. FINDINGS

Field observations noted the soils transitioned from a medium-coarse, brown sand to a dense, light-brown/tan clay with some silt around 2-3 ft bgs and extended to the base of the excavation along the southern side of the proposed excavation area (TP-4 through TP-6).The clay layer contained rust-red staining, which can be indicative of the high water table mark in soils. At TP-1, the clay layer began at 0.5 ft bgs. The clay layer was not encountered at TP-2, nor at TP-3. Atlas screened soils with a PID every 1-2 feet; no readings exceeded 0.0 ppmv. No visual staining or olfactory observations indicated the presence of petroleum contamination.

Analytical results were characterized into 4 soil re-use classes (Class 1, 2, 3 and 4) which are outlined below, based on Ecology's 2016 Guidance (Table 12.1 and 12.2) and MTCA Level A Cleanup Levels.

- Class 1: No evidence of contamination and can be reused on-site based on testing and geotechnical properties.
- Class 2: Low levels of contamination that exceed natural background levels but below Ecology's MTCA Cleanup levels.
- Class 3: Moderate levels of contamination that exceed Ecology's MTCA Cleanup levels.
- Class 4: Higher levels of contamination that exceed MTCA Methods A cleanup levels and may contain F-listed waste that require handling and disposal as Dangerous Waste.

Based on the analytical results, TP-1, TP-3, TP-4, TP-5, and TP-6 can be categorized as Class 2; no analytes exceeded MTCA Level A Cleanup standards. TP-2 is categorized as Class 3 due to three compounds meeting Class 3 levels, and one compound, Arsenic, exceeded the MTCA Level A Cleanup Level (**Table 2**).

Class 2 Soils can be used as backfill at cleanup sites, fill in commercial or industrial areas, or road and bridge embankment constructions, given that the soils are:

- Placed the highest water mark, or, if not known, placed 10 feet above the water table
- Not placed within 100 feet of any private drinking water well or within the 10-year wellhead protection area of a public water supply well
- Not placed in or directly adjacent to a wetland/surface water where contact with water is possible
- Not placed under a surface water infiltration facility or septic drain

Class 3 Soils are soils with moderate levels of residual petroleum contamination and PAHs that could have adverse impacts on the environment. Class 3 soil may be re-used on-site if it meets all conditions described in Class 2, as well as:

- Should be a maximum of 2 feet thick to minimize potential for leaching or vapor impacts.
- Not be placed under a surface water infiltration facility or septic drain field

- When exposed, runoff from area in use should be contained or treated to prevent entrance to storm drains, surface water or wetlands

If Class 2 soils meet criteria outlined above, the soils could be re-used as backfill at cleanup sites above the water table, as fill in commercial or industrial areas above the water table, or as road and bridge embankment construction in areas above the water area. Class 3 soils, if all criteria are met, can be re-used as pavement base material under public and private paved streets and roads, and as material under commercial industrial parking lots.

Copies of the Analytical Laboratory Results and completed chain-of-custody are provided in **Appendix II.**

4. CONCLUSIONS AND RECOMMENDATIONS

Soil sample results from TP-2 meet Class 3 criteria, as well as exceed MTCA Level A Cleanup levels for Arsenic. All other soil sample results meet Class 2 criteria, and do not exceed any MTCA Cleanup Levels. Atlas recommends either:

1) Segregate soils excavated in the vicinity of TP-2 (up to the extent of the other sample locations), and manage that soil as Class 3 soils – the other soils excavated could be considered Class 2 soils. Skanska could then assess their ability to meet on-site re-use criteria for Class 2 soils and engage the services of a landfill for disposal recommendations for Class 3 soils. This option would require additional resources up-front during excavation and additional time required for two separate management plans. Disposal costs may be lower overall, if Class 2 soils are able to be re-used on-site.

2) Excavation of all soils without segregation, for disposal at a landfill. Combining soils would likely dilute the higher concentrations from TP-3. If the landfill required additional waste characterization, the results of the diluted soils may support lower cost for disposal of all soils. This option would mean all soils are treated similarly by selected landfill, and unless additional testing occurs, the highest laboratory results may be applied to all soils. This option also requires less resources, as soils are not being managed separately.

Atlas also recommends outreach to landfills to determine if any additional analysis is required prior to submitting soils for acceptance, and that the landfill itself is permitted to accept the material.

5. LIMITATIONS

The scope of services described herein was intended to provide additional information regarding the presence of Petroleum Hydrocarbons, VOCs, PAHs and RCRA 8 Metals within proposed

excavation in A5. This scope collected discrete soil samples from six locations, at depths extending to 7 ft bgs in three locations and 4 ft in three locations – as such, data presented can only describe the soils analyzed – additional samples would be required for full site characterization. If the proposed excavation extends beyond the limits of the test pits horizontally or vertically, additional data may be required to confirm results align with previous data.

This work was not designed to identify all potential concerns or to eliminate all risk associated with the subject Property. Even the most rigorous professional assessments may fail to identify all existing conditions. This work will not provide a guarantee regarding site contamination and may not generate sufficient data to accurately define the lateral and vertical extent of contamination. This work does not include other services not specifically described in the scope of services presented above.

Property activities and regulations beyond Atlas control could change at any time after the completion of our sampling. Therefore, Atlas observations, findings, and opinions can be considered valid as of the property visit and at the locations where samples were collected and tested.

Our report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions, (both on-site and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use the generated report shall notify Atlas of such intended use. Based on the intended use of the report, Atlas may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Atlas from any liability resulting from the use of the report by any unauthorized party. No warranty, express or implied, is made

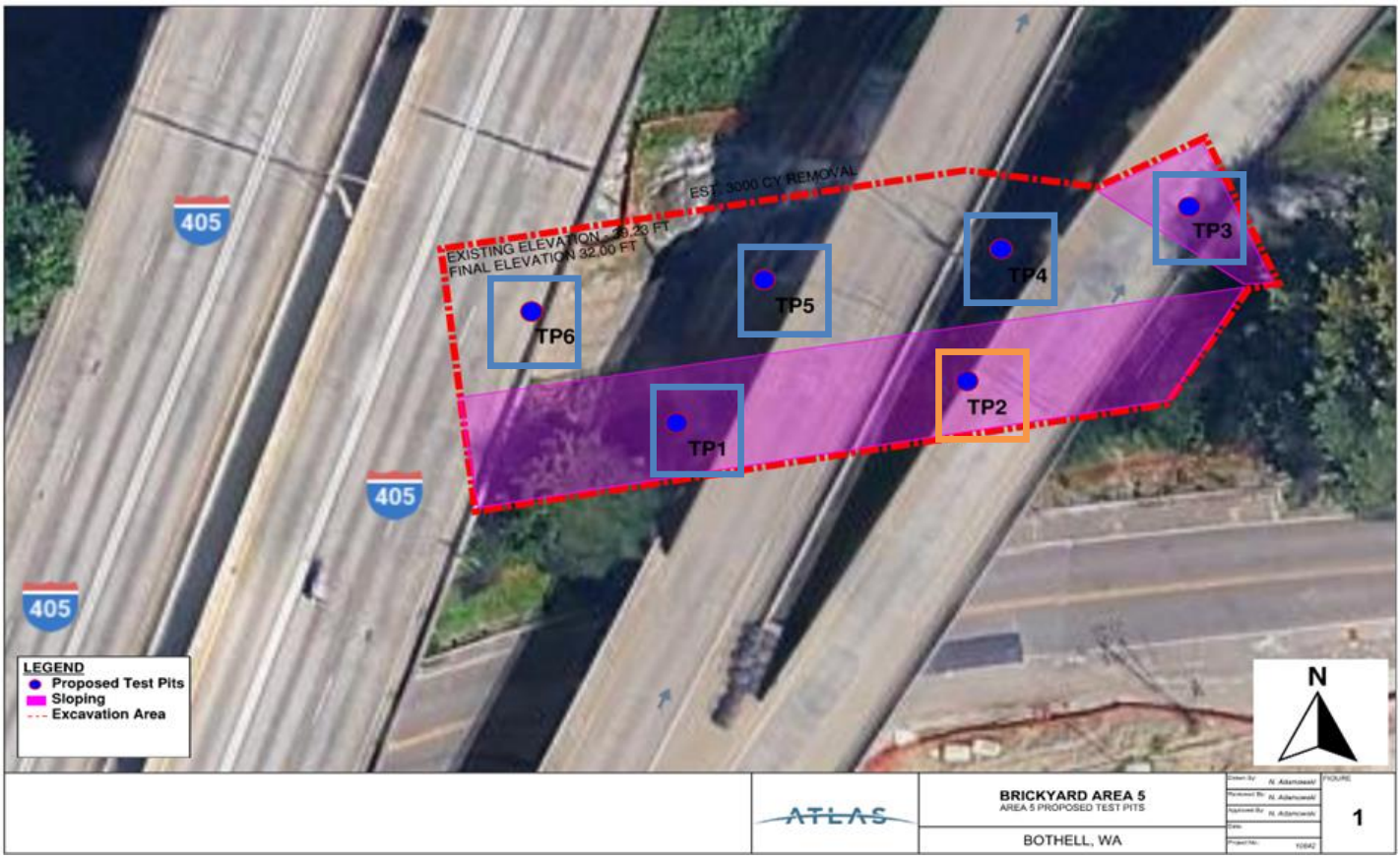


Figure 1: **Soil Test Pit Locations and Soil Categories .**
Blue boxes indicate Class 2 soils, while the orange box indicates Class 3 Soils.

Table 1

Test Pit Location Information

Brickyard Area A5

Skanska I405, SR 522 Vicinity To SR 527 ETL

Bothell, Washington

Atlas PN: 3181

Test Pit ID	Location Description	Latitude:	Longitude:	Sample IDs	Sample Depths (ft bgs)	Max PID (ppmv)
TP-1	Along slope, south western side of proposed excavation	47.75646136	-122.18485795	TP-1-4	4	0.0
TP-2	Along slope, south-eastern side of proposed excavation	47.75642372	-122.18460247	TP-2-4	4	0.0
TP-3	Northeastern corner of proposed excavation	47.75665655	-122.18424574	TP-3-4	4	0.0
TP-4	Northeastern middle of proposed excavation	47.75658105	-122.18466584	TP-4-3 TP-4-5 TP-4-7	3 5 7	0.0 0.0 0.0
TP-5	Northwestern middle of proposed excavation	47.75656978	-122.18448646	TP-5-3 TP-5-5 TP-5-7	3 5 7	0.0 0.0 0.0
TP-6	Northwestern corner of proposed excavation	47.75657406	-122.18477078	TP-6-3 TP-6-5 TP-6-7	3 5 7	0.0 0.0 0.0

Notes:

Coordinates obtained using UTM Geo Map application, created by Geodesy Engineers, © Y2 Technology

UTM Geo Map application utilizes Google Maps software

Coordinates presented in Decimal Degrees

Table 2
Select Soil Analytical Results
Brickyard Area A5
Skanska I405, SR 522 Vicinity To SR 527 ETL
Bothell, Washington
Atlas PN: 3181

Sample ID	Analyte	ECOLOGY SOIL REUSE CATEGORIES				MTCA CLEANUP STANDARDS		Result (mg/kg)
		1	2	3	4	A - Unrestricted	A - Industrial	
TP-1-4	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.0055961
TP-1-4	Arsenic	--	--	--	--	**20**	**20**	7.04
TP-1-4	Barium	--	--	--	--	**16,000**	--	148
TP-1-4	Cadmium	--	--	--	--	**2**	**2**	0.128
TP-1-4	Chromium	--	--	--	--	**2,000**	--	46
TP-1-4	Copper	--	--	--	--	--	--	31
TP-1-4	Lead	<17	17-50	>50-220	<220	**250**	**1000**	6.68
TP-1-4	Mercury	--	--	--	--	**2**	**2**	0.0545
TP-1-4	Nickel	--	--	--	--	--	--	56.2
TP-1-4	Selenium	--	--	--	--	--	--	0.541
TP-1-4	Silver	--	--	--	--	**400**	--	ND<0.126
TP-1-4	Zinc	--	--	--	--	**400**	--	73.1
TP-1-4	Total Naphthalenes	<0.05	0.05-5	<=5	>5	--	--	ND<0.01096
TP-1-4	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.1
TP-1-4	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.637
TP-1-4	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<45.9
TP-1-4	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.0049
TP-1-4	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00675
TP-1-4	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0117
TP-1-4	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01803
TP-2-4	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.109648
TP-2-4	Arsenic	--	--	--	--	**20**	**20**	**23.6**
TP-2-4	Barium	--	--	--	--	**16,000**	--	183
TP-2-4	Cadmium	--	--	--	--	**2**	**2**	0.583
TP-2-4	Chromium	--	--	--	--	**2,000**	--	44.5
TP-2-4	Copper	--	--	--	--	--	--	50.5
TP-2-4	Lead	<17	17-50	>50-220	<220	**250**	**1000**	178
TP-2-4	Mercury	--	--	--	--	**2**	**2**	0.0616
TP-2-4	Nickel	--	--	--	--	--	--	51
TP-2-4	Selenium	--	--	--	--	**400**	--	0.651
TP-2-4	Silver	--	--	--	--	**400**	--	ND<0.128
TP-2-4	Zinc	--	--	--	--	--	--	266
TP-2-4	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00338
TP-2-4	Total Naphthalenes	<0.05	0.05-5	<=5	>5	--	--	ND<0.01086
TP-2-4	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.1
TP-2-4	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.751
TP-2-4	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	259
TP-2-4	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00578
TP-2-4	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00796
TP-2-4	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0138
TP-2-4	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.02129
TP-3-4	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.0049684

TP-3-4	Arsenic	--	--	--	--	**20**	**20**	2.87
TP-3-4	Barium	--	--	--	--	**16,000**	**--**	59.7
TP-3-4	Cadmium	--	--	--	--	**2**	**2**	0.0871
TP-3-4	Chromium	--	--	--	--	**2,000**	**--**	23.6
TP-3-4	Copper	--	--	--	--	**--**	**--**	18.2
TP-3-4	Lead	<17	17-50	>50-220	<220	**250**	**1000**	4.11
TP-3-4	Mercury	--	--	--	--	**2**	**2**	ND<0.00788
TP-3-4	Nickel	--	--	--	--	**--**	**--**	29.3
TP-3-4	Selenium	--	--	--	--	**400**	**--**	0.342
TP-3-4	Silver	--	--	--	--	**400**	**--**	ND<0.105
TP-3-4	Zinc	--	--	--	--	**--**	**--**	38.4
TP-3-4	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00303
TP-3-4	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.00973
TP-3-4	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<11.1
TP-3-4	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.607
TP-3-4	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<38.8
TP-3-4	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00467
TP-3-4	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00643
TP-3-4	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0112
TP-3-4	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01723
TP-4-3	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.00595485
TP-4-3	Arsenic	--	--	--	--	**20**	**20**	6.48
TP-4-3	Barium	--	--	--	--	**16,000**	**--**	128
TP-4-3	Cadmium	--	--	--	--	**2**	**2**	0.0766
TP-4-3	Chromium	--	--	--	--	**2,000**	**--**	52.3
TP-4-3	Copper	--	--	--	--	**--**	**--**	29.4
TP-4-3	Lead	<17	17-50	>50-220	<220	**250**	**1000**	5.88
TP-4-3	Mercury	--	--	--	--	**2**	**2**	0.0671
TP-4-3	Nickel	--	--	--	--	**--**	**--**	48.9
TP-4-3	Selenium	--	--	--	--	**400**	**--**	0.551
TP-4-3	Silver	--	--	--	--	**400**	**--**	ND<0.128
TP-4-3	Zinc	--	--	--	--	**--**	**--**	61.6
TP-4-3	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00363
TP-4-3	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01166
TP-4-3	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.4
TP-4-3	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.625
TP-4-3	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<47
TP-4-3	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00481
TP-4-3	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00663
TP-4-3	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0115
TP-4-3	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01771
TP-4-5	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.0057165
TP-4-5	Arsenic	--	--	--	--	**20**	**20**	6.68
TP-4-5	Barium	--	--	--	--	**16,000**	**--**	153
TP-4-5	Cadmium	--	--	--	--	**2**	**2**	0.0809
TP-4-5	Chromium	--	--	--	--	**2,000**	**--**	55
TP-4-5	Copper	--	--	--	--	**--**	**--**	31.8
TP-4-5	Lead	<17	17-50	>50-220	<220	**250**	**1000**	7.15
TP-4-5	Mercury	--	--	--	--	**2**	**2**	0.0825
TP-4-5	Nickel	--	--	--	--	**--**	**--**	55.2
TP-4-5	Selenium	--	--	--	--	**400**	**--**	0.56

TP-4-5	Silver	--	--	--	--	**400**	**--**	ND<0.127
TP-4-5	Zinc	--	--	--	--	**--**	**--**	72.4
TP-4-5	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00349
TP-4-5	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01119
TP-4-5	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.3
TP-4-5	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.63
TP-4-5	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<46.7
TP-4-5	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00484
TP-4-5	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00667
TP-4-5	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0116
TP-4-5	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01786
TP-4-7	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.0061445
TP-4-7	Arsenic	--	--	--	--	**20**	**20**	7.46
TP-4-7	Barium	--	--	--	--	**16,000**	**--**	185
TP-4-7	Cadmium	--	--	--	--	**2**	**2**	0.119
TP-4-7	Chromium	--	--	--	--	**2,000**	**--**	56.7
TP-4-7	Copper	--	--	--	--	**--**	**--**	40
TP-4-7	Lead	<17	17-50	>50-220	<220	**250**	**1000**	8.77
TP-4-7	Mercury	--	--	--	--	**2**	**2**	0.0637
TP-4-7	Nickel	--	--	--	--	**--**	**--**	65.5
TP-4-7	Selenium	--	--	--	--	**400**	**--**	0.721
TP-4-7	Silver	--	--	--	--	**400**	**--**	ND<0.123
TP-4-7	Zinc	--	--	--	--	**--**	**--**	90.7
TP-4-7	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00375
TP-4-7	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01204
TP-4-7	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.6
TP-4-7	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.667
TP-4-7	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<47.5
TP-4-7	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00513
TP-4-7	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00706
TP-4-7	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0122
TP-4-7	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01893
TP-5-3	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.00575465
TP-5-3	Arsenic	--	--	--	--	**20**	**20**	7.7
TP-5-3	Barium	--	--	--	--	**16,000**	**--**	165
TP-5-3	Cadmium	--	--	--	--	**2**	**2**	0.0926
TP-5-3	Chromium	--	--	--	--	**2,000**	**--**	55.6
TP-5-3	Copper	--	--	--	--	**--**	**--**	27.3
TP-5-3	Lead	<17	17-50	>50-220	<220	**250**	**1000**	8.14
TP-5-3	Mercury	--	--	--	--	**2**	**2**	0.0518
TP-5-3	Nickel	--	--	--	--	**--**	**--**	48.8
TP-5-3	Selenium	--	--	--	--	**400**	**--**	0.558
TP-5-3	Silver	--	--	--	--	**400**	**--**	ND<0.122
TP-5-3	Zinc	--	--	--	--	**--**	**--**	63.7
TP-5-3	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00351
TP-5-3	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01127
TP-5-3	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13
TP-5-3	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.572
TP-5-3	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<45.8
TP-5-3	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00439
TP-5-3	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00605

TP-5-3	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0105
TP-5-3	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01617
TP-5-5	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.00604665
TP-5-5	Arsenic	--	--	--	--	**20**	**20**	6.77
TP-5-5	Barium	--	--	--	--	**16,000**	**--**	184
TP-5-5	Cadmium	--	--	--	--	**2**	**2**	0.139
TP-5-5	Chromium	--	--	--	--	**2,000**	**--**	51.7
TP-5-5	Copper	--	--	--	--	**--**	**--**	44.4
TP-5-5	Lead	<17	17-50	>50-220	<220	**250**	**1000**	8.78
TP-5-5	Mercury	--	--	--	--	**2**	**2**	0.0589
TP-5-5	Nickel	--	--	--	--	**--**	**--**	68.1
TP-5-5	Selenium	--	--	--	--	**400**	**--**	0.599
TP-5-5	Silver	--	--	--	--	**400**	**--**	ND<0.135
TP-5-5	Zinc	--	--	--	--	**--**	**--**	92.1
TP-5-5	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00369
TP-5-5	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01184
TP-5-5	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.8
TP-5-5	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.698
TP-5-5	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<48.5
TP-5-5	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00537
TP-5-5	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.0074
TP-5-5	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0128
TP-5-5	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01985
TP-5-7	Arsenic	--	--	--	--	**20**	**20**	4.81
TP-5-7	Barium	--	--	--	--	**16,000**	**--**	153
TP-5-7	Cadmium	--	--	--	--	**2**	**2**	0.0787
TP-5-7	Chromium	--	--	--	--	**2,000**	**--**	50.9
TP-5-7	Copper	--	--	--	--	**--**	**--**	27.1
TP-5-7	Lead	<17	17-50	>50-220	<220	**250**	**1000**	6.29
TP-5-7	Mercury	--	--	--	--	**2**	**2**	0.0615
TP-5-7	Nickel	--	--	--	--	**--**	**--**	53.1
TP-5-7	Selenium	--	--	--	--	**400**	**--**	0.546
TP-5-7	Silver	--	--	--	--	**400**	**--**	ND<0.127
TP-5-7	Zinc	--	--	--	--	**--**	**--**	68.1
TP-5-7	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00353
TP-5-7	Total Naphthalenes	<0.05	0.05-5	<=5	>5	**--**	**--**	ND<0.01133
TP-5-7	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<12.9
TP-5-7	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.623
TP-5-7	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<45.4
TP-5-7	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00479
TP-5-7	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.0066
TP-5-7	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0115
TP-5-7	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01769
TP-6-3	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	**--**	**--**	0.0046789
TP-6-3	Arsenic	--	--	--	--	**20**	**20**	3.49
TP-6-3	Barium	--	--	--	--	**16,000**	**--**	98.2
TP-6-3	Cadmium	--	--	--	--	**2**	**2**	0.0897
TP-6-3	Chromium	--	--	--	--	**2,000**	**--**	30.6
TP-6-3	Copper	--	--	--	--	**--**	**--**	20.4
TP-6-3	Lead	<17	17-50	>50-220	<220	**250**	**1000**	3.63
TP-6-3	Mercury	--	--	--	--	**2**	**2**	ND<0.00804

TP-6-3	Nickel	--	--	--	--	--	--	35.7
TP-6-3	Selenium	--	--	--	--	**400**	--	0.315
TP-6-3	Silver	--	--	--	--	**400**	--	ND<0.107
TP-6-3	Zinc	--	--	--	--	--	--	41.1
TP-6-3	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00285
TP-6-3	Total Naphthalenes	<0.05	0.05-5	<=5	>5	--	--	ND<0.00916
TP-6-3	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<11.3
TP-6-3	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.549
TP-6-3	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<39.6
TP-6-3	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00422
TP-6-3	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00582
TP-6-3	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0101
TP-6-3	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01554
TP-6-5	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.00567785
TP-6-5	Arsenic	--	--	--	--	**20**	**20**	4.86
TP-6-5	Barium	--	--	--	--	**16,000**	--	160
TP-6-5	Cadmium	--	--	--	--	**2**	**2**	0.161
TP-6-5	Chromium	--	--	--	--	**2,000**	--	52.6
TP-6-5	Copper	--	--	--	--	--	--	28.8
TP-6-5	Lead	<17	17-50	>50-220	<220	**250**	**1000**	7.6
TP-6-5	Mercury	--	--	--	--	**2**	**2**	0.0575
TP-6-5	Nickel	--	--	--	--	--	--	56.4
TP-6-5	Selenium	--	--	--	--	**400**	--	0.581
TP-6-5	Silver	--	--	--	--	**400**	--	ND<0.118
TP-6-5	Zinc	--	--	--	--	--	--	82.5
TP-6-5	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00346
TP-6-5	Total Naphthalenes	<0.05	0.05-5	<=5	>5	--	--	ND<0.01112
TP-6-5	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.3
TP-6-5	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.577
TP-6-5	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<46.6
TP-6-5	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00444
TP-6-5	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00611
TP-6-5	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0106
TP-6-5	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.01632
TP-6-7	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.0058304
TP-6-7	Total cPAHs	<0.05	0.05-0.1	>0.1-2	>2	--	--	0.00578675
TP-6-7	Arsenic	--	--	--	--	**20**	**20**	6.2
TP-6-7	Barium	--	--	--	--	**16,000**	--	153
TP-6-7	Cadmium	--	--	--	--	**2**	**2**	0.0911
TP-6-7	Chromium	--	--	--	--	**2,000**	--	56.6
TP-6-7	Copper	--	--	--	--	--	--	35.2
TP-6-7	Lead	<17	17-50	>50-220	<220	**250**	**1000**	6.75
TP-6-7	Mercury	--	--	--	--	**2**	**2**	0.0715
TP-6-7	Nickel	--	--	--	--	--	--	59.7
TP-6-7	Selenium	--	--	--	--	**400**	--	0.54
TP-6-7	Silver	--	--	--	--	**400**	--	ND<0.13
TP-6-7	Zinc	--	--	--	--	--	--	71.4
TP-6-7	Naphthalene	See Total Naphthalenes				**5**	**5**	ND<0.00355
TP-6-7	Total Naphthalenes	<0.05	0.05-5	<=5	>5	--	--	ND<0.01141
TP-6-7	Diesel Range Organics	<25	25-200	>200-500	>500	**2000**	**2000**	ND<13.7
TP-6-7	Gasoline Range Organics	<5	5-30	>30-100	>100	**100**	**100**	ND<0.828

TP-6-7	Lube Oil	<100	100-200	>200-500	>500	**2000**	**2000**	ND<48.1
TP-6-7	Benzene	<0.005	0.005-0.03	<=0.03	>0.03	**0.03**	**0.03**	ND<0.00636
TP-6-7	Ethylbenzene	<0.005	0.005-6	<=6	>6	**6**	**6**	ND<0.00877
TP-6-7	Toluene	<0.005	0.005-7	<=7	>7	**7**	**7**	ND<0.0152
TP-6-7	Total Xylenes	<0.015	0.015-9	<=9	>9	**9**	**9**	ND<0.02346

Notes:

Samples collected 9/24/2025 and analyzed via EPA Methods SW8270SIM, 8260D, 6020B, NWTPH-Dx, and NWTPH-Gx

Soil Re-use Categories, Table 12.1, *Guidance for Remediation of Petroleum Contaminated Sites,* Washington Department of Ecology, 2016

Green highlighted value indicates Category 1 Blue highlighted value indicates Category 2

Light Orange value indicates Category 3 Dark Orange value indicates Category 4

ND> indicates non-detect less than the metho mg/Kg = migrograms per kilogram

Bold, Red value indicates the value exceeds the MTCA Level A Cleanup Standard (Specified), Unrestricted or Industrial

cPAHs = Carcinogenic Polyaromatic Hydrocarbons

Total cPAH calculated via Environmental Protection Agency guidance:

Each of the seven carcinogenic PAHs were multiplied by their EPA-designated Toxic Equivalency Factor (TEF) and summed. Non-detect concentrations are included via multiplying the method detection limit by one-half and by its TEF, and summing.

APPENDIX I
FIELD NOTES

ATLAS

Log of Boring:

Client: Skanska
Project Name: Brickyard Soil Sampling
Location: TP-02, -04, -07
OSG PN: 10342/17/8
Logged By: HW, AC

Date & Time Started: 9/24 @ 1115
Date & Time Completed: " " @ 1145
Drilling Company: Skanska
Drilling Method: Test pits

Depth of Water ATD: —
Total Boring Depth: 4', 7', 4'
Primary Driller: Skanska
Drilling Equipment: Excavator

Depth	Sample Interval	Recovery	PID (ppm)	Lithologic Description	Sample ID
TP-2				0-.5 loamy, brown m-c sand, moist, no PET 0.5-1.5 dk brown/black loamy organic material w/ roots, matrix m-c moist sand no PET 1.5-3 brown, m-c, some f-sand with silt, no PET, moist 3-4' SAA, w/ redox features (Fe + staining) no PET, moist med. compaction END OF PIT	TP-2-4 @1130
TP-4				Date: 9/24 Time Start: 1148 Finish: 1230 0-1' Quarry spall in matrix of dk brown, moist, m sand to large river cobbles, rounded, 3-4" long, moist, no PET odor, loose 1-1.5 Dk brown, m-c sand, some silt 1.5-3 brown, m-f sand and dry silty clay, redox features, no PET odor grading to clay, tan, dry, no odor, tight/compact, well sorted SAA end of pit	TP-4-3 @1200 TP-4-5 @1210 TP-4-7 @1215
TP-1				Date: 9/24 Time Start: 1245 Finish: 0-0.5 Dk brown, loamy, organic m sand, some silty clay-tanish-, moist, no PET, some little gravel 0.5-2 Silty clay, tight, dry, some redox, well sorted, no PET odor, trace organics SAA END of boring	TP-1-4 @1300

Notes (well construction if applicable):
PET = petroleum
SAA = same as above

All depths provided in feet below ground surface unless otherwise noted. ATD = at time of drilling.

ATLAS

Log of Boring:

Client: Skanska
Project Name: Backyard Soil Sampling
Location: TP-06, -05, -03
OSG PN: 10542.17.8
Logged By: AG

Date & Time Started: 9/24 @ 1315
Date & Time Completed: @
Drilling Company: Skanska
Drilling Method: Test pits

Depth of Water ATD: —
Total Boring Depth: 7'
Primary Driller: Skanska
Drilling Equipment: Excavator

Depth	Sample Interval	Recovery	PID (ppm)	Lithologic Description	Sample ID
TP-6					
0	—	—	0.0	0-0.5' loamy, brown m SAND, little silt, moist, no PET 0.5-1' grayish black silt, little sand and gravel, trace clay, organic odor, trace cobbles	no PET odor
				1-1.5 SAA	
	—	—	0.0	1.5-2 grayish light brown silt to silty sand and gravel, some cobbles, organic odor (septic?)	TP6-3 @1330 TP6-5 @1355
			0.0	2-3 SAA	TP-6-7 @1405
			0.0	3-7 silty clay, dense, some redox	
5			0.0	END of boring	
TP-5					
				0-0.5 loamy, brown F/C sand, little silt, moist 0.5-1' grayish-black silt and gravel, little sand, trace clay, organic odor, dense	no PET odor
			0.0	1-1.5 SAA	
			0.0	1.5-2 grayish-light brown silt to silty sand and gravel, dense, some cobbles, organic odor	
			0.0	3-7 v.dense light brown clay, little silt, redox	TP-5-3 @1435 TP-5-5 @1420 TP-5-7 @1445
			0.0	4	
			0.0	5	
10			0.0	6	
			0.0	7	
				END of Boring	
TP-3					
	—	—	0.0	0-1 Brown SAND, some gravel, little silt, v. dry, loose	no PET odor
	—	—	0.0	1-2 SAA	
	—	—	0.0	2-3 SAA	
	—	—	0.0	3-4 SAA	TP-3-4 @1505
	—			END of boring	
15					
20					

Notes (well construction if applicable):
PET = petroleum
SAA = same as above

All depths provided in feet below ground surface unless otherwise noted. ATD = at time of drilling.

APPENDIX II
ANALYTICAL RESULTS

3600 Fremont Ave N
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Atlas Technical Consultants
Mika Miyamoto
17619 NE 67th Court, Suite 100
Redmond, WA 98052

RE: Brickyard Soil Sampling, 0001842, Phase 17, Task 8
Work Order Number: 2509601

October 02, 2025

Attention Mika Miyamoto:

Alliance Technical Group, LLC - Seattle received 12 sample(s) on 9/24/2025 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx
Gasoline by NWTPH-Gx
PAHs by EPA Method 8270E SIM
Sample Moisture (Percent Moisture)
Total Metals by EPA 6020B
Volatile Organic Compounds by EPA 8260D

All analyses were performed according to our accredited Quality Assurance program. Please contact the laboratory if you should have any questions about the results.

Alliance Technical Group is committed to accuracy, speed, and customer service. Thank you for choosing Alliance Technical Group's Seattle laboratory team for your analytical needs. We appreciate this opportunity to serve you!

Sincerely,

Lyann Rivera
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.4 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original

Date: *10/02/2025*

CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Work Order: 2509601

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2509601-001	TP-2-4	09/24/2025 11:30 AM	09/24/2025 4:38 PM
2509601-002	TP-4-3	09/24/2025 12:00 PM	09/24/2025 4:38 PM
2509601-003	TP-4-5	09/24/2025 12:10 PM	09/24/2025 4:38 PM
2509601-004	TP-4-7	09/24/2025 12:15 PM	09/24/2025 4:38 PM
2509601-005	TP-1-4	09/24/2025 1:00 PM	09/24/2025 4:38 PM
2509601-006	TP-6-3	09/24/2025 1:30 PM	09/24/2025 4:38 PM
2509601-007	TP-6-5	09/24/2025 1:55 PM	09/24/2025 4:38 PM
2509601-008	TP-6-7	09/24/2025 2:05 PM	09/24/2025 4:38 PM
2509601-009	TP-5-3	09/24/2025 2:20 PM	09/24/2025 4:38 PM
2509601-010	TP-5-5	09/24/2025 2:35 PM	09/24/2025 4:38 PM
2509601-011	TP-5-7	09/24/2025 2:45 PM	09/24/2025 4:38 PM
2509601-012	TP-3-4	09/24/2025 3:05 PM	09/24/2025 4:38 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2509601**

Date: **10/2/2025**

CLIENT: Atlas Technical Consultants

Project: Brickyard Soil Sampling

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-001
Client Sample ID: **TP-2-4**

Collection Date: 9/24/2025 11:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	62.9		mg/Kg-dry	1	9/30/2025 6:22:19 PM
Heavy Oil	259	126		mg/Kg-dry	1	9/30/2025 6:22:19 PM
Total Petroleum Hydrocarbons	259	189		mg/Kg-dry	1	9/30/2025 6:22:19 PM
Surr: 2-Fluorobiphenyl	130	50 - 150		%Rec	1	9/30/2025 6:22:19 PM
Surr: o-Terphenyl	147	50 - 150		%Rec	1	9/30/2025 6:22:19 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
2-Methylnaphthalene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
1-Methylnaphthalene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Acenaphthylene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Acenaphthene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Fluorene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Phenanthrene	0.0524	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Anthracene	ND	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Fluoranthene	0.135	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Pyrene	0.121	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Benz(a)anthracene	0.0518	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Chrysene	0.0868	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Benzo(b)fluoranthene	0.0986	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Benzo(k)fluoranthene	0.0504	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Benzo(a)pyrene	0.0773	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Indeno(1,2,3-cd)pyrene	0.0783	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Dibenz(a,h)anthracene	0.0357	0.0238		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Benzo(g,h,i)perylene	0.0794	0.0477		mg/Kg-dry	1	9/30/2025 4:56:23 PM
Surr: 2-Fluorobiphenyl	65.5	44.7 - 160		%Rec	1	9/30/2025 4:56:23 PM
Surr: Terphenyl-d14 (surr)	63.9	52.1 - 159		%Rec	1	9/30/2025 4:56:23 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	7.48		mg/Kg-dry	1	9/26/2025 5:45:42 PM
Surr: Toluene-d8	94.9	65 - 135		%Rec	1	9/26/2025 5:45:42 PM
Surr: 4-Bromofluorobenzene	94.1	65 - 135		%Rec	1	9/26/2025 5:45:42 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0180		mg/Kg-dry	1	9/26/2025 5:45:42 PM
Toluene	ND	0.0374		mg/Kg-dry	1	9/26/2025 5:45:42 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 11:30:00 AM
Project: Brickyard Soil Sampling
Lab ID: 2509601-001
Matrix: Soil
Client Sample ID: TP-2-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0374		mg/Kg-dry	1	9/26/2025 5:45:42 PM
m,p-Xylene	ND	0.0748		mg/Kg-dry	1	9/26/2025 5:45:42 PM
o-Xylene	ND	0.0374		mg/Kg-dry	1	9/26/2025 5:45:42 PM
Surr: Dibromofluoromethane	100	74.8 - 121		%Rec	1	9/26/2025 5:45:42 PM
Surr: Toluene-d8	105	79.6 - 120		%Rec	1	9/26/2025 5:45:42 PM
Surr: 1-Bromo-4-fluorobenzene	102	53 - 139		%Rec	1	9/26/2025 5:45:42 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	23.6	0.261		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Barium	183	1.30		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Cadmium	0.583	0.0261		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Chromium	44.5	0.652		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Copper	50.5	2.61		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Lead	178	0.261		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Mercury	0.0616	0.0522		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Nickel	51.0	0.391		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Selenium	0.651	0.261		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Silver	ND	0.391		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Zinc	266	3.91		mg/Kg-dry	1	10/1/2025 3:45:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	21.5	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 12:00:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-002
Matrix: Soil
Client Sample ID: TP-4-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	64.2		mg/Kg-dry	1	9/30/2025 6:33:59 PM
Heavy Oil	ND	128		mg/Kg-dry	1	9/30/2025 6:33:59 PM
Total Petroleum Hydrocarbons	ND	193		mg/Kg-dry	1	9/30/2025 6:33:59 PM
Surr: 2-Fluorobiphenyl	114	50 - 150		%Rec	1	9/30/2025 6:33:59 PM
Surr: o-Terphenyl	125	50 - 150		%Rec	1	9/30/2025 6:33:59 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
2-Methylnaphthalene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
1-Methylnaphthalene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Acenaphthylene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Acenaphthene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Fluorene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Phenanthrene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Anthracene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Fluoranthene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Pyrene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Benz(a)anthracene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Chrysene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Benzo(b)fluoranthene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Benzo(k)fluoranthene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Benzo(a)pyrene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Indeno(1,2,3-cd)pyrene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Dibenz(a,h)anthracene	ND	0.0256		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Benzo(g,h,i)perylene	ND	0.0512		mg/Kg-dry	1	9/30/2025 5:44:02 PM
Surr: 2-Fluorobiphenyl	71.9	44.7 - 160		%Rec	1	9/30/2025 5:44:02 PM
Surr: Terphenyl-d14 (surr)	70.3	52.1 - 159		%Rec	1	9/30/2025 5:44:02 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.23		mg/Kg-dry	1	9/26/2025 6:39:32 PM
Surr: Toluene-d8	94.1	65 - 135		%Rec	1	9/26/2025 6:39:32 PM
Surr: 4-Bromofluorobenzene	94.6	65 - 135		%Rec	1	9/26/2025 6:39:32 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0149		mg/Kg-dry	1	9/26/2025 6:39:32 PM
Toluene	ND	0.0311		mg/Kg-dry	1	9/26/2025 6:39:32 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 12:00:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-002
Matrix: Soil
Client Sample ID: TP-4-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0311		mg/Kg-dry	1	9/26/2025 6:39:32 PM
m,p-Xylene	ND	0.0623		mg/Kg-dry	1	9/26/2025 6:39:32 PM
o-Xylene	ND	0.0311		mg/Kg-dry	1	9/26/2025 6:39:32 PM
Surr: Dibromofluoromethane	98.5	74.8 - 121		%Rec	1	9/26/2025 6:39:32 PM
Surr: Toluene-d8	104	79.6 - 120		%Rec	1	9/26/2025 6:39:32 PM
Surr: 1-Bromo-4-fluorobenzene	103	53 - 139		%Rec	1	9/26/2025 6:39:32 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	6.48	0.262		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Barium	128	1.31		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Cadmium	0.0766	0.0262		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Chromium	52.3	0.656		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Copper	29.4	2.62		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Lead	5.88	0.262		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Mercury	0.0671	0.0525		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Nickel	48.9	0.393		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Selenium	0.551	0.262		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Silver	ND	0.393		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Zinc	61.6	3.93		mg/Kg-dry	1	10/1/2025 3:48:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	23.1	0.500		wt%	1	9/30/2025 9:33:34 AM

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-003
Client Sample ID: **TP-4-5**

Collection Date: 9/24/2025 12:10:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	63.8		mg/Kg-dry	1	9/30/2025 6:45:51 PM
Heavy Oil	ND	128		mg/Kg-dry	1	9/30/2025 6:45:51 PM
Total Petroleum Hydrocarbons	ND	191		mg/Kg-dry	1	9/30/2025 6:45:51 PM
Surr: 2-Fluorobiphenyl	147	50 - 150		%Rec	1	9/30/2025 6:45:51 PM
Surr: o-Terphenyl	162	50 - 150	S	%Rec	1	9/30/2025 6:45:51 PM

NOTES:
S - Outlying surrogate recovery observed (high bias). Sample is non-detect; result meets QC requirements.

PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
2-Methylnaphthalene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
1-Methylnaphthalene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Acenaphthylene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Acenaphthene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Fluorene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Phenanthrene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Anthracene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Fluoranthene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Pyrene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Benz(a)anthracene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Chrysene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Benzo(b)fluoranthene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Benzo(k)fluoranthene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Benzo(a)pyrene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Indeno(1,2,3-cd)pyrene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Dibenz(a,h)anthracene	ND	0.0246		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Benzo(g,h,i)perylene	ND	0.0492		mg/Kg-dry	1	9/30/2025 6:00:09 PM
Surr: 2-Fluorobiphenyl	70.9	44.7 - 160		%Rec	1	9/30/2025 6:00:09 PM
Surr: Terphenyl-d14 (surr)	64.6	52.1 - 159		%Rec	1	9/30/2025 6:00:09 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.27		mg/Kg-dry	1	9/26/2025 7:06:21 PM
Surr: Toluene-d8	93.2	65 - 135		%Rec	1	9/26/2025 7:06:21 PM
Surr: 4-Bromofluorobenzene	95.4	65 - 135		%Rec	1	9/26/2025 7:06:21 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-003
Client Sample ID: **TP-4-5**

Collection Date: 9/24/2025 12:10:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0150		mg/Kg-dry	1	9/26/2025 7:06:21 PM
Toluene	ND	0.0313		mg/Kg-dry	1	9/26/2025 7:06:21 PM
Ethylbenzene	ND	0.0313		mg/Kg-dry	1	9/26/2025 7:06:21 PM
m,p-Xylene	ND	0.0627		mg/Kg-dry	1	9/26/2025 7:06:21 PM
o-Xylene	ND	0.0313		mg/Kg-dry	1	9/26/2025 7:06:21 PM
Surr: Dibromofluoromethane	100	74.8 - 121		%Rec	1	9/26/2025 7:06:21 PM
Surr: Toluene-d8	107	79.6 - 120		%Rec	1	9/26/2025 7:06:21 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 7:06:21 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	6.68	0.259		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Barium	153	1.30		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Cadmium	0.0809	0.0259		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Chromium	55.0	0.648		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Copper	31.8	2.59		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Lead	7.15	0.259		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Mercury	0.0825	0.0519		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Nickel	55.2	0.389		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Selenium	0.560	0.259		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Silver	ND	0.389		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Zinc	72.4	3.89		mg/Kg-dry	1	10/1/2025 3:51:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	22.9	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 12:15:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-004
Matrix: Soil
Client Sample ID: TP-4-7

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	64.9		mg/Kg-dry	1	9/30/2025 6:57:35 PM
Heavy Oil	ND	130		mg/Kg-dry	1	9/30/2025 6:57:35 PM
Total Petroleum Hydrocarbons	ND	195		mg/Kg-dry	1	9/30/2025 6:57:35 PM
Surr: 2-Fluorobiphenyl	136	50 - 150		%Rec	1	9/30/2025 6:57:35 PM
Surr: o-Terphenyl	151	50 - 150	S	%Rec	1	9/30/2025 6:57:35 PM

NOTES:
S - Outlying surrogate recovery observed (high bias). Sample is non-detect; result meets QC requirements.

PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
2-Methylnaphthalene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
1-Methylnaphthalene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Acenaphthylene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Acenaphthene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Fluorene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Phenanthrene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Anthracene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Fluoranthene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Pyrene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Benz(a)anthracene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Chrysene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Benzo(b)fluoranthene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Benzo(k)fluoranthene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Benzo(a)pyrene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Indeno(1,2,3-cd)pyrene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Dibenz(a,h)anthracene	ND	0.0264		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Benzo(g,h,i)perylene	ND	0.0528		mg/Kg-dry	1	9/30/2025 6:16:09 PM
Surr: 2-Fluorobiphenyl	72.0	44.7 - 160		%Rec	1	9/30/2025 6:16:09 PM
Surr: Terphenyl-d14 (surr)	69.4	52.1 - 159		%Rec	1	9/30/2025 6:16:09 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.64		mg/Kg-dry	1	9/26/2025 7:33:14 PM
Surr: Toluene-d8	94.7	65 - 135		%Rec	1	9/26/2025 7:33:14 PM
Surr: 4-Bromofluorobenzene	94.6	65 - 135		%Rec	1	9/26/2025 7:33:14 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 12:15:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-004
Matrix: Soil
Client Sample ID: TP-4-7

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0159		mg/Kg-dry	1	9/26/2025 7:33:14 PM
Toluene	ND	0.0332		mg/Kg-dry	1	9/26/2025 7:33:14 PM
Ethylbenzene	ND	0.0332		mg/Kg-dry	1	9/26/2025 7:33:14 PM
m,p-Xylene	ND	0.0664		mg/Kg-dry	1	9/26/2025 7:33:14 PM
o-Xylene	ND	0.0332		mg/Kg-dry	1	9/26/2025 7:33:14 PM
Surr: Dibromofluoromethane	98.4	74.8 - 121		%Rec	1	9/26/2025 7:33:14 PM
Surr: Toluene-d8	104	79.6 - 120		%Rec	1	9/26/2025 7:33:14 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 7:33:14 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	7.46	0.251		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Barium	185	1.25		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Cadmium	0.119	0.0251		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Chromium	56.7	0.627		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Copper	40.0	2.51		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Lead	8.77	0.251		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Mercury	0.0637	0.0501		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Nickel	65.5	0.376		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Selenium	0.721	0.251		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Silver	ND	0.376		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Zinc	90.7	3.76		mg/Kg-dry	1	10/1/2025 3:55:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	25.0	0.500		wt%	1	9/30/2025 9:33:34 AM

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 1:00:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-005
Matrix: Soil
Client Sample ID: **TP-1-4**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	62.8		mg/Kg-dry	1	9/30/2025 7:09:25 PM
Heavy Oil	ND	126		mg/Kg-dry	1	9/30/2025 7:09:25 PM
Total Petroleum Hydrocarbons	ND	188		mg/Kg-dry	1	9/30/2025 7:09:25 PM
Surr: 2-Fluorobiphenyl	130	50 - 150		%Rec	1	9/30/2025 7:09:25 PM
Surr: o-Terphenyl	144	50 - 150		%Rec	1	9/30/2025 7:09:25 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
2-Methylnaphthalene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
1-Methylnaphthalene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Acenaphthylene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Acenaphthene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Fluorene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Phenanthrene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Anthracene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Fluoranthene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Pyrene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Benz(a)anthracene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Chrysene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Benzo(b)fluoranthene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Benzo(k)fluoranthene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Benzo(a)pyrene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Indeno(1,2,3-cd)pyrene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Dibenz(a,h)anthracene	ND	0.0241		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Benzo(g,h,i)perylene	ND	0.0481		mg/Kg-dry	1	9/30/2025 6:32:13 PM
Surr: 2-Fluorobiphenyl	73.0	44.7 - 160		%Rec	1	9/30/2025 6:32:13 PM
Surr: Terphenyl-d14 (surr)	68.7	52.1 - 159		%Rec	1	9/30/2025 6:32:13 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.34		mg/Kg-dry	1	9/26/2025 8:00:07 PM
Surr: Toluene-d8	94.6	65 - 135		%Rec	1	9/26/2025 8:00:07 PM
Surr: 4-Bromofluorobenzene	95.1	65 - 135		%Rec	1	9/26/2025 8:00:07 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0152		mg/Kg-dry	1	9/26/2025 8:00:07 PM
Toluene	ND	0.0317		mg/Kg-dry	1	9/26/2025 8:00:07 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 1:00:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-005
Matrix: Soil
Client Sample ID: TP-1-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0317		mg/Kg-dry	1	9/26/2025 8:00:07 PM
m,p-Xylene	ND	0.0634		mg/Kg-dry	1	9/26/2025 8:00:07 PM
o-Xylene	ND	0.0317		mg/Kg-dry	1	9/26/2025 8:00:07 PM
Surr: Dibromofluoromethane	99.1	74.8 - 121		%Rec	1	9/26/2025 8:00:07 PM
Surr: Toluene-d8	105	79.6 - 120		%Rec	1	9/26/2025 8:00:07 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 8:00:07 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	7.04	0.257		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Barium	148	1.29		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Cadmium	0.128	0.0257		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Chromium	46.0	0.643		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Copper	31.0	2.57		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Lead	6.68	0.257		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Mercury	0.0545	0.0514		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Nickel	56.2	0.386		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Selenium	0.541	0.257		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Silver	ND	0.386		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Zinc	73.1	3.86		mg/Kg-dry	1	10/1/2025 3:58:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	22.9	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 1:30:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-006
Matrix: Soil
Client Sample ID: TP-6-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	54.0		mg/Kg-dry	1	9/30/2025 7:21:07 PM
Heavy Oil	ND	108		mg/Kg-dry	1	9/30/2025 7:21:07 PM
Total Petroleum Hydrocarbons	ND	162		mg/Kg-dry	1	9/30/2025 7:21:07 PM
Surr: 2-Fluorobiphenyl	116	50 - 150		%Rec	1	9/30/2025 7:21:07 PM
Surr: o-Terphenyl	126	50 - 150		%Rec	1	9/30/2025 7:21:07 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
2-Methylnaphthalene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
1-Methylnaphthalene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Acenaphthylene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Acenaphthene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Fluorene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Phenanthrene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Anthracene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Fluoranthene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Pyrene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Benz(a)anthracene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Chrysene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Benzo(b)fluoranthene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Benzo(k)fluoranthene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Benzo(a)pyrene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Indeno(1,2,3-cd)pyrene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Dibenz(a,h)anthracene	ND	0.0201		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Benzo(g,h,i)perylene	ND	0.0403		mg/Kg-dry	1	9/30/2025 6:48:15 PM
Surr: 2-Fluorobiphenyl	74.4	44.7 - 160		%Rec	1	9/30/2025 6:48:15 PM
Surr: Terphenyl-d14 (surr)	69.0	52.1 - 159		%Rec	1	9/30/2025 6:48:15 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	5.47		mg/Kg-dry	1	9/26/2025 8:52:32 PM
Surr: Toluene-d8	94.5	65 - 135		%Rec	1	9/26/2025 8:52:32 PM
Surr: 4-Bromofluorobenzene	93.2	65 - 135		%Rec	1	9/26/2025 8:52:32 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0131		mg/Kg-dry	1	9/26/2025 8:52:32 PM
Toluene	ND	0.0273		mg/Kg-dry	1	9/26/2025 8:52:32 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 1:30:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-006
Matrix: Soil
Client Sample ID: TP-6-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0273		mg/Kg-dry	1	9/26/2025 8:52:32 PM
m,p-Xylene	ND	0.0547		mg/Kg-dry	1	9/26/2025 8:52:32 PM
o-Xylene	ND	0.0273		mg/Kg-dry	1	9/26/2025 8:52:32 PM
Surr: Dibromofluoromethane	99.5	74.8 - 121		%Rec	1	9/26/2025 8:52:32 PM
Surr: Toluene-d8	106	79.6 - 120		%Rec	1	9/26/2025 8:52:32 PM
Surr: 1-Bromo-4-fluorobenzene	102	53 - 139		%Rec	1	9/26/2025 8:52:32 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	3.49	0.220		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Barium	98.2	1.10		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Cadmium	0.0897	0.0220		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Chromium	30.6	0.550		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Copper	20.4	2.20		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Lead	3.63	0.220		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Mercury	ND	0.0440		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Nickel	35.7	0.330		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Selenium	0.315	0.220		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Silver	ND	0.330		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Zinc	41.1	3.30		mg/Kg-dry	1	10/1/2025 4:01:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	9.01	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 1:55:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-007
Matrix: Soil
Client Sample ID: TP-6-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	63.6		mg/Kg-dry	1	9/30/2025 7:56:20 PM
Heavy Oil	ND	127		mg/Kg-dry	1	9/30/2025 7:56:20 PM
Total Petroleum Hydrocarbons	ND	191		mg/Kg-dry	1	9/30/2025 7:56:20 PM
Surr: 2-Fluorobiphenyl	135	50 - 150		%Rec	1	9/30/2025 7:56:20 PM
Surr: o-Terphenyl	146	50 - 150		%Rec	1	9/30/2025 7:56:20 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
2-Methylnaphthalene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
1-Methylnaphthalene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Acenaphthylene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Acenaphthene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Fluorene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Phenanthrene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Anthracene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Fluoranthene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Pyrene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Benz(a)anthracene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Chrysene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Benzo(b)fluoranthene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Benzo(k)fluoranthene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Benzo(a)pyrene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Indeno(1,2,3-cd)pyrene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Dibenz(a,h)anthracene	ND	0.0244		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Benzo(g,h,i)perylene	ND	0.0488		mg/Kg-dry	1	9/30/2025 7:04:20 PM
Surr: 2-Fluorobiphenyl	68.4	44.7 - 160		%Rec	1	9/30/2025 7:04:20 PM
Surr: Terphenyl-d14 (surr)	73.4	52.1 - 159		%Rec	1	9/30/2025 7:04:20 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	5.74		mg/Kg-dry	1	9/26/2025 9:19:27 PM
Surr: Toluene-d8	95.3	65 - 135		%Rec	1	9/26/2025 9:19:27 PM
Surr: 4-Bromofluorobenzene	95.2	65 - 135		%Rec	1	9/26/2025 9:19:27 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0138		mg/Kg-dry	1	9/26/2025 9:19:27 PM
Toluene	ND	0.0287		mg/Kg-dry	1	9/26/2025 9:19:27 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-007
Client Sample ID: **TP-6-5**

Collection Date: 9/24/2025 1:55:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0287		mg/Kg-dry	1	9/26/2025 9:19:27 PM
m,p-Xylene	ND	0.0574		mg/Kg-dry	1	9/26/2025 9:19:27 PM
o-Xylene	ND	0.0287		mg/Kg-dry	1	9/26/2025 9:19:27 PM
Surr: Dibromofluoromethane	98.5	74.8 - 121		%Rec	1	9/26/2025 9:19:27 PM
Surr: Toluene-d8	105	79.6 - 120		%Rec	1	9/26/2025 9:19:27 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 9:19:27 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	4.86	0.242		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Barium	160	1.21		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Cadmium	0.161	0.0242		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Chromium	52.6	0.604		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Copper	28.8	2.42		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Lead	7.60	0.242		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Mercury	0.0575	0.0483		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Nickel	56.4	0.363		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Selenium	0.581	0.242		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Silver	ND	0.363		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Zinc	82.5	3.63		mg/Kg-dry	1	10/1/2025 4:04:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	22.2	0.500		wt%	1	9/30/2025 9:33:34 AM

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-008
Client Sample ID: **TP-6-7**

Collection Date: 9/24/2025 2:05:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	65.6		mg/Kg-dry	1	9/30/2025 8:08:09 PM
Heavy Oil	ND	131		mg/Kg-dry	1	9/30/2025 8:08:09 PM
Total Petroleum Hydrocarbons	ND	197		mg/Kg-dry	1	9/30/2025 8:08:09 PM
Surr: 2-Fluorobiphenyl	129	50 - 150		%Rec	1	9/30/2025 8:08:09 PM
Surr: o-Terphenyl	140	50 - 150		%Rec	1	9/30/2025 8:08:09 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
2-Methylnaphthalene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
1-Methylnaphthalene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Acenaphthylene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Acenaphthene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Fluorene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Phenanthrene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Anthracene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Fluoranthene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Pyrene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Benz(a)anthracene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Chrysene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Benzo(b)fluoranthene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Benzo(k)fluoranthene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Benzo(a)pyrene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Indeno(1,2,3-cd)pyrene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Dibenz(a,h)anthracene	ND	0.0251		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Benzo(g,h,i)perylene	ND	0.0501		mg/Kg-dry	1	9/30/2025 7:20:26 PM
Surr: 2-Fluorobiphenyl	70.0	44.7 - 160		%Rec	1	9/30/2025 7:20:26 PM
Surr: Terphenyl-d14 (surr)	66.2	52.1 - 159		%Rec	1	9/30/2025 7:20:26 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	8.24		mg/Kg-dry	1	9/26/2025 9:46:19 PM
Surr: Toluene-d8	95.7	65 - 135		%Rec	1	9/26/2025 9:46:19 PM
Surr: 4-Bromofluorobenzene	94.0	65 - 135		%Rec	1	9/26/2025 9:46:19 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0198		mg/Kg-dry	1	9/26/2025 9:46:19 PM
Toluene	ND	0.0412		mg/Kg-dry	1	9/26/2025 9:46:19 PM

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 2:05:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-008
Matrix: Soil
Client Sample ID: TP-6-7

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0412		mg/Kg-dry	1	9/26/2025 9:46:19 PM
m,p-Xylene	ND	0.0824		mg/Kg-dry	1	9/26/2025 9:46:19 PM
o-Xylene	ND	0.0412		mg/Kg-dry	1	9/26/2025 9:46:19 PM
Surr: Dibromofluoromethane	97.1	74.8 - 121		%Rec	1	9/26/2025 9:46:19 PM
Surr: Toluene-d8	104	79.6 - 120		%Rec	1	9/26/2025 9:46:19 PM
Surr: 1-Bromo-4-fluorobenzene	103	53 - 139		%Rec	1	9/26/2025 9:46:19 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	6.20	0.265		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Barium	153	1.32		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Cadmium	0.0911	0.0265		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Chromium	56.6	0.662		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Copper	35.2	2.65		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Lead	6.75	0.265		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Mercury	0.0715	0.0530		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Nickel	59.7	0.397		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Selenium	0.540	0.265		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Silver	ND	0.397		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Zinc	71.4	3.97		mg/Kg-dry	1	10/1/2025 4:07:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	24.5	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 2:20:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-009
Matrix: Soil
Client Sample ID: TP-5-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	62.5		mg/Kg-dry	1	9/30/2025 8:55:18 PM
Heavy Oil	ND	125		mg/Kg-dry	1	9/30/2025 8:55:18 PM
Total Petroleum Hydrocarbons	ND	188		mg/Kg-dry	1	9/30/2025 8:55:18 PM
Surr: 2-Fluorobiphenyl	129	50 - 150		%Rec	1	9/30/2025 8:55:18 PM
Surr: o-Terphenyl	142	50 - 150		%Rec	1	9/30/2025 8:55:18 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
2-Methylnaphthalene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
1-Methylnaphthalene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Acenaphthylene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Acenaphthene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Fluorene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Phenanthrene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Anthracene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Fluoranthene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Pyrene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Benz(a)anthracene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Chrysene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Benzo(b)fluoranthene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Benzo(k)fluoranthene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Benzo(a)pyrene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Indeno(1,2,3-cd)pyrene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Dibenz(a,h)anthracene	ND	0.0247		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Benzo(g,h,i)perylene	ND	0.0495		mg/Kg-dry	1	9/30/2025 7:36:29 PM
Surr: 2-Fluorobiphenyl	69.3	44.7 - 160		%Rec	1	9/30/2025 7:36:29 PM
Surr: Terphenyl-d14 (surr)	67.9	52.1 - 159		%Rec	1	9/30/2025 7:36:29 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	5.69		mg/Kg-dry	1	9/26/2025 10:13:12 PM
Surr: Toluene-d8	94.3	65 - 135		%Rec	1	9/26/2025 10:13:12 PM
Surr: 4-Bromofluorobenzene	94.5	65 - 135		%Rec	1	9/26/2025 10:13:12 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0137		mg/Kg-dry	1	9/26/2025 10:13:12 PM
Toluene	ND	0.0285		mg/Kg-dry	1	9/26/2025 10:13:12 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-009
Client Sample ID: **TP-5-3**

Collection Date: 9/24/2025 2:20:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0285		mg/Kg-dry	1	9/26/2025 10:13:12 PM
m,p-Xylene	ND	0.0569		mg/Kg-dry	1	9/26/2025 10:13:12 PM
o-Xylene	ND	0.0285		mg/Kg-dry	1	9/26/2025 10:13:12 PM
Surr: Dibromofluoromethane	97.4	74.8 - 121		%Rec	1	9/26/2025 10:13:12 PM
Surr: Toluene-d8	104	79.6 - 120		%Rec	1	9/26/2025 10:13:12 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 10:13:12 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	7.70	0.249		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Barium	165	1.24		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Cadmium	0.0926	0.0249		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Chromium	55.6	0.622		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Copper	27.3	2.49		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Lead	8.14	0.249		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Mercury	0.0518	0.0498		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Nickel	48.8	0.373		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Selenium	0.558	0.249		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Silver	ND	0.373		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Zinc	63.7	3.73		mg/Kg-dry	1	10/1/2025 4:11:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	20.3	0.500		wt%	1	9/30/2025 9:33:34 AM

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 2:35:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-010
Matrix: Soil
Client Sample ID: TP-5-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	66.2		mg/Kg-dry	1	9/30/2025 9:07:02 PM
Heavy Oil	ND	132		mg/Kg-dry	1	9/30/2025 9:07:02 PM
Total Petroleum Hydrocarbons	ND	199		mg/Kg-dry	1	9/30/2025 9:07:02 PM
Surr: 2-Fluorobiphenyl	228	50 - 150	S	%Rec	1	9/30/2025 9:07:02 PM
Surr: o-Terphenyl	252	50 - 150	S	%Rec	1	9/30/2025 9:07:02 PM

NOTES:
S - Outlying surrogate recovery observed (high bias). Sample is non-detect; result meets QC requirements.

PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
2-Methylnaphthalene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
1-Methylnaphthalene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Acenaphthylene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Acenaphthene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Fluorene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Phenanthrene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Anthracene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Fluoranthene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Pyrene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Benz(a)anthracene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Chrysene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Benzo(b)fluoranthene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Benzo(k)fluoranthene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Benzo(a)pyrene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Indeno(1,2,3-cd)pyrene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Dibenz(a,h)anthracene	ND	0.0260		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Benzo(g,h,i)perylene	ND	0.0520		mg/Kg-dry	1	9/30/2025 7:52:30 PM
Surr: 2-Fluorobiphenyl	70.8	44.7 - 160		%Rec	1	9/30/2025 7:52:30 PM
Surr: Terphenyl-d14 (surr)	70.0	52.1 - 159		%Rec	1	9/30/2025 7:52:30 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.95		mg/Kg-dry	1	9/26/2025 10:40:04 PM
Surr: Toluene-d8	94.0	65 - 135		%Rec	1	9/26/2025 10:40:04 PM
Surr: 4-Bromofluorobenzene	95.7	65 - 135		%Rec	1	9/26/2025 10:40:04 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-010
Client Sample ID: **TP-5-5**

Collection Date: 9/24/2025 2:35:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0167		mg/Kg-dry	1	9/26/2025 10:40:04 PM
Toluene	ND	0.0348		mg/Kg-dry	1	9/26/2025 10:40:04 PM
Ethylbenzene	ND	0.0348		mg/Kg-dry	1	9/26/2025 10:40:04 PM
m,p-Xylene	ND	0.0695		mg/Kg-dry	1	9/26/2025 10:40:04 PM
o-Xylene	ND	0.0348		mg/Kg-dry	1	9/26/2025 10:40:04 PM
Surr: Dibromofluoromethane	99.1	74.8 - 121		%Rec	1	9/26/2025 10:40:04 PM
Surr: Toluene-d8	105	79.6 - 120		%Rec	1	9/26/2025 10:40:04 PM
Surr: 1-Bromo-4-fluorobenzene	105	53 - 139		%Rec	1	9/26/2025 10:40:04 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	6.77	0.275		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Barium	184	1.38		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Cadmium	0.139	0.0275		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Chromium	51.7	0.688		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Copper	44.4	2.75		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Lead	8.78	0.275		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Mercury	0.0589	0.0550		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Nickel	68.1	0.413		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Selenium	0.599	0.275		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Silver	ND	0.413		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Zinc	92.1	4.13		mg/Kg-dry	1	10/1/2025 4:14:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	25.5	0.500		wt%	1	9/30/2025 9:33:34 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-011
Client Sample ID: **TP-5-7**

Collection Date: 9/24/2025 2:45:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	62.0		mg/Kg-dry	1	9/30/2025 9:18:49 PM
Heavy Oil	ND	124		mg/Kg-dry	1	9/30/2025 9:18:49 PM
Total Petroleum Hydrocarbons	ND	186		mg/Kg-dry	1	9/30/2025 9:18:49 PM
Surr: 2-Fluorobiphenyl	134	50 - 150		%Rec	1	9/30/2025 9:18:49 PM
Surr: o-Terphenyl	144	50 - 150		%Rec	1	9/30/2025 9:18:49 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
2-Methylnaphthalene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
1-Methylnaphthalene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Acenaphthylene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Acenaphthene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Fluorene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Phenanthrene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Anthracene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Fluoranthene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Pyrene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Benz(a)anthracene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Chrysene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Benzo(b)fluoranthene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Benzo(k)fluoranthene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Benzo(a)pyrene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Indeno(1,2,3-cd)pyrene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Dibenz(a,h)anthracene	ND	0.0249		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Benzo(g,h,i)perylene	ND	0.0498		mg/Kg-dry	1	9/30/2025 8:08:34 PM
Surr: 2-Fluorobiphenyl	69.9	44.7 - 160		%Rec	1	9/30/2025 8:08:34 PM
Surr: Terphenyl-d14 (surr)	75.8	52.1 - 159		%Rec	1	9/30/2025 8:08:34 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.21		mg/Kg-dry	1	9/26/2025 11:07:00 PM
Surr: Toluene-d8	94.6	65 - 135		%Rec	1	9/26/2025 11:07:00 PM
Surr: 4-Bromofluorobenzene	94.8	65 - 135		%Rec	1	9/26/2025 11:07:00 PM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0149		mg/Kg-dry	1	9/26/2025 11:07:00 PM
Toluene	ND	0.0310		mg/Kg-dry	1	9/26/2025 11:07:00 PM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Project: Brickyard Soil Sampling
Lab ID: 2509601-011
Client Sample ID: **TP-5-7**

Collection Date: 9/24/2025 2:45:00 PM
Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0310		mg/Kg-dry	1	9/26/2025 11:07:00 PM
m,p-Xylene	ND	0.0621		mg/Kg-dry	1	9/26/2025 11:07:00 PM
o-Xylene	ND	0.0310		mg/Kg-dry	1	9/26/2025 11:07:00 PM
Surr: Dibromofluoromethane	97.8	74.8 - 121		%Rec	1	9/26/2025 11:07:00 PM
Surr: Toluene-d8	106	79.6 - 120		%Rec	1	9/26/2025 11:07:00 PM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/26/2025 11:07:00 PM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	4.81	0.261		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Barium	153	1.30		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Cadmium	0.0787	0.0261		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Chromium	50.9	0.651		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Copper	27.1	2.61		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Lead	6.29	0.261		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Mercury	0.0615	0.0521		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Nickel	53.1	0.391		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Selenium	0.546	0.261		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Silver	ND	0.391		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Zinc	68.1	3.91		mg/Kg-dry	1	10/1/2025 4:30:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	22.0	0.500		wt%	1	9/30/2025 9:33:34 AM

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 3:05:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-012
Matrix: Soil
Client Sample ID: TP-3-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx				Batch ID: 49414		Analyst: ZD
Diesel Range Organics	ND	53.0		mg/Kg-dry	1	9/30/2025 9:30:35 PM
Heavy Oil	ND	106		mg/Kg-dry	1	9/30/2025 9:30:35 PM
Total Petroleum Hydrocarbons	ND	159		mg/Kg-dry	1	9/30/2025 9:30:35 PM
Surr: 2-Fluorobiphenyl	114	50 - 150		%Rec	1	9/30/2025 9:30:35 PM
Surr: o-Terphenyl	125	50 - 150		%Rec	1	9/30/2025 9:30:35 PM
PAHs by EPA Method 8270E SIM				Batch ID: 49422		Analyst: SH
Naphthalene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
2-Methylnaphthalene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
1-Methylnaphthalene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Acenaphthylene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Acenaphthene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Fluorene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Phenanthrene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Anthracene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Fluoranthene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Pyrene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Benz(a)anthracene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Chrysene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Benzo(b)fluoranthene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Benzo(k)fluoranthene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Benzo(a)pyrene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Indeno(1,2,3-cd)pyrene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Dibenz(a,h)anthracene	ND	0.0214		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Benzo(g,h,i)perylene	ND	0.0427		mg/Kg-dry	1	9/30/2025 8:24:34 PM
Surr: 2-Fluorobiphenyl	69.7	44.7 - 160		%Rec	1	9/30/2025 8:24:34 PM
Surr: Terphenyl-d14 (surr)	70.6	52.1 - 159		%Rec	1	9/30/2025 8:24:34 PM
Gasoline by NWTPH-Gx				Batch ID: 49404		Analyst: RG
Gasoline Range Organics	ND	6.05		mg/Kg-dry	1	9/27/2025 12:00:43 AM
Surr: Toluene-d8	94.7	65 - 135		%Rec	1	9/27/2025 12:00:43 AM
Surr: 4-Bromofluorobenzene	95.1	65 - 135		%Rec	1	9/27/2025 12:00:43 AM
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Benzene	ND	0.0145		mg/Kg-dry	1	9/27/2025 12:00:43 AM
Toluene	ND	0.0302		mg/Kg-dry	1	9/27/2025 12:00:43 AM

Analytical Report

Work Order: **2509601**
Date Reported: **10/2/2025**

Client: Atlas Technical Consultants
Collection Date: 9/24/2025 3:05:00 PM
Project: Brickyard Soil Sampling
Lab ID: 2509601-012
Matrix: Soil
Client Sample ID: TP-3-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA 8260D				Batch ID: 49404		Analyst: RG
Ethylbenzene	ND	0.0302		mg/Kg-dry	1	9/27/2025 12:00:43 AM
m,p-Xylene	ND	0.0605		mg/Kg-dry	1	9/27/2025 12:00:43 AM
o-Xylene	ND	0.0302		mg/Kg-dry	1	9/27/2025 12:00:43 AM
Surr: Dibromofluoromethane	101	74.8 - 121		%Rec	1	9/27/2025 12:00:43 AM
Surr: Toluene-d8	105	79.6 - 120		%Rec	1	9/27/2025 12:00:43 AM
Surr: 1-Bromo-4-fluorobenzene	104	53 - 139		%Rec	1	9/27/2025 12:00:43 AM
Total Metals by EPA 6020B				Batch ID: 49441		Analyst: ME
Arsenic	2.87	0.216		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Barium	59.7	1.08		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Cadmium	0.0871	0.0216		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Chromium	23.6	0.539		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Copper	18.2	2.16		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Lead	4.11	0.216		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Mercury	ND	0.0431		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Nickel	29.3	0.323		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Selenium	0.342	0.216		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Silver	ND	0.323		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Zinc	38.4	3.23		mg/Kg-dry	1	10/1/2025 4:33:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R10337		Analyst: MT
Percent Moisture	7.95	0.500		wt%	1	9/30/2025 9:33:34 AM

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Total Metals by EPA 6020B

Sample ID: **MB-49441** SampType: **MBLK** Units: **mg/Kg** Prep Date: **9/30/2025** RunNo: **103412**
Client ID: **MBLKS** Batch ID: **49441** Analysis Date: **9/30/2025** SeqNo: **2157103**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.200									
Barium	ND	1.00									
Cadmium	ND	0.0200									
Chromium	ND	0.500									
Copper	ND	2.00									
Lead	ND	0.200									
Mercury	ND	0.0400									
Nickel	ND	0.300									
Selenium	ND	0.200									
Silver	ND	0.300									
Zinc	ND	3.00									

Sample ID: **LCS-49441** SampType: **LCS** Units: **mg/Kg** Prep Date: **9/30/2025** RunNo: **103412**
Client ID: **LCSS** Batch ID: **49441** Analysis Date: **9/30/2025** SeqNo: **2157104**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	39.7	0.200	40.00	0	99.2	80	120				
Barium	40.2	1.00	40.00	0	101	80	120				
Cadmium	2.03	0.0200	2.000	0	101	80	120				
Chromium	42.2	0.500	40.00	0	105	80	120				
Copper	43.8	2.00	40.00	0	110	80	120				
Lead	20.7	0.200	20.00	0	104	80	120				
Mercury	1.01	0.0400	1.000	0	101	80	120				
Nickel	42.8	0.300	40.00	0	107	80	120				
Selenium	3.90	0.200	4.000	0	97.5	80	120				
Silver	2.09	0.300	2.000	0	105	80	120				
Zinc	40.3	3.00	40.00	0	101	80	120				

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Total Metals by EPA 6020B

Sample ID: **2509727-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **9/30/2025** RunNo: **103412**
Client ID: **BATCH** Batch ID: **49441** Analysis Date: **9/30/2025** SeqNo: **2157107**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	43.4	0.216	43.29	2.100	95.4	75	125				
Barium	81.5	1.08	43.29	37.00	103	75	125				
Cadmium	2.24	0.0216	2.164	0.05797	101	75	125				
Chromium	61.8	0.541	43.29	18.69	99.5	75	125				
Copper	49.4	2.16	43.29	9.123	93.0	75	125				
Lead	23.8	0.216	21.64	2.420	98.6	75	125				
Mercury	1.11	0.0433	1.082	0.02362	100	75	125				
Nickel	67.2	0.325	43.29	27.61	91.5	75	125				
Selenium	4.18	0.216	4.329	0.2306	91.2	75	125				
Silver	2.27	0.325	2.164	0	105	75	125				
Zinc	62.9	3.25	43.29	21.93	94.6	75	125				

Sample ID: **2509727-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **9/30/2025** RunNo: **103412**
Client ID: **BATCH** Batch ID: **49441** Analysis Date: **9/30/2025** SeqNo: **2157109**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	43.2	0.215	42.94	2.100	95.8	75	125	43.41	0.448	20	
Barium	84.0	1.07	42.94	37.00	110	75	125	81.49	3.08	20	
Cadmium	2.23	0.0215	2.147	0.05797	101	75	125	2.245	0.546	20	
Chromium	54.9	0.537	42.94	18.69	84.3	75	125	61.75	11.7	20	
Copper	48.6	2.15	42.94	9.123	91.8	75	125	49.40	1.72	20	
Lead	23.4	0.215	21.47	2.420	97.9	75	125	23.76	1.35	20	
Mercury	1.09	0.0429	1.074	0.02362	99.1	75	125	1.106	1.66	20	
Nickel	67.3	0.322	42.94	27.61	92.4	75	125	67.21	0.101	20	
Selenium	4.21	0.215	4.294	0.2306	92.8	75	125	4.178	0.868	20	
Silver	2.24	0.322	2.147	0	104	75	125	2.272	1.26	20	
Zinc	62.5	3.22	42.94	21.93	94.4	75	125	62.88	0.676	20	

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx

Sample ID: **MB-49414**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/29/2025**	RunNo: **103419**
Client ID: **MBLKS**	Batch ID: **49414**		Analysis Date: **9/30/2025**	SeqNo: **2157334**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	50.0									
Heavy Oil	ND	100									
Total Petroleum Hydrocarbons	ND	150									
Surr: 2-Fluorobiphenyl	11.0		10.00		110	50	150				
Surr: o-Terphenyl	12.0		10.00		120	50	150				

Sample ID: **LCS-49414**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/29/2025**	RunNo: **103419**
Client ID: **LCSS**	Batch ID: **49414**		Analysis Date: **9/30/2025**	SeqNo: **2157335**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	501	150	500.0	0	100	68.2	125				
Surr: 2-Fluorobiphenyl	13.0		10.00		130	50	150				
Surr: o-Terphenyl	12.7		10.00		127	50	150				

Sample ID: **2509601-006AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **9/29/2025**	RunNo: **103419**
Client ID: **TP-6-3**	Batch ID: **49414**		Analysis Date: **9/30/2025**	SeqNo: **2157342**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	519	160	534.0	0	97.2	40.5	159				
Surr: 2-Fluorobiphenyl	13.8		10.68		129	50	150				
Surr: o-Terphenyl	14.0		10.68		131	50	150				

Sample ID: **2509601-006AMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **9/29/2025**	RunNo: **103419**
Client ID: **TP-6-3**	Batch ID: **49414**		Analysis Date: **9/30/2025**	SeqNo: **2157343**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	529	160	534.0	0	99.1	40.5	159	519.0	1.96	30	
Surr: 2-Fluorobiphenyl	11.9		10.68		112	50	150		0		
Surr: o-Terphenyl	13.4		10.68		126	50	150		0		

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx

Sample ID: **2509648-005ADUP** SampType: **DUP** Units: **mg/Kg** Prep Date: **9/29/2025** RunNo: **103419**
Client ID: **BATCH** Batch ID: **49414** Analysis Date: **9/30/2025** SeqNo: **2157359**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	6,480	47.8						4,560	34.7	30	R
Heavy Oil	ND	95.7						0		30	
Total Petroleum Hydrocarbons	6,480	144						4,560	34.7	30	R
Surr: 2-Fluorobiphenyl	93.6		9.569		978	50	150		0		S
Surr: o-Terphenyl	12.9		9.569		135	50	150		0		

NOTES:
S - Outlying surrogate recovery attributed to TPH interference.
R - High RPD due to high analyte concentration. In this range, high RPD's may be expected.

