

**HSIP: Bogard Road at Engstrom Road/Green Forest Drive Intersection Improvements
Project No.: 0001(630)/CFHWY00453**

PS&E Review

PS&E REVIEW COMMENTS are due on July 3, 2025. The review meeting will be held at **9:00 AM** on July 10, 2025 in the **Main** conference room. **Please E-mail comments, using the comment form, to Ryan Norkoli (ryan.norkoli@alaska.gov) and Claire Ellis (clair.ellis@alaska.gov).**

*****Electronic Copy available on the internet at the following location:**

dot.alaska.gov/creg/design/highways/PS&E_Review/CFHWY00453/

*****Meeting conference call-in number*****

GCI Conference Now Number:	(800) 315-6338
Secondary GCI Conference Now Number:	(913) 904-9376
Access Code:	85827

DISTRIBUTION:

Chris Bentz PM, Project Manager, 2525 (4+CD)
Sharon L. Smith, Chief, Contracts, 2525
Mike San Angelo, Statewide Materials Engineer, 2538 (email only)
Mike Yerkes, Central Region Materials, 2526 (2)
Mahear Aboueid, Concurrent Review Engineer, 2525
Ken Thomas, Traffic & Safety, 2525
Justin Zarr, HWY Data Supervisor, Planning, 2525 (CD)
Orion LeCroy, Hydrologist, Central Region, 2525 (2)
Travis Test, Survey, 2525 (email only)
Bob Keiner, ROW Engineering Supervisor, 2525
James Sowerwine, ROW, 2525 (CD)
Melanie Arnolds, Chief, ROW, 2525 (Memo and EE)
Cindy Ferguson, Chief, TS&U, 2525
Vacant, Utilities Engineer, 2525
David Freese, Utilities Lead, 2525
Shamsa Kordestani, Utilities Lead, 2525
Joel St Aubin, Regional Construction Engineer, 2525 (Memo and EE)
Laura Mann, Construction Group Chief, 2525
Jonathon Tymick, Construction Project Manager, 2525 (2)
Athena Marinkovic, Construction ESCP Specialist
Ryan Norkoli, Review Engineer, Contracts, 2525
Fred Park, Spec./Estimating Engineer, Highway Design, 2525
Alex Read, Preliminary Design & Environmental Group Chief, 2525
Brian Elliott, Preliminary Design & Environmental, 2525
Anna Bosin, Traffic Safety, 2525 (2)
Roxanne Risse, Traffic Design, 2525 (2)
Vacant, Planning Manager, Planning, 2525
Sean Baski, Highway Design Group Chief, 2525
Kirk Warren, Chief, Maintenance and Operations, 2525 (2)
Burrell Nickeson, Maintenance and Operations, 2525 (Memo and EE)
Jeremy Thompson, Maintenance and Operations, 2525
Connor Eshleman, Highway Design, 2525
Luke Bowland, Pre-Construction Engineer, 2525 (Memo and EE)
Lauren Meyer, Regional Construction Office Engineer, 2525 (Memo and EE)
Jeff Carleton, Electrical, 2525 (email only)

Additional Distribution Email Only (without Engineer's Estimate):

Pre-Design Engineering Division Manager, Mat-Su Borough, PD&E@mat-sugov.us

Stuart Leidner, State Parks stuart.leidner@alaska.gov

Emily Haynes, FHWA emily.haynes@dot.gov

MEMORANDUM

State of Alaska

Department of Transportation and Public Facilities

to: See Distribution

DATE: May 28, 2025

TELEPHONE: 269-0423

FROM: Ryan Norkoli, P.E.

SUBJECT: **HSIP: Bogard Road at Engstrom Road/Green
Forest Drive Intersection Improvements
Project No. 0001(630)/CFHWY00453
PS&E Review**

Attached for final review and comments are the appropriate copies of the subject assembly. The following specific replies are requested in addition to any other comments:

Right-of-Way	Either that R/W is available for the project or an estimated date when it may be available.
Utilities	Either the utility agreements have been completed or an estimated date when they may be available.
Environmental	What permits are required for this project and an estimated date when they will be acquired.

Ordinarily, only the principal reviewers are invited to attend. Comments are limited to those submitted in writing unless there are significant omissions.

Please use the review comment form located on the Library drive in /admin/forms/forms/pre PS&E review comment.doc. If you don't have access to the L drive, and still need a current version of the comment form, let me know and I will E-mail it to you.

IRIS Project No. CFHWY00453

IRIS Activity: 062P (or your sections activity code)

IRIS Template: TTPJ001

IRIS Phase: T02015

PIH Review REVIEW

PROJECT NAME: HSIP Bogard Rd at Engstrom Rd Intersection Improvements

PROJECT NUMBER: CFHWY00453

	DATE: 7/5/2022 REVIEWER: Isaac Kelsey SECTION: ENV PHONE: (907) 269-0524	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

1)	1	ENV	The entire project overlaps zones B&C of a drinking water protection area for PWSID: AK2220154 (Creekwood Park Water System). The eastern portion of the project overlaps with protection zone A of the same drinking water system. EA will need to solicit comments/consultation from DEC for project authorization.	Thank you, will support Environmental group as needed. Received comments/consultation from DEC in regards to storm water and water quality. Ongoing coordination.	ZDK

PIH REVIEW

PROJECT NAME: HSIP: Bogard Rd at Engstrom Rd/Green Forest Dr Intersection Imp

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 5/1/2025 REVIEWER: Julia Fleming SECTION: ROW Engineering PHONE: (907) 269-0678	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic/Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O.

Item No.	Sheet No. / Page No.	Section	Comment	Response	Meeting Note

2)	A 01	RW	Change the Range referenced in the north arrow to R1E.	Corrected.	ZDK
3)	D 01	RW	Shed referenced in Removal table is outside of the view-frame and doesn't actually appear on sheet F6.	Not enough space to capture in the view frame. Parcel plats in the spec appendices will show an adequate view of the shed location.	ZDK
4)	D 01	RW	Do we have survey for the 2 wells to be decommissioned and 2 septic systems to be removed? If so, suggest showing on plan sheets.	Yes we have survey necessary for decommission and removal.	ZDK
5)	D 01	RW	Suggest adding reference to sheet F06 to the last item in the Removal of Fence table.	Updated so that last item on Removal of Fence table references F07, previously F06.	PGH
6)	F 01	RW	Will a TCE be needed where slopes are close to ROW at 1013+00 LT?	Work can be completed within ROW and no TCE is necessary.	ZDK
7)	F 01	RW	Continue coordinating with Property Management regarding the fence and (potential) sign encroachments at Cache Camper.	All encroachments relocated out of the ROW.	ZDK
8)	F 02	RW	Will a TCE be needed where slopes are close to ROW at 1019+80 RT?	A TCE will not be needed at this location. Proposed ROW is adequate.	ZDK
9)	F 03	RW	Adjust leaders in profile.	Corrected.	ZDK
10)	F 03/ R 03	RW	Is the intent to allow public access (ATV, pedestrian, etc) along the west side of the proposed fence around the infiltration basin (1021+40 RT)? If not, suggest moving fence west to just inside ROW line. Could this possibly be something to bring up with the adjacent property owner?	Fenced basin was recommended by M&O to encapsulate basin. Fencing adjusted to top of berm and 15' off back of pathway. Allows for additional clear space and ATV traffic to navigate around.	ZDK
11)	F 05	RW	Ensure we have sufficient interest for the obliteration work at 101+60 RT.	Obliteration work is within proposed purchased ROW.	ZDK

**PIH
REVIEW**

PROJECT NAME: HSIP: Bogard Rd at Engstrom Rd/Green Forest Dr Intersection Imp

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 5/1/2025 REVIEWER: Julia Fleming SECTION: ROW Engineering PHONE: (907) 269-0678	Confirmation of action taken on comment by:

12)	F 05- F 06/ R 06- R 07	RW	Looks like we're affecting future access to the four lots at 104+00 LT to 107+00 LT. Has this been considered?	Access for these lots will not be provided at this time unless added as part of ROW negotiations with the property owner.	ZDK
13)	F All	RW	For PS&E use the proposed ROW lines, easements and TCEs in the F sheets.	Revised.	ZDK
14)	F All	RW	Suggest being consistent with the labeling of the roads. Some roads Drive/Road is spelled out, some are abbreviated with Dr/Rd. Some abbreviations have periods, some don't etc.	Revised.	ZDK
15)	H All	RW	Use proposed ROW lines for PS&E.	Revised.	ZDK

PIH Review REVIEW

PROJECT NAME: HSIP: Bogard RD at Engstrom RD/Green Forest Dr.
PROJECT NUMBER: CFHWY00453

	DATE: 7/15/22 REVIEWER: M Hebnes/Freese SECTION: Utilities PHONE: (907) 269-0632	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)
 In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic/Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

16)	1	U	PE Authorizations will be sent to ATT, ENSTAR, GCI, MEA and MTA by the end of August	Sounds great, thank you.	ZDK
17)	F sheets	U	Please show updated ROW on next submittal showing slope limits inside ROW.	Updated.	ZDK
18)	R02	U	Guardrail shown to station 1008+00 on Sheet R02. Please encapsulate guardrail installation beginning at STA 1008+00 on F and H sheets if this is accurate.	Added F Sheet to encapsulate G-rail run.	ZDK
19)	R03	U	Add an “E” in front of Ashmore.	Corrected.	ZDK
20)	Specs	U	Please include the 688 Spec with the next submittal for review. Discuss the applicable utility companies and contacts with Matthew Hebnes.	Included in special provisions.	ZDK

PIH Review REVIEW

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd / Green Forest Dr Intersection Improvements

PROJECT NUMBER: CFHWY00453

	DATE: 7/1/22 REVIEWER: M. Hensch, A. Hunting SECTION: HD PHONE: (907) 269-0593 / 0595	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

21)	A 01	HD	Design Designations; match functional class, AADT, and design speed for Bogard, Engstrom, and Green to Design Criteria.	Updated.	ZDK
22)	A 01	HD	Map; change Engstrom Drive to Engstrom Road	Corrected.	ZDK
23)	A 02	HD	Add E Ashmore Ave and East Destin Dr	Added.	ZDK
24)	A 02	HD	Index; correct the B sheet numbers	Corrected.	ZDK
25)	A 03	HD	Add hatch used on H sheets	Remain as is.	ZDK
26)	B 01/02	HD	Remove “West” and “East”; use stationing only	Revised.	ZDK
27)	B 05	HD	Use pay item name approach instead of “driveway”	Specific to that driveway. Remain as is.	ZDK
28)	C 01	HD	Match to EE; 401 and 604 numbers; 606 names; 603 quantities	Updated to match.	PGH
29)	C 02	HD	Match to EE; 661 numbers; Est Factors; match 610 numbers	Updated to match.	PGH
30)	D 04	HD	Correct the Ashmore names in summary table	Reviewed and revised in approach summary table.	PGH

**PIH Review
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd / Green Forest Dr Intersection Improvements

PROJECT NUMBER: CFHWY00453

	DATE: 7/1/22 REVIEWER: M. Hensch, A. Hunting SECTION: HD PHONE: (907) 269-0593 / 0595	Confirmation of action taken on comment by:

31)	E06	HD	Clarify the radius point that the “spoke” rebar are measured 18” OC at. (It’s a circle so the ends closest to the center will differ from the ends near the pavement.)	Clarified in section note 18” O.C starts 2” clear from top back of curb.	ZDK
32)	F	HD	Match road names to H sheets and sign summary. Correct names on vicinity maps in DSR, and names in sidebar maps of F sheets.	Corrected.	ZDK
33)	F	HD	Indicate what “break line” is or remove.	Remain as is. Used on several project without issue.	ZDK
34)	F 09	HD	Approach design starts at 19 ft instead of 18 ft.	Approach starts at 19’ due to the start of taper widening at STA. 1015+22.49 RT.	ZDK
35)	Z 03	HD	Section 3.2. Consider adding more detail on the location (Ex. 100’ west of existing Engstrom Road).	Added language to elaborate on location of intersection.	PGH
36)	Z 04	HD	Section 3.3. Consider removing this alternative. It’s the same as the fourth alternative only without the right turn lane, which is more of a traffic analysis feature.	We’ve considered but are keeping in the alternative. Adding the right turn lane also changes the roundabout geometry overall, so may have to keep as a separate alternative.	PGH
37)	Z07	HD	Why are Traffic projections (and design designation) using a 10 year design life? Typically they are 20 years.	This project has a 10 year design life per the signed design designation. Traffic volumes projected 20 years would likely warrant a multi-lane roundabout, but also exceed Bogard Road’s existing capacity. There are no projects planned to increase capacity on Bogard Road. Installing a multi-lane roundabout that exceeds the current & planned capacity of the existing two-lane facility is not justified under the HSIP program. Any project that improves Bogard Road capacity would address this intersection as well.	KRV

PIH PROJECT NAME: HSIP: Bogard Rd. at Engstrom Rd. and Green Forest Dr. Intersection Improvements
REVIEW PROJECT NUMBER: CFHWY00453 / 0001630

	DATE: 7/15/2022 REVIEWER: A. DeVore, I. Bryce SECTION: Central Region Materials PHONE: 269-6013	Confirmation of action taken on comment by:

In Sheet No. column use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use a A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic/Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O.

Item No.	Sheet No. / Page No.	Section	Comment	Response	Meeting Note

38)	General	M	Type VH HMA to be used. This will be reflected in the recommendations.	Updated in the plans, specs, and estimate.	ZDK
39)	B05	M	Pavement No. 5- why 3" of D-1? Recommend either 2" or 4".	This matches the depth of the 3" ATB for the adjacent mainline roadway structural section, such that the top of Selected Material Type A for approach will be at same grade as top of D-1 for mainline grade. Ease of construction.	ZDK
40)	B06	M	Recommend Surfacing Course (E-1) vs D-1 for unpaved approach surfacing.	Surface course added for unpaved approaches.	ZDK
41)	C1/D03	M	Structure Installation Summary: Pay Item shown is 604.0001.0001, but EE estimate has 604.0001.0000.	Updated to 604.0001.0001 to match.	PGH
42)	D01	M	Verify Removal of Pavement quantity	Verified and updated.	PGH
43)	H3	M	Type IA Junction Box callout: correct spelling of "Porous Backwill"	Corrected.	ZDK

PIH Review REVIEW

PROJECT NAME: Bogard Road ant Engstrom Road/Green Forest Drive Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/13/22 REVIEWER: Mathis/Moore SECTION: Construction PHONE: (907) 269-0450 & 715-1670	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic/Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

44)	F03	C	Make sure P7-10 and S7-8 clear the adjacent ramps.	All storm drain structures are clear of curb ramp installations and island refuges.	ZDK
45)	1	C	643/Traffic Control and Flagging – Please provide adequate funding. Looking at the ROW and Proposed ROW there in no easy way to detour traffic around the site during construction. – This will lead to heavy Traffic Control/Flagging/Pilot car operation. With narrow lanes between curb that will not accommodate two way traffic on a single side the contractor will be in a constant state of managing traffic.	Included adequate funding for flagging and traffic control largely based on Seward Meridian. See Traffic Control Plan for phasing details.	ZDK
46)	A02	C	Note 3: - State grubbing limits (Slope Catch?) - I have usually seen the clearing limits in a wetland to be 1' past the slope catch not 10' past. – Please disregard if this was previously analyzed	Deleted language regarding wetlands. No mapped wetlands are present in the project footprint.	ZDK
47)	X	C	Add Items: 644.0001.0000 Field Office 644.2007.0000 Vehicle (2 Each) 642.???? Contractor Furnished Computations	Added these items as requested.	PGH
48)	1 & B04	C	How will the C material inside the roundabout circle be finished? If landscaped, recommend the use of rock mulch for cover instead of a wood mulch due to high winds.	Rock mulch included. See landscaping details.	ZDK

PIH Review
REVIEW

PROJECT NAME: Bogard Road ant Engstrom Road/Green Forest Drive Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/13/22 REVIEWER: Mathis/Moore SECTION: Construction PHONE: (907) 269-0450 & 715-1670	Confirmation of action taken on comment by:

49)	1 & E06	C	E06 gives spacing on expansion joints for the Truck Apron, please also specify a max distance (or written guidance) for expansion joints for the Patterned Concrete Median. The adjacent Trunk Rd project specified the industry standard practice for expansion joints leaving it up to interpretation by the Contractor. This led to heat expansion damage after the completion of the project that has been problematic for M&O.	See section 608-3.01 project specials for expansion and control joint requirements.	ZDK
50)	1	C	I could not locate a typical section for Ashmore Drive? Please provide if not included.	E. Ashmore Ave is a paved approach and uses the "Paved Approach" typical section on Sheet B05.	ZDK
51)	B01 & F01	C	Guardrail is called for from Sta 1007+94 to 1016+18 Rt: On Sheet F1 please depict start of guardrail and end terminal B01 – provide guardrail detail in the typical sections for the applicable station ranges	Additional F sheet added to encapsulate guardrail run. G-rail placement shown in the B Typical. G-rail "Case" indicated in the D Summary Table.	ZDK
52)	B01	C	This sheet is for the "West Bogard Road" alignment: - All station range call outs should end at ICD/Engstrom/Green Forest. They conflict with sheet B02 typical sections. - Left Pathway Station Range – should be from 1021+00 to ICD. Then delete second call out Right Pathway Station Range should be – 1021+45 to ICD, not starting at 1021+00. Then delete second call out	- Corrected. - Deleted 2nd callout.	ZDK
53)	1	C	NOTE: The Next 4 Comments mostly are addressing the clarification of the station callouts for typical sections. In my opinion the typical sections depicting set lane/shoulder widths through tapers and gore widening is confusing. Below I have attempted to clarify using this logic.	Thank you.	ZDK

PIH Review
REVIEW

PROJECT NAME: Bogard Road ant Engstrom Road/Green Forest Drive Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/13/22 REVIEWER: Mathis/Moore SECTION: Construction PHONE: (907) 269-0450 & 715-1670	Confirmation of action taken on comment by:

54)	B01	C	The “West Bogard Rd” Typical section is called out from 1014+00 to Engstrom Rd/GFD with set 12’ lanes and 6’ shoulders. This is only true outside of the lane tapers from sta 1014+00 to sta 1015+22.49: • Please review and revise the station call outs as needed. • The right lane/shoulder varies in width between tapers up to the median gore at 1019+70.55 • The left lane/shoulders vary in width from 1015+40 thru the end of the last taper radius before the ICD	• Callouts revised. • Lanes labeled as “varies”. F Sheets include additional pavement layout labels to accommodate.	ZDK
55)	B02	C	“East Bogard Rd” station call outs: • Calls for set lane width and shoulders from Engstrom to 1030+00 – please revise for varied lane portions in tapers • Right Path should be from ICD to 1025+20, not 1026+60 • Aux Lane & Path – Left lane/gore varies in width to station 1029+58.10 not the specified 1028+55	• See response to comment #54. • Corrected. • Correct as is. Turn lane and or Gore are terminated at 1028+55. Through lane and shoulder take over from 1028+55 to EOP.	ZDK
56)	B03	C	“Green Forest Drive & Engstrom Rd” typical station call out: • Review for varied lane width in areas called out for set lanes • “Pathway on Left” – First call out should end at Bogard/ICD not 107+40 • “Pathway on Right” – Appears to start at 107+00 on F06 not 107+10	• See response to comment #54. • Corrected. • Updated and verified.	ZDK
57)	B02 B04	C	Do the different typical section details need station ranges attached? The F sheets are the only reference and they are not all labeled or identified. This leaves the ACAD drawings as the only means for exact locations for construction.	Station ranges to remain as it dictates other features. Lanes changed to varies and additional labels added to F Sheets for clarity.	ZDK

PIH Review REVIEW

PROJECT NAME: HSIP: Bogard Rd at Engstrom Rd/Green Forest Intersection Improv
PROJECT NUMBER: CFHWY00453

	DATE: July 15, 2022 REVIEWER: Jake Ciufio SECTION: Hydrology PHONE: (907) 269-0532	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)
In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

58)	B 01	HY	Provide typical sections for guardrail and special ditches.	Guardrail added to the typical section for clarity. See special ditch E Sheet details.	ZDK
59)	B 03	HY	Recommend adding a ditch on the right side of Green Forest between 107+10 and 109+00. The 2:1 cut ranges in height from ~ 15 to 30' and original ground above the cut drains toward the road. The ditch is needed to keep the pathway dry during mid-winter rain events, spring thaw, and summer rain events. The ditch could be shallow and drain to a field inlet connected to the proposed storm drain system.	Ditching added behind all pathway for snow storage and additional water capacity.	ZDK
60)	C 01	HY	How will special ditches be paid for?	They won't be paid for directly. Special ditches will be subsidiary to unclassified excavation pay item. See included spec language.	ZDK
61)	E 06	HY	"Joints" is misspelled in the sheet title.	Corrected.	ZDK
62)	F 01	HY	Is another plan and profile sheet needed to show the entire length of proposed guardrail?	Additional F sheet added to encompass g-rail installation.	ZDK

**PIH Review
REVIEW**

PROJECT NAME: HSIP: Bogard Rd at Engstrom Rd/Green Forest Intersection Improv
PROJECT NUMBER: CFHWY00453

	DATE: July 15, 2022 REVIEWER: Jake Ciufu SECTION: Hydrology PHONE: (907) 269-0532	Confirmation of action taken on comment by:

63)	F 02	HY	There is an existing 24" diameter corrugated steel cross culvert near 1019+60 (inlet location: 61.614717, -149.256576). I inspected the culvert in September 2021 as part of the Bogard: Trunk Road to Wasilla Fishhook Pavement Preservation project. Its condition is unknown due to blockages at the inlet and outlet. I recommend replacing the culvert on this project. Add the existing culvert to the base map and the removal summary table.	Culvert replaced between two low points to allow for infiltration in the ditch/low spots. Culvert not placed in the low to alleviate discharge onto developed property that was constructed post 1982 Bogard Reconstruction that put the original culvert in. Will act as an overflow and not allow over topping of the roadway.	ZDK
64)	F 03	HY	For projects within the Municipality of Anchorage, insulation is required for pipes with a diameter less than 30" if the depth of cover is less than 4 feet. Review depth of cover (including HMA). Consider adding insulation if cover is less than 4 feet. Insulation may be needed downstream of the perforated pipe.	Not typical for DOT storm drain systems except when protecting other facilities from freezing as a result of cool air flowing through the drainage system.	ZDK
65)	F 03	HY	For structure S3-2, check the clearance between P3-1 and P3-2.	Clearances verified and meet the requirement of the manhole details.	ZDK
66)	F 05	HY	P5-2 is outside ROW. Ensure permanent access is available for M&O.	See R sheets for proposed ROW. All drainage structures will be constructed within ROW or ROW Easement.	ZDK
67)	F 05	HY	Has the location of P5-2 been field verified to ensure it follows a natural drainage path?	Yes, we did a site visit this spring to determine it would. Natural drainage flows about 200-ish feet to Finger Lake through naturally vegetated land. Now redirected to natural low east of green forest due to new private development.	ZDK

PIH Review
REVIEW

PROJECT NAME: HSIP: Bogard Rd at Engstrom Rd/Green Forest Intersection Improv
PROJECT NUMBER: CFHWY00453

	DATE: July 15, 2022 REVIEWER: Jake Ciufio SECTION: Hydrology PHONE: (907) 269-0532	Confirmation of action taken on comment by:

68)	F 05	HY	Is a cross culvert needed near 103+00? Recommend field verifying as well as checking MSB contours. It seems plausible that drainage would be in the westerly direction (toward Finger Lake).	No, as existing Green Forest on the East side drains into a low depression/wetland further east of STA. 104+00.	ZDK
69)	F 05	HY	Is a culvert needed under the driveway at 102+25 RT? P5-1 flows toward the driveway.	Driveway culvert added.	ZDK
70)	F 07	HY	P7-1 and P7-2 appear to be smaller diameter compared to the other proposed pipes. Check diameters.	They are both 18" diameter to meet minimum rollout clearances. Now P8-1 & P8-2.	ZDK
71)	F 07	HY	Check minimum cover for P7-13.	P7-13, now P8-15, has +3' of cover everywhere.	ZDK
72)	G 11	HY	Please provide the H&H report for review when it is ready.	Completed and provided to new CR Hydrologist.	ZDK
73)	G 12	HY	"Protection" is misspelled in the sheet title.	Corrected.	ZDK
74)	G 12	HY	Consider removing geotextile from underneath the ditch lining and around the porous backfill. It will tend to clog over time and will be difficult (more expensive) to maintain. In theory, porous backfill and ditch lining could be washed and reused. Geotextile could be replaced with a granular filter, placed around the perforated pipe only, or a thicker layer of porous backfill could be used. Also, keep in mind, much of the sediment will be captured in the forebay. This reduces the need for geotextile downstream of the forebay.	Geotextile deleted from basin design.	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/5/2022 REVIEWER: Tim Glassett SECTION: M&O PHONE: 269-0763	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic/Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O.

Item No.	Sheet No. / Page No.	Section	Comment	Response	Meeting Note
75)	F07, G11	M&O	Could we remove P7-2? , S7-2 and S7-1 could both directly drain into the infiltration basin. This would slightly simplify the drainage structures and the long runs. This would then change the basin forebay berm. Just an idea not attached to it.	Drainage flow route will remain as is to the basin forebay.	ZDK
76)	General	M&O	Will there be an opportunity for replacement parts? Thinking of extra delineators as they are the first to be destroyed.	No, replacement parts would be non-participating funds.	ZDK
77)	General	M&O	Will the markings be inlaid?	Yes, we will be using inlaid MMA markings, 500 mil in roundabout.	ZJH

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

78)	Z-Signature	TS	Revise USC 409 to USC 407. This was recently changed with IJA.	Updated	PGH
79)	Z3	TS	Under Guidelines, consider adding NCHRP 834: Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.	Added and met pedestrian sight distance as recommended in NCHRP 834.	ZDK
80)	Z4	TS	Agree preferred alternative consistent with HSIP scope.	Thank you.	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

81)	Z -App I Pg 4	TS	1. Paragraph 3 -What were the WB through entry (V1) and exit (V3) fastest path speeds under the flush median scenario? 2. If raised median is removed, we request that fastest path and natural path speeds be documented in this table for the WB through movement. 3. Also, if raised median in removed, consider providing adequate flush median space for future installation with ped refuge.	1. 30.0 mph and 32.2 mph, respectively 2. Table will be updated if geometry is modified. Fastest path speeds for WB through movement are in right-most column. Natural path speeds are reported in the section below fastest path speeds. 3. Advise against planning for a median retrofit. The geometry of the entry + RTL is different when assuming a flush median versus raised median. A flush median allows overlapping truck movements but doesn't constrain the fastest path, therefore the total curbed width is narrower to constrain the fastest path. A raised auxiliary splitter island constrains both truck movements and fastest paths, therefore wider asphalt must be provided to accommodate truck movements.	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

82)	Z App I Table	TS	1) Good table. Thank you. After finalization of vertical and horizontal grades and landscaping plan, please develop and provide copies of plan sheets identifying fastest path alignments with speeds, stopping sight distance, intersection sight distance, and pedestrian crossing sight distance for final record in DSR. Providing examples available from Seward and Dowling DSR. 2) Thank you for providing AutoCAD truck templates. Please develop plan sheets for truck turning templates for record documentation in DSR appendix. 3) Please add stopping sight distance and pedestrian crossing sight distance calculations to this summary. 4) Check excel equation for "Likely through entry speed". Appears that V1pbase controls as a minimum here.	1. Created and added to the DSR appendix. 2. Created and added to the DSR appendix for WB-67, 50, & 40. 3. Added ISD and SSD calcs to table summary. CSD calcs completed in another table. Both included in DSR appendices. 4. Corrected. 7/22/22 ZDK	ZDK
83)	Z -App I Table	TS	Fastest Path/Parameter Column – Consider revising the notations for each calculation in the parameter column to match those used in NCHRP 672 (ie. V1pbase, V1, V3phase, V3 etc.)	Adequately notated and checked using several source methods. Leave as is.	ZDK
84)	Z App I Table	TS	Fastest Path/Source Column – 1) Consider revising source columns to include reference question numbers from NCHRP 672. 2) NY Roundabouts appears to reference NCHRP 672 equations. If so, that reference could be removed. If different, recommend including in DSR Section 2.0.	1. Source column adequately notated. Leave as is. 2. An included additional check for reference purposes only. Roundabout designed to meet NCHRP 672. Will leave as is.	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

85)	E3	TS	Will the bike ramp transitions require a new detail? Or is it an adaptation of the vehicular curb cut details? Example bike transition detail to consider in CTF Alternative Entrance Alignment (WFL) CFHWY00260.	Pathway transitions follow the vertical and horizontal offsets shown in the curb and gutter termination transitions detail from shoulder to pathway. See added pathway transition details in E Sheets.	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

86)	F3	TS	We think the WB RYTL need more discussion and is not yet finalized. If raised median for WB RYTL remains, recommend increasing median width to provide minimum pedestrian refuge for both NW crosswalks. If raised median is replaced with flush median, evaluate northwestern pedestrian crossing for decision sight distance for ~42 ft and ~48 ft. If flush median is installed, consider providing adequate space for future raised median installation with ped refuge. May also consider future storm drain manholes in proposed curb inlet locations?	Mat Su O&M has requested removal of raised median and shortening the median lengths on Bogard and Engstrom. Raised median for WB RYTL meets minimum width of 6' from face of curb to face of curb for pedestrian refuge. However it is not wide enough to meet 2' minimum separation distances between detectable warning tiles. If raised median is maintained, design will be revised to widen median and provide pedestrian refuge. Peer reviewer recommended against flush median due to 30 mph fastest path speeds for the WB through movement. However the fastest path and natural path speeds for a previous iteration of design featuring a flush median fall within the limits established in DOT&PF's updated roundabout peer review policy. Decision sight distance for a crossing pedestrian was not evaluated for the previous iteration of design. The curb & lane geometry for the previously considered flush median to separate the entry from YRTL was significantly different from the proposed geometry for a raised splitter island separating the RTL from the entry. The previous design relied on the flush median to accommodate truck movements, whereas the current design accommodates truck movements on pavement. Retrofitting one design with a different median type than it was designed for would result in poor performance (safety or maneuverability).	KRV/ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 7/15/22 REVIEWER: O. LeCroy/S. Thomas SECTION: Traffic and Safety (TS) PHONE: (907) 269-0653	Confirmation of action taken on comment by:

				Raised auxiliary island will be installed. Additional lane width on the inner part of the lane and gore striping included at MSB request for temp snow storage space during plowing operations. Auxiliary island width increased to meet minimums for refuge. Right turn movement barred from WB through lane to force use of the right turn lane.	
87)	F3	TS	Are max 2% ADA cross slopes maintained at the eastern and western crosswalks?	All crosswalks meet 2% max cross slopes as designed with exception of the Engstrom west and middle crosswalk at the inside splitter island curb line. Due to Engstrom's steep grade and short transition we not be able to make these two crossing sections compliant with the 2% max. However after deep diving into ADA littérature, roundabouts are not clearly defined under a category. Signalized intersections are allowed up to 5% max grade, stop controlled or yield are allowed 2% max, and midblock crossings allowed to follow the grade of the adjacent roadway. Given a roundabout has both signalized, stop, and yield control features (aka through movements at speed, stop control, and yield control) the max grades will be treated like a signalized intersection. That said we were able to through best effort to keep the majority at or below the 2% desired maximum.	ZDK
88)	H14-H15	TS	Bike lane ends signs can be removed. No designated bike lanes on Bogard Rd. Bike transitions provided as an alternative route to bikers, who may choose to use roundabout lanes.	Signs removed.	ZJH

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 07/15/22 REVIEWER: Mat-Su Borough SECTION: Multiple Dept. & Sec. PHONE: (907) 861-7715	Confirmation of action taken on comment by:

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)

In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Rating		Comment: This rating should be used to indicate the quality of the review set package you received. <i>Unsatisfactory/design intent not clear or accurate and major errors – One cone. Low Acceptable/design intent not well represented and errors – Two cones. Acceptable/design intent developed and minor errors – Three cones. High Acceptable/ clear design intent and few errors – Four cones. Outstanding/very clear design intent and little to no errors – Five cones</i>

Item No.	Sheet / Page No.	Section	Comment	Response	Meeting Note

89)	General	DES (KB)	The main concern Department of Emergency Services (DES) has is will we have direct access across Bogard leaving the fire station turning left toward the roundabout? In Some drawings, it does not look like we do. In other drawings, it shows we have adequate access. This is critical for our required response times. It also appears DES is losing some of our property, will there be reimbursement for that portion?	Left turns from the fire station onto Bogard Rd are accommodated via a flush patterned concrete median break in the west splitter island. These movements have been analyzed using a 40' fire truck and the movement is anticipated to be readily accommodated with the current geometry. Yes, reimbursement of DES property will occur.	KRV/ZDK
90)	A01	ROW (SA)	The range on the north arrow is wrong on the cover page.	Corrected.	ZDK
91)	A01	PD&E (JT)	We have measured the 85 percentile speed on Green Forest Drive to be 32 mph – recommended design speed of at least 30 mph, 35 mph if possible.	Splitter island has been adjusted to account for 35 mph speeds. Roadway will remain posted at 25 and primary roadway design will be 25 mph.	ZDK
92)	D02	O&M (JB)	MSB O&M is okay with the HDPE culverts as long as they have metal end sections.	Plastic end sections or per MSB O&M meeting 08/30/22	ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 07/15/22 REVIEWER: Mat-Su Borough SECTION: Multiple Dept. & Sec. PHONE: (907) 861-7715	Confirmation of action taken on comment by:

93)	F04 F07 F08	O&M (JB)	The current Plans in Hand do not reflect previous comments from O&M. the design as it is now, will add to drifting piles, make snow removal nearly impossible and hinder regular grading when on Engstrom. The borough O&M Superintendent for this area mentioned that he will be available to answer questions or oversee necessary changes to the design. Please see a 3-page PDF drawing showing O&M's input; it is attached to this comment sheet.	The Borough currently maintains two roundabouts in a high wind zone in front of the Colony schools with raised splitter islands. Raised splitter islands are critical to the safety and functionality of a roundabout. They help in slowing and deflecting approaching vehicles to appropriate speeds and entry angles. Lengths are determined by typical speeds for the approach (higher speed = longer median). As the purpose of this project is to address safety at the intersection, design features necessary for safe operation of the roundabout cannot be eliminated from the design. Markups show elimination of auxiliary splitter island. A previous version of design utilized a flush median to separate the WB Bogard entry from the right turn lane. Per design guidance, recommended entry speeds should be between 20-25 MPH. Maximum theoretical entry speeds for the WB entry were 30.0 mph for this previous version of design. The raised auxiliary splitter island included in the current design lowers the maximum theoretical entry speed to 25 mph. All raised medians on this project have been designed with snow plowing in mind. The design maintains minimum widths of 17' from face of curb to face of curb based on feedback from DOT&PF Maintenance & Operations. Per MSB O&M meeting on 08/30/22, additional space on the inside curb line and gore stripping added for temporary snow storage during plowing operations. Additionally all pathways widen to a 10' top (2' buffer and 8' sidewalk) for plowing operations with a LT Pick-up Truck and ditching installed adjacent to all pathways for additional snow storage.	KRV/ZDK

**PS&E
REVIEW**

PROJECT NAME: HSIP: Bogard Rd At Engstrom Rd/ Green Forest Dr Intersection Improvements

PROJECT NUMBER: 0001(630)/CFHWY00453

	DATE: 07/15/22 REVIEWER: Mat-Su Borough SECTION: Multiple Dept. & Sec. PHONE: (907) 861-7715	Confirmation of action taken on comment by:

94)	F05	PD&E (JT)	Will drainage easement be obtained for storm drain outfall onto lot 14 of Finger Lake Heights RSB and out to Finger Lake?	No, drainage route has been updated to discharge in proposed ROW on the east side low of Green Forest.	ZDK
95)	F05 F06	PD&E (JT)	How will physical access be provided to lots 10-13 of Finger Lake Heights RSB?	Currently no access exists to those lots. It is the property owner's responsibility to file for driveway permits and develop their own driveway if such a time arises. Access to these lots will likely be discussed as part of negotiations to purchase lot 4 (held by same owner). New infiltration basin access creates opportunity for access to be developed from the basin/Tew's access road.	ZDK
96)	H10	PD&E (JT)	O&M has had issues with saddle bracket/steel bands breaking and being difficult to replace on light poles – could signs 50A & 50B be moved to a 3" post?	Sign assembly moved onto a separate 3" T post.	ZJH
97)	H12	PD&E (JT)	O&M request CREE LEDway light fixtures.	CREE LEDway fixture used as the design basis fixture and listed in the plans.	ZJH
98)	H18	PD&E (JT)	Legends for signs 6 & 7 appear to be transposed.	Sign legends fixed	ZJH



MEMORANDUM

STATE OF ALASKA

Department of Transportation and Public Facilities
Central Region-Division of Design and Engineering Services
Traffic, Safety, and Utilities Section

To: Distribution: Design Chiefs and Project Managers

Thru: Luke Bowland, P.E. *LB*
Regional Preconstruction Engineer

Date: May 13, 2023

Thru: Cynthia Ferguson, P.E., Chief *CF*
Traffic, Safety, and Utilities

From: Scott E. Thomas, P.E. *SET*
Central Region Traffic & Safety Engineer

Subject: RR Xing Cert Checklist 3.0
Traffic Control Devices Review

An updated 2023 RR Crossing Devices Checklist (ver 3.0) is attached with necessary reference materials for field inspection within less than two years of certifying a design project. The purpose is to verify all projects near to and affecting railroad crossings have adequate warning devices in place and functioning properly before completing the project (*see 23 CFR 646.12(b)*). This version updates clearance times for WB-67 vehicles and sight triangles for double tracks.

1. Fill out a Railroad Crossing Devices Checklist 3.0 before certification, desirably by PIH review. The Design Engineer or Engineering Manager is responsible for the forms and field review.
2. Finalize the Checklist by signature of the Engineer-of-Record. List on the checklist any repairs or replacements needed and how they will be done.
3. Provide a scanned copy of the completed Checklist to the Regional Traffic & Safety Engineer and the ARRC Chief Engineer (for filing in railroad crossing files) on or before routing the Project Certification Sheet.

For any questions or assistance in filling out the Checklist, contact Larry Huling, Engineering Assistant, at 269-0637. A spreadsheet tool is available to test design vehicle track clearance times for other than WB-67 vehicles.

Attachments:

Railroad Crossing Devices Checklist - Flow Chart

Railroad Crossing Devices Checklist – Forms A-C Sight Distance, 2-6 Traffic Devices

For additional guidance, see <https://www.fhwa.dot.gov/federal-aidessentials/indexofvideos.cfm>
(Railroad Coordination and Certification Requirements – pdf and video)

Distribution:

John Linnell, P.E., Director, Construction & Operations
Joel St. Aubin, P.E., Chief of Construction
Laura Paul, P.E., Chief, Highway Construction
Michael San Angelo, P.E., Chief, Statewide Materials, HQ
Carolyn Morehouse, P.E., Chief Engineer, Statewide D&ES, HQ
Matthew Walker, P.E., State Traffic and Safety Engineer HQ
Nathan Purves, P.E., Southcoast Region Traffic and Safety Engineer
Nathan Stephan, P.E., Northern Region Traffic and Safety Engineer

Also cc : Sean Baski, P.E., Chief Highway Design
Alex Read, P.E., Project Manager
Ryan Hammel, P.E., Project Manager
Chris Bentz, P.E., Project Manager
Christina Huber, P.E., Project Manager
Chris Post, P.E., Project Manager
Steven Rzepka, P.E., Project Manager
Clint Adler, P.E., Chief, Mat-Su District Office
Chris Bentz, P.E., Project Manager
Kristina Busch, P.E., Project Manager
Kevin Jackson, P.E., Chief, Preliminary Design & Environmental
Galen Jones, P.E., Project Manager
Aaron Hunting, P.E., Project Manager
vacant, P.E., Project Manager
Jenelle Brinkman, P.E., Chief Aviation Design
Phil Cheasebro, P.E., Project Manager
Joy Vaughn, P.E., Project Manager
Matt Hansen, P.E., Project Manager
Aaron Hughes, P.E., Project Manager
Cynthia Ferguson, P.E., Chief, Traffic, Safety & Utilities
Noah King, P.E., Project Manager
Jon Knowles, P.E., Regional Utilities Engineer
Orion LeCroy, P.E., HSIP Coordinator
Roxanne Risse, P.E., Traffic Design Engineer
Larry Huling, Railroad Inventory, Engineering Assistant
Val Rader, P.E., ITS Engineer
Melanie Arnolds, P.E., Chief, Right-of-Way
Kirk Warren, P.E., Chief, Maintenance and Operations
Ryan Norkoli, P.E., Highway Review Engineer

(cc: via email)

Brad Coy, P.E., Municipal Traffic Engineer, Municipality of Anchorage
Brian Lindamood, P.E., Chief Engineer, Alaska Railroad
Brad Sworts, Pre-Design and Engineering Manager, Matanuska Susitna Borough



State of Alaska
Department of Transportation and Public Facilities

RAILROAD CROSSING DEVICES CHECKLIST

RR MP	Road name	Road MP	Cross Street/Intersection	Dist From:
N/A	E Bogard Road	N/A	N/A	N/A
Federal Crossing #	Nearest Community	Max Train Speed	Roadway Posted Speed	
N/A	Palmer Alaska	N/A	50 MPH	
Road Ownership	Location notes:			
DOT&PF	Bogard Rd and Engstrom Rd intersection			

Name	State#	Federal#
PROJECT HSIP: Bogard Rd at Engstrom Rd / Green Forest Dr Int Imp	CFHWY00453	0001630



NO RAILROAD CROSSINGS ARE AFFECTED BY THIS ROAD PROJECT.



ALL CROSSING DEVICES IN PLACE, CORRECT & SIGHT DISTANCE ADEQUATE.

OR

SELECT THE SCHEDULE OF WORK FOR THE AFFECTED RAILROAD CROSSING:



All crossing devices work will be completed before road work begins.



Crossing devices work will be concurrent with road work. Railroad notified.

A,B,C



SIGHT DISTANCE TRIANGLES: All Locations

See SIGHT TRIANGLES pages. ALWAYS ATTACH. Forms A, B, C

2



ADVANCE WARNING SIGNS: All Locations

See ADVANCE WARNING SIGNS page. ALWAYS ATTACH. Form 2.

3



PASSIVE DEVICES: Signs & Markings Only

See PASSIVE DEVICES page. Attach if no lights or gates at this crossing. Form 3.

4



ACTIVE DEVICES: Flashing Lights & Gates

See ACTIVE DEVICES page. Attach if there are lights or gates. Form 4.

5



PAVEMENT MARKINGS: 40 MPH or greater

See PAVEMENT MARKINGS page. Attach only where markings used. Form 5.

6



PATHWAY SIGNS or MARKINGS

See PATHWAY page. Attach if path signs and/or markings used. Form 6.

Field inspected by: N/A

On this date: / / Year

Registered

Engineer's Approval: *Claire Ellis, P.E.*
(Printed name)

X

Claire L. Ellis

Date: 5 / 23 / 2025

Notes: Provide a final copy to the Regional Traffic & Safety Engineer and Alaska Railroad Corporation Chief Engineer. This checklist is based upon the 2009 MUTCD and the 2016 Alaska Traffic Manual Supplement (ATMS). This list does not address Temporary Traffic Control.

MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Design and Engineering Services – Central Region
Highway Design

TO: File

DATE: June 29, 2023

TELEPHONE NO:

FROM: Iain McPherson, PE
THROUGH Joshua E. Cross, PE, PTOE

SUBJECT: **Traffic Control Plan**
HSIP: Bogard Rd at Enstrom Rd &
Green Forest Dr Intersection
Improvements
0001630/CFHWY00453

This memo has been prepared to summarize the general traffic control methods required for construction of HSIP: Bogard Rd at Enstrom Rd & Green Forest Dr Intersection Improvements.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has required this plan to ensure constructability and as a starting point for a contractor generated traffic control plan (TCP). This recognizes that different contractors will have various methods for controlling traffic and safety. All TCPs must adhere to Part 6 of the Alaska Traffic Manual.

Four details are attached. These details provide direction on how to treat roadside slope, obstacles, hazards, and clear distances. Also included are acceptable locations for permanent construction signs. The location of the permanent construction signs will be installed according to Standard Drawing C-04.12 and as modified by the attached plan drawing, unless approved otherwise by the Engineer.

Details for a potential 6 phase construction plan and detours are also attached.

Refer to the project specifications for further guidance on traffic control restrictions and agency coordination requirements.

DESIGNED BY
CHECKED BY
DRAFTED BY

SCALE
N/A

DATE
1/14/2025

TIME
1:17 PM

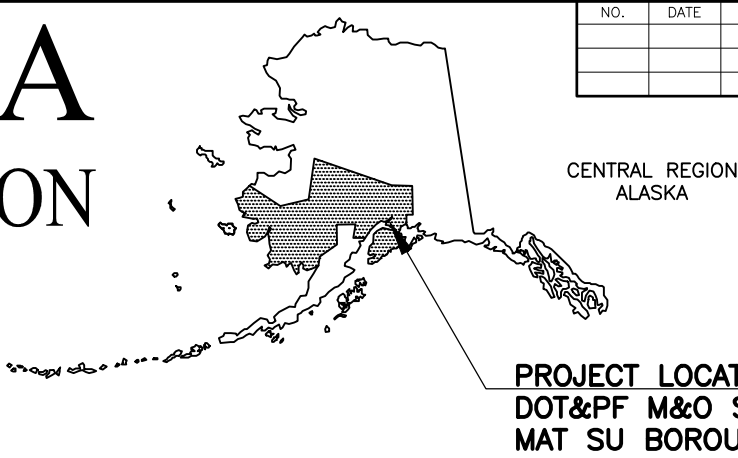
DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\C\ SHEETS\00656_J1A_COVER.DWG

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

PROPOSED HIGHWAY PROJECT

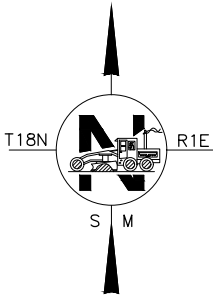
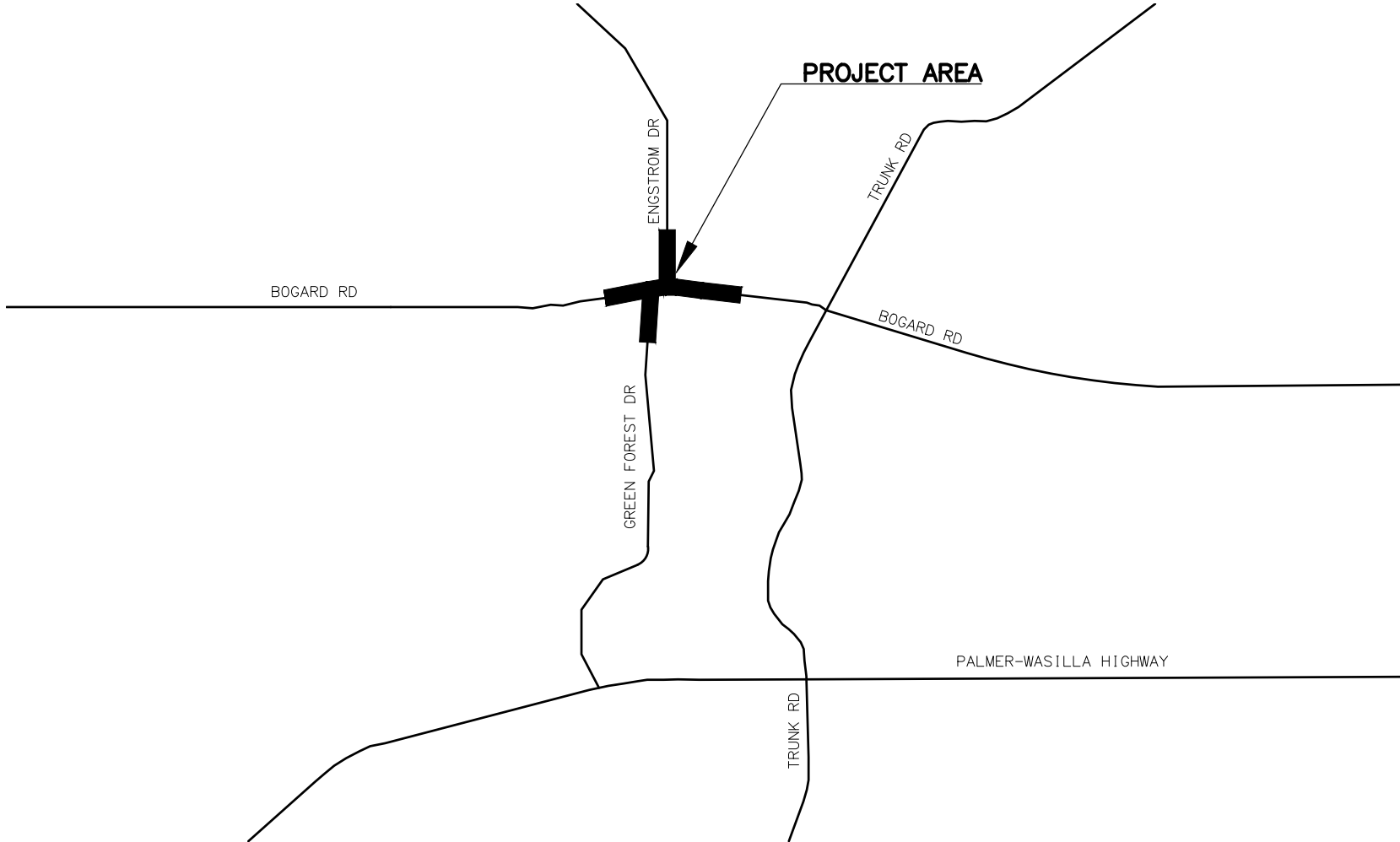
HSIP: BOGARD ROAD AT ENGSTROM ROAD/
GREEN FOREST DRIVE INTERSECTION
IMPROVEMENTS PROJECT NO.
0001(630)/CFHWY00453
TRAFFIC CONTROL PLANS



NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J1	J15
ROUTE ID		2381095X000	MILEPOINT	4.450 - 4.750			
LATITUDE		61.61460000	LONGITUDE	149-25472222			

PROJECT SUMMARY		
ROADWAY	WIDTH	LENGTH
BOGARD ROAD MP 4.45-4.75	36 FT	0.3 MILES
ENGSTROM ROAD MP 0.00-0.10	24 FT	0.1 MILES
GREEN FOREST DRIVE MP 0.95-1.15	20 FT	0.2 MILES

DESIGN DESIGNATIONS			
	BOGARD ROAD	ENGSTROM ROAD	GREEN FOREST DRIVE
FUNCTIONAL CLASS	URBAN ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR
AADT (EXISTING YEAR)	8,247	2,440	1,311
AADT (DESIGN YEAR)	10,708	N/A	N/A
DESIGN SPEED (V) (MPH)	55	35	25
DHV (EXISTING YEAR)	10.89%	N/A	N/A
DHV (DESIGN YEAR)	10.89%	N/A	N/A
T-PERCENT COMMERCIAL TRUCKS (%)	6.77%	N/A	N/A
D-DIRECTIONAL DISTRIBUTION (%)	50%	N/A	N/A



PLANS DEVELOPED BY: KINNEY ENGINEERING LLC, AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES
4111 AVIATION AVENUE, ANCHORAGE, AK 99502
(907)269-0590

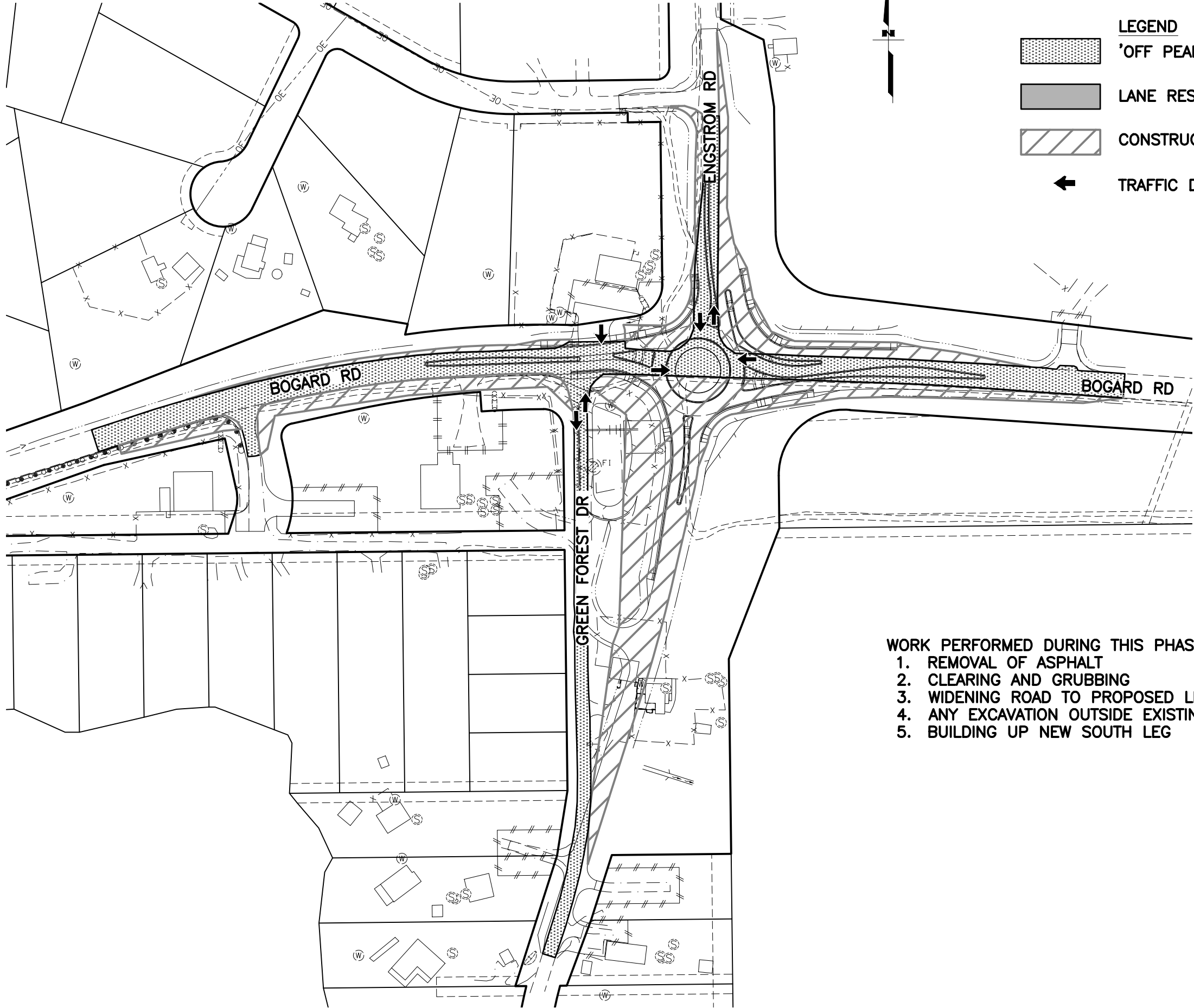
APPROVED:

REGIONAL PRECONSTRUCTION ENGINEER DATE

CONCUR:

REGIONAL CONSTRUCTION ENGINEER DATE

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J2	J15



LEGEND

- 'OFF PEAK' CONSTRUCTION AREA/PAVEMENT REMOVAL
- LANE RESTRICTIONS
- CONSTRUCTION AREA
- TRAFFIC DIRECTION

CONSTRUCTION PHASE 1
THIS PHASE IS TO PROVIDE FOR THE CONSTRUCTION OF THE OUTSIDE WIDENING AND BUILDING UP EMBANKMENT OF NEW SOUTHERN LEG.

MAINTAIN TWO-WAY TRAFFIC WITH EXISTING TRAFFIC PATTERS REMAINING IN EFFECT.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:**
- 1. REMOVAL OF ASPHALT
 - 2. CLEARING AND GRUBBING
 - 3. WIDENING ROAD TO PROPOSED LIMITS
 - 4. ANY EXCAVATION OUTSIDE EXISTING ROADS
 - 5. BUILDING UP NEW SOUTH LEG

PHASE 1

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

DESIGNED BY
CHECKED BY
DRAFTED BY

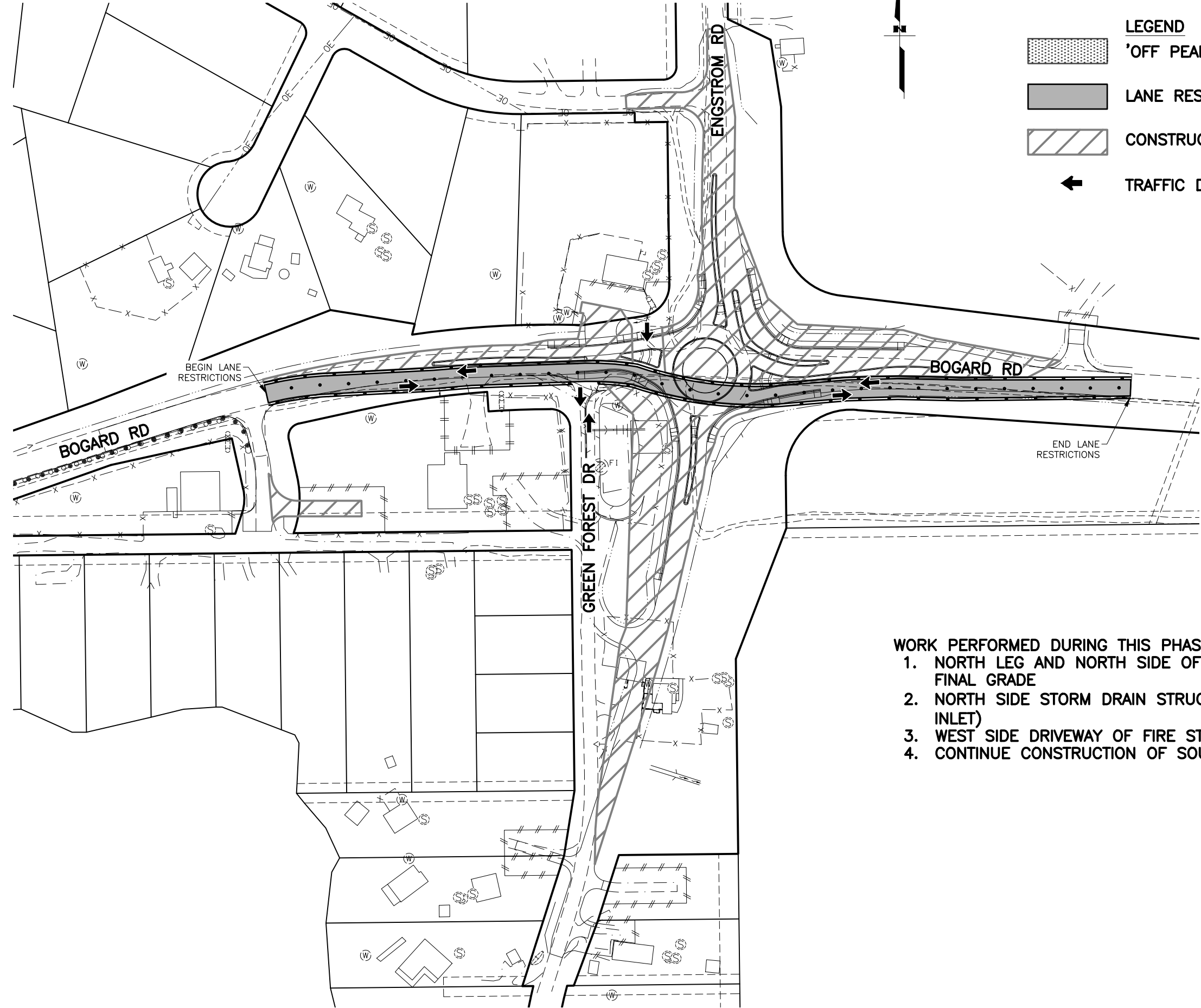
SCALE
1" = 80'

DATE
1/14/2025

TIME
1:23 PM

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00565_00656_02-07_TOP.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J3	J15



LEGEND

[Patterned Box] 'OFF PEAK' CONSTRUCTION AREA/PAVEMENT REMOVAL

[Solid Grey Box] LANE RESTRICTIONS

[Hatched Box] CONSTRUCTION AREA

[Arrow] TRAFFIC DIRECTION

CONSTRUCTION PHASE 2
THIS PHASE IS TO PROVIDE FOR THE CONSTRUCTION OF THE NORTH PORTION OF THE ROUNDABOUT(NOT INCLUDING CONCRETE WORK OR PAVING) AND CONTINUE TO BUILD THE SOUTH LEG.

BOGARD ROAD THROUGH TRAFFIC WILL BE SHIFTED SOUTH. GREEN FOREST DRIVE REMAINS OPEN FOR TRAFFIC UNDER EXISTING CONDITIONS. ENGSTROM ROAD WILL BE CLOSED.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:
1. NORTH LEG AND NORTH SIDE OF BOGARD ROAD CONSTRUCTED TO FINAL GRADE
 2. NORTH SIDE STORM DRAIN STRUCTURES AND PIPES (WITHOUT CURB INLET)
 3. WEST SIDE DRIVEWAY OF FIRE STATION
 4. CONTINUE CONSTRUCTION OF SOUTH LEG

PHASE 2

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

DESIGNED BY
CHECKED BY
DRAFTED BY

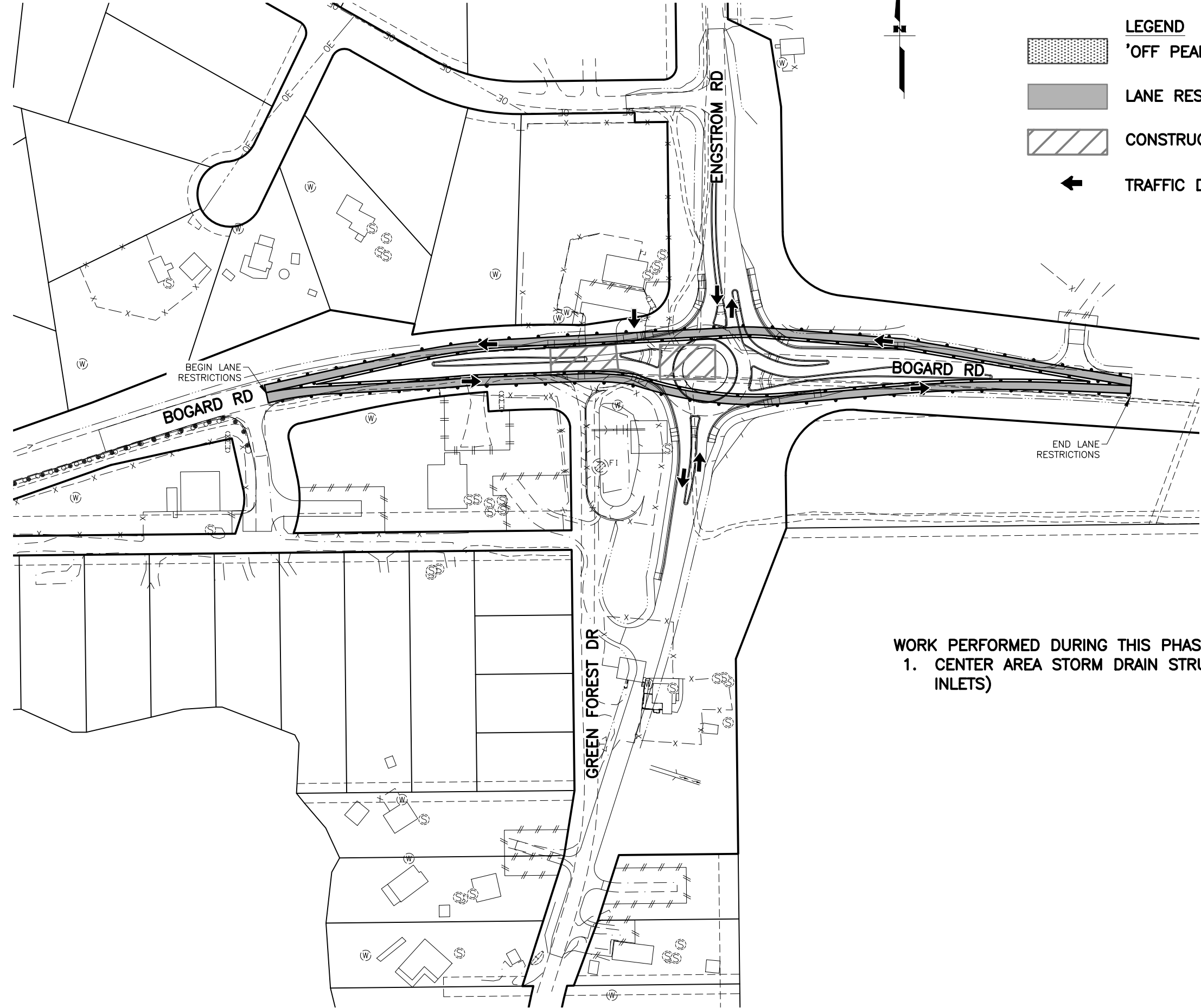
SCALE
1" = 80'

DATE
1/14/2025

TIME
1:23 PM

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00565_00656_02-07_TOP.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J4	J15



CONSTRUCTION PHASE 3
THIS PHASE IS TO PROVIDE FOR THE CONSTRUCTION OF THE MIDDLE SECTION OF STORM DRAIN AND CONTINUE TO BUILD THE SOUTH LEG.

BOGARD ROAD THROUGH TRAFFIC WILL BE DIVIDED WITH WEST BOUND SHIFTED NORTH AND EAST BOUND TRAFFIC SHIFTED SOUTH. GREEN FOREST DRIVE WILL BE CLOSED. ENGSTROM ROAD WILL BE OPENED WITH NO EAST TO NORTH TURNING MOVEMENT.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:
1. CENTER AREA STORM DRAIN STRUCTURES AND PIPES (WITHOUT CURB INLETS)

PHASE 3

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

DESIGNED BY
CHECKED BY
DRAFTED BY

SCALE
1" = 80'

DATE
1/14/2025

TIME
1:23 PM

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00565_00656_02-07_TOP.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J5	J15

LEGEND

- 'OFF PEAK' CONSTRUCTION AREA/PAVEMENT REMOVAL
- LANE RESTRICTIONS
- CONSTRUCTION AREA
- TRAFFIC DIRECTION

CONSTRUCTION PHASE 4
THIS PHASE IS TO PROVIDE FOR THE CONSTRUCTION OF THE SOUTH PORTION OF THE ROUNDABOUT(NOT INCLUDING PAVING) AND FINISH THE SOUTH LEG. CONCRETE ISLANDS ON NORTH, EAST, AND SOUTH LEGS POURED.

BOGARD ROAD THROUGH TRAFFIC WILL BE SHIFTED NORTH. GREEN FOREST DRIVE WILL BE CLOSED. ENGSTROM ROAD WILL BE REOPENED.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:
1. SOUTH LEG AND SOUTH SIDE OF BOGARD ROAD CONSTRUCTED TO FINAL GRADE
 2. NORTH LEG SEPARATION ISLAND CONCRETE POURED
 3. FINISH CONSTRUCTION OF SOUTH LEG, INCLUDING CONCRETE

PHASE 4

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

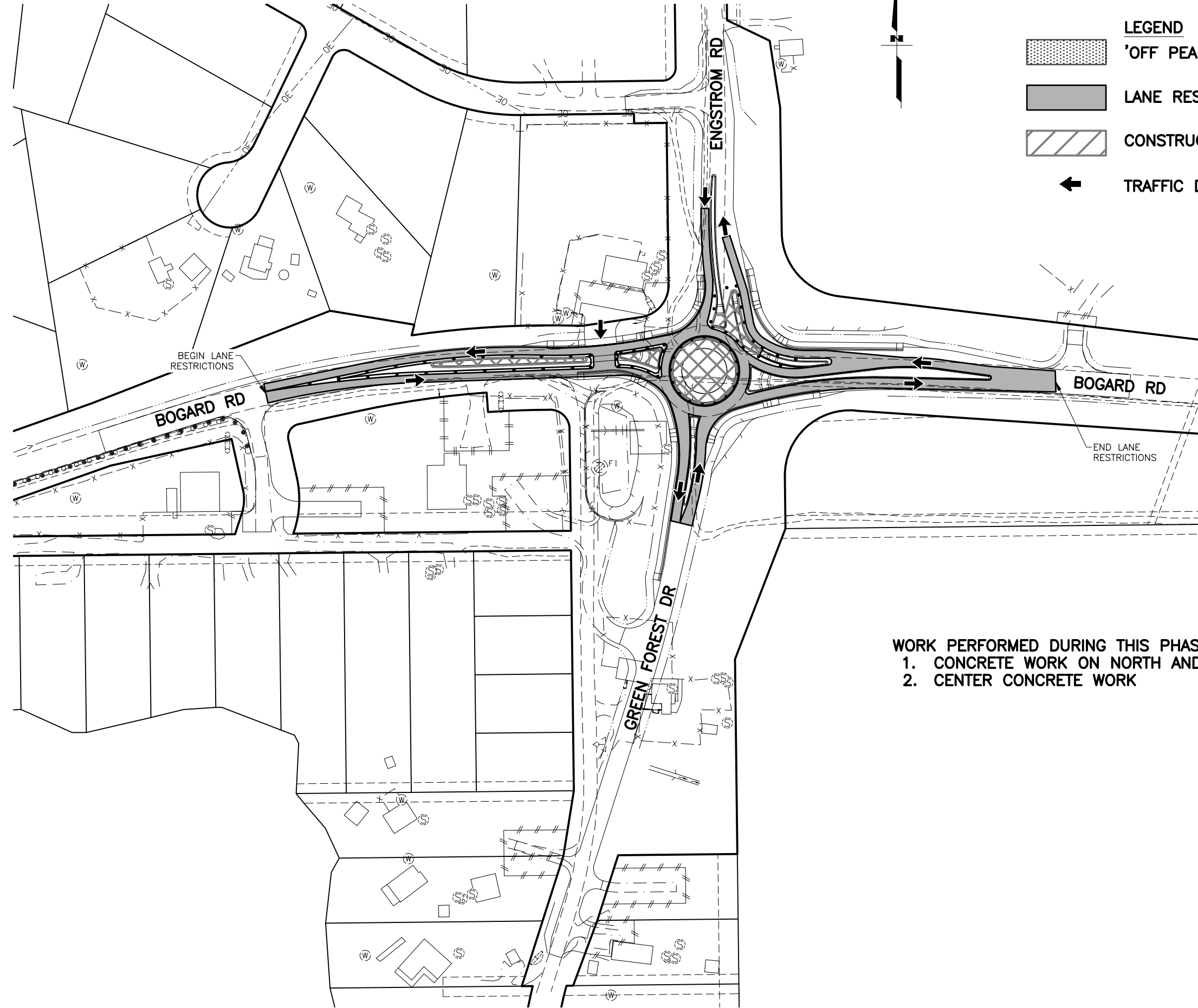
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

DESIGNED BY: _____
CHECKED BY: _____
DRAFTED BY: _____
SCALE: 1" = 80'
DATE: 1/14/2025
TIME: 1:23 PM
DRAWING LOCATION: Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00565_00656_02-07_TOP.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J6	J15



LEGEND

- 'OFF PEAK' CONSTRUCTION AREA/PAVEMENT REMOVAL
- LANE RESTRICTIONS
- CONSTRUCTION AREA
- TRAFFIC DIRECTION

CONSTRUCTION PHASE 5
THIS PHASE IS TO PROVIDE FOR THE CONSTRUCTION OF THE ROUNDABOUT ISLANDS CONCRETE WORK.

BOGARD ROAD THROUGH TRAFFIC WILL BE SIMILAR TO PROPOSED TRAFFIC PATTERN. GREEN FOREST DRIVE WILL BE OPEN FOR TRAFFIC UNDER PROPOSED CONDITIONS. ENGSTROM ROAD WILL BE OPEN AND NORTH BOUND WILL BE LIMITED TO EAST LEG ONLY.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:
- 1. CONCRETE WORK ON NORTH AND WEST LEG SEPARATION ISLANDS
 - 2. CENTER CONCRETE WORK

PHASE 5

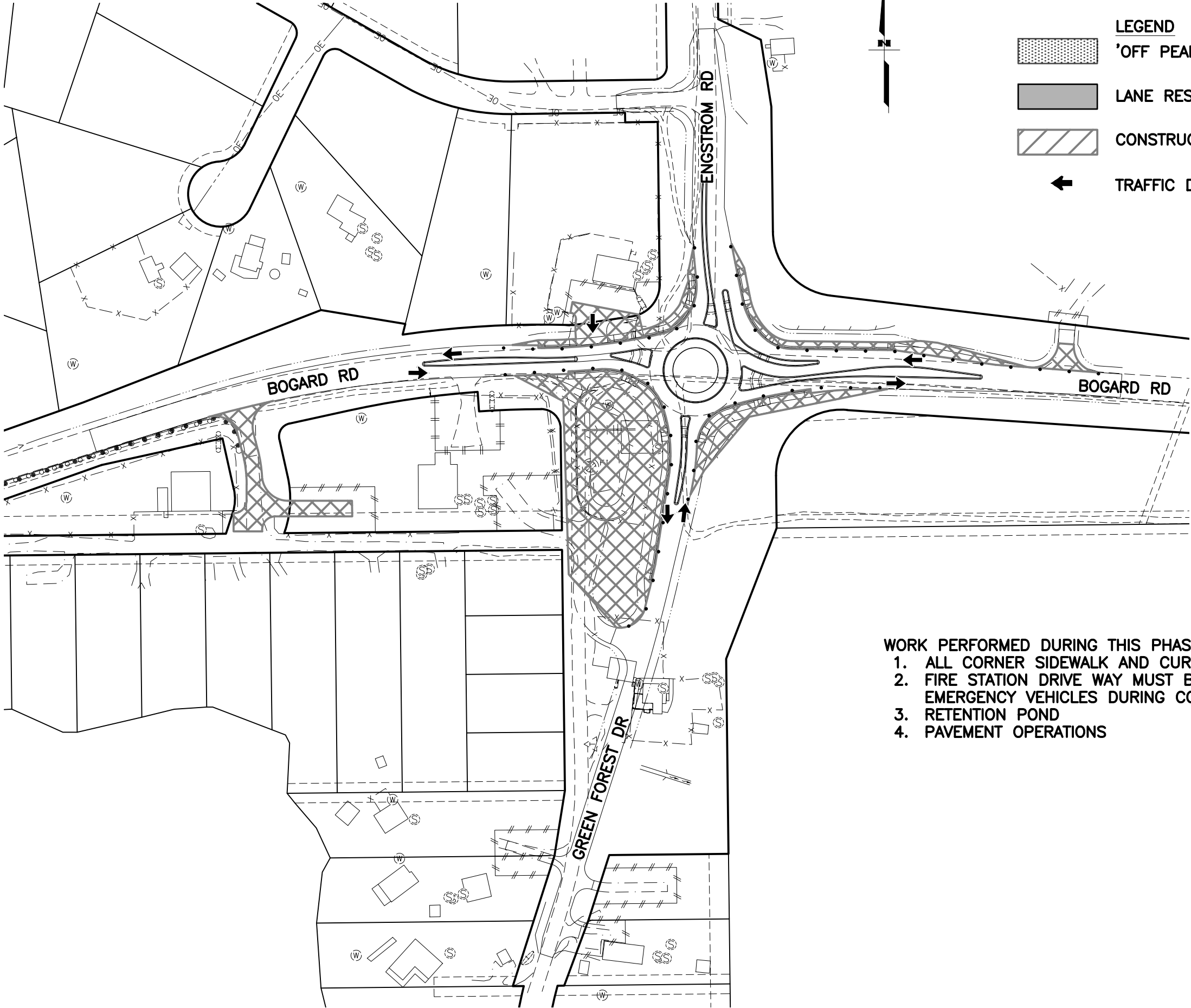
PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J7	J15



LEGEND

- 'OFF PEAK' CONSTRUCTION AREA/PAVEMENT REMOVAL
- LANE RESTRICTIONS
- CONSTRUCTION AREA
- TRAFFIC DIRECTION

CONSTRUCTION PHASE 6
THIS PHASE OF CONSTRUCTION COMPLETES THE ROUNDABOUT, SIDE ROADS, AND REMAINING AREAS OUTSIDE TRAVEL WAY. LANE CLOSURES MAY BE REQUIRED FOR PAVEMENT OPERATIONS AND CONCRETE POURS.

- WORK PERFORMED DURING THIS PHASE TO INCLUDE:
1. ALL CORNER SIDEWALK AND CURB AND GUTTER CONCRETE WORK
 2. FIRE STATION DRIVE WAY MUST BE PARTIALLY ACCESSIBLE FOR EMERGENCY VEHICLES DURING CONSTRUCTION
 3. RETENTION POND
 4. PAVEMENT OPERATIONS

PHASE 6

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

CONSTRUCTION PHASING

DESIGNED BY
CHECKED BY
DRAFTED BY

SCALE

DATE
1/14/2025 1:23 PM

TIME

1/14/2025 1:23 PM

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00656_08-U10_DETOUR ROUTES.DWG

NOTES:

1. ADDITIONAL CLOSURE AND DETOUR DETAILS FOR APPROACHES ON BOGARD ROAD, GREEN FOREST DRIVE, ENGSTROM ROAD AND STRINGFIELD ROAD ARE SHOWN ON SHEET J9A.

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J8	J15

LEGEND

INTERSECTION OF
BOGARD RD AND
ENGSTROM RD
CLOSED
USE DETOUR

CW-SPECIAL #1



M4-9L
48"X36"



M4-103
48"X36"



M4-9R
48"X36"



R11-4
60"X30"



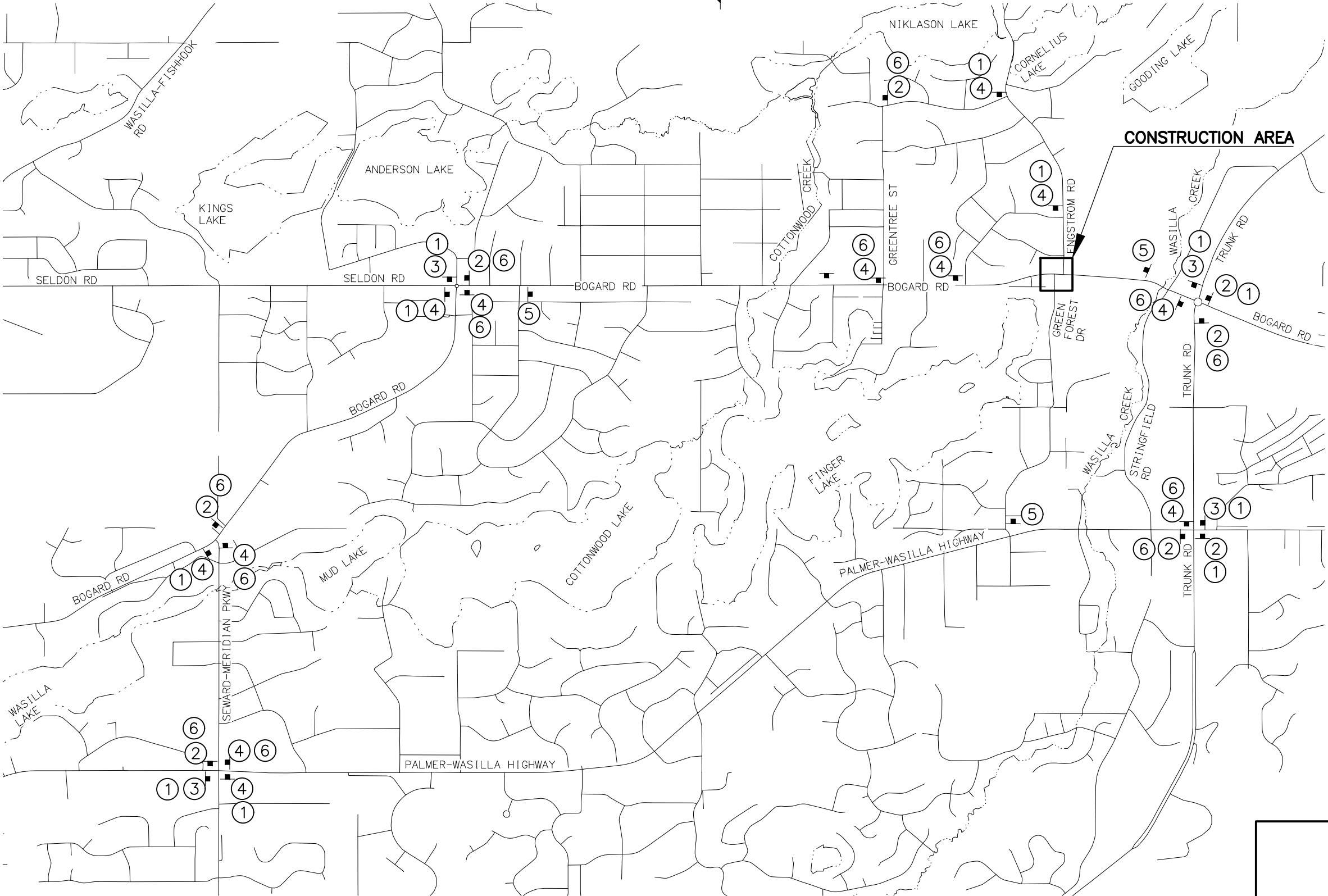
CW-SPECIAL #2

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

TEMPORARY CLOSURE
DETOUR PLAN

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102



DESIGNED BY
CHECKED BY
DRAFTED BY

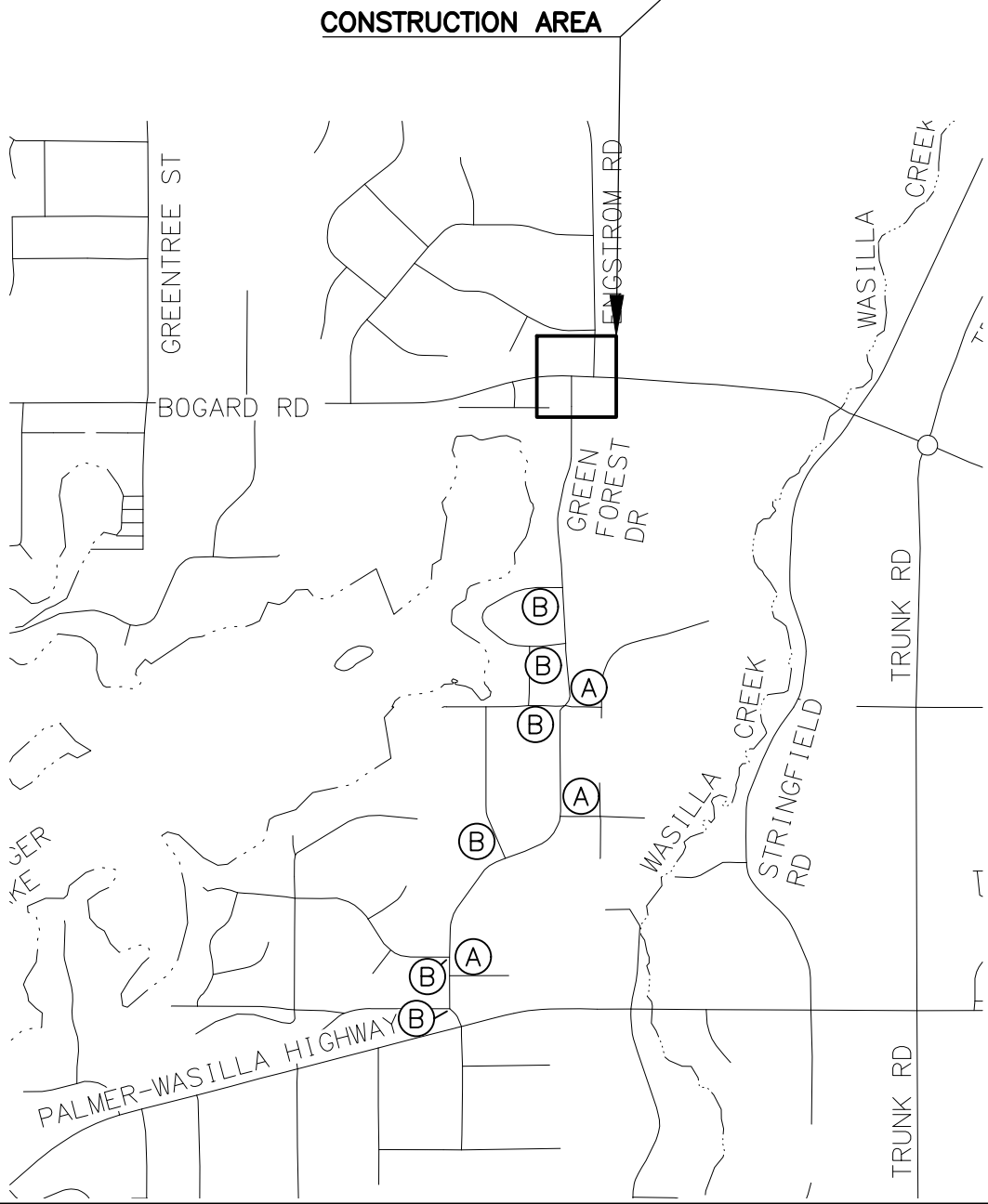
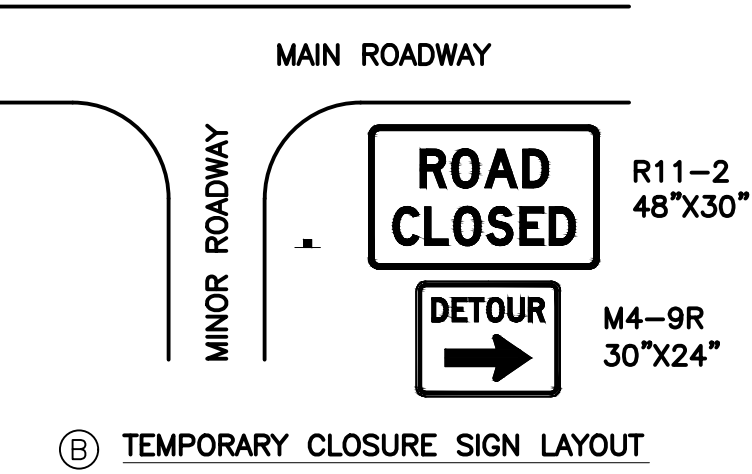
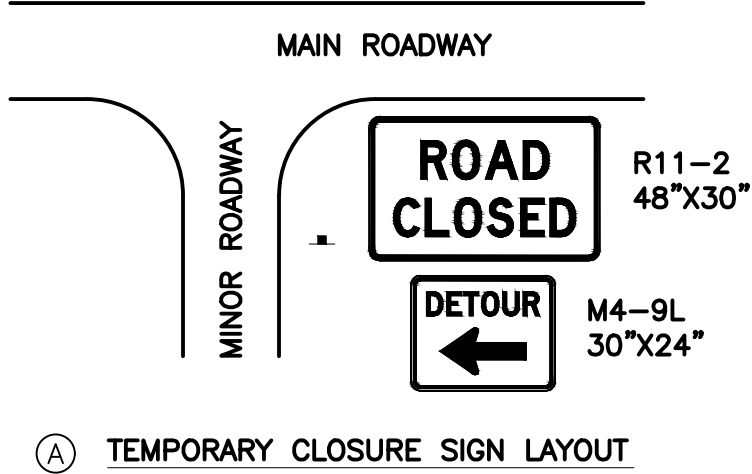
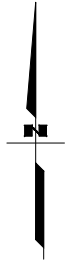
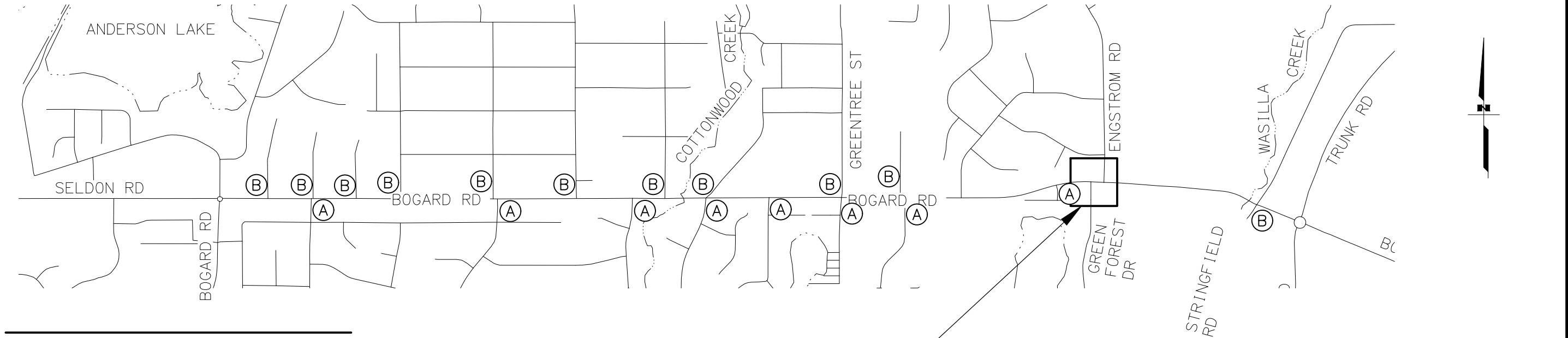
SCALE

DATE
1/14/2025 1:24 PM

TIME

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\CSHEETS\00656_08-U10_DETOUR ROUTES.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J9	J15



PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP**

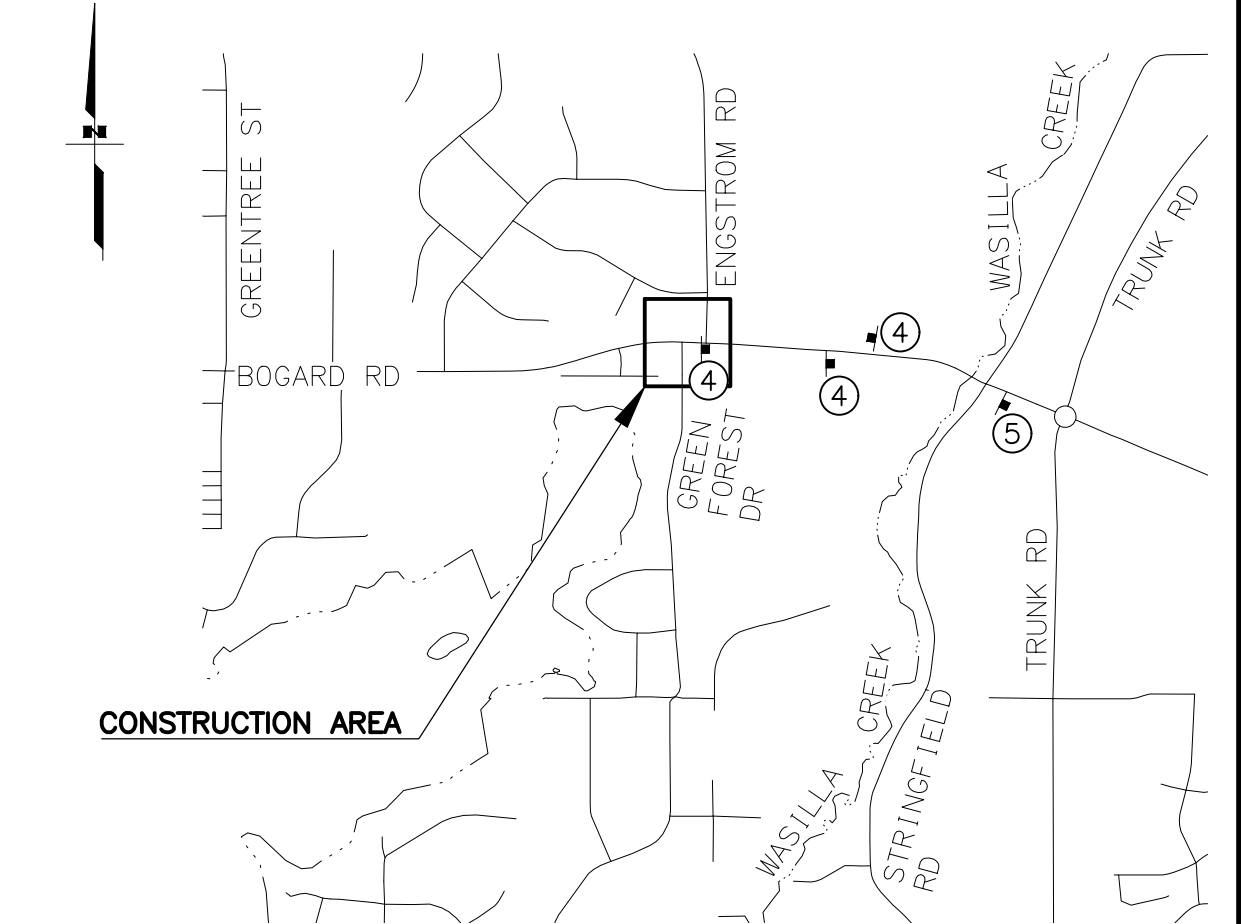
**TEMPORARY CLOSURE
DETOUR PLAN**

DRAWING LOCATION: Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\C\SHEETS\00656_08-U10_DETOUR ROUTES.DWG

DESIGNED BY: _____
CHECKED BY: _____
DRAFTED BY: _____

SCALE: _____
DATE: 1/14/2025
TIME: 1:24 PM

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J10	J15



ENGSTROM RD RIGHT IN/OUT ONLY AND/OR GREEN FOREST DR RIGHT OUT ONLY DETOUR SIGN LAYOUT

LEGEND

① **ROAD CLOSED TO THRU TRAFFIC**
R11-4
60"X30"

② **DETOUR** (Left Arrow)
M4-9L
48"X36"

③ **DETOUR** (Right Arrow)
M4-9R
48"X36"

④ **DETOUR** (Up Arrow)
M4-103
48"X36"

⑤ **ENGSTROM RD DETOUR** (U-turn Arrow)
CW-SPECIAL #3

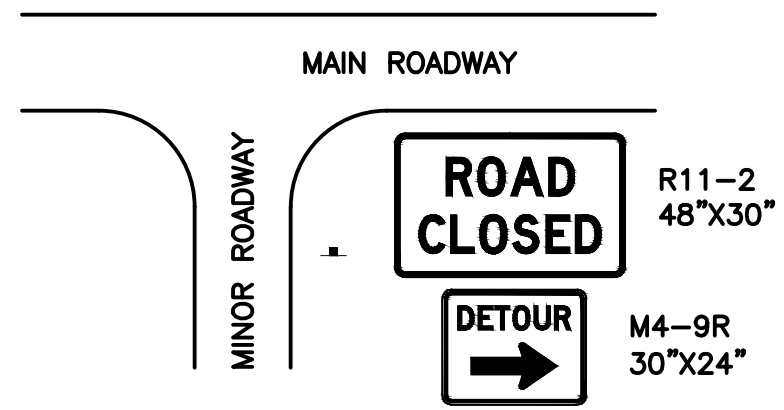
PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

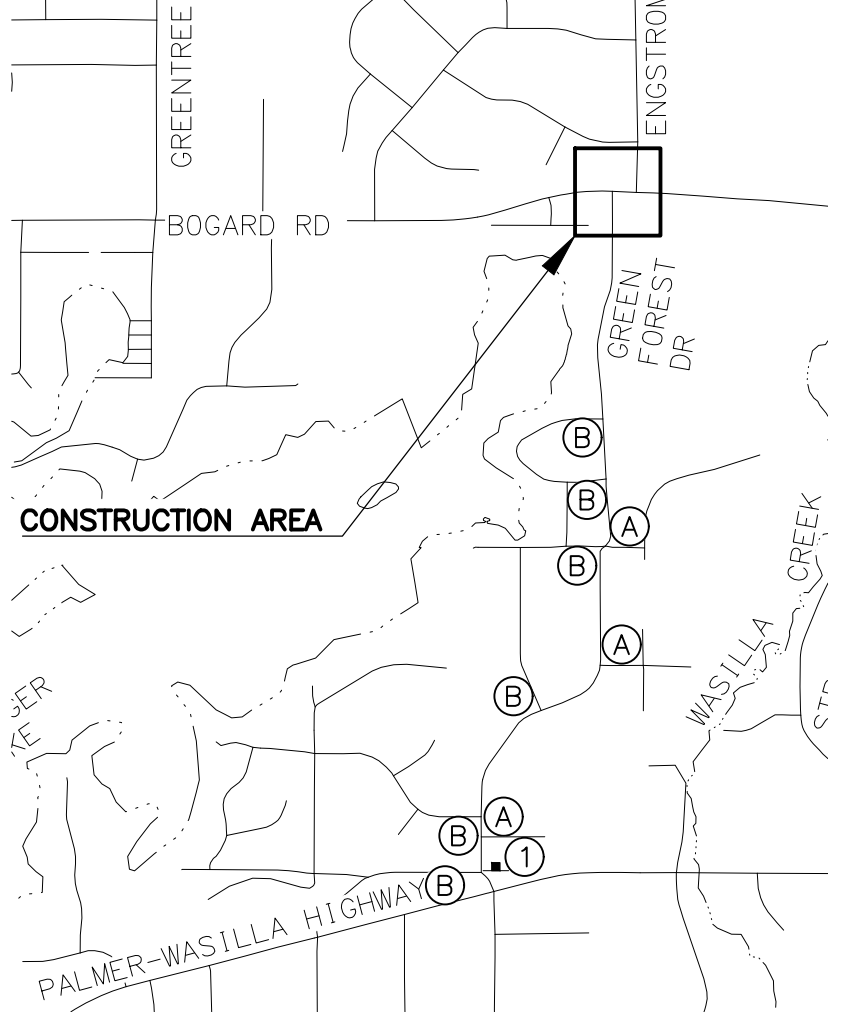
DETOUR ROUTES

① TEMPORARY CLOSURE SIGN LAYOUT



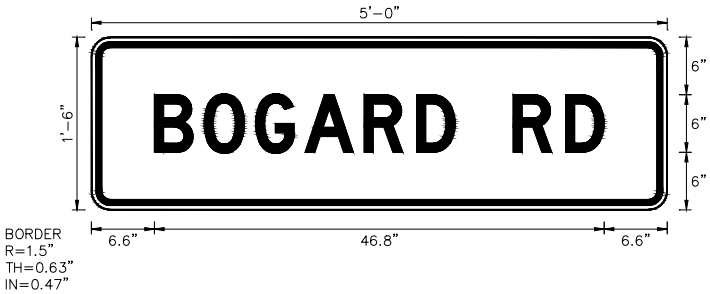
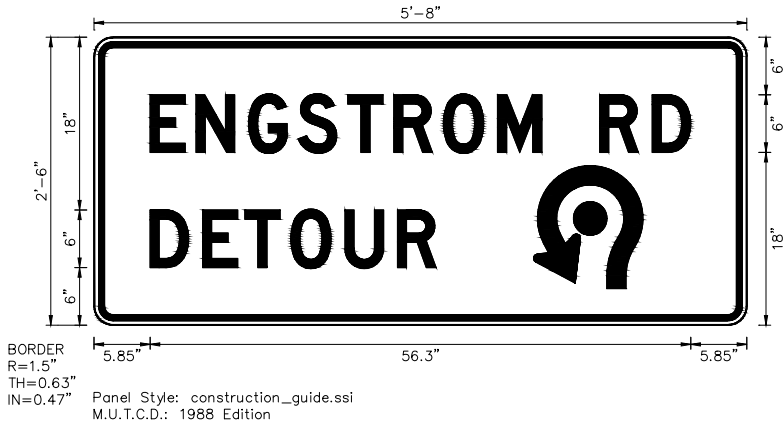
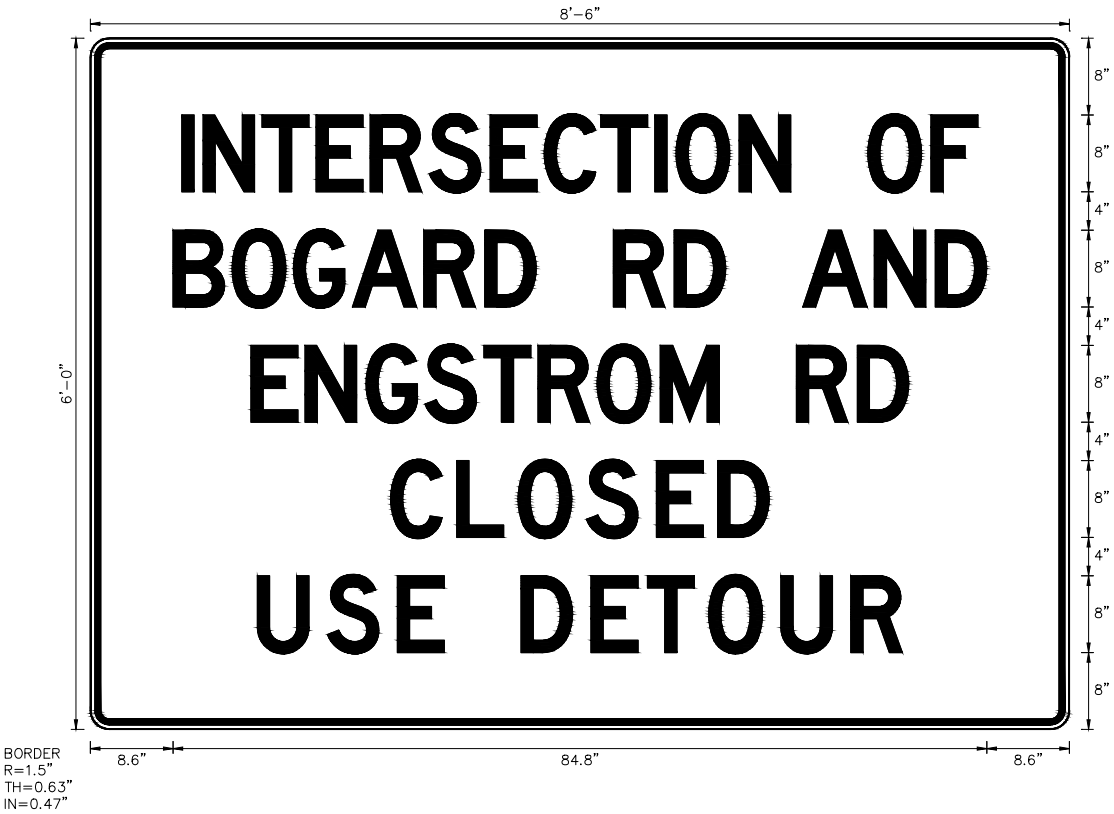
② TEMPORARY CLOSURE SIGN LAYOUT

ENGSTROM ROAD CLOSURE SIGN LAYOUT



GREEN FOREST DR CLOSURE SIGN LAYOUT

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J11	J15



DESIGNED BY
CHECKED BY
DRAFTED BY

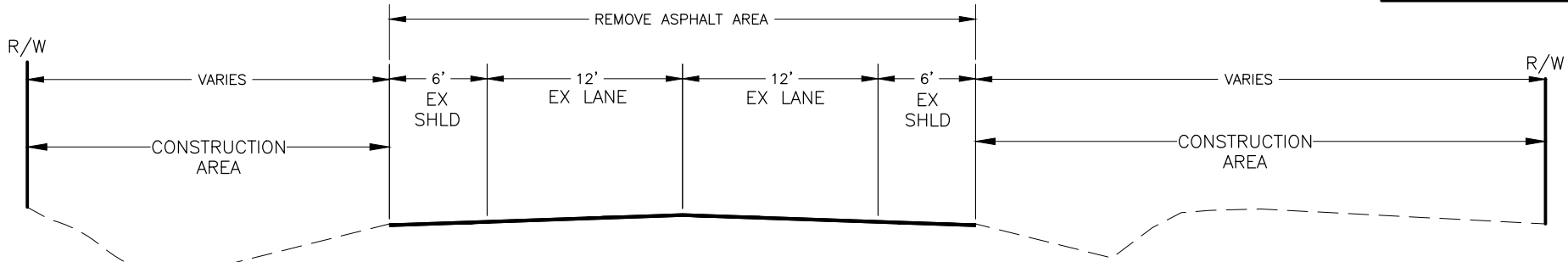
SCALE

DATE
1/14/2025

TIME
1:24 PM

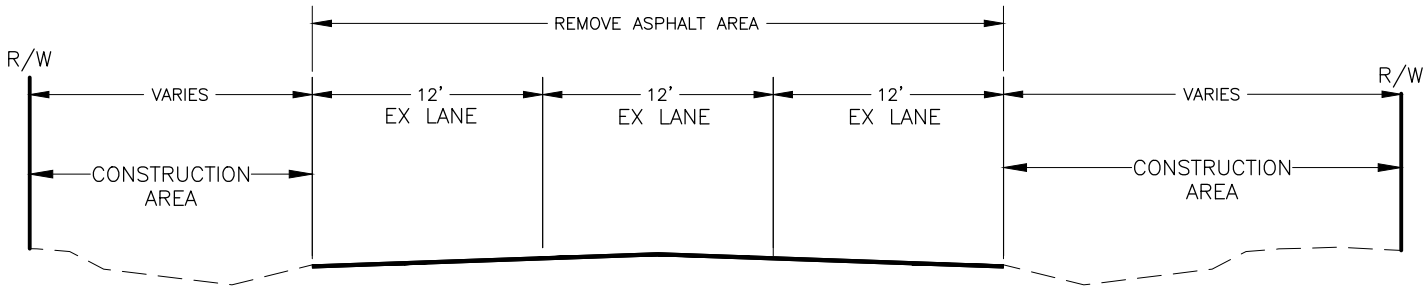
DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\CSHEETS\00656_J12-J13_TYPICAL_SECTION.DWG

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J12	J15



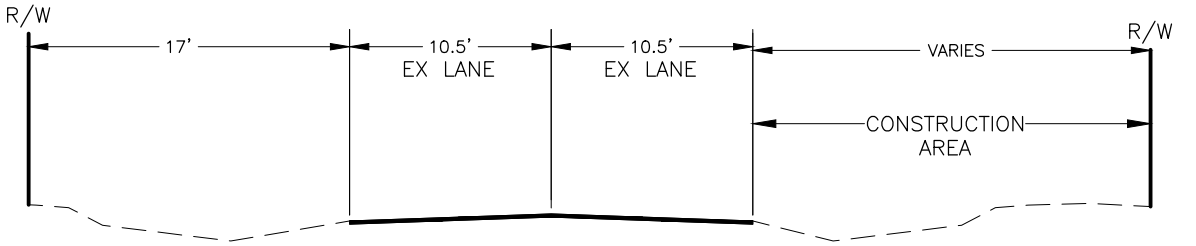
BOGARD ROAD TYPICAL SECTION PHASE 1

EXISTING ROADWAY



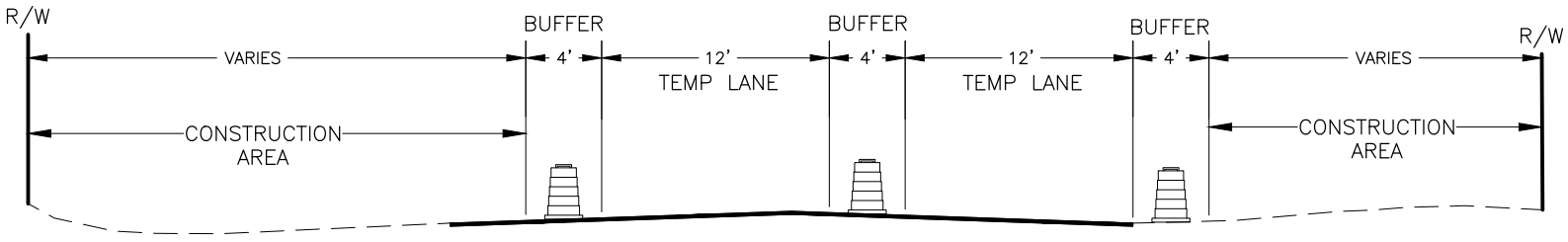
ENGSTROM ROAD TYPICAL SECTION PHASE 1

EXISTING ROADWAY



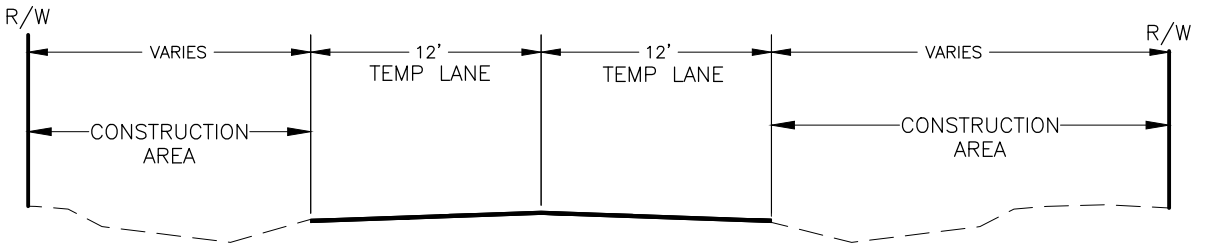
GREEN FOREST TYPICAL SECTION PHASE 1, 2, & 3

EXISTING ROADWAY



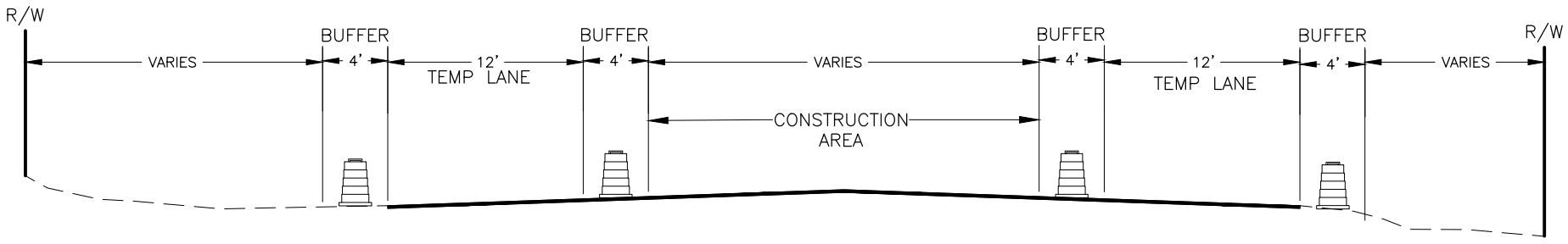
BOGARD ROAD TYPICAL SECTION PHASE 2

ROADWAY SHIFTED SOUTH



ENGSTROM ROAD TYPICAL SECTION PHASE 3

FINISH GRADE ROADWAY



BOGARD ROAD TYPICAL SECTION PHASE 3

SPLIT LANES

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

TYPICAL SECTIONS

DESIGNED BY
CHECKED BY
DRAFTED BY

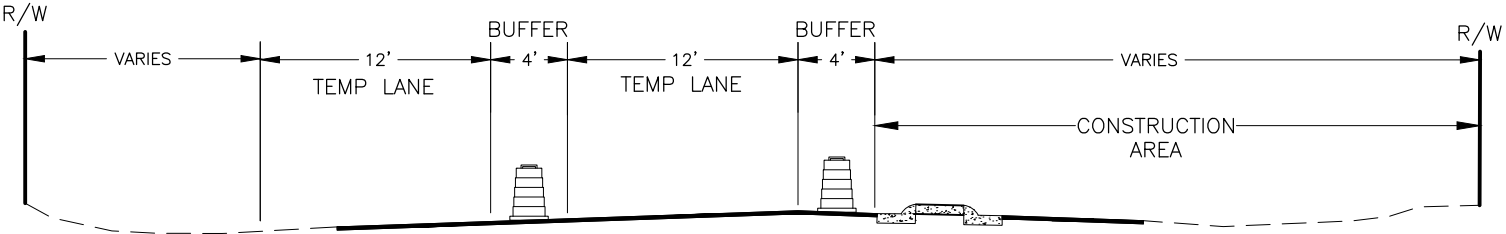
SCALE

DATE
1/14/2025 1:24 PM

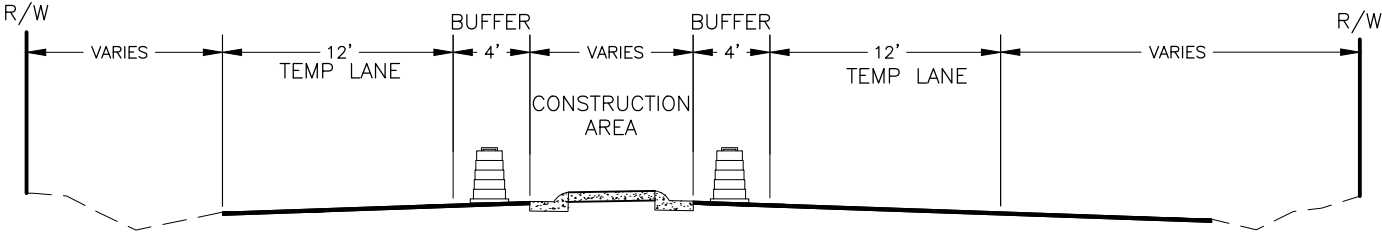
TIME

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_ROUNDABOUT\DWGS\CSHEETS\00656_J12-J13_TYPICAL_SECTION.DWG

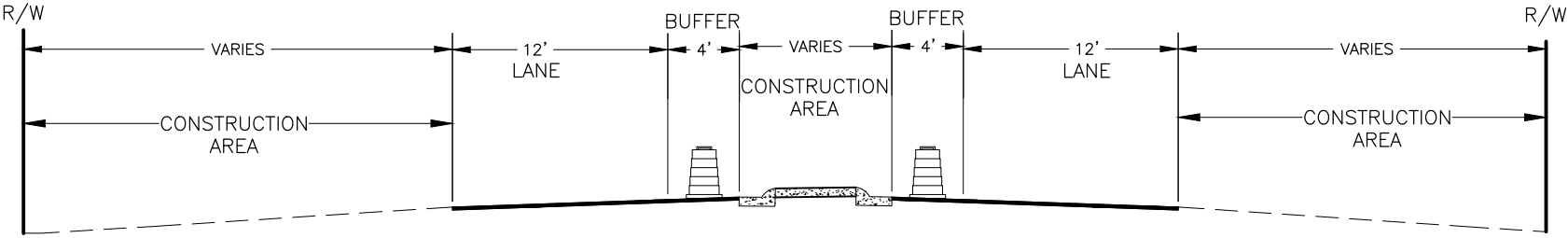
NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J13	J15



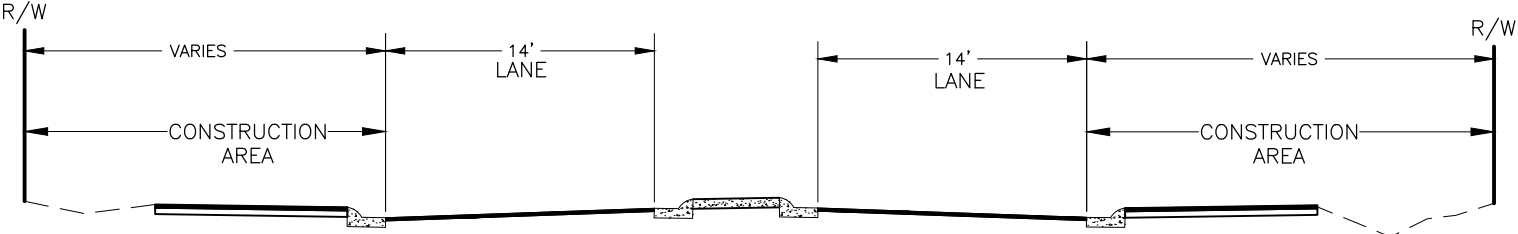
BOGARD ROAD TYPICAL SECTION PHASE 4
ROADWAY SHIFTED NORTH



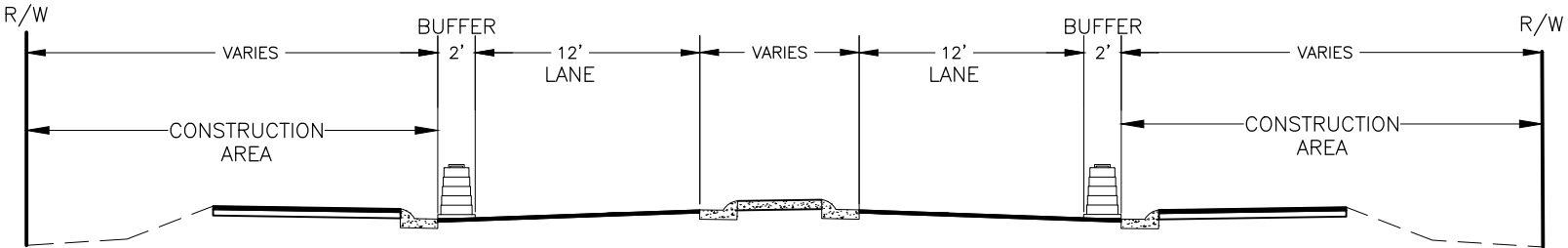
ENGSTROM ROAD TYPICAL SECTION PHASE 4 & 5
ROADWAY MEDIANS



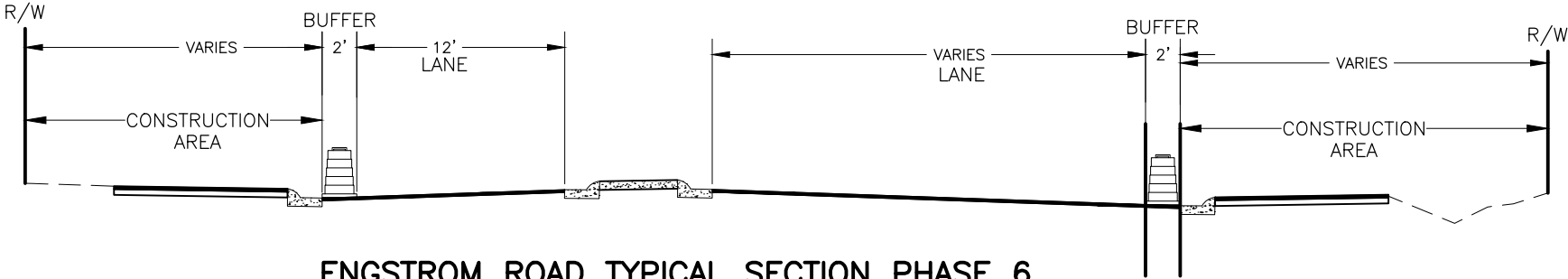
BOGARD ROAD TYPICAL SECTION PHASE 5
ROUNDAABOUT MEDIANS



GREEN FOREST DRIVE TYPICAL SECTION PHASE 5 & 6
PROPOSED ROADWAY



BOGARD ROAD TYPICAL SECTION PHASE 6
OUTSIDE SIDEWALKS



ENGSTROM ROAD TYPICAL SECTION PHASE 6
EXISTING ROADWAY

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

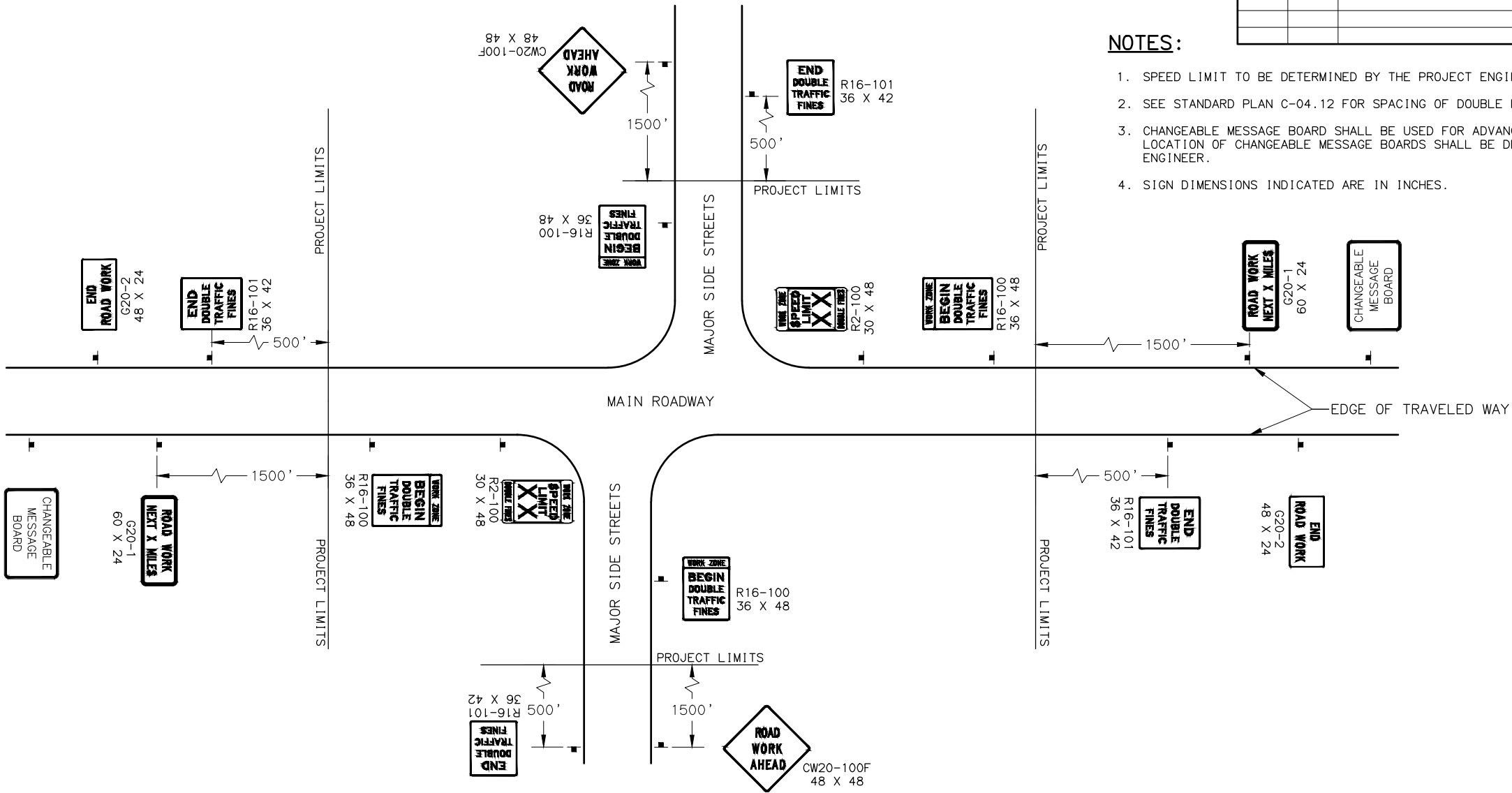
**HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP**

TYPICAL SECTIONS

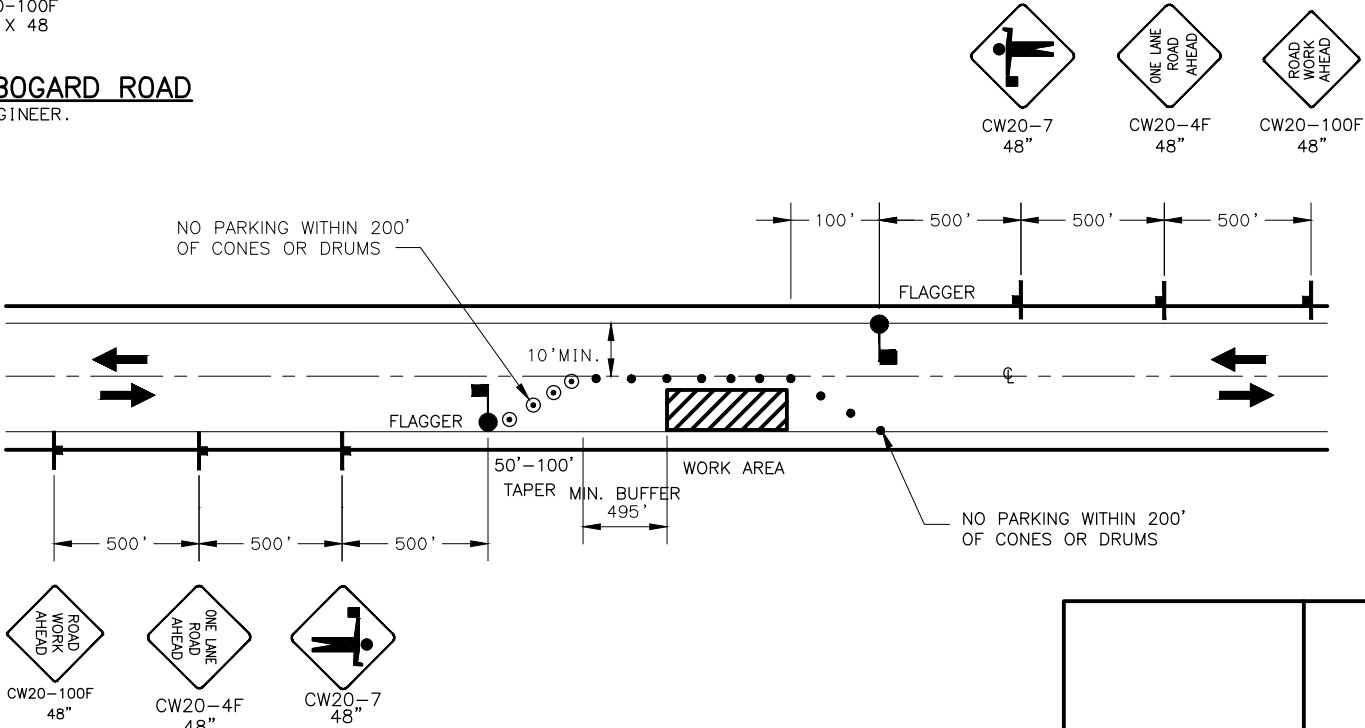
NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J14	J15

NOTES:

- SPEED LIMIT TO BE DETERMINED BY THE PROJECT ENGINEER.
- SEE STANDARD PLAN C-04.12 FOR SPACING OF DOUBLE FINE SIGN.
- CHANGEABLE MESSAGE BOARD SHALL BE USED FOR ADVANCED NOTIFICATION. LOCATION OF CHANGEABLE MESSAGE BOARDS SHALL BE DETERMINED BY THE ENGINEER.
- SIGN DIMENSIONS INDICATED ARE IN INCHES.



PERMANENT CONSTRUCTION SIGNING – BOGARD ROAD
* FINAL LOCATION TO BE DETERMINED BY PROJECT ENGINEER.



SINGLE LANE CLOSURE TWO LANE ROAD
LANE TRAFFIC NTS

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

DETAILS

DESIGNED BY
CHECKED BY
DRAFTED BY

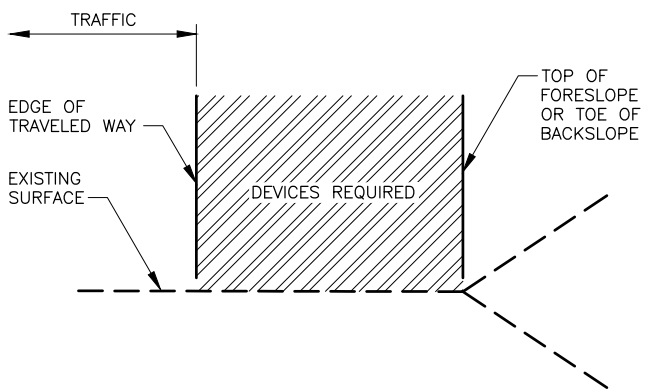
SCALE

DATE
1/14/2025 1:25 PM

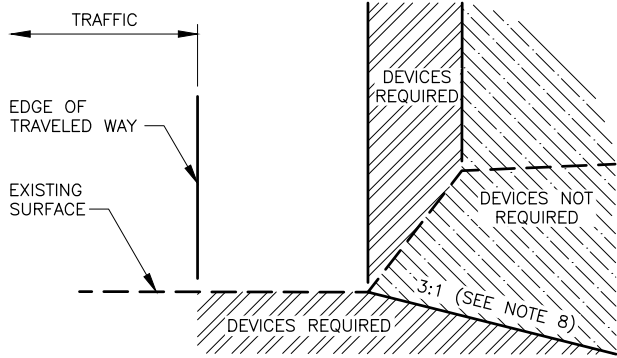
TIME

DRAWING LOCATION
Z:\PROJECTS\00565_BOGARD-ENGSTROM_RNDABT\DWGS\00565_00656_014-J15_PERM_CONST_SIGNS.DWG

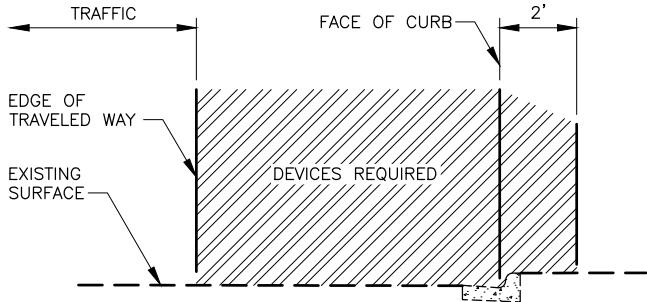
NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	001630/CFHWY00453	2025	J15	J15



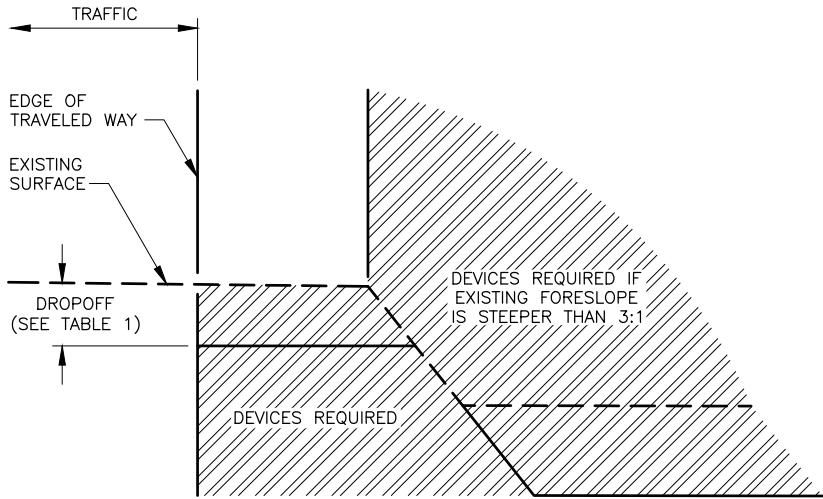
EMBANKMENT SECTION



BACKSLOPE SECTION



CURB AND GUTTER SECTION



FORESLOPE SECTION

NOTES:

- TRAFFIC CONTROL DEVICES REQUIRED BY THE GUIDELINES ON THIS SHEET ARE INTENDED FOR CONDITIONS WHICH WILL BE IN PLACE LONGER THAN ONE CONTINUOUS WORK SHIFT. AN APPROVED TRAFFIC CONTROL PLAN IS REQUIRED PRIOR TO BEGINNING WORK.
- THE EXISTING GROUND CROSS SECTION AT A LOCATION DETERMINES WHETHER TRAFFIC CONTROL DEVICES ARE NEEDED AT THE SAME LOCATION DURING CONSTRUCTION.
- GUARDRAIL EXISTING AT A LOCATION BEFORE CONSTRUCTION SHALL REMAIN IN PLACE DURING CONSTRUCTION OR APPROVED ALTERNATE DEVICES SHALL BE INSTALLED.
- INSTALL TRAFFIC CONTROL DEVICES BETWEEN THE EDGE OF TRAVELED WAY AND THE WORK AREA ON ANY ROADWAY OPENED TO TRAFFIC WHEN REQUIRED BY THIS DRAWING.
- FOR EXISTING ROADWAY ALIGNMENTS INSTALL TRAFFIC CONTROL DEVICES WHEN WORK OCCURS IN THE "DEVICES REQUIRED" AREAS SHOWN ON THIS DRAWING.
- FOR DETOURS, TEMPORARY ROADWAYS, OR NEW ROADWAYS NOT YET COMPLETE, INSTALL TRAFFIC CONTROL DEVICES WHEN ANY OF THE FOLLOWING CONDITIONS EXIST:
 - THE PROPOSED HORIZONTAL OR VERTICAL CURVATURE IS STEEPER THAN THE EXISTING.
 - THE ROADWAY OR SHOULDER WIDTH IS LESS THAN THE EXISTING.
 - THE PROPOSED BACKSLOPE OR FORESLOPE IS STEEPER THAN THE EXISTING.
- FOR DROPOFFS, INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE FORESLOPE SECTION DETAIL AND TABLE 1.
- ON ANY NEWLY CONSTRUCTED SLOPE STEEPER THAN 4:1 BUT FLATTER THAN 3:1, PROVIDE A TEN FOOT FLAT RECOVERY AREA AT THE TOE OF SLOPE OR INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE FORESLOPE SECTION DETAIL.
- TRAFFIC CONTROL DEVICE REQUIREMENTS:
 - ON ROADWAYS WITH A SPEED LIMIT GREATER THAN 40 MILES PER HOUR OR AVERAGE DAILY TRAFFIC VOLUME GREATER THAN 4000 VEHICLES PER DAY, INSTALL TEMPORARY PORTABLE CONCRETE BARRIER OR TEMPORARY GUARDRAIL. ON MULTI-LANE ROADWAYS, CLOSE THE LANE CLOSEST TO THE WORK AREA AND INSTALL DRUMS.
 - TERMINATE RUNS OF TEMPORARY PORTABLE CONCRETE BARRIER USING ONE OF THE FOLLOWING TWO METHODS:
 - TEMPORARY CRASH ATTENUATOR
 - RIGID TO SEMI-RIGID GUARDRAIL TRANSITION WITH AN APPROVED CRASHWORTHY END TREATMENT
 - TERMINATE RUNS OF TEMPORARY GUARDRAIL USING EITHER OF THE FOLLOWING TWO METHODS:
 - AN APPROVED CRASHWORTHY END TREATMENT
 - FLARE THE ENDS OF THE TEMPORARY GUARDRAIL AWAY FROM THE ROADWAY AT A RATE OF 15:1 ON A TRANSVERSE SLOPE OF 10:1 OR FLATTER TO THE OUTSIDE EDGE OF THE CLEAR ZONE.
 - ON ALL OTHER ROADWAYS, INSTALL TYPE II BARRICADES, DRUMS OR DELINEATORS WHEN DEVICES ARE REQUIRED. SPACE THE DEVICES IN ACCORDANCE WITH THE REQUIREMENTS FOR SPACING TYPE II BARRICADES AND DRUMS SET FORTH IN THE ALASKA TRAFFIC MANUAL.
- DO NOT CONSTRUCT VERTICAL DROPOFFS GREATER THAN 1.5" WITHIN THE TRAFFIC LANE OR ACTIVE WHEEL TRACK. PROVIDE 2' OF SHY DISTANCE FROM EDGE OF ALL TRAFFIC CONTROL DEVICES TO THE EDGE OF THE TRAVELED WAY.

TABLE 1
TRAFFIC CONTROL DEVICES REQUIRED FOR VERTICAL DROPOFFS
≤ 4 FEET FROM THE TRAVELED WAY *

ROADWAY TYPE	DROPOFF ≤ 2"	2" < DROPOFF < 12"	DROPOFF ≥ 12"
AVERAGE DAILY TRAFFIC > 4000 OR SPEED > 40 MPH	TAPER ASPHALT AT 1:1 (45°)	TYPE II BARRICADES OR DRUMS	TEMPORARY PORTABLE CONCRETE BARRIER OR TEMPORARY GUARDRAIL
ALL OTHER ROADWAYS	NONE REQUIRED	TUBULAR CANDLES OR DELINEATORS	TYPE II BARRICADES OR DRUMS

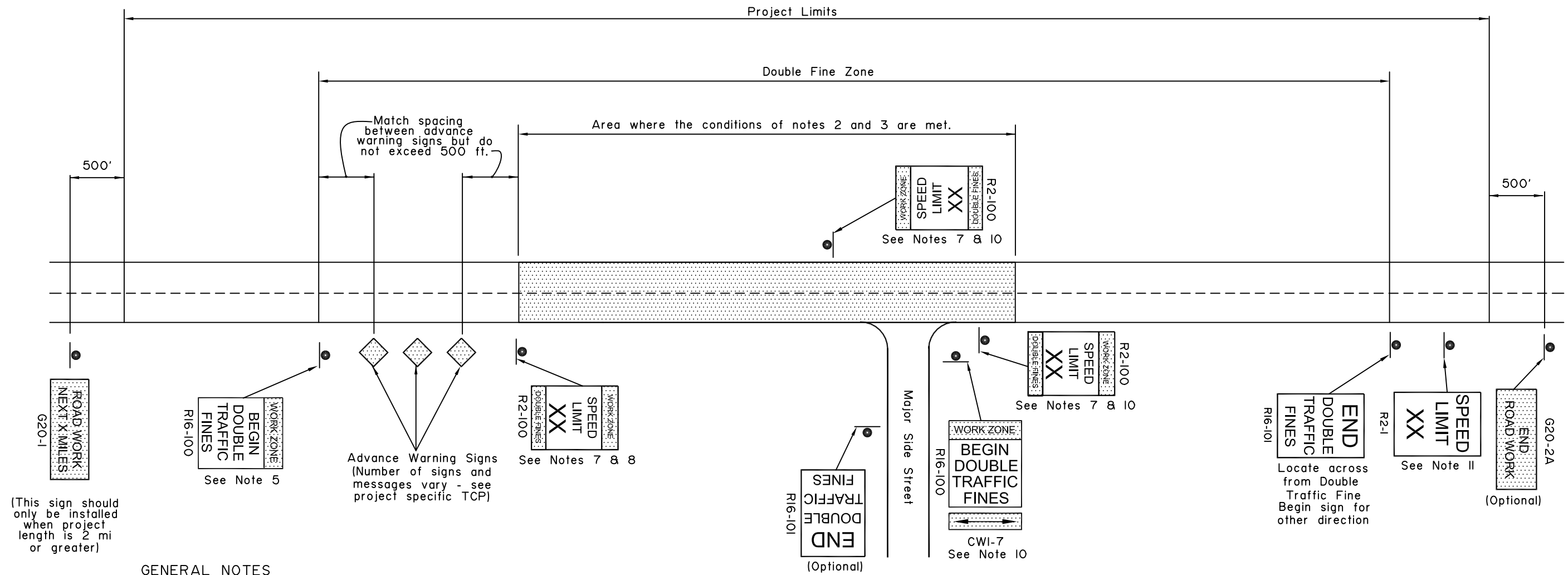
SPACE THE DEVICES IN ACCORDANCE WITH REQUIREMENTS FOR SPACING TYPE II BARRICADES AND DRUMS SET FORTH IN THE ALASKA TRAFFIC MANUAL.

PLANS DEVELOPED BY:
KINNEY ENGINEERING, LLC
3909 Arctic Blvd, Suite 400
ANCHORAGE, AK 99503
(907) 346-2373
CERT. OF AUTH. NO. AECL 1102

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: BOGARD RD AT
ENGSTROM RD & GREEN
FOREST DR INT IMP

TRAFFIC CONTROL DEVICES
FOR ROADSIDES



GENERAL NOTES

- Signs are shown for one direction only (with one exception). Signs for the other direction mirror those shown.
- Double fine signs shall be used only where one or more of the following conditions exist:
 - Active work areas (where road workers and/or machines are presently working on or adjacent to a road)
 - Detours on new temporary roads built for that purpose (this does not include detours on existing streets)
 - Sections of paved roads where pavement has been removed.
 - Roads being paved where unmatched asphalt lifts result in a vertical lip between lanes.
- Double fine signs shall be confined to the areas where the above conditions exist, with the following exceptions:
 - If the project is 2 miles or shorter in length, the entire project may be posted for double fines when the above conditions exist on any part of the project.
 - When the above conditions exist at multiple locations separated by less than 2 miles, the locations and the intervening segments may be posted as a single double fine zone.
- Double fine signs shall be removed or covered when work activity ceases for more than two days and conditions b, c, or d of note 2 are not met.
- The R16-100 "BEGIN" sign may be used in place of the first advance warning sign. However, when this is done, the appropriate advance warning sign must be reinstalled when the double fine sign is taken down or covered.
- When a double fine zone is longer than 2 miles, work zone speed limit signs shall be posted at spacings not greater than 2 miles within the double fine zone.
- "Work zone speed limit signs", as used here, refer either to 1) R2-100 signs or 2) standard R2-1 regulatory speed limit signs with CW20-102 "DOUBLE FINES" plates mounted below.
- The limit shown on work zone speed limit signs shall be either the existing limit before construction or, if a work zone speed limit order has been approved in accordance with ADOT&PF Procedure 05.05.020 PDR, a reduced limit.
- All existing regulatory speed limit signs within double fine zones shall either be replaced with R2-100 signs or supplemented with CW20-102 plates.
- Signs shall be installed at major intersections within the double fine zone to warn entering drivers of double fines. This may be done with a R16-100 sign with a CW1-7 arrow panel on the side street or with two work zone speed limit signs on the main street on either side of the intersection. Use of R16-100 signs on side streets eliminates the need for "Road Work Ahead" signs on those streets. If the speed limit has been reduced, the two work zone speed limit signs are mandatory.
- At the end of each double fine zone, install an R2-1 sign showing the speed limit for the road beyond the double fine zone.

State of Alaska DOT&PF
ALASKA STANDARD PLAN

LOCATION OF
DOUBLE TRAFFIC
FINE SIGNS

Adopted as an Alaska
Standard Plan by:
Kenneth J. Fisher, P.E.
Chief Engineer

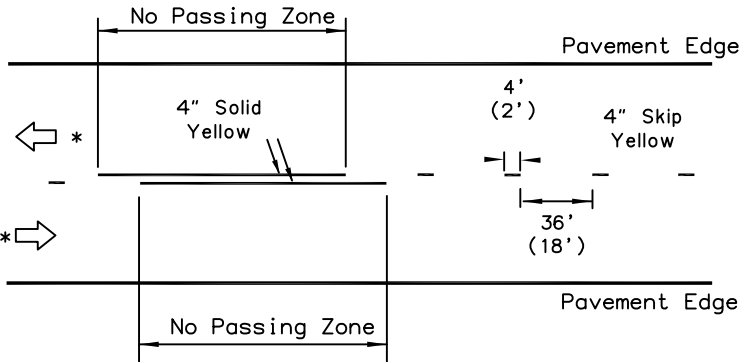
Adoption Date: 02/08/2019

Last Code and Stds. Review
By: Date:

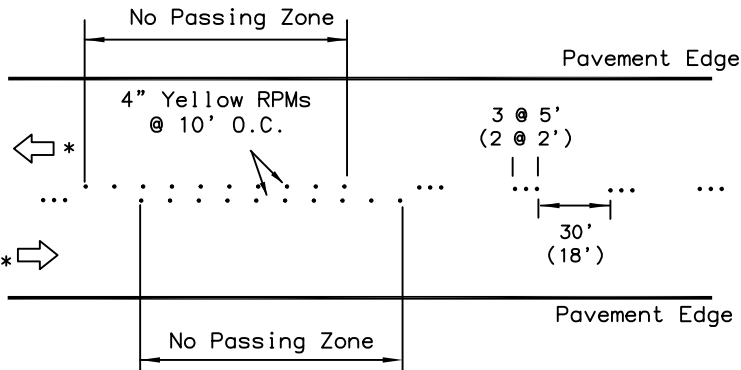
Next Code and Standards Review date: 02/08/2029

GENERAL NOTES:

- Final pavement markings conforming to Part 3 of the Alaska Traffic Manual should be installed before paved roads are open to public travel. If that is not practical, install interim pavement markings as shown on this drawing. Maintain interim pavement markings until final pavement markings are installed.
- No interim pavement markings are required:
 - on projects that will not have permanent markings when finished.
 - in work zones that are open to public travel for no more than one work shift during daytime or for no more than one hour at night.
 - where DO NOT PASS and PASS WITH CARE signs are installed on two lane roads as shown in Detail C, no pavement markings are required:
 - for 3 days if seasonal ADT is above 2000, or
 - for 1 month if seasonal ADT is below 2000.
- Interim pavement markings should not be in place longer than 14 calendar days before being replaced with permanent markings conforming to Part 3 of the Alaska Traffic Manual unless the Engineer provides written approval.
- Where R4-1 DO NOT PASS signs are used, install at the beginning of no passing zones and at no more than 1500' spacings within no passing zones.
- Install high level warning devices on all DO NOT PASS and PASS WITH CARE signs.
- Offset temporary markings 8"-12" from the future location of permanent markings if applied on the same lift of pavement.
- Dimensions in parenthesis apply to curves with a radius of 1000 feet or less or where posted speed limit is 30 mph or less.



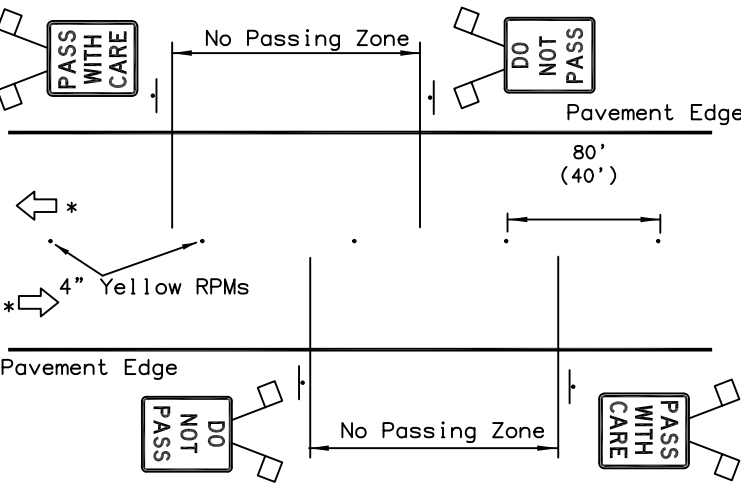
Striping



Temporary Raised Pavement Markers

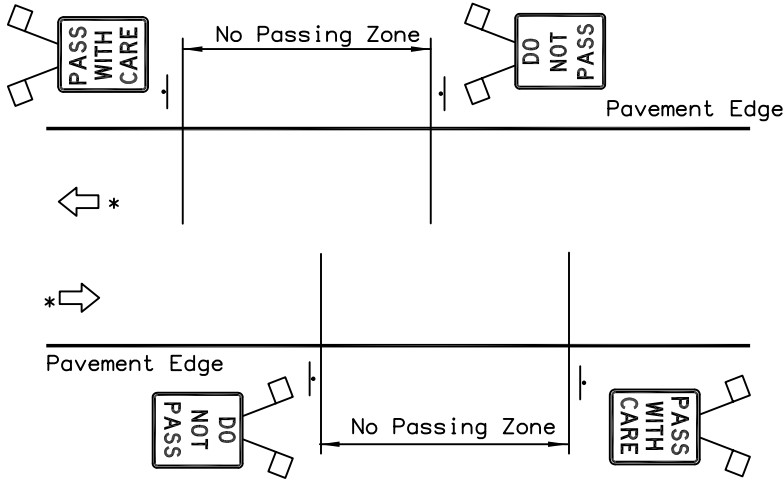
DETAIL A

Two-lane road: No Passing Zones indicated with pavement markings.



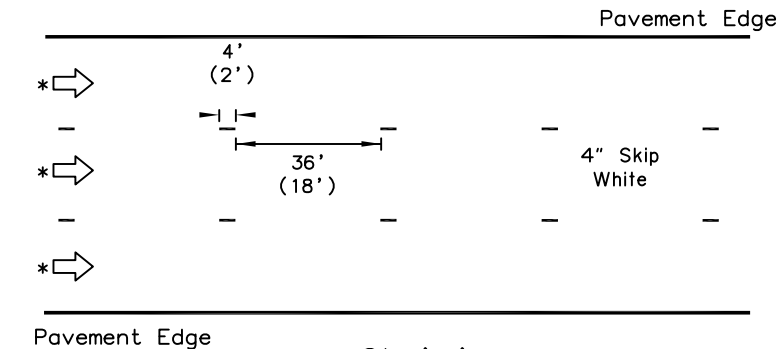
DETAIL B

Two-lane road: No Passing Zones indicated by signs only. Raised pavement markers for centerline delineation.

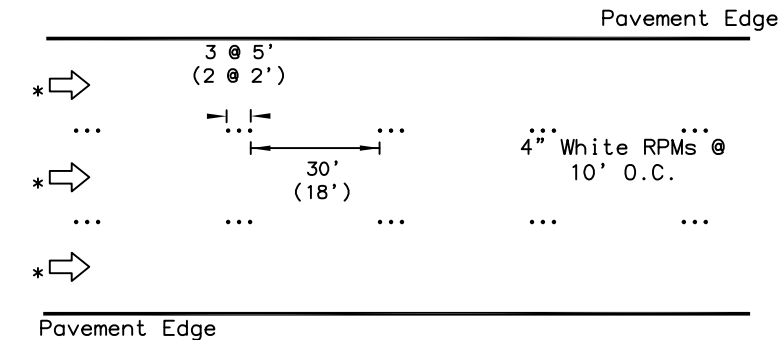


DETAIL C

Two-lane road: No Passing Zones indicated by signs only (see Note 2c). No centerline delineation.



Striping



Temporary Raised Pavement Markers

DETAIL D

Multilane one-way road: Lane dividing lines

* Direction of Travel

State of Alaska DOT&PF
ALASKA STANDARD PLAN
INTERIM
PAVEMENT MARKINGS

Adopted as an Alaska
Standard Plan by:
Kenneth J. Fisher, P.E.
Chief Engineer

Adoption Date: 02/08/2019

Last Code and Stds. Review
By: Date:

Next Code and Standards Review date: 02/08/2029

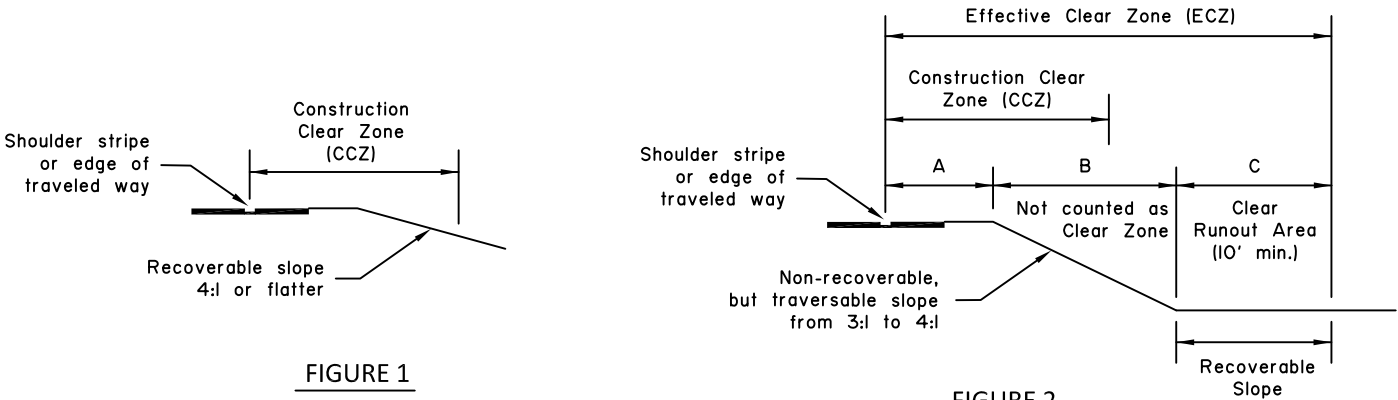


FIGURE 1

FIGURE 2

Table 1 - Width of Construction Clear Zone (feet)									
Hazard	AADT	Posted Speed Limit (MPH)							
		<=30 MPH		35 to 40 MPH		45 to 55 MPH		>=60 MPH	
		6:1 or flatter	5:1 to 4:1	6:1 or flatter	5:1 to 4:1	6:1 or flatter	5:1 to 4:1	6:1 or flatter	5:1 to 4:1
Fill (Fore) & Cut (Back) Slopes	Under 750	5'	5'	6'	8'	8'	12'	12'	16'
	750 - 6,000	6'	10'	8'	12'	14'	18'	20'	26'
	Over 6,000	10'	10'	12'	14'	16'	20'	22'	28'
Fixed Objects	All	15'		30'					

Table 2 - Treatment for Hazards Within Construction Clear Zone		
Roadside Condition to be Treated	Category	Treatment
Fill (Fore) Slopes, including trenches	Steeper than 3:1 or water 3 ft. or deeper	Use Table 5 to select from the following two options: 1. Install rigid barrier or guardrail if the condition warrants barrier, or 2. Use drums or Type II barricades if the condition does not warrant barrier.
	3 : 1 to 4 : 1	1. Use drums or Type II barricades if 10 ft. of runout at the bottom of the slope is not clear of obstructions. 2. No traffic control devices are required if 10 ft. of runout at the bottom of the slope is clear of obstructions. 3. If water 3 ft. or deeper is at bottom of slope, use Table 5.
	Flatter than 4 : 1	No traffic control devices are required, except when water 3 ft. or deeper is in construction clear zone use Table 5.
Fixed Objects	All	Install rigid barrier or guardrail if called for by the plans or specifications. Otherwise use SSHC Section 643-3.04.3 - Fixed Objects.

GENERAL NOTES:

- The "Construction Clear Zone" (CCZ) may be called "Work Zone Clear Zone" or "Clear Zone in Work Zones" in other publications.
- In the case of conflicts, this Standard Plan has lesser precedence than Section 643 (Traffic Maintenance) of the Standard Specifications for Highway Construction (SSHC).
- During seasonal shutdown or if construction activity is scheduled for suspension for 45 days or more, treat hazards within a 30 foot CCZ width or within the permanent design clear zone (CZ) width.
- These guidelines are not comprehensive and are not intended to limit the use of safety measures.
- During pilot car operations, keep fixed objects and other hazards, 2 feet or farther, away from the edge of traveled way and delineate with channelizing devices as required by the Engineer.

INSTRUCTIONS FOR USING TABLES 1 THROUGH 5:

Use The following tables to determine how to treat roadside fixed object or slopes (including trenches, berms and material stockpiles) in construction clear zones.

TABLE 1: Use to determine whether the hazard is within the CCZ

TABLE 2: Use to determine the appropriate treatment for hazards within the CCZ. No treatment is required for fixed objects or slopes outside the CCZ.

TABLES 3a and 3b: Use to determine appropriate treatment for pavement edge dropoffs.

TABLE 4: Use to determine barrier flare rates.

TABLE 5: Use to determine whether drums or Type II barricades, or temporary barrier or guardrail, are required on fill slopes or for water hazards.

TABLE 1 NOTES:

- Measure CCZ from the shoulder stripe. If there is no shoulder stripe, measure from the edge of the traveled way. See Figure 1.
- If CCZ includes or ends on a slope of 3:1 to 4:1, use the Effective Clear Zone (ECZ) that extends beyond the bottom of the slope to provide a clear runout area of 10 foot minimum width. The ECZ width must equal or greater than the CCZ width from Table 1. See Figure 2 and verify that A+C ≥ CCA and C ≥ 10 feet.
- If a CCZ includes or ends on a slope steeper than 3:1, the top of slope must be delineated by channelizing devices or protected by barrier.
- The term "fixed objects" is defined in Section 643-1.02 of the SSHC.
- AADT stands for Average Annual Daily Traffic. Use the higher of the as listed in the plans or the average of June/July/August ADT's, unless otherwise specified by the Engineer.

TABLE 2 NOTES:

- Eliminate non-traversable slopes (those steeper than 3:1) and fixed objects (as defined in Section 643-1.02 of the SSHC) within the CCZ when practicable. They should only be left in place and treated as shown in this table when elimination is not practicable.
- Maintain a 2-foot minimum wide lateral buffer space between the edge of traveled way and work areas. This provides an area to install barriers or other delineation by channelizing devices.
- If necessary to treat multiple hazards on the same road segment (slopes and fixed objects), choose treatments from Table 2 that satisfy the requirements for the most significant of the multiple hazards.

State of Alaska DOT&PF
ALASKA STANDARD PLAN
ROADSIDE SAFETY TREATMENT
FOR WORK ZONES

Adopted as an Alaska Standard Plan by: *Carolyn A. Morehouse*

Carolyn Morehouse, P.E.
Chief Engineer

Adoption Date: 09/15/2022

Last Code and Stds. Review
By: LRG Date: 09/15/2022

Next Code and Standards Review date: 09/15/2032

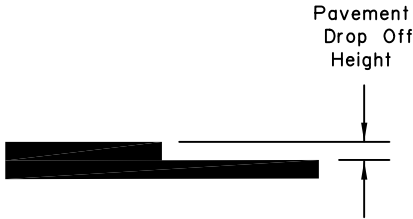


FIGURE 3
Pavement Drop-off Detail

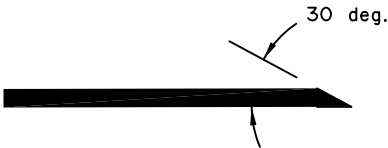


FIGURE 4
Safety Edge Detail

Table 3a - Treatment for Pavement Edge Drop-offs for Posted Speeds > 30 MPH

Nominal Lift Thickness / Height of Pavement Edge Drop-off	Between Active Lanes of traffic moving in same direction	Between Active Lanes of traffic moving in opposing directions	Outside Pavement Edge (if within 3' of traveled way)	Outside Pavement Edge if more than 3' from traveled way and within the CCZ	Across Active Lane, and Entrance and Exit Ramps
0 to 1.0"	No Edge Treatment or Signage Required				
More than 1.0" to 2.0"	UNEVEN LANE Signs		LOW SHOULDER Signs		Taper Drop-off at slope of 15H:1V or flatter Use BUMP Sign
More than 2.0" to 3.0"	UNEVEN LANES Signs - Use Channelizing Devices or Safety Edge	UNEVEN LANES Signs - Use Channelizing Devices	LOW SHOULDER Signs - Use Channelizing Devices - Consider Safety Edge	LOW SHOULDER Signs	
More than 3.0" to 6.0"	UNEVEN LANES Signs - Use Channelizing Devices and Use Safety Edge	UNEVEN LANES Signs - Use Channelizing Devices	SHOULDER DROP OFF Signs - Use Channelizing Devices and Safety Edge; or Use Barrier	SHOULDER DROP OFF Signs - Use Channelizing Devices or Barrier	
More than 6"	Prohibited		Barrier - Installed on traffic side of drop-off	Channelizing Devices or Barrier according to Table 5	

Table 3b - Sign Numbers

Legend	Number	ATM * Ref.
UNEVEN LANES	W8-11	6F.45
LOW SHOULDER	W8-9	6F.44
SHOULDER DROP OFF (Symbol)	W8-17	6F.44
SHOULDER DROP OFF (Plaque)	W8-17P	6F.44
BUMP	W8-1	2C.28
* ATM = Alaska Traffic Manual		

Table 4 - Barrier Flare Rates

Speed (mph)	Flare Rate	
	Rigid	Semi-Rigid
70	20:1	15:1
60	18:1	14:1
55	16:1	12:1
50	14:1	11:1
45	12:1	10:1
40	10:1	8:1
30	8:1	7:1

TABLE 3 NOTES:

1. This table applies to pavement edge drop-offs that are adjacent to traffic and left after the pavement shift ends and for posted speeds > 30 mph. Use engineering judgment for edge treatment for posted speeds ≤30 mph.
2. Use interim pavement markings and signs as required according to Standard Plan C-05 (for all conditions).
3. A Safety Edge is a formed pavement edge taper sloped at approximately 30°, but not more than 35° from horizontal.
4. Use a Safety Edge for longitudinal or diagonal pavement edge drop-offs more than 2 inches within a traveled lane. See Figure 3. Use a Safety Edge on longitudinal joints between lanes as required by Table 3a.
5. The "Across Active Lane, and Entrance and Exit Ramps" column applies to any location where motorists will cross pavement drop-offs (includes transverse construction joints) at an acute angle (45° or more). Taper may be reduced to 6:1 at posted speeds of 30 mph or less.
6. Signage applies to all posted speed for edge drop-offs as shown in Table 3a. For information on signs and locations, see SSHC Section 643-3.04 and the Alaska Traffic Manual (ATM). Signs should be place at the beginning and end points of each paved segment, and in locations between as specified. Also, see Table 3b.
7. "Channelizing Devices" means drums with steady-burn lights, candle, or cones.
8. Treatment for pavement edge drop-offs are in addition to Treatment for Hazards within Construction Clear Zones (CCZs) (i.e. fixed obstacle or slope protection may also be required).

BARRIER TERMINATION AND TABLE 4 NOTES:

1. Terminate portable rigid barrier (concrete or metal) with one of the following methods:
 - a) An NCHRP 350 or MASH TL-3 approved end treatment or crash cushion.
 - b) An NCHRP 350 or MASH TL-3 approved buried-in-backslope treatment
 - c) A Thrie-Beam transition according to Std. Plan G-32 (except attached to a rigid barrier instead of a bridge rail) and terminated with a MASH TL-3 end treatment.
 - d) Terminate outside the CCZ by flaring barriers away from the roadway at the rate shown in Table 4 for rigid barriers (maximum 10:1 cross slope in front of the barrier).
 - e) Sloped ends may be used to terminate barriers within the CZ when the regulatory (black on white sign) speed limit is 30 mph or below. For speeds more than 30 mph, the Engineer may approve sloped ends if they determine NCHRP 350 or MASH compliant end treatments are impracticable. See Std. Plan G-46 for concrete barrier sloped ends.
2. Terminate temporary W-Beam guardrail with one of the following methods:
 - a. With a MASH TL-3 approved end treatment
 - b. By burying it in a backslope according to Std. Plan G-16
 - c. By flaring the guardrail away from the road at the rate shown in Table 4 for semi-rigid barriers (maximum 10:1 cross slope in from of the guardrail).
 - d. Terminate outside the CZ.

State of Alaska DOT&PF
ALASKA STANDARD PLAN

ROADSIDE SAFETY TREATMENT
FOR WORK ZONES

Adopted as an Alaska
Standard Plan by: *Carolyn H Morehouse*
Carolyn Morehouse, P.E.
Chief Engineer

Adoption Date: 09/15/2022

Last Code and Stds. Review
By: LRG Date: 09/15/2022

Next Code and Standards Review date: 09/15/2032

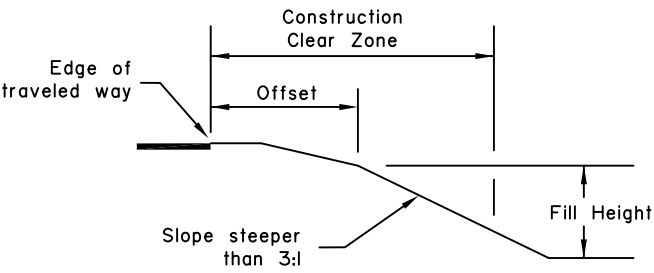


FIGURE 5

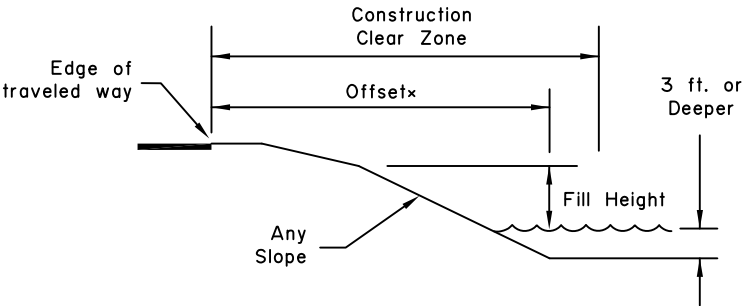


FIGURE 6

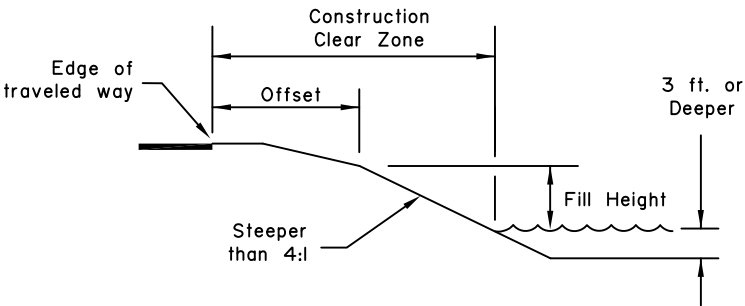


FIGURE 7

TABLE 5 NOTES:

1. Use this table for fill slopes steeper than 3:1 or water hazards that start within the Construction Clear Zone (CCZ). See Figures 5, 6, and 7.
2. Near Lane AADT, as used in this table, means the higher of the AADT listed in the plans or the seasonal Average Daily Traffic (ADT) for June, July, and August in the lane nearest the slope or water hazard during the planned construction period. Assume an even distribution of traffic across lanes - i.e. if there is 6000 one-way AADT on three lanes, use 2000 AADT in each lane.
3. Duration is the estimated number of days traffic will be exposed to the fill (fore) slope or water hazard.
4. To use Table 5, find the cell that corresponds to the speed limit, duration, offset, traffic volume, and the presence of a slope or water hazard.
 - a. If the cell is unshaded, a Temporary Barrier is required when the fill height equals or exceeds the height (in feet) shown in the cell.
 - b. If the cell is shaded or fill height is less than the height shown in the cell, use drums or Type II barricades.
5. A water hazard is defined as:
 - a. Water 3 feet or deeper within the CCZ, or
 - b. Where a slope steeper than 4:1 starts within the CCZ and leads to water 3 feet or deeper.
6. Consider water depth to be the highest level anticipated during the duration period.
7. If both a water hazard and a slope steeper than 3:1 are present, install Temporary Barrier if warranted for either condition.
8. Temporary Barrier is rigid barrier (concrete or metal) or guardrail meeting NCHRP or MASH TL-3, or higher.