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

PAHs by EPA Method 8270E SIM

Sample ID: **MB-49422** SampType: **MBLK** Units: **mg/Kg** Prep Date: **9/29/2025** RunNo: **103440**
Client ID: **MBLKS** Batch ID: **49422** Analysis Date: **9/30/2025** SeqNo: **2157902**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.0200									
2-Methylnaphthalene	ND	0.0200									
1-Methylnaphthalene	ND	0.0200									
Acenaphthylene	ND	0.0200									
Acenaphthene	ND	0.0200									
Fluorene	ND	0.0200									
Phenanthrene	ND	0.0200									
Anthracene	ND	0.0200									
Fluoranthene	ND	0.0200									
Pyrene	ND	0.0200									
Benz(a)anthracene	ND	0.0200									
Chrysene	ND	0.0200									
Benzo(b)fluoranthene	ND	0.0200									
Benzo(k)fluoranthene	ND	0.0200									
Benzo(a)pyrene	ND	0.0200									
Indeno(1,2,3-cd)pyrene	ND	0.0200									
Dibenz(a,h)anthracene	ND	0.0200									
Benzo(g,h,i)perylene	ND	0.0400									
Surr: 2-Fluorobiphenyl	0.726		1.000		72.6	22.2	146				
Surr: Terphenyl-d14 (surr)	0.685		1.000		68.5	20.2	159				

Sample ID: **LCS-49422** SampType: **LCS** Units: **mg/Kg** Prep Date: **9/29/2025** RunNo: **103440**
Client ID: **LCSS** Batch ID: **49422** Analysis Date: **9/30/2025** SeqNo: **2157903**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	1.76	0.0200	2.000	0	87.9	58.5	121				
2-Methylnaphthalene	1.73	0.0200	2.000	0	86.5	49.7	128				
1-Methylnaphthalene	1.89	0.0200	2.000	0	94.5	53.9	126				
Acenaphthylene	1.93	0.0200	2.000	0	96.7	57	123				
Acenaphthene	1.73	0.0200	2.000	0	86.7	56	121				
Fluorene	1.90	0.0200	2.000	0	95.0	56.6	121				

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

PAHs by EPA Method 8270E SIM

Sample ID: **LCS-49422**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/29/2025**	RunNo: **103440**
Client ID: **LCSS**	Batch ID: **49422**		Analysis Date: **9/30/2025**	SeqNo: **2157903**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenanthrene	1.66	0.0200	2.000	0	82.9	52.8	124				
Anthracene	1.79	0.0200	2.000	0	89.3	53.7	125				
Fluoranthene	1.75	0.0200	2.000	0	87.3	55.2	125				
Pyrene	1.70	0.0200	2.000	0	84.8	56	124				
Benz(a)anthracene	1.57	0.0200	2.000	0	78.6	55.3	129				
Chrysene	2.11	0.0200	2.000	0	106	50.4	122				
Benzo(b)fluoranthene	1.53	0.0200	2.000	0	76.4	52	125				
Benzo(k)fluoranthene	2.09	0.0200	2.000	0	105	49.1	126				
Benzo(a)pyrene	1.77	0.0200	2.000	0	88.3	53.4	125				
Indeno(1,2,3-cd)pyrene	1.59	0.0200	2.000	0	79.6	52.1	127				
Dibenz(a,h)anthracene	1.72	0.0200	2.000	0	85.8	52.8	124				
Benzo(g,h,i)perylene	1.60	0.0400	2.000	0	80.2	47.9	130				
Surr: 2-Fluorobiphenyl	0.699		1.000		69.9	44.7	160				
Surr: Terphenyl-d14 (surr)	0.614		1.000		61.4	52.1	159				

Sample ID: **2509601-001AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **9/29/2025**	RunNo: **103440**
Client ID: **TP-2-4**	Batch ID: **49422**		Analysis Date: **9/30/2025**	SeqNo: **2157905**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2.46	0.0238	2.378	0.01532	103	40.2	142				
2-Methylnaphthalene	2.54	0.0238	2.378	0.01592	106	30.7	150				
1-Methylnaphthalene	2.85	0.0238	2.378	0.01267	119	34.3	148				
Acenaphthylene	2.72	0.0238	2.378	0	114	29.4	156				
Acenaphthene	2.45	0.0238	2.378	0.004336	103	39.5	139				
Fluorene	2.79	0.0238	2.378	0.008022	117	36.2	144				
Phenanthrene	2.26	0.0238	2.378	0.05240	92.9	31.1	147				
Anthracene	2.17	0.0238	2.378	0.006415	90.9	34.3	145				
Fluoranthene	2.49	0.0238	2.378	0.1351	99.1	33.6	152				
Pyrene	2.45	0.0238	2.378	0.1209	98.1	28.1	156				
Benz(a)anthracene	2.24	0.0238	2.378	0.05182	92.1	29.5	158				
Chrysene	3.01	0.0238	2.378	0.08679	123	31.4	143				

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

PAHs by EPA Method 8270E SIM

Sample ID: **2509601-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **9/29/2025** RunNo: **103440**
Client ID: **TP-2-4** Batch ID: **49422** Analysis Date: **9/30/2025** SeqNo: **2157905**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(b)fluoranthene	2.42	0.0238	2.378	0.09863	97.7	30	154				
Benzo(k)fluoranthene	2.64	0.0238	2.378	0.05040	109	30.6	148				
Benzo(a)pyrene	2.86	0.0238	2.378	0.07735	117	29.3	154				
Indeno(1,2,3-cd)pyrene	2.18	0.0238	2.378	0.07830	88.6	24.5	150				
Dibenz(a,h)anthracene	2.49	0.0238	2.378	0.03566	103	17.6	152				
Benzo(g,h,i)perylene	2.39	0.0476	2.378	0.07936	97.3	16.4	152				
Surr: 2-Fluorobiphenyl	0.988		1.189		83.1	44.7	160				
Surr: Terphenyl-d14 (surr)	0.820		1.189		68.9	52.1	159				

Sample ID: **2509601-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **9/29/2025** RunNo: **103440**
Client ID: **TP-2-4** Batch ID: **49422** Analysis Date: **9/30/2025** SeqNo: **2157906**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2.83	0.0238	2.376	0.01532	118	40.2	142	2.457	14.0	30	
2-Methylnaphthalene	2.96	0.0238	2.376	0.01592	124	30.7	150	2.540	15.2	30	
1-Methylnaphthalene	3.28	0.0238	2.376	0.01267	137	34.3	148	2.850	14.0	30	
Acenaphthylene	3.38	0.0238	2.376	0	142	29.4	156	2.718	21.8	30	
Acenaphthene	2.90	0.0238	2.376	0.004336	122	39.5	139	2.448	17.1	30	
Fluorene	3.00	0.0238	2.376	0.008022	126	36.2	144	2.792	7.06	30	
Phenanthrene	2.59	0.0238	2.376	0.05240	107	31.1	147	2.262	13.7	30	
Anthracene	2.44	0.0238	2.376	0.006415	102	34.3	145	2.167	11.6	30	
Fluoranthene	2.81	0.0238	2.376	0.1351	113	33.6	152	2.492	12.1	30	
Pyrene	2.83	0.0238	2.376	0.1209	114	28.1	156	2.453	14.3	30	
Benz(a)anthracene	2.77	0.0238	2.376	0.05182	115	29.5	158	2.242	21.1	30	
Chrysene	3.44	0.0238	2.376	0.08679	141	31.4	143	3.006	13.6	30	
Benzo(b)fluoranthene	3.03	0.0238	2.376	0.09863	123	30	154	2.421	22.2	30	
Benzo(k)fluoranthene	3.30	0.0238	2.376	0.05040	137	30.6	148	2.640	22.3	30	
Benzo(a)pyrene	3.15	0.0238	2.376	0.07735	129	29.3	154	2.863	9.62	30	
Indeno(1,2,3-cd)pyrene	2.85	0.0238	2.376	0.07830	117	24.5	150	2.184	26.6	30	
Dibenz(a,h)anthracene	2.96	0.0238	2.376	0.03566	123	17.6	152	2.492	17.3	30	
Benzo(g,h,i)perylene	2.88	0.0475	2.376	0.07936	118	16.4	152	2.393	18.4	30	

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

PAHs by EPA Method 8270E SIM

Sample ID: **2509601-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **9/29/2025** RunNo: **103440**
Client ID: **TP-2-4** Batch ID: **49422** Analysis Date: **9/30/2025** SeqNo: **2157906**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Fluorobiphenyl	1.18		1.188		98.9	44.7	160		0		
Surr: Terphenyl-d14 (surr)	0.956		1.188		80.5	52.1	159		0		

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: **LCS-49404**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/26/2025**	RunNo: **103381**
Client ID: **LCSS**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156520**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	21.7	5.00	25.00	0	87.0	65	135				
Surr: Toluene-d8	1.16		1.250		92.4	65	135				
Surr: 4-Bromofluorobenzene	1.21		1.250		96.9	65	135				

Sample ID: **MB-49404**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/26/2025**	RunNo: **103381**
Client ID: **MBLKS**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156504**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	5.00									
Surr: Toluene-d8	1.21		1.250		96.5	65	135				
Surr: 4-Bromofluorobenzene	1.16		1.250		92.9	65	135				

Sample ID: **2509601-001BDUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **9/26/2025**	RunNo: **103381**
Client ID: **TP-2-4**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156506**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	7.48						0		30	
Surr: Toluene-d8	1.78		1.871		94.9	65	135		0		
Surr: 4-Bromofluorobenzene	1.76		1.871		94.1	65	135		0		

Sample ID: **2509601-012BMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **9/26/2025**	RunNo: **103381**
Client ID: **TP-3-4**	Batch ID: **49404**		Analysis Date: **9/27/2025**	SeqNo: **2156518**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	30.5	6.05	30.24	0.6860	98.7	65	135				
Surr: Toluene-d8	1.48		1.512		98.2	65	135				
Surr: 4-Bromofluorobenzene	1.38		1.512		91.2	65	135				

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Volatile Organic Compounds by EPA 8260D

Sample ID: **LCS-49404**	SampType: **LCS**	Units: **µg/L**	Prep Date: **9/26/2025**	RunNo: **103379**
Client ID: **LCSS**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156444**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.927	0.0120	1.000	0	92.7	80	120				
Toluene	0.935	0.0250	1.000	0	93.5	80	120				
Ethylbenzene	0.937	0.0250	1.000	0	93.7	80	120				
m,p-Xylene	1.86	0.0500	2.000	0	93.1	80	120				
o-Xylene	0.954	0.0250	1.000	0	95.4	80	120				
Surr: Dibromofluoromethane	1.35		1.250		108	74.8	121				
Surr: Toluene-d8	1.30		1.250		104	79.6	120				
Surr: 1-Bromo-4-fluorobenzene	1.28		1.250		102	53	139				

Sample ID: **MB-49404**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/26/2025**	RunNo: **103379**
Client ID: **MBLKS**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156429**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0120									
Toluene	ND	0.0250									
Ethylbenzene	ND	0.0250									
m,p-Xylene	ND	0.0500									
o-Xylene	ND	0.0250									
Surr: Dibromofluoromethane	1.24		1.250		98.9	79.5	124				
Surr: Toluene-d8	1.30		1.250		104	77.5	124				
Surr: 1-Bromo-4-fluorobenzene	1.27		1.250		102	60.5	139				

Sample ID: **2509601-001BDUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **9/26/2025**	RunNo: **103379**
Client ID: **TP-2-4**	Batch ID: **49404**		Analysis Date: **9/26/2025**	SeqNo: **2156431**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0180						0		30	
Toluene	ND	0.0374						0		30	
Ethylbenzene	ND	0.0374						0		30	
m,p-Xylene	ND	0.0748						0		30	
o-Xylene	ND	0.0374						0		30	

Work Order: 2509601
CLIENT: Atlas Technical Consultants
Project: Brickyard Soil Sampling

QC SUMMARY REPORT

Volatile Organic Compounds by EPA 8260D

Sample ID: **2509601-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **9/26/2025** RunNo: **103379**
Client ID: **TP-2-4** Batch ID: **49404** Analysis Date: **9/26/2025** SeqNo: **2156431**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	1.84		1.871		98.6	74.8	121		0		
Surr: Toluene-d8	1.98		1.871		106	79.6	120		0		
Surr: 1-Bromo-4-fluorobenzene	1.92		1.871		102	53	139		0		

Sample ID: **2509601-011BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **9/26/2025** RunNo: **103379**
Client ID: **TP-5-7** Batch ID: **49404** Analysis Date: **9/26/2025** SeqNo: **2156442**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.18	0.0149	1.241	0	95.0	64.8	130				
Toluene	1.19	0.0310	1.241	0	95.7	64.5	127				
Ethylbenzene	1.20	0.0310	1.241	0	96.8	68.7	122				
m,p-Xylene	2.37	0.0621	2.483	0	95.4	69.1	122				
o-Xylene	1.19	0.0310	1.241	0	95.5	72.4	118				
Surr: Dibromofluoromethane	1.68		1.552		108	74.8	121				
Surr: Toluene-d8	1.66		1.552		107	79.6	120				
Surr: 1-Bromo-4-fluorobenzene	1.63		1.552		105	53	139				

Sample Log-In Check List

Client Name:	**ONEILL**	Work Order Number:	**2509601**
Logged by:	**Lyann Rivera**	Date Received:	**9/24/2025 4:38:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	3.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Alliance TECHNICAL GROUP
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790

Date: 9/24/25 Page: 1 of: 2

Laboratory Project No (internal): 2509601

Project Name: Brickyard Soil Sampling

Special Remarks:

Project No: 0001842, Phase 17, Task 8

Client: Atlas

Collected by: HW, AG

Address: 17619 NE 67th Ct. #100

Location: Brickyard, Site 5

City, State, Zip: Redmond, WA 98052

Disposal: Samples will be disposed in 30 days unless otherwise requested. ☐ Retain volume (specify above) ☐ Return to client

Telephone: 425-429-7500

Report To (PM): mika.miyamoto@oneatlas.com

Email(s): mika.miyamoto@oneatlas.com, mike.foster@oneatlas.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	FDB (8011)	Comments
1 TP-2-4	9/24/25	1130	S	3		X	X		X	X		X						
2 TP-4-3		1200	S	3		X	X		X	X		X						
3 TP-4-5		1210	S	3		X	X		X	X		X						
4 TP-4-7		1215	S	3		X	X		X	X		X						
5 TP-7-4		1300	S	3		X	X		X	X		X						
6 TP-6-3		1330	S	3		X	X		X	X		X						
7 TP-6-5		1355	S	3		X	X		X	X		X						
8 TP-6-7		1405	S	3		X	X		X	X		X						
9 TP-5-3		1420	S	3		X	X		X	X		X						
10 TP-5-5		1435	S	3		X	X		X	X		X						

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 (RCRA-8) Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr (Cu) Fe Hg K Mg Mn Mo Na (Ni) Pb Sb Se Sr Sn Ti Tl V (Zn)

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:
☒ Standard ☐ Next Day ☐ 3 Day ☐ Same Day ☐ 2 Day (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Alex Gagnon	Alex Gagnon	9/24/25 16:38	x Jack Van Mone		9/24/25 1638
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

Chain of Custody Record & Laboratory Services Agreement

Alliance TECHNICAL GROUP
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790

Date: 9/24/25 Page: 2 of: 2

Laboratory Project No (internal): 25096107

Project Name: Brickyard Soil Sampling

Special Remarks:

Project No: 0001054.2, Phase 17, Task 8

Client: Atlas

Collected by: HW, AG

Address: 17619 NE 67th Ct. #100

Location: Brickyard

City, State, Zip: Redmond, WA 98052

Report To (PM): Mika Miyamoto

Disposal: Samples will be disposed in 30 days unless otherwise requested.
☐ Retain volume (specify above) ☐ Return to client

Telephone: 425-429-7800

Email(s): mika.miyamoto@oneatlas.com, mike.foster@oneatlas.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1 TP-5-7	9/24/25	1445	S	3		X	X		X		X	X				
2 TP-3-4	9/24/25	1505	S	3		X	X		X		X	X				
3																
4																
5																
6																
7																
8																
9																
10																

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 (RCRA-8) Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr (Cu) Fe Hg K Mg Mn Mo Na (Ni) Pb Sb Se Sr Sn Ti Tl V (Zn)

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:
☒ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day ☐ _____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Alex Gagnon	Alex Gagnon	9/24/25 16:35	x Jon Jacklauthorne		9/24/25 1638
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

CONTRACT NO: 009727 FEDERAL AID NO:
CONTRACT TITLE: RECONFIGURE I-405/SR522 INTERCHANGE
CHANGE ORDER NO: 40 GSP STD SPEC 2022

PRIME CONTRACTOR: 951751673 SKANSKA USA CIVIL WEST CALIFORNIA
1995 AGUA MANSA RD

RIVERSIDE CA 92509-2405

(X)Ordered by Engineer under the terms of Section 1-04.4 of the Standard Specifications

( )Change proposed by Contractor

ENDORSED BY:	SURETY CONSENT:
Patrick Prendergast Patrick Prendergast (Mar 27, 2025 06:36 PDT)	
CONTRACTOR SIGNATURE	ATTORNEY IN FACT
Mar 27, 2025	
DATE	DATE

ORIGINAL CONTRACT AMOUNT:	834,000,000.00
CURRENT CONTRACT AMOUNT:	834,376,029.06
ESTIMATED NET CHANGE THIS ORDER:	0.00
ESTIMATED CONTRACT TOTAL AFTER CHANGE:	834,376,029.06

Mar 27, 2025	RECOMMEND EXECUTION ( )
PROJECT ENGINEER SIGNATURE DATE	EXECUTED (x)
	RECOMMEND EXECUTION ( )
REGIONAL ADMIN SIGNATURE DATE	EXECUTED ( )
STATE CONSTRUCTION ENGINEER SIGNATURE DATE	EXECUTED ( )
SIGNATURE RESPRESENTING DATE	OTHER APPROVAL WHEN REQUIRED

CONTRACT NO:009727 CHANGE ORDER NO: 40

All work, materials, and measurements to be in accordance with the provisions of the Standard Specifications and Special Provisions for the type of construction involved.

This contract is revised as follows:

Any references to provisions of Division 1 of the Standard Specifications contained herein shall be deemed to refer to the appropriate provisions of the Request for Proposal (RFP) and other Contract Documents. Any references to Prime Contractor or Contractor contained herein shall be deemed to refer to the Design-Builder.

DESCRIPTION OF WORK:
This is a WSDOT-initiated Change Order in accordance with Section 1-04.4 of the RFP. This Change Order modifies Appendix B General Special Provisions to reference Standard Specifications 2022 instead of Standard Specifications 2023.

DESIGN REQUIREMENTS:
The preparation and approvals of the necessary Released for Construction Plans and Specifications for all of the work described herein shall be in accordance with the RFP and the approved Quality Management Plan.

The Contract Documents are revised as follows:

Appendix A01, RFP Documents is deleted in its entirety and replaced with pages 3 of 289 through 8 of 289 of this Change Order.

Appendix B03, Special Provisions, is deleted in its entirety and replaced with pages 9 of 289 through 289 of 289 of this Change Order.

CONSTRUCTION REQUIREMENTS:
The construction requirements for all items related to this Change Order shall be in accordance with the appropriate Standard Plans, RFP and Released for Construction Plans and Specifications as revised by this Change Order.

MATERIALS REQUIREMENTS:
All documentation for approval and acceptance for material incorporated into this project through this Change Order shall be in accordance with Section 2.25 of the RFP prior to payment.

MEASUREMENT & PAYMENT:
This is a no cost Change Order.

CONTRACT TIME:
This Change Order does not impact Contract Time.

Appendix A1 - RFP Documents
I-405, Brickyard to SR527 Improvement Project

The following is a list of documents included in the RFP. The documents are categorized as

C = Contract Documents
BC = Reference Documents, except where Basic Configuration elements are depicted or otherwise described
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N/A = Not Applicable

Referenced As	RFP Documents	C, BC, R	Issue Date
	The Design-Builder's Proposal	C	
	Revisions to The Design-Builder's Proposal (BAFO)	C	
ITP	Instructions to Proposers	C	04/27/23
Chapter 1	General Provisions	C	05/12/23
Chapter 2	Technical Requirements	C	05/12/23
Contract Form	Contract Form	C	02/03/23
Appendix A			
Appendix A01	RFP Documents	C	03/25/25
Appendix A02	Electronic Files	R	07/31/24
Appendix B			
Appendix B1	Standard Specifications M 41-10	C	10/25/22
Appendix B2	INTENTIONALLY OMITTED	N/A	N/A
Appendix B3	Special Provisions	C	03/25/25
Appendix B4	WSDOT Bridge and Structures Office Design Memoranda	C	05/04/23
Appendix B5	Steel Escalation Cost Adjustment	C	10/25/22
Appendix B6	WSDOT Northwest Region Electrical Special Provisions	C	04/06/23
Appendix B7	WSDOT Northwest Region ITS Special Provisions	C	04/06/23
Appendix B7a	Variable Message Sign (VMS)	C	04/30/24
Appendix B7b	Road Weather Information System (RWIS)	C	07/23/24
Appendix B8	Snohomish County Traffic Signal Special Provisions	C	10/25/22
Appendix C			
Appendix C01	Commitments List	C	11/17/22
Appendix D			
Appendix D01	Bridge Design Manual LRFD M 23-50	C	10/25/22
Appendix D02	Construction Manual M 41-01	C	02/03/23
Appendix D03	Design Manual M 22-01	C	11/17/22
Appendix D04	Roadside Manual M 25-30	C	10/25/22
Appendix D05	Environmental Manual M 31-11	C	10/25/22
Appendix D06	Geotechnical Design Manual M 46-03	C	10/25/22
Appendix D07	Highway Runoff Manual M 31-16	C	10/25/22
Appendix D08	Hydraulics Manual M 23-03	C	10/25/22
Appendix D09	Local Agency Guidelines M 36-63	C	10/25/22
Appendix D10	Maintenance Manual M 51-01	C	10/25/22
Appendix D11	Materials Manual M 46-01	C	10/25/22
Appendix D12	Pavement Surface Condition Field Rating Manual for Asphalt Pavements	C	10/25/22
Appendix D13	Plans Preparation Manual M 22-31	C	10/25/22
Appendix D14	Right of Way Manual M 26-01	C	10/25/22
Appendix D15	Roadside Policy Manual M 3110	C	10/25/22
Appendix D16	Standard Plans M 21-01	C	10/25/22
Appendix D17	Traffic Manual M 51-02	C	10/25/22
Appendix D18	Utilities Accommodation Policy M 22-86	C	10/25/22
Appendix D19	Utilities Manual M 22-87	C	10/25/22
Appendix D20	Temporary Erosion and Sediment Control Manual M3109	C	10/25/22
Appendix D21	Northshore Utility District 2021 Engineering Specifications	C	10/25/22
Appendix D22	Highway Surveying Manual M 22-97	C	10/25/22
Appendix D23	Pavement Policy	C	10/25/22
Appendix D24	2016 King County Road Design and Construction Standards	C	10/25/22
Appendix D25	2016 King County Road Design and Construction Figures	C	10/25/22
Appendix D26	NWR Area 3 & 5 - Integrated Roadside Vegetation Management Plan	C	10/25/22
Appendix D27	Washington State Modifications to the Manual on Uniform Traffic Control Devices (WAC 468-95)	C	10/25/22
Appendix D28	FHWA Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition with Revisions 1 and 2 dated May, 2012	R	10/25/22
Appendix D29	Sign Fabrication Manual M55-05	R	10/25/22
Appendix D30	Electronic Engineering Data Standards Manual M 3028	R	10/25/22
Appendix D31	WSDOT Work Zone Traffic Control Guidelines for Maintenance Operations M 54-34	C	10/25/22
Appendix D32	U.S. Access Board Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Rights-of-Way, July 2011	C	10/25/22
Appendix D33	Alderwood Water & Wastewater District Standards & Guidelines 2017	C	10/25/22
Appendix D34	Alderwood Water & Wastewater District Sewer Standard Details	C	10/25/22
Appendix D35	Alderwood Water & Wastewater District Water Standard Details	C	10/25/22

Appendix A1 - RFP Documents
I-405, Brickyard to SR527 Improvement Project

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Referenced As	RFP Documents	C, BC, R	Issue Date
Appendix D36	Bothell Design and Construction Standards 2022	C	10/25/22
Appendix D37	City of Bothell Standard Details 2022	C	10/25/22
Appendix D38	Snohomish County PUD Facility Connection Requirements	C	10/25/22
Appendix D39	Snohomish County PUD Electrical Service Requirements	C	10/25/22
Appendix D40	City of Kirkland 2022 Pre-Approved Plans	C	10/25/22
Appendix D41	FHWA Standard Highway Signs, 2004 with 2012 Supplement	C	10/25/22
Appendix D42	Standards for Utilities Installed in Proximity of Seattle Public Utilities Transmission Pipelines	C	10/25/22
Appendix E			
Appendix E01	NEPA Corridor FEIS and ROD	R	10/25/22
Appendix E02	NEPA	N/A	N/A
Appendix E02a	NEPA - SR 522 to SR 527 ETL Project	R	12/08/22
Appendix E02b	NEPA ECS Report - Brickyard	R	10/25/22
Appendix E03	SEPA DNS - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E04	Endangered Species Act (ESA) Documentation	N/A	N/A
Appendix E04a	Endangered Species Act (ESA) Documentation - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E04b	Endangered Species Act (ESA) Documentation - Brickyard	R	10/25/22
Appendix E05	Agreements	R	10/25/22
Appendix E06	Noise Discipline Report - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E07	Noise Policy and Procedures	R	10/25/22
Appendix E08	Cultural Resources	N/A	N/A
Appendix E08a	Cultural Resources Survey and Addendum - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E08b	Cultural Resources Discipline Report - Brickyard	R	10/25/22
Appendix E09	Hazardous Materials Reports	N/A	N/A
Appendix E09a	Hazardous Materials Reports - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E09b	Revised Right-Sized Hazardous Materials Environmental Report - Brickyard	R	10/25/22
Appendix E10	Wetland and Stream Assessment Reports (WSAR)	N/A	N/A
Appendix E10a	Wetland and Stream Assessment and JD Assessment - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E10b	Wetland and Stream Report - Brickyard	R	10/25/22
Appendix E11	Mitigation Documents	C	10/25/22
Appendix E12	Interagency Agreements	R	10/25/22
Appendix E13	Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains	C	10/25/22
Appendix E14	WSDOT Fish Exclusion Protocols and Standards	C	10/25/22
Appendix E15	Bird Monitoring and Protocols	N/A	N/A
Appendix E15a	Bird Management Protocols and Standards	C	10/25/22
Appendix E15b	MBTA and Bald/Golden Eagle Documentation - SR 522 to SR 527 ETL Project	R	10/25/22
Appendix E15c	MBTA and Bald/Golden Eagle Documentation - Brickyard	R	10/25/22
Appendix E16	Spill Prevention, Control and Countermeasures Plan Template	R	10/25/22
Appendix E17	WDFW Invasive Species Management Protocols	R	10/25/22
Appendix E18	ECAP Report Template and Flowchart	R	10/25/22
Appendix E19	WSDOT Fish Passage Barrier Correction Monitoring Plan	R	10/25/22
Appendix E20	Environmental Permit and Documentation Crosswalk	R	10/25/22
Appendix F			
Appendix F1	Contract Bond	C	10/25/22
Appendix F2	Report of Survey Mark Form	R	10/25/22
Appendix F3	Design-Build Contract File Index	R	10/25/22
Appendix F4	DRB Forms and Guidelines	C	10/25/22
Appendix F5	Construction Stormwater Site Inspection Form	C	10/25/22
Appendix F6	ROM Sample	R	04/21/23
Appendix G			
Appendix G1	Geotechnical Baseline Report	C	03/17/23
Appendix G2	Geotechnical Data Report	R	04/21/23
Appendix G3	Reference Information	R	12/22/22
Appendix G4	Hillside Properties Technical Memorandum	R	02/09/23
Appendix G5	Stream 25.0L Improvements: Stability Analysis Technical Memorandum	R	10/25/22
Appendix G6	Brickyard BRT Fault Rupture	R	08/20/24
Appendix H			
Appendix H1	Conceptual Hydraulic Report	R	12/22/22

Appendix A1 - RFP Documents
I-405, Brickyard to SR527 Improvement Project

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Referenced As	RFP Documents	C, BC, R	Issue Date
Appendix H2	Technical Information Report (TIR) City of Bothell	R	10/25/22
Appendix H3	Conceptual Stream Restoration Plans	C	02/09/23
Appendix H4	Washington State Aquatic Habitat Guidelines Program, Integrated Streambank Protection Guidelines, 2003.	R	10/25/22
Appendix H5	WDFW Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards, 2012	R	10/25/22
Appendix H6	WDFW Aquatic Habitat Guidelines, Draft Fish Protection Screen Guidelines for Washington State, 2000	R	10/25/22
Appendix H7	Storm Drainage System and Culvert Inspection Data	R	10/25/22
Appendix H8	Preliminary Hydraulic Design Report for Fish Barrier Removal	R	10/25/22
Appendix H9	HIRUN Pollutant Loading and Dilution Calculations	R	10/25/22
Appendix H10	Category 1 Ecology-Approved BMPs	C	10/25/22
Appendix H11	Stormwater BMP Maintenance Plan Example and NWR Memo	R	10/25/22
Appendix H12	2016 King County Surface Water Design Manual	C	10/25/22
Appendix H13	WSDOT Fish Passable Structure Hydraulic Design Report Template	C	10/25/22
Appendix H14	WDFW Fish Passage Barrier Surface Water Diversion Screening Assessment and Prioritization Manual 2009	C	10/25/22
Appendix H15	Miscellaneous As Built Hydraulic Reports	R	10/25/22
Appendix H16	Culvert Injunction Implementation Guidelines	R	10/25/22
Appendix H17	WDFW Water Crossing Design Guidelines 2013	C	10/25/22
Appendix H18	NCHRP Report 568 Riprap Design Criteria, Specifications, and Quality Control	C	10/25/22
Appendix H19	WSDOT Wildlife Structures in Wetland Mitigation Sites	C	10/25/22
Appendix H20	WDFW Stream Habitat Restoration Guidelines 2012	C	10/25/22
Appendix H21	Juanita Creek Hydrology and Hydraulics Study	C	10/25/22
Appendix H22	HRM Deviation for Minimum Requirement 4	C	10/25/22
Appendix H23	2021 King County Surface Water Design Manual	C	10/25/22
Appendix H24	City of Kirkland Addendum to 2021 King County Surface Water Design Manual	C	10/25/22
Appendix H25	Stream 25 Basin Redirection	R	12/22/22
Appendix H26	Sammamish River Migration Risk Assessment	R	01/26/23
Appendix I			
Appendix I1	City of Bothell Agreements	C	10/25/22
Appendix I2	King County Agreements	C	10/25/22
Appendix I3	Community Transit Agreements	C	10/25/22
Appendix I4	City of Kirkland Agreements	C	10/25/22
Appendix J			
Appendix J1	Pavement Design Report	R	10/25/22
Appendix J2	Existing IRI Values	R	04/27/23
Appendix J3	Bridge Chain Drag Report	R	10/25/22
Appendix J4	HMA Pavement Repair	R	08/28/24
Appendix K			
Appendix K1	Prevailing Wage Information	C	04/27/23
Appendix L			
Appendix L1	I-405, Brickyard to SR527 Urban Design Criteria	C	12/08/22
Appendix L2	I-405 Urban Design Criteria	C	03/02/23
Appendix L3	FHWA Flexibility in Highway Design	R	10/25/22
Appendix L4	American Standard for Nursery Stock (ANSI Z60.1-2014)	R	10/25/22
Appendix M			
Appendix M1	Conceptual Plans	BC	04/21/23
Appendix M2	Forward Compatible Plans	BC	10/25/22
Appendix M3	Interim Forward Compatible Plans	BC	10/25/22
Appendix N			
Appendix N1	As Builts within Project Limits	R	02/16/23
Appendix N2	Bridge As Builts	R	10/25/22
Appendix N3	Bridge Inspection Reports	R	10/25/22
Appendix N4	Bridge Load Rating Summaries	R	10/25/22
Appendix N5	Bridge Deck Condition Reports	R	12/08/22
Appendix N6	Design Decision White Papers	R	10/25/22
Appendix O			
Appendix O01	Corridor Analysis Express Toll Lanes Design	C	10/25/22
Appendix O02	Chan Plan Scale - NWR Approval Letter	R	10/25/22
Appendix O03	Design-Build Document Package (DDP) Checklist	R	10/25/22

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I-405, Brickyard to SR527 Improvement Project

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N/A = Not Applicable

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Appendix O04	WSDOT NWR Channelization Plan Checklist	C	10/25/22
Appendix O05	Maximum Extent Feasible Template & Signature Page	R	10/25/22
Appendix O06	ADA Scope of Work	C	10/25/22
Appendix O07	Design Approval Package	N/A	N/A
Appendix O7a	Conceptual Design Approval	C	10/25/22
Appendix O7b	Vicinity Map	R	10/25/22
Appendix O7c	Project Summary Documents	R	10/25/22
Appendix O7d	Basis of Design	C	10/25/22
Appendix O7e	Design Parameter Worksheets	R	10/25/22
Appendix O7f	Preliminary Quantities	R	10/25/22
Appendix O7g	Pre-Approved Design Analyses	BC	10/25/22
Appendix O7h	Existing Design Variance List	R	10/25/22
Appendix O08	DB #21-01 File Naming Convention	C	10/25/22
Appendix O09	Clear Zone Inventory Form	R	10/25/22
Appendix O10	Conceptual Design Memorandum	R	10/25/22
Appendix O11	Noise Wall Coordinates	C	03/17/23
Appendix O12	Sample Tech Memo - Side Slopes	R	10/25/22
Appendix O13	Approved Crosswalk Closures	R	10/25/22
Appendix O14	Project File Checklist	R	10/25/22
Appendix O15	Project Delivery Memos	C	11/17/22
Appendix O16	City of Bothell Deviation	R	05/04/23
Appendix P			
Appendix P1	Joint Aquatic Resource Permit Application (JARPA) - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2	Permits - SR522 to SR527 ETL Project	N/A	N/A
Appendix P2a	Section 404 and 10 Permits - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2b	Section 408 Permission - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2c	USCG Bridge Permit - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2d	Section 401 WQC - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2e	Section 402 NPDES Permit and AO - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2f	HPA - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2g	CZMA - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2h	City of Bothell SCUP - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2i	City of Bothell SSDP-SVAR - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P2j	City of Bothell ECY Final Decision - SR 522 to SR 527 ETL Project	C	10/25/22
Appendix P3	JARPA - Brickyard	C	10/25/22
Appendix P4	Permits - Brickyard Project	N/A	N/A
Appendix P4a	Section 404 Permit - Brickyard	C	12/01/22
Appendix P4b	HPA - Brickyard	C	10/25/22
Appendix Q	INTENTIONALLY OMITTED		
Appendix R			
Appendix R1	Right of Way Plans	C	04/27/23
Appendix R2	Record of Survey	C	10/25/22
Appendix R3	WSDOT Notice of Entry Notification Template	R	10/25/22
Appendix R4	State Sales Tax Rule 170 & 171 Map	R	02/23/23
Appendix R5	Illegal Encampments within State Right of Way	R	10/25/22
Appendix R6	Temporary Easements and Construction Interdisciplinary Commitment Memos	C	04/27/23
Appendix R7	Local Agency Work Permit Areas	R	10/25/22
Appendix R8	Rule 171 DOR Ruling	C	02/23/23
Appendix R9	Draft ROW Plans	R	04/21/23
Appendix RR	INTENTIONALLY OMITTED		
Appendix S			
Appendix S1	Canyon Park Park and Ride Requirements	C	10/25/22
Appendix S2	King County Temporary Restriction Requirements for Regional Trails	C	10/25/22
Appendix S3	Sound Transit BRT Platform Configuration Minimum Requirement	C	10/25/22
Appendix S4	Sound Transit BRT Station Design Plans and Details	R	04/21/23
Appendix S5	Illustrative Representation of a BRT Platform	R	03/02/23
Appendix S6	King County Metro Transit Facilities Guidelines	C	10/25/22
Appendix S7	Vertical Construction Specifications	C	05/04/23

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Referenced As	RFP Documents	C, BC, R	Issue Date
Appendix S8	Vertical Construction Code Analysis Memo	C	10/25/22
Appendix S9	Community Transit Passenger Facility Standards	C	10/25/22
Appendix S10	Brickyard Park and Ride Requirements	C	10/25/22
Appendix S11	Handover Area Diagram	R	10/25/22
Appendix S12	Transit Facilities Architectural and Urban Design Criteria	C	02/28/25
Appendix S13	Transit Bus Dimensions	C	01/05/23
Appendix S14	I-405 Bus Shelter Foundation Reactions Memorandum	C	10/25/22
Appendix S15	Sound Transit Customer Signage Design Manual	C	10/25/22
Appendix S16	Sound Transit Customer Signage Conceptual Plan	R	03/10/23
Appendix S17	Sound Transit BRT Station Material Requirements	N/A	N/A
Appendix S17a	ST Tiling Material Requirements	C	03/07/25
Appendix S17b	ST Concrete Paver Material Requirements	C	03/07/25
Appendix S18	Sound Transit Certifiable Items List (CIL)	C	10/25/22
Appendix S19	Sound Transit Memo - Proprietary Items	C	10/25/22
Appendix S20	Sound Transit BRT water meter and underground hydrant details	R	10/25/22
Appendix S21	Sound Transit Design Criteria Manual	C	10/25/22
Appendix S22	Sound Transit Architectural Standard Drawings	C	10/25/22
Appendix S23	Sound Transit Architectural Directive Drawings	C	10/25/22
Appendix S24	Sound Transit Ladder Tie-Off	R	12/22/22
Appendix S25	Sound Transit Equipment and Facilities Numbering Standard	C	10/25/22
Appendix S26	Sound Transit Camera Coverage and Resolution Requirements	C	03/02/23
Appendix S27	WAVE Pad Construction Information	R	03/17/23
Appendix S28	Sound Transit Design Technology Manual	R	03/23/23
Appendix S29	BIMf	C	03/23/23
Appendix S30	SR 522 Transit Hub Light Levels	R	04/27/23
Appendix T			
Appendix T1	WSDOT Intelligent Transportation Systems Northwest Region Design Requirements	C	01/05/23
Appendix T2	WSDOT Northwest Region ITS Details	C	03/30/23
Appendix T3	HOV Design Guide for the Northwest Region	R	10/25/22
Appendix T4	WSDOT Northwest Region Current Practices in Electrical Design	C	10/25/22
Appendix T5	WSDOT Signal Turn-on Requirements	C	10/25/22
Appendix T6	WSDOT Northwest Region Standard Signal Details	C	10/25/22
Appendix T7	WSDOT Construction Requirements for Light and Signal Foundations	C	10/25/22
Appendix T8	FHWA Guidelines for Applying Traffic Microsimulation Modeling Software	R	10/25/22
Appendix T9	NWR Signing Plan Sheet Examples	R	10/25/22
Appendix T10	Special Sign Details	R	10/25/22
Appendix T11	Signing Inventory Form	R	10/25/22
Appendix T12	Type 1 Breakaway Feature Description	R	10/25/22
Appendix T13	Good To Go! Logo	R	10/25/22
Appendix T14	Speed Limit Reduction in Work Zone, WSDOT Secretary Executive Order E1060.00	R	10/25/22
Appendix T15	Work Zone Safety and Mobility, WSDOT Secretary Executive Order E1001.02	R	10/25/22
Appendix T16	Transportation Management Plan Checklist	R	10/25/22
Appendix T17	WSDOT Sign Sheeting Policy Memorandum	C	10/25/22
Appendix T18	Sign Reporting	C	10/25/22
Appendix T19	CCTV Plot	C	02/09/23
Appendix T20	Intersection Control Evaluations	C	10/25/22
Appendix T21	ETL Pavement Marking Details	C	10/25/22
Appendix T22	Toll Signing Design Guidance Document	C	10/25/22
Appendix T23	Northwest Region Traffic Operations Redbook Section F	R	10/25/22
Appendix T24	Northwest Region Traffic Operations Redbook Sections G & H	R	10/25/22
Appendix T25	Lighting Plot	R	10/25/22
Appendix T26	SR522_SR527 Signal Plans	R	12/15/22
Appendix T27	WSDOT AGi32 Basics for WSDOT Highway Lighting	C	10/25/22
Appendix T28	WSDOT Draft Power System Design	C	04/06/23
Appendix T29	RRFB Details	R	10/25/22
Appendix T30	Service Agreement Request Checklist	R	10/25/22
Appendix T31	WSDOT Northwest Region Pavement Marking Guidelines	R	10/25/22
Appendix T32	Enhancement Criteria for Uncontrolled Pedestrian Crossing Locations	R	10/25/22
Appendix T33	Removable Door Handles Specification	C	10/25/22
Appendix T34	Maintenance of Traffic (MOT) Conceptual Staging Plans and Traffic Volumes	R	12/01/22

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Appendix T35	Maintenance of Traffic (MOT) Allowable Closures	C	05/12/23
Appendix T36	Traffic Analysis Guidelines for MOT	R	10/25/22
Appendix T37	WSDOT Protocol for Vissim Simulation	R	10/25/22
Appendix T38	WSDOT Sidra Policy Settings	R	10/25/22
Appendix T39	WSDOT Synchro & SimTraffic Protocol	R	10/25/22
Appendix T40	I-405, Bellevue to Lynnwood Improvement Projects - Access Revision Report Update	C	10/25/22
Appendix T41	I-405, Brickyard to SR 527 Improvement project - Intersection Operations Memorandum	C	10/25/22
Appendix T42	SR 522 Minimum Required Configuration During Construction	C	10/25/22
Appendix T43	Traffic Sign Management System Existing Sign Inventory	R	12/15/22
Appendix T44	Type A and B Pullout Details	R	03/02/23
Appendix T45	WSDOT Illumination Design Supplement	C	04/06/23
Appendix T46	WSDOT ANSI/NEMA Labels for LED Luminaires	C	04/06/23
Appendix T47	Conditional Approval Request	C	05/04/23
Appendix U			
Appendix U1	Assignment/Delegation of Utility Permit/Franchise Rights and Obligations	C	10/25/22
Appendix U2	Existing Utilities Listing	C	01/26/23
Appendix U3	Utility Owner Contact List	R	10/25/22
Appendix U4	Franchise Agreements	C	12/22/22
Appendix U5	Utility Agreements	C	01/26/23
Appendix U6	Utility Preliminary Design Concepts	R	04/21/23
Appendix U7	Prior Relocations	C	10/25/22
Appendix U8	Utility As Builts	C	12/15/22
Appendix U9	Utility Permits	C	12/15/22
Appendix U10	Utility Easements & Deeds	C	10/25/22
Appendix V			
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Appendix W			
Appendix W1	Project Identification Sign Detail	R	10/25/22
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Appendix Y			
Appendix Y1	WSDOT Communications Manual	R	10/25/22
Appendix Y2	WSDOT Community Engagement Plan	R	10/25/22
Appendix Y3	CTCO Template	R	10/25/22
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Appendix Z1	Illustrative Representation of a Toll Point	R	10/25/22
Appendix Z2	Responsibility Matrix	R	10/25/22
Appendix Z3	Access Point Layout	R	10/25/22

Division 2
Earthwork

Clearing, Grubbing, and Roadside Cleanup

Description

Section 2-01.1 is supplemented with the following:

(March 13, 1995)
Clearing and grubbing on this project shall be performed within the following limits:

*** $$1$$ ***

Construction Requirements

Clearing

Item number 1 of Section 2-01.3(1) is revised to read:

(April 2, 2018)
1. Trees identified for removal shall be felled into the Contracting Agency right of way or areas that will be cleared of vegetation.

Roadside Cleanup

Section 2-01.3(4) is supplemented with the following:

(January 5, 1998)
*** $$1$$ ***

Payment

The first and second paragraphs of Section 2-01.5 are revised to read:

(August 7, 2017)
Payment will be made for the following bid items when they are included in the proposal:

All costs for clearing and grubbing on this project shall be included in the *** $$1$$ ***.

Removal of Structures and Obstructions

Description

Section 2-02.1 is supplemented with the following:

(March 13, 1995)
This work shall consist of removing miscellaneous traffic items.

(October 4, 2021)
Removal and Disposal of Asbestos Material
This work shall consist of removing, handling, and disposing of Asbestos Containing Material and Presumed Asbestos Containing Material identified in the Good Faith Investigation (GFI). The Contractor shall remove and dispose of asbestos in any and all areas as identified in the GFI.

(March 13, 1995)
This work shall consist of removing portions of an existing box culvert in preparation for extending the box culvert.

(February 25, 2021)
Decommissioning Wells
The Contractor shall decommission wells at the locations as shown in the Plans.

Vacant

Section 2-02.2 is supplemented with the following:

(February 25, 2021)
Materials shall conform to WAC 173-160-381 for the type of well scheduled for decommissioning.

Construction Requirements

Section 2-02.3 is supplemented with the following:

(September 7, 2021)
Removal of Obstructions
The following miscellaneous Obstructions shall be removed and disposed of:

*** $$1$$ ***

(March 13, 1995)
Removing Miscellaneous Traffic Items
The following miscellaneous traffic items shall be removed and disposed of:

*** $$1$$ ***

(June 6, 2022)
Removal and Disposal of Hazardous Material
Hazardous material is suspected to exist on this project. Approximate limits of contamination are identified in the Plans. The site history, prior studies and/or test results indicate a potential for encountering *** $$1$$ ***.

Copies of the environmental reports are available for review at https://ftp.wsdot.wa.gov/contracts/. All necessary permits for this work will be furnished by the Contracting Agency. The Contractor is responsible for all work, records, and reports required to perform the work described in this section. The Contracting Agency will perform all testing of suspected hazardous or contaminated material.

The Contractor shall notify the Engineer 10 working days prior to beginning work in the area identified in the Plans as contaminated. The Contractor shall notify the Engineer immediately if contamination is discovered in areas other than those identified in the Plans or is suspected through observations such as an oily sheen or discolored soils that may or may not emit strong chemical odors.

Contaminated Soil and Hazardous Material

The Engineer will determine the limits of excavation required. All material that is designated by the Engineer to be removed shall be handled and stored in a manner that prevents the spread of contamination to adjacent soil or water. Separate stockpiles shall be maintained for known hazardous or contaminated material and for suspected hazardous or contaminated material. The Contractor shall transport hazardous or contaminated material and dispose of it at a permitted facility. The Contractor shall provide the Engineer with a copy of the shipping manifest or bill of lading indicating the amount of material hauled to disposal and bearing the disposal site operator's confirmation for receipt of the material. Manifests shall be submitted in accordance with Section 1-07.5(7).

Contaminated Water

All water that is removed from the areas of contamination, including free water that leaches from contaminated soil stockpiles or water that is suspected of being contaminated, shall be collected, handled and stored in a manner that prevents the spread of contamination to adjacent soil or water. The Contractor shall transport contaminated water and dispose of it at a permitted facility. The Contractor shall provide the Engineer with a copy of the shipping manifest or bill of lading indicating the amount of material hauled to disposal and bearing the disposal site operator's confirmation for receipt of the material. Manifests shall be submitted in accordance with Section 1-07.5(7).

(October 4, 2021)

Removal and Disposal of Asbestos Material

Prior to performance of any contract work, the Contractor shall obtain all permits from and provide notification to, the Washington State Department of Labor and Industries, the Washington State Department of Ecology, the local clean air agency, and other permitting and regulatory agencies with jurisdiction over the work involving asbestos as the laws, rules, and regulations require.

Prior to commencing asbestos related work, the Contractor shall submit as a Type 1 Working Drawing any and all written verification of approvals and notifications that have been given and/or obtained from the required jurisdictional agencies. The Contractor shall include a schedule of activities for all work involving asbestos removal as part of the Type 1 Working Drawing. Asbestos related work shall also be shown on the Contractor's project progress schedule.

The Contractor shall designate a Washington State Certified Asbestos Supervisor (CAS), certified in accordance with WAC 295-65-012, to supervise the asbestos removal and to ensure that the handling and removal of asbestos is accomplished by certified asbestos workers, pursuant to Washington State Department of Labor and Industries standards. The Contractor shall ensure that the removal and disposal of asbestos meets the requirements of EPA regulation 40 CFR Part 61, local health department regulations, and all other applicable regulations.

The Contractor shall ensure the safety of all workers, visitors to the site, and the public in accordance with all applicable laws, rules, and regulations.

(October 4, 2021)

Removal and Disposal of Asbestos Material

In the event suspected Asbestos Containing Material (ACM) is encountered, the Contractor shall immediately notify the Engineer and the provisions of Section 1-04.7 shall apply. Prior to commencing asbestos related work, the Contractor shall obtain all permits from and provide notification to, the Washington State Department of Labor and Industries, the Washington State Department of Ecology, the local clean air agency, and other permitting and regulatory agencies with jurisdiction over the work involving asbestos as the laws, rules, and regulations require.

The ACM shall only be disturbed under the supervision of a Washington State Certified Asbestos Supervisor (CAS). The CAS shall be certified in accordance with WAC 295-65-012.

The CAS shall supervise the asbestos removal and ensure that the handling and removal of asbestos is accomplished by certified asbestos workers and in accordance with Washington State Department of Labor and Industries standards. The Contractor shall ensure that the removal and disposal of asbestos meets the requirements of EPA regulation 40 CFR Part 61, local health department regulations, and all other applicable regulations.

No asbestos is expected to be encountered. However, if the Contractor believes they have encountered asbestos, they shall immediately notify the Engineer in accordance with Section 1-04.7.

(June 26, 2000)

Salvage of Removed Structure Items

All *** $$1$$ *** of the existing bridge or structure being removed shall remain the property of the Contracting Agency.

The Contractor shall transport the specified salvaged items to the following location:

$$2$$

The Contractor shall stack the material where directed by the Engineer. The Contractor shall contact the Engineer at least five working days prior to scheduled delivery of the items to confirm delivery arrangements.

(February 25, 2021)

Decommissioning of Wells

1. Protect the well in place until decommissioned.

2. The Contractor shall provide the Department of Ecology (Ecology) a Notice of Intent (NOI) prior to decommissioning a well. A pdf of the NOI shall be provided to the Engineer within 24 hours of submittal to Ecology. A pdf of any Ecology required well reports shall be provided to the Engineer within 24 hours of submittal to the Ecology. Well reports shall include tag numbers, coordinates or other data required by Ecology for incorporation into the Ecology database for wells.

3. Licensed well drillers shall be utilized in accordance with Chapter 18.104 RCW, the Washington Well Construction Act.

4. The Contractor shall comply with WAC 173-160-381 which describes the standards for decommissioning a well.

5. The Contractor shall comply with WAC 173-160-261 requiring all dug wells to have a proper cap to prevent injury and contamination.

6. The Contractor shall comply with local laws pertaining to the decommissioning of wells.

7. This Work shall be completed prior to physical completion of the project or as agreed upon with the Engineer.

Removal of Bridges, Box Culverts, and other Drainage Structures

Section 2-02.3(2) is supplemented with the following:

(June 26, 2000)
The Contractor shall remove existing Bridge *** $$1$$ *** after routing traffic onto *** $$2$$ ***.

(June 26, 2000)
The Contractor shall remove existing Bridge ***$$1$$*** in stages as shown in the Plans.

(June 26, 2000)
The Contractor shall remove the following portions of Bridge *** $$1$$ ***, as shown in the Plans:

*** $$2$$ ***

(June 26, 2000)
Removal Limits in Water
The existing piers of Bridge *** $$1$$ *** within the wetted perimeter of the *** $$2$$ *** which do not conflict with new construction shall be removed to elevation *** $$3$$ ***. All broken concrete, and other bridge removal debris shall be removed from the bottom of the *** $$4$$ ***.

Use of Explosives

(January 2, 2018)
The Contractor may use explosives in the demolition of *** $$1$$ ***.

If explosives are used for any removal operation, the Contractor shall:

1. Conform with Section 1-07.22, including providing notice of the time and duration of the blasting operation to all residents and property owners within the safety zone.

2. Submit a Type 2 Working Drawing consisting of a detailed blasting plan.

3. Perform a pre-blast survey to document the pre-blast condition of all structures within the safety zone, and provide copies of the pre-blast survey to the Engineer.

4. Obtain permits and approvals from all applicable governmental agencies.

The blasting plan shall include, at a minimum, the following:

1. Show all stages of the demolition work.

2. Show details of all “pre-weakening” of the bridge, including locations and extent of the Structure modifications.

3. Specify the explosive and charge type and quantity.

4. Specify the firing sequence.

5. Specify the fall direction and fall sequence of the bridge, and show locations and details of all cables and structure attachments used for control.

6. Show details of drill holes and explosive placement.

7. Specify types of ground vibration monitoring equipment and show the locations of such equipment.

8. Specify how noise and shock waves are kept to a minimum.

9. Specify fragment, dust, and debris control.

10. Name, address, and phone number(s) of the licensed explosives expert supervising the operation.

11. Specify safety and security procedures, including, but not limited to, the following:

    a. Methods of storage and transportation.

    b. Measures taken to secure the blasting materials at all times, including all non-working hours.

    c. Measures taken to secure the bridge site at all times during and after installation of all charges and after blasting.

    d. Safeguards against accidental discharge.

    e. Safety zone limits.

    f. Barricade locations.

    g. Location of firing device, warning signals, warning signs.

h. Communication procedures for notifying the Engineer, nearby residents, and all personnel of impending blasting.

The Contractor shall enlist a licensed, experienced explosives expert to supervise all stages of explosive work, including hole drilling and explosive placement, safety procedures, and blasting operations.

At least five to ten working days prior to the scheduled blast, a pre-blast conference shall be held to discuss the blasting plan, all pre-blast preparations of the bridge, the pre-blast, blast, and post-blast procedures, and the responsibilities and activities of the personnel and equipment involved. Those attending shall include, at a minimum, the project superintendent, the licensed explosives expert assigned to supervise the work, and the work crew leaders responsible for performing the pre-blast and post-blast activities.

Traffic shall not be allowed in the vicinity during blasting operations.

All damage as a result of the Contractor's blasting operations shall be repaired by the Contractor at no additional expense to the Contracting Agency in accordance with Sections 1-07.13 and 1-07.14.

(January 2, 2018)
Requirements for Closing Bridge to Traffic Prior to Beginning Removal
The Contractor shall not close the existing bridge to traffic, and shall not begin bridge removal operations, until the following conditions are met:

1. The Contractor's bridge demolition plan Working Drawing submittal has been processed and all comments from the Engineer have been addressed.

2. The Contractor has received the Engineer's acceptance of all shop drawings and materials submittals for materials required for the work to be executed during the closure.

3. The Contractor has submitted a Type 1 Working Drawing consisting of a report on the status of material delivery. The report shall specify the materials already available at the site, the materials yet to arrive at the site, and the scheduled delivery dates of the materials yet to arrive at the site, with written verification from the supplier or copies of confirmed purchase orders indicating the delivery dates of the materials yet to arrive at the site.

4. The Contractor shall provide an updated progress schedule in accordance with Section 1-08.3 confirming that the scheduled delivery of materials will meet the schedule to complete the work within the allowed time. The Contractor shall supplement the progress schedule with a written narrative describing the assumed production rates and planned resource allocations that support the bridge construction activity durations provided in the progress schedule.

5. The Contractor has received the Engineer's concurrence to proceed.

(June 26, 2000)
Removing Portions of Existing Box Culvert
The Contractor shall remove, to the limits shown in the Plans, the existing wingwalls, wingwall footings, aprons, and parapet walls of the box culvert to be extended.

Removal of Pavement, Sidewalks, Curbs, and Gutters

Section 2-02.3(3) is supplemented with the following:

(September 8, 1997)
The approximate thickness of the *** $$1$$ *** pavement is *** $$2$$ ***.

Measurement

Section 2-02.4 is supplemented with the following:

(December 4, 2006)
Hazardous material excavation including haul will be measured by the cubic yard. All excavated material will be measured in the position it occupied before the excavation was performed. An original ground measurement will be taken using cross-section or digital terrain modeling survey techniques. The original ground will be compared with a survey of the excavation area taken after the work is completed.

(September 8, 1997)
Pavement removal will be measured by the square yard.

(October 25, 1999)
Sidewalk removal will be measured by the square yard.

(September 8, 1997)
Curb removal will be measured by the linear foot.

Payment

Section 2-02.5 is revised by the following:

(August 7, 2017)
Payment will be made for the following bid item when it is included in the proposal.

All costs for the removal of structures and obstructions shall be included in *** $$1$$ ***.

Section 2-02.5 is supplemented with the following:

(February 25, 2021)
“Decommissioning Wells”, lump sum including all Work as specified and payment to regulatory agencies for any associated fees for monitoring or decommissioning of wells.

(December 4, 2006)
“Hazardous Material Handling And Disposal”, by force account as provided in Section 1-09.6.

All costs associated with storing stockpiled hazardous waste and contaminated soils, collecting, handling and storing contaminated water, loading the stockpiled material into the hauling conveyance for transport to the disposal site, and transporting and disposing of hazardous or contaminated materials at an approved facility will be paid by force account under the item “Hazardous Material Handling And Disposal”.

To provide a common basis for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor’s total bid.

“Hazardous Material Excavation Incl. Haul”, per cubic yard.
The unit contract price for “Hazardous Material Excavation Incl. Haul” shall be full pay for all costs associated with excavating the material designated to be removed, hauling it to the stockpile location, and stockpiling the excavated material.

(September 30, 1996)
"Removing Miscellaneous Traffic Item", lump sum.

(September 30, 1996)
"Removal and Disposal of Asbestos Material", lump sum.

(June 26, 2000)
"Removing Portion of Conc. Box Culv.", lump sum.

The lump sum contract price for "Removing Portion of Conc. Box Culv." shall be full pay for preparing the box culvert for the extension by removing and disposing of all concrete and other debris specified.

(September 30, 1996)
"Removing *** $$1$$ *** Pavement", per square yard.

(June 26, 2000)
All costs in connection with removing the box culvert wingwalls, footings, aprons, and parapet wall and disposing of concrete and other debris as specified shall be included in the unit contract prices for the items of work involved in the extension of the box culvert(s).

(November 3, 1999)
"Removing *** $$1$$ *** Sidewalk”, per square yard.

(September 8, 1997)
“Removing *** $$1$$ *** Curb”, per linear foot.

Roadway Excavation and Embankment

Construction Requirements

Rock Cuts

Section 2-03.3(2) is supplemented with the following:

(September 7, 2021)

Rock Slope Scaling and Removal and Disposal of Rock Slope Scaling Debris

The Contractor shall remove loose rock and soil from the existing rock slope locations shown in the Plans or as specified by the Engineer, and shall remove and dispose of all rock slope scaling debris generated by the work.

Equipment

Rock slope scaling shall be performed with scaling bars, portable hydraulic wedges, air pillows, hand drills, splitters, and other mechanical or hand tools demonstrated to be effective in performing the work to the satisfaction of the Engineer.

Submittals

The Contractor shall submit a rock slope scaling plan as a Type 2 Working Drawing. The rock slope scaling plan shall include, but not be limited to, the following:

1. Documented work experience of all rock slope scaling supervisors and scalers scheduled to be working on the project. Rock slope scaling supervisors shall have at least 1,500 hours of documented experience as a rock slope scaler. Rock slope scalers shall have at least 1,000 hours of documented experience as a rock slope scaler.

2. The proposed construction sequence and schedule.

3. The type of tools and equipment to be used for rock scaling purposes.

4. The number of rock slope scaling crews to be employed on the project, with a rock slope scaling crew defined as one qualified scaling supervisor and two qualified scalers.

5. Operation plan for collection, removal and disposal of all rock slope scaling debris generated by the rock slope scaling work.

6. Operation plan for protection of roadway surface, railroad facilities, structures, utilities, and other facilities adjacent to the rock slope scaling locations.

7. If the Roadway is exposed to the collection of rock slope scaling debris, the submittal shall include the equipment and procedure to be used to clear the Roadway for public use between rock slope scaling operations.

The Contractor shall not begin rock slope scaling operations until receiving the Engineer's approval of the rock slope scaling plan.

Rock Slope Scaling Construction Requirements

As a first item of work, the Contractor shall clear the rock slope of trees and woody vegetation within the work zone within 15 feet of the slope crest or as otherwise specified by the Engineer. Clearing shall conform to Sections 2-01.1

and 2-01.3(1), and the requirement that the vegetation shall be close cut, leaving the root wad intact.

The Contractor shall conduct rock slope scaling operations in accordance with the details shown in the Plans, the traffic control restrictions and requirements shown in the Plans and specified in the Special Provisions, and the rock slope scaling plan as approved by the Engineer. The size and work experience of the rock slope scaling crew as defined above shall be maintained at all times.

Rock slope scaling shall begin at the top of the rock slope and work shall proceed down slope, removing loose rock and soil as the work progresses. The extent of rock slope scaling shall be as shown in the Plans and as adjusted in the field by the Engineer.

Rock Slope Scaling Debris Collection and Removal
The Contractor shall collect, remove and dispose of all rock slope scaling debris generated by the work, including all rock debris within the limits of the project present at the base of the slope at the beginning of the project. Ditches and benches shall be cleared of all rock slope scaling debris and returned to original functional condition as specified by the Engineer

The Contractor shall break up any rocks that are too large to transport into manageable sized pieces for haul.

Rock slope scaling debris collection and removal shall be conducted in accordance with the traffic control restrictions and requirements shown in the Plans and specified in the Special Provisions, and the rock slope scaling plan as approved by the Engineer.

Except when the Plans or Special Provisions specify a Contracting Agency provided site for disposal of all or specific portions of the rock slope scaling debris, all rock slope scaling debris shall be disposed of at a site conforming to Section 2-03.3(7)C.

Disposal Of Surplus Material

Section 2-03.3(7) is supplemented with the following:

(March 13, 1995)
Surplus materials may be disposed of within the Contracting Agency furnished site, as detailed in the Plans. For informational purposes the maximum capacity of this site is *** $$1$$ *** cubic yards, neat line measurement.

(March 13, 1995)
Surplus materials may be disposed of by widening embankments at the following locations, as may be designated by the Engineer :

*** $$1$$ ***

For informational purposes the maximum capacity of the embankment widening sites is *** $$2$$ *** cubic yards, neat line measurement

(March 13, 1995)
The Contractor is not required to utilize the Contracting Agency provided site(s), and may make arrangements, at the Contractor's expense, for the disposal of waste materials, and shall protect the Contracting Agency from all damages arising from the Contractor's waste disposal operations.

(March 13, 1995)
It is anticipated that the waste site(s) provided by the Contracting Agency will not be of sufficient size or capacity to dispose of all excess materials. Therefore, it will be necessary for the Contractor to make arrangements, at the Contractor's expense, for the disposal of excess waste materials and shall protect the Contracting Agency from all damages that may arise from the waste disposal operations.

Embankment Construction

Compacting Earth Embankments

Section 2-03.3(14)C is supplemented with the following:

(March 13, 1995)
All embankments, except waste embankments, shall be compacted using Method A.

Embankments at Bridge And Trestle Ends

Section 2-03.3(14)I is supplemented with the following:

(March 13, 1995)
The approach embankments at the ends of *** $$1$$ *** shall be constructed *** $$2$$ *** before undertaking the construction of the end piers.

Measurement

Section 2-03.4 is supplemented with the following:

(March 13, 1995)
The embankment widening for guardrail will be measured by the cubic yard, between the original roadway slope and the neat lines of the widened embankment.

(March 13, 1995)
Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Engineer.

(March 13, 1995)
Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract. Control stakes will be set during construction to provide the Contractor with all essential information for the construction of excavation and embankments.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Engineer.

(April 5, 2010)
Rock slope scaling will be measured by the crew hour.

Rock slope scaling debris removal including haul will be measured by the cubic yard in the hauling conveyance at the point of removal from the work site.

Payment

Section 2-03.5 is supplemented with the following:

(September 30, 1996)
"Embankment in Place", per cubic yard.

The unit contract price per cubic yard shall be full pay to perform the work as specified, including terracing the existing slope.

(March 13, 1995)
All costs in connection with the preparation of waste sites and waste deposits shall be included in the *** $$1$$ ***.

(April 5, 2010)
"Rock Slope Scaling", per crew hour.
The unit contract price per crew hour for "Rock Slope Scaling" shall be full pay for performing the work as specified.

"Rock Slope Scaling Debris Removal Incl. Haul", per cubic yard.
The unit contract price per cubic yard for "Rock Slope Scaling Debris Removal Incl. Haul" shall be full pay for performing the work as specified, including collection, removal and disposal of all rock debris within the limits of the project present at the base of the slope at the beginning of the project.

All costs in connection with felling of trees and woody vegetation from the site as specified, and collection, removal and disposal of all trees and woody vegetation cut and removed from the slope, shall be included in the lump sum contract price for "Clearing and Grubbing".

Subgrade Preparation

Construction Requirements

Subgrade For Surfacing

Section 2-06.3(1) is supplemented with the following:

(March 13, 1995)
The subgrade shall be trimmed with an automatically controlled machine.

(March 13, 1995)
A subgrade trimmer is not required but all portions of Section 2-03 shall apply as though a subgrade trimmer were specified.

Structure Excavation

Construction Requirements

General Requirements

Removal of Unstable Base Material

Section 2-09.3(1)C is supplemented with the following:

(September 8, 2020)
If the soil in the footing excavation *** $$1$$ *** is disturbed and becomes unsuitable before placement of the concrete footing, the Contractor shall excavate below the plan grade a maximum of 1 foot, as determined by the Engineer, and backfill with gravel backfill for foundations.

Construction Requirements, Structure Excavation, Class A

Excavation Using Open Pits – Extra Excavation

Section 2-09.3(3)B is supplemented with the following:

(September 7, 2021)
Extra excavation and open pit excavation, as defined in this section, will not be allowed at the following location(s):

*** $$1$$ ***

Shoring for the excavation sites specified above shall be Structural Shoring in accordance with Section 2-09.3(3)D. The Contractor shall submit Type 2E Working Drawings consisting of shoring plans in accordance with Section 2-09.3(3)D.

(April 1, 2019)
The Contracting Agency has identified the following areas where the Contractor may dig open pits or perform extra excavation without shoring or cofferdams provided slope stability is evaluated using limit equilibrium methods:

*** $$1$$ ***

Submittals and Design Requirements
At the locations identified above, the temporary excavation slopes shall be designed by an engineer or engineering geologist licensed in Washington State. The Contractor shall submit Type 2E Working Drawings for the areas identified above. The Type 2E Working Drawings may address each site individually, as groups, or in entirety. The design shall use limit equilibrium slope stability methods and software and shall be completed in conformance with the WSDOT *Geotechnical Design Manual* M 46-03. The design shall be based on site specific conditions and shall include a stability assessment of interim or intermediate stages if they are used and shall include all applicable surcharge loads including those from construction equipment or stock piled materials. Required submittal elements include, at a minimum, the following:

1. A plan view showing the limits of the excavation and its relationship to traffic, Structures, utilities and other pertinent project elements. If the stability of the excavation requires no-load zones or equipment setback distances, those shall be shown on the plan view.

2. A typical or controlling cross section showing the proposed excavation, original ground line, and locations of traffic, existing Structures, utilities, site constraints, surcharge loads, or other conditions that could affect the stability of the slope. If the stability of the excavation requires no-load zones or equipment setback distances, those shall be shown in cross section.

3. A summary clearly describing subsurface conditions and groundwater conditions, sequencing considerations, and governing assumptions.

4. Supporting calculations for the design of the excavation, the soil and material properties selected for design, and the justification for the selection for those properties, in accordance with the WSDOT *Geotechnical Design Manual* M 46-03.

5. Safety factors, or load and resistance factors used, and justification for their selection, in accordance with the WSDOT *Geotechnical Design Manual* M 46-03, and referenced AASHTO design manuals.

6. A monitoring plan to evaluate the excavation performance throughout its design life.

7. Any supplemental subsurface explorations made by the Contractor to meet the requirements for geotechnical design of excavation slopes, in accordance with the WSDOT *Geotechnical Design Manual* M 46-03.

Shoring And Cofferdams

Section 2-09.3(3)D is supplemented with the following:

(March 13, 1995)
The Contractor shall protect the existing pavement from damage due to the Contractor's operations and shall shore all excavation adjacent to the existing pavement.

(August 2, 2010)
The Contractor shall protect the existing track and facilities of the Railroad Company from damage due to the Contractor's operations, and shall shore all excavation adjacent to the existing railroad track. Shoring shall be steel sheet piling designed for a Cooper E-80 loading according to the American Railway Engineering and Maintenance Association (AREMA) Manual For Railway Engineering. Damage to the railroad track or railroad facilities, due to the Contractor's operations, will be repaired by the Railroad at the Contractor's expense.

(March 13, 1995)
Because of the nearness of the work to the existing *** $$1$$, *** the Contractor shall protect the *** $$2$$ *** during the *** $$3$$ ***.

Measurement

The subsection **Lower Limits** of Section 2-09.4 is supplemented with the following:

(January 4, 2010)
Under girders, at end pier embankments, the lower limit will follow a line parallel to the bottom of the girders and three feet below them.

Construction Geosynthetic

Description

Section 2-12.1 is supplemented with the following:

(November 17, 1997)
Geosynthetic Reinforced Slope
The Contractor shall furnish and construct geosynthetic reinforced slopes in accordance with the details shown in the Plans, these specifications, or as directed by the Engineer.

Materials

Borrow

Section 9-03.14 is supplemented with the following:

(November 17, 1997)
Borrow for Geosynthetic Reinforced Slope

All backfill material used in the reinforced soil zone of the geosynthetic reinforced slope shall be free draining, free from organic or otherwise deleterious material and shall conform to the gradation for *** $$1$$ *** borrow, except that the percent passing a No. 200 sieve shall be 7 to 12 percent, and the SE shall be 15 minimum. The material shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The backfill material shall meet the following requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 min.
pH	AASHTO T 289-91	4.5 to 9

Reinforced slope backfill material satisfying these gradation, durability and chemical requirements shall be classified as nonaggressive.

Cold Drawn Wire

Section 9-07.9 is supplemented with the following:

(November 17, 1997)

Welded wire fabric for the slope facing, including all facing anchor pins and tie-bars, shall conform to the requirements of AASHTO M55. Welded wire fabric, anchor pins, and tie-bars shall be galvanized after fabrication in accordance with ASTM A 641 (2 oz./ft^2 minimum). All damage to galvanizing shall be repaired with formula A-9-73 Galvanizing Repair Paint in accordance with Section 9-08.2.

Geosynthetic Properties For Retaining Walls and Reinforced Slopes

Section 9-33.2(2) is supplemented with the following:

(January 2, 2012)
Geosynthetic Properties for Reinforced Slopes

Geotextile reinforcement (primary and secondary) in geosynthetic reinforced slopes shall conform to the properties specified in Tables 7 and 11.

If geogrid reinforcement is used for wrapped face reinforced slope construction, the geotextile material placed at the wall face to retain the backfill material as shown in the Plans shall conform to the properties of Table 7.

Wide strip geosynthetic strengths are minimum average roll values (i.e., the average test results for any sampled roll in a lot shall meet or exceed the values shown in the table). These wide strip strength requirements apply only in the geosynthetic direction perpendicular to the slope face. Wide width tensile strength testing is in conformance with the most recently approved ASTM geosynthetic test procedure (ASTM D4595 for geotextiles, and ASTM D6637 for geogrids), except for

geosynthetic sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 11: Long-term tensile strength, T_{al}, required for geosynthetic reinforcement used in geosynthetic reinforced slopes.

[3]Slope Location	Vertical Spacing of Primary Reinforcement Layers	Primary Reinforcement Layer Distance from Top of Reinforced slope	[1,2]Minimum Long-Term Tensile Strength, T_{al}, for Primary Reinforcement	[1]Minimum Ultimate Tensile Strength (ASTM D4595 or D6637) for Secondary Reinforcement
$$1$$	***$$2$$***	***$$3$$***	***$$4$$***	1300 lbs/ft.

[1]These long-term tensile strength requirements apply only in the geosynthetic direction perpendicular to the slope face.

[2]T_{al}.shall be determined in accordance with WSDOT Standard Practice T925.

[3]Reinforced slopes ***$$5$$*** are classified as Class ***$$6$$*** structures.

(August 4, 2014)
Geosynthetic Properties for Turf Reinforcement Mat
The turf reinforcement mat shall be a three-dimensional non-degradable polymer mat conforming to the properties indicated in Table 12. All geosynthetic properties are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table.

Table 12: Turf Reinforcement Mat Property Requirements.

Property	Test Method	Minimum Property Requirements
Tensile Strength, Minimum in Machine and X-Machine direction	ASTM D 6818	10 lbs/in.
Thickness	ASTM D 6525	0.5 inch
UV Resistance	ASTM D 4355 @ 500 hours	70%

Source Approval

Section 9-33.4(1) is supplemented with the following:

(April 5, 2004)
Geosynthetic Reinforced Slope Primary Reinforcement
Geosynthetic products which are qualified for use in geosynthetic reinforced structures for primary reinforcement (Classes 1, 2, or both) are listed in the current Qualified Products List (QPL).

For geosynthetic products proposed for use as primary reinforcement which are not listed in the current QPL, the Contractor shall submit test information and the calculations used in the determination of T_{al} performed in accordance with WSDOT Test Method 925 to the State Materials Laboratory in Tumwater for evaluation. The Contracting Agency will require up to 30 calendar days after receipt of the information to complete the evaluation.

Source approval for reinforced slope primary reinforcement geosynthetic materials listed in the current QPL, or as approved based on data developed and submitted in accordance with WSDOT Test Method 925, will be based on conformance to the applicable values in Tables 7 and 11.

(April 5, 2004)
Geosynthetic Reinforced Slope Secondary Reinforcement
The Contractor shall submit to the Engineer the following information regarding the geosynthetic secondary reinforcement product(s) proposed for use:

Manufacturer's name and current address,
Full product name,
Geosynthetic structure, including fiber/yarn type, and
Geosynthetic polymer type(s).

If the geosynthetic source has not been previously evaluated or included in the QPL, a sample of each proposed geosynthetic shall be submitted to the State Materials Laboratory in Tumwater for evaluation. A maximum of 14 calendar days will be required for this testing once the samples and required product information arrive at the Materials Laboratory. Source approval will be based on conformance to the applicable values in Tables 7 and 11. Source approval will not be the basis of acceptance of specific lots of material unless the lot sampled can be clearly identified, and the number of samples tested and approved meet the requirements of WSDOT Test Method 914.

(November 17, 1997)
Geosynthetic Reinforced Slope Turf Reinforcement Mat
Approval of source for turf reinforcement mat will be by Manufacturer’s Certificate of Compliance.

Acceptance Samples
Section 9-33.4(3) is supplemented with the following:

(November 17, 1997)
Geosynthetic Reinforced Slope Primary Reinforcement
Geotextile acceptance testing shall meet the requirements of Table 7, and both geotextile and geogrid acceptance testing shall meet the required ultimate tensile strength T_{ult} as provided in the QPL for the selected product(s). If the selected product(s) are not listed in the current QPL, the result of the testing for T_{ult} must be greater than or equal to T_{ult} as determined from the product data submitted and approved by the State Materials Laboratory during source approval. If the results of the testing show that the reinforced slope primary geosynthetic reinforcement lot does not meet the specified properties, the roll or rolls which were sampled will be rejected, and additional sampling and testing will be performed as specified.

(April 5, 2004)
Geosynthetic Reinforced Slope Secondary Reinforcement
If the results of the testing show that the reinforced slope secondary reinforcement geosynthetic lot does not meet the properties specified in Table 7 (geotextiles only) and Table 11 (geotextiles and geogrids), the roll or rolls which were sampled will be rejected, and additional sampling and testing will be performed as specified.

(November 17, 1997)
Geosynthetic Reinforced Slope Turf Reinforcement Mat
Acceptance of turf reinforcement mat will be by Manufacturer's Certificate of Compliance.

Acceptance by Certificate of Compliance

Section 9-33.4(4) is supplemented with the following:

(November 17, 1997)
Reinforced Slope
The Contractor shall provide a Manufacturer's Certificate of Compliance to the Engineer, including polymer type in addition to all information as specified, for all quantities of reinforced slope geosynthetic material, including primary and secondary reinforcement materials, and erosion mat material when specified in the Plans.

Construction Requirements

Section 2-12.3 is supplemented with the following:

(November 17, 1997)
Geosynthetic Reinforced Slope Construction Requirements

Submittals
The Contractor shall submit to the Engineer, a minimum of 14 calendar days prior to beginning construction of each reinforced slope, detailed plans for each reinforced slope and as a minimum, the submittals shall include the following:

1. Detailed reinforced slope plans showing the actual lengths proposed for the geosynthetic reinforcing layers and the locations of each geosynthetic product proposed for use in each of the geosynthetic reinforcing layers.

2. The Contractor's proposed reinforced slope construction method, including any proposed forming systems, types of equipment to be used and proposed erection sequence.

3. Manufacturer's Certificate of Compliance, samples of the reinforced slope geosynthetic(s) and sewn seams for the purpose of acceptance as specified.

4. Details of geosynthetic reinforced slope corner construction, including details of the positive connection between the slope sections on both sides of the corner.

5. Details of terminating a top layer of reinforced slope geosynthetic and backfill due to a changing reinforced slope profile.

Approval of the Contractor's proposed reinforced slope construction details and methods shall not relieve the Contractor of their responsibility to construct the reinforced slopes in accordance with the requirements of these Specifications.

Reinforced Slope Construction

The Contractor shall excavate for the reinforced slope in accordance with Section 2-09, and conforming to the limits and construction stages shown in the Plans.

The Contractor shall direct all surface runoff from adjacent areas away from the reinforced slope construction site.

The Contractor shall begin reinforced slope construction at the lowest portion of the excavation and shall place each layer horizontally as shown in the Plans. The Contractor shall complete each layer entirely before beginning the next layer.

Geotextile splices shall consist of a sewn seam or a minimum 1 ft overlap. Geogrid splices shall consist of adjacent geogrid strips butted together and fastened using hog rings, or other methods approved by the Engineer, in such a manner to prevent the splices from separating during geogrid installation and backfilling. The Contractor shall offset geosynthetic splices in one layer from those in the other layers such that the splices shall not line up vertically. Splices parallel to the slope face will not be allowed, as shown in the Plans.

Primary reinforcing geosynthetic shall be cut to the length shown in the Plans. For geogrids, the end of the primary reinforcing located at the face of the slope shall be cut so that the cut ribs extend no more than 0.6 inch but not less than 0.2 inch from the cross ribs. For geogrids, the length of the reinforcement required as shown in the Plans shall be defined as the distance between the geosynthetic facing and the last geogrid node at the end of the reinforcement in the slope backfill.

The Contractor shall stretch out the geosynthetic in the direction perpendicular to the slope face to ensure that no slack or wrinkles exist in the geosynthetic prior to backfilling. Soil piles or the geosynthetic manufacturer's recommended method shall be used to hold the geosynthetic in place until the specified cover material is placed.

The Contractor shall place fill material on the geosynthetic in lifts such that 6 inches minimum of fill material is between the vehicle or equipment tires or tracks and the geosynthetic at all times. The Contractor shall remove all particles within the backfill material greater than 3 inches in size. Turning of vehicles on the first lift above the geosynthetic will not be permitted. The Contractor shall not end dump fill material directly on the geosynthetic without the prior approval of the Engineer.

Should the geosynthetic be damaged or the splices disturbed, the backfill around the damaged or displaced area shall be removed and the damaged strip of geosynthetic replaced by the Contractor at no expense to the Contracting Agency.

The Contractor shall place and compact the reinforced slope backfill in accordance with the reinforced slope construction sequence detailed in the Plans. The minimum compacted backfill lift thickness of the first lift above each geosynthetic layer shall be 6 inches. The maximum compacted lift thickness anywhere within the reinforced slope shall be 10 inches.

The Contractor shall compact each layer to 95 percent of maximum density. The water content of the reinforced slope backfill shall not exceed the optimum water content by more than 3 percent. The Contractor shall not use sheepsfoot rollers or rollers with protrusions. Rollers which weigh more than 6,000 lbs shall be used with the vibrator turned off. The Contractor may use rollers which weigh 6,000 lbs or less with the vibrator turned on with the prior approval of the Engineer.

The Contractor shall construct slope corners at the locations shown in the Plans, and in accordance with the reinforced slope corner construction sequence and method submitted by the Contractor and approved by the Engineer. Slope angle points with an interior angle of less than 150 degrees shall be considered to be a corner. The slope corner shall provide a positive connection between the sections of the reinforced slope on each side of the corner such that the slope backfill material cannot spill out through the corner at any time during the design life of the reinforced slope. The Contractor shall construct the slope corner such that the reinforced slope sections on both sides of the corner attain the full geosynthetic layer embedment lengths shown in the Plans.

Where required by reinforced slope profile grade, the Contractor shall terminate top layers of reinforced slope geosynthetic and backfill in accordance with the method submitted by the Contractor and approved by the Engineer. The end of each layer at the top of the slope shall be constructed in a manner which prevents slope backfill material from spilling out the face of the slope throughout the life of the reinforced slope. If the profile of the top of the slope changes at a rate of 1V:1H or steeper, this change in top of slope profile shall be considered to be a corner.

Tolerances

The Contractor shall complete the base of the reinforced slope excavation to within plus or minus 3 inches of the staked elevations unless otherwise directed by the Engineer. The Contractor shall place the external slope dimensions to within plus or minus 2 inches of that staked on the ground. The Contractor shall space the reinforcement layers vertically to within plus or minus 1 inch of that shown in the Plans.

The completed reinforced slope(s) shall meet the following tolerances:

	Tolerance
Deviation from the design slope and horizontal alignment for the slope face, when measured along a 10-foot straight edge at the midpoint of each reinforced slope layer, shall not exceed:	5 inches
Deviation from the overall design slope per 10 feet of reinforced slope height shall not exceed:	3 inches

(August 2, 2010)

Turf Reinforced Mat Installation

Splices in the Turf Reinforced Mat shall be butted together and the splice shall be held together with hog rings, or other methods approved by the Engineer, in a manner that will prevent the splice from separating during installation and backfilling.

The face of the reinforced slope shall be cleared of all rocks, dirt clods, vegetation, trash and other obstructions that may cause the mat to bridge the ground surface. The mat shall be unrolled in the direction of water flow with the flat side against the ground.