			Table 5 - Minimum Fill Height at which Temporary Barrier Is Waranted															
			Seasonal Traffic Volume - ADT															
			0-750	751-1500			1501-6000				6001-15000				15001+			
Posted WZ Speed Limit	Duration (# days)	Offset (ft)	All Slopes/ Water Condition	slope		Water	slope			Water	slope			Water	slope			Water
				2.9:1 to 1.1:1	1:1 to Vert.		2.9:1 to 2.1:1	2:1- 1.1:1	1:1- Vert.		2.9:1 to 2.1:1	2:1- 1.1:1	1:1- Vert.		2.9:1 to 2.1:1	2:1- 1.1:1	1:1- Vert.	
30 MPH and lower	4-30	5-10																
		3-5														11'	11'	
		0-3											11'	11'				
	31-100	5-10																
		3-5							11'	11'						35'	11'	11'
		0-3											35'			31'		
	101+	5-10							11'	11'						35'	11'	11'
		3-5											35'	11'	11'		29'	
		0-3			11'	11'							31'			17'	8'	8'
35 to 45 MPH	4-30	6-12																
		3-6															10'	10'
		0-3														29'		
	31-100	6-12							10'	10'						29'	10'	10'
		3-6											29'	10'	10'		19'	9'
		0-3															27'	10'
	101+	6-12							10'	10'						29'	10'	10'
		3-6			10'	10'							28'	10'	10'		12'	7'
		0-3					29'						18'	9'	9'		7'	6'
45 to 55 MPH	4-30	9-18																
		3-9																
		0-3														8'	8'	
	31-100	9-18							8'	8'						13'	8'	8'
		3-9											13'	8'	8'		7'	7'
		0-3							13'							7'	6'	6'
	101+	9-18											13'	8'	8'		13'	7'
		3-9			8'	8'							12'	7'	7'	37'	6'	5'
		0-3							13'	8'	8'			7'	6'	6'	23'	5'
60 MPH and above	4-30	13-26																
		3-13																
		0-3											10'	6'	6'		10'	6'
	31-100	13-26															10'	6'
		3-13																
		0-3							10'	6'	6'					40'	6'	5'
	101+	13-26															10'	6'
		3-13			6'	6'							10'	6'	6'		30'	6'
		0-3							10'	6'	6'		34'	6'	5'	5'	10'	3'

State of Alaska DOT&PF
ALASKA STANDARD PLAN

ROADSIDE SAFETY TREATMENT
FOR WORK ZONES

Adopted as an Alaska
Standard Plan by: *Carolyn H Morehouse*
Carolyn Morehouse, P.E.
Chief Engineer

Adoption Date: 09/15/2022

Last Code and Stds. Review
By: LRG Date: 09/15/2022

Next Code and Standards Review date: 09/15/2032

MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities
Design and Engineering Services – Central Region
Highway Design

TO: File

DATE: January 31st, 2025

TELEPHONE NO:

FROM: Iain McPherson, PE

SUBJECT: **Traffic Control Plan Background**

THROUGH: Joshua E. Cross, PE, PTOE

HSIP: Bogard Rd at Enstrom Rd &
Green Forest Dr Intersection
Improvements

0001630/CFHWY00453

This memo summarizes an evaluation of construction traffic control plan phasing for HSIP: Bogard Rd at Enstrom Rd & Green Forest Dr Intersection Improvements.

Construction Phasing is based on consultation with the DOT&PF Design Team, guidance in National Cooperative Highway Research Program (NCHRP) Report 672 Section Edition Chapter 10, the Alaska Traffic Manual, and the DOT&PF Highway Preconstruction Manual Chapter 14.

NCHRP Report 672 provides guidance for roundabout construction phasing and states the goal of phasing is to “minimize staging and to provide large sections of the project to construct during each construction stage”. Chapter 10 presents 3 construction staging options:

1. Construction under no traffic
2. Construction with some traffic diverted
3. Construction under full traffic

Construction under no traffic (Staging Option 1) fully closes the work zone to traffic. This option is the most desirable because of the reduction in staging complexity, increased safety of personnel, and reduced construction time. This option is best suited for roundabouts on new roadways. The downside is this has a large impact on the traveling public if there are not good detour routes.

Construction with some traffic diverted (Staging Option 2) closes as much of the existing roadway as possible for as long as possible. This can include closing minor approaches with the mainline open or construction of temporary roadways. The goal of this staging is to eliminate intersection conflicts during construction. This option is best suited for locations where minor approaches can

be closed for long periods of time. For evaluation purposes this option does not consider short duration closures.

Construction under full traffic (Staging Option 3) is the least desirable approach due to potential conflicts and extensive traffic control needs. However, this option is often necessary to maintain traffic flow in areas with inadequate detour routes. Working conditions under full traffic can be improved by allowing night work, flagging, temporary signals, and temporary roadway construction.

An evaluation of each staging option considered the following:

- Surrounding Road Network
 - Engstrom Road is the primary south access for the Hart Lake and Wolfe Lake neighborhoods. Closures of Engstrom Road require traffic to reroute more than 10 miles along major roads and residential streets to access from the north and west or along Sebastian Drive or Greentree St and Springwood Dr, nearby residential streets.
 - Bogard Road is a major east-west corridor between Palmer and Wasilla. Closing Bogard Road requires diverting traffic to Palmer-Wasilla Highway and Seward Meridian Parkway for more than 10 miles.
- Design Features
 - Fire station access must be maintained throughout construction.
 - Temporary signals and temporary roadway construction require a large amount of added work outside the roadway prism to move traffic outside of the work zone. Temporary roads and signals may not accommodate construction and fit within the project ROW.
 - Green Forest will be realigned and can be constructed with traffic still on the existing alignment for the majority of construction.
 - Storm drain pipes and curb inlets require trench excavation across the roundabout footprint. Once installed adequate cover must be maintained over pipes and inlet structures protected.
- Traffic Patterns
 - Bogard Road has an AADT of more than 12,000 vehicles (2022), and closures will reroute traffic and impact other roadways and traffic patterns.
 - Engstrom Road has an AADT of more than 2,000 AADT (2022), and closures will reroute traffic and impact other roadways, including neighborhood streets.
 - Full intersection closures and Engstrom Road closures will require rerouting PM peak traffic more than 10 miles and on neighborhood streets.
- Schedule Constraints
 - Seasonal weight restrictions are typically in effect to mid-June
 - Utility relocations need to be completed prior to mainline (Bogard Road) construction.
 - Closures during the school year would require rerouting of school related traffic including relocating bus stops. Therefore, no daytime closures and restrictions are allowed during the school year starting August 15.

- No daytime closures and restrictions are allowed during the Alaska State Fair (Aug 18-Sept 4)

Based on these considerations, Staging Option 1 is not recommended. The project will be constructed on existing alignments and will impact traffic. A long duration, full work zone closure has the greatest impact on traffic and requires long detours. Construction can be phased to accommodate traffic through the work zone with limited closures.

A combination of Staging Option 2 and Staging Option 3 is recommended. Construction can be phased to accommodate traffic on Bogard Road and minimize Engstrom Road and Green Forest Drive closures. Work on Bogard Road can be accomplished by shifting traffic lanes through the work zone, short-term closures, and night work. Short-term closures of Engstrom Road and Green Forest Drive are needed to construct approach improvements. The following phasing alternatives were considered for developing traffic control phasing.

1. Alternative A – No full intersection closures longer than a weekend
2. Alternative B – A single full intersection closure for longer than one weekend

The following assumptions apply to all phases of both alternatives:

- There are no dedicated pedestrian and bicycle facilities in the project area work zone. Existing pedestrian and bicycle access is along the shoulder only. When special pedestrian routes are not provided, pedestrians and bicycles will need to be escorted through the construction site when the typical section is modified.
- Speed through the work zone will be reduced to 25 mph.
- During all phases the following will be allowed:
 - Night closures 2000 hrs. to 0500 hrs.
 - Weekend Closures: 2000 hrs. Friday to 0500 hrs. Monday
 - Flagged single lane traffic outside the times outlined below
 - Mainline (Bogard Road) speed reduction to 25 MPH
 - Left turns from Green Forest can be temporarily detoured to Trunk Rd
 - Left turns onto Engstrom can be temporarily detoured to Trunk Rd
- During all phases the following must be maintained:
 - Daytime business access
 - Round the clock fire station access
 - Bogard through traffic during peak hour traffic Monday through Friday 0630 hrs to 0800 hrs and 1530 hours to 1800 hrs (based on 2022 counts)
 - No daytime closures while Mat-Su School District is in session (before May 23rd and after Aug 15th)
 - No daytime closures during the Alaska State Fair (Aug 18th to Sept 4th) for activities requiring truck traffic and activities resulting in detouring traffic on the Glenn Highway and the Palmer-Wasilla Highway
- Winter shut down/two season work
 - No detours/closures allowed during winter shutdown

- All roads will have a paved surface during winter

Alternative A

Phase A-1

Phase A-1 maintains two-way traffic on all approaches. Work consists of constructing improvements and utility relocations outside the existing paved roadways.

This phase will be the longest phase to construct the new Green Forest Drive alignment while minimizing impacts to the traveling public. Constructing Green Forest Drive to as close to finished grade as possible will allow subsequent phases to shift traffic from other work areas.

Phase A-2

Phase A-2 shifts Bogard Road traffic to the south side of the roadway and maintains Green Forest Drive access. Lane reductions with flagging may be allowed to accommodate fill placement. Work consists of constructing the north side of Bogard Road, Engstrom Road, and the northern portion of the roundabout footprint. This includes installing storm drain pipes and inlet structures in the construction area. Work may also continue along the new alignment for Green Forest Drive, if needed.

A short duration closure of Engstrom Road will be needed to accomplish grading and install the storm drain features. The closure should not be longer than 2 weeks with a detour to Sebastian Drive.

Phase A-3

Phase A-3 shifts eastbound traffic to the south and westbound traffic to the north around the roundabout footprint. Lane reductions with flagging may be allowed to accommodate large truck traffic. Work consists of constructing the central portion of the storm drain (within the roundabout footprint).

Green Forest Drive traffic will be moved to the new alignment to maintain turning movements.

Engstrom Road traffic will be shifted to the east or restricted to right-in/right-out only.

Phase A-4

Phase A-4 shifts Bogard Road traffic to the north side of the roadway and maintains Engstrom Road access. Lane reductions with flagging may be allowed to accommodate fill placement. Work consists of constructing the southern portion of the storm drain and finished grading for the roundabout. Traffic on Green Forest Drive will need to be closed for a weekend for the storm drain installation and detoured onto adjacent routes.

Phase A-5

Phase A-5 is for constructing the central island and splitter islands along Bogard.

Traffic will shift outside on the new vehicular lanes and sidewalk as needed to construct the island curbing. Nighttime restrictions on turning traffic maybe needed to construct central curbing on the splitter islands and the central island.

Phase A-6

Phase A-6 incorporates temporary lane closures for remaining work in the roadway. Traffic may be shifted north and south as needed for paving and striping operations.

Alternative A Schedule

A phasing schedule for a single construction season is presented in the following table.

Table 1. Alternative A Schedule

Phase	Duration (weeks)	Anticipated Work
A-1	3	Begin earthwork no later than June 15 Clearing and grubbing, utility relocations, pavement removal, Green Forest realignment, improvements outside existing roads
A-2	1.5	Engstrom Road, Green Forest Drive, north storm drain, north half of roundabout footprint
A-3	0.5	Storm Drain inside roundabout footprint
A-4	2	Storm drain, south half of roundabout, concrete splitter islands
A-5	1	Concrete splitter islands
A-6	2	Curb and gutter, curb ramps, paving, striping End no later than August 15

If construction occurs over two seasons, Phase A-1 can start in the first season and subsequent phases can be extended. Phase A-1 work can occur during school times as the work is outside the existing roadways.

Alternative B

Phase B-1

Phase B-1 is the same as Phase A-1 and maintains two-way traffic on all approaches. Work consists of constructing improvements and utility relocations outside the existing paved roadways.

This phase will be the longest phase to construct the new Green Forest Drive alignment while minimizing impacts to the traveling public. Constructing Green Forest Drive to as close to finished grade as possible will allow subsequent phases to shift traffic from other work areas.

Phase B-2

Phase B-2 shifts Bogard Road traffic to the south side of the roadway and maintains Engstrom Road and Green Forest Drive access. Lane reductions with flagging may be allowed to accommodate fill placement. Work consists of constructing the north side of Bogard Road, Engstrom Road, and the northern portion of the roundabout footprint. This includes installing storm drain pipes and inlet structures in the construction area. Work may also continue along the new alignment for Green Forest Drive, if needed.

A short duration closure of Engstrom Road will be needed to accomplish grading and install the storm drain features. The closure should not be longer than one week. Storm drain features may be constructed during Phase 4, Full Closure as needed.

Phase B-3

Phase B-3 shifts Bogard Road traffic to the north side of the roadway and maintains Engstrom Road and Green Forest Drive access. Lane reductions with flagging may be allowed to accommodate fill placement. Work consists of constructing the southern portion of the of the storm drain and finished grading for the roundabout.

Phase B-4

Phase B-4 includes a full intersection closure. Work consists of:

- Completion of the installation of storm drain
- Final grading
- Installation of curb and gutter
- Initial lift of paving (if time permits)

Any remaining work will be completed under Phase B-5

A full intersection closure will require round-the-clock contractor operations to minimize the closure duration. The closure should be no longer than two weeks to avoid schedule impacts to other phases.

Phase B-5

Phase B-5 incorporates temporary lane closures and for remaining work in the roadway. Traffic may be shifted north and south as needed for paving and striping operations.

Alternative B Schedule

A phasing schedule for a single construction season is presented in the following table.

Table 2. Alternative B Schedule

Phase	Duration (weeks)	Anticipated Work
B-1	3	Begin earthwork no later than June 15 Clearing and grubbing, utility relocations, pavement removal, Green Forest Drive realignment, improvements outside existing roads
B-2	1	Engstrom Road, Green Forest Drive, north storm drain, north half of roundabout footprint
B-3	2	Storm Drain inside roundabout footprint, splitter islands
B-4	2	FULL CLOSURE. Construction on south half of roundabout, final grading on complete roundabout, concrete forms, C&G , and paving.
B-5	2	Concrete splitter islands, curb ramps, striping End no later than August 15

If construction occurs over two seasons, Phase B-1 can start in the first season and subsequent phases can be extended. Phase B-1 work can occur during school times as the work is outside the existing roadways.

Recommendation

A comparison of Alternative A and Alternative B shows work can be accomplished while maintaining two-way traffic on Bogard Road without a full closure. Both alternatives utilize similar phasing to minimize the impacts to traffic. Short duration closures on Engstrom Road will be needed. However, Alternative A provides greater flexibility than Alternative 2 for ensuring the roads are open for school traffic by August 15. For example, a schedule extension of 2 weeks or more requires Alternative B to reschedule Phase B-4 to a second construction season, with that work not able to begin until mid-June, when the weight restrictions are removed.

Alternative A is the preferred phasing.

Based on the known constraints, discussion with DOT&PF staff, and the potential impacts to the traveling public the following are recommended:

- Limit short duration closures on Bogard Road to nights and weekends.
- Limit short duration closures on Engstrom and Green Forest to two weeks.
- Allow single-lane operations with flagging.
- Require round-the clock operations for contractor requested night closures.
- Require all road surfaces be in a drivable condition before transitioning work phases.
- Require all roads to have a paved driving surface for winter shut down, if needed.

Should a contractor request a full closure, as described in Alternative B, the following are recommended:

- Limit the closure duration to no more than two consecutive weeks.
- Require the contractor to provide a detailed schedule of work to be done during the closure
- Require the contractor to provide a schedule showing how the closure fits within the schedule constraints described in this memo.
- Require round-the-clock- operations to reduce the closure time and associated detours.

Transportation Management Plan

For

HSIP: BOGARD ROAD AT ENGSTROM ROAD AND GREEN FOREST DRIVE INTERSECTION IMPROVEMENTS

Project Number: 0001(630) / CFHWY00453

Palmer, Alaska



**Alaska Department of Transportation & Public Facilities
Central Region, Mat-Su District Office**

**500 S. Seward Meridian Pkwy
Wasilla, Alaska USA 99654**

Prepared By: Zachary Kay, Engineering Assistant

Phase: PS&E Review

Preparation Date: May 6, 2025

The following Transportation Management Plan (TMP) has been prepared for/by the Alaska Department of Transportation and Public Facilities (DOT&PF) to assist contractors in successfully planning for project transportation impacts in accordance with 23 CFR 630, Subparts J & K, and DOT&PF Policy and Procedure 05.05.015 "Highway Work Zone Safety and Mobility".

This document lays out a set of strategies for managing the work zone impacts and is required by the [Work Zone Safety Mobility Rule](#). This TMP was developed from the Oregon DOT Transportation Management Plan Template, FHWA Sample Transportation Management Plans and Templates, and DOT&PF Highway Preconstruction Manual.

Table of Contents

1.0	Introduction	1
1.1	Purpose	1
1.2	Project Description	1
1.3	Project Staff	1
2.0	Transportation Management Plan	3
2.1	Stakeholder Involvement	3
2.2	Construction Impacts on Traffic Mobility	4
2.3	Existing Road Users	4
2.4	Road Capacity Analysis.....	4
2.5	Project-Specific Safety Concerns.....	5
2.6	TOP and PIP	5
2.7	ROW & Public Access	5
2.8	Utility Proximity	5
2.9	Oversize/Overweight Vehicles	5
2.10	Environmental Impacts from Temporary Construction	6
2.11	Traffic Control Plan (TCP).....	6

Appendix A: Temporary Traffic Control Plan

1.0 Introduction

1.1 Purpose

The purpose of this TMP is to provide the details regarding the development of TTCP and other measures recommended during the construction phase of this project. During construction, it is desired that disruptions and delays to travelers and freight be minimized without compromising public or worker safety and the quality of the work being performed. This TMP is considered a living document and will be subject to additions and modifications throughout the project's life.

1.2 Project Description

The Alaska Department of Transportation and Public Facilities (DOT&PF), in cooperation with the Federal Highway Administration (FHWA), is proposing to add a single lane roundabout at the intersection of Bogard Road with Engstrom Road and Green Forest Drive. The project is located in the Matanuska-Susitna Borough (MSB) in S27, T18N, R1E, SM and S34, T18N, R1E, SM, 61.614601 Latitude, and -149.254848 Longitude. See Figure 1 for the Location and Vicinity Map.

The proposed project will include the realignment of Green Forest Drive, construction of a roundabout, drainage improvements, installation of roadside hardware, lighting, and relocation of utilities. The project will be developed and funded through the Highway Safety Improvement Program (HSIP). The HSIP specifically targets reducing fatalities and severe injury crashes on Alaska's roadways.

1.3 Project Staff

Design Manager
DOT&PF
Name/Title: Chris Bentz, P.E., Project Manager Unit: Mat-Su District Office Phone: 907 707-1912 Email: chris.bentz@alaska.gov
Roles and Responsibilities:

Design Engineer
DOT&PF
Name/Title: Claire Ellis, P.E., Project Engineer Unit: Mat-Su District Office Phone: 907 707-1920 Email: claire.ellis@alaska.gov
Roles and Responsibilities:

The Construction Project Manager is responsible for overseeing TMP components and other safety and mobility aspects of the project. They may delegate to traffic control representatives. Personnel require training in accordance with P&P 05.05.015. (DOT&PF Alaska Construction Manual, Section 3.10, pg. 3-8)

Construction Manager
DOT&PF / Consultant
Name/Title: Unit: Phone: Email:
Roles and Responsibilities:

Construction Project Engineer
DOT&PF / Consultant
Name/Title: Unit: Phone: Email:
Roles and Responsibilities:

TMP Implementation/Monitoring Staff	
DOT&PF / Consultant	Contractor
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	
Public Information Officer	
DOT&PF / Consultant	Contractor
Name/Title: Unit: Phone: Email:	Name/Title: Unit: Phone: Email:
Roles and Responsibilities:	

Emergency Service Contacts	
Fire and Emergency Medical Services (FEMS)	Police Department (PD)
Name/Title:	Name/Title:
Unit:	Unit:
Phone:	Phone:
Email:	Email:
Roles and Responsibilities:	

2.0 Transportation Management Plan

2.1 Stakeholder Involvement

Table 1. Project Stakeholders

Agency/ Organization	Name	Title	Phone Number
Agency Representatives			
DOT&PF	Chris Bentz	Design Project Manager	907-707-1912
Schools			
Mat-Su Borough School District Public Information Office	John Notestine	Public Information Officer	907-746-9200
Mat-Su Durham School Services		Durham Dispatch	907-885-3561
Emergency Services			
Mat-Su Borough	Brian Davis	Fire Deputy Director	907-861-8003
Department of	Tracey Loscar	EMS Deputy Director	907-861-8317
Emergency Services	Casey Cook	Emergency Manager	907-861-8500
Alaska State Troopers Palmer Post			907-745-2131
Hospitals			
Mat-Su Regional Outpatient & Medical Center			907-861-6000
Mat-Su Midwifery and Family Health			907-373-3420

2.2 Construction Impacts on Traffic Mobility

Contractor to follow section 643 for traffic restrictions as it applies. Contractor to utilize various construction techniques to ensure traffic mobility through the site. Contractor and on-site Inspector(s) shall coordinate with road users/stakeholders as necessary.

Table 2. Roadways Affected by Project

Roadways Affected by TMP – Summary					
Roadway/Street Name	Classification	AADT	Truck Percentage	Peak Hour Volume	Posted Speed
Bogard Rd	Urban Arterial	8,247	6.77%	1531 AM 1638 PM	50 MPH
Engstrom Rd	Urban Collector	3,766	N/A	190 AM 143 PM	35 MPH
Green Forest Dr	Urban Local Rd	1,235	N/A	31 AM 61 PM	25 MPH
Sebastian Dr	Urban Local Rd	N/A	N/A	N/A	25 MPH
Destin Dr	Urban Local Rd	N/A	N/A	N/A	25 MPH

2.3 Existing Road Users

Land use in the vicinity of the project is mixed including residential subdivisions and businesses. This area services several schools which include many bus routes in the surrounding area that pass through this project location. The northwest corner of Bogard Road and Engstrom Road intersection serves the Central Mat-Su Fire Station.

Bogard Road is classified as an urban minor arterial and is a major east-west connection within the MSB connecting the city of Palmer to the city of Wasilla. Engstrom Road is classified as an urban collector which serves several residential areas north of Bogard Road. Green Forest Drive is classified as urban local and functions as a north-south connection between Palmer-Wasilla Highway and Bogard Road.

2.4 Road Capacity Analysis

Based on the DOT&PF Central Region Annual Traffic Geographic Information System (GIS) Map and the project developed Traffic Control Plans (TCP), it is not expected that road capacity needs to be analyzed under the anticipated construction conditions. The project TCP provides reasonable workspace, suggested detour routes, short duration closures on the minor roadways, suggested work phasing, and maintains through traffic on Bogard Road through construction.

2.5 Project-Specific Safety Concerns

Should construction activities coincide with school season, Contractor shall coordinate any potential impacts to bus stops and bus routes with school bus services to ensure safe and accessible bus stop locations can be maintained throughout the project corridor.

2.6 TOP and PIP

The HPCM Section 1400.2 sets forth the criteria for determining if a project is to be classified as a “Significant Project” for purposes of determining the level of effort required in developing a Traffic Management Plan (TMP). Although Bogard Road is classified as a Minor Arterial and is located within the Mat-Su Borough’s Road Service Area (RSA), AADTs are below 30,000 vehicles per day, will not require greater attention than normal to traffic control, and in the event of a full closure, practical alternate routes are available. Therefore, the project is not considered a “Significant Project”, and a PIP is not required.

The Department will coordinate with relevant public agencies and event organizers and incorporate means and methods for minimizing traffic impacts with the contractor not covered by the TCP within the project plans.

2.7 ROW & Public Access

Access to the Fire Station located on the NW corner of Bogard and Engstrom shall be maintained throughout construction unless otherwise coordinated with MSB Emergency Services. Access to residence(s), businesses, and through traffic shall be maintained via approved Traffic Control Plan as demonstrated in appendix A. The project required acquisition of several parcels, temporary construction permits, and temporary construction easements that provide adequate space for all construction activities to occur within permanent ROW, easements or temporary work areas.

2.8 Utility Proximity

AT&T Telecommunications Co., Enstar Natural Gas Co., GCI Communications Corp., Matanuska Electrical Association, Inc., and Matanuska Telephone Association all own utilities within the project vicinity. Work on and adjacent to the existing or proposed utilities will follow utility agreements and best practices. All utility relocation work will be completed within permanent ROW, easements or temporary work areas and is expected not have any adverse impacts to traffic. All joint trenching, bores, and overhead work needs are accounted for within the utility agreements and the project specifications.

2.9 Oversize/Overweight Vehicles

Analysis of the project location, proposed design, and potential construction methods indicates that no special permitting will be required for shipping of materials or equipment. The contractor

should coordinate with the Division of Measurement Standards and Commercial Vehicle Enforcement (MSCVE) as needed.

Alaska Railroad does not operate within the project area.

2.10 Environmental Impacts from Temporary Construction

The proposed project does not involve any unusual circumstances or significant environmental impacts; it meets the criteria for classification as a Categorical Exclusion per 23 CFR 771.117. A Categorical Exclusion for the project was approved on December 10, 2020. An Expedited Re-Evaluation was completed on June 14, 2023. The contractor will be required to prepare and implement a SWPPP that conforms to the DOT&PF BMPs for Erosion and Sediment Control in accordance with the DOT&PF contract specifications. Appropriate erosion and sediment controls will be used and maintained in optimal condition during construction and all other exposed soils/fills will be permanently stabilized.

The contractor will be required to dispose of solid waste at an ADEC approved landfill. An ESCP will be made available to the contractor to use as guidance in developing the SWPPP.

The contractor is responsible for obtaining all necessary permits and clearances for materials sites, disposal sites, and staging areas unless DOT&PF has obtained all necessary permits.

2.11 Traffic Control Plan (TCP)

See Appendix A.

Appendix A: Temporary Traffic Control Plan

Standard: The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, or on private roads open to public travel (see definition in Section 1A.13), including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130) through a TTC zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents. (2009 MUTCD, Part 6, pg. 547)

Erosion and Sediment Control Plan
For
HSIP: Bogard Rd. at Engstrom Rd. & Green Forest
Dr. Intersection Improvements
001630/CFHWY00453

Palmer, Alaska



Alaska Department of Transportation & Public Facilities
Central Region
P.O. Box 196900
Anchorage, Alaska USA 99519-6900

Prepared By: Patty Homerding
ESCP Preparation Date: May 2025

The following Erosion and Sediment Control Plan (ESCP) has been prepared by the Alaska Department of Transportation and Public Facilities (DOT&PF) to assist bidders in successfully planning their construction means and methods to comply with the 2021 Alaska Construction General Permit (CGP), United States Army Corps of Engineers (USACE) 404/10 Permit, Alaska Department of Environmental Conservation (DEC) 401 Water Quality Certification, Alaska Department of Fish and Game (ADF&G) Title 16, and other permits associated with this project. This document is not intended to be all inclusive of the best management practices (BMP's) that will be required to reduce the potential for sediment discharge during construction and comply with permit conditions or construction specifications. This ESCP is intended to guide contractors during the bidding process and assist in the preparation of the contractor's Storm Water Pollution Prevention Plan (SWPPP) that must be approved prior to commencing construction after award. The contractor is responsible for the risk assessment analysis, planning, preparation and implementation of the SWPPP.

TABLE OF CONTENTS

1.0 PERMITTEE (5.3.1)	1
1.1 Operator(s)/Contractor(s)	1
1.2 Subcontractors	2
2.0 STORM WATER CONTACTS (5.3.2).....	3
2.1 Contact Information for SWPPP Preparation	4
3.0 PROJECT INFORMATION (5.3.3).....	5
3.1 Project Information	5
3.2 Project Site-Specific Conditions (5.3.3)	5
3.3 Reference Documents Available	6
4.0 NATURE OF CONSTRUCTION ACTIVITY (5.3.4)	7
4.1 Scope of Work	7
4.2 Project Function (5.3.4.1)	7
4.3 Support Activities (As Applicable)	7
4.4 Sequence and Timing of Soil-disturbing Activities (5.3.4.2)	8
4.5 Size of Property and Total Area expected to be Disturbed (5.3.4.3).....	8
4.6 Identification of All Potential Pollutant Sources (5.3.4.5)	9
5.0 SITE MAPS (5.3.5).....	10
6.0 DISCHARGES	12
6.1 Locations of Other Industrial Storm Water Discharges (5.3.8)	12
6.2 Allowable Non-Storm Water Discharges (1.4.3; 4.3.7; 5.3.9)	12
7.0 DOCUMENTATION OF PERMIT ELIGIBILITY RELATED TO TOTAL MAXIMUM DAILY LOADS (3.2, 5.6).....	13
7.1 Identify Receiving Waters (5.3.3.3)	13
7.2 Identify TMDLs (5.6.1)	13
8.0 DOCUMENTATION OF PERMIT ELIGIBILITY RELATED TO ENDANGERED SPECIES (3.3, 5.7)	14
8.1 Information on Endangered or Threatened Species or Critical Habitat (5.7.1)	14
9.0 APPLICABLE FEDERAL, STATE, TRIBAL, OR LOCAL REQUIREMENTS (4.10, 4.15)	14
9.1 Historic Properties	14
9.2 Projects near Public Water System (PWS) (4.10)	15
10.0 CONTROL MEASURES/BEST MANAGEMENT PRACTICES (4.0; 5.3.6)	18
10.1 Minimize Amount of Soil Exposed during Construction Activity (4.2.2)	20
10.1.1 Site Delineation (4.2.1)	20
10.2 Maintain Natural Buffer Areas (4.2.3)	20
10.2.1 Clearing Vegetation (4.2.4)	21
10.3 Control Storm Water Discharges and Flow Rates (4.2.5)	21

10.3.1	Protect Steep Slopes (4.2.6)	22
10.4	Storm Water Inlet Protection Measures (4.3.1)	22
10.5	Water Body Protection Measures (4.3.2)	23
10.6	Down-Slope Sediment Controls (4.3.3)	23
10.7	Stabilized Construction Vehicle Access and Exit Points (4.3.4)	24
10.8	Dust Generation and Track-Out from Vehicles (4.3.5, 4.3.6)	24
10.9	Soil Management and Soil Stockpile (4.3.7)	24
10.10	Authorized Non-Storm Water Discharges (4.3.8)	25
10.11	Sediment Basins (4.3.9)	25
10.12	Dewatering (4.4)	25
10.13	Permanent/Post-Construction BMPs (4.11)	26
10.13.1	Soil Stabilization (4.5, 5.3.6.3)	26
10.14	Treatment Chemicals (4.6; 5.3.6.4)	27
10.15	Treatment Chemicals (4.6.1)	27
10.15.1	Treatment Chemical Selection (4.6.2)	27
10.15.2	Treatment Chemical Use Procedures (4.6.3; 4.6.6)	27
10.15.3	Application of Treatment Chemicals (4.6.4; 4.6.5)	28
10.16	Active Treatment System Information or Cationic Treatment Chemicals (4.6.7)	28
10.17	Good Housekeeping Measures (4.8)	28
10.17.1	Washing of Equipment and Vehicles (4.8.1)	28
10.17.2	Fueling and Maintenance Areas (4.8.2)	29
10.17.3	Staging and Material Storage Areas (4.8.3)	29
10.17.4	Washout of Applicators/Containers Used for Paint, Concrete, and Other Materials (4.8.4)	29
10.17.5	Fertilizer or Pesticide Use (4.8.5)	30
10.18	Spill Notification (4.9)	31
10.19	Construction and Waste Materials (4.8.6, 5.3.7)	31
11.0	INSPECTIONS (5.4; 6.0)	33
11.1	Inspection Schedules (5.4.1.2; 6.1; 6.2; 6.6)	33
11.2	Inspection Form or Checklist (5.4.1.3; 6.7)	34
11.3	Corrective Action Procedures (5.4.1.4; 8.0)	34
11.4	Inspection Recordkeeping (5.4.2)	34
12.0	MONITORING PLAN (IF APPLICABLE) (5.5; 7.0)	35
12.1	Determination of Need for Monitoring Plan	35
13.0	POST-AUTHORIZATION RECORDS (5.8)	35
13.1	Additional Documentation Requirements (5.8.2)	35
13.1.1	Records of Employee Training (4.14; 5.8.2.8)	35
14.0	MAINTAINING AN UPDATED SWPPP (5.9)	36

14.1	SWPPP Amendment Log (5.9.2)	36
14.2	Deadlines for SWPPP Modifications (5.9.3)	36
15.0	ADDITIONAL SWPPP REQUIREMENTS (5.10)	36
15.1	Retention of SWPPP (5.10.1)	36
15.2	Main Entrance Signage (5.10.2).....	36
15.3	Availability of SWPPP (5.10.3)	37
15.4	Signature and Certification (5.10.4)	37

APPENDICES

Appendices that are marked with **(ESCP)** are to be filled out by the Designer. All other appendices are to be filled out by the SWPPP preparer and will not be included in the ESCP.

Appendix A	Site Maps and Drawings (ESCP)
Appendix B	BMP Details (ESCP)
Appendix C	Project Schedule
Appendix D	Supporting Documentation: (ESCP) • TMDLs • Endangered Species • Historic Properties • DEC Non-Domestic Wastewater Plan Review Non-Objection Letter (if required) • DEC Dewatering Permit (if required) • Environmental Permits and Commitments • Other Permits or Requirements
Appendix E	Project Specific ESCP Discussion & Comments (ESCP – not part of the SWPPP template)

The above Appendix E is for ESCP writers only and should include any additional information that the Designer would like to share with the SWPPP preparer. Below is the list of Appendices to be included in the SWPPP.

Appendix E	Delegation of Authority (25D-107, 25D-108), Subcontractor Certifications (25D-105), Project Staff Tracking (25D-127) and Personnel Qualifications
Appendix F	Permit Conditions: • Copy of Signed Notice of Intent • Copy of Letters from DEC Authorizing Coverage, with DEC NOI Tracking Number • Copy of 2021 Alaska Construction General Permit
Appendix G	Grading and Stabilization Records (25D-110)
Appendix H	Monitoring Plan (if applicable) and Reports
Appendix I	Training Records (25D-125)
Appendix J	Corrective Action Log and Delayed Action Item Reports (25D-112, 25D-113)
Appendix K	Inspection Records (25D-100)
Appendix L	SWPPP Preconstruction Site Visit (25D-106)
Appendix M	SWPPP Amendment Log (25D-114)
Appendix N	Daily Record of Rainfall (25D-115)
Appendix O	Hazardous Materials Control Plan
Appendix P	Treatment Chemical/Active Treatment Systems (if applicable)
Appendix Q	Other • Anti-Degradation Analysis (if applicable) • Correspondence with Regulatory Agencies • Notices of Termination

1.0 PERMITTEE (5.3.1)

The Department of Transportation & Public Facilities (DOT&PF) will be a permittee for the project. Upon the approval of the contractor's Storm Water Pollution Prevention Plan (SWPPP) by DOT&PF, the contractor will be required to submit a Notice of Intent (NOI) and obtain permit coverage as an operator. The contractor's contact information as well as contact information for all subcontractors must be included in the contractor's SWPPP. All subcontractors will be required to sign a certification (DOT&PF Form 25D-105) that they have read the Alaska Construction General Permit (CGP) and the contractor's SWPPP and will adhere to their terms and conditions.

1.1 Operator(s)/Contractor(s)

Operator Information					
Organization: Enter Text		Name: Enter Text		Title: Enter Text	
Phone: Enter Text		Fax (optional): Enter Text		Email: Enter Text	
Mailing Address:	Street (PO Box): Enter Text				
	City: Enter Text		State: Enter Text		Zip: Enter Text
Area of Control	Day-to-day operational control of those activities at a site which are necessary to ensure compliance with a SWPPP or other permit conditions.				

The contractor has day-to-day operational control over activities in the field, including subcontractors, installing, maintaining, and inspecting all erosion and sediment controls and implementation of the SWPPP.

Owner/Operator Information					
Organization: State of Alaska Department of Transportation and Public Facilities (DOT&PF)		Name: Enter Text		Title: Enter Text	
Phone: Enter Text		Fax (optional): Enter Text		Email: Enter Text	
Mailing Address:	Street (PO Box): P.O. Box 196900				
	City: Anchorage		State: Alaska		Zip: 99519-6900
Area of Control	Operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications.				

Repeat as necessary.

1.2 Subcontractors

Subcontractor Information			
Organization: Enter Text		Name: Enter Text	Title: Enter Text
Phone: Enter Text		Fax (optional): Enter Text	Email: Enter Text
Mailing Address:	Street (PO Box): Enter Text		
	City: Enter Text	State: Enter Text	Zip: Enter Text
Area of Control	Insert Area of Control (if more than one operator at site)		

Repeat as necessary to include all subcontractors. Include any Utility company and the Utility companies' contractors' doing concurrent relocation as a subcontractor – see subsection 641-1.07.

2.0 STORM WATER CONTACTS (5.3.2)

Identify the qualified persons responsible for the following required positions (note: a small project may have all these responsibilities carried out by one person):

Superintendent; DOT&PF's Project Engineer; Storm Water Lead (5.3.2.1); SWPPP Preparer (5.3.2.2); Person(s) Conducting Inspections- Contractor's SWPPP Manager and DOT&PF's Storm Water Inspector (5.3.2.3); Person(s) Conducting Monitoring (if applicable, 5.3.2.4), and Person(s) Operating Active Treatment System (if applicable, 5.3.2.5).

Document that the named individuals are Qualified Persons as described in CGP Appendix C. Include documentation of qualifications in Appendix E of the SWPPP.

Qualified Personnel	Responsibility
Contractor's Superintendent Company Name Address City, State, Zip Code Telephone # Fax/Email	The Contractor's duly authorized representative in responsible charge of the work. Authority for the overall operation of the Project and for Contractor furnished sites and facilities directly related to the Project.
DOT&PF's Project Engineer Company Name Address City, State, Zip Code Telephone # Fax/Email	The DOT&PF's duly authorized representative in responsible charge of the work. Authority to stop and/or modify construction activities as necessary to comply with the SWPPP and the terms and conditions of the permit. Must approve all amendments.
SWPPP Manager (Storm Water Lead and Inspector) Company Name Address City, State, Zip Code Telephone # Fax/Email	Authority to stop and/or modify construction activities as necessary to comply with the SWPPP and the terms and conditions of the permit. Assess conditions at the construction site that could impact storm water quality. Assess the effectiveness of any erosion and sediment control measures selected to control the quality of storm water discharge, and familiar with Part 6 as a means to ensure compliance with the permit.
SWPPP Preparer Company Name Address City, State, Zip Code Telephone # Fax/Email	Possess the skills to assess conditions at the construction site that could impact storm water quality. Familiar with Part 5 as a means to implement the permit.

DOT&PF's Storm Water Inspector Company Name Address City, State, Zip Code Telephone # Fax/Email	Assess conditions at the construction site that could impact storm water quality. Assess the effectiveness of any erosion and sediment control measures selected to control the quality of storm water discharge, and familiar with Part 6 as a means to ensure compliance with the permit.
Monitoring Person (If Applicable) Company Name Address City, State, Zip Code Telephone # Fax/Email	Knowledgeable in the principles and practices of water quality monitoring who is familiar with Part 7 and the monitoring plan for the site and how to conduct water quality sampling, testing, and reporting.
Active Treatment System Operator (If Applicable) Company Name Address City, State, Zip Code Telephone # Fax/Email	Knowledgeable in the principles and practices of treatment systems that employs chemical coagulation, chemical flocculation or electrocoagulation to aid in the treatment of storm water runoff. Familiar with Part 4.5 as a means to implement and comply with the permit.

A SWPPP Project Staff Tracking log (Form 25D-127) will be included in Appendix E to document any changes in personnel for the positions of Superintendent, Project Engineer, SWPPP Manager, and Inspectors.

Delete the information below prior to submittal of SWPPP. This information is provided for the SWPPP Preparer and is not part of the SWPPP template.

2.1 Contact Information for SWPPP Preparation

The following people may be contacted for questions when writing the SWPPP:

<u>Name</u>	<u>Phone</u>	<u>Email</u>
Athena Marinkovic	(907) 269-0436	athena.marinkovic@alaska.gov
Isaac Kelsey	(907) 707-1918	isaac.kelsey@alaska.gov

3.0 PROJECT INFORMATION (5.3.3)

3.1 Project Information

Project Name: HSIP: Bogard Rd At Engstrom Road & Green Forest Dr Intersection Improvements				
Location Address:	Street/Location: Bogard Rd at Engstrom Rd & Green Forest Dr		Borough or similar government subdivision: MatSu Borough	
	City: Palmer		State: Alaska	Zip:
	Latitude (decimal degree, 5 places): 61.61460		Longitude (decimal degree, 5 places): 149.25472	
	Determined By: ☐ GPS ☒ Web Map: GoogleEarth, Middle of Project ☐ USGS Topo Map, Scale: ☐ Other:			

3.2 Project Site-Specific Conditions (5.3.3)

Mean annual precipitation based on nearest weather stations (inches): Anderson Lake (USC500302) has an average annual precipitation of 19.18 inches per year, and Matanuska Valley 9 (USC 00506875) has an average annual precipitation of 19.67 inches per year.

Source: Western Regional Climate Center Website: <http://www.wrcc.dri.edu/coopmap/#>

Size of the 2-yr, 24-hr storm event (in inches): 1.5", provided by NOAA's National Weather Service, based on recordings made at the Palmer 5 NW (50-6875) weather station is 1.50 inches.

Source: https://hdsc.new.noaa.gov/hdsc/pfds/pfds_map_ak.html

Soil Type(s) and Slopes: According to the geotechnical report for this project area, the soils around the area generally have a combination of gravel and sand with silt and cobbles.

Source: Geotechnical Report, HSIP: Bogard Road at Engstrom Road – Green Forest Drive Intersection Improvements, December 2021

Landscape Topography: The topography in the project area includes rolling hills on Bogard Road as well as Engstrom Road and Green Forest Drive. There is a decrease in elevation from Engstrom Drive into Bogard Road and Bogard Road into Green Forest Drive.

Describe current drainage patterns and note any changes due to grading or fill activities.

Drainage patterns: The drainage in the existing project footprint consist of shallow ditches or down fill embankments. There are no well-established drainage routes that flow out of the project area, and runoff likely ponds in low areas adjacent to the roadway until it infiltrates into the soil or drains to Finger Lake. Drainage from the project will include a new storm drain system as well as ditching and an infiltration basin.

Type of Existing Vegetation: The project area is surrounded by businesses with some residential buildings that include native vegetation such as alder and small spruce.

Approximate growing season: May 8 to October 5

Source: https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/reg_supp/

Seeding Dates: Seeding dates for this project are May 15 to August 15, or obtain written approval from Engineer to seed at a different date

Source: Section 618 of Project Specifications

Time Period to Avoid Vegetation Clearing: May 1 to July 15

Source:

<https://www.fws.gov/sites/default/files/documents/Timing%20Recommendations%20for%20Land%20Disturbance%20%26%20Vegetation%20Clearing%20-%20June%202017.pdf>

Fish Window: Not applicable as there will be no work in anadromous streams.

Historic site contamination evident from existing site features and known past usage of the site: Contaminated sites within the project vicinity are tabulated below.

Contaminated Sites within Project Vicinity			
Site Name	Hazard ID	Location (Latitude, Longitude)	Status
Lakes Public Safety Building 52	23447	(61.6150, -149.2551)	Cleanup Complete
Neklasson Lake Repeater	23206	(61.6199, -149.2564)	Cleanup Complete
AT&T Alascom Neklason Lake Relay	121	(61.6200, -149.2564)	Cleanup Complete

Additional information about these sites is available on the DEC Division of Spill Prevention and Response website: <https://www.arcgis.com/home/item.html?id=315240bf84aa0b8272ad1cef3cad3>. Include only those sites listed as 'Active' or 'Cleanup Complete – Institutional Controls'

3.3 Reference Documents Available

Listed below are the reference documents available for this project. Please contact the Project Engineer for assistance in obtaining these documents.

- Project Specific Permits – located in Appendix D and in the Special Provisions Package
- Geotechnical Report – available from the Plans room during the bidding process or download from the Bid Express project site (<https://ui.bidx.com/login?referer=%2Fak%2Flettings> – login required)
- Environmental Commitment Memo – available at Preconstruction Meeting
- Environmental Document – available for review in the DOT&PF Preliminary Design & Environmental section

4.0 NATURE OF CONSTRUCTION ACTIVITY (5.3.4)

4.1 Scope of Work

The Proposed Action would:

This HSIP project will construct a single lane roundabout at the intersection of Bogard Road with Engstrom Road and Green Forest Drive. The construction will also:

- Realign Green Forest Drive
- Install medians, curb ramps, sidewalks and lighting
- Replace guardrail and guardrail end treatments
- Upgrade existing drainage system and regrade drainage ditches
- Relocate utilities

4.2 Project Function (5.3.4.1)

Bogard Road is a minor arterial, Engstrom Road is a minor collector, and Green Forest Drive is a local road. Currently, the Bogard Road at Engstrom Road and Green Forest Drive intersections are within 200 feet of each other, creating overlapping influence areas that potentially increase the accident rate. The accident rate for the two intersections exceeds the statewide average and was thus selected through the Highway Safety Improvements Program (HSIP) in order to increase safety in the area. There are sight distance issues on Bogard Road as well that make the left turn from Engstrom Road difficult and increase the accident rate for the area. This project will realign Green Forest Drive and add a single lane roundabout at the intersection. Construction will also include drainage improvements, lighting, utility relocations, roadside hardware installation, and increased safety.

4.3 Support Activities (As Applicable)

Modify support activities table, as necessary. "Dedicated" only applies to activities exclusively for the project, i.e. commercial concrete or asphalt plants would be marked "No" under the "Dedicated" column. Location must be provided for ALL support activities, even those which are commercial or off-site. Provide a physical address for the support activities. For private and/or commercial support activities locations, include the name of the individual and/or company and their physical address. Location may be an address or other descriptive location, i.e. NE corner of staging area.

Support activities for this project are:

Support Activity	Location	Dedicated	
		Yes	No
Concrete Batch Plant		☐	☐
Asphalt Batch Plant		☐	☐
Equipment Staging Yards		☐	☐

Material Storage Areas		☐	☐
Excavated Material Disposal Areas		☐	☐
Borrow Areas		☐	☐

4.4 Sequence and Timing of Soil-disturbing Activities (5.3.4.2)

The contractor will be required to finish, either temporary or final stabilized, individual areas prior to moving on to the next area. The contractor will be required to prepare a detailed schedule for review and approval prior to commencement of construction activities and is to be included in the SWPPP. The schedule will detail the sequence of activities and describe the stabilization schedule. The contractor must adapt this section with their specific plans in the project SWPPP.

4.5 Size of Property and Total Area expected to be Disturbed (5.3.4.3)

The following are estimates of the construction site:

Description	Number	Remarks
Total project area:	18.3 acres	ROW to ROW
Construction-site area to be disturbed:	10.8 acres	Clearing limits for temporary and permanent design
Percentage impervious area BEFORE construction:	39 %	Asphalt (impervious): 3.23 acres Gravel (Impervious): 1.03 acres Forest (pervious): 6.54 acres
Runoff Coefficient BEFORE construction:	0.41	$\sum \frac{3.23 * 0.86 + 1.03 * 0.85 + 6.54 * 0.12}{3.23 + 1.03 + 6.54}$
Percentage impervious area AFTER construction:	43 %	Asphalt (impervious): 4.00 acres Gravel (Impervious): 0.34 acres Concrete (Impervious): 0.33 acres Forest (pervious): 6.13 acres
Runoff coefficient AFTER construction:	0.44	$\sum \frac{4.00 * 0.86 + 0.34 * 0.95 + 0.33 * 0.85 + 6.13 * 0.12}{4.00 + 0.34 + 0.33 + 6.13}$

The values shown in the table above were calculated with the information available at the time of the final design. The contractor's values will be different due to staging areas, batch plants, material stockpiles, etc. A weighted "C" value from the Rational Method was used to calculate the Runoff Coefficient. If a discrepancy is found, contact the Project Engineer to request further information.

4.6 Identification of All Potential Pollutant Sources (5.3.4.5)

Identify and list all potential sources of sediment from construction materials and activities which may affect the quality of storm water discharges from the construction site.

Identify and list all potential sources of pollution, other than sediment, from construction materials and activities which may affect the quality of storm water discharges from the construction site.

Potential sources of sediment to storm water runoff:

- Pavement removal, clearing and grubbing
- Excavation for road and ditching, back slope stabilization
- Pipe installation
- Utility relocation
- Construction vehicle tracking
- Dust from construction activities

Potential pollutants and sources, other than sediment, to storm water runoff:

Trade Name Material	Storm Water Pollutants	Location
Gas, diesel, oil	Petroleum, oil, lubricants	Equipment storage area, staging area, fueling area
Antifreeze, coolants	Methanol, ethylene glycol, propylene glycol	Equipment storage area, staging area
Trash	Paper, plastic, metal	Waste storage area
Waste	Organic material, fertilizer	Sanitation facilities

5.0 SITE MAPS (5.3.5)

Site map(s) and drawings are located in Appendix A.

The SWPPP must include a legible site map (or set of maps for large projects) showing the entire site and identifying the following site-specific information:

1. North Arrow **(ESCP)**
2. Property boundaries **(ESCP)**
3. Locations where earth-disturbing activities will occur, noting any phasing dictated by design **(ESCP)**
4. Location of areas that will not be disturbed and natural features to be preserved **(ESCP)**
5. Locations of all storm water conveyances including ditches, pipes, and swales **(ESCP)**
6. Locations of storm water inlets and outfalls, with a unique identification code for each outfall **(ESCP)**
7. Location where storm water and/or authorized non-storm water discharges to waters of the U.S. (including wetlands) or a Municipal Separate Storm Sewer Systems (MS4), if present **(ESCP)**
8. Direction of storm water flow and approximate slopes anticipated after grading activities **(ESCP)**
9. Locations where control measures will be installed **(ESCP)**
10. Locations where exposed soils will be or have been stabilized
11. Locations where post-construction storm water controls will be installed (i.e. seeding areas, matting, riprap, sedimentation basins, etc.) **(ESCP)**
12. Locations of support activities, if known
13. Locations where authorized non-storm water will be used
14. Locations and sources of run-on to the site from adjacent property that may contain quantities of pollutants (e.g., sediment, fertilizers and/or pesticides, paints, solvents, fuels) which could be exposed to rainfall, or snowmelt, and could be discharged from your construction site, if applicable **(ESCP)**
15. Locations of all waters of the U.S. (including significant wetland areas 10,000 square feet or greater) on the site within 2,500 feet of the site boundary (~1/2 mile on each side of road) that may be affected by storm water discharges from the site (see Section 7.1) **(ESCP)**
 - a. This can be shown on a general location map (USGS quad map, a portion of a city or county map, or other map) with enough detail to identify the location of the construction site and waters of the U.S. within the one mile distance.
16. Location of existing public water system (PWS) drinking water protection areas (DWPA) for PWS sources (e.g. springs, wells, or surface water intakes) that intersect the boundary of the proposed project/permit area. The DWPAs can be found using the interactive web map application, "Alaska DEC Drinking Water Protection Areas", located at <http://dec.alaska.gov/das/GIS/apps.htm>. **(ESCP)**
 - a. A copy of the webpage from the above URL will work with the addition of the project boundary and labels for the DWPAs by their ID numbers (see Section 9).
17. Sampling point(s), if applicable
18. Areas where final stabilization has been accomplished
19. Location of staging and material storage areas (construction materials, hazardous materials, fuels, etc.) **(ESCP, if known)**
20. Dumpsters
21. Porta-potties
22. Concrete, paint, or stucco washout areas
23. Stabilized construction exits **(ESCP, if known)**

6.0 DISCHARGES

Subject to compliance with the terms and conditions of the CGP, the permittee is authorized to discharge pollutants in storm water discharges from the site. If the permittee is eligible for coverage under CGP and does not comply with the requirements of the CGP, the permittee may be in violation of this general permit for otherwise eligible discharges.

Instructions:

Describe and identify the location of any storm water discharge associated with support activities, including discharges from dedicated asphalt and concrete plants covered by the CGP (5.3.8).

6.1 Locations of Other Industrial Storm Water Discharges (5.3.8)

The contractor is required to identify discharges from related support activities. Portable batch plants located on department-supplied property must be included in the contractor's SWPPP and related inspections. If the DOT&PF is not a CGP operator for the site or sites listed in this subsection, then describe the sites and BMPs for them in a separate SWPPP2. In this section, explain which areas are covered within this SWPPP and which are covered within a separate SWPPP2. Also provide information on where the SWPPP2 is available for review.

6.2 Allowable Non-Storm Water Discharges (1.4.3; 4.3.7; 5.3.9)

The contractor must list all allowable non-storm water discharges and describe how the discharges will be minimized and managed to reduce pollution to storm water in the contractor's SWPPP.

Allowable Non-Storm Water Discharges:

- Discharges from fire-fighting activities (1.4.3.1)
- Fire hydrant flushing (1.4.3.2)
- Waters used to wash vehicles where detergent are not used (1.4.3.3)
- Water used to control dust (1.4.3.4)
- Potable water including uncontaminated water line flushings (1.4.3.5)
- Routine external building wash down that does not use detergents (1.4.3.6)
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used (1.4.3.7)
- Uncontaminated air conditioning or compressor condensate (1.4.3.8)
- Uncontaminated, non-turbid discharges of ground water or spring water (1.4.3.9)
- Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated groundwater (1.4.3.10)
- Uncontaminated construction dewatering waters that are treated by an appropriate control measure in compliance with Part 4.4.2 or have been treated with treatment chemicals in compliance with Part 4.6 (1.4.3.11)
- Landscape irrigation (1.4.3.12)

7.0 DOCUMENTATION OF PERMIT ELIGIBILITY RELATED TO TOTAL MAXIMUM DAILY LOADS (3.2, 5.6)

A search of the “Alaska’s Final **2014/2016** Integrated Water Quality Monitoring and Assessment Report” found no listings or impairments for **Finger Lake**.

7.1 Identify Receiving Waters (5.3.3.3)

Description of receiving waters:

Finger Lake – Finger Lake is southwest and downhill from the project area but is outside of the project area. Currently there are no established drainage routes flowing from the project area, but some runoff may eventually drain into this lake.

Outstanding Natural Resource Waters (2.1.6):

The DEC must be consulted, at least 30 days prior to construction activities, when determining requirements for water quality analysis on all projects that meet the following:

- Will or may discharge storm water to a Tier 3 water body, also known as Outstanding Natural Resource Waters (ONRW).

No ONRW are designated in Alaska as of the date of this document.

Description of storm sewer and/or drainage systems: This project will install new drainage structures as well as manholes through the project area. This system will also construct an infiltration basin. The storm drain system will collect runoff from the curb inlets and drain to the infiltration basin.

7.2 Identify TMDLs (5.6.1)

Is an EPA-established or approved TMDL published for the receiving water(s) listed in Section 7.1?

☐ Yes ☒ No

TMDL: **N/A**

Summary of consultation with state or federal TMDL authorities (5.6.2): **N/A**

Measures taken to ensure compliance with TMDL (5.6.3): **N/A**

Are there impaired receiving waters listed in Section 7.1 without an approved TMDL? ☐ Yes ☒ No

8.0 DOCUMENTATION OF PERMIT ELIGIBILITY RELATED TO ENDANGERED SPECIES (3.3, 5.7)

8.1 Information on Endangered or Threatened Species or Critical Habitat (5.7.1)

Are endangered or threatened species and critical habitats on or near the project area?

☐ Yes ☒ No

Describe how this determination was made: No endangered or threatened species and critical habitats were identified within the project area. The Alaska Department of Fish and Game (ADF&G) Endangered and Threatened Species Lists, and U.S. Fish and Wildlife Service (USFWS) threatened and endangered species lists were checked.

Will species or habitat be adversely affected by storm water discharge?

☐ Yes ☒ No

Provide summary of necessary measures (5.7.5): **N/A**

9.0 APPLICABLE FEDERAL, STATE, TRIBAL, OR LOCAL REQUIREMENTS (4.10, 4.15)

The project will comply with all applicable Federal, State, Local, and Tribal requirements for soil erosion control and storm water management.

The contractor will be responsible for obtaining all necessary permits and clearances for material and disposal sites, and/or equipment storage areas in accordance with the CGP for Storm Water Discharges from Construction Activities.

9.1 Historic Properties

SHPO consultation was completed on: **July 3, 2019**

Are there any historic sites on or near the construction site?

☒ Yes ☐ No

Describe how this determination was made:

A preliminary review of the Alaska Heritage Resources Survey (AHRS) database on August 15, 2018 identified one historic resource (ANC-00212; A. Havemeister Dairy Farm) adjacent to the project area.

The preliminary Area of Potential Effect (APE) included both direct and indirect effects. The area of direct effect included existing roads, the approximate location of the roundabout, and other ground disturbing construction activities. The area of indirect effect was the first row of adjacent properties. Initiation letters were sent to consulting parties on June 14, 2019. On June 18, 2019, the Knik Tribe responded that no places of traditional importance are known within the project area, so no further consultation is requested.

On July 3, 2019, SHPO responded that they have no objections to the proposed APE, but that DOT&PF may need to further investigate Havemeister Dairy Farm (ANC-00212) to assess the property's historic value.

The DOT&PF and SHPO determined that the Havemeister Dairy Farm (ANC-00212) is eligible for listing in the National Historic Register of Historic Places under Criterion A, and possibly Criterion C. The proposed project would require acquisition of a small amount of forested land, which is listed in the DOT&PF findings letter as a contributing element to the Havemeister Farm historic district. Loss of these portions of the property would not diminish the ability of the remaining forest to block road noise, dust and visual intrusions into the farm district. On June 29, 2020, DOT&PF submitted a findings letter with an updated APE figure to 6 of 17 Project Name: HSIP: Bogard Road at Engstrom Road and Green Forest Drive Intersection Improvements Documentation Form State Project Number: CFHWY00453/Federal Project Number: 0001630 November 2017 all consulting parties. The SHPO concurred with a Finding of No Historic Properties Adversely Affected on July 9, 2020. No additional comments were received from other consulting parties.

If cultural or paleontological resources are discovered after the initial commencement of construction activities, work that would disturb such resources is to be stopped, and the Office of History and Archaeology, a Division of Parks and Outdoor Recreation of the Alaska Department of Natural Resources (<http://dnr.alaska.gov/parks/oha/>), is to be notified immediately at (907) 269-8721.

It is the Contractor's responsibility, thru the Project Engineer, to get clearance for material and disposal sites that have not been assessed during the Design phase of the project.

9.2 Projects near Public Water System (PWS) (4.10)

The project boundary intersects **0** Public Water System (PWS) Drinking Water Protection Area(s) (DWPA) and **0** Provisional Protection Area(s), and will have to follow the requirements of the 2021 CGP Part 4.10. The PWS contact will need to be notified by whatever method is most expedient: email, phone, or post (4.10.1). This should be done by the DOT&PF Project Engineer on behalf of both parties.

The intersecting DWPA's and Provisional Protect Areas ID numbers (PWSID) with contact information are:

Water System Name	PWSID	Contact Name	Phone #	Address	Email
None					

The water system name, number, name of contact, and all methods of contact can be found at: <https://dec.alaska.gov/eh/dw/dwp/protection-areas-map/>.

If the project is near a PWS, add language that addresses the following items:

1. Within the identified DWPA, restrict project activities that could significantly change the natural surface water drainage or groundwater gradient (4.10.2).
2. Immediately notify the nearby PWS of any identified potential contamination, such as spills or excess erosion (4.10.3).

Record the time, date, and method of contact and enter into the SWPPP in Appendix Q. Either a copy of the email, or a formal memo stating the date of phone call, or a receipt from certified mail will fulfill this obligation.

General Principles for Erosion and Sediment Controls.

The contractor must design, install, and maintain effective erosion and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed, and maintained to:

- Control storm water volume and velocity to minimize soil erosion and pollutant discharges;
- Control storm water discharges, including both peak flowrates and total storm water volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points;
- Minimize the amount of soil exposed during construction activity;
- Minimize the disturbance of steep slopes;
- Minimize sediment discharges from the site. The design, installation, and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity, duration of precipitation; the nature of resulting storm water runoff; and soil characteristics, including the range of soil particle sizes expected to be present on the site;
- Provide and maintain natural buffers around waters of the U.S., direct storm water to vegetated areas and maximize storm water infiltration to reduce pollutant discharges, unless infeasible;
- Minimize soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates it to be compacted.
- Unless infeasible, preserve topsoil. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed.

Additional Erosion and Sediment Controls Selection and Design Considerations:

Preventing storm water from coming into contact with polluting materials is generally more effective, and less costly, than removing pollutants from storm water;

Using a combination of control measures is more effective than using control measures in isolation for minimizing pollutants in the storm water discharge;

Using technologically available, economically practicable, and achievable methods in light of best industry practices;

Assessing the type and quantity of pollutants, including their potential to impact receiving water quality, is critical to designing effective control measures that will achieve the limits in this permit;

Minimizing impervious areas at the permittees facility and infiltrating runoff onsite (including bioretention cells, green roofs, and pervious pavement, among other approaches) can reduce runoff and improve groundwater recharge and stream base flows in local streams, although care must be taken to avoid ground water contamination;

Dissipate storm water runoff into open vegetated swales and natural depressions to reduce in stream impacts of erosive flows;

Conserving and/or restoring of riparian buffers will help protect streams from storm water runoff and improve water quality; and

Using treatment interceptors (e.g., sand filters) may be appropriate in some instances to minimize the discharge of pollutants.

Describe the Best Management Practices (BMPs) to be implemented to control pollutants in storm water discharges. For each major activity identified:

- Clearly describe appropriate control measures.
- Describe the general sequence during the construction process in which the measures will be implemented.
- Describe maintenance and inspection procedures to be undertaken for that specific BMP.
- Include protocols, thresholds, and schedules for cleaning, repairing, and/or replacing damaged or failing BMPs.
- Identify staff responsible for maintaining BMPs. (If your SWPPP is shared by multiple operators, indicate the operator responsible for each BMP.)

Categorize each BMP under one of the following areas of BMP activity as described below:

1. *Minimize the Amount of Soil Exposed during Construction Activity (4.2.2) & Site Delineation (4.2.1)*
2. *Maintain Natural Buffer Areas (4.2.3) & Clearing Vegetation (4.2.4)*
3. *Control Storm Water Discharges and Flow Rates (4.2.5)*
4. *Protect Steep Slopes (4.2.6)*
5. *Storm Water Inlet Protection (4.3.1)*
6. *Water Body Protection (4.3.2)*
7. *Down-Slope Sediment Controls (4.3.3)*
8. *Stabilized Construction Vehicle Access and Exit Points (4.3.4)*
9. *Track-Out from vehicles (4.3.5)*
10. *Dust Generation (4.3.6)*
11. *Stockpile Management (4.3.7)*
12. *Sediment Basins (4.3.9)*
13. *Dewatering (4.4)*
14. *Soil Stabilization (4.5)*
15. *Treatment Chemicals / Active Treatment Systems (4.6)*
16. *Good Housekeeping Measures (4.8)*
17. *Spill Notification (4.9)*
18. *Construction and Waste Materials (5.3.7)*
19. *Permanent/Post-Construction BMPs (4.11)*
20. *Projects near a Public Water System (PWS) (4.10)*

- Note the location of each BMP on your site map(s).
- Any structural BMPs should have design specifications and details referred to in Section 11 or included in Appendix B.

For more information or ideas on BMPs, see the DEC *Alaska Storm Water Guide*:

<https://dec.alaska.gov/water/wastewater/stormwater/guidance/> & for a list of Alaska specific BMPs look at the DOT&PF *Alaska SWPPP Guide*'s Appendix B - BMP Guide for Erosion & Sediment Control at http://dot.alaska.gov/stwddes/desenviron/assets/pdf/bmp/bmp_all.pdf

10.0 CONTROL MEASURES/BEST MANAGEMENT PRACTICES (4.0; 5.3.6)

Much of the guidance in this section is for both the ESCP & SWPPP preparers. Carefully read through the requirements listed below when filling out Section 10. When developing this section, think about how they are going to construct the project. Look at means and measures but do not direct the contractor...merely suggest. Consider 'prior to/upon construction' methods (i.e. upon placing culvert install a fiber roll and outlet protection). The following sections describe BMPs that will or may be used as necessary to prevent erosion and control sediment.

The selection, design, installation, maintenance, and removal of control measures must be in accordance with good engineering practices, manufacturer specifications, and address site-specific conditions such as precipitation, site topography, soil characteristics, and growing season.

The plan preparer will use this section to describe the types and locations of control measures and BMPs to be installed and maintained in accordance with CGP Part 4.0.

Describe each control measure and BMP, including installation schedule and maintenance, inspection, and removal requirements. You may include a brief description of each BMP in this section and refer to detailed installation, maintenance, inspection, removal requirements, and manufacturer's specifications that **MUST** be included in the Appendix B.

If a control measure or BMP will be used to comply with more than one element of this section, you do not need to repeat the detailed installation, maintenance, inspection, removal requirements, and manufacturer's information. For each repeated element, identify the control measure or BMP to be used, and refer to the section or Appendix B where the detailed information is presented.

The person(s) identified in Section 2.0 of this SWPPP will be responsible for ensuring compliance with the installation, maintenance, inspection, and removal of these control measures.

The format to be used is:

BMP Description:

Describe purpose, applicability, limitations and design. If using a BMP manual or publication, this information may be found there.

BMP Manual/Publication:

Provide the citation information as described below. If referencing Appendix B, where the BMP details are provided, ensure the attached sheets clearly identify this information.

Installation Schedule:

Identify the activity or phase prior to which the BMP will be installed or the activity that requires this BMP to be installed before it can begin.

Maintenance and Inspection:

Describe the thresholds and/or indicators for maintenance and protocols for inspecting the BMP. Describe the maintenance procedures. If using a BMP manual or publication, this information may be found there.

Responsible Staff:

Name the position and company who is responsible for installation and maintenance.

How to Cite a BMP Publication:

DOT&PF requires citations for the BMP manual or publication used to select and design the BMP, along with a description of the BMP. If no BMP manual or publication was used to select or design a given BMP then state "No BMP manual or publication was used in the design or selection of this BMP". BMP designs submitted by the contractor and approved by the Project Engineer may be used but still must state that no manual or publication was used.

BMP Manuals/Publications: BMP manuals describe each BMP and outline details such as installation, design parameters, applicability/limitations, maintenance, and targeted pollutants. To cite a manual, include the title, author (individual or agency) and date of publication.

Be careful when citing outside of the state control measures or BMPs. Read through them to make sure they do not put any additional restrictions that go beyond the CGP. If citing outside of state BMPs, make sure to mark out any requirements that do not apply to this project or do not meet CGP requirements and cite as 'modified from (insert BMP manual title).

DOT&PF Specifications and Plan Sheets: The publication cited may be the DOT&PF contract specifications and plan sheets provided that the minimum information regarding the BMP is included (those listed above).

When the plans and specifications are used, the reference must include the sheet or page number and these must be appended to the SWPPP. If the specifications and plan sheets do not provide the minimum information, the plan preparer must provide the missing information in the plan. Any drawing or description developed by the plan preparer must include the statement "No BMP manual or publication was used for this design."

Manufacturer's Specification Sheet: Referencing a manufacturer's specification sheet is suitable only if it includes all the necessary information listed in the above subsection. When using the manufacturer's specification sheet(s), provide the product name, manufacturer, and date of copyright, and attach copies of the specification sheet(s) to the plan. It may also be helpful to provide the manufacturer's website if the information was obtained online. You may deviate from manufacturer's specifications where you provide justification for such deviation and include documentation of your rationale in the ESCP/SWPPP.

Permanent/Post-Construction Control Measures: Identify any permanent/post-construction control measures that will be installed during the construction process and not discussed elsewhere in the SWPPP (permanent Soil Stabilization measures should be covered in section 10.13).

10.1 Minimize Amount of Soil Exposed during Construction Activity (4.2.2)

Describe how the disturbed land areas (e.g., clearing and grading) and undisturbed land areas (e.g., trees, boundaries of sensitive areas, or buffers established by CGP Part 4.2.3) will be delineated.

Describe the areas that will be disturbed for each phase of construction, and the methods you will use (e.g., signs, fences, etc.) to protect the areas that are to be left undisturbed. Construction activities must be phased to minimize the extent and duration of exposed soil.

Identify natural features and describe how each will be protected during construction activity.

Describe how native topsoil will be preserved. Native topsoil should be preserved for later use with on-site stockpiles, unless deemed infeasible by space constraints or site design criteria creates impervious surfaces (CGP Part 4.2.2.1).

BMP Description

BMP Manual/Publication:

☐ **Permanent**

☐ **Temporary**

Installation Schedule:

Maintenance and Inspection:

Responsible Staff:

10.1.1 Site Delineation (4.2.1)

BMP Description Site Delineation BMP 54.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ **Permanent**

☒ **Temporary**

Installation Schedule:

Install prior to land disturbance activities.

Maintenance and Inspection:

Inspection: Verify continued BMP implementation
Maintenance: Repair and/or replace site delineation measures as necessary until construction activities are complete.

Responsible Staff:

SWPPP Manager & Superintendent, Contractor

10.2 Maintain Natural Buffer Areas (4.2.3)

Are stream crossings or waters of the U.S. located within or immediately adjacent to the property?

☐ Yes

☒ No

If YES, describe the control measures to be implemented to comply with the CGP Part 4.2.3 (e.g., buffer areas, perimeter controls, etc.).

You must maintain natural buffer areas at stream crossings and around the edge of any waters of the U.S. that are located within or immediately adjacent to the construction activity in accordance with the following:

- The buffer must be a minimum of 25 feet wide, or the width as required by local ordinance, unless infeasible based on site dimensions;
- Exceptions are allowed for water dependent activities, specific water access activities, or necessary water crossings;

- A permittee should, to the extent practicable, use perimeter controls adjacent to buffers and direct storm water sheet flow to buffer areas to increase sediment removal and maximize storm water infiltration.

BMP Description Vegetation Buffer, BMP-38.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ **Permanent**

☒ **Temporary**

Installation Schedule:	Install prior to any soil disturbance
Maintenance and Inspection:	<u>Inspection:</u> Ensure buffer delineation is in place. Check for any damage from equipment or vehicles. Ensure stormwater is not forming. Check for sediments and pollutants in the buffer area. <u>Maintenance:</u> Replace or repair damage in buffer delineation.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.2.1 Clearing Vegetation (4.2.4)

Clearing of vegetation that disturbs the vegetative mat and exposes soil is **prohibited** prior to obtaining authorization under the CGP.

Cutting of trees and brush while the ground is frozen without disturbing the vegetative mat for the purpose of clearing in accordance with the U.S. Fish & Wildlife Service "Recommended Time Periods for Avoiding Vegetation Clearing" is allowed prior to the submittal of a project's NOI. If vegetation clearing that disturbs the vegetative mat and occurs after the onset of spring thaw (as defined in Appendix C) or conditions that consist of above freezing temperatures that cause melting of snow, the permittee must develop a SWPPP and file an NOI. Operators must receive authorization under this permit and otherwise comply with the terms of this permit prior to such clearing.

10.3 Control Storm Water Discharges and Flow Rates (4.2.5)

Describe control measures to comply with the CGP (e.g., divert storm water around the site, slow down or contain storm water, use of velocity dissipation devices, installing permanent storm water management controls prior to construction of site improvements to the extent practicable, etc.). Storm water that may concentrate must be slowed down or contained.

Example Format:

BMP Description: Fiber Rolls for Erosion and Sediment Control, BMP 10.00.a., BMP 10.01.b

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ **Permanent**

☒ **Temporary**

Installation Schedule:	Install prior to any soil disturbance
Maintenance and Inspection:	<u>Inspection:</u> Look for roll ends remain abutted tightly. Ensure that the rolls are in contact with the soil and are entrenched. Look for scouring underneath the rolls. <u>Maintenance:</u> If rolls are crushed, torn, slumping, or split, the damaged sections must be replaced. Remove sediment accumulated upslope of the roll when it reaches one-half the distance between the top of the fiber roll and the ground surface.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.3.1 Protect Steep Slopes (4.2.6)

Will steep slopes be present at the site during construction? ☒ Yes ☐ No

BMP Description: Fiber Rolls for Erosion Control BMP-10.01.a

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ Permanent

☒ Temporary

Installation Schedule:	Installed prior to soil disturbance in the contributing drainage area.
Maintenance and Inspection:	<u>Inspection:</u> Ensure that roll ends remain abutted tightly and that the rolls are in contact with the soil and are entrenched. Look for scouring underneath the rolls. <u>Maintenance:</u> Replace any crushed, torn, slumping or split rolls and any damaged sections. Remove sediment accumulated upslope of the roll when it reaches one-half the distance between the top of the fiber roll and the ground surface.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

Sediment Controls:

Sediment control measures (e.g. sediment ponds, traps, filters, etc.) must be constructed as one of the first steps in grading. These control measures must be functional before other land disturbing activities take place.

10.4 Storm Water Inlet Protection Measures (4.3.1)

Describe control measures (e.g., filter berms, perimeter controls, temporary diversion dikes, etc.) to be implemented to protect all inlets receiving storm water from the project during the duration of the project.

Example Format:

BMP Description: Storm Drain Inlet Sediment Protection, BMP 25.00-29.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ Permanent

☒ Temporary

Installation Schedule:	Install prior to ground disturbance in areas where storm drain inlets are to be installed.
Maintenance and Inspection:	<u>Inspection:</u> Check for sediment accumulation and any ponding of water. Ensure proper installation of storm drain inlet sediment protection. Check for tearing, undermining, or collapsing of fabric. <u>Maintenance:</u> Remove and repair damaged sections. Remove excessive sediment accumulation.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.5 Water Body Protection Measures (4.3.2)

Describe control measures selected to minimize discharge of sediment prior to entry into water bodies located on or immediately downstream of the site.

Example Format:

BMP Description: Rock Filter Berm BMP-16.00	
BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021	
☐ Permanent	☒ Temporary
Installation Schedule:	Gravel filter berms will be used as perimeter protection 24 hours after grubbing.
Maintenance and Inspection:	<u>Inspection:</u> Look for voids, undercutting, and/or sediment accumulation. <u>Maintenance:</u> Make repairs to berms at first sign of deterioration. Remove and either dispose of or reincorporate into the project any sediment buildup before 1/2 of above ground height or capacity or 1/3 if protecting a water body or storm drain inlet. Replace filter material when necessary.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

BMP Description: Culvert Inlet Protection BMP-08.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ Permanent	☒ Temporary
Installation Schedule:	Immediately when culvert is installed, bedded, and backfilled. All culvert inlet protection will be installed within 24 hours of culvert placement.
Maintenance and Inspection:	<u>Inspection:</u> Look for roll ends remain abutted tightly. Ensure that the rolls are in contact with the soil and are entrenched. Look for scouring underneath the rolls. <u>Maintenance:</u> Remove accumulated sediment before it reaches 1/3 of the design depth. Repair any structural damage and restore structure to original dimensions and is in full contact with soil around the inlet.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.6 Down-Slope Sediment Controls (4.3.3)

Describe sediment controls (e.g., silt fence or temporary diversion dike) for any portion of the down-slope and side-slope perimeter where storm water will be discharged from disturbed areas of the site.

Fibers rolls will be used as a down-slope sediment control. See Section 10.3.1 Protect Steep Slopes for the BMP description, installation, maintenance, and inspection information.

10.7 Stabilized Construction Vehicle Access and Exit Points (4.3.4)

Vehicle access points must be limited as much as possible and must be stabilized.

Describe location(s) of vehicle entrance(s) and exit(s), procedures to remove accumulated sediment off-site (i.e., vehicle tracking), and stabilization practices (i.e., stone pads and/or wash racks) to minimize off-site vehicle tracking of sediments and discharges to storm water.

Any rubber tire operating on bare soils will require a stabilized entrance / exit prior to driving on paved surfaces. Tracked equipment must be cleaned prior to operating on paved surfaces. The existing gravel surfaces will be used for the stabilized access and exit points.

BMP Description: Stabilized Construction Exit, BMP 23.00 & 24.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ Permanent

☒ Temporary

Installation Schedule:	Install prior to earthwork
Maintenance and Inspection:	<u>Inspection:</u> Check for sediment accumulation. Inspect roadway for sediment track-out. <u>Maintenance:</u> Repair and/or clean out any structures used to trap sediment. Remove any sediment and mud deposited on roadway.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.8 Dust Generation and Track-Out from Vehicles (4.3.5, 4.3.6)

Describe control measures to minimize the generation of dust and off-site vehicle tracking of sediment. Dust must be minimized prior to the vehicle exits by application of water or other dust suppression techniques.

The contractor will be required to remove any debris including soil and rock from the roadway. Any material tracked will be swept up daily.

Example Format:

BMP Description: Street Sweeping and Vacuuming for Sediment Control, BMP 55.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ Permanent

☒ Temporary

Installation Schedule:	Use dust control measures as needed for the duration of the project.
Maintenance and Inspection:	<u>Inspection:</u> Inspect continuously during use of the project <u>Maintenance:</u> Remove accumulated sediments and dispose in approved location.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.9 Soil Management and Soil Stockpile (4.3.7)

Will soil stockpiles be at the site during construction? ☒ Yes ☐ No

If YES, describe control measures intended to control sediment loss from the stockpiles (e.g., tarps or perimeter straw wattles). Show location(s) of stockpile(s) on site maps, if known. Stockpiles must be

stabilized or covered, protected with sediment controls and located away from storm water inlets, conveyance channels, or water bodies, if possible.

BMP Description: Plastic Covering BMP-12.00

BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021

☐ **Permanent**

☒ **Temporary**

Installation Schedule:	Plastic covering will be installed when the stockpile will not be actively worked on more than 14 days or when there are windy conditions. Plastic covering will be secured either by weighted or trenched method.
Maintenance and Inspection:	<u>Inspection:</u> Look for unsecured covering or locations of erosion under the covering. <u>Maintenance:</u> Re-secure covering.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.10 Authorized Non-Storm Water Discharges (4.3.8)

A permittee must minimize any non-storm water authorized by this permit. List any authorized non-storm water discharges.

10.11 Sediment Basins (4.3.9)

Refer to CGP Part 4.3.8 to determine if a sediment basin is required for your site.

Will a sediment basin be required during construction? ☐ Yes ☒ No

If YES, provide a brief description of the sediment basin here. Append detailed design information in appendices (e.g., calculated volume of runoff from a two-year, 24-hour storm, or other assumptions used to calculate appropriate sediment-basin size). Show location of sediment basin(s) on site maps.

10.12 Dewatering (4.4)

Describe dewatering practices to be implemented if water must be removed from an area so construction activity can continue.

Will dewatering be conducted during construction? ☒ Yes ☐ No

Will excavation dewatering be conducted within 1,500 feet of a DEC mapped contaminated site found on the DEC website? ☒ Yes ☐ No

For DEC's contaminated sites:

<http://www.arcgis.com/home/item.html?id=315240bf84aa0b8272ad1cef3cad3>.

If yes to above question, review and comply with the DEC General Permit for Excavation Dewatering (AKG002000_- <https://dec.alaska.gov/water/wastewater/stormwater/dewater-hydrostatic/#dewater>), or most current version, for specific requirements

Describe control measures to be implemented to comply with dewatering discharges authorized either under the CGP or the DEC General Permit for Excavation Dewatering requirements.

Example Format:

BMP Description: Contained Silt Control System BMP-07.00	
BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021	
☐ Permanent ☒ Temporary	
Installation Schedule:	Install prior to dewatering activities
Maintenance and Inspection:	<u>Inspection:</u> Check for tears, weathering or any compromised integrity in the filtration fabric. Inspect for any sediment or erosion around the system. <u>Maintenance:</u> Replace damaged filtration bags, or when bags no longer filter sediment or passes water a reasonable rate. Replace filtration bags when clean discharge is reduced roughly 50%. Repair erosion and channels.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.13 Permanent/Post-Construction BMPs (4.11)

Describe any permanent/post-construction control measures that will be installed during the construction process AND have not been discussed elsewhere in this document.

Examples of these measures are:

- Biofilters
- Detention/Retention Devices
- Earth Dikes, Drainage Swales, and Lined Ditches
- Infiltration Basins
- Vegetated Strips and/or Swales

10.13.1 Soil Stabilization (4.5, 5.3.6.3)

The project must stabilize all disturbed areas of the site to minimize on-site erosion and sedimentation and the resulting discharge of pollutants.

Soil stabilization requirements vary depending on the mean annual precipitation for the site. Refer to CGP Part 4.5 for specific requirements.

Refer to the Alaska Plant Materials Center's Alaska Coastal Revegetation & Erosion Control Guide and Interior Alaska Revegetation & Erosion Control Guide at <http://plants.alaska.gov> for help in selecting appropriate seed mixes and information on methods for revegetation.

Describe permanent & temporary stabilization control measures and sequence of installation.

Describe how the site will be stabilized prior to seasonal freeze-up.

Example Format:

BMP Description: Permanent Seeding and Soil Amendments, BMP 52.00 & 53.00	
BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, October 2016	
☒ Permanent	☐ Temporary
Installation Schedule:	Install after last ground disturbance activity
Maintenance and Inspection:	<u>Inspection:</u> Regularly inspect seeded areas where protective measures have failed or where plant growth is disturbed. <u>Maintenance:</u> Water seeded areas as necessary. Reseed areas where growth is inadequate or absent. Fertilize as needed.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.14 Treatment Chemicals (4.6; 5.3.6.4)

Provide documentation for all treatment chemicals and/or an Active Treatment System (ATS) to comply with CGP Part 4.6. Submit cationic treatment chemical use or ATS to DEC at least 14 days for approval before installing.

Will treatment chemicals be used to control erosion and/or sediment during construction?

☐ Yes ☐ No

If YES, comply with CGP Part 4.6 and complete the following sections (10.15 & 10.16).

10.15 Treatment Chemicals (4.6.1)

The use of treatment chemicals to reduce erosion from the land or sediment in a storm water discharge is allowed provided all the requirements of CGP Part 4.6 are met. Use conventional sediment controls before and after the application of treatment chemicals. Chemicals may only be applied where storm water is treated upstream and is directed to a sediment control (e.g., sediment trap, sediment basin) before discharge.

No treatment chemicals will be used on this project.

If YES, comply with ACGP Part 4.6 and complete the following subsections. If NO, delete the following subsections.

10.15.1 Treatment Chemical Selection (4.6.2)

Describe what chemicals will be used, including information required by CGP Part 4.6.2.

Insert Text

10.15.2 Treatment Chemical Use Procedures (4.6.3; 4.6.6)

Describe storage methods that will be used and ensure they comply with Part 4.6.3.

Describe training for employees using treatment chemicals at the site, as specified in Part 4.6.6. Document this training in either appendix for Employee Qualifications or Training Records.

Insert Text

10.15.3 Application of Treatment Chemicals (4.6.4; 4.6.5)

The application of treatment chemicals shall be in combination with appropriate physical control measures to ensure effectiveness of treatment chemical. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier.

Briefly describe treatment chemical application procedures to be used. Append detailed treatment chemical application procedures Appendix P.

Insert Text

10.16 Active Treatment System Information or Cationic Treatment Chemicals (4.6.7)

A permittee who uses an Active Treatment System (ATS) or cationic treatment chemicals as a control measure must submit information required by the DEC for review at least 14 days prior to start of operation of the ATS at the project. Specific submittal requirements can be found at 4.6.7.

Will an ATS or cationic treatment chemicals be used as a control measure at the site?

☐ Yes ☒ No

If YES, simply include the packet submitted to DEC in Appendix P, and refer to this documentation below.

Insert Text

10.17 Good Housekeeping Measures (4.8)

The project must design, install, implement, and maintain effective good housekeeping measures to prevent and/or minimize the discharge of pollutants. The project must include appropriate measures for any of the following activities at the site.

Consult the DEC Storm Water Guide or other resources for more information or ideas on BMPs. See also the EPA's National Menu of BMPs at <https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater> for a list of Alaska specific BMPs look at the *Alaska SWPPP Guide's* Appendix B - BMP Guide for Erosion & Sediment Control at http://www.dot.state.ak.us/stwddes/desenviron/assets/pdf/bmp/bmp_all.pdf

10.17.1 Washing of Equipment and Vehicles (4.8.1)

Will equipment and vehicle washing and/or wheel wash-down be conducted at the site?

☐ Yes ☒ No

If YES, describe the control measures to be implemented to comply with CGP Part 4.8.1.

Example Format:

BMP Description:

BMP Manual/Publication:

Installation Schedule:

Maintenance and Inspection:	Inspection: Maintenance:
Responsible Staff:	

10.17.2 Fueling and Maintenance Areas (4.8.2)

Describe equipment/vehicle fueling and maintenance practices to be implemented to control pollutants to storm water (e.g., secondary containment, drip pans, spill kits, etc.).

Describe spill prevention and control measures to be implemented, including ways to reduce the chance of spills, stop the source of spills, contain and clean up spills, dispose of materials contaminated by spills, and train personnel responsible for spill prevention and control.

Will equipment and vehicle fueling or maintenance be conducted at the site?

☒ Yes ☐ No

The contractor's lay down yards, fueling and maintenance areas must be delineated on the contractor's SWPPP site map. Spill kits appropriate to respond to the hazards on site will be required. Inspections will include the contractor's fueling, maintenance, and laydown areas. Equipment will be maintained to prevent oils and grease from discharging with storm water. Prior to use each day, equipment operators are required to do a visual inspection for leaks, drips, and excess grease. If leaks cannot be repaired and stopped, the equipment will be placed out of service over drip pans and/or pads to collect any fluids or grease and prevent pollution discharge. Topping off fluids will not be allowed in lieu of maintenance. Equipment operators will look for excess grease accumulations, especially when the weather warms up, removing and properly disposing of excess grease to prevent discharge.

HMCP or SPCC: For the specific sections in the Good Housekeeping BMPs that deal with fueling and oiling, equipment care and maintenance, waste materials, etc., it should be mentioned, by referencing the specific page and section, this requirement for BMP reference and citation is met. Also, it will/can create less conflict within the SWPPP due to the HMCP being project specific and the BMP citations more generic.

10.17.3 Staging and Material Storage Areas (4.8.3)

Designate areas to be used for staging and material storage areas. Locate such activities, to the extent practicable, away from storm water conveyance channels, storm water inlets, and waters of the U.S.; and minimize the exposure to precipitation and storm water and vandalism for all chemicals, treatment chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment.

10.17.4 Washout of Applicators/Containers Used for Paint, Concrete, and Other Materials (4.8.4)

Describe location(s) and controls to minimize the potential for storm water pollution from washout areas for concrete mixers, paint, stucco, etc.

Will washout areas for trucks, applicators, or containers of concrete, paint, or other materials be used at the site? ☒ Yes ☐ No

If YES, describe control measures to be implemented to comply with CGP Part 4.8.4. If NO, delete the following paragraph.

The contractor will provide a designated concrete washout area. The washout area may be moved during the construction process but the location must be kept current on the site map. Concrete wash water may not be discharged with storm water. The washout must have sufficient capacity for the scheduled activities.

Example Format:

BMP Description:	
BMP Manual/Publication: DOT&PF, Alaska SWPPP Guide, March 2021	
Installation Schedule:	Install before pouring concrete
Maintenance and Inspection:	<u>Inspection:</u> Verify that concrete washout is filled to 50% capacity. For self-installed equipment, ensure plastic liner is securely anchored and intact and inspect sidewalls for leaks. For pre-fabricated containment, check the unit for leaks and potential damage. Ensure washouts signs are secure and visible. <u>Maintenance:</u> Clean existing washouts before washout is 50% full Provide alternate washout during washout cleaning if necessary. Repair damaged washouts, Contain spills or discharge of concrete waste materials. Replace or install signage as needed. Reline self-installed containers after each cleaning.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

10.17.5 Fertilizer or Pesticide Use (4.8.5)

Describe fertilizers and/or pesticides expected to be used and/or stored on-site and procedures for storage of materials to minimize exposure of the materials to storm water.

Will fertilizers or pesticides be used at the site? ☒ Yes ☐ No

If YES, describe control measures to be implemented to comply with CGP Part 4.8.5.

Use fertilizers in the seeding process. Apply fertilizers and pesticides that will minimize chemical loss to storm water runoff. Follow manufacturer's label requirements for application rates and proper disposal.

Example Format:

BMP Description:	
BMP Manual/Publication:	
Installation Schedule:	
Maintenance and Inspection:	<u>Inspection:</u> <u>Maintenance:</u>
Responsible Staff:	

Contractors will obtain authorization to spray pesticides through DOT&PF M&O utilizing the DOT&PF Integrated Vegetation Management Plan (IVMP). A permit from DEC is only required (in addition to IVMP authorization obtained via working through the regional M&O environmental analysts and a TCP from ROW) if the contractor is applying pesticide to a water body/aquatic site. Also, if spraying within the MOA, a local permit must be obtained from the MOA as well. For more information and contacts, visit <http://dot.alaska.gov/stwdmno/ivmp/index.shtml>.

10.18 Spill Notification (4.9)

The contractor shall describe spill-notification procedures, including relevant federal, state, tribal, and local agency contact information, to be implemented in the event of a leak, spill, or release of hazardous substances or oil that occur at the construction site. Refer to CGP Part 4.9 for permit requirements.

Contractor shall use DOT&PF Hazardous Material Control Plan template at http://www.dot.state.ak.us/stwddes/dcsconst/assets/docs/constforms/hmcp_template.doc to create project specific plan. Include final plan as approved by DOT&PF in Appendix O.

10.19 Construction and Waste Materials (4.8.6, 5.3.7)

Describe in general terms the type of construction and waste materials expected to be stored at the site, with updates as appropriate, and describe the measures for handling and disposal of all wastes generated at the site, including clearing and demolition debris or other waste soils removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste. Refer also to CGP Parts 4.8.3 Staging and Material Storage Areas, and 4.8.6 Storage, Handling, and Disposal of Construction Waste.

Building materials and other construction site wastes must be properly managed and disposed of to reduce the risk of pollution from materials such as surplus or refuse building materials or hazardous wastes. Practices such as trash disposal, recycling, proper material handling, and spill prevention and cleanup measures can reduce the potential for storm water runoff to mobilize construction site wastes and contaminate surface or groundwater.

The contractor must establish proper building and material storage areas to avoid pollutants coming in contact with rainfall or flowing storm water. Any materials that have the potential to pollute storm water will be covered to prevent rainfall from coming into contact with them. Garbage containers will be covered to prevent debris from blowing away as well. Any contractor supplied staging area must be included in inspections and the SWPPP. No materials will be staged or stored, even temporarily in flowing water.

The contractor should designate a waste collection area on site that does not receive substantial amount of runoff from upland areas and does not drain directly to a water body.

Construction Materials

Insert Text or Table

Waste Materials

Insert Text or Table

Example Format:

BMP Description: <i>General Construction Site Waste Management</i>	
BMP Manual/Publication: <i>DEC Alaska Storm Water Guide, December 2011</i>	
Installation Schedule:	Continuously during construction activities
Maintenance and Inspection:	<u>Inspection:</u> Inspect storage and use areas and identify containers or equipment that could malfunction and cause leaks or spills. Check equipment and containers for leaks, corrosion, support or foundation failure, or other signs of deterioration, and test them for soundness. <u>Maintenance:</u> Immediately repair or replace any that are found to be defective.
Responsible Staff:	SWPPP Manager & Superintendent, Contractor

11.0 INSPECTIONS (5.4; 6.0)

Minimum requirements for the locations and scope of site inspections are described in the CGP Part 6.4.

Inspection requirements for linear projects are described in the CGP Part 6.5.

Describe the frequency inspections will occur at your site, including any correlations to storm frequency and intensity.

Note that inspection details for particular BMPs should be included in Section 11 or Appendix B.

11.1 Inspection Schedules (5.4.1.2; 6.1; 6.2; 6.6)

Refer to CGP Part 6.1 for inspection frequency requirements.

Required inspection frequency is based on mean annual precipitation for the site. Refer to Section 3.2 for annual precipitation data and can be found in the project specifications.

A permittee must allow an authorized representative of DEC, EPA or the MS4 operator to conduct a site inspection in accordance with the CGP Part 6.6.

Inspection Frequency:

The inspection frequency in Central Region will now be once every seven calendar days.

Inspection frequency: **Once every seven calendar days**

Justification for reduction in inspection frequency, if applicable: **Insert Text**

As defined by the CGP, winter shutdown means the cessation of soil disturbing or soil stabilizing construction activity for winter. Typically this period is from October/November to April/May and is approximately from Fall Freeze-up to Spring Thaw.

CGP Definition of Fall Freeze-up: For the purposes of this permit, means for planning purposes in the development of the SWPPP and initial planning of control measure maintenance the date in the fall that air temperatures will be predominately below freezing. It is the date in the fall that has an 80% probability that a minimum temperature below a threshold of 32.5 degrees Fahrenheit will occur on or after the given date.

CGP Definition of Spring Thaw: For the purposes of this permit, means for planning purposes in the development of the SWPPP and initial planning of control measure maintenance the date in the spring that air temperatures will be predominately above freezing. It is the date in the spring that has a 20% probability that a minimum temperature below a threshold of 32.5 degrees Fahrenheit will occur on or after the given date.

These dates can be found by looking up the "Fall 'Freeze' Probabilities" & "Spring 'Thaw' Probability" for the weather station closest to the site on the website: www.wrcc.dri.edu/summary/Climsmak.html. NOTE: this estimation of "Fall Freeze-up" & "Spring 'Thaw'" is for planning purposes only. During construction, the permittee will need to maintain control measures based on actual conditions.

Estimated date of winter shutdown: **Insert Text**

The inspections will be conducted jointly with department personnel as directed by the Project Engineer. The schedule for site inspections will be established and updated daily as necessary to meet the requirements of the CGP and provide the department with notice and opportunity to participate in the site inspection.

11.2 Inspection Form or Checklist (5.4.1.3; 6.7)

Contractor is required to attach Form 25D-100 in Appendix K. An Inspection Report will be completed after each inspection, identifying BMPs installed at the time of inspection, noting corrective actions required, and documenting complete-by-date for any actions discovered during the inspection. Each report will be certified by the Contractor's Superintendent and DOT&PF's Project Engineer.

11.3 Corrective Action Procedures (5.4.1.4; 8.0)

Identify how conditions found that require corrective action will be addressed:

The following guidelines apply for setting corrective action complete-by dates as required by the CGP:

For conditions that are easily remedied (i.e., removal of tracked sediment, maintenance of control measures, or spill clean-up), the permittee must initiate appropriate steps to correct the problem within twenty-four hours from the time of discovery and correct the problem as soon as possible; or

If installation of a new control measure is needed or an existing control measure requires significant redesign and reconstruction or replacement, the permittee must install the new or modified measure and make it operational within seven calendar days from the time of discovery of the need for the corrective action, unless infeasible.

If a discharge occurs during a local 2-year, 24-hour storm event, a corrective action must be initiated the day after the storm event ends as described in CGP Part 8.1.1.

For corrective actions that could affect a subcontractor, notify the subcontractor within three calendar days of taking the corrective action.

Additionally, deadlines for completion of corrective actions shall be selected to protect water quality and prior to the next storm event unless impracticable.

Corrective Action Log

The corrective action log will document the following within 24 hours of discovery of any conditions listed in CGP Part 8.1 (use Form 25D-112 and include in Appendix J):

- Date the problem was identified
- Summary of corrective action taken or to be taken
- Notice of whether SWPPP modifications were required as a result of this discovery or corrective action
- Date corrective action completed and name of person completing the action

In the event there is a reason (outside of the project staff's control) that a corrective action cannot practicably be completed by the set complete-by date, DOT&PF will complete a Delayed Action Item Report (Form 25D-113). This form will set a new complete-by date and document the reason that the previous date could not be met.

11.4 Inspection Recordkeeping (5.4.2)

Records (including inspection reports, corrective action logs, delayed action item reports, grading and stabilization logs, amendment logs, staff tracking logs, rainfall logs, and training logs) will be maintained for a minimum period of at least three (3) years after the permit is terminated. A hard copy and electronic copy of the final SWPPP, including all appendices, will be transmitted to DOT&PF when the project's NOTs are filed.

12.0 MONITORING PLAN (IF APPLICABLE) (5.5; 7.0)

12.1 Determination of Need for Monitoring Plan

Is there an EPA-established or approved TMDL? ☐ Yes ☒ No

Is the receiving water listed as impaired for turbidity and/or sediment? ☐ Yes ☒ No

13.0 POST-AUTHORIZATION RECORDS (5.8)

Copy of Permit Requirements (5.8.1)

The contractor's SWPPP must contain the following documents:

- copy of CGP (5.8.1.1)
- copy of the signed and certified NOI form submitted to DEC (5.8.1.2)
- upon receipt, a copy of letter from DEC authorizing permit coverage, providing tracking number (5.8.1.3)

These documents must be included in Appendix F.

13.1 Additional Documentation Requirements (5.8.2)

The Grading and Stabilization Log, Form 25D-110 in Appendix G, will be filled out to satisfy the following CGP requirements:

- Dates when grading activities occur (5.8.2.1.1)
- Description of grading activities and location (5.8.2.1.2)
- Dates when construction activities temporarily or permanently cease on a portion of the site (5.9.2)
- Dates when stabilization measures are initiated (5.8.2.1.4)
- Description of Stabilization Measure (5.8.2.1.5)
- Date of beginning and ending period for winter shutdown (5.8.2.2)

Other documents will be included as shown below:

- Copies of inspection reports (5.4.2; 5.8.2.3; insert in Appendix K).
- Copies of monitoring reports, if applicable (7.3.9.2; 5.8.2.4; 5.8.2.5; 5.5.2; 9.1; insert in Appendix H).
- Documentation in support of chemical-treatment processes (4.6; 5.8.2.7; insert in Appendix P).
- Documentation of maintenance and repairs of control measures (5.8.2.9; 8.1; 8.2; insert in Appendix J).
- Copy of DEC Letter of Non-Objection (insert in Appendix D).

13.1.1 Records of Employee Training (4.14; 5.8.2.8)

Training staff and subcontractors is an effective BMP. Document all training conducted for your staff, those with specific storm water responsibilities (e.g. installing, inspecting, and maintaining BMPs), and subcontractors. Use the Training Log (Form 25D-125) in Appendix I.

Describe Training Conducted: **Insert Text**

General storm water and BMP awareness training for staff and subcontractors:

During safety meetings and schedule briefings, corrective actions from the previous period will be reviewed. The contractor is encouraged to discuss timing of activities and stabilization requirements. Records of the training topics, attendees, and length must be maintained in the contractor's SWPPP.

Detailed training for staff and subcontractors with specific storm water responsibilities:

Insert Text

Individual(s) Responsible for Training:

Insert Names, Titles, and Contact Numbers here

Documentation of training conducted shall be record on Form 25D-125 and included in Appendix I.

14.0 MAINTAINING AN UPDATED SWPPP (5.9)

This section does not need to be filled out but is a list of reminders for the applicant.

The permittee must modify the SWPPP, including site map(s), in response to any of the following:

- Whenever changes are made to construction plans, control measures, good housekeeping measures, monitoring plan (if applicable), or other activities at the site that are no longer accurately reflected in SWPPP (5.9.1.1);
- If inspections of site investigations by staff or by local, state, tribal, or federal officials determine SWPPP modifications are necessary for permit compliance (5.9.1.2); and
- To reflect any revisions to applicable federal, state, tribal, or local laws that affect control measures implemented at the construction site (5.9.1.3).

14.1 SWPPP Amendment Log (5.9.2)

A permittee must keep a log showing dates, name of person authorizing the change, and a brief summary of changes for all significant SWPPP modifications (e.g., adding new control measures, changes in project design, or significant storm events that cause replacement of control measures). Use DOT&PF construction form 25D-114. **Amendments must be approved by an AK-CESCL or equivalently certified individual and be included in Appendix M. The Superintendent and the SWPPP Manager are the only persons authorized to amend the SWPPP and update the SWPPP Amendment Log. Amendments must be approved by the Project Engineer. This approval must be documented in the "PE's Initials column" by the Project Engineer.**

14.2 Deadlines for SWPPP Modifications (5.9.3)

Revisions to the SWPPP must be completed within seven days of the inspection that identified the need for a SWPPP modification or within seven days of substantial modifications to the construction plans or changes in site conditions.

15.0 ADDITIONAL SWPPP REQUIREMENTS (5.10)

15.1 Retention of SWPPP (5.10.1)

A copy of the SWPPP (including a copy of the permit), NOI, and acknowledgement letter from DEC must be retained at the construction site.

15.2 Main Entrance Signage (5.10.2)

A sign or other notice must be posted conspicuously near the main entrance of the site. The sign or notice must include a copy of the completed NOI for both DOT&PF and the contractor.

15.3 Availability of SWPPP (5.10.3)

The permittee must keep a current copy of the SWPPP at the site. The SWPPP must be made available to subcontractors, government and tribal agencies, and MS4 operators, upon request.

15.4 Signature and Certification (5.10.4)

As co-permittees, the SWPPP is signed, dated, and certified by both the contractor and by DOT&PF. DOT&PF requires the use of its forms, instead of those provided as examples in the DEC template. The contractor must complete the SWPPP Contractor Certification (Form 25D-111) once DOT&PF approves the SWPPP and include it in Appendix E. Either the contractor's corporate officer or their duly authorized representative can certify the SWPPP. If a duly authorized representative certifies, the Delegation of Signature Authority form must be included in Appendix E.

Upon approval, DOT&PF will provide the contractor with signed DOT&PF forms for the DOT&PF SWPPP Certification (Form 25D-109) and DOT&PF Delegation of Authority (Form 25D-107) for inclusion in Appendix E of the SWPPP.

APPENDIX A
SITE MAPS AND DRAWINGS



APPENDIX B

BMP DETAILS



APPENDIX D
SUPPORTING DOCUMENTATION



APPENDIX E
PROJECT SPECIFIC ESCP DISCUSSIONS & COMMENTS

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
CENTRAL REGION



BID FORM, CONTRACT, BOND, STANDARD MODIFICATIONS
AND SPECIAL PROVISIONS FOR:

**HSIP: Bogard Road at Engstrom
Road/Green Forest Drive Intersection
Improvements
Project No. 0001(630) / CFHWY00453**

**AS ADVERTISED: TBD
Document Fee: \$100.00**

**To be used in conjunction with State of Alaska Standard Specifications for Highway
Construction dated 2020, and the Plans for the above referenced project.**

www.dot.alaska.gov - "Procurement"

TABLE OF CONTENTS

(Federal-Aid Highways)

1.	<u>Invitation</u> (yellow)		
	INVITATION TO BID	25D-7	(CR 7/18)
2.	<u>Bid Notices</u> (yellow)		
	REQUIRED DOCUMENTS	25D-4H	(11/23)
	FEDERAL EEO BID CONDITIONS	25A-301	(03/23)
3.	<u>Forms</u> (yellow)		
	SUBCONTRACTOR LIST	25D-5	(5/17)
	BIDDER REGISTRATION	25D-6	(6/22)
	CONTRACTOR'S QUESTIONNAIRE	25D-8	(8/01)
	BID FORMS		
	a. Bid Cover Sheet		
	b. Bid Schedule		
	c. Bid Attachments		
	d. Addenda Acknowledgement		
	e. Bidder's Acknowledgement and Certification		
	CONSTRUCTION CONTRACT	25D-10H	(1/15)
	PAYMENT BOND	25D-12	(8/01)
	PERFORMANCE BOND	25D-13	(8/01)
	BID BOND	25D-14	(8/01)
	BID MODIFICATION	25D-16	(7/18)
	NON-DOMESTIC MINIMAL USE & DE MINIMIS REGISTER	25D-60	(11/23)
	EEO-1 CERTIFICATION	25A-304	(10/19)
	DOT&PF TRAINING PROGRAM REQUEST	25A-310	(5/13)
	TRAINING UTILIZATION REPORT	25A-311	(1/16)
	CONTACT REPORT	25A-321A	(10/16)
	DBE UTILIZATION REPORT	25A-325C	(3/12)
	PRIME CONTRACTOR'S WRITTEN DBE COMMITMENT	25A-326	(8/01)
	SUMMARY OF GOOD FAITH EFFORT DOCUMENTATION	25A-332A	(8/01)
4.	<u>Contract Provisions and Specifications</u> (white)		
	STANDARD MODIFICATIONS		
	SPECIAL PROVISIONS		
	APPENDIX A: CONSTRUCTION SURVEY REQUIREMENTS		
	APPENDIX B: ENVIRONMENTAL PERMITS		
	APPENDIX C: MATERIAL CERTIFICATION LIST		
	APPENDIX D: SIGN SHOP DRAWINGS		
	APPENDIX E: TEMPORARY CONSTRUCTION EASEMENTS		
	REQUIRED CONTRACT PROVISIONS FOR		
	FEDERAL-AID (FHWA) CONSTRUCTION CONTRACTS	25D-55H	(10/23)
5.	<u>Federal Wage Rates</u>		
	Federal wage rates can be obtained at https://sam.gov/content/home for the State of Alaska. Use the federal wage rates that are in effect 10 days before Bid Opening. The Department will include a paper copy of the federal wage rates in the signed Contract.		
6.	<u>State Wage Rates</u>		
	State wage rates can be obtained at http://www.labor.state.ak.us/lss/pamp600.htm . Use the State wage rates that are in effect 10 days before Bid Opening. The Department will include a paper copy of the State wage rates in the signed Contract.		



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

INVITATION TO BID

for Construction Contract

Date TBD

HSIP: Bogard Road at Engstrom Road/Green Forest Drive Intersection Improvements
Project No. 0001(630) / CFHWY00453

The Department invites bidders to submit bids for furnishing all labor, equipment, and materials and performing all work for the project described below. The Department will only consider bids received **before 2:00 PM local time (per the Department's time source) on the TBD day of Month 2025**. On that date, the Department will assemble, open, and then publicly announce the timely-received bids at Anchorage, Alaska at 2:15 PM, or as soon thereafter as practicable.

Location of Project: Palmer, Alaska

Contracting Officer: Sean L. Holland, P.E., Regional Director

Issuing Office: Central Region

State Funded ☐

Federal Aid ☒

Description of Work:

This federally funded project will include the realignment of Green Forest Drive, construction of a roundabout, drainage improvements, installation of roadside hardware, lighting, and relocation of utilities. The project will be developed and funded through the Highway safety Improvement Program (HSIP).

Project DBE Utilization Goal: ☒ Race-Neutral

The Engineer's Estimate is between **\$10,000,000** and **\$20,000,000**

All work shall be completed in N/A Calendar Days, or by **October 31, 2028**.

The Department will identify interim completion dates, if any, in the Special Provisions.

The apparent successful bidder must furnish a payment bond in the amount of 100% of the contract and a performance bond in the amount of 100% of the contract as security conditioned for the full, complete and faithful performance of the contract. The apparent successful bidder must execute the said contract and bonds within **ten (10)** calendar days, or such further time as may be allowed in writing by the Contracting Officer, after receiving notification of the acceptance of their bid.

Submission of Bidding Documents

Bidders may submit bidding documents electronically via the Department's approved online bidding service, through the mail or hand delivered. For mailed or hand delivered bids and for electronically submitted bids with a paper bid guaranty, documents shall be submitted in a sealed envelope marked as follows:

Bidding Documents for Project:

**HSIP: Bogard Road at Engstrom Road/Green Forest
Drive Intersection Improvements
Project No. 0001(630) / CFHWY00453**

ATTN:

**State of Alaska
Department of Transportation & Public Facilities
PO Box 196900
4111 Aviation Avenue
Anchorage, AK 99519-6900**

It is incumbent upon the bidder to ensure its bid, any amendments, and/or withdrawal arrive, in its entirety, at the location and before the deadline stated above. A bidder sending a bid amendment or withdrawal via email must transmit its documentation to the Department at this email address: crdotpfcontracts@alaska.gov.

To be responsive, a bid must include a bid guaranty equal to 5% of the amount bid. *(When calculating the bid amount for purposes of determining the 5% value of the bid guaranty, a bidder shall include its base bid amount, plus the amount bid for alternate and supplemental bid items, if any.)*

The Department hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises will be afforded full opportunity to submit bids and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

NOTICE TO BIDDERS

Bidders must have a Vendor ID or your bid may not be accepted. More information can be obtained at the following website: <http://dot.alaska.gov/aashtoware/docs/AWP-Vendor-List-Guidance.pdf>

The following data may assist a bidder in preparing its bid:

See attached Special Notice to Bidders for this project.

A bidder may obtain hard copy project plans and specifications for the price of **\$100.00** from:

State of Alaska, Department of Transportation & Public Facilities

Plans Room

4111 Aviation Avenue

PO Box 196900

Anchorage, AK 99519-6900

Phone: (907) 269-0408

If a bidder has a question relating to design features, constructability, quantities, or other technical aspects of the project, it may direct its inquiry to the questions and answers area of the Bid Express proposal page: <https://www.bidx.com/ak/lettings>

A bidder requesting assistance in viewing the project site must make arrangements at least 48 hours in advance.

The point of contract for inquiries for this project is **Chris Bentz, P.E.**

Email: chris.bentz@alaska.gov

Phone: (907) 707-1912

For questions relating to electronic bidding or for assistance with your Bid Express account, contact Bid Express customer support at customer.support@bidx.com or call toll free (888)352-BIDX(2439) Monday through Friday 7:00am to 8:00pm (Eastern).

A bidder may direct questions concerning bidding procedures and requirements to:

Sharon L. Smith, P.E.

Chief of Contracts

PO Box 196900

Anchorage, AK 99519-6900

Email: sharon.smith@alaska.gov

Phone: (907) 269-0414

Other Information:

The Bid Calendar, Plan Holder List, Bid Results and DBE information are available on the Internet at: www.dot.alaska.gov under Procurement.

This project was designed in the US customary (USC) units. Inspection will take place in USC units. Submittals must be provided in USC units.

To report bid rigging activities call: 1-800-424-9071.

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

The **2020 Standard Specifications for Highway Construction** can be obtained at <http://www.dot.state.ak.us/stwddes/dcspcs/assets/pdf/hwyspecs/sshc2020.pdf>

SPECIAL NOTICE TO BIDDERS

The Department hereby notifies bidders that information to assist in bid preparation is available from the Department of Transportation and Public Facilities, Anchorage office, located at 4111 Aviation Avenue.

1. **Publications.** The following are available from the Plans Room, download online, or as noted:
 - a. Standard Specifications for Highway Construction, 2020 Edition comb bound (\$25.00), download at: www.dot.state.ak.us/stwddes/dcspsecs/assets/pdf/hwyspecs/sshc2020.pdf, or order bound book from LuLu at: <https://www.lulu.com/en/us/shop/state-of-alaska-dept-of-transportation/2020-alaska-standard-specification-for-highway-construction/paperback/product-1gq9j9gk.html>
 - b. Alaska Test Methods Manual (Lab & Field), May 06, 2022 Edition (\$25.00). Available online at: www.dot.state.ak.us/stwddes/desmaterials/mat_wagtc/testman.shtml
 - c. Alaska Storm Water Pollution Prevention Plan Guide, March 2021. www.dot.state.ak.us/stwddes/desenviron/resources/stormwater.shtml
 - d. Utility facility clearance requirements. Available online at:
 - Matanuska Electric Association, Inc. (MEA) Electrical Facility Clearance Requirements www.mea.coop/mysafety/overhead-lines/
 - ENSTAR Natural Gas Company (ENSTAR) www.enstarnaturalgas.com/safety-education/natural-gas-safety/safety-for-excavators-contractors/
 - e. Quantity Computations
 - f. Cross Sections
 - g. Geotechnical Report. HSIP: Bogard Rd at Engstrom Rd / Green Forest Dr Int Imp, Project No. 0001603 / CFHWY00453, December, 2021, By DOT&PF
 - h. Erosion, Sediment Control Plan (ESCP). HSIP: Bogard Rd at Engstrom Rd / Green Forest Dr Int Imp, Project No. 0001603 / CFHWY00453, Month Here, Year Here, By DOT&PF
 - i. Traffic Control Plan (TCP). HSIP: Bogard Rd at Engstrom Rd / Green Forest Dr Int Imp, Project No. 0001603 / CFHWY00453, Month Here, Year Here, Kinney Engineering, LLC.
2. **Materials Certification List (MCL).** The MCL provides the Engineer with the appropriate approving authority. Contractor, submit certification for each material to the Engineer. The MCL is included in Appendix C.
3. **Environmental Documents.** The Department has approved an environmental document addressing concerns and environmental commitments. This document is available for review in the Department Section of Preliminary Design and Environmental. (907) 269-0542.
4. **Section 120, Disadvantaged Business Enterprise (DBE) Program.** . The Department, in coordination with US DOT, has adopted a Race-Neutral DBE Program effective for Federal-aid projects advertised in Central Region after June 30, 2015. In particular, all bidders shall be aware that Good Faith Effort Documentation is required from the successful bidder for all contracts, regardless of DBE goal or DBE utilization, in accordance with Section 120 Disadvantaged Business Enterprise (DBE) Program.

The overall DBE Utilization Goal is revised to 8.28 percent.

Direct questions about this notice to the Manager of the Civil Rights Office, (907) 269-0848, <http://www.dot.state.ak.us/cvlrts/index.shtml>.

5. **Cargo Preference Act Requirements** The provisions of the Cargo Preference Act (CPA) must be physically incorporated into all Federal-aid Projects awarded after February 15, 2016, and must be physically incorporated in all agreements with subcontractors and lower tier subcontractors.

Form 25D-55 (2/16) is revised to include the CPA provisions to the Required Contract Provisions for Federal-Aid Construction Contracts. See the last page of Form 25D-55 for the CPA requirements.

For additional details, please visit: <https://www.fhwa.dot.gov/construction/cqit/cargo.cfm>

6. **Buy America Provision.** Effective for Federal award obligations after October 23, 2023, meet the requirements at 2 CFR 184 for construction materials.

Iron products, steel products, and predominantly iron or steel manufactured products remain subject to the requirements of 23 CFR 635.410 and related FHWA Interpretations and waivers.

Manufactured products that are not predominantly iron or steel continue to be waived under FHWA's 1983 waiver of manufactured products.

On August 16, 2023, USDOT issued a waiver at 88 FR 55817 applicable to construction materials on FHWA funded projects.

HSP20-7A revises the specifications in 106-1.01 to incorporate these new requirements.

2 CFR 184:

<https://www.federalregister.gov/documents/2023/08/23/2023-17724/guidance-for-grants-and-agreements>

23 CFR 635.410:

<https://www.govinfo.gov/content/pkg/CFR-2022-title23-vol1/xml/CFR-2022-title23-vol1-sec635-410.xml>

USDOT waiver at 88 FR 55817:

<https://www.federalregister.gov/documents/2023/08/16/2023-17602/waiver-of-buy-america-requirements-for-de-minimis-costs-and-small-grants>

FHWA interpretations, waivers, regulations, policy and guidance on Buy America:

<https://www.fhwa.dot.gov/construction/cqit/buyam.cfm>

7. **Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment.** 2 CFR 200.216, as amended effective August 13, 2020, Federal Register, Vol. 85, No. 157, 49506 – 49582, Prohibition on certain telecommunication and video surveillance services or equipment. Refer to Subsection 106-1.01.

8. **Utilities.**

- a. **Agreements and Dispositions.** Utility Agreements and dispositions are available for review at the office of the Utilities Engineer, (907) 269-0644. Copies may be available, coordinate with the Utility Engineer.
- b. **Utilities, and Erosion, Sediment and Pollution Control.** Utilities will be relocated by others concurrently with construction of this project. The Contractor is responsible for the coordination with Other Contractor's and for control of erosion, sediment and pollution including stabilization of areas disturbed during utility relocation, as described in Section 105-1.06.

The Contractor will identify, in their SWPPP, other work that is or will occur inside or adjacent to the project limits during the contract period.

9. **COVID-19 Management Plan** The Governor's emergency declaration and mandates relating to COVID-19 expired on February 14, 2021. However, contractors are encouraged to review COVID-19 Response and Recovery Health Advisories that can be accessed at:

<https://covid19.alaska.gov/health-advisories/>

Contractors will still be required to meet any applicable local ordinances or requirements currently in effect, and comply with any future federal, state or local declarations or mandates that might be adopted while work on the project is ongoing.

Consistent with Section 107-1.01 of the Standard Specifications for Highway Construction, the Contractor will be responsible for paying all costs and expenses incurred to comply with any COVID-19 Health Mandates or Health Advisories in effect during times when the Contractor is performing project-related work activities. The Contractor will additionally be responsible for preparing any general or site-specific mitigation and response plans required for its forces, along with any attendant schedule delays or impacts.

10. **Certified Payroll.** Certified payroll must be submitted electronically through AASHTOWare for contracts awarded after January 1, 2021.

In order to submit certified payroll, Contractors, Subcontractors, and lower tier Subcontractors must be active in AASHTOWare, which requires they have a valid Vendor ID with a 913 commodity code.

To obtain a Vendor ID, register with the State of Alaska via the Vendor Self-Serve (VSS). Instructions for creating a new account in the VSS system can be found under Reference Guides and Forms at the following link:

<https://iris-vss.alaska.gov/PRDVSS1X1/Advantage4>

For information on certified payroll, contact the Department of Labor and Workforce Development, Wage and Hour Administration:

Juneau	(907) 465-4842
Anchorage	(907) 269-4900
Fairbanks	(907) 451-2886

DOT&PF AASHTOWare Project guidance, including schedule, FAQs, training options:

<http://dot.alaska.gov/aashtoware/>

11. **Interim Completion Phase.** This project includes at least one interim completion phase. Refer to Subsection 651-1.05 Interim Completion and Subsection 652-1.05 Failure to Complete on Time for further information.
12. **Section 408 and 703 Hard Aggregate.** Hot Mix Asphalt, Type VH requires hard aggregate. Refer to the table in 703-2.04 Coarse Aggregate for the specified Nordic Abrasion value. Material suppliers are also included in 703-2.04.
13. **Asphalt Material Price Adjustment.** The unit price adjustment for asphalt material will be combined and paid under one Pay Item. Refer to Sections in Division 300 and 400 that include an "Asphalt Material Price Adjustment" Pay Item.
14. **Solicitation Cancellation.**
15. **Limitation of Operation.** Limit disturbed unstabilized ground. Refer to Subsection 652-1.04 Limitation of Operation for further information.
16. **Contract Price Adjustment(s).** The Department will not provide cost escalation or de-escalation price adjustment for this contract, except for specific items described in the bid package at the time of bid opening.
17. **Post Award Conference.** There will be a mandatory post award conference held in [LOCATION], Alaska prior to the Contractor beginning work. Refer to Subsection 108-1.10 Post Award Conference.
18. **USDOL Davis-Bacon and Related Acts Final Rule.** On September 29, 2023 FHWA updated form FHWA-1273 to incorporate the new Davis-Bacon and Related Acts final rule. Form FHWA-1273 is required to be physically incorporated into construction contracts, subcontracts, and lower-tier subcontracts for awards made after October 23, 2023. DOT&PF satisfies this requirement by incorporating Form 25D-55H into contracts.

A section-by-section change of form FHWA-1273 is available at

<https://www.fhwa.dot.gov/construction/cqit/form1273.cfm>

The USDOL has a website containing the final rule, frequently asked questions, and a comparison chart of changes at <https://www.dol.gov/agencies/whd/government-contracts/construction/rulemaking-davis-bacon>

FED_SOA-CRSNB-23.1201_SSHC2020

PART 4

**STANDARD MODIFICATIONS
AND
SPECIAL PROVISIONS**

To the **STATE OF ALASKA**



**STANDARD
SPECIFICATIONS
FOR
HIGHWAY CONSTRUCTION**

**2020
EDITION**

Blank Page

TABLE OF CONTENTS

Section	Page
DIVISION 100 — GENERAL PROVISIONS	
102 Bidding Requirements and Conditions	3
104 Scope of Work	4
105 Control of Work	5
106 Control of Material	6
107 Legal Relations and Responsibility to Public	9
108 Prosecution and Progress	11
109 Measurement and Payment	12
120 Disadvantaged Business Enterprise (DBE) Program	13
DIVISION 200 — EARTHWORK	
201 Clearing and Grubbing	16
202 Removal of Structures and Obstructions	17
203 Excavation and Embankment	22
204 Structure Excavation for Conduits and Minor Structures	27
205 Excavation and Fill for Major Structures	30
DIVISION 300 — BASES	
301 Aggregate Base and Surface Course	33
306 Asphalt Treated Base Course	35
DIVISION 400 — ASPHALT PAVEMENTS AND SURFACE TREATMENTS	
402 Tack Coat	49
411 Intelligent Compaction	69
DIVISION 500 — STRUCTURES	
505 Piling	76
550 Commercial Concrete	77
DIVISION 600 — MISCELLANEOUS CONSTRUCTION	
603 Culverts and Storm Drains	81
604 Manholes and Inlets	85
605 Underdrains	86
606 Guardrail	87
609 Curbing	101
610 Ditch Lining	102
615 Standard Signs	103
618 Seeding	108
619 Soil Stabilization	112
621 Planting Trees and Shrubs	117
633 Silt Fence	125
639 Driveways	126
641 Erosion, Sediment, and Pollution Control	127
642 Construction Surveying and Monuments	149
643 Traffic Maintenance	165
644 Services to be Furnished by the Contractor	187
645 Training Program	190
646 CPM Scheduling	193
647 Equipment Rental	194
651 Control of Work – Supplemental Requirements	196
652 Prosecution and Progress – Supplemental Requirements	199
660 Signals and Lighting	200
661 Electrical Load Centers	217
670 Traffic Markings	220
682 Utility Potholing	225
688 Utilities	227
DIVISION 700 — MATERIALS	

TABLE OF CONTENTS

Section	Page
702 Asphalt Materials	232
703 Aggregates	233
706 Concrete and Plastic Pipe	236
710 Fence and Guardrail	237
712 Miscellaneous	239
724 Seed	240
726 Topsoil	242
727 Soil Stabilization Material	243
730 Sign Materials	248
740 Signals and Lighting Materials	250
Appendix A Construction Survey Requirements	
Appendix B Environmental Permits	
Appendix C Material Certification List	
Appendix D Sign Shop Drawings	
Appendix E Temporary Construction Easements	
Appendix F Draft Permits	

DIVISION 100 — GENERAL PROVISIONS

Blank Page

SECTION 102
BIDDING REQUIREMENTS AND CONDITIONS

Standard Modification

102-1.05 PREPARATION OF BID.

In the third paragraph, replace the fourth sentence with the following:

If the bidder is a joint venture, the bid must be signed by an officer or agent with authority to bind the joint venture.

HSM20.42-043022

**SECTION 104
SCOPE OF WORK**

Standard Modification

104-1.06 VALUE ENGINEERING CHANGE PROPOSALS BY CONTRACTOR.

Replace 104-1.06.3.e with the following:

- e. The Contractor may submit VECPs for an approved subcontractor. If the Contractor elects to submit a VECP for an approved subcontractor and it is subsequently accepted by the Department, the Department will reimburse the Contractor per 104-1.06.5.

HSM20.2-113020R

SECTION 105 CONTROL OF WORK

Special Provisions

Add the following Subsection 105-1.011 Related Sections:

105-1.011 RELATED SECTIONS.

Section 651, Control of Work – Supplemental Requirements

CR105.5-012816R1

105-1.15 PROJECT COMPLETION.

Replace the 1st sentence in the 3rd paragraph with the following:

When all physical work and cleanup provided for under the Contract is found to be complete, except for work specified for Period of Establishment, the Engineer will issue a letter of project completion.

CR105.6-23.0601

**SECTION 106
CONTROL OF MATERIAL**

Standard Modification

106-1.01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS.

Add the following:

PROHIBITION ON CERTAIN TELECOMMUNICATION AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT. On projects using federal funds, the Contractor shall comply with the requirements of 2 CFR 200.216, Prohibition on certain telecommunication and video surveillance services or equipment, including any future amendments thereto that are applicable to the project.

By submitting a bid or by execution of the contract, the Contractor certifies that it has not entered into a contract nor extended or renewed a contract to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system produced by:

- Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
- Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
- Any entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

The Contractor further certifies that it has complied with the requirements of 2 CFR 200.216 and that it will continue to do so throughout the term of the Contract.

HSM20.20-21.1231

Special Provision

Replace the BUY AMERICA PROVISION with the following:

BUY AMERICA PROVISION. On projects using federal funds the Contractor shall ensure all iron, steel, manufactured products, and construction materials incorporated into the project are produced in the United States as required by 2 CFR Part 184 Buy America Preferences for Infrastructure Projects and 23 CFR §635.410, Buy America requirements.

The Contractor shall submit a completed Non-Domestic Minimal Use and De Minimis Register, Form 25D-60, prior to award of the contract. When the Contractor becomes aware of a change from or error in a previously submitted Form 25D-60, the Contractor shall submit an updated Form 25D-60.

The Contractor shall submit a certificate of compliance according to Subsection 106-1.05 for each item listed on the Material Certification List. The Engineer may authorize the use of materials based on a certificate of compliance and Form 25D-62 Certificate of Buy America Act Compliance. Materials incorporated into the project on the basis of a certificate of compliance may be tested at any time, whether in place or not, and if they do not conform to Contract specifications, they may be rejected and ordered removed under the Subsection 105-1.11.

Manufactured products that are not predominantly steel or iron, or a combination of both, or construction materials are not subject to Buy America provisions. Declare manufactured products on Form 25D-62 regardless of their exemption.

Non-domestic products in excess of the minimal use and/or the de minimis amounts shall be replaced at no expense to the State. Failure to comply may also subject the Contractor to default and debarment.

The supplier certifying Form 25D-62 may be the manufacturer, fabricator, vendor, or supplier; provided they have sufficient control and knowledge of the manufacturing process to accept responsibility and

certify full and complete conformance with 23 CFR §635.410 and 2 CFR Part 184. The Prime Contractor shall also certify Form 25D-62. Provide additional certifications and backup documentation to signed Form 25D-62 when required by the Engineer. False statements may result in criminal penalties prescribed under AS 36.30.687 and Title 18 US Code Section 1001 and 1020.

The United States, Mexico, Canada Agreement (USMCA) does not apply to the Buy America requirement.

Buy America does not apply to construction materials, steel products, and iron products, brought temporarily to the construction site and removed at or before the completion of the project. Further, it does not apply to construction materials, steel products, and iron products which remain in place at the Contractor's convenience. Buy America does not apply to iron ore, pig iron, and processed, pelletized and reduced iron ore.

The following materials are exempt from Build America, Buy America requirements per Section 70917(c) of P. L. 117-58:

1. cement and cementitious materials
2. aggregates such as stone, sand, or gravel
3. aggregate binding agents or additives

De Minimis amount:

Small amounts of non-domestic construction materials, are allowed provided the total value of the non-domestic products is no more than the lesser of \$1,000,000 or 5% of total material costs for the project including freight to the project location.

The total material costs of the project include (Form 25D-60):

1. Predominantly Iron and Steel products
2. Construction Materials
3. Manufactured Products

Do not include the cost of materials exempted per Section 70917(c) of P. L. 117-58, earth materials, processed aggregates, asphalt, concrete, fuel, lubricant, equipment repair parts, etc. in the total material costs of the project.

PREDOMINANTLY STEEL OR IRON PRODUCTS. Products and materials where the cost of the iron and steel, or a combination of both, exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product, or a good faith estimate of the cost of iron or steel components.

To be classified as domestic, all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

Iron and Steel minimal use:

All predominately steel and iron, or a combination of both, products incorporated into the work, shall be manufactured in the United States except that minor amounts of steel and iron products of foreign manufacture may be used, provided the aggregate cost of such does not exceed one tenth of one percent (0.001) of the total contract amount, or \$2,500, whichever is greater. For the purposes of this paragraph, the cost is the value of the products as they are delivered to the project, including shipping.

CONSTRUCTION MATERIALS. The following list contains the categories of construction materials, and the requirements for domestic origin. Construction materials are an article, material, or supply that is:

1. **Non-ferrous metals.** All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
2. **Plastic and Polymer-based products.** All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.
3. **Glass.** All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
4. **Fiber Optic Cable.** All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.
5. **Optical Fiber.** All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.
6. **Lumber.** All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
7. **Drywall.** All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.
8. **Engineered Wood.** All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

If one construction material contains as inputs other construction materials, it remains classified as a construction material for the purposes of this section. Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

MANUFACTURED PRODUCTS. Articles, materials, or supplies that have been processed into a specific form and shape or combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.

If an item is classified as an iron or steel product, a construction material, or an exempted material per Section 70917(c) of P. L. 117-58 then it is not a manufactured product.

An article, material, or supply classified as a manufactured product may include components that are construction materials, iron or steel products, or an exempted material per Section 70917(c) of P. L. 117-58.

Replace Subsection 106-1.05 with the following:

106-1.05 CERTIFICATES OF COMPLIANCE. A certificate of compliance must meet one of the following:

1. If by manufacturer's certification, the certificate must include the project name and number, the signature of the manufacturer, and must include information that clearly demonstrates the material or assembly complies with all Contract requirements except for domestic preference.
2. If by Contractor's summary sheet, the summary sheet must include the project name and number, the signature of the contractor, and must include attached documentation that clearly demonstrates the material or assembly fully complies with all Contract requirements except for domestic preference.

Electronic submittals that are submitted by email from the Contractor's email account are considered signed by the Contractor.

The Contractor shall submit additional certificates of compliance or test data if required by the Contract or by the Engineer. The Engineer may refuse permission to incorporate materials or products into the project based on a certificate of compliance that does not meet the Contract requirements.

HSP20.7A-23.1114

SECTION 107
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Special Provisions

107-1.02 PERMITS, LICENSES, AND TAXES.

The Department will: Add No. 3:

3. The Department has received the following permits on the Contractor's behalf:
 - a. ADEC Alaska Pollution Discharge Elimination System General Construction Permit
 - b. ADEC Non-domestic Wastewater Plan Approval

CR107.4-120117R2

The Contractor shall:

Replace No. 1. with the following:

1. Acquire all permits and licenses required to complete the project that are not acquired by the Department.
 - a. Complete all draft permits. Draft permits are included in Appendix F, when there are draft permits.

CR107.2-070121

Add No. 10:

10. Provide a wetland specialist able to conduct wetlands determinations and delineations according to the Corps of Engineers 1987 Wetland Delineation Manual, and the Regional Supplement to the Corps of Engineers Wetland Delineations Manual (Alaska Region, Version 2.0, September 2007). The wetland specialist shall conduct the determination and delineations of sites outside the project limits or not previously permitted, impacted by the Contractor's operations. These delineations will be subject to Corps of Engineers approval.

CR107.5-120117R

107-1.07 ARCHAEOLOGICAL OR HISTORICAL DISCOVERIES.

Replace the 1st sentence including numbers 1, 2, and 3, with:

When operation encounters historic or prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, (shell heaps, land or sea mammal bones or tusks, or other items of historical significance), cease operations immediately and notify the Engineer.

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.

Add the following:

Non-municipal Water Source. If water is required for a construction purpose from a nonmunicipal water source, obtain a Temporary Water Use Permit from the Water Resource Manager, and provide a copy to the Engineer. The Water Resource Manager is with the Department of Natural Resources in Anchorage and may be contacted at (907) 269-8645.

CR107.3-051517

Add the following:

Eagles. Eagles are protected under 16 U.S.C. 668-668c Protection of Bald and Golden Eagles, that prohibits “takes” of eagles, their eggs, nests, or any part of the bird. The Act defines “taking” as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

Maintain a Primary Zone of minimum 330-feet as an undisturbed habitat buffer around nesting eagles. If topography or vegetation does not provide an adequate screen or separation, extend the buffer to 1320-feet, or a sufficient distance to screen the nest from human activities. The actual distance will depend on site conditions and the individual eagle’s tolerance for human activity. Within the Secondary Zone, between 330-feet and 660-feet from a nest tree, no obtrusive facilities, or major habitat modifications shall occur. If nesting occurs in sparse stands of trees, treeless areas, or where activities would occur within line-of-site of the nest, extend the buffer up to 2640-feet. No blasting, logging and other noisy, disturbing activities should occur during the nesting period (February 1 – August 31) within the primary or secondary zones.

Do not disturb a nesting eagle. Notify the Engineer when an active eagle nest is within the primary or secondary zones.

CR107.1-100118

**SECTION 108
PROSECUTION AND PROGRESS**

Standard Modification

108-1.01 SUBCONTRACTING OF CONTRACT.

In item 1g. replace AS 45.45.101(a) with AS 45.45.010(a).

In item 2f. replace AS 45.45.101(a) with AS 45.45.010(a).

HSM20.41-010122

Special Provision

Replace Subsection 108-1.01 1h. with the following:

1h. Other required items listed in Form 25D-042 are included in the subcontracts;

Replace Subsection 108-1.01 2g. with the following:

2g. Other required items listed in Form 25D-042, are included in the lower tier subcontracts;

CR108.4-010120

Add the following Subsection 108-1.011 Related Sections:

108-1.011 RELATED SECTIONS.

Section 652, Prosecution and Progress – Supplemental Requirements

CR108.3-012816R

108-1.07 FAILURE TO COMPLETE ON TIME.

Replace Table 108-1 with the following:

**Table 108-1
DAILY CHARGE FOR LIQUIDATED DAMAGES
FOR EACH CALENDAR DAY OF DELAY**

Original Contract Amount		Daily Charge
From More Than	To and Including	
\$ 0	1,000,000	\$1,500
1,000,000	5,000,000	2,900
5,000,000	25,000,000	5,500
25,000,000	-----	6,900

HSM20.43A-24.0701

**SECTION 109
MEASUREMENT AND PAYMENT**

Special Provision

109-1.01 GENERAL.

Replace the 2nd paragraph with the following:

When more than one type of material or work is specified for a pay item, the proposal line number, and the description are used to differentiate the material or work.

CR109.4-010120

109-1.05 COMPENSATION FOR EXTRA WORK ON TIME AND MATERIALS BASIS.

Under Item 3. Equipment, Item a. add the following to the second paragraph:

The rental rate area adjustment factors for this project shall be as specified on the adjustment maps for the Alaska – South Region.

Provide a printed copy of the current Equipment Watch rate sheet for each piece of equipment utilized on time and materials work.

CR109.2-110118

Standard Modification

109-1.08 FINAL PAYMENT. Add the following after the fifth paragraph:

On federally funded projects, if DOLWD Wage and Hour Administration notifies the Department of a pending prevailing wage investigation, and that the investigation is preventing the closing out of the project, the Contractor may place the notified amount in escrow under Wage and Hour for the exclusive purpose of satisfying unpaid prevailing wages. Upon receipt of notice from Wage and Hour that the Contractor has satisfactorily transferred the necessary funds into escrow, the Department will proceed to issue final payment.

HSM20.3-113020R

SECTION 120
DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

Standard Modification

120-1.01 DESCRIPTION.

In the first sentence of the second paragraph, delete "8.83 percent" and substitute the following: "9.39 percent".

120-3.01 DETERMINATION OF COMPLIANCE.

2. Phase II – Award.

- a. Written DBE Commitment. Delete in its entirety and substitute the following: Complete Form 25A-326 for each DBE to be used on the project.

HSM20.21A-24.0415

DIVISION 200 — EARTHWORK

Blank Page

SECTION 201 CLEARING AND GRUBBING

Special Provisions

201-3.01 GENERAL.

Add the following:

Perform the work necessary to preserve and/or restore land monuments and property corners from damage. Restore land monuments and/or property corners that are disturbed according to Section 642. An undisturbed area five feet in diameter may be left around existing monuments and property corners. A list of land monuments and property corners is shown on the Right of Way maps.

CR201.3-042313

Add the following:

Clearing and grubbing is not permitted within the migratory bird window of May 1 to July 15; except as permitted by Federal, State and local laws when approved by the Engineer.

CR201.1-010114

201-5.01 BASIS OF PAYMENT.

Add the following:

The work required to preserve and restore land monuments and property corners is subsidiary to 201 Pay Items.

CR201.3-042313

SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION. Add the following:

Property Owner Fence: salvage and neatly stack in the owner's yard.

CR202.6-040120

Fugitive Materials: remove and dispose of fugitive materials from under guardrails, around luminaire bases, and as specified. Conduct a pre-construction inspection of the project area with the Engineer to determine the limits of the fugitive material removal and disposal work.

CR202.4-040120/CFHWY00453

Gas Pipe: remove and dispose.

CR202.5-20.0401R

Ground Water Wells: decommission.

CR202.8-20.0401R/CFHWY00453

Septic System: remove and dispose.

CFHWY00453

202-2.01 MATERIALS. Add the following:

Fugitive Materials: including but not limited to organic matter (peat, roots, sticks, sod or other), muck, earth (where not part of surface material) rocks, gravel, sand, silts and debris (trash and similar) and as identified by the Engineer.

CR202.4-040120/CFHWY00453

Replace Subsection 202-3.01 with the following:

202-3.01 GENERAL.

Demolish and remove indicated improvements located at the listed addresses below. See respective estimated number of permanent structures to be removed. These include, but are not limited to:

- 1) 7750 E Bogard Rd
 - a) 2800 SF Commercial Shop.
 - b) Storage container and other non-permanent structures.
- 2) 2945 N Green Forest Dr.
 - a) 4100 SF Multi-story Family Home.
 - b) 1300 SF Detached Garage.
 - c) 350 SF Storage Shed.
 - d) Green houses and other non-permanent structures.

Raze, remove, and dispose of, or salvage all buildings and foundations, structures, fences, and other obstructions, any portions of which are within the right-of-way, except utilities and those for which other provisions have been made for removal.

Remove the utility lines, sidewalks, and other attached appurtenances from the buildings, foundations, and structures.

Buildings may contain asbestos.

Fill basements, or cavities left by structure removal, to the level of surrounding ground and if within the prism of construction, compact backfill as specified under Section 203.

Topsoil, seed, mulch and fertilize all disturbed ground in accordance with Section 618 and 620.

Stockpile all materials which are designated for use on the project at approved locations.

Burning and use of explosives will not be permitted on the project.

Non-combustible debris, construction and demolition waste materials, with written approval, may be placed in embankments under the provisions of Subsection 203-3.03 for placing rock in embankments (No metal pipes, wires, or cables may be placed in any embankment). Maximum allowed dimension of broken material is 6 inches.

Dispose of waste material outside of the project right-of-way limits according to Subsection 202-3.06.

CFHWY00453

Property Owner Fence: carefully remove fences, designated by the Engineer, to the right-of-way limit, or to the end of the span beyond the right-of-way limit. Fence materials belong to the property owners. Salvage and stack fence materials neatly in the property owner's yard. If a noise barrier or separation fence is constructed, with the owner's permission, use salvaged fencing to fill fencing gaps behind the property line. Use salvaged fencing according to Section 607, for reconstructed fences.

CR202.6-040120

202-3.04 REMOVAL OF PIPE. Add the following:

Gas Pipe: ENSTAR Natural Gas Company will abandon existing gas pipelines. Follow the procedures given in Subsection 105-1.06 Cooperation With Utilities, when working around gas pipelines until they have been abandoned. Once the pipelines are abandoned, remove abandoned natural gas pipe within the right-of-way that are in conflict with the work and dispose of outside the right-of-way project limits according to Subsection 202-3.06.

CR202.5-20.0401R

Replace Subsection 3.05 with the following:

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. In removing pavements, curbs, walks, driveways and similar structures, make all cuts clean, vertical, and true to designated lines where an abutting structure or a part of a structure is to be left in place.

Pavement materials, base course, sidewalks, curbs, gutters, etc., designated for removal may be placed in the embankment in accordance with 203-3.03 with written approval. Maximum allowed dimension of material is 6 inches.

Dispose of materials, not placed in the embankment, outside the right-of-way project limits according to Subsection 202-3.06.

CR202.2-040120

Add the following Subsection 202-3.06 Salvage and Disposal of Construction and Demolition Materials:

202-3.06 SALVAGE AND DISPOSAL OF CONSTRUCTION AND DEMOLITION MATERIALS. Unless otherwise noted, remove, handle, salvage, transport, store, and dispose waste materials according to the Occupational, Safety, and Health Administration (OSHA), Environmental Protection Agency (EPA), Alaska Department of Environmental Conservation (ADEC), and other Federal, State and local government agency's statutes, rules and regulations.

Use disposal sites outside the project right-of-way limits unless directed otherwise, in writing, by the Engineer. Obtain written consent from the private or public property owner for such disposal and a waiver of all claims against the State for any damage to such land which may result, together with all permits required by law for such disposal. Furnish a copy of such permission, waiver of claims, and permits to the Engineer before commencing work. Grade disposal areas to drain.

CR202.1-040120

Add the following Subsection 202-3.08 Ground Water Decommissioning:

202-3.08 GROUND WATER WELL DECOMMISSIONING. Decommission the water wells located at the addresses provided for demolition in subsection 202-3.01 according to DEC requirements conforming to 18AAC 80.015(e) Well Protection Source Water Protection, and Well Decommissioning, or a DEC approved alternate method. Develop and submit a detailed Ground Water Well Decommissioning Plan to the Engineer. A well record of decommissioning shall be completed for each well. Contact the **Mat-Su** DEC office at (907) 376-1850, for plan review requirements of alternate methods. The well casing shall be decommissioned at least five feet below the bottom of roadway structural section. The location and top elevation of the well shall be surveyed by an Alaska-Registered Professional Land Surveyor (PLS) prior to backfilling the excavation for as-built purposes.

Backfill all trenches, holes, and pits flush to the surrounding finish grade with Select Material, Type C outside of the roadway structural section. Topsoil, seed, mulch and fertilize all disturbed ground in accordance with Section 618 and 620.

CR202.8/CFHWY00453

Add the following Subsection 202-3.09 Removal of Fugitive Materials:

202-3.09 REMOVAL OF FUGITIVE MATERIALS. Remove fugitive materials from in front of, under, and for a width of 10 ft behind sections of guardrail, measured from the roadside face of guardrail, or as directed by the Engineer. Provide positive drainage away from the roadway. Slope edges of sand removal at 3:1 or flatter.

Clean around the base of a luminaire when the base falls within the 10 ft. The 10 ft width is measured from the roadside face of the guardrail toward the shoulder to the closest point of the luminaire base plate, or as directed by the Engineer. Remove fugitive materials from around the base to a level flush with surrounding ground - or as directed by the Engineer.

Remove disturbed materials in the same work shift the disturbance occurred. Do not reuse these materials within the project limits without the written approval of the Engineer.

Dispose of removed materials according to Subsection 202-3.06

CR202.4-040120/CFHWY00453

Add the following Subsection 202-3.10 Removal of Septic System:

202-3.10 REMOVAL OF SEPTIC SYSTEM. Remove and dispose of onsite septic systems located at the addresses provided for demolition in subsection 202-3.01 in accordance with applicable requirements. These include, but are not limited, pumping the holding tank, removing the piping from the structure to the tank, and removing the tank. All cleanouts and monitoring points shall be removed. Contractor is responsible for verifying size, location, and number of holding tanks.

Backfill all trenches, holes, and pits flush to the surrounding finish grade with Select Material, Type C outside of the roadway structural section. Topsoil, seed, mulch and fertilize all disturbed ground in accordance with Section 618 and 620.

CFHWY00453

202-4.01 METHOD OF MEASUREMENT. Add the following:

Removing and disposing fugitive materials along the edge of the traveled way will not be measured for payment.

CR202.4/CFHWY00453

Standard Modification

202-5.01 BASIS OF PAYMENT.

In the first paragraph, replace "and 22.0013.____." with the following: "and 202.0013.____."

In the fourth paragraph, replace "Items 020.0014.____" with the following: "Items 202.0014.____"

HSM20.4-113020R

Add the following:

Acquiring waste disposal permits is subsidiary to 202 Pay Items.

CR202.1-040120

Removing and disposing fugitive materials is subsidiary to Section 606 Pay Items.

CR202.4/CFHWY00453

Removing and disposing of gas pipe line abandoned within the Right-of-Way is subsidiary to Section 203 Pay Item 203.0003.0000 Unclassified Excavation.

CR202.5/CFHWY00453

Item 202.2022.____. At the Contract Unit price for the actual length of fence taken down, disposed, or delivered to the owner, regardless of the type or height.

CR202.6-040120

Item 202.2012.____. At the Contract Lump Sum price for each well decommissioned. Payment includes full compensation for necessary excavation, backfill, disposal, cutting of the casing, recording, planning, and surveying.

CR202.8/CFHWY00453

Item 202.2025.____. At the Contract Lump Sum price for each septic system removed and disposed. Payment includes full compensation for necessary excavation, pumping, purging, processing, or removing Septic-contaminated soils around the tanks, and backfilling the resultant hole.

CFHWY00453

PAY ITEM

Item Number	Item Description	Unit
202.2008.____	Removal of Pipe, Gas	LF
202.2012.____	Ground Water Well Decommissioning	Each
202.2013.____	Remove Fugitive Materials	LF
202.2022.____	Removal of Fence	LF
202.2025.____	Removal of Septic System	Each

CR202.4-040120 / CR202.5.040120 / CR202.6-040120 / CR202.8-040120 / CFHWY00453

SECTION 203 EXCAVATION AND EMBANKMENT

Special Provisions

203-1.01 DESCRIPTION.

Add the following:

Ditch linear or special ditching grading shall consist of the final shaping of designated ditches and slopes for drainage by grading with a small dozer, motor grader, or other suitable means approved by the Engineer.

This work includes contaminated material testing, excavation of contaminated material, and water sampling for contaminated materials encountered during construction performed by the Contractor and by utility relocation work described in Section 651.

CFHWY00453

Add the following Subsections:

203-1.02 DEFINITIONS. This work shall comply with Alaska Department of Environmental Conservation (ADEC) regulations and guidance regarding contaminated material testing and handling. Applicable references include, but are not limited to the following:

1. ADEC 18 AAC 75 Oil and Other Hazardous Substances Pollution Control
2. ADEC 18 AAC 70 Water Quality Standards
3. ADEC 18 AAC 60 Solid Waste Management
4. ADEC Field Sampling Guidance
5. 25 CFR 1910.120 (HAZWOPER)

203-1.03 SUBMITTALS.

1. Sampling and Analysis Plan (SAP).
2. ADEC Excavation Dewatering Permit (if any dewatering operations are proposed within 1,500 feet of an active (open or closed with institutional controls) contaminated site).
3. Health and Safety Plan for working with contaminated material per 25 CFR 1910.120
4. ADEC Transport, Treatment, & Disposal Approval Form for Contaminated Media (prior to moving any contaminated media from the immediate vicinity of the location generated).
5. Certificate(s) of Disposal (CD) for any contaminated media removed from the project.
6. Laboratory Data Packages from any laboratory testing.
7. Copies of Environmental field notes.

CFHWY00453

203-3.01 GENERAL.

Add No. 5 after the 11th paragraph:

5. within 50 feet of detection loops.

CR203.4-022015

Standard Modification

203-3.04 COMPACTION WITH MOISTURE AND DENSITY CONTROL.

In the second paragraph delete "and ATM 214".

HSM20.5-113020R

Add the following Subsections:

203-3.06 ENVIRONMENTAL SUBCONTRACTOR. The Contractor shall obtain the services of an Environmental Subcontractor with employees considered to be Qualified Environmental Professionals (QEPs) by ADEC to prepare a SAP for approval by the Engineer and ADEC and to perform on site field testing and to collect samples for laboratory analysis.

203-3.07 WATER SAMPLING. If the water table is encountered during excavation within 1,500 feet of a contaminated material area and dewatering is necessary, the Contractor shall be required to obtain an ADEC Excavation Dewatering Permit before any dewatering activities occur. An Environmental Subcontractor may be required by the ADEC Excavation Dewatering Permit to collect analytical water samples. The SAP may be designed to address any sampling required in accordance with the Permit. Samples shall be tested, or stored for future testing at the Engineer's option, according to the appropriate current ADEC analytical test methods (EPA Hazardous Waste Test Methods [SW-846]) and Alaska specific methods (e.g. AK101, AK102, or AK103). Samples not tested by two times the analytical method holding time may be disposed. Transmit the results in writing directly to the Engineer.

During excavation, field screening and laboratory samples shall be taken and tested at intervals defined in the ADEC-approved SAP.

203-3.08 CONTAMINATED MATERIAL TESTING. This work shall consist of field screening and testing soils for contaminants. Each truckload of soil imported from a suspected site or other location at the direction of the Engineer shall be examined for contamination. Any soil excavated from an area of suspected contamination shall be examined for potential contamination prior to on-site reuse or off-site export.

According to Subsection 203-3.09, Excavation of Contaminated Material, the Contractor or Environmental Subcontractor shall perform field tests and shall retain an independent analytical laboratory, approved by ADEC, to conduct laboratory tests as detailed below:

1. Field Tests
 - a. Photo-ionization Detector (PID) Analysis
 - b. Visual/Olfactory Analysis (Petroleum Odor, Discoloration, Sheen, etc.)
2. Laboratory Tests
 - a. Gasoline-Range Organics (GRO) by method AK101
 - b. Diesel-Range Organics (DRO) by method AK102
 - c. Volatile Organic Compounds (VOC) by method SW8260C
 - d. Polycyclic Aromatic Hydrocarbons (PAH) by method SW8270D SIM

A QEP shall conduct field testing using a photoionization detector (PID) with a 10.6 electron volt (eV) lamp, or other approved ADEC instrument, as approved in the SAP. The Contractor shall submit the name of the Environmental Subcontractor and any associated QEP(s) to the Engineer at the preconstruction conference. The Environmental Subcontractor shall be available at all times hauling is in progress to conduct the required field tests as specified by the SAP.

The Environmental Subcontractor shall sample and test according to ADEC approved testing procedures as specified in the approved SAP. If a PID response and/or visual/olfactory observations indicate the presence of any contamination, the soils will have failed the test and will be designated as contaminated. If no response is observed, the soil will be examined for odor or other visual signs of contamination by a QEP. If a petroleum odor is detected, the soils will fail the test and will be designated as contaminated. If no petroleum odor or visual signs of contamination are detected, the soil will be considered to have passed field criteria. These criteria shall be amended as required to receive ADEC approval of the SAP.

The QEP and Environmental Subcontractor shall be responsible for ensuring soils exhibiting a PID response that indicate the presence of any contamination, or soils exhibiting characteristics of fuel contamination (i.e. odor, sheen, or stain), are identified to the Engineer.

Contaminated material will not be accepted for borrow and shall be immediately stockpiled for characterization and removal in accordance with procedures detailed in the approved SAP. Contaminated material cannot be removed from the site without approval from the Engineer and ADEC regarding transport and final disposal or treatment of any amount of contaminated material (e.g. soil or water).

The PID calibration will be checked and re-performed if failing quality control parameters at least once per day. Calibration check readings must be within five (5) percent of the calibration gas used. Calibration shall be referenced to one hundred (100) part per million (ppm) isobutylene gas.

203-3.09 EXCAVATION OF CONTAMINATED MATERIAL. This work shall consist of removing and disposing of fuel contaminated soils encountered during the excavation. Disposal of fuel contaminated soils shall be at a location approved by the Engineer and ADEC. Contaminated areas shall not be excavated past limits required for construction of this project unless directed by the Engineer.

1. Determining Limits of Contaminated Soil. One location is identified as potentially containing contaminated soil and/or water on the ADEC Contaminated Sites Database (File Number 2105.26.001 and Hazard ID 23166). The exact limits of potential contaminated soil/groundwater within the excavation cannot be determined until the material is exposed. Once exposed, the soil shall be tested according to Subsection 203-3.08, Contaminated Material Testing and the SAP. Testing will verify the contamination levels in the soils and determine if the soils can be disposed of as unclassified excavation or if they will require special handling. Soils that have a response from a PID or equivalent instrument above background limits defined in the SAP but not greater than 5 ppm above background shall be considered "contaminated" and will require special handling, shall be tested according to Subsection 203-3.08 and disposed of according to this Subsection and the approved SAP.
2. Worker Health and Safety. Before the excavation of any soils identified as contaminated, the Contractor shall assure the personnel working in the area of potential contamination have received State of Alaska, Department of Labor, Health and Safety Training. The Contractor shall provide the Engineer a list of the personnel and subcontractors that will be working within the area identified as being potentially contaminated. Workers directly exposed to potentially contaminated soils shall have 40-hour Occupational Safety and Health Administration (OSHA) 25 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) training. An OSHA compliant safety and health plan shall be provided by the Contractor to address health and safety concerns for working with contaminated materials.

The Contractor shall notify personnel and subcontractors, before they begin work at the site, that they will be working in an area identified as being potentially contaminated with hydrocarbons.

3. Contaminated Soil Removal and Segregation. In the event the Contractor must stockpile contaminated soil, a liner, cover and temporary fencing will be required and shall meet the requirements found in 18 AAC 75.370 (Soil storage and disposal). Table D (Bottom Liner Specifications) provides minimum requirements for stockpile bottom liners.

The size and location of the liner shall be as approved by the Engineer. The Contractor shall cover and secure the stockpile at the end of each work day with a minimum six (6) mil, reinforced polyethylene liner or its equivalent per 18 AAC 75.370. The Contractor shall be responsible for removal of the stockpile liner, safety fence, and cover once the fuel contaminated soil is removed.

The method of treatment or disposal shall be according to ADEC regulations for fuel contaminated soils. Additional testing required at the disposal site shall be done according to Subsection 203-3.08, Contaminated Material Testing, unless otherwise directed by the Engineer or SAP.

Before the Contractor backfills the excavation, samples from the excavation (bottom and sides) shall be taken for confirmation testing in accordance with frequencies and quantities specified by the SAP. Backfill within the limits of planned excavation shall meet the requirements for the item of work involved. Backfill outside plan excavation limits shall meet the requirements of Select Material, Type C or better.

4. Responsibility. With respect to preexisting hazardous substances or contaminated materials in the project area, nothing in this contract is intended to impose upon the Contractor, or to require the Contractor to assume, the status under state or federal environmental law of a facility owner or operator, or an owner or generator of those preexisting hazardous substances or contaminated materials. The Contractor shall assume the responsibility to obtain administrative approvals and to coordinate the activities with ADEC and/or any federal agency having jurisdiction, to carefully abide by the applicable laws, regulations, and the terms of any administrative approvals, and to otherwise use environmentally sound management practices such that the Contractor does not, as a result of its own actions, become a facility owner or operator, or an owner or generator of hazardous substances by reason of an unpermitted release of hazardous substances.

203-4.01 METHOD OF MEASUREMENT. Add the following:

Item 203.2013.0000, Contaminated Material Testing, Handling & Disposal, will be measured for payment on a time and materials basis according to Section 109, Compensation for Extra Work on Time and Materials Basis. Backfilling within the plan excavation limits will not be measured for payment but will be subsidiary to the respective items of work. Backfilling outside plan excavation limits will be measured for payment as embankment construction.

Water sampling and contaminated material testing shall be reimbursed based on paid receipts for the authorized sampling and testing.

Providing an Environmental Subcontractor and associated QEP(s) to test for contaminated soils or water will not be measured for payment. Testing soils to determine contamination will be measured for payment under Item 203.2013.____, Contaminated Material Testing, Handling & Disposal.

Ditch linear grading or special ditching will not be paid for directly. Furnishing equipment, labor, tools, and incidentals to provide the preparation, excavation and shaping necessary to complete the work will be subsidiary to Pay Item 203.0003.____ Unclassified Excavation.

CFHWY00453

203-5.01 BASIS OF PAYMENT. Add the following:

Payment for authorized water sampling and contaminated material testing will be made on the receipts for authorized tests plus 15 percent, and shall be considered full compensation for the labor, equipment, and materials required to obtain samples and have tests performed. A change order will not be required to initiate water sampling or contaminated material testing.

Excavating and disposing of fuel contaminated soil will be paid under Item 203.2013.____, Contaminated Material Testing, Handling & Disposal. The Contractor will be paid on a time and materials basis for authorized Work according to Section 109. Backfilling within plan excavation limits will be paid for under their respective pay items for that work. Backfilling outside plan excavation limits will be paid for as embankment construction according to this Section.

No separate payment will be made for providing the hazardous waste professional, this will be subsidiary to Item 203(31), Contaminated Material Testing, Handling & Disposal.

Ditch linear grading or special ditching will not be paid for directly. Furnishing equipment, labor, tools, and incidentals to provide the preparation, excavation and shaping necessary to complete the work will be subsidiary to Pay Item 203.0003.____ Unclassified Excavation.

Placement, hauling, and production of Selected Material, Type C generated from roadway excavation will not be paid for and is subsidiary to Pay Item 203.0003.____ Unclassified Excavation.

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
203.2013.____	Contaminated Material Testing, Handling & disposal	CS

CFHWY00453

Special Provision

Replace Section 204 with the following:

**SECTION 204
STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES**

204-1.01 DESCRIPTIONS. Excavate and backfill for conduits (pipe culverts, structural plate pipe, pipe arches, storm drains, underdrains, and electrical conduits), headwalls, manholes, inlet boxes, and other minor structures.

Dewater ground water from work areas. Construct and maintain temporary water diversion when working in waterways, and for facilities or structures with active drainage.

Perform all pumping, bailing, draining, sheeting, bracing, and incidentals required for proper execution of the work.

204-2.01 MATERIALS. Use materials that conform to the following:

Selected Material	Subsection 703-2.07
Porous Backfill Material	Subsection 703-2.10

1. Structure Backfill and Bedding Material.

a. Selected Material, Type A.

- (1) Material passing the 1-inch sieve.
- (2) Material passing the 1/2-inch sieve for plastic conduits less than 8 inches in diameter.

b. Porous Backfill Material.

Uniform porous backfill material for underdrain conduit.

- (1) Material passing the 1-inch sieve for conduit 3-inch to 10-inch diameters.
- (2) Material passing the 2-inch-sieve for conduit 12-inch to 60-inch diameters.

2. Backfill Material: Selected Material Type C

In the roadbed structure use backfill material meeting the requirements of the roadbed structure, except use the structure backfill material and bedding as specified herein.

Use all suitable material from the project excavation for bedding, structure backfill, and backfill material before using material from another source.

204-3.01 CONSTRUCTION REQUIREMENTS. Clear and grub prior to starting excavation according to the requirements of Section 201.

Keep the work areas dewatered and divert water when working in a waterway or active drainage, Subsection 204-3.02.

Remove and dispose, Subsection 203-3.01, of unsuitable foundation material, including rock or other unyielding material, below the designed elevation as directed, except no less than 6 inches, and replace with approved material.

Place bedding material to a minimum thickness of 4 inches, except 6-inch minimum thickness for conduit over rock or unyielding material, and below electrical conduit, unless shown otherwise in the plans.

Place the bedding material to provide uniform support for conduit with the material in the middle one-third loosely placed and not compacted. Do not shape the bedding to the curvature of the round conduits. Shape the bedding for pipe arches, horizontal ellipse, and underpass shapes with spans exceeding 12 feet. Provide a minimum shaped width one-half the span of the pipe arch and underpass shapes and one-third the span of horizontal ellipse shape. Shape the bedding to the relatively flat bottom arc or fine-grade the foundation to a slight "V" shape.

Place minor precast concrete structures, other than conduits, on the 4-inch bedding/leveling course, of uniform stiffness and thickness with even compaction throughout.

Place the structure backfill over the bedding each side of the structure to 12 inches above the structure or the ground surface if less than 12 inches, except 6 inches above electrical conduit.

Place the structure backfill and backfill material in uniform layers not more than 6 inches deep. Do not create unbalanced loading with the placement of the structure backfill materials. When placing material against concrete, place the material according to the requirements of Section 550.

Compact the materials, each layer, without ponding or jetting to meet Subsection 203-3.04. In the haunch area, each side of the conduit, compact the material by firmly tamping into place.

Outside the roadbed structure, the Engineer may visually inspect and approve the excavation, bedding, structure backfill, backfill material, and compaction.

Support and protect existing conduits or utilities, not scheduled for removal or abandonment, when encountered in the excavation.

Remove all sheeting and bracing used in structure excavation upon completion of the work.

204-3.02 DEWATERING AND WATER DIVERSION. Submit a plan for work area dewatering and each waterway diversion, 14 days before related construction activities. Do not implement the plan without written approval. Include the permit requirements in the plan.

1. Do not exceed State of Alaska water quality standards.
2. Do not divert water from dewatering into a waterway.
3. Provide an approved disposal site for work area excess water. Maintain disposal site a minimum of 100 ft from waterway.
4. Prevent turbid water from directly entering waterways.
5. Do not divert water onto the roadway.
6. In addition to other equipment required to complete the temporary water diversion and dewatering work, maintain a minimum of two trash pumps with hoses at the site during diversion construction activities. Maintain the intake to prevent fish entrapment, entrainment, or injury with the use of perforated or slotted plate and woven wire with a mesh size not greater than 3/32 inch or a profile bar and wedgewire with openings not greater than 1/16 inch. Do not exceed passive approach velocity of 0.2 fps and active approach velocity of 0.4 fps.

Rewater to minimize sediment movement downstream of the site. Prior to rewatering, slowly wet the reconstructed waterway channel; wash the fines into the bed by using pumps, or by diverting a small portion of the waterway channel flow. Capture and pump the sediment and turbid water, from the downstream end of the channel to the upstream end of the channel, until fines are washed into the streambed and water runs clear. Attain the Engineers written approval before breaching the coffer/diversion dams. Slowly breach the coffer/diversion dams and rewater the waterway channel.

204-4.01 METHOD OF MEASUREMENT. Section 109. Use neat line method as follows:

Structure Excavation:

1. Masonry Structures (except conduit). Between vertical planes, 18 inches outside the base of the masonry sections for the depth required.
2. Conduit. Between parallel vertical planes located 18 inches outside the horizontal projection of the outside diameter of the conduit and to the depth shown on the Plans.

Structure excavation only measured below the limits of other classes of excavation. Structure's in embankment section, the natural ground line as cross-sectioned is the uppermost level of computation.

204-5.01 BASIS OF PAYMENT. The Contract price includes the placing and compacting of all backfill and bedding when the materials used are obtained from excavation, any clearing and grubbing required and not paid for under some other item, formation of any embankments made with surplus material from structure excavation, and disposal of all surplus or unsuitable excavation.

Culvert baffles, headwalls, temporary water diversion, dewatering and rewatering, and the removal of pavement are subsidiary to the conduit and minor structure Pay Items.