The turf reinforcement mat shall be anchored at the shoulder of the slope in an anchor trench a minimum of 12 inches deep and 6 inches wide. The anchor trench shall be excavated prior to placing the erosion mat on the slope. Heavy duty steel pins or polyethylene pegs shall be used to anchor the mat to the slope face. Steel pins shall be a minimum 0.2 inch diameter, with a 1.5 inch diameter steel washer secured at the head of the pin. Polyethylene pegs shall be “T” type or have a 1.5 inch diameter washer secured at the head of the peg. All pins or pegs shall be 12 inches long minimum. Hog rings, or other methods approved by the Engineer, shall be used to attach the turf reinforcement mat to the cross ribs of the primary reinforcing at the face of the slope. The ties shall be as durable and strong as the material to which they are tied. The turf reinforcement mat shall be securely attached to the cross ribs by tie(s) centered between the pins or pegs.

Upon completion of the mat installation, *** $$1$$ *** inch(es) of Topsoil Type *** $$2$$ *** shall be spread over the turf reinforcement mat by drop spreader, blower truck, cyclone spreader, or by shovels, rakes, and brooms. The Topsoil shall be lightly raked or brushed into the mat apertures to completely fill the mat thickness. The slope shall be seeded with grass seed by broadcast or hydroseeding in accordance with Sections 8-01 and 9-14, and as specified in the Contract Provisions.

(November 17, 1997)

Geosynthetic Wrapped Slope Facing Construction

The Contractor shall use a temporary form system to minimize sagging of the geosynthetic facing elements during construction. A typical example of a temporary form system and sequence of reinforced slope construction required when using this form are detailed in the Plans.

Geosynthetic reinforcement splices exposed at the slope face shall prevent loss of backfill material through the face. The splicing material exposed at the slope face shall be as durable and strong as the material to which the splices are tied.

The Contractor shall compact the zone within 3 ft of the slope face without causing damage or distortion to the slope face or reinforcing layers by using light mechanical tampers approved by the Engineer.

The wall face shall be stepped vertically rather than using a battered forming system. Boston Ivy shall be placed in the slope face through the geosynthetic reinforcement layers in the horizontal portion of each step as indicated in the Plans. The first row of ivy plants shall be placed in the bottom layer of the reinforced slope. Rows of plants shall be spaced vertically no more than 16 ft apart. Plants within a row shall be spaced horizontally 6 to 7 ft apart. Holes placed through the reinforcement shall be the minimum size necessary to install the plants.

(November 17, 1997)
Welded Wire Facing Construction

The Contractor shall install welded wire facing as shown in the Plans. Horizontally adjacent facing panels shall be butted together such that no gap between facing panels exists. Butted together facing panel splices shall be offset from each other in adjacent layers so that the splices do not line up with one another from layer to layer.

If secondary geosynthetic reinforcement is specified, secondary reinforcement splices transverse to the slope shall be butted together and the splice shall be held together with hog rings, or other methods approved by the Engineer in the manner that will prevent the splice from separating during geosynthetic installation and backfilling.

The front 3 inches to 6 inches of reinforced slope backfill at the slope face, as shown in the Plans, shall be thoroughly mixed with lime, 16-16-16 fertilizer, and grass seed to create a vegetated face. Lime shall be applied at a rate 6.0 lbs/cy, fertilizer at a rate of 0.7 lbs/cy, and grass seed at a rate of 0.4 lbs/cy.

The Contractor shall compact the zone within one meter of the slope face without causing damage or distortion to the slope face or reinforcing layers by using light mechanical tampers approved by the Engineer. The maximum outward bulge of the face between primary reinforcement layers shall not exceed 3 inches.

(November 17, 1997)
Installing Guardrail Posts in Geosynthetic Reinforced Slopes

The Contractor shall install guardrail posts as shown in the Plans after completing the reinforced slopes. The Contractor shall install the posts in a manner that prevents bulging of the slope face and prevents ripping, tearing, or pulling of the geosynthetic reinforcement. Holes through the geosynthetic reinforcement shall be the minimum size necessary for the post. The Contractor shall demonstrate to the Engineer prior to beginning guardrail post installation that the installation method will not rip, tear, or pull the geosynthetic reinforcement.

Measurement

Section 2-12.4 is supplemented with the following:

(January 5, 1998)
Geosynthetic reinforced slope will be measured by the square foot of face of completed reinforced slope, measured in the plane of the slope.

$$1$$ borrow including haul will be measured as specified in Section 2-03.4.

Structure excavation Class B including haul will be measured as specified in Section 2-09.4 and to the limits shown in the Plans.

Payment

Section 2-12.5 is supplemented with the following:

(November 17, 1997)
"Geosynthetic Reinforced Slope", per square foot.

"*** $$1$$ *** Borrow Incl. Haul", per ton or per cubic yard.
"Structure Excavation Class B Incl. Haul", per cubic yard.

The unit contract price per square foot for "Geosynthetic Reinforced Slope" shall be full pay to perform the work as specified, including compaction of the backfill material, and furnishing and installing the facing materials, plantings, and any temporary forming system used.

Division 3
Aggregate Production and Acceptance

Production From Quarry and Pit Sites

Material Sources, General Requirements

Section 3-01.2 is supplemented with the following:

(March 13, 1995)
Permits For Pit Operations In King County

The Contractor is advised that King County may require the Contractor to meet any or all of the following listed conditions before considering issuance of a temporary permit for pit operations within King County:

1. Security fences and locking gates shall be installed where deemed necessary by the King County Department of Building. Cable or wire gates are not acceptable.

2. Hours of operation shall be limited to: 7:00 a.m. to 7:00 p.m.

3. Access roads shall be improved and maintained to the satisfaction of the King County Department of Public Works. A haul road agreement for County road maintenance may be required.

   All roads shall be swept, washed, or both, by the Contractor at the Contractor's expense as often as the Department of Building deems necessary.

   Property shall have functional access to an arterial level street.

4. All operations will have to be approved by King County Flood Control for drainage plans, Washington State Department of Ecology, and Puget Sound Air Pollution Control Authority.

   Those properties near or adjacent to any water body shall have written approval from the State of Washington Department of Fisheries.

   The Contractor shall obtain a mining reclamation permit from the State of Washington Department of Natural Resources for sites of over three acres in size of disturbed land or resulting in pit walls more than thirty feet high and steeper than one to one slope.

5. No stockpiling of foreign excavated material is permitted on the site except for those materials to be used in the land rehabilitation of the subject property.

6. No signs other than signs required by Chapter 24.42, King County Zoning Code are authorized as a result of the temporary permit.

7. Plans required:

   a. Scale of Plot Plans

Site Size:	less than 10 acres	1 inch = 50 feet
	10 to 100 acres	1 inch = 100 feet
	over 100 acres	1 inch = 200 feet

   b. Contours

   Show existing and proposed contours at 5-foot intervals. If existing and proposed contours are superimposed upon one another it must be clear as to which is which. Plans which incorporate a screening process may be required by the County to distinguish said contours.

   Finished contours must show how the property can be used under the existing zoning. Plans showing daylighting of property to road grade or below with high 2:1 slope walls will no longer be permitted within the R, S, or G zones. The plans must contain large terraces which will permit the lot sizes and roads that are permitted within the zone.

   c. Sections

   Show a minimum of two sections in each direction.

   d. Maximum Slope

   Cuts shall not be steeper in slope than two horizontal to one vertical unless the owner furnishes a soils engineering or an engineering geology report certifying that the site has been investigated and indicating that the proposed deviation will not endanger any private property or result in the deposition of debris on any public way or interfere with any existing drainage course.

   e. Fill Slopes

   No fill shall be made which creates an exposed surface steeper in slope than two horizontal to one vertical.

   f. Benches on Slopes

   There shall be a 10 foot wide bench sloped into the hillside for every 50 feet in height.

   g. Setbacks

Material and vegetation shall be left in its natural state:

50 feet from any FP, A, G, S, or R zoned property;

20 foot setback which includes a 6 foot high planted berm along any public right-of-way;

20 feet from M, B, or CG zoned property;

10 feet from QM or FR zoned property.

Plans shall show type of vegetation existing within the buffer zones.

h. Drainage

All drainage facilities shall be designed to carry surface waters to the nearest practical street, storm drain, or natural water-course. Adequate provision shall be made to prevent any surface waters from damaging the face of an excavation or fill. All slopes shall be protected from surface water runoff from above by berms or swales.

The Contractor is further advised that King County may require conditions which are in addition to the foregoing list and that the County may reject permit applications at its discretion because of the proposed operations proximity to schools, residential neighborhoods, hospitals, arterials, or for other environmental conditions.

When there are discrepancies between the requirements of the State and the County the more stringent specifications shall apply.

Should the Contractor fail to comply with any requirements of a temporary permit obtained in the Contracting Agency's name, the Contracting Agency will take the necessary action to meet these requirements and any costs incurred by the Contracting Agency will be deducted from monies due or to become due the Contractor.

State Furnished Material Sources

Section 3-01.3 is supplemented with the following:

(March 13, 1995)
The following source of stockpiled materials is made available at no cost to the Contractor:

Stockpile Site *** $$1$$, a source for $$2$$, *** is located in the *** $$3$$ of Section $$4$$, Township $$5$$ North, Range $$6$$, *** W.M., as shown in the Plans.

(June 26, 2000)
The following source of materials is made available at no cost to the Contractor:

*** $$1$$ Site $$2$$ *** a source for the production of *** $$3$$ *** is located in the *** $$4$$ of Section $$5$$, Township $$6$$ North, Range $$7$$ *** W.M., as shown in the Plans.

In the event that the Contractor proposes to provide these materials from another source, adjustment of quantities shall be made in accordance with Section 3-01.4(1). Such adjustment will be based on the relative specific gravity of the sources. A specific gravity of *** $$8$$ *** for the State-provided source will be used for comparative purposes. The comparative specific gravity of Contractor provided sources will be determined by AASHTO Test Method T-85 on the Saturated Surface Dry Basis by the Headquarters Materials Laboratory.

Payment

The second paragraph of Section 3-01.6 is supplemented with the following:

(June 03, 1996)
If the Contractor elects not to use the Contracting Agency furnished source(s) of material, the following items of work shall not be performed on this project.

*** $$1$$ ***.

If the Contractor submits unit price(s) in the amount of zero for the above item(s) of work that do not have an estimated amount included in the proposal, the Contracting Agency will accept the Contractor's proposal as being notice of the Contractor's intent not to utilize the Contracting Agency furnished source.

After execution of the contract, should the Contractor decide to utilize the source(s) furnished by the Contracting Agency, the Contractor will be permitted to do so, provided that for those items listed above for which zero has been entered on the proposal, the work required shall be performed at the Contractor's expense.

(March 13, 1995)
The Contractor is advised that while use of the Contracting Agency-furnished materials source(s) is not mandatory, the following items of work in *** $$1$$ Site $$2$$ *** must be performed:

*** $$3$$ ***

(March 13, 1995)
The use of *** $$1$$ Site $$2$$ *** is mandatory and that all work in the site shall be performed.

Stockpiling Aggregates

General Requirements

Removing Aggregates From Stockpiles

Section 3-02.2(7) is supplemented with the following:

(March 13, 1995)
Materials for use on this project are being produced and stockpiled under another contract. The material being produced is shown in the Plans as existing in stockpile at the following location:

*** $$1$$ ***

It is expected that the material will be available to the Contractor in ample time for the Contractor's use. However, any delay shall not constitute a claim by the Contractor against the Contracting Agency for additional compensation. Should the Contractor be delayed by reason of insufficient material in the stockpile, the Contractor will be granted an extension of time equal to the time actually lost by reason of such delay.

(March 13, 1995)
*** $$1$$ *** are existing in stockpiles at the location and in the amounts shown in the Plans.

The Contractor may obtain material from other sources provided they are approved by the Engineer and provided the Contractor makes all arrangements and pays all expenses required for the acquisition of the materials.

If the Contractor chooses to use the materials existing in stockpiles, the Contractor shall pay promptly to the Treasurer of *** $$2$$ *** County, as may come due, a sum owing at the rates specified below based on the quantity of materials allowed by the Engineer on the final or periodic estimates:

*** $$3$$ ***

Payment

Section 3-02.5 is supplemented with the following:

(March 13, 1995)
The unit contract price per cubic yard for *** $$1$$ *** shall be full pay for the purchase, loading, hauling, and placing of materials provided in stockpile or, if so chosen by the Contractor, for the furnishing, hauling, and placing of materials obtained by the Contractor from an approved source of the Contractor's own choice and acquisition.

Payment of money due the Contractor on the final estimate will not be made until the Engineer has furnished the Secretary of Transportation with a certificate to verify that all sums due *** $$2$$ *** from the Contractor for materials have been paid in full.

Site Reclamation

General Requirements

Contracting Agency-Provided Sites

Section 3-03.2(1) is supplemented with the following:

(March 13, 1995)
Site reclamation will be performed by the Contracting Agency on all sites furnished by the Contracting Agency.

Division 4
Bases

Ballast and Crushed Surfacing

Construction Requirements

Shaping and Compaction

Section 4-04.3(5) is supplemented with the following:

(March 13, 1995)
The top surface of the final lift of surfacing material on each mainline roadway shall be trimmed using a trimming machine that maintains grade and transverses slopes automatically, through sensors that respond to reference lines on both edges of each roadway.

The minimum width to be trimmed shall be the travelled way plus sufficient width for the treads of the paving machine.

The trimmed surface shall be smooth and uniform with no chatter or ripples.

Division 5
Surface Treatments and Pavements

Cement Concrete Pavement Rehabilitation

Description

Section 5-01.1 is supplemented with the following:

(September 7, 2021)
This work consists of repairing partial depth spalls using polyester concrete.

Materials

Section 5-01.2 is supplemented with the following:

(September 7, 2021)
Partial Depth Spall Repair – Polyester Concrete
The components of the polyester concrete including the polyester resin binder, aggregate, and high molecular weight methacrylate resin surface primer shall be provided through a single system provider.

Polyester Resin Binder
Polyester resin binder shall be an unsaturated isophthalic polyester-styrene co-polymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77°F, RVT No. 1 spindle)	ASTM D2196
Specific Gravity:	1.05 to 1.10 at 77°F	ASTM D1475
Styrene Content:	40% to 50% by weight of polyester styrene resin	ASTM D2369

The hardened resin shall conform to the following requirements:

Elongation:	35% minimum, type I specimen, thickness 0.25" ± 0.03", Rate – 0.45 in./min.	ASTM D638
Tensile Strength:	2,500 psi minimum, type I specimen thickness 0.25" ± 0.03", Rate – 0.45 in./min.	ASTM D 638
Conditioning:	18 hours/77°F/50% + 5 hours/158°F	ASTM D618
Silane Coupler:	1.0% minimum (by weight of polyester-styrene resin)	

The silane coupler shall be an organosilane ester, gamma-methacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP and CHP initiators shall be used as recommended by the manufacturer.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance.

High Molecular Weight Methacrylate (HMWM) Resin

HMWM resin shall be wax-free, low odor and consist of a resin, initiator and promotor conforming to the following requirements:

Viscosity	<25 cps (Brookfield RVT with UL adaptor, 50 rpm at 77°F)	ASTM D2196
Flash Point:	180°F minimum	ASTM D3278
Tack-Free Time:	400 minutes maximum	California Test 551
SSD Bond Strength	700 PSI minimum at 24 hours and 70 ± 1°F	California Test 551
Specific Gravity	0.90 minimum at 77°F	ASTM D1475
Volatile Content	30 percent, maximum.	ASTM D2369
Vapor Pressure	0.04 inches Hg, maximum at 77°F	ASTM D323

The promoter/initiator system for the methacrylate resin shall consist of a metal drier and peroxide.

If supplied separately from the resin, the drier shall not be mixed directly with the peroxide. The containers shall not be stored in a manner that allows leakage or spilling to contact the containers or materials of the other.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance.

Aggregate
The aggregate shall be thoroughly washed and kiln dried.

The aggregate for polyester concrete shall meet the requirements of Section 9-03.1 except that ASR mitigation will not apply to aggregate for polyester concrete. Polyester concrete aggregate shall conform to the following requirements for gradation:

Sieve Size	Percent Passing	
	Gradation 1	Gradation 2
½"		100
⅜"	100	83-100
#4	62-85	65-82
#8	45-67	45-65
#16	29-50	27-48
#30	16-36	12-30
#50	5-20	6-17
#100	0-7	0-7
#200	0-3	0-3
All percentages are by weight.		

The combined aggregate shall have a maximum of 45 percent crushed particles.

The surface of the aggregate shall be dry and the absorption shall not exceed 1.0. The moisture content of the combined aggregate shall not exceed one-half of the aggregate absorption when tested in accordance with AASHTO T255. The aggregate temperature shall be between 40°F and 100°F at the time of mixing.

Sand for Abrasive Finish
The sand for abrasive finish shall be commercial quality blast sand having at least 95 percent passing the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested in accordance with AASHTO T 27. The moisture content of the sand shall not exceed 0.5 percent.

Construction Requirements

Partial Depth Spall Repair

Section 5-01.3(5) is supplemented with the following:

(September 7, 2021)
Partial Depth Spall Repair - Polyester Concrete
Manufacturer's Technical Representative
The Contractor shall have the services of a qualified polyester concrete manufacturer's technical representative physically present at the job site during the first shift of polyester concrete placement. The manufacturer's technical representative shall assist the Contractor in training the Contractor's personnel and providing technical assistance in preparing the concrete surface, applying

primer, and mixing, placing, and curing the polyester concrete. If the polyester concrete Work is unsatisfactory, or additional training or technical assistance is needed the Contractor shall have the services of the manufacturer's at the job site for additional time as deemed necessary by the Engineer to correct the deficiency.

Mix Design

Polyester concrete shall be composed of a polyester resin binder and aggregate. The Contractor shall prepare and submit a Type 1 Working Drawing consisting of the polyester concrete mix proportions and mixing procedure. The polyester resin binder in the polyester concrete shall be between 11 to 13 percent by weight of the dry aggregate. The mix design shall include the proportion of polyester resin binder as a percentage of the dry weight of aggregate, the approximate set time and time for opening to traffic for the temperature ranges expected during polyester concrete placement.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, and quantity. Each shipment shall be accompanied by a Safety Data Sheet (SDS) for each component of the resin binder.

The material shall be stored in accordance with the manufacturer's recommendations.

Surface Preparation

Removal of the existing pavement shall not damage any pavement to be left in place. Any existing pavement that is to remain that has been damaged shall be repaired at the Contractor's expense. If jackhammers are used for removing pavement, they shall not weigh more than 30 pounds, and chipping hammers shall not weigh more than 15 pounds. All power driven hand tools used for the removal of pavement shall be operated at angles less than 45 degrees as measured from the surface of the pavement to the tool. The patch limits shall extend beyond the spalled area a minimum of 3 inches. Repair areas shall be kept square, rectangular or circular. Repair areas that are within 12 inches of another repair area shall be combined.

A vertical cut shall be made to a minimum depth of 2 inches around the perimeter to be patched using a saw or core drill as marked by the Engineer. The Contractor shall remove material within the perimeter of the saw cut to a depth of 2 inches, or to sound concrete as determined by the Project Engineer.

The concrete surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the polyester concrete. The surfaces to receive the polyester concrete shall be sand blasted and all loose material removed. All sandblasting residue shall be removed.

Spall repair shall not be done in areas where dowel bars are encountered.

When a partial depth repair is placed directly against an adjacent longitudinal joint, a bond-breaking material such as polyethylene film, roofing paper, or other

material as accepted by the Engineer shall be placed between the existing concrete and the area to be patched.

Working transverse joints or cracks adjacent to or within the repair area require placement of a compressible insert. The new joint or crack shall be formed to the same width as the existing joint or crack. The compressible joint material shall be placed into the existing joint 1 inch below the depth of repair. The compressible insert shall extend at least 3 inches beyond each end of the patch boundaries.

Patches that abut the Lane/Shoulder joint require placement of a formed edge, along the slab edge, even with the surface.

If the concrete surfaces become contaminated, the contaminated areas shall be re-cleaned by abrasive blasting at the Contractor's expense.

Precautions shall be taken to ensure that no dust or debris leaves the roadway and that all traffic is protected from rebound and dust. Appropriate shielding shall be provided as required at no additional cost to the Contracting Agency and shall be approved by the Engineer. The Contractor shall reseal all joints in accordance with Section 5-05.3(8)B.

Application of Prime Coat

Application of the prime coat and the polyester concrete shall not begin if rain is forecast within 12-hours of completion of the Work. The area receiving the prime coat shall be dry and had no rain within the past 12 hours. Immediately prior to applying the prime coat, loose material shall be removed using oil and moisture free compressed air.

The concrete surface shall be between 40°F and 100°F when applying the prime coat.

The Contractor shall apply a prime coat consisting of one coat of promoted/initiated wax-free HMWM resin to the prepared concrete and steel surfaces immediately before placing the polyester concrete.

The prime coat shall be worked into the concrete in a manner to assure complete coverage of the area receiving polyester concrete.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and re-primed.

The prime coat shall not be allowed to run into drainage structures, joints or working cracks.

Mixing Components

The components of the polyester resin binder shall be thoroughly blended just prior to mixing with the aggregate. The polyester concrete shall be thoroughly mixed prior to placing.

The Contractor shall prevent any cleaning chemicals from reaching the polyester concrete mix during the mixing operations.

Polyester Concrete Placement
Under no circumstances shall any polyester resin or polyester concrete be allowed to run into drainage structures, joints or working cracks.

Place polyester concrete within two hours of placing the HMWM prime coat.

Polyester concrete shall be placed within 15 minutes following initiation. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area receiving the polyester concrete shall be the same as specified above for the HMWM prime coat.

The polyester concrete shall be consolidated in accordance with the manufacturer's recommendations.

Finished Polyester Concrete Surface
All repair areas shall be struck off level with the adjacent concrete. Forms shall be coated with suitable bond release agent to permit ready release of forms.

Sand for abrasive finish shall be broadcast onto surface to uniformly cover any smooth or glossy areas immediately after finishing and before resin gelling occurs. The completed surface shall be free of any smooth or glossy areas. After the polyester concrete has cured, any smooth or glossy areas shall be repaired by the Contractor in the manner recommended by the System Provider and approved by the Engineer at no additional cost. The surface texture of polyester concrete shall be uniform and impervious to moisture.

Curing
The polyester concrete shall be cured in accordance with the manufacturer's recommendations. The Contractor shall measure the compressive strength of the cured polyester concrete with a rebound hammer in accordance with ASTM C 805. Traffic and equipment shall not be permitted on the polyester concrete until it achieves a compressive strength of 2,500 psi based on the rebound hammer manufactures correlation of rebound number to compressive strength for the rebound hammer used.

Cement Concrete Pavement Grinding

Section 5-01.3(9) is supplemented with the following:

(April 1, 2013)
The Contractor shall grind a test section 1500 foot long across the full width of a lane for evaluation by the Engineer to determine if the Work meets the Specifications. If the Specifications have been met the Contractor may proceed with the remaining cement concrete pavement grinding. If the Specifications have not been met, the Contractor shall make adjustments and another test section shall be completed.

Bituminous Surface Treatment

Construction Requirements

Application of Emulsified Asphalt and Aggregate

Section 5-02.3(3) is supplemented with the following:

(August 5, 2013)
The grades of emulsified asphalt to be used for New Construction bituminous surface treatments shall be *** $$1$$ *** for the first application and *** $$2$$ *** for the second application.

(August 5, 2013)
The grade of emulsified asphalt to be used for bituminous surface treatment Seal Coats shall be *** $$1$$. ***.

Measurement

Section 5-02.4 is supplemented with the following:

(March 13, 1995)
The additional cost involved in the construction of bituminous surface treatment for road approach will be measured per each for each road approach treated, regardless of location, length, width or design.

Payment

Section 5-02.5 is supplemented with the following:

(February 5, 2001)
"Bituminous Surface Treatment For Road Approach", per each.
The unit contract price per each for "Bituminous Surface Treatment For Road Approach" shall be in addition to payments made for the mineral aggregate and asphalt.

(August 5, 2013)
CRS-2P Cost Price Adjustment
The Contracting Agency will make a CRS-2P Cost Price Adjustment, either a credit or a payment, for qualifying changes in the reference cost of asphalt binder. The adjustment will be applied to partial payments made according to Section 1-09.9 for the following bid items when they are included in the proposal:

"Emulsified Asphalt CRS-2P"

The adjustment is not a guarantee of full compensation for changes in the cost of emulsified asphalt CRS-2P. The Contracting Agency does not guarantee that emulsified asphalt CRS-2P will be available at the reference cost.

The Contracting Agency will establish the asphalt binder reference cost twice each month and post the information on the Agency website at: https://wsdot.wa.gov/business-wsdot/contracts/about-public-works-contracts/payments-reporting/asphalt-binder-reference-cost. The reference cost will be determined using posted prices furnished by Poten & Partners, Inc. If the selected price source ceases to be available for any reason, then the Contracting Agency will select a substitute price source to establish the reference cost.

The base cost established for this contract is the reference cost posted on the Agency website for the period immediately preceding the bid opening date.

Adjustments will be based on the most current reference cost for Western Washington or Eastern Washington as posted on the Agency website, depending on where the work is performed. For work completed after all authorized working days are used, the adjustment will be based on the posted reference cost during which contract time was exhausted. The adjustment will be calculated as follows:

No adjustment will be made if the reference cost is within 5% of the base cost.

If the reference cost is greater than or equal to 105% of the base cost, then
Adjustment = (Current Reference Cost – (1.05 x Base Cost)) x (Q x 0.65).

If the reference cost is less than or equal to 95% of the base cost, then
Adjustment = (Current Reference Cost – (0.95 x Base Cost)) x (Q x 0.65).

Where Q = total tons of Emulsified Asphalt CRS-2P paid in the current month's progress payment.

"CRS-2P Cost Price Adjustment", by calculation.

"CRS-2P Cost Price Adjustment" will be calculated and paid for as described in this section. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the total bid by the Contractor.

(January 3, 2017)

AC-15P Cost Price Adjustment

The Contracting Agency will make an AC-15P Cost Price Adjustment, either a credit or a payment, for qualifying changes in the reference cost of asphalt binder. The adjustment will be applied to partial payments made according to Section 1-09.9 for the following bid items when they are included in the proposal:

"Modified Asphalt Cement AC-15P"

The adjustment is not a guarantee of full compensation for changes in the cost of modified asphalt cement AC-15P. The Contracting Agency does not guarantee that modified asphalt cement AC-15P will be available at the reference cost.

The Contracting Agency will establish the asphalt binder reference cost twice each month and post the information on the Agency website at: https://wsdot.wa.gov/business-wsdot/contracts/about-public-works-contracts/payments-reporting/asphalt-binder-reference-cost. The reference cost will be determined using posted prices furnished by Poten & Partners, Inc. If the selected price source ceases to be available for any reason, then the Contracting Agency will select a substitute price source to establish the reference cost.

The base cost established for this contract is the reference cost posted on the Agency website for the period immediately preceding the bid opening date.

Adjustments will be based on the most current reference cost for Western Washington or Eastern Washington as posted on the Agency website, depending on where the work is performed. For work completed after all authorized working days are used, the adjustment will be based on the posted reference cost during which contract time was exhausted. The adjustment will be calculated as follows:

No adjustment will be made if the reference cost is within 5% of the base cost.

If the reference cost is greater than or equal to 105% of the base cost, then Adjustment = (Current Reference Cost – (1.05 x Base Cost)) x Q .

If the reference cost is less than or equal to 95% of the base cost, then Adjustment = (Current Reference Cost – (0.95 x Base Cost)) x Q .

Where Q = total tons of Modified Asphalt Cement AC-15P paid in the current month's progress payment.

"AC-15P Cost Price Adjustment", by calculation.

"AC-15P Cost Price Adjustment" will be calculated and paid for as described in this section. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the total bid by the Contractor.

Hot Mix Asphalt

Materials

How to Get an HMA Mix Design on the QPL

Mix Designs Containing RAP and/or RAS

High RAP/Any RAS – Mix Design Submittals for Placement on QPL

Section 5-04.2(1)A2 is revised to read:

(April 27, 2022)
For High RAP/Any RAS mix designs, comply with the following additional requirements:

1. All RAS will be manufactured waste RAS only.

2. For mix designs with any RAS, test the RAS stockpile (and RAP stockpile if any RAP is in the mix design) in accordance with Table 3.

3. For High RAP mix designs with no RAS, test the RAP stockpile in accordance with Table 3.

4. For mix designs with High RAP/Any RAS, construct a single stockpile for RAP and a single stockpile for RAS and isolate (sequester) these stockpiles from further stockpiling before

beginning development of the mix design. Test the RAP and RAS during stockpile construction as required by item 1 and 2 above. Use the test data in developing the mix design and report the test data to the Contracting Agency on WSDOT Form 350-042 as part of the mix design submittal for approval on the QPL. Account for the reduction in asphalt binder contributed from RAS in accordance with AASHTO PP 78. Do not add RAP or RAS to the sequestered stockpiles after starting the mix design process, unless measures have been taken:

a. Test samples of the RAP or RAS to be added to the sequestered stockpile in accordance with Table 3. A minimum of 5 tests of the RAP or RAS will be required each time additional material is added to the sequestered stockpiles.

b. Evaluate and compare the test results from Section 4a to the results from the original sequestered stockpile properties from the mix design. Develop a written plan defining how the RAP/RAS will be incorporated into the sequestered stockpile without materially changing the binder grade or aggregate gradation properties of the sequestered stockpile. Submit the test results and incorporation plan to the Engineer for approval.

Table 3	**Test Frequency of RAP/RAS During RAP/RAS Stockpile Construction for Approving a High RAP/Any RAS Mix Design for Placement on the QPL**	
Test Frequency[1]	**Test for**	**Test Method**
1/1000 tons of RAP (minimum of 10 per mix design) and 1/100 tons of RAS (minimum of 10 per mix design)	Asphalt Binder Content and Sieve Analysis of Fine and Coarse Aggregate	FOP for AASHTO T 308 and FOP for AASHTO T 30
1/400 tons of RAS (minimum of 5 per mix design)	Asbestos content <0.1%	PLM Test Method EPA/600/R-93/116 (1000 Point Count) See Section 9-03.21(1)A
1/200 tons of RAS (minimum of 5 per mix design)	Asbestos Containing Material (ACM) <1.0%	PLM Test Method EPA/600/R-93/116 See Section 9-03.21(1)A
[1]"tons", in this table, refers to tons of the reclaimed material before being incorporated into HMA.		

5. Limit the amount of RAP and/or RAS used in a High RAP/Any RAS mix design by the amount of binder contributed by the RAP and/or RAS, in accordance with Table 4.

Table 4	**Maximum Amount of RAP and/or RAS in HMA Mixture**
Maximum Amount of Binder Contributed from:	

RAP	RAS
40%[1] minus contribution of binder from RAS	20%[2]
[1]Calculated as the weight of asphalt binder contributed from the RAP as a percentage of the total weight of asphalt binder in the mixture. [2]Calculated as the weight of asphalt binder contributed from the RAS as a percentage of the total weight of asphalt binder in the mixture.	

6. Develop the mix design including RAP, RAS, recycling agent, and new binder.

7. Extract, recover, and test the asphalt residue from the RAP and RAS stockpiles to determine the percent of recycling agent and/or grade of new asphalt binder needed to meet but not exceed the performance grade (PG) of asphalt binder required by the Contract.

    a. Perform the asphalt extraction in accordance with AASHTO T 164 or ASTM D 2172 using reagent grade solvent.

    b. Perform the asphalt recovery in accordance with AASHTO R 59 or ASTM D 1856.

    c. Test the recovered asphalt residue in accordance with AASHTO R 29 to determine the asphalt binder grade in accordance with Section 9-02.1(4).

    d. After determining the recovered asphalt binder grade, determine the percent of recycling agent and/or grade of new asphalt binder in accordance with ASTM D 4887.

    e. Test the final blend of recycling agent, binder recovered from the RAP and RAS, and new asphalt binder in accordance with AASHTO R 29. The final blended binder shall meet but not exceed the performance grade of asphalt binder required by the Contract and comply with the requirements of Section 9-02.1(4).

8. Include the following test data with the mix design submittal:

    a. All test data from RAP and RAS stockpile construction.

    b. A Safety Data Sheet (SDS) and documentation that no asbestos has been added during production of the manufactured waste shingles as detailed in Section 9-03.21(1).

    c. All data from testing the recovered and blended asphalt binder.

9. Include representative samples of the following with the mix design submittal:

a. RAP and RAS.

b. 150 grams of recovered asphalt residue from the RAP and RAS that are to be used in the HMA production.

Mix Design – Obtaining Project Approval

Section 5-04.2(2) is supplemented with the following:

(January 3, 2011)
ESAL's
The number of ESAL's for the design and acceptance of the HMA shall be *** $$1$$ *** million.

HMA Tolerances, Specification Limits and Adjustments

The second paragraph of item number 1 of Section 9-03.8(7) is revised to read:

(September 8, 2020)
These tolerance and specification limits constitute the allowable limits as described in Section 1-06.2. The tolerance limit for aggregate shall not exceed the limits of the control points, except the No. 8 tolerance is ± 4% from the JMF, the No. 200 tolerance is ± 2.0% from the JMF with a minimum of 2% and a maximum of 8.0% passing the No. 200 sieve, other tolerance limits for sieves designated as 100 percent passing will be 99-100.

Reclaimed Asphalt Shingles

Section 9-03.21(1)A, including title, is revised to read:

(April 27, 2022)
Recycled Asphalt Shingles
Recycled asphalt shingles shall be manufactured waste shingles and shall be non-asbestos containing material (ACM) as defined in 40 CFR 61 Subpart M and tested in accordance with 40 CFR part 763, subpart E, appendix E, Section 1, Polarized Light Microscopy (PLM) Test Method EPA/600/R-93/116 by a certified testing laboratory. The PLM Test Method to determine ACM content will be the standard PLM Test Method to determine ACM less than 1.0%. Additionally, the PLM 1000 Point Count Test Method to determine asbestos less than 0.1% is required. At a minimum, the laboratory testing for asbestos content will be certified by one or more the following: National Voluntary Laboratory Accreditation Program (NVLAP), American Industrial Hygiene Association IH Laboratory Accreditation, or Washington State Department of Ecology for analysis of asbestos in bulk material. The Contractor shall keep all ACM and asbestos test results on file and provide copies to the Engineer when submitting a HMA mix design for approval in accordance with Section 5-04. The Contractor shall provide the testing and certification for toxicity characteristics in accordance with Section 9-03.21(1) prior to delivery and placement of the recycled asphalt shingles and use of the RAS in HMA. The Contractor shall also provide a Safety Data Sheet (SDS) of the RAS specifically detailing all ingredients of the manufactured waste shingles. The ingredients list needs to include the amount of asbestos as well as all types of fibrous materials.

Construction Requirements

Section 5-04.3 is supplemented with the following:

(January 3, 2017)
The expected percentage of new asphalt binder in the HMA is *** $$1$$ ***. Should the actual percentage of new asphalt binder required by the job mix formula for HMA produced with Agency-provided aggregate vary by more than plus or minus 0.3-percent an adjustment in payment will be made. The adjustment in payment (plus or minus) will be based on the invoice cost to the Contractor. When RAP and/or RAS are used in the production of HMA the adjustment will be reduced by the percentage of RAP and/or RAS asphalt binder. No adjustment will be made when the Contractor elects not to use a Contracting Agency provided source.

Weather Limitations

The first sentence of Section 5-04.3(1) is revised to read:

(August 3, 2009)
HMA for wearing course shall not be placed on any travelled way from *** $$1$$ *** and through March 31st of the following year without written approval from the Engineer.

Equipment

Pavers

Section 5-04.3(3)C is supplemented with the following:

(April 4, 2016)
Reference lines will be required for both outer edges of the traveled way for each mainline roadway for vertical control in accordance with Section 5-04.3(3)C.

Material Transfer Device or Material Transfer Vehicle

(April 4, 2016)
Section 5-04.3(3)D is deleted in its entirety.

Section 5-04.3(3)D including title is revised to read:

(August 1, 2011)
Material Transfer Vehicle
Direct transfer of HMA from the hauling equipment to the paving machine will not be allowed in the top 0.30-feet of the pavement section of hot mix asphalt (HMA) used in traffic lanes with a depth of 0.08-feet or greater. A material transfer vehicle (MTV) shall be used to deliver the HMA from the hauling equipment to the paving machine. HMA placed in irregularly shaped and minor areas such as road approaches, tapers, and turn lanes are excluded from this requirement.

The MTV shall mix the HMA after delivery by the hauling equipment and prior to lay down by the paving machine. Mixing of the HMA shall be sufficient to obtain a uniform temperature throughout the mixture

HMA Mixture Acceptance

Section 5-04.3(9) is supplemented with the following:

(August 1, 2016)
Visual Evaluation
The following HMA will be accepted by visual evaluation:

*** $$1$$ ***

HMA Compaction Acceptance

The column in Table 14 of Section 5-04.3(10), titled “Statistical Evaluation of HMA Compaction is Required for”, is supplemented with the following:

(April 3, 2017)
- Any HMA for which the specified course thickness is greater than 0.10 feet and the HMA is placed in the shoulder.

HMA Compaction – Visual Evaluation

The last sentence in Section 5-04.3(10)D is revised to read:

(April 4, 2016)
HMA that is used for preleveling shall be compacted with a pneumatic tire roller unless otherwise approved by the Engineer.

Joints

Section 5-04.3(12) is supplemented with the following:

(January 5, 2004)
The HMA overlay shall be feathered to produce a smooth riding connection to the existing pavement.

HMA utilized in the construction of the feathered connections shall be modified by eliminating the coarse aggregate from the mix at the Contractor's plant or the commercial source or by raking the joint on the roadway, to the satisfaction of the Engineer.

Surface Smoothness

The first four paragraphs of Section 5-04.3(13) are revised to read:

(January 5, 2015)
Pavement surface smoothness for this project will include International Roughness Index (IRI) testing that will be completed by the Contracting Agency. The Contracting Agency will perform the IRI testing on each through lane, climbing lane, and passing

lane, greater than one mile in length and these lanes will be subject to incentive/disincentive adjustments. IRI testing for a lane will be reported every 0.01 mile by averaging the IRI data for the left and right wheelpath within the section.

Bridge approaches and bridge decks that are located within the lanes specified to be tested and are paved with HMA will be included in the IRI testing. Bridge structures, approach slabs and 0.02 miles on either side of the bridge structures and approach slabs will be eligible for price adjustment incentives and excluded from disincentive adjustments.

Ramps, shoulders and tapers will not be included in IRI testing for pavement smoothness and will not be subject to incentive adjustments. They will be subject to parallel and transverse 10-foot surface requirements, corrective work and disincentive adjustments.

Upon completion of the paving operation the Contractor shall notify the Engineer that the roadway is ready for IRI testing. Notification shall not take place until the following conditions are met for all lanes to be tested on the project:

1. All lanes are open to traffic, unrestricted and in their final configuration.

2. All permanent pavement markings are in place or temporary pavement markings to the satisfaction of the Engineer.

If requested by the Engineer the Contractor shall sweep the roadway immediately prior to testing. If the sweeping is needed as a result of the Contractor's operation it shall be the responsibility and expense of the Contractor. Should the Contracting Agency not be able to complete the testing as a result of the Contractor's Work the testing will be rescheduled and any additional costs to the Contracting Agency will be deducted from monies due or that may become due the Contractor.

It is the intent that the testing will be completed and the results provided to the Contractor within 30 calendar days of the Contractor's notification that the roadway is ready for testing. If weather or other conditions exist which are determined by the Engineer to be unsuitable for IRI testing of the pavement then the testing will be deferred until favorable conditions are available and the 30 calendar days extended.

Provided that all other Work required for Substantial Completion has been completed; the day following the Contractor's notification that the roadway is ready for IRI testing through the day the IRI data is provided to the Contractor will be nonworking days in accordance with Section 1-08.5.

Corrective work for pavement smoothness may be taken by the Contractor prior to IRI testing. After completion of the IRI testing the Contractor shall measure the smoothness of each 0.01 mile section with an IRI greater than 125 with a 10-foot straightedge within 14 calendar days or as approved by the Engineer. The Contractor shall identify all locations that require corrective work and provide the straight edge measurements at each location that exceeds the allowable limit to the Engineer. If all measurements in a 0.01 section comply with the smoothness requirements the Contractor shall provide the maximum measurement to the Engineer and a statement that corrective work is not required. Unless approved by

the Engineer, corrective work shall be taken by the Contractor for pavement identified by the Contractor or Engineer that does not meet the following requirements:

1. The completed surface of all courses shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds.

2. The completed surface of the wearing course shall not vary more than ⅛ inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline.

3. The completed surface of the wearing course shall vary not more than ¼ inch in 10 feet from the rate of transverse slope shown in the Plans.

All corrective work shall be completed at no additional expense, including traffic control, to the Contracting Agency. Pavement shall be repaired by one or more of the following methods:

1. Diamond grinding; repairs shall not reduce pavement thickness by more than ¼ inch.

2. Removal and replacement of the HMA wearing course.

3. By other method approved by the Engineer.

For repairs following IRI testing the repaired area shall be checked by the Contractor with a 10-foot straightedge to ensure it no longer requires corrective work. With approval of the Engineer a lightweight profiler, California profilograph or other device may be used in place of the 10-foot straight edge.

If correction of the roadway as listed above either will not or does not produce satisfactory results as to smoothness or serviceability the Engineer may accept the completed pavement and a credit will be calculated in accordance with Section 5-04.5(1). Under these circumstances the decision whether to accept the completed pavement or to require corrective work as described above shall be vested entirely in the Engineer.

During the last review of this roadway, which was conducted on *** $$1$$ ***, by the Contracting Agency the following IRI (inches/mile) values were obtained. The IRI values are informational only and are average IRI values for 0.10 mile sections. Additional information may be available for review at the Engineer's Office.

***

SR	Begin Milepost	End Milepost	IRI Running Avg NB/EB (Inch/mile)	IRI Running Avg SB/WB (Inch/mile)
$$2$$	$$3$$	$$4$$	$$5$$	$$6$$

***

The second sentence of Section 5-04.3(13) is deleted and replaced with the following:

(March 13, 1995)
The completed surface of the wearing course of the following sections of Roadway shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline:

1. *** $$1$$ ***

The completed surface of the wearing course of all other sections of Roadway shall not vary more than 1/8 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline.

The second sentence of Section 5-04.3(13) is revised to read:

(January 5, 2004)
The completed surface of the wearing course shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to centerline.

Planing Bituminous Pavement

Section 5-04.3(14) is supplemented with the following:

(January 5, 2004)
The Contractor shall perform the planing operations no more than *** $$1$$ *** calendar days ahead of the time the planed area is to be paved with HMA, unless otherwise allowed by the Engineer in writing.

(January 5, 2004)
At the start of the planing operation the Contractor shall plane a 500 foot test section to be evaluated by the Engineer for compliance with the surface tolerance requirements. The test section shall have a minimum width of 10 feet. If the planing is in accordance with the surface tolerance requirements, the Contractor may begin production planing. If the planing is not in conformance with the surface tolerance requirements, the Contractor shall make adjustments to the planing operation and then plane another test section.

If at any time during the planing operation the Engineer determines the required surface tolerance is not being achieved, the Contractor shall stop planing. Planing shall not resume until the Engineer is satisfied that specification planing can be produced or until successful completion of another test section. The forward speed during production planing shall not exceed the speed used for the test section.

The completed surface after planing and prior to paving shall not vary more than 1/4 inch from the lower edge of a 10-foot straightedge placed on the surface parallel or transverse to the centerline. The planed surface shall have a matted texture and the difference between the high and low of the matted surface shall not exceed 1/8 inch.

Pavement repair operations, when required, shall be accomplished prior to planing.

(March 13, 1995)
Vertical Edge Planing
During planing of bituminous pavement in the travelled lanes, the Contractor shall coordinate the planing and paving operations such that the planed roadway surface shall not remain unpaved at the end of the work day. The Contractor shall have a contingency plan to ensure that no planed areas remain unpaved due to equipment breakdown or other emergency.

(August 3, 2009)
Beveled Edge Planing
A beveled edge shall be constructed in areas that will not be paved during the same work shift.

The Contractor shall use a beveled cutter on the mandrel of the planing equipment, or other approved method(s), to eliminate the vertical edge(s). The beveled edge(s) shall be constructed at a 4:1 slope.

Payment

Section 5-04.5 is supplemented with the following:

(January 5, 2015)
"Smoothness Compliance Adjustment" by calculation.

Smoothness Compliance Adjustments

Section 5-04.5(1) is supplemented with the following:

Smoothness Compliance Adjustments will be based on the requirements in Section 5-04.3(13) and the following calculations:

1. Final IRI acceptance and incentive/disincentive payments for pavement smoothness will be calculated on an IRI value per 0.10 mile in accordance with the price adjustment schedule.

    a. For sections of a lane that are a minimum of 0.01 mile and less than 0.10 mile, the price adjustment will be calculated using the average of the 0.01 mile IRI values and the price adjustment prorated for the length of the section.

    b. For bridges, approach slabs and 0.02 miles on either side the price adjustment will be calculated independently from other measured lanes.

    c. IRI values per 0.01 miles that were measured prior to corrective work will be included in the 0.10 mile price adjustment for sections with corrective work.

2. A smoothness compliance adjustment will be calculated in the sum of minus $250.00 for each and every section of single traffic lane 0.01 miles

in length in that does not meet the 10-foot straight edge requirements in Section 5-04.3(13).

The price adjustment schedule for this contract shall be *** $$1$$ ***.

Price Adjustment Schedule

IRI for each 0.10 mi. section	Pay Adjustment Schedule 1	Pay Adjustment Schedule 2	Pay Adjustment Schedule 3
in. / mi.	**$ / 0.10 mi.**	**$ / 0.10 mi.**	**$ / 0.10 mi.**
< 30	600	600	600
30	600	600	600
31	580	580	580
32	560	560	560
33	540	540	540
34	520	520	520
35	500	500	500
36	480	480	480
37	460	460	460
38	440	440	440
39	420	420	420
40	400	400	400
41	380	380	380
42	360	360	360
43	340	340	340
44	320	320	320
45	300	300	300
46	280	280	280
47	260	260	260
48	240	240	240
49	220	220	220
50	200	200	200
51	180	180	180
52	160	160	160
53	140	140	140
54	120	120	120
55	100	100	100
56	80	80	80
57	60	60	60
58	40	40	40
59	20	20	20
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0	0	0
65	0	0	0
66	-20	0	0
67	-40	0	0

68	-60	0	0
69	-80	0	0
70	-100	0	0
71	-120	0	0
72	-140	0	0
73	-160	0	0
74	-180	0	0
75	-200	0	0
76	-220	-20	0
77	-240	-40	0
78	-260	-60	0
79	-280	-80	0
80	-300	-100	0
81	-320	-120	0
82	-340	-140	0
83	-360	-160	0
84	-380	-180	0
85	-400	-200	0
86	-420	-220	0
87	-440	-240	0
88	-460	-260	0
89	-480	-280	0
90	-500	-300	0
91	-520	-320	0
92	-540	-340	0
93	-560	-360	0
94	-580	-380	0
95	-600	-400	0
96	-620	-420	0
97	-640	-440	0
98	-660	-460	0
99	-680	-480	0
100	-700	-500	0
101	-720	-520	0
102	-740	-540	0
103	-760	-560	0
104	-780	-580	0
105	-800	-600	0
106	-820	-620	0
107	-840	-640	0
108	-860	-660	0
109	-880	-680	0
110	-900	-700	0
111	-920	-720	0
112	-940	-740	0
113	-960	-760	0
114	-980	-780	0
115	-1000	-800	0
116	-1020	-820	0
117	-1040	-840	0

118	-1060	-860	0
119	-1080	-880	0
120	-1100	-900	0
121	-1120	-920	0
122	-1140	-940	0
123	-1160	-960	0
124	-1180	-980	0
≥125	-1200	-1000	0

(January 13, 2021)

Asphalt Cost Price Adjustment

The Contracting Agency will make an Asphalt Cost Price Adjustment, either a credit or a payment, for qualifying changes in the reference cost of asphalt binder. The adjustment will be applied to partial payments made according to Section 1-09.9 for the following bid items when they are included in the proposal:

"HMA Cl. ___ PG ___"
"HMA for Approach Cl. ___ PG ___"
"HMA for Preleveling Cl. ___ PG ___"
"HMA for Pavement Repair Cl. ___ PG ___"
"Commercial HMA"

The adjustment is not a guarantee of full compensation for changes in the cost of asphalt binder. The Contracting Agency does not guarantee that asphalt binder will be available at the reference cost.

The Contracting Agency will establish asphalt binder reference costs twice each month and post the information on the Agency website at: https://wsdot.wa.gov/business-wsdot/contracts/about-public-works-contracts/payments-reporting/asphalt-binder-reference-cost. The reference cost will be determined using posted prices furnished by Poten & Partners, Inc. If the selected price source ceases to be available for any reason, then the Contracting Agency will select a substitute price source to establish the reference cost.

Price adjustments will be calculated one time per month. No price adjustment will be made if the Current Reference Cost is within +/-5% of the Base Cost. Reference costs for projects located in Eastern versus Western Washington shall be selected from the column in the WSDOT website table labeled "Eastern", or "Western", accordingly. The adjustment will be calculated as follows:

If the reference cost is greater than or equal to 105% of the base cost, then
Asphalt Cost Price Adjustment = (Current Reference Cost – (1.05 x Base Cost)) x (Q x 0.056).

If the reference cost is less than or equal to 95% of the base cost, then
Asphalt Cost Price Adjustment = (Current Reference Cost – (0.95 x Base Cost)) x (Q x 0.056).

Where: **Current Reference Cost** is selected from the website table based on the "Date Effective" that immediately precedes the current month's

progress estimate end date. For work completed after all authorized working days are used, the adjustment will be based on the posted reference cost during which contract time was exhausted.

Base Cost is selected from the website table based on the "Date Effective" that immediately precedes the contract bid opening date, and shall be a constant for all monthly adjustments.

Q = total tons of all classes of HMA paid in the current month's progress payment.

"Asphalt Cost Price Adjustment", by calculation.
"Asphalt Cost Price Adjustment" will be calculated and paid for as described in this section. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the total bid by the Contractor.

(April 4, 2016)
"Asphalt Binder Revision" by calculation.
"Asphalt Binder Revision" shall be calculated and paid for as described in Section 5-04.3.

Cement Concrete Pavement

Description

Section 5-05.1 is supplemented with the following:

(August 6, 2012)
This Work consists of furnishing and placing pigmented, textured, or textured and pigmented cement concrete pavement at the locations and depth as shown in the Plans.

Materials

Section 5-05.2 is supplemented with the following:

(August 6, 2012)
Pigment color for cement concrete pavement shall be one chosen from the manufactures and colors listed below:

*** $$1$$ ***

The pigment shall be incorporated in accordance with the manufacturer's recommendations.

Construction Requirements

Section 5-05.3 is supplemented with the following:

(August 6, 2012)
Pigmented Cement Concrete
Curing shall be in accordance with Section 5-05.3(13) and be applied to the surface in accordance with the manufacturer's recommendations. If liquid membrane-forming

concrete curing compound is used it shall meet the requirements of ASTM C 309 Type 1-D.

The Contractor shall provide a 2 foot by 2 foot sample panel, that has been cured a minimum seven days, showing the color of cement concrete to the Engineer for acceptance before placing any pigmented cement concrete pavement.

(August 6, 2012)
Textured Cement Concrete

Textured cement concrete pavement pattern shall be one chosen from the manufactures and patterns listed below:

*** $$1$$ ***

A mat or stamp shall be used to imprint the pattern into the concrete surface.

Curing shall be in accordance with Section 5-05.3(13) and be applied to the surface in accordance with the manufacturer's recommendations. If liquid membrane-forming concrete curing compound is used it shall meet the requirements of ASTM C 309 Type 1-D.

Concrete Mix Design for Paving

Item number 1 of Section 5-05.3(1) is supplemented with the following:

(January 2, 2018)
Coarse aggregate derived from the recycling of Cement Concrete Pavement removed from the project may be used as coarse aggregate or blended with coarse aggregate for Cement Concrete Pavement. The Contractor shall remove all bituminous material, joint sealant and backer material from the existing pavement prior to removal for recycling. The recycled concrete aggregates shall meet the requirements of Section 9-03.21(1)B. Cement Concrete Pavement experiencing carbonate silica reaction, sulfate reaction, D cracking or any other conditions that may affect concrete durability shall not be used. Cement Concrete Pavement mix designs using recycled concrete aggregates will require the use of Low Alkali Cement or 25 percent Class F fly ash by total weight of the cementitious materials or the Contractor shall submit evidence that other ASR mitigating measures control expansion in accordance with Section 9-03.1(1).

Section 5-05.3(1) is supplemented with the following:

(August 6, 2012)
Aggregate for Textured Cement Concrete Pavement
Coarse aggregate for Textured Cement Concrete Pavement shall conform to Section 9-03.1(4), AASHTO grading No. 7. An alternate for combined gradation for Textured Cement Concrete Pavement conforming to Section 9-03.1(5) may be proposed, that has a nominal maximum aggregate size of ½ inch sieve.

Surface Smoothness

The third paragraph of Section 5-05.3(12) is replaced with the following:

(January 7, 2019)
Operate the inertial profiler in accordance with AASHTO R 57. Collect two longitudinal traces, one in each wheel path. Collect profile data in a continuous pass including areas excluded from pay adjustments for each section paved. The Contractor shall determine when each section is to be tested except that the minimum length to be tested shall be 528 feet unless accepted by the Engineer. Where a completed section of concrete pavement abuts a segment to be completed later in the project, the 50 feet adjacent to uncompleted section shall be included in the testing and incentive/disincentive for the uncompleted segment. Provide seven calendar days notice to the Engineer prior to testing.

Opening to Traffic

Section 5-05.3(17) is revised to read:

(August 7, 2017)
Maturity Testing for Concrete Pavement
The pavement shall not be opened to traffic until the Strength-Maturity Relationship (SMR) demonstrates the pavement has a minimum compressive strength of 2,500 psi and approval of the Engineer. The pavement shall be cleaned prior to opening to traffic.

The Contractor shall establish a Maturity Value on the approved concrete mix through the use of a testing program following the WSDOT Maturity Method Test Procedure for estimating concrete strength.

The Contractor shall establish the SMR at least 14 calendar days prior to the production pours. The Contractor shall notify the Engineer 7 days prior to performing the SMR as to the time, date and location where the SMR will be performed. The Contractor shall allow WSDOT the opportunity to place maturity loggers in the test cylinders in order to calibrate the WSDOT maturity meter. A SMR shall be developed for each mix used on the project. Referenced SMRs from previous projects will not be allowed.

The Contractor shall be responsible for the installation of the maturity logger/sensors within the concrete pavement pour area. For panel replacements performed under Section 5-01, place a minimum of four loggers/sensors at two different locations. Two in one of the first few panel replacements and two in the last panel replacement of the day, each day. For continuous concrete paving operations performed under Section 5-05, place a minimum of four loggers/sensors, two at the beginning and two at the end of the concrete pour, each day. The Contractor shall maintain the integrity of the logger/sensors and wires during concrete pouring, finishing and curing operations or until the maturity information is no longer needed.

The Contractor shall perform the Quality Control Procedure to Verify the Strength-Maturity Relationship on days 1 and 2 of concrete placement as indicated in the test procedure.

The Contractor shall develop a Quality Control Plan based on the Strength-Maturity Relationship to monitor and provide remedial action to ensure the concrete meets design strengths.

Any alteration in mix proportions or source or type of any material, in excess of those tolerable by batching variability shall require the development of a new SMR prior to its use at the Contractors time and expense. Alterations include a change in type, source, or proportion of cement, fly ash, coarse aggregate, fine aggregate, or admixtures. A change in water-to-cementitious material ratio greater than 5.0 percent requires the development of a new SMR.

Maturity Method Test Procedure

This test method provides a procedure for estimating concrete strength by means of the maturity method. The maturity method is based on strength gain as a function of temperature and time. This method is a modification of ASTM C1074 covering the procedures for estimating concrete strength by means of the maturity method.

The maturity method consists of three steps:

- Develop Strength-Maturity Relationship
- Estimate in-place strength
- Verify Strength-Maturity Relationship.

The Nurse-Saul “temperature-time factor (TTF)” maturity index shall be used in this test method, with a datum temperature of 0 °C (32 °F).

Apparatus

- If the maturity meter has input capability for datum temperature, verify that the proper value of the datum temperature has been selected prior to each use.
- Intellirock maturity system (or approved equivalent). This system shall include the logger/sensor, handheld reader, and software.
- The data obtained from the maturity meter shall be unalterable and un-interruptible.
- The same brand and type of maturity meters shall be used in the field as those used to develop and verify the strength-maturity relationship.
- Logger/sensor wire grade shall be larger than or equal to 20 awg.

Contractors Procedure to Develop Strength-Maturity Relationship

Step	Action
1	For every concrete design that will be evaluated by the maturity method, prepare a minimum of 21 cylinders in accordance with FOP for AASHTO T 23. Additional cylinders should be cast to avoid having to repeat the procedure. The mixture proportions and constituents of the concrete shall be the same as those of the job concrete whose strength will be estimated using this practice. The minimum size of each batch shall be approximately 3 m^3 (4 yd^3). A mobile mixer may be used for batching provided it is to be used on the project. Calibration documentation shall be provided to the Engineer prior to batching.
2	Fresh concrete testing for each batch shall include concrete placement temperature, slump, and air content in accordance with FOP for AASHTO T 309, FOP for AASHTO T 119, and FOP for AASHTO T 152.

3	Embed loggers/sensors in at least two cylinders. Loggers/sensors shall be placed 2-4 inches from any surface. Activate the loggers/sensors.
4	Cure the cylinders in accordance with FOP for AASHTO T 23.
5	Perform compression strength tests in accordance with FOP for AASHTO T 22 to target 2,500 psi for opening to traffic. In targeting the opening to traffic requirement and to properly characterize and validate the maturity calibration curve at least three target cylinder breaks must be broken prior to 2,500 psi. Test three cylinders at each age and compute the average strength. The cylinders with loggers/sensors may be tested if additional cylinders are needed. If a cylinder is obviously defective (for example, out of round, not square, damaged due to handling), the cylinder shall be discarded. If an individual cylinder strength is greater than 10 percent outside the average of three cylinders, the cylinder can be considered defective and be discarded. When two of the three cylinders are defective, a new batch must be evaluated unless additional acceptable cylinders are available.
6	At each test age, record the individual and average values of maturity and strength for each batch on a permanent data sheet
7	Plot the average strengths as a function of the average maturity values, with data points shown. Using a computer spreadsheet program such as Microsoft Excel, calculate a point-to-point interpolation through the data. The resulting curve is the strength-maturity relationship to be used for estimating the strength of the concrete mixture placed in the field. When developing the SMR, the spreadsheet software allows the Contractor to develop the corresponding maturity equation, which defines the SMR. The Engineer should carefully examine the data for “outliers”, faulty cylinder breaks, or faulty maturity readings. The Engineer should use judgment to determine if certain points should be discarded, or retested, or whether the entire SMR should be regenerated.

Contractors Procedure to Estimate In-Place Strength

Step	Action
1	Prior to or at the time of concrete placement, install loggers/sensors at the frequency specified. Loggers/sensors shall be placed a minimum of 2 ft. from a panel edge 4 to 5 inches from the panel surface. Loggers/sensors may be tied to reinforcing steel, but should not be in direct contact with the reinforcing steel or formwork.
2	As soon as practical after concrete placement, connect and activate the maturity meter(s).

3	The Contractor shall provide to the Engineer, prior to opening the pavement to traffic, encrypted data files (with software to read the files) of the maturity data from the loggers/sensors. Data shall be provided until the maturity is at a value that is equal to or greater than the required strength for that concrete mixture, as determined by the SMR. Additionally, data shall be provided on a record log.

Contractors Quality Control Procedure to Verify Strength-Maturity Relationship

Step	Action
1	At the specified verification interval make three cylinders in accordance with FOP for AASHTO T 23.
2	Embed a logger/sensor in one cylinder. Loggers/sensors shall be placed 2-4 inches from any surface. Activate the logger/sensor as soon as possible.
3	Cure the cylinders in accordance with FOP for AASHTO T 23.
4	Perform compression strength tests on all three of the cylinders in accordance with FOP for AASHTO T 22 to verify strength and time to reach 2,500 psi for opening to traffic. Compute the average strength of the cylinders. If a cylinder is obviously defective (for example, out of round, not square, damaged due to handling), the cylinder shall be discarded. If any individual cylinder strength is greater than 10 percent outside the average of three cylinders, that cylinder will be considered defective and be discarded. When two of the three cylinders are defective, the verification procedure will have to be repeated starting at step 1.
5	Record on a permanent data sheet the maturity value at the time of compression testing and individual and average strengths established from the cylinder breaks. Also record the predicted strength based on the SMR established for that particular concrete design, and the percent difference between average and predicted values. The SMR is verified when the predicted strength established from the average SMR and the cylinder breaks are within 10 percent. A copy of the data sheet and an encrypted file for the maturity data shall be provided to the Engineer on a daily basis.

Measurement

Section 5-05.4 is supplemented with the following:

(August 6, 2012)
Pigmented, textured, or textured and pigmented cement concrete pavement will be measured by the square yard placed.

Payment

Section 5-05.5 is supplemented with the following:

(August 6, 2012)
"Pigmented Cement Concrete Pavement", per square yard
The unit Contract price per square yard for Pigmented Cement Concrete Pavement shall be full pay for all costs incurred to perform the Work in this Specification.

(August 6, 2012)
"Textured Cement Concrete Pavement", per square yard
The unit Contract price per square yard for Textured Cement Concrete Pavement shall be full pay for all costs incurred to perform the Work in this Specification.

(August 6, 2012)
"Textured and Pigmented Cement Concrete Pavement", per square yard
The unit Contract price per square yard for Textured and Pigmented Cement Concrete Pavement shall be full pay for all costs incurred to perform the Work in this Specification.

(August 5, 2013)
All costs in connection with conducting concrete pavement maturity testing and surface cleaning prior to opening to traffic shall be included in the unit Contract price per cubic yard for "Cement Conc. Pavement" and per square yard for "Replace Cement Concrete Panel", if either or both of the items are included in the Contract.

(August 7, 2017)
JUST IN TIME TRAINING

Description
Just In Time Training (JITT) is a formal class for the joint training of Contractor and Contracting Agency employees that will be associated with the construction or rehabilitation of Cement Concrete Pavement.

Construction Requirements
Training
The Contractor shall provide a JITT instructor who is experienced with the specified pavement construction methods, materials, and tests. The instructor shall not be an employee of the Contractor or the Contracting Agency. JITT shall be at a facility provided by the Contractor unless otherwise agreed to by the Engineer.

The following personnel are required to attend the JITT:

1. Representing the Contractor: The Superintendent, foremen and key construction personnel associated with the work.
2. Representing the Contracting Agency: Up to ***$$1$$*** Contracting Agency staff selected by the Engineer.

JITT shall meet the following requirements:

1. At least 4 hours long or a length agreed to by the Engineer.
2. Cover all aspects of work methods, equipment and materials the Contractor is proposing to use.
3. Conducted within 3 miles of the job site or at a mutually agreed to location.
4. Completed before the start of paving.

5. Conducted during normal working hours.
6. At the Contractors option, JITT may be an extension of a prepaving conference.

Submittals

A minimum of 5 calendar days before JITT the Contractor shall submit to the Engineer the instructor's name and qualifications, the JITT facility's location, and 1 copy each of any course, handout, and presentation materials.

Payment

Payment will be made for each of the following items that are included in the Proposal:

"Just In Time Training", lump sum.

The lump sum Contract payment shall be full compensation for all costs incurred by the Contractor in providing "Just In Time Training".

Division 6
Structures

General Requirements for Structures

Work Access and Temporary Structures

Section 6-01.5 is re-titled and revised to read:

(April 1, 2019)

Work Access

The Contractor shall construct work access to accommodate all work within the wetted perimeter, or vertically above the sensitive area, of *** $$1$$ ***, as shown in the plans or staked by the Engineer. The Contractor shall construct and remove the work access in accordance with all environmental regulations and permits, including those specified in Sections 1-07.5 and 1-07.6.

Submittals

The Contractor shall submit Type 2 Working Drawings of the work access, except that if the Contractor chooses an access alternative using a work trestle structure, the Working Drawings shall be Type 2E. The Contractor shall design the work access structure to withstand all applicable loads in accordance with accepted design codes. The Contractor shall specify the design code(s) in the design calculations and working drawings.

The Contractor shall include information with the work access submittal on the construction equipment that will use the work access. The Contractor shall specify the type and model of construction equipment to be used, and shall include equipment catalogue cuts with capacities and geometry. The Contractor shall include anticipated wheel or track loads, axle spacings, outrigger geometry and reactions, crane pick angles and reach, and other equipment details.

(April 6, 2015)
Waterway Clearance Requirements
One span of the work access structure shall provide more than *** $$1$$ *** horizontal clearance between supporting piers. The bottom of the superstructure of the work access structure shall be at elevation *** $$2$$ *** or higher. All waterborne debris that accumulates against the work access structure shall be removed by the Contractor.

(April 6, 2015)
Payment
Payment will be made in accordance with Section 1-09.3 for the following bid item:

"Work Access - ___", lump sum.

(August 6, 2018)
Temporary Bridge
The Contractor shall design, furnish, erect, maintain, and remove a temporary bridge, including substructure, in accordance with this Special Provision and the details shown in the Plans unless otherwise accepted by the Engineer.

Geometric Requirements
The temporary bridge shall conform to the following geometric requirements:

1. The temporary bridge shall be an overall minimum length of *** $$1$$ ***.

2. The minimum width on the temporary bridge between barriers or railings shall be *** $$2$$ ***.

3. The temporary bridge superstructure shall provide a minimum vertical clearance of *** $$3$$ *** to *** $$4$$ ***.

Design Requirements
The temporary bridge shall conform to the following design requirements:

1. The temporary bridge, including the barriers or railings, shall be designed in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications. Barriers or railings shall be designed to TL-2, minimum, with a minimum height of 32-inches, except where the Plans require a higher test level and railing height. Seismic design shall conform to AASHTO LRFD Seismic Guide Specification Section 3.6.

2. The minimum vehicular live load used for design shall be 75 percent of HL-93, unless otherwise specified in the Contract Plans.

3. The driving surface of the temporary bridge shall be durable, skid resistant deck, with an initial skid number of at least 35 and maintaining a skid number of 26 minimum, in accordance with AASHTO T 242.

4. Notwithstanding the requirements of Section 1-06.1, the materials used by the Contractor to compose the temporary bridge may be salvaged steel, provided that the use of such salvaged steel shall be subject to inspection and approval by the Contractor's engineer of record and acceptance by the

Engineer. For salvaged steel materials where the grade of steel cannot be positively identified, the design stresses for the steel shall conform to Section 6-02.3(17)B3.

5. In addition to the criteria specified in Item 1, the temporary bridge substructure shall be designed in accordance with the WSDOT Geotechnical Design Manual (M46-03).

Submittals

The Contractor shall submit Type 3E Working Drawings of the temporary bridge including an erection plan and procedure conforming to Section 6-03.3(7)A.

If the temporary bridge is to be in place for greater than 90 calendar days, the Contractor shall submit a Type 2E Working Drawing consisting of a load rating report prepared in accordance with the AASHTO *Manual for Bridge Evaluation* and WSDOT *Bridge Design Manual LRFD* M23-50 Chapter 13.

Construction and Removal

The Contractor shall construct the temporary bridge in accordance with the working drawings and erection plan as accepted by the Engineer, environmental permit conditions specified in Section 1-07.5 as supplemented in these Special Provisions and as shown in the Plans, and in accordance with the details shown in the Plans. The Contractor shall maintain the temporary bridge, including the driving surface, for the life of the temporary bridge in this project.

All welding, repair welding, and welding inspection, of steel components of the temporary bridge shall conform to the Section 6-03.3(25) and 6-03.3(25)A requirements specified for steel bridges.

After the temporary bridge is no longer needed the Contractor shall remove the temporary bridge.

Payment

Payment will be made in accordance with Section 1-09.3 for the following bid item:

"Temporary Bridge___", lump sum.

Concrete Structures

Materials

Section 6-02.2 is supplemented with the following:

(April 1, 2013)

Resin Bonded Anchors

The resin bonded anchor system shall include the nut, washer, and threaded anchor rod which is installed into hardened concrete with a resin bonding material.

Resin bonding material used in overhead and horizontal application shall be specifically recommended by the resin manufacturer for those applications.

Resin bonding material used in submerged liquid environment shall be specifically recommended by the resin manufacturer for this application.

The resin bonded anchor system shall conform to the following requirements:

1. Threaded Anchor Rod and Nuts
   Threaded anchor rods shall conform to ASTM A 193 Grade B7 or ASTM A 449, except as otherwise noted, and be fully threaded. Threaded anchor rods for stainless steel resin bonded anchor systems shall conform to ASTM F 593 and shall be Type 304 unless otherwise specified.

   Nuts shall conform to ASTM A 563, Grade DH, except as otherwise noted. Nuts for stainless steel resin bonded anchor systems shall conform to ASTM F 594 and shall be Type 304 unless otherwise specified.

   Washers shall conform to ASTM F 436, and shall meet the same requirements as the supplied anchor rod, except as otherwise noted. Washers for stainless steel resin bonded anchor systems shall conform to ASTM A 240 and the geometric requirements of ASME B18.21.1 and shall be Type 304 Stainless Steel unless otherwise specified.

   Nuts and threaded anchor rods, except those manufactured of stainless steel, shall be galvanized in accordance with AASHTO M 232. Galvanized threaded anchor rods shall be tested for embrittlement after galvanizing, in accordance with Section 9-29.6(5).

   Threaded anchor rods used with resin capsules shall have the tip of the rod chiseled in accordance with the resin capsule manufacturer's recommendations. Galvanized threaded rods shall have the tip chiseled prior to galvanizing.

2. Resin Bonding Material
   Resin bonding material shall be a two component epoxy resin conforming to Type IV ASTM C 881 or be one of the following:

   a. Vinyl ester resin.

   b. Polyester resin.

   c. Methacrylate resin.

3. Ultimate Anchor Tensile Capacity
   Resin bonded anchors shall be tested in accordance with ASTM E 488 to have the following minimum ultimate tensile load capacity when installed in concrete having a maximum compressive strength of 6000 pounds per square inch (psi) at the embedment specified below:

Anchor Diameter (inch)	Tensile Capacity (lbs.)	Embedment (inch)
3/8	7,800	3-3/8
1/2	12,400	4-1/2

5/8	19,000	5-5/8
3/4	27,200	6-3/4
7/8	32,000	7-7/8
1	41,000	9
1-1/4	70,000	11-1/4

The Contractor shall submit items 1 and 2 below to the Engineer for all resin bonded anchor systems. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

For resin bonded anchor systems that are installed in a submerged liquid environment the Contractor shall submit items 1, 2, and 4 below. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 below to the Engineer.

1 The resin manufacturer's written installation procedure for the anchors.

2. The manufacturer's certificate of compliance for the threaded anchor rod certifying that the anchor rod meets these requirements.

3. Test results by an independent laboratory certifying that the threaded anchor rod system meets the ultimate anchor tensile load capacity specified in the above table. The tests shall be performed in accordance with ASTM E 488.

4. For threaded anchors intended to be installed in submerged liquid environments the Contractor shall submit tests performed by an independent laboratory within the past 24 months which certifies that anchors installed in a submerged environment meet the strength requirements specified in the above table.

(September 8, 2020)

Epoxy Bonding Agent For Surfaces And For Steel Reinforcing Bar Dowels

Epoxy bonding agent for surfaces shall be Type II, as specified in Section 9-26.1. Epoxy bonding agent for steel reinforcing bar dowels shall be either Type I or Type IV, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the resin manufacturer.

(August 3, 2015)

Epoxy Crack Sealing Materials

Epoxy sealing paste shall be a thixotropic compound.

Epoxy injection resin shall be a moisture-insensitive, two-component material capable of restoring the structural integrity of a structure by structurally bonding cracks, delaminations and hollow planes. Resin formulations shall be hydrophilic with variable viscosity to allow full depth penetration in cracks having a width of 6 mils and greater.

Epoxy injection resin, when mixed with the hardener in accordance with the manufacturer's written instructions, shall cure to a non-shrink solid material. The material shall have a normal curing time of less than 24 hours.

Epoxy injection resin shall have the following physical properties:

Solids Content, by weight (minimum)	98	percent
Viscosity (maximum) at 77F (Brookfield)	700	cps
Compressive Yield Strength (minimum)	12,000	psi
Minimum Flexural Strength (ASTM D 790)	10,000	psi
Bond Strength (minimum)	500	psi

The Contractor shall submit a Type 2 Working Drawing consisting of sample of the material of the epoxy sealing paste and epoxy injection resin together with sufficient directions and technical data for its use.

The Contractor shall submit a Type 1 Working Drawing consisting of the Safety Data Sheet (SDS) for each type of epoxy sealing paste and epoxy injection resin.

(April 6, 2015)

Rapid Cure Silicone Sealant

Rapid cure silicone sealant shall be Dow Corning 902 RCS Joint Sealant.

The Contractor shall deliver the joint sealant to the job site in the sealant manufacturer's original sealed container. Each container shall be marked with the sealant manufacturer's name and lot or batch number. Each lot or batch shall be accompanied by the manufacturer's Safety Data Sheet (SDS), and Manufacturer's Certificate of Compliance, identifying the lot or batch number, and certifying that the materials conform to the properties stated on the product data sheet.

The backer rod shall be closed cell expanded polyethylene foam as recommended by the sealant manufacturer. The diameter of the backer rod shall be as recommended by the sealant manufacturer for the expansion joint opening at the time of installation.

(April 6, 2015)

Polyester Concrete

Polyester Resin Binder

The resin shall be an unsaturated isophthalic polyester-styrene co-polymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77F, RVT No. 1 spindle)	ASTM D 2196
Specific Gravity:	1.05 to 1.10 at 77F	ASTM D 1475
Styrene Content:	45% to 50% by weight of polyester styrene resin	ASTM D2369

The hardened resin shall conform to the following requirements:

Elongation:	35% minimum w/ thickness 0.25" ± 0.04"	ASTM D 638

Tensile Strength:	2,500 psi minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Conditioning	18 hours/77F/50% + 5 hours/158F	ASTM D 618

Silane Coupler: 1.0% minimum (by weight of polyester-styrene resin)

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP and CHP initiators shall be used as recommended by the manufacturer.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance.

High Molecular Weight Methacrylate (HMWM) Resin

In addition to the viscosity and density properties, and the promoter/initiator system, specified in Section 6-09.2, the HMWM resin for polyester concrete shall conform to the following requirements:

Flash Point:	180F minimum	ASTM D 3278
Tack-Free Time:	400 minutes maximum	California Test 551

Prior to adding initiator, the HMWM resin shall have a maximum volatile content of 30 percent, when tested in conformance with ASTM D 2369.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance.

Aggregate

The aggregate shall be from a WSDOT approved pit site and shall be thoroughly washed and kiln dried.

The aggregate shall conform to Section 9-03.1(5)B for either 1/2-inch or 3/8-inch maximum nominal aggregate size.

The combined aggregate shall have a maximum of 45 percent crushed particles. Fine aggregate shall conform to Section 9-03.13.

Aggregate absorption shall not exceed 1.0 percent. The moisture content of the aggregate shall not exceed one half of the aggregate absorption at the time of mixing with the polyester resin binder. The aggregate temperature shall be between 45F and 100F at the time of mixing.

Sand for Abrasive Finish

The sand for abrasive finish shall conform to Section 6-09.2, and the aggregate moisture content requirements specified above.

(April 6, 2015)

Elastomeric Concrete

Elastomeric concrete shall be one of the following three products:

BASF/Watson Bowman Acme Wabo Crete II

D. S. Brown Delcrete

R. J. Watson Poly-Tron

The elastomeric concrete aggregate shall be as specified, gradated, and packaged by the elastomeric concrete manufacturer.

The primer shall be as recommended by the elastomeric concrete manufacturer.

The Contractor shall deliver the elastomeric concrete components to the job site in the elastomeric concrete manufacturer's original sealed containers. Each container shall be marked with the sealant manufacturer's name and lot or batch number. Each lot or batch shall be accompanied by the manufacturer's Safety Data Sheet (SDS), and Manufacturer's Certificate of Compliance, identifying the elastomeric concrete manufacturer and the lot or batch number, and certifying that the materials conform to the properties stated in the product data sheet.

Bridge Supported Utilities

(June 26, 2000)
Inserts shall be of the type and model specified in the Plans. Inserts shall be galvanized in accordance with AASHTO M 111.

(September 3, 2019)
Hanger rods, and associated nuts and washers, shall conform to Section 9-06.5(1), and shall be galvanized in accordance with ASTM F2329.

Steel bars and plates shall conform to ASTM A 36 and shall be galvanized in accordance with AASHTO M 111.

(September 3, 2019)
Horizontal strut bolts or threaded rods, and associated nuts and washers, shall conform to Section 9-06.5(1), and shall be galvanized in accordance with ASTM F2329.

Pre-formed fabric pads shall be composed of multiple layers of duck, impregnated and bound with high quality oil resistant synthetic rubber, compressed into resilient pads. The pre-formed fabric pads shall conform to latest edition of MIL C 882 and the following requirements. The number of plies shall be as required to produce the specified thickness, after compression and vulcanizing.

Pre-formed fabric pads shall have a shore A hardness of 90$\pm$5 in accordance with ASTM D 2240.

Pre-formed fabric pads for bridge utility supports will be accepted based on the Manufacturer's Certificate of Compliance that the material furnished conforms to these specifications.

(June 26, 2000)
Pipe rolls or pipe saddles shall be of the type and model specified in the Plans.

(September 3, 2019)
Anchor straps shall conform to ASTM A 36 and shall be galvanized after fabrication in accordance with AASHTO M 111.

Anchor bolts, and associated nuts and washers, shall conform to Section 9-06.5(4), and shall be galvanized in accordance with ASTM F2329.

(April 30, 2001)
Bridge Drain Risers
Spacer bars and riser bars for the drain riser assembly shall conform to ASTM A 36.

(September 8, 2020)
Core Drilled Bridge Deck Drain
Bridge deck drain pipe sleeve shall be any smooth wall, non-perforated, PVC pipe of the diameter and minimum wall thickness specified in the Plans.

Epoxy bonding agent shall be Type II conforming to Section 9-26.1. The grade and class of the epoxy bonding agent shall be as recommended by the bonding agent manufacturer.

(April 6, 2015)
Seismic Retrofit Materials
Components fabricated and constructed for seismic retrofit work shall conform to the following requirements:

(April 6, 2015)
Steel pipe shall conform to ASTM A 53, Grade B, Type E or S, galvanized. The pipe shall be Schedule 40, except as otherwise specified in the Plans.

PVC pipe shall be any smooth wall, non-perforated, PVC pipe of the diameter and minimum wall thickness or Schedule specified in the Plans.

(September 8, 2020)
Steel bars, plates and shapes shall conform to ASTM A 36 except that structural shapes may conform to ASTM A 992.

Epoxy bonding agent, where shown in the Plans for bonding steel components to concrete, shall be Type II as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the bonding agent manufacturer.

All steel components and assemblies for seismic restrainers, except as otherwise specified, shall be galvanized after fabrication in accordance with AASHTO M 111.

Bolts, nuts, and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with ASTM F2329.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions. Additionally, the threaded anchor rods for seismic retrofit elements shall conform to either ASTM A 193 Grade B7 or ASTM F 1554 Grade 105,

and shall conform to the appropriate supplemental requirements for grade and manufacturer's identification, and charpy impact testing (15-foot-pounds minimum at 40F). Results of the charpy impact testing for the production lot(s) including the anchor rods furnished for seismic retrofit components and assemblies shall be submitted to the Engineer along with the Manufacturer's Certificate of Compliance.