Additional excavation to provide for shoring, sheet piles, excavation shields or flattening the excavation slopes, is subsidiary.

When item 204.0001.____, 0002.____, or 0003.____ structure Excavation, does not appear in the bid schedule, structure excavation required to complete other items of work is subsidiary, except that excavation and disposal of unsuitable material required from below a plane 12 inches below the invert elevation of conduits and 12 inches below the bottom of structures is paid as extra work.

Any backfill or bedding material required whose source is other than project excavation is paid at the contract unit price for the materials being used, or as extra work if no unit price has been established.

Traffic control paid under Section 643 and Erosion, Sediment, and Pollution Control paid under Section 641.

PAY ITEM

Item Number	Item Description	Unit
204.0001.____	Structure Excavation	CY
204.0002.____	Structure Excavation	Ton
204.0003.____	Structure Excavation	LS

CR204-24.0501

**SECTION 205
EXCAVATION AND FILL FOR MAJOR STRUCTURES**

Standard Modification

205-3.05 COMPACTION.

1. Compaction with Moisture and Density Control. 2nd paragraph delete: "and ATM 214".

HSM20.5-113020R

DIVISION 300 — BASES

Blank Page

**SECTION 301
AGGREGATE BASE AND SURFACE COURSE**

Special Provision

301-2.01 MATERIALS.

Add the following after the first sentence:

Recycled Asphalt Material (RAM) may be substituted for aggregate base course, inch for inch, if the following conditions are met:

1. RAM shall be crushed or processed to 100 percent by weight passing the 1.5 inch sieve and 95-100 percent by weight passing the 1 inch sieve.
2. The gradation of the extracted aggregate shall meet the following:

Sieve	Percent Passing by Weight
1 inch	100
3/4 inch	70 – 100
3/8 inch	42 – 90
No. 4	28 – 78
No. 16	11 – 54
No. 50	5 – 34
No. 100	3 - 22
No. 200	2 – 12

3. The asphalt content shall be 2.5 – 5.0 percent by weight of the RAM.

CR301.1-012407R

301-3.01 PLACING.

Add the following:

Place base course material, used for the sidewalk and pathway foundations, with equipment capable of providing a specified depth and uniform surface.

CR301.2-062116

Add No. 5 after the 5th paragraph:

5. within 50 feet of detector loops.

CR301.3-022015

Standard Modification

301-3.03 SHAPING AND COMPACTION.

In the second paragraph delete "and ATM 214".

HSM20.5-113020R

Add the following:

If recycled asphalt material is substituted for aggregate base course, the following conditions shall be met:

1. Density acceptance will be determined by control strip method ATM 412. Use a test strip with a vibratory compactor with a minimum dynamic force of 40,000 pounds. The optimum density will be determined by the Engineer using a nuclear densometer gauge to monitor the test strip. Adequate water shall be added to aid compaction.
2. After the appropriate coverage with the vibratory compactor, a minimum of 6 passes with a pneumatic tire roller shall be completed. Tires shall be inflated to 80 psi ($\pm$ 5 psi) and the roller shall have a minimum operating weight per tire of 3,000 pounds.

301-5.01 BASIS OF PAYMENT.

Add the following:

Recycled asphalt material substituted for aggregate base course will be paid for as Item 301.0001.____
Aggregate Base Course, at the unit price shown in the bid schedule for that Item.

CR301.1-012407R

Special Provisions

Replace Section 306 with the following:

SECTION 306 ASPHALT TREATED BASE COURSE

306-1.01 DESCRIPTION. Construct a plant-mixed asphalt treated base (ATB) course on an approved foundation to the lines, grades, and depths shown in the Plans. Recycled asphalt pavement (RAP) may be used in the mix as specified herein.

306-1.02 REFERENCE.

1. Section 401, Hot Mix Asphalt and Surface Treatments.

MATERIALS

306-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN (JMD). Design the JMD according to the Alaska Test Manual (ATM) 417 using the design requirements of Table 306-1 and as specified herein. Recycled Asphalt Pavement may be used to supplement the aggregate and asphalt binder in the ATB.

**TABLE 306-1
ATB DESIGN REQUIREMENTS**

DESIGN PARAMETERS	CLASS "B"
ATB (Including Asphalt Binder)	
Stability, Pounds	1200 min.
Flow, 0.01 Inch	8 - 16
Voids in Total Mix, %	3 - 5
Compaction, Number of Blows Each Side of Test Specimen	50
Asphalt Binder	
Percent Voids Filled with Asphalt Binder (VFA)	65 - 78
Asphalt Binder Content, Min. %	5.0
Dust-Asphalt Ratio*	0.6 - 1.4
Voids in the Mineral Aggregate (VMA), %, Min.	
Type II	12.0
Recycled Asphalt Pavement (RAP)	
RAP, Max. %.	25

*Dust-asphalt ratio is the percent of material passing the No. 200 sieve divided by the percent of effective asphalt binder.

The JMD will specify the Target Values (TV) for gradation, the TV for asphalt binder content, the Maximum Specific Gravity (MSG) of the ATB, the additives, and the allowable mixing temperature range.

Target values for gradation in the JMD must be within the broad band limits shown in Table 703-4. For acceptance testing, ATB mixture will have the full tolerances in Table 306-2 applied.

Do not mix ATB produced from different plants for testing or production paving. ATB from different plants will be rejected.

Submit the following to the Engineer at least 15 days before the production of ATB:

1. A letter stating the location, size, and type of mixing plant, the proposed gradation for the JMD including gradations for individual virgin aggregate (aggregate) stockpiles and the RAP stockpile. Provide supporting process quality control information; including the blend ratio of each aggregate stockpile, the RAP stockpile and the RAP asphalt binder content. For mixes with RAP, provide JMD gradation with and without RAP. Provide calibration data if ATM 406 is used for RAP process control.
2. Representative samples of each aggregate (coarse, intermediate, fine, blend material and mineral filler, if any) and RAP required for the proposed JMD. Furnish 100 lbs of each intermediate and/or coarse aggregate, 200 lbs of fine aggregate, 25 lbs of blend sand, and 200 lbs of RAP.
3. Three separate 1-gallon samples, minimum, of the asphalt binder proposed for use in the ATB. Include name of product, manufacturer, test results of the applicable quality requirements of Subsection 702-2.01, manufacturer's certificate of compliance according to Subsection 106-1.05, a temperature viscosity curve for the asphalt binder or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet (MSDS).
4. One sample, of at least 1/2 pint, of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current MSDS.

The Engineer will evaluate the material and the proposed gradation using ATM 417 and Table 306-1 ATB Design Requirements.

The mix, the materials and proposed gradation meeting the specification requirements will become part of the Contract when approved, in writing, by the Engineer.

FAILURE TO MEET SPECIFICATION REQUIREMENTS

Submit a new JMD with changes noted and new samples in the same manner as the original JMD when:

- The results do not achieve the requirements specified in Table 306-1
- The asphalt binder source is changed
- The source of aggregate, aggregate quality, gradation, or blend ratio is changed
- The source of RAP is changed

Do not produce ATB for production paving and payment before the Engineer provides written approval of the JMD, the original or a new replacement JMD.

Payment for ATB will not be made until the new JMD is approved. Approved changes apply only to ATB produced after the submittal of changes.

The Engineer will assess a fee for each mix design subsequent to the approved Job Mix. The fee will be included under Pay Item 306.2001.____ ATB, Price Adjustment, Type ____; Class____.

306-2.02 AGGREGATES. Conform to Subsection 703-2.04. Type II, Class B (IIB) total combined aggregates.

Use a minimum of three stockpiles for crushed ATB aggregate (coarse, intermediate, and fine). Place RAP, blend material and mineral filler in separate piles.

306-2.03 ASPHALT BINDER. Conform to 702-2.01. If asphalt binder is not specified use PG 52-28.

The total asphalt binder content may be a combination of the asphalt binder specified and the residual asphalt binder in the RAP.

Provide test reports for each batch of asphalt binder showing conformance to the specifications in Section 702, before delivery to the project. Require that the storage tanks used for each batch be noted on the test report, the anti-strip additives required by the mix design be added during load out for delivery to the project, and a printed weight ticket for anti-strip is included with the asphalt binder weight ticket. The location where anti-strip is added may be changed with the written approval of the Engineer.

Furnish the following documents at delivery:

1. Manufacturer's certificate of compliance (Subsection 106-1.05).
2. Conformance test reports for the batch (provide prior to delivery as noted above).
3. Batch number and storage tanks used.
4. Date and time of load out for delivery.
5. Type, grade, temperature, and quantity of asphalt binder loaded.
6. Type and percent of anti-strip added.

306-2.04 ANTI-STRIP ADDITIVES. Use anti-strip agents in the proportions determined by ATM 414 and included in the approved JMD. At least 70% of the aggregate must remain coated when tested according to ATM 414. A minimum of 0.25% by weight of asphalt binder is required.

306-2.05 PROCESS QUALITY CONTROL. Sample and test materials for quality control of the ATB according to Subsection 106-1.03. Submit to the Engineer, with the JMD, a documentation plan that will provide a complete, accurate, and clear record of the sampling and testing results. When directed by the Engineer, adjust the plan and resubmit.

Submit a paving and plant control plan at the pre-paving meeting to be held a minimum of 7 days before initiating pre-paving operations. Address the sequence of operations. Outline steps to provide product consistency, to minimize segregation, to prevent premature cooling of the ATB, and to provide the mat density required by these specifications. Include a proposed quality control testing frequency for gradation, asphalt binder content, and compaction.

Failure to perform quality control forfeits the Contractor's right to a retest under Subsection 306-4.02.

Provide copies of the documented sampling and testing results no more than 24 hours from the time taken.

306-2.06 RECYCLED ASPHALT PAVEMENT (RAP). Process existing pavement removed under Subsection 202-3.07 so material passes the 1 1/2" sieve. Stockpile the material separately from the crushed aggregates. Perform one gradation and one asphalt binder content test for every 1000 tons of RAP or a minimum of 10 sets of tests whichever is greater.

CONSTRUCTION REQUIREMENTS

306-3.01 WEATHER LIMITATIONS. Do not place ATB on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place ATB unless the roadway surface temperature is 40°F or warmer.

306-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of ATB buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of production ATB.

306-3.03 ASPHALT MIXING PLANTS. Meet AASHTO M 156. Use an asphalt plant designed to dry aggregates, maintain accurate temperature control, and accurately proportion asphalt binder and aggregates. Calibrate the asphalt plant and furnish copies of the calibration data to the Engineer at least 4 hours before ATB production.

When using recycled asphalt pavement material, mix the RAP with the aggregate before the aggregate enters the plant thereby adding the RAP combined with the aggregate to the asphalt treated base mixture at one time.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the ATB.

Provide a tap on the asphalt binder supply line just before it enters the plant (after the 3-way valve) for sampling asphalt binder.

Provide aggregate and asphalt binder sampling equipment meeting OSHA safety requirements.

306-3.04 HAULING EQUIPMENT. Costs associated with meeting the requirements of Subsection 306-3.04 are subsidiary to Section 306 Pay Items.

Vehicles/Equipment. Haul ATB in trucks with tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution, or an approved manufactured asphalt release agent. Do not use petroleum fuel as an asphalt release agent.

During ATB hauling activities, the hauling vehicle will have covers attached and available for use. Be prepared to demonstrate deployment of the cover when hauling material or empty. Illustrate the efficiency of deployment and how the materials are protected from the environment and the environment is protected from the materials. When directed by the Engineer, cover the ATB in the hauling vehicle(s).

Roadway Maintenance. Daily inspect, remove/clean, and dispose of project materials deposited on existing and new pavement surface(s) inside and outside the project area including haul routes.

The inspection plan and method of removal/cleaning and disposal shall be submitted in writing to the Engineer and approved by the Engineer 7 days before initiating paving operations. Include alternatives, options to immediately correct deficiencies in the inspection plan and methods of removal/cleaning and disposal that may be discovered as the work is being performed.

The Engineer may require the Contractor to include a vehicle/equipment cleaning station(s), to be added at the project site and or at the plant, in the basic plan or as one of the corrective alternatives/options. At a minimum, the cleaning station will include the materials and means to:

- (1) Spray truck tires with an environmental degradable release agent if mix adheres to tires before dumping in front of the paving equipment.
- (2) Clean off loose mix from gates, chains, and tires that might fall on the pavement of the haul route.
- (3) Contain, collect and disposal of (1) and (2).

The Contractor is responsible for the inspection plan, the means, and methods used for removal/cleaning and disposal of fugitive materials/debris. The Contractor is responsible for the damage as a result of not removing these materials (to the roadway material, the users, and others) and the damage to the roadway materials from the removal method(s). Approval does not change the Contractor's responsibility, nor add responsibility to the Department for this work.

Repair damage, as specified in Subsection 306-3.16 Patching Defective Areas, to the existing roadway materials (asphalt type) as a result of the fugitive materials or their removal. Use repair materials of similar type to the damaged material. Attain written approval from the Engineer for the proposed material.

306-3.05 PAVING EQUIPMENT. Use self-propelled asphalt pavers with a heated vibratory screed. Control grade and cross slope with automatic grade and slope control devices. Use an erected string line, a 30-foot minimum mobile stringline (ski), or other approved grade follower, to automatically actuate the screed or blade control system. Use grade control on either (a) both the high and low sides or (b) grade control on the high side and slope control on the low side.

Use a paver screed assembly that produces a finished surface of the required smoothness, thickness, and texture without tearing, shoving, or displacing the ATB.

Equip pavers with a receiving hopper having sufficient capacity for a uniform spreading operation and a distribution system to place the ATB uniformly in front of screed.

Prevent segregation of the coarse aggregate particles from the remainder of the ATB during paving operations. Specifically equip pavers to prevent segregation between the hopper and augers. Use means and methods approved by the paver manufacturer. Means and methods may include chain curtains, deflector plates, or other similar devices or combination of devices. When required by the Engineer, provide a Certificate of Compliance verifying use of the means and methods required to prevent segregation.

306-3.06 ROLLERS. Use both steel-wheel (static or vibratory) and pneumatic-tire rollers. Avoid crushing or fracturing of aggregate. Use rollers designed to compact ATB asphalt mixtures and reverse without backlash.

All rollers shall have an attached infrared thermometer that measures and displays the surface temperature to the operator.

Use fully skirted pneumatic-tire rollers having a minimum operating weight of 3000 pounds per tire.

306-3.07 PREPARATION OF EXISTING SURFACE. Prepare base surface conforming to the Plans and Specifications.

Before placing the hot asphalt mix, apply tack coat material (Section 702) as specified here and in Section 402. Uniformly coat contact surfaces of curbing, gutters, sawcut pavement, cold joints, manholes, and other structures with tack coat material. Allow tack coat to break before placement of ATB on these surfaces.

306-3.08 PREPARATION OF ASPHALT. Provide a continuous supply of asphalt binder to the asphalt mixing plant at a uniform temperature, within the allowable mixing temperature range.

306-3.09 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the ATB, sampled at the point of acceptance for asphalt binder content, does not exceed 0.5% (by total weight of mix), as determined by ATM 407.

Heat the aggregate for the ATB, and the RAP when being used in the mix, to a temperature compatible with the mix requirements specified.

Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. ATB containing soot or fuel is unacceptable (Subsection 105-1.11).

306-3.10 MIXING. Combine the aggregate, asphalt binder, and additives in the mixer in the amounts required by the JMD. Mix to obtain 98% coated particles when tested according to AASHTO T 195.

306-3.11 TEMPORARY STORAGE. Silo type storage bins may be used, provided the characteristics of the ATB remain unaltered. Changes in the JMD, visible or otherwise, are cause for rejection. Changes may include: visible segregation, heat loss; and the physical characteristics of the asphalt binder, lumpiness, or stiffness of the ATB or similar.

306-3.12 PLACING AND SPREADING. Use asphalt pavers to distribute ATB. Place the ATB upon the approved surface, spread, strike off, and adjust surface irregularities. The maximum compacted lift thickness allowed is 3 inches.

During placement, the Engineer, using an infrared camera, may evaluate the ATB surface immediately behind the paver for temperature uniformity. Areas with temperature differences more than 25° F lower than the surrounding ATB may produce areas of low density. Contractor shall immediately adjust laydown procedure to maintain a temperature differential of 25° F or less. Thermal images and thermal profile data will become part of the project record and shared with the Contractor.

Use hand tools to spread, rake, and lute the ATB in areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop-off exceeds 2 inches.

Do not cover/place over the asphalt treated base material until the ATB material throughout that section, as defined by the Paving Plan, is placed and accepted.

Do not pave against new Portland cement concrete curbing until it has cured for at least 72 hours.

Do not place ATB over bridge deck membranes, except as directed by the Engineer.

306-3.13 COMPACTION. Compact the ATB by rolling thoroughly and uniformly. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers. Prevent indentation of ATB. Do not leave rollers or other equipment standing on ATB that is not sufficiently cooled to prevent indentation.

A mat area with density lower than 92.0 % MSG is considered segregated and not in conformance with the requirements of the Contract. The work shall be deemed unacceptable by the Engineer according to Subsection 105-1.11 unless, the Engineer determines that reasonably acceptable work has been produced as permitted in Subsection 105-1.03.

The MSG of the JMD will be used for the first lot of ATB. The MSG for additional lots will be determined from the first subplot of each lot.

Acceptance testing for density will be performed according to ATM 410 using a 6 inch diameter core.

306-3.14 JOINTS. Minimize the number of joints. Do not construct longitudinal joints in the driving lanes unless approved by the Engineer in writing at the Pre-paving meeting. Place and compact the ATB to provide a continuous bond, texture, and smoothness between adjacent sections of the ATB.

Coordinate the joints in the ATB pavement layer with the layer of HMA pavement above. Offset the longitudinal joints in the HMA pavement layer above from the joint in the ATB asphalt pavement layer immediately below by at least 6 inches.

Form transverse joints by cutting back on the previous run to expose the full depth of the layer. Saw cut the joint, use a removable bulkhead or other method approved by the Engineer.

Remove to full depth improperly formed joints resulting in surface irregularities. Before removing pavement, cut a neat straight line along the pavement to be removed and the pavement to remain. Use a power saw or other method approved by the Engineer. Replace the removed asphalt with new ATB and thoroughly compact.

306-3.15 SURFACE TOLERANCE. Costs associated with meeting surface tolerances are subsidiary to the ATB Pay Items.

The Engineer will test the finished surface after final rolling at selected locations using a 10 ft straightedge. Correct variations from the testing edge, between any two contacts, of more than 1/4 inch.

306-3.16 PATCHING DEFECTIVE AREAS. Costs associated with patching defective areas are subsidiary to the ATB Pay Items.

Remove defective ATB for the full thickness of the course, do not skin patch. Cut the pavement so that edges are vertical and the sides are parallel to the direction of traffic. Coat edges with a tack coat meeting Section 402 and allow to cure. Place and compact fresh ATB to grade (Subsection 306-3.13) and surface tolerance requirements (Subsection 306-3.15).

306-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

1. Asphalt Treated Base.

- a) By weighing. No deduction will be made for the weight of asphalt binder or anti stripping additive or cutting back joints.

2. Asphalt Binder. By the ton, as follows.

Method 1:

Percent of asphalt binder for each subplot multiplied by the total weight represented by that subplot. The same tests used for the acceptance testing of the subplot will be used for computation of the asphalt binder quantity. If no acceptance testing is required, the percent of asphalt binder is the target value for asphalt binder in the JMD.

Method 2:

Supplier's invoices minus waste, diversion, and remnant. This procedure may be used on projects where deliveries are made in tankers and the asphalt plant is producing ATB for one project only.

The Engineer may direct, at any time that tankers be weighed in the Engineer's presence before and after unloading. If the weight determined at the project varies more than 1% from the invoice amount, payment will be based on the weight determined at the project.

Any remnant or diversion will be calculated based on tank stickings or weighing the remaining asphalt binder. The Engineer will determine the method. The weight of asphalt binder in waste ATB will be calculated using the target value for asphalt binder as specified in the JMD.

Method 1 will be used for determining asphalt binder quantity unless otherwise directed in writing. The procedure initially used will be the one used for the duration of the project. No payment will be made for any asphalt binder more than 0.4% above the optimal asphalt binder content specified in the JMD.

3. ATB, Price Adjustment, Type ; Class. By the fees specified in Subsections 306-2.01, 4.02, and 5.01.

306-4.02 ACCEPTANCE SAMPLING AND TESTING.**1. Asphalt Treated Base**

The bid quantity of ATB produced and placed is divided into lots and the lots evaluated individually for acceptance.

A lot is normally 10,000 tons. The lot is divided into sublots of 1000 tons, each randomly sampled and tested for asphalt binder content, density, and gradation according to this subsection. The lot is evaluated for acceptance according to Subsection 306-4.03. Seasonal startup or a new JMD requires starting a new lot.

If less than 8 sublots have been placed at the time a lot is terminated, the material in the shortened lot will be included as part of the prior lot. The acceptance computed for the prior lot will include the samples from the shortened lot. Density test results from material in the shortened lot will be based on the MSG of the first subplot of the shortened lot. If there is no prior lot, and there are at least 3 sublots, the material in the shortened lot will be considered as a lot and acceptance will be based on the actual number of test results in the shortened lot. If there are less than 3 sublots, the ATB will be accepted for payment based on the Engineer's approval of the JMD, and placement and compaction of the ATB to the specified depth, finished surface requirements, and tolerances.

If 8 or 9 sublots have been placed at the time a lot is terminated, they will be considered as a lot and the acceptance will be based on the actual number of test results (excluding outliers) in the shortened lot.

If the bid quantity is between 3,000 to 10,000 tons, the quantity is considered one lot. The lot is divided into sublots of 1000 tons, and each randomly sampled and tested for asphalt binder content, density, and gradation according to this subsection.

ATB quantities of less than 600 tons remaining after dividing the Contract quantity into sublots will be included in the last subplot. ATB quantities of 600 tons or greater will be treated as an individual subplot.

For bid quantity less than 3,000 tons, ATB will be accepted for payment based on the Engineer's approval of a JMD and the placement and compaction of the ATB to the specified depth and finished surface requirements and tolerances.

The Engineer reserves the right to perform any testing required in order to determine acceptance.

- a. Asphalt Binder Content. ATB samples shall be taken randomly by the Contractor in the presence of the Engineer from behind the paver screed before initial compaction, or will be taken randomly by the Engineer from the windrow according to ATM 402 or ATM 403 at the discretion of the Engineer. The location (behind the paver screed or windrow) will be determined at the pre-paving meeting. The Engineer will determine random sampling locations.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if requested. At the discretion of the Engineer, asphalt binder content will be determined according to ATM 405 or ATM 406, except ATM 405 will not be used when RAP is included in the mixture.

- b. Aggregate Gradation. Aggregates tested for gradation acceptance will have the full tolerances from Table 306-2 applied. For ATB samples, the gradation will be determined according to ATM 408 from the aggregate remaining after the ignition oven (ATM 406) has burned off the asphalt binder.

- c. Density. The Engineer will determine and mark the location(s) where the Contractor takes each mat core sample. The location(s) for taking core samples is determined using a set of random numbers (independent of asphalt binder and aggregate sampling set of random numbers) and the Engineer's judgment. Take no mat cores within 1-foot of a joint or edge. Core samples are not taken on bridge decks.

Take core samples according to ATM 413 in the presence of the Engineer. Cut full depth core samples centered on the marks from the finished ATB within 24 hours after final rolling. Neatly core drill one six inch diameter sample at each marked location. Use a core extractor to remove the core - do not damage the core. The Engineer will immediately take possession of the samples. Backfill and compact voids left by coring with new ATB within 24 hours and according to ATM 413. The Engineer will determine density of samples according to ATM 410.

- d. Asphalt Binder Content, Aggregate Gradation, and Density – Retest. When test results have failed to meet specifications, retest of acceptance test results for asphalt binder content, gradation, and density may be requested provided the quality control requirements of Subsection 306-2.05 Process Quality Control are met. Deliver this request in writing to the Engineer within 7 days of receipt of the final test of the lot. The Engineer will mark the sample location for the density retest within a 2 foot radius of the original core. The original test results are discarded and the retest result is used to evaluate the material for acceptance. Only one retest per sample is allowed. When gradation and asphalt binder content are determined from the same sample, a request for a retest of either gradation or asphalt binder content results in a retest of both. Both gradation and asphalt binder content retest results are used in the evaluation. Except for the first lot, retesting for gradation or asphalt binder from the first subplot of a lot will include retesting for the MSG. Retesting will be performed by a Department laboratory.

2. Asphalt Binder

The bid quantity of asphalt binder produced and placed is divided into lots and the lots evaluated individually for binder grade acceptance.

Testing will be by AASHTO accredited independent laboratories. When retesting is requested, the assigned value (ATV) will be determined using ASTM D3244. Each test will be completed by a different laboratory.

- a. Acceptance Test. The lot size for asphalt binder will normally be 200 tons. If a project has more than one lot and the remaining asphalt binder quantity is less than 150 tons, it is added to the previous lot and that total quantity will be evaluated as one lot. If the remaining asphalt binder quantity is 150 tons or greater, it is sampled, tested and evaluated as a separate lot.

If the bid quantity of asphalt binder is between 85 to 200 tons, the bid quantity is considered as one lot and sampled, tested, and evaluated according to this subsection. Quantities of asphalt binder less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

Sample asphalt binder at the plant from the supply line in the presence of the Engineer according to ATM 401. The Engineer will take immediate possession of the samples. Take three samples from each lot, one for acceptance testing, one for Contractor requested retesting, and one held in reserve for referee testing if requested. Meet Subsection 702-2.01 requirements for asphalt binder quality.

- b. Retest. Submit a written request, for a retest, no more than 7 days from receiving notice of the failed acceptance test. In the request, identify the retest laboratory. The Engineer will send the second sample (retest sample) to the laboratory. Provide the retest results to the Engineer. Contractor pays for the retest costs.

If the average of the combined test results ($[\text{acceptance} + \text{retest}]/2$) passes the specification requirement, the average value becomes the ATV. If this ATV fails the specification requirement, the Engineer or Contractor may request the third sample (referee sample) be tested.

- c. Referee Test. The Engineer will send the third sample (referee sample) to an agreed upon laboratory. The average of the combined test results ([acceptance + retest + referee]/3) equals the ATV. If the ATV fails to meet specifications, the Contractor pays for the referee test.

306-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. A mat area of finished surfacing that is contaminated with foreign material; is segregated (determined visually or by testing), has a lower density than specified, fails to meet surface tolerance requirements, is flushing or bleeding asphalt binder after compaction is complete, or in any other way determined to be defective is unacceptable according to Subsection 105-1.11. ATB, not meeting the specified limits noted in Table 306-2, is considered defective. Correct unacceptable work and materials according to Subsection 306-3.16 and as directed by the Engineer.

TABLE 306-2

LOWER SPECIFICATION LIMIT (LSL) & UPPER SPECIFICATION LIMIT (USL)

Measured Characteristics	LSL		USL	
3/4-inch sieve or largest sieve size	99		100	
1/2-inch sieve or first sieve retaining aggregate	TV	-6	TV	+6
3/8-inch sieve	TV	-6	TV	+6
No. 4 sieve	TV	-6	TV	+6
No. 8 sieve	TV	-6	TV	+6
No. 16 sieve	TV	-5	TV	+5
No. 30 sieve	TV	-4	TV	+4
No. 50 sieve	TV	-4	TV	+4
No. 100 sieve	TV	-3	TV	+3
No. 200 sieve*	TV	-2.0	TV	+2.0
Asphalt Binder Content, %	TV	-0.4	TV	+0.4
Mat Density %	92.0		100.0	

*LSL for the No. 200 sieve is restricted by the broadband limits in Table 703-4.

Asphalt binder will be randomly sampled and tested in accordance with Subsection 306-4.02. Provide supplier process control test results with the delivery ticket for each load of asphalt binder to the Engineer before unloading asphalt binder at the project. No payment will be made without this documentation.

306-4.04 ASPHALT MATERIAL PRICE ADJUSTMENT. Asphalt Material Price Adjustment. This subsection provides a price adjustment for asphalt material by: (1) additional compensation to the contractor or (2) a deduction from the contract amount.

1. This provision shall apply:
 - a. To asphalt material meeting the criteria of Subsection 702-2.01 Asphalt Binder, and is included in items listed in the bid schedule of Sections 306, 307, 308, 318, 401 thru 405, 408, 520, 608 and 609.
 - b. To cost changes in asphalt material that occur between the date of bid opening and the date on the certified bill of lading from the asphalt material refiner/producer.
 - c. When there is more than a seven and one half percent (7.5%) increase or decrease in the Alaska Asphalt Material Price Index, AAMPI, from the date of bid opening to the date on the certified bill of lading from the asphalt refiner/producer.
2. Provide the certified bill of lading from the asphalt material refiner/producer.

3. The AAMPI is calculated bimonthly on the first and third Friday of each month, and will remain in effect from the day of calculation until the next bimonthly calculation. The AAMPI is posted on the Department's Statewide Materials website at and calculated according to the formula posted there. http://www.dot.state.ak.us/stwddes/desmaterials/aprice_index.shtml
4. Price adjustment will be cumulative and calculated with each progress payment. Use the AAMPI in effect on the date of the certified bill of lading from the asphalt material refiner/producer, to calculate the price adjustment for asphalt material. The Department will increase or decrease payment under this contract by the amount determined with the following asphalt material price adjustment formula:

For an increase exceeding 7.5%, additional compensation = $[(IPP - IB) - (0.075 \times IB)] \times Q$

For a decrease exceeding 7.5%, deduction from contract = $[(IB - IPP) - (0.075 \times IB)] \times Q$

Where:

Q = Quantity of Asphalt Material incorporated into project, in tons as measured by the Engineer

IB = Index at Bid: the Bi-monthly AAMPI in effect on date of bid, in dollars per ton

IPP = Index at Pay Period: The bi-monthly AAMPI in effect on the date shown on the certified bill of lading from the asphalt refiner/producer, in dollars per ton

5. Method of measurement for determining Q (quantity) is the weight of asphalt material that meets the criteria of this subsection and is incorporated into the project. The quantity does not include aggregate, mineral filler, blotter material, thinning agents added after material qualification, or water for emulsified asphalt. The quantity for emulsified asphalts will be based on the asphalt residue material only and will be calculated using the percent residue from testing, or if not tested, from the manufacturer's certificate of compliance.

306-5.01 BASIS OF PAYMENT.

Except where specified as individual Pay Items the work and materials associated with:

Asphalt binder, anti-stripping additives, surface tolerance corrections, patching defective areas; removal and disposal of rejected ATB, and the hauling equipment are subsidiary to the Asphalt Treated Base Pay Items.

Item 306.2001-____. ATB, Price Adjustment, Type ____; Class ____: is the sum of the price adjustment for the fees assessed the Contractor including:

- Each mix design subsequent to the approved Job Mix Design (Subsection 306-2.01) will result in a fee of \$2500.00 each.
- Failure to cut core samples within the specified period will result in a fee of \$100.00 per sample per day (Subsection 306-4.02).
- Failure to backfill voids left by sampling within the specified period will result in a fee of \$100 per hole per day (Subsection 306-4.02).
- Contractor retesting, referee sample testing and Contractor requested testing for visually inspected and rejected asphalt treated base failing to meet specifications will result in a fee being assessed for all costs associated with the test (Subsection 306-4.02, 4.03).

Item 306.2002._____. Asphalt Material Price Adjustment.

For each Section as included in Subsection 306-4.04 Asphalt Material Price Adjustment, item 1, the "Asphalt Material Price Adjustment" is paid under the asphalt material Pay Item for the Section with the greatest quantity as determined by the estimate of quantities included in the Plans at the time of the bid opening.

- When more than one "Asphalt Material Price Adjustment" Pay Item is included in the Plans or bid schedule the asphalt material price adjustment, for each Section's asphalt material, is paid under the Pay Item with the greatest quantity.
- When more than one asphalt material is included in the project and only one "Asphalt Material Price Adjustment" Pay Item is included in the Plans or bid schedule, the asphalt material price adjustment, for each Section's asphalt material, is paid under the one Pay Item regardless of the quantity.
- When the Pay Item "Asphalt Material Price Adjustment", is not included, for any section, no payment will be made.

PAY ITEM

Item Number	Item Description	Unit
306.0001.____	ATB	Ton
306.0002.____	Asphalt Binder, Grade PG <u>##-## X</u>	Ton
306.2001.____	ATB, Price Adjustment, Type ____; Class ____	CS
306.2002.____	Asphalt Material Price Adjustment	CS

CR306-010122

DIVISION 400 — ASPHALT PAVEMENTS AND SURFACE TREATMENTS

Blank Page

SECTION 402 TACK COAT

Standard Modification

Replace Subsection 402-3.02 with the following:

402-3.02 EQUIPMENT. Furnish, maintain, and operate asphalt distributor to apply asphalt material uniformly at even heat on variable widths of surface up to 15 feet at readily determined and controlled flow rates. Provide an asphalt distributor capable of application rates from 0.01 to 0.11 gallon per square yard. Equip with a heater, tachometer, flow rate gauge, operable mechanical tank gauge, thermometer for measuring temperatures of tank contents, power unit for the pump and full circulation spray bars adjustable laterally and vertically.

402-3.04 APPLICATION OF ASPHALT MATERIAL.

Add the following at the end of the first paragraph:

Control deviation from any specified application rate to within 0.02 gallon per square yard.

Add the following after the second paragraph:

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. If necessary, the Engineer will determine when the tack has cured.

HSM20.6-113020

Special Provision

Add the following Section:

SECTION 408 **HOT MIX ASPHALT PAVEMENT - TYPE VH** (Superpave)

408-1.01 DESCRIPTION. Construct one or more courses of plant-produced Hot Mix Asphalt (HMA) pavement on an approved surface, to the lines, grades, and depths shown on the Plans.

1. In this Section HMA refers to Type VH, except where noted otherwise.

408-1.02 REFERENCES.

1. Section 401 Hot Mix Asphalt Pavement. (HMA Type I, II, III, and IV)
 - a. Temporary Asphalt Pavement: HMA, Type II, Class B, minimum.
 - b. Preleveling/Leveling Course: HMA, Type IV, Class B.

MATERIALS

408-2.01 ASPHALT BINDER. Conform to Subsection 702-2.01. If binder performance grade is not specified, use PG 64-40E.

Provide test reports for each batch of asphalt binder showing conformance to the specifications in Section 702 before delivery to the project. Require that the storage tanks used for each batch be noted on the test report, the anti-strip additives required by the mix design be added during load out for delivery to the project, and a printed weight ticket for anti-strip is included with the asphalt binder weight ticket. The location where anti-strip is added may be changed with the written approval of the Engineer.

Furnish the following documents at delivery:

1. Manufacturer's certificate of compliance (Subsection 106-1.05).
2. Conformance test reports for the batch (provide prior to delivery as noted above).
3. Batch number and storage tanks used.
4. Date and time of load out for delivery.
5. Type, grade, temperature, and quantity of asphalt binder loaded.
6. Type and percent of liquid anti-strip added.

Asphalt binder may be conditionally accepted at the source if a manufacturer's certification of compliance is provided, according to Subsection 106-1.05, and the applicable requirements of Section 702 are met.

408-2.02 LIQUID ANTI-STRIP ADDITIVE. Use anti-strip agents in proportions determined by ATM 414 and included in the approved Job Mix Design (JMD). At least 90% of the aggregate must remain coated when tested according to ATM 414. The following minimum dose (percent) of liquid anti-strip by weight of asphalt binder is required:

TABLE 408-2.02-1
MINIMUM DOSE OF LIQUID ANTI-STRIP BY WEIGHT OF ASPHALT BINDER

Liquid Anti-strip Type	Minimum Dose by Weight of Asphalt Binder, %
Amines based	0.30
Phosphate Ester based	0.30
Organ-Silane based	0.05

408-2.03 JOINT ADHESIVE. Conform to Subsection 702-2.05.

408-2.04 JOINT SEALANT. Conform to Subsection 702-2.06.

408-2.05 WARM MIX ASPHALT. Conform to Subsection 702-2.07.

408-2.06 ASPHALT RELEASE AGENT. Conform to Subsection 702-2.08.

408-2.07 AGGREGATES. Conform to Subsection 703.2.04. Use a minimum of three stockpiles of crushed aggregate (coarse, intermediate, and fine). Place blend material, if any, in a fourth pile.

408-2.08 RECYCLED ASPHALT PAVEMENT. Not allowed in connection with HMA Type V~~H~~.

408-2.09 JOB MIX DESIGN. Provide target values for gradation that satisfy both the broad band gradation limits shown in Table 703-4 and the requirements for Table 408-1 for Type V~~H~~ HMA.

**TABLE 408-1
HMA DESIGN REQUIREMENTS**

Design Parameters	
Design ESALs, Millions	0.3 to < 3
Rut Index, Max., ATM 419. mm	3
Asphalt Binder Content, Min. %	5.0
Liquid Anti-Strip Additive*, % Min.	0.3

* By weight of asphalt binder.

The approved JMD will specify the Target Values (TV) for gradation, the TV for asphalt binder content, the Maximum Specific Gravity (MSG) of the HMA, the Additives, and the recommended mixing temperature range.

Submit the following to the Engineer at least 15 days before the production of HMA:

1. A letter stating the location, size, and type of mixing plant. The letter shall include the proposed gradation for the JMD, gradation for individual stockpiles, and the blend ratio of each aggregate stockpile.
2. Representative samples of each aggregate (coarse, intermediate, fine, blend material and mineral filler, if any) in the proposed mix design. Furnish a total of 500 pounds of material in the proportional amounts in the proposed JMD.
3. Five separate 1-gallon samples of the asphalt binder proposed for use in the HMA. Include name of product, manufacturer, test results of the applicable quality requirements of Subsection 702-2.01, manufacturer's certificate of compliance according to Subsection 106-1.05, a temperature viscosity curve for the asphalt binder or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet.
4. One sample, of at least 1/2 pint, of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current Material Safety Data Sheet.
5. Testing results per Subsection 106-1.03.1 for each aggregate type proposed for use.

The Engineer will evaluate the material and the proposed gradation using ATM 417 or AASHTO R35 and the requirements of Table 408-1 for Type V~~H~~ HMA, and establish the approved JMD which will become a part of the Contract.

Obtain an approved JMD prior to shipment of aggregates to an asphalt plant site or producing HMA for payment.

Contractor Mix Design. If a bid item for JMD appears in the contract, or if the Engineer approves a request from the Contractor to perform the JMD at no cost to the Department, provide a JMD following the requirements specified in this section. Submit the JMD to the Engineer at least 15 working days before HMA production. Submit samples to the Engineer upon request for JMD verification testing.

All Contractor-furnished JMDs must be sealed by a professional Engineer registered in the State of Alaska. The Professional Engineer shall certify that the JMD was performed according to the specified procedures, and meets all project specifications.

Changes. Submit a new JMD with changes noted and new samples in the same manner as the original JMD submittal when:

- a. The results of the JMD evaluation do not achieve the requirements specified in Table 408-1
- b. The asphalt binder source is changed
- c. The source of aggregate, aggregate quality or gradation is changed
- d. The results of a Test Strip do not meet the requirements of the specification – the Engineer may require a new JMD.

Do not produce HMA for production paving and payment before the Engineer provides written approval of the JMD; the original, or a replacement JMD.

The Engineer has the option to require further verification of the JMD under 408-2.10 Process Quality Control. If a Test Strip(s) is required, do not produce HMA for production paving and payment before the Engineer provides written approval of the Test Strip construction, construction process, materials, and the JMD, Subsection 408-2.10.

Payment for HMA will not be made until the new JMD and the Test Strip, when required, is approved.

Approved changes apply only to HMA produced after the submittal of changes.

The Engineer will assess a fee for each mix design subsequent to the approved Job Mix Design, per Subsection 408-5.01.

408-2.10 PROCESS QUALITY CONTROL. Sample and test materials for quality control of the HMA according to Subsection 106-1.03. Submit to the Engineer at the "Pre-Paving Meeting", Subsection 408-3.01, the JMD, and a documentation plan that provides a complete, accurate, and clear record of the sampling and testing results.

Failure to perform quality control forfeits the Contractor's right to a retest under Subsection 408-4.02

Provide copies of the documented sampling and testing results no more than 24 hours from the time taken.

Supplemental Process Quality Control.

The Engineer has the option to require supplemental process quality controls including additional sampling and testing. Include the supplemental process quality controls in the documentation plan.

When directed by the Engineer: provide "Density Profiles" and or "Test Strips".

1. Density Profiles. Provide density profile testing, with a nuclear density gauge, of the mat and longitudinal joints. Include the frequency of the test groups, configuration of the test groups for mat density and joint density individually or combined. Indicate the number of tests in a test group intended to confirm the density of the mat and joints.

Locations that may require testing include: all lanes on bridge decks, adjacent to longitudinal joints, areas where segregation is visible, thermal segregation potential exists, where mat density is lower than the minimum (considered segregated), and the paver starts/stops. The Engineer will identify these and other areas that require density testing.

2. Test Strips. Construct test strips (ATM 412) using the approved job mix HMA a minimum of 5 working days prior to planned production paving, except use the proposed JMD when the test strip is being constructed to help evaluate the JMD as part of the mix performance analysis. Submit a proposed test strip location to the Engineer for coordination, and approval; include in the process control documentation plan. The Engineer's approval and written authorization of the location, date, and time, is required before construction of a test strip.

Establish roller patterns and the number of passes required to assure that proper placement and compaction is achieved. The test strip shall include no less than 300 tons and no more than 1000 tons, except as may be authorized, in writing, by the Engineer. The full complement of the paving train shall be on site to receive instructions from the Engineer as needed to complete the mix performance analysis. Make the equipment available for inspection as required by Subsection 408-3.04. Provide an onsite process control representative with authority to modify mix components as instructed by the Engineer.

Failed Test Strip: the Engineer may direct the Contractor to remove and dispose of test strips not meeting specification requirements. Contractor, construct a new test strip or return the surface materials and grade to their original condition as directed by the Engineer.

Only after the Engineer approves the test strip may HMA be produced for production paving and payment.

Refer to Subsection 408-5.01 for payment of test strips.

CONSTRUCTION REQUIREMENTS

408-3.01 PRE-PAVING MEETING. Meet with the Engineer for a pre-paving meeting in the presence of the project superintendent and paving foreman at least (5) working days before beginning paving operations. Submit a paving plan and pavement inspection plan at the meeting. When directed by the Engineer, adjust the plan and resubmit.

1. Paving Plan. Include the following:
 - a. Sequence of operations
 - b. List of equipment that will be used for production, transport, pick-up (if applicable), laydown, and compaction
 - c. Reserved
 - d. Procedures to produce consistent HMA
 - e. Procedures to minimize material and thermal segregation
 - f. Procedures to minimize premature cooling
 - g. Procedures to achieve HMA density
 - h. Procedures for joint construction including corrective action for joints that do not meet surface tolerance requirements
 - i. Quality control testing methods, frequencies and sample locations for gradation, asphalt binder content, and density, and
 - J. Any other information or procedures necessary to provide completed HMA construction that meets the Contract Requirements
2. Pavement Inspection Plan. Include the following:
 - a. Process for daily inspections
 - b. Means and methods to remove and dispose of project materials

408-3.02 CONTRACTOR QUALITY CONTROL. Perform quality control (QC) of HMA materials in accordance with Subsection 106-1.03.

408-3.03 WEATHER LIMITATIONS. Place HMA on a stable/non-yielding roadbed. Do not place HMA when the base material is wet or frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place HMA when the roadway surface temperature is colder than 40° F, or after September 15th without the Engineer's approval in writing.

408-3.04 EQUIPMENT, GENERAL. Use equipment in good working order and free of HMA buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of production and test strip HMA.

408-3.05 ASPHALT MIXING PLANT. Meet AASHTO M 156. Use an HMA plant capable of producing at least 150 tons of HMA per hour noted on posted DEC air quality permit, designed to dry aggregates, maintain consistent and accurate temperature control, and accurately proportion asphalt binder and aggregates. Calibrate the HMA plant and furnish copies of the calibration data to the Engineer at least 24 hours before HMA production.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the HMA.

Provide a tap on the asphalt binder supply line just before it enters the plant (after the 3-way valve) for sampling asphalt binder. Provide aggregate and asphalt binder-sampling locations meeting OSHA safety requirements.

You may use belt conveyor scales to proportion plant blends and mixtures if the scales meet the general requirements for weighing equipment and are calibrated according to the manufacturer's instructions.

408-3.06 HAULING EQUIPMENT. Haul HMA in trucks with tight, clean, smooth metal beds. Keep beds free of petroleum oils, solvents, or other materials that would adversely affect the mixture. Apply a thin coat of approved asphalt release agent to beds as necessary to prevent mixture adherence. Provide trucks with covers attached and available for use.

Do not haul HMA on barges.

When directed by the Engineer cover the HMA in the hauling vehicle(s).

408-3.07 ASPHALT PAVERS. Use self-propelled asphalt pavers with heated vibratory screed assemblies to spread and finish HMA to the specified section widths and thicknesses without introducing thermal or material segregation.

Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation and a distribution system to place the HMA uniformly in front of screed. Use a screed assembly that produces a finished surface of the required smoothness, thickness, and texture without tearing, shoving, or displacing the HMA. Heat and vibrate screed extensions. Place auger extensions within 20 inches of the screed extensions or per written manufacturer's recommendations.

Equip the paver with a means of preventing segregation of the coarse aggregate particles from the remainder of the HMA when carried from the paver hopper back to the augers.

Equip the paver with automatic screed controls capable of operating from a reference line or a ski from either or both sides of the paver.

The use of a "Layton Box" or equivalent towed paver is allowed on bike paths, sidewalks, and driveways.

408-3.08 ROLLERS. Use both steel-wheel (static or vibratory) and pneumatic-tire rollers. Use rollers designed to compact HMA and capable of reversing without shoving or tearing the mixture. Select rollers that will not crush the aggregate or displace the HMA. Equip vibratory rollers with separate vibration and propulsion controls.

Equip the rollers with an infrared thermometer that measures and displays the surface temperature to the operator. Infrared thermometer may be hand-held or fixed to the roller.

Utilize a pneumatic roller in the complement of rollers to compact the leveling course. Use fully skirted pneumatic-tire roller having a minimum operating weight of 3000 pounds per tire.

Equip rollers (breakdown and intermediate) with intelligent compaction (IC) equipment according to Section 411 Intelligent Compaction.

408-3.09 RESERVED.

408-3.10 PREPARATION OF EXISTING SURFACE. Prepare existing surfaces according to the Contract. Prior to placing HMA, clean existing surfaces of loose material and uniformly coat contact surfaces of curbing, gutters, manholes and other structures with tack coat material meeting Section 402. Treat cold joint surfaces according to 408-3.17. Allow tack coat to break before placement of HMA on these surfaces. Do not apply the tack coat material until the Engineer approves the existing surface including, not limited to; the existing paved surface, the milled surface, and a prior layer of HMA pavement.

Before applying tack coat to an existing paved surface, clean and patch the surface. Remove irregularities to provide a reasonably smooth and uniform surface. Remove and replace unstable areas with HMA. Clean the edges of existing pavements, which are to be adjacent to new pavement, to permit the adhesion of asphalt materials. Clean loose material from cracks. Fill the cleaned cracks, wider than 1 inch, with HMA tamped in place. Wash and/or sweep the paved surface clean and free of loose materials.

Preparation of a milled surface:

1. Prelevel remaining ruts, pavement delaminations, and depressions having a depth greater than 1/2 inch with an approved HMA.
2. Notify the Engineer of pavement areas that appear thin or unstable. Where milling operation creates thin or unstable pavement areas, or where it breaks through existing pavement, remove thin and unstable pavement, and 2 inches of existing base material, compact and replace with an approved HMA.

408-3.11 PREPARATION OF ASPHALT. Provide a continuous supply of asphalt binder to the asphalt mixing plant at a uniform temperature, within the recommended mixing temperature range.

408-3.12 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the HMA, sampled at the point of acceptance for asphalt binder content, does not exceed 0.5% (by total weight of mix), as determined by ATM 407.

Heat the aggregate for the HMA to a temperature compatible with the mix requirements specified. Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. HMA containing soot or fuel is unacceptable per Subsection 105-1.11.

408-3.13 MIXING. Combine the aggregate, asphalt binder, and additives in the mixer in the amounts required by the JMD. Mix to obtain at least 98% coated particles when tested according to AASHTO T195.

For batch plants, put the dry aggregate in motion before addition of asphalt binder.

Mix the HMA within the temperature range determined by the JMD.

Upon the Engineer's request, provide daily burner charts showing start/stop times and temperatures.

408-3.14 TEMPORARY STORAGE OF HMA. Silo type storage bins may be used, provided the characteristics of the HMA remain unaltered.

Signs of visible segregation, heat loss, changes from the JMD, change in the characteristics of asphalt binder, lumpiness, and stiffness of the mixture, are causes for rejection.

Do not store HMA on barges.

408-3.15 PLACING AND SPREADING. Use asphalt pavers to distribute HMA, including leveling course and temporary HMA. Place the HMA upon the approved surface, spread, strike off, and adjust surface irregularities. The maximum compacted lift thickness allowed is 3 inches.

When multiple lifts are specified in the Contract, do not place the final lift until all lower lifts throughout that section, are placed and accepted.

Do not place HMA abutting curb and gutter until curb and gutter are installed, except as approved by the Engineer. Do not pave against new Portland cement concrete curbing until it has cured for at least 72 hours.

When practicable, adjust elevation of metal fixtures before paving the final lift, so they will be between 1/4 and 1/2 inch below the top surface of the final lift. Metal fixtures include, but are not limited to manholes, valve boxes, monument cases, hand holes, and drains.

Use hand tools to spread, rake, and lute the HMA in areas where irregularities or unavoidable obstacles make mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop off exceeds 2 inches.

Place HMA over bridge deck membranes according to Section 508 and the membrane manufacturer's recommendations.

Do not mix HMA produced from different plants for testing or paving.

408-3.16 COMPACTION. Thoroughly and uniformly, compact the HMA by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers. Prevent indentation in the mat; do not leave rollers or other equipment standing on HMA that has not sufficiently cooled.

The Lower Specification Limit for density is 93.0% of the Maximum Specific Gravity (MSG) as determined by ATM 409. The MSG from the approved JMD is used for the first lot of each type of HMA. The MSG for additional lots is determined from the first subplot of each lot.

408-3.17 JOINTS. Place and compact the HMA to provide a continuous bond, texture, and smoothness between adjacent sections of the HMA.

Minimize the number of joints. Do not construct longitudinal joints in the driving lanes unless approved by the Engineer in writing at the pre-paving meeting. Offset the longitudinal joints in one layer from the joint in the layer immediately below by at least 6 inches. Align the joints of the top layer at the centerline or lane lines. Where preformed marking tape striping is required, offset the longitudinal joint in the top layer not more than 6 inches from the edge of the stripe.

Form transverse joints by saw-cutting back on the previous run to expose the full depth of the course or by using a removable bulkhead. Skew transverse joints 15 to 25 degrees.

For all joints below the top lift, uniformly coat joint surfaces with tack coat material meeting Section 402.

Uniformly coat the joint face of all top lift joints with a joint adhesive. Follow joint adhesive manufacturer's recommendations for temperatures and application method. Remove joint adhesive applied to the top of pavement surface. If infrared joint heaters are used and passing joint densities are achieved in each of the first three joint densities taken, then joint adhesive is not required.

The Lower Specification Limit for top lift longitudinal joint density is 91.0% of the MSG of the panel completing the joint. MSG will be determined according to ATM 409.

For top lift panels that have a longitudinal joint density less than 91.0% of the MSG in a subplot, seal the surface of the longitudinal joints with joint sealant within that subplot or as directed. Apply joint sealant according to the manufacturer's recommendations while the HMA is clean, free of moisture and prior to final traffic marking. Place the sealant at a maximum application rate of 0.15 gallons per square yard, and at least 12 inches wide centered on the longitudinal joint. After surface sealing, inlay by grinding pavement striping into the sealed HMA. Use grooving equipment that grinds a dry cut to groove the width, length, and thickness of the striping within the specified striping tolerances.

Correct improperly formed joints that result in surface irregularities according to a corrective action plan.

Complete all hot lapped joints while the mat temperature is over 230°F as measured by the Engineer, within 3 inches of the joint. Tack coat and joint adhesive are not required for hot lapped joints. Hot lapped joints will receive the full Longitudinal Joint Density Price Adjustment incentive without testing for joint density.

Top lift longitudinal joints will be evaluated for acceptance according to Subsection 408-4.03.

408-3.18 SURFACE REQUIREMENTS AND TOLERANCE. The finished surface of all HMA paving must match dimensions shown in the contract for horizontal alignment and width, profile grade and elevation, crown slope, and pavement thickness. Water must drain across the pavement surface without ponding. The surface must have a uniform texture, without ridges, puddles, humps, depressions, and roller marks. The surface must not exhibit raveling, cracking, tearing, asphalt bleeding, or aggregate segregation. Leave no foreign material, uncoated aggregate, or oversize aggregate on the HMA surface.

The Engineer will test the finished surface after final rolling at selected locations using a 10-foot straightedge. The Engineer will identify pavement areas that deviate more than 3/16 inch from the straightedge, including joints, as defective work. Perform corrective work by removing and replacing, grinding, cold milling or infrared heating such areas as required. Do not surface patch. After the Contractor performs corrective work, the Engineer will retest the area.

The Engineer will use an inertial profiler to measure the top lift HMA surface in the driving lanes for surface smoothness within 21 days after paving is complete and driving lanes are delineated.

Profiler measurements will not be taken in turn lanes, ramps, lane transitions, or within 25 feet of bridge abutments and transverse joints with pre-existing pavement.

The Engineer will measure the pavement smoothness in both wheel paths of each lane. The smoothness is measured as International Roughness Index (IRI), reported as inches/mile, at 0.1-mile increments. Pavement smoothness is the average of all IRI measurements for the project.

The Engineer will identify areas requiring corrective action in accordance with Table 408-4. Perform full-width corrective action in those areas. The Engineer may waive corrective work for localized roughness for deficiencies resulting from manholes or other similar appurtenances near the wheel path.

Perform Corrective Actions according to one of the following or by a method approved by the Engineer:

1. Diamond Grinding. If the required pavement thickness is not decreased by more than 1/4-inch, grind to the required surface tolerance and cross section. Remove and dispose of all waste materials. Apply joint sealant and sand to exposed aggregates per the manufacturer's recommendations.
2. Overlaying. Mill or sawcut the existing pavement to provide a vertical transverse joint face to match the overlay to the existing pavement. Apply tack coat on the milled surface and joint adhesive to all vertical joints and overlay the full width of the underlying pavement surface. Use the same approved HMA for overlays. Place a minimum overlay thickness of 2.0 inches.
3. Mill and Fill. Mill the existing pavement to provide a vertical transverse joint face. Apply tack coat to the milled surface and joint adhesive to all vertical joints prior to inlaying new HMA to match the existing pavement. Use the same approved HMA. Place a minimum thickness of 2.0 inches.

After completion of corrective work, the Engineer will measure the pavement surface with an inertial profiler for a smoothness price adjustment.

Price adjustments for pavement smoothness will be calculated according to Subsection 408-4.03.3.

408-3.19 REPAIRING DEFECTIVE AREAS. Remove HMA that is contaminated with foreign material, is segregated (determined visually or by testing), flushing, or bleeding asphalt. Remove and dispose defective HMA for the full thickness of the course. Cut the pavement so that edges are vertical and the sides are parallel to the direction of traffic. Coat edges with a tack coat according to Section 402. Place and compact fresh HMA so that compaction, grade, and smoothness requirements are met.

408-3.20 ROADWAY MAINTENANCE. Inspect daily according to pavement inspection plan. Remove, and dispose of project materials incorrectly deposited on existing and new pavement surfaces(s) inside and outside the project area including haul routes.

The Contractor is responsible for damage caused by not removing these materials and any damage to the roadway from the removal method(s).

Repair damage to the existing roadway that results from fugitive materials or their removal.

408-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

1. Hot Mix Asphalt.
 - a. By weight. No deduction is made for the weight of asphalt binder or anti stripping additive or cutting back joints.
 - b. By the final HMA surface area.
2. Asphalt Binder. By weight, as follows:

Method 1 is used to determine asphalt binder quantity unless otherwise directed in writing. The procedure initially used will be the one used for the duration of the project. No payment is made for any asphalt binder more than 0.4% above the optimum asphalt binder content specified in the JMD.

Method 1: Percent of asphalt binder for each subplot multiplied by the total HMA weight represented by that subplot. The Engineer will use either ATM 405 or ATM 406 to determine the percent of asphalt binder. The same test method used for the acceptance testing of the subplot will be used for computation of the asphalt binder quantity. In the absence of testing, the percent of asphalt binder is the target value for asphalt binder in the JMD.

Method 2: Supplier's invoices minus waste, diversion, and remnant. This procedure is an Engineer's option for projects where deliveries are made in tankers and the asphalt plant is producing HMA for one project only.

The Engineer may direct, at any time that tankers are weighed in the Engineer's presence before and after unloading. If the weight determined at the project varies more than 1% from the invoice amount, payment is based on the weight determined at the project.

Any remnant or diversion will be calculated based on tank stickings or weighing the remaining asphalt binder. The Engineer will determine the method. The weight of asphalt binder in waste HMA is calculated using the target value for asphalt binder as specified in the JMD.

3. Job Mix Design. When specified, a Contractor furnished JMD is measured as one according to the HMA type.
4. Temporary Pavement. Per Section 401.
5. Leveling Course. Per Section 401.
6. HMA Price Adjustment. Calculated by quality level analysis under Subsection 408-4.03.1.
7. Longitudinal Joint Density Price Adjustment. By the linear foot of top lift longitudinal joint under Subsection 408-4.03.2.
8. Joint Adhesive. By the linear foot of longitudinal and transverse joint.
9. Pavement Smoothness Price Adjustment. Calculated from inertial profiler data using FHWA's ProVAL software under Subsection 408-4.03.3.
10. Asphalt Material Price Adjustment. Determined under Subsection 408-4.04.
11. Liquid Anti-Strip Additive. Based on the number of tons of asphalt binder containing required additive.
12. Crack Repair. From end to end of the crack repaired according to 408-3.10, measured horizontally along the centerline of the crack.
13. Prelevel for Ruts, Delaminations, and Depressions. By the surface area where prelevel is placed according to 408-3.10(1), measured according to Section 109.
14. Repair Unstable Pavement. By the surface area of pavement repaired according to 408-3.10(2), measured according to Section 109.
15. Asphalt Binder Price Adjustment. Determined under Subsection 408-4.03.4.

408-4.02 ACCEPTANCE SAMPLING AND TESTING.

1. Hot Mix Asphalt

The bid quantity of each type of HMA produced and placed is divided into lots and the lots evaluated individually for acceptance.

A lot is normally 5,000 tons. The lot is divided into sublots of 500 tons, each randomly sampled and tested for asphalt binder content, density, and gradation according to this Subsection. The lot is evaluated for price adjustment according to Subsection 408-4.03.1. Seasonal startup or a new JMD requires starting a new lot.

If less than 8 sublots have been placed at the time a lot is terminated, the material in the shortened lot will be included as part of the prior lot. The price adjustment computed for the prior lot will include the

samples from the shortened lot. Density test results from material in the shortened lot will be based on the MSG of the first subplot of the shortened lot. If there is no prior lot, and there are at least 3 sublots, the material in the shortened lot will be considered as a lot and the price adjustment will be based on the actual number of test results in the shortened lot. If there are less than 3 sublots, the HMA will be accepted for payment based on the Engineer's approval of the JMD, and placement and compaction of the HMA to the specified depth, finished surface requirements, and tolerances.

If 8 or 9 sublots have been placed at the time a lot is terminated, they will be considered as a lot and the price adjustment will be based on the actual number of test results in the shortened lot.

If the bid quantity is between 1,500 to 5,000 tons, the quantity is considered one lot. The lot is divided into sublots of 500 tons, each randomly sampled and tested for asphalt binder content, density, and gradation according to this Subsection.

For bid quantity less than 1,500 tons, HMA will be accepted for payment based on the Engineer's approval of the JMD, and placement and compaction of the HMA to the specified depth, finished surface requirements, and tolerances.

The Engineer reserves the right to perform any testing required in order to determine acceptance.

- a. Asphalt Binder Content. HMA samples shall be taken randomly by the Contractor in the presence of the Engineer from behind the paver screed before initial compaction, or will be taken randomly by the Engineer from the windrow, according to ATM 402 or ATM 403, at the discretion of the Engineer. The location (behind the paver screed or windrow) will be determined at the pre-paving meeting. The Engineer will determine random sampling locations.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if requested. At the discretion of the Engineer, Asphalt binder content will be determined according to ATM 405 or ATM 406.

- b. Aggregate Gradation. Aggregates tested for gradation acceptance will have the full tolerances from Table 408-2 applied.

- (1) Drum Mix Plants. Samples will be taken from the combined aggregate cold feed conveyor via a diverter device, from the stopped conveyor belt or from the same location as samples for determination of asphalt binder content, at the discretion of the Engineer. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if requested. The aggregate gradation for samples from the conveyor system will be determined according to ATM 304. For HMA samples, the gradation will be determined according to ATM 408 from the aggregate remaining after the ignition oven (ATM 406) has burned off the asphalt binder. Locate diverter devices for obtaining aggregate samples from drum mix plants on the conveyor system delivering combined aggregates into the drum. Divert aggregate from the full width of the conveyor system and maintain the diverter device to provide a representative sample of aggregate incorporated into the HMA.

- (2) Batch Plants. Samples will be taken from dry batched aggregates according to ATM 301 or from the same location as samples for determination of asphalt binder content, at the discretion of the Engineer. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if requested. The aggregate gradation for dry batch samples will be determined according to ATM 304. For HMA samples, the gradation will be determined according to ATM 408 from the aggregate remaining after the ignition oven (ATM 406) has burned off the asphalt binder.

- c. Density. The Engineer will determine and mark the location(s) where the Contractor takes each core sample.
- (1) Mat Cores: The location(s) for taking core samples is determined using a set of random numbers (independent of asphalt binder and aggregate sampling set of random numbers) and the Engineer's judgment. Take no mat cores within 1 foot of a joint or edge. Core samples are not taken on bridge decks.
 - (2) Longitudinal Joint Cores: The Engineer will mark the location(s) to take the core sample, centered on the visible surface joint, and adjacent to the mat core sample taken in the panel completing the joint.

Take core samples according to ATM 413 in the presence of the Engineer. Cut full depth core samples, centered on the marks and as noted above, from the finished HMA within 24 hours after final rolling. Neatly core drill one six-inch diameter sample at each marked location. Use a core extractor to remove the core - do not damage the core. The Engineer will immediately take possession of the samples. Backfill and compact voids left by coring with new HMA within 24 hours, and according to ATM 413. The Engineer will determine density of samples according to ATM 410.

- d. Asphalt binder Content, Aggregate Gradation, and Density - Retest. When test results have failed to meet specifications, retest of acceptance test results for asphalt binder content, gradation, and density may be requested provided the quality control requirements of Subsection 408-3.02 Contractor Quality Control are met. Deliver this request in writing to the Engineer within 7 days of receipt of the final test of the lot. The Engineer will mark the sample location for the density retest within a 2-foot radius of the original core. The original test results are discarded and the retest result is used in the price adjustment calculation regardless of whether the retest result gives a higher or lower pay factor. Only one retest per sample is allowed. When gradation and asphalt binder content are determined from the same sample, a request for a retest of either gradation or asphalt binder content results in a retest of both. Both gradation and asphalt binder content retest results are used in the price adjustment calculation. Except for the first lot, retesting for gradation or asphalt binder from the first subplot of a lot will include retesting for the MSG. Retesting will be performed by a Department laboratory.

2. Asphalt Binder

The bid quantity of asphalt binder produced and placed is divided into lots and the lots evaluated individually for binder grade acceptance.

Testing will be by AASHTO accredited independent laboratories. When retesting is requested, the assigned value (ATV) will be determined using ASTM D3244. Each test will be completed by a different laboratory.

- a. Acceptance Test. The lot size for asphalt binder is 200 tons. If a project has more than one lot and the remaining asphalt binder quantity is less than 150 tons, it is added to the previous lot and that total quantity will be evaluated as one lot. If the remaining asphalt binder quantity is 150 tons or greater, it is sampled, tested and evaluated as a separate lot.

If the bid quantity of asphalt binder is between 85 to 200 tons, the quantity is considered as one lot and sampled, tested, and evaluated according to this subsection. Quantities of asphalt binder less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

Sample asphalt binder at the plant from the supply line in the presence of the Engineer according to ATM 401. The Engineer will take immediate possession of the samples. Take three samples from each lot, one for acceptance testing, one for Contractor requested retesting, and one held in reserve for referee testing if requested. Meet Subsection 702-2.01 requirements for asphalt binder quality.

- b. Retest. Submit a written request, for a retest, no more than 7 days from receiving notice of the failed acceptance test. In the request, identify the retest laboratory. The Engineer will send the second sample (retest sample) to the laboratory. Provide the retest results to the Engineer. Contractor pays for the retest costs.

If the average of the combined test results $([\text{acceptance} + \text{retest}]/2)$ passes the specification requirement, the average value becomes the ATV. If this ATV fails the specification requirement, the Engineer or Contractor may request the third sample (referee sample) be tested.

- c. Referee Test. The Engineer will send the third sample (referee sample) to an agreed upon laboratory. The average of the combined test results $([\text{acceptance} + \text{retest} + \text{referee}]/3)$ equals the ATV. If the ATV fails to meet specifications, the Contractor pays for the referee test.

408-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The Engineer may reject material which appears to be defective based on visual inspection. If a test of rejected material is requested, a minimum of two samples are collected from the rejected material and tested. If all test results are within specification limits, payment for the material is made.

The following methods are applied to each type of HMA with Price Adjustment Pay Items in the Contract. These methods describe how price adjustments are determined based on the quality of the HMA, binder, longitudinal joint density, and pavement smoothness.

1. HMA Price Adjustment. Acceptance test results for HMA asphalt binder content, gradation and mat density are used in HMA price adjustment. These test results for a lot are analyzed collectively and statistically by the Quality Level Analysis (QLA) method as specified in Subsection 106-1.03.3 to determine the total estimated percentage of the lot that is within specification limits. The values for percent passing the #200 sieve, asphalt binder content and density test results are reported to the nearest 0.1 percent. All other sieves used in QLA are reported to the nearest whole number.

The HMA price adjustment is based on the lower of two pay factors. The first factor is a composite pay factor (CPF) for HMA that includes gradation and asphalt binder content. The second is the density pay factor (DPF).

A lot containing material with less than a 1.000 pay factor is accepted at an adjusted price, provided that pay factor is at least 0.800 and there are no isolated defects identified by the Engineer. A lot containing material that fails to obtain the minimum pay factor is considered unacceptable and rejected under Subsection 105-1.11.

HMA pay factors are computed as follows:

- a. All statistical Quality Level Analysis (QLA) is computed using the Engineer's Price Adjustment programs.

- b. The USL and LSL are equal to the Target Value (TV) plus and minus the allowable tolerances in Table 408-2, or as shown below. The TV is the specification value shown in the approved Job Mix Design.

**TABLE 408-2
HMA LOWER SPECIFICATION LIMIT (LSL) & UPPER SPECIFICATION LIMIT (USL)**

Measured Characteristics	LSL	USL
3/4-inch or largest sieve size	99	100
1/2-inch sieve or first sieve retaining aggregate	TV-6	TV+6
3/8-inch sieve	TV-6	TV+6
No. 4 sieve	TV-6	TV+6
No. 8 sieve	TV-6	TV+6
No. 16 sieve	TV-5	TV+5
No. 30 sieve	TV-4	TV+4
No. 50 sieve	TV-4	TV+4
No. 100 sieve	TV-3	TV+3
No. 200 sieve*	TV-2.0	TV+2.0
Asphalt Binder Content, %	TV-0.4	TV+0.4
Mat Density, %	93.0	100.0

*LSL for the No. 200 Sieve is restricted by the broadband limits in Table 703-4.

- c. The percent within limits (PWL), Quality Levels and characteristic pay factors (PFs) are determined by the Engineer for each Lot in accordance with Subsection 106-1.03.3. The Composite Pay Factor (CPF) for the lot is determined from gradation and asphalt binder content (ac) acceptance test results using the following example formula:

$$\text{CPF} = \frac{[f_{3/4 \text{ inch}} (\text{PF}_{3/4 \text{ inch}}) + f_{1/2 \text{ inch}} (\text{PF}_{1/2 \text{ inch}}) + \dots f_{ac} (\text{PF}_{ac})]}{\Sigma f}$$

Table 408-3 gives the weight factor (f) for each test property considered.

**TABLE 408-3
WEIGHT FACTORS**

Property	Type V ^H Factor "f"
3/4-inch sieve	4
1/2-inch sieve	5
3/8-inch sieve	5
No. 4 sieve	4
No. 8 sieve	4
No. 16 sieve	4
No. 30 sieve	5
No. 50 sieve	5
No. 100 sieve	4
No. 200 sieve	20
Asphalt Content, %	40

The Density Pay Factor (DPF) is computed using HMA mat core compaction acceptance test results.

The CPF and DPF are rounded to the nearest 0.001. The price adjustment for each individual lot is calculated as follows:

HMA Price Adjustment = [Lowest Pay Factor* -1.000] x (tons in lot) x (PAB)

*Lowest Pay Factor, CPF or DPF

PAB = Price Adjustment Base = \$140.00 per ton.

2. Longitudinal Joint Density Price Adjustment. Longitudinal joint density price adjustment will be based on the project average of all top lift cold joint densities and determined as follows:

a. Disincentive. Project average top lift joint density less than 91.0% MSG:
Deduct \$3.00 per lineal foot.

b. Incentive. Project average top lift joint density greater than:

92.0% MSG.	Add \$0.50 per lineal foot
93.0% MSG.	Add \$1.00 per lineal foot
94.0% MSG.	Add \$1.50 per lineal foot

3. Pavement Smoothness Price Adjustment. Pavement smoothness will be measured by the Engineer and reported as IRI (inches/mile), according to Subsection 408-3.18. Incentive for pavement smoothness shall apply only if both the project average CPF and DPF are greater than or equal to 1.000. Disincentive for pavement smoothness shall apply regardless of the project average CPF or DPF.

The Engineer will calculate the pavement smoothness price adjustment according to Method 1 (pavement placed over graded subgrade) or Method 2 (pavement placed over existing pavement), whichever applies to the majority of the project. The SF is rounded to the nearest 0.001.

Method 1: $SPA = PAB \times PQ \times SF$,
where:

SPA = Pavement Smoothness Price Adjustment

PAB = Price Adjustment Base = \$140.00 per ton

PQ = Top layer HMA quantity, tons

SF = Smoothness Factor (Table 408-4)

TABLE 408-4
SMOOTHNESS FACTOR (SF)

IRI (in./mile)	SF
Less than 40.0	0.050
40.0 to 70.0	$0.050 - (IRI - 40.0)/600.0$
70.0 to 90.0	0.000
90.0 to 120.0	$(90.0 - IRI)/120.0$
Greater than 120.0*	-

* Corrective Work required, see Subsection 408-3.18

Method 2: $SPA = PAB \times PQ \times SF$,

where:

SPA = Pavement Smoothness Price Adjustment

PAB = Price Adjustment Base = \$140.00 per ton

PQ = Top layer HMA quantity, tons

SF = Smoothness Factor = $0.120 \times \text{RR} - 0.020$; SF not to exceed 0.050

RR = Roughness Reduction = $(\text{Initial IRI} - \text{Final IRI}) / \text{Initial IRI}$

Initial IRI = Pre-project average IRI as measured and reported by the Engineer. The Initial IRI will either be included in the bid documents or the timeline for when the Initial IRI will be measured will be identified in the bid documents.

Final IRI = Top layer HMA average IRI as measured and reported by the Engineer according to Subsection 408-3.18.

4. **Asphalt Binder Price Adjustment.** A lot quantity of asphalt binder, with a pay factor less than 1.00, is accepted or rejected per Table 408-4.03-1 Asphalt Binder Pay Factors.

**TABLE 408-4.03-1
ASPHALT BINDER PAY FACTORS**

Pay Factor			1.01	1.00	0.95	0.90	0.75	Reject
RTFO (Rolling Thin Film Oven)								
DSR ^(a.1)	All Grades	G*/Sinδ, kPa ⁻¹	≥ 2.69	2.68–2.20	2.19–1.96	1.95–1.43	1.42–1.10	< 1.10
MSCR ^(a.2)	PG 52-40 E	J _{NR 3.2}	≤ 0.39	0.40–0.50	0.51–0.59	0.60–0.69	0.70–1.00	> 1.00
		% Rec _{3.2}	≥ 86.0	85.9–75.0	74.9–68.0	67.9–60.0	59.9–55.0	< 55.0
	PG 58-34 E	J _{NR 3.2}	≤ 0.19	0.20–0.25	0.26–0.29	0.30–0.39	0.40–0.50	> 0.50
		% Rec _{3.2}	≥ 90.0	89.9–85.0	84.9–80.0	79.9–75.0	74.9–70.0	< 70.0
	PG 64-40 E	J _{NR 3.2}	< 0.05	0.05–0.10	0.11–0.15	0.16–0.20	0.21–0.25	> 0.25
		% Rec _{3.2}	≥ 97.0	96.9–95.0	94.9–91.0	90.9–85.0	84.9 – 80.0	< 80.0
PAV (Pressurized Aging Vessel)								
DS ^(a.3)	PG 64-40 E & All Other Grades	G*Sinδ, kPa	≤4711	4712–5000	5001–5289	5290–5578	5579–5867	> 5867
	PG 52-40 E, PG 58-34 E	G*Sinδ, kPa	≤ 5700	5701–6000	6001–6300	6301–6600	6601 – 7000	> 7000
CS ^(a.4 & 5)	All Grades ^(a.4)	BBR, S, MPa	≤ 247	248–300	301–338	339–388	389–449	≥ 450
	All Grades ^(a.5)	BBR, m	≥ 0.320	0.319–0.300	0.299–0.294	0.293–0.278	0.277–0.261	< 0.261

Creep Stiffness (CS)

Dynamic Shear (DS)

Multiple Stress Creep Recovery (MSCR)

- a. Asphalt Binder Pay Adjustment = $(\text{Lowest Pay Factor} - 1.00) \times (\text{tons in lot})^* \times \text{PAB} \times 5$

*Select the lowest pay factor from:

RTFO (test the binder residue at the performance grade temperature)

(1) DS, All Grades, $G^*/\text{Sin}\delta$, kPa⁻¹

(2) MSCR: PG, Select the highest pay factor corresponding to, either $J_{NR\ 3.2}$ or % Rec_{3.2} values

PAV

(3) DS, PG, $G^*\text{Sin}\delta$, kPa

(4) CS, All Grades, BBR, S MPa

(5) CS, All Grades, BBR, m

- b. If three consecutive acceptance samples are out of specification, stop HMA production immediately and submit a corrective action plan to the Engineer for approval.

408-4.04 ASPHALT MATERIAL PRICE ADJUSTMENT.

Asphalt Material Price Adjustment. This subsection provides a price adjustment for asphalt material by: (1) additional compensation to the contractor or (2) a deduction from the contract amount.

1. This provision shall apply:
 - a. To asphalt material meeting the criteria of Subsection 702-2.01 Asphalt Binder, and is included in items listed in the bid schedule of Sections 306, 307, 308, 318, 401 thru 405, 408, 520, 608 and 609.
 - b. To cost changes in asphalt material that occur between the date of bid opening and the date on the certified bill of lading from the asphalt material refiner/producer.
 - c. When there is more than a seven and one half percent (7.5%) increase or decrease in the Alaska Asphalt Material Price Index, AAMPI, from the date of bid opening to the date on the certified bill of lading from the asphalt refiner/producer.
2. Provide the certified bill of lading from the asphalt material refiner/producer.
3. The AAMPI is calculated bimonthly on the first and third Friday of each month, and will remain in effect from the day of calculation until the next bimonthly calculation. The AAMPI is posted on the Department's Statewide Materials website at and calculated according to the formula posted there. http://www.dot.state.ak.us/stwddes/desmaterials/aprice_index.shtml
4. Price adjustment will be cumulative and calculated with each progress payment. Use the AAMPI in effect on the date of the certified bill of lading from the asphalt material refiner/producer, to calculate the price adjustment for asphalt material. The Department will increase or decrease payment under this contract by the amount determined with the following asphalt material price adjustment formula:

For an increase exceeding 7.5%, additional compensation = $[(IPP - IB) - (0.075 \times IB)] \times Q$

For a decrease exceeding 7.5%, deduction from contract = $[(IB - IPP) - (0.075 \times IB)] \times Q$

Where:

Q = Quantity of Asphalt Material incorporated into project, in tons as measured by the Engineer

IB = Index at Bid: the Bi-monthly AAMPI in effect on date of bid, in dollars per ton

IPP = Index at Pay Period: The bi-monthly AAMPI in effect on the date shown on the certified bill of lading from the asphalt refiner/producer, in dollars per ton

5. Method of measurement for determining Q (quantity) is the weight of asphalt material that meets the criteria of this subsection and is incorporated into the project. The quantity does not include aggregate, mineral filler, blotter material, thinning agents added after material qualification, or water for emulsified asphalt. The quantity for emulsified asphalts will be based on the asphalt residue material only and will be calculated using the percent residue from testing, or if not tested, from the manufacturer's certificate of compliance.

408-5.01 BASIS OF PAYMENT.

The following items, unless included as individual Pay Items, are subsidiary to the Section 408 Hot Mix Asphalt Pavement related Pay Items as included in the bid schedule:

- Asphalt binder
- Liquid anti-strip additives
- Tack coat
- Crack sealing
- Crack repair
- Joint adhesive
- Surface sealing of longitudinal joints
- Surface tolerance corrections
- Patching defective areas
- Prelevel for ruts, delaminations, and depressions
- Repair unstable pavement
- Job mix design
- Density profiles, Subsection 408-2.10 Process Quality Control
- Repair work and materials when planing equipment breaks through existing pavement – Subsection 408-3.10 Preparation of Existing Surface
- Work and materials associated with Subsection 408-3.06 Hauling Equipment
- Work and materials associated with Subsection 408-3.20 Roadway Maintenance

Test Strips: Subsection 408-2.10 Process Quality Control.

- a. Approved. Test strip construction and material, approved by the Engineer in writing, as meeting the specification requirements will be paid for at the Contract unit prices for HMA and asphalt binder as included in the Bid Schedule. Price adjustments 408.2008.____, 408.2009.____, 408.2010.____ and 408.2021.____ do not apply.
- b. Failed. The materials, construction of, removal and disposal of a failed test strip will be at the Contractor's expense.

Pay Item 408.2008.____ HMA Price Adjustment, Type _____. The sum of the price adjustments for each material lot, and for deductions and fees assessed. Deductions and fees assessed include:

- Each mix design subsequent to the approved JMD for each type and class of HMA specified will result in a fee of \$6000.
- Failure to cut core samples within the specified period will result in a deduction of \$100 per sample per day.
- Failure to backfill voids left by sampling within the specified period will result in a deduction of \$100 per hole per day.
- If an asphalt binder referee test is requested and the ATV confirms the asphalt binder does not meet Contract requirements, a fee of \$500 will be assessed.

Pay Item 408.2008.____ HMA Price Adjustment, Type _____. and 408.2022.____ Combined Price Adjustment do Does not apply to the following:

- Driveway and approach HMA.
- HMA contract quantity is less than 1500 tons.

Pay Item 408.2009.____. Longitudinal Joint Density Price Adjustment. The total price adjustment.

Pay Item 408.2010.____. Pavement Smoothness Price Adjustment. The total price adjustment.

Pay Item 408.2015.____ Asphalt Material Price Adjustment.

For each Section as included in Subsection 408-4.04 Asphalt Material Price Adjustment, item 1.a, the "Asphalt Material Price Adjustment" is paid under the asphalt material Pay Item for the Section with the

greatest quantity as determined by the estimate of quantities included in the Plans at the time of the bid opening.

- When more than one "Asphalt Material Price Adjustment" Pay Item is included in the Plans or bid schedule the asphalt material price adjustment, for each Section's asphalt material, is paid under the Pay Item with the greatest quantity.
- When more than one asphalt material is included in the project and only one "Asphalt Material Price Adjustment" Pay Item is included in the Plans or bid schedule, the asphalt material price adjustment, for each Section's asphalt material, is paid under the one Pay Item regardless of the quantity.
- When the Pay Item "Asphalt Material Price Adjustment", is not included, for any section, no payment will be made.

Pay Item 408.2021.____. Asphalt Binder Price Adjustment. The sum of the price adjustments for each material lot.

PAY ITEM		
Item Number	Item Description	Unit
408.2001.____	HMA, Type __	Ton
408.2004.____	Asphalt Binder, Grade PG <u>##-## X</u>	Ton
408.2007.____	Liquid Anti-Strip Additives	CS
408.2008.____	HMA Price Adjustment, Type __; Class __	CS
408.2009.____	Longitudinal Joint Density Price Adjustment	CS
408.2010.____	Pavement Smoothness Price Adjustment, Method _	CS
408.2014.____	Joint Adhesive	LF
408.2015.____	Asphalt Material Price Adjustment	CS
408.2020.____	HMA, Fiber Reinforced, Type <u>VF</u>	Ton
408.2021.____	Asphalt Binder Price Adjustment	CS

C408-24.1101

Special Provision

Add the following Section:

SECTION 411 INTELLIGENT COMPACTION

411-1.01 DESCRIPTION. This work shall consist of the compaction of the asphalt mixtures utilizing Intelligent Compaction (IC) rollers within the limits of the work as described in the plans. (Defined in 411-1.02) Each IC roller will be equipped with a High Accuracy Positioning System (HAPS), typically GPS to document the rollers position.

The Contractor shall supply sufficient numbers of rollers and other associated equipment necessary to complete the compaction requirements for the specific materials. At a minimum, the breakdown and intermediate rollers will be equipped with IC.

The Contractor shall provide technical support from the roller manufacturer and from the manufacturer of HAPS equipment.

411-1.02 DEFINITIONS. IC is defined as a process that uses rollers equipped with a measurement / documentation system that automatically displays and records various critical compaction parameters including, but not limited to HMA temperature, the roller GPS location, and number of roller passes in real time during the compaction process.

MATERIALS

411-2.01 MATERIALS. Ensure that materials comply with the requirements of the plans and specifications.

CONSTRUCTION REQUIREMENTS

411-3.01 SUBMITTALS. Prior to paving or at the pre-paving meeting the Contractor shall prepare and submit a written IC Quality Control Plan (QCP) for the project. As a minimum, the QCP shall contain the following information:

1. Detailed procedure for correlating and verifying HAPS for the IC roller(s) and rover(s).
2. Detailed plan and procedure for the construction of the Test Section to establish target compaction pass counts and target values for the strength of the materials using the standard testing devices, e.g. Nondestructive density gauges, pavement cores, and IC roller(s).
3. Procedures for monitoring of the construction operations and the IC roller(s) during production and final evaluation operations.
4. Procedures to monitor the ongoing IC data including pavement temperature, number of roller passes and the required level of compaction.
5. Process and procedure analysis of the IC data from the roller(s). The frequency of reviewing the data from the roller shall be at a minimum of twice per shift of HMA placement and compaction operations. The data shall be date/time stamped which permits for external evaluation at a later time.
6. Process and Procedure for Pre-construction training for the field personnel including the roller operator(s) and Department personnel regarding the proper operation of the IC technology, including but not limited to: setup of IC rollers, set up of a HAPS base station and/or universal total station (UTS), verification IC accuracy measurement with a hand-held rover, IC data analysis, and in-situ point test measurements.
7. Temperature Controls: The Contractor shall provide details on their plans to achieve minimum compaction prior to mat temperatures cooling below compaction temperatures. IC breakdown roller

compaction process needs to be completed (final IC roller pass) before the mat temperature falls below a minimum of 240° F for the initial phase (breakdown) and 200° F for the intermediate IC roller phase.

8. Asphalt pavement operations shall not begin before the QCP has been approved by the Engineer.
9. The Engineer may require the replacement of ineffective or unqualified equipment or Quality Control personnel. Paving operations may be required to stop until Quality Control corrective actions are taken.

411-3.02 IC ROLLER. The IC rollers shall meet the following requirements:

1. IC rollers shall be self-propelled double-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort. IC rollers shall also be equipped with non-contact temperature sensors for measuring pavement surface temperatures. Written approval by the on-site technical representative shall be provided to the Engineer before use certifying that the equipment is in satisfactory working condition and can function properly during production, placement and compaction operations.
2. The IC rollers will include a High Accuracy Positioning System (HAPS) to monitor the location and track the number of passes over a given cell. GPS or universal total station (UTS) components including receiver(s), radio, modem, and various sensors shall be mounted on each IC roller. GPS may be utilized on projects with no obstructions on the project that will limit a clear view of the sky within 13 degrees of the horizon. Obstructions may include overpasses, trees, and buildings. Other limiting factors may include high-powered communications towers, such as those used by the Military and FAA that weaken or obstruct the satellite signal. UTS guidance may be used on any project, or in the specific locations where GPS will not perform.
3. The IC rollers shall include an integrated on-board documentation system that is capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, location of the roller, number of roller passes, pavement surface temperatures, roller speeds, vibration frequencies and amplitudes of roller drums.
4. The display unit shall be capable of transferring the data via wireless network, with a USB port for backup.

411-3.03 HIGH ACCURACY POSITIONING SYSTEM (HAPS). The goal of the HAPS requirements is to achieve accurate and consistent HAPS measurements among all HAPS devices on the same project. Conversions of HAPS data need to be minimized to avoid errors introduced during the process. The Contractor shall provide a High Accuracy Positioning System (HAPS) that meets the following requirements:

1. Real Time Kinematic Global Positioning System (RTK-GPS)

-or-

2. Universal Total Station (UTS)
 - a. GPS Base Station. Local or virtual GPS base receiver that acquires satellite signals from the GPS and GLONASS constellations. The GPS base station shall broadcast updated correction data to the GPS receivers on the IC rollers and the hand-held rovers during operations.
 - b. UTS. A robotic total station set up over a control point determines the position of the Active Machine Target mounted on the IC Roller(s) and rover.
 - c. Rover. A hand-held GPS receiver or Active UTS target on a survey rod with controller shall be provided and operated by the Contractor for in-situ point measurements in conjunction with the IC roller at the direction of the Engineer.

- d. Control and Accuracy. GPS or UTS systems will use the local coordinates (NEZ) of the project control, as established by the surveyor. Accuracy must be verified to within 1 foot between the IC rollers and rovers.
- e. Data Storage and Display. The data from the IC roller shall be displayed to the roller operator on a color coded computer screen in “real time” during the roller operation and the data saved for transferring to and viewing by the Engineer.

411-3.04 DATE ANALYSIS SOFTWARE. Software should be selected that provides “near real time” feedback of the roller’s data output with a simple graphical user interface. Logins will be provided to the Project Engineer for analysis during construction. Provide the information and data elements in the format shown in tables 411-1 and 411-2.

**TABLE 411-1
ESSENTIAL IC DATA INFORMATION**

Item No.	Description
1	Section Title
2	Machine Manufacture
3	Machine Type
4	Machine Model
5	Drum Width (ft)
6	Drum Diameter (ft)
7	Machine Weight (lbs)

**TABLE 411-2
ESSENTIAL IC DATA ELEMENTS**

Item No.	Date Field Name	Example of Data
1	Date Stamp (YYYYMMDD)	e.g. 20080701
2	Time Stamp (HHMMSS.S)	e.g. 090504.0 (9 hr 5 min. 4.0 s.)
3	Longitude (decimal degrees)	e.g. 94.85920403
4	Latitude (decimal degrees)	e.g. 45.22777335
5	Northing (ft)	e.g. 1354048.30
6	Easting (ft)	e.g. 5009934.90
7	Elevation (ft)	e.g. 339.945
8	Roller pass number	e.g. 2
9	Direction index	e.g., 1 forward, 2 reverse
10	Roller speed (mph)	e.g. 2.0
11	Vibration on	e.g., 1 for yes, 2 for no
12	Frequency (vpm)	e.g. NA
13	Amplitude (mm)	e.g. NA
14	Surface temperature (°F) - HMA	e.g. 280

Provide Manufacturers recommended compactor, or retrofit, operator settings and user manuals and required software needed to view and export information by the operator and the Department. Work shall not begin until the Engineer has approved the IC submittals and the IC equipment.

411-3.05 DOCUMENTATION. The project documentation shall include:

1. Quality Control Tests. All hot mix asphalt quality control test results shall be submitted to the Engineer within 24 hours of shift completion.
2. Equipment. Documentation of the manufacture, model, type of asphalt paver, and rollers to be used each day of paving operations. The IC roller(s) positioning in the paving operations shall be noted.
3. IC Roller Data. The Engineer shall be provided access to an online portal where the IC roller data may be downloaded in a Veta compatible format.
4. IC Roller Analysis. The Contractor will analyze the IC roller data for conformance to the requirements for coverage area and uniformity and will submit a report produced by Veta software (or in an alternate method approved by the Engineer) to the Engineer within 24 hours of each completed shift that contains documentation of the percentage of areas that meet or exceed the optimal number of roller passes as established by the test strip (as established in 401-2.10 or 408-2.10) and maps displaying the number of roller passes on all areas paved that shift.
5. IC Construction Operations Criteria. A minimum coverage of 95% of the area paved in each individual shift shall meet or exceed the optimal number of roller passes as established by the test strip. Construction areas not meeting the IC coverage criteria may be investigated by the Engineer. If mat density in areas investigated is less than the density requirements specified in 401-3.16 or 408-3.16, repairs may be directed by the Engineer according to 401-3.19, or 408-3.19, or in another method approved by the Engineer. Repairs will be made at the Contractors expense and no additional compensation will be given. The IC Construction Operations Criteria does not affect the acceptance processes for the material or construction operations.

411-3.06 PRE-PRODUCTION TEST SECTION(S). Prior to the start of production, the Contractor, HAPS representative and/or IC roller manufacturer shall conduct the following to ensure proper setup of the HAPS, IC roller(s) and the rover(s) using the same datum:

1. On a location nearby or within the project limits as approved by the Engineer, the HAPS to be used on the project shall be set up and calibrated. Verify that the roller and rover are working properly and that there is communication with all HAPS.
2. Record the coordinates of the roller from the on-board display.
3. Remove the receiver from the rover, place it on top of the roller receiver, and record the coordinates shown on the rover display.
4. Measure and record the coordinates of both sides of the front drum with the rover.
5. Confirm horizontal accuracy between the roller and rover to within 0.1 foot using the coordinates previously obtained. Do not begin work until this has been verified.
6. The project plan file provided by the Department shall be uploaded into the IC Data analysis software and depending on the roller manufacture, the on-board IC computer.
7. During production operations, test the system each shift to verify the accuracy before beginning work.

411-3.07 PERSONNEL. The Contractor shall coordinate for on-site technical assistance from the IC Equipment Manufacturer Representative during the initial seven (7) days of production and then as needed during the remaining operations. At a minimum, the roller representative shall be present during the initial setup and verification testing of the IC roller(s). The roller representative shall also assist the Contractor and the Department with data management using the data analysis software including IC data input and processing.

411-3.08 TRAINING. The Contractor shall coordinate and conduct on-site training for Contractor and Department project personnel related to operation of the IC technology. The Contractor's personnel shall

include the IC Field manager or IC Program Administrator, ICQC technician(s), and roller operator(s). Department personnel shall include the Project Engineer and field inspector(s). Provide an enclosed facility for the training, with electrical availability for visual presentations. Training shall be at least 4 hours duration.

Topics shall include the following as a minimum;

1. Background information for the specific IC system(s) to be used.
2. Setup and checks for IC system(s), GPS or UTS equipment operation. Operation of the IC systems on the roller, i.e. setup data collection, start/stop of data recording, and on-board display options.
3. Operation of analysis software to review IC coverage maps, temperature maps, compare point test data, perform statistics analysis, and produce reports for project requirements.
4. Coverage and uniformity requirements.

411-4.01 METHOD OF MEASUREMENT. Per Section 109.

411-5.01 BASIS OF PAYMENT. The contracted price will be paid for at the Contract lump sum price. Payment will be full compensation for preparing and installing the equipment including software, providing support, maintenance, and training, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
411.2000.____	Intelligent Compaction	LS

CFHWY00453

DIVISION 500 — STRUCTURES

Blank Page

SECTION 505 PILING

Special Provisions

505-3.03 DRIVING PILES.

Replace the 1st sentence in the 1st paragraph with the following:

Drive all piles, except piles for lighting standards, to the driving resistance and minimum penetration specified in the Contract documents using the pile driving criteria provided by the Engineer.

Add No. 5:

5. Piles for Lighting Standards. For lighting standards, install piles of sufficient length to cut the pile at the required cut-off elevation and to provide the minimum installed length shown on the Plans.

Sites for lighting standard foundations can contain subsurface soils that consist of very dense sandy gravel with cobbles and boulders.

When the minimum pile length, shown on the Plans, for a lighting standard foundation cannot be achieved, install the pile tip to an elevation established by the Engineer.

505-5.01 BASIS OF PAYMENT.

Add the following:

Pay Item 505.2004.____ Lighting Standard Piles, Furnish and Install, includes the costs for both furnishing and installing piles for lighting standards for Pay Item 660.0003.____ Highway Lighting System Complete.

PAY ITEM

Item Number	Item Description	Unit
505.2004.____	Lighting Standard Piles, Furnish and Install	Each

CR505.2-100118R

**SECTION 550
COMMERCIAL CONCRETE**

Special Provisions

Replace Subsection 550-1.01 with the following:

550-1.01 DESCRIPTION. Furnish, place, finish, and cure Portland cement concrete for minor structures and incidental construction.

CR550.1-060121

Standard Modification

550-2.02 COMPOSITION OF MIXTURE – JOB MIX DESIGN.

Replace Table 550-1 with the following:

**TABLE 550-1
COMMERCIAL CONCRETE DESIGN REQUIREMENTS**

Class	B-B	B	W
Water-Cement Ratio, lbs/lbs, maximum	0.40	0.45	0.50
Total Air Content, %	5.5 – 6.5	5.5 – 6.5	4.0 – 6.5
Coarse Aggregate Gradation, AASHTO M43 ^a	No. 57 or 67	No. 57 or 67	No. 7, 8, 57, or 67
Compressive Strength, psi, minimum	5,000	4,000	3,000

a. Alternative sizes of coarse aggregate, as shown in AASHTO M 43, may be used when approved in writing.

HSM20.8-113020R

Add the following to the first paragraph of 1.Submittals.

Submit the JMD on Form 25D-203.

HSM20.25-123121

Add the following Subsection 550-2.03 Precast Concrete Products:

550-2.03 PRECAST CONCRETE PRODUCTS. Provide precast concrete products from an ATM 520 certified plant. Submit certification for each product.

Minor and Incidental Structure Products

1. Curb and gutter
2. Manhole sections
3. Headwall
4. Modular retaining wall units
5. Noise wall panels and posts
6. Portable barriers
7. Utility structures
 - a. Cabinet base
 - (1) Load center base/foundation
 - (2) Controller base/foundation
 - b. Junction box
 - c. Similar structures
8. Water and waste water structures
 - a. Catch basin
 - b. Inlet box
 - c. Outlet box
 - d. Similar structures

Major Structure Products Section 501 Concrete for Structures

Major structure products include box culvert, mechanically stabilized earth, retaining walls, three-sided flat-topped culvert, three-sided arch culvert, and similar structures.

CR550.1-060121

Standard Modification

550-5.01 BASIS OF PAYMENT.

Replace the first sentence with the following:

If items 550.0001.____, 550.0002.____, 550.0003.____, 550.0004.____, 550.0005.____, or 550.0006.____ do not appear in the Bid Schedule concrete is subsidiary to other items.

Add the following pay items:

PAY ITEM		
Item Number	Item Description	Unit
550.0005.____	Class B-B Concrete	LS
550.0006.____	Class B-B Concrete	CY

HSM20.8-113020R

DIVISION 600 — MISCELLANEOUS CONSTRUCTION

Blank Page

Special Provision

Replace Section 603 with the following:

SECTION 603 CULVERTS AND STORM DRAINS

603-1.01 DESCRIPTION. Construct or reconstruct culvert and storm drain pipe. Install culvert marker posts, and strap plastic culvert ends.

603-1.02 REFERENCES.

ASTM D3953	Standard Specification for Strapping, Flat Steel and Seals
ASTM D4675	Standard Guide for Selection and Use of Flat Strapping Materials

603-2.01 MATERIALS. Use materials that conform to the following:

Bedding and Backfill	Subsection 204-2.01
Joint Mortar	Subsection 705-2.04
Flexible Watertight Gaskets	Subsection 705-2.05
Non-reinforced Concrete Pipe	Subsection 706-2.01
Reinforced Concrete Pipe	Subsection 706-2.02
Corrugated High Density Polyethylene (HDPE) Pipe	Subsection 706-2.07
Corrugated Steel Pipe and Pipe Arches	Subsection 707-2.01
Corrugated Aluminum Pipe	Subsection 707-2.03
Galvanize	Subsection 716-2.07
Culvert Marker Posts (Flexible Delineator Posts)	Subsection 730-2.05

Item 603.0017.____, Pipe, listed in the bid schedule, furnish either Corrugated Steel Pipe (CSP), Corrugated Aluminum Pipe, Reinforced Concrete Pipe, or Corrugated Dual Wall HDPE (plastic) Pipe. Select pipe for each installation that meets or exceeds the requirements shown on the Plans for height of cover.

For steel and plastic pipe, match the end section material to the pipe material.

Separate dissimilar materials with an electrical insulating material. The insulating material must be at least 1/16 inch thick and approved by the Engineer.

Culvert marker post is 6-foot tall by 2.5 inches wide with reinforcing ribs, capable of a 9-inch minimum bending radius, and blue with no marking.

Culvert marker Strap and Seals according to ASTM D3953. .625 inch x .02 inch, dry Type 1 regular-duty (magnetic, ferritic), galvanized Finish B (hot-dipped Grade 2 moderate coating, .18 oz./ft² surface or .0002 inch thick minimum. Push type seals, Style III (overlap), regular duty, galvanized Finish B (hot-dipped coating) by 1.75-inch minimum length and matched to strapping width.

CONSTRUCTION REQUIREMENTS

603-3.01. GENERAL. Excavate, bed, and backfill according to the requirements of Subsections 204-2.01 and 204-3.01, and the Plans.

Dewater ground water from work areas; construct and maintain temporary water diversion when working in waterways, and for facilities or structures with active drainage according to Section 204.

603-3.02. LAYING PIPE. Begin the pipe laying at the downstream end of the pipe. Keep the lower segment of the pipe in contact with the bedding throughout its full length. Place bell or groove ends of rigid pipe and outside circumferential laps of flexible pipe facing upstream.

Lay paved or partially lined pipe so that the longitudinal centerline of the paved segment coincides with the flow line. Install elliptical conduit and circular conduit reinforced with other than a full circular cage or cages so the orientation of a vertical plane through the longitudinal axis of the conduit does not vary more than 5 degrees from the design orientation.

Repair damaged metallic coating on metal pipe according to AASHTO M36.

603-3.03 JOINING PIPE. Joints shall provide circumferential and longitudinal strength to preserve the pipe alignment, prevent separation of pipe sections, and provide a watertight joint between new sections of pipe and joints between new and existing sections of pipe of similar and dissimilar materials. Include a continuous gasket (seal) in all joints. Construct the watertight joint capable of passing a laboratory hydrostatic pressure and vacuum test of at least 4 psi for 10 minutes.

1. Rigid Pipe. Use either bell and spigot or tongue and groove joints. Join pipe sections with the ends fully entered and the inner surfaces reasonably flush and even.

Use one or more of the following joint materials, or any other if approved:

- a. Portland cement mortar
- b. Portland cement grout
- c. Rubber gaskets
- d. Coupling bands
- e. Preformed plastic sealing compound

Make mortar joints using an excess of mortar to form a bead around the outside of the pipe.

For grouted joints, use molds or runners to retain the poured grout. Install rubber ring gaskets to form a flexible, watertight seal.

When using portland cement mixtures, protect the completed joints against rapid drying using suitable covering material.

2. Metal Pipe. Join the metal pipe firmly using connecting bands conforming to ASTM B745 (Corrugated Aluminum Pipe) and ASTM A760 (Corrugated Steel Pipe) and as noted herein. Use bands that are no more than two nominal sheet thicknesses lighter than the pipe joined, and in no case more than 0.052 inches lighter. Include a gasket each side of the gap.
 - a. Primary Band. Furnish and install corrugated bands so that the band corrugations match and conform to the corrugations of the pipe. Conform to the following guidelines:
 - (1) The gap between the pipes joined is in the center of the band and is no wider than one corrugation width.
 - (2) Band for 12-inch through 30-inch diameter pipe are at least 12 inches wide.
 - (3) Bands for pipe with diameters greater than 30 inches are at least 22 inches wide.
 - b. Secondary Band. Use this band only where it is not physically possible to use primary bands, such as on field-cut pipe ends, joining new pipe to existing pipe, etc. Furnish and install deformed metal sheet bands (dimple bands) so that the projections match and are the same depth as the pipe corrugations. Form these projections in circumferential rows with one projection for each corrugation of the helical pipe.

Conform to the following guidelines:

- (1) The gap between the pipes joined is in the center of the band and is no wider than 2 inches.
 - (2) Bands for 12-inch diameter pipe are at least 12 inches wide and have one circumferential row of projections for each pipe end joined.
 - (3) Bands for pipe with diameters greater than 12 inches are at least 24 inches wide and have two circumferential rows of projections for each pipe end joined.
3. Plastic Pipe. Use push-on or mechanical joints. Ensure that the plastic pipe couplings' corrugation matches the pipe corrugation and that their width is not less than one-half the nominal pipe diameter.

Furnish all bolted connections on coupling bands with cut washers placed between the nut and the angle bracket or use nuts with integral washers.

Take up any pipe that is out of alignment, unduly settled, or damaged and re-lay or replace it.

603-3.04 CULVERT MARKER.

1. Marker Post. Install a culvert marker on the approach side of storm drain outfalls 30 inches and smaller, field inlets not in paved parking lots, all end sections to cross culverts, or as directed. Drive to maintain forty-two inches of post above the ground after driving, and
2. Marker Strap. In addition to marker posts, install marker strap around the plastic pipe ends.

Position the strap in the valley of the first annular ring from the top end of the culvert. From the vertical centerline of the culvert, at the top, overlap the strap and extend the ends to approximately 30 degrees each side of the centerline. Place the strap loosely without twists in the valley, without compressing the pipe, and tight enough to keep the strap from moving out of the valley without deforming the pipe or pipe corrugation. Seal the strap at three locations, one at each of the ends, and one at the top of the culvert. Extend the strap ends beyond the end seals approximately 1/2-inch. Double crimp the seal, two pairs of crimps minimum each seal.

Repair the strap galvanizing where abraded and at cut ends according to ASTM A780. Prepare the surface with power tools per SSPC-SP11, hand tools per SSPC-SP2, and as required by the paint manufacturer. Apply paint, Type – paint containing zinc dust, to the prepared surfaces and allow enough time for curing as required by the manufacturer's printed instructions.

603-4.01 METHOD OF MEASUREMENT. Section 109, and as follows:

1. Culvert Pipe. The length of pipe, measured in place, along the invert.
2. Pipes for Storm Drains. The length of pipe, measured in place, along the invert, from center to center of structures. The length through the inlets, catch basins, and manholes is included in the measured length.

603-5.01 BASIS OF PAYMENT. Branch connections and elbows are subsidiary to the pipe unless included as a separate Pay Item.

Coupling bands, seals (gaskets), and other items necessary for the proper joining of the sections are subsidiary.

Culvert markers are subsidiary to the pipe.

Excavation, bedding, and backfill paid under Section 204.

PAY ITEM

Item Number	Item Description	Unit
603.0001.____	CSP ____ Inch	LF
603.0002.____	____ Inch CSP Arch	LF
603.0003.____	End Section for CSP ____ Inch	Each
603.0004.____	End Section for ____ Inch CSP Arch	Each
603.0009.____	Corrugated Aluminum Pipe ____ Inch	LF
603.0010.____	____ Inch Corrugated Aluminum Pipe Arch	LF
603.0011.____	End Section for Corrugated Aluminum Pipe ____ Inch	Each
603.0012.____	End Section for ____ Inch Corrugated Aluminum Pipe Arch	Each
603.0013.____	Reinforced Concrete Pipe, ____ Inch, Class ____	LF
603.0014.____	Reinforced Concrete End Section, ____ Inch	Each
603.0015.____	Elbow, (Type & Size)	Each
603.0016.____	Branch Connection (Type & Size)	Each
603.0017.____	Pipe ____ Inch	LF
603.0019.____	____ Inch Pipe Arch	LF
603.0020.____	End Section for Pipe ____ Inch	Each
603.2032.____	Corrugated HDPE Pipe ____	LF
603.2033.____	End Section for Corrugated HDPE Pipe ____	Each

CR603-20.0615R

**SECTION 604
MANHOLES AND INLETS**

Special Provisions

604-2.01 MATERIALS.

Replace "Precast Concrete Manhole Sections Subsection 712-2.05" with the following:

Precast Concrete Products

Subsection 550-2.03, 712-2.05

CR604.2-060121

SECTION 605 UNDERDRAINS

Special Provisions

Replace Subsection 605-2.01 with the following:

605-2.01 MATERIALS. Use materials that conform to the following:

Porous Backfill Material	Subsection 703-2.10
Flexible Watertight Gaskets	Subsection 705-2.05
Perforated Concrete Pipe	Subsection 706-2.03
Corrugated High Density Polyethylene (HDPE) Pipe	Subsection 706-2.07
Corrugated Steel Pipe	Subsection 707-2.01
Corrugated Aluminum Pipe	Subsection 707-2.03
Gray Iron Casting	Subsection 719-2.02
Marker Post	Subsection 730-2.05

Replace Subsection 605-3.01 with the following:

605-3.01 PIPE INSTALLATION. Excavate, bed, and backfill according to the requirements of Subsection 204-2.01 and 204-3.01.

Dewater ground water from work areas; construct and maintain temporary water diversion when working in waterways, and for facilities or structures with active drainage according to Section 204.

Provide perforated pipe with Class 1 perforations.

Place the perforated pipe on a compacted bedding layer. Place the pipe with the perforations down.

Joints shall provide circumferential and longitudinal strength to preserve the pipe alignment, prevent separation of pipe sections, and provide a watertight joint between new sections of pipe and joints between new and existing sections of pipe of similar and dissimilar materials. Include a continuous gasket (seal) in all joints. Construct the watertight joint capable of passing a laboratory hydrostatic pressure and vacuum test of at least 4 psi for 10 minutes.

Use push-on, screw-on, or corrugated couplings matching the pipe corrugation of bell and spigot or split collar type engaging at least two full corrugations on each pipe section. Use fittings supplied or recommended by the pipe manufacturer.

Join pipe end sections and plug or cap up-grade ends of subdrain pipe.

After the pipe installation inspection and approval, place and compact the porous backfill material to a minimum height of 12 inches above the top of pipe. Fill trench above the porous backfill with specified material.

605-5.01 BASIS OF PAYMENT.

Delete pay item 605.0006 and .0007.

Add the following:

PAY ITEM		
Item Number	Item Description	Unit
605.2008.____	Perforated Corrugated HDPE Pipe ____	LF

CR605.1-061520

Special Provisions

Replace Section 606 with the following:

SECTION 606 GUARDRAIL

606-1.01 DESCRIPTION. Construct new guardrail, terminal sections, transition rail, and permanent crash cushions.

The permanent crash cushion, hereafter referred to as, "crash cushion," includes the complete assembly (crash cushion, foundation, backstop or transition) represented in the FHWA eligibility letter(s).

Remove and reconstruct or remove and dispose of existing guardrail, terminal sections, transition rail, and crash cushions.

CR606-123121R

606-1.02 SUBMITTALS.

1. Submit the following at the preconstruction conference and receive approval before installation.
 - a. Permanent Crash Cushions.
 - (1) FHWA Eligibility Letter(s). Eligibility letters demonstrating each crash cushion assembly is MASH 2016 compliant with the AASHTO 2016 Manual for Assessing Safety Hardware (MASH-16) Test Level 3. Demonstrate the eligibility letter shielding widths cover the hazard widths and travel directions shown in the plans.
 - (2) AASHTO Listing Category. AASHTO listing or documented updates for the crash cushion classification as listed in the 2011 AASHTO Roadside Design Guide, Section 8.4.
 - (3) Manufacturers' Shop Drawings, Assembly, and Installation Instructions. Submit shop drawings and detailed assembly and installation instructions for the crash cushion as included in the FHWA Eligibility Letters.
 - (4) Manufacturer Certification Letter. Certify the crash cushion(s) meet the requirements of the FHWA eligibility letter(s), are suited to the Contract requirements including the environmental conditions at the installation site.
 - (5) Manufacturers' Installer Certification Letter. Certify the installation contractor is familiar with and trained to install the crash cushion.
 - (6) Manufacturers' Installation Checklist. Submit a crash cushion installation checklist.
 - b. Parallel Terminals.

Manufacturer Installation Checklist. Submit an Assembly Installation Checklist.
2. Submit the following after installation.
 - a. Permanent Crash Cushions.
 - (1) Manufacturer Certification Letter. Certify the installed crash cushion(s) meet the requirements of the FHWA eligibility letters. Submit the certification letters(s) signed and dated no more than 14 days after installation.

- (2) Manufacturers' Installation Checklist. Submit the completed installation checklist signed by the Installer and Manufacturer no more than 14 days after installation. Complete the checklist after each assembly.

b. Parallel Terminals.

Manufacturer Installation Checklist. Submit the completed installation checklist signed by the Installer and Manufacturer no more than 14 days after installation. Complete the checklist after each assembly.

606-2.01 MATERIALS. Use materials that conform to the following:

Concrete, Class B	Section 550
Flexible Delineator Posts	Subsection 730-2.05
Guardrail Connection Plate	Subsection 710-2.12
Thrie-Beam Terminal Connector	Subsection 710-2.12
Guardrail Hardware	Subsection 710-2.07
Guardrail Posts and Blockouts	Subsection 710-2.06
High Strength Bolts	Subsection 716-2.03
Metal Beam Rail	Subsection 710-2.04
Terminals	Subsection 710-2.11
Terminal Markers	Subsection 730-2.05
Wire Cable	Subsection 709-2.02

Guardrail Reflector Assembly Brackets, Side-Mounted. Aluminum alloy.

Retroreflective Sheeting.

1. Post-Mounted Flexible Delineators and Guardrail Reflectors. ASTM D4956 Type IX or XI.
2. Terminal Markers. ASTM D4956 Type VIII, IX or XI.

Permanent Crash Cushion Assembly.

Crash cushions include the complete assembly as included in the Eligibility Letter, the crash cushion, the foundation, and rigid backup anchorage, or transition connection. Install an added Terminal Marker or other flexible delineator to the front of the crash cushions as recommended by the Manufacturer.

Design the crash cushion for the installation location environment. Snow combined with frequent freeze-thaw cycles creates significant ice buildup that may impair the performance of the crash cushion. Design to mitigate the effects from snow and ice. Crash cushions using supports that interlock and travel within fixed tracks at or below the first six inches from ground level, and crash cushions not designed to mitigate snow and Ice buildup are not acceptable for permanent use. Crash cushion covers, when available from the manufacturer, are required as part of the crash cushion installation.

Crash Cushion Classifications. 2011 AASHTO Roadside Design Guide, 4th Edition. The Engineer will determine the final classification of each materials submittal. Provide redirective and non-gating crash cushions of the type specified in the plans and matching the description noted below.

1. Sacrificial: Demonstrated designed for a single impact.
2. Reusable Crash Cushion. Demonstrated to have major components survive most impacts intact and salvageable. Some components require replacement after a crash.
3. Low-maintenance and Self-restoring Crash Cushion. Demonstrated to suffer very little, if any damage, upon impact and easily pulled back into their full operating condition. They may partially rebound after an impact and may only need an inspection to ensure that no parts have been damaged or misaligned.

CR606-123121R

CONSTRUCTION REQUIREMENTS

606-3.01 GENERAL. Install guardrail and terminals at the locations shown on the Plans. Conform to the Alaska Standard Plans and these Specifications.

At locations where public traffic is adjacent to guardrail work, have all materials on site, including crashworthy terminals, that are required to completely install a segment of guardrail before beginning work on that segment.

Start guardrail installation at the "upstream" end (the end adjacent traffic encounters first) by either installing a crashworthy terminal, connecting to an existing barrier or shielding the end with a crash cushion or truck mounted attenuator (TMA) meeting NCHRP 350, Test Level 3. Continue installation in the direction of traffic. Exception: if the guardrail run connects to existing barrier, buried in the backslope terminal, existing or new bridge railing, or other existing structure at the "downstream" end, guardrail installation may start at the point of connection.

Do not leave posts installed for guardrail within the clear zone for more than 48 hours before installing the rail. At the end of each work shift, install drums or Type II barricades with flashing warning lights to delineate incomplete sections of guardrail and terminal sections.

If guardrail runs are not completed within 10 calendar days after beginning installation, install temporary crash cushions meeting NCHRP 350 or MASH test level 3 at all non-crashworthy guardrail ends within the construction clear zone. Apply Traffic Price Adjustment if the Contractor does not comply with the crash cushion requirement.

When possible, proceed with construction of guardrails with the direction of traffic.

Where necessary, adjust the height of existing guardrail to provide a smooth transition to new guardrail. Use 25 linear feet of guardrail or two 12' 6" pieces of guardrail to transition to match the existing or new guardrail elements and/or end treatments.

After shaping the slopes and staking proposed guardrail terminal section locations, request the Engineer to field verify their locations. Receive approval of the staked locations before installing terminal sections.

Treat field cuts to timber posts and blockouts according to AWP standard M 4.

Install blockouts according to manufacturer's recommendations and as shown on the plans.

Install side-mounted guardrail reflectors and post-mounted flexible delineators as follows:

1. at intervals noted on the plans or Alaska Standard Plans, starting with the first guardrail post beyond terminal sections
2. with the retroreflective sheeting facing approaching traffic
3. with retroreflective sheeting on both sides, on two-way roadways
4. not on the terminal sections, except as shown on the plans
5. at or below 500 feet in elevation, except as noted otherwise in the Plans.

Attach terminal markers, in a vertical position, to the P.T. post of Short Radius Guardrail sections and to the post where the flare begins for parallel guardrail terminals. Coordinate terminal marker locations with the Engineer.

At the end of each work shift, install drums or Type II barricades with flashing warning lights to delineate incomplete sections of guardrail and terminal sections.

CR606-123121R

606-3.02 POSTS. Set posts to accommodate the line, grade, and curvature shown on the Plans. Use either wood or steel posts when allowed by the type of guardrail specified, subject to the following:

1. Exclusive of end treatments, use one type of post in each run of guardrail.

Set posts as follows:

1. Set posts plumb, in the location and to the depth shown on the Plans or Alaska Standard Plans.
2. Choose an installation method that does not damage the post, adjacent pavement, structures, utility conduits, and final slopes. Repair all damage to the satisfaction of the Engineer, or replace the damaged item, as per subsection 105-1.11.
3. Set wood or steel posts in dug, drilled, or pre-punched holes. Steel posts may also be set by ramming or driving if:
 - a. The underlying material is no larger than six inch; and
 - b. The posts are not damaged during installation.
4. Backfill and compact around posts with material as specified in the typical section to firmly support the post laterally and vertically. Compact under and around posts to the Engineer's satisfaction.
5. For placement in solid rock or broken rock embankment greater than six inch, set wood or steel posts in pre-dug, pre-drilled, or pre-punched holes.
6. In new roads, install posts before final shoulder or median compaction, surfacing, and paving.

606-3.03 BEAM RAIL. Fabricate metal work in the fabricator's shop. Bend curved guardrail elements with radii less than or equal to 100 feet in the fabricator's shop or with an approved bending apparatus.

Receive approval before field punching, cutting, or welding. Repair damaged spelter coat areas on galvanized rail elements according to AASHTO M 36 (ASTM A760).

Lap rail elements so that the exposed ends face away from approaching traffic in the adjacent lane.

Use bolts long enough to extend at least 1/4 inch beyond the nuts. Except where required for adjustments, do not extend bolts more than 1 inch beyond the nuts.

Locate bolts at expansion joints at the center of the slotted holes.

Tighten bolts at expansion joints to snug-tight. Make all other bolts fully-tight.

606-3.04 CABLE RAIL. Install cable guardrail according to the Plans and Specifications. Install at the locations shown on the Plans.

606-3.05 TERMINAL SECTIONS.

Parallel Terminals.

Install terminal sections according to the manufacturer's recommendations for the entire length of the terminal then, if required, transition rail height over 25' to match guardrail height and splice location.

Install ASTM D4956 Type III, IV, or V retroreflective sheeting on the end section of parallel terminals consisting of yellow and black bars sloping 45 degrees downward toward the traffic side of the terminal according to guidance for Object Markers for Obstructions Adjacent to the Roadway in Chapter 2C of the ATM.

Submit the manufacturers' complete Assembly Installation Checklist signed and dated after completing installation to support acceptance for each installation, see Subsection 606-1.02 for further information.

606-3.06 REMOVAL AND RECONSTRUCTION OF GUARDRAIL. Remove and reconstruct guardrail as specified. Replace lost or damaged materials without extra compensation.

When replacing existing guardrail complete the replacement run installed within 14 calendar days after removal.

For guardrail located within 50 feet of bridge ends, remove and replace the existing guardrail in the same work shift.

606-3.07 REMOVAL AND DISPOSAL OF EXISTING GUARDRAIL. Remove the existing guardrail, including the rail, cable elements, terminal sections, hardware, posts, concrete bases, and steel tubes. Backfill resulting holes with material in 6-inch layers that is similar to the existing embankment and compact to the same approximate density.

Guardrail.

Notify the Engineer a minimum of 5 days before removing guardrail. The Engineer will notify the ADOT & PF, M & O, and have an M & O representative designate portions of guardrail for salvage. Deliver salvaged guardrail and associated hardware to the M & O station located at NA. Remaining items removed become the Contractor's property.

Permanent Crash Cushion.

Notify the Engineer a minimum of 5 days before removing permanent crash cushions. The Engineer will notify the ADOT & PF, M & O, and have an M & O representative designate portions of the crash cushion for salvage. Deliver salvaged crash cushion and associated hardware to the M & O station located at NA. Remaining items removed become the Contractor's property.

606-3.08 ADJUST EXISTING GUARDRAIL. When called for on the Plans, reset existing guardrail to the height shown on the applicable Alaska Standard Plan, measured from the top of the rail to the finished shoulder surface below the rail. Raise and lower the posts several times to prevent settlement and then re-drive them to the height shown on the Plans. Use other methods if approved.

606-3.09 INSTALL NEW GUARDRAIL. Install guardrail as shown on the Plans.

606-3.10 TERMINAL MARKERS. For each parallel rail terminal, attach a terminal marker to the extreme piece of rail.

Attach flexible markers, in a vertical position, to the terminal end directly to the backside of the rail face, the face away from the traveled way, or the first post of each parallel guardrail terminal. Provide an additional marker where the flare begins for guardrail terminal widening. Provide two markers at the end of each run of guardrail; coordinate the locations with the Engineer.

Attach the flexible markers using hardware and attachment methods recommended by the manufacturer. The connection shall not negatively influence the performance of the guardrail as noted in 606-2.01.

606-3.11 LENGTH OF NEED VERIFICATION. After shaping the slopes and staking the proposed guardrail locations, notify the Engineer to field verify the beginning and ends. The Engineer will approve the staked location of the guardrail before installation. When the Engineer determines additional guardrail is required, complete the installation immediately.

606-3.12 PERMANENT CRASH CUSHION. Install crash cushions according to the manufacturer's instructions.

Construct crash cushions to shield the hazard width and travel direction shown in the plans.

Manufacturer's Crash Cushion Installation Certification. Submit the Manufacturer's Crash Cushion Installation Certification letter signed and dated after completing installation, see Subsection 606-1.02 for further information.

Manufacturer Certified Installers. Install crash cushions using installers certified by the crash cushion manufacturer. Install Crash cushions as follows:

1. Parallel to the approach traveled way or as shown on the plans.
2. Follow Section 203 for the excavation and embankment requirements of the concrete base component of the crash cushion.
3. Follow Section 501 for a concrete pad, sized according to the manufacturer's recommendations, constructed on a minimum of 12 inches of Selected Material, Type B.
4. Cut or fill to the top of the concrete pad with Selected Material, Type B at 12:1 or shallower on installations in grass median.
5. Install top elevation of concrete pad flush to pavement edge when adjacent to or within asphalt pavement.
6. Bolt crash cushion to median barrier with manufacturer approved barrier to crash cushion connector when attached to median barrier.
7. Install a terminal marker or other flexible delineator on the nose of each crash cushion as recommended by the manufacturer. The terminal marker is in addition to, not a substitute for, the retroreflective delineation installed on the crash cushion nose.
8. Manufacturers' Crash Cushion Installation Checklist. Submit the installation checklist signed and dated after completing installation, see Subsection 606-1.02 for further information.

The crash cushion installation is not complete until the Crash Cushion Manufacturers' Installation Checklist and Installation Certification letter are submitted and the Engineer accepts the installation.

Excess excavated material is the property of the Contractor.

CR606-123121R

606-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

1. Guardrail. Measured along the face of the rail or cable, from the center of the end posts.

Short Radius Guardrail. Per each, installed in place.

When the guardrail is connected to a terminal section, the pay limit for the rail ends where the specified terminal section begins.

2. Terminals. Per each, installed in place.
3. Transition Rail. Per each accepted connection.
4. Permanent Crash Cushion. Each installed and accepted.

606-5.01 BASIS OF PAYMENT.

Payment for temporary crash cushions or TMA installed to protect motorists when guardrail installations are not completed within 10 calendar days of beginning installation is subsidiary to other items.

1. Guardrail. Side-mounted guardrail reflectors, post-mounted flexible delineators, terminal markers, guardrail beam, posts, blockouts, and associated hardware are subsidiary. Installation of downstream anchors, transitions for rail height and splice locations, long span guardrail sections, and guardrail stiffening sections are subsidiary to guardrail installation.
2. Short Radius Guardrail Sections. The contract price includes all materials from the terminal anchor to and including the first wood or steel post of standard guardrail or guardrail end terminal, and including the terminal anchor assembly, in-line anchor, terminal posts, short radius guardrail posts, rail elements, terminal markers, and associated hardware required for a complete installation.
3. Terminal Sections.
 - a. Parallel Guardrail Terminal. The contract price includes rail elements, posts, blockouts, pipe sleeves, cable assemblies, guardrail extruders, terminal markers, and all associated hardware required for a complete installation.
4. Transition Rail. The contract price includes all brackets, beam sections, transition pieces, and all posts and associated hardware required for a complete connection of the guardrail section to a bridge rail or barrier.
5. Permanent Crash Cushion. The contract price includes all work and materials required to install each permanent crash cushion, foundations, and connections along with the manufacturer's field support, recommendations, and shop drawings. Removal and salvage of existing crash cushions is subsidiary to Pay Item 606.2007.____ Pay Item(s).

All material required for embankment widening for guardrail and terminal sections is paid for under the appropriate pay items shown in the bid schedule.

Guardrail salvage is subsidiary to Pay Item 606.0006.____ Removing and Disposing of Guardrail.

PAY ITEM

Item Number	Item Description	Unit
606.0001.____	W-Beam Guardrail	LF
606.0002.____	Thrie Beam Guardrail	LF
606.2003.____	Box Beam Guardrail	LF
606.0004.____	Cable Guardrail	LF
606.0005.____	Removing and Reconstructing Guardrail	LF
606.0006.____	Removing and Disposing of Guardrail	LF
606.0007.____	Double-faced, W-Beam Guardrail	LF
606.0009.____	Short Radius Guardrail	Each
606.0013.____	Parallel Guardrail Terminal	Each
606.0015.____	Adjust Existing Guardrail	LF
606.0016.____	Transition Rail	Each
606.2007.____	Crash Cushion, Permanent _____	Each

CR606-123121R

SECTION 608 SIDEWALKS

Special Provisions

608-1.01 DESCRIPTION. Construct, or retrofit asphalt, or concrete sidewalks.

Sidewalk Section 608 includes "sidewalks", pathways, medians, curb ramps, miscellaneous on-grade concrete, and asphalt surfaces not addressed elsewhere in the specifications.

608-2.01 MATERIALS. Use materials that conform to the following:

1. Concrete

Bed Course Material	Subsection 703-2.03
Joint Fillers.....	Subsection 705-2.01
Joint Sealers	Subsection 705-2.02
Concrete	Section 550, Class B
Muriatic or Phosphoric	
AASHTO M 194 Chemical Admixtures [†]	
ASTM C 494 Standard Specification for Chemical Admixtures for Concrete [†]	
ASTM C 309, Liquid Membrane-Forming Compounds for Curing Concrete [†]	
AASHTO M-33 Preformed Expansion Joint Filler for Concrete (Bituminous Type)	
ASTM C 979 Standard Specification for Pigments for Integrally Colored Concrete	
Reinforcing Steel	Section 503

[†] Compatible with colorant manufacturer.

Provide concrete for slabs according to Section 501, ACI 303R, 303.1, this specification and the material manufacturer's and supplier's written instructions.

Maximum slump 4-inch, except 8-inch maximum if using super plasticizers or mid-range water reducers. Mix used for sample(s) shall be the same as the production mix(s).

Concrete - Exposed Aggregate Finish. Provide aggregate from a single source. Keep aggregate for exposed aggregate finish separate from other project aggregate.

Concrete – Colored. Color concrete using an integral color, with a surface hardener, a color cure, a release agent, and a sealer compatible with colorant(s).

Concrete - Pattern Imprinted. Use a manufactured system designed to provide the pattern specified and a release agent compatible with the colorant.

2. Asphalt (HMA)

Bed Course Material	Subsection 703-2.03
Asphalt Binder, PG 52-28	Subsection 702-2.01
Aggregate, Type II or III	Subsection 703-2.04
Mix Design Requirements (ATM 417)	
Marshall Stability, pounds, min.....	1000
Percent Voids, Total Mix.....	2-5
Compaction, Blows/side	50

Coating/Paint:

Material - Methyl Methacrylate (MMA)	Subsection 712-2.17 (MMA only)
Color	Federal Standard 595, color 30111 (Brick Red)

3. Detectable Warnings

Cast iron detectable warning plates with truncated dome pattern, a slip resistant surface, and with handle or flange on bottom or approved equal. Detectable warning plates shall be coated with yellow polymer soaked finish. Detectable warnings shall be manufactured according to the 2006 U.S. DOT ADA Standards for Transportation Facilities.

608-2.02 REFERENCES.

1. ACI 303	Cast-In-Place Architectural Concrete Practice
2. PCA PA124	Finishing Concrete Slabs with Color and Texture
3. PCA SP021	Color and Texture in Architectural Concrete

608-2.03 SUBMITTALS – EXPOSED AGGREGATE, COLORED CONCRETE, PAINTED HMA AND PATTERN IMPRINTED CONCRETE AND HMA. Provide complete submittals (3 printed copies, except samples as specified below), to the Engineer for review and approval, at least 21 days before beginning construction of concrete and asphalt items. Submittals will be returned to the Contractor within 14 days from the date submitted, marked as approved by the Department, or requiring revisions. Amend and resubmit the documents for review until approved by the Engineer. Receive approval before beginning production.

Submit shop drawings, product data, specifications, certifications; manufacturers and installer's resumes, and samples as specified in Section 401, 501, 503, 608 and herein.

1. Shop Drawings, Product Data, Specifications, and Certifications.

- a. Exposed aggregate finish: manufacturer's chemical surface retarder.
- b. Integral concrete colorant: manufacturer's color chart, and chipset. Indicate color additive numbers and required dosage rates as part of the concrete mix submittal, Subsection 501-3.01.
- c. Manufacturer's concrete pattern imprinting system.
- d. Manufacturer's fabricated HMA pattern imprinting tool - shop drawings.
- e. Methyl Methacrylate for coating HMA.
- f. Other when requested by the Engineer.

2. Resumes.

a. Manufacturer.

Concrete. Provide documentation for five years of successful product performance, with a minimum of five completed projects and including but not limited to:

- Manufacturer's colorant, hardener, color cure, release agent, and sealer
- Batch Plant's mixing of manufacturer's colorants and other additives, and product delivery
- Manufacturer's pattern imprinting system

HMA. Provide documentation of two years and three projects successfully fabricating pattern imprinting tools and successful product performance applying MMA in similar applications to this Project.

b. Installer.

Concrete and HMA. Installer(s) with 2 years' experience and 3 successfully completed projects of similar configuration and method of installation.

In addition:

- 1) For projects with concrete integral colorant and or pattern imprint system, provide a minimum of one project using the proposed manufacturer's colorant and pattern imprint system.

3. Manufacturer's.

All manufacturers, listed and other, are required to submit for review and approval. Manufacturers of concrete colorant and pattern imprinting systems:

<u>Bomanite Corporation</u> P.O. Box 599 Madera, CA 93639 Ph: 303.369.1115 Fax: 303.291.0282 Email: bomanite.com	<u>Brickform, division of Solomon Colors, Inc.</u> 11061 Jersey Blvd. Rancho Cucamonga, CA 91730 Ph: 800.483.9628 Email: brickform.com	<u>Davis Colors</u> 3700 East Olympic Blvd. Los Angeles, CA 90023 Ph: 800.356.4848 Fax: 323.269.1053 Email: daviscolors.com	<u>L.M. Scofield Company</u> 6533 Bandini Blvd. Los Angeles, CA 90040 Ph: 323.720.3000 Fax: 323.720.3000 Email: Scofield.com

4. Pattern Imprinting, Coloring Concrete, and HMA Painting Plans.

Provide pattern imprinting, concrete coloring, and HMA painting plans to the Engineer for review and approval. Include the following, at a minimum, to achieve a final product that accurately represents, to scale, colored concrete, painted HMA and the pattern imprinted concrete and HMA (including the joints) elements:

- the sequence and schedule of operations,
- the proposed method of pattern imprinting,
- the method of coloring the concrete,
- the method of applying the MMA coating/paint to the HMA.

5. Exposed aggregate, Colored Concrete and Painted HMA and Pattern Imprinted Concrete and HMA Sample(s).

Provide one sample, equal to the width of the item, 6 ft x 6 ft maximum, 4 ft x 4 ft minimum, of each item for review by the Engineer. Demonstrate exposing the aggregate, the addition of colorant to the concrete, painting the HMA and pattern imprinting the concrete and HMA on each sample provided. Receive written approval of the sample prior to beginning production work.

Retain samples of binder(s), sand(s), aggregate(s), and color additive, used in the sample for comparison with the item production materials. Keep sample through completion of related work for use as a quality standard for finished work. Keep the sample through Project completion when requested by the Engineer.

CONSTRUCTION REQUIREMENTS

608-3.01 CONCRETE SIDEWALKS. Excavate to the required depth and to a width necessary to install and brace the forms. Shape and compact the foundation to a firm, even surface conforming to the section shown on the Plans. Replace soft and yielding material with approved material. Compact bed course material according to Subsection 203-3.04.

Use full depth forms made of wood or metal. Use forms that are straight, free from warp, and strong enough to resist the pressure of the concrete without springing. Coat forms with an approved form-release agent. Brace and stake the forms so that they maintain their position until their removal.

Thoroughly moisten the foundation immediately before placing the concrete.

Finish the surface according to Section 550-3.05. Do not plaster the surface. Edge all outside slab edges and all joints to a 1/4 inch radius.

CR608-113020R

Make expansion joints spaced every 24 feet on center, at grade breaks, or tie in locations. Expansion joints are to be a 1/2 inch wide, filled with a filler meeting Subsection 705-2.01, and sealed with a 1/2 inch thick layer of sealant meeting Subsection 705-2.02.

Divide sidewalk into sections using dummy joints formed by a jointing tool or other acceptable means. Dummy joints are to be spaced every 6 feet on center or adjusted as needed for best fit. Make dummy joints 1/3 the depth of the concrete and approximately 1/8 inch wide.

CFHWY00453

Form construction joints around all appurtenances such as manholes, utility poles, buildings, or bridges, extending into and through the sidewalk. Install preformed expansion joint filler 1/2 inch thick in construction joints. Extend the expansion joint material the full depth of the walk.

Apply joint sealer evenly to completely seal all joints.

Cure the concrete according to Section 550-3.06. During the curing period, exclude all pedestrian and vehicular traffic. Exclude vehicular traffic for additional time as directed.

The Engineer will test the finished surface with a 10-foot straightedge. Variations of more than 1/4-inch from the edge of the straightedge across or along the sidewalk surface, except at grade changes, are unacceptable. Portions of the sidewalk surface and pedestrian ramps less than 10 feet in width, or length may be tested using a shorter straightedge.

Exposed Aggregate, Colored Concrete and Painted HMA and Pattern Imprinted Concrete and HMA

Match the Project work to the approved sample. Significant differences in appearance (texture, color, pattern, or other) between adjacent panels/sections of work, from the approved sample including adjacent panels/sections similar to the approved sample yet significantly different to each other, as judged by the Engineer, will result in removal and replacement of the deficient panel(s)/section(s) of work.

Take all precautions to avoid damaging new and existing, concrete and asphalt.

Prevent surrounding materials from being discolored by the concrete and HMA and the HMA MMA coating (curbs, gutters, and other). When directed by the Engineer, in writing, remove stains and coatings on other concrete and or HMA, resulting from your work.

Where HMA paving is against; exposed aggregate finish, colored, pattern imprinted; colored and pattern imprinted concrete, place the concrete prior to asphalt paving. Do not place the HMA pavement until the concrete has cured sufficiently to prevent damage from the paving operation.

Acceptance of corrective work requires the Engineer's written approval. Repair all new and existing damaged concrete and HMA, including the removal of surface contaminants, to the satisfaction of the Engineer. The Engineer will not provide written approval until all damaged concrete and HMA is repaired.

CR608-113020R

1. Slab Types.

TABLE 608-1 Slab Type Requirements ^{a, b}						
Type ^c	Description	Finish ^{d, e, f}	Added Color ^g	Added Pattern ^g	t ^h Inches	Reinforcing ⁱ (bar spacing each way)
a. & b.	Typical	Broom	—	—	4, 6	—
I	Broom	Broom	—	—	4	4x4 – W2.9xW2.9
					6	#5@12" O.C.
					8	#6@12" O.C.
II	Exposed Aggregate	Aggregate	—	—	4	4x4 – W2.9xW2.9
					6	#5@12" O.C.
III	Colored	Broom	Color Manufacturer	—	4	4x4 – W2.9xW2.9
					6	#5@12" O.C.
IV	Pattern Imprinted	Coordinate	—	Pattern Manufacturer	4	4x4 – W2.9xW2.9
					6	#5@12" O.C.
V	Colored & Pattern Imprinted	Coordinate	Color & Pattern Manufacturer	—	4	4x4 – W2.9xW2.9
					6	#4@18" O.C.

CFHWY00453

- Sealer and Hardener: provide for all slabs.
- Transition the slab at approaches as shown in the plans.
- Type a. & b.; Pay Items 608.0001.____, are the "Typical" concrete sidewalk.
- Broom: provide a medium broom finish.
- Aggregate: provide a uniform color slightly darker than the typical uncolored slab with a uniform reveal according to ACI 303.1.
- Coordinate: coordinate and provide finish as required by pattern imprint system manufacturer.
- Color and Pattern: provide color and or pattern similar to that noted and available from the listed manufacturer(s). Provide color and pattern from the same manufacturer or provide from different manufacturers with a certification from each permitting warranted use of their product with the product of the other manufacturer. Use a release agent as approved by the manufacturer(s).
- t: provide the slab thickness, denoted as "t"
- Reinforcing: Provide welded wire fabric in sheets not rolls. Lap joints 1 1/2 mesh minimum.

2. Joints.

Lay out joints as shown or noted in the Plans and Specifications, if not shown or noted provide:

- Control Joints. Maximum spacing equals 12 ft. (also referred to as, "dummy joints")
 - the joint configuration should create a square or rectangle with the long side no more than 1.5 times the short side,
 - space the control joint matching the width of the slab,
 - at corners and intersections, align the joints parallel to the edge(s) of the intersecting slab.
 - locate the joints equally spaced between the: ends/edges of slab, slab corners, slab intersections or a combination of one and another.

CR608-113020R

b. Expansion Joints. Maximum spacing equals 24 ft.

- (1) expansion joints are to be a 1/2 inch wide, filled with a filler meeting Subsection 705-2.01, and sealed with a 1/2 inch thick layer of sealant meeting Subsection 705-2.02.
- (2) align expansion joints parallel and uniform with the control joints (dummy joints) layout or as directed by the engineer.

Touch up pattern and finish edges with hand tools immediately after placing concrete and as directed by the manufacturer(s) and Engineer.

CFHWY00453

608-3.02 ASPHALT SIDEWALKS. Place bed course material in layers. Compact it according to Subsection 203-3.04.

Place asphalt material on the compacted bed course in one or more courses as indicated on the Plans. Compact it uniformly to required depth. Use a power roller of an acceptable type and weight. In areas inaccessible to the roller, use other approved methods.

608-3.03 CURB RAMPS. Construct curb ramps according to the details and the locations shown on the Plans. Follow the construction requirements of Subsection 608-3.01. Install detectable warnings.

Measure curb ramp slopes with a 24-inch electronic level. Calibrate and operate the level according to the manufacturer's instructions.

Provide the slab Type as identified here and elsewhere, Type "a". Refer to 608-3.01.1 Slab Type, Table 608-1 Slab Type Requirements for further information.

608-3.04 DETECTABLE WARNINGS. Construct detectable warnings according to the details and the locations shown on the Plans. Install detectable warning plates by embedding plate flanges into cast-in-place concrete construction so there are no vertical changes in grade exceeding 0.25 inch or horizontal gaps exceeding 0.5 inch. Align pattern on a square grid in the predominate direction of travel. Install the same type of detectable warning plate throughout the project.

Detectable warnings shall be installed according to the 2006 U.S. DOT ADA Standards for Transportation Facilities.

608-3.05 ASPHALT – PATTERN IMPRINTED AND PAINTED. Construct pattern imprinted and painted HMA according to Subsection 608-3.02 Asphalt Sidewalks and as noted herein.

1. Pattern. Fabricate the imprint tool pattern to match standard brick dimensions in a running bond configuration with a slightly wider joint/indent spaced similar to the concrete expansion Joint.
2. Painting. Prepare the asphalt surface and apply the coating/paint according to the MMA manufacturer's instructions. Apply coating (MMA) completely covering the asphalt surface including pattern imprint. Do not fill the pattern indentation, with MMA, flush with the top surface. Leave a 1/8", smooth, concave painted/coated surface between bricks (joint).

608-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Sidewalk by area of finished surface, weight of material placed, and lump sum as included in the bid schedule. Ramps are included in the measurement unless included as a separate measured and paid item.

HMA used for matching existing surfaces, such as paved parking lots behind a new sidewalk/pathway, will be included in the measurement of the related asphalt Pay Item.

608-5.01 BASIS OF PAYMENT.

Subsidiary to the Pay Items: excavation, backfill, reinforcement, expansion joint material, samples, asphalt binder, corrective work, and other related miscellaneous items.

Embankment and bed course materials will be furnished, placed, and paid under Sections 203 and 301, respectively.

Curb Ramp when included in the bid schedule includes ramp runs, backing curbs, flares, landings to provide a single street-level access and detectable warnings, except detectable warnings are paid separately when included as an item in the bid schedule.

PAY ITEM		
Item Number	Item Description	Unit
608.0001.____	Concrete Sidewalk, 4 inches thick	SY
608.0001.____	Concrete Sidewalk, 6 inches thick	SY
608.0002.____	Asphalt Sidewalk	Ton
608.0006.____	Curb Ramp	Each
608.0007.____	Curb Ramp, Retrofit	Each
608.2002.____	Asphalt Pathway	Ton
608.2004.____	Asphalt Medians	Ton
608.2006.____	Asphalt Pathways and Medians	Ton
608.2007.____	Asphalt, (Sidewalk, Plaza, etc., __ Inches Thick)	SY
608.2008.____	Asphalt Pattern Imprinted and Painted, (Median, etc., __ Inches Thick)	SY
608.2010.____	Concrete Sidewalk Wall, (Type __; Slab __ in; Wall __ in; Ht __ ft)	LF
608.2011.____	Concrete Sidewalk Retaining Wall, (Type __; Slab __ in; Wall __ in; Ht __ ft)	LF
608.2012.____	Concrete Sidewalk Barrier Wall, (Type __; Slab __ in; Wall __ in; Ht __ ft)	LF
608.2013.____	Concrete, Type I, __ inches thick, Broom Finish, (median slab, etc.)	SY
608.2013.____	Concrete, Type II, __ inches thick, Exposed Aggregate Finish, (median slab, etc.)	SY
608.2013.____	Concrete, Type III, __ inches thick, Colored, (median slab, etc.)	SY
608.2013.____	Concrete, Type IV, __ inches thick, Pattern Imprinted, (median slab, etc.)	SY
608.2013.____	Concrete, Type V, __ inches thick, Colored and Pattern Imprinted, (median slab, etc.)	SY
608.2014.____	Concrete Medians	SY
608.2015.____	Concrete Stairway	LS
608.2032.____	Detectable Warning Tile	SY

CR608-113020R

Special Provisions

Replace Section 610 with the following:

SECTION 610 DITCH LINING

610-1.01 DESCRIPTION. Construct ditch lining at the locations on the Plans or as staked.

610-2.01. MATERIALS. Use crushed stones that are angular, hard, sound, and durable with at least one face resulting from fracture.

1. Angular—stones, the particles of which possess well-defined edges formed at the intersection of roughly planar faces.
2. Hardness—resistance of a material to indentation or scratching. AASHTO T96, not more than 50% wear at 500 revolutions.
3. Soundness—measure of aggregates durability when exposed to the elements, AASHTO T104.
4. Gradation—ATM 304:
 - a. Maximum of 6 inches in greatest dimension
 - b. Not more than 50% by weight passing a 3-inch sieve
 - c. Not more than 5% passing a 1-inch sieve
5. Breadth and Width—at least 1/3 of the length

610-3.01 CONSTRUCTION REQUIREMENTS. Place and spread ditch lining materials so that the finished face is uniform. Place stones on slopes 1.5:1 and flatter.

610-4.01 METHOD OF MEASUREMENT. Section 109.

610-5.01 BASIS OF PAYMENT. Excavation required below normal ditch grade is subsidiary.

PAY ITEM

Item Number	Item Description	Unit
610.0001.____	Ditch Lining	CY
610.0002.____	Ditch Lining	Ton
610.0003.____	Ditch Lining	STA

CR610-060117R

Special Provisions

Replace Section 615 with the following:

SECTION 615 STANDARD SIGNS

615-1.01 DESCRIPTION. Furnish and install standard signs and delineators. Remove and relocate or remove and dispose of existing signs and markers, as specified.

615-2.01 MATERIALS. Use materials that conform to the following Subsections:

Sheet Aluminum	730-2.01
High Density Overlaid Plywood	730-2.02
Retroreflective Sheeting, ASTM D4956	730-2.03
Sign Posts	730-2.04
Delineator Posts	730-2.05
Acrylic Prismatic Reflectors	730-2.06
Sign Support Fasteners	730-2.07

1. Shop Drawings. Submit shop drawings, for all signs that must meet the ASDS letter width and spacing charts for variable width legends (such as D-series and I-3 signs), and which require custom shop drawings specific to the project. Submit 4 sets of collated shop drawings prepared according to Subsection 105-1.02. Show the following on each sign drawing:
 - a. Dimensions of all horizontal and vertical characters and spaces
 - b. Overall dimensions
 - c. Sign material and sheeting material type
 - d. Panel thickness
 - e. Legend and letter series
 - f. Whether the sign will be framed
2. Sign Fabrication. Use ASTM D4956 Type IV retroreflective sheeting (for lettering, symbols, borders, and background) on sheet aluminum panels for all signs except the following:
 - a. Orange Background Signs. Use Type IX or XI fluorescent orange reflective sheeting placed on sheet aluminum panels, except:
 - (1) For temporary installations, the reflective sheeting place on aluminum, plastic, or plywood sheet panels.
 - (2) For flexible signs, (Roll-Up Signs) use fluorescent reflective sheeting Type VI or better (based on durability and reflectivity, as determined by the Engineer). Roll-Up Sign – 3M Series RS 24, Reflexite Marathon Orange, or approved equal.
 - b. Railroad Crossbucks and Vertical Crossbuck Supports: Use white ASTM D4956 Type VIII or Type IX or XI retroreflective sheeting for background of sign and all strips.
 - c. Non-Illuminated Overhead Signs with White Legends on Green Backgrounds: Use ASTM D4956 Type IX or XI retroreflective sheeting for legends and background. Create the legend in one of the following ways:
 - (1) Cut border and legend from white ASTM D4956 Type IX or XI retroreflective sheeting and adhere them to a green ASTM D4956 Type IX background, or
 - (2) Cut stencil of border and legend out of green transparent acrylic film and use transparent adhesive to overlay the film on a white ASTM D4956 Type IX or XI retroreflective background.

- d. Fluorescent Yellow-Green School Area Signs: Use ASTM D4956 Type VIII, Type IX or XI retroreflective sheeting for background.

Use a manufacturer-recommended clear coat on all screened signs.

Use sign layouts (including characters, symbols, corner radii, and borders) that conform to the ASDS.

3. Sign Posts and Bases. Use sign posts and bases of the types specified. The structural aspects of design and materials for sign supports must comply with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Do not splice sign posts.

Foundation Concrete:

- a. Non-structural and Non-steel-reinforced Sign Foundations. Use Class W concrete, or commercially available pre-mixed sacked concrete with a minimum compressive strength of 3,000 psi. When sacked concrete is used, acceptance will be based on manufacturer Certificates of Compliance and the compressive strength test results of the specimens prepared according to ATM 506.
- b. Steel-reinforced Roadside Sign Foundations. Use Class B concrete meeting the requirements of Section 550, except:

Overhead Sign Support Foundations. Use Class A concrete meeting the requirements of Section 501.

4. Delineators. Use delineator assemblies that conform to the requirements shown on the Plans. Fabricate flexible delineators using ASTM 4956 Type III, IV, V, IX or XI retroreflective sheeting.
5. Reflective Sheeting Warranty. Supply manufacturer's warranty for reflective sheeting, including retention of fluorescent yellow-green (measured in accordance with ASTM E2301) for ten years according to the following criteria:
- a. Minimum Fluorescent Luminance Factor Y_F : 20%
- b. Minimum Total Luminance Factor Y_T : 35%

The warranty shall stipulate that: If the sheeting fails to meet the minimum fluorescence values within the first 7 years from the date of fabrication of the sign, the manufacturer shall, at the manufacturer's expense, restore the sign surface to its original effectiveness. If the reflective sheeting fails to meet the minimum fluorescence values within the 8th through 10th year from the date of fabrication, the manufacturer shall, at the manufacturer's expense, provide enough new replacement sign sheeting to the Department to restore the sign surface to its original effectiveness.

CONSTRUCTION REQUIREMENTS.

615-3.01 GENERAL.

1. Place posts in excavated holes to the depth shown on the Alaska Standard Plans.
2. Backfill the space around the posts and foundations placed in holes to finish ground with selected earth or sand, free of rocks or deleterious material. Place backfill in layers approximately 6 to 12 inches thick and thoroughly compact it.
3. Dispose of surplus excavated material neatly along the adjacent roadway as directed. 4. Install flexible delineator posts according to the manufacturer's recommendations.
5. Attach sign panels to posts, electroliers, traffic signal standards, bridge rails, piers, and abutments using the types and sizes of fastening hardware shown on the Plans.

6. If using existing signs and mileposts that are removed and relocated, ensure they conform to the details shown on the Plans or as directed.
7. Sign Salvage:

Notify the Engineer 5 working days prior to beginning sign salvage activities. The Engineer will physically identify those signs to salvage.

- a. Property of the State. When 615-3.01 7a identifies a maintenance station to receive sign salvage, the signs (sign panels, posts, and hardware) are the property of the State.

Protect all items from damage during salvaging and delivery. For each sign so designated, disconnect sign post from panel and group the panels together. Group posts together with their hardware. Deliver sign panels, posts, and hardware to the State Maintenance Station noted in these Special Provisions. Do not deliver salvaged materials until inspected and approved by the Engineer. Replace any items damaged by you at no additional cost to the Department.

Deliver salvaged sign panels, posts, and hardware to the State Maintenance and Operations Station, located at:

289 Inner Springer Loop Road, Palmer, AK.

- b. Property of the Contractor. When 615-3.01 7a does not identify a State Maintenance and Operations Station; the signs salvaged (sign panels, posts, and hardware) are the property of the Contractor.

Remove project signs and/or parts designated for salvage, off the project site.

Dispose of foundations from salvaged existing signs in a manner approved of by the Engineer (remove and dispose, abandoned in place, or otherwise). If abandoned in place, remove the tops of the foundations, reinforcing steel, anchor bolts, and conduits to a depth of not less than 12 inches below roadway subgrade or unimproved ground, whichever applies.

Dispose of sign salvage not wanted by the Contractor, not used in the project, and not accepted by the Local Maintenance and Operations Station as required by Federal, State, and Municipal environmental regulations.

All signs, the sign panels, posts, hardware, and foundations at a single installation are considered as one unit.

8. All materials and finished signs are subject to inspection and acceptance in place.
 - a. Surfaces exposed to weathering must be free of defects in the coating that impair serviceability or detract from general appearance or color match.
 - b. Finished signs must be clean and have no chatter marks, burrs, sharp edges, loose rivets, delaminated reflective sheeting, or aluminum marks. Do not make repairs to the face sheet.
9. Install the various breakaway assemblies according to the manufacturer's written instructions. Meet MASH crashworthiness requirement for breakaway hardware, unless approved otherwise by the Engineer.
10. Secure the anchors in templates and install them according to the manufacturer's written instructions.

11. Finish the foundation according to these tolerances:

- a. Do not use more than two shims per coupling.
- b. Do not use more than three shims to plumb each post.

Remove and replace all foundations requiring more than three shims to plumb a post without extra compensation.

12. Construct the top of any foundation located on a slope so that the finished slope passes through the top center of the foundation. Grade the area 24 inches up and down slope of the foundation edge so that no portion of the foundation projects above the surrounding slope and water will drain away from the foundation.

13. Attach a label to the back of all standard signs in the lower right corner. Make the label at least 15 square inches and show the year the sign was purchased from the manufacturer. Show the last two digits of the year in clear and bold numbers. Make the label from ASTM D4956 Type I or brighter retroreflective sheeting. Use background and legend colors meeting Table 615-1.

**TABLE 615-1
DECAL COLORS**

YEAR	BACKGROUND COLOR	LEGEND COLOR
XXX1	Yellow	Black
XXX2	Red	White
XXX3	Blue	White
XXX4	Green	White
XXX5	Brown	White
XXX6	Orange	Black
XXX7	Black	White
XXX8	White	Black
XXX9	Purple	White
XXX0	Strong Yellow-Green	Black

Central values and tolerance limits for each color, as referenced in the MUTCD, are available from the Federal Highway Administration, (HHS-30), 400 7th St. SW, Washington, D.C. 20590

615-3.02 SIGN PLACEMENT AND INSTALLATION. The location and type of installation will be as shown on the Plans. Sign locations are approximate and subject to field adjustment by the Engineer. Do not allow the top of the embedded steel tube to extend more than 2 inches above the surrounding ground and concrete foundation.

On all signs, install 2-inch diameter wind washers, colored to match the sign face, between the fastener head and the sign. Use rust-resistant washers fabricated from a material equal in strength to the sign blank.

Mount signs on mast arms level.

Bring existing signs that are to remain, into conformance with Standard Drawing S-05. Keep existing signs in service until they are no longer needed.

615-4.01 METHOD OF MEASUREMENT.

Standard Signs and Object Markers. By the total area of legend-bearing sign panel erected in place. No deductions in quantity for corner rounding will be made. Nominal dimensions for sign sizes indicated on the Plans will be used to calculate sign pay quantities. Octagons and round signs will be measured as rectangles. Only one side of each double-faced sign will be measured for payment.

Removal and Relocation. By each, complete in place.

Delineators. By each, complete in place. A single delineator consists of one post equipped with three reflectors.

Salvage Sign. By each complete sign delivered in acceptable condition.

615-5.01 BASIS OF PAYMENT. Sign posts, bases, and mounting hardware are subsidiary.

Salvage Sign. Each complete sign includes the sign panels, posts, hardware, and foundations at a single installation.

When Items 615.0002.____, 615.0003.____, or 615.0006.____ do not appear on the bid schedule, this work is subsidiary.

PAY ITEM

Item Number	Item Description	Unit
615.0001.____	Standard Sign	SF
615.0002.____	Remove and Relocate Sign	Each
615.0003.____	Remove and Relocate Milepost	Each
615.0004.____	Delineator, Rigid	Each
615.0005.____	Delineator, Flexible	Each
615.0006.____	Salvage Sign	Each
615.0007.____	Salvage and Dispose Sign	Each

CR615-23.0501

SECTION 618 SEEDING

618-1.01 DESCRIPTION. Establish a healthy living perennial stand of grass or other vegetative living groundcover by seeding. Maintain the living cover for the term of the Contract.

618-2.01 MATERIALS. Use materials that conform to the following:

Water	Subsection 712-2.01
Seed	Section 724 (Grass Seed)
Fertilizer	Section 725
Topsoil	Section 726
Soil Stabilization	Section 619
Soil Stabilization Material	Section 727

**TABLE 618-1
GRASS SEED MIX, SOIL STABILIZER, AND FERTILIZER APPLICATION RATES**

Materials	Ingredients	Application Rate (per MSF ^c)
Grass Seed Mix ^{a, b}	Nortran – Tufted Hairgrass	0.60 lbs.
	Arctared – Red Fescue	0.45 lbs.
	Wainwright - Slender Wheatgrass	0.37 lbs.
	Annual Ryegrass	0.08 lbs.
		Total = 1.50 lbs.
Soil Stabilizer		
Slope ≤ 3:1	Mulch	46 lbs.
Slope >3:1	Mulch with tackifier	45-58 lbs.
Fertilizer	20-20-10	12 lbs.

- a. Do not remove the tags from seed bags.
- b. Submit an alternate seed mix when the specified seed is not commercially available. Provide a letter confirming the specified seed is not available. Include an agronomist certified seed mix design, including application rate, suited to the project site.
- c. MSF = 1000 ft².

CONSTRUCTION REQUIREMENTS

618-3.01 SURFACE PREPARATION. Remove ruts, holes, humps and other irregularities from the surface. Clear stones four inches in diameter and larger, weeds, plant growth, sticks, stumps, and other debris that will interfere with the application of stabilization material, topsoil, the seeding operation, growth of vegetative groundcover, and subsequent maintenance of the cover.

Smooth the slopes for a uniform appearance and round the top and bottom of the slopes to facilitate tracking or raking. Do not disrupt drainage flow lines.

Evenly place stabilization material and or topsoil when specified.

Prepare the surface material by grooving the material in a uniform pattern that is perpendicular to the fall of the slope. Use one or more of the following grooving methods with associated equipment before the application of seed:

1. Manual raking with landscaping rake;
2. Mechanical track walking with track equipment; or

3. Mechanical raking with a scarifying slope board. Form one-inch wide grooves spaced no more than six inches apart.

618-3.02 SEEDING SEASON. Seed disturbed areas after permanent cessation of ground disturbing activities in that area, within the period specified in the Alaska Department of Environmental Conservation (ADEC) Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP) for Alaska, Section 4.5 Soil Stabilization, and Section 641 Erosion, Sediment, and Pollution Control.

Do not seed during windy conditions, when climatic conditions or ground conditions would hinder placement or proper growth.

Seed between May 15 and August 15.

618-3.03 APPLICATION. Seed, seeding, reseeding includes the application of seed, fertilizer, and stabilization material.

If the seed mix, fertilizer and stabilization material are not included in the Plans or Specifications, including their application rates, use the recommendations of the ADNRC and the Revegetation Manual for Alaska.

Do not seed areas of bedrock and plant beds.

Use any of the following methods:

1. Hydraulic Method

Apply seed and stabilization material in one application when using the hydraulic method. Apply fertilizer with the hydraulic method. Include the fertilizer with the seed and stabilization material or apply separately.

- a. Furnish and place a slurry made of seed, fertilizer, water, and other materials.
- b. Use hydraulic seeding equipment that will maintain a continuous agitation and apply a homogeneous mixture through a spray nozzle. The pump must produce enough pressure to maintain a continuous, nonfluctuating spray that will reach the extremities of the seeding area with the pump unit located on the roadbed. Provide enough hose to reach areas not practical to seed from the nozzle unit situated on the roadbed.
- c. If mulch material is required, it may be added to the water slurry in the hydraulic seeder after adding the proportionate amounts of seed and fertilizer. Add seed to the slurry mixture no more than 30 minutes before application.
- d. Mix the slurry and apply it evenly.

2. Dry Methods

- a. Use mechanical spreaders, seed drills, landscape seeders, aircraft, cultipacker seeders, fertilizer spreaders, or other approved mechanical spreading equipment.
- b. Spread fertilizer separately at the specified rate.

618-3.04 MAINTENANCE. Maintenance includes but is not limited to the following:

1. Protecting seeded areas against traffic by approved warning signs or barricades and against erosion.

2. Repairing surfaces gullied or otherwise damaged following seeding. Fill erosion gullies 4 inches deep and greater filling the gully to surrounding grade including the portions less than 4 inches deep. Apply and prepare the stabilization material and or topsoil for seeding. Seed repaired area. Refer to Subsections 618-3.01 & 3.03.
3. Reseeding areas not showing evidence of satisfactory growth within 3 weeks of seeding and after repairs are complete. Reseed bare patches of soil more than 10 square feet in area. Contact ADNR for advice or corrective measures, when seeded areas are not showing evidence of satisfactory growth.
4. Watering seeded areas for healthy growth of vegetative cover. Adjust the amount of water when directed.

618-3.05 ACCEPTANCE. The vegetative ground cover will be inspected considering each station and each side of the road a separate area. Acceptance of the ground cover requires a minimum of 75% cover density in the inspection area, gullies repaired and reseeded, and no bare patches of soil more than 10 square feet in area.

Repair/reseed areas that are not accepted.

618-3.06 PERIOD OF ESTABLISHMENT. Establishment period, for each seeded area, extends one complete growing season (May 1 to August 15) after the planting year, acceptance, and final inspection beginning from the date of Project completion, Subsection 105-1.15.

Employ all possible means to preserve/maintain the new vegetative groundcover in a healthy and vigorous condition to ensure successful establishment. Maintain the vegetative cover, according to Subsection 618-3.04, to not less than the requirements for acceptance, Subsection 618-3.05.

618-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Seeding by the Acre. By the area of ground surface acceptably seeded and maintained.

Seeding by the Pound. By the weight of dry seed acceptably seeded and maintained.

Water for Seeding. If weighed, a conversion factor of 8.34 pounds per gallon will be used to convert weights to gallons.

MGAL equals 1000 gallons.

618-5.01 BASIS OF PAYMENT.

1. Pay Items 618.0001.____ and .0002.____ Seeding. Payment is for healthy established vegetative groundcover through the establishment period.
 - a. The initial surface preparation, seed, fertilizer, mulch when applied hydraulically, their application, and the water for hydraulic application are subsidiary.
 - b. Maintenance fill, stabilization material, topsoil, surface preparation, seed, fertilizer, mulch when applied hydraulically, and the water required for hydraulic application are subsidiary.
2. Pay Item 618.0003.____ Water for Seeding. Payment is for water applied for growth of vegetative groundcover through the establishment period.

If Pay Item 618.0003.____ Water for Seeding, is not included in the bid schedule, water applied for growth of vegetative groundcover through the establishment period is subsidiary.

Except for maintenance, stabilization material is paid under Section 619 and topsoil under Section 620.

PAY ITEM		
Item Number	Item Description	Unit
618.0001.____	Seeding	Acre
618.0002.____	Seeding	LB
618.0003.____	Water for Seeding	MGAL

CR618-23.0601

Special Provision

Replace Section 619 with the following:

**SECTION 619
SOIL STABILIZATION**

619-1.01 DESCRIPTION. Furnish, install, and maintain materials to stabilize the soil. Control erosion, sediment, and pollution.

619-1.02 RELATED SECTIONS, REFERENCE ORGANIZATIONS, AND STANDARD DOCUMENTS.

1. Alaska Department of Transportation and Public Facilities (ADOT&PF):

Standard Specifications for Highway Construction

Seeding	Section 618
Topsoil.....	Section 620
Planting Trees and Shrubs	Section 621
Silt Fence	Section 633
Erosion, Sediment, and Pollution Control	Section 641
Soil Stabilization Material.....	Section 727

2. American Association of State Highway and Transportation Officials (AASHTO)

Standard Practice for:

- Compost for Erosion/Sediment Control (Filter Berms and Filter Socks) R 51
- Compost for Erosion/Sediment Control (Compost Blankets)..... R 52

3. United States Composting Council (USCC)

- Testing Methods for the Examination of Compost and Composting (TMECC)
- Seal of Testing Assurance Program (STA) documents

4. Erosion Control Technology Council (ECTC)

- Hydraulic Erosion Control Products (HECPs) Specification Chart
Table 1, Performance Chart for Standard HECPs
- Rolled Erosion Control Products (RECPs) Specification Chart
Table 1, Rolled Erosion Control - Temporary
Table 2, Rolled Erosion Control - Permanent

5. National Transportation Product Evaluation Program (NTPEP)

- Testing and Evaluation of Products Materials and/or Devices

6. Texas DOT/Texas Transportation Institute (TTI) Hydraulics and Erosion Control Laboratory

619-1.03 SUBMITTALS. Submit stabilization and erosion, sediment and pollution control performance testing results with certifications for each material, Section 619-2.01 Materials. Submit a sample of each material to the Engineer 7 days before the scheduled installation.

- 1) Test compost, all applications, no more than 90 days before installation.
- 2) At a minimum, certificate will include the name of the manufacturer, product name, style number or similar, chemical composition of the material, the fibers, netting, yarn and similar and the weed free status of the material.
- 3) Organic materials shall be accompanied with all applicable health certificates and permits.
- 4) Furnish a Material Safety Data Sheet (MSDS) that demonstrates the product is not harmful to plants, animals, and aquatic life.

619-2.01 MATERIALS. Select stabilization materials, individually or a combination of, matched to the project applications/conditions (sheet flow, concentrated flow, slope, length of slope, access, etc.) providing performance and functional longevity meeting the most restrictive requirements of the Construction General Permit (CGP), the approved Storm Water Pollution Prevention Plan (SWPPP) and Section 641 Erosion, Sediment and Pollution Control.

- 1) Mulch..... Subsection 727-2.01
 - Dry Erosion Control, Stabilization Products
 - Hydraulic Erosion Control Products (HECPs)
- 2) Matting Subsection 727-2.02
 - Rolled Erosion Control Products (RECPs)
- 3) Sediment Retention Fiber Rolls (SRFRs) Subsection 727-2.03
 - Filter Socks
 - Compost Socks
 - Coir Logs
- 4) Compost..... Subsection 727-2.04
- 5) Tackifier..... Subsection 727-2.05
- 6) Soil Binders (Polyacrylamide (PAM))..... Subsection 727-2.06
- 7) Geotextile-Encased Check Dams and Sediment Barriers Subsection 727-2.07
- 8) Sandbag Subsection 727-2.08
- 9) Manufactured Inlet Protection System Subsection 727-2.09
- 10) Clear Plastic Covering..... Subsection 727-2.10
- 11) Staples Subsection 727-2.11
- 12) Other stabilization materials submitted to and approved by the Engineer.

Include on the packaging the manufacturer's name, the content, the air dry-weight and the guaranteed chemical analysis of the contents. Ship and deliver to the site in the original, unopened containers.