(September 8, 2020)
High-strength steel rods for longitudinal seismic restrainer assemblies shall conform to ASTM F 1554 Grade 105, including Supplemental Requirements S2, S3, and S5. Nuts, and couplers if required, shall conform to ASTM A 563 Grade DH. Washers shall conform to ASTM F 436.

High-strength steel rods and associated couplers, nuts and washers shall be galvanized after fabrication in accordance with ASTM F2329.

(September 8, 2020)
Column Jacketing Materials
All metal components shall conform to ASTM A 36, and shall be painted in accordance with Section 6-07.3(9), and Section 6-03.3(30) as supplemented in these Special Provisions. Metal surfaces in contact with grout shall be considered in contact with concrete for the purposes of Section 6-07.3(9).

Grout shall conform to the requirements of Section 9-20.3(4) and the following requirements:

> The grout shall be a pumpable mix capable of filling the annulus between the concrete column and steel column jacket assembly. The grout shall be free of lumps and undispersed cement, and shall not show any visible signs of separation of water and cement during pumping operations.

Aggregate conforming to Section 9-03.1(5) with a maximum aggregate size of 3/8 inch may be used to extend the grout. Mortar shall conform to Section 9-20.4(2).

Epoxy bonding agent for filling grout voids shall be Type II, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the bonding agent manufacturer.

(September 8, 2020)
Precast Prestressed Concrete Stay-In-Place Panels
Concrete shall have an initial strength at strand release of at least 5,000 psi, and a 28 day minimum compressive strength as specified in the Plans.

Prestressing reinforcement strand shall conform to Section 9-07.10, except that the diameter shall be as specified in the Plans. The strand shall be provided by a manufacturer and facility capable of producing ½" diameter strand with an average bond pull-out force of 16.0 kips when tested in accordance with ASTM A1081. Test reports for ASTM A1081 shall be submitted with the Manufacturer's Certificate of Compliance, and testing shall have been performed on strand produced within the previous 36 months.

Grout shall conform to Section 9-20.3(2).

Leveling bolts shall conform to Section 9-06.5(1), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Backer rod shall be closed cell expanded polyethylene foam.

Construction Requirements

Section 6-02.3 is supplemented with the following:

(September 7, 2021)
Epoxy Crack Sealing

The materials being used may be dermatetic. The Contractor's contact with and use of the materials shall conform to the requirements specified in the SDS for each material, and all personnel shall be provided with appropriate clothing and protective garments.

All materials shall be stored and protected from ignition sources as recommended by the material manufacturer.

The cracks shall be cleaned of efflorescence, deteriorated concrete and other surface debris, by vacuuming, flushing, routing, sawing or other means as required.

Entry ports shall consist of tubes, tees or other valve devices as recommended by the resin manufacturer. The ports shall be placed at intervals along each crack in accordance with the manufacturer's written instructions for the resin being used. The holes for the entry ports shall be drilled with a hollow bit with an attached vacuum chuck to prevent concrete dust from becoming embedded in the crack.

The exposed crack surfaces and the areas around the entry ports shall be sealed with epoxy sealing paste and cured in accordance with the resin manufacturer's written instructions, to attain a seal capable of withstanding the applied injection pressures.

The Contractor shall furnish the services of a factory trained technical representative to perform the epoxy crack sealing injection.

Injection shall be accomplished with a pressure or injection machine compatible with the resin selected for use and shall begin at the lowest port and continue until there is evidence of the resin at the entry port directly above and adjacent to the port being pumped. When material travel is indicated, the nozzle shall be moved to the port that shows resin. The previously pumped port shall be sealed. Injection shall continue until the crack is completely filled. On wide cracks where resin travel between ports will be rapid, two or more ports may be pumped simultaneously. On exceptionally large cracks, a formulation (dependent upon crack width, ambient temperature, modulus requirements and other variables) of epoxy resin and fine sands shall be used as recommended by the resin manufacturer.

After all ports have been pumped and the crack is full, the epoxy resin shall be cured without disturbance in accordance with the resin manufacturer's written instructions as necessary to ensure development of the full bond capacity of the material.

After the epoxy has cured completely, the epoxy sealing paste and port stems shall be ground flush with the original surface of the concrete.

At the discretion of the Engineer, cores shall be taken after the repair is completed to confirm penetration and bonding. The number and locations of such cores will be as specified by the Engineer. These cores shall be submitted to the Engineer for testing in the State Materials Laboratory. The Contractor shall submit a Working Drawing for repair of core holes in accordance with Section 6-01.16.

Bridge Supported Utilities

(August 3, 2015)
The Contractor shall furnish and install inserts for the bridge utility supports as shown in the Plans. The Contractor shall verify that the hanger rods freely hang plumb in their inserts, and shall make adjustments to the inserts as necessary and as accepted by the Engineer prior to utility installation.

(June 26, 2000)
The Contractor shall furnish and install the bridge utility supports, and the utility pipe or conduit pipe, as shown in the Plans.

(June 26, 2000)
The Utility Company will furnish material for and install *** $$1$$ ***. The Contractor shall install *** $$2$$ *** furnished by the *** $$3$$ ***.

The Contractor shall notify the utility company a sufficient time in advance and shall cooperate with the utility company in order that the utility furnished items may be installed in the structure.

Seismic Retrofit

(April 6, 2015)
Seismic Retrofit Demolition Plan
The Contractor shall submit Type 2 Working Drawings showing the method of removing the specified portions of the existing bridges required by the seismic retrofit work. The Working Drawings shall show the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, and details of the methods and equipment used for containment, collection, and disposal of all debris. The Working Drawings shall show all stages of demolition.

(April 6, 2015)
Column Jacket Installation Plan
The Contractor shall submit Type 2E Working Drawings describing the column jacket installation plan. The submittal shall include at a minimum, the following:

1. Step by step installation procedure.

2. The methods of cleaning and preparing the existing column surfaces prior to installing the column jacket assembly.

3. The methods of containing, collecting, and disposing of the debris generated by cleaning and preparing the existing column surfaces.

4. The methods of containing, collecting, and disposing of all excess grout generated during the grouting process.

5. The locations of grout injection valves, and the methods and materials used to remove them following use, and to fill the void following removal.

6. The method of sealing the gap between the existing column surface and the column jacket assembly prior to grouting.

7. The method and materials used to clamp and brace the column jacket assembly in place during field assembly and grouting.

8. The proposed grout mix with manufacturer's data sheets.

9. The equipment used to pump the grout and monitor the grout pressure and the quantity of grout injected.

10. The method, materials, and equipment used to fill grout voids within the column jacket assembly, and to finish the exposed surface flush after repair.

11. The method, materials, and equipment used to field repair all damaged primer coatings, and to field apply the intermediate and finish coats of paint.

(April 6, 2015)
Column Jacket Shop Drawings
The Contractor shall submit column jacket shop drawings as Type 2 Working Drawings. The shop drawings shall include, at a minimum, the following:

1. Plan, elevation, and sections of the jacket system and all components, with all dimensions and tolerances.

2. Field measurements of the existing column(s).

3. All material designations.

4. Location of horizontal and vertical splices.

5. Location of spacers and method of attachment.

6. Welds and welding procedures.

(September 8, 2020)
Field Measuring Existing Bridge Columns
The Contractor shall field measure the dimensions (diameter, or width and thickness, as appropriate for column shape) of the existing bridge columns receiving column jackets prior to preparing column jacket assembly shop drawings. The following locations shall be field measured as a minimum for each column:

1. Top of footing or footing pedestal.

2. Bottom of crossbeam.

3. Mid-height of column.

The Contractor shall field measure the column height from top of footing or footing pedestal to bottom of crossbeam for each column.

The Contractor shall tabulate these field measured dimensions and submit them to the Engineer along with the column jacket assembly shop drawings.

Where site conditions, such as traffic control requirements or deeply buried foundations, create difficulties for field measuring buried portions of the bridge columns, the Contractor may request a waiver of the pre-fabrication field measuring requirements for specific columns. If the Engineer concurs with the Contractor's request for a waiver of the pre-fabrication field measuring requirement for specific columns, and for columns identified in the Special Provisions as already designated with a waiver, the Contractor shall:

1. Field measure the diameter, or width and thickness, as appropriate for the column shape, of the above ground portion of the column receiving the waiver.

2. Fabricate the column jacket to a length exceeding the column height (2'-0" or ten percent of the estimated column height, whichever is greater) based on the original plans and other available site data. The shop drawing details shall specify the column jacket fabrication length, and the assumed column height based on the available information.

3. Submit the method, template, and equipment used to field cut the top of the column jacket assembly at installation.

The Contractor shall submit the request for a waiver of the pre-fabrication field measuring requirement prior to preparing column jacket assembly shop drawings, and shall not submit shop drawings until receiving the Engineer's confirmation of the waiver request and completing all field measurements still required.

(April 6, 2015)
The column(s) at the Bridge and Pier location(s) specified below has (have) received a waiver of the pre-fabrication field measuring requirement, and no separate waiver request from the Contractor is required for this (these) specific column(s):

*** $$1$$ ***

However, the Contractor shall conform to all other requirements specified above for columns receiving a waiver of the pre-fabrication field measuring requirement.

(April 6, 2015)
Field Measuring for Seismic Retrofit Components
The Contractor shall field measure dimensions of existing items and members of Bridge No(s). *** $$1$$ *** prior to preparing shop drawings for fabricated steel components and assemblies.

The Contractor shall field measure dimensions of the following items:

*** $$2$$ ***

The Contractor shall tabulate these field measured dimensions and submit them to the Engineer along with the shop drawing submittals for the corresponding steel components and assemblies.

(April 6, 2015)
Removing Portions of Existing Concrete

The Contractor shall remove portions of existing concrete required by the seismic retrofit work in accordance with Section 2-02.3(2)A2 and as shown in the Plans.

The Contractor shall dispose of all materials removed by the demolition operations in accordance with Section 2-02.3.

The Contractor shall roughen, clean, and saturate the existing concrete surfaces bonding to the fresh concrete in accordance with Section 6-02.3(12).

(April 6, 2015)
Drilling Holes and Setting Steel Reinforcing Bars, and Placing Concrete

The Contractor shall drill holes for, and set, steel reinforcing bars into the existing concrete as shown in the Plans in accordance with Section 6-02.3(24)C as supplemented in these Special Provisions.

(April 6, 2015)
Installing and Tensioning High-Strength Steel Bar Reinforcement

The Contractor shall furnish and install high-strength steel bars as shown in the Plans. The hole through existing concrete shall be core drilled. The concrete surface in contact with the high-strength steel bar bearing plate shall be coated with epoxy bonding agent just prior to stressing the high-strength steel bar. After stressing, the high-strength steel bar shall be grouted in accordance with Section 6-02.3(26)H.

(April 6, 2015)
Longitudinal Seismic Restrainers

The Contractor shall submit Type 1 Working Drawings consisting of shop drawings of the steel components of the longitudinal seismic restrainer assemblies in accordance with Section 6-03.3(7).

The Contractor shall core drill holes through the pier diaphragm for the high-strength steel bar as shown in the Plans. The Contractor shall set the PVC pipe in place with epoxy bonding agent as shown in the Plans.

Holes for the resin bonded anchors for the longitudinal seismic restrainer anchorages shall be located and drilled in accordance with Section 6-02.3(18) as supplemented in these Special Provisions, and as follows:

1. The bottom layer of steel reinforcing bars in the slab in the vicinity of the longitudinal seismic restrainer anchorage as shown in the Plans shall be located and marked on the concrete surface.

2. Using the anchorage assembly as a template, the Contractor shall align and slightly shift the anchorage assembly as required so that the holes avoid the existing steel reinforcing bars.

3. The Contractor shall drill holes for the resin bonded anchors with the anchorage assembly in position as a template.

4. If, after shifting the anchorage assembly, conflicts still exist between hole locations and existing steel reinforcing bars, the Contractor may, with the Engineer's approval, core drill holes at the conflict locations.

The surface of the concrete in contact with the anchorage assembly shall be coated with Type II epoxy bonding agent conforming to Section 9-26.2, with the grade and class as recommended by the epoxy bonding agent manufacturer. The longitudinal seismic restrainer anchorage assembly shall be set in place within the set time specified in the manufacturer's data sheet for the epoxy bonding agent.

All longitudinal seismic restrainers at a pier shall be installed so that the free end (the end with the gap as shown in the Plans) shall be on the same side of the pier.

(September 8, 2020)
Column Jacketing

The steel column jacket assembly for each column shown in the Plans shall be fabricated in accordance with the shop drawings.

The Contractor shall excavate and shore as required to expose the column surface below ground to the top of the existing footing or footing pedestal. Dirt, debris and any surface attachments shall be removed from the surface of the column in accordance with the Contractor's column jacket installation plan.

For specific columns for which the Engineer confirms a waiver of the pre-fabrication field measuring of the column height dimension, the Contractor shall field measure the column height upon completion of the excavation. The Contractor shall field cut the top of the column jacket assembly using the method, template, and equipment as specified in the pre-fabrication field measuring waiver request submittal.

The Contractor shall position the steel column jacket around the existing column using spacers to center the assembly. The spacers may be welded to the inside of the jacket and, if used, shall be placed and attached as shown in the shop drawings.

Field welded complete penetration groove welds of the column jacket assemblies shall be inspected in accordance with Section 6-03.3(25)A. Field weld inspection shall be performed by a certified welding inspector (CWI). The Contractor shall not begin welding until receiving acceptance of the joint fit-up from the CWI. The CWI shall randomly monitor the intermediate stages of welding. The CWI's daily reports and nondestructive testing reports indicating compliance with contract requirements shall be submitted as a Type 1 Working Drawing upon completion of the last column jacket in the Contract.

The Contractor shall install external grout injection valves for use in filling the cavity with grout. The valves shall be spaced such that the grout will uniformly fill the gap between the jacket assembly and the column surface. The grout pump shall be equipped with a pressure gauge to monitor grout pressures. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The production grout compressive strength shall be measured using four inch diameter by eight inch cylinders, cast and cured in accordance with Section 6-02.3(5)H. The cylinders shall attain a 7-day minimum compressive strength of 4,000 psi.

The gap between the column jacket assembly and the existing column surface at the base of the assembly shall be sealed in accordance with the column jacket installation plan.

The grouting operation shall conform to Section 6-02.3(6)A.

The grouting operation shall begin from the base of the assembly and from the base of each successive lift. The Contractor shall pump grout into the assembly while maintaining a uniform level grout head around the column.

The Contractor shall limit the height of each lift of grout to minimize undulations and displacements of the surface of the column jacket assembly during grouting. For column jacket assemblies of circular (constant radius) cross section, the height of each lift of grout shall be limited to 20 feet maximum, except as otherwise accepted by the Engineer. For column jacket assemblies with cross sections of all other shapes, the height of each lift of grout shall be limited to 8 feet maximum, except as otherwise accepted by the Engineer.

The Contractor may restrain the column jacket assembly within the specified tolerances during grouting operations by using a bracing system in accordance with the column jacket installation plan. Except as otherwise shown in the Plans, restraints for the bracing system shall not pass through the column. Except when a bracing system is used, placement of the next grout lift shall not begin until the previous grout lift has hardened.

The Contractor shall contain and collect all grout outside the column jacket assembly.

When the assembly is completely grouted to the top, the Contractor shall place mortar conforming to Section 9-20.4(2) over the top of the grout at the top of the assembly, and shall slope the mortar to drain.

All clamps, valves, injection ports, lifting ears, and other attachments shall be removed not less than 24 hours after completing grouting operations at the column. The Contractor shall fill all voids with mortar conforming to Section 9-20.4(2), and shall finish them flush with the exterior surface of the column jacket assembly. The Contractor shall not remove the attachments by flame cutting.

Seven calendar days after completing the grouting of a column jacket assembly, the Engineer will inspect the assembly for voids between the steel casing and the grout. The Contractor shall completely fill all voids detected by the Engineer by injecting epoxy bonding agent into the lowest point of each void and venting at the highest point. The exposed epoxy bonding agent shall be finished flush with the exterior surface of the column jacket assembly.

After inspection for voids and epoxy injection of voids is complete, steel surfaces with damaged primer coat shall be repaired with field primer in accordance with Section 6-07.3(9). The primer repair shall be followed by application of the intermediate and

finish field coats of paint to all exposed steel surfaces in accordance with Section 6-07.3(9) and Section 6-03.3(30) as supplemented in these Special Provisions.

Backfill shall not be placed against the column jacket assembly until the finish coat of paint is completely cured, based on the cure duration recommended by the paint manufacturer. The Contractor shall fill and compact the excavation with native backfill, except as otherwise specified in the Plans, in accordance with Section 2-09.3(1)E.

(January 7, 2019)

Polyester Concrete

Manufacturer's Technical Representative

The Contractor shall have the services of a qualified polyester concrete manufacturer's technical representative physically present at the job site. The manufacturer's technical representative shall assist the Contractor in training the Contractor's personnel and providing technical assistance in preparing the header blockout surface, applying primer, and mixing, placing, and curing the polyester concrete.

Mix Design

Polyester concrete shall be composed of the following three components – polyester resin binder, high molecular weight methacrylate (HMWM) resin, and aggregate, in accordance with Section 6-02.2 as supplemented in these Special Provisions.

The Contractor shall prepare and submit a Type 1 Working Drawing consisting of the polyester concrete design mix and mixing procedure. The mix design shall include a recommended initiator percentage for the expected application temperature, and the recommended amount of polyester resin binder as a percentage of the dry weight of aggregate. The amount of peroxide initiator used shall result in a polyester concrete set time between 30 and 120 minutes during placement as determined by California Test 551, Part 2, "Method of Test For Determination of Set Time of Concrete Overlay and Patching Materials", by Gilmore Needles. Accelerators or inhibitors may be required as recommended by the polyester resin binder supplier.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, and quantity. Each shipment of polyester resin binder and HMWM resin shall be accompanied by a Safety Data Sheet (SDS).

The material shall be stored in accordance with the manufacturer's recommendations.

Sufficient material to perform the entire polyester concrete application shall be in storage at the site prior to any field preparation.

Equipment and Containment

The Contractor shall submit a Type 1 Working Drawing consisting of all equipment for cleaning the concrete and steel surfaces, and mixing and applying the polyester concrete.

The HMWM resin, and abrasive blasting materials, shall be contained and restricted to the surface receiving the polyester concrete only, and shall not escape to the surrounding environment. The Contractor shall submit a Type 1 Working Drawing consisting of the method and materials used to collect and contain the HMWM resin, and abrasive blasting materials.

Surface Preparation

The concrete and steel surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the polyester concrete. Surface cleaning shall be by abrasive blasting. Precautions shall be taken to ensure that no dust or debris leaves the bridge deck and that all traffic is protected from rebound and dust.

If the concrete or steel surfaces become contaminated, the contaminated areas shall be recleaned by abrasive blasting.

Application of Prime Coat

Application of the HMWM prime coat and the polyester concrete shall not begin if rain is forecast within 12-hours of completion of the Work. The area receiving the prime coat shall be dry and had no rain within the past 12 hours. Immediately prior to applying the prime coat, the surfaces shall be cleaned to remove accumulated dust and any other loose material.

The concrete bridge deck surface shall be between 50F and 85F when applying the prime coat.

The Contractor shall apply one coat of promoted/initiated wax-free HMWM resin to the prepared concrete and steel surfaces immediately before placing the polymer concrete. The promoted/initiated resin shall be worked into the concrete in a manner to assure complete coverage of the area receiving polyester concrete. A one pint sample of each batch of promoted/initiated HMWM resin shall be retained and submitted to the Engineer at the time of primer application.

The prime coat shall cure for 30 minutes minimum before beginning placement of the polyester concrete. Placement of the polymer concrete shall not proceed until the Engineer verifies that the HMWM resin was properly promoted and initiated, as evidenced by the HMWM batch sample.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed.

Mixing Equipment for Polyester Concrete

Polyester concrete shall be mixed in mechanically operated mixers in accordance with the mix design as approved by the Engineer. The mixer size shall be limited to a nine cubic yard maximum capacity, unless otherwise approved by the Engineer.

The aggregate and resin volumes shall be recorded for each batch along with the date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each work shift.

The Contractor shall prevent any cleaning chemicals from reaching the polyester mix during the mixing operations.

Mixing Components

The polyester resin binder in the polyester modified concrete shall be approximately 12 percent by weight of the dry aggregate. The Contractor shall specify the exact percentage in the mix design Working Drawing submittal.

The polyester resin binder shall be initiated and thoroughly blended just prior to mixing the aggregate and binder. The polyester concrete shall be thoroughly mixed prior to placing.

Polyester Concrete Placement

The polyester concrete shall be placed within two hours of placing the prime coat.

Polyester concrete shall be placed within 15 minutes following initiation. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area receiving the polyester concrete shall be the same as specified above for the HMWM prime coat.

The polyester concrete shall be consolidated in accordance with the manufacturer's recommendations.

Finished Polyester Concrete Surface

The finished surface of the polyester concrete shall be smooth and uniform as to crown and grade in accordance with Section 6-02.3(10)D3.

Finishing equipment used shall strike off the polyester concrete to the established grade and cross section.

The polyester concrete shall receive an abrasive sand finish. The sand finish shall be applied by hand immediately after strike-off and before gelling occurs. Sand shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard.

Curing

The polyester concrete shall be cured in accordance with the manufacturer's recommendations. The Contractor shall measure the compressive strength of the cured polyester concrete with a rebound hammer in accordance with ASTM C 805. The readings of the rebound hammer used shall be correlated to the compressive strength of the polyester concrete product in accordance with ASTM C 805 Section 5.4, and the Contractor shall submit a Type 1 Working Drawing of this correlation.

Traffic and equipment shall not be permitted on the polyester concrete until it achieves a compressive strength of 2500 psi based on the rebound hammer readings and the correlation chart for the rebound hammer used.

(January 7, 2019)

Elastomeric Concrete

Elastomeric concrete shall be composed of the following three components – two-component polyurethane resin binder, and aggregate, in accordance with Section 6-02.2 as supplemented in these Special Provisions.

Manufacturer's Technical Representative

The Contractor shall have the services of a qualified elastomeric concrete manufacturer's technical representative physically present at the job site. The manufacturer's technical representative shall assist the Contractor in training the Contractor's personnel and providing technical assistance in preparing the header blockout surface, applying primer, and mixing, placing, and curing the elastomeric concrete.

Delivery and Storage of Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, and quantity. Each shipment of polyurethane resin binder shall be accompanied by a Safety Data Sheet (SDS).

The materials shall be stored in accordance with the manufacturer's recommendations.

Sufficient material to perform the entire elastomeric concrete application shall be in storage at the site prior to any field preparation.

Equipment and Containment

The Contractor shall submit a Type 1 Working Drawing consisting of all equipment for cleaning the concrete and steel surfaces, and mixing and applying the elastomeric concrete.

The abrasive blasting materials shall be contained and restricted to the surface receiving the elastomeric concrete only and shall not escape to the surrounding environment. The Contractor shall submit a Type 1 Working Drawing consisting of the method and materials used to collect and contain the abrasive blasting materials.

Surface Preparation

The concrete and steel surfaces shall be prepared by removing all material which may act as a bond breaker between the surface and the elastomeric concrete, including the removal of all loose, deteriorated, or otherwise unsound concrete. Steel surfaces shall be cleaned and prepared to an SSPC SP-10 surface condition. Surface cleaning shall be by abrasive blasting.

Precautions shall be taken to ensure that no dust or debris leaves the bridge deck and that all traffic is protected from rebound and dust.

If the concrete or steel surfaces become contaminated, the contaminated areas shall be recleaned by abrasive blasting.

Freshly placed concrete shall be cured for a minimum of 14 calendar days before application of primer and elastomeric concrete.

Application of Prime Coat

Application of the prime coat and the elastomeric concrete shall not begin if rain is forecast within 12-hours of completion of the Work. The area receiving the prime coat shall be dry and had no rain within the past 12 hours. Immediately prior to applying the prime coat, the surfaces shall be cleaned to remove accumulated dust and any other loose material.

The concrete bridge deck surface shall be between 50F and 85F when applying the prime coat.

The Contractor shall apply primer in accordance with the elastomeric concrete manufacturer's recommendations and shall limit the extent of primer application to that surface area that can be covered by a layer of elastomeric concrete before primer cure.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed.

Mixing Components

The Contractor shall mix the elastomeric concrete components and the resultant mixture in accordance with the equipment and procedure recommended by the elastomeric concrete manufacturer.

Elastomeric Concrete Placement

The elastomeric concrete shall be placed on the liquid prime coat within the time limits specified by the manufacturer. Elastomeric concrete shall be placed in layers not to exceed the maximum depth recommended by the elastomeric concrete manufacturer. At locations deep enough to require placement of multiple layers of elastomeric concrete, each layer shall be cured, and the top of the previous layer roughened, as recommended by the elastomeric concrete manufacturer before placement of the next layer.

Elastomeric concrete shall be placed within five minutes of initiation.

The surface temperature of the area receiving the elastomeric concrete shall be the same as specified above for the prime coat.

Finished Elastomeric Concrete Surface

The finished surface of the elastomeric concrete shall be smooth and uniform as to crown and grade in accordance with Section 6-02.3(10)D3.

Finishing tools or equipment used shall strike off the elastomeric concrete to the established grade and cross section.

The finished surface of elastomeric concrete shall receive an abrasive sand finish. The sand finish shall be applied by hand immediately after strike-off and before gelling occurs. Sand shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard.

Curing

The elastomeric concrete shall be cured in accordance with the manufacturer’s recommendations. The Contractor shall measure the compressive strength of the cured elastomeric concrete with a rebound hammer in accordance with ASTM C805. The readings of the rebound hammer used shall be correlated to the compressive strength of the elastomeric concrete product in accordance with ASTM C805 Section 5.4, and the Contractor shall submit a Type 1 Working Drawing of this correlation.

Traffic and equipment shall not be permitted on the elastomeric concrete until it achieves a compressive strength of 2500 psi based on the rebound hammer readings and the correlation chart for the rebound hammer used.

Proportioning Materials

Section 6-02.3(2) is supplemented with the following:

(September 8, 2020)
Expansion Joint Header Concrete
Expansion joint header concrete shall have a minimum compressive strength of 4,000 psi at 28 days. Unless the Plans or Special Provisions specify a different strength, the concrete shall achieve a minimum compressive strength of 2,500 psi based on early break cylinders prior to allowing traffic to pass across the expansion joint.

Type III cement conforming to Section 9-01.2(1) may be used.

The nominal maximum size aggregate shall be 1-1/2 inch.

Section 6-02.3(3) notwithstanding, non-chloride accelerating admixtures conforming to the following specifications may be used:

Admixture	**Specifications**
Accelerating	Section 9-23.6(4)
Water Reducing/Accelerating	Section 9-23.6(6)

Placing Concrete

Placing Concrete in Foundation Seals

Section 6-02.3(6)B is supplemented with the following:

(June 26, 2000)
If, in the opinion of the Engineer, water conditions at the time of construction do not require seals for footing construction, the Engineer may specify that the seals be omitted. In such a case the Contractor shall lower and construct the footing, as shown in the Plans, at the elevation shown in the Plans for the bottom of seal. The height of the pier shaft or columns shall be adjusted accordingly.

No adjustment will be allowed in the unit contract prices for concrete, steel reinforcing bar, and excavation by reason of any increase or decrease in quantities involved due to the deletion of seals.

(June 26, 2000)
If, in the opinion of the Engineer, water conditions at the time of construction do not require seals for construction, the Engineer may specify that the seals be omitted. In such a case, the Contractor shall excavate only to the bottom of footing elevation and shall construct the footing as shown in the Plans.

No adjustment will be allowed in the unit contract prices for concrete, steel reinforcing bar, and excavation by reason of any increase or decrease in quantities involved due to the deletion of seals.

Precast Concrete Panels

Shop Drawings

The list included in the third paragraph of Section 6-02.3(9)A is supplemented with the following:

(September 8, 2020)

7. Construction sequence and method of forming the precast prestressed concrete stay-in-place panels.

8. Details of additional reinforcement, if any, provided at lifting and support locations.

9. Method and equipment used to support the precast prestressed concrete stay-in-place panels during storage, transporting, and erection.

10. Method used to identify the precast prestressed concrete stay-in-place panel's location for calculating its position accounting for profile grade and transverse slope, and for ensuring correct placement during erection.

11. Erection sequence, including the method of lifting the panels, placing and adjusting the panels to proper alignment and grade, and supporting the panels during leveling and grouting operations.

12. Method for forming the grout pad on the exterior face of the prestressed concrete girder flange, if an alternative method is proposed, and at the interior face of the stay-in-place panel to the dimensions detailed in the Plans.

Finishing

Section 6-02.3(9)E is supplemented with the following:

(September 8, 2020)

The Contractor shall furnish a Class 2 surface finish, as specified in Section 6-02.3(14)B, on all surfaces of the precast prestressed concrete stay-in-place panels, except as otherwise noted. The top surface of all panels shall be textured using a metal tined comb. It shall leave striations in the fresh concrete ¼-inch deep by at least 1/8-inch wide, spaced at 2 to 3 times the groove width apart, and oriented perpendicular to the prestressing strand. The timing and method used shall produce the required texture without displacing larger particles of aggregate. Areas of mortar buildup more than 1/4 inch above the top surface of the panel shall be removed.

Tolerances

Section 6-02.3(9)F is supplemented with the following:

(September 8, 2020)
The precast prestressed concrete stay-in-place panels shall not exceed the following scalar tolerances:

Length (perpendicular to strands):	± 3/16 inch
Width (parallel to strands):	± 1/4 inch
Thickness:	+ 1/4, -1/8 inch
Squareness (difference in diagonal lengths):	± 1/4 inch per 5 feet, ± 1/2" max.
Vertical location of strand group C.G.:	± 1/16 inch
Vertical location of individual strands:	± 1/8 inch
Horizontal location of strands:	± 1/4 inch
Strand or bar projection from ends:	± 1/2 inch
Camber (either upward or downward) at time of placement on structure:	± 1/4 inch per ten feet

Precast prestressed concrete stay-in-place panels with tolerances exceeding those specified above, or with hairline cracks visibly apparent radiating from the strand at the end of the panel and extending more than three inches along the panel will be subject to evaluation by the Engineer for possible rejection.

Handling and Storage

Section 6-02.3(9)G is supplemented with the following:

(September 8, 2020)
Precast prestressed concrete stay-in-place panels shall be maintained in a flat and level position, without any twisting, at all times. Supports shall be oriented transverse to the prestressed strands, extend the full width of the panel, and be located in a manner to minimize elastic and time-dependent deformation of the panels.

Unloading and reloading at a site other than the bridge site will be permitted only under the direct supervision of the Engineer. The panels shall not be stacked, unless otherwise allowed by the Engineer. If such permission is granted, the panel supports shall be in the same vertical plane and shall be of sufficient height to prevent damage to the lifting bar loops. The Contractor shall have received the Engineer's verification that the bottom panel of the stack is flat and level, without any twisting, prior to stacking additional panels. The Contractor shall not stack panels on top of adjacent girders of the structure.

Erection

Section 6-02.3(9)I is supplemented with the following:

(September 8, 2020)
The precast prestressed concrete stay-in-place panels shall be at least 60 days old at the time of placing bridge deck concrete. The Contractor shall place the panels atop the prestressed girders as shown in the Plans, adjusting the leveling bolts as required to match the level of adjacent panels and accommodate camber.

The grout pad shall be placed after the panels have been fully adjusted for grade and camber. The exposed portion of the grout pad forms that are intended to be left in place permanently shall be tinted to match the color of the adjacent concrete surfaces and shall be secured with an accepted adhesive or other method as accepted by the Engineer.

Prior to placing the bridge deck steel reinforcing bars and concrete, the Contractor shall place a backer rod at the intersection between panels as shown in the Plans. All intersections between panels shall be sealed to prevent leakage during concrete placement. Prior to placing the bridge deck concrete, the surface of the panels shall be cleaned of all foreign materials and saturated with water for a minimum of 4 hours before fresh concrete is placed.

Bridge Decks and Bridge Approach Slabs

Concrete Placement, Finishing, and Texturing

Section 6-02.3(10)D is supplemented with the following:

(August 4, 2008)
Repairing Slab Left Exposed After Removing Existing Curb or Sidewalk
The concrete exposed by the removal of the existing curb or sidewalk shall be removed to a depth of 1-inch below finished grade or to the top of the existing roadway deck steel reinforcing bars, whichever is less. The Contractor shall not remove concrete below the top of the existing steel reinforcing bars. The Contractor shall not damage the bond between the existing steel reinforcing bars and the concrete.

After roughening, cleaning and wetting the surface in accordance with Section 6-02.3(12), the Contractor shall place concrete over the surface to the finish grade of the adjacent concrete roadway deck using a modified Class 4000 concrete mix. The maximum aggregate size in the modified Class 4000 concrete mix shall be 3/8 inch. The finished portion of the deck shall have the same texture, slope and grade as that of the existing deck.

(August 4, 2008
Repairing Slab Left Exposed After Removing Existing Curb and Railbase
After roughening and cleaning the concrete exposed by the removal of the existing curb and railbase, that portion of the exposed surface not covered by the new traffic barrier shall be coated with epoxy mortar and finished to have the same texture, slope and grade as that of the existing deck.

(August 3, 2015)
Bridge Drain Risers

The Contractor shall submit a Type 2 Working Drawing consisting of the method of removing the bridge drain grate nipple extrusion, the method of grinding the existing curb as necessary for bridge drain riser installation, and the method of cleaning the existing drain casting surfaces in contact with the drain risers. The shop drawings and weld procedures for the drain riser assemblies shall be submitted in accordance with Sections 6-03.3(7) and 6-03.3(25).

The existing bridge drain grate bolt, debris from removing the nipple extrusion and cleaning the drain casting contact surfaces, and all debris in the bridge drain cavity, shall be disposed of in accordance with Section 2-02.3.

After cleaning the bridge drain casting contact surfaces, the Contractor shall install the spacer bars and riser bars of the bridge drain riser assembly as shown in the Plans.

All exposed surfaces of the spacer bars and riser bars following installation shall be painted with two coats of paint conforming to Section 9-08.1(2)F. Each coat shall have a minimum dry film thickness of two mils.

(August 4, 2008)
A minimum of four slotted holes, each 2 inches long and 3/4 inches high, shall be provided on each bridge drain riser. The slotted holes shall be located at the bottom of the riser, two on the traffic side of the assembly and one each on the short ends of the assembly. Risers shall be installed to be flush with the proposed roadway profile and shall maintain uniform contact with the existing drain. This portion of work shall be completed prior to the installation of the membrane waterproofing.

The membrane waterproofing shall extend to the bottom of and all around the bridge drain riser, except that the Contractor shall ensure that the slotted holes of the bridge drain riser assembly remain open and unplugged by the membrane waterproofing. Water seeping under the overlay shall be allowed to drain through the slotted holes and into the bridge drains.

After all the items of work on this project have been completed, the Contractor shall clean and flush all the bridge drains.

(August 3, 2015)
Plugging Existing Bridge Drain

The Contractor shall submit a Type 2 Working Drawing consisting of the method and materials used to plug the existing bridge drains specified in the Plans to be plugged. The submittal shall include the following:

1. Material used to plug the drain outlet, and method of securing the plug in position.

2. The type of concrete material used to fill the drain cavity.

3. The method used to remove the exposed drainpipe, if removal is specified in the Plans.

All cut, damaged, and exposed metal surfaces to remain, including the drain outlet plug if metal components are used, shall be painted with two coats of paint conforming to Section 9-08.1(2)F. Each coat shall have a minimum dry film thickness of two mils.

When the removal of exposed drainpipe is specified in the Plans, the Contractor shall remove the embedded anchors a minimum of one inch beneath the existing concrete surface. The void left by removal of the embedded anchors shall be filled with mortar conforming to Section 9-20.4(2). The mortar shall match the color of the existing concrete surface as near as practicable.

All materials removed from the bridge drains specified in the Plans to be plugged shall be disposed of as specified in Section 2-02.3.

(April 6, 2015)
Core Drilled Bridge Deck Drain
The Contractor shall core drill drain holes through the bridge deck of the bridges and in the locations shown in the Plans. The Contractor shall grind the concrete bridge deck to provide a taper at the top of the cored hole if shown in the Plans. The Contractor shall contain, collect and dispose of the concrete cores and debris in accordance with Section 2-02.3.

The Contractor shall coat the surfaces of the cored holes with epoxy bonding agent, and shall set a bridge deck drain pipe sleeve in place as shown in the Plans. The Contractor shall ensure that the void between the cored hole surface and the outside of the pipe sleeve is completely filled with epoxy bonding agent. The Contractor shall take appropriate measures to prevent the epoxy bonding agent from escaping from the void and shall secure the pipe sleeve in position until the epoxy bonding agent is cured.

Bridge Approach Slab Orientation and Anchors

Section 6-02.3(10)F is supplemented with the following:

(August 4, 2008)
The pavement end of the bridge approach slab shall be constructed parallel to the pavement seat.

(August 4, 2008)
The pavement end of the bridge approach slab shall be constructed parallel to the pavement seat for bridge(s) No. *** $$1$$ ***. The pavement end of the bridge approach slab shall be constructed normal to the roadway center line for bridge(s) No. *** $$2$$ ***.

Expansion Joints

Section 6-02.3(13) is supplemented with the following:

Expansion Joint Modification

(April 6, 2015)
Expansion Joint Demolition Plan
The Contractor shall submit Type 2 Working Drawings showing the method of removing the specified portions of the existing bridge expansion joints. The Working Drawings shall show the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, and details of the methods and equipment used for containment, collection, and disposal of all debris. The Working Drawings shall show all stages of demolition.

(April 6, 2015)
Joint Preparation and Installation Procedure
The Contractor shall submit a Type 1 Working Drawing consisting of the sealant manufacturer's recommended joint preparation and installation procedure.

(April 6, 2015)
Field Measuring Existing Bridge Expansion Joints
The Contractor shall field measure the following dimensions of the existing bridge expansion joints of Bridge No(s). *** $$1$$ ***:

1. Length along the roadway surface and the horizontal and vertical surfaces of the concrete curb.

2. Opening width at both curb lines and at the centerline of the roadway surface.

The Contractor shall submit a Type 1 Working Drawing consisting of the field measured dimensions.

(April 6, 2015)
Removing Portions of Existing Bridge Expansion Joints
The Contractor shall remove all concrete, expansion joint materials, overlay, dirt and debris at the bridge expansion joints of Bridge No(s). *** $$1$$ *** within the blockout dimensions shown in the Plans.

Concrete removal shall conform to Section 2-02.3(2)A2 and the following restriction on power driven tools:

1. Jack hammers no heavier than the nominal 30 pound class.

2. Chipping hammers no heavier than the nominal 15 pound class.

No other power driven equipment shall be used to remove concrete in the vicinity of the bridge expansion joints. The power driven tools shall be operated at angles less than 45 degrees as measured from the surface of the deck to the tool.

The Contractor shall dispose of all materials removed from the bridge expansion joints in accordance with Section 2-02.3.

For polyester concrete headers, or elastomeric concrete headers, the Contractor shall clean and prepare all existing concrete surfaces bonding to the header in accordance with the ***Polyester Concrete*** or ***Elastomeric Concrete*** subsection, respectively, to Section 6-02.3 as supplemented in these Special Provisions. For concrete headers, the Contractor shall clean and prepare all existing concrete surfaces bonding to the header in accordance with Section 6-02.3(12)B.

(April 6, 2015)
Drilling Holes and Setting Steel Reinforcing Bars

The Contractor shall drill holes for, and set, steel reinforcing bars into the existing concrete as shown in the Plans in accordance with Section 6-02.3(24)C as supplemented in these Special Provisions.

(April 6, 2015)
Placing Polyester Concrete or Elastomeric Concrete Headers

The Contractor shall form the polyester concrete or the elastomeric concrete headers in accordance with either the ***Polyester Concrete*** or the ***Elastomeric Concrete*** subsection to Section 6-02.3 as supplemented in these Special Provisions. The Contractor shall remove all forms from the bridge expansion joints after casting and curing the polyester concrete or the elastomeric concrete headers.

(September 8, 2020)
Placing Concrete Headers

The Contractor shall form, cast, and cure, the concrete headers in accordance with Section 6-02.3 and as shown in the Plans. Unless the Plans or Special Provisions specify a different strength, the concrete headers shall have attained a minimum compressive strength of 2,500 psi before the Contractor may allow traffic to pass across the expansion joint.

(September 8, 2020)
Placing Expansion Joint Sealant

The Contractor shall have the services of a qualified sealant manufacturer's technical representative physically present at the job site to assist in assuring the proper installation of the rapid cure silicone sealant, provide technical assistance for the use of the joint sealant, train the Contractor's personnel installing the joint sealant, and to observe and inspect the installation of at least the first complete joint.

The joint sealant shall not be placed against concrete until at least seven days after concrete placement. The joint sealant shall not be placed against polyester concrete or elastomeric concrete until a time period recommended by the sealant manufacturer.

The Contractor shall clean the bridge expansion joints of all forms, dirt, form oil, grease, and other deleterious material. The Contractor shall clean and prepare the entire joint surface receiving the joint sealant in accordance with the manufacturer’s joint preparation procedure, and as recommended by the sealant manufacturer's technical representative, including two stage abrasive blasting surface preparation and compressed air cleaning. All steel surfaces to

be in contact with the joint sealant shall be cleaned to an SSPC-SP10 condition. The joint receiving the sealant shall be sound, clean, dry, and frost free.

After the cleaned and prepared joint has received the Engineer's acceptance for joint dimensions, alignment, and preparation, the Contractor shall apply the primer, as recommended by the sealant manufacturer, to all surfaces to be in contact with the joint sealant. The primer shall dry and cure for the time period recommended by the sealant manufacturer for the surface type.

After the primer is cured, the Contractor shall place the backer rod, and place the rapid cure silicone sealant in accordance with the joint installation procedure.

If the joint width at the time of installation is less than 1-inch or greater than three inches, the Contractor shall not proceed with the expansion joint modification until the installation procedure is revised as recommended by the sealant manufacturer's technical representative.

After installing the rapid cure silicone sealant, the Contractor shall flood the joint area with water. If leakage is detected, the bridge expansion joint system shall be repaired by the Contractor, as recommended by the sealant manufacturer.

(September 8, 2020)
Placing Expansion Joint Sealant

The Contractor shall have the services of a qualified sealant manufacturer's technical representative physically present at the job site to assist in assuring the proper installation of the rapid cure silicone sealant, provide technical assistance for the use of the joint sealant, train the Contractor's personnel installing the joint sealant, and to observe and inspect the installation of at least the first complete joint.

Prior to scarifying the concrete deck for the modified concrete overlay, the Contractor shall remove all expansion joint materials and debris from the existing expansion joints, and shall dispose of these materials and debris as specified in Section 2-02.3.

Prior to placing the modified concrete overlay, the Contractor shall install a temporary form as shown in the Plans to fill the expansion joint gap. The temporary form shall preserve the expansion joint gap during the modified concrete overlay placement, and shall not damage the joint or the concrete overlay upon removal. The Contractor shall submit Type 2 Working Drawing consisting of the type of temporary form material, and the method of installation and removal.

The joint sealant shall not be placed against concrete (including concrete overlay except for polyester concrete overlay) until at least seven days after concrete placement.

After placing the modified concrete overlay and rounding the corner of the overlay at the joints with a 3/8 inch radius, the Contractor shall clean the bridge expansion joints of all temporary forms, dirt, form oil, grease, and other deleterious material. The Contractor shall clean and prepare the entire joint surface receiving the joint sealant in accordance with the manufacturer’s joint

preparation procedure, and as recommended by the sealant manufacturer's technical representative, including two stage abrasive blasting surface preparation and compressed air cleaning. All steel surfaces to be in contact with the joint sealant shall be cleaned to an SSPC-SP10 condition. The joint receiving the sealant shall be sound, clean, dry, and frost free.

After the cleaned and prepared joint has received the Engineer's acceptance for joint dimensions, alignment, and preparation, the Contractor shall apply the primer, as recommended by the sealant manufacturer, to all surfaces to be in contact with the joint sealant. The primer shall dry and cure for the time period recommended by the sealant manufacturer for the surface type.

After the primer is cured, the Contractor shall place the backer rod, and place the rapid cure silicone sealant in accordance with the joint installation procedure.

If the joint width at the time of installation is less than 1-inch or greater than three inches, the Contractor shall not proceed with the expansion joint modification until the installation procedure is revised as recommended by the sealant manufacturer's technical representative and as approved by the Engineer.

After installing the rapid cure silicone sealant, the Contractor shall flood the joint area with water. If leakage is detected, the bridge expansion joint system shall be repaired by the Contractor, as recommended by the sealant manufacturer.

Modular Expansion Joint System

Section 6-02.3(13)C is supplemented with the following:

(September 8, 2020)
Acceptable Manufacturers
The following manufacturers are known to have prequalified modular expansion joint system details by successfully completing fatigue testing in accordance with Section 6-02.3(13)C:

1. The D.S. Brown Company
   P.O. Box 158
   300 E. Cherry Street
   North Baltimore, Ohio 45872-0158
   Tel. (419) 257-3561
   Fax (419) 257-2200
   www.dsbrown.com

2. Watson Bowman ACME Corporation
   95 Pineview Drive
   Amherst, New York 14228-2166
   Tel. (716) 691-7566
   Fax (716) 691-9239
   www.wbacorp.com

3. Mageba USA, LLC
   575 Lexington Ave FI-4
   New York, New York 10022-6146

Tel. (212) 644-3335
Fax (212) 644-3339
www.magebausa.com

Design Axle Loads and Impact Factors

The vertical load range for fatigue design shall be a 32.0 kip tandem. This tandem shall be taken as two 16.0 kip axles spaced four feet apart. Only one of these tandem axles must be considered in the design, unless the joint opening exceeds four feet. The load range shall be increased by the dynamic load allowance (Impact Factor) of 75%. Load factors shall be applied in accordance with Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

The vertical load for strength design shall be a 50.0 kip tandem. This tandem shall be taken as two 25.0 kip axles spaced four feet apart. Only one of these tandem axles must be considered in the design, unless the joint opening exceeds four feet. This load shall be increased by the dynamic load allowance (Impact Factor) of 75%. Load factors shall be applied in accordance with Table 3.4.1-1 of the AASHTO LRFD Bridge Design Specifications, current edition and latest interims.

The horizontal load range for fatigue design shall be *** $$1$$ *** percent of the amplified vertical load range (LL+IM) specified above. For modular expansion joint systems installed on vertical grades in excess of five percent, the horizontal component of the amplified vertical load range (LL+IM) specified above shall be added to this horizontal load range.

The horizontal load for strength design shall be 20 percent of the amplified vertical load (LL+IM) specified above. For modular expansion joint systems installed on vertical grades in excess of five percent, the horizontal component of the amplified vertical load (LL+IM) specified above shall be added to this horizontal load.

Fatigue Testing Laboratory

The following facilities are known to be capable of performing the fatigue testing specified in Section 6-02.3(13)C:

1. Structural Engineering Testing Laboratory (SETL)
   University of Washington
   Seattle, WA
   SETL Director:
   Dr. Dawn Lehman: (206) 715-2108
   SETL Manager
   Vince Chaijaroen: (206) 543-7433

2. Bowen Laborabory
   Purdue University
   West Lafayette, IN
   Director of Bowen Laboratory:
   Dr. Amit Varma: (765) 496-3419

3. ATLSS Engineering Research Center

Lehigh University
Bethlehem, PA
ATLSS Engineering Research Center Director:
Dr. Richard Sause: (610) 758-3565
ATLSS Engineering Research Center Administrative Director:
Dr. Chad Kusco: (610) 758-5299

Finishing Concrete Surfaces

Pigmented Sealer for Concrete Surfaces

Section 6-02.3(14)C is supplemented with the following:

(April 6, 2009)
The color of the pigmented sealer shall be Washington Gray.

(April 6, 2009)
The color of the pigmented sealer shall be Mt. St. Helens Gray.

(April 6, 2009)
The color of the pigmented sealer shall be Mt. Baker Gray.

(April 6, 2009)
The color of the pigmented sealer shall be Cascade Green.

(April 6, 2009)
The color for the following structure feature(s) shall match the specified color(s):

Structure and Feature	Pigmented Sealer Color
*** $$1$$ ***	*** $$2$$ ***

Falsework and Formwork

Falsework and Formwork at Special Locations

Section 6-02.3(17)C is supplemented with the following:

(October 3, 2022)
Falsework opening over railroad tracks shall be approved by the Railroad Company in accordance with Section 1-07.28 and the Special Provisions. The Contractor shall notify the Railroad Company at least *** $$1$$ *** working days prior to erecting falsework over a track, and shall include the dimensions of the opening and the duration of the restricted clearance in the submittal.

Concrete Forms on Steel Spans

The first paragraph of Section 6-02.3(17)K is revised to read as follows:

(August 3, 2015)
Except as otherwise specified, concrete forms on all steel structures shall be removable and shall not remain in place. Where needed, the forms shall have openings for truss or girder members. Each opening shall be large enough to

leave at least 1-1/2 inches between the concrete and steel on all sides of the steel member after the forms have been removed. Unit contract prices cover all costs related to these openings.

Permanent metal forms may be used to form that portion of the concrete slab inside the webs of the steel box girders, subject to the following requirements:

1. Metal forms shall be 18 gage minimum thickness, zinc coated, steel sheet conforming to ASTM A 653 Coating Designation G 210. All accessories shall conform to ASTM A 36 or Section 9-06.1 with a zinc coating of 2.0 ounces per square foot.

2. Forms shall be designed by the Contractor to support the plastic concrete, metal forms, steel reinforcing bars, and a construction live load of 60 pounds per square foot. Deflection of the metal form shall not exceed 1/360 of the span. Camber of the metal form shall not exceed the anticipated deflection. The working unit stress shall not exceed 0.725 of the specified yield strength of the metal form material.

3. The metal forms shall provide for the full depth of the deck slab above the uppermost portions of the form. Bottom transverse steel reinforcing bars of the deck slab shall be at least 1 inch clear of the metal forms at all points. Forms or supports shall not be welded to girder flanges.

4. The bridge deck concrete shall be placed continuously between the transverse construction joints shown in the Plans, except in an emergency when the Engineer authorizes an interruption in the concrete placement. In such an emergency, the Contractor shall construct a transverse joint at the bottom of a flute and shall field drill 1/4 inch weep holes through the metal form at 12 inch centers along the line of the joint.

5. All zinc coating on exposed metal form damaged or removed during construction shall be repaired with one coat of paint conforming to Section 9-08.1(2)B, two mils minimum dry film thickness.

6. Should the Engineer determine that inspection of the underside of the hardened slab is warranted, the Contractor shall remove at least one section of metal form in each span at no extra cost to the Contracting Agency. If excessive honeycomb or other defects are found, the Contractor shall, if required by the Engineer, remove additional form sections at no additional expense to the Contracting Agency, and shall revise concrete placing methods as required to produce sound concrete. All unacceptable concrete shall be removed or repaired.

7. Complete layout, details, and a description of materials, for the permanent metal forms shall be included in the Contractor's falsework and formwork submittal as specified in Section 6-02.3(16).

8. No adjustment will be made to the lump sum contract price for "Bridge Deck - ____" for additional quantities of materials required because of the use of the permanent forms.

Placing Anchor Bolts

Section 6-02.3(18) is supplemented with the following:

(January 3, 2011)
Resin Bonded Anchors

The embedment depth of the anchors shall be as specified in the Plans. If the embedment depth of the anchor is not specified in the Plans then the embedment depth shall be as specified in the table of minimum and maximum torque below.

The anchors shall be installed in accordance with the resin manufacturer's written procedure.

Holes shall be drilled as specified in the Plans. Holes may be drilled with a rotary hammer drill when core drilling is not specified in the Plans. If holes are core drilled, the sides of the holes shall be roughened with a rotary hammer drill after core drilling.

Holes shall be prepared in accordance with the resin manufacturer's recommendations and shall meet the minimum requirements as specified herein. Holes drilled into concrete shall be thoroughly cleaned of debris, dust, and laitance prior to installing the threaded rod and resin bonding material. Holes shall not have any standing liquid at the time of installation of the threaded anchor rod.

The anchor nuts shall be tightened to the following torques when the embedment equals or exceeds the minimum embedment specified.

Anchor Diameter (inch)	Minimum Torque (ft-lbs)	Maximum Torque (ft-lbs)	Minimum Embedment (Inch)
3/8	12	18	3-3/8
1/2	22	35	4-1/2
5/8	55	80	5-5/8
3/4	106	140	6-3/4
7/8	165	190	7-7/8
1	195	225	9
1-1/4	370	525	11-1/4

When the anchor embedment depth is less than the minimum values specified, the anchor nuts shall be tightened to the torque values specified in the Plans, or as recommended by the resin bonded anchor system manufacturer and approved by the Engineer.

Reinforcement

Placing and Fastening

Section 6-02.3(24)C is supplemented with the following:

(September 8, 2020)
Drilling Holes for, and Setting, Steel Reinforcing Bar Dowels
Where called for in the Plans, holes shall be drilled into existing concrete to the size and dimension shown in the Plans. The Contractor may use any method for drilling the holes provided the method selected does not damage the concrete and the steel reinforcing bar that is to remain. Core drilling will be required when specifically noted in the Plans.

The Contractor shall exercise care in locating and drilling the holes to avoid damage to existing steel reinforcing bars and concrete. Location of the holes may be shifted slightly with the acceptance of the Engineer in order to avoid damaging the existing steel reinforcing bars. All damage caused by the Contractor's operations shall be repaired by the Contractor in accordance with Section 1-07.13.

Steel reinforcing bars shall be set into the holes noted in the Plans with epoxy resin. The holes shall be cleaned before placing the resin.

The Contractor shall demonstrate, to the satisfaction of the Engineer, that the method used for setting the steel reinforcing bars completely fills the void between the steel reinforcing bar and the concrete with epoxy resin. Dams shall be placed at the front of the holes to confine the epoxy and shall not be removed until the epoxy has cured in the hole.

Cast-in-Place Prestressed Concrete

The third paragraph of Section 6-02.3(26) is revised to read as follows:

(January 4, 2010)
Before tensioning, the Contractor shall remove all side forms from the girders. The Contractor shall not release the falsework supporting the superstructure, and shall not place construction loads and other live loads on the superstructure, until the job-cured 2-inch grout cubes, fabricated in accordance with WSDOT TM 813, reach a minimum compressive strength of 800 psi in accordance with WSDOT FOP for AASHTO T 106.

Measurement

Section 6-02.4 is supplemented with the following:

(September 8, 2020)
*** $$1$$ *** contains the following approximate quantities of materials and work:

*** $$2$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for accepted changes will be made in the lump sum Contract price for *** $$3$$ *** even though the actual quantities required may deviate from those listed.

(September 8, 2020)
"Modular Expansion Joint System___" contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for accepted changes will be made in the applicable modular expansion joint system lump sum Contract price for "Modular Expansion Joint System___" even though the actual quantities required may deviate from those listed.

(September 8, 2020)
Expansion joint modification contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for accepted changes will be made in the lump sum Contract price for "Expansion Joint Modification___" even though the actual quantities required may deviate from those listed.

(August 6, 2012)
Epoxy crack sealing will be measured by the linear foot along the sealed crack at the concrete surface.

(June 26, 2000)
Modify bridge drain will be measured per each for each bridge drain modified.

(June 26, 2000)
Plugging existing bridge drain will be measured per each for each bridge drain plugged.

(April 6, 2015)
Core drilled bridge deck drain will be measured per each for each bridge deck drain core drilled and completed with a PVC pipe sleeve.

(April 6, 2015)
Longitudinal seismic restrainer will be measured per each.

(September 8, 2020)
Seismic retrofit contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for

accepted changes will be made in the lump sum Contract price for “Seismic Retrofit - _____” even though the actual quantities required may deviate from those listed.

(September 8, 2020)
Column jacketing contains the following approximate quantities of materials and work:

*** $$1$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for accepted hanges will be made in the lump sum Contract price for “Column Jacketing - _____” even though the actual quantities required may deviate from those listed.

Payment

The fifth and sixth bid items under Section 6-02.5 are supplemented with the following:

(April 6, 2015)
The contract quantity specified for “Steel Reinf. Bar for Bridge” includes the quantity for the epoxy-coated steel reinforcing bars located in the substructure of the bridge(s) included in this project.

Section 6-02.5 is supplemented with the following:

(August 2, 2010)
“Bridge Deck - _____”, lump sum.
The lump sum contract price for “Bridge Deck - _____” shall be full pay for constructing the reinforced concrete portions of the steel bridge superstructure, including *** $$1$$ ***.

(April 6, 2015)
“Expansion Joint Modification ___”, lump sum.

(August 1, 2011)
“Epoxy Crack Sealing”, per linear foot.

Payment for taking and submitting cores to the Engineer for testing, as specified by the Engineer, will be by force account in accordance with Section 1-09.6. For the purpose of providing a common Proposal for all Bidders, the Contracting Agency has entered an amount for the item “Force Account Epoxy Crack Sealing Cores” in the bid proposal to become a part of the total bid by the Contractor.

(June 26, 2000)
“Modify Bridge Drain”, per each.

(June 26, 2000)
“Plugging Existing Bridge Drain”, per each.

(June 26, 2000)
All costs in connection with *** $$1$$ *** bridge drains as specified shall be included in the unit contract price per square yard for *** $$2$$ ***.

(April 6, 2015)
"Core Drilled Bridge Deck Drain", per each.

(April 6, 2015)
All costs in connection with constructing the core drilled bridge deck drains as specified shall be included in the ***$$1$$***.

(April 6, 2015)
"Longitudinal Seismic Restrainer", per each.

(April 6, 2015)
"Seismic Retrofit - _____", lump sum.

(April 6, 2015)
"Column Jacketing - _____", lump sum.

(June 26, 2000)
Bridge and Structures Minor Items
For the purpose of payment, such bridge and structures items as *** $$1$$ *** etc., for which there is no pay item included in the proposal, are considered as bridge and structures minor items. All costs in connection with furnishing and installing these bridge and structures minor items as shown and noted in the Plans and as outlined in these specifications and in the Standard Specifications shall be included in the *** $$2$$ ***

(June 26, 2000)
Bridge Supported Utilities
All costs in connection with placing *** $$1$$ *** through the superstructure of *** $$2$$ *** as shown in the Plans, including all *** $$3$$ ***, shall be included in the *** $$4$$. ***

(June 26, 2000)
No additional compensation will be made by reason of any delay or other expense to the Contractor caused by coordination with the utility company or by installing utility company furnished items. However, any unavoidable delays to the Contractor caused by coordination with the utility company or resulting from installing utility company furnished items will be adjusted in accordance with Section 1-08.8.

Steel Structures

Construction Requirements

Shop Plans

Erection Methods

The list in the second paragraph of Section 6-03.3(7)A is supplemented with the following:

(April 6, 2015)
8. If the Contractor selects a girder launching method as the erection procedure, the Contractor shall submit plan details of the nose beam, roller

assemblies, jacks, blocking, tow lines and control lines, and shall prepare an erection procedure that describes the method and equipment involved in the launching procedure, the elevation and alignment control and corrective measures enforced during the launching process, the methods of monitoring and adjusting the tow line and control line loads during the launching process, and the spare jacks, tow lines, control lines, and other critical field erection equipment provided to ensure a continuous and safe operations.

(April 6, 2015)

8. The method and equipment used to drill holes, and ream existing rivet holes following rivet removal, through and in the existing gusset plates and steel members.

Welding and Repair Welding

Section 6-03.3(25) is supplemented with the following:

(April 6, 2015)
Electroslag Welding - Narrow Gap (ESW-NG) Procedure
The ESW-NG procedure may be used for groove welds in bridge members and member components up to four inches thick subject to the following requirements:

Qualification Testing
Unless the Contractor submits previously performed qualification testing documents, the Contractor shall provide the opportunity for Contracting Agency representatives to witness all qualification testing.

HAZ Specimens, Type and Number of Tests for ESW-NG
For all compression members including ESW-NG of compression members, CVN testing of the HAZ is not required. However, for welds deposited by ESW-NG on tension and reversal members, additional CVN tests of the HAZ shall be performed to qualify the process. The CVN tests for the HAZ shall be the following:

1. Five specimens shall be removed from the quarter-thickness section of the HAZ on each side of the procedure qualification welded joint in accordance with the ESW-NG Tension Member CVN Test Plate Detail as shown in the Plans.

2. The weld fusion line shall be revealed by etching the transverse-to-weld section.

3. The notch location shall be in the base metal within 1/16 inch from the weld fusion line. If the weld curvature does not permit the entire notch to be placed within 1/16 inch from the fusion line, then one end of the notch shall be placed on the fusion line while the remaining portion of the notch extends away from the fusion line into the base metal.

If different grades of steel such as 36 and 50 or 50 and 50W are joined by ESW-NG, the procedure qualification tests shall be conducted on the same two grades

of steel. If transition joints between thick and thin members are made, the WPS shall be conducted on the same joint preparation (having the same thicknesses and joint transition slope). The heat affected zone CVN toughness specimens shall be extracted from both sides of the transition joint.

Test Results Required for ESW-NG

HAZ

For CVN toughness determination in welds carrying applied tensile stress, five specimens taken at the quarter-thickness location on both sides of the ESW-NG weld shall be tested. The highest and lowest values shall be discarded. The test is successful if the following criteria are achieved for the three remaining tests:

1. The average CVN toughness shall be a minimum of 15 foot-pounds at 40F.

2. No more than one specimen shall have a CVN toughness less than 15 foot-pounds at 40F.

3. No specimen shall have a CVN toughness value below 10 foot-pounds at 40F.

High Strength Bolt Holes

Reamed and Drilled Holes

The second sentence of the first paragraph of Section 6-03.3(27)B is revised to read:

(September 8, 2020)
Reamers and drills shall be directed mechanically, non hand-held, except as otherwise noted. The Contractor may ream and drill holes through *** $$1$$ *** of Bridge No(s) *** $$2$$ *** using hand-held reamers and drills, provided that the method and equipment used conforms to the erection plan as accepted by the Engineer in accordance with Section 6-03.3(7)A as supplemented in these Special Provisions. Unless otherwise shown in the Plans, all holes reamed and drilled for bolted connections with existing gusset plates and steel members shall be 1/16 inch larger than the bolt diameter specified in the Plans for the connection.

Shop Assembly

Method of Shop Assembly

Section 6-03.3(28)A is supplemented with the following:

(August 5, 2013)
The girders shall also be shop assembled either completely or progressively in the transverse direction. The transverse shop assembly shall consist of a minimum of two adjacent girders, with pier diaphragms, intermediate diaphragms and cross bracing, and temporary bracing between girders at the end of the shop assembly (longitudinally). Staging of the transverse shop assembly shall proceed along with the longitudinal shop assembly. Each next

stage of the transverse shop assembly shall be assembled to one of the previous transverse shop assemblies, repositioned if necessary, and pinned to ensure accurate alignment. Unless otherwise specified, the girders shall be blocked or supported in the no-load position.

After acceptance of the shop assembly by the Engineer, pier diaphragms, intermediate diaphragms and cross bracing utilized in the transverse shop assembly shall be removed from the girders and shipped to the bridge construction site each as individual units. Shop bolted connections in the diaphragms and cross bracing shall be completed and fully tightened to the minimum tension specified during the shop assembly. Fully tightened connections shall be inspected prior to shipping.

Check of Shop Assembly

Section 6-03.3(28)B is supplemented with the following:

(August 3, 2015)
If an assembly or stage of assembly is not accepted by the Engineer, deficiencies shall be corrected and the assembly or stage of assembly shall be resubmitted to the Engineer for acceptance.

Painting

Section 6-03.3(30) is supplemented with the following:

(August 3, 2009)
Paint for the new steel shall be applied in accordance with Section 6-07.3(9). The color of the top coat, when dry, shall match *** $$1$$ ***.

(April 6, 2015)
The Contractor shall paint all galvanized structural steel components of the following specified items in accordance with Section 6-07.3(11):

*** $$1$$ ***

The color of the top coat, when dry, shall match *** $$2$$ ***.

Placing Superstructure

Section 6-03.3(38) is supplemented with the following:

(August 3, 2015)
All concrete located below the permanent location of the steel girders shall be completely covered to protect the concrete from staining from rusty water.

The Contractor shall submit a Type 2 Working Drawing consisting of a concrete surface protection plan. The submittal shall include, but not be limited to, describing all material components of the surface protection system, including material specifications and thicknesses of all components, dimensions of all sub-units and details of how the sub-units are assembled to create the combined system, the method of installing the system, including all means of fastening the system to or

holding the system against the concrete surfaces, the methods of maintaining the system in place during superstructure construction, and the methods of repairing damage to the system during superstructure construction.

Removal of the concrete surface protection system will be performed by Contracting Agency forces at a later date.

Swinging the Span

Section 6-03.3(39) is supplemented with the following:

(June 26, 2000)
The Contractor shall measure and submit to the Engineer camber values at the points indicated in the Plans at each of the following times:

1. After the spans are swung.

2. After roadway slab placement.

Measurement

Section 6-03.4 is supplemented with the following:

(August 6, 2007)
Structural low alloy steel contains the following approximate steel quantities:

Bridge	Quantity
*** $$1$$ ***	*** $$2$$ ***

Payment

The second bid item under Section 6-03.5 is supplemented with the following:

(August 6, 2007)
All costs in connection with furnishing and installing steel girder pipe railing as shown in the Plans shall be included in the lump sum Contract price for “Structural Low Alloy Steel”.

Section 6-03.5 is supplemented with the following:

(June 26, 2000)
All costs in connection with furnishing, installing, and maintaining the concrete surface protection system as specified shall be included in the *** $$1$$ ***.

Timber Structures

Construction Requirements

Storing and Handling Material

Section 6-04.3(1) is supplemented with the following:

(March 6, 2000)

The Contractor shall provide and maintain a water pump or pumps, and associated equipment adequate for use in fire control, on the project at all times. This requirement does not relieve the Contractor of responsibility as specified in Section 1-07.14.

(January 2, 2018)
After removing the existing timber deck and prior to installing the replacement timber deck, the Contractor shall clean the top contact surfaces of the supporting timber and steel stringers and floorbeams. After cleaning, the top contact surfaces shall be prepared as follows:

Steel Supporting Members
The top flanges of the steel stringers and floor beams shall be uniformly covered with a heavy coat of hot asphalt binder (Grade PG 58-22 or Grade PG 64-22 for Western Washington (west of the Cascade Mountain Crest), and Grade PG 64-28 for Eastern Washington (east of the Cascade Mountain Crest)) conforming to Section 9-02.1(4).

Timber Supporting Members
The Contractor shall furnish and install asphalt roofing felt over the top contact surface of all timber stringers, bridging, and blocking. The asphalt roofing felt shall be attached to the timber with 7/8 inch long galvanized roofing nails spaced at 2'-0" centers, unless otherwise shown in the Plans. The asphalt roofing felt shall weigh at least 65 pounds per one-hundred square feet and extend at least 2 inches on each side of the member being covered.

Payment

Section 6-04.5 is supplemented with the following:

(March 6, 2000)
All costs in connection with providing and maintaining fire control equipment at the construction and material storage site as specified shall be included in the *** $$1$$ ***.

(March 6, 2000)
All costs in connection with cleaning and preparing the top contact surfaces of the supporting timber and steel members as specified prior to redecking shall be included in the *** $$1$$ ***.

Piling

Materials

Section 6-05.2 is supplemented with the following:

(April 6, 2015)
Micropiles
Materials for micropiles shall consist of the following:
Admixtures for grout shall conform to Section 9-23.6. Admixtures that control bleed, improve flowability, reduce water content, and retard set may be used in the grout, subject to the review and acceptance of the Engineer. Admixtures shall be compatible with the

grout and mixed in accordance with the manufacturer's recommendations. Accelerators are not permitted. Admixtures containing chlorides are not permitted.

All cement shall be Portland cement conforming to Section 9-01.2(1).

Centralizers and spacers shall be fabricated from schedule 40 PVC pipe or tube, steel. Wood shall not be used. Centralizers and spacers shall be securely attached to the reinforcement; sized to position the reinforcement within 3/8 inch of plan location from center of micropile; sized to allow grout tremie pipe insertion to the bottom of the drillhole; and sized to allow grout.to freely flow up the drillhole and casing and between adjacent reinforcing bars.

Encapsulation (double corrosion protection) shall be shop fabricated using high-density, corrugated polyethylene tubing conforming to the requirements of AASHTO M 252 with a nominal wall thickness of 1/32 inch. The inside annulus between the reinforcing bars and the encapsulating tube shall be a minimum of 1/4 inch and be fully grouted with grout as defined below.

Epoxy coating shall conform to Section 9-07.3. Bearing plates and nuts encased in the micropile concrete footing need not be epoxy coated.

Fine aggregate for sand-cement grout shall be sand conforming to AASHTO M 45.

Grout shall be a neat cement or sand/cement mixture with a minimum seven day compressive strength of 4,000 psi in accordance with Section 9-20.3(4).

Steel pipe casing for micropiles shall have the diameter and at least the minimum wall thickness shown in the Working Drawings. Steel pipe casing shall conform to one of the following:

1. ASTM A 252, Grade 2 or 3. If the casing is to be welded, the carbon equivalency (CE) as defined in AWS D 1.1, Section Xl 5.1, shall not exceed 0.45, and the sulfur content shall not exceed 0.05 percent.

2. API 5L Grade X52 or better.

3. API 5CT Grade N80 or better.

4. Another equivalent steel pipe specification acceptable to the Engineer.

The manufacturer or fabricator of steel piling shall furnish a certificate of compliance in accordance with Section 1-06.3 stating that the piling being supplied conforms to these specifications. The certificate of compliance shall include test reports for tensile and chemical tests. Samples for testing shall be taken from the base metal, steel, coil or from the manufactured or fabricated piling. The certificate of compliance shall be in English units. As an alternative to steel pipe with mill certificate of compliance documentation, new structural grade or mill secondary steel pipe may be furnished for micropile casing without certified mill test reports under the following conditions:

1. The steel pipe shall meet or exceed the mechanical requirements of API 5L Grade X52 or better or API 5CT Grade N80 or better.

2. The CE shall not exceed 0.45 and the sulfur content shall not exceed 0.05 percent, if welding of the casing is required.

3. Two unique coupon tests with reports, conforming to ASTM A 370, including Annex A2, shall be provided for each truckload of pipe supplied.

4. The pipe shall be free of defects (dents, cracks, and tears).

The alternate testing for non-mill certified steel pipe is not permitted if domestic steel is required for the project.

Welded circumferential joints in pipe shall develop the strength of the pipe section. Threaded pipe joints shall develop at least the nominal resistance used in the design of the micropile.

Structural steel plates and shapes for micropile top attachments shall conform to either ASTM A 36 or ASTM A 572 Grade 50.

Reinforcing steel shall be deformed bars in accordance with Sections 9-07.4 or 9-07.11. When a bearing plate and nut are required to be threaded onto the top end of reinforcing bars for the micropile top to footing anchorage, the threading may be continuous spiral deformed ribbing provided by the bar deformations or may be cut into a reinforcing bar. If threads are cut into a reinforcing bar, the next larger bar number designation from that shown on the Plans shall be provided, at no additional cost to the Contracting Agency. Reinforcing bars for micropiles shall be epoxy coated in accordance with Section 6-02.3(24)H and 9-07.3.

Bar tendon couplers, if required, shall develop the ultimate tensile strength of the bars.

Construction Requirements

Section 6-05.3 is supplemented with the following:

(October 3, 2022)

Micropiles

General Requirements

The Contractor is responsible for the design, installation and testing of micropiles and micropile top attachments for this project. The Contractor shall select the micropile type, size, micropile top attachment, installation means and methods, shall estimate the ground-to-grout bond value, and shall determine the required grout bond length and final micropile diameter. The Contractor shall design and install micropiles that will develop the load capacities specified in the Plans. The micropile load capacities shall be verified by verification and proof load testing, and shall meet the test acceptance criteria specified in this Special Provision.

Contractor's Experience Requirements and Submittal

The micropile Contractor shall be experienced in the construction and load testing of micropiles and have successfully constructed at least three projects in the last five years involving construction totaling at least 50 micropiles of equal or greater capacity than required for this project. The Contractor shall submit construction details, structural details and load test results for at least three previous successful micropile load tests from different projects of similar scope to this project.

The micropile Contractor shall design the micropile system. The micropile system shall be designed by a Professional Engineer, licensed under Title 18 RCW State of Washington, with experience in the design and construction of at least three successfully completed micropile projects over the past five years, with micropiles of equal or greater capacity than required in these plans and specifications. The on-site foremen and drill rig operators shall also have experience on at least three projects over the past five years installing micropiles of equal or greater capacity than required for this project.

The Contractor shall submit a Type 2 Working Drawing consisting of the completed project reference list, including a brief project description with the owner's name and current phone numbers. This Working Drawing submittal shall also include a personnel list for the micropile system designer, supervising Engineer, drill rig operators and on-site foremen to be assigned to the project. The personnel list shall contain a summary of each individual's experience and be complete enough for the Engineer to determine whether each individual satisfies the required qualifications.

Definitions

Alignment Load (AL): A minimum initial load (5 percent FDL) applied to micropile during testing to keep the testing equipment correctly positioned.

Factored Design Load (FDL): The factored design load expected to be applied to the micropile. The factored design load (FDL) is as specified in the bridge Plans.

Maximum Test Load: The maximum load to which the micropile is subjected during testing. The load shall be 1.5 *x* FDL for verification load tests and 1.0 *x* FDL for proof load tests.

Proof Load Test: Incremental loading of a production micropile, recording the total movement at each increment.

Verification Load Test: Non-production micropile load test performed to verify the design of the micropile system and the construction methods proposed, prior to installation of production micropiles.

Micropile Design Requirements

The micropiles shall be designed to meet the specified loading conditions, as shown in the Plans. The Contractor shall design the micropiles, and the micropile top to footing connections using the Load and Resistance Factor Design (LRFD) method.

Steel pipe used for micropile permanent casing shall incorporate an additional 1/16 inch thickness of sacrificial steel for corrosion protection. Where required as shown in the Plans, corrosion protection of the internal steel reinforcing bars, consisting of encapsulation (double corrosion protection), epoxy coating, or grout, shall be provided in accordance with Section 6-05.2 as supplemented in these Special Provisions. Where permanent casing is used for a portion of the micropile, encapsulation shall extend at least five feet into the casing.

Micropile Design Submittals

The Contractor shall submit Type 3E Working Drawings consisting of complete design calculations and working drawings with all details, dimensions, quantities,

ground profiles, and cross-sections necessary to construct the micropile structure. The Contractor shall verify the limits of the micropile structure and ground survey data before preparing the detailed working drawings.

Design Calculations

Design calculations shall include the following items:

1. A written summary report which describes the overall micropile design and its compatibility with the anticipated subsurface conditions as described by the contract test hole boring logs, the Summary of Geotechnical Conditions provided in the Appendix to the Special Provisions, and the geotechnical report(s) prepared for this project.

2. Applicable code requirements and design references.

3. Micropile structure critical design cross-section(s) geometry including soil strata and piezometric levels and location, magnitude and direction of design applied loadings, including slope or external surcharge loads.

4. Design criteria including, soil shear strengths (friction angle and cohesion), unit weights, and ground-to-grout bond values and micropile drillhole diameter assumptions for each soil strata.

5. Load and resistance factors (for Load and Resistance Factor Design) used in the design of the ground-to-grout bond values, the ground-to-grout bond length, surcharges, soil/rock and material unit weights, steel, grout, and concrete materials.

   The bond zone for micropiles shall be below the following elevations:

   *** $$1$$ ***

6. Design calculation sheets with the project number, micropile structure location, designation, date of preparation, initials of designer and checker, and page number at the top of each page. An index page shall be included with the design calculations.

7. Design notes including an explanation of any symbols and computer programs used in the design.

8. Other design calculations as required.

Working Drawings

The Contractor shall submit Type 3E Working Drawings.

The working drawings shall include all information required for the construction and quality control of the piling. Working drawings shall include the following items:

1. A plan view of the micropile structure identifying:

   a. A reference baseline and elevation datum.

b. The offset from the construction centerline or baseline to the face of the micropile structure at all changes in horizontal alignment.

c. Beginning and end of micropile structure stations.

d. Right-of-way and permanent or temporary construction easement limits, location of all known active and abandoned existing utilities, adjacent structures or other potential interference. The centerline of any drainage structure or drainage pipe behind, passing through, or passing under the micropile structure.

e. Subsurface exploration locations shown on a plan view of the proposed micropile structure alignment with appropriate reference base lines to fix the locations of the explorations relative to the micropile structure.

2. An elevation view of the micropile structure(s) identifying:

a. Elevation view showing micropile locations and elevations; vertical and horizontal spacing; batter and alignment and the location of drainage elements (if applicable).

b. Existing and finish grade profiles both behind and in front of the micropile structure.

3. Design parameters and applicable codes.

4. General notes for constructing the micropile structure including the overall construction sequence, micropile installation sequence, means and methods to prevent damage to existing adjacent piles and micropiles, installation tolerances, and other special construction requirements.

5. Start date and time schedule and micropile installation schedule providing the following:

Micropile number
Micropile Factored Design Load
Type and size of reinforcing steel
Type and size of steel casing
Minimum total bond length
Total micropile length
Micropile top attachment

6. Micropile structure typical sections including micropile spacing and inclination; minimum drill hole diameter; pipe casing and reinforcing bar sizes and details; splice types and locations; centralizers and spacers; grout bond zone and casing plunge lengths and corrosion protection details; and connection details to the substructure footing, anchorage, plates, etc.

7. A typical detail of verification and production proof test micropiles defining the micropile length, minimum drill hole diameter, inclination, and load test bonded and unbonded test lengths.

8. Details, dimensions, and schedules for all micropiles, casing and reinforcing steel, including reinforcing bar bending details.

9. Details and dimensions for micropile structure appurtenances such as barriers, coping, drainage gutters, fences, etc. (if applicable).

10. Details for constructing micropile structures around drainage facilities (if applicable).

11. Details for terminating micropile structures and adjacent slope construction (if applicable).

When plan dimensions are changed due to field conditions or for other reasons, the Contractor shall submit revised Type 3E Working Drawings, including supporting design calculations. Within 30 days after completion of the work, the Contractor shall submit as-built drawings to the Engineer, conforming to the requirements specified for Type 3E Working Drawings in Section 1-05.3.

Construction Submittals

The Contractor shall submit Type 2E Working Drawings consisting of the following for the micropile system or systems to be constructed:

1. Discussion of how the Contractor's construction methods accommodate and are compatible with the anticipated subsurface conditions as described in the contract test hole boring logs, the Summary of Geotechnical Conditions provided in the Appendix to the Special Provisions, and the geotechnical report(s) prepared for this project.

2. If welding of casing is proposed, the Contractor shall submit the proposed welding procedure in accordance with Section 6-03.3(25).

3. Manufacturer's information, model, size, and type of equipment to be used for installing micropiles, with appropriate manufacturer's literature for review. Include detailed description of the drilling equipment and methods proposed to be used to provide drillhole support and prevent detrimental ground movements.

4. Information on headroom and space requirements for installation equipment that verify the proposed equipment can perform at the site. Plan describing how surface water, drill flush, and excess waste grout will be controlled, contained, collected, and disposed of.

5. Certified mill test reports for the reinforcing steel and certified mill test reports or independent test reports for non-mill certified steel casing used in micropile installation. The ultimate strength, yield strength, elongation, and material properties composition shall be included.