CONSTRUCTION REQUIREMENTS

619-3.01 GENERAL. Stabilization may include individual or a combination of materials, including but not limited to temporary seeding, mulch, tackifier, staples, matting, stabilizing emulsions, soil binders, dustless sweeping, dust palliatives, and others.

1. Material Storage and Protection. Store materials elevated off the ground and covered protecting them from construction and or damage from the environment including but not limited to:
 - Precipitation
 - Extended ultraviolet radiant including sunlight
 - Chemicals that are strong acids or other
 - Flames and welding sparks
 - Excess temperatures
 - Other environmental conditions that may damage the materials
2. Fabrication.
 - a. Sandbags. Sand bags shall measure 15 inches by 30 inches. Place approximately 1.0 cubic foot of select Material, Type B, in each sandbag sack. Close the open end of the sandbag as recommended by the fabric manufacturer.

619-3.02 SURFACE PREPARATION. Clear all areas to be stabilized of stones 4 inches in diameter and larger and of weeds, plant growth, sticks, stumps, and other debris or irregularities that might interfere with the stabilization operation, growth of cover (where vegetative cover is part of the stabilization operation) or subsequent maintenance of the vegetative-covered area(s).

Smooth the surface of the area(s) to be stabilized; make the areas reasonably free of ruts, holes, and humps; trackwalk if required by the manufacturer; apply the stabilization material to each area.

If specified, apply topsoil to the area to be stabilized before application of the stabilizing material. Section 618 and 620.

619-3.03 APPLICATION. Apply stabilization material, including rate of application, according to the specifications. If not specified, apply according to the manufacturer's requirements. Where manufacturer requirements conflict with the specification, except where the Engineer directs otherwise, apply the material according to the requirements of the manufacturer.

If seeding is specified, except where seed is included in the stabilization material, complete the application of stabilization materials within 24 hours after seed is placed.

Do not use vehicles or equipment which cause rutting or displacement of the subgrade or topsoil.

1. Temporary Seeding. Annual Ryegrass per Subsection 724-2.02, Table 724-1. Apply at a rate of 1/2 lb/1000 sq. ft., minimum, on level ground to a maximum of 1 1/2 lb/1000 sq. ft., maximum, on sloping ground and highly erodible soils. Prepare surface and place seed as noted under Subsection 619-3.02 Surface Preparation and Section 618 Seeding. Confirm application of temporary seeding with the Engineer.
2. Tacking Agents - Tackifiers. Apply tacking agents according to the manufacturer's installation instructions matched to the application providing functional longevity, erosion control effectiveness, and vegetative establishment.
3. Soil Binders. Apply soil binders according to the manufacturer's installation instructions.
 - a. Using Polyacrylamide (PAM) and PAM with Short-Term Mulch:
Apply PAM on bare soils.

Apply PAM and PAM with short-term mulch only where sediment control is in place and complete.

Do not apply PAM and PAM with short-term mulch on saturated ground during rainfall.
 - b. Using Moderate-Term Mulch:
Apply moderate-term mulch according to manufacturer's installation instructions. If the curing period to achieve maximum performance is greater than the time period before precipitation is predicted, or the soil is saturated, do not apply the moderate-term mulch except as approved by the Engineer.
 - c. Using Long-Term Mulch:
Apply long-term mulch according to the manufacturer's installation instructions.
4. Erosion Control Blankets (ECBs). Select blankets, as specified by the manufacturer, to match the slope; and installed according to the manufacturer's instructions rolled out on well prepared soils to assure intimate contact and anchored with staples, stakes and or anchor trenches. Temporary erosion control blankets with 60 percent or greater open area may be installed prior to seeding. Place blankets with less than 60 percent open area immediately after the seeding operation.

Staple matting/ECBs as recommended by the manufacturer for the application.
5. Compost Blankets. Construct compost blankets according to latest AASHTO R 52 and as specified. Use coarse compost and place over bare soil a blanket of 2 inch minimum thickness, except as otherwise specified. Apply material either by hand spreading and or pneumatically. Compost will have no free water visible or produce dust when handled. Place compost before seeding or mix seed with compost.
6. Check Dams. Place check dams as soon as possible and practicable or when and where if directed by the Engineer. Place the check dams perpendicular to channels and construct of a height sufficient to maximize detention while keeping the water in the channel. Place and install check dams according to the Plans and anchor to maintain in effective position.
 - a. Sandbag. Place the initial row in tight contact with the ditchline for the length of the dam. Place each following row centered across the joint between the bags of the lift/row below.

7. Stabilized Construction Entrance.

Temporary stabilized construction entrance shall be constructed according to the Plans, prior to beginning any clearing, grubbing, earthwork, or excavation.

When the stabilized entrance no longer prevents track out of sediment or debris, the Contractor shall either rehabilitate the existing entrance to original condition, or construct a new entrance.

When the Plans require a tire wash in conjunction with the stabilized entrance, the Contractor shall include details for the tire wash and the method for containing and treating the sediment-laden runoff as part of the SWPPP. All vehicles leaving the site shall stop and wash sediment from their tires.

8. Sediment Control Barriers. Sediment control barriers shall be installed according to the Plans or manufacturer's recommendations in the areas of clearing, grubbing, earthwork, or drainage prior to starting those activities.

- a. Sandbag. Place the initial row in tight contact with the surface perpendicular to the slope. Place each following row centered across the joint between the bags of the lift/row below.
- b. Sediment Retention Fiber Rolls.
- c. Silt Fence.
- d. Compost Berm. Construct compost berms according to latest AASHTO R 51. Use coarse compost.

9. Turf Reinforcement Mats. According to manufacturer's installation instructions.

619-3.04 MAINTENANCE. Maintain stabilized areas in a satisfactory condition for the term of the Contract. Inspect as required by the CGP, approved SWPPP, and Section 641 Erosion, Sediment and Pollution Control and correct any deficiencies immediately. Remove and dispose of temporary measures, including trapped sediment and contaminants, off project at approved locations. Materials manufactured as degradable may be left in place when approved by the Engineer.

Maintenance includes but is not limited to:

1. Protecting stabilized areas against traffic by approved warning signs or barricades.
2. Repairing surfaces gullied or otherwise damaged following application of stabilization material(s).

Where seeding is included as a part of the soil stabilization:

1. Reseeding, as required by Section 618 Seeding. Reapply the stabilization materials correcting the problems of the initial application.
2. Watering, where vegetative growth is part of the soil stabilization, according to Section 618 Seeding.

The Engineer will perform inspection of the stabilization as required in the CGP, Section 641, and the SWPPP. Make repairs as required by same and as directed.

619-4.01 METHOD OF MEASUREMENT. Section 109, measured on the slope of the ground surface.

619-5.01 BASIS OF PAYMENT. Water, maintenance, repair, removal, and disposal of temporary stabilization materials are subsidiary.

Seeding is paid under Section 618 Pay Items, topsoil under Section 620 Pay Items, silt fence under Section 633 Pay Items and temporary erosion, sediment, and pollution control under 641 Pay Items.

PAY ITEM		
Item Number	Item Description	Unit
619.0001.____	Mulching	SY
619.0002.____	Matting	SY
619.2001.____	Compost	SY
619.2002.____	Turf Reinforcement Mat	SY
619.2003.____	Sediment Retention Fiber Rolls	LF
619.2004.____	Check Dam and Sediment Barrier (-Geotextile)	LF
619.2005.____	Check Dam	LF
619.2006.____	Sediment Barrier	LF
619.2007.____	Compost Berm	LF
619.2008.____	Sandbags	Each
619.2009.____	Manufactured Inlet Protection System	Each
619.2010.____	Sandbag Inlet Protection System	Each
619.2016.____	Mulch	SY

CR619-18.0501R1

Special Provisions

Replace Section 621 with the following:

SECTION 621 PLANTING TREES AND SHRUBS

621-1.01 DESCRIPTION. Furnish and plant trees, seedlings, and shrubs. Maintain the plants for the term of the Contract. Prepare planting beds, including furnishing and installing shredded bark mulch.

CR621/CFHWY00453

621-1.02 QUALIFICATIONS FOR LANDSCAPE CONTRACTOR. Provide documentation which verifies the experience of the Landscape Contractor performing the work described in this section and maintaining landscaping projects comparable in scope, materials and diversity in three (3) construction projects and one (1) maintenance project within the last five (5) years prior to the bid date of this project. This experience shall only include projects from cold climate states or provinces and three (3) shall be from Southcentral Alaska. Demonstrate experience in landscape installation related to tree, shrub, perennial, and landscape boulder work.

621-1.03 SUBMITTALS. At the preconstruction conference provide documentation showing the Landscape Contractor performing the work meets the following requirements:

1. Project Experience: A list of three (3) construction and (1) maintenance projects completed by the Landscape Contractor under the same company name similar in scope, landscape materials, plant materials, methods of installation and maintenance to the project. Include in the list the dates, type, description and amount of work performed and the name and telephone number of a contact person at the agency or entity for which the work was performed.
2. Personnel: A list of proposed key personnel including the name of the superintendent and assistant(s) who will direct the actual installation. Provide a resume for each person listed, showing a minimum of five (5) years experience in directing landscape projects prior to the bid date of this project, three (3) of which shall have been in Alaska. The resumes shall include the following information and demonstrate compliance with any requirements requested:
 - 1.) Number of years of continuous relevant experience in landscaping projects. Significant projects shall be listed in the resume.
 - 2.) Recent relevant landscaping, vegetation restoration, including project description, date of work, individual's role on the project, and one reference for each project.

Dedicate the superintendent's full time to this project during installation.

The Department may approve or reject the personnel based on the qualifications as submitted. The Landscape Contractor, the superintendent, and his assistant(s) will not be authorized to work on this project without Department approval. The Department may suspend work if an unauthorized Landscape Contractor or unauthorized personnel are substituted for authorized personnel without approval. The Contractor bears the full responsibility for delays and additional costs of work due to such substitutions. No adjustments in contract time and payments will be allowed.

CFHWY00453

MATERIALS

621-2.01 PLANT STOCK. Furnish plants that are true to type and name according to the current edition of *Standardized Plant Names*, American Joint Committee on Horticultural Nomenclature. Furnish plants and plant bundles labeled with durable and legible labels according to size, botanical genus, and common plant name.

Furnish the variety and species specified in the Special Provisions. Furnish plants that are typical of the species or variety and that conform to American Standard for Nursery Stock (ANSI Z60.1) for type and grade.

Furnish nursery grown plants, except specified collected plants. Furnish plants grown or conditioned to an environment similar to the project site, including elevation, annual precipitation, soil conditions, and climate. Furnish plants free from disease, injurious insects, mechanical wounds, broken branches, decay, or other defects.

Furnish tree and shrub seedlings 18 to 24 inches in height above the ground at the time of planting.

1. Nursery Stock.

- a. Furnish trees and shrubs root pruned during their growing period in the nursery, according to standard nursery practice, to produce a fibrous compact root system suitable for the species and sizes called for on the Plans.
- b. Furnish container grown plants that have been growing for at least one year and no more than two years in the same container. Only ground cover plants may exhibit a "pot-bound" condition.
- c. Provide trees with straight trunks, well-branched with symmetrical tops and unhealed scars less than 3/4-inch in diameter.

2. Collected Stock. Collect healthy plants growing under natural conditions in locations and soils that permit proper collecting practices. Provide collected stock with a root system or ball at least 25 percent larger than nursery-grown material.

3. Balled and Burlapped Plants.

- a. Meet the ball diameters and depths specified in the *American Standard for Nursery Stock*.
- b. Furnish plants with a firm ball of earth from the undisturbed soil in which the plant was growing. Wrap the ball with burlap or similar approved material and lace it tightly to hold the ball firm and intact. Plant material at the planting site with broken or loose earth balls or with manufactured earth, will not be accepted. Handle balled and burlapped plants by the earth ball only and protect against drying and freezing.

4. Substitutions. Substitutions require written approval.

Notify the Engineer, in writing, six weeks before the target planting date if a plant is not available. The Engineer will evaluate availability and consider allowing the nearest available size of similar variety with a corresponding adjustment to the contract unit price.

5. **Storage and Packing.** Handle and pack all plant material according to standard nursery practice and as required by the planting soil and climatic conditions. Improperly stored or handled plants will not be accepted.
6. **Inspection.**
 - a. Make all planting stock available for inspection in the nursery or collecting field before digging. At least 14 days before digging operations, furnish complete and detailed information about the supply source for each item of plant material.
 - b. Final inspection and acceptance for size of ball or roots, color, absence of defects, and for other requirements will be made at the planting site before placing the plants in their permanent positions.

The Engineer will reject plants:

1. Listed on the Alaska Department of Natural Resources Division of Agriculture webpage with an Alaska Natural Heritage Program Invasiveness Ranking greater than 70;
2. Without attached labels;
3. Lacking proper proportions, injuries to bark or roots, broken branches, insect pests, disease;
4. Showing signs of improper storage, handling, damaged or loose earth balls;
5. Containing prohibited noxious weeds (as listed in 11 AAC 34.020(a)) in the earth ball or containers.

CR621-23.0601_1/CFHWY00453

6. Found to be rootbound.

CR621/CFHWY00453

621-2.02 FERTILIZER. Use a regular release, 8-32-16 (N-P-K) fertilizer in granular form with trees, seedlings, and shrubs. Mix the fertilizer with the soil at the manufacturer's recommended application rate.

621-2.03 LIMESTONE. Use limestone that meets Subsection 712-2.03.

621-2.04 MULCH. Use mulch that meets Section 727-2.01 MULCH, Dry Erosion Control, Stabilization Products, 2 Shredded Bark Mulch. Commercially available shredded wood fiber landscape mulch is acceptable, provided added color is natural dark brown.

621-2.05 BACKFILL MIX. Use free draining topsoil for backfill in planting beds of a natural friable surface soil that is without admixtures of undesirable refuse, foreign materials, roots, hard clay, noxious weeds, tall grasses, brush, sticks, stubble, litter, and toxins. Local red loam or imported peat mix with nutritional and gradation data may be used to supplement topsoil. Use topsoil backfill with 10-15 percent organic matter as determined by loss-on-ignition of oven-dried samples according to ATM 203, and meeting the following:

Sieve Designation	Percent Passing by Weight
3/4 Inch	100
No. 4	95-100
No. 16	30-55
No. 200	25-55

621-2.06 STAKES. Use stakes that are strong and fit for the purpose intended.

621-2.07 TREE WOUND DRESSING. Use tree wound dressing that is antiseptic, waterproof, and contains no materials harmful to the living tissue of trees.

CR621-23.0601_1/CFHWY00453

621-2.08 LANDSCAPE EDGING. Use composite decking consisting of recycled Linear Low-Density Polyethylene (LLDPE) and recycled wood.. Provide an average wall thickness of 1-inch, a height of 5.5 inches. Install according to the manufacturer's specifications, ensuring it is straight, level, and secure.

621-2.09 LANDSCAPE BOULDERS. Landscape boulders shall be native rock or fabricated stone with dimensions per Contract Documents. Sharply fractured boulders or shot-rock are not acceptable unless otherwise noted. Boulders shall have one flat side to place down in a stable formation with no wobbling in the required locations. Specific characteristics of boulders shall be:

1. Angular with three distinct faces.
2. Boulder Samples: Identify and submit the sources for all landscape boulders for field approval by Engineer.
3. Boulder examples: Provide samples of boulders on site of the three different sizes shown.
4. Place Boulders prior to installation of planting soils and planting materials.
5. Stake locations or outline areas to receive boulders as indicated on Drawings. Adjust locations when requested and obtain Engineer acceptance of layout before installing boulders. Make minor adjustments as required.
6. Set boulders on or into subgrade as indicated on Drawings and ensure boulders are stable and will not move. Place boulder using nylon slings or other suitable equipment to prevent marring of the boulders by equipment. Do not drop or roll boulders from equipment.
7. Orient most aesthetic side of boulder up directed to allow maximum visibility. Place boulders to provide minimum of exposed rough, fractured, or marred edges, or areas previously underground. Make minor adjustments as requested by the Engineer.

CFHWY00453

CONSTRUCTION REQUIREMENTS

621-3.01 TEMPORARY STORAGE. Where temporary storage or heeling-in of plants is required, provide, and prepare a suitable heeling-in ground or a well-ventilated and cool storage shed, located near the planting site, before shipping planting stock.

Heel-in or properly store all acceptable planting stock if not planted within 24 hours, as follows:

1. **Balled and Burlapped Plants.** Temporarily store in a protected area with balls 6 inches apart. Fill voids with moist mulch up to and including the top of the ball.
2. **Bare-Rooted Plants.** Puddle immediately, then heel-in by placing the plants, properly spread, in a trench and covering the roots with moist topsoil.

Protect bare root plants adequately at all times. Plants left out of the ground unprotected overnight, left with roots exposed to the sun, or improperly protected during transit, unloading, heeling-in, or during the planting operation, are unacceptable.

Protect the roots of plants stored in a shed at all times using moist straw or other approved material. Water as required.

621-3.02 ADVANCE PREPARATION AND CLEANUP. After clearing and grubbing of the area is complete, remove any stones, sticks, stumps, clods, and other debris which might interfere with growth or maintenance. Repair any subsequent damage from erosion or other causes.

CR621-23.0601_1/CFHWY00453

Lay out areas which receive group plantings. Mark these areas individually with flags, or other approved methods to delineate between planting areas. The Engineer will approve the shape, size, location and general layout of planting areas before the work may proceed.

Stake or mark with other approved methods the location of individual trees within each planting area for approval by the Engineer.

CFHWY00453

621-3.03 PLANTING. Perform all planting work using good horticultural practices.

1. **Plant Season.**
 - a. **Locally Grown.** Plant between June 1 and September 15.
 - b. **Imported.** Handle plants according to the nursery recommendations. Plant between June 1 and August 15.
2. **Excavation.**
 - a. Keep topsoil separate from underlying layers and render it loose and friable. Remove any material detrimental to plant growth and dispose of it at approved locations.
 - b. Make pits for trees at least 2-5 times the diameter of the root ball or the spread root system of bare-root trees. Make the depths of pits for trees at least 2 feet and as much deeper, as may be necessary to provide a minimum depth of 9 inches below the bottom of the ball or spread root system of the tree when placed at the proper elevation.
 - c. Construct planting pits for seedlings and shrubs.
 - d. Ensure that the dimensions of pits, pockets, or trenches for vines, ground covers, and similar types of plants will provide space for the spread root system. Keep the depth and width at least 6 inches below and around the root system.
3. **Pruning.**
 - a. **Roots.** Prune all damaged or broken main roots with a clean, oblique cut immediately above the point of damage.
 - b. **Branches.** Use pruning techniques that conform to the best horticultural practices with due regard to natural or desired form and growth characteristics of the individual species. Preserve a single terminal leader when pruning. On all deciduous plants, remove 1/3 to 1/2 of the potential leaf-bearing surface. Treat all cut surfaces that are 3/4 inch or more in diameter with tree wound dressing.
4. **Transplanting.** Relocate plant material, within the limits of the project, designated for transplanting to areas shown on the drawings or as specified. Dig this material with root systems or balls as specified for collected stock and replant it the same way as new stock.
5. **Placing Plants.**
 - a. Set plants plumb on lightly tamped backfill mix and at a level so that the root collar will bear the same relation to the planting site as it bore to the ground from which it was dug.
 - b. Handle balled and burlapped plants by the earth ball and not by the plant itself. Place the plants in holes without removing the burlap.
 - c. Fill the hole with water before placing the plant. Place the backfill gradually, allowing the soil to soak up the water.

6. **Backfilling.** Backfill seedlings, trees, and shrubs with topsoil and fertilizer mix.

Work backfill mix around the roots and firmly tamp it as it is placed into the holes to eliminate air pockets. Avoid bruising or breaking the roots while tamping or firming the backfill mix about them. Hold upright plants plumb during the backfilling operation. When the backfilling is 2/3 completed, loosen the exposed burlap and lay it back from the ball or cut off excess. After thorough watering, complete the backfilling. During backfilling, remove stocks, sod, clods, or other material that tend to form air pockets. Except in areas for shrub beds, construct a shallow basin of backfill mix approximately 3 inches deep and as wide as the diameter of the hole around each plant. On steep slopes, pull enough soil to the lower side of the plants to form shallow basins to catch and hold water. After the backfilling is completed, water the plant basins thoroughly.

7. **Wrapping.** When specified, wrap the trunks of all deciduous shade and flowering trees with 4-inch-wide waterproof paper, overlapping 1-1/2 inches, between the lowest main branches to the ground line. Tie the wrapping in at least 5 places, including top, middle, and bottom. Complete these protective measures within 4 days after planting.

8. **Staking and Guying.**

- a. Immediately after planting, brace all evergreen trees 4 to 6 feet high and all deciduous trees 6 feet and over in height and less than 1-1/2 inch in diameter. Use a single stake measuring at least 2 inches by 2 inches by 6 feet and place it 2 feet deep into the ground on the windward side to avoid injury to the root system. Connect the stake to the tree using approved binding straps.
- b. Immediately guy all deciduous trees 1-1/2 inches and over in diameter, and all evergreen trees 6 feet and over in height using 3 cables spaced approximately 120 degrees apart around the tree. Use cables each made of 2 No. 12 galvanized steel wires, free from bends and kinks, twisted into a strand. Fasten cables around the trunk immediately above a substantial limb wherever possible. Fasten cables around the trunk at a distance from the ground equal to 1/2 to 2/3 of the total height of the tree. Anchor cables to the ground at an equal distance away from the trunk. Protect the tree from damage caused by the cable using an approved method.
- c. Use other anchor stakes that are at least 2 inches x 2 inches x 2 feet. Drive the stakes at right angles to the guy wire. Ensure that the stakes do not extend more than 3 inches above the ground. Notch or drill the stakes to prevent cables from slipping.

621-3.04 PERIOD OF ESTABLISHMENT. The establishment period extends one complete growing season (May 1 to September 30) after the planting year, acceptance, and final inspection beginning from the date of Project completion, Subsection 105-1.15. The growing season may include the time remaining after September 30, from the first 45 days of deep watering in the planting year resuming after May 1 of the following year, Subsection 621-3.07.

Employ all possible means to preserve/maintain the plants in a healthy and vigorous condition to ensure successful establishment. Maintain the plants according to Subsection 621-3.07, to not less than the requirements for acceptance, Subsection 621-3.06. In addition, apply fertilizer to seedlings, trees, and shrubs by driving a 1 1/2 ounce fertilizer spike, of the same material and proportions initially applied to the soil, into the ground at the drip line of each plant between May 15 and May 31; and again for the shrubs between June 15 and June 30.

621-3.05 CLEANUP. Remove from planting sites any quantities of subsoil, rock, and other spoils resulting from excavation after planting. Dispose of them as directed. On slopes 3:1 and steeper, you may scatter or dispose of material other than rock and coarse debris. Leave all planting sites in an acceptable condition.

621-3.06 PLANT ACCEPTANCE AND REPLACEMENTS. Engineer and Contractor, in the growing season after the planting year and before June 30, inventory seedlings and shrubs planted to determine the number of dead and unhealthy plants.

1. **Acceptance.** Acceptance of each species of tree, seedling, and shrub requires a minimum of 75% of the number originally planted to be in healthy and vigorous condition in the growing season after the planting year.
2. **Replacement.** For each species of tree, seedling and shrub, replace the dead and unhealthy plants to maintain at least 75% of the number originally planted, in a healthy and vigorous condition. The Engineer will select the dead and unhealthy plants to replace. Remove the dead and unhealthy plants selected.

Provide healthy replacement plants of the same species and size as the original plantings. Complete replacement planting between July 1 and July 15.

621-3.07 MAINTENANCE. Maintenance includes but is not limited to the following:

1. Protecting planted areas against traffic by approved warning signs, barricades, or other approved means and against erosion.
2. Replacing plants vandalized, stolen, or damaged during the maintenance period. Replace plants as soon as weather conditions permit.
3. Performing the necessary weeding, spraying (with approved insecticides or fungicides), cultivating, replacing mulch, and tightening or replacing guy wires and stakes as may be required, and maintaining the plants in an upright position and at the proper grade.
4. Apply fertilizer to trees, seedlings, and shrubs by driving a 1 1/2 ounce fertilizer spike, of the same material and proportions initially applied to the soil, into the ground at the drip line of each plant between May 15 and May 31, and again for the shrubs between June 15 and June 30.
5. Deep water the trees, seedlings, and shrubs immediately after planting. Deep watering shall provide water penetration throughout the entire root zone to the total depth of the plantings, planting pits and trenches with a minimum of runoff. Keep the immediate root areas moist at all times. Rain is not a substitute for deep watering unless permitted by the Engineer.

Deep water trees, seedlings and shrubs according to the following maintenance schedule:

- a. Deep water plants at least twice a week during the first 45 days after planting.
 - (1) The 45 Days Extend Past September 30. Stop the twice weekly deep watering after September 30 and resume the twice weekly watering on May 1 of the following calendar year for the balance of the 45 days. Continue to water the plants as noted in Subsection 621-3.07.3.a.(2).
 - (2) The 45 Days Does Not Extend Past September 30. After the 45 days of deep watering in the planting year, water the plants for the balance of the growing season.
 - (a) Once a week in June and July,
 - (b) Once between August 10 and August 20,
 - (c) Once during the last week in September.
- b. Deep water the plants during the Period of Establishment.
 - (1) Once a week during May, June, and July,
 - (2) Once between August 10 and August 20,
 - (3) Once during the last week of September.
- c. When directed, deep water trees, seedlings, and shrubs past September 30, or provide supplemental watering any time during the life of the project if weather conditions are excessively warm or dry.
- d. When directed, deep water trees, seedlings and shrubs before freeze-up.

Equip watering equipment with, or following equipment with a Type B advance warning arrow panel using caution mode according to Part VI of the Alaska Traffic Manual.

621-4.01 METHOD OF MEASUREMENT. Section 109, by the number of plants or length of hedge alive, healthy and in a vigorous condition accepted at final inspection.

CR621-23.0601_1/CFHWY00453

Transportation, excavation, equipment and labor for placement are subsidiary.

CFHWY00453

621-5.01 BASIS OF PAYMENT. Excavation, topsoil, backfill, fertilization, and disposal of all unsuitable and surplus material and water for planting are subsidiary.

Pay Item 621.2006.____ Water for Maintenance. Payment is for water for maintenance, growth, and establishment through the term of the Contract. Type B Advance Warning Arrow Panel for watering is subsidiary. Water for planting is subsidiary to planting.

Pay Items, except Pay Item 621.2006.____, paid at rate of 90% of the bid unit price for the initial plantings. The balance withheld is after the establishment period and all dead and unhealthy plants, Subsection 621-3.06, are replaced, and established.

PAY ITEM		
Item Number	Item Description	Unit
621.0001.____	Tree	Each
621.0002.____	Shrub	Each
621.0003.____	Hedge	LF
621.0004.____	Vine	Each
621.0004.____	Perennial, ____	Each
621.2005.____	Furnishing and Planting, ____	Each
621.2006.____	Water for Maintenance	MGAL
621.2007.____	Landscape Edging	LF
621.2008.____	Landscape Boulder - ____	Each
621.2018.____	Rock Mulch - ____	SY

CR621-23.0601_1/CHFWY0453

**SECTION 633
SILT FENCE**

Standard Modification

633-2.01 MATERIALS.

Replace "Silt Fence Subsection 729-2.04" with the following:

Silt Fence Subsection 729-2.02

633-3.01 CONSTRUCTION REQUIREMENTS.

Replace the first sentence with the following:

Install silt fence according to the SWPPP, Appendix B.

HSM20.13-113020R

Special Provisions

Replace Section 639 with the following:

**SECTION 639
DRIVEWAYS**

639-1.01 DESCRIPTION. Construct driveways and approaches.

639-2.01 MATERIALS. Reserved.

639-3.01 CONSTRUCTION. Reserved.

639-4.01 METHOD OF MEASUREMENT. By the number of driveways and approaches constructed.

639-5.01 BASIS OF PAYMENT. The Contract unit price for driveways and approaches is for furnishing equipment and labor.

Materials required to construct driveways and approaches will be paid for separately under the respective items listed in the bid schedule.

PAY ITEM		
Item Number	Item Description	Unit
639.0001.____	Driveway	Each
639.0002.____	Driveway, Residential	Each
639.0003.____	Driveway, Commercial	Each
639.2000.____	Approach	Each

CR639/CFHWY00453

Special Provision

Replace Section 641 with the following:

**SECTION 641
EROSION, SEDIMENT, AND POLLUTION CONTROL**

641-1.01 DESCRIPTION.

Provide project administration and Work relating to control of erosion, sedimentation, and discharge of pollutants, according to this Section and applicable local, state, and federal requirements, including the Alaska Pollution Discharge Elimination System (APDES) Construction General Permit (CGP). The state APDES program is administered by the Department of Environmental Conservation (DEC). Section 301(a) of the Clean Water Act (CWA) and 18 AAC 83.015 provide that the discharge of pollutants to water of the U.S. is unlawful except as allowed by the CGP.

641-1.02 DEFINITIONS.

These definitions apply only to Section 641.

ACTIVE TREATMENT SYSTEM (ATS) OPERATOR. CGP Appendix C.

ALASKA CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (AK-CESCL). A person who has completed training, testing, and other requirements of, and is currently certified as, an AK-CESCL from an AK-CESCL Training Program (a program developed under a Memorandum of Understanding between the Department and others). The Department recognizes AK-CESCLs as “qualified personnel” required by the CGP. An AK-CESCL must be recertified every three years. (See Qualified Person)

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC). The state agency authorized by EPA to administer the Clean Water Act’s National Pollutant Discharge Elimination System.

ALASKA GENERAL PERMIT FOR EXCAVATION, DEWATERING (Excavation Dewatering Permit).

Permit authorizing excavation dewatering discharges from Construction Activities.

ALASKA MULTI-SECTOR GENERAL PERMIT (MSGP). Permit authorizing storm water discharges associated with Industrial Activity.

ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM (APDES). A system administered by DEC that issues and tracks permits for storm water discharges.

BEST MANAGEMENT PRACTICES (BMPS). CGP Appendix C.

CLEAN WATER ACT (CWA). Federal Water Pollution Control Amendments of 1972, as amended (33 U.S.C. 1251 et seq.).

CONSTRUCTION ACTIVITY. Ground disturbing activity by the Contractor, Subcontractor or utility company; that may result in erosion, sedimentation, or a discharge of pollutants into storm water. CGP Appendix C.

CONSTRUCTION GENERAL PERMIT (CGP). The permit authorizing storm water discharges from Construction Activities, issued and enforced by Alaska DEC. It authorizes storm water discharges providing permit conditions and water quality standards are met.

U.S. ARMY CORPS OF ENGINEERS PERMIT (COE Permit). U.S. Army Corps of Engineers Permit for construction in waters of the U.S. may be issued under Section 10 of the Rivers and Harbors Act of 1899, or Section 404 of the Clean Water Act.

ELECTRONIC NOTICE OF INTENT (ENOI). CGP Appendix C.

ELECTRONIC NOTICE OF TERMINATION (ENOT). CGP Appendix C.

ENVIRONMENTAL PROTECTION AGENCY (EPA). The federal agency charged to protect human health and the environment.

ERODIBLE STOCKPILE. Any material storage area or stockpile consisting of mineral aggregate, organic material, or a combination thereof, with greater than 5 percent passing the #200 sieve, and any material storage where wind or water transports sediments or other pollutants from the stockpile. Erodible Stockpile also includes any material storage area or stockpile where the Engineer determines there is potential for wind or water transport of sediments or other pollutants away from the stockpile.

EROSION AND SEDIMENT CONTROL PLAN (ESCP). The Department's project specific document that illustrates measures to control erosion and sediment on the project. The ESCP provides bidders with the basis for cost estimating and guidance for developing an acceptable Storm Water Pollutant Prevention Plan (SWPPP).

FINAL STABILIZATION. CGP Appendix C, "Stabilization".

HAZARDOUS MATERIAL CONTROL PLAN (HMCP). The Contractor's detailed project specific plan for prevention of pollution from storage, use, transfer, containment, cleanup, and disposal of hazardous material (including, but are not limited to, petroleum products related to construction activities and equipment). The HMCP is included as an appendix to the SWPPP.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) PERMIT. A DEC storm water discharge permit issued to certain local governments and other public bodies, for operation of storm water conveyances and drainage systems. CGP Appendix C.

OPERATOR(S). The party(s) responsible to obtain CGP permit coverage. CGP Appendix C.

1. Contractor – the Contractor is an Operator inside and outside the Project Zone.
2. Department – the Department is an Operator inside the Project Zone.

POLLUTANT. Any substance or item meeting the definition of pollutant contained in 40 CFR § 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sediment, sewage, garbage, sewage sludge, chemical wastes, biological materials, wrecked or discarded equipment, rock, sand, cellar dirt and industrial or municipal waste.

PROJECT ZONE. The physical area provided by the Department for Construction. The Project Zone includes the area of highway or facility under construction, project staging and equipment areas, and material and disposal sites; when those areas, routes and sites, are provided by the Contract.

Material sites, material processing sites, disposal sites, haul routes, staging and equipment storage areas; that are furnished by the Contractor or a commercial operator, are not included in the Project Zone.

QUALIFIED PERSON. CGP Appendix C and Section 641-1.04.

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC PLAN). The Contractor's detailed plan for petroleum spill prevention and control measures that meet the requirements of 40 CFR 112.

SPILL RESPONSE FIELD REPRESENTATIVE. The Contractor's representative with authority and responsibility for managing, implementing, and executing the HMCP and SPCC Plan.

STORM EVENT. CGP Appendix C.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP). The Contractor's plan for compliance with the CGP for construction activities inside the Project zone, CGP Appendix C and Section 641.

STORM WATER POLLUTION PREVENTION PLAN TWO (SWPPP2). The Contractor's plan for compliance with the CGP and MSGP for construction activities outside the Project Zone.

SUPERINTENDENT. The Contractor's duly authorized representative with authority and responsibility for the overall operation of the Project and Contractor furnished sites and facilities.

SWPPP AMENDMENT. A modification to the SWPPP. CGP Part 5.0.

SWPPP MANAGER. The Contractor's Qualified Person with authority and responsibility. CGP Appendix C.

SWPPP PREPARER. The Contractor's Qualified Person with authority and responsibility. CGP Appendix C.

SWPPPTRACK. Software Subscription service version SWPPPTTrack DOT AK developed and provided by SWPPPTTrack AK LTD, for use on construction projects that require coverage under the APDES CGP.

TEMPORARY STABILIZATION. CGP Appendix C, "Stabilization".

641-1.02.01 REFERENCE.

A list of websites and documents referenced herein, including SWPPP preparation documents and construction forms, are available at the DOT&PF Statewide Design and Engineering Services Storm Water web page and Construction Forms webpage.

DEC Permit information is available at the DEC Division of Water webpage.

641-1.03 PLAN AND PERMIT SUBMITTALS.

For plans listed in Subsection 108-1.03.5 (SWPPP, HMCP, and SPCC), use the Contractor submission and Department review deadlines identified in this subsection.

Partial and incomplete submittals will not be accepted for review. Any submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline. No additional Contract time or additional compensation will be allowed due to delays caused by partial or incomplete submittals, or required re-submittals.

1. Storm Water Pollution Prevention Plan. Submit one electronic copy (single PDF file) of the SWPPP to the Engineer for approval. Deliver these documents to the Engineer at least 21 days before beginning Construction Activity. Organize the SWPPP and related documents for submittal according to the requirements of Subsection 641-2.01.2.

The Department will review the SWPPP submittals within 14 days after they are received. Submittals will be returned to the Contractor, and marked as either "rejected" with reasons listed or as "approved" by the Department. When the submittal is rejected, the Contractor must revise and resubmit the SWPPP. The 14-day review period will restart when the Contractor submits an electronic copy of the revised SWPPP to the Engineer for approval.

After the SWPPP is approved and certified by the Department using Form 25D-109, the Contractor must certify the approved SWPPP using Form 25D-111. See Subsection 641-1.03.4 for further SWPPP submittal requirements.

Submit the final SWPPP. Transmit an electronic copy (single pdf file) of the final SWPPP to the Engineer when the Contractor's eNOT is filed, or within 30 days of the Department's eNOT being filed, whichever is sooner. Include all SWPPP documents.

2. Hazardous Material Control Plan. The HMCP Template is available at the DOT&PF Construction Forms webpage. The HMCP submittal, review timeline, and signature requirements are the same as the SWPPP.
3. Spill Prevention, Control, and Countermeasure Plan. When a SPCC Plan is required under Subsection 641-2.03, submit an electronic copy of the SPCC Plan to the Engineer. Deliver these documents to the Engineer at least 21 days before beginning Construction Activity. The Department reserves the right to review the SPCC Plan and require modifications.

4. CGP Coverage. The Contractor is responsible for permitting of Contractor and subcontractor Construction Activities related to the Project. Do not use the SWPPP for Construction Activities outside the Project Zone where the Department is not an operator. For Construction Activities outside the Project Zone, the Contractor must use a SWPPP2. Department approval is not required for a SWPPP2.

After the Department certifies the SWPPP and prior to beginning Construction Activity, submit an eNOI with the required fee to DEC for coverage under the CGP. Submit a copy of the signed eNOI and DEC's written acknowledgement (by letter or other document), to the Engineer as soon as practicable and no later than three days after filing eNOI or receiving a written response.

Do not begin Construction Activity until the conditions listed in Subsection 641-3.01.1 are completed.

The Department will submit an eNOI to DEC for Construction Activities inside the Project Zone. The Engineer will provide the Contractor with a copy of the Department's eNOI and DEC's written acknowledgment (by letter or other document), for inclusion in the SWPPP.

Before Construction Activities occur, transmit to the Engineer an electronic copy of the approved and certified SWPPP, with signed Delegations of Signature Authorities on Forms 25D-107 and 25D-108, SWPPP Certifications on Forms 25D-111 and 25D-109, both permittee's signed eNOIs and DEC's written acknowledgement.

5. DEC SWPPP Review. When CGP Part 2.1.3, or 2.1.4 requires DEC SWPPP review:
 - a. Transmit a copy of the Department-approved SWPPP to DEC using delivery receipt confirmation;
 - b. Transmit a copy of the delivery receipt confirmation to the Engineer within seven days of receiving the confirmation; and
 - c. Retain a copy of delivery receipt confirmation in the SWPPP.
6. Local Government SWPPP Review. When local government or the CGP Part 2.1.4, requires local government review:
 - a. Transmit a copy of the Department-approved SWPPP and other information as required to local government, with the required fee. Use delivery receipt confirmation;
 - b. Transmit a copy of the delivery receipt confirmation to the Engineer within seven days of receiving the confirmation;
 - c. Transmit a copy of any comments by the local government to the Engineer within seven days of receipt;
 - d. Amend the SWPPP as necessary to address local government comments and transmit SWPPP Amendments to the Engineer within seven days of receipt of the comments;
 - e. Include a copy of local government SWPPP review letter in the SWPPP; and
 - f. File a notification with local government that the project is ending.
7. Modifying Contractor's eNOI. When required by the CGP Part 2.7, modify your eNOI to update or correct information within 30 calendar days of the change. Reasons for modification are in the CGP Part 2.7.1. The Contractor must submit an eNOT instead of an eNOI modification when the operator has changed. The new operator must file an eNOI to obtain permit coverage.

641-1.04 PERSONNEL QUALIFICATIONS.

Provide documentation in the SWPPP that the individuals serving in these positions meet the personnel qualifications. The Department accepts the following certificates as equivalent to AK-CESCL: Certified Professional in Erosion and Sediment Control (CPESC), or Certified Inspector in Sediment, and Erosion Control Certified (CISEC). These equivalent certificates are included in the CGP Appendix C and repeated below.

TABLE 641-1.04 PERSONNEL QUALIFICATIONS

Personnel Title	Required Qualifications
SWPPP Preparer	1. Current certification as a Certified Professional in Erosion and Sediment Control (CPESC); or 2. Current certification as AK-CESCL, and at least two years' experience in erosion and sediment control as a SWPPP Manager or SWPPP writer, or equivalent; or 3. Professional Engineer registered in the State of Alaska with current certification as AK-CESCL.
Superintendent	Current AK-CESCL, or substitute training from CGP Appendix C, Qualified Person Table 4
SWPPP Manager	Current AK-CESCL or substitute training from CGP Appendix C, Qualified Person Table 4.
Active Treatment System Operator	Current AK-CESCL or substitute training from CGP Appendix C, Qualified Person Table 4. ATS operator should possess a recognized certification, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to meet the ATS requirement.

641-1.05 SIGNATURE/CERTIFICATION REQUIREMENTS AND DELEGATIONS.

1. eNOI and eNOT. The eNOI, eNOT, and eNOI Modifications must be signed and certified by a responsible corporate officer according to CGP Appendix A, Part 1.12. Signature and certification authority for the eNOI and eNOT cannot be delegated.
2. Delegation of Signature Authority for Other SWPPP Documents and Reports. Use Form 25D-108 to delegate signature authority and certification authority to the Superintendent position, according to CGP Appendix A, Part 1.12.3, for the SWPPP, Inspection Reports and other reports required by the CGP. The Superintendent position is responsible for signing and certifying the SWPPP, Inspection Reports, and other reports required by the CGP, except the eNOI, eNOI Modifications, and eNOT.

The Engineer will provide the Department's delegation on Form 25D-107, which the Contractor must include in the SWPPP.

3. Subcontractor Certification. Subcontractors must certify on Form 25D-105, that they have read and will abide by the CGP and the conditions of the project SWPPP.
4. Signatures and Initials. Where documents are completed in SWPPPTTrack, utilize SWPPPTTrack to sign and initial documents. When documents are not completed in SWPPPTTrack (e.g. Form 25D-111 SWPPP Certification for Contractor), upload scanned copies after signing and initialing the documents into SWPPPTTrack.

641-1.06 RESPONSIBILITY FOR STORM WATER PERMIT COVERAGE.

107-1.02 includes the requirements to obtain permits, and to provide permit documents to the Engineer.

1. The Department and the Contractor are jointly responsible for permitting and permit compliance within the Project Zone.

2. The Contractor is responsible for permitting and permit compliance for all construction support activity in the Project Zone and outside the Project Zone. The Contractor has sole responsibility for compliance with DEC, COE, and other applicable federal, state, and local requirements, and for securing all necessary clearances, rights, and permits. The Contractor is responsible for protection, care, and upkeep of all work, and all associated off-site zones.
3. The Contractor is responsible for obtaining an Excavation Dewatering Permit (AKG002000) if construction activities are within 1,500 feet of a DEC-identified contaminated site or groundwater plume.
4. An entity that owns or operates, a commercial plant (as defined in Subsection 108-1.01.4) or material source or disposal site outside the Project Zone, is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has appropriate permit coverage.
5. The Department is not responsible for permitting or permit compliance, and is not liable for fines resulting from noncompliance with permit conditions:
 - a. For areas outside the Project Zone;
 - b. For Construction Activity and Support Activities outside the Project Zone; and
 - c. For commercial plants, commercial material sources, and commercial disposal sites.

641-1.07 UTILITY.

Relocation Coverage. A Utility company is not an Operator when utility relocation is performed concurrently with the Project, as outlined in Section 105-1.06. The Department maintains operational control over the Utility's plans and specifications for coordination with project construction elements, and the Contractor has day-to-day control over the various utility construction activities that occur in support of the Project. A Utility company is considered a subcontractor for concurrent relocation.

After the Contractor has an active NOI for the Project, a Utility Company performing advance relocation work under a separate SWPPP no longer has Operator status and files the NOT for the Utility Company's SWPPP covering only the completed utility work. Remaining utility relocation work is included in and performed under the Project SWPPP.

641-1.08 USE of SWPPPTRACK. The Contractor is responsible for purchasing and contracting with SWPPPTrack AK LTD for the use of the SWPPPTrack software application and services until final stabilization is achieved and the eNOT has been completed. Contact SWPPPTrack Alaska Support at (888) 401-1993 or AKSupport@SWPPPTrack.com for project fees, setup coordination, device requirements, and training.

Perform and document all inspections required by the CGP and the SWPPP with SWPPPTrack and populate all inspection fields accurately to represent current project conditions. Complete the following forms using SWPPPTrack:

1. SWPPP Construction Site Inspection Report (25D-100)
2. SWPPP Grading & Stabilization Activities Log (25D-110)
3. SWPPP Corrective Action Log (25D-112)
4. SWPPP Amendment Log (25D-114)
5. SWPPP Daily Record of Rainfall (25D-115)
6. SWPPP Training Log (25D-125)
7. SWPPP Project Staff Tracking (25D-127)

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.**1. SWPPP Preparer and Pre-Construction Site Visit.**

Use a SWPPP Preparer to develop the SWPPP according to the CGP, DEC and Department SWPPP Template. Subsection 641-1.02.01 provides directions to templates.

The SWPPP Preparer must conduct a pre-construction inspection at the Project site before construction activity begins. If the SWPPP Preparer is not a Contractor employee, the SWPPP Preparer must visit the site accompanied by the Contractor. Give the Department at least seven days advance notice of the site visit, so that the Department may participate.

Document the SWPPP Preparer's pre-construction inspection in the SWPPP on Form 25D-106, SWPPP Pre-Construction Site Visit, include the names of attendees and the date.

2. Developing the SWPPP.

- a. Meet all CGP requirements.
- b. Use the Department's ESCP, Environmental commitments, and other Contract documents as a starting point for developing the SWPPP.
- c. Develop the SWPPP with sections and appendices according to the DEC CGP SWPPP Template and DOT&PF SWPPP Template. Include the information required by the Contract and described in the CGP Part 5.0. Use the forms available at the DOT&PF Construction Forms website.
- d. Compile the SWPPP in three ring binders with tabbed and labeled dividers for each appendix. Submit the SWPPP according to Subsection 641-1.03.

3. SWPPP Considerations and Contents.

- a. The SWPPP must provide erosion and sediment control measures for all Construction Activity within the Project Zone.

Construction activity outside the Project Zone must have permit coverage. Document permit compliance according to SWPPP2 requirements.

- b. The SWPPP must consider the activities of the Contractor and all subcontractors and utility companies performing work in the Project Zone. Describe the roles and responsibilities of the Contractor, subcontractors, utility companies, and the Department with regard to implementation of the SWPPP. Include the utility companies and other operators performing Construction Activity.

Identify areas:

- (1) Over which each operator has operational control; and
- (2) Where the Department and Contractor are co-operators.
- c. For work outside the Project Zone the SWPPP must identify the entity that has storm water permit coverage, the operator, and areas that are:
 - (1) Dedicated to the Project and where the Department is not an operator; and
 - (2) Not dedicated to the project, but used for the project.
- d. If the project discharges to a Tier III, Outstanding Natural Resource Water, comply with the CGP Part 2.1.6. Submittal deadlines apply prior to filing an eNOI and beginning construction activities. As of the issuance of the CGP 2021, no Tier III, Outstanding Natural Resource Water is designated in the State of Alaska.
- e. There are special requirements in the CGP Part 3.2, for storm water discharges into an impaired water body. Monitoring of storm water discharges may be required. The Contractor is responsible for monitoring and reporting inside and outside the project zone.

- f. Describe the sequence and timing of activities that disturb soils and BMP implementation and removal. Phase earth-disturbing activities to minimize unstabilized areas, and to achieve temporary or final stabilization. Whenever practicable incorporate final stabilization work into excavation, embankment, and grading activities. Include drawings showing each phase of the project with the BMPs implemented in the Phase.
 - g. Delineate the site according to the CGP Part 4.2.1.
 - h. Minimize the amount of soil exposed and preserve natural topsoil on site, unless infeasible according to the CGP Part 4.2.2.
 - i. Describe methods and time limits, to initiate temporary or final soil stabilization. Comply with stabilization requirements in the CGP Part 4.5.
 - j. If construction will cease during winter months, describe all requirements for winter shutdown according to the CGP Part 4.12.
 - k. Plans for ATS must meet with the requirements in the CGP Part 2.1.5 and 4.6.
 - l. Design all temporary BMPs to accommodate a two year 24-hour storm event. Describe and document all installed control measures in the SWPPP according to the CGP Part 5.3.6. Include a citation from a published BMP Manual, publication, or manufacturers specification used as a source, or include a statement "No BMP Manual was used for this design". If using out of state BMPs, follow the instructions in the DOT&PF SWPPP Guide.
 - m. Provide a legible site map or set of maps in the SWPPP, showing the entire site and identifying boundaries of the property where construction and earth-disturbing activities will occur. Include all elements described in the CGP Part 5.3.5 and the DEC CGP SWPPP Template Section 5.0.
 - n. Identify the inspection frequency in the SWPPP according to the CGP Part 6.1; except, inspect once every seven calendar days regardless of the precipitation amount.
 - o. Linear Project Inspections, described in CGP Part 6.5, are not applicable to this Contract.
 - p. The SWPPP must cite and incorporate applicable requirements of the Project permits, environmental commitments, COE permit, and commitments related to historic preservation. Make additional consultations or obtain permits as necessary for Contractor specific activities that were not included in the Department's permitting and consultation.
 - q. The SWPPP is a dynamic document. Keep the SWPPP current by noting installation, modification, and removal of BMPs, and by using amendments, SWPPP amendment logs, Inspection Reports, corrective action logs, records of land disturbance and stabilization, and any other records necessary to document storm water pollution prevention activities and to satisfy the requirements of the CGP and this specification. See Subsection 641-3.03 for more information.
4. Recording Personnel and Contact Information in the SWPPP.
- Identify the SWPPP Manager as the Storm Water Lead and Storm Water Inspector positions in the SWPPP. Document the SWPPP Manager's responsibilities in Section 2.0 Storm Water Contacts, of the SWPPP Template and:
- a. Identify that the SWPPP Manager does not have authority to sign inspection reports (unless the SWPPP Manager is also the designated project Superintendent).
 - b. Identify that the SWPPP Manager cannot prepare the SWPPP unless the SWPPP Manager meets the Contract requirements for the SWPPP Preparer.

Include in the SWPPP proof of AK-CESCL, or equivalent certifications for the Superintendent and SWPPP Manager, and for any acting Superintendent and acting SWPPP Managers. If the Superintendent or SWPPP Manager is replaced, permanently or temporarily, by an acting Superintendent or acting SWPPP Manager; record in the SWPPP, on Form 25D-127, the names of the replacement personnel, and date of replacement. For temporary personnel, record their beginning and ending dates.

Provide 24-hour contact information for the Superintendent and SWPPP Manager. The Superintendent and SWPPP Manager must have 24-hour contact information for all Subcontractor SWPPP Coordinators and Utility SWPPP Coordinators.

Include in the SWPPP, proof of AK-CESCL or equivalent certifications of ATS operators. Record names of ATS operators and their beginning and ending dates, on Form 25D-127.

The Department will provide proof of AK-CESCL, or equivalent certifications for the Department's Project Engineer, Storm Water Inspectors, and Monitoring Person, and names and dates they are acting in that position. Include Department's staff certifications in SWPPP Appendix E. Include the Department's staff names, dates acting, and assignments in Section 2.0 of the SWPPP and on Form 25D-127.

641-2.02 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS.

Prepare the HMCP using the Department template for the prevention of pollution from storage, use, containment, cleanup, and disposal of all hazardous material, including petroleum products related to construction activities and equipment. Include the HMCP as an appendix to the SWPPP. Compile Material Safety Data Sheets in one location and reference that location in the HMCP.

641-2.03 SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC Plan) REQUIREMENTS.

Prepare and implement an SPCC Plan, required by 40 CFR 112; when both of the following conditions are present on the project:

1. Oil or petroleum products from a spill may reach navigable waters (defined in 40 CFR 112), and
2. Total above ground storage capacity for oil and any petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons).

Reference the SPCC Plan in the HMCP and SWPPP.

641-2.04 RESPONSIBILITY AND AUTHORITY OF THE SUPERINTENDENT AND SWPPP MANAGER.

The Superintendent shall certify the SWPPP, Inspection Reports, and other reports required by the CGP, except the eNOI and eNOT. The Superintendent may not delegate the task or responsibility of certifying these documents.

The Superintendent may assign certain duties to the SWPPP Manager.

1. Ensuring Contractor's and subcontractor's compliance with the SWPPP and CGP;
2. Ensuring the control of erosion, sedimentation, or discharge of pollutants;
3. Directing and overseeing installation, maintenance, and removal of BMPs;
4. Performing Inspections; and
5. Updating the SWPPP including adding amendments and forms.

When Bid Item 641.0007._____ is part of the Contract, the SWPPP Manager must be a different person than the Superintendent, be available at all times to administer SWPPP requirements, and be physically present within the Project Zone or the project office, when construction activities are occurring.

The Superintendent and SWPPP Manager shall be knowledgeable in the requirements of Section 641, the SWPPP, CGP, BMPs, HMCP, SPCC Plan, environmental permits, and environmental commitments.

The Superintendent and SWPPP Manager shall have the Contractor's complete authority and be responsible for suspending construction activities that do not conform to the SWPPP or CGP.

641-2.05 MATERIALS.

Use materials suitable to withstand hydraulic, wind, and soil forces, and to control erosion and trap sediments according to the requirements of the CGP and the Specifications.

Use the seed mixture specified in the Contract or as directed by the Engineer.

Use soil stabilization material as specified in Section 727.

Use silt fences as specified in Section 729.

Use straw and straw products certified weed free of prohibited and restricted noxious weed seed and quarantined pests, according to Alaska Administrative Code, Title 11, Chapter 34 (11 AAC 34). When straw or straw products certified according to 11 AAC 34 are not available, use non-certified products manufactured within Alaska before certified products manufactured in another state, country, or territory. Non-certified straw or straw products manufactured in another state, country, or territory shall not be used. Grass, legumes, or any other herbaceous plants produced as hay, shall not be substituted for straw, or straw products.

641-3.01 CONSTRUCTION REQUIREMENTS.

Comply with the SWPPP and the requirements of the CGP Part 5.0.

1. Before Construction.

The following actions must be completed before Construction Activity begins:

- a. The SWPPP Preparer must visit the Project. Document the visit on SWPPP Form 25D-106. The SWPPP must be developed, or amended with the findings from the visit.
- b. The SWPPP must be approved by the Engineer on Form 25D-109.
- c. The Contractor must be authorized to begin work by the Engineer.
- d. The Project must have an eNOI for the Department and for the Contractor.
- e. The Department approved SWPPP must be submitted to DEC and Local Governments per CGP Part 2.1.2, Part 2.1.4, and Part 2.4.1.
- f. The Contractor has transmitted to the Engineer an electronic copy of the approved SWPPP.
- g. The Delegation of Authority, Forms 25D-108 and 25D-107, for both the Contractor and Engineer are signed.
- h. Main entrance signage must meet the requirements of CGP Part 5.10.2.

Post notices on the outside wall of the Contractor's project office, and near the main entrances of the construction project. Protect postings from the weather. Locate postings so the public can safely read them without obstructing construction activities or the traveling public (for example, at an existing pullout). Do not use retroreflective signs for the SWPPP posting. Do not locate SWPPP signs in locations where the signs may be confused with traffic control signs or devices. Update the notices if the listed information changes.

- i. Track precipitation according to CGP Part 7.3.9. Submit the method to track precipitation to the Engineer for approval.
- J. Complete all setup and training required to implement SWPPPTrack.
- k. Complete the upload of the BMP inventory into SWPPPTrack.

2. During Construction.

- a. Delineate The Site. Comply with the CGP Part 4.2.1.
- b. BMPs. Install BMPs according to the SWPPP prior to the initiation of ground disturbance.
- c. Document subcontractors. Provide a copy of the SWPPP and the CGP to all subcontractors and utility companies before they begin soil-disturbing activities. Verify they understand and comply with the SWPPP and CGP.
 - (1) Document all subcontractors and utility companies that may work on the site, according to the CGP Part 5.3.1, and SWPPP Section 1.2.
 - (2) Require subcontractors and utility companies to sign the SWPPP Subcontractor Certification, Form 25D-105. Include Form 25D-105 in the SWPPP Appendix E.
 - (3) Inform subcontractors and utility companies, in a timely manner, of SWPPP amendments that affect them. Coordinate with subcontractors and utility companies to protect BMPs, including temporary and final stabilization from damage.
 - (4) Notify the Engineer immediately if the actions of any utility company or subcontractor do not comply with the SWPPP and the CGP.
- d. Provide Training. Provide ongoing training to all employees, subcontractors, and utility companies according to the CGP Part 4.14.
 - (1) Provide training no less than once a month during construction activity;
 - (2) Document training in the SWPPP Training Log on Form 25D-125. Include the training record in the SWPPP Appendix I.
- e. Protection and Restoration. Comply with Subsection 107-1.11.
- f. Good Housekeeping Measures. Comply with the SWPPP and CGP Part 4.8.
- g. Control Measures. Comply with the SWPPP and CGP Part 5.3.6.
 - (1) Maintain BMPs.
 - (2) Comply with requirements of the HMCP and SPCC Plan, and all local, state, and federal regulations that pertain to the handling, storage, containment, cleanup, and disposal of petroleum products or other hazardous materials.
 - (3) Keep the SWPPP and HMCP current, Subsection 641-2.01.3, SWPPP Considerations and Contents.

3. Winter Construction.

If winter construction activity occurs, the project must have BMPs in place, Part 4.12.2. Inspections can be reduced to once per month if the project meets the CGP Part 6.2.4.

4. Storm Water Discharge Pollutant Reporting Requirements.

If an incident of non-compliance occurs, that may endanger health or the environment, a report must be made, CGP Appendix A, Part 3.4.

A permit non-compliance is any type of pollutant, such as turbidity or petroleum that enters storm water runoff and flows into a receiving water body, MS4, or wetland that is connected to waters of the U.S.

- a. Report the incident to the Engineer immediately;
- b. Report to DEC orally within 24 hours after the permittee becomes aware of the incident; and
- c. Report to DEC in writing within five days after the permittee becomes aware of the circumstances. To report in writing, complete the written noncompliance report on Form 25D-143, and file the written report with DEC. Coordinate the report with the Engineer. Include in the report:
 - (1) A description of the noncompliance and its causes;
 - (2) The exact dates and times of noncompliance;
 - (3) If not yet corrected the anticipated time the project will be brought back into compliance; and
 - (4) The corrective action taken or planned to reduce, eliminate and prevent reoccurrence.
- d. Report an incident of noncompliance with COE Permits to the Engineer immediately. The Engineer will notify the COE.

5. Hazardous Materials Reporting Requirements.

Report any release of a hazardous substance immediately to the Engineer, as soon as the person has knowledge of the discharge.

Report spills of petroleum products or other hazardous materials to the Engineer and other agencies as required by law, and according to the CGP Part 9.3.

- a. To water.

Any amount of hazardous material released must be reported immediately to the Engineer, DEC, and the Coast Guard.

- b. To land.

Any release of a petroleum product, must be reported as soon as the person has knowledge of the discharge, CGP Part 9.3.2.

- (1) Release in excess of 55 gallons,
- (2) Release in excess of 10 gallons but less than 55 gallons, must be reported to the DEC within 48 hours after the person has knowledge of the discharge, and
- (3) Release in excess of 1 gallon to 10 gallons, must be recorded, logged, and provided to the DEC on a monthly basis.
- c. Use the HMCP and SPCC Plan for contact information to report spills to regulatory agencies.
- d. Implement measures to prevent the reoccurrence of and to respond to the release of hazardous materials.
- e. Prior to disposal of contaminated material, submit a Contaminated Media Transport and Treatment Disposal Approval Form to the DEC Division of Spill Prevention and Response. Dispose as approved by the DEC.

6. Maintenance of BMPs and Corrective Action.

Implement maintenance and corrective action as required by the CGP Part 4.13 and Part 8.0, SWPPP, and manufacturer's specifications, whichever is more restrictive.

- a. Implement corrective actions. Comply with the CGP Part 8.0 and the SWPPP.

b. Corrective Action deadlines and documentation.

- (1) Complete Corrective actions according to the CGP Part 8.2.
- (2) Document corrective actions in the Corrective Action Log, Form 25D-112, according to the SWPPP, CGP Part 5.9.2, and Part 8.3.

If a different BMP is installed to correct the condition leading to the corrective action, a SWPPP Amendment must be completed.

- (3) Document the conditions, in the Corrective Action Log, for corrective actions not completed according to the CGP 8.2. Notify the Engineer, and implement the corrective action as soon as possible.

The Engineer may assign a new complete-by date using a Delayed Action Item Report, Form 25D-113 (DAIR Form), if the Contractor is unable to complete the corrective action within the required timeframe. The DAIR Form can only be authorized and completed by the Engineer.

7. Stabilization.

- a. All Soil stabilization requirements must be met in accordance with CGP Part 4.5 and the SWPPP.
- b. When temporary or permanent seeding is required, provide a working hydro seeding equipment located within 100 miles of the project by road; with 1,000 gallon or more tank capacity, paddle agitation of tank, and the capability to reach the seed areas with an uniform mixture of water, seed, mulch and tackifier. If the project is located in an isolated community, the hydro-seeder must be located at the project.
- c. Apply temporary seed and stabilization measures after preparing the surface to reduce erosion potential and to facilitate germination and growth of vegetative cover according to Section 618 and 619.
- d. Apply permanent seed and other stabilization measures after land-disturbing activity has permanently ceased. Comply with the CGP, SWPPP, and the Contract Sections 618, 619, 724, and 727.
- e. Incorporate final or temporary stabilization immediately after installing culverts or other drainage structures to satisfy the CGP Part 4.5, SWPPP and Engineer. Stabilize under any bridge and in areas upstream and downstream of culverts, drainages and areas disturbed by related construction activities after installation, or before deactivating stream bypass or diversion.
- f. Stabilization before Fall Freeze-up, and Spring Thaw.

Stabilize Construction Activities within the Project Zone with BMPs prior to the anticipated date of fall freeze-up, according to the SWPPP and CGP Part 4.12.

Exceptions to stabilization prior to anticipated date of fall freeze-up include:

- (1) Where temporary stabilization activities are precluded by snow cover or frozen ground conditions prior to the anticipated date of fall freeze-up, stabilization measures must be initiated as soon as practicable following the actual spring thaw.
- (2) When winter construction activity is authorized by the Engineer and conducted according to the Contract.

8. Ending CGP Coverage.

- a. The Engineer will determine the date that the following conditions for ending CGP coverage have been met within the Project Zone:
 - (1) Land disturbing activities have ceased;

- (2) Final Stabilization has been achieved on all portions of the Project Zone, including Department furnished material sources, disposal sites, staging areas, equipment areas, etc., according to the CGP Part 4.5.2; and
 - (3) Temporary BMPs have been removed.
 - b. After the Engineer has determined the conditions for submitting an eNOT have been met according to the CGP Part 10.2, the Department will:
 - (1) Send written notice to the Contractor with the date that the conditions were met;
 - (2) Submit an eNOT to DEC within 30 days, and
 - (3) Provide a copy of the eNOT and DEC's acknowledgement letter to the Contractor.
 - c. If the Contractor's CGP eNOI acreage includes Support Activities and any other areas where the Department is not an Operator, the Contractor may not be able to file an eNOT at the same time as the Department.
 - d. The Contractor must submit a copy of each signed eNOT and DEC's acknowledgement letter to the Department within three days of filing the eNOT or receiving a written response. Insert the eNOT and DEC acknowledgement letter in the SWPPP Appendix Q.
 - e. The Contractor is responsible for coordinating local government inspections of work and ending permit coverage with local governments. See Subsection 641-1.03.6 for more information.
9. Ending Inspections, BMP maintenance, and SWPPP Updates in the Project Zone.
- The Contractor is responsible for continuing inspections, BMP maintenance, and SWPPP updates until permit coverage is ended.
10. Transmit final SWPPP.
- Collate all documents into a single electronic file before transmittal. Transmit one electronic copy of the final SWPPP to the Engineer according to Subsection 641-1.03.1.

641-3.02 SWPPP DOCUMENTS, LOCATION ON-SITE, AVAILABILITY, AND RECORD RETENTION.

The SWPPP and related documents maintained by the Contractor are the Record for demonstrating compliance with the CGP. Copies of SWPPP documents transmitted to the Engineer under the requirements of this specification are informational and do not relieve the Contractor's responsibility to maintain complete records as required by the CGP and this specification.

Keep the SWPPP, HMCP, and SPCC Plan at the on-site project office. If there is not an on-site project office, keep the documents at a locally available location that meets CGP requirements and is approved by the Engineer. Records may be moved to another office for record retention after the eNOTs are filed. Records may be moved to another office during winter shutdown. Update on-site postings if records are relocated during winter shutdown. Provide the Department with copies of all Records.

Retain Records including a copy of the SWPPP, for at least three years after the date of eNOT according to the CGP Part 9.4.

The SWPPP and related documents must be made available for review and copy, to the Department and other regulatory agencies that request them. See CGP Parts 5.10, 6.6 and 9.5.

641-3.03 SWPPP INSPECTIONS, AMENDMENTS, REPORTS, AND LOGS.

Perform Inspections, prepare Inspection Reports, and prepare SWPPP Amendments in compliance with the SWPPP and the CGP using Department forms from the DOT&PF Construction Forms website.

1. Inspection during Construction.

Conduct Inspections according to the schedule and requirements of the SWPPP and CGP Part 6.0, except inspect once every seven calendar days regardless of the precipitation amount, Subsection 641-2.01.3.n.

Inspections required by the CGP and SWPPP must be performed by the Contractor's SWPPP Manager and the Department's Storm Water Inspector jointly, unless approved by the Engineer, when:

- a. One of the inspectors is not on site, access is only by air, and weather delayed or canceled flights;
- b. One of the inspectors is sick;
- c. The project is on a reduced frequency inspection schedule with no staff on site, the only access to the site is by air, and it is economical to send only one inspector; or
- d. When the Engineer determines a safety concern that makes joint inspection impracticable.

When this is the case, the Operator who conducts the Inspection must provide a copy of the Inspection Report to the other Operator within three days of the Inspection date and document the date of the report transmittal in Appendix K.

2. Inspection Reports.

Use only the Department SWPPP Construction Site Inspection Report, Form 25D-100, to record Inspections. Changes or revisions to Form 25D-100 are not permitted, except for adding or deleting data fields that list: Location of Discharge Points and Site Specific BMPs. Complete all fields in the Inspection Report; do not leave any field blank.

The Superintendent or SWPPP Manager must review and correct all errors within three days of the date of inspection.

Inspection Reports must be signed by the person described in the CGP Appendix A, Part 1.12 or by a duly authorized representative of that person. Only the Superintendent can certify the Inspection Form.

Insert a Complete-by-Date for each corrective action listed that complies with the CGP Part 8.2.

Provide a copy of the completed, unsigned Inspection Report to the Engineer by the end of the next business day following the inspection.

The Engineer may coordinate with the Superintendent to review and correct any errors or omissions before the Superintendent signs the report. Corrections are limited to adding missing information or correcting entries to match field notes and conditions present at the time the Inspection was performed. The signed and certified Inspection Report must be provided to the Engineer on the same day the Superintendent signed the form.

The Engineer will sign and certify the Inspection Report and will return the original to the Contractor within three working days if compliant with the CGP and SWPPP.

If the Inspection Report is not compliant with the CGP or SWPPP, the Engineer may make corrections after the Superintendent has signed and certified the Inspection Report. The Engineer will initial and date each correction. If the Engineer makes corrections, the Superintendent must recertify the Inspection Report by entering a new signature and date in the white space below the original signature and date lines. Send a copy of the recertified Inspection Report to the Engineer on the day it is recertified.

When an Inspection Report, certified by both the Superintendent and Engineer, requires corrections:

- a. Document the corrections in an addendum memo addressing only the omitted or erroneous portions.
- b. Superintendent and Engineer sign and certify the updated Inspection Report and the addendum memo.
- c. File the corrected Inspection Report and addendum memo in Appendix K and update the amendment log.

The issuance of an addendum memo does not relieve the Contractor of liquidated damages that may have been incurred as a result of the error on the original certified inspection report.

3. Items and Areas to Inspect.

Conduct inspections of all areas required by the CGP Part 6.4 and SWPPP.

4. Reduced Inspection Frequencies.

Conduct Inspections according to the inspection schedule indicated in the approved SWPPP. Any change in inspection frequency must be approved by the Engineer, and beginning and ending dates documented as an amendment to the SWPPP.

The frequency of inspections may be reduced according to the CGP Part 6.2.1 if the site is stabilized and the reduced frequency is approved by the Engineer. At actively staffed sites, inspect within two business days of the end of a storm event that results in a discharge from the site.

5. Winter Shutdown Inspections.

Conduct winter shutdown inspection 14 calendar days after the anticipated fall freeze-up date and conditions under the CGP Parts 4.12. and 6.2.3, and the SWPPP are met. The Engineer may approve suspension of inspections and waive requirements for updating the Grading and Stabilization Activities Log and Daily Record of Rainfall, Form 25D-115, during winter shutdown.

Inspections must resume on a regular frequency or reduced inspection frequency identified in the SWPPP, at least 21 days before anticipated spring thaw, CGP Part 6.2.3. Resume updating the Daily Record of Rainfall Form at the start of the 21-day spring thaw inspection.

6. Inspection before Project Completion.

Conduct Inspection to ensure Final Stabilization is complete throughout the Project, and temporary BMPs that are required to be removed are removed. Temporary BMPs that are biodegradable and are specifically designed and installed with the intent of remaining in place until they degrade, may remain in place after project completion if approved by the Engineer.

7. SWPPP Amendments and SWPPP Amendment Log.

The SWPPP Amendment Log, Form 25D-114, must be filled out by an individual who holds a current AK-CESCL, or equivalent certification. The Superintendent or the SWPPP Manager must sign and date amendments to the SWPPP and updates to the SWPPP Amendment Log.

SWPPP Amendments must be approved by the Engineer.

Amendments must occur:

- a. Whenever there is a change in design, construction operation, or maintenance at the construction site that has or could cause erosion, sedimentation or the discharge of pollutants that has not been previously addressed in the SWPPP;
- b. If an Inspection identifies that any portion of the SWPPP is ineffective in preventing erosion, sedimentation, or the discharge of pollutants;

- c. Whenever an Inspection identifies a problem that requires additional or modified BMPs or a BMP not shown in the original SWPPP is added;
- d. If the Inspection frequency is modified (note beginning and ending dates);
- e. When there is a change in personnel who are named in the SWPPP, according to Subsection 641-2.01;
- f. When an inspection is not conducted jointly;
- g. When an eNOI modification is filed;
- h. When a Noncompliance Report is filed with the DEC.

Place all correspondence with the DEC, EPA or MS4s in Appendix Q.

Amend the SWPPP as soon as practicable after any change or modification, but in no case, later than seven days following identification of the need for an amendment. All SWPPP Amendments must have an amendment number, be dated, and signed.

Keep the SWPPP Amendment Log current. Prior to a scheduled Inspection or submittal of an inspection, submit to the Engineer a copy of the pages of the Amendment Log that contain new entries since the last submittal. Include copies of any documents amending the SWPPP.

Keep the SWPPP Amendment Log in appendix M.

8. Site Maps.

Maintain site maps in accordance with CGP Part 5.3.5 and the SWPPP Template 5.0. It is acceptable to have separate site maps for BMPs, grading and stabilization activities.

9. Corrective Action Log.

The Superintendent and SWPPP Manager are the only persons authorized to make entries on the SWPPP Corrective Action Log, Form 25D-112.

The Corrective Action Log must document corrective actions required by the conditions listed in the CGP Part 8.0. Document the need for corrective action within 24 hours of either:

- a. Identification during an inspection, or
- b. Discovery by the Department's or Contractor's staff, a subcontractor, or a regulatory agency inspector.
- c. If a corrective action is discovered outside of an inspection, update the log with the date of discovery, the proposed corrective action, and the date the corrective action was completed.

Keep the Corrective Action Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Corrective Action Log in Appendix J.

10. Grading and Stabilization Activities Log.

The Superintendent and SWPPP Manager are the only persons authorized to date and initial entries on the SWPPP Grading and Stabilization Activities Log, Form 25D-110. Use the SWPPP Grading and Stabilization Activities Log, to record land disturbance and stabilization activities.

Keep the Grading and Stabilization Activities Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection. Keep the Grading and Stabilization Activities Log organized and completed to demonstrate compliance with the CGP Part 4.5.

Keep the Grading and Stabilization Activities Log in Appendix G.

11. Daily Record of Rainfall.

Use SWPPP Daily Record of Rainfall, Form 25D-115, to comply with CGP Part 7.3.9. Submit a copy to the Engineer with each completed Inspection Report. Keep the Daily Record of Rainfall current in Appendix N.

For projects on a 14-day inspection frequency or reduced inspection frequency, SWPPPTrack will generate a precipitation alert for storm events that produce more than 0.5 inch of rainfall in 24 hours. If a storm event does not produce a discharge from the project zone, submit an explanation in response to the SWPPPTrack precipitation alert.

12. Staff Tracking Log.

Use the SWPPP Project Staff Tracking, Form 25D-127, to identify project staff that are required to be AK-CESCL certified or an equivalent qualification, CGP Appendix C. Complete this form to document the positions of Superintendent, SWPPP Manager, Engineer, DOT&PF Storm Water Inspector, and when these positions have changed personnel, either permanently or temporarily. Update the SWPPP Project Staff Tracking Form within 24 hours of any changes in personnel, qualifications, or other staffing items related to administration of the CGP or Section 641.

641-3.04 FAILURE TO PERFORM WORK.

The Engineer has authority to suspend work and withhold monies for an incident of non-compliance with the CGP, or the SWPPP, that may endanger health or the environment or for failure to perform work related to Section 641.

Non-compliance.

1. **Incidents of Non-compliance.** Failure to:

- a. Obtain appropriate permits before Construction Activities occur;
- b. Perform SWPPP Administration;
- c. Perform timely Inspections;
- d. Update the SWPPP;
- e. Transmit updated SWPPP, Inspection Reports, and other updated SWPPP forms to the Engineer;
- f. Maintain effective BMPs to control erosion, sedimentation, and pollution in accordance with the SWPPP, the CGP, and applicable local, state, and federal requirements;
- g. Perform duties according to the requirements of Section 641;
- h. Meet requirements of the CGP, SWPPP, or other permits, laws, and regulations related to erosion, sediment, or pollution control; or
- i. Any other requirements established or included in the Contract.

2. **Notice of non-compliance**, either oral or written will include:

- a. Reason/defects
- b. Corrective actions required
- c. Time allowed for completing the corrective action

3. **Levels of Non-compliance and Response** correspond with harm to the workers, the public or the environment and whether the harm is:

- a. **Not-imminent**, the Engineer will either orally or in writing, or both, provide notice to the Contractor indicating the incident of non-compliance.

Contractor's that take corrective action and complete the action to the satisfaction of the Engineer, within the time specified, may return to the status of compliance, and avoid elevating the response to imminent.

- b. **Imminent**, the Engineer will orally provide notice to the Contractor of non-compliance and promptly provide written notice to suspend work until corrective action is completed.

Additional actions, taken against the Contract whether the level of non-compliance is Not-imminent or Imminent, may include:

- a. Withholding monies until corrective action is completed
- b. Assessing damages or equitable adjustments
- c. Employing others to perform the corrective action and deduct the cost

No additional Contract time or additional compensation is allowed due to delays caused by the Engineer's suspension of work.

641-3.05 ACCESS TO WORK.

The Project, including any related off-site areas or support activities, must be made available for inspection, or sampling and monitoring, by the Department and other regulatory agencies. CGP Part 6.6.

641-4.01 METHOD OF MEASUREMENT.

See Section 109 and as follows:

Item 641.0005.____, measured as specified in the Directive authorizing the work.

Item 641.0006.____, measured as specified in Table 641-2 Version C.

641-5.01 BASIS OF PAYMENT.

1. BMP Values. Table 641-1 BMP Values – Reserved.
2. Erosion, Sediment, and Pollution Control - Liquidated Damages. Liquidated Damages assessed according to Table 641-2 are not an adjustment to the Contract amount. These damages charges are related to Contract performance but are billed by the Department to the Contractor, independent of the Contract amount. An amount equal to the Liquidated Damages may be withheld, for unsatisfactory performance, from payment due under the Contract until the Contractor remits payment for billed Liquidated Damages.

TABLE 641-2- VERSION C

EROSION, SEDIMENT AND POLLUTION CONTROL – LIQUIDATED DAMAGES

Code	Specification Section Number and Description	Deductible Amount in Dollars	Cumulative Deductible Amounts in Dollars
A	641-1.05 Failure to have a qualified (AK-CESCL or equivalent) SWPPP Manager	Calculated in Code B or F	
B	Failure to meet SWPPP requirements of: (1) 641-2.01.1 Name of SWPPP Preparer (2) Not Applicable (3) 641-3.03.8 Sign and Date SWPPP amendments by qualified person. (4) 641-3.02 Records maintained at project and made available for review	\$750 per omission	
C	Not Applicable.		
D	641-3.03.5 Failure to stabilize a Project prior to fall freeze-up.	\$5,000 per Project per year	
E	641-2.01.1. Failure to conduct pre-construction inspections before Construction Activities on all projects greater than 1 acre.	\$2,000 per Project	
F*	641-3.03. Failure to conduct and record CGP Inspections 641-3.03.1 Personnel conducting Inspections and Frequency 641-3.03.2 Inspection Reports, use Form 25D-100, completed with all required information	\$750 per Inspection	Additional \$750 for every additional 7 day period without completing the required inspection.
G	641-3.01.4 Corrective action, failure to timely accomplish BMP maintenance and/or repairs. In effect until BMP maintenance and/or repairs is completed.	\$500 per Project per day	
H	641-3.01.3 Failure to provide to the Engineer and DEC a timely oral noncompliance report of violations or for a deficient oral noncompliance report	\$750 for the first day the report is late or deficient	Additional \$750 for every 14 day period without the required information
I	641-3.01.3 Failure to provide to the Engineer and DEC a timely written noncompliance report, use Form 25D-143, of violations or for a deficient written noncompliance report	\$750 for the first day the report is late or deficient	Additional \$750 for every 14 day period without the required information
J	641-3.04 Failure to comply with the requirements of the CGP, approved SWPPP, and Section 641, except as listed above	\$750 per occurrence for the first day of noncompliance	Additional \$750 for every day the deficiency remains uncorrected

***CODE F.** Liquidated Damages according to Code F will not be billed for typographic errors and minor data entry errors, except the liquidated damages will be assessed for these errors when:

- the Contractor has previously been notified and subsequent inspection reports repeat the same or similar error,
- multiple inspection reports are submitted after the submission due date and the same or similar errors are repeated on multiple overdue reports,
- an error in recording the inspector's AK-CESCL certification date results in an inspector performing the inspection during a period when their certification was lapsed or was otherwise invalid

See Subsection 641-3.04 Failure to Perform Work, for additional work and payment requirements.

Item 641.0001._____ Erosion, Sediment, and Pollution Control Administration. At the Contract lump sum price for administration of all work under this Section. Includes, but is not limited to, SWPPP and HMCP and SPCC Plan preparation, agency fees for SWPPP reviews, SWPPP amendments, pre-construction Inspections, Inspections, monitoring, reporting, and recordkeeping or copying Records related to the SWPPP and required by the CGP, and Record retention.

Item 641.0005._____ Temporary Erosion, Sediment and Pollution Control by Directive. At the contingent sum prices specified in the Directive using time and materials to authorize the work, for all labor, supervision, materials, equipment, and incidentals to install, maintain, remove and dispose of temporary erosion, sedimentation, and pollution control BMPs. Prices for this item will be by time and materials according to Subsection 109-1.05, or by mutual agreement between the Engineer and Contractor. All additional Erosion, Sediment, and Pollution Control Administration necessary due to this item will not be paid for separately but will be subsidiary to other bid items.

Item 641.0006._____ Withholding. The Engineer may withhold an amount equal to Liquidated Damages, assessed according to Section 641, from payment due the Contractor. Liquidated Damages for violations of the Contract, CWA, and CGP are determined by the Engineer according to Table 641-2. The Engineer may withhold payment due the Contractors until the Contractor pays the Liquidated Damages to the Department.

The Department will not release performance bonds until Liquidated Damages assessed according to Section 641 are paid to the Department, and all requirements according to Subsection 103-1.05 are satisfied.

Item 641.0007._____ SWPPP Manager. At the Contract lump sum price for a SWPPP Manager that conforms to this specification. When Item 641.0007._____ appears in the Bid Schedule, the SWPPP Manager must be a different person than the superintendent, and must be physically present during construction activity with duties and authority as described in Subsection 641-2.04. When Item 641.0007._____ does not appear in the Bid Schedule, the SWPPP Manager is subsidiary to Item 641.0001._____.

Item 641.0008._____ SWPPPTTrack. Payment for purchasing and contracting with SWPPPTTrack AK LTD for the use of the SWPPPTTrack software application and services will be based on paid receipts plus a 5 percent markup.

Subsidiary Items. Temporary erosion, sediment, and pollution control measures that are required outside the Project Zone are subsidiary. Work required by the HMCP and SPCC Plan including hazardous material storage, containment, removal, cleanup and disposal, are subsidiary to Item 641.0001._____ Erosion, Sediment and Pollution Control Administration.

Work under other pay items. Work that is paid for directly or indirectly under other pay items will not be measured and paid for under Section 641. This work includes but is not limited to:

1. Dewatering;
2. Shoring;
3. Bailing;
4. Permanent seeding;
5. Installation and removal of temporary work pads;
6. Temporary accesses;
7. Temporary drainage pipes and structures;
8. Diversion channels;
9. Settling impoundment; and
10. Filtration.

Permanent erosion, sediment, and pollution control measures will be measured and paid for under other Contract items, when shown on the bid schedule.

Work at the Contractor's Expense. Temporary erosion, sediment, and pollution control measures that are required due to carelessness, negligence, or failure to install temporary or permanent controls as scheduled or ordered by the Engineer, or for the Contractor's convenience, are at the Contractor's expense.

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
641.0001.____	Erosion, Sediment and Pollution Control Administration	LS
641.0005.____	Temporary Erosion, Sediment and Pollution Control by Directive	CS
641.0006.____	Withholding	CS
641.0007.____	SWPPP Manager	LS
641.0008.____	SWPPPTTrack	CS

CR641-24.0401

Special Provision

Replace Section 642 with the following:

SECTION 642 CONSTRUCTION SURVEYING AND MONUMENTS

642-1.01 DESCRIPTION. Perform surveying and staking essential for the completion of the project and perform the necessary calculations required to accomplish the work in conformance with the Plans and Specifications and industry standard engineering and survey practice.