6. Grouting Plan. The plan shall include complete descriptions, details, and supporting calculations for the following:

a. Grout mix design and type of materials to be used in the grout including certified test data and trial batch reports.

b. Grouting equipment, including capacity and relation to the grouting demand and working conditions as well as provisions for back-up equipment and spare parts.

c. Types and sizes of grout hoses, connections, and grout delivery systems.

d. Methods and equipment for placing, positioning, and supporting the steel pipe casing and reinforcing bars. Centralizers and spacers shall permit the free flow of grout without misalignment of the reinforcing bar(s) and permanent casing.

e. Methods and equipment for accurately monitoring and recording the grout depth, grout volume and grout pressure as the grout is being placed. The Contractor shall estimate the grout take. There will be no extra payment for grout overruns.

f. Procedures and schedules for grout batching, mixing, and pumping including provisions for handling drilling fluid and for post grouting.

g. Grouting rate calculations, when requested by the Engineer. The calculations shall be based on the initial pump pressures or static head on the grout and losses throughout the placing system, including anticipated head of drilling fluid to be displaced.

h. Contingency procedures for handling blockage of ducts or equipment breakdowns.

i. Estimated curing time for grout to achieve specified strength. During production, grout shall be tested in accordance with the **Grout Testing** subsection of this Special Provision.

j. Procedure and equipment for Contractor monitoring of grout quality.

7. Detailed plans for the proposed micropile load testing method. This shall include all drawings, details, and structural design calculations necessary to describe the proposed test method, reaction load system capacity and equipment setup, types and accuracy of apparatus to be used for applying and measuring the test loads and micropile top movements in accordance with the **Micropile Load Tests** subsection of this Special Provision.

8. Calibration reports and data for each test jack, pressure gauge and master pressure gauge and electronic load cell to be used. The calibration tests shall have been performed by an independent testing laboratory within 90 calendar days of the date submitted.

9. Discussion of the Contractor's contingency plan if a verification load test or a proof load test fails.

Pre-construction Meeting

A pre-construction meeting will be scheduled by the Engineer and held prior to the start of micropile construction. The prime Contractor, micropile specialty Contractor, and excavation Contractor shall attend the meeting. The pre-construction meeting will be conducted to clarify the construction requirements for the work, to coordinate the construction schedule and activities, and to identify contractual relationships and delineation of responsibilities amongst the prime Contractor and the various subcontractors - specifically those pertaining to excavation for micropile structures, anticipated subsurface conditions, micropile installation and testing, micropile structure survey control and site drainage control.

Site Drainage Control

The Contractor shall control and properly dispose of drill flush and construction related waste, including excess grout, in accordance with Section 1-07.5(3) as supplemented in these Special Provisions and all applicable local codes and regulations. The Contractor shall provide positive control and discharge of all surface water that will affect construction of the micropile installation. The Contractor shall maintain all pipes or conduits used to control surface water during construction. The Contractor shall repair damage caused by surface water in accordance with Section 1-07.13. Upon substantial completion of the work, the Contractor shall remove surface water control pipes or conduits from the site. Alternatively, with the concurrence of the Engineer, pipes or conduits that are left in place may be fully grouted and abandoned or left in a way that protects the structure and all adjacent facilities from migration of fines through the pipe or conduit and potential ground loss.

Excavation

The Contractor shall coordinate the work and the excavation so the micropile structures are safely constructed. The Contractor shall perform the micropile construction and related excavation in accordance with the Plans and approved submittals.

Micropile Allowable Construction Tolerances

The centerline of piling shall not be more than 3 inches from indicated plan location.

The pile-hole alignment of vertical micropiles shall be plumb within 2 percent of total-length plan alignment. The pile-hole alignment of micropiles inclined up to 1:6 shall be within 4-percent of plan alignment. The pile-hole alignment of micropiles inclined greater than 1:6 shall be within 7-percent of plan alignment.

The top elevation of micropile shall be ± 1 inch maximum from vertical elevation indicated.

The centerline of reinforcing steel shall not be more than 1/2 inch from indicated location.

Drilling

The drilling equipment and methods shall be suitable for drilling through the conditions to be encountered, without causing damage to any overlying or adjacent structures or services. The drill hole shall be open along its full length to at least the design minimum drill hole diameter prior to placing grout and reinforcement.

Temporary casing or other approved method of micropile drill hole support will be required in caving or unstable ground to permit the micropile shaft to be formed to the minimum design drill hole diameter. The Contractor's proposed method(s) to provide drill hole support and to prevent ground movements shall have received the concurrence of the Engineer. Use of drilling fluid containing bentonite is not allowed.

Ground Heave or Subsidence

During construction, the Contractor shall observe the conditions in the vicinity of the micropile construction site on a daily basis for signs of ground heave or subsidence. The Contractor shall immediately notify the Engineer if signs of movements are observed. The Contractor shall immediately suspend or modify drilling or grouting operations if ground heave or subsidence is observed, if the micropile structure is adversely affected, or if adjacent structures are damaged from the drilling or grouting. If the Engineer determines that the movements require corrective action, the Contractor shall take corrective actions necessary to stop the movement or perform repairs.

When due to the Contractor's methods or operations or failure to follow the specified/approved construction sequence, the costs of providing corrective actions will be borne by the Contractor in accordance with Section 1-07.13.

Pipe Casing and Reinforcing Bars Placement and Splicing

Reinforcement may be placed either prior to grouting or placed into the grout-filled drill hole before temporary casing (if used) is withdrawn. Reinforcement surface shall be free of deleterious substances such as soil, mud, grease or oil. Micropile cages and reinforcement groups, if used, shall be sufficiently robust to withstand the installation and grouting process and the withdrawal of the drill casings without damage or disturbance. Grout shall provide one inch minimum cover over bare or epoxy coated bars (1/4-inch on bar couplers) or 1/2 inch minimum cover over the encapsulation of encapsulated bars.

The Contractor shall check micropile top elevations and adjust all installed micropiles to the planned elevations.

Permanent casing, if specified, shall be installed to the minimum tip elevations shown in the Plans.

Centralizers and spacers shall be provided at 10 feet centers maximum spacing. The upper and lower most centralizer shall be located a maximum of 5 feet from the top and bottom of the micropile. The central reinforcement bars with centralizers shall be lowered into the stabilized drill hole and set. The reinforcing steel shall be inserted into the drill hole to the desired depth. Bars shall not be driven or forced into the hole. The Contractor shall re-drill and reinsert reinforcing steel when necessary to facilitate insertion.

Lengths of casing and reinforcing bars to be spliced shall be secured in proper alignment and in a manner to avoid eccentricity or angle between the axes of the two lengths to be spliced. Splices and threaded joints shall meet the requirements of Section 6-05.2 as supplemented in these Special Provisions. Threaded pipe casing joints shall be located at least two casing diameters (OD) from a splice in any reinforcing bar. When multiple bars are used, bar splices shall be staggered at least one foot.

Grouting

Micropiles shall be primary grouted the same day the load transfer bond length is drilled. The Contractor shall complete the load transfer bond length drilling and primary grouting of a micropile before beginning work on another micropile in the same footing or pile cap.

Prior to grouting, the drill hole shall be flushed with water and/or air to remove drill cuttings.

The grouting equipment shall be colloidal mixers only and shall produce a grout free of lumps and undispersed cement. Contractor shall have means and methods of measuring the grout quantity and pumping pressure during the grouting operations. The grout pump shall be equipped with a pressure gauge to monitor grout pressures. A second pressure gauge shall be placed at the point of injection into the micropile top. The pressure gauges shall be capable of measuring pressures of 150 psi or twice the actual grout pressures used, whichever is greater. The grout shall be kept in agitation prior to mixing. Grout shall be placed within one hour of mixing. The grouting equipment shall be sized to enable each micropile to be grouted in one continuous operation.

The grout shall be injected from the lowest point of the drill hole and injection shall continue until uncontaminated grout flows from the top of the micropile. The grout may be pumped through grout tubes, casing, hollow-stem augers, or drill rods. Temporary casing, if used, shall be extracted in stages ensuring that after each length of casing is removed the grout level is brought back up to the ground level before the next length is removed. Additional grout shall be placed by the use of a tremie pipe at all times. The tremie pipe shall always extend below the level of the existing grout in the drill hole. The grout pressures and grout takes shall be controlled to prevent excessive heave or fracturing of rock or soil formations. Upon completion of grouting, the grout tube may remain in the hole, but must be filled with grout.

If the Contractor elects to use a postgrouting system, working drawings and details shall be submitted to the Engineer for review in accordance with the **Construction Submittals** subsection of this Special Provision.

Grout Testing

Grout within the micropile verification and proof test micropiles shall attain the minimum specified seven day design compressive strength prior to load testing. During placement of initial verification micropiles, proof test micropiles, and production micropiles, micropile grout will be sampled and tested by the Engineer for compressive strength in accordance with WSDOT Test Method 813 and AASHTO T 106 at a frequency of no less than one set of three 2 inch grout cubes from each grout plant each day of operation or per every 10 micropiles, whichever occurs more frequently. The compressive strength will be the average of the 3 cubes tested. The Contractor is responsible for sampling and testing additional grout cubes as necessary for early breaks prior to verification and proof testing.

If a compressive strength test fails, the Engineer may require the Contractor to proof test some or all of the production micropiles installed since the last grout batch that met the specified compressive strength.

Grout consistency, as measured by grout density, shall be tested by the Contractor just prior to the start of micropile grouting in accordance with API RP-13B-1 at a frequency of at least one test per micropile. For the grout to be approved for use, the specific gravity reported by the test shall be between 1.8 and 1.9. The Contractor's grout consistency test equipment shall be calibrated by an independent testing laboratory. The Contractor shall not use test equipment greater than 180-calendar days past the most recent calibration date, until such equipment is recalibrated by an independent testing laboratory.

Micropile Installation Records

The Contractor shall prepare and submit Type 1 Working Drawings consisting of full-length installation records for each micropile installed, including all grout volumes, pressures, and installation methods used. The records shall be submitted no later than the end of each work week and within 24 hours after all micropile installation is completed. The data shall be recorded in the micropile installation log. A separate log shall be provided for each micropile.

Micropile Load Tests

The Contractor shall perform verification and proof testing of micropiles at the locations specified in this Special Provision, the Plans or as otherwise specified by the Engineer. Tests shall be performed using a tension load test in accordance with ASTM D 3689 or a compression load test in accordance with ASTM D 1143, except as modified by this Special Provision.

Completed production micropiles may be used as part of the reaction frame for proof load testing. No reaction bearing elements of the load test frame for verification and proof load testing of micropiles shall bear on existing structure elements.

Verification Load Tests

The Contractor shall perform pre-production verification micropile testing to verify the design of the micropile system and the construction methods proposed prior to installing anyproduction micropiles. Sacrificial verification test micropiles shall be constructed in conformance with the Working Drawing submittal. Verification test micropiles shall be installed at the following locations:

*** $$2$$ ***

Verification load tests shall be performed to verify that the Contractor installed micropiles will meet the required compression and tension load capacities and load test acceptance criteria and to verify that the length of the micropile load transfer bond zone is adequate. The Contractor shall submit Type 2 Working Drawings consisting of the micropile verification load test results for the Engineer's acceptance prior to the installation of production micropiles.

The drilling-and-grouting method, casing length and outside diameter, reinforcing bar lengths, reinforcing bar size and strength, and depth of embedment for the verification test micropile(s) shall be identical to those specified for the production micropiles at the given locations. The verification test micropile structural steel sections shall be sized to safely resist the maximum test load.

The jack, bearing plates, and stressing anchorage shall be positioned at the beginning of the test such that unloading and repositioning during the test will not be required.

Testing Equipment and Data Recording

Testing equipment shall include dial gauges, dial gauge support, jack and pressure gauge, electronic load cell, and a reaction frame. The load cell is required only for the creep test portion of the verification test. The Contractor shall provide a description of test setup and jack, pressure gauge and load cell calibration curves in accordance with the **Working Drawings** subsection of this Special Provision. Additionally, the Contractor shall not use test jacks, pressure gauges and master pressure gauges, and electronic load cells greater than 90 calendar days past their most recent calibration date, until such items are recalibrated by an independent testing laboratory.

The Contractor shall design the testing reaction frame to be sufficiently rigid and of adequate dimensions such that excessive deformation of the testing equipment does not occur.

The Contractor shall apply and measure the test load with a hydraulic jack and pressure gauge. The pressure gauge shall be graduated in 75 psi increments or less. The jack and pressure gauge shall have a pressure range of no more than twice the anticipated maximum test pressure. Jack ram travel shall be sufficient to allow the test to be done without resetting the equipment. The Contractor shall monitor the creep test load hold during verification tests with both the pressure gauge and the electronic load cell. The Contractor shall use the load cell to accurately maintain a constant load hold during the creep test load hold increment of the verification test.

The Contractor shall measure the micropile top movement with a dial gauge capable of measuring to 1 mil (0.001 inch). The dial gauge shall have a travel sufficient to allow the test to be done without having to reset the gauge. The Contractor shall visually align the gauge to be parallel with the axis of the micropile and support the gauge independently from the jack, micropile or reaction frame. The Contractor shall use two dial gauges when the test setup requires reaction against the ground or single reaction micropiles on each side of the test micropile.

The required load test data shall be recorded by the Contractor.

Verification Test Loading Schedule

The Contractor shall test the verification micropiles to a maximum test load of 1.5 times the micropile Factored Design Load shown in the Plans. The verification micropile load tests shall be made by incrementally loading the micropile in accordance with the following cyclic load schedule:

AL = Alignment Load FDL = Factored Design Load

LOAD	HOLD TIME
AL	1 minute
0.075 FDL	4 minutes
0.150 FDL	4 minutes
0.225 FDL	4 minutes
0.300 FDL	4 minutes

0.375 FDL	4 minutes
AL	1 minute
0.150 FDL	1 minute
0.300 FDL	1 minute
0.375 FDL	1 minute
0.450 FDL	4 minutes
0.525 FDL	4 minutes
0.600 FDL	4 minutes
0.675 FDL	4 minutes
0.750 FDL	4 minutes
AL	1 minute
0.300 FDL	1 minute
0.600 FDL	1 minute
0.675 FDL	1 minute
0.750 FDL	1 minute
0.825 FDL	4 minutes
0.900 FDL	4 minutes
1.00 FDL	60 minutes
	(Creep Test Load Hold)
AL	1 minute
0.300 FDL	1 minute
0.600 FDL	1 minute
0.900 FDL	1 minute
0.975 FDL	4 minutes
1.050 FDL	4 minutes
1.125 FDL	4 minutes
1.200 FDL	4 minutes
1.275 FDL	4 minutes
1.350 FDL	4 minutes
1.425 FDL	4 minutes
1.500 FDL	4 minutes
	(Maximum Test Load)
1.200 FDL	4 minutes
0.900 FDL	4 minutes
0.600 FDL	4 minutes
0.300 FDL	4 minutes
AL	15 minutes

After the hold time at each load, Micropile top movement shall be measured and recorded. The verification test micropile shall be monitored for creep at the 1.000 Factored Design Load (FDL). Micropile movement during the creep test shall be measured and recorded at 1, 2, 3, 4, 5, 6, 10, 20, 30, 50, and 60 minutes. The alignment load shall not exceed 5 percent of the FDL load. Dial gauges shall be reset to zero after the initial AL is applied.

The acceptance criteria for micropile verification load tests are:

1. The micropile shall sustain the first 1.000 FDL test load with no more than the following total vertical movement at the top of the micropile, relative to the position of the top of the micropile prior to testing.

*** $$3$$ ***

2. At the end of the 1.000 FDL creep test load increment, test micropiles shall have a creep rate not exceeding 0.040 inch/log cycle time (1 to 10 minutes) or 0.080 inch/log cycle time (6 to 60 minutes). The creep rate shall be linear or decreasing throughout the creep load hold period.

3. Failure does not occur at the maximum test load of 1.005 FDL. Failure is defined as a slope of the load versus deflection curve (at end of increment) exceeding 0.025 inches/kips or at which attempts to further increase the test load simply result in continued micropile movement.

The Engineer will provide the Contractor written acceptance or rejection of the verification load tests within five working days.

Verification Test Micropile Rejection

If a verification tested micropile fails to meet the acceptance criteria, the Contractor shall modify the design, the construction procedure, or both, and shall perform another verification test incorporating the revisions. These modifications may include modifying the installation methods, increasing the bond length, or changing the micropile type. Any modification that necessitates changes to the structure will require the Engineer's review and acceptance. Any modifications of design or construction procedures or cost of additional verification test micropiles and load testing shall be at no additional expense to the Contracting Agency. At the completion of verification testing, test micropiles shall be removed down to an elevation two feet below finished ground line, except as otherwise specified in the Plans or by the Engineer.

Proof Load Tests

The Contractor shall proof load test the specified number of production micropiles at locations specified by the Engineer. Additional proof tests will be required if modifications are made in the micropile installation methods subsequent to the first production micropile, or if any of the proof tests fail.

Proof Test Loading Schedule

Proof tests shall be conducted by incrementally loading the micropile in accordance with the following schedule:

AL = Alignment Load FDL = Factored Design Load

LOAD	HOLD TIME
AL	1 minute
0.10 FDL	4 minutes
0.20 FDL	4 minutes
0.30 FDL	4 minutes
0.40 FDL	4 minutes
0.50 FDL	4 minutes
0.60 FDL	4 minutes
0.70 FDL	4 minutes
0.80 FDL	4 minutes
0.90 FDL	4 minutes
1.00 FDL	10 or 60 minutes (Creep Test)

0.75 FDL	4 minutes
0.50 FDL	4 minutes
0.25 FDL	4 minutes
AL	4 minutes

Depending on performance, either a 10 minute or 60 minute creep test shall be performed at the maximum test load of 1.0067 FDL. Where the micropile top movement between 1 and 10 minutes exceeds 0.040 inch, the maximum test load shall be maintained an additional 50 minutes. Movements shall be recorded at 1, 2, 3, 5, 6, 10, 20, 30, 50 and 60 minutes. The alignment load shall not exceed 5 percent of FDL. Dial gauges shall be reset to zero after the initial AL is applied.

The acceptance criteria for micropile proof load tests are:

1. The micropile shall sustain the maximum test load of 1.00 FDL with no more than the following total vertical movement at the top of the micropile, relative to the position of the top of the micropile prior to testing.

*** $$4$$ ***

2. At the end of the 1.00 FDL creep test load increment, test micropiles shall have a creep rate not exceeding 0.040 inch/log cycle time (1 to 10 minutes) or 0.080 inch/log cycle time (6 to 60 minutes). The creep rate shall be linear or decreasing throughout the creep load hold period.

Proof Test Micropile Rejection
If a proof-tested micropile fails to meet the acceptance criteria, the Contractor shall proof test another micropile as selected by the Engineer. For failed micropiles the Contractor shall submit a Type 2 Working Drawing consisting of a repair procedure. For further construction of subsequent micropiles, the Contractor shall modify the design, the construction procedure, or both. These modifications may include installing replacement micropiles, incorporating failed micropiles at not more than 50 percent of the maximum load attained, post grouting, modifying installation methods, increasing the bond length, or changing the micropile type. Any modification that necessitates changes to the structure design will require the Engineer's review and acceptance.

Manufacture of Steel Piles

Section 6-05.3(5) is supplemented with the following:

(September 8, 2020)
Furnishing St. Piling
Welding for steel pipe piling shall conform to AWS D1.1/D1.1M, latest edition, Structural Welding Code, and Section 6-03.3(25), except that all weld filler metal shall be low hydrogen material selected from Table 4.1 in AASHTO/AWS D1.5M/D1.5:2020 Bridge Welding Code.

Welding and joint geometry for the seam, whether it be longitudinal or helical, shall be qualified in accordance with Clause 4, Qualification, of the AWS D1.1/D1.1M, latest edition, Structural Welding Code. In addition, charpy V-notch (CVN) testing in accordance with Clause 4, Part D, of the AWS D1.1/D1.1M, latest edition, Structural

Welding Code, shall be performed. CVN testing shall include five tests at 0°F. The acceptance threshold for the five samples shall meet an average value of 20-foot-pounds CVN for the set of test coupons and a minimum value of 15-foot-pounds CVN for any individual test coupon. The Contractor may submit documentation of prior qualification to the Engineer to satisfy this requirement.

Dimensional tolerances shall conform to the material specification that the steel pipe piling is manufactured under, and, at a minimum, the following requirements:

1. Out-of-roundness shall be within 1-percent of the nominal outside diameter.

2. Deviation from a straight line, parallel to the centerline of the pile, shall not exceed 0.001 times the length of the pile.

3. The maximum radial offset of the strip/plate edges shall be 1/8-inch. The offset shall be transitioned with a taper weld and the slope shall not be less than a 1 in 2.5 taper.

4. The bead height of weld reinforcement shall not exceed 3/16-inch.

5. Misalignment of weld beads for double-sided welded pipe shall not exceed 1/8-inch.

6. The wall thickness shall not be less than 95-percent or greater than 110-percent of the specified nominal thickness.

All seams and skelp splices shall be complete penetration welds. Skelp splices in spiral welded (helical seam) pipe shall not be located within 12 inches of a girth shop or field weld.

All skelp splices shall be 100 percent radiographically or ultrasonically inspected in accordance with either API 5L Annex E Section E.4 or E.5, or Table 6.2 and Clause 6 Part E, F or G in AWS D1.1/D1.1M, latest edition, Structural Welding Code. Additionally, 10-percent of the total length of seam welds for both longitudinal and helical welded pipe, and one pipe diameter length of seam centered on any skelp splice intersection, shall be randomly inspected as specified above. If repairs are required in more than 10-percent of the welds examined, additional inspection shall be performed. The additional inspection shall be made on both sides of the repair for a length equal to 10-percent of the length of the pipe outside circumference. If repairs are required in more than 10-percent of welds examined in the second sample, 100-percent of the entire seam on the pile shall be inspected.

All seams and splices shall be 100 percent visually inspected in accordance with the acceptance criteria for statically loaded non-tubular connections in Table 6.1 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code. Repairs shall conform to Section 5.26 of the AWS D1.1/D1.1M, latest edition, Structural Welding Code, using approved repair and weld procedures.

Each length of steel pipe pile shall be marked with paint stencil, no closer than six inches to the end of the pipe, with the name of the manufacturer, material specification and grade of pipe, steel heat number, nominal pipe diameter, and wall thickness.

Splicing Steel Casings and Steel Piles

Section 6-05.3(6) is supplemented with the following:

(September 8, 2020)
Furnishing St. Piling

Welding for steel pipe piling shall conform to AWS D1.1/D1.1M, latest edition, Structural Welding Code, and Section 6-03.3(25), except that all weld filler metal shall be low hydrogen material selected from Table 4.1 in AASHTO/AWS D1.5M/D1.5:2020 Bridge Welding Code.

Welding and joint geometry for splices shall be qualified in accordance with Clause 4, Qualification, of the AWS D1.1/D1.1M, latest edition, Structural Welding Code. In addition, charpy V-notch (CVN) testing in accordance with Clause 4, Part D, of the AWS D1.1/D1.1M, latest edition, Structural Welding Code, shall be performed. CVN testing shall include five tests at 0°F. The acceptance threshold for the five samples shall meet an average value of 20-foot-pounds CVN for the set of test coupons and a minimum value of 15-foot-pounds CVN for any individual test coupon. The Contractor may submit documentation of prior qualification to the Engineer to satisfy this requirement.

Ends of steel pipe piling shall be prepared for splicing in accordance with AWS D1.1/D1.1M, latest edition, Structural Welding Code.

All splices shall be complete penetration groove welds using continuous backing rings of 1/4 inch minimum thickness. Tack welds shall be located in the root of the complete penetration groove weld.

Shop splices shall be 100 percent visually and ultrasonically inspected in accordance with the acceptance criteria for statically loaded non-tubular connections in Table 6.1 and the acceptance criteria in Table 6.2 in AWS D1.1/D1.1M, latest edition, Structural Welding Code. Repairs for shop and field splices shall conform to Section 5.26 of AWS D1.1/D1.1M, latest edition, Structural Welding Code, using approved repair and weld procedures.

Field splice welds and welders shall be further qualified, tested and inspected as follows:

1. Welder qualification shall be performed on sample full girth sections of steel pipe pile to be used, in the same position and using the same weld joint as for production pile splicing. At the Contractor's option, these tests may be performed on the test piles during test pile installation.

2. Weld qualification tests shall be conducted in the presence of the Contractor's CWI and a representative of the Contracting Agency.

3. Field welded test joints for welder qualification shall be inspected as specified above for shop splices.

4. Production pile field splices shall be inspected as specified above for shop splices, within the limits designated for UT inspection as shown in the Plans.

All welds shall be 100 percent visually inspected. The Engineer and the Contractor's CWI reserve the right to request UT inspection of splices in any pile location.

Quality control for field welding shall be conducted by an AWS Certified Welding Inspector (CWI). The Contractor shall not begin pile splicing operations until receiving the CWI's approval of the joint fit-up. The CWI shall inspect 100 percent of all field welds in accordance with the criteria and requirements specified above. All field splices shall have received the CWI's approval prior to Engineer acceptance.

The CWI shall prepare a Type 1 Working Drawing documenting the results of the nondestructive quality control inspection of all field welds, and shall submit the report to the Engineer within five working days of the completion of the final pile splice in the project or as otherwise requested by the Engineer.

Test Piles

Section 6-05.3(10) is supplemented with the following:

(March 6, 2000)
The Contractor shall furnish and drive *** $$1$$ *** test piles at the following locations or at locations designated by the Engineer:

*** $$2$$ ***

The *** $$3$$ *** test piles shall be driven in the location of permanent piles and the number of permanent *** $$4$$ *** piles required for this project has been reduced by the appropriate number.

Driving Piles

Achieving Minimum Tip Elevation and Bearing

Section 6-05.3(11)D is supplemented with the following:

(August 3, 2015)
The areas where piles are to be driven are adjacent to highly developed areas. It is essential that vibration and noise resulting from pile driving be held to a minimum. Unless otherwise allowed by the Engineer, pile driving shall be done during regular daytime working hours. The Contractor shall select pile driving equipment which will minimize noise and vibration. When, in the opinion of the Engineer, noise or vibration are excessive, the Contractor will be required to use a hammer that does not exceed the minimum specifications by more than 10 percent for the type and capacity of piling being driven. If pre-boring, jetting, or other special methods are not specified elsewhere in the contract and are ordered by the Engineer to reduce noise or vibration, such change in method shall be considered a change, subject to the terms of Section 1-04.4.

(August 3, 2015)
The *** $$1$$ *** piles *** $$2$$ *** shall be placed in prebored holes drilled to elevation ***$$3$$***.

The holes shall be of adequate diameter to isolate the pile from skin friction. The hole around the pile due to oversize boring shall be filled with dry sand or pea gravel after the pile is placed.

(August 3, 2015)
The *** $$1$$ *** piles ***$$2$$*** shall be prebored to elevation *** $$3$$ ***.

The diameter of the preboring shall be adjusted to provide for full contact between the pile casing and the surrounding soil without shattering the soil formation. It is estimated that the required diameter for preboring will be approximately 1 inch less than the pile diameter; however, the diameter shall be adjusted by the Contractor as specified by the Engineer to accomplish the results described above. Jetting will not be permitted. The Contractor shall follow preboring immediately with the placing of the pile casing to prevent sloughing into the excavated hole.

(April 6, 2015)
The Contractor is advised that overdriving is anticipated for piles driven at the following location(s):

Location(s)	Approx. Magnitude of Overdriving Anticipated to Reach Minimum Tip Elev.
*** $$1$$ ***	*** $$2$$ ***

The Contractor shall size the hammer and pile to accommodate overdriving of this magnitude without premature refusal or pile damage.

Measurement

Section 6-05.4 is supplemented with the following:

(March 6, 2000)
Measurement for preboring for *** $$1$$ *** pile will be per linear foot of hole drilled.

(April 6, 2015)
Micropiles will be measured per each, for each micropile installed and accepted.

Micropile verification load testing will be measured per each for each successfully completed and accepted micropile verification load test.

Micropile proof load testing will be measured per each for each successfully completed and accepted micropile proof load test.

Payment

Section 6-05.5 is supplemented with the following:

(March 6, 2000)
“Preboring For ***$$1$$*** Pile”, per linear foot.

The unit contract price per linear foot for “Preboring For ***$$2$$*** Pile” shall be full pay for performing the work as specified, including removal and disposal of excavated soils from preboring, and backfilling.

(April 6, 2015)
“Micropile”, per each.
The unit contract price per each for "Micropile" shall be full pay for performing the Work as specified.

“Micropile Verification Load Testing”, per each.
“Micropile Proof Load Testing”, per each.
The unit contract price per each for “Micropile Verification Load Testing” and “Micropile Proof Load Testing” shall be full pay for performing the Work as specified.

Bridge Railings

Materials

Section 6-06.2 is supplemented with the following:

(January 5, 2004)
Chain link fence fabric shall conform to the Section 9-16.1(1)B requirements for Type 1 fence.

Fittings, fabric bands, stretcher bars, tie wire, and other fence hardware, shall conform to Section 9-16.1.

Pipe for posts and longitudinal members shall conform to ASTM A 53, Grade B, Type E or S, galvanized, and shall be Schedule 40 unless otherwise shown in the Plans.

Steel bars, plates, and shapes shall conform to ASTM A 36, and shall be galvanized in accordance with AASHTO M 111, except that structural shapes may conform to ASTM A 992.

Bolts, nuts, and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

(March 6, 2000)
Epoxy resin shall conform to Section 9-26.1.

(April 6, 2015)
Tamper Proof Nuts for steel Bridge Railing Type BP
Tamper proof nuts for steel Bridge Railing Type BP shall be one of the following products from one of the following manufacturers:

Vandlgard-Nut VCN151-6 (zinc)

Manufactured by	Local Supplier
Simi Fastening Systems	Northwest Fasteners Inc.

4615 Industrial St. Bldg. No. 1-P
Simi Valley, CA 93063
(800) 959-8256
FAX (805) 581-9162
www.simifast.com

15127 Washington Avenue SW
Lakewood, WA 98498
(253) 582-1671
FAX (253) 581-3131

Trigroove Nut ZTRN37C (Zamak 5 zinc alloy AC41A)
Breakaway Nut ZNB37C (Zamak 5 zinc alloy AC41A)
Manufactured by
Screw & Supply Inc.
1712 Church Street
Holbrook, NY 11741
(800) 223-1316
FAX (631) 567-3057
www.screwsupply.com

Local Supplier
Tacoma Screw Products Inc.
2001 Center Street
Tacoma, WA 98409
(800) 562-8192
FAX (253) 272-2719

Spanner Nut 1N.386 (zinc alloy)
Manufactured by
TamperProof Screw Company Inc.
30 Laurel Street
Hicksville, NY 11801
(516) 931-1616
FAX (516) 931-1654
www.tamperproof.com

Trident Tamper Resistant Nut 37CNTNZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWS (stainless steel alloy 304)
Manufactured by
Tanner Bolt & Nut Company
4302 Glenwood Road
Brooklyn, NY 11210
(800) 456-2658
FAX (888) 434-3215
www.tannerbolt.com

(May 28, 2020)

Bridge Railing Type Snow Fence and Bridge Railing Type Wire Fabric Fence

Wire fabric shall be 8 gage diameter, 2 inch square wire mesh conforming to ASTM F 2453 Type 2 and galvanized after fabrication in accordance with AASHTO M 111.

HSS tubes shall conform to ASTM A 500, Grade B.

Steel bars, plates, and shapes shall conform to either ASTM A 36 or ASTM A 992.

The railing assembly shall be galvanized after fabrication in accordance with AASHTO M 111.

Anchor rods shall be fully threaded, conforming to ASTM F593 Type 302. Washers shall conform to ASTM A193 Grade B7, galvanized in accordance with AASHTO M 232. Nuts

shall be tamper proof, as one of the following products from one of the associated manufacturers:

Vandlgard-Nut VCN151-6 (zinc)

Manufactured by	Local Supplier
Simi Fastening Systems	Northwest Fasteners Inc.
4615 Industrial St. Bldg. No. 1-P	15127 Washington Avenue SW
Simi Valley, CA 93063	Lakewood, WA 98498
(800) 959-8256	(253) 582-1671
FAX (805) 581-9162	FAX (253) 581-3131
www.simifast.com	

Trigroove Nut ZTRN37C (Zamak 5 zinc alloy AC41A)
Breakaway Nut ZNB37C (Zamak 5 zinc alloy AC41A)

Manufactured by	Local Supplier
Screw & Supply Inc.	Tacoma Screw Products Inc.
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Holbrook, NY 11741	Tacoma, WA 98409
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Spanner Nut 1N.386 (zinc alloy)
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FAX (516) 931-1654
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Trident Tamper Resistant Nut 37CNTNZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWZ (Zamak 5 zinc alloy AC41A)
Breakaway Nut 37CNBAWS (stainless steel alloy 304)
Manufactured by
Tanner Bolt & Nut Company
4302 Glenwood Road
Brooklyn, NY 11210
(800) 456-2658
FAX (888) 434-3215
www.tannerbolt.com

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

The railing assembly shall be shop painted or powder coated after galvanizing in accordance with Section 6-07.3(11). The color of the finish coat, when dry, shall match the color *** $$1$$ ***.

Construction Requirements

Metal Railings

Section 6-06.3(2) is supplemented with the following:

(March 6, 2000)
Bridge Railing Type Chain Link Fence
The Contractor shall install anchor bolts for each post anchorage as shown in the Plans. Alternatively, the Contractor may install resin bonded anchors at each post anchorage, in accordance with Section 6-02 as supplemented in these Special Provisions.

Longitudinal members shall be connected to the steel posts as shown in the Plans.

The Contractor shall install the chain link fence fabric in accordance with Section 8-12.3(1)D, except as otherwise noted. The chain link fence fabric shall be fastened to the posts and longitudinal members at a maximum spacing of 14 inches.

(March 6, 2000)
Bridge Railing Type Chain Link Fence
The post blockouts shall be formed with a steel sleeve of the diameter and thickness specified in the Plans. The steel sleeve shall be galvanized after fabrication in accordance with AASHTO M 111. The Contractor shall fill the bottom portion of the railing post with expanded polystyrene as shown in the Plans.

The Contractor shall install the steel posts in the post blockouts as shown in the Plans. The posts shall be installed vertically, set in position with epoxy resin, and braced to maintain the vertical position until the epoxy resin hardens.

Longitudinal members shall be connected to the steel posts as shown in the Plans.

The Contractor shall install the chain link fence fabric in accordance with Section 8-12.3(1)D, except as otherwise noted. The chain link fence fabric shall be fastened to the posts and longitudinal members at a maximum spacing of 14 inches.

(May 28, 2020)
Bridge Railing Type Snow Fence and Bridge Railing Type Wire Fabric Fence
The railing shall be fabricated and installed in accordance with the shop drawings. The railing panels shall be installed parallel to the top of the associated concrete surface and the railing posts shall be installed perpendicular to the associated concrete surface.

The Contractor shall install anchor bolts for each post anchorage as shown in the Plans. Alternatively, the Contractor may install resin bonded anchors at each post anchorage, in accordance with Section 6-02.3(18) as supplemented in these Special Provisions.

After completing erection, the Contractor shall repair all metal surfaces with damaged paint or powder coatings and exposed metal with a field repair coating in accordance with Section 6-07.3(9)I and Section 6-07.3(11)A (for paint) or Section 6-07.3(11)B (for powder coating). The color of the finish coat of the field repair coating, when dry, shall match the color specified in Section 6-06.2 as supplemented in these Special Provisions.

Payment

Section 6-06.5 is supplemented with the following:

(March 6, 2000)
All costs in connection with constructing Bridge Railing Type *** $$1$$ *** shall be included in the *** $$2$$ ***.

Painting

Description

Section 6-07.1 is supplemented with the following:

(August 3, 2009)
This work shall consist of cleaning and painting all exposed metal surfaces of Bridge No(s). *** $$1$$ ***, in accordance with Section 6-07.3(10), except as otherwise noted below.

Portions of the structure(s) excluded from this work include:

*** $$2$$ ***

(August 3, 2009)
This work shall consist of cleaning and painting the exposed timber surfaces of Bridge No(s). *** $$1$$ ***, in accordance with Section 6-07.3(13) as supplemented in these Special Provisions and as specified below:

*** $$2$$ ***

Construction Requirements

Painting Existing Steel Structures

Section 6-07.3(10) is supplemented with the following:

(August 3, 2009)
The Contractor *** $$1$$ *** paint the existing utility company conduits attached to the structure, such as sewer, water, gas and telephone. The Contractor shall protect the utilities from damage due to operations on the bridges.

(August 3, 2009)
Light fixtures and lenses, including navigation, aircraft, flag pole luminaire, and luminaire light fixtures and lenses, shall not be painted and shall be kept clean from paint. The Contractor shall remove all paint from the light fixtures and lenses due to the painting operation.

(August 3, 2015)
In the cleaning operation, particular attention shall be paid to cleaning the grid deck. Any means acceptable to the Engineer, in addition to flushing, as required to clean

dirt, oil and grease from the grid surfaces in accordance with SSPC-SP 1 shall be used.

Containment

Section 6-07.3(10)A is supplemented with the following:

(August 3, 2009)
The Contractor shall adequately protect all gears, machinery, mechanical equipment, electrical equipment, navigation and clearance light lenses, motors, sheaves and cables and all other equipment which might become damaged by and during the cleaning and painting operations. Should the Contractor's operation foul or otherwise contaminate the lubricated surfaces, the Contractor shall, if directed by the Engineer, clean and relubricate the surfaces at the Contractor's expense.

(September 7, 2021)
The following bridge(s) have a wind speed/gust threshold:

Bridge	Wind Speed/Gust Threshold (miles per hour)
Bridge No(s). *** $$1$$ ***	*** $$2$$ ***

Each day, the Contractor shall review the five-day wind speed/gust forecast for each bridge site from the Western Region Headquarters of the National Weather Service at www.wrh.noaa.gov. The Contractor shall lower or withdraw tarps, plastic exterior, and other containment components presenting an exposed face to the wind when either of the following apply:

1. When wind speeds or gusts exceeding the threshold are forecast by the National Weather Service.

2. When the structure site weather station records wind speeds or gusts exceeding the threshold.

The containment system may be restored after 2 hours without winds or gusts exceeding the threshold, and no forecast of such wind speeds or gusts to return within 24 hours.

Weather Station
Prior to installing any components of a containment system on a bridge with a specified wind speed/gust threshold, the Contractor shall install a wireless weather station on the bridge at a location acceptable to the Engineer. The Contractor shall provide one of the following wireless weather station systems, or an accepted equal:

1. Davis Instruments Vantage Pro2 model 06163.

2. Weather Hawk 916 Wireless Weather Station.

3. Columbia Weather Systems Capricom FLX.

The Contractor shall submit a Type 2 Working Drawing consisting of details of the selected wireless weather station system, including installation and operation details. The Contractor shall install wireless display console units for both the Contracting Agency's and the Contractor's use at locations acceptable to the Engineer. The Contractor shall protect the wireless weather station system from damage during all paint removal, surface cleaning, and paint application operations.

The Contractor shall maintain a log of daily weather data updated on a daily basis. The log shall be available to the Engineer for review at any time during the project. The weather data shall be tabulated in the form of a spreadsheet. At a minimum, the weather data shall indicate the high and low temperature, relative humidity, maximum wind speed and direction, wind gusts, and rainfall. If requested by the Engineer, the Contractor shall submit a Type 1 Working Drawing of weather data. Upon request, the Contractor shall provide wireless access to the weather station data.

At the end of the Contract, the wireless weather station and all associated system components shall be removed from the bridge and become the property of the Contractor.

Surface Preparation Prior to Overcoat Painting

Section 6-07.3(10)D is supplemented with the following:

(April 6, 2015)
The following steel surfaces of Bridge No(s). *** $$1$$ *** shall receive surface preparation in accordance with SSPC SP1 followed by cleaning in accordance with this Section:

*** $$2$$ ***

Surface Preparation - Full Paint Removal

Section 6-07.3(10)E is supplemented with the following:

(April 5, 2010)
The following steel surfaces of Bridge No(s). *** $$1$$ *** shall receive full paint removal surface preparation in accordance with this Section:

*** $$2$$ ***

Paint Color

Section 6-07.3(10)I is supplemented with the following:

(August 3, 2009)
The color of the top coat, when dry, shall match *** $$1$$ ***.

Field Coating Application Methods

Section 6-07.3(10)N is supplemented with the following:

(August 3, 2009)
Spray painting will be permitted for the application of paint to the surfaces of the steel grid roadway decking and steel grid catwalks, provided every precaution or means necessary to prevent any damage due to spraying operations or from wind borne paint is taken, provided further that if satisfactory results are not, in the opinion of the Engineer, obtained with the spraying application, the Contractor shall revert to the use of brushes. In the event spray painting is used on the steel grid roadway decking, the application shall be made only from the underside of the roadway, and then only at such times as traffic has been diverted to other lanes. A protective covering shall be placed immediately over areas of the roadway decking being spray painted to prevent damage from wind borne paint.

Painting or Powder Coating of Galvanized Surfaces

Section 6-07.3(11) is supplemented with the following:

(August 3, 2009)
The color of the finish coat, when dry, shall match *** $$1$$ ***

Bituminous Surfacing on Structure Decks

Construction Requirements

Section 6-08.3 is supplemented with the following:

(October 29, 2020)
Surfacing Removal and Paving Equipment Load and Spacing Restrictions
The following bridge(s) is (are) subject to the requirements and restrictions of this Special Provision:

*** $$1$$ ***

The gross vehicle weight (GVW) of the surfacing removal and paving train vehicles (planers, scrapers, haul trucks, asphalt pavers, MTD/V, and rollers) allowed on the bridge shall not exceed the maximum GVW specified in the Plans and the spacing of the vehicles shall not be less than that specified in the Plans unless otherwise accepted as described in the **Submittal of Alternative Surfacing Removal and HMA Paving Trains** subsection of this Special Provision.

The Contractor shall submit a Type 2 Working Drawing consisting of the proposed methods and equipment to be used to remove surfacing and apply HMA overlay to the bridge deck. The Working Drawing shall include catalogue cuts, make, model, axle spacing, and gross weights of all surfacing removal equipment, pavers, rollers, and haul trucks used to conduct surfacing removal and paving operations on the bridge. The Working Drawing shall show the surfacing removal train units and paving train units and associated support equipment that is simultaneously on the bridge, in longitudinal section. The longitudinal section shall show the units in operational order. The details shall show or specify means of confirming in the field that the equipment units conform to and do not exceed the load limits specified in the Plans.

Submittal of Alternative Surfacing Removal and HMA Paving Trains

During the Bid period, prospective Bidders may submit a maximum of two surfacing removal and HMA paving trains for review and comment. The submittal shall consist of the maximum gross vehicle weights including loaded weights for removal equipment, haul trucks, rollers, pavers, etc., the axle spacing of the equipment and the minimum spacing between adjacent pieces of equipment. Submittals must be received by the Contracting Agency's representative identified in the Notice to All Planholders by 5:00 PM one week prior to Bid opening. Electronic submittals will be accepted. All submittals received by the required date and time, both accepted and not accepted, will be posted on the Contract Ad & Award information page no later than the Friday prior to Bid opening.

Contractor Survey for Grade Controlled Structure Decks

Section 6-08.3(2) is supplemented with the following:

(January 3, 2017)
The Contractor survey requirements specified in this Section and associated Sections 6-08.3(2)A, 6-08.3(2)B and 6-08.3(2)C do not apply to the following Grade Controlled Structures in this Contract:

*** $$1$$ ***

Full Depth Removal of Bituminous Pavement from Structure Decks

Section 6-08.3(5) is supplemented with the following:

(January 2, 2018)
Rotary milling/planing equipment shall not be used to remove the existing surfacing from the bridge deck of the following bridge(s):

*** $$1$$ ***

(January 2, 2018)
Rotary milling/planing equipment conforming to Section 6-08.3(5)B may be used to remove all but the bottom 0.10-foot layer of existing surfacing from the bridge deck of the following bridge(s):

*** $$1$$ ***

Rotary milling/planing equipment shall not be used to remove the bottom 0.10-foot layer of existing surfacing from the bridge deck of these bridges.

Modified Concrete Overlays

Materials

Section 6-09.2 is supplemented with the following:

(******)

Materials for Polyester Concrete

Polyester Resin Binder

The resin shall be an unsaturated isophthalic polyester-styrene co-polymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77F, RVT No. 1 spindle)	ASTM D 2196
Specific Gravity:	1.05 to 1.10 at 77F	ASTM D 1475
Styrene Content:	45% to 50% by weight of polyester styrene resin	ASTM D2369

After adding the initiator, the resin shall conform to the following requirements:

Elongation:	35% minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Tensile Strength:	2,500 psi minimum w/ thickness 0.25" ± 0.04"	ASTM D 638
Conditioning	18 hours/77F/50% + 5 hours/158F	ASTM D 618
Silane Coupler:	1.0% minimum (by weight of polyester-styrene resin)	

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP initiators shall be used when the surrounding concrete temperatures are above 60F. A blend of initiators may be used as approved by the Engineer when the surrounding concrete temperature is 50F to 60F.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

High Molecular Weight Methacrylate (HMWM) Resin

In addition to the viscosity and density properties, and the promoter/initiator system, already specified in this Section, the HMWM resin for polyester concrete overlays shall conform to the following requirements:

Flash Point:	180F minimum	ASTM D 3278
Tack-Free Time:	400 minutes maximum	California Test 551

Prior to adding initiator, the HMWM resin shall have a maximum volatile content of 30 percent, when tested in conformance with ASTM D 2369.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance conforming to Section 1-06.3.

Aggregate

The aggregate shall be from a WSDOT approved pit site and shall be thoroughly washed and kiln dried.

The aggregate shall conform to Section 9-03, and one of the following combined aggregate gradings:

Combined Aggregate

Sieve Size	1/2" Max. % Passing	3/8" Max. % Passing
1/2"	100	100
3/8"	83-100	100
U.S. No. 4	65-82	62-85
U.S. No. 8	45-64	45-67
U.S. No. 16	27-48	29-50
U.S. No. 30	12-30	16-36
U.S. No. 50	6-17	5-20
U.S. No. 100	0-7	0-7
U.S. No. 200	0-3	0-3

The combined aggregate shall have a maximum of 45 percent crushed particles. Fine aggregate shall consist of natural sand only.

Aggregate absorption shall not exceed 1.0 percent. The moisture content of the aggregate shall not exceed one half of the aggregate absorption at the time of mixing with the polyester resin binder. The aggregate temperature shall be between 45F and 100F at the time of mixing.

Sand for Abrasive Finish
The sand for abrasive finish shall conform to Section 6-09.2, and the aggregate moisture content requirements specified above.

Construction Requirements

Equipment

Section 6-09.3(1) is supplemented with the following:

(******)
Mobile Mixer for Polyester Concrete
The mixer shall be equipped to be calibrated to automatically proportion and blend all components of the specified mix on a continuous or intermittent basis as required by the finishing operation, and shall discharge mixed material directly into the finishing machine.

The mixer shall be equipped with a metering device that automatically measures and records the aggregate volumes and the corresponding resin volumes. The metering device shall have a readout display gage visible at all times, and shall be capable of printing out the volumes being recorded for each material.

The aggregate and resin volumes shall be recorded at no greater than five minute intervals along with the date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each work shift.

The Contractor shall prevent any cleaning chemicals from reaching the polyester mix during the overlay applications.

Submittals

Section 6-09.3(2) is supplemented with the following:

(******)
Submittals for Polyester Concrete
The Contractor shall submit the following items to the Engineer for approval in accordance with Section 6-01.9:

1. The type of shot blasting machine selected by the Contractor for use in this project to scarify concrete surfaces.

2. The method and materials used to contain, collect, and dispose of all concrete debris generated by the scarifying process, including provisions for protecting adjacent traffic from flying debris.

3. The qualifications of on-site supervisors, mobile mixer operators, and finishing machine operators, in accordance with Section 6-09.3(8) as supplemented in these Special Provisions.

4. The polyester concrete mix design in accordance with Section 6-09.3(3) as supplemented in these Special Provisions.

5. Samples, as specified below, shall be submitted to the Engineer at least 15 working days prior to placing the polyester overlay:

    a. One gallon minimum of the polyester resin binder.

    b. One pint minimum of the HMWM resin.

    c. 100 pounds minimum of aggregate.

    d. Representative samples from each lot of prepackaged deck repair material and aggregate extenders, if selected for use in this project, as specified in Section 6-09.3(3) as supplemented in these Special Provisions.

6. The method and materials used to contain HMWM resin and polyester concrete within the deck area specified to receive the overlay.

7. Paving equipment specifications and details of the screed rail support system, including details of anchoring the rails and providing rail continuity.

The Contractor shall not begin scarifying operations until receiving the Engineer's approval of Items 1 and 2. The Contractor shall not begin placing polyester concrete overlay until receiving the Engineer's approval of Items 3 through 7.

Concrete Overlay Mixes

Section 6-09.3(3) is supplemented with the following:

(January 7, 2002)
The Contractor may use either fly ash modified concrete (FMC), latex modified concrete (LMC), or microsilica modified concrete (MMC) for the concrete overlay. The Contractor shall select one type of concrete for the overlay, provide a mix for the selected concrete to the Engineer in accordance with Item 5 of Section 6-09.3(2), and use that type for the total concrete overlay operation. Use of a combination of types will not be allowed.

(January 7, 2002)
The Contractor may use either fly ash modified concrete (FMC), or latex modified concrete (LMC) for the concrete overlay. The Contractor shall select one type of concrete for the overlay, provide a mix for the selected concrete to the Engineer in accordance with Item 5 of Section 6-09.3(2), and use that type for the total concrete overlay operation. Use of a combination of types will not be allowed. Use of microsilica modified concrete (MMC) will not be allowed.

(January 7, 2002)
The Contractor shall use latex modified concrete (LMC) for the total concrete overlay operation, and shall provide a concrete mix to the Engineer in accordance with Item 5 of Section 6-09.3(2). Use of fly ash modified concrete (FMC) or microsilica modified concrete (MMC) will not be allowed.

(******)
Polyester Concrete
The Contractor shall use polyester concrete for the total concrete overlay operation. Use of latex modified concrete (LMC), fly ash modified concrete (FMC) or microsilica modified concrete (MMC) will not be allowed.

Polyester concrete shall consist of the following three components – polyester resin binder, HMWM resin, and combined aggregate, in accordance with Section 6-09.2 as supplemented in these Special Provisions. The Contractor shall submit the mix design for the polyester concrete to the Engineer for approval. The mix design shall include a recommended initiator percentage for the expected application temperature. The polyester resin binder shall be approximately 12 percent by weight of the dry combined aggregate. The Contractor shall not begin the trial overlay of the polyester concrete, as specified in Section 6-09.3(8) as supplemented in these Special Provisions, until receiving the Engineer's approval of the polyester concrete mix design.

(******)
Deck Repair Concrete for Polyester Concrete Overlays
Patching concrete for further deck preparation in accordance with Section 6-09.3(6) shall be the polyester concrete mix used for the overlay.

Storing and Handling

Section 6-09.3(4) is supplemented with the following:

(******)

Storing and Handling of Polyester Concrete Materials

All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name brand, quantity, and mixing ratio. Each shipment of polyester resin binder and HMWM resin shall be accompanied by a Safety Data Sheet (SDS).

The material shall be stored to prevent damage by the elements and to ensure the preservation of their quality and fitness for the work. The storage space shall be kept clean and dry and shall contain a high-low thermometer. The temperatures of the storage space shall not fall below nor rise above that recommended by the manufacturer. Every precaution shall be taken to avoid contact with flame.

Stored materials shall be inspected prior to their use and shall meet the requirements of these Special Provisions at the time of use.

Any material which is rejected because of failure to meet the required tests or that has been damaged so as to cause rejections shall be immediately replaced at no additional expense to the Contracting Agency.

Sufficient material to perform the entire polyester concrete overlay application shall be in storage at the site prior to any field preparation, so that there shall be no delay in procuring the materials for each day's application.

Appropriate impermeable protective garments shall be used by all workers who may contact the resin or initiators to prevent skin contact. If skin contact occurs, the resin or initiators shall be immediately washed off. Clothing that becomes saturated with resin shall be removed immediately.

All personnel working with the polyester concrete shall be issued suitable approved organic vapor respirators in addition to other appropriate protection equipment.

Scarifying Concrete Surface

Section 6-09.3(5) is supplemented with the following:

(January 7, 2002)
The Contractor may use either a rotary milling machine, hydro-demolition machine, or shot blasting machine for scarifying concrete surfaces. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

(January 7, 2002)
The Contractor may use either a hydro-demolition machine or shot blasting machine for scarifying concrete surfaces. The use of a rotary milling machine will not be allowed. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

(April 6, 2015)
The Contractor shall use a hydro-demolition machine for scarifying concrete surfaces. The use of a rotary milling or shot blasting machines will not be allowed.

The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

(******)
The Contractor shall use a shot blasting machine for scarifying concrete surfaces. The use of a rotary milling or hydro-demolition machines will not be allowed. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

(******)
The scarification depth for all concrete decks receiving polyester concrete overlay shall be 1/4 inch, and all references to scarification depth in Sections 6-09.3(5)A and 6-09.3(5)B shall be revised accordingly.

(******)
Steel reinforcing bars used in deck repair operations, in accordance with Sections 6-09.3(5)F and 6-09.3(6)B, shall be epoxy-coated in accordance with Section 6-02.3(24)H.

Further Deck Preparation

Deck Repair Preparation

Section 6-09.3(6)B is supplemented with the following:

(April 6, 2015)
The Contractor shall not remove the bottom two inches of the existing concrete deck, unless otherwise directed by the Engineer. If the existing concrete bridge deck is punctured by the removal operations, the Contractor shall form the bottom surface prior to placing the patching concrete. The Contractor shall submit the method and materials to be used for such forming as a Type 2E Working Drawing in accordance with Section 6-02.3(16).

Placing Deck Repair Concrete

Section 6-09.3(6)C is supplemented with the following:

(******)
Placing Patching Concrete For Polyester Concrete Overlay
Patching concrete shall be polyester concrete, as specified in Section 6-09.3(3) as supplemented in these Special Provisions. Concrete Class M shall not be used.

Polyester concrete for deck repair shall be placed and cured in accordance with Sections 6-09.3(11) and 6-09.3(13), respectively, as supplemented in these Special Provisions.

All deck repair material that fails to achieve a minimum compressive strength of 3,000 psi in six hours as verified by the rebound number determined in accordance with ASTM C 805 shall be removed and replaced with new deck repair material by the Contractor, at no additional expense to the Contracting Agency.

Quality Assurance

Section 6-09.3(8) is supplemented with the following:

(******)
Quality Assurance For Polyester Concrete Overlay
The Contractor shall arrange to have the suppliers of the polyester resin binder and HMWM resin furnish technical service relating to application of material and health and safety training for personnel who are to handle the polyester concrete and the HMWM resin prime coat.

On-site supervisors, and all personnel operating the mobile mixer and finishing machines, shall have successful previous experience in mixing and placing polyester concrete overlay. Documentation of project experience with polyester concrete overlay shall include the name and location of the project, the Contracting Agency of the project, the area quantity of overlay placed, and the name and current phone number of the Contracting Agency's contact person for the referenced project.

(******)
Polyester Concrete Trial Overlay
The Contractor shall place a trial overlay of polyester concrete using the equipment selected by the Contractor and the production mix and procedure as approved by the Engineer in accordance with Section 6-09.3(3). The Contractor shall notify the Engineer of the time and location of the trial overlay at least seven calendar days prior to the scheduled trial overlay.

The trial overlay shall be placed on a previously cast and cured concrete pad at a location selected by the Contractor. The plan area of the concrete pad shall be 12 feet minimum in width and 15 feet minimum in length.

The Contractor shall clean the concrete pad surface, mix, place, finish, and cure the polyester concrete overlay, and check the trial overlay for bond, in accordance with Section 6-09.3 as supplemented in these Special Provisions, except as otherwise noted. The Contractor need not scarify the concrete surface and perform further deck preparation on the concrete pad surface provided that all other conditions of Section 6-09.3(7) are satisfied. The trial overlay shall be 12 feet wide, 15 feet long, and 3/4 inches thick.

The Contractor shall perform three pull-off tests on the trial overlay in accordance with American Concrete Institute 503R - Appendix A. The Contractor shall record the pull-off test results and the amount of (if any) failure into the base concrete, and shall provide written documentation of the test results to the Engineer.

The Contractor shall not begin placing polyester concrete overlay at the bridge site(s) receiving the polyester concrete overlay until receiving the Engineer's approval of the completed trial overlay.

After receiving the Engineer's approval of the completed trial overlay, the concrete pad and trial overlay shall become the Contractor's property and shall be removed and disposed of in accordance with Section 2-02.3.

Mixing Concrete for Concrete Overlay

Section 6-09.3(9) is supplemented with the following:

(******)
Mixing Polyester Concrete
Polyester concrete shall be mixed in mobile mixers conforming to Section 6-09.3(1) as supplemented in these Special Provisions, and in accordance with the mix design approved by the Engineer.

The polyester resin binder in the polyester concrete shall be approximately 12 percent by weight of the dry aggregate. The Contractor shall determine the exact percentage as approved by the Engineer.

The amount of peroxide initiator used shall result in a polyester concrete set time between 30 and 120 minutes during placement as determined by California Test 551, Part 2, “Method of Test For Determination of Set Time of Concrete Overlay and Patching Materials”, by Gilmore Needles. Accelerators or inhibitors may be required as recommended by the polyester resin binder supplier and as approved by the Engineer.

The polyester resin binder shall be initiated and thoroughly blended just prior to mixing the aggregate and binder. The polyester concrete shall be thoroughly mixed prior to placing.

Overlay Profile and Screed Rails

Section 6-09.3(10) is supplemented with the following:

(******)
The minimum thickness of polyester concrete overlay shall be 3/4 inches, except as otherwise shown in the Plans or adjusted by the Engineer.

Placing Concrete Overlay

Section 6-09.3(11) is supplemented with the following:

(******)
Placing Polyester Concrete Overlay
Application of the HMWM prime coat and the polyester concrete overlay shall not begin if rain is expected. The area receiving the prime coat shall be dry and had no rain for at least 24 hours. Immediately prior to applying the prime coat, the surface receiving the prime coat shall be swept clean by compressed air to remove accumulated dust and any other loose material. If the surface receiving the HMWM prime coat and polyester concrete has been exposed to moisture within the previous 12 hours, it shall be thoroughly dried using a heat lance prior to placement of the HMWM prime coat.

The concrete bridge deck surface temperature shall be between 50F and 85F when the prime coat is applied.

The prepared concrete surface shall receive one coat of promoted/initiated wax-free HMWM resin. The promoted/initiated HMWM resin primer shall be worked into the concrete in a manner to effect complete coverage of the area. A one pint sample of each batch of promoted/initiated HMWM resin shall be retained and submitted to the Engineer at the time of primer application to verify proper catalyzation. Under no circumstances shall any resin be allowed to run into drains and expansion joints, or otherwise escape the Contractor's collection and containment system.

If the HMWM primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at no additional expense to the Contracting Agency.

The HMWM prime coat shall cure for a minimum of 30 minutes before placing the polyester concrete overlay. Placement of the polymer concrete shall not proceed until the Engineer verifies that the HMWM resin was properly promoted and initiated, as evidenced by the HMWM batch sample.

The polyester concrete shall be placed on the liquid or hardened HMWM prime coat within two hours of placing the prime coat. Polyester concrete shall be placed prior to gelling and within 15 minutes following initiation, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

If, for any reason, polyester concrete is not placed over the prime coat within the two hour time limit, the Contractor shall apply a fresh coat of HMVM resin primer immediately followed by an abrasive sand finish coating. The abrasive sand finish shall be broadcast onto the surface to affect a uniform coverage of a minimum of 0.8 pounds per square yard. Prior to applying the polyester concrete overlay, the surface shall be re-cleaned in accordance with Section 6-09.3(7).

Expansion joints shall be adequately isolated prior to placing the overlay as approved by the Engineer. Saw cutting at bridge expansion joints will not be allowed.

The surface temperature of the area receiving the polyester concrete shall be the same as specified above for the HMWM prime coat.

The polyester concrete shall be consolidated to a relative compaction of not less than 97 percent.

Finishing Concrete Overlay

Section 6-09.3(12) is supplemented with the following:

(******)
Finishing Polyester Concrete Overlay
The finished surface of the polyester concrete overlay shall conform to Section 6-02.3(10).

The polyester concrete shall be struck off to the established grade and cross section and consolidated to the required compaction. No further texturing and grooving of the finish overlay surface will be required. Forms shall be coated with suitable bond release agent to permit ready release of forms.

The polyester concrete overlay shall receive an abrasive sand finish. The sand finish shall be applied immediately after overlay strike-off and before gelling occurs.

The surface texture of polyester concrete surface shall be uniform and shall have a friction number of not less than 35 as determined by ASTM E 274.

After initial finishing, the polyester overlay may require grinding of rough areas as determined by the Engineer. The grinding shall be done in a manner that will not damage the existing bridge deck. Rotary milling machines are not allowed.

The Contractor shall demonstrate to the satisfaction of the Engineer that the method and equipment for grinding the polyester overlay are adequate for the intended purpose and will provide satisfactory results. The removal shall not commence until the Contractor receives the Engineer's approval of the grinding equipment.

The bridge deck areas specified by the Engineer to receive grinding shall be ground in a longitudinal direction. The grinding equipment shall use diamond tipped saw blades mounted on a power driven, self-propelled machine that is specifically designed to texture concrete surfaces. The grinding equipment shall have a blade spacing to provide grooves that are between 0.10 and 0.15 inches wide. The land area between the grooves shall be approximately 0.125 inches.

The Contractor shall contain, collect, and dispose of all concrete debris generated by the grinding operation in accordance with Item 2 of the polyester concrete submittal in Section 6-09.3(2) as supplemented in these Special Provisions.

Prior to opening the overlay area to vehicular traffic the finished overlay shall be power swept to remove excess loose aggregate and abrasive sand. The Contractor shall demonstrate to the satisfaction of the Engineer that the power broom equipment will not damage the finished overlay. Any damage to the finished overlay caused by the power broom shall be repaired at no additional expense to the Contracting Agency.

Curing Concrete Overlay

Section 6-09.3(13) is supplemented with the following:

(******)
Curing Polyester Concrete
Traffic and equipment shall not be permitted on the polyester overlay for at least four hours and until the polyester overlay has reached a minimum compressive strength of 3,000 psi as verified by the rebound number determined in accordance with ASTM C 805.

Areas in the polyester concrete that do not totally cure, or that fail to attain the minimum compressive strength specified above, shall be removed and replaced with new polyester concrete material by the Contractor, at no additional expense to the Contracting Agency.

Checking For Bond

Section 6-09.3(14) is supplemented with the following:

(******)

Checking Polyester Concrete For Bond

After the requirements for curing have been met, the entire overlaid surface shall be sounded by the Contractor, in a manner approved by and in the presence of the Engineer, to ensure total bond of the concrete to the bridge deck. Polyester concrete in unbonded areas shall be removed and replaced with polyester concrete by the Contractor, at no additional expense to the Contracting Agency.

All cracks, except those that are significant enough to require removal as determined by the Engineer, shall be thoroughly filled and sealed with HMWM resin. Cracks 1/16 inch and greater in width shall receive two applications of HMWM resin. Immediately following the application of HMWM resin, the wetted surface shall be coated with sand for abrasive finish.

Measurement

Section 6-09.4 is supplemented with the following:

(******)

Polyester concrete overlay will be measured by the square yard of overlay surface actually placed, finished, and cured.

Payment

Section 6-09.5 is supplemented with the following:

(******)

“Polyester Concrete Trial Overlay”, lump sum.

The lump sum contract price for “Polyester Concrete Trial Overlay” shall be full pay for performing the work as specified, including establishing a location for the trial overlay, and construction, removal, and disposal of the concrete pad and trial overlay.

(******)

“Force Account Grinding Polyester Conc. Overlay”, force account.

Grinding polyester concrete overlay as specified will be paid by force account in accordance with Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Force Account Grinding Polyester Conc. Overlay" in the bid proposal to become a part of the total bid by the Contractor.

(******)

“Polyester Concrete Overlay”, per square yard.

The unit contract price per square yard for “Polyester Concrete Overlay” shall be full pay for performing the work as specified, including placing, finishing, and curing the overlay, and checking for bond.

(April 6, 2015)

"Force Account Forms For Full Depth Deck Repair", force account

Payment for "Force Account Forms For Full Depth Deck Repair" will be by force account in accordance with Section 1-09.6. For the purpose of providing a common proposal to all bidders, the Contracting Agency has entered an amount for the item "Force Account

Forms For Full Depth Deck Repair" in the bid proposal to become a part of the total bid by the Contractor.

Concrete Barrier

Construction Requirements

Temporary Barrier

The first paragraph of Section 6-10.3(5) is revised to read:

(February 3, 2020)
For temporary barrier, the Contractor shall use precast concrete barrier type F. Temporary concrete barrier type F shall comply with Standard Plan requirements and cross-sectional dimensions, except that: (1) it may be made in other lengths than those shown in the Standard Plan, and (2) it may have permanent lifting holes no larger than 4 inches in diameter or lifting loops.

Placing Concrete Barrier

Section 6-10.3(6) is supplemented with the following:

(March 13, 1995)
Precast barrier intended for permanent placement may be used at temporary locations and will be considered temporary barrier until installed at a permanent location.

Barrier damaged while being used at a temporary location shall not be reused at a permanent location even though it has been repaired, and when no longer required at a temporary location, shall become the property of the Contractor and removed from the project.

Payment

Section 6-10.5 is supplemented with the following:

(August 1, 2016)
The following paragraph is added immediately following the bid item, “Temporary Barrier”:

The unit contract price per linear foot for "Temporary Barrier" shall include all costs for furnishing, placing, maintaining, replacing, and cleaning barrier delineation.

(March 6, 2000)
All costs in connection with constructing *** $$1$$ *** barrier shall be included in the *** $$2$$ ***.

Noise Barrier Walls

Materials

Section 6-12.2 is supplemented with the following:

(September 8, 2020)

Precast Concrete Noise Barrier Walls

Grout for encapsulating dowel bars shall conform to Section 6-02.3(26)H.

Grout pads at the bases of precast concrete panels shall conform to Section 6-02.3(20).

Base plates and anchor bolt templates shall conform to ASTM A 36. Base plates shall be corrosion protected by one of the following methods:

1. One coat of paint conforming to Section 9-08.1(2)F.

2. Galvanized after fabrication in accordance with AASHTO M 111.

3. Galvanized after fabrication in accordance with ASTM B 695, Class 5, Type 1.

Anchor rods shall conform to ASTM F 1554 Grade 105. Nuts shall conform to ASTM A 563. Washers shall conform to ASTM F 436, except that plate washers conforming to ASTM A 36 may be used. Nuts and washers, and a minimum of 1'-0" of the exposed end of the anchor rod, shall be corrosion protected by one of the following methods:

1. One coat of paint conforming to Section 9-08.1(2)F.

2. Galvanized after fabrication in accordance with ASTM F2329.

3. Galvanized after fabrication in accordance with ASTM B 695, Class 5, Type 1.

The cone head end, 1'-0" minimum, of Rod A and steel reinforcing Bar B, as identified in the Standard Plans, shall be painted with one coat paint conforming to Section 9-08.1(2)F.

The sealant system for the vertical joint between precast concrete panels shall consist of a polyurethane sealant conforming to Section 9-04.2(3) and a closed cell foam backer rod conforming to ASTM C 1330 Type C. The polyurethane sealant shall be tested for compatibility with the closed cell foam backer road in accordance with Section 9-04.2(3).

(September 8, 2020)

Masonry Noise Barrier Walls

Concrete masonry units (CMU's) shall conform to ASTM C 90, Grade N, Type 1. Concrete masonry units shall have a density between 100 and 115 pounds per cubic foot. Shrinkage shall not exceed 0.065 percent.

CMU's will be accepted based on a Manufacturer's Certificate of Compliance. The Manufacturer's Certificate of Compliance shall include test results, conducted within the previous twelve months, as required to document compliance with the material requirements specified in these Special Provisions.

The concrete masonry unit faces shall be nominal 8 by 16 inches with thicknesses as specified in the Plans. Concrete masonry unit surface texture and color shall be as follows:

*** $$1$$ ***

Special shapes shall be provided to complete the work as specified in the Plans.

The Contractor shall submit Type 2 Working Drawings consisting of four samples of each type of concrete masonry unit block specified for use on the project.

Grout for concrete masonry units shall conform to ASTM C 476 for fine grout.

Mortar for concrete masonry units shall conform to ASTM C 270, Type S. The color shall be natural gray. The Contractor shall mix the mortar in a mechanical mixer of one sack minimum capacity for a minimum of three minutes after all materials have been added before using the mortar.

Masonry sealer shall be a silane based water repellent selected from one of the following, or an accepted equal:

1. Baracade Silane 40, manufactured by Euclid.
2. MasterProtect H 200, manufactured by Master Builder Solutions.
3. Florok Enviro-Shield 40, manufactured by Chargar.

The Contractor shall submit Type 1 Working Drawings consisting of the manufacturer's recommended masonry sealer application procedure.

The parge coating applied to the top of the masonry wall shall be a waterproof cement-base coating selected from one of the following, or an accepted equal:

1. Conproseal, manufactured by Chargar.
2. MasterSeal 581, manufactured by Master Builder Solutions.
3. Tamoseal, manufactured by Euclid.

The sealant system for the vertical expansion joints shall consist of a polyurethane sealant conforming to Section 9-04.2(3) and a closed cell foam backer rod conforming to Section 9-04.2(3)A.

Construction Requirements

Submittals

Section 6-12.3(1) is supplemented with the following:

(August 3, 2015)
The Contractor shall submit a field survey of the existing groundline along each noise barrier wall alignment. The Contractor shall obtain field topographical information for the existing ground within ten feet of the noise barrier wall alignment, except as further limited by the Contracting Agency Right of Way and construction easements for this project. The Contractor shall ensure a vertical survey accuracy of 0.1 foot. The Contractor shall establish horizontal survey control at ten foot intervals, or at six inches differential vertical elevation from the adjacent point on the alignment, whichever is less.

The Contractor shall submit Type 2 Working Drawings consisting of the field survey, including all field notes. If the Engineer confirms that the groundline condition along the noise barrier wall alignment at the time of construction requires revisions to the

noise barrier wall details shown in the Plans, the Engineer will provide revised noise barrier wall Plan details to the Contractor within 14 calendar days.

The Contractor shall complete the field survey as a first item of noise barrier wall work.

Precast Concrete Panel Fabrication and Erection

Section 6-12.3(6) is supplemented with the following:

(April 5, 2004)
The Contractor shall form a *** $$1$$ *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the traffic side.

The Contractor shall form a *** $$1$$ *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the residential area, except as otherwise noted. The surfaces of the pilaster shall receive either a Class 2 surface finish in accordance with Section 6-02.3(14)B, if pigmented sealer is being applied, or a Class 1 surface finish in accordance with Section 6-02.3(14)A, if pigmented sealer is not being applied.

Masonry Wall Construction

Section 6-12.3(7) is supplemented with the following:

(August 3, 2015)
Masonry Wall
The Contractor shall construct the masonry wall in accordance with the standards of masonry installation specified in Chapter 21 of the International Building Code.

All masonry wall construction workers shall be thoroughly trained and experienced in the necessary crafts, shall be completely familiar with the specified requirements and methods needed for proper completion of the work, and shall be supervised at the construction site at all times by the supervising journey-level masons.

Sample Masonry Wall Panel
The Contractor shall demonstrate Work quality and methods by constructing a 48-inch by 48-inch sample panel of each type of masonry wall and submitting them as Type 2 Working Drawings. The sample panel shall be constructed by the supervising journeyman mason specified by the Contractor. The sample panel shall show the general construction and appearance of the installed concrete masonry units. The Contractor shall construct the sample panel on a transportable platform and shall relocate the sample panel as specified by the Engineer as construction progresses.

If any of the supervising journeyman masons are replaced during the project, each replacement supervising journeyman mason shall construct another sample panel as a requirement for being accepted by the Engineer for the supervising position.

The Contractor shall construct all masonry walls in accordance with the quality of the sample panel. All masonry wall construction not consistent with the quality of the

accepted sample panel shall be reconstructed by the Contractor at no additional cost to the Contracting Agency.

The Contractor shall maintain the sample panel at the project site until all the noise barrier walls are accepted by the Engineer, at which time all sample panels shall become the property of the Contractor and shall be disposed of in accordance with Section 2-02.3.

General Requirements

All masonry materials stored on the project site shall be stored off the ground and protected from weather. Concrete masonry units that are chipped, cracked, or spalled on the faces or edges shall not be used.

The Contractor shall lay up all walls in running bond, unless otherwise shown in the Plans, and all walls shall be plumb, level, and true to the lines and dimensions as shown in the Plans. All head and bed joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.

Mortar

Mortar joints shall be of uniform thickness, ½ inch maximum. The Contractor shall not change coursing or bonding after beginning work on a wall. The Contractor shall tool all joints flush with adjacent surfaces to a dense brushed finish. The split face side of wall shall have a concave smooth joint. The scored split faces shall have a rake joint to match the depth of the scores.

Temperature

When air temperatures fall below 40F, grout mixing water and aggregate shall be heated to produce a grout temperature between 40F and 120F. While grouting the concrete masonry units, and for at least 24 hours after grouting the units, the Contractor shall maintain the temperature of the concrete masonry units above freezing. When atmospheric temperatures fall below 20F, the Contractor shall erect enclosures around the concrete masonry units being grouted and shall maintain the enclosures for at least 24 hours after grouting the units.

The Contractor shall not perform masonry wall work when the air temperature is below 40F on a falling thermometer, or when it is likely that the temperature will fall below 40F before the mortar has set, except when appropriate provisions have been made to heat and enclose the concrete masonry units and the work area. The Contractor may begin masonry wall work at 34F on a rising thermometer.

Grouting Cells

Cells with steel reinforcing bars shall be grouted solid and compacted. Vertical cells with steel reinforcing bars shall be aligned and filled to provide a continuous unobstructed opening of the dimensions indicated, but in no case less than two inches by three inches. The Contractor shall provide cleanout openings at the bottom of all cells to be filled at each stage of grout placement where the height of grout placement is greater than four feet. The Contractor shall remove all overhanging mortar and other obstructions and debris from the insides of the cells being grouted. The Contractor shall seal all cleanouts, after the Engineer has inspected and accepted the cells. The Contractor shall place grout in lifts of eight feet or less.

Top Course

The Contractor shall cover the tops of all exposed walls not being worked on with a waterproof membrane, secured in place. All unfinished work shall be stepped back for joining to new work. Toothing shall not be performed.

The top course shall be a solid grouted bond beam unit. The Contractor shall apply a parge coat to the top of the wall.

Cleaning Exposed Surfaces

The Contractor shall clean all exposed masonry at the end of each day's work. After final pointing, the Contractor shall remove all mortar spots and droppings. The Contractor shall cut out all defective joints and repoint the joints solidly with mortar. The Contractor shall protect all work from damage, stain, and discoloring.

The Contractor shall perform additional final cleaning prior to applying the pigmented sealer. The Contractor shall remove all large particles of mortar before wetting the wall. The Contractor shall saturate the concrete masonry units with clean water and shall flush all loose mortar and dirt from the wall surface. The Contractor shall scrub the wall surface with a stiff brush and a masonry cleaning solution, in accordance with the cleaning solution manufacturer's instructions. The Contractor shall thoroughly wash the wall surface of all cleaning solution, dirt, and mortar crumbs with clean pressurized water. The Contractor shall not use acid cleaning solutions to clean the wall surface. The Contractor shall protect all wall surfaces adjacent to the sections of wall being cleaned.

Masonry Sealer

All exposed masonry surfaces shall receive two coats of masonry sealer, applied to either one foot minimum below finish ground line or to the base of the bottom row of masonry blocks, whichever is higher, from one of the masonry sealer products specified in Section 6-12.2 as supplemented in these Special Provisions. The masonry sealer shall be applied in accordance with the manufacturer’s recommendations.

Payment

Section 6-12.5 is supplemented with the following:

(April 5, 2004)

All costs in connection with performing the field survey of the existing groundline of the noise barrier wall alignment, and submitting the field survey to the Engineer, shall be included in the lump sum contract price for “Structure Surveying”.

Structural Earth Walls

Materials

Section 6-13.2 is supplemented with the following:

(October 29, 2020)

Welded Wire Faced Structural Earth Wall Materials

Welded Wire Mats and Backing Mats

Welded wire fabric for welded wire mats, welded wire form facing units, and backing mats shall conform to AASHTO M 32, and shall be fabricated from smooth wire fabric conforming to AASHTO M 55.

The minimum clear opening dimension of the backing mat, or the combination of welded wire form facing unit with geosynthetic wall facing wrap, shall not exceed the minimum particle size of the wall facing backfill as specified below.

Welded wire fabric for welded wire mats, welded wire form facing units, and backing mats shall be galvanized after fabrication in accordance with either ASTM A 641 (two ounces minimum per square foot) or AASHTO M 111. All damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Backfill for Welded Wire Faced Structural Earth Wall

The coarse, granular material used for the wall facing backfill placed immediately behind the wall face, as shown in the Plans, shall conform to the following gradation requirements:

1. The minimum particle size shall be no less than the width of the minimum opening dimension in the backing mat or the geosynthetic wall facing wrap.

2. The maximum particle size shall be no greater than six inches for welded wire reinforced walls, and no greater than four inches for geosynthetic reinforced walls.

Proprietary Materials

Hilfiker Welded Wire Retaining Wall (WWW) System

Welded wire fabric wire size for backing mats shall be W2.1 minimum for wall face backing layers of 1’-6” maximum thickness, and shall be W2.5 minimum for wall face backing layers between 1’-6” and 2’-0”.

Construction geotextile for wall facing shall conform to the requirements in Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Tensar Wire Form Retaining Wall System

Wire support struts shall conform to AASHTO M 32, and shall be galvanized after fabrication in accordance with either ASTM A 641 (two ounces minimum per square foot) or AASHTO M 111. All damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Geosynthetic connection rods shall be manufactured from high-density polyethylene with either fiberglass inclusions or oriented polypropylene, as recommended by Tensar Earth Technologies, Inc.

Geosynthetic separating the wall facing backfill from the welded wire faced structural earth wall backfill shall conform to the requirements in Section 9-33.1 for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Tensar Geogrid Materials

Geogrid reinforcement and geosynthetic wall facing wrap shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637 for multi-rib specimens.

For geogrid reinforcement and geosynthetic wall facing wrap, the ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than -20°F and greater than 122°F.

(January 10, 2022)

Precast Concrete Panel Faced Structural Earth Wall Materials

General Materials

Concrete Leveling Pad

Leveling pad concrete shall be commercial concrete in accordance with Section 6-02.3(2)B.

Proprietary Materials

ARES Modular Panel Wall System

Tensar Geogrid Materials

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637 for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results

from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

Rubber bearing pads shall be a type and grade as recommended by Tensar Earth Technologies, Inc.

Geosynthetic joint cover for all horizontal and vertical joints shall be a non-woven geosynthetic as recommended by Tensar Earth Technologies, Inc. Adhesive used to attach the geosynthetic to the rear of the precast concrete facing panel shall be as recommended by Tensar Earth Technologies, Inc.

Reinforced Earth Wall

Reinforcing strips shall be shop fabricated from hot rolled steel conforming to ASTM A 572 Grade 65 or approved equal, and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Bolts and nuts shall conform to Section 9-06.5(3), and shall be galvanized in accordance with ASTM F 2329.

Rubber bearing pads shall be a type and grade as recommended by the Reinforced Earth Company.

Vertical joint filler between panels, when specified in the structural earth wall working drawings, shall be two inch square, flexible open cell polyether foam strips, Grade UU-34, as recommended by the Reinforced Earth Company.

Filter fabric joint cover for all horizontal and vertical joints, when specified in the structural earth wall working drawings, shall be a pervious woven polypropylene filter fabric as recommended by the Reinforced Earth Company. Adhesive used to attach the fabric material to the rear of the precast concrete facing panel shall be as recommended by the Reinforced Earth Company.

MSE Plus Wall

Pins connecting the soil reinforcing mesh to the precast concrete panels shall conform to AASHTO M 32 and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of paint conforming to Section 9-08.1(2)B.

Bearing pads shall be serrated high-density polyethylene (HDPE) copolymer pads as recommended by SSL, LLC.

Filter fabric joint cover for all horizontal and vertical joints shall be non-woven geosynthetic conforming to AASHTO M 288. Adhesive used to bond the geosynthetic to the rear of the precast concrete facing panel shall be as recommended by SSL, LLC.

(August 3, 2015)
Lock + Load Retaining Wall System
Stainless steel wire and wire rods shall conform to ASTM A 580.

Stainless steel bars, plates and shapes shall conform to ASTM A 276 Type 304.

The maximum particle size of the backfill material within 1'-6" of the back face of the precast concrete facing panel shall not exceed 3/4 inches.

(January 2, 2018)
Concrete Block Faced Structural Earth Wall Materials

General Materials

Concrete Block

Acceptability of the blocks will be determined based on the following:

1. Visual inspection.
2. Compressive strength tests, conforming to Section 6-13.3(4).
3. Water absorption tests, conforming to Section 6-13.3(4).
4. Manufacturer's Certificate of Compliance in accordance with Section 1-06.3.
5. Freeze-thaw tests conducted on the lot of blocks produced for use in this project, as specified in Section 6-13.3(4).
6. Copies of results from tests conducted on the lot of blocks produced for this project by the concrete block fabricator in accordance with the quality control program required by the structural earth wall manufacturer.

The blocks shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength conforms to the 28-day requirements, and when all other acceptability requirements specified above are met.

Testing and inspection of dry cast concrete blocks shall conform to ASTM C 140, and shall include block fabrication plant approval by WSDOT prior to the start of block production for this project.

Mortar

Mortar shall conform to ASTM C 270, Type S, with an integral water repellent admixture as accepted by the Engineer. The amount of admixture shall be as recommended by the admixture manufacturer. To ensure uniform color, texture,

and quality, all mortar mix components shall be obtained from one manufacturer for each component, and from one source and producer for each aggregate.

Geosynthetic Soil Reinforcement

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of T_{al} and T_{ult} as listed in the QPL for the products used shall meet or exceed the values required for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637, for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The gap between the connector and the bearing surface of the connector tab cross-rib shall not exceed 0.5 inches. A maximum of 10 percent of connector tabs may have a gap between 0.3 inches and 0.5 inches. Gaps in the remaining connector tabs shall not exceed 0.3 inches.

The Engineer will take random samples of the geogrid materials at the job site. Acceptance of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were sampled will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

Drainage Geosynthetic Fabric

Drainage geosynthetic fabric shall be a non-woven geosynthetic conforming to the requirements in Section 9-33.1, for Construction Geotextile for Underground Drainage, Moderate Survivability, Class B.

Proprietary Materials

Allan Block Wall

Wall backfill material placed in the open cells of the precast concrete blocks and placed in the one to three foot zone immediately behind the precast concrete blocks shall be crushed granular material conforming to Section 9-03.9(3).

GEOWALL Structural Earth Retaining Wall System

Connection pins shall be fiberglass conforming to the requirements of Basalite Concrete Products, LLC.

KeyGrid Wall

KeyStone connection pins shall be fiberglass conforming to the requirements of Keystone Retaining Wall Systems, Inc.

Landmark Retaining Wall

Lock bars shall be made of a rigid polyvinyl chloride polymer conforming to the following requirements:

Property	Value	Specification
Specific Gravity	1.4 minimum	ASTM D 792
Tensile Strength at yield	2,700 psi minimum	ASTM D 638

Lock bars shall remain sealed in their shipping containers until placement into the wall. Lock bars exposed to direct sunlight for a period exceeding two months shall not be used for construction of the wall.

Mesa Wall

Block connectors for block courses with geogrid reinforcement shall be glass fiber reinforced high-density polypropylene conforming to the following minimum material specifications:

Property	Specification	Value
Polypropylene	ASTM D 4101 Group 1 Class 1 Grade 2	73 ± 2 percent
Fiberglass Content	ASTM D 2584	25 ± 3 percent
Carbon Black	ASTM D 4218	2 percent minimum
Specific Gravity	ASTM D 792	1.08 ± 0.04
Tensile Strength	ASTM D 638	

at yield		8,700 ± 1,450 psi
Melt Flow Rate	ASTM D 1238	0.37 ± 0.16 ounces/10 min.

Block connectors for block courses without geogrid reinforcement shall be glass fiber reinforced high-density polyethylene (HDPE) conforming to the following minimum material specifications:

Property	Specification	Value
HDPE	ASTM D 1248	
	Type III Class A Grade 5	68 ± 3 percent
Fiberglass Content	ASTM D 2584	30 ± 3 percent
Carbon Black	ASTM D 4218	2 percent minimum
Specific Gravity	ASTM D 792	1.16 ± 0.06
Tensile Strength	ASTM D 638	
at yield		8,700 ± 725 psi
Melt Flow Rate	ASTM D 1238	0.11 ± 0.07 ounces/10 min.

Construction Requirements

Section 6-13.3 is supplemented with the following:

(April 4, 2011)
Welded Wire Faced Structural Earth Wall

Welded wire faced structural earth walls shall be constructed of only one of the following wall systems.

The Contractor shall make arrangements to purchase the welded wire mats, welded wire form facing units, geogrid reinforcement, backing mats, facing elements, fasteners, geosynthetic connection rods, construction geotextile for wall facing, and all necessary incidentals from the source identified for each wall system:

Hilfiker Welded Wire Retaining Wall (WWW) System
Hilfiker is a registered trademark of Hilfiker Retaining Walls.

Hilfiker Retaining Walls
1902 Hilfiker Lane
Eureka, CA 95503-5711
(707) 443-5093
FAX (707) 443-2891
www.hilfiker.com

Tensar Wire Form Retaining Wall System
Tensar is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 344-2090
FAX (678) 281-8546
www.tensarcorp.com

(January 10, 2022)

Precast Concrete Panel Faced Structural Earth Wall

Precast concrete panel faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the precast concrete panels, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:

ARES Modular Panel Wall System

ARES Modular Panel Wall System is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 344-2090
FAX (678) 281-8546
www.tensarcorp.com

MSE Plus Wall

MSE Plus Wall is a registered trademark of SSL, LLC

SSL, LLC
4740 Scotts Valley Drive Suite E
Scotts Valley, CA 95066
(831) 430-9300
FAX (831) 430-9340
www.mseplus.com

Reinforced Earth Wall

Reinforced Earth is a registered trademark of the Reinforced Earth Company.

The Reinforced Earth Company
9025 East Kenyon Ave. Suite 200
Denver, CO 80237
(303) 790-1481
FAX (303) 790-1461
www.reinforcedearth.com

(August 3, 2015)

Lock + Load Retaining Wall System

Lock + Load is a registered trademark of Lock + Load Retaining Walls, Ltd.

Lock + Load Retaining Walls, Ltd.
1681 Chestnut Street Suite 400
Vancouver, BC V6J 4M6 Canada
(604) 732-9990
FAX: (604) 676-2705
www.lock-load.com

(January 2, 2018)

Concrete Block Faced Structural Earth Wall

Concrete block faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the concrete blocks, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:

Allan Block Wall

Allan Block Wall is a registered trademark of the Allan Block Corporation

Allan Block Corporation
7424 W 78th Street
Bloomington, MN 55439
(800) 899-5309
FAX (952) 835-0013
www.allanblock.com

GEOWALL Structural Earth Retaining Wall System

GEOWALL is a registered trademark of Basalite Concrete Products, LLC

Basalite Concrete Products LLC
3299 International Place
Du Pont, WA 98327-7707
(800) 964-9424
FAX: (253) 964-5005
www.basalite.com

Redi-Rock Positive Connection System

Redi-Rock Positive Connection System is a registered trademark of Redi-Rock International, LLC

Redi-Rock International, LLC
05481 US 31 South
Charlevoix, MI 49720
(866) 222-8400
FAX (231) 237-9521
www.redi-rock.com

Mesa Wall

Mesa Wall is a registered trademark of Tensar Corporation

Tensar Corporation
2500 Northwinds Parkway Suite 500
Atlanta, GA 30009
(770) 334-2090
FAX (678) 281-8546
www.tensarcorp.com

Landmark Retaining Wall System

Landmark Retaining Wall System is a registered trademark of Anchor Wall Systems, Inc.

Anchor Wall Systems, Inc.
5959 Baker Road, Suite 390
Minnetonka, MN 55345-5996
(877) 295-5415
FAX (952) 979-8454
www.anchorwall.com

KeyGrid Wall
KeyGrid is a registered trademark of Keystone Retaining Wall Systems, Inc.

Keystone Retaining Wall Systems, Inc.
4444 West 78th Street
Minneapolis, MN 55435
(800) 747-8971
FAX (952) 897-3858
www.keystonewalls.com

Submittals

Section 6-13.3(2) is supplemented with the following:

(January 3, 2011)
The following geotechnical design parameters shall be used for the design of the structural earth wall(s):

Wall Name or No.: *** $$1$$ ***

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	***$$2$$***	***$$3$$***	***$$4$$***
Friction Angle (deg)	***$$5$$***	***$$6$$***	***$$7$$***
Cohesion (psf)	***$$8$$***	***$$9$$***	***$$10$$***

For the Service Limit State, the wall shall be designed to accommodate a differential settlement of *** $$11$$ *** per 100 feet of wall length.

For the Extreme Event I Limit State, the wall shall be designed for a horizontal seismic acceleration coefficient k_h of *** $$12$$ *** g and a vertical seismic acceleration coefficient k_v of *** $$13$$ *** g.

Precast Concrete Facing Panel and Concrete Block Fabrication

Section 6-13.3(4) is supplemented with the following:

(April 3, 2017)
Specific Fabrication Requirements for Precast Concrete Panel Faced Structural Earth Walls
ARES Modular Panel Wall System
The concrete mix for precast concrete facing panels shall be a Contractor mix design in accordance with Section 6-02.3(2)A, producing a minimum

compressive strength at 28 days of 4,500 psi. The Contractor mix design for precast concrete facing panels shall not include Type III cement unless otherwise allowed by the Engineer.

(August 3, 2015)
Lock + Load Retaining Wall System
Concrete for precast concrete panels and counterfort members shall conform to ASTM C 1116 Type III, with cement and aggregate gradation as recommended by Lock + Load Retaining Walls, Ltd, slump and air content as specified in this Section, and a minimum compressive strength at 28 days of 5,500 psi. The fiber reinforcement shall be mixed in the concrete at a minimum reinforcement ratio of 3.0 pounds per cubic yard and as specified by Lock + Load Retaining Walls, Ltd.

Full size precast concrete facing panels for Lock + Load retaining walls shall be 2'-8" wide and 1'-4" tall.

Precast concrete counterfort members shall be fabricated, handled, stored, and shipped in accordance with the requirements specified in this Section for precast concrete facing panels.

Precast Concrete Facing Panel and Concrete Block Erection

Section 6-13.3(5) is supplemented with the following:

(April 2, 2012)
Specific Erection Requirements for Precast Concrete Block Faced Structural Earth Walls
Landmark Retaining Wall
When placing each course of concrete blocks, the Contractor shall pull the blocks towards the front face of the wall until the male key of the bottom face of the upper block contacts and fits into the female key of the top face of the supporting block below.

A maximum gap of 1/8-inch is allowed between adjacent concrete blocks, except for the base course set of concrete blocks placed on the leveling pad. A maximum gap of 1-inch is allowed between adjacent base course concrete blocks, provided geosynthetic reinforcement for drains is in place over the gap at the back face of the concrete blocks.

Lock bars shall be installed in the female key of the top face of all concrete block courses receiving geogrid reinforcement. Gaps between adjacent lock bars in the key shall not exceed 3-inches. The lock bar shall be installed flat side up, with the angled side to the back of the concrete block, as shown in the shop drawings.

Geogrid reinforcement shall be placed and connected to concrete block courses specified to receive soil reinforcement. The leading edge of the geogrid reinforcement shall be maintained within 1-inch of the front face of the supporting concrete blocks below. Geogrid panels shall be abutted for 100 percent backfill coverage with less than a 4-inch gap between adjacent panels.

Backfill shall be placed and compacted level with the top of each course of concrete blocks, and geogrid reinforcement placed and connected to concrete block courses specified to receive soil reinforcement, before the Contractor may continue placing the next course of concrete blocks.

Mesa Wall

For all concrete block courses receiving geogrid reinforcement, the fingers of the block connectors shall engage the geogrid reinforcement apertures, both in the connector slot in the block, and across the block core. For all concrete block courses with intermittent geogrid coverage, a #3 steel reinforcing bar shall be placed, butt end to butt end, in the top block groove, with the butt ends being placed at a center of a concrete block.

Backfill

Section 6-13.3(7) is supplemented with the following:

(August 3, 2015)
Specific Backfill Requirements for Precast Concrete Panel Faced Structural Earth Walls

Lock + Load Retaining Wall System

The Contractor shall begin placement and compaction of backfill above the tail of the counterfort member first, then towards the back face of the precast concrete facing panel, followed by placement and compaction of the remainder of the backfill layer. The zone for compaction by plate compactor equipment only, with no soil density testing requirement, shall be within 1'-4" of the back face of the precast concrete facing panel.

Geosynthetic Retaining Walls

Materials

Geosynthetic Properties For Retaining Walls and Reinforced Slopes

Section 9-33.2(2) is supplemented with the following:

(August 7, 2006)
Geosynthetic Properties For Temporary Geosynthetic Retaining Walls

Wide strip geosynthetic strengths provided in Table 10 are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table. These wide strip strength requirements apply only in the geosynthetic direction perpendicular to the wall face. The test procedures specified in the table are in conformance with the most recently approved ASTM geosynthetic test procedures, except for geosynthetic sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 10: Wide strip tensile strength required for the geosynthetic reinforcement used in geosynthetic retaining walls.

Wall Location	Vertical Spacing of Reinforcement Layers	Reinforcement Layer Distance from Top of Wall	Minimum Tensile Strength Based on ASTM D4595 for Geotextiles and ASTM D6637 for Geogrids
$$1$$	***$$2$$***	***$$3$$***	***$$4$$***

Soil Nail Walls

Materials

Section 6-15.2 is supplemented with the following:

(August 3, 2015)

Permanent Soil Nail Materials and Components

A soil nail system is a structural system used to transfer tensile loads to soil. A soil nail system may also be specified in the Plans as a nail. A soil nail system includes all steel reinforcing bars, anchorage devices, grout, coatings, sheathings and couplers if used.

The Contractor shall either select a soil nail system from the Qualified Products List, or submit a Type 2 Working Drawing consisting of the following information:

1. Catalogue cuts or Manufacturer's Certificates of Compliance for centralizers and grout admixtures.

2. Manufacturer's Certificate of Compliance for bearing plates, nuts, steel reinforcing bars, tendon encapsulation tubing, and welded shear studs. The Manufacturer's Certificate of Compliance for the nuts shall confirm compliance with the specified strength requirements.

If the Contractor selects a permanent soil nail system from the Qualified Products List (QPL), the Contractor shall submit a Type 1 Working Drawing consisting of a certificate from the permanent soil nail system fabricator/supplier confirming that the material specifications of the permanent soil nail system components as furnished conform to those specified in the QPL.

Component Material Specifications

Bearing plates shall conform to ASTM A 36, ASTM A 529, ASTM A 536, ASTM A 572, ASTM A 588, or AASHTO M 270.

Centralizers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Grout shall be a neat cement grout or a sand-cement grout conforming to Section 9-20.3(4). The compressive strength for the grout shall be as required by the soil nail manufacturer. Grout components shall be as follows:

Admixtures shall conform to the requirements of Section 9-23.6. Expansive admixtures and accelerators will not be permitted. Admixtures shall be mixed in accordance with the manufacturer's recommendations.

Aggregates shall conform to the requirements of Section 9-03.

Cement shall conform to the requirements of Section 9-01, and shall not contain lumps or other indications of hydration.

Nuts shall conform to either ASTM A 563, Grade B, Hexagonal, ASTM A 536 Grade 100-70-03, ASTM A 29 Grades 12L14, 1215, or C1045, AASHTO M 169 Grades 1117 or 12L14, ASTM A 513 Type 5 Grade 1026, ASTM A 521 Class CF, ASTM A 897 Grade 125/80/10M, or ASTM A 519 Grade 1026, and shall be capable of developing 100 percent of the GUTS of the soil nail. The nuts shall be fitted, where necessary, with a special wedge washer or spherical seat such that the nut bears uniformly on the bearing plate.

Washers shall conform to either ASTM F 436, ASTM A 536 Grade 80-55-06 or ASTM A 47 Grade 32510.

Soil nails shall be deformed steel reinforcing bars conforming to AASHTO M 31, Grade 60 minimum, and Section 9-07.2. All soil nails, except those specified in the Plans to be encapsulated, shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3. The soil nails shall be of the type and size specified in the Plans. The soil nails shall not be spliced. The soil nails shall be threaded at the bearing plate end a minimum of six inches. The threading shall be continuous spiral deformed ribbing. Alternatively, threads may be cut into the soil nail if the bar size is increased to the next larger size from the size specified in the Plans at no additional cost to the Contracting Agency.

Tendon encapsulation, when specified in the Plans to provide additional corrosion protection, shall be fabricated from one of the following:

1. High density corrugated polyethylene (PE) tubing conforming to the requirements of ASTM D 3350 Class PE335520C or Class PE335400C, ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness of 40 mils.

2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784, Class 13464-B, and having a nominal wall thickness of 40 mils.

The soil nails shall be centralized within the sheathing with a minimum 0.2 inch grout cover over the soil nail inside the sheath. The encapsulation shall be constructed at the factory under controlled conditions. Field construction of the encapsulation will not be permitted.

Welded shear studs shall conform to Section 9-06.15, and shall be welded in accordance with Section 6-03.3(25).

Construction Requirements

Soil Nail Testing And Acceptance

Verification Testing

Section 6-15.3(8)A is supplemented with the following:

(April 5, 2004)
Soil nail verification tests shall be conducted as follows:

Verification Test Limits	Soil Nail Row	Number of Successful Verification Tests Required
$$1$$	***$$2$$***	***$$3$$***

Permanent Ground Anchors

Description

Section 6-17.1 is supplemented with the following:

(January 7, 2013)
This work also consists of furnishing, field locating, installing, stressing and testing rock bolts and rock dowels.

Materials

Section 6-17.2 is supplemented with the following:

(September 8, 2020)
Permanent Ground Anchor Materials and Components
A permanent ground anchor system is a structural system used to transfer tensile loads to soil or rock. A permanent ground anchor system may also be specified in the Plans as an anchor, a ground anchor, or a tieback. A permanent ground anchor system includes all prestressing steel, anchorage devices, grout, coatings, sheathings and couplers if used.

The Contractor shall either select a permanent ground anchor system from the Qualified Products List or submit a Type 2 Working Drawing consisting of the following information:

1. Catalogue cuts or Manufacturer's Certificates of Compliance for anchorage covers, bond breaker, centralizers, corrosion inhibiting grease, end caps, grout admixtures, and strand tendon spacers.

2. Manufacturer's Certificates of Compliance for anchor heads, anchor head wedges, bar tendon nuts, bar tendon couplers, tendon encapsulation tubing, trumpet assemblies, and bar tendons or strand tendons. The Manufacturer's Certificates of Compliance for the anchorhead wedges (grippers), and bar tendon nuts and couplers, shall confirm compliance with the specified strength requirements.

If the Contractor selects a permanent ground anchor system from the Qualified Products List (QPL), the Contractor shall submit a Type 1 Working Drawing consisting of a certificate from the permanent ground anchor system fabricator/supplier confirming that the material specifications of the permanent ground anchor system components as furnished conform to those specified in the QPL.

Component Material Specifications

Anchorage covers shall have a minimum thickness of 0.20 inches and shall conform to either ASTM A 53 for pipe, or ASTM A 500 for tubing, or ASTM A 36, ASTM A 529, ASTM A 572, ASTM A 588, or AASHTO M 270 for fabricated steel.

Anchorheads shall conform to either ASTM A 36, AASHTO M 169 Grades 1040 or 1045, ASTM A 521 Grade 1045, ASTM A 576 Grade 1045, or ASTM A 536 Grade 80-55-06.

Bearing plates shall conform to either ASTM A 36, ASTM A 572, ASTM A 588, AASHTO M 270, ASTM A 529, or ASTM A 536.

Anchorhead wedges (grippers) shall conform to AASHTO M 169 Grade 12L14, case hardened 0.012 to 0.015 inches deep to Rockwell C 59 to 65.

Bar tendon nuts shall conform to either ASTM A 29 Grade C1045, ASTM A 521 Class CF, AASHTO M 169 Grades 1117 or 1144, or ASTM A 536 Grade 100-70-03, and shall be capable of developing 100 percent of the GUTS of the bar tendon.

Bondbreaker shall conform to the requirements of Section 4.7 of the Post-Tensioning Institute “Recommendations for Prestressed Rock and Soil Anchors”, and shall be fabricated from a smooth plastic tube or pipe having the following properties:

1. Resistant to chemical attack from aggressive environments, grout or grease;
2. Resistant to aging by ultra-violet light;
3. Fabricated from material nondetrimental to the tendon;
4. Capable of withstanding abrasion, impact, and bending during handling and installation;
5. Enable the tendon to elongate during testing and stressing; and
6. Allow the tendon to remain unbonded after lock-off.

Centralizers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Corrosion inhibiting grease shall conform to the requirements of Section 3.2.5 of the Post-Tensioning Institute, "Specification For Unbonded Single Strand Tendons".

Couplers for bar tendons, if required, shall be furnished by the manufacturer of the bar tendons and shall be AASHTO M 169 Grades 1045, 1117 or 1144, ASTM A 519 Grade 1026, or equivalent steel developing 100 percent of the GUTS of the bar tendon without evidence of any failure. Couplers shall be placed in the bond zone. Couplers for strand tendons will not be allowed.

End caps shall conform to ASTM D 3350 Class PE324420C, Class PE334410C, or Class PE335400C, ASTM D 1248, and AASHTO M 252, ASTM D 1784 Class 1346B, ASTM A 653, or ASTM A 36.

Grout shall be a neat cement grout or a sand-cement grout conforming to Section 9-20.3(4). The compressive strength for the grout shall be as required by the tieback manufacturer. Grout components shall be as follows:

Admixtures shall conform to the requirements of Section 9-23.6. Expansive admixtures shall only be added to the grout used for filling sealed encapsulations, trumpets and anchorage covers. Accelerators will not be permitted. Admixtures shall be compatible with prestressing steels and mixed in accordance with the manufacturer's recommendations.

Aggregates shall conform to the requirements of Section 9-03.

Cement shall conform to the requirements of Section 9-01, and shall not contain lumps or other indications of hydration.

Prestressing steel shall consist of either bar tendons with an ultimate tensile strength of 150 ksi conforming to AASHTO M 275 Type II, or strand tendons with an ultimate tensile strength of 270 ksi conforming to AASHTO M 203. The Contractor shall submit Type 1 Working Drawings consisting of certified mill test results and typical stress-strain curves along with samples from each heat, properly marked, for the prestressing steel. The typical stress-strain curve shall be obtained by conventional industry standard practices. The guaranteed ultimate strength, yield strength, elongation, and composition shall be specified.

Strand tendon spacers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Tendon encapsulation, when specified in the Plans to provide additional corrosion protection, shall be fabricated from one of the following:

1. High density corrugated polyethylene (PE) tubing conforming to the requirements of ASTM D 3350 Class PE334410C, Class PE335520C or Class PE335400C, ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness of 40 mils or greater.

2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784, Class 13464-B, and having a nominal wall thickness of 40 mils or greater.

Trumpet providing the transition from the bearing plate to the unbonded length corrosion protection shall be fabricated from a steel pipe or tube conforming to the requirements of ASTM A 53 for pipe or ASTM A 500 for tubing. The trumpet shall have a minimum wall thickness of 0.20 inches, and shall be seal welded to the bearing plate. The seal weld shall be visually inspected only, in accordance with Section 6-03.3(25)A.

(September 8, 2020)

Rock Bolt and Rock Dowel Materials

Rock bolts shall be continuously threaded steel reinforcement bars conforming to either; AASHTO M 31 Grade 60 or 75 deformed bar, ASTM 615 Grade 60 or 75 deformed bar, ASTM A 706 Grade 60 or 80 deformed bar, ASTM A 722 Grade 150 Type II, or AASHTO M 275 Grade 150 Type II and shall be capable of being post-tensioned to the design loads, performance test loads, and proof loads specified. The bending requirements of AASHTO M 31, ASTM 615, and ASTM 706 shall be waived.

Rock dowels shall be continuously threaded steel reinforcement bars conforming to either; AASHTO M 31 Grade 60 or 75 deformed bar, ASTM A 615 Grade 60 or 75

deformed bar, or ASTM A 706 Grade 60 or 80 deformed bar with a minimum size of a No. 7 bar for Type 1 rock dowels, and a minimum size of a No.11 bar for Type 2 rock dowels. The bending requirements of AASHTO M 31, ASTM 615, and ASTM 706 shall be waived.

Anchor bar steel for rock bolts and dowels shall be provided with epoxy coating in accordance with either AASHTO M 284, ASTM A 775, or ASTM A 934. The patching material, compatible with coating material and inert in grout selected for use, shall be supplied with each shipment.

Bearing plated shall be galvanized in accordance with either AASHTO M 111, AASHTO M 232, ASTM A 123, or ASTM A 153, and shall conform to ASTM A 36 Grade 36 or ASTM A 572 Grade 50. Bearing plate size will be reviewed and approved by the Engineer in accordance with Section 6.10 of Post Tensioning Institute “Recommendations for Prestressed Rock and Soil Anchors”. Bearing plate thickness shall be not less than ¾ inch and its dimensions not less than 2 inches greater than the drill hole diameter.

Nuts and couplers shall be galvanized in accordance with either AASHTO M 232 or ASTM A 153 and exceed 100 percent of the MUTS (Minimum Ultimate Tensile Strength) of the bar. For Grades 60, 75, and 80 bar the nuts and coupler shall conform to either AASHTO M 169 or ASTM A 108. For Grade 150 bar the nuts shall conform to either ASTM A 29 or ASTM A 536, couplers shall conform to ASTM A 29.

Washers shall be galvanized in accordance with AASHTO M 232 or ASTM A 153 and conform to ASTM F 436. Spherical and beveled washers shall be galvanized in accordance with AASHTO M 232 or ASTM A 153 and conform to ASTM A 536 or ASTM A 47.

Centralizers shall be fabricated from plastic or material which is non-detrimental to the pre-stressing steel. Wood shall not be used.

Grout shall conform to Section 9-20.3(2).

Sleeved bondbreakers for rock bolts shall be fabricated from plastic tube or pipe having the following properties:

1. Resistant to chemical attack from aggressive environment, grout or corrosion inhibiting compound.

2. Resistant to aging by ultra-violet light.

3. Non-detrimental to bolt. Resistant to damage caused by abrasion, impact, crushing and bending during handling and installation.

4. Enable the bolt to elongate during testing.

5. Resistant to distortion caused by heat generated by the curing of the grout.

The wall thickness of sleeved bondbreaker shall meet the following:

Type	Nominal	Minimum
HDPE/PP	0.060 in. (1.5 mm)	0.050 in. (1.25 mm)
PVC	0.040 in. (1.0 mm)	0.035 in. (0.9 mm)

Corrosion inhibiting compounds shall be provided by the manufacturer or shall be either a grease, wax, or gel and conforms to the following:

Properties	Test Method	Criteria		
		Grease	Wax[1]	Gel[1]
Dropping Point, °F min.	ASTM D 566	300°	N/A	N/A
Melting Point, °F min.	ASTM D 127(2)	N/A	145°	500°
Oil Separation @160°F, max.	FTMS 791B Method 321.2	0.5	N/A (product is liquid)	0.5
Water, % max.	ASTM D 95	0.1	0.4	0.4
Flash Point °F, min.	ASTM D 92	300°	300°	
Accelerated Corrosion Test: Salt Fog @ 100°F @ 5 mils, hrs. min.	ASTM B 117	1000	1000	1000
Water Soluble Ions, ppm max.				
a. Chloride	ASTM D 512	10	10	10
b. Sulfides	APHA 4500S^2-E	10	10	10
c. Nitrates	ASTM D 3867	10	10	10
Soak Test: Salt Fog 50/50 Immersion, hrs.	ASTM B 117 Modified	720+	720+	720+
Sheathing Compatibility @150°F				
a. Hardness % max change	ASTM D 4289	15% change	15% change	15% change
b. Volume % max change	ASTM D 4289	10% change	10% change	10% change
c. Tensile Strength % max change	ASTM D 638	30% change	30% change	30% change
Note 1: A combination of wax and gel is possible when approved by the Engineer. Note 2: ASTM D 566 may be used when the wax product consistency warrant it.				

Anchorage covers for rock bolts shall be galvanized in accordance with either AASHTO M 111 or ASTM F 2329 as applicable, and have a minimum thickness of 0.20 inches; and shall conform to either ASTM A 53 for pipe, or ASTM A 500 for tubing, or ASTM A 36, ASTM A 529, ASTM A 572, ASTM A 588, or AASHTO M 270 for fabricated steel.

Construction Requirements

Section 6-17.3 is supplemented with the following:

(September 8, 2020)

Rock Bolt and Rock Dowel Construction Requirements

Rock Bolt and Rock Dowel Installation Experience Requirements

The Contractor's foreman supervising the rock bolt and rock dowel work shall have installed a minimum of 3,000 linear feet of post-tensioned rock bolts or rock dowels on a minimum of five projects within the past five years.

The Contractor's rock bolt and rock dowel drill operators shall have installed a minimum of 1,000 linear feet of post-tensioned rock bolts or rock dowels on a minimum of three projects within the past five years.

The Contractor shall submit a Type 2 Working Drawing consisting of a list documenting the rock bolt and rock dowel work experience of the foreman and drill operators working on the project. This list shall include a brief description of each project and a reference shall be included for each project listed. As a minimum, the reference shall include an individual's name and current phone number.

Rock Bolt and Rock Dowel Submittals

The Contractor shall submit Type 2 Working Drawings consisting of a rock bolt and rock dowel plan. The rock bolt and rock dowel plan shall include the following:

1. The proposed construction sequence and schedule.

2. The proposed drilling method and equipment.

3. The proposed drill hole diameter.

4. The minimum bond zone length for the rock bolts.

5. The proposed anchor steel bars, couplers, nut, bearing plate, flat washer, and beveled washer specifications, including manufacturer's data sheets and mill certificates. Manufacturer's verification for the bearing plate thickness for the specified rock bolt and rock dowel capacities.

6. The proposed grout mix design, including manufacturer's certificate of compliance and the procedures for placing the grout. For rock bolts, if two-stage grouting is used, the means for determining the level of the primary grout for the bond zone. If single-stage grouting is used, the fabrication details for the bondbreaker in the free-stressing length, including corrosion inhibiting compounds.

7. The proposed corrosion protection for the rock bolt and rock dowel systems.

8. The proposed stressing procedures and stressing equipment.

9. The proposed construction method for upwardly inclined anchors.

10. The proposed equipment for measuring and recording the volume of grout injected for production rock bolts and rock dowels.

11. The calibration data for each load cell, test jack, pressure gauge and master pressure gauge to be used in the proof testing, in accordance with the calibration requirements specified in Section 6-17.3(3).

Rock Bolt and Rock Dowel Preconstruction Conference

A rock bolt and rock dowel preconstruction conference may be held at the discretion of the Engineer in accordance with Section 6-17.3(4).

Rock Bolt and Rock Dowel Storage and Handling

Rock bolt and rock dowel storage and handling shall conform to the Section 6-17.3(6) requirements for permanent ground anchor tendons.

Field handling procedures for epoxy-coated rock bolts and rock dowels shall conform to Sections 6-02.3(24)H, including providing padding between contact points during storage and lifting, and covering epoxy-coated rock bolts and rock dowels to minimize ultraviolet exposure.

Rock Bolt and Rock Dowel Grout

Grout shall meet the requirements of Section 9-20.3(2).

The use of epoxy or polyester resin as bonding agents will not be allowed.

Rock Bolt and Rock Dowel Installation

General Requirements

The Contractor shall install rock bolts and rock dowels at the location and orientation in accordance with the rock bolt and rock dowel plan accepted by the Engineer. For rock bolts, the Engineer will designate the required free-stressing length. For rock dowels, the Engineer will designate the minimum length.

The rock bolts and rock dowels shall be installed within five degrees of the orientation angle specified by the Engineer. Unless otherwise specified by the Engineer, the angle of installation shall be perpendicular to the rock face and inclined slightly downward at the rock bolt and rock dowel location.

In all cases, at least three-quarters of the bearing plate shall be in contact with the rock face. The orientation of the bearing plate against the rock surface should be within twenty degrees of normal to the bar. Beveled washers shall be used to accommodate all non-perpendicular installations, but should not exceed twenty degrees. If the axis of the anchor is not within five degrees of perpendicular to the rock surface, or within the angle provided by the beveled washer up to a maximum of twenty degrees, or if the rock beneath the bearing plate is not sound or is highly irregular as determined by the Engineer, a bearing pad accepted by the Engineer shall be constructed so that the bar is not bent when the nut is torqued during lock-off of the anchor. The Engineer may also require the use of over-sized bearing plates, when the rock surface is weak or highly weathered.

The use of hand drills for advancing the hole will not be allowed without the written permission of the Engineer and demonstrated effectiveness by the Contractor. The drill hole shall be sized to provide a minimum of 1/2 inches of grout cover around the rock bolt or rock dowel. The Contractor shall flush the drill hole of all drill cuttings and debris prior to installing the rock bolt or rock

dowel. Holes determined by the Engineer to be unacceptable for rock bolt and rock dowel installation shall be re-drilled by the Contractor at no additional expense to the Contracting Agency.

Rock bolts and rock dowels shall not be precut at the factory to lengths shown in the Plans, but rather shall be delivered to the job site in bulk lengths and field cut to the appropriate lengths. Each rock bolt and rock dowel shall be fitted with a bearing plate, nut, and washers. Prior to placing rock bolts and rock dowels in the drilled holes, all mill scale, flaking rust and grease shall be removed from the rock bolt and rock dowel.

Centralizers shall be placed along the rock bolt or rock dowel at ten foot centers prior to grouting, with a minimum of one centralizer per rock bolt or rock dowel. The lowermost centralizer shall be located within 12 inches of the end of the rock bolt or rock dowel. Centralizers shall be of sufficient strength to support the weight of the anchor bar in the drilled hole and provide a minimum of 0.5 inches of grout cover.

The grout equipment shall produce a grout free of lumps and undispersed cement. The pump shall be equipped with a pressure gauge near the discharge end to monitor grout pressures. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The grout shall be injected from the lowest point of the drill hole. Sufficient grout shall be placed in the drill hole to ensure full encapsulation of the rock bolt or rock dowel. The volume of grout injected, and the corresponding grout injection pressure, for each production rock bolt and rock dowel shall be measured using the methods and equipment specified in the rock bolt and rock dowel plan.

The entire length of the rock bolt and rock dowel shall be corrosion-protected with grout. Bare steel from field cutting of the anchor bar and any damaged galvanizing on the bearing plates, nuts and washers shall be painted in accordance with Section 6-07.3(10)P with one coat of galvanizing repair paint conforming to Section 9-08.1(2)B.

Specific Rock Dowel Requirements

The Contractor shall install Type 1 rock dowels to achieve the design load specified in the Plans; if the design load is not specified in the Plans a 25 kip design load should be used. When the grout has reached final set, the Contractor shall install the bearing plate, washers and nut. The nut shall be torqued to a nominal 100 foot-pounds to ensure proper seating against the rock face. The end of the completed rock dowel shall be trimmed to within six inches of the rock face.

Specific Rock Bolt Requirements

The Contractor shall select the type of rock bolt and construction method to be used. The Contractor shall embed and install rock bolts to achieve the design load specified in the Plans. The rock bolt shall be sized so that the design load does not exceed 60 percent of the minimum ultimate tensile strength (MUTS) of the rock bolt. In addition, the rock bolt shall be sized so that the maximum test load does not exceed 80 percent of the MUTS for Grade 150 bar or 90 percent of the minimum yield strength for Grade 75 bar. The end of the completed rock

bolt shall be trimmed to within six inches of the rock face, and fitted with a galvanized steel anchorage cover filled with a corrosion-inhibiting compound.

Testing And Stressing

Section 6-17.3(8) is supplemented with the following:

(January 7, 2013)
Rock Dowel Proof Testing
At the discretion of the Engineer, up to five percent, but not less than three installed production rock dowels as selected by the Engineer shall be proof tested. The Contractor shall conduct the proof test, and the Engineer will interpret the results.

The rock dowel shall be tensioned to 25 kips for Type 1 rock dowels, with a calibrated hollow-ram hydraulic jack using a bar extension and coupler attached to the rock dowel. The test load specified for the particular type of rock dowel shall be held for ten minutes. If no loss of load occurs over the ten minute hold period, the rock dowel is acceptable.

The Engineer may require additional proof testing above the specified five percent maximum if rock dowels fail the proof testing. All failed rock dowels shall be replaced with an additional rock dowel installed in a separate hole at no additional expense to the Contracting Agency.

Upon acceptance by the Engineer, the Contractor shall permanently stamp or etch the bearing plate of or otherwise label each rock dowel with a unique number assigned by the Engineer, the installation date and the total anchor length.

Rock Bolt Testing
The Contractor shall conduct rock bolt testing in accordance with the requirements specified in this Section for permanent ground anchors, including testing equipment, and test load monitoring, recording and documentation.

Rock Bolt Performance Testing
At the Engineer's discretion, the Contractor shall conduct up to three performance tests to demonstrate the effectiveness of the construction method for each rock bolt design, and when a significant change is proposed in the construction method.

Rock bolts shall be tensioned to 120 percent of the design load of the rock bolt for a holding time period of not more than 60 minutes. The Contractor shall monitor the test load and shall document the results in accordance with the requirements specified in this Section.

The Engineer will analyze the rock bolt performance test results and determine whether the rock bolt is acceptable. A rock bolt is acceptable if both the following conditions are satisfied:

1. The total elastic movement obtained at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the stressing length.

2. The rock bolt carries the maximum test load with a creep rate that does not exceed 0.04 inches between one and ten minutes, or 0.08 inches per log cycle of time between the six and 60 minute readings.

If the Contractor fails to successfully achieve these testing criteria, the Engineer may require additional rock bolt performance tests to be completed at no additional expense to the Contracting Agency.

Production rock bolting shall not begin until the Contractor has completed performance testing of the design rock bolts and the test results have been accepted by the Engineer.

Rock Bolt Proof Testing

Each production rock bolt shall be proof tested. Proof testing shall consist of tensioning the rock bolt to 120 percent of the design load and holding that load for ten minutes. If no loss of load occurs in this time period, the rock bolt is accepted. If a rock bolt fails this proof test, the rock bolt shall be replaced with an additional rock bolt installed in a separate hole.

After tensioning and achieving a successful rock bolt proof test, the load shall be locked off at 100 percent of the design load and the remaining portion of the rock bolt grouted, if appropriate. The end of the completed rock bolt shall be trimmed to within six inches of the rock face.

Upon acceptance by the Engineer, the Contractor shall permanently stamp or etch the bearing plate of or otherwise label each rock bolt with a unique number assigned by the Engineer, the installation date, the stressing load, and the total anchor length.

Verification Testing

Section 6-17.3(8)A is supplemented with the following:

(August 3, 2015)

Verification tests shall be performed to verify the design of the anchor system. These ground anchor test results shall verify the Contractor's design and be accepted by the Engineer prior to ordering anchor material for the tieback retaining walls. The tests shall be performed on sacrificial test anchors. A minimum of two successful verification tests shall be conducted. The locations shall be close to the anchor location of the production anchors. The test locations shall be selected by the Contractor and accepted by the Engineer, except where specific permanent ground anchor rows between specific station limits are shown in the Plans.

Verification test anchors shall be constructed using the same procedures and anchor geometry (drill hole diameter, bond length, unbonded length) as the production anchors.

The anchor tested shall be loaded to 150 percent of the factored design load (FDL). The prestressing tendon shall be proportioned such that the maximum stress does not exceed 80 percent of the ultimate strength of the steel. The jack

shall be positioned at the beginning of the test such that unloading and repositioning of the jack during the test will not be required.

The verification tests shall be made by incrementally loading the anchors in accordance with the following schedule.

AL - Anchor Alignment Load
FDL - Factored Design Load

Load	Hold Time
AL	1 Min.
0.25FDL	10 Min.
0.50FDL	10 Min.
0.75FDL	10 Min.
1.00FDL	10 Min.
1.15FDL	60 Min.
1.25FDL	10 Min.
1.50FDL	10 Min.
AL	1 Min.

The test load shall be applied in increments of 25 percent of the factored design load. Each load increment shall be held for at least 10 minutes. Measurement of anchor movement shall be obtained at each load increment. The load-hold period shall start as soon as the test load is applied and the anchor movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6, 10, 20, 30, 40, 50, and 60 minutes.

The verification test will be considered successful if the anchor meets the criteria for a performance tested ground anchor in Section 6-17.3(9), and in addition, a pull-out failure does not occur at the 1.50FDL maximum load.

The Engineer will give the Contractor a written order concerning ground anchor construction within seven working days after completion of the verification tests. This written order will either confirm the bond lengths as shown in the Contractor's plans for ground anchors or reject the anchors based upon the result of the verification tests.

Performance Testing

The performance test schedule following the second paragraph of Section 6-17.3(8)B is revised to read:

(January 3, 2011)
Performance Test Schedule

Load
AL
0.25FDL
AL
0.25FDL
0.50FDL

AL
0.25FDL
0.50FDL
0.75FDL
AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
1.15FDL
AL
Jack to lock-off load

Where: AL - is the alignment load
FDL - is the factored design load.

Proof Testing

The proof test schedule following the first paragraph of Section 6-17.3(8)C is revised to read:

(January 3, 2011)
Proof Test Schedule

Load

AL
0.25FDL
0.50FDL
0.75FDL
1.00FDL
1.15FDL
Jack to lock-off load

Where: AL - is the alignment load
FDL - is the factored design load

Measurement

Section 6-17.4 is supplemented with the following:

(January 4, 2010)
Rock bolts will be measured by the linear foot of rock bolt (unbonded plus bonded length) installed, successfully proof tested, and accepted.

Rock dowels will be measured by the linear foot of rock dowel installed and accepted.

Payment

Section 6-17.5 is supplemented with the following:

(January 4, 2010)
"Rock Bolt", per linear foot.
The unit contract price per linear foot for "Rock Bolt" shall be full pay for performing the work as specified, including all performance and proof testing, and all grout injection up to 200 percent of that calculated at each production rock bolt location.

"Rock Dowel Type _", per linear foot.
The unit contract price per linear foot for "Rock Dowel Type _" shall be full pay for performing the work as specified, including all proof testing, and all grout injection up to 200 percent of that calculated at each production rock dowel location.

"Force Account Rock Bolt & Rock Dowel Grout Exceedance", force account.
Payment for "Force Account Rock Bolt & Rock Dowel Grout Exceedance", for all grout injection over 200 percent of that calculated at each production rock bolt and rock dowel location, will be by force account as provided in Section 1-09.6. Wasted grout will not be measured for payment.

For the purposes of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Force Account Rock Bolt & Rock Dowel Grout Exceedance" in the bid proposal to become a part of the total bid by the Contractor.

Shotcrete Facing

Materials

Section 6-18.2 is supplemented with the following:

(August 1, 2005)
Shotcrete Facing
Portland cement shall be Type I or II in accordance with Section 9-01.2(1).

Air entrainment shall be 6.0 percent, ± 1.5 percent.

Water for mixing and curing shall be clean and free from substances which may be injurious to concrete or steel, and shall be free of elements which would cause staining.

Aggregate for shotcrete shall meet the following gradation requirements:

Sieve Size	Percent Passing by Weight
1/2 inch	100
3/8 inch	90 to 100
U.S. No. 4	70 to 85
U.S. No. 8	50 to 70
U.S. No. 16	35 to 55
U.S. No. 30	20 to 35
U.S. No. 50	8 to 20

U.S. No. 100	2 to 10
U.S. No. 200	0 to 2.5

(August 3, 2015)

Coloration for Shotcrete Facing Finishing Alternative C

If shotcrete facing finishing Alternative C is specified, the Contractor shall provide shotcrete coloration for finishing the sculptured shotcrete to match the color of the natural surroundings. Acceptance of the final appearance of the coloration will be based on the pre-production test panel. Acceptance of the long-term properties of the coloration material will be based on a manufacturer's certification, submitted as a Type 1 Working Drawing which verifies the following to be true about the product:

1. Resistance to alkalis in accordance with ASTM D 543.

2. Demonstrates no change in coloration after 1,000 hours of testing in accordance with ASTM D 822.

3. Does not oxidize when tested in accordance with ASTM D 822.

4. Demonstrates resistance to gasoline and mineral spirits when tested in accordance with ASTM D 543.

Additionally, the certification shall provide the product name, proposed mix design and application method, and evidence of at least one project where the product, using the proposed mix and application method, was applied and which has provided at least five years or more of acceptable durability and color permanency.

(August 3, 2015)

Fiber Reinforcement for Shotcrete Facing

Fiber reinforcement for shotcrete facing shall be either steel fibers or macro synthetic fibers.

Steel fibers shall be cold drawn, deformed steel Type 1 or Type 4 fibers conforming to ASTM A 820 with a minimum tensile strength of 120 ksi. Steel fibers shall have a length between 1.0 and 1.50 inches and shall have a length to diameter ratio of less than 80. The steel fibers used shall be manufactured specifically for shotcrete applications.

Macro synthetic fibers shall be deformed polyolefin Type 3 fibers conforming to ASTM C 1116. Macro synthetic fibers shall have a length between 1.0 and 2.0 inches and shall be between 0.02 and 0.04 inches in diameter. The macro synthetic fibers used shall be manufactured specifically for shotcrete applications.

Fiber reinforcement will be accepted based on the Manufacturer's Certificate of Compliance.

Construction Requirements

Section 6-18.3 is supplemented with the following:

(August 3, 2015)

Shotcrete Facing for Rock/Soil Slope Stabilization

Qualifications of Contractor's Personnel

The shotcrete crew members shall have work experience conforming to Section 6-18.3(4), except that the nozzle operators and pumping equipment operators shall have placed a minimum of 100 cubic yards of shotcrete on a minimum of three projects of similar slope heights and orientations as in this project within the last five years.

All nozzle operators shall be qualified by test in accordance with Section 6-18.3(4).

Testing

Pre-production and production testing shall conform to Section 6-18.3(3) and the following additional requirements:

Fiber reinforcement shall be included in the shotcrete mix used for all pre-production and production testing.

The Contractor shall make at least two 12 inch square production test panels, where one section is defined as one day's placement. One additional 12 inch square production test panel shall be made whenever a nozzle operator or equipment is changed during the daily work period.

In addition to compressive strength testing, cores taken from the pre-production and production test panels will be tested for density, absorption and voids in accordance with ASTM C 642.

Absorption shall not exceed 8 percent and void content shall not exceed 17 percent.

Mix Design

Unless otherwise specified in the Plans, the fiber reinforced shotcrete used for rock/soil slope stabilization shall have a minimum compressive strength of 2,500 psi at seven days and 4,000 psi at 28 days.

Microsilica shall be included in the shotcrete mix, but shall not exceed 8 percent by mass of the mix.

The minimum steel fiber content in the shotcrete mix shall be 100 pounds per cubic yard. The minimum macro synthetic fiber content in the shotcrete mix shall be 10 pounds per cubic yard.

Surface Preparation

Immediately prior to shotcrete application, rock and soil surfaces within the section being shot shall be scaled of all loose material and be thoroughly cleaned by use of air or water jets or other means acceptable to the Engineer. Shotcrete shall not be placed on any surface which is frozen, spongy, or where there is free water. The surface receiving shotcrete shall be dampened not more than one hour prior to shotcrete application.

Alignment Control

Thickness control pins shall conform to Section 6-18.3(6) and shall be placed on a maximum five foot square grid pattern.

Drainage

Unless otherwise shown in the Plans, weep holes shall be provided throughout the shotcrete facing at 10-foot centers maximum, horizontal and vertical. The weep holes shall consist of 24-inch long, two inch diameter Schedule 40 PVC slotted drain pipe placed within predrilled holes and sloped to drain. The weep hole drains shall be installed prior to placement of the shotcrete facing. The weep hole drains shall extend one to three inches beyond the final finished surface of the shotcrete facing. During placement of the shotcrete facing, the exposed open ends of the weep hole drains shall be covered or plugged to prevent shotcrete intrusion. The Contractor shall remove the covers or plugs after completing shotcrete placement.

Prefabricated drainage mat, if shown in the Plans or specified by the Engineer, shall be placed on the slope face prior to placement of the shotcrete facing in accordance with Section 6-15.3(7) and the details shown in the Plans, and shall be secured to the slope face by methods acceptable to the Engineer to ensure permanent and full contact with the slope.

Anchor Bars

Unless otherwise shown in the Plans, steel reinforcing bar anchor bars shall be placed at approximately 10-foot centers maximum, horizontal and vertical. The bars shall be L shaped #5 bars with the short leg measuring 8 inches and the long leg 24 inches. The bars shall be placed in 1-1/4 inch diameter, 24-inch deep holes. The bars shall be set either with grout conforming to Section 9-20.3, or with Type II epoxy bonding agent conforming to Section 9-26.1, with the grade and class as recommended by the epoxy bonding agent manufacturer. The bars shall be placed such that the short leg of the L shaped bar points upward and is approximately 1-1/2 inches clear of the slope surface.

Mixing of Production Fiber Reinforced Shotcrete

Fiber reinforced shotcrete can be mixed by either a dry mix or wet mix process. If the dry mix process is selected, the fiber reinforcement used shall only be steel fibers. If the wet mix process is selected, the fiber reinforcement may be either steel fibers or macro synthetic fibers.

The method and equipment used for batch mixing shall be as submitted in accordance with Section 6-18.3(1). The frequency and procedure for equipment inspection, cleaning and maintenance shall be as recommended by the equipment manufacturer.

Dry Mix Process

The cement and aggregate shall be batched by weight. Pre-dampening shall be done prior to flow into the main hopper and immediately after flow out of the packaging in order to ensure that the premix will flow at a uniform rate (without slugs) through the main hopper, delivery hose and nozzle to form uniform shotcrete free of dry pockets. Pre-dampened cement and aggregate mix shall not be used if allowed to stand more than 90 minutes.

Wet Mix Process
The batching and mixing shall conform to ASTM C 94.

Batching and Mixing Fiber Reinforcement
If fiber addition takes place in the field after batching and mixing the shotcrete, the procedure used to add the fibers to the shotcrete mix shall be demonstrated by the Contractor for the Engineer's acceptance.

If fibers are added during the batching and mixing process, a screen having a mesh of 1.5 to 2.5 inches shall be used to prevent any fiber balls from entering the shotcrete line. Batching through a screen will not be required if the Contractor successfully demonstrates to the Engineer that fiber balls are not being formed.

Fibers shall not be added to the dry or wet mix at a rate faster than they can be blended with the other ingredients without forming balls or clumps. Bulk fibers showing a tendency to tangle together shall pass through a vibrating screen or be carefully sifted into the mix so that they enter the mix as individual elements and not as clumps.

Shotcrete Application
Shotcrete application shall conform to Section 6-18.3(7) and the following requirements:

Unless otherwise shown in the Plans, the minimum finished thickness of the shotcrete facing shall be four inches.

Shotcrete shall be applied from the lower portion of the area upwards to prevent rebound from accumulating on surfaces yet to be covered. Rebound, defined as shotcrete constituents that fail to adhere to the applied surface, shall not be worked into the finished shotcrete facing and shall not be salvaged or recycled for inclusion in later batches.

Shotcrete application shall be suspended if any of the following conditions are present:

1. High winds prevent proper application of the shotcrete.

2. The ambient temperature is, or is forecast to be, outside the temperature range of 40F to 90F during placement or initial curing.

3. Rain or seepage is washing cement out of the freshly placed shotcrete or is causing sloughs in the work.

Construction joints shall be tapered over a minimum distance of 12 inches to the thin edge. Square construction joints will not be permitted.

Shotcrete Finishing
Unless otherwise shown in the Plans or specified in the Special Provisions, the shotcrete facing shall be finished in accordance with Finish Alternative A in Section 6-18.3(8). Colorization, if required, shall conform to the requirements specified in Section 6-18.2 as supplemented in these Special Provisions.

Measurement

Section 6-18.4 is supplemented with the following:

(April 5, 2010)
Shotcrete facing for rock/soil slope stabilization will be measured by the cubic yard of shotcrete placed.

Payment

Section 6-18.5 is supplemented with the following:

(April 5, 2010)
"Shotcrete Facing For Rock/Soil Slope Stabilization", per cubic yard.
The unit contract price per cubic yard for "Shotcrete Facing For Rock/Soil Slope Stabilization" shall be full pay for performing the work as specified, including pre-production and production testing, surface preparation, weep hole drains, steel anchor bars, and shotcrete, mixing, application, curing and finishing, and, if required, shotcrete colorization.

Shafts

Materials

Access Tubes and Caps

The first paragraph of Section 9-36.4 is revised to read:

(October 3, 2022)
Access tubes for CSL or TIP testing shall be steel pipe of 0.145 inches minimum wall thickness and at least 1½ inch inside diameter, or shall be Sonitec V2 CSL Tubes manufactured in America by Dextra. Dextra CSL tubes shall use Dextra caps and connectors.

Construction Requirements

Shaft Excavation

Section 6-19.3(3) is supplemented with the following:

(January 2, 2012)
Variations in the bearing layer elevation from that shown in the Plans are anticipated. The Contractor shall have equipment on-site capable of excavating an additional 20 percent of depth below that shown in the Plans.

Temporary and Permanent Shaft Casing

Section 6-19.3(3)B is supplemented with the following:

(January 2, 2012)

Shaft casing shall be equipped with cutting teeth or a cutting shoe, and installed by either rotating or oscillating the casting. Installing the casing by vibratory means will not be allowed.

Temporary Telescoping Shaft Casing

The second paragraph of Section 6-19.3(3)B4 is revised to read as follows:

(January 2, 2012)
Temporary telescoping casing will not be allowed for bridge end pier shafts.

Required Use of Slurry in Shaft Excavation

Section 6-19.3(3)I is supplemented with the following:

(August 3, 2015)
If the Contractor is utilizing casing that is adequately sealed into competent soils such that the water cannot enter the excavation, the Contractor may, with the Engineer's permission, continue excavation in wet soils without slurry provided the water level within the casing does not rise or exhibit flow.

Slurry Installation Requirements

Slurry Technical Assistance

Section 6-19.3(4)A is supplemented with the following:

(January 2, 2012)
The slurry manufacturer's representative shall be present during construction and completion of the first shaft excavated at the following specific shaft sites:

*** $$1$$ ***

Assembly and Placement of Reinforcing Steel

Section 6-19.3(5) is supplemented with the following:

(August 1, 2016)
For those shafts with a specified minimum penetration into the bearing layer and no specified tip elevation, the Contractor shall furnish each shaft steel reinforcing bar cage, including access tubes for non-destructive QA testing in accordance with Section 6-19.3(6), 20 percent longer than specified in the Plans. The Contractor shall add the increased length to the bottom of the cage. The Contractor shall trim the shaft steel reinforcing bar cage to the proper length prior to placing it into the excavation. If trimming the cage is required and access tubes are attached to the cage, the Contractor shall either shift the access tubes up the cage, or cut the access tubes provided that the cut tube ends are adapted to receive the watertight cap as specified.

Contractor Furnished Accessories for Nondestructive QA Testing

Thermal Wire and Thermal Access Points (TAPs)

Section 6-19.3(6)E is supplemented with the following:

(January 2, 2018)
The thermal wire and associated couplers shall be obtained from the following source:

Pile Dynamics, Inc.
30724 Aurora Road
Cleveland, OH 44139
(216) 831-6131
FAX: (216) 831-0916
www.pile.com

Placing Concrete

Requirements for Placing Concrete Underwater

Section 6-19.3(7)D is supplemented with the following:

(January 2, 2012)
The Contractor may use a tremie instead of a concrete pump, subject to the following conditions:

1. The tremie shall have a hopper at the top that empties into a watertight tube at least eight inches in diameter.

2. The discharge end of the tube on the tremie shall include a device to seal out water while the tube is first filled with concrete.

Measurement

Section 6-19.4 is supplemented with the following:

(January 2, 2012)
Fresh water for shaft slurry will be measured in accordance with Section 2-07.4.

Payment

Section 6-19.5 is supplemented with the following:

(January 2, 2012)
“Fresh Water for Shaft Slurry”, per M gal.

Buried Structures

Description

Definitions

The list of types of buried structures in Section 6-20.1(1) is supplemented with the following:

(January 10, 2022)
Composite Arch System (CAS): A buried Structure consisting of a two-component Superstructure placed on reinforced concrete foundations. The Superstructure consists of fiber-reinforced polymer (FRP) composite hollow tube external reinforcement/stay-in-place forms filled with expansive self-consolidating concrete (ESCC), supporting custom pultruded corrugated FRP deck panels retaining the structural backfill.

The Superstructure of the CAS shall be as designed and supplied by:

Advanced Infrastructure Technologies (AIT), LLC
55 Baker Boulevard
Brewer, ME 04412
(207) 573-9055
www.aitbridges.com

Fabrication shall be by the supplier or a licensed designee as designated by a Type 1 Working Drawing.

Materials

Section 6-20.2 is supplemented with the following:

(January 10, 2022)
Composite Arch System
FRP Composite Hollow Tubes
Glass fibers shall be type E-glass manufactured in accordance with ASTM D578 Section 4.2.2 and tested in accordance with ASTM D2343.

Carbon fibers shall be standard modulus fibers. Tensile strength, tensile modulus, and strain of the fibers shall be documented in accordance with the manufacturer's test specifications.

Resin shall be epoxy vinyl ester resin with viscosity suitable for infusion. Clear casting tensile strength and tensile modulus shall be tested in accordance with ASTM D638. Clear casting flexural strength and modulus shall be tested in accordance with ASTM D790. Heat distortion temperature shall be documented in accordance with ASTM D648.

FRP components will be accepted based on a Manufacturer's Certificate of Compliance. The certificate shall include test results for physical, material, and durability properties specified in Section 3 of the *AASHTO LRFD Guide Specification for Design of Concrete Filled FRP Tubes for Flexural and Axial Members*.

FRP Deck Panels and Associated Fasteners and Adhesive Sealant
The resin shall be premium grade, chemically resistant, UV stabilized polyurethane of the type specified in the fabrication shop drawings.

The glass reinforcement shall be E-Glass that is straight and continuous, with fibers oriented in three directions (0, 45, 90-degrees with respect to the length of the panel). The glass content shall be a minimum of 70-percent by weight.

The FRP deck panels shall have a class B flame spread rating of 75 or less when tested in accordance with ASTM E84, with the thickness, width, and corrugation height specified in the fabrication shop drawings.

The fasteners attaching the FRP deck panels to the FRP composite hollow tubes shall be drill point type AISI 410 stainless steel screws as specified in the fabrication shop drawings.

The adhesive sealing the longitudinal joint of the FRP deck panels shall be a two-part urethane sealant as specified in the fabrication shop drawings.

Expansive Self Consolidating Concrete (ESCC)

Total Cementitious Materials (CM) shall include cement, fly ash, and an expansive cement component specified by the composite arch bridge system supplier.

Cement shall be Type I/II or Type IL portland cement conforming to AASHTO M 85.

An expansive cement product conforming to ASTM C845 Type K shall be added at the rate as specified in Item 8 of the mix design parameters specified below.

Class F fly ash conforming to Section 9-23.9 or ground granulated blast furnace slag conforming to Section 9-23.10 may be added at the allowable rates specified in Item 9 of the mix design parameters specified below.

ESCC Mix Design

The ESCC mix shall be designed in accordance with Section 6-02.3(2)A2 and the following requirements:

1. Minimum 28-day compressive strength = 6000 psi.

2. Maximum size of coarse aggregate = 3/8-inch.

3. Fine aggregate proportions shall be 50 ± 5-percent of the total aggregate by volume, to be determined by trial batching as required to attain specified strength, Visual Stability Index (VSI) and flow characteristics.

4. Type F high range water reducer conforming to Section 9-23.6(7) is required and shall be used at the concrete supplier’s recommended dosage.

5. Viscosity modifying admixture conforming to Section 9-23.6(9) may be added at the concrete supplier’s recommended dosage to improve mix stability.

6. Hydration stabilizer (retarder) is required to ensure sufficient water and time to begin ettringite formation of the Type K expansive cement.

7. Minimum Cementitious Material (CM) = 850 LB./C.Y.

8. The mix shall contain Type K expansive cement at a rate of 15-percent by weight of total cementitious material. This quantity may be revised by a CTS Component materials technician that has reviewed mix design and has provided a recommended Type K proportion for a specific mix supplier.

9. The mix may include Section 9-23.9 Class F fly ash at a rate less than 25-percent by weight of cementitious material, or Section 9-23.10 Grade 100 or Grade 120 ground granulated blast furnace slag at a rate less than 50-percent, by weight of cementitious material.

10. The water/cementitious material ratio (W/CM) shall be between 0.40 and 0.45.

11. Air content shall be 0-percent to 5.0-percent.

ESCC shall meet the following requirements in accordance with ASTM C1611 or AASHTO T 347 and AASHTO T 351 for slump flow and visual stability index:

1. Slump flow shall be between 24 and 30-inches

2. Visual stability index shall be between 0 and 1.0.

Additional concrete mix design requirements of the supplier shall be shown in the FRP tube fabrication shop drawings.

Trial batches shall be performed prior to use to verify compressive strength, slump flow, and visual stability index. Test results shall be submitted as a Type 1 Working Drawing. The trial batch requirement may be waived at the discretion of the Engineer if the concrete supplier is experienced in producing ESCC.

Each batch of ESCC delivered to the jobsite shall be tested for slump flow and visual stability index. If the ESCC fails to meet the requirements re-dosing with additives is permitted. The Engineer may reject ESCC that does not meet specified requirements.

Construction Requirements

Section 6-20.3 is supplemented with the following:

(January 10, 2022)
Composite Arch System

Design

The CAS design, Superstructure and foundation, shall conform to Section 6-20.3(1), and the following:

The CAS shall be designed in accordance with the AASHTO LRFD Bridge Design Specifications, the AASHTO LRFD Guide Specifications for Design of Concrete-Filled FRP Tubes for Flexural and Axial Members, the ASCE Pre-

Standard for LRFD of Pultruded FRP Structures, and other applicable specifications.

The CAS shall be designed by the supplier on a project-specific basis by a licensed professional engineer, with design and load rating calculations and fabrication shop drawing Working Drawings provided to the Contractor.

Submittals

Submittals for CAS Superstructure and foundation shall conform to Section 6-20.3(2).

Foundation

The CAS foundation shall be constructed in accordance with Sections 6-20.3(5) and 6-20.3(6).

Fabrication

The CAS structural components shall be fabricated, either by the supplier or an independent fabricator licensed by the supplier, in accordance with Section 6-20.3(7) and the following:

Fabrication Quality Control/Quality Assurance

FRP composite hollow tubes shall be fabricated in accordance with the supplier's QC/QA plan and standard operating procedures. The portions of the QC/QA plan and procedures which do not contain trade secret material will be submitted to the Contracting Agency for review upon Engineer's request prior to beginning fabrication.

The FRP laminate comprising the tube shell shall be tested for tensile strength. Test result documentation of the mechanical properties and the required design values shall be submitted as a Type 1 Working Drawing.

A minimum of five test specimens shall be obtained from each FRP composite hollow tube. A minimum of two specimens per tube shall be tested. If the mean of the two tests from any one tube fails to meet or exceed the required design value, then at least three more specimens from the corresponding tube shall be tested. If the mean of the three additional specimens does not meet or exceed the design value, the tube will be rejected and replaced. All test results shall be submitted as a Type 1 Working Drawing prior to placing and assembling the tubes.

FRP Composite Hollow Tube Fabrication

The FRP composite hollow tubes may be fabricated as specified below using a closed mold vacuum assisted resin transfer method (VARTM) of composite manufacturing:

Reinforcement Storage and Preparation

Fabrics shall be stored in a clean, dry environment in the original packaging. They shall be protected from water, dirt, grease, grinding dust, and other foreign matter. The fabrics shall be cut on a clean cutting surface, free of any deleterious material that may adhere to the fabrics prior to layup. Longitudinal fabric shall not be spliced. Hoop reinforcement may be spliced.

Chemicals
Vinyl ester resins and other chemicals necessary for catalyzing the infusion matrix shall be stored in accordance with the manufacturer's recommendations.

Vacuum Assisted Resin Transfer
Prior to vacuum infusion of the vinyl ester matrix, the fabricator shall thoroughly seal the tooling and demonstrate that the sealed tooling can obtain a minimum workable vacuum pressure and a drop test. Chemical additives and catalysts to be combined with the vinyl ester resin shall be measured by weight, or the corresponding volume, based on the batch weight of the vinyl ester resin. The fabricator shall maintain documentation of the promotion rates and the actual amount of catalyst used for each infusion.

The infusion tank shall be charged with a sufficient amount of resin at all times to prevent air bubbles from entering the infusion ports in the tooling. Once resin is introduced into the tooling, the infusion process shall continue uninterrupted until it has been demonstrated that all evacuation ports have a surplus of resin flowing past the finished surface of the tooling and that no less than the predicted volume of resin has been introduced into the tool.

Post Processing
Once the laminate has been allowed to harden, the FRP composite hollow tubes shall be removed from the form with care so as not to induce stresses into the curing laminate. The laminate shall reach a minimum Barcol hardness value of 35 prior to removing the tubes from the form.

Tolerances
The finished FRP composite hollow tubes shall conform to the dimensions set forth in the accepted Type 2 Working Drawing fabrication shop drawings of Section 6-20.3(2). The diameter shall not vary in any one section by more than one-percent of the dimension given in the fabrication shop drawings. The tubes shall be checked for shape variations. No tube may vary from the shape specified in the fabrication shop drawings, expect for diameter, by more than 2-inches or one-percent of the dimension, whichever is smaller.

Composite Arch System Placement and Assembly
The CAS structural components shall be erected in accordance with Section 6-20.3(8) and the following:

Assignment of Responsibility
The supplier shall furnish the Contractor the FRP composite hollow tubes, FRP deck panels, stainless steel fasteners, and the structural adhesive at the project site on the date requested by the Contractor.

The Contractor is responsible for the complete installation of the FRP composite hollow tubes including but not limited to unloading and storing the tubes at the project site, erecting and setting the tubes into the reinforced concrete foundation, filling the tubes with ESCC, inspecting the filled tubes for voids, and filling such voids if any are found.

After receiving the accepted fabrication shop drawings, the Contractor shall notify the fabricator to fabricate and deliver the FRP composite hollow tubes, FRP deck panels, stainless steel fasteners, and the structural adhesive to the project site.

Handling and Storage at the Project Site

Care shall be taken when handling the FRP composite hollow tubes such that no damage is caused to the unfilled tubes. When moved or placed by hand, tubes shall be stabilized to prevent tipping over. When moved by hoist, straps shall provide at least 2 inches of padded contact area.

The Contractor is responsible for receiving, unloading, and storing the FRP deck panels. All FRP deck panels shall be handled with care and protected from cuts, scratches, and abrasions. FRP deck panels shall be stored on blocking off the ground and kept clean and dry. Damaged panels shall be replaced at no additional expense to the Contracting Agency.

FRP Tube and FRP Panel Placement and Assembly

The Contractor is advised that the FRP composite hollow tubes have some flexibility prior to filling with ESCC, and tubes out of tolerance without any outside loading may be brought into tolerance with a small force applied at each end. All tubes shall be clearly marked by the fabricator in accordance with the designation in the fabrication shop drawings.

The FRP composite hollow tubes shall be erected in a vertical position and FRP deck panels installed prior to filling the tubes with ESCC. The maximum allowable variation of installed tubes shall be ± 1/2-inch in-plane and out-of-plane. The FRP deck panels shall be installed over the tubes after the tubes are erected and aligned. The tubes shall be set into the reinforced concrete foundation as shown in the Plans. Care shall be taken when placing the foundation and vibrating around the base of the tubes as to not damage or displace the tubes.

FRP deck panels shall be installed as shown in the Plans using fasteners provided. The first row of FRP deck panels shall be installed on each side prior to casting the foundation stem wall. The remaining FRP deck panels shall be installed after the foundation stem wall has been cast and prior to filling the FRP composite hollow tubes with ESCC.

Adhesive provided shall be used in accordance with the manufacturer's recommendations to seal the longitudinal joint between the panels. FRP deck panels shall be installed starting at the bottom at both ends of the FRP composite hollow tubes and proceeding to the apex. The Contractor shall assure that the starter panels are placed as shown in the Plans to a level line. A closure plate is provided at the apex to be field-trimmed to fit and attached after the tubes are filled with ESCC.

Once the foundation has achieved 2000 psi minimum concrete compressive strength, the erected FRP composite hollow tubes shall be filled with ESCC.

Placing ESCC Tube Fill

ESCC will be accepted as a self-consolidating concrete in accordance with Section 6-02.3(5).

ESCC shall be placed in accordance with Section 6-02.3(6) and the following:

All FRP composite hollow tubes shall be filled with ESCC under the observation of the Engineer. The tubes shall be filled in one continuous operation. Vibration may be necessary for shallow rise tubes and such use of vibration will be determined by the Engineer. The tubes shall be filled through the fill holes that are field drilled by the Contractor to the size and locations shown in the fabrication shop drawings.

ESCC placement shall be accomplished using a method capable of directing the ESCC into the 3-inch fill hole and regulating placement speed to prevent voids. Acceptable methods include the use of a boom type pump truck, a trailer pump, or a standard concrete bucket. The Contractor shall have an alternative method available in the event of an equipment malfunction.

All FRP composite hollow tubes shall undergo auditory tap testing after ESCC placement to ensure complete filling of tubes. In the event that voids are discovered, they shall be injected with grout conforming to Section 9-20.3(2) for large voids or epoxy bonding agent conforming to Section 9-26.1 for small voids. The maximum permitted hole size for grout injection is 3/4-inch. The supplier shall be provided 72-hour minimum notice and offered the opportunity to be present for the filling of the tubes and tap testing.

Backfilling the Assembled Composite Arch System

The CAS shall be backfilled in accordance with Section 6-20.3(9) and the following:

ESCC fill in the FRP composite hollow tubes shall reach a minimum compressive strength of 3000 psi prior to any backfilling or compaction activities on the Structure other than headwall connection work.

Select gravel backfill shall extend to the lines and grades shown in the Plans and shall be placed in accordance with Section 2-09.3(1)E and as follows:

Backfill shall be placed in maximum 6-inch lifts with each layer compacted to 95-percent of the maximum density determined by the Compaction Control Test in accordance with Section 2-03.3(14)D. Compaction within 4-feet of the Structure shall be accomplished with hand compactors only. Vibratory rollers may be used outside of this zone and above the Structure provided there is at least 24-inches of compacted cover above the Structure.

All backfill shall be carefully placed to avoid damage to the Structure.

Lightweight equipment of an operating weight less than 12-tons may be operated over the Structure provided there is at least 12-inches of cover. Construction equipment of an operating weight 12-tons or greater may be used after 24-inches of compacted backfill has been placed over the

Structure. In no case may the loading exceed the AASHTO design loading HL-93 without the Engineer's written permission.

Backfill shall be placed in lifts such that at no time will the elevation difference exceed 24-inches between opposite sides of the Structure.

Payment

Section 6-20.5 is supplemented with the following:

(January 10, 2022)
Payment for the Composite Arch System will be made with the lump sum item, "Contractor Designed Buried Structure No. ____" shall be full payment for the Work as specified.

Division 7
Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits

Drains

(October 3, 2022)
MEDIA FILTER DRAINS

Description

This Work shall consist of constructing media filter drains as detailed in the Plans.

Materials

Materials shall meet the requirements of the following sections:

Aggregate for Bituminous Surface Treatment	9-03.4
Crushed Surfacing Base Course	9-03.9(3)
Gravel Backfill for Drains	9-03.12(4)
Underdrain Pipe	9-05.2
Seed	9-14.3
Fertilizer	9-14.4
Mulch and Amendments	9-14.5
Agricultural Grade Dolomite Lime	9-14.5(5)
Agricultural Grade Gypsum	9-14.5(6)
Compost	9-14.5(8)
Horticultural Grade Perlite	9-14.5(9)
Compost Socks	9-14.6(6)
Geotextile for Underground Drainage (Moderate Survivability, Drainage Class C, non-woven)	9-33

Media Filter Drain Mix

Media filter drain mix shall be mixed in the following proportions: 3 cubic yards of aggregate, 1 cubic yard of horticultural grade perlite, 40 pounds of agricultural grade dolomite lime, and 12 pounds of agricultural grade gypsum. The perlite, dolomite lime, and gypsum shall not contain toxic material. Media filter drain mix shall be premixed prior to placement. The soil amendments and aggregate shall meet the following requirements prior to mixing.

Aggregate for Media Filter Drain Mix

Aggregate for media filter drain mix shall meet the requirements of Section 9-03.4(2), $\frac{3}{8}$-inch to No.4., with the exception of:

- The use of recycled material is not permitted.
- The fracture requirement shall be at least two fractured faces and will apply to material retained on the No. 4 sieve in accordance with FOP for AASHTO T 335.

Acceptance of the aggregate shall be in accordance with Section 3-04.5, Table 2 for "Other" materials based on one sample every 1000 tons. Testing of aggregate shall occur prior to mixing with the soil amendments. Horticultural grade perlite, agricultural grade dolomite lime and gypsum will be accepted by catalog cut or bag label.

Construction Requirements

General Requirements

The Contractor shall construct the media filter drain in accordance with the details in the Plans. Media filter drain type work elements are shown in Table 1.

Media Filter Drain Table 1

Elements of Media Filter Drain Construction	Media Filter Drain Type						
	1	2	3	4	5	6	7
Media Filter Drain Mix	X	X	X	X	X	X	X
Scarification	X	X	X	X	X	X	X
Underdrain Pipe	X	X		X		X	
Gravel Backfill for Drains	X	X		X		X	
Geotextile for Underground Drainage	X	X		X		X	
Excavation	X	X	X	X	X	X	X
CSBC			X		X		X
Compost Blanket	X	X	X	X	X	X	X
Compost Sock						X	X
Flow Spreader				X	X	X	X
Gravel Backfill for Pipe Zone Bedding				X	X		
Non-Vegetation Zone	X	X	X	X	X		

The Contractor shall sequence construction of the media filter drain to ensure different sections of the media filter drain are not contaminated or displaced by other materials during installation. Once constructed, the Contractor will not be allowed to drive equipment over areas of the media filter drain.

Before excavating media filter drains, the Contractor shall clear and grub the area in accordance with Section 2-01.

Preparation

Prior to placement of the compost blanket, the Contractor shall scarify the area for the grass strip to a depth of 2 to 3 inches as shown in the Plans. The application and scarifying methods shall be approved by the Engineer. The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Excavation

Media filter drain excavation shall conform to Section 2-09.3(4).

Installation

Medium compost shall be uniformly and evenly placed as shown in the Plans.

Underdrain shall be constructed in accordance with Section 7-01.3.

Compost blanket shall be constructed in accordance with Section 8-01.3(4).

Compost sock shall be constructed in accordance with Section 8-01.3(12).

The media filter drain area shall be seeded in accordance with 8-02.3(9) after the compost blanket has been installed.

After excavation, the non-vegetation zone shall backfill as detailed in the plans. The use of recycled material is not permitted.

Measurement

Media filter drain will be measured per square yard along the ground surface of the completed installation.

Payment

"Media Filter Drain Type ____", per square yard.
The unit Contract price per square yard for "Media Filter Drain Type ____" shall be full pay to furnish all labor, equipment, and materials to complete the Work as specified.

Clearing and grubbing shall be paid for in accordance with Section 2-01.5.

Seeding, Fertilizing, and Mulching will be paid for in accordance with Section 8-02.5.

Division 8
Miscellaneous Construction

Erosion Control and Water Pollution Control

Construction Requirements

General

The tenth paragraph of Section 8-01.3(1) is revised to read:

(January 25, 2010)
Erodible Soil Eastern Washington
Erodible soil not being worked whether at final grade or not, shall be covered within the following time period using an approved soil cover practice:

July 1 through September 30	30 days
October 1 through June 30	15 days

Section 8-01.3(1) is supplemented with the following:

(April 1, 2002)
Side Slope Treatment
Slopes shall be compacted within *** $$1$$ *** days of exposure of a new section of cut and construction of a new portion of an embankment.

Erosion and Sediment Control (ESC) Lead

Item number 3 and 4 in the second paragraph of Section 8-01.3(1)B are revised to read:

(October 3, 2022)
3. Submit to the Engineer no later than the end of the next working day following the inspection a TESC Inspection Report that includes:

   a. When, where, and how BMPs were installed, maintained, modified, and removed.

   b. Observations of BMP effectiveness and proper placement.

   c. Recommendations for improving future BMP performance with upgraded or replacement BMPs when inspections reveal TESC BMP deficiencies.

   d. Identify for each discharge point location whether there is compliance with state water quality standards in WAC 173-201A for turbidity and pH.

Water Management

Management of Off-Site Water

Section 8-01.3(1)C4 is supplemented with the following:

(August 6, 2012)
Off-site Stormwater
Stormwater is known to enter the project site at the following locations:

*** $$1$$ ***

Temporary Seeding and Mulching

Temporary Seeding

Section 8-01.3(2)B is supplemented with the following:

(August 4, 2014)
Seed of the following mix, rate, and analysis shall be applied at the rates shown below on all areas requiring ***$$1$$*** seeding within the project:

Seed by Common Name and (Botanical name)	Pounds Pure Live Seed (PLS) Per Acre

*** $$2$$	$$
$$	$$
$$	$$
Total	$$ ***

The seed shall be certified in accordance with WAC 16-302 and meet the following requirements:

Prohibited Weed	0% max.
Noxious Weed	0% max.
Other Weed	0.20% max.
Other Crop	0.40% max.

(August 4, 2014)
Seed of the following mix, rate, and analysis shall be applied at the rates shown below on all areas requiring ***$$1$$*** seeding within the project:

Seed by Common Name, (Botanical Name), and "Source Identification"	Pounds Pure Live Seed (PLS) Per Acre
*** $$2$$	$$
$$	$$
$$	$$
Total	$$ ***

Source Identified seed shall be generation four or less. Non-Source Identified seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the appropriate genetic zones of the *** $$3$$ *** Ecoregion(s) as defined by the US Environmental Protection Agency (EPA).

The seed certification class shall be Certified (blue tag) in accordance with WAC 16-302 and meet the following requirements:

Prohibited Weed	0% max.
Noxious Weed	0% max.
Other Weed	0.20% max.
Other Crop	0.40% max.

The Contractor shall document all Source Identified seed by providing the Association of Official Seed Certifying Agents (AOSCA) yellow seed label for each species in the mix. Site Identification Logs can be supplied for collections where the AOSCA yellow label is not available.

(September 3, 2019)
Grass seed shall be a commercially prepared mix, made up of low growing species which will grow without irrigation at the project location, and approved by the Engineer. The application rate shall be two pounds per 1000 square feet. Fertilizer shall be a commercially prepared mix of 10-20-20 and shall be applied at the rate of 10 pounds per 1000 square feet.

(January 3, 2006)
Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$1$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$2$$ *** pounds per acre.

Soluble Potash as K_2O - *** $$3$$ *** pounds per acre.

*** $$4$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

(August 4, 2014)
Seed of the following mix, rate, and analysis shall be applied at the rates shown below on all areas requiring *** $$1$$ *** seeding within the project:

Seed by Common Name, (Botanical Name), and "Source Identification"	Pure Live Seed Pounds (PLS) Per Acre
*** $$2$$	$$
$$	$$
$$	$$
Total	$$ ***

Seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the *** $$3$$ *** Ecoregion(s) as defined by the US Environmental Protection Agency (EPA).