Furnish and maintain facilities, equipment, and services specified in this section for Digital Terrain Modeling (DTM). All furnished facilities and equipment remain your property when you complete the work.

642-1.02 DEFINITIONS.

1. Break Line: A break line defines the horizontal location where TIN lines must break, and snap to the vertical location of the break line.
2. Catch Point: In the cross section of a road, the point at which the fill or cut slope intersects the edge of the existing ground.
3. CAD: Computer-Aided Design.
4. CORS: Continuously Operating Reference Station.
5. DTM: Digital Terrain Model. A computer generated 3D model representing the project terrain, and based on the association of features such as alignments, profiles, sections, grading lines, points, and surfaces.
6. GLONASS: A radio-based satellite navigation system operated by Russia. GLONASS is an alternative and is complementary to the United States Global Positioning System.
7. GNSS: Global Navigation Satellite System.
8. GPS: Global Positioning System; A radio-based satellite navigation system operated by the United States.
9. Hinge Point: In the cross section of a road, the point at which any slope intersects another slope of different angle.
10. Monument: A fixed physical object marking a point on the surface of the earth; used to commence or control a survey; mark the boundaries of a parcel of land; or the centerline of a right-of-way corridor. Monuments will be Primary or Secondary, as shown in the Plans.
11. Neat-line: Defines the geometric limits of a material, as indicated by the typical section, profile, and alignment.
12. NGS: National Geodetic Survey; United States Government Agency that provides information and products related to the definition and management of the NSRS.
13. NSRS: The National Spatial Reference System.
14. OPUS: On-line Positioning User Service; The National Geodetic Survey operates OPUS as a means to provide GPS users easier access to the NSRS.

15. Point: An identified spot located on the surface of the earth. For the purpose of this definition, a point can be either physical or electronic depending on the context in which it is used. Physical points include PK nails, wooden hubs, rebar, large nails, or other structures capable of being utilized as a marker. Electronic points include all points generated by computers or electronic surveying equipment.
16. PPK: Post Processed Kinematic; PPK surveys are similar to RTK surveys, except there is no radio communication between the reference station and the rover, so the rover cannot process a position in "real time". Survey data from both the reference station and rover is imported into GPS processing software to determine the measured position.
17. Reference Monument: A monument placed at a known distance and direction from a property corner or other survey point, usually not on a property or survey line. A reference monument is employed to perpetuate a corner/point that cannot be monumented at its true location or where the corner monument is subject to destruction.
18. RTK: Real Time Kinematic; RTK surveys utilize two or more receivers with at least one receiver remaining stationary over a known coordinate. The radio at the reference station broadcasts its position to the rovers and the system processes the baselines in "real time" allowing for project coordinate information to be gathered and analyzed during the actual field survey.
19. Slope Staking: The process of using measurements and calculations to determine where to begin a cut or fill, the slope ratio, and the depth of the cut or fill.
20. Static: Static survey methods require multiple GPS receivers to collect data over the course of a long period of time. The data collected by the receivers is downloaded into a GPS processing software program to determine the measured position.
21. Surveyor: The Contractor's Professional Land Surveyor placed in "responsible charge", and currently registered in the State of Alaska as defined in AS 08.48.341.
22. Tessellation Spacing: The distance along a line or an arc that a TIN point is created.
23. TIN: Triangulated Irregular Network; A vector based representation of a physical land surface.
24. Witness Corner: A point or monument placed at a known distance and direction from a property corner or other survey point. A witness corner is employed to witness the location of a corner/point that cannot be monumented at its true location.
25. Weeding: A procedure used to limit the frequency of information displayed.

642-2.01 MATERIALS.

1. Monument Cases: Use castings meeting AASHTO M 105, Class No. 30A. Coat castings with a bituminous damp-proof coating. Bolting tops shall be used.
2. Primary Monument: A minimum 2 3/8" diameter nonferrous pipe at least 30 inches long, with a minimum 4-inch flange at the bottom and having magnets attached at the top and bottom. A minimum 3 1/4" diameter nonferrous metal cap shall be permanently attached to the top. Mark the cap around the outside edge with the words "STATE OF ALASKA DOT&PF". Permanently stamp every monument with the Surveyor's registration number, the year set, and the point/corner identification. Orient cap so that the data may be read when the reader is facing north, except for centerline monuments that will be oriented to be read facing up-station.
3. Secondary Monument: A minimum 5/8 inch x 30 inch rebar with a 2-inch aluminum cap attached to the top. Permanently stamp every secondary monument with the Surveyor's registration number, the point/corner identification, and the year set.

CONSTRUCTION REQUIREMENTS

642-3.01 GENERAL REQUIREMENTS. Work classified as Land Surveying under AS 08.48, and work involving the location, control, and monumentation of construction centerline and right-of-way, shall be performed by or directly under the responsible charge of, a person registered in the State of Alaska as a Professional Land Surveyor.

Use competent, qualified personnel and suitable equipment for construction surveying activities. The Surveyor's personnel shall be supervised and trained in the avoidance of systematic errors. The Surveyor's personnel shall be familiar with geodetic concepts and least-squares adjustments. Correcting errors resulting from the operations of said personnel shall be at the Contractor expense. The Contractor is responsible for the accuracy of the work.

Schedule a mandatory Pre-Survey Conference with the Engineer, Contractor, Surveyor, and all personnel who are to be involved in the survey work, two weeks prior to beginning survey work. The purpose of this meeting will be to discuss methods and practices of accomplishing the required survey work.

Furnish computer services to accomplish the work. All data shall be signed by the Surveyor for completeness and accuracy. As soon as practical after completion of the work, and in no case later than acceptance of the project, deliver field books, computer forms and computer output data to the Engineer. Furnish all computer generated data in a file format and medium that is compatible with Department software. This data becomes the property of the State of Alaska.

Furnish field survey notes. Keep field notes in standard bound notebooks in a clear, orderly, and neat manner consistent with the State of Alaska DOT&PF Construction Surveying Requirements. Make field books available for inspection by the Engineer's project personnel at any time. Copies of the field books shall be kept in a separate secure location.

Furnish all equipment including but not limited to vehicles, stakes, measuring tapes, levels, rods, lasers, GPS receivers, total stations, traffic control devices, safety devices and other equipment necessary for establishing, checking and maintaining the required points, lines and grades.

Furnish traffic control necessary for surveying activities in accordance with Section 643, and the latest edition of the Alaska Traffic Manual (ATM). Outfit all field employees with appropriate High Visibility Clothing as defined in Section 643, Subsection 3.11.

The Engineer may randomly spot check the Contractor's surveys, staking, and computations. The Department assumes no responsibility for the accuracy of the work.

The Engineer has the right to communicate directly with the Surveyor. Any communication regarding changes to the original scope of work shall go through the Contractor.

The Surveyor is responsible for:

1. Maintaining registration as a Professional Land Surveyor in the State of Alaska.
2. Maintaining familiarity with the site conditions and progress of the project.
3. Determining the accuracy required for each survey stake.
4. Following the State of Alaska DOT&PF Construction Surveying Requirements.
5. Notifying the Engineer of conflicts and changes necessary due to utilities, match point variations, design revisions, or other variables.
6. Slope Staking.
7. Staking all clearing and/or grubbing limits. Clearly identify all trees that are specified to remain.

8. Staking and hubbing all layers of material shown in the typical sections, including the bottom of excavation, top of borrow, top of base course, and top of surcharge.
9. Staking all culverts, curbs, inlets, and other drainage appurtenances.
10. Staking all bridge and pedestrian over/under-crossings.
11. Staking all right-of-way and material source limits.
12. Rabbit tracking for temporary and permanent pavement striping, and pavement marking devices.
13. Weekly settlement platform elevation monitoring.
14. Development of DTM's, and plotted cross sections.
15. As-built and Topographic surveying.
16. Performing elevation readings on settlement platforms.
17. Removal and disposal of all flagging, lath, stakes and other staking material after the Project is completed. Burning of material is not allowed on the project.
18. All other surveying and staking necessary to complete the project.

642-3.02 MONUMENTS. The Department will reference and replace all monuments identified on the plans. The Surveyor shall notify the Engineer immediately of any monuments encountered that are not identified on the plans. The Engineer will determine whether the monuments encountered are to be referenced or adjusted by the Surveyor or the Department.

If directed by the Engineer, the adjustment of monument cases or the referencing of monuments not identified on the plans will be considered additional work and paid by 642(3), Three Person Survey Party. Set existing monument cases to be adjusted to new elevations in the manner and at the elevations directed.

The Surveyor shall complete and stamp a *State of Alaska Land Survey Monument Record* form for each primary and secondary monument referenced. Provide the required survey information on the form in accordance with statutory requirements, including the project name/number, section, township, and range. Meet requirements for recording at the District Recorder's Office in which the project is located for each monument record. Deliver conforming copies of the recorded forms to the Engineer before monument removal or disturbance.

642-3.03 SURVEY CONTROL. The basis of project control is identified in the *Survey Control Sheet*. Use the calibration parameters shown in the *Survey Control Sheet* to Calibrate/Localize/Convert to the local project coordinate system. Contact the AK DOT&PF Central Region Survey Manager through the Engineer for calibration parameters if they are not shown in the plans. Independently recover and verify all survey control points shown in the *Survey Control Sheet*. Establish and verify new reference points where required, to replace missing points. Notify the Engineer immediately if a reference point is discovered to be in error, or a reset point is not in harmonious relationship to the existing control points. Provide the Engineer a signed hard copy verifying vertical loop closure of project control points.

The use of RTK is not an acceptable method for establishing additional horizontal or vertical control. Horizontal control points may be established using Static GPS or conventional traversing methods. Vertical control points shall be established with differential levels.

Survey accuracy requirements shall conform to the minimums listed in the *State of Alaska DOT&PF Construction Surveying Requirements*.

642-3.04 GPS SURVEYS. The specifications described in this Section are not intended to discourage the use of new GPS procedures and techniques. Procedures that are not defined by this specification may be allowed if approved by the AK DOT&PF Central Region Survey Manager, through the Engineer.

1. General Requirements:
 - a. All surveying shall be done in the local project coordinate system.
 - b. OPUS shall be used for the determination of Reference Station positions only, and shall not be used directly for producing final positions for any Static, Fast Static, RTK or PPK surveys. OPUS may be used as a tool for verification of the final positions obtained from these types of surveys.
2. GPS Equipment: Survey Grade dual frequency GPS receivers shall be used. For static surveys these shall be set up on adjustable leg tripods at a minimum. Fast or Rapid Static GPS surveys require a bipod at a minimum. RTK or PPK surveys may use fixed or adjustable poles, or secure lashings to vehicles.
3. GPS Reference Stations:
 - a. All Reference Stations shall be approved by the AK DOT&PF Central Region Survey Manager through the Engineer, prior to conducting any GPS surveys.
 - b. Primary Reference Stations shall meet current NGS CORS standards. Secondary Reference Stations may be used temporarily when a Primary Reference Station is not available.
 - c. Primary Reference Stations shall be permanently mounted and shall not change throughout the duration of the project.
 - d. Secondary Reference Stations may be tripod mounted, however, GPS receivers shall never be mounted on aluminum tripods.
 - e. All Reference Stations shall be tied to an OPUS derived position, and on the NAD83 datum. Submit GPS data files for a minimum of 2 days, 12 hours per day, 5 second epoch to OPUS to determine the final position. The OPUS derived position shall be determined at the beginning of the project, and shall not change throughout the duration of the project unless approved by the Engineer. Notify all users immediately if any changes are made to the Reference Station's position. If OPUS is unable to process a position, the Reference Station shall be tied to existing project control.
 - f. Reference Stations shall be physically located in clear view of the sky. Avoid locations near cellular towers or other areas that may disrupt satellite signal reception. Avoid locations near large flat surfaces such as buildings, large signs, fences, and other objects that may cause multi-path interference.
 - g. Reference Stations shall be located to provide maximum coverage of the project area.
 - h. Store 5 second epoch data, and post data online for use by the Engineer.
 - i. GNSS enabled Reference Stations are allowed.
4. RTK Surveys:
 - a. The Surveyor shall follow prudent practices when conducting RTK surveys. The NGS has published a draft manual titled National Geodetic Survey User Guidelines For Classical Real Time GNSS Positioning, v.2.0.3 issued in September, 2008. The Surveyor shall become familiar with this manual, in order to better understand prudent practices. Copies of the draft manual may be available upon request or may be downloaded from the following web site: http://www.ngs.noaa.gov/PUBS_LIB/NGSRealTimeUserGuidelines.v2.0.4.pdf.
 - b. RTK surveys may not be used to permanently mark or delineate Right-Of-Way.

5. Local Coordinate Calibration:

- a. Use GPS calibration parameters if they are provided on the *Survey Control Sheet*. If GPS calibration parameters are not given, develop a local site calibration based on existing project control. All included control points shall have WGS84 positions that were observed by either a GPS Static or Fast Static network, as well as the final adjusted project control coordinate values that match the values listed on the *Survey Control Sheet*. The calibration shall consist of the following conversion parameters; Rotation, Translation, Scale, and GPS derived orthometric heights. Values listed on the *Survey Control Sheet* shall be held fixed in any adjustment, barring any large residuals. Notify the Engineer of any large residuals so that the problems can be identified and corrected. Submit a signed hard copy of the calibration parameters, residuals, and related control points to the Engineer for approval before staking activities begin.
- b. Perform a local calibration each time the coordinates of the reference station change.

6. GPS Data Summary Report:

- a. Generate reports for all surveyed points, including the Point Number, Northing, Easting, Elevation, Point Code, Annotation(s), Date, Time, residuals, observation (start and stop) times, and antenna height information. Summary reports shall bear the signature and seal of the Surveyor.
- b. The Engineer may require the Contractor to re-survey specified points at no cost to the Department if the Survey doesn't meet the minimum accuracy requirements defined in the *State of Alaska DOT&PF Construction Surveying Requirements*.

7. Weather Conditions: The Surveyor shall follow prudent practices when conducting GPS surveys in inclement weather. The following is recommended as a guideline:

- a. Regularly observe surface and solar weather forecasts prior to planning survey activities.
- b. Use sound practical judgment when performing surveys during inclement weather conditions.
- c. Observations should never be conducted during an electrical storm.
- d. Note significant or unusual weather conditions in the field notes, data collector, or receiver.

642-3.05 TOPOGRAPHIC SURVEYS. Topographic surveys shall be conducted under the direct supervision of the Surveyor. The purpose of a topographic survey is to gather field data to determine the configuration (relief) of the surface of the earth (ground). Use all data collected to generate topographic DTM surfaces as defined in Section 642-3.07, Digital Terrain Models. All data becomes the property of the State of Alaska. Conduct topographic surveys as follows:

1. General Requirements:

- a. Collect topographic data within the right-of-way limits.
- b. Keep all shots 50 ft or closer, as necessary to accurately define all surface features within the roadway corridor.
- c. Keep a field book of notes describing changes or errors of rod heights, point descriptors, or other annotations necessary to verify all electronic data.
- d. Identify each point with a point number. Multiple points with the same point number are not permitted.
- e. Identify each shot with the appropriate point code. Break line points shall be separately identifiable from ground shots.
- f. Append any additional information required to further describe a point with point annotations.
- g. Develop a summary of standard point codes for all points used on the project.

- h. Develop a summary of standard point descriptors to identify all point codes used on the project (i.e. *Edge of Pavement* is the point descriptor corresponding to the *EP* point code).
2. Functional Requirements: The purpose of a topographic survey is to develop an appropriate DTM as defined in Section 642-3.07. Conduct a topographic survey to meet the appropriate functional requirements as defined below:
 - a. *As-built Surfaces* – Conduct a survey of all finished roadway surfaces, embankments, ditches and other topographic features as required to accurately define the project topography.
 - b. *Excavation Surfaces* – Conduct a survey of original grade (upper) surfaces, and bottom of excavation (lower) surfaces, as necessary to produce DTM volumetric quantities. Follow the requirements listed below:
 - (1) Upper surface – Survey prior to excavation. Topographic data may be collected prior to grubbing and pavement removal, and adjusted by the average depth removed as measured in the field.
 - (2) Lower surface – Survey after the final grade has been established by excavation.
 - c. *Embankment Surfaces* – Conduct a survey of excavated or original grade (lower) surfaces, and top of embankment (upper) surfaces, as necessary to produce DTM volumetric quantities. Follow the requirements listed below:
 - (1) Upper surface – Survey after the final grade has been established.
 - (2) Lower surface – Survey prior to the placement of embankment. If only grubbing or pavement removal is required prior to placement of embankment, the topographic data may be collected prior to grubbing and pavement removal and adjusted by the average depth removed, as measured in the field. If excavation is required prior to placement of embankment, survey only after excavation activities have been completed.
 3. Accuracy Tolerance Limits: The Surveyor shall check into and collect primary control monument locations to ensure the data being collected meets the minimum *Horizontal* and *Vertical Accuracy Tolerances*. This shall serve as a basis of acceptance for the topographic data collected by the Surveyor. The *Horizontal* and *Vertical Accuracy Tolerances* will be used to check for systematic error, and will be evaluated by comparing all control check shots taken during the topographic survey to the monument's location as defined on the *Survey Control Sheet*. The *Volumetric Accuracy Tolerance* will be used to check for random and operator error, and will be evaluated by comparing the Contractor furnished DTM with an independent DTM developed by the Department. The *Volumetric Accuracy Tolerance* shall be applied only to survey data that is used to calculate volumetric quantities.
 - a. *Horizontal Accuracy Tolerance* – Check shots shall be within $\pm$ five hundredths (0.05) of a foot of the monument's horizontal position. If any of the data doesn't meet the minimum the horizontal tolerance, the Engineer may require the Contractor to re-survey the non-conforming points at no additional cost to the Department.
 - b. *Vertical Accuracy Tolerance* – Check shots shall be within $\pm$ one tenth (0.10) of a foot of the monument's vertical position. If any of the data doesn't meet the minimum vertical tolerance, the Engineer may direct the Contractor to re-survey the non-conforming points at no additional cost to the Department.
 - c. *Volumetric Accuracy Tolerance* – The Department will determine the volumetric error on randomly selected areas, including at least 20% of the area within the slope limits. The Department will calculate the volumetric error as follows:
 - (1) Determine the *net volume* by comparing the Contractor's DTM to the Department's DTM.
 - (2) Determine the *accepted volume* by comparing the Department's DTM to the appropriate neat-line surface.
 - (3) Determine the volumetric error by dividing the *net volume* by the *accepted volume*.

The Engineer may require the Contractor to re-survey any areas that exceed 5% error at no additional cost to the Department.

4. Control Check Requirements: Collect local project control data at the following minimum frequency:
 - a. Every time the instrument is turned on, at the beginning of the survey session.
 - b. Prior to every time the instrument is turned off, at the end of the survey session.
 - c. Every time the instrument is moved (radial survey).
 - d. Every time the backsight is moved (radial survey).
 - e. Every time the actual or broadcasted position of the Reference Station changes (GPS survey).
5. Deliverables: Provide copies of the following to the Engineer:
 - a. Plotted and electronic as-built surfaces (developed per Section 642-3.07) showing major and minor contours. Standard contour intervals shall be 5 ft (major) and 1 ft (minor).
 - b. All field books noting any errors, corrections, or changes to the data.
 - c. All electronic survey data in a comma delimited ASCII file in PNEZD format (Point number, Northing, Easting, Elevation, and Description).
 - Letter of conformance signed and sealed by the Surveyor, certifying that the Topographic Survey meets the minimum *Horizontal* and *Vertical* accuracy requirements. Attach all backup data and calculations.

642-3.06 AS-BUILT SURVEYS. As-built surveys shall be conducted under the supervision of the Surveyor. The as-built survey shall document the final locations of roadways, topographic surfaces, structures, and utilities within the ROW project limits. The Surveyor shall maintain communication with the Contractor, Sub-Contractor or Utility Company as necessary to coordinate surveying activities. Surveying activities shall be conducted as soon as possible as each phase of the project is completed, and to avoid scheduling conflicts. The survey will be used to verify that the contracted work items conform to the plans and specifications. All survey data becomes the property of the State of Alaska.

1. General Requirements:
 - a. Topographic Survey of all roadway and pedestrian corridors, in accordance with Section 642-3.05, Topographic Surveys.
 - b. Utility Survey of all existing and re-located utilities. Record the horizontal and vertical location of all underground and overhead utilities. Take digital photos of all exposed utility crossings. Identify the location of each photo taken, including the approximate northing, easting, and bearing.
 - c. Structural Survey of all existing and re-located structures, including bridges, tunnels, manholes, signs, fences, guard rails, walls, and foundations.
2. Deliverables: Provide copies of the following to the Engineer:
 - a. Plotted as-built drawings showing the final surveyed locations of all roadways, topographic surfaces, structures, and utilities. Plotted drawings shall be identified by the Project name and number, and bear the signature and seal of the Surveyor.
 - b. Printed color photos, identifying the location of all underground utility crossings.
 - c. All field books used to conduct the as-built survey.
 - d. All DTM and point data files generated by the as-built survey.

642-3.07 DIGITAL TERRAIN MODELS. Develop all Digital Terrain Models using CAD software that is compatible with the latest release of software used by the Department. All DTM's shall be approved by the Engineer.

1. **DTM Development Methods:** Develop all DTM's using the appropriate method as defined below:
 - a. ***Engineering Method*** - Use this method to define all neat-line surfaces. Develop the DTM by associating all appropriate engineered features such as alignments, profiles, sections, daylight surfaces, grading lines, and other features.
 - (1) CAD software shall generate and automatically update surfaces based on the association of alignments, profiles, sections, grading lines, and other parameters necessary to accurately represent neat-line geometry.
 - (2) Limit tessellation spacing to allow an accurate representation of a surface feature. The Engineer may require changes to the tessellation spacing, if necessary to allow an accurate representation of the feature.
 - (3) If the Contractor excavates or fills beyond the neat-line limit without the direction of the Engineer, only the neat-line limit shall be used.
 - b. ***Topographic Method*** - Use this method to define all topographic surfaces. Each vertex of a triangle in the TIN shall be formed by a field measured data point, and shall be located by its (XYZ) coordinate. Develop the TIN surface by connecting Topographic Survey points to their nearest neighboring points (in XY), except as outlined below:
 - (1) **Break Lines** – Create break lines by connecting Topographic Survey points that are identified by their appropriate break line descriptors. Break lines shall snap to vertices on adjacent break lines when two break lines intersect. Break lines shall not cross. Use break lines to establish the following features:
 - (a) Centerline of roadway.
 - (b) Lane separations (for multiple lane roadways).
 - (c) Edge of pavement.
 - (d) Shoulder hinge points.
 - (e) Bottom of ditch.
 - (f) Ditch back slope catch point.
 - (g) For curb and gutter sections, break lines shall be collected at the flow line and back of curb.
 - (h) Ridge lines.
 - (i) Rim of pits or significant depressions.
 - (j) Areas of slope change or undulations in slope.
 - (k) Bottom of valleys or draws.
 - (l) Hydraulic features.
 - (m) Around buildings and structures (including top and bottom of walls).
 - (2) **Boundaries** – Boundaries break the TIN lines and define the edge of the surface. Use boundaries to trim all non-relevant edges from the DTM. Use either non-destructive or destructive trimming as necessary to preserve the accuracy of the DTM. Use boundaries to establish the following features:
 - (a) Outer boundary of the DTM.
 - (b) Edge of a void inside the surface.
 - (c) Edge of an island inside of a void.
 - (3) **Surface Editing** – Surface Editing allows changes that more accurately represent the actual terrain. Use surface editing to delete or swap edges of the triangulated network as necessary to best represent the actual site condition. Mathematically computed points for the purpose of surface smoothing may be used only if approved by the Engineer. The creation of contour lines for the purpose of DTM surface extraction is not acceptable.
 - c. ***Combination Method*** - Use this method when the Engineer approves a change to the neat-line limit.
 - (1) In areas where the Engineer approves a change to the neat-line limit, develop new surfaces using the *Topographic Method*.
 - (2) Replace the neat-line surface with the new topographic surfaces to create an appropriate single surface.

642-3.08 CONTRACTOR FURNISHED COMPUTATIONS. Provide computations for volumetric pay items using DTM's developed per Section 642-3.07. Cross sections developed from the appropriate DTM's will be used as a supplementary quality control check on DTM parameters and quantities, and not for pay. The Contractor may use the *Average End Area Method* in accordance with Section 109, only if approved in writing by the Engineer.

1. Deliverables: Provide copies of the following to the Engineer:
 - a. Plotted cross sections from the DTM surfaces. Develop separate cross sections for each volumetric pay item. More than one pay item per plotted cross section is not allowed.
 - (1) Plot every 50 ft on Station, including intermediate stations as required to define angle points, curves, or other significant changes in the roadway geometry.
 - (2) Show the elevation and offset information for all vertex points. Weeding vertex point labels is not allowed. Elevation and offset information may be shown on a separate report if the amount of information exceeds what can be legibly shown on the plot.
 - (3) Show the area for each cross section.
 - (4) Label each plot with the project name, project number, pay item number, and pay item name.
 - (5) Label each plot with the Surveyor's Company name and address.
 - b. Plotted profiles from the DTM surfaces. Develop separate plots for each volumetric pay item. Each plot shall only identify the profiles appropriate to the volumetric pay item.
 - (1) Plot the profile along the alignment centerline as shown in the plans.
 - (2) Label each profile as original ground, bottom of excavation, and the top or bottom of embankment, as appropriate.
 - (3) Label topographic profiles with elevation and station information, using a weeding frequency of every 100 ft, or as necessary to match the frequency shown on the plans.
 - (4) Label the neat-line profiles with elevation and station information every 100 ft, and for the beginning, end, and VPI of all vertical curves and grade breaks. Label the percent slope between all grade breaks, to the fourth significant decimal.
 - (5) Label each plot with the project name, project number, pay item number, and pay item name.
 - (6) Label each plot with the Surveyor's Company name and address.
 - c. Electronic Data
 - (1) Provide copies of all Topographic, Neat-line, and Combination surfaces to the Engineer. Include all electronic features (alignments, profiles, sections, etc.) used to generate the surfaces.
 - (2) All data shall be delivered on a clearly labeled CD-ROM or DVD, unless specified otherwise by the Engineer. The label shall include the project name, project number, Surveyor's company name, and date. All data becomes the property of the State of Alaska.
 - (3) DTM files shall be saved in Autodesk, TIN, XML, or other approved formats compatible with Department software.
 - d. Volume Reports
 - (1) Provide interim volume reports showing quantities between every 50 ft station. The volume reports shall be summarized to allow the Department to reference the quantities per individual plan sheet, or as defined in any earthwork summary shown on the plan sheets.
 - (2) Provide a final volume report reflecting the final total quantity. Attach all data, calculations, and plots to the report. The report shall be signed, sealed, and dated by the Surveyor. This report shall be used as the basis for final pay.

642-3.09 CONTRACTOR FURNISHED ENGINEERING TOOLS. Furnish and maintain Engineering Tools as directed by the Engineer, for the exclusive use of the Engineer throughout the duration of the project. The Contractor shall furnish all equipment specifications to the Engineer for approval, prior to furnishing equipment. The equipment shall be in good working condition not more than 1 model year old. The Contractor shall insure and indemnify the Department against normal wear and tear, damage, theft, and all other events that may cause a loss of function of the furnished tools. The equipment shall be returned to the Contractor upon completion of the project, or when services are terminated by the Engineer. Furnish training for the Engineer's staff, as directed by the Engineer.

1. GPS Rover Unit – All components shall be fully compatible to provide a stand-alone GPS Rover Unit. The Rover Unit shall be an “all on the pole” system equipped with the following:
 - a. Receiver
 - (1) Bluetooth compatible.
 - (2) Meet waterproof specification IPX7.
 - (3) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (4) Dual frequency receiver capable of tracking at least twelve (12) satellites simultaneously on parallel channels.
 - (5) Capable of RTK, Static, and Fast Static occupations.
 - (6) Capable of receiving L1, L2, and GNSS frequencies.
 - (7) Antenna model shall have undergone antenna calibration by the NGS.
 - (8) Ensure the receiver contains the manufacturer’s latest firmware upgrades.
 - (9) Provide the manufacturer’s user guide.
 - b. Controller
 - (1) Bluetooth compatible.
 - (2) Equipped with onboard software allowing for the configuration of RTK, PPK, or Static rover modes.
 - (3) Meet waterproof specification IPX7.
 - (4) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (5) Full QWERTY keyboard with numeric keypad, and/or equivalent touch screen interface.
 - (6) Capable of collecting data in WGS84 and displaying local project coordinates.
 - (7) Equipped with onboard software that allows automatic point logging.
 - (8) Capable of creating and storing line-work in DFX or DWG format.
 - (9) Equipped with onboard software to allow the user to stake-out points, 3D lines, and DTM surfaces. Software shall allow the user to read cut/fill elevations relative to a DTM surface.
 - (10) Capable of importing, exporting, and storing point, line, and DTM data.
 - (11) Capable of showing satellite, radio, and battery status.
 - (12) Equipped with onboard software that allow the user to create and manage survey jobs, point data, coordinate systems, and alignments.
 - (13) Equipped with a removable memory storage device with a minimum capacity of 512MB.
 - (14) Capable of storing custom configuration settings for the GPS Rover Unit.
 - (15) Ensure the controller contains the manufacturer’s latest firmware upgrades.
 - (16) Provide the manufacturer’s user guide.
 - c. Radio System
 - (1) Meet waterproof specification IPX7.
 - (2) Support a frequency compatible with the Reference Station.
 - (3) Capable of storing multiple radio frequencies.
 - (4) Compatible with the Reference Station’s broadcasting format and protocol.
 - (5) Power and programming cables.
 - (6) Provide the manufacturer’s user guide.
 - d. Batteries
 - (1) Provide all batteries required to fully power and operate the GPS Rover Unit.
 - (2) Batteries shall be capable of powering their respective equipment continuously, for not less than 6 hours under normal operating conditions.
 - (3) Each battery shall be rechargeable and commercially available.
 - (4) Provide an identical replacement backup battery for each primary battery required.
 - (5) Provide all power connectors necessary to connect the batteries to the equipment.
 - (6) Provide battery chargers to allow all onboard batteries to be charged simultaneously, and that safeguard against overcharging.
 - e. Rod
 - (1) Fixed height (non-adjustable).
 - (2) Mounting hardware for GPS controller and radio.
 - (3) Pole grip with bubble level.
 - (4) Detachable bipod.
 - (5) Interchangeable flat and pointed footings.
 - (6) Quick release adapter for the GPS receiver.

- f. Carrying Case
 - (1) Hard Shell.
 - (2) Shockproof.
 - (3) Waterproof.
 - (4) Capacity to hold all components of the GPS rover, minus the rod.
2. Continually Operating Reference Station – The location of the CORS shall not change for the duration of the project. The CORS shall be permanently mounted per NGS CORS standards. All structures, mounting hardware, power supply, computers, software, networking, and personnel required to support and operate the CORS is considered subsidiary to this item. Store CORS data for the duration of the project, and post online for use by the Engineer. The CORS shall include and conform to the following requirements:
 - a. GPS Receiver
 - (1) Choke-ring antenna, model shall have undergone antenna calibration by the NGS.
 - (2) Meet waterproof specification IPX7.
 - (3) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (4) Able to operate in temperatures between -20° F to +140° F.
 - (5) Capable of logging L1/L2 data continuously for 180 days, and storing at 1 second intervals. If onboard memory storage capacity is insufficient, backup all data on an external memory storage device.
 - (6) Support multiple, simultaneous data logging sessions at different collection rates.
 - (7) Equipped with a dual frequency receiver capable of tracking L1, L2, and GNSS frequencies on at least 12 satellites. Receiver shall have a minimum of 24 channels.
 - (8) Support CMR/CMR+ and RTCM output simultaneously via separate ports.
 - (9) Use multi-path mitigation techniques.
 - (10) Satellite acquisition technology shall provide improved tracking in areas of high radio interference such as under power lines, around airports, near radio-intensive construction sites.
 - (11) Capable of 1PPS output with an accuracy of 1µsec.
 - (12) Equipped with 1 primary and 1 secondary power input port.
 - (13) The system shall automatically switch between power sources.
 - (14) Equipped with over-voltage protection on all power inputs.
 - (15) Capable of reporting Signal-to-Noise Ratio (SNR) values for L1 and L2.
 - (16) Capable of logging data at operator selected intervals of 0.5, 1, 5, and 30 seconds.
 - (17) Provide the manufacturer's user guide.
 - b. Radio
 - (1) Transmission power, 25 watt minimum.
 - (2) Meet waterproof specification IPX7.
 - (3) Ensure the radio has a current license to broadcast in accordance with FCC requirements.
 - (4) Ensure the radio broadcast frequency doesn't conflict with other nearby broadcasting sources.
 - (5) Provide the manufacturer's user guide.
 - c. CORS Facility – Provide a facility to mount and house CORS station equipment.
 - (1) Facility shall meet NGS CORS mounting requirements, and shall be approved by the Engineer.
 - (2) Shall be physically located in a clear view of the sky, away from objects that may cause multi-path interference.
 - (3) Location shall provide for maximum strength of geometry relative to the primary control network and the project limits.
 - (4) Shall be connected to a primary power source, and a backup power source capable of providing uninterrupted backup power for a minimum of 48 hours.
3. GPS Base/Repeater Station – All components shall be fully compatible to provide a stand-alone GPS Base/Repeater Station setup. The setup shall include the following:
 - a. Receiver
 - (1) Meet waterproof specification IPX7.
 - (2) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (3) Dual frequency receiver capable of tracking at least 12 satellites simultaneously on parallel channels.
 - (4) Antenna model shall have undergone antenna calibration by the NGS.

- (5) Ensure the receiver contains the manufacturer's latest firmware upgrades.
 - (6) Carrying case.
 - (7) Tribrach with optical plummet and height rod.
 - (8) Provide the manufacturer's user guide.
- b. Controller
- (1) Equipped with onboard software allowing for configuration as a GPS reference station in RTK, PPK, Static, and Fast Static modes.
 - (2) Capable of logging raw observations for post processing.
 - (3) Capable of showing satellite, radio, and battery status.
 - (4) Meet waterproof specification IPX7.
 - (5) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (6) Full QWERTY keyboard with numeric keypad, and/or equivalent touch screen interface.
 - (7) Equipped with a removable memory storage device with a minimum capacity of 512MB.
 - (8) Equipped with 1 primary and 1 secondary power input port.
 - (9) Ensure the controller contains the manufacturer's latest firmware upgrades.
 - (10) Provide the manufacturer's user guide.
- c. Radio
- (1) Transmission power, 25 watt minimum.
 - (2) Meet waterproof specification IPX7.
 - (3) Shockproof for a drop onto a hard surface from a height of 4 feet.
 - (4) Support a frequency compatible with the Reference Station.
 - (5) Capable of storing multiple radio frequencies.
 - (6) Compatible with the CORS broadcasting format and protocol.
 - (7) Ensure the radio has a current license to broadcast in accordance with FCC requirements.
 - (8) Ensure the radio broadcast frequency doesn't conflict with other nearby broadcasting sources.
 - (9) Equipped with onboard software/firmware allowing for configuration as either a Reference Station or a Repeater Station.
 - (10) Carrying case.
 - (11) Antenna.
 - (12) Antenna/pole mounting adapter.
 - (13) Provide the manufacturer's user guide.
- d. Tripods – Provide one of each:
- (1) Conventional tripod with extendible range pole. Include carrying case.
 - (2) Conventional wood tripod.
- e. Batteries
- (1) Provide all batteries required to fully power and operate the GPS Base/Repeater Station.
 - (2) Batteries shall be capable powering their respective equipment continuously, for not less than 6 hours under normal operating conditions.
 - (3) Each battery shall be rechargeable and commercially available.
 - (4) Provide an identical replacement backup battery for each primary battery required.
 - (5) Provide all power connectors necessary to connect the batteries to the equipment.
 - (6) Provide battery chargers to allow all batteries to be properly charged, and that safeguard against overcharging.
4. Computer Hardware – Hardware shall meet the following minimum requirements:
- a. Laptop Computer
- (1) 2.8 GHz multi-core CPU.
 - (2) 120GB Internal Hard Drive.
 - (3) 4 GB System RAM.
 - (4) Display 13" with 1,600 x 1,200 resolution.
 - (5) 512MB video memory.
 - (6) DVD Burner Drive.
 - (7) Internal Bluetooth and Wi-fi.
 - (8) Internal Battery.
 - (9) 120v AC Adapter.

- (10) 12v DC Adapter.
 - (11) Built-in CF, SD, and PCMCIA card ports.
 - (12) 4 USB 2.0 ports.
 - (13) 1394 (firewire) port.
 - (14) Mouse (wireless).
 - (15) Travel Case (hard) for laptop and accessories.
- b. Laptop Computer Mount
 - (1) Permanently installed in a vehicle, as directed by the Engineer.
 - (2) Fastened to the passenger side of the vehicle.
 - (3) Shock and vibration resistant.
 - (4) Fully adjustable positioning with mechanically locking hinge points.
- c. Desktop Computer
 - (1) 3 GHz multi-core CPU
 - (2) 120GB Internal Hard Drive
 - (3) 4 GB System RAM
 - (4) Compatible DVI 19" monitor with 1,600 x 1,200 resolution
 - (5) Internal video card/chip, 512MB, 2 DVI ports
 - (6) Internal DVD Burner Drive
 - (7) CF and SD media card reader
 - (8) 6 USB ports
 - (9) 1394 (firewire) port
 - (10) Internal wireless (IEEE 802.11 b/g) network card
 - (11) Internal Ethernet card (10/100 Mbps).
 - (12) Uninterruptible Power Source (UPS), 8 outlets, 390 Watt
 - (13) 250 GB Backup Hard Drive (external)
 - (14) Mouse and Keyboard
- d. Laser Printer
 - (1) 45 pages per minute print speed.
 - (2) 1200 x 1200 dpi print quality.
 - (3) Main tray capacity shall hold no less than 500, 8.5 x 11 inch sheets.
 - (4) Multipurpose tray capable of custom sizes up to 11 x 17 inch sheets.
 - (5) 128 MB of onboard memory, minimum.
5. Computer Software – All software shall be licensed and fully operational. Provide software that is similar or approved equal in accordance with the following:
- a. Operating System Software – Provide an operating system that supports the drivers of all onboard and auxiliary computer hardware systems. The operating system shall be of the latest release, with the most current updates installed. The operating system shall support all of the applications listed below.
 - b. CAD Software – Provide CAD software that is capable of dynamically associating and updating alignment, profile, section, grading, point, and surface data. The software shall be capable of saving all data to formats that are compatible with the latest release of CAD software currently used by the Department. Formatting shall preserve the dynamic relationship of all DTM features. Software that doesn't dynamically associate all DTM features is not acceptable.
 - c. Word Processing Software – Provide software that is compatible with the latest release of word processing software currently used by the Department.
 - d. Spreadsheet Processing Software – Provide software that is compatible with the latest release of spreadsheet processing software currently used by the Department.
 - e. Anti-Virus Software – Provide software to protect against viruses and other security threats. Software shall be equipped with a firewall containing industry standards of system protection. The software shall be capable of backing up all hard drive data.

- f. GPS Processing Software – Provide GPS processing software of the latest release and from the same vendor as the GPS equipment furnished. Include all necessary hardware/software keys to enable L1 & L2 Static, PPK, and RTK processing, GNSS processing, network adjustments, datum and map transformations, and RINEX data importing and exporting.

642-4.01 METHOD OF MEASUREMENT. The work will be measured according to Section 109, and as follows:

1. Item 642.0001. Construction Surveying. Prior to beginning work, develop a Lump Sum Agreement that itemizes major contract work requirements by percentage. Work will be measured by the percent completion of all major contract work requirements defined in the Lump Sum Agreement.
2. Item 642.0003. Three Person Survey Party. By the hour for extra, additional, or unanticipated work made necessary by changes in the project, as directed, and as supported by certified payrolls. Work accomplished by a three person survey party will be paid at 100% of the contract unit price. Work accomplished by a two person survey party will be paid at 75% of the contract unit price. Work accomplished by a one person survey party will be paid at 32% of the contract unit price.
3. Item 642.2005. Contractor Furnished Computations. Prior to beginning work, develop a Lump Sum Agreement that itemizes all plan sheets labeled “Plan and Profile” (or similar) by percentage. Work will be measured by the percent completion of all computations required, per plan sheet defined in the Lump Sum Agreement.
4. Item 6432.2006. Contractor Furnished Engineering Tools. Contingent sum work will be measured in accordance with the directive authorizing the work.

642-5.01 BASIS OF PAYMENT. Pay Items include all necessary personnel, equipment, transportation, traffic control, and supplies to accomplish the work described in the Contract, or directed by the Engineer.

1. Item 642.0001. Construction Surveying. This item includes all surveying work described in the Contract except for work paid for under 642.0003.____, 642.2005.____, and 642.2006.____. 5% of the contract lump sum bid price will be withheld until the final As-Built Survey is completed and accepted by the Engineer. Surveying required for determining volumetric quantities is considered subsidiary to Item 642.2005.____.
2. Item 642.0003. Three Person Survey Party. Adjustment according to 109-1.04 is not allowed for this pay item. When directed by the Engineer to reference an existing monument not shown in the plans, payment will be made after the Monument Record Forms are prepared and recorded in the local Recorder’s Office and accepted by the Engineer.
3. Item 642.2005. Contractor Furnished Computations. This item includes all work required to develop and furnish quantity computations in accordance with methods required by the contract. Earthwork computations, digital terrain model development, plotted cross sections, quantity reports, and associated topographic surveying are subsidiary to this item. The Engineer may withhold payment for this item if the minimum specifications are not met. 10% of the contract lump sum bid price will be withheld until final computations are accepted by the Engineer. If the Contractor excavates or fills beyond the neat-line limit without the direction of the Engineer, the calculated volume shall only extend to the neat-line limit.
4. Item 6432.2006. Contractor Furnished Engineering Tools. The Engineer shall issue a directive defining and authorizing the work. Payment for a GPS Rover, Base/Repeater Station, CORS, or Computer System will be made on a time and materials basis in accordance with Subsection 109-1.05-3e, Leased or Rented Equipment. Payment for training will be made on a time and materials basis in accordance with Section 109-1.05. If the training is beyond the Contractor’s ability or expertise, payment will be made in accordance with Subsection 109-1.05-4, Work by a Specialty Subcontractor. The Engineer may withhold payment for this item if the minimum specifications are not met. The Engineer may issue a directive at any time to terminate or re-authorize the work, at no additional cost to the Department.

Payment will be made under:

PAY ITEM

Item Number	Item Description	Unit
642.0001.____	Construction Surveying	LS
642.0003.____	Three Person Survey Party	Hour
642.2005.____	Contractor-Furnished Computations	LS
642.2006.____	Contractor-Furnished Engineering Tools	CS

CFHWY00453

Special Provisions

Replace Section 643 with the following:

SECTION 643 TRAFFIC MAINTENANCE

643-1.01 DESCRIPTION. Protect and control traffic during the contract. Furnish, erect, maintain, replace, clean, move, and remove the traffic control devices required to ensure the traveling public's safety. Perform all administrative responsibilities necessary to implement this work.

Maintain all roadways and pedestrian and bicycle facilities affected by the work in a smooth and traversable condition. Construct and maintain approaches, crossings, intersections, and other necessary features throughout the project for the life of the contract.

Illuminate construction activities listed in Table 643-4 during hours of night work on roads open to the public within project limits.

643-1.02 DEFINITIONS. These definitions apply only to Section 643.

ATM. When used in this Section, ATM stands for the Alaska Traffic Manual, which is comprised of the Manual on Uniform Traffic Control Devices (MUTCD), the Alaska Traffic Manual Supplement, any adopted revisions or interim addenda to either document issued subsequently, and corrections to known errors to either document.

BALLOON LIGHT. Light surrounding by a balloon-like enclosure kept inflated by pressurized air or helium, and producing uniform light through 360 horizontal degrees.

CONSTRUCTION PHASING PLAN. A plan for each phase of the project showing how to accommodate traffic. Show the sequence of work by segment or phase, if required.

FIXED OBJECTS. Private vehicles, parked flagger vehicles, idle construction equipment, construction material stockpiles, culvert ends, individual trees, power poles, utility poles and appurtenances, and other items deemed by the Engineer to present a hazard to motorists, pedestrians, or bicyclists traveling through the work zone.

NIGHT WORK. Work occurring between sunset and sunrise on all days except the "No Lighting Required" period shown in the Table 643-1 below:

**TABLE 643-1
PROJECT LOCATIONS – NIGHT TIME ILLUMINATION EXCLUSION**

Latitude (degrees)	No Lighting Required		Nearby Cities
	Start	End	
South of 61	Lighting Required All Year		Everything South of Hope
61	June 11	July 1	Anchorage, Valdez, Girdwood
62	June 2	July 13	Wasilla, Palmer, Glennallen, Talkeetna
63	May 27	July 17	Cantwell, Paxson, McGrath
64	May 22	July 21	Tok, Delta, Nome
65	May 18	July 25	Fairbanks
66	May 14	July 29	Circle City
67	May 10	August 2	Coldfoot, Kotzebue
68	May 7	August 6	Galbraith Lake
69	May 3	August 9	Happy Valley
70	April 30	August 12	Deadhorse
71	April 27	August 15	Barrow
72	April 24	August 19	

TRAFFIC. The movement of vehicles, pedestrians, and bicyclists through road construction, maintenance operations, utility work, or similar operations.

TRAFFIC CONTROL PLAN (TCP). A drawing or drawings indicating the method or scheme for safely guiding and protecting motorists, pedestrians, bicyclists, and workers in a traffic control zone. The TCP depicts the traffic control devices and their placement and times of use.

TRAFFIC CONTROL ZONE. A portion of a road construction project, maintenance operation, utility work or similar operation that affects traffic and requires traffic control to safely guide and protect motorists, pedestrians, bicyclists, or workers.

643-1.03 TRAFFIC CONTROL PLAN. Implement an approved TCP before beginning work within the project limits.

The TCP includes, but is not limited to, signs, barricades, traffic cones, plastic safety fence, sequential arrow panels, portable changeable message board signs, special signs, warning lights, portable concrete barriers, crash cushions, flaggers, pilot cars, interim pavement markings, temporary lighting, temporary roadways and all other items required to direct traffic through or around the traffic control zone according to these Specifications and the ATM. Address in the TCPs placement of traffic control devices, including location, spacing, size, mounting height and type. Include code designation, size, and legend per the ATM and the Alaska Sign Design Specification (ASDS). Include longitudinal buffer space for the posted speed limit, according to Table 6C-2 of the ATM unless project conditions or geometric features prohibit including all or a portion of the buffer length.

When a TCP is included in the Plans, use it, modify it, or design an alternative TCP. When a TCP is omitted from the Plans, provide one according to this Section and the ATM.

Submit new or modified TCPs to the Engineer for approval. All TCPs must include the following information:

1. Project name and number.
2. A designated TCP number and name on each page.
3. For TCPs more than one page, each page must be numbered.
4. The posted speed limit for each roadway.
5. Existing striping width, lane width, and road surfacing.
6. Construction lane widths, striping layout, and temporary pavement marker layout.
7. Provisions for Pedestrian, Bicycle, and ADA travel through the work zone.
8. Dates and times the TCP will be in effect and why it is being used.
9. The Worksite Traffic Supervisor's signature certifying that all TCPs conform to the ATM and the Contract.
10. The Project Superintendent's signature confirming the TCP is compatible with the work plan.
11. The name(s) of the Worksite Traffic Supervisor, his/her alternate and their 24-hour telephone number(s).
12. Signs to be used and the ASDS designation number and size.
13. Location and spacing of all devices and signs.
14. A plan to address any possible slopes, drop offs, paving joints, or similar temporary features that may occur during use of the TCP.
15. For TCPs proposed to be used at night, note how the requirements will be met for the required lighting and retroreflective material.

TCPs submitted for approval without all the required information will be rejected. Allow 7 days for review of each TCP submittal. All required modifications to a TCP require a new submission and an additional 7 days for review.

A minor revision to a previously approved TCP during construction requires 48 hours for review and approval by the Engineer.

The TCPs, Plans, and Alaska Standard Plans show the minimum required number of traffic control devices. If unsafe conditions occur, the Engineer may require additional traffic control devices.

A waiver may be requested, in writing, of regulation 17 AAC 25 regarding oversize and overweight vehicle movements inside the project limits. If the waiver is approved, movements of oversize and overweight vehicles in or near traffic inside the project limits will be done according to the provisions of an approved Traffic Control Plan. Maintain a minimum 12-foot lateral separation between the nonstreet legal vehicles and the motoring public. The Traffic Control Plan shall specify the traffic control devices required for these operations.

Road Closures and Major Traffic Sequencing (events). Submit a written request to the Engineer for review and approval of each proposed event and event date. Allow 7 days for the Engineer to review any proposed event or subsequent changes/corrections. The proposed event date will be no less than 14 days from the date of written approval.

643-1.04 WORKSITE TRAFFIC SUPERVISOR. Provide a Worksite Traffic Supervisor responsible for maintaining 24-hour traffic operations.

1. **Qualifications.** Provide a Worksite Traffic Supervisor knowledgeable and experienced regarding the requirements of the ATM and the implementation of those requirements. Provide a Worksite Traffic Supervisor familiar with the Plans, the Specifications, proposed operations, and certified as one of the following:

- a. Traffic Control Supervisor, American Traffic Safety Services Association (ATSSA)
- b. Traffic Control Supervisor, Laborers' International Union of North America (LIUNA)
- c. Work Zone Temporary Traffic Control Technician, International Municipal Signal Association (IMSA). After December 31, 2026 IMSA certification will not be accepted.

Certify according to Form 25D-124 that the Worksite Traffic Supervisor has a minimum 4000 hours of temporary traffic control work experience, is competent and capable, and has the authority to perform the duties and responsibilities in accordance with this section.

- a. Temporary traffic control work experience shall demonstrate an understanding of concepts, techniques, and practices in the installation and maintenance of traffic control devices, and skill in reading, interpreting, implementing, and modifying TCPs.
- b. Temporary traffic control work experience includes a combination of: flagging; installing traffic control devices in accordance with TCPs; monitoring traffic control devices and TCP performance; and recognizing and reporting deficiencies in traffic control devices and TCPs for correction.
- c. Temporary traffic control work experience is gained while serving as a Worksite Traffic Supervisor-in-training, temporary traffic control support personnel, and Flagger.

Worksite Traffic Supervisors shall maintain current certification and be able to show their certification anytime they are on the project.

2. **Duties.**

- a. Prepare the TCPs and public notices and coordinate traffic control operations between the Project Superintendent and the Engineer.
 - b. Physically inspect the condition and position of all traffic control devices used on the project at least twice each day and at approximately 12-hour intervals. Ensure that traffic control devices work properly, are clean and visible, and conform to the approved TCP. Complete and sign a detailed written report of each inspection within 24 hours. Use Traffic Control Daily Review Form 25D-104.
 - c. Supervise the repair or replacement of damaged or missing traffic control devices.
 - d. Review and anticipate traffic control needs. Make available proper traffic control devices necessary for safe and efficient traffic movement.
 - e. Review work areas, equipment storage, and traffic-safety material handling and storage.
 - f. Hold traffic safety meetings with superintendents, foremen, subcontractors, and others as appropriate before beginning construction, prior to implementing a new TCP, and as directed. Invite the Engineer to these meetings.
 - g. Supervise all traffic control workers, flaggers, and pilot car drivers.
 - h. Certify that all flaggers are certified as required by Subsection 643-3.04.4. Submit a copy of all flagger certifications to the Engineer.
 - i. Supervise lighting for night work.
3. **Authority.** The Worksite Traffic Supervisor shall have the Contractor's authority to stop work and implement immediate corrective action to unsafe traffic control, in locations where unsafe traffic control is present.

643-1.05 CONSTRUCTION PHASING PLAN. Submit a Construction Phasing Plan for approval no less than 5 working days prior to the preconstruction conference. Include the following:

1. Form 25D-124 designating the Worksite Traffic Supervisor, providing the 24-hour telephone number, and certifying minimum 4,000 hours of work experience as described in 643-1.04 Worksite Traffic Supervisor.
2. A construction-phasing plan for each phase or segment of the project.
3. TCPs for the first phase of the project. Show permanent and temporary traffic control measures, including the times each TCP will be used.

Submit any changes to the Engineer for approval 7 days before proposed implementation.

643-1.06 TRAFFIC MAINTENANCE SETUP. When shown on the bid schedule, Traffic Maintenance Setup items are site specific and are detailed as individual TCPs on the plan sheets. They depict the method or scheme required to route traffic safely and efficiently when any of the following restrictions occur:

1. **Lane Closure.** The closure of one or more lanes on a roadway.
2. **Detour.** The redirection of traffic through or around a traffic control zone.
3. **Road Closure.** The closure of a roadway with or without a specified detour route.
4. **One Lane Road.** A two-way roadway reduced to a single-lane roadway with flaggers, pilot cars, traffic signals, stop signs, or yield signs.

643-2.01 MATERIALS. Provide traffic control devices meeting the following requirements:

1. **Signs.** Use signs, including sign supports, that conform to Section 615, the ATM, and ASDS.
 - a. Construction Signs: Regulatory, guide, or construction warning signs designated in the ASDS.
 - b. Permanent Construction Signs: As designated on the Plans or an approved TCP.
 - c. Special Construction Signs: All other signs are Special Construction Signs. Neatly mark the size of each sign on its back in 3-inch black numerals.
2. **Portable Sign Supports.** Use wind-resistant sign supports with no external ballasting. Use sign supports that can vertically support a 48 X 48 inch traffic control sign at the height above the adjacent roadway surface required by the ATM.
3. **Barricades and Vertical Panels.** Use barricades and vertical panel supports that conform to the ATM. Use Type III Barricades at least 8 feet long. Use retroreflective sheeting that meets ASTM D4956 Type II or III.
4. **Portable Concrete Barriers.** Use portable concrete barriers that conform to the Contract. For each direction of traffic, equip each 12.5-foot section of barrier with at least two side-mounted retroreflective tabs placed approximately 6 to 8 feet apart, or a continuous 4-inch wide horizontal retroreflective stripe mounted 6 inches below the top of the barrier. Use yellow tabs or stripe when barriers are placed at centerline. Use white tabs or stripe when barriers are placed on the roadway shoulder. Use retroreflective sheeting that meets ASTM D4956 Type III, IV or V.
5. **Warning Lights.** Use Type A (low intensity flashing), Type B (high intensity flashing) or Type C (steady burn) warning lights that conform to the ATM.
6. **Drums.** Use plastic drums that conform to the requirements of the ATM. Use retroreflective sheeting that meets ASTM D4956 Type II or III.
7. **Traffic Cones and Tubular Markers.** Use reflectorized traffic cones and tubular markers that conform to the requirements of the ATM. Use traffic cones and tubular markers at least 28 inches high. Use retroreflective sheeting that meets ASTM D4956 Type II or III.
8. **Interim Pavement Markings.** Apply markings according to Section 670 and the manufacturer's recommendations. Use either:
 - a. Paint meeting Subsection 708-2.03 with glass beads meeting Subsection 712-2.08,
 - b. Preformed Marking Tape (removable or non-removable) meeting Subsection 712-2.14, or
 - c. Temporary Raised Pavement Markers meeting Subsection 712-2.15 or 712-2.16, as appropriate.
9. **High-Level Warning Devices.** Use high-level warning devices that conform to the ATM.
10. **Temporary Crash Cushions.** Use retroreflective sheeting that meets ASTM D4956 Type III, IV or V. Application of crash cushion must be appropriate for the intended use and be installed per manufacturer's recommendation. Temporary crash cushions used as rail or barrier end treatments must be redirective. Temporary crash cushions that are barrels or barricade filled with sand or water may only be used when the forecasted temperature during their use is above 32 degrees Fahrenheit.
11. **Sequential Arrow Panels.** Use Type A (24 X 48 inch), Type B (30 X 60 inch) or Type C (48 X 96 inch) panels that conform to the ATM.
12. **Portable Changeable Message Board Signs.** Use new truck or trailer mounted portable changeable message board signs with self-contained power supply for the sign and with:
 - a. Message sign panel large enough to display 3 lines of 18-inch high characters
 - b. Eight character display per message module

- c. Fully programmable message module
 - d. Remote control cellular, wireless radio frequency (RF), landline
 - e. Waterproof, lockable cover for the controller keyboard
 - f. Capacity for electric/hydraulic sign raising or lowering
 - g. Radar over speed detection
 - h. Variable flash and sequence rates
 - i. Light emitting diode (LED) display, using Institute of Transportation Engineers (ITE) amber/yellow
 - j. The capacity for a minimum of 150 pre-programmed messages
 - k. Battery-Pack Operation Duration: minimum of 55 hours under full load
 - l. Power chords shall comply with the National Electrical Code (NEC) Article 600.10 Portable or Mobile Signs, paragraphs 600.10(C)(1) Cords and 600.10(C)(2) Ground-Fault Circuit Interrupter (GFCI). The cord will have integral GFCI protection located in either the attachment plug or 12 inches or less from the plug.
13. **Plastic Safety Fence.** Use 4-foot high construction orange fence manufactured by one of the following companies, or an approved equal:
- a. "Safety Fence" by Jackson Safety, Inc., Manufacturing and Distribution Center, 5801 Safety Drive NE, Belmont, Michigan, 49306. Phone (800) 428-8185.
 - b. "Flexible Safety Fencing" by Carsonite Composites, LLC, 19845 U.S. Highway 76, Newberry, South Carolina, 29108. Phone (800) 648-7916.
 - c. "Reflective Fencing" by Plastic Safety Systems, Inc., 2444 Baldwin Road, Cleveland, Ohio 44104. Phone (800) 662-6338.
14. **Temporary Sidewalk Surfacing.** Provide temporary sidewalk surfacing as required by an approved TCP and the following:
- a. Use plywood at least 1/2-inch thick for areas continuously supported by subgrade. Use plywood at least 1 inch thick for areas that are not continuously supported.
 - b. Do not use unsupported 1-inch plywood longer than 30 inches.
 - c. Use plywood with regular surfaces. Do not overlap plywood joints higher than 1/2-inch. Bevel overlap joints so the maximum slope of the overlapping edge is 2 horizontal to 1 vertical.
 - d. Fasten so wind and traffic will not displace temporary surfacing.
15. **Temporary Guardrail.** Use temporary guardrail that meets Section 606, except that posts may require placement under special conditions, such as in frozen ground.
16. **Flagger Paddles.** Use flagger paddles with 24 inches wide by 24 inches high sign panels, 8 inch Series C lettering (see ASDS for definition of Series C), and otherwise conform to the ATM. Use retroreflective sheeting that meets ASTM D4956 Type VIII, IX or XI. Use background colors of fluorescent orange on one side and red on the other side.
17. **Truck Mounted Attenuator (TMA).** The TMA shall be mounted on a vehicle with a minimum weight of 15,000 pounds and a maximum weight per the manufacturer's recommendations.

18. **Portable Steel Barriers.** Use portable steel barriers that conform to the contract. For each direction of traffic, equip each section of barrier with side-mounted retroreflective tabs placed approximately 6 to 8 feet apart, or a continuous 4-inch wide horizontal retroreflective stripe mounted 6 inches below the top of the barrier. Use yellow tabs or stripe when barriers are placed at centerline. Use white tabs or stripe when barriers are placed on the roadway shoulder. Use retroreflective sheeting that meets ASTM D4956 Type III, IV, or V.

19. **Flexible Markers.** Refer to Subsection 606-2.01 Materials.

643-2.02 Crashworthiness. Temporary Work Zone devices, including portable barriers, manufactured after December 31, 2019, must have been successfully tested to the 2016 edition of Manual for Assessing Safety Hardware (MASH). Such devices manufactured on or before this date, and successfully tested to National Cooperative Highway Research Program (NCHRP) Report 350 or the 2009 edition of MASH, may continue to be used throughout their normal service lives.

Submit documentation, by the method indicated on table 643-2, that the following devices comply with Test Level 3 requirements of National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH). Submit documentation of compliance to the Engineer before installing devices on the project.

**TABLE 643-2
WORK ZONE TRAFFIC CONTROL DEVICE AND
BARRIER CRASH TESTING COMPLIANCE**

Category	Devices	Devices Manufactured Before Dec. 31, 2019 ¹	Devices Manufactured after Dec. 31, 2019 ¹	Method of Documentation
1	Low-mass single-piece devices w/o attachments; traffic cones, tubular markers, single piece drums, delineators	NCHRP 350, MASH 2009, or MASH 2016	MASH 2016	Manufacturer's Certification for devices exceeding height and weight limits
2	Category 1 devices with attachments, barricades, portable sign supports, drums w/lights, other devices weighing less than 100 pounds but not included in Category 1	NCHRP 350, MASH 2009, or MASH 2016	MASH 2016	FHWA eligibility letter, at Test Level 32.
3	Fixed sign supports, truck mounted attenuators, temporary crash cushions, bridge railing, bridge and guardrail transitions, and guardrail and barrier end treatments.	NCHRP 350, MASH 2009, or MASH 2016	MASH 2016	FHWA eligibility letter, at Test Level 32.
	Portable Concrete and steel barriers	NCHRP 350, MASH 2009, or MASH 2016	MASH 2016	FHWA eligibility letter, if available, at Test Level 3, or DOT&PF eligibility determination, unless otherwise required in the Contract

- 1 The Engineer will determine whether a device is in serviceable condition. Serviceable means the device will function equivalent to a new device of the same manufacture.
- 2 When no test level is specified in a FHWA Eligibility letter; it is implied that the tests were run for Test Level 3.

In Table 643-2, Category 1 devices that exceed the following weights and heights require certification that they meet the evaluation criteria of NCHRP Report 350 or MASH, Test Level 3. This certification may be a one-page affidavit signed by the vendor. Documentation supporting the certification (crash tests and/or engineering analysis) must be kept on file by the certifying organization. No certification is required for devices less than or equal to both the weight and height on the schedule below:

Device	Composition	Weight	Height
Cones	Rubber	20 lb	36 in.
	Plastic	20 lb	48 in.
Candles	Rubber	13 lb	36 in.
	Plastic	13 lb	36 in.
Drums	Hi Density Plastic	77 lb	36 in.
	Low Density Plastic	77 lb	36 in.
Delineators	Plastic or fiberglass	N/A	48 in.

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. Keep the work, and portions of the project affected by the work, in good condition to accommodate traffic safely. Provide and maintain traffic control devices and services inside and outside the project limits, day and night, to guide traffic safely.

Unless otherwise provided in this Section, keep all roadways, business accesses, and pedestrian facilities within the project limits open to traffic. Obtain the Engineer's approval before temporarily closing residential, commercial, or street approaches. Provide access through the project for emergency vehicles and school and transit buses. Properly sign and/or flag all locations where the traveling public is redirected or stopped. Organize construction operations so the total of all construction related stoppages experienced by a vehicle traveling through the project does not exceed 20 minutes except when indicated otherwise in the Contract.

Stop equipment at all points of intersection with the traveling public unless an approved TCP shows otherwise.

Continue to operate all illumination and signalization according to the requirements of Subsection 660-3.09. When moving approach lanes, realign signal heads as necessary according to the ATM. Coordinate any modifications to existing traffic signals with the agency that maintains and operates them. Operate flood lighting at night according to the ATM. Adjust flood lighting so that it does not shine into oncoming traffic.

Provide and maintain safe routes for pedestrians and bicyclists through or around traffic control zones at all times, except when regulations prohibit pedestrians or bicyclists. Station a flagger, where construction activity encroaches onto the safe route in a traffic control zone, to assist pedestrians, and bicyclists past the construction activity.

Maintain business access(s) during flagging operations.

Immediately notify the Engineer as soon as an employee or a subcontractor becomes aware of any traffic related crash that occurs within the project limits, between construction warnings signs, along a detour route, or involving traffic in a queue back up from project work. Within 3 days fill out the information on Form 25D-123 Work Zone Crash Report and submit a copy to the Engineer.

643-3.02 ROADWAY CHARACTERISTICS DURING CONSTRUCTION. Obtain an approved TCP before reducing existing roadway lane and shoulder widths and before starting construction. Maintain a clear area with at least 2 feet between the edge of traveled way and the work area. Use barricades, traffic cones, or drums to delineate this area. Place traffic control devices on the work side of the clear area. Space them according to the ATM.

CR643-24.0401/CFHWY00453

Traffic Traversing Unpaved Surface(s).

The total length of unpaved surfaces(s), measured parallel to the roadway, may not exceed the disturbed ground limit in Subsection 652-1.04 and as noted in 643-3.02.

Limit the concurrent unpaved surfaces to the limits shown in the plans, and the immediate area of work.

Except:

Traffic may traverse a continuous gravel surface for duration of the project except when work is suspended for winter maintenance.

CR643/CHFWY00453

If maintaining traffic on an unpaved surface, provide a smooth and even surface that public traffic can use at all times. Properly crown the roadbed surface for drainage. Before beginning other grading operations, place sufficient fill at culverts and bridges to permit traffic to cross smoothly and unimpeded. Use part-width construction techniques when routing traffic through roadway cuts or over embankments under construction. Excavate the material or place it in layers. Alternate the construction activities from one side to the other. Route the traffic over the side opposite the one under construction.

Detour traffic when the Plans or an approved TCP allows. Maintain detour routes so that traffic can proceed safely. When detours are no longer required, obliterate the detour. Topsoil and seed appropriate areas.

If two-way traffic cannot be maintained on the existing roadway or detour, use half-width construction or a road closure if it is shown on an approved TCP. Make sure the TCP indicates closure duration and conditions. Schedule the roadway closures to avoid delaying school buses, and peak-hour traffic. For road closures, post closure-start and road-reopen times at the closure site, within view of waiting traffic.

CR643-24.0401/CFHWY00453

Pave lanes next to the central island and splitter islands first. Pave lanes next to exit and entrance ramps last. Place temporary 12:1 sloped wedge of asphalt concrete against the abrupt pavement edge on lanes next to exit and entrance ramps. Do not open the roadway to traffic until slope wedges are in place.

CR643/CHFWY00453

643-3.03 PUBLIC NOTICE. Give notice at least 3 days before major changes, delays, lane restrictions, or road closures to local officials and transportation organizations, including but not necessarily limited to:

- Alaska Trucking Association
- Alaska State Troopers
- Division of Measurement Standards
- Local Police Department
- Local Fire Department
- Local Government Traffic Engineer
- School and Transit Authorities
- Local Emergency Medical Services
- Local Media (newspapers, radio, television)
- Railroads (where applicable)
- U.S. Postal Service
- Major Tour Operators

Provide local traffic enforcement and maintenance agencies 24-hour notice before shutting down a traffic signal system. Provide notice as required by utility companies before repairing or replacing a utility.

Provide the Alaska State Troopers, local police and fire department with the radio frequencies used on the project and the 24-hour telephone numbers of the Worksite Traffic Supervisor and the Project Superintendent. These telephone numbers are used to alert construction employees when emergency vehicles must pass through the project. When notified of emergencies make every necessary effort to expedite rapid passage.

Additional notices may be given through the Navigator or 511 System for selected projects. Check the special provisions for those requirements.

643-3.04 TRAFFIC CONTROL DEVICES. Before starting construction, erect permanent and temporary traffic control devices required by the approved TCPs. The Engineer will determine advisory speeds when necessary.

For lane closures on multilane roadways, use sequential arrow panels. During hours of darkness when required by the approved TCP, use flashing warning lights to mark obstructions or hazards and steady-burn lights for channelization.

Use only one type of traffic control device in a continuous line of delineating devices, unless otherwise noted on an approved TCP. Use drums or Type II barricades for lane drop tapers.

During non-working hours and after completing a particular construction operation, remove all unnecessary traffic control devices. Store all unused traffic control devices in a designated storage area which does not present a nuisance or visual distraction to traffic. If sign panels are post mounted and cannot be readily removed, cover them entirely with either metal or plywood sheeting. Completely cover signal heads with durable material that fully blocks the view of signal head and will not be damaged or removed by weather.

Keep signs, drums, barricades, and other devices clean at all times.

Use only traffic control devices that meet the requirements of the "Acceptable" category in ATSSA (American Traffic Safety Services Association) "Quality Guidelines for Temporary Traffic Control Devices" and meet crashworthiness requirements per Section 643-2.02.

Immediately replace any devices provided under this Section that are lost, stolen, destroyed, inoperable or deemed unacceptable while used on the project. Stock repair parts for each Temporary Crash Cushion used on the project. Repair damaged crash cushions within 24 hours.

Maintain pre-existing roadside safety hardware at an equivalent or better level than existed prior to project implementation until the progress of construction necessitates removing the hardware. All existing hazards that are currently protected with roadside safety hardware or new hazards which result from project improvements shall be protected or delineated as required in the plans, specifications, and approved TCPs until permanent roadside safety hardware is installed. All temporary roadside safety hardware shall meet crashworthiness requirements of Subsection 643-2.02.

All items paid under this Section remain the property of the Contractor, unless noted otherwise in the contract. Remove them after completing the project.

1. **Embankments.** Close trenches and excavations at the end of each continuous work shift, except as indicated by the Engineer.

Install portable concrete or steel barrier, plastic drums, barricades, tubular markers, plastic safety fence, and cones as specified on the Plans or TCPs to delineate open trenches, ditches, other excavations, and hazardous areas when they exist along the roadway for more than one continuous work shift.

2. **Adjacent Travel Lane Paving.** When paving lifts are 2 inches or greater and you cannot finish paving adjacent travel lanes or paved shoulders to the same elevation before the end of the paving shift, install: W8-11 (Uneven Lanes), W8-9 (Low Shoulder), W8-17 (Shoulder Drop-Off), W14-3 (No Passing Zone), R4-1 (Do Not Pass), R4-2 (Pass with Care), and W8-1 (Bump) signs as appropriate. Place additional signs every 1500 feet if the section is longer than 1/2 mile.
3. **Fixed Objects, Construction Vehicles and Equipment Working On or Next to the Traveled Way.** Do not park equipment in medians. Locate fixed objects at least 30 feet from the edge of traveled way. Fixed objects that exist prior to construction activity are not subject to this requirement unless the proposed temporary traffic routing moves the edge of traveled way closer to the pre-existing fixed object. Vehicles and other objects within parking lots in urban environments are considered preexisting fixed objects regardless of whether they are or are not present continuously throughout the day.

When worksite restrictions, land features, right of way limitations, environmental restrictions, construction phasing, or other construction conditions allow no practicable location meeting the preceding requirements, the Engineer may approve alternate locations for fixed objects. Alternate locations shall be as far as practicable from the edge of traveled way. When the alternate location provides 15 feet or more separation from the edge of traveled way, the Engineer may verbally approve the alternate location. When the alternate location provides less than 15 feet separation, written approval is required.

When the Engineer determines a fixed object or fixed objects present unacceptable hazard, use drums, or Type II barricades with flashing warning lights, or use portable concrete or steel barriers, or temporary crash cushion to delineate or shield the hazard, as approved by the Engineer.

Remove obstructions greater than 4 inches above the nominal foreslope grade at the end of each continuous work shift.

4. **Flagging.** Furnish trained and competent flaggers and all necessary equipment, including lighting of the flagging position during nighttime operations, to control traffic through the traffic control zone. The Engineer will approve each flagging operation before it begins and direct adjustments as conditions change.

Flaggers must be certified as one of the following:

- a. ATSSA Flagger
- b. ATSSA Flagging Instructor
- c. LIUNA Flagger
- d. LIUNA Traffic Control Technician
- e. IMSA Work Zone Temporary Traffic Control Technician

After December 31, 2026, IMSA certification will not be accepted.

Flaggers shall maintain current flagger certification. Flaggers must be able to show their flagger certification anytime they are on the project.

Flaggers must maintain their assigned flagging location at all times, unless another qualified flagger relieves them, or the approved traffic control plan terminates the flagging requirements. Remove, fully cover, or lay down flagger signs when no flagger is present. Keep the flaggers' area free of encumbrances. Keep the flagger's vehicle well off the roadway and away from the flagging location so the flagger can be easily seen.

Provide approved equipment for two-way radio communications between flaggers when flaggers are not in plain, unobstructed view of each other.

Obtain the Engineer's written approval before flagging signalized intersections. When flagging a signalized intersection, either turn off and cover the traffic signal or place it in the All-Red Flash mode. Coordinate changing traffic signal modes and turning off or turning on traffic signals with the agency responsible for signal maintenance and operation and the Engineer. Get their written approval in advance. Only uniformed police officers are permitted to direct traffic in an intersection with an operating traffic signal.

5. **Pilot Cars.** You may use pilot cars when part of an approved TCP, if the Engineer determines one-way traffic is necessary, or if the route through the traffic control zone is particularly hazardous, involved, or frequently altered to preclude adequate signing. Do not use pilot cars to avoid localized traffic control at several locations. Pilot car operators may not control Automated Flagging Assistance Devices while operating a pilot car.

Organize construction operations so the total of all stoppages experienced by a vehicle traveling through a project does not exceed 20 minutes. However, this does not imply that you may allow 20 minutes in all cases. Coordinate multiple pilot-car operations within a project or adjoining projects to minimize inconvenience to the traveling public. Two or more pilot cars may be used to provide two-way traffic through the traffic control zone to reduce the waiting period. The flagger or pilot car operator must record each pilot car's departure time in a bound field book furnished by the Engineer. Whenever practical, the flagger should tell the motorist the reason for and approximate length of the delay. Make every reasonable effort to yield right-of-way to the public and prevent excessive delay.

Use an automobile or pickup as the pilot car, with the company logo prominently displayed. Equip the pilot car with a two-way radio for contact with flaggers and other pilot cars. Mount a G20-4 sign (Pilot Car Follow Me) on the rear at least 5 feet above the driving surface. Use high intensity flashing strobe lights, oscillating beacons, or rotating beacons on all Pilot Cars. Vehicle hazard warning lights may supplement but are not permitted to be used instead of high intensity flashing strobe lights, oscillating beacons, or rotating beacons. Identify the last vehicle in the column.

When pilot car operations are approved, establish all required pilot car traffic control devices before beginning work. Continue pilot car operations until no longer necessary and an approved TCP is in place for operations without pilot car, including all required traffic control devices.

6. **Street Sweeping and Power Brooming.** Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material. Use equipment for brooming and sweeping as recommended by the manufacturer and the following:

Dirt, dust and construction materials, mobilized as a result of power brooming and or sweeping, shall not be pushed, ejected, thrown or drift beyond the lesser of, 2 feet from the equipment perimeter or the edge of the paved surface.

All equipment shall operate to typical industry standards. Maintain equipment to operate as designed by the manufacturer. Equipment will employ safety equipment, warning lights, and other as required by the Specifications and these Special Provisions.

Sweeper and Broom Options: Table 643-5, Traffic Control Rate Schedule, Street Sweeping

- a. **Regenerative Sweeper:** Sweeper that blows a stream of air at the paved surface, causing fine particles to rise, and then caught through a vacuum system.
- b. **Vacuum Sweeper:** Sweeper that creates a vacuum at the paved, surface sucking dirt, dust, and debris into a collection system.
- c. **Mechanical Broom Sweeper:** Sweeper designed to pick up and collect larger size road debris, stones and litter, etc. In addition to the requirements noted in these Specifications, use of a mechanical broom sweeper requires the Engineer to approve the sweeper for the intended use.

- d. **Power Broom:** Power brooming that wets, pushes and or ejects loose material directly into an attached collection/pickup container may be used when approved by the Engineer. The added moisture will be contained to the paved roadway surface.

Dry Power Brooming is not permitted. Power brooming without direct/immediate means of collection/pickup is not permitted.

- 7. **Watering.** Furnish, haul, and place water for dust control and pavement flushing, as directed. Use water trucks that can provide a high-pressure water stream to flush the pavement and a light-water spray to control dust. If the flushing operations contaminate or fill adjacent catch basins, clean and restore them to their original condition. This requirement includes sections of roadway off the project where flushing is required. The Engineer will control water application.

Obtain an Alaska Department of Natural Resources permit for water removal before taking water from a lake, stream, or other natural water body. Comply with the Alaska Department of Fish and Game screening requirements for all water removal operations.

- 8. **Portable Changeable Message Board Signs.** Furnish Changeable Message Signs when approved on a TCP. Display only messages approved on the TCP. Follow application guidelines in the ATM.
- 9. **Truck Mounted Attenuator (TMA).** TMAs are mounted on the rear of work vehicles. Impact attenuators shall meet crashworthiness requirements of 643-2.02. TMAs shall be mounted on a vehicle with a minimum weight of 15,000 pounds and a maximum weight in accordance with the manufacturer's recommendations. TMAs shall have an adjustable height so that it can be placed at the correct elevation during usage and to a safe height for transporting. Approach ends of TMAs shall have impact attenuator markings in accordance with the ATM. Do not use a damaged attenuator in the work. Replace any damaged TMA at your expense.
- 10. **Traffic Control Vehicles.** Use high intensity flashing strobe lights, oscillating beacons, or rotating beacons on the Work Zone Supervisor's vehicle and on vehicles being used to transport and set-up traffic control devices. Vehicle hazard warning lights may supplement but are not permitted to be used instead of high intensity flashing strobe lights, oscillating beacons, or rotating beacons.

643-3.05 AUTHORITY OF THE ENGINEER. When existing conditions adversely affect the public's safety or convenience, the Contractor will receive an oral notice, and then a written notice according to Subsection 105-1.01, Authority of the Engineer. The notice will state the defect(s), the corrective action(s) required, and the time required to complete the corrective action(s). In no case shall this time exceed 24 hours. If corrective action(s) are not completed within the specified time, the Engineer may immediately suspend work on the offending operations until the defect(s) are corrected. The Engineer may require outside forces to correct unsafe conditions. The cost of work by outside forces will be deducted from any monies due under the terms of this Contract.

643-3.06 TRAFFIC PRICE ADJUSTMENT. A Traffic Price Adjustment, under Item 643.0023.____, will be assessed for unauthorized lane closures or reductions. Unauthorized lane reductions will be assessed as one full lane closure, for each lane reduced without authorization.

Authorized lane closures and/or lane reductions are those shown in the Contract, an approved TCP, or authorized in writing.

Unauthorized lane reductions include unacceptable roadway, pedestrian walkway or route, and bicycle route or pathway surfaces, such as severe bumps, ruts, wash-boarding, potholes, excessive dust or mud, and non-conforming or out of place traffic control devices. Failure to install temporary crash cushions or barriers, when required according to the Contract or TCP, is also considered an unauthorized lane reduction. The Engineer will make the sole determination whether unauthorized lane reductions or closures are present.

Failure to maintain an acceptable infrastructure or traffic control plan will result in a price adjustment equal to 100 percent of the applicable rate shown in Table 643-3, Adjustment Rates, for the time the roadway or pedestrian facility is in an unacceptable condition.

The rates are liquidated damages which represent highway user costs, based on Average Daily Traffic (ADT). The Engineer will use the rate shown for the current ADT for this project, as published in the Regional Traffic Volume Report prepared by the Department's Planning Section. Adjustment rates for unauthorized reduction or closure of each lane of pedestrian walkways or route, and bicycle route or pathway, are the same as for one full roadway lane closure.

**TABLE 643-3
ADJUSTMENT RATES**

Published ADT	Dollars/Minute of Unauthorized Lane Reduction or Closure
Less than 1,000	\$6
1,000-4,999	\$25
5,000-9,999	\$75
10,000-29,999	\$105
30,000+	\$150

643-3.07 MAINTENANCE OF TRAFFIC DURING SUSPENSION OF WORK. Approximately one month before work is suspended for the season, schedule a preliminary meeting with the Engineer and Maintenance & Operations to outline the anticipated roadway condition and the work expected to be completed before shutdown. Schedule a field review with the Department for winter maintenance acceptance. At the field review, the Engineer will prepare a punch list for implementation before acceptance.

To be relieved of winter maintenance responsibility, leave all roads with a smooth and even surface for public use at all times. Properly crown the roadbed surface for drainage and install adequate safety facilities. Make sure all illumination and signals, including vehicle detectors, are in good working order.

After the project is accepted for winter maintenance and until ordered to resume construction operations, the Department is responsible for maintaining the facility. The Department will accept maintenance responsibility only for portions of the work that are open to the public, as determined by the Engineer. The Department will not accept maintenance responsibility for incomplete work adjacent to accepted roads. The contractor is responsible for maintaining all other portions of the work. The Engineer will issue a letter of "Acceptance for Winter Maintenance" that lists all portions of the work that the Department will maintain during a seasonal work suspension. The contractor retains all contractually required maintenance responsibilities until receipt of this letter.

If the contractor suspends work due to unfavorable weather (other than seasonal) or due to failure to correct unsafe conditions, carry out Contract provisions, or carry out the Engineer's orders. All costs for traffic maintenance during the suspended period will be borne by the Contractor.

When work is resumed, replace or renew any work or materials lost or damaged during temporary use. If the Department caused damage during winter suspension, payment will be made for repairs by unit pay item or in accord with Subsection 109-1.05, Compensation for Extra Work. When the Engineer directs, remove any work or materials used in the temporary maintenance. Complete the project as though work has been continuous.

643-3.08 CONSTRUCTION SEQUENCING. The construction sequencing detailed in these provisions, the Special Provisions, and the Plans is suggested only. The Contractor may propose alternative construction sequencing.

Throughout the project, maintain the existing roadway, pedestrian walkway, or route, and bicycle route or pathway configuration (such as the number of lanes and their respective widths) except for restrictions to traffic allowed in the Special Provisions or on the Plans, and addressed through approved TCPs. A restriction to traffic is any roadway surface condition, work operation, or traffic control setup that reduces the number of lanes or impedes traffic. Obtain an approved TCP before restricting traffic.

CR643-24.0401/CFHWY00453

Unless otherwise determined by the Engineer and on an approved Traffic Control Plan (TCP), do not restrict traffic during the times listed below:

1. Monday through Friday: 0530 hrs to 0800 hrs and 1530 hrs to 1800 hrs.
2. Around any Holiday:
 - a. If