The seed certification class shall be Certified (blue tag) in accordance with WAC 16-302 and meet the following requirements:

Prohibited Weed	0% max.
Noxious Weed	0% max.
Other Weed	0.20% max.

Other Crop	0.40% max.

Temporary Mulching

Section 8-01.3(2)D is supplemented with the following:

(January 5, 2015)
*** $$1$$ *** shall be applied at a rate of *** $$2$$ *** pounds per acre with no more than *** $$3$$ *** pounds per acre applied in a single lift.

Roadside Restoration

Description

Section 8-02.1 is supplemented with the following:

(August 4, 2014)
This work shall consist of removing and disposing of buried previously fabricated debris that may be encountered during soil amendment incorporation or excavation for irrigation systems.

(April 1, 2019)
This Work consists of supplying and applying a Biotic Soil Amendment (BSA) in accordance with these Specifications and as shown in the Plans or as designated by the Engineer.

Materials

Section 8-02.2 is supplemented with the following:

(January 3, 2011)
Conservation Grade Plant Material
Conservation grade plant material is defined as healthy plants that do not meet aesthetic standards as defined in ASNS. The plants have healthy, well-developed roots and in all other ways meet standards for healthy and vigorous growth. However, these plants may have multiple leaders, damaged or missing leaders, Y crotches, bent branches, or other unusual shapes or forms. These plants may be used where shown in the plans.

(April 1, 2019)
Biotic Soil Amendments (BSAs), also known as biotic soil media and hydraulic growth medium, shall be soil amendments engineered to improve the development of deficient soils and to facilitate sustainable vegetation. BSAs shall consist of a blend of organic material, nutrient sources, soil building and biostimulant components. BSAs shall increase the water and nutrient holding capacity of the soil and promote the growth of beneficial microorganisms. BSAs shall provide for enhanced seed germination and vegetative establishment.

Biotic Soil Amendment shall be certified to be free of weed seeds and pathogens, free of plastic, composed of non-toxic materials, and be a pre-mixed formulation unaltered by synthetic materials.

The biotic soil amendment shall have a minimum of 90% organic matter (organic growth medium) and contain other materials designed to improve seed germination, vegetation establishment and overall soil health. In addition to organic growth medium BSA shall include mycorrhizal fungi and a minimum of three of the following ingredients:

- Biochar
- Humus/Humic Acid
- Porous Ceramics or Water-holding Organic Polymers
- Seaweed Extract
- Beneficial Bacteria
- Micronutrients

The Contractor shall provide test results dated within 3 years prior to the date of application from an independent, accredited laboratory that has been recognized by an accrediting organization to test and evaluate products to product safety standards. The independent, accredited lab shall be free from commercial, financial, and other pressures that may influence the results of the testing and evaluation process. Test results shall show that the product meets the following table requirements:

Table 1: Biotic Soil Amendment Requirements

BSA Properties	Test Methods	Requirements
Physical		
Organic Matter	ASTM D586	90% minimum
pH	ASTM D1293	5.0 - 8.5
C:N Ratio	ASTM E1508	10:1 minimum 50:1 maximum
Water-Holding Capacity[1]	ASTM D7367	400% minimum
Moisture Content	ASTM 2974	10% minimum, 50% maximum
Environmental		
Acute Toxicity	EPA Method 2021.0	Non-toxic
EPA Metal Limits	SW846-6020 04.06	Pass
Performance		
Growth Enhancement	ASTM D7322	500% minimum

[1]Water holding capacity of the pre-packaged material without the addition of ancillary amendments.

Submittal Requirements

At the time of delivery, the Contractor shall submit the specific biotic soil amendment packing list to the Engineer for acceptance. The packing list shall include complete identification including, but not limited to, the following information:

- Manufacturer name and location,
- Manufacturer telephone number and fax number,
- Manufacturer's e-mail address and web address, and
- BSA name.
- Certification that the specific BSA meets the physical, environmental and performance criteria of this specification and test results.

Acceptance

Acceptance of the materials shall be based on:

1. Certificate of Compliance demonstrating adherence to the Specifications,

2. Visual inspection ensuring the material is free of plastic.

Erosion Control and Roadside Planting

Section 9-14 is supplemented with the following:

(January 3, 2011)
Weed Barrier Mats
Weed Barrier Mats shall be 3 feet square. They shall be made of UV stabilized geotextile colored with carbon black and shall provide a minimum of 3 years of weed control. Weed Barrier Mats shall be 2.5 mils thick with a minimum of 400 micropores per square inch. Staples shall be a minimum of 11 gauge wire and be *** $$1$$ *** inches in length.

Acceptance will be based on a catalog cut.

Topsoil

Topsoil Type A
Section 9-14.2(1) is supplemented with the following:

(February 25, 2021)
Topsoil Type A shall meet the following requirements:

1. Cation exchange capacity (CEC) of Topsoil Type A shall be a minimum of 5 milliequivalents CEC/100 g dry soil (U.S. EPA Method 9081).

2. Organic content greater than 8-percent but less than 15-percent as measured on a dry weight basis using AASHTO T 267 Determination of Organic Content in Soils by Loss on Ignition.

Topsoil Type A shall be 60-percent to 70-percent *** $$1$$ *** Loam and 40-percent to 30-percent *** $$2$$ *** Compost by volume. *** $$3$$ *** Loam shall be as defined by the US Department of Agriculture Soil Classification System.

The Contractor shall submit a Particle Size Analysis as a Type 1 Working Drawing from an independent accredited soils testing laboratory indicating the Material source and compliance with all Topsoil Type A specifications. The laboratory analysis shall be with a sample size of no less than 2 pounds.

The *** $$4$$ *** Compost shall conform to the requirements of Section 9-14.5(8).

Mulch and Amendments

Compost
Section 9-14.5(8) is supplemented with the following:

(January 3, 2010)

Acceptance will be based upon a visual examination of the compost and US Composting Council Seal of Testing Assurance (STA) certified laboratory test results dated within 90 calendar days of the application.

(September 3, 2019)
The compost product may contain biosolids as a feedstock. Biosolids compost production and quality shall comply with WAC 173-308.

The Compost Submittal Requirements shall include a copy of the Coverage Under the General Permit for Biosolids Management issued to the manufacturer by the Department of Ecology in accordance with WAC 173-308 (Biosolids Management).

Construction Requirements

Section 8-02.3 is supplemented with the following:

(April 1, 2019)

Storage and Handling

Biotic soil amendments in accordance with the above requirements shall be furnished by the manufacturer in pre-packaged, standard unopened containers with weight, name of plant nutrients and manufacturer's guaranteed statement of analysis clearly marked in accordance with State and Federal laws. Field mixing of BSA components will not be permitted. Containers shall be kept safe in storage protected from weather, excessive temperatures, and construction operations. Products shall be handled in compliance with any instructions or recommendations stated by the manufacturer. Any spills shall be promptly cleaned.

Installation of Biotic Soil Amendment

The Contractor shall comply with the equipment manufacturer's installation instructions and recommendations. Biotic soil amendment shall be hydraulically applied at the rate of 4000 pounds per acre with no more than 2500 pounds applied in any single lift. Lifts shall be applied from opposing directions to soil surface for uniform coverage. If recommended by the BSA manufacturer, seed, tackifier and/or fertilizer shall be added to the slurry as recommended by manufacturer or BSA shall be applied within 48 hours of the seeding operation. A continuous and uniform cover shall be provided to the depth specified by the manufacturer. Thin areas or areas of bare soil will not be allowed, and supplemental biotic soil amendment applied by the Contractor shall be at no additional cost to the Contracting Agency.

Topsoil

Topsoil Type A

Section 8-02.3(4)A is supplemented with the following:

(August 3, 2015)
Topsoil Type A shall be placed to a non-compacted depth of *** $$1$$ *** inches. The topsoil shall be thoroughly blended prior to placement.

The Contractor shall submit a Type 1 Working Drawing consisting of independent test results from an accredited laboratory demonstrating the Topsoil

Type A meets the requirements of Section 9-14.1(1). The Type 1 Working Drawing shall also include the Request for Approval of Material in accordance with Section 1-06.1(2).

Roadside Seeding, Lawn and Planting Area Preparation

Section 8-02.3(5) is supplemented with the following:

(August 5, 2013)
After the initial planting area weed control, soil placement, grading, and the installation of irrigation lines are completed, and prior to planting, all designated planting areas shall be covered with compost.

Prior to placement of compost, the application methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen or water saturated soil that may be detrimental to successful application or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas at a depth of *** $$1$$ *** inches.

(August 5, 2013)
After the initial planting area weed control, soil placement, and grading are completed, and prior to the installation of irrigation lines and planting, all designated planting areas shall be covered with compost.

Prior to placement and incorporation of compost, the application and incorporation methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen soil or water saturated soil that may be detrimental to successful application, incorporation, or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas at a depth of *** $$1$$ *** inches.

After placement of the compost, the Contractor shall incorporate the layer uniformly into the existing soil to a depth of *** $$2$$ *** inches.

(August 5, 2013)
After initial area weed control, grading, and soil placement are completed, all soil shall be covered with compost.

Prior to the placement and incorporation of compost, the application and incorporation methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen or water saturated soil that may be detrimental to successful application, incorporation, or soil structure.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

Compost shall be uniformly and evenly placed in all designated areas at a depth of *** $$1$$ *** inches.

After placement of the compost, the Contractor shall incorporate the layer uniformly into the existing soil to a depth of *** $$2$$ *** inches.

(August 4, 2014)
Removal of Buried Previously Fabricated Debris
The Contractor shall remove buried previously fabricated debris as directed by the Engineer to a maximum depth of two feet. The excavated debris shall be removed from the project site to a disposal facility approved by the Engineer.

Mulch and Amendments

Fertilizers

Section 8-02.3(6)B is supplemented with the following:

(September 3, 2019)
Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$1$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$2$$ *** pounds per acre.

Soluble Potash as K_2O - *** $$3$$ *** pounds per acre.

*** $$4$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

(September 3, 2019)
First Application of Fertilizer
Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$1$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$2$$ *** pounds per acre.

Soluble Potash as K_2O - *** $$3$$ *** pounds per acre.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

Second Application of Fertilizer
A second application of fertilizer shall be applied during the period of March 1 to April 15 or November 15 to December 15. In no instance shall the second application of fertilizer occur less than 90 days after the first fertilizer application.

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** $$4$$ *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** $$5$$ *** pounds per acre.

Soluble Potash as K_20 - *** $$6$$ *** pounds per acre.

*** $$7$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

(September 3, 2019)
Fertilizer shall be a commercially prepared mix of 10-20-20 and shall be applied at the rate of 10 pounds per 1000 square feet.

(September 3, 2019)
Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N – *** $$1$$ *** pounds per acre.

Sulfur – *** $$2 $$ ***pounds per acre.

*** $$3$$ *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

Planting

Section 8-02.3(8) is supplemented with the following:

(February 25, 2013)
When work requiring disturbance within planting area(s) *** $$1$$ *** is complete, the Contractor shall perform planting work within the next available planting window.

Seeding, Fertilizing, and Mulching

Seeding and Fertilizing

Section 8-02.3(9)B is supplemented with the following:

(September 3, 2019)
Seed of the following mix, rate, and analysis shall be applied at the rates shown below on all areas requiring ***$$1$$*** seeding within the project:

Seed by Common Name, (Botanical Name), and "Source Identification"	Pounds Pure Live Seed (PLS) Per Acre
*** $$2$$	$$
$$	$$
$$	$$
Total	$$ ***

Source Identified seed shall be generation four or less. Non-Source Identified seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the appropriate genetic zones of the *** $$3$$ *** Ecoregion(s) as defined by the US Environmental Protection Agency (EPA).

The seed certification class shall be Certified (blue tag) in accordance with WAC 16-302 and meet the following requirements:

Prohibited Weed	0% max.
Noxious Weed	0% max.
Other Weed	0.20% max.
Other Crop	0.40% max.

The Contractor shall document all Source Identified seed by providing the Association of Official Seed Certifying Agents (AOSCA) yellow seed label for each species in the mix. Site Identification Logs can be supplied for collections where the AOSCA yellow label is not available.

(September 3, 2019)
Grass seed shall be a commercially prepared mix, made up of low growing species which will grow without irrigation at the project location, and accepted by the Engineer. The application rate shall be two pounds per 1000 square feet.

(September 3, 2019)

Seed of the following mix, rate, and analysis shall be applied at the rates shown below on all areas requiring *** $$1$$ *** seeding within the project:

Seed by Common Name, (Botanical Name), and "Source Identification"	Pure Live Seed Pounds (PLS) Per Acre
*** $$2$$	$$
$$	$$
$$	$$
Total	$$ ***

Seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the *** $$3$$ *** Ecoregion(s) as defined by the US Environmental Protection Agency (EPA).

The seed certification class shall be Certified (blue tag) in accordance with WAC 16-302 and meet the following requirements:

Prohibited Weed	0% max.
Noxious Weed	0% max.
Other Weed	0.20% max.
Other Crop	0.40% max.

Mulch

Section 8-02.3(11) is supplemented with the following:

(April 2, 2012)
Bark mulch or wood chip mulch shall be placed to a uniform non-compacted depth of *** $$1$$ *** over all planting areas.

Bark or wood chip mulch shall not be placed in areas of standing or flowing water.

Mulch for Seeding Areas

Section 8-02.3(11)A is supplemented with the following:

(September 3, 2019)
*** $$1$$ *** shall be applied at a rate of *** $$2$$ *** pounds per acre with no more than *** $$3$$ *** pounds per acre applied in a single lift.

Measurement

Section 8-02.4 is supplemented with the following:

(April 1, 2019)
Biotic Soil Amendment will be measured by the acre along the grade and slope of the area covered immediately after application.

Payment

Section 8-02.5 is supplemented with the following:

(September 7, 2021)
"Removal of Buried Previously Fabricated Debris" will be paid for by force account as specified in Section 1-09.6. The payment for removal of buried man-made debris shall be full compensation for all costs for the specified Work to include removing, loading, hauling, and all associated disposal costs.

For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total Bid.

(April 1, 2019)
"Biotic Soil Amendment", per acre.

The unit Contract price per acre for "Biotic Soil Amendment" shall be full pay to perform the Work as specified. When seed is mixed into, and applied with the biotic soil amendment, payment for seed will be made under the Bid item *** $$1$$ ***.

Irrigation Systems

Construction Requirements

Excavation

Trenches

Within Critical Root Zone

Section 8-03.3(6)A2 is supplemented with the following:

(October 3, 2022)
Mechanical trenching within the Critical Root Zone of existing trees is allowed at the following locations:

*** $$1$$ ***

The Contractor shall exercise care when excavating pipe trenches near existing trees to minimize damage to tree roots.

Utilize International Society of Arboriculture (ISA) Best Practices for all trenching activities to minimize soil compaction and damage to root systems. All shattered root ends shall be clean-cut using appropriate sharp pruning tools. Where roots are 1½ inches or greater in diameter are encountered, the trench shall be hand excavated and tunneled under the roots. Exposed roots 1½ or greater in diameter shall be wrapped with heavy, moist material, such as burlap or canvas, for protection and to prevent excessive drying. The wrapping material must be kept moist until the trench is backfilled. All wrapping material and fastenings used to cover the roots shall be removed before backfilling.

Guide Posts

Description

Section 8-10.1 is supplemented with the following:

(April 1, 2002)
This Work shall consist of furnishing and installing barrier delineators on concrete barrier when barrier runs concurrent with guide post locations.

Materials

Section 8-10.2 is supplemented with the following:

(October 3, 2022)
Barrier delineators shall consist of a flat plastic reflector lens or reflective sheeting attached to a housing or bracket to facilitate the mounting of the delineator on concrete traffic barrier. The reflective surface shall be rectangular or trapezoidal shape with a minimum area of 9 square inches for reflectors and 12 square inches for reflective sheeting. The housing or bracket can be flexible or rigid, molded from a durable plastic or other durable material approved by the Engineer. Barrier delineators shall be one sided for single direction or two sided for bi-directional.

Reflectors shall be acrylic or polycarbonate. Reflectors shall equal or exceed the following minimum values of specific intensity:

Observation Angle (Degrees)	Entrance Angle (Degrees)	Specific Intensity cd/ft-c	
		White	Yellow
0.1	0	126	75
0.1	20	50	30

Reflective sheeting for barrier delineators shall be in accordance with Section 9-28.12.

Construction Requirements

Section 8-10.3 is supplemented with the following:

(April 1, 2002)
Barrier delineators shall be placed on the traffic face of the barrier six inches down from the top. Spacing shall be as shown in the plans. Delineator color shall be white on the right of traffic and yellow on the left of traffic. The surface of the barrier where the delineator is applied shall be free of dirt, curing compound, moisture, paint, or any other material that would adversely affect the bond of the adhesive. Install delineators with an adhesive recommended by the manufacturer.

(April 1, 2002)
Barrier delineators shall be placed on the top of the barrier. Spacing shall be as shown in the plans. Delineator color shall be white on the right of traffic and yellow on the left of traffic. The surface of the barrier where the delineator is applied shall be free of dirt, curing compound, moisture, paint, or any other material that would adversely affect the

bond of the adhesive. Install delineators with an adhesive recommended by the manufacturer.

Measurement

Section 8-10.4 is supplemented with the following:

(April 1, 2002)
Barrier delineators will be measured by the unit for each delineator furnished and installed.

Payment

Section 8-10.5 is supplemented with the following:

(April 1, 2002)
"Barrier Delineator", per each

Guardrail

Description

Section 8-11.1 is supplemented with the following:

(February 3, 2020)
High-Tension Cable Barrier System (4 Cable)
This work consists of supplying and constructing high-tension cable barrier systems (cable, posts, compensating devices, fittings, and hardware), terminals, and transitions in conformity with the lines and grades as staked.

(April 1, 2019)
This Work shall consist of applying an aesthetic treatment, either a powder coating or reactive coloring agent, to galvanized beam guardrail, galvanized guardrail posts, terminal ends and associated hardware that provides a “non-reflective” and “earth” tone colored finish (dark brown) that visually blends with the natural environment.

Materials

Section 8-11.2 is supplemented with the following:

(October 3, 2022)
High-Tension Cable Barrier System (4 Cable)
The Contractor shall furnish a high-tension 4-cable barrier system, terminals, and transitions that meet the requirements of NCHRP Report 350 Test Level 3 or 4 that are designed for a minimum cable tension of 3,000-pounds at an ambient air temperature of 70 degrees F. All fittings and connecting hardware shall have a minimum breaking strength of 36,000-pounds.

The maximum allowable lateral deflection distance for the high-tension cable barrier system(s) on the project is:

*** $$1$$ *** feet

The Contractor shall submit a Type 2 Working Drawing consisting of fabrication drawings and installation procedures. The Working Drawings shall specify all components used in the entire barrier system and document the barrier system deflection distances.

The barrier system will be accepted based on a Manufacturer's Certificate of Compliance provided by the Contractor. The Manufacturer's Certificate of Compliance shall consist of a Contract specific letter from the manufacturer stating the system is NCHRP 350 Test Level 3 or 4 compliant, a copy of the original FHWA eligibility letter(s) for the barrier system, documentation from the manufacturer describing any and all modifications that have been made to the system since the letter(s) were issued, and a statement from the manufacturer certifying that those modifications do not affect the performance of the original system.

(April 1, 2019)

Powder Coating

Powder coating materials for coating galvanized surfaces shall be in accordance with Section 9-08.2. The color shall match SAE AMS Standard 595, color number 30045.

Reactive Coloring Agent

The reactive coloring agent shall consist of a stable, "non-reflective" "earth" tone (dark brown) colored finish on the surface of the galvanized materials. The reactive coloring agent shall only utilize oxidizers, metals, metal salts, and/or other trace elements applied directly to the galvanized surfaces to obtain the desired color. The chemical components of the reactive coloring agent shall have no adverse reactions or effects on soils, plants, or animals and shall not contain corrosive by-products once the product has been applied. Only nitrate fertilizer products are permitted to be present as soluble residues.

The reactive coloring agent shall be provided by either the following manufacturer or an accepted equal:

NATINA manufactured by Natina Products, LLC
1577 First Street
Coachella, CA 92236
Telephone: (877) 762-8462
www.natinaproducts.com

Beam Guardrail

Posts and Blocks

Section 9-16.3(2) is supplemented with the following:

(April 6, 2015)
Shear plates and backing plates shall conform to ASTM A 36, and shall be galvanized after fabrication in accordance with AASHTO M 111.

(April 6, 2015)
Grout for post bases shall conform to Section 9-20.3(2).

(April 6, 2015)

Steel angles connecting the timber blockout to the existing steel truss members shall conform to either ASTM A 36 or ASTM A 992, and shall be galvanized in accordance with AASHTO M 111.

(April 6, 2015)
HSS steel tubing shall conform to ASTM A 500 Grade B, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Steel bars, plates, and shapes shall conform to ASTM A 36, and shall be galvanized after fabrication in accordance with AASHTO M 111, except that structural shapes may conform to ASTM A 992.

Galvanized sheet metal shall conform to ASTM A 653, Coating Designation G 235.

Paving bulkheads, timber blocking, and custom cut shims shall be Douglas Fir-Larch No. 2 or better, and shall be treated as specified in this Section.

Rubberized asphalt shall conform to ASTM D 6690 (Type 1 for bridge locations in Western Washington, and Type 2 for bridge locations in Eastern Washington).

Hardware

Section 9-16.3(4) is supplemented with the following:

(April 6, 2015)
Resin bonded anchors shall conform to Sections 6-02.2 and 6-02.3(18) as supplemented in these Special Provisions.

(April 6, 2015)
Lag screws shall conform to Section 9-06.22.

Construction Requirements

Section 8-11.3 is supplemented with the following:

(October 3, 2022)

Installing Steel Posts on Existing Box Culverts

Field Measurements

The Contractor shall obtain field measurements both vertically and horizontally at each location steel posts are to be installed on the existing box culvert. The Contractor shall calculate the steel post lengths for fabrication using the field measurement information obtained.

Submittals

The Contractor shall remove surfacing materials from the top of the box culvert and shall determine the length of the posts. Prior to post and rail fabrication the Contractor shall submit Type 2 Working Drawings in accordance with Section 1-05.3. The Working Drawings shall include plan and elevation views of each post location on the culvert. The plan view drawing shall show the station and offset of each post on the culvert. The elevation view drawing shall show the top of culvert elevation at each post location, the top of surfacing elevation at each post location, the top of rail elevation, the top of post elevation, and the length of post at each post location.

Excavation
The Contractor shall excavate an area extensive enough to allow the top of the culvert to be cleaned of all dirt, oil, and debris, installation of the baseplate, backfilled, and properly compacted around the posts.

Post Installation
See the Contract plans for the method of steel post attachment to the box culvert (embedded or bolt through). Steel posts shall be installed in accordance with Standard Plan C-20.41 or Standard Plan C-20.43.

The Contractor shall exercise care in locating and drilling the holes to avoid damage to existing steel reinforcing bars and concrete. To avoid damaging the existing steel reinforcing bars, the location of the holes may be shifted slightly with the acceptance of the Engineer. All damage caused by the Contractor's operations shall be repaired by the Contractor in accordance with Section 1-07.13.

Backfilling
After the posts are installed on the box culverts, the excavated areas shall be backfilled and compacted in 6-inch maximum lifts. Compaction shall be accomplished with three passes with a mechanical tamper. When culvert posts are installed through HMA, repair the roadway with materials matching the existing surfacing depths. Use Commercial HMA in accordance with Section 5-04.

Additional Box Culvert Guardrail Steel Post Assemblies
For each culvert with embedded or bolt through guardrail steel posts, furnish and deliver one complete set of Box Culvert Guardrail Steel Post Assemblies. Box Culvert Guardrail Steel Post Assemblies shall be delivered to the Contracting Agency locations as listed below:

Location (SR & MP)	Location/Contact Phone Number
*** $$1$$ ***	*** $$2$$ ***
*** $$3$$ ***	*** $$4$$ ***

A complete set of assemblies will include the following:

When using Embedded Anchor Box Culvert Guardrail Steel Posts (Standard Plan C-20.41):

1. Steel Post and Base Plate Assembly – One replacement post and base plate for each post installed on culvert

2. Embedded Anchor Bolt Assemblies including four threaded rods, bolts, and resin adhesive for each post installed on culvert

When using Bolt-Thru Anchor Box Culvert Guardrail Steel Posts (Standard Plan C-20.43):

1. Steel Post and Base Plate Assembly – One replacement post and base plate for each post installed on culvert

2. Bottom Plate – One plate for each post installed on culvert

3. Hex Head Bolts, Nuts, & Washers – 4 bolts, 4 nuts, and 8 washers for each post installed on culvert

Provide 48-hours' notice to both the Engineer and the contact(s) listed above prior to delivery. Damaged items will not be accepted and shall be replaced at no cost to the Contracting Agency.

(October 3, 2022)

High-Tension Cable Barrier System (4 Cable)

A manufacturer's representative, or an installer who has been trained and certified by the unit's manufacturer within the last 5 years and for the specific system(s) being installed, shall supervise assembly and installation at all times. Provide a copy of the installer's certification to the Engineer prior to installation.

Assemble and install high-tension cable barrier according to the manufacturer's recommendations. This shall include the connection to guardrail and the transition and terminal sections identified in the Plans. Submit any Contractor proposed modification in barrier location, type, terminal or transition to the Engineer for approval a minimum of 10-days prior to any work in the affected section.

Unless otherwise stated in the Plans, all posts shall be a socket type assembly; with the actual cable barrier post being inserted into a sleeve encased in a cast in place or precast reinforced concrete post foundation and will be installed as recommended by the manufacturer. On every 6th-post, install yellow retro-reflective markers in accordance with the manufacturer's system.

Terminal Placement

Unless otherwise stated in the Plans, the foundations for the high tension cable barrier terminals shall be cast in place or precast concrete and shall be installed in accordance with manufacturer's recommendations. If a precast concrete foundation is installed, the bottom of the unit shall have a full and even bearing on the surface under it. If there is a need for backfilling an excavation, use Controlled Density Fill (CDF) in accordance with Section 2-09.3(1) E. Delineate the anchor posts for approach traffic with Type 3 lateral clearance markers (object markers) in accordance with Section 9-28.12.

Additional High-Tension Cable Barrier Components

Furnish and deliver one complete set of High-Tension Cable Barrier to each of the Contracting Agency sites listed below:

*** $$1$$ ***

Include the following components with each complete set:

One-hundred line posts and all associated hardware including but not limited to spacers, connectors, straps, caps and covers. If the system has a special post to accommodate turnbuckles, then 5 of the line posts shall be these special posts.

Twenty sockets except when concrete sockets are used.

One 50 foot long section of cable used for the contract.

Three cable splices and 3 turnbuckle assemblies for a 3-cable system or 4 cable splices and 4 turnbuckle assemblies for a 4-cable system (1-assembly consists of a left and right hand threaded end with a turnbuckle).

One tension measuring device as recommended by the manufacturer.

One anchor post designed for use with the foundations installed.

Ten line terminal posts and all associated hardware.

Provide 48-hours notice to both the Engineer and the maintenance contact listed above prior to delivery. Damaged items will not be accepted and shall be replaced at no cost to the Contracting Agency.

(April 1, 2019)
Aesthetic treatments to the galvanized W-beam guardrail, galvanized guardrail posts, galvanized guardrail terminals, and associated galvanized hardware shall be performed using either a powder coating or reactive coloring agent. The Contractor shall apply powder coating or reactive coloring agent to all galvanized steel rail, posts, other galvanized steel parts, and impact head components of the beam guardrail as specified in the Plans. Confirm that the manufacturer of proprietary guardrail terminals allows the use of powder coatings or reactive coloring agents prior to applying them.

Only the top 30 inches on any guardrail post length to be exposed above ground shall receive aesthetic treatment.

The color of the finish coat shall be a dark brown. The Contractor shall furnish a one-foot minimum length test section of galvanized W-beam guardrail treated with the proposed aesthetic treatment product to the Engineer for acceptance. The test section shall be prepared in accordance with the manufacturer's instructions.

The Engineer will provide acceptance in writing accepting the color of the test section prior to acceptance of any permanently incorporated material into the project.

Powder Coating
Powder coating of galvanized surfaces shall be in accordance with Section 6-07.3(11)B.

Reactive Coloring Agent
Application of the reactive coloring agent to galvanized surfaces shall be in accordance with the following:

The reactive coloring agent shall be applied using the same methods used for the accepted test section. The treated material shall develop full coloration within two weeks of application and achieve a color consistent with the color of the authorized test section.

The Contractor shall apply the reactive coloring agent prior to delivering the steel components to the project site. The reactive coloring agent manufacturer or the manufacturer’s authorized application contractor shall apply the reactive coloring agent for both the test section and production applications. Application of the reactive coloring agent shall fully coat the galvanized steel in accordance with the manufacturer’s written instructions and achieve the accepted surface color. Once the reactive coloring agent is

applied, the Contractor shall protect the steel pieces from abrasion that would remove the brown color.

After the various guardrail components have been installed, the Contractor shall apply the reactive coloring agent to any steel products that did not receive adequate coloring, or where the color was removed during the shipment or the construction process. This remedial action shall coat the affected area. Any reactive coloring agent applied in the field shall be cured according to manufacturer's specifications, and shall be applied while protecting soil, plants, and surrounding natural surfaces.

(October 3, 2022)

Installing Steel Posts on New Box Culverts

Post Installation

See the Contract plans or culvert Working Drawings for the method of steel post attachment to the box culvert (embedded or bolt through). Steel posts shall be installed in accordance with Standard Plan C-20.41 or Standard Plan C-20.43.

The Contractor shall exercise care in locating and drilling the holes to avoid damage to existing steel reinforcing bars and concrete. To avoid damaging the existing steel reinforcing bars, the location of the holes may be shifted slightly with the acceptance of the Engineer. All damage caused by the Contractor's operations shall be repaired by the Contractor in accordance with Section 1-07.13.

Additional Box Culvert Guardrail Steel Post Assemblies

For each culvert with embedded or bolt through guardrail steel posts, furnish and deliver one complete set of Box Culvert Guardrail Steel Post Assemblies. Box Culvert Guardrail Steel Post Assemblies shall be delivered to the Contracting Agency locations as listed below:

Box Culvert Designation & Location (SR & MP)	Contracting Agency Delivery Location/Contact Phone Number
*** $$1$$ ***	*** $$2$$ ***
*** $$3$$ ***	*** $$4$$ ***

A complete set of assemblies will include the following:

When using Embedded Anchor Box Culvert Guardrail Steel Posts (Standard Plan C-20.41):

1. Steel Post and Base Plate Assembly – One replacement post and base plate for each post installed on culvert

2. Embedded Anchor Bolt Assemblies including Four threaded rods, bolts, and resin adhesive for each post installed on culvert

When using Bolt-Thru Anchor Box Culvert Guardrail Steel Posts (Standard Plan C-20.43):

1. Steel Post and Base Plate Assembly – One replacement post and base plate for each post installed on culvert

2. Bottom Plate – One plate for each post installed on culvert

3. Hex Head Bolts, Nuts, & Washers – 4 bolts, 4 nuts, and 8 washers for each post installed on culvert

Provide 48-hours' notice to both the Engineer and the contact(s) listed above prior to delivery. Damaged items will not be accepted and shall be replaced at no cost to the Contracting Agency.

Beam Guardrail

Section 8-11.3(1) is supplemented with the following:

(April 5, 2010)
This project may contain a mixture of steel and wood posts. The bidder is advised that post selection will be as detailed in the plans and these specifications.

Erection of Posts

Section 8-11.3(1)A is supplemented with the following:

(April 6, 2015)
Timber Blockouts for Beam Guardrail Type Thrie Beam
The Contractor shall cut and trim the timber blocks as necessary to conform to the shape of the existing concrete baluster rail, and to align the beam guardrail element, as shown in the Plans.

When the specified timber blockout spacing places a block at an existing concrete end post or intermediate post, the Contractor shall core drill holes into the existing concrete as shown in the Plans and as follows. The Contractor shall not shatter or damage the concrete adjacent to the holes. Location of blockout assemblies may be shifted slightly within the tolerance specified in the Plans in order to reduce the risk of damage to existing steel reinforcing bars. However, once a blockout assembly position is established, damage to existing steel reinforcing bars caused by subsequent core drilling operations at that assembly location is acceptable.

(January 4, 2016)
Steel Posts for Beam Guardrail Type Thrie Beam
The Contractor shall field measure the dimension of the existing curb above the existing wearing surface at each curb line for each bridge receiving beam guardrail Type Thrie Beam. The field measured dimensions, and all adjustments to the field measurements required by planing and paving operations included in this project, shall be included in the steel post assembly shop drawings submitted in accordance with Section 8-11.3(1)G.

(September 8, 2020)
Beam Guardrail Type WP Thrie Beam
The Contractor shall field measure the depth of the existing ballast and wearing course at both wheel guard lines, and shall include the dimensions at both wheel guard lines in the steel post mounting bracket shop drawings submitted in accordance with Section 8-11.3(1)G.

The Contractor shall remove the existing ballast and wearing course to the top of existing timber deck in the vicinity of the steel post anchorage locations, and shall dispose of the removed surfacing materials in accordance with Section 2-02.3.

As shown in the Plans, the Contractor shall place a timber block beneath the timber deck at each steel post anchorage location and against the existing exterior timber stringer.

The Contractor shall install the steel post anchorage assembly, including the deck plate, distribution plate, bearing plate, base plate, backing plate, and HSS steel tube post, as shown in the Plans. Timber deck shims shall be cut and trimmed as necessary to align the top of the vertical webs of the steel post anchorage 1/2 inch below the top of the surrounding wearing course surfacing, in accordance with the existing timber deck transverse slope and existing ballast and wearing course depth specified in the shop drawings.

The Contractor may field drill holes through the steel components in accordance with Section 6-03.3(27) except as otherwise noted. The Contractor shall identify all holes to be field drilled in the steel fabrication shop drawings. The Contractor may field drill the holes using hand held drills provided that the Contractor submits the method and equipment used to the Engineer for approval, and that the Contractor receives the Engineer's acceptance of the submittal prior to beginning hand drilling. The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

The Contractor shall replace all existing ballast and wearing course removed in the vicinity of the steel post anchorage locations to the top of the surrounding surfacing. The Contractor shall fill the void with an HMA surfacing material accepted by the Engineer.

Erection of Rail

Section 8-11.3(1)B is supplemented with the following:

(April 6, 2015)
Field Measuring to Existing Type 3 Anchors
The Contractor shall field measure the dimension from the centerline of the existing Type 3 anchors specified for reuse to the end of the existing concrete curb and railbase or concrete baluster railing end blocks of the adjacent bridge. The Contractor shall submit these dimensions to the Engineer along with a Type 2 Working Drawing showing the arrangement of the thrie beam guardrail elements and approach guardrail elements relative to the existing Type 3 anchors and concrete curb and railbase or concrete baluster railing end blocks for each bridge as applicable.

(April 6, 2015)
Attaching Beam Guardrail Type Thrie Beam to Timber Blockouts
The Contractor shall fasten the thrie beam element to the timber blockout assemblies such that the steel shear plates fit snug against the surface forming the opening through the concrete baluster rail.

The Contractor may field drill the holes through the thrie beam elements in accordance with Section 6-03.3(27), except as otherwise noted. The Contractor may field drill the holes using hand held drills.

The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

(September 13, 2021)
Thrie Beam Expansion Joint Element
Where beam guardrail Type Thrie Beam crosses bridge interior expansion joints, the Contractor shall place a thrie beam expansion section element conforming to Standard Plan C-25.22 or C-25.26.

(April 6, 2015)
Beam Guardrail Type WP Thrie Beam
The Contractor may field drill the holes through the thrie beam elements in accordance with Section 6-03.3(27), except as otherwise noted. The Contractor may field drill the holes using hand held drills.

The Contractor shall repair all galvanized steel surfaces damaged by field drilling operations by painting the damaged areas with one coat of paint conforming to Section 9-08.1(2)B.

After completing the beam guardrail retrofit and replacing the surfacing at the steel post anchorage locations on the bridge up to the level of the surrounding surfacing, the Contractor shall install the sheet metal water barrier, when the water barrier is shown in the Plans. A bonding layer of rubberized asphalt shall be applied to the surfacing contact area immediately prior to installing the water barrier assembly. The direction of overlap of adjacent water barrier segments shall be as directed by the Engineer.

Removing Guardrail and Guardrail Anchor

Section 8-11.3(1)D is supplemented with the following:

(September 8, 2020)
Beam Guardrail Type WP Thrie Beam
The Contractor shall remove the existing bridge guardrail posts and railing, the existing timber wheel guards, all associated fasteners, and the existing ballast and wearing course in the vicinity of the steel post anchorage assemblies of the bridges being retrofitted with beam guardrail Type WP Thrie Beam as shown in the Plans

The items specified above shall be removed as follows:

1. The Contractor shall remove the existing timber wheel guards before beginning the beam guardrail retrofit work.

2. The Contractor shall not remove any section of the existing bridge railing system on the bridge until completing the beam guardrail

retrofit within that section of the bridge, except as otherwise specified. The Contractor may remove portions of the existing bridge railing system on the bridge which conflict with the anchorages, posts, and rail elements of the retrofit, provided:

a. The Contractor installs as much of the beam guardrail retrofit as possible in the section that does not conflict with the existing bridge railing system elements.

b. After removing the conflicting element of the existing bridge railing system, the Contractor shall immediately complete the beam guardrail retrofit in the section.

c. The Contractor receives the Engineer's acceptance for removing the conflicting element of the existing bridge railing system before proceeding.

Guardrail Construction Exposed to Traffic

Section 8-11.3(1)H is supplemented with the following:

(April 6, 2015)
Beam Guardrail Type WP Thrie Beam
Whenever the Contractor is not actively working on the beam guardrail retrofit, the Contractor shall ensure that all guardrail ends are securely fastened to the rail posts and existing bridge railing system, including temporary terminal end sections as required. The Contractor shall conduct retrofit operations such that no gaps occur between the existing bridge railing system and the beam guardrail retrofit at any time.

The Contractor shall submit Type 2 Working Drawings detailing the temporary connections between the existing guardrail system and the thrie beam guardrail system, and the temporary terminal end sections.

Measurement

Section 8-11.4 is supplemented with the following:

(October 3, 2022)
Box culvert guardrail steel posts type 31 will be measured per each, for each post installed.

(February 3, 2020)
Measurement of high-tension cable barrier (4 Cable) will be by the linear foot along the line of the completed barrier from end to end including transition sections, terminals, cable barrier to guardrail terminals, foundations, sockets, concrete, compensating devices, tensioning device, slip base post, sleeves, caps, and all hardware.

(April 2, 2018)
Measurement of Aesthetic Treatment for beam guardrail will be by the linear foot measured along the line of the completed guardrail, including expansion sections and the end section for F connections.

Measurement for Aesthetic Treatment for beam guardrail transition section will be per each for the type of transition section installed.

Measurement for Aesthetic Treatment for beam guardrail anchor type specified will be per each for the completed anchor, including the attachment of the anchor to the guardrail.

Measurement of Aesthetic Treatment beam guardrail ____ terminal will be per each for the completed terminal.

Measurement of Aesthetic Treatment beam guardrail Type 31 buried terminal Type 2 will be per linear foot for the completed terminal.

Payment

Section 8-11.5 is supplemented with the following:

(April 2, 2018)
"Aes. Tr. Beam Guardrail Type ___", per linear foot

"Aes Tr. Beam Guardrail Type 1- ____ Ft. Long Post", per linear foot.

"Aes Tr. Beam Guardrail Type 31- ____ Ft. Long Post", per linear foot.

The unit Contract price per linear foot for "Aes. Tr. Beam Guardrail Type____", "Aes Tr. Beam Guardrail Type 1- ____ Ft. Long Post", and "Aes Tr. Beam Guardrail Type 31- ____ Ft. Long Post", shall be full payment for all costs to perform the Work as specified.

"Aes. Tr. Beam Guardrail Transition Section Type ____", per each
The unit Contract price per each for "Aes. Tr. Beam Guardrail Transition Section Type ____" shall be full payment for all costs to perform the Work as described in Section 8-11.3.

"Aes. Tr. Beam Guardrail Anchor Type ____", per each.

"Aes. Tr. Beam Guardrail ____ Terminal", per each.

The unit Contract price per each for "Aes. Tr. Beam Guardrail Anchor Type ____" and "Aes. Tr. Beam Guardrail ___ Terminal" shall be full payment for all costs to perform the Work as specified.

"Aes. Tr. Beam Guardrail Type 31 Buried Term. Type 2", per linear foot.

The unit Contract price per linear foot for "Aes. Tr. Beam Guardrail Type 31 Buried Term. Type 2" shall be full payment for all costs to perform the Work as specified.

(January 13, 2021)
All Costs in construction of guardrail leave-outs including all required materials as specified will be included in the unit Contract prices of the various guardrail bid items.

(October 3, 2022)
"Box Culvert Guardrail Steel Post Type 31", per each.

The unit contract price per each for “Box Culvert Guardrail Steel Post Type 31” shall be full pay for completing the installation of the posts, including obtaining field measurements, excavation, furnishing, placing and compacting the backfill material, and when required, repairing surfacing materials. Beam guardrail will be paid for in accordance with Section 8-11.5.

“Additional Box Culvert Guardrail Steel Post Assemblies”, lump sum.

The lump sum contract price for “Additional Box Culvert Guardrail Steel Post Assemblies” shall be full pay to complete the work as specified.

(February 3, 2020)
“High-Tension Cable Barrier System (4 Cable)”, per linear foot.
“Additional High-Tension Cable Barrier Components”, lump sum.

The unit contract price per linear foot for “High-Tension Cable Barrier (4 Cable)” shall be full pay to complete the work as specified.

(February 3, 2020)
The lump sum contract price for “Additional High-Tension Cable Barrier Components” shall be full pay to complete the work as specified for a 4 Cable system.

Chain Link Fence and Wire Fence

Materials

Section 8-12.2 is supplemented with the following:

(September 8, 2020)
Coated Chain Link Fence
Chain link fence fabric shall be hot-dip galvanized with a minimum of 0.8 ounce per square foot of surface area.

Fencing materials shall be coated with an ultraviolet-insensitive plastic or other inert material at least 2 mils in thickness. Any pretreatment or coating shall be applied in accordance with the manufacturer's written instructions. The Contractor shall provide the Engineer with the manufacturer's written specifications detailing the product and method of fabrication. The color shall match SAE AMS Standard 595 color number *** $$1$$ ***.

Samples of the coated fencing materials shall have received the Engineer’s acceptance prior to installation on the project.

The Contractor shall supply the Engineer with 10 aerosol spray cans containing a minimum of 14 ounces each of paint of the color specified above. The touch-up paint shall be compatible with the coating system used.

(September 3, 2019)
Cable Fence
Steel pipe shall conform to ASTM A 53, Grade B, Type E or S.

Steel bars, plates, and shapes shall conform to ASTM A 36.

Steel components shall be galvanized after fabrication in accordance with AASHTO M 111.

Resin bonded anchors shall conform to Section 6-02.2 as supplemented in these Special Provisions.

Proof coil chain shall conform to ASTM A413 Grade 30.

Spelter sockets and turnbuckles shall conform to the size and breaking strength requirements specific in the Plans, shall be compatible with the wire rope selected by the Contractor, and shall be galvanized after fabrication in accordance with AASHTO M 232.

Wire rope shall conform to one of the following:

1. ASTM A 603 with Class A weight zinc-coated wires throughout.

2. ASTM A 1023 with drawn galvanized wires throughout in accordance with ASTM A 1007. Acceptance of ASTM A 1023 wire rope is contingent upon the Contractor furnishing a Type 1 Working Drawing certifying that the lot of supplied wire rope has a minimum modulus of elasticity of 15,000 ksi when tested in accordance with ASTM A 931 Section 3.2.17.

3. Phillystran HPTG 27000 I as manufactured by:

   Phillystran, Inc.
   151 Commerce Drive
   Montgomeryville, PA 18936-9628
   (215) 368-6611
   www.phillystran.com

Construction Requirements

Section 8-12.3 is supplemented with the following:

Cable Fence

(April 6, 2015)
The Contractor shall field measure the slope of the top of the existing retaining wall at each location of cable fence end post and intermediate brace. The Contractor shall submit Type 1 Working Drawings consisting of the tabulated field measured slope data.

(April 6, 2015)
The Contractor shall submit shop drawings of the cable fence in accordance with Section 6-03.3(7). The shop drawings shall include, at a minimum, the following:

1. Plan, elevation, and section views of the cable fence and all components, with dimensions and tolerances.

2. Material designations for all components.

3. Socketing procedure for the spelter sockets.

4. Erection plan for installing the posts, installing and connecting the cable to the posts, and tensioning the cable.

The Contractor shall install resin bonded anchors in accordance with Section 6-02.3(18) as supplemented in these Special Provisions.

The cable shall be tensioned to 400 pounds with six inches minimum of take up still available in the turnbuckle.

(January 10, 2022)
The Contractor shall clean, prepare, and shop paint or powder coat all exposed galvanized surfaces of the cable fence post assemblies in accordance with Section 6-07.3(11). The color of the finish coat, when dry, shall match SAE AMS Standard 595 Color No. 20045. After installation of the cable fence posts, any surfaces with paint or powder coating damage shall be repaired in accordance with Section 6-07.3(10)P or Section 6-07.3(11)B6, respectively.

Measurement

Section 8-12.4 is supplemented with the following:

(April 6, 2015)
Cable fence will be measured by the linear foot along the line and slope at the base of the completed fence.

Payment

Section 8-12.5 is supplemented with the following:

(April 1, 2002)
"Coated Chain Link Fence Type ___", per linear foot.
Payment for clearing of fence line for "Coated Chain Link Fence Type ___" shall be in accordance with Section 2-01.5.
"Coated End, Gate, Corner, Pull Post for Chain Link Fence", per each.
"Double 14 Ft. Coated Chain Link Gate", per each.
"Double 20 Ft. Coated Chain Link Gate", per each.
"Single 6 Ft. Coated Chain Link Gate", per each.

(April 6, 2015)
"Cable Fence", per linear foot.

Monument Cases

Description

Section 8-13.1 is deleted and replaced by the following:

(March 13, 1995)
This work shall consist of furnishing and placing monument cases, covers, and pipes in accordance with the Standard Plans and these Specifications, in conformity with the lines and locations shown in the Plans or as staked by the Engineer.

Materials

Section 8-13.2 is supplemented with the following:

(March 13, 1995)
The pipe shall be Schedule 40 galvanized pipe.

Construction Requirements

Monument Case and Cover

The last paragraph of Section 8-13.3(1) is revised to read:

(March 13, 1995)
The Engineer will be responsible for placing the concrete core and tack or wire inside the pipe.

Adjust Monument Case and Cover

Reinstalling Monument Case and Cover

The first sentence of Section 8-13.3(2)B is revised to read:

(October 3, 2022)
The adjusted or reinstalled monument case and cover shall be reset to ¼-inch below the finished pavement as indicated in the plans and in accordance with the following additional requirements:

Measurement

Section 8-13.4 is deleted and replaced by the following:

(March 13, 1995)
Measurement of monument case, cover, and pipe will be by the unit for each monument case, cover, and pipe furnished and set.

Payment

Section 8-13.5 is supplemented with the following:

(April 28, 1997)
"Monument Case, Cover, and Pipe", per each.

Cement Concrete Sidewalks

Construction Requirements

Section 8-14.3 is supplemented with the following:

(October 3, 2022)

The Contractor shall request a pre-construction meeting with the Engineer to be held two to five working days before any work can start on cement concrete sidewalks, curb ramps or other pedestrian access routes to discuss construction requirements. Those attending shall include:

1. The Contractor and subcontractor in charge of constructing forms, and placing, and finishing the cement concrete.

2. Engineer (or representative) and Project Inspectors for the cement concrete sidewalk, curb ramp or pedestrian access route Work.

Items to be discussed in this meeting shall include, at a minimum, the following:

1. Slopes shown on the Plans.

2. Inspection

3. Traffic control

4. Pedestrian control, access routes and delineation

5. Accommodating utilities

6. Form work

7. Installation of detectable warning surfaces

8. Contractor ADA survey and ADA Feature as-built requirements

9. Cold Weather Protection

(January 7, 2019)
Timing Restrictions

Curb ramps shall be constructed on one leg of the intersection at a time. The curb ramps shall be completed and open to traffic within five calendar days before construction can begin on another leg of the intersection unless otherwise allowed by the Engineer.

Unless otherwise allowed by the Engineer, the five calendar day time restriction begins when an existing curb ramp for the quadrant or traffic island/median is closed to pedestrian use and ends when the quadrant or traffic island/median is fully functional and open for pedestrian access.

(January 7, 2019)
Layout and Conformance to Grades

Using the information provided in the Contract documents, the Contractor shall lay out, grade, and form each new curb ramp, sidewalk, and curb and gutter.

Riprap

Measurement

Section 8-15.4 is supplemented with the following:

(March 13, 1995)
Special excavation will be measured by the cubic yard. Quantities will be computed to the neat lines from the top of the seals to the existing stream bed or ground line for the area outside the limits of structure excavation.

(February 5, 2001)
The last paragraph of Section 8-15.4 is deleted.

Payment

The first sentence of the second paragraph of Section 8-15.5 is revised to read:

(March 13, 1995)
The unit contract price per ton or cubic yard for the class or kind of riprap specified shall be full pay for furnishing all labor, tools, equipment, and materials required to construct the riprap, including excavation.

Section 8-15.5 is supplemented with the following:

(September 30, 1996)
"Special Excavation", per cubic yard.

Concrete Slope Protection

Construction Requirements

Placing Semi-Open Concrete Masonry Units

Section 8-16.3(2) is supplemented with the following:

(December 19, 2005)
The Contractor shall round and treat the areas between the bridge end slopes and the edges of the shoulders to the satisfaction of the Engineer.

Upon completion of the installation of the units, the voids shall be filled full with top soil. All excess fill shall be removed and the exposed concrete surfaces swept clean. The slope protection shall be seeded to grass in accordance with Section 8-01.3(2)A.

Payment

Section 8-16.5 is supplemented with the following:

(September 30, 1996)
"Semi-Open Conc. Masonry Slope Protection", per square yard.

Illumination, Traffic Signal Systems, Intelligent Transportation Systems, and Electrical

Materials

Section 8-20.2 is supplemented with the following:

(April 6, 2015)
Traffic Signal Standard Foundation Shaft Casing

All permanent casing shall be a smooth wall non corrugated structure of steel base metal. All permanent casing shall be of ample strength to resist damage and deformation from transportation and handling, installation stresses, and all pressures and forces acting on the casing. The casing shall be clean prior to placement in the excavation. The permanent casing may be telescoped, but the outside diameter of the casing shall not be less than the specified diameter of the shaft.

Conduit, Innerduct, and Outerduct

Foam Conduit Sealant

Section 9-29.1(11) is supplemented with the following:

(January 7, 2019)

The following products are accepted for use as foam conduit sealant:

- CRC Minimal Expansion Foam (No. 14077)
- Polywater FST Foam Duct Sealant
- Superior Industries Foam Seal
- Todol Duo Fill 400

Junction Boxes, Cable Vaults, and Pull Boxes

Section 9-29.2 is supplemented with the following:

(September 3, 2019)
Slip-Resistant Surfacing for Junction Boxes, Cable Vaults, and Pull Boxes

Where slip-resistant junction boxes, cable vaults, or pull boxes are required, each box or vault shall have slip-resistant surfacing material applied to the steel lid and frame of the box or vault. Where the exposed portion of the frame is ½ inch wide or less, slip-resistant surfacing material may be omitted from that portion of the frame.

Slip-resistant surfacing material shall be identified with a permanent marking on the underside of each box or vault lid where it is applied. The permanent marking shall be formed with a mild steel weld bead, with a line thickness of at least 1/8 inch. The marking shall include a two character identification code for the type of material used and the year of manufacture or application. The following materials are approved for application as slip-resistant material, and shall use the associated identification codes:

1. Harsco Industrial IKG, Mebac #1 - Steel: **M1**

2. W. S. Molnar Co., SlipNOT Grade 3 – Coarse: **S3**

3. Thermion, SafTrax TH604 Grade #1 – Coarse: **T1**

Light And Signal Standards

Section 9-29.6 is supplemented with the following:

(January 13, 2021)
Light Standards with Type 1 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved Plans listed below, provided the following requirements have been satisfied:

(a) Light source to pole base distance (H1) shall be as noted in the Plans. Verification of H1 distances by the Engineer, prior to fabrication, is not required. Fabrication tolerance shall be ± 6 inches.

(b) All other requirements of the Special Provisions have been satisfied.

Fabricator	Pre-Approved Drawing No.	Rev.	Mounting Height(s) (feet)
Valmont Ind., Inc.	DB01164, Sheets 1-5 of 5	B	30, 35, 40, and 50
Ameron Pole Products Division	WA15LT3721, Sheets 1 and 2 of 2	A	20, 25, 30, 35, 40, 45, and 50
Millerbernd Manufacturing Co.	74515-WA-LP1-BB, Sheets 1 and 2 of 2	H	30, 35, 40, and 50
Millerbernd Manufacturing Co.	74515-WA-LP1-ELBOW, Sheets 1-3 of 3	J	30, 35, 40, and 50
Millerbernd Manufacturing Co.	74515-WA-LP1-SB, Sheets 1-3 of 3	G	30, 35, 40, and 50

(January 13, 2021)
Light Standards with Type 1 Luminaire Arms

Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved plans listed below, provided the following requirements have been satisfied:

(a) Mounting heights shall be as specified in the Plans.

(b) Light source to pole base distances (H1) shall be determined or verified by the Engineer prior to fabrication. Fabrication tolerance shall be ±6 inches.

(c) All other requirements of the Special Provisions have been satisfied.

Fabricator	Pre-Approved Drawing No.	Rev.	Mounting Height(s) (feet)
Valmont Ind., Inc.	DB01164, Sheets 1-5 of 5	B	30, 35, 40, and 50
Ameron Pole Products Division	WA15LT3721, Sheets 1 and 2 of 2	A	20, 25, 30, 35, 40, 45, and 50

Millerbernd Manufacturing Co.	74515-WA-LP1-BB, Sheets 1 and 2 of 2	H	30, 35, 40, and 50
Millerbernd Manufacturing Co.	74515-WA-LP1-ELBOW, Sheets 1-3 of 3	J	30, 35, 40, and 50
Millerbernd Manufacturing Co.	74515-WA-LP1-SB, Sheets 1-3 of 3	G	30, 35, 40, and 50

(January 10, 2022)
Traffic Signal Standards

Traffic signal standards shall be furnished and installed in accordance with the methods and materials noted in the applicable Standard Plans, pre-approved plans, or special design plans.

All welds shall comply with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Welding inspection shall comply with Section 6-03.3(25)A Welding Inspection.

Hardened washers shall be used with all signal arm connecting bolts instead of lockwashers. All signal arm ASTM F 3125 Grade A325 connecting bolts tightening shall comply with Section 6-03.3(33).

Traffic signal standard types, applicable characteristics, and foundation types are as follows:

Type PPB

Pedestrian push button posts shall conform to Standard Plan J-20.10 or to one of the following pre-approved plans:

Fabricator	Pre-Approved Drawing No.
Valmont Ind., Inc.	DB01165 Rev. B (4 sheets)
Ameron Pole Products Division	WA15TR10-1 Rev. C (1 sheet) and WA15TR10-3 Rev. B (1 sheet)
Millerbernd Manufacturing, Co.	74514-WA-PED-PPB Rev J (2 sheets)

Foundations shall be as noted in Standard Plan J-20.10

Type PS, Type I, Type RM, and Type FB

Type PS pedestrian signal standards, Type I vehicle signal standards, Type RM ramp meter signal standards, and Type FB flashing beacon standards shall conform to Standard Plan J-20.16, J-21.15, J-21.16, and J-22.15 respectively, or to one of the following pre-approved plans:

Fabricator	Pre-Approved Drawing No.

Valmont Ind., Inc.	DB01165 Rev. B (4 sheets)
Ameron Pole Products Division	WA15TR10-1 Rev. C (1 sheet) and WA15TR10-2 Rev. C (1 sheet)
Millerbernd Manufacturing, Co.	74514-WA-PED-FB Rev. H (2 sheets)
Millerbernd Manufacturing Co.	74514-WA-PED-SB Rev. H (2 sheets)

Foundations shall be as noted in Standard Plan J-21.10.

Type II

Type II signal standards are single mast arm signal standards with no luminaire arm or extension. Type II standards shall conform to one of the following pre-approved plans. Maximum arm length (in feet) and wind load (XYZ value, in cubic feet) is noted for each manufacturer.

Fabricator	Pre-Approved Drawing No.	Max. Arm Length (ft)	Max. Wind Load (XYZ) (ft^3)
Valmont Ind., Inc.	DB00162 Rev. B (5 sheets)	65	3206
Ameron Pole Products Division	WA15TR3724-1 Rev. C (sheet 1 of 2), and WA15TR3724-2 Rev. D (sheet 2 of 2)	65	2935
Millerbernd Manufacturing, Co.	74516-WA-TS-II Rev. L (4 sheets)	65	3697

Foundations shall be as noted in the Plans and Standard Plan J-26.10. Type II signal standards with two mast arms installed 90 degrees apart may use these pre-approved drawings. Standards with two arms at any other angle are Type SD and require special design.

Type III

Type III signal standards are single mast arm signal standards with one Type 1 (radial davit type) luminaire arm. The luminaire arm has a maximum length of 16 feet and a mounting height of 30, 35, 40, or 50 feet, as noted in the Plans. Type III standards shall conform to one of the following pre-approved plans. Maximum arm length (in feet) and wind load (XYZ value, in cubic feet) is noted for each manufacturer. Wind load limit includes a luminaire arm up to 16 feet in length.

Fabricator	Pre-Approved Drawing No.	Max. Arm	Max. Wind Load (XYZ) (ft^3)

		Length (ft)	
Valmont Ind., Inc.	DB00162 Rev. B (5 sheets), with Type “J” luminaire arm	65	3259
Ameron Pole Products Division	WA15TR3724-1 Rev. C (sheet 1 of 2), and WA15TR3724-2 Rev. D (sheet 2 of 2), with Series “J” luminaire arm	65	2988
Millerbernd Manufacturing, Co.	74516-WA-TS-III-J Rev. L (5 sheets)	65	3750

Foundations shall be as noted in the Plans and Standard Plan J-26.10. Type III signal standards with two mast arms installed 90 degrees apart may use these pre-approved drawings. Standards with two arms at any other angle are Type SD and require special design.

Type IV

Type IV strain pole standards shall be consistent with the Plans and Standard Plan J-27.15 or one of the following pre-approved plans:

Fabricator	Pre-Approved Drawing No.
Valmont Ind., Inc.	DB01167 Rev. B (2 sheets)
Ameron Pole Products Division	WA15TR15 Rev. A (2 sheets)
Millerbernd Manufacturing, Co.	74554-WA-SP-IV Rev. H (2 sheets)

Foundations shall be as noted in the Plans and Standard Plan J-27.10.

Type V

Type V strain poles are combination strain pole and light standards, with Type 1 (radial davit type) luminaire arms. Luminaire rams may be up to 16 feet in length, and a mounting height of 40 or 50 feet, as noted in the Plans. Type V strain poles shall be consistent with the Plans and Standard Plan J-27.15 or one of the following pre-approved plans:

Fabricator	Pre-Approved Drawing No.
Valmont Ind., Inc.	DB01167 Rev. B (2 sheets),
Ameron Pole Products Division	WA15TR15 Rev. A (2 sheets)
Millerbernd Manufacturing, Co.	74554-WA-SP-V Rev. J (3 sheets)

Foundations shall be as noted in the Plans and Standard Plan J-27.10.

Type CCTV

Type CCTV camera pole standards shall conform to Standard Plan J-29.15 or to one of the following pre-approved plans:

Fabricator	Pre-Approved Drawing No.
Valmont Ind., Inc.	DB01166 Rev. C (4 sheets)
Ameron Pole Products Division	WA15CCTV01 Rev. B (2 sheets)
Millerbernd Manufacturing, Co.	74577-WA-LC1 Rev. H (2 sheets)
Millerbernd Manufacturing, Co.	74577-WA-LC2 Rev. H (2 sheets)
Millerbernd Manufacturing, Co.	74577-WA-LC3 Rev. H (3 sheets)

Foundations shall be as noted in the Plans and Standard Plan J-29.10.

Type SD

Type SD signal standards are outside the basic requirements of any pre-defined signal standard and require special design. All special design shall be based on the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and pre-approved plans and as follows:

1. A 115 mph wind loading shall be used.

2. The Mean Recurrence Interval shall be 1700 years.

3. Fatigue category shall be III.

Complete calculations for structural design, including anchor bolt details, shall be prepared by a Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering or by an individual holding valid registration in another state as a civil or structural Engineer.

All shop drawings and the cover page of all calculation submittals shall carry the Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration. The cover page shall include the contract number, contract title, and sequential index to calculation page numbers. Two copies of the associated design calculations shall be submitted for approval along with shop drawings.

Details for handholes and luminaire arm connections are available from the Bridges and Structures Office.

Foundations for Type SD standards shall be as noted in the Plans.

Foundation Hardware
Section 9-29.6(5) is supplemented with the following:

(January 13, 2021)
Anchor bolt assemblies for light standards installed on top of barrier (median barrier mount) shall consist of the following:

- (4) 1-inch diameter threaded rods (bolts), minimum 36 inches in length
- (24) heavy hex nuts, six per anchor rod
- (24) flat washers, six per anchor rod
- Two anchor plates

Each anchor plate shall be constructed from 1/2" ASTM A36 plate and hot-dip galvanized in accordance with AASHTO M111. Each anchor plate shall be ring shaped, with an outside diameter of 16 inches and an inside diameter of 12 inches. Each anchor plate shall have four 1 1/8” diameter holes on a 13.89” bolt circle, with the holes positioned to match the anchor rod layout shown in the Standard Plans.

Anchor rods shall extend a minimum of five inches and a maximum of six inches above the top of the traffic barrier. The lower anchor plate shall be embedded 29 inches below the top of the traffic barrier. Each anchor plate shall be clamped with a heavy hex nut and washer above and below the anchor plate. The lower heavy hex nut for the pole base plate shall be no more than one inch from the top of the traffic barrier.

Control Cabinet Assemblies
Section 9-29.13 is supplemented with the following:

(January 2, 2018)
Uninterruptible Power Supply (UPS)
Each UPS System shall provide battery backup power to the cabinet to which it is connected in the event of loss or failure of normal utility power. Each UPS system shall be constructed for full on line configuration (line interactive type), providing automatic voltage regulation and power conditioning when operating on normal utility power. The transfer between utility power and battery power shall not interfere with the normal operation of the connected downstream cabinet.

Each UPS System shall be capable of supplying a minimum 1000W load at 120 VAC for a minimum number of hours depending on the number of batteries specified:

- Four batteries: Minimum 4 hours run time.

- Eight batteries: Minimum 8 hours run time.

Each UPS System shall be composed of the following equipment:

UPS Cabinet Construction
Each UPS Cabinet shall be constructed as follows. The equipment shall be installed within the cabinet as shown in the Plans.

1. The cabinet shall be designated Type 331, consisting of Housing 1B and Mounting Cage 1 as described in the CalTrans TEES. The housing shall use 0.125 inch minimum thickness 5052 H32 ASTM B209 alloy aluminum, with bare mill finish. The exterior shall not be anodized or painted.

2. Each cabinet door shall be provided with:

    a. A three point latch system. Locks shall be spring loaded construction locks capable of accepting a Best 6 pin core. A 6 pin construction core of the type (blue, green, or red) specified in the contract shall be installed in each core lock. One core removal key and two standard keys shall be included with each cabinet and delivered to the Engineer.

    b. A one piece, closed cell, neoprene gasket.

    c. A two position doorstop assembly. The doorstops shall hold the door open at both 90 degrees and 180 +/- 10 degrees.

3. Cabinet lighting shall be provided by two LED light strips. Each LED light strip shall be approximately 12 inches long, have a minimum output of 320 lumens, and have a color temperature of 4000K (cool white) plus or minus 400K. Lighting shall not interfere with the proper operation of any other ceiling or shelf mounted equipment. All lighting fixtures shall energize whenever any door is opened. Each door switch shall be labeled “Light”. Both light strips shall be ceiling mounted - rack mounted lights are not allowed. One light strip shall be installed over the front face of the rack and the second shall be installed over the rear face of the rack. Each light strip shall be oriented parallel to the door face, and placed such that the associated face of the rack and the rack mounted equipment is illuminated.

4. Cabinet ventilation shall be as described in the TEES for a Type 332L cabinet. The door vent filter shall be a 12 inch by 16 inch by 1 inch thick (nominal) disposable paper filter.

5. A UPS Service Panel, installed on the left side of the cabinet as viewed from the front. This service panel shall include the following, positioned as shown in the Plans:

    a. Two three-position terminal blocks. Each terminal block shall be labeled “Power IN” or “Power OUT” as appropriate.

    b. Two 120V 1P-15A circuit breakers, one each for the cabinet lighting and the cabinet ventilation (fan and thermostat).

    c. A Tesco TES-10B (or equivalent) Surge Suppressor.

    d. A HESCORLS LF60X (or equivalent) Line Filter.

e. A neutral (AC-) bus bar, with minimum 10 connections.

f. A ground bus bar, with minimum 10 connections.

6. Three battery shelves, each 0.5U (Rack Unit) in height. Each shelf shall be vented and capable of supporting three AlphaCell 240XTV batteries without visibly flexing. Each shelf shall span the full width and depth of the rack, and be secured to all of the rack verticals.

7. One drawer shelf, 1U in height.

8. A Generator Transfer Switch (GTS) and enclosure, meeting the requirements of Section 9-29.13(8). The GTS shall be installed in place of the Police Panel Switch enclosure as shown on a Type 332L cabinet. The lock shall have an aluminum rain shield cover riveted to the cabinet housing.

UPS System Components

The following UPS System Equipment shall be provided and installed within the cabinet as shown in the Plans. All equipment shall be from Alpha Technologies unless otherwise noted.

1. One UPS Controller, model FXM 2000 w/SNMP module operating at 120 VAC, Part Number (P/N) 017-232-31. The UPS Controller shall include the 19” EIA rack mount kit, P/N 740-697-21, and support shelf, P/N 3610030085.

2. One Universal Automatic Transfer Switch (UATS) Accessory Shelf Assembly (P/N 020-168-25), consisting of a Surge Arrestor Assembly (P/N 740-755-21), UATS (P/N 020-165-21), and 120V Single Duplex Plate (P/N 740-748-23).

3. Four or eight AlphaCell 240XTV Batteries, as required by the Contract. Where four batteries are required, they shall be installed with two each on the middle and lower battery shelves. Where eight batteries are required, the upper and middle battery shelves shall hold three batteries each, with the remaining two installed on the lower battery shelf. Batteries shall be labeled with their string ID and number in the string. The first four batteries shall be labeled A1 through A4, and the second four batteries (when required) shall be labeled B1 through B4.

4. Remote Battery Monitoring System Plus. Use P/N 03760260-002 for cabinets requiring four batteries. Use P/N 03760260-003 for cabinets requiring eight batteries.

5. 48V Battery Cable Kit, 10ft in length with 1/4-20 termination(s), P/N 740-628-27. Where eight batteries are required, a second battery cable kit and a Y-Connector (P/N 870-601-21) shall also be included.

6. Battery Heater Mats, one per shelf with batteries installed, sized for the number of batteries present on that shelf. Each mat shall run on

120VAC and be plugged into the duplex receptacle on the Accessory Shelf Assembly.

Three sets of cabinet drawings and maintenance and operations manuals shall be provided. Two sets shall be hard copies in paper format and placed in the cabinet drawer shelf. The third shall be electronic in PDF format and provided on a portable USB flash drive (stick) and placed in the cabinet drawer shelf.

Contact information for Alpha Technologies:

Alpha Technologies, Inc.
3767 Alpha Way
Bellingham, WA 98226
Phone: (360) 647-2360
E-mail: alpha@alpha.com
Website: www.alpha.ca

Traffic Data Accumulator and Ramp Meters

Section 9-29.13(11) is supplemented with the following:

(July 6, 2021)

Advanced Transportation Controller

All new Traffic Data Accumulator (Data Station) and Ramp Meter cabinets shall be provided with a Type ATC 2070 Controller as shown in the Plans. Each controller shall comply with Advanced Transportation Controller (ATC) Standard Version 06 (ATC 5201 v06.25), and shall support both C12S serial bus operation and C1S (104 pin) parallel bus operation. Each controller shall be supplied with the following options and equipment:

1. Board Support Package, in electronic format (see ATC 5201, Paragraph 3.3.1)
2. 2070-1C Engine Board (CPU Module)
3. 2070-2E Field I/O Module
4. 2070-3B or 2070-3D Front Panel
5. 2070-4A Power Supply Module

A spare blank cover (4X wide), designed to cover the slot for the 270-2E module when it is removed, shall also be provided.

ATC Controllers are required to be preapproved by WSDOT to ensure compatibility with WSDOT ITS operating software. The following controllers have been verified compatible with WSDOT ITS operating software and are preapproved:

1. Model: **Intelight 2070-LDX**

   Manufacturer:
   Q-Free America
   5962 La Place Ct SE, Ste. 150
   Carlsbad, CA 92008
   (833) MAXHELP (833-629-4357)
   info@intelight-its.com

www.intelight-its.com

2. Model: **McCain ATC 2070LX**

Manufacturer:
McCain, Inc.
2365 Oak Ridge Way
Vista, CA 92801
(888) 262-2246
info@mccain-inc.com
www.mccain-inc.com

3. Model: **Siemens ATC 2070LX**

Manufacturer:
Siemens Mobility, Inc.
9225 Bee Cave Road
Building B, Suite 101
Austin, TX 78733
(512) 837-8300
mobility.siemens.com/us/en.html

4. Model: **Safetran ATC 2070LX**

Manufacturer:
Econolite
1250 N Tustin Ave
Anaheim, CA 92807
(714) 630-3700
www.econolite.com

Flashing Beacon Control

Section 9-29.15 is supplemented with the following:

(January 7, 2019)
Rapid Flashing Beacons

Rapid Flashing Beacon (RFB) indications shall comply with the dimensional, operational, and flash pattern requirements of Federal Highway Administration (FHWA) Interim Approval 21 (IA-21, Conditions 4, 5, and 6, excluding Condition 5f; https://mutcd.fhwa.dot.gov/resources/interim_approval/ia21/index.htm). RFB systems shall be capable of providing, at a minimum, the following two-channel flashing patterns:

1. NEMA Standard 50-50:

   - Channel one is ON and channel two is OFF for 0.5 seconds.
   - Channel one is OFF and channel two is ON for 0.5 seconds.

   (Cycle repeats; the total flashing pattern cycle length is 1.00 second.)

2. RFB “WW+S” Pattern (IA-21 Condition 5b):

- Channel one is ON and channel two is OFF for 0.05 seconds.
- Both channels are OFF for 0.05 seconds.
- Channel one is OFF and channel two is ON for 0.05 seconds.
- Both channels are OFF for 0.05 seconds.
- Channel one is ON and channel two is OFF for 0.05 seconds.
- Both channels are OFF for 0.05 seconds.
- Channel one is OFF and channel two is ON for 0.05 seconds.
- Both channels are OFF for 0.05 seconds.
- Both channels are ON for 0.05 seconds.
- Both channels are OFF for 0.05 seconds.
- Both channels are ON for 0.05 seconds.
- Both channels are OFF for 0.25 seconds.

(Cycle repeats; the total flashing pattern cycle length is 0.80 seconds.)

The flashing pattern shall be user-selectable in the field.

RFB system pushbuttons shall include a locator tone, but shall not include tactile arrows, speech messages, or vibrotactile indications. RFB system pushbuttons may include speech message and vibrotactile functionality, provided these features can be deactivated. RFB system pushbuttons shall use a 9” x 12” R10-25 sign. The R10-25 sign may include integral yellow warning lights.

Pedestrian Push Buttons

Section 9-29.19 is supplemented with the following:

(June 29, 2022)
Accessible Pedestrian Signal (APS) Pushbuttons

When required in the Contract, APS Pushbuttons shall be provided for traffic signal systems. Each accessible pedestrian signal (APS) shall be a complete APS pushbutton system at each pedestrian pushbutton location shown in the Plans.

Each pushbutton station shall include the following:

1. Flat dark green colored housing.
2. High contrast pushbutton arrow (dark on a light background or light on a dark background). White on silver or silver on white are not acceptable as high contrast.

3. Integral 9” x 15” R10-3e Sign. Braille shall not be included. Adaptor plates shall be included if required to accommodate the sign.

4. Interface unit for installation in associated pedestrian display:
5. Percussive tone / rapid tick walk indication.

6. Voice messages, as specified below, pre-installed. Voice shall be male.

7. Interconnect cable for installation between pushbutton station and pedestrian display interface unit. Four conductor cable meeting the requirements of Standard Specification 9-29.3(2)B or 9-29.3(2)G may be used if it meets the pushbutton manufacturer’s requirements. Otherwise, cable shall be provided by the pushbutton manufacturer.

The following shall be provided at each intersection:

1. One USB flash drive with copies of all voice message audio files for that intersection, placed in the traffic signal cabinet drawer or drawing envelope. A separate flash drive is required for each intersection.

2. One USB cable of the appropriate type (A to A, A to B, male/female, etc.), placed in the traffic signal cabinet drawer or drawing envelope.

Any other equipment or software required by the manufacturer for setup, operation, and maintenance of the pushbutton stations shall be provided.

Dual button adaptor brackets are required for all installations with two APS pushbuttons on the same Type PPB, Type PS, or Type I Signal Standard. Where dual button adaptor brackets are required, they shall be obtained from the same manufacturer as the pushbutton station - brackets and extensions from other manufacturers shall not be used.

APS Speech Messages
Speech messages shall be provided in the following format:

- “Wait.”
- “Wait to cross ____(A)_____ at _____(B)_____.”
- “Walk sign is on to cross ____(A)_____.”

Tables with the entries for (A) and (B) above, as well as quantities for button and arrow orientations, are provided in the Plans for each intersection.

Order forms shall be completed by the Contractor using the information presented above.

Each APS pushbutton shall include a label tape with the text “Crossing (A) at (B)”, where (A) and (B) are the street names as described here and programmed into the pushbutton. The label shall be installed directly on the side or back of the APS pushbutton, and shall remain intact and legible until final installation.

Delivery and Setup

All APS pushbuttons shall be delivered to the region signal shop or owning agency shop for verification and owner setup. After the owning agency has completed setup, the Contractor will be notified that the APS pushbuttons are ready for pickup and installation.

Wireless access features (Bluetooth and/or WiFi), if included, will be disabled upon installation.

Approved APS Equipment

APS equipment shall be one of the following systems:

1. Model: **Campbell Guardian Independent 4-Wire APS**

   Components:
   APS Pushbutton Kit: KAC-32021-2BT
   Pedestrian Display Interface Unit: 501-0300 SPI

   Manufacturer:
   Campbell Company
   450 W McGregor Dr
   Boise, ID 83705
   (208) 345-7459
   www.pedsafety.com

2. Model: **Pelco IntelliCross Intelligent Pedestrian System**

   Components:
   APS Pushbutton: SE-2901-#-P30 9x15
   Pedestrian Display Interface Unit: SE-6190-PNC

   Manufacturer:
   Pelco Products, Inc.
   320 W 18th St
   Edmond, OK 73013
   (405) 340-3435
   intellicross@pelcoinc.com
   www.pelcointellicross.com

3. Model: **Polara iNS iNavigator Push Button Station**

   Components:
   APS Pushbutton: iNS23TN1-G
   Pedestrian Display Interface Unit: iPHCU3S
   PC Interface Module: iN-DGL (one per intersection; place in cabinet drawer).

   Manufacturer:
   Polara Enterprises
   1497 CR 2178
   Greenville, TX 75402
   (903) 366-0300

www.polara.com

Only one brand of equipment shall be used for the entire Contract.

Equipment List And Drawings

Section 8-20.2(1) is supplemented with the following:

(March 13, 1995)
Pole base to light source distances (H1) for lighting standards with pre-approved plans shall be as noted in the Plans.

Pole base to light source distances (H1) for lighting standards without pre-approved plans will be furnished by the Engineer as part of the final approved shop drawings, prior to fabrication.

(March 13, 1995)
Pole base to light source distances (H1) for lighting standards with pre-approved plans will be determined or verified by the Engineer at the request of the Contractor prior to fabrication.

Pole base to light source distances (H1) for lighting standards without pre-approved plans and for combination traffic signal and lighting standards will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

(March 13, 1995)
If traffic signal standards, strain pole standards, or combination traffic signal and lighting standards are required, final verified dimensions including pole base to signal mast arm connection point, pole base to light source distances (H1), mast arm length, offset distances to mast arm mounted appurtenances, and orientations of pole mounted appurtenances will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

Construction Requirements

Foundations

Section 8-20.3(4) is supplemented with the following:

(August 7, 2017)
Shafts For Signal Standard Foundations
Shaft foundations for the traffic signal standards at the following location(s) shall be constructed in accordance with the following requirements:

*** $$1$$ ***

Shaft foundations for traffic signal standards shall be constructed in accordance with Section 6-19.3, except as follows:

Quality Assurance
The tolerance for placing the center at the top of shaft under Section 6-19.3(1)A is revised for traffic signal standard foundation shafts to be within 4-inches of the Plan location.

Non-destructive testing of shafts under Sections 6-19.3(1)B and 6-19.3(9) and associated Work under Section 6-19.3(6) does not apply.

Shaft Excavation
Permanent casing advanced during excavation operations is required full depth for all traffic signal standard shaft foundation locations specified at the beginning of this Special Provision. Excavation in advance of the casing tip shall not exceed three feet. In no case shall shaft excavation and casing placement extend below the bottom of shaft excavation as shown in the Plans.

When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the portion of the shaft excavation in the geological unit that contains the obstruction, then the Contractor shall remove, break-up, or push aside, the obstruction under the provisions of Section 8-20.5 as supplemented in these Special Provisions.

Placing Concrete
Traffic signal standard foundation shaft concrete shall be Class 4000P.

Casing Removal
Tops of permanent casing for the shafts shall be removed to at least 6-inches beneath the finish groundline, unless otherwise specified by the Engineer.

Wiring

Section 8-20.3(8) is supplemented with the following:

(March 13, 1995)
Field Wiring Chart

501	AC+ Input	516-520 Railroad Pre-empt
502	AC- Input	5A1-5D5 Emergency Pre-empt
503-510	Control-Display	541-580 Coordination
511-515	Sign Lights	581-599 Spare

Movement Number	1	2	3	4	5	6	7	8	9
Vehicle Head									
Red	611	621	631	641	651	661	671	681	691
Yellow	612	622	632	642	652	662	672	682	692
Green	613	623	633	643	653	663	673	683	693
Spare	614	624	634	644	654	664	674	684	694
Spare	615	625	635	645	655	665	675	685	695
AC-	616	626	636	646	656	666	676	686	696
Red Auxiliary	617	627	637	647	657	667	677	687	697

Yellow Auxiliary	618	628	638	648	658	668	678	688	698
Green Auxiliary	619	629	639	649	659	669	679	689	699
Pedestrian Heads & Dets.									
Hand	711	721	731	741	751	761	771	781	791
Man	712	722	732	742	752	762	772	782	792
AC-	713	723	733	743	753	763	773	783	793
Detection	714	724	734	744	754	764	774	784	794
Common-Detection	715	725	735	745	755	765	775	785	795
Spare	716	726	736	746	756	766	776	786	796
Spare	717	727	737	747	757	767	777	787	797
Spare	718	728	738	748	758	768	778	788	798
Spare	719	729	739	749	759	769	779	789	799
Detection									
AC+	811	821	831	841	851	861	871	881	891
AC-	812	822	832	842	852	862	872	882	892
Common-Detection	813	823	833	843	853	863	873	883	893
Detection A	814	824	834	844	854	864	874	884	894
Detection B	815	825	835	845	855	865	875	885	895
Loop 1 Out	816	826	836	846	856	866	876	886	896
Loop 1 In	817	827	837	847	857	867	877	887	897
Loop 2 Out	818	828	838	848	858	868	878	888	898
Loop 2 In	819	829	839	849	859	869	879	889	899
Supplemental Detection									
Loop 3 Out	911	921	931	941	951	961	971	981	991
Loop 3 In	912	922	932	942	952	962	972	982	992
Loop 4 Out	913	923	933	943	953	963	973	983	993
Loop 4 In	914	924	934	944	954	964	974	984	994
Loop 5 Out	915	925	935	945	955	965	975	985	995
Loop 5 In	916	926	936	946	956	966	976	986	996
Loop 6 Out	917	927	937	947	957	967	977	987	997
Loop 6 In	918	928	938	948	958	968	978	988	998
Spare	919	929	939	949	959	969	979	989	999

Signal Systems

Section 8-20.3(14) is supplemented with the following:

(January 2, 2018)
Uninterruptible Power Supply (UPS)
UPS Systems shall be tested before and after field installation.

Contractor Quality Control Testing
Prior to delivery of the UPS system to the Washington State Department of Transportation Materials Laboratory (State Materials Laboratory), all components and equipment, including the batteries shall be fully installed in the cabinet and the UPS system operations shall be successfully tested by the Contractor's representative. A testing certification (letter or similar) shall be provided with the cabinet.

After the UPS system has been successfully tested, the batteries shall be removed from the cabinet and the cabinet and batteries shall be delivered, independently, to

the State Materials Laboratory, located in Tumwater, Washington, for pre-installation testing.

UPS System Laboratory Testing

The UPS system testing shall simulate the operations as installed in the field. The tests shall check the operation of each individual component as well as the overall operation of the system.

The State Materials Laboratory testing of the UPS system will consist of the following four separate stages:

1. Delivery and Assembly
2. Documentation
3. Demonstration
4. Performance Test

Testing will follow in the listed order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

The Contractor shall designate a qualified representative for these tests. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, all notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

Stage 1: Delivery and Assembly

The Contractor shall provide all Work necessary to assemble the UPS system and make ready for demonstration at the State Materials Laboratory. Upon delivery, the batteries shall be reinstalled in the cabinet and the UPS system shall be made fully operational. All components for the complete UPS system, including the necessary test equipment, shall be ready for testing within 14 calendar days of delivery to the State Materials Laboratory.

Stage 2: Documentation

All documentation shall be furnished with the UPS system equipment prior to the start of testing. The documents to be supplied shall consist of the following:

1. Serial numbers when applicable.
2. Wiring diagrams for all equipment in the required quantities and formats.
3. Complete operations and maintenance manuals in the required quantities and formats.
4. A description of the functions and the capabilities of individual components and of the overall UPS system.

Stage 3: Demonstration
The Contractor shall provide the following:

1. A presentation on how to operate the system.

2. A complete and thorough demonstration to show that all components of the UPS system are in good condition and operating properly.

The demonstration shall be performed by the Contractor's representative in the presence of State Materials Laboratory personnel.

Stage 4: Performance Test
The performance test will be conducted by State Personnel to determine if the UPS system performs correctly. The performance test shall include the testing of the following specifications:

1. Battery Discharge Rate

2. Battery Recharge Rate

3. Power Transfer Rate

4. Operational Duration

Test results for items 1-3 shall be within the manufacturers recommended values in order for the tests to be considered successful. For item 4, the test is considered successful if the system maintains the test load for the required minimum duration for the battery configuration.

Equipment Failure or Rejection
All component or system failures shall be documented. This documentation shall provide the following information:

1. A detailed description of the failure.

2. The steps undertaken to correct the failure.

3. A list of parts that were replaced, if any.

All failed or rejected equipment shall be removed from the Materials Laboratory within three calendar days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory by the Contractor and delivered to the appropriate site(s) as designated elsewhere in this Contract.

UPS System Field Testing
After installation, the Contractor shall field test the UPS system to ensure the system operates in accordance with Plans, Specifications and manufacturer's instructions. The test shall ensure that that all components are operational within manufacturer's

tolerances. The Contractor shall provide a testing procedure to the Engineer for approval. The testing procedure shall provide for operational testing of the following:

1. UPS Power Module
2. Surge Suppressor
3. Automatic Transfer Switch
4. Generator Power Transfer Switch

The field test shall demonstrate the loss of utility power and the switch over to battery power without interference with the normal operation of the connected downstream cabinet. For traffic signal systems, this this includes the traffic signal controller including conflict monitor and any other peripheral devices within the traffic controller assembly.

Signal Controllers

Section 8-20.3(14)A is supplemented with the following:

(August 2, 2010)
Testing
All signal control equipment shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, the following:

All notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following four separate stages:

a. Delivery and Assembly
b. Demonstration and Documentation
c. Performance Test
d. Operational Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery Assembly

All components for the complete traffic control systems, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

Equipment and prerequisites necessary to complete this stage shall include:

a. Detection Simulator:
The detection simulator shall provide at least one detector per phase and variable traffic volumes. One simulator shall be required for every two controllers tested.

b. Communications Network:
Locations, specified for coordinating communications equipment and cable, shall be completely wired to provide an operational communications system between all local and master controllers.

The Contractor shall provide labor, equipment, and materials necessary to assemble all control equipment complete and ready for demonstration. Materials and equipment used for this stage that are not required for field installation shall remain the property of the Contractor. Failure to complete this stage within ten working days will result in rejection of the entire system.

Stage 2 Demonstration and Documentation

This stage shall be completed within seven working days following the completion of Stage 1. Failure to do so shall result in rejection of the entire shipment.

All documentation shall be furnished with the control equipment prior to the start of testing. If corrections to any document are deemed necessary by the State, the Contractor shall submit this updated version prior to the final approval by the State Materials Laboratory. The documents to be supplied shall consist of or provide the following:

a. A Complete accounting of all the control and test equipment required.

b. A complete set of documents which shall include:

1. Serial numbers when applicable.

2. Written certification that equipment of the same make and model has been tested according to NEMA Environmental Standards and Test Procedures, and has met or exceeded these standards. The certificate shall include equipment model number and where, when, and by whom the tests were conducted. This certificate shall accompany each shipment of controllers.

3. Reproducible mylar wiring diagrams and two blue-tone prints for each controller and cabinet supplied. The sheet size shall be 24 inches by 36 inches.

4. Wiring diagrams for all auxiliary equipment furnished. One set per cabinet.

5. Complete operations and maintenance manuals including complete and correct software listing and flow charts. One set of operations and maintenance manuals per cabinet; at least four but no more than ten. Five sets of software listings and flow charts.

6. Complete operations and maintenance manuals for all auxiliary equipment. One set per cabinet.

c. A description of the functions and the capabilities of individual components and of the overall control system.

d. A presentation on how to operate the system.

e. A complete and thorough demonstration to show that all components of the control system are in good condition and operating properly, and proof that the controller and cabinet are functioning correctly.

f. Detailed instructions for installing and operating the controller(s), including explanations on the use of all features of the controller(s).

g. The operational and maintenance manuals for each traffic signal controller supplied including as a minimum, but not to be limited to the following:

1. Detailed instructions for maintaining all hardware components, controller, and auxiliary equipment.

2. A complete parts list detailing all manufacturer's identification codes.

3. Detailed wiring diagrams and schematics indicating voltage levels and pictorial description, part name, and location for all hardware components, controller, and auxiliary equipment.

The demonstration shall include the following:

a. Phasing per plans and all phase timing.

b. Detection including any special detector functions.

c. Conflict Monitor and Load Switches.

d. Special Coordination including communication equipment.

This demonstration shall be performed by the Contractor in the presence of State Materials personnel. The Contractor shall supply any item not accounted for within five working days of the accounting. Controllers and cabinets that remain incomplete five working days after notification shall be rejected and returned freight collect to the Contractor.

Stage 3 Unit Performance Test

A minimum of ten working days shall be allowed for one or two cabinet assemblies and five working days for each additional assembly.

The unit performance test will be conducted by State Personnel to determine if each and every controller cabinet assembly complies with NEMA Environmental Standards as stated in NEMA publication No. TS 1-1976, Part 2.

Any unit submitted, whose failure has been corrected, shall be retested from the beginning of this stage.

Stage 4 Operational Test

All control and auxiliary equipment shall operate without failure for a minimum of ten consecutive days. If an isolated controller is specified, it shall operate as an isolated controller. If a coordinated system is specified, it shall operate as a total coordinated system with the master and all local controllers operating in all coordinated modes.

If any failure occurs during this stage, all equipment for this stage shall be restarted following completion of repairs.

Equipment Failure Or Rejection

Equipment failures shall be defined as set forth in NEMA Publication No. TS 1-1976. Failure of load switches, detector amplifiers, and conflict monitors shall not result in rejection of the controller or cabinet. However, the Contractor shall stock, as replacements, approximately 30 percent more than the total for these three items. All excess material shall remain the property of the Contractor following completion of all tests.

If a failure occurs during Stages 3 or 4, repairs shall be made and completed within ten working days following notification of the malfunction. The Contractor shall have the option of making onsite repairs or repair them at a site selected by the Contractor. Failure to complete repairs within the allotted time shall result in rejection of the controller or cabinet assembly under test.

A total of two failures will be allowed from the start of Stage 3 to the end of Stage 4. If three failures occur during this time period, the equipment will be rejected. New equipment of different serial numbers submitted as replacement shall be received by the Materials Laboratory for testing under Stage 3 within ten working days following notification of rejection. Failure to meet this requirement within the allotted time will result in rejection of the

entire system. Software errors will be considered as failures and, if not corrected within ten working days, the entire system will be subject to rejection. Following rejection of any equipment, the Contractor shall be responsible for all costs incurred. This shall include but not be limited to all shipping costs.

When the traffic control program is supplied by the State, the Contractor shall prove that any failures are, in fact, caused by that program and not the hardware.

All component or system failures, except load switches and detector amplifiers, shall be documented. This documentation shall be submitted prior to commencing the test or stage in which the failure was found and shall provide the following information:

a. A detailed description of the failure.
b. The steps undertaken to correct the failure.
c. A list of parts that were replaced, if any.

Upon completion of the tests, the equipment will be visually inspected. If material changes are observed which adversely affect the life of the equipment, the cause and conditions shall be noted. The Contractor will immediately be given notice to correct these conditions. If not repaired within ten working days of notification, the equipment will be subject to rejection. A final accounting shall be made of all equipment prior to approval.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory and delivered to sites as designated elsewhere in this contract.

Guarantees
Guarantees and warranties shall be in accordance with Section 1-05.10.

Payment

Section 8-20.5 is supplemented with the following:

(April 6, 2015)
"Removing Traffic Signal Shaft Obstructions", estimated.
Payment for removing obstructions, as defined in Section 8-20.3(4) as supplemented in these Special Provisions, will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all

bidders, the Contracting Agency has entered an amount for the item "Removing Traffic Signal Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

Permanent Signing

Materials

Roadside Sign Structures

Section 9-06.16 is supplemented with the following:

(January 3, 2011)
Perforated Steel Square Sign Post System
Where noted in the Plans, steel sign post systems shall be square, pre-punched galvanized steel tubing, that are NCHRP 350 Test Level 3 Certified and FHWA approved. The steel sign post system shall include all anchor sleeves, and other hardware required for a complete sign installation.

System Acceptance
Systems listed in the current QPL will be accepted per the QPL approval code. Systems not listed in the QPL will be accepted based on a Supplier's Certificate of Compliance. The Supplier's Certificate of Compliance will be a contract specific letter from the supplier stating the system is NCHRP 350 Test Level 3 compliant.

Hardware

Section 9-28.11 is supplemented with the following:

(August 3, 2015)
Locknuts shown in the Plans specifying a locknut or locknut with nylon insert shall conform to one of the following:

1. ANCO Pin Locknut, with stainless steel locking pin, as manufactured by Lok-Mor, Inc.

2. Tri-lock Locknut, as manufactured by Lok-Mor, Inc.

3. Grade DH or 2H hex or heavy hex nuts conforming to one of the ASTM material specifications in the Locknut category of the Hardware table of this Section may be modified by installing a nylon insert washer. A minimum of 60-percent of the original number of threads shall meet the requirements of the applicable ASTM material specification after insertion of the nylon insert washer.

4. Hex or heavy hex nuts conforming to one of the ASTM material specifications in the Locknut category of the Hardware table of this Section may be modified by adding one of the following products to a minimum of one-half of the internal threads of the nut and the entire exterior top surface of the nut:

   a. Nylok Blue Torq-Patch Locknut.

   b. Nylok Precote 30.

   c. ND Patch 360 Ring Patch.

   The nuts with any of the three listed products are permitted for a single use only and shall have a maximum of two nut widths of thread extending beyond the nut after installation.

The alternatives to locknuts specified in Standard Plans G-90.20, G-90.30, and J-75.41 are deleted and replaced with the four options specified above.

Reflective Sheeting

Section 9-28.12 is revised to read:

(October 3, 2022)

Reflective sheeting material shall conform to ASTM D4956 – *Standard Specification for Retroreflective Sheeting for Traffic Control*.

Device Type	Use	Sheeting Color	Allowable Sheeting Types
Signs			
Permanent Signing	All	All	III, IV[1]
Temporary Construction Warning Signs	All	Fluorescent Orange	VIII, IX,X, XI[2]
Temporary Construction Regulatory Signs	All	White	IV
Temporary Construction Regulatory Signs	Rural	White	II[3]
Temporary Construction Regulatory Signs	Urban/Rural	White	III[3]
Temporary Construction Regulatory Signs	All	Red	III, IV
Temporary Construction Regulatory Signs	All	Green	II, IV

Temporary Construction Regulatory Letters, border or symbols		Green	III, IV[3]
Temporary Construction Signs	All	All Other Background Colors	III[3], IV
Other Devices			
Barricades	All	White or Orange	III[3], IV
Barrier Delineators	All	White or Yellow	III, IV, V XI
Bollards	All	All	IV
Flexible Guidepost	All	All	III, IV, V
Object Makers	All	All	III, IV
Pedestrian Channelization Devices	All	White or Orange	III[3], IV
Tall Channelization Devices 42-inch	All	Fluorescent Orange/White	VIII, IX, XI[4]
Traffic Cones 36-inch and 28-inch	All	White or Higher White	III[3], IV
Traffic Safety Drums	All	Fluorescent Orange/White	VIII, IX, XI[4]
Transportable Attenuators	All	Yellow and Black Chevron	III[3], IV
Transportable Attenuators	All	White and Red Chevron	IV
Tubular Markers (portable or pavement mounted)	All	White or Yellow	III[3], IV

Notes:

1. Except Overhead Warning Signs shall use Type XI and overhead exit only shall use Type IV or XI fluorescent yellow.

2. Former Type X, not shown in ASTM D4956, however meets requirements of Types VII, IX and XI.

3. Only devices in inventory may be used, new fabrication shall use Type IV.

4. Type III and Type IV orange and white sheeting may be still used through December 31, 2026.

Sign Support Structures

Section 9-28.14 is supplemented with the following:

(September 8, 2020)
Manufacturers for Steel Roadside Sign Supports

The Standard Plans lists several steel sign support types. These supports are patented devices and many are sole-source. All of the sign support types listed below are acceptable when shown in the Plans.

Steel Sign Support Type	Manufacturer

Type TP-A & TP-B	Transpo Industries, Inc.
Type PL, PL-T & PL-U	Northwest Pipe Co.
Type AS	Transpo Industries, Inc.
Type AP	Transpo Industries, Inc.
Type ST 1, ST 2, ST 3, & ST 4	Ultimate Highway Solutions, Inc., Allied Tube & Conduit Corp. (Mechanical Division), Trinity Highway Products, LLC.
Type SB-1, SB-2, & SB-3	Ultimate Highway Solutions, Inc., Xcessories Squared Development and Manufacturing Incorporated, Trinity Highway Products, LLC.

Construction Requirements

Sign Structures

Fabrication of Steel Structures

Fabrication of Monotube Sign Bridges and Cantilever Sign Structures

Section 8-21.3(9)A1 is supplemented with the following:

(September 8, 2020)
The color of the monotube sign bridge and cantilever sign structure finish coat, when dry, shall match *** $$1$$ ***.

Bridge Mounted Sign Brackets

Section 8-21.3(9)E is supplemented with the following:

(April 6, 2015)
Bridge Mounted Sign Bracket No(s). *** $$1$$ *** include the following quantities of structural carbon steel:

*** $$2$$ ***

For bridge mounted sign brackets mounted with resin bonded anchors, the Contractor shall install resin bonded anchors in accordance with Section 6-02.3(18) as supplemented in these Special Provisions. For this type of mounting, Bridge Mounted Sign Bracket No(s). *** $$3$$ *** include the following quantities of drilled holes:

*** $$4$$ ***

Foundations

Shafts for Monotube Sign Bridge and Cantilever Sign Structure Foundations

Section 8-21.3(9)F1 is supplemented with the following:

(September 8, 2020)
Shafts for monotube sign bridge and cantilever sign structure foundations at the following location(s) shall be constructed in accordance with Section 8-21.3(9)F1, except temporary casing is not required by the Contracting Agency but is instead a Contractor option.

*** $$1$$ ***

Shafts for monotube sign bridge and cantilever sign structure foundations at the following location(s) shall be constructed in accordance with Section 8-21.3(9)F1, including the required use of temporary casing:

*** $$2$$ ***

Measurement

Section 8-21.4 is supplemented with the following:

(September 8, 2020)
*** $$1$$ *** contain(s) the following approximate quantities of material and work:

*** $$2$$ ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for accepted changes will be made in the applicable sign structure lump sum Contract price even though the actual quantities required may deviate from those listed.

Temporary Pavement Markings

Materials

Pavement Marking Material

Section 9-34 is supplemented with the following:

(October 3, 2022)
Temporary Adhesive Transverse Rumble Strips
Temporary Adhesive Transverse Rumble Strips shall consist of a self-adhesive orange rumble strips that is 4 inches wide and 0.250 inches thick.

Temporary Adhesive Transverse Rumble Strips shall be manufactured by Advanced Traffic Markings, Seton, Stop-Painting, or an approved equal.

Construction Requirements

Pavement Marking Application

Temporary Pavement Markings – Short Duration

Section 8-23.3(4)A is supplemented with the following:

(October 3, 2022)
Temporary Adhesive Transverse Rumble Strips - A SOLID line used as an advance warning device. Each line shall be continuous and placed in the travel lane, perpendicular to the flow of traffic, as shown in the Plans. Each temporary transverse rumble strip shall be applied in accordance with the manufacturer's recommendation.

Temporary adhesive transverse rumble strips may be used on two-way, two-lane roadways in conditions requiring traffic to stop.

Do not place temporary adhesive transverse rumble strips on sharp horizontal or vertical curves, through pedestrian crossings or on bicycle routes. When placed on roadways used by bicyclists a minimum clear path of 4 feet shall be provided at each edge of the roadway or on each paved shoulder if feasible.

Temporary adhesive transverse rumble strips shall be repaired immediately when it no longer provides the intended use. Temporary adhesive transverse rumble strips will be removed when they are no longer required.

Measurement

Section 8-23.4 is supplemented with the following:

(October 3, 2022)
Temporary Adhesive Transverse Rumble Strips will be measured by the linear foot of each installed line for the initial installation only. Repair, for any reason, of temporary transverse rumble strips will not be measured.

Payment

Section 8-23.5 is supplemented with the following:

(October 3, 2022)
"Temporary Adhesive Transverse Rumble Strips", per linear foot.

The unit Contract price per linear foot for "Temporary Adhesive Transverse Rumble Strips" shall be full pay for all Work as specified.

Rock and Gravity Block Wall and Gabion Cribbing

Materials

Section 8-24.2 is supplemented with the following:

(January 7, 2002)
Gravity Block Wall

Gravity block wall blocks shall be rectangular prisms with dimensions 2'-5 1/2" by 2'-5 1/2" by 4'-11", except for special blocks which shall be as dimensioned in the Plans. All dimensions shall be ± 1/2".

Except as otherwise specified, gravity block wall blocks will be accepted by the Engineer based on visual inspection only, with no minimum compressive strength and no air content requirements for the concrete used in the block.

Gravity block wall blocks for permanent walls of heights greater than six feet and less than 15 feet shall be cast with Class 3000 concrete, conforming to the air content requirements of Section 6-02.3(2)A. Commercial concrete shall not be used. Gravity block wall blocks for permanent walls of these heights will be accepted based on visual inspection, and conformance to Section 6-02.3(27) and the specified concrete strength and air content requirements.

Construction Requirements

Gravity Block Wall

Section 8-24.3(2) is supplemented with the following:

(January 7, 2002)
Definitions

Temporary Gravity Block Wall: A gravity block wall that is constructed and removed under the same contract. Temporary gravity block walls shall not exceed ten feet in height, measured from the bottom of the bottom row of blocks to the top of the highest block.

Permanent Gravity Block Wall: A gravity block wall that remains in place after the conclusion of the contract under which the gravity block wall was constructed. Permanent gravity block walls shall not exceed 15 feet in height, measured from the bottom of the bottom row of blocks to the top of the highest block.

Submittals

The Contractor shall submit working drawings of the gravity block wall to the Engineer for approval in accordance with Section 6-01.9. The working drawings shall include, but not be limited to, the following:

1. Plan, elevation, and section views of the wall, showing the layout, batter, and orientation of the blocks.

2. Dimensions and details of the blocks, including details and locations of block erection lifting loops and inserts, and the features designed to interlock blocks together if the blocks have such features.

3. Method and equipment used to erect the blocks.

4. Erection sequence.

The Contractor shall not begin fabricating gravity block wall blocks until receiving the Engineer's approval of the working drawing submittal.

Gravity Block Wall Erection

After excavating for the wall base, the Contractor shall grade the excavation for a width equal to or exceeding the width of the bottom row of blocks. The base shall be graded to the base elevation shown in the Plans and working drawings as approved by the Engineer, and shall accommodate the batter of the bottom row of blocks.

The Contractor shall erect the gravity block wall and place the backfill in accordance with the erection sequence as approved by the Engineer. The top of the gravity block wall shall be within two inches of the line and grade shown in the Plans. The backfill shall be compacted in accordance with Section 2-03.3(14)C, Method C.

The Contractor shall repair all large blemishes, honeycombed areas, and chipped surfaces, (25 square inches and larger) on the exposed face of the erected wall using methods and materials as approved by the Engineer.

Glare Screen

Description

Section 8-25.1 is supplemented with the following:

(April 1, 2002)

This work shall consist of furnishing and constructing permanent and temporary barrier glare screen on concrete barrier in accordance with the Plans, these Specifications, and as directed by the Engineer.

Materials

Section 8-25.2 is supplemented with the following:

(April 1, 2002)

Barrier Glare Screen

Barrier glare screen shall consist of modular units with vertical blades mounted on a horizontal base rail. Base rails and blades shall be made of non-warping, non metallic durable polymeric materials; shall be resistant to damage due to impacts, ultraviolet light, ozone, hydrocarbons, and other effects of atmosphere weathering; shall resist stiffening with age; and shall be designed for a minimum life equaling 60 months of outdoor service.

The color of blades shall be gray or green. Only one color shall be used throughout the project. The height of the blade shall be 24 inches. The blade width and spacing shall provide for a minimum 22 degree sight cutoff angle. The length of the unit shall be the same as the length of the concrete barrier that the unit is mounted on. The unit can be composed of smaller sub-units as long as the competed assembly is the same length as the concrete barrier. The unit shall not exceed 4.5 pounds per linear foot.

Brackets and mounting hardware may be metallic or non-metallic. Metallic brackets and anchor hardware shall be stainless steel or galvanized in accordance with ASTM A-153. Anchors shall be a stud mechanical system and shall include the necessary washers.

The blade to rail base separation strength shall be a minimum of 1,500 pounds. Anchors shall have a minimum 3,000 pound pull-out and shear strength.

Barrier glare screen shall be selected from approved materials listed in the Qualified Products List.

Laboratory Tests

Three blades shall be cycled at 1000 hours in a weatherometer in accordance with ASTM G 53 (3 hr. 60C UV, 3 hr. 50C CON). The blades shall show no signs of delamination, distress, or discoloration. Physical properties of tensile strength and rigidity shall be maintained within 80 percent of the unconditioned values.

An impact test shall be performed on three partial sections of the modular unit consisting of the base rail and one blade. The temperature shall be 45 F. The modular unit shall be fastened in a similar fashion as to how the system would be used in the field. Each blade shall receive three impacts with a horizontal steel bar traveling at 50 MPH impacting at mid-height on the blade. After impact, the screening unit (blades and base) shall be inspected for the following criteria:

1. Any cracking, splitting, or delamination, other than surface cracking evident on only one face of the blade, is considered a failure.

2. If the blade leans more than 10 degrees from the vertical it is considered a failure.

3. Any separation of the blade from the base is considered a failure.

4. Any separation of the base from the attachment is considered a failure.

If an individual blade or base fails any of the above criteria, the product is unacceptable.

Pre-approval

In order for a particular model of temporary barrier glare screen to become pre-approved, the following conditions must be met:

1. The manufacturer must submit a written request for pre-approval along with samples for each model to be tested to: Materials Engineer, Department of Transportation Material Laboratory, P.O. Box 47365, Olympia, WA 98504-7365. Samples shall be complete with blades, base rail, and mounting hardware and shall be accompanied by the manufacture's written installation procedures.

2. The barrier screen will be field impact tested by the State Materials Laboratory to verify compliance with these specifications.

3. In lieu of State Materials Laboratory testing, the Lab will accept the results of pre-approved testing performed by the manufacturer or other agencies under the following conditions:

    a. The State Materials Laboratory is informed of the pre-approval testing sufficiently in advance in order to attend and observe. Attendance will be at the discretion of the Materials Laboratory.

b. The results of the testing shall be reported in sufficient detail to enable the State Materials Laboratory to evaluate compliance with these specifications.

The Manufacturer must submit a certified test report, including test data developed by an approved testing laboratory, which demonstrates that the barrier screening complies with the requirements of the specifications. Certified test data supplied by the manufacturer shall be subject to verification by appropriate tests conducted by the State Materials Laboratory.

Frequency of field testing, evaluation, and pre-approval updating shall be at the sole discretion of the Materials Laboratory.

Construction Requirements

Section 8-25.3 is supplemented with the following:

(April 1, 2002)
Barrier Glare Screen
The vertical blades shall be attached to the rail base in a positive mechanical manner to prevent unintentional blade rotation or dislocation. Barrier glare screen shall be attached to the top of the barrier using approved anchors and following the manufacturer's recommendations. Each modular unit of 10 feet or less shall be secured to the concrete barrier with anchors at a minimum of three points. Modular units greater than 10 feet in length shall be secured at a minimum of four points. Spanning the joint between concrete barrier sections will not be allowed.

When the temporary screening is no longer required, the Contractor shall remove the screening units. When noted in the contract that the screening will become the property of the Contracting Agency, the Contractor shall deliver and stockpile the screening units at the location noted in the contract.

Measurement

Section 8-25.4 is supplemented with the following:

(April 1, 2002)
Barrier glare screen and temporary barrier glare screen will be measured by the linear foot along its completed line and slope.

Payment

Section 8-25.5 is supplemented with the following:

(April 1, 2002)
“Barrier Glare Screen", per linear foot.
"Temporary Barrier Glare Screen", per linear foot.

Wire Mesh Slope Protection

Description

Section 8-29.1 is supplemented with the following:

(April 5, 2010)
This work also consists of furnishing and installing cable net slope protection.

Materials

Section 8-29.2 is supplemented with the following:

(January 2, 2018)
Cable Net Slope Protection Materials

Except where the Plans specify only one type of wire mesh backing material, wire mesh shall consist of either of the following:

1. 8x10 double-twisted, hexagonal wire mesh conforming to ASTM A 975

2. Chain link fabric conforming to Section 9-16.4(2) except that the chain link mesh grid shall be two-inch square.

Unless otherwise specified, wire mesh shall be PVC coated. The color of the PVC coating shall be SAE AMS Standard 595 color number 20045, unless otherwise specified in the Plans.

Wire rope for cable net panels specified in the Plans to be 5/16-inch nominal diameter shall be galvanized aircraft cable (GAC) construction, EIP steel, 7x7 or 7x19, having a nominal breaking strength of at least 9,200 pounds. 5/16-inch wire rope shall be fabricated and galvanized in accordance with Federal Specification RR-W-410E and ASTM A 1023.

Wire rope for cable anchors, and for other wire ropes specified in the Plans to be 3/4-inch nominal diameter or larger, shall be independent wire rope class (IWRC) construction, EIP steel, 6x19, and shall be galvanized in accordance with ASTM A 603 Class A.

Hardware shall conform to Section 9-16.4(4), with appropriate adjustments for the actual wire rope diameter used for the cable net slope protection. Jaw end swivels shall be galvanized after fabrication in accordance with Federal Specification RR-C-271D Type VII Class 3. Screw pin anchor shackles shall be galvanized after fabrication in accordance with Federal Specification RR-C-271D Type IVA Grade A Class 2.

Lacing wire for seaming the double-twisted wire mesh shall conform to Section 9-16.4(5).

Pressed ring fasteners for seaming the double-twisted wire mesh and fastening the mesh to the cable nets shall be made of high tensile steel.

Threaded bar ground anchors used for anchoring the top cable net support rope and steel post anchor assemblies to the ground surface as shown in the Plans shall be deformed continuously threaded steel reinforcement bars conforming to either Section 9-07.2 or Section 9-07.11 (Grade 60 or better). Threaded bar ground anchors shall be either epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3 or galvanized after fabrication in accordance with ASTM A 767 Class I.

Bearing plates shall conform to ASTM A 572 Grade 50 and shall be galvanized after fabrication in accordance with AASHTO M 111. Nuts shall conform to either ASTM A 563 Grade B, hexagonal, or Section 9-07.11. Washers shall conform to AASHTO M 293, except that plate washers shall conform to ASTM A 36. Nuts and washers shall be galvanized after fabrication in accordance with AASHTO M 111 for plate washers and AASHTO M 232 for all other hardware.

Steel posts shall conform to ASTM A 992 and shall be galvanized after fabrication in accordance with AASHTO M 111. Bars and plates welded to steel posts shall conform to ASTM A 572 Grade 50 and shall be galvanized after fabrication in accordance with AASHTO M 111.

Grout for soil anchors and ground anchors shall conform to Section 9-16.4(6).

Concrete for soil gravity anchors shall be either commercial concrete conforming to Section 6-02.3(2)B or Class 3000 conforming to Section 6-02.

Steel reinforcing bars for soil gravity anchors shall conform to Section 9-07.2 and shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3.

Construction Requirements

Section 8-29.3 is supplemented with the following:

(January 3, 2011)

Cable Net Slope Protection Construction Requirements

Submittals

The Contractor shall submit a cable net slope protection plan to the Engineer for approval in accordance with Section 6-01.9. The cable net slope protection plan shall include the following:

1. Identification of the supplier of the cable nets. The cable net supplier shall either be listed in the WSDOT Qualified Products List (QPL) or the WSDOT New Products List, or if not listed in the WSDOT QPL or WSDOT New Products List, the submittal shall include written documentation demonstrating satisfactory performance of cable nets furnished by this supplier in projects completed for other agencies in similar site conditions.

2. An inclusive list with catalogue cuts for the appurtenances to be used for the anchors, support system, seaming panels, wire mesh fasteners, anchor bars, grout, wire rope, clips, thimbles, ferrules, steel rings and other fastening hardware.

3. Mill certificates for the wire rope.

4. A 3'-0" square physical sample of the PVC coated wire mesh in the specified color.

5. The Contractor's plan for installing anchors for the cable net slope protection, and the equipment and process to be used to confirm the capacity of the constructed anchors. The calibration data for the stressing devices used to proof test the anchors, as completed by an independent

testing laboratory within 60 calendar days of the submittal date of the cable net slope protection plan to the Engineer, shall be included.

6. Working drawings for the temporary yoke or load frame to be used for anchor proof testing.

7. The Contractor's plan for assembling the cable nets and wire mesh, and erecting the assembled nets on the slope.

The Contractor shall not begin cable net slope protection operations until receiving the Engineer's approval of the cable net slope protection plan.

Cable Net Slope Protection Assembly

The cable net panels shall conform to the following criteria:

Panel Size:	approximately 12 feet by 25 feet
Grid Size:	no larger than 12 inches by 12 inches
Interior and Perimeter Rope:	no smaller than 5/16 inch diameter

Cable nets shall be fabricated with a perimeter rope. Interior wire rope junctions shall be bound with either double knots of 1/8 inch diameter corrosion resistant wire, or high-strength, corrosion resistant clips with slotted bottoms made from 0.08 inch thick plate. All perimeter-interior wire rope junctions shall be bound with corrosion resistant ferrules.

Clips and ferrules shall be pressed on and tie wires knotted so as not to slip when manually stretched or during the placement of the nets. Clips and ferrules shall be secured in the manner intended by the manufacturer while not damaging the wire ropes. Cable net assemblies showing signs of slight damage as determined by the Engineer will be subject to rejection.

Cable Net Slope Protection Installation

Cable net slope protection shall be installed in accordance with the details shown in the Plans.

Anchors and the top horizontal support rope shall be located a minimum of 15 feet beyond the slope crest, at locations receiving the Engineer's approval.

Anchors shall achieve the specified anchor capacity in vertical pullout. If double anchors are used, they shall be installed to ensure equal load distribution to both anchors, and each anchor shall achieve 60 percent of the specified anchor capacity in vertical pullout. For vertical pullout proof testing, an anchor is acceptable if it sustains the specified capacity for 10 minutes with no loss of load. Anchors that fail this criterion shall be replaced and retested at no additional expense to the Contracting Agency. For Type 1 cable net slope protection, up to 25 percent of the support rope anchors shall be proof tested. For Type 2 cable net slope protection, all support rope anchors shall be proof tested. Up to 25 percent of the side and back anchors shall be proof tested at the discretion of the Engineer. If more than three anchors fail, the Contractor shall proof test all anchors.

Proof testing of anchors shall be performed against a temporary yoke or load frame. No part of the temporary yoke or load frame shall bear within three feet of the anchor being tested.

Unless otherwise specified in the Plans, the wire mesh shall be placed on the outside of the cable net panels, and lapped and fastened as detailed in the Plans. With the exception of vertical seaming of the net panels, the wire mesh shall be connected to the cable net panels as shown in the Plans prior to placement on the slope.

All galvanized steel with exposed steel or damaged galvanizing shall be repaired in place after erection of the cable net slope protection in accordance with Section 6-07.3(9)I with paint conforming to Section 9-08.1(2)B.

Measurement

Section 8-29.4 is supplemented with the following:

(April 5, 2010)
Cable net slope protection will be measured by the square foot of cable net panels erected on the slope.

Payment

Section 8-29.5 is supplemented with the following:

(January 3, 2011)
"Cable Net Slope Protection Type ___", per square foot.
The unit contract price per square foot for "Cable Net Slope Protection Type ___" shall be full pay for performing the work as specified, including fabrication and installation of all steel posts and anchors and all anchor proof testing.

Temporary Stream Diversion

Construction Requirements

General

General TSD Requirements

Section 8-31.3(1)A is supplemented with the following:

(October 3, 2022)
Minimum Stream Flows
At all times of operation, the Contractor’s temporary stream diversion shall be designed to convey the following minimum flow rate of water in cubic feet per second:

*** $$1$$ ***

(October 3, 2022)
Minimum Stream Flows (Contingency System)
A Contingency System is required for this Project. The Contractor's contingency system shall be designed to convey the following minimum flow rate of water in cubic feet per second:

*** $$1$$ ***

(August 7, 2017)
FIELD OFFICE BUILDING

Description
This work shall consist of furnishing and setting-up a temporary office building for the sole use of the Contracting Agency.

Construction Requirements
The building shall be set-up, at the location designated by the Engineer, within the first 10 working days, unless the Engineer has approved a different schedule.

The building shall be weather-tight, installed plumb and level, and provided with the following as a minimum:

1. 240 square feet of floor space
2. Above ground floor
3. Heat
4. Electric lights
5. Telephone
6. Adequate windows
7. Six square feet of shelving
8. Plan table: 3 feet 6 inches deep by 6 feet wide by 3 feet 3 inches high
9. Drafting stool
10. Conference table: 4 foot by 8 foot
11. Four chairs
12. Cylinder door lock and six keys
13. Sanitary facilities (unless existing facilities are available)

The building shall remain the property of the Contractor and removed from the site upon physical completion of the contract, or when designated by the Engineer.

Payment
Payment will be made for the following bid item when included in the proposal:

"Field Office Building", lump sum.

The lump sum contract price for "Field Office Building" shall be full pay for furnishing, installing, maintaining, and removing the facility, including all costs associated with all required utility hook-ups and disconnects, and monthly utility charges for all utilities except telephone.

The monthly telephone costs will be paid by the Contracting Agency.

(October 3, 2022)
BOLLARDS

Description

This work shall consist of furnishing and installing steel bollards in accordance with the Plans, Standard Plans, and these Specifications, at the locations shown in the Plans or as staked by the Engineer.

Materials

Posts and Hardware

Type 1 and Type 2 bollard posts shall be in accordance with the Standard Plans and ASTM A 53, NPS 3 (3" Nom.) schedule 80 steel pipe. Post sleeves shall be ASTM A 53, NPS 4 (4"Nom.) schedule 40 steel pipe.

Type 3 bollard posts shall be steel structural tubing in accordance with the Plans and ASTM A 500 Gr B.

Steel plate shall be in accordance with ASTM A 36.

All steel parts shall be hot-dip galvanized after fabrication in accordance with AASHTO M 111.

Reflective Tape

Reflective tape shall be in accordance with Section 9-28.12.

Concrete

Footings shall be constructed using concrete Class 3000.

Construction Requirements

Bollards shall be constructed in accordance with the Standard Plans.

Bollards shall not vary more than ½ inch in 30 inches from a vertical plane.

Bollard posts and the exposed parts of the base assembly shall be painted in accordance with Section 6-07.3(11) for galvanized surfaces. The top coat shall match SAE AMS Standard 595, Color No. 33538 Traffic Signal Yellow.

Measurement

Measurement for bollards will be by the unit for each type of bollard furnished and installed.

Payment

Payment will be made for the following bid items when included in the proposal:

"Bollard Type ___", per each.

(August 6, 2018)
Environmental Compliance

Description

It is the Contractor's responsibility to conduct and perform all Work in accordance with Environmental Regulations, Environmental Commitments, permits, and Plans that the Work is

subject to. The Environmental Compliance Lead (ECL) shall be the Contractor's representative that is responsible for management of the Contractor's environmental compliance.

Construction Requirements

Environmental Compliance Lead (ECL)

The Contractor shall designate a primary ECL and an alternate ECL to perform the duties of the ECL. The Contractor shall provide the Engineer with a copy of the formal assignment in writing prior to the start of construction. The Contractor's superintendent and/or foreman cannot be designated as the primary or alternate ECL.

The ECL shall represent all Contractor work actions for the project, regardless of whether the work is performed by the Contractor or one of the subcontractors. The ECL shall have the authority to direct work to expeditiously correct any environmental compliance deficiency and coordinate these measures with the Engineer, and to order the Contractor's on-site personnel to stop work that is not being performed in compliance with the permits.

The ECL shall be on-site during all work activities unless otherwise approved by the Engineer. The Contractor shall maintain 24-hour telephone numbers at which the Contractor's designated ECL can be contacted and be available upon the Engineer's request during other than normal working hours. ECL and alternate(s) shall be listed on the Emergency Contact List required under Section 1-05.13(1).

The ECLs shall have, for the life of the Contract, a current Certificate of Training in Construction Site Erosion and Sediment Control (CESCL) from a course approved by the Washington State Department of Ecology.

The primary responsibilities of the ECL are to assist the Contractor's superintendent in planning and scheduling work activities to achieve environmental compliance; and be present on-site to observe work activities and resolve environmental compliance issues as they may develop.

The duties of the ECL shall also include the following requirements:

- Erosion and Sediment Control (ESC) Lead, Section 8-01.3(1)B,
- Updating the Spill Prevention, Control and Countermeasures Plan, Section 1-07.15(1),
- Attending the preconstruction conference (ECL and alternates),
- Evaluation of the Contractor's work operations and schedule in regard to environmental risks,
- Providing advanced notification to the Engineer of work activities that may create environmental compliance concerns.

Payment

Payment will be made for each of the following Bid items that are included in the Proposal:

"Environmental Compliance Lead", lump sum.

The lump sum Contract price for "Environmental Compliance Lead" shall be full payment for all costs for the Work. When the proposal includes an item for Environmental Compliance Lead all costs for ESC Lead in Section 8-01 shall be included in the lump sum price.

(October 3, 2022)
WATER CROSSINGS

Description

This Work consists of furnishing, mixing, and placing aggregates for streams, rivers and waterbodies of the type specified at the locations and in conformity with the lines and dimensions shown in the Plans or established by the Engineer.

Definitions

Aquitard - A bedding or stratum of sediment with low permeability that resists subsurface flow.

Blended Streambed Aggregate - Blended streambed aggregates are defined as a mix of the aggregates with the associated ratios in accordance with the Special Provisions or as shown in the Plans.

Materials

Streambed Aggregates

Streambed aggregates shall be naturally occurring water rounded aggregates. Aggregates from quarries, ledge rock, and talus slopes are not acceptable for these applications. Streambed aggregates shall meet the following test requirements for quality:

Aggregate Property	Test Method	Requirement
Degradation Factor	WSDOT T 113	Degradation Factor
Los Angeles Wear, 500 Rev.	AASHTO T 96	50% max.
Bulk Specific Gravity	AASHTO T 85	2.55 min.

Material for streambed aggregates shall be free of deleterious material. Deleterious material includes wood, organic waste, coal, charcoal, or any other extraneous or objectionable material. The material shall not contain more than 3 percent organic material by weight. At the discretion of the Engineer, the percent of deleterious materials may be determined visually or be tested in accordance with AASHTO T 194 or AASHTO T 267.

Streambed Sediment

Streambed sediment shall meet the following requirements for grading. If the Contractor proposes an alternate gradation, the Contractor shall submit a Type 2 Working Drawing consisting of 0.45 power maximum density curve of the proposed gradation. The alternate gradation shall closely follow the maximum density line and have Nominal Aggregate Size of no less than 1½ inches or no greater than 3 inches. The exact point of acceptance will be determined by the Engineer.

Streambed Sediment	
Sieve Size	**Percent Passing**
2½"	99-100
2"	85-100
1"	50-82
1/2”	28-68
No. 40	10-20
No. 200	5-10

All percentages are by weight.

Streambed Fine Sediment

Streambed fine sediment shall meet the following requirements for grading. If the Contractor proposes an alternate gradation, the Contractor shall submit a Type 2 Working Drawing consisting of 0.45 power maximum density curve of the proposed gradation. The alternate gradation shall closely follow the maximum density line and have Nominal Aggregate Size of no less than the No 6 sieve or no greater than ¼ inch sieve. The exact point of acceptance will be determined by the Engineer.

Streambed Sediment	
Sieve Size	**Percent Passing**
No. 4	99-100
No. 10	46-86
No. 40	26-40
No. 200	10-20
All percentages are by weight.	

Streambed Cobbles

Streambed cobbles shall be clean, naturally occurring water rounded gravel material. Streambed cobbles shall have a well-graded distribution of cobble sizes and conform to one or more of the following gradings as shown in the Plans:

	Percent Passing				
Approximate Size[1]	**4" Cobbles**	**6" Cobbles**	**8" Cobbles**	**10" Cobbles**	**12" Cobbles**
12"					99-100
10"				99-100	70-90
8"			99-100	70-90	
6"		99-100	70-90		
5"		70-90			30-60
4"	99-100			30-60	
3"	70-90		30-60		
2"		30-60			
1½"	20-50				
¾"	10 max.	10 max.	10 max.	10 max.	10 max.

[1]Approximate Size can be determined by taking the average dimension of the three axes of the rock, Length, Width, and Thickness, by use of the following calculation:

$$\frac{\text{Length+Width+Thickness}}{3} = \text{Approximate Size}$$

Length is the longest axis, width is the second longest axis, and thickness is the shortest axis.

The grading of the cobbles shall be determined by the Engineer by visual inspection of the load before it is dumped into place, or, if so ordered by the Engineer, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load.

Streambed Boulders

Streambed boulders shall be hard, sound, and durable material, free from seams, cracks, and other defects tending to destroy its resistance to weather. Streambed boulders shall

be rounded to sub-angular in shape and the thickness axis shall be greater than 60 percent of the length axis. Streambed boulders sizes are approximately as follows, see Plans for sizes specified:

Rock Size[1]	Approximate Size
Type One	12" - 18"
Type Two	18" - 28"
Type Three	28" - 36"
Type Four	36" - 48"
Type Five	48" - 54"
Type Six	54" - 60"

[1]Approximate Size can be determined by taking the average dimension of the three axes of the rock, Length, Width, and Thickness, by use of the following calculation:

$$\frac{\text{Length+Width+Thickness}}{3} = \text{Approximate Size}$$

Length is the longest axis, width is the second longest axis, and thickness is the shortest axis.

Streambed Sand

Streambed sand shall meet the following requirements for grading. If the Contractor proposes an alternate gradation, the Contractor shall submit a Type 2 Working Drawing consisting of 0.45 power maximum density curve of the proposed gradation. The exact point of acceptance will be determined by the Engineer. The alternate gradation shall closely follow the maximum density line and have Nominal Aggregate Size of no less than the ⅜ inch or no greater than ⅝ inch.

Streambed sand shall consist of natural unwashed material, having hard, strong, durable particles free from adherent coating or deleterious matter, as accepted by the Engineer. At the discretion of the Engineer, the percent of deleterious materials may be determined visually or be tested in accordance with AASHTO T 194 or AASHTO T 267.

Sieve Size	Percent Passing
½"	99-100
3⁄8"	90-100
No 4	90 Max
No. 8	32-67
No. 200	2-7
All percentages are by weight.	

Aquitard Bedding Material

Aquitard bedding material shall consist of natural unwashed silty material, having hard, strong, durable particles free from adherent coating, and capable of preventing subsurface flows, as accepted by the Engineer. Aquitard bedding material shall not contain deleterious matter.

Blending Streambed Aggregates

*** $$1$$ ***

Construction Requirements

Streambed Preconstruction Conference

A streambed preconstruction conference shall be held at least 7 calendar days prior to the Contractor beginning streambed construction. The Contractor shall notify the Engineer 14 calendar days prior to the meeting taking place and should indicate within the notice if they intend to evaluate native streambed materials for use on the project. The purpose of the meeting is to discuss the goals, objectives, intent, streambed construction procedures, critical functions during stream work, potential use of native streambed excavation materials, quality control steps to control mixing ratios, personnel, equipment to be used, and other elements of construction.

Those attending shall include:

1. (Representing the Contractor) The superintendent or on-site supervisors, the Environmental Compliance Lead and other personnel or subcontractors that will have on-site responsibility for in-channel streambed Work.

2. (Representing the Contracting Agency) The Engineer, WSDOT Headquarters Hydraulics, key inspection personnel, and other key staff as appropriate will be invited by the Contracting Agency.

3. Representatives from interested permitting agencies and affected Tribes will be invited by the Contracting Agency.

Onsite Streambed Evaluation Meeting

The onsite streambed evaluation meeting shall be held at least 7 calendar days prior to the Contractor reintroducing flows into the new channel or removal of the temporary stream diversion, whichever occurs first. The Contractor shall notify the Engineer 14 calendar days prior to the meeting taking place. The purpose of this prefinal inspection is to conduct an evaluation of the constructed streambed and Woody Material installation to ensure the work was completed in compliance with the Contract and permit requirements

Those attending shall include:

1. (Representing the Contractor) The superintendent, on-site supervisors, the Environmental Compliance Lead and other personnel that will have on-site responsibility for in-channel streambed Work.

2. (Representing the Contracting Agency) The Engineer, WSDOT Headquarters Hydraulics, key inspection personnel, and other staff as appropriate will be invited by the Contracting Agency.

3. Representatives from interested permitting agencies and affected Tribes will be invited by Contracting Agency.

Mixing of Streambed Aggregates

Streambed sediment, streambed fine sediment, streambed cobbles, streambed sand, and aquitard bedding material will be separately tested and accepted by the Engineer prior to delivery, placement in a stockpile or blending activities.

After acceptance by the Engineer, streambed aggregates shall be thoroughly blended before placement. Acceptance of the final mixture of blended streambed aggregate will be based upon visual inspection by the Engineer.

Native streambed aggregates may be available from the existing streambed excavation limits as shown in the Contract Plans. Components of the excavated streambed which meet the criteria for the specific material may be used to supplement imported streambed aggregates. The Contracting Agency will compensate the Contractor by change order in accordance with Section 1-04.4.

Placement of Streambed Aggregates

Aquitard

Aquitard bedding material shall be placed as shown in the plans. After placement, the bedding material shall be compacted to be uniformly dense and unyielding.

Stockpiling Aggregate

Streambed aggregates, as described above, shall be blended into single well graded stockpiles separate from other aggregates.

Placing Blended Streambed Aggregates in Streambed

Blended streambed aggregate shall be placed in the prepared channel excavation to the lines and grades shown on the Plans and in such a way as to prevent material segregation. Blended streambed aggregate shall be placed in lifts no thicker than 12 inches. Blended streambed aggregate in its final location shall be a well graded mix.

Placement of blended streambed aggregate shall be constructed to ensure that stream low flow rate of 30 gallons per minute is conveyed above each channel lift. The Contractor shall apply water and Streambed Sand at a rate of 30 gallons per minute to each lift to facilitate filling the interstitial voids of the blended streambed aggregate. Adjustment of the low flow rate may be required to ensure that the voids are satisfactorily filled. The voids are satisfactorily filled when the 30 gallons per minute flow rate does not go subsurface and there is no perceivable difference in the low flow rate from upstream of the project limits to the downstream of project limits. The Contractor shall apply water at the 30 gallons per minute flow rate to the stream channel for visual acceptance by the Engineer. Water shall be free from contaminates, chlorination and additives that have a risk on fish and other ecological life.

Placing Blended Streambed Aggregates in Streambank

Blended streambed aggregate placed in the streambanks shall be placed in lifts no thicker than 12 inches. The Contractor shall compact each lift to be uniformly dense and unyielding as approved by the Engineer.

Additional Streambed Grading

Changes to the streambed may be directed at the streambed evaluation meeting.

Measurement

Streambed Sediment will be measured per ton.
Streambed Fine Sediment will be measured per ton.
Streambed Cobbles __ In. will be measured per ton.
Streambed Boulders Type __ will be measured per each.
Streambed Sand will be measured per ton.

Aquitard will be measured per ton.

Payment

Payment will be made in accordance with Section 1-04.1, for each of the following Bid items that are included in the Proposal:

"Streambed Sediment", per ton.
"Streambed Fine Sediment", per ton.
"Streambed Cobbles __ In.", per ton.
"Streambed Boulders Type __", per each.
"Streambed Sand", per ton.
"Aquitard", per ton.

The unit Contract price per ton for "Streambed Sediment", "Streambed Fine Sediment", "Streambed Cobbles __ In.", "Streambed Boulders Type __", "Streambed Sand" and "Aquitard" shall be full payment for all costs to perform the Work as specified including blending of streambed aggregates and watering in each lift, including supply and application of water to facilitate filling the interstitial voids.

"Additional Streambed Grading", by Force Account in accordance with 1-09.6.

For the purpose of providing a common Proposal for all Bidders, the Contract Agency has entered an amount for the item "Additional Streambed Grading" in the Bid Proposal to become a part of the total bid by the Contractor.

Streambed Aggregates

Section 9-03.11, including all subsections, is deleted.

(October 3, 2022)
WOODY MATERIAL

Description

This Work consists of furnishing and installing Woody Materials and Slash where designated in the Plans or determined by the Engineer.

Definitions

Woody Material – Logs, rootwads, or stumps greater than 4 inches in diameter. The size and length of Woody Material will be as designated in the Plans.

Slash – Branches, small trees, brush, and treetops smaller than 4 inches in diameter.

Materials

Woody Material

Woody Material shall be a log with or without rootwad, of the diameter and length specified in the plans and shall meet the following requirements:

1. Woody Material – Log with rootwad - A trunk of a native coniferous tree species with the length as designated in the plans (measured from the cut end of the log to the start of the rootwad mass). Trunk diameter at breast height (DBH) as designated in the plans. DBH measured 4.5-feet from the start of the rootwad mass.

2. Woody Material – Log without rootwad - A trunk of a native coniferous tree species with the length as designated in the plans (from cut end to cut end). The

cut end of the log shall be no more than 4-inches narrower than the specified DBH.

3. The rootwad diameter shall be a minimum of 2.5 times the DBH and maximum 4 times DBH with roots intact. Woody Material shall be free of soil and rocks, and rot and disease, and shall be structurally sound. Cleaning shall not strip logs of bark and roots.

4. The acceptable tolerance of DBH as specified in the plans is ±3 inches.

5. The acceptable tolerance of the length of Woody Materials is ±6 inches.

Woody Material may be available from trees removed by excavation or clearing and grubbing limits as shown in the Plans. Components of the removed trees which meet the criteria for the specific Woody Material may be used to supplement the Woody Material and will accepted by a visual inspection by the Engineer.

Slash

Slash shall consist of a random assortment of branches, trees, brush and treetops of the following native species: Western red cedar (Thuja plicata), douglas fir (Pseudotsuga mensezeii), western hemlock (Tsuga heterophylla) coniferous trees, or various hardwood trees. No more than 50% of hardwood species shall be used. The needles shall be left intact to the extent possible given the mechanics of handling Slash. The maximum diameter of any piece of slash shall be 4 inches. The maximum length of any piece of Slash shall be 6 feet. Slash shall not contain any material which causes turbidity.

Slash shall consist of a random assortment of branches, trees, brush and treetops of the following native species: Western red cedar (Thuja plicata), douglas fir (Pseudotsuga mensezeii), western hemlock (Tsuga heterophylla) coniferous trees, or various hardwood trees. No more than 50% of hardwood species shall be used. The needles shall be left intact to the extent possible given the mechanics of handling Slash. The maximum diameter of any piece of Slash shall be 4 inches. The maximum length of any piece of Slash shall be 6 feet. Slash shall not contain any material which causes turbidity.

Construction Requirements

The streambed and bank shall be temporarily excavated to allow placement of the Woody Material. Backfill shall be native material or designed streambed material. Backfill shall be placed in lifts no thicker than 12 inches and shall be compacted to be uniformly dense and unyielding as approved by the Engineer.

The Contractor shall install each Woody Material at the location and elevation shown in the Plans.

The Contractor shall exercise care when placing the Woody Material to ensure that the method of installation minimizes disturbance of waterways and prevents sediment or pollutant discharge into water.

The Contractor shall exercise care when installing and transporting the Woody Materials to avoid damage. Rootwads shall remain intact during delivery and installation.

Acceptance of Woody Material will be based upon inspection by the Engineer, prior to placement.

Measurement

Woody Material – Log without Rootwad and Woody Material – Log with Rootwad will be measured per each.

Slash will be measured by the cubic yard, in the hauling conveyance.

Payment

Payment will be made in accordance with Section 1-04.1, for each of the following bid items.

"Woody Material - Log without Rootwad DBH _____", per each.
"Woody Material - Log with Rootwad DBH _____", per each.
The unit contract price for each "Woody Material - Log without Rootwad DBH _____" and "Woody Material - Log with Rootwad DBH _____" shall be full payment for construction of one log with or without rootwad as specified, including acquiring, storing, hauling to the site, unloading, assembling, bundling, installing, anchoring, excavation, backfill, compaction and grading needed for final placement.

"Slash", per cubic yard.
The unit Contract price per cubic yard for "Slash" shall be full payment for all costs to complete the Work as specified, including acquiring, storing, hauling to the site, unloading, assembling, bundling, installing, anchoring, excavation, backfill, compaction and grading needed for final placement.

Division 9
Materials

Appendices
(January 2, 2012)

The following appendix is attached and made a part of this contract:

*** $$1$$ ***

[Fill-in is the name, title, and if necessary the page numbers of the appendix, formatted as shown in the following sample:]

APPENDIX A:
Summary of Geotechnical Conditions, Page __ through Page __.

Appendices
(January 2, 2012)

The following appendices are attached and made a part of this contract:

*** $$1$$ ***

[Fill-in is the name, title, and if necessary the page numbers of the appendices, formatted as shown in the following sample:]

APPENDIX A:
Summary of Geotechnical Conditions, Page __ through Page __.

APPENDIX B:
(Name of Report or Document), Page __ through Page __.

(September 30, 2022)
Standard Plans

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M21-01, effective September 30, 2022, is made a part of this contract.

The Standard Plans are revised as follows:

A-10.30
RISER RING detail (Including SECTION view and RISER RING DIMENSIONS table): The RISER RING detail is deleted from the plan.

INSTALLATION detail, SECTION A: The “1/4”” callout is revised to read “+/- 1/4" (SEE CONTRACT ~ Note: The + 1/4" installation is shown in the Section A view)”

B-90.40
Valve Detail – DELETED

C-8
DELETED

C-8A
DELETED

C-23.60
DELETED

D-2.04
DELETED

D-2.06
DELETED

D-2.08
DELETED

D-2.32
DELETED

D-2.34
DELETED

D-2.60
DELETED

D-2.62
DELETED

D-2.64
DELETED

D-2.66
DELETED

D-2.68
DELETED

D-2.80
DELETED

D-2.88
DELETED

D-3.15
DELETED

D-3.16
DELETED

D-3.17
DELETED

D-3.10
Sheet 1, Typical Section, callout – “FOR WALLS WITH SINGLE SLOPE TRAFFIC BARRIER. USE THE DETAILS ABOVE THE MATCH LINE ON STANDARD PLAN D-3.15” is revised to read; ”FOR WALLS WITH SINGLE SLOPE TRAFFIC BARRIER, SEE CONTRACT PLANS”
Sheet 1, Typical Section, callout – “FOR WALLS WITH F-SHAPE TRAFFIC BARRIER. USE THE DETAILS ABOVE THE MATCH LINE ON STANDARD PLAN D-3.16” is revised to read; ”FOR WALLS WITH F-SHAPE TRAFFIC BARRIER, SEE CONTRACT PLANS”

D-3.11
Sheet 1, Typical Section, callout – “”B” BRIDGE APPROACH SLAB (SEE BRIDGE PLANS) OR PERMANENT GEOSYNTHETIC WALL BARRIER ~ SEE STANDARD PLANS D-3.15 OR D-3.16” is revised to read; ”B” BRIDGE APPROACH SLAB OR MOMENT SLAB (SEE CONTRACT PLANS)
Sheet 1, Typical Section, callout – “TYPICAL BARRIER ON BRIDGE APPROACH SLAB (SEE BRIDGE PLANS) OR PERMANENT GEOSYNTHETIC WALL BARRIER ~ SEE STANDARD PLANS D-3.15 OR D-3.16” is revised to read; “TYPICAL BARRIER ON BRIDGE APPROACH SLAB OR MOMENT SLAB (SEE CONTRACT PLANS)

D-10.10
Wall Type 1 may be used if no traffic barrier is attached on top of the wall. Walls with traffic barriers attached on top of the wall are considered non-standard and shall be designed in accordance with the current WSDOT Bridge Design Manual (BDM) and the revisions stated in the 11/3/15 Bridge Design memorandum.

D-10.15
Wall Type 2 may be used if no traffic barrier is attached on top of the wall. Walls with traffic barriers attached on top of the wall are considered non-standard and shall be designed

in accordance with the current WSDOT BDM and the revisions stated in the 11/3/15 Bridge Design memorandum.

D-10.30
Wall Type 5 may be used in all cases.

D-10.35
Wall Type 6 may be used in all cases.

D-10.40
Wall Type 7 may be used if no traffic barrier is attached on top of the wall. Walls with traffic barriers attached on top of the wall are considered non-standard and shall be designed in accordance with the current WSDOT BDM and the revisions stated in the 11/3/15 Bridge Design memorandum.

D-10.45
Wall Type 8 may be used if no traffic barrier is attached on top of the wall. Walls with traffic barriers attached on top of the wall are considered non-standard and shall be designed in accordance with the current WSDOT BDM and the revisions stated in the revisions stated in the 11/3/15 Bridge Design memorandum.

D-15.10
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are withdrawn. Special designs in accordance with the current WSDOT BDM are required in place of these STD Plans.

D-15.20
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are withdrawn. Special designs in accordance with the current WSDOT BDM are required in place of these STD Plans.

D-15.30
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are withdrawn. Special designs in accordance with the current WSDOT BDM are required in place of these STD Plans.

F-10.18
Note 2, “Region Traffic engineer approval is needed to install a truck apron lower than 3”.” - DELETED

J-10.10
Sheet 4 of 6, “Foundation Size Reference Table”, PAD WIDTH column, Type 33xD=6’ – 3” is revised to read: 7’ – 3”. Type 342LX / NEMA P44=5’ – 10” is revised to read: 6’ – 10”
Sheet 5 of 6, Plan View, “FOR EXAMPLE PAD SHOWN HERE:, “first bullet” item, “-SPACE BETWEEN TYPE B MOD. CABINET AND 33x CABINET IS 6” (IN)” IS REVISED TO READ: “SPACE BETWEEN TYPE B MOD. CABINET (BACK OF ALL CHANNEL STEEL) AND 33x CABINET IS 6” (IN) (CHANNEL STEEL ADDS ABOUT 5” (IN)”

J-10.16
Key Note 1, Standard Plan J-10.30 revised to Standard Plan J-10.14

J-10.17

Key Note 1, Standard Plan J-10.30 revised to Standard Plan J-10.14

J-10.18

Key Note 1, Standard Plan J-10.30 revised to Standard Plan J-10.14

J-20.10

Elevation View, horizontal dimension to edge of sidewalk 10" (IN) OR LESS DESIRABLE ~ 18" (IN) MAXIMUM is revised to read: "10" (IN) MAXIMUM"

J-20.26

Add Note 1, "1. One accessible pedestrian pushbutton station per pedestrian pushbutton post."

J-20.16

View A, callout, was – LOCK NIPPLE, is revised to read; CHASE NIPPLE

J-21.10

Sheet 1, Elevation View, Round Concrete Foundation Detail, callout – "ANCHOR BOLTS ~ ¾" (IN) x 30" (IN) FULL THREAD ~ THREE REQ'D. PER ASSEMBLY" IS REVISED TO READ: "ANCHOR BOLTS ~ ¾" (IN) x 30" (IN) FULL THREAD ~ FOUR REQ'D. PER ASSEMBLY"

Sheet 1 of 2, Elevation view (Round), add dimension depicting the distance from the top of the foundation to find 2 #4 reinforcing bar shown, to read; 3" CLR.. Delete "(TYP.)" from the 2 ½" CLR. dimension, depicting the distance from the bottom of the foundation to find 2 # 4 reinf. Bar.

Sheet 1 of 2, Elevation view (Square), add dimension depicting the distance from the top of the foundation to find 1 #4 reinforcing bar shown, to read; 3" CLR. Delete "(TYP.)" from the 2 ½" CLR. dimension, depicting the distance from the bottom of the foundation to find 1 # 4 reinf. Bar.

Sheet 2 of 2, Elevation view (Round), add dimension depicting the distance from the top of the foundation to find 2 #4 reinforcing bar shown, to read; 3" CLR. Delete "(TYP.)" from the 2 ½" CLR. dimension, depicting the distance from the bottom of the foundation to find 2 # 4 reinf. Bar.

Sheet 2 of 2, Elevation view (Square), add dimension depicting the distance from the top of the foundation to find 1 #4 reinforcing bar shown, to read; 3" CLR. Delete "(TYP.)" from the 2 ½" CLR. dimension, depicting the distance from the bottom of the foundation to find 1 # 4 reinf. Bar.

Detail F, callout, "Heavy Hex Clamping Bolt (TYP.) ~ 3/4" (IN) Diam. Torque Clamping Bolts (see Note 3)" is revised to read; "Heavy Hex Clamping Bolt (TYP.) ~ 3/4" (IN) Diam. Torque Clamping Bolts (see Note 1)"

Detail F, callout, "3/4" (IN) x 2' – 6" Anchor Bolt (TYP.) ~ Four Required (See Note 4)" is revised to read; "3/4" (IN) x 2' – 6" Anchor Bolt (TYP.) ~ Three Required (See Note 2)"

J-21.15

Partial View, callout, was – LOCK NIPPLE ~ 1 ½" DIAM., is revised to read; CHASE NIPPLE ~ 1 ½" (IN) DIAM.

J-21.16

Detail A, callout, was – LOCKNIPPLE, is revised to read; CHASE NIPPLE

J-22.15

Ramp Meter Signal Standard, elevation, dimension 4' - 6" is revised to read; 6'-0"

(2x) Detail A, callout, was – LOCK NIPPLE ~ 1 ½" DIAM. is revised to read; CHASE NIPPLE ~ 1 ½" (IN) DIAM.

J-40.10
Sheet 2 of 2, Detail F, callout, "12 – 13 x 1 ½" S.S. PENTA HEAD BOLT AND 12" S. S. FLAT WASHER" is revised to read; "12 – 13 x 1 ½" S.S. PENTA HEAD BOLT AND 1/2" (IN) S. S. FLAT WASHER"

J-40.36
Note 1, second sentence; "Finish shall be # 2B for backbox and # 4 for the cover." Is revised to read; "Finish shall be # 2B for barrier box and HRAP (Hot Rolled Annealed and Pickled) for the cover.

J-40.37
Note 1, second sentence; "Finish shall be # 2B for backbox and # 4 for the cover." Is revised to read; "Finish shall be # 2B for barrier box and HRAP (Hot Rolled Annealed and Pickled) for the cover.

J-75.20
Key Notes, note 16, second bullet point, was: "1/2" (IN) x 0.45" (IN) Stainless Steel Bands", add the following to the end of the note: "Alternate: Stainless steel cable with stainless steel ends, nuts, bolts, and washers may be used in place of stainless steel bands and associated hardware."

J-75.41
DELETED

K-80.20
DELETED

L-5.10
Sheet 2, Typical Elevation, callout - "2' – 0" MIN. LAP SPLICE BETWEEN (mark) A #3 BAR AND WALL REINFORCEMENT ~ TYPICAL" is revised to read: "2' – 0" MIN. LAP SPLICE BETWEEN (MARK) A #4 BAR AND WALL REINFORCEMENT ~ TYPICAL"
Section C, callout; "(mark) A #3" is revised to read: "(mark) A #4", callout - "(mark) B #3" is revised to read: "(mark) B #4", callout - "(mark) C #3 TIE" is revised to read: "(mark) C #4 TIE"
Reinforcing Steel Bending Diagram, (mark) B detail, callout – "128 deg." is revised to read: "123 deg.", callout – "51 deg." is revised to read: "57 deg."

The following are the Standard Plan numbers applicable at the time this project was advertised. The date shown with each plan number is the publication approval date shown in the lower right-hand corner of that plan. Standard Plans showing different dates shall not be used in this contract.

A-10.10-00.....8/7/07	A-30.35-00.....10/12/07	A-50.10-01……...8/17/21
A-10.20-00.....10/5/07	A-40.00-01.....7/6/22	A-50.40-01……...8/17/21
A-10.30-00.....10/5/07	A-40.10-04.....7/31/19	A-60.10-03.....12/23/14
A-20.10-00.....8/31/07	A-40.15-00.....8/11/09	A-60.20-03.....12/23/14
A-30.10-00.....11/8/07	A-40.20-04.....1/18/17	A-60.30-01.....6/28/18
A-30.30-01.....6/16/11	A-40.50-02.....12/23/14	A-60.40-00.....8/31/07

B-5.20-03.....9/9/20
B-5.40-02.....1/26/17
B-5.60-02.....1/26/17
B-10.20-02.....3/2/18
B-10.40-02.....8/17/21
B-10.70-02……8/17/21
B-15.20-01.....2/7/12
B-15.40-01.....2/7/12
B-15.60-02.....1/26/17
B-20.20-02.....3/16/12
B-20.40-04.....2/27/18
B-20.60-03.....3/15/12
B-25.20-02.....2/27/18
B-25.60-02.....2/27/18
B-30.05-00……..9/9/20
B-30.10-03.....2/27/18
B-30.15-00……..2/27/18
B-30.20-04.....2/27/18
B-30.30-03.....2/27/18
B-30.40-03.....2/27/18
B-30.50-03.....2/27/18
B-30.60-00……..9/9/20
B-30.70-04.....2/27/18
B-30.80-01.....2/27/18
B-30.90-02.....1/26/17
B-35.20-00.....6/8/06
B-35.40-00.....6/8/06
B-40.20-00.....6/1/06
B-40.40-02.....1/26/17
B-45.20-01.....7/11/17
B-45.40-01.....7/21/17
B-50.20-00.....6/1/06
B-55.20-03.....8/17/21
B-60.20-02.....9/9/20
B-60.40-01.....2/27/18
B-65.20-01.....4/26/12
B-65.40-00.....6/1/06
B-70.20-01.....3/15/22
B-70.60-01.....1/26/17
B-75.20-03.....8/17/21
B-75.50-02.....3/15/22
B-75.60-00.....6/8/06
B-80.20-00.....6/8/06
B-80.40-00.....6/1/06
B-85.10-01.....6/10/08
B-85.20-00.....6/1/06
B-85.30-00.....6/1/06
B-85.40-00.....6/8/06
B-85.50-01.....6/10/08
B-90.10-00…....6/8/06
B-90.20-00.....6/8/06
B-90.30-00.....6/8/06
B-90.40-01.....1/26/17
B-90.50-00.....6/8/06
B-95.20-02.....8/17/21
B-95.40-01.....6/28/18

1

C-1.....9/8/22
C-1b.....9/8/22
C-1d.....10/31/03
C-2c.....8/12/19
C-4f.....8/12/19
C-6a.....9/8/22
C-7.....9/8/22
C-7a.....9/8/22
C-20.10-08.....9/8/22
C-20.14-05.....9/8/22
C-20.15-02.....6/11/14
C-20.18-04.....9/8/22
C-20.40-09.....9/8/22
C-20.41-04.....8/22/22
C-20.42-05.....7/14/15
C-20.43-00……8/22/22
C-20.45.03.....9/8/22
C-22.16-07.....9/16/20
C-22.40-09.....9/8/22
C-22.45-06.....9/8/22
C-23.70-00……..8/22/22
C.24.10-03.....7/24/22
C-24.15-00…….3/15/22
C-25.20-07.....8/20/21
C-25.22-06.....8/20/21
C-25.26-05.....8/20/21
C-25.30-01…….8/20/21
C-25.80-05.....8/12/19
C-60.10-02…….9/8/22
C-60.15-00……..8/17/21
C-60.20-01……9/8/22
C-60.30-01……8/17/21
C-60.40-00……..8/17/21
C-60.45-00……..8/17/21
C-60.50-00……..8/17/21
C-60.60-00……..8/17/21
C-60.70-01……9/8/22
C-60.80-01……..9/8/22
C-70.15-00……..8/17/21
C-70.10-03.....8/20/21
C-75.10-02.....9/16/20
C-75.20-03.....8/20/21
C-75.30-03.....8/20/21
C-80.10-02.....9/16/20
C-80.20-01.....6/11/14
C-80.30-02.....8/20/21
C-80.40-01.....6/11/14
C-85.10-00.....4/8/12
C-85.11-01.....9/16/20
C-85.15-02.....8/27/21
C-85-18-03.....9/8/22

2

D-2.36-03.....6/11/14
D-2.46-02……8/13/21
D-2.84-00.....11/10/05
D-2.92-01.....4/26/22
D-3.09-00.....5/17/12
D-3.10-01……5/29/13
D-3.11-03……6/11/14
D-4.....12/11/98
D-6.....6/19/98
D-10.10-01.....12/2/08
D-10.15-01.....12/2/08
D-10.20-01.....8/7/19
D-10.25-01.....8/7/19
D-10.30-00.....7/8/08
D-10.35-00.....7/8/08
D-10.40-01.....12/2/08
D-10.45-01.....12/2/08

3

E-1.....2/21/07
E-2.....5/29/98
E-4.....8/27/03
E-4a.....8/27/03

4

F-10.12-04.....9/24/20
F-10.62-02.....4/22/14
F-40.15-04.....9/25/20

F-10.16-00.....12/20/06
F-10.18-03.....3/28/22
F-10.40-04.....9/24/20
F-10.42-00.....1/23/07
F-10.64-03.....4/22/14
F-30.10-04.....9/25/20
F-40.12-03.....6/29/16
F-40.14-03.....6/29/16
F-40.16-03.....6/29/16
F-45.10-03.....8/13/21
F-80.10-04.....7/15/16

1

G-10.10-00.....9/20/07
G-20.10-03.....8/20/21
G-22.10-04.....6/28/18
G-24.10-00.....11/8/07
G-24.20-01.....2/7/12
G-24.30-02.....6/28/18
G-24.40-07.....6/28/18
G-24.50-05.....8/7/19
G-24.60-05.....6/28/18
G-25.10-05.....9/16/20
G-26.10-00……7/31/19
G-30.10-04.....6/23/15
G-50.10-03.....6/28/18
G-90.10-03……7/11/17
G-90.20-05……7/11/17
G-90.30-04……7/11/17
G-95.10-02.....6/28/18
G-95.20-03.....6/28/18
G-95.30-03.....6/28/18

2

H-10.10-00.....7/3/08
H-10.15-00.....7/3/08
H-30.10-00.....10/12/07
H-32.10-00.....9/20/07
H-60.10-01.....7/3/08
H-60.20-01.....7/3/08
H-70.10-02.....8/17/21
H-70.20-02.....8/17/21

3

I-10.10-01.....8/11/09
I-30.10-02.....3/22/13
I-30.15-02.....3/22/13
I-30.16-01.....7/11/19
I-30.17-01.....6/12/19
I-30.20-00.....9/20/07
I-30.30-02.....6/12/19
I-30.40-02.....6/12/19
I-30.60-02.....6/12/19
I-40.10-00.....9/20/07
I-40.20-00.....9/20/07
I-50.20-02.....7/6/22
I-60.10-01.....6/10/13
I-60.20-01.....6/10/13
I-80.10-02.....7/15/16

4

J-05.50-00…….8/30/22
J-10.....7/18/97
J-10.10-04……9/16/20
J-10.12-00……9/16/20
J-10.14-00……9/16/20
J-10.15-01.....6/11/14
J-10.16-02……8/18/21
J-10.17-02……8/18/21
J-10.18-02……8/18/21
J-10.20-04……8/18/21
J-10.21-02……8/18/21
J-10.22-02.....8/18/21
J-10.25-00……7/11/17
J-10.26-00…….8/30/22
J-12.15-00……6/28/18
J-12.16-00……6/28/18
J-15.10-01.....6/11/14
J-15.15-02……7/10/15
J-20.01-00…….8/30/22
J-20.10-04.....7/31/19
J-20.11-03.....7/31/19
J-20.15-03.....6/30/14
J-20.16-02.....6/30/14
J-20.20-02.....5/20/13
J-20.26-01.....7/12/12
J-21.10-04.....6/30/14
J-28.10-02.....8/7/19
J-28.22-00.....8/07/07
J-28.24-02.....9/16/20
J-28.26-01.....12/02/08
J-28.30-03.....6/11/14
J-28.40-02.....6/11/14
J-28.42-01.....6/11/14
J-28.43-01.....6/28/18
J-28.45-03.....7/21/16
J-28.50-03.....7/21/16
J-28.60-03.....8/27/21
J-28.70-04.....8/30/22
J-29.10-02.....8/26/22
J-29.15-01.....7/21/16
J-29.16-02.....7/21/16
J-30.10-01……8/26/22
J-40.01-00……..8/30/22
J-40.05-00……7/21/16
J-40.10-04……4/28/16
J-40.20-03……4/28/16
J-40.30-04……4/28/16
J-40.35-01……5/29/13
J-40.36-02……7/21/17
J-40.37-02……7/21/17
J-40.38-01.....5/20/13
J-40.39-00……5/20/13
J-50.25-00…….6/3/11
J-50.30-00…….6/3/11
J-60.05-01……..7/21/16
J-60.11-00……..5/20/13
J-60.12-00……..5/20/13
J-60.13-00……..6/16/10
J-60.14-01……7/31/19
J-75.10-02……7/10/15
J-75.20-01……7/10/15
J-75.30-02…….7/10/15
J-75.50-00……8/30/22
J-75.55-00……8/30/22
J-80.05-00……8/30/22
J-80.10-01……8/18/21
J-80.12-00……8/18/21
J-80.15-00……6/28/18
J-81.10-02……8/18/21
J-81.12-00……9/3/21
J-84.05-00……8/30/22
J-86.10-00……6/28/18
J-90.10-03…….6/28/18
J-90.20-03…….6/28/18
J-90.21-02……6/28/18
J-90.50-00……6/28/18

J-21.15-01.....6/10/13
J-21.16-01.....6/10/13
J-21.17-01.....6/10/13
J-21.20-01.....6/10/13
J-22.15-02.....7/10/15
J-22.16-03.....7/10/15
J-26.10-03…..7/21/16
J-26.15-01…..5/17/12
J-26.20-01…..6/28/18
J-27.10-01…..7/21/16
J-27.15-00…..3/15/12
J-28.01-00……8/30/22
J-40.40-02……7/31/19
J-45.36-00……7/21/17
J-50.05-00……7/21/17
J-50.10-01…….7/31/19
J-50.11-02…….7/31/19
J-50.12-02…….8/7/19
J-50.13-01…….8/30/22
J-50.15-01…….7/21/17
J-50.16-01…….3/22/13
J-50.18-00…….8/7/19
J-50.19-00…….8/7/19
J-50.20-00…….6/3/11

1

K-70.20-01.....6/1/16
K-80.10-02.....9/25/20
K-80.32-00……8/17/21
K-80.34-00……8/17/21
K-80.35-01.....9/16/20
K-80.37-01.....9/16/20

2

L-5.10-00……..9/19/22
L-5.15-00……..9/19/22
L-10.10-02.....6/21/12
L-20.10-03.....7/14/15
L-30.10-02.....6/11/14
L-40.15-01.....6/16/11
L-40.20-02.....6/21/12
L-70.10-01.....5/21/08
L-70.20-01.....5/21/08

3

M-1.20-04.....9/25/20
M-1.40-03.....9/25/20
M-1.60-03.....9/25/20
M-1.80-03.....6/3/11
M-2.20-03.....7/10/15
M-2.21-00……..7/10/15
M-3.10-04.....9/25/20
M-3.20-04.....8/2/22
M-3.30-04.....9/25/20
M-3.40-04.....9/25/20
M-3.50-03.....9/25/20
M-5.10-03.....9/25/20
M-7.50-01.....1/30/07
M-9.50-02.....6/24/14
M-9.60-00……..2/10/09
M-11.10-04.....8/2/22
M-12.10-03……8/2/22
M-15.10-01.....2/6/07
M-17.10-02.....7/3/08
M-20.10-04.....8/2/22
M-20.20-02.....4/20/15
M-20.30-04.....2/29/16
M-20.40-03.....6/24/14
M-20.50-02.....6/3/11
M-24.20-02.....4/20/15
M-24.40-02.....4/20/15
M-24.60-04.....6/24/14
M-24.65-00……7/11/17
M-24.66-00……7/11/17
M-40.10-03.....6/24/14
M-40.20-00.....10/12/07
M-40.30-01.....7/11/17
M-40.40-00.....9/20/07
M-40.50-00.....9/20/07
M-40.60-00.....9/20/07
M-60.10-01.....6/3/11
M-60.20-03.....8/17/21
M-65.10-03.....8/17/21
M-80.10-01.....6/3/11
M-80.20-00.....6/10/08
M-80.30-00.....6/10/08

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9727 CO 040 GSP Std Spec 2022

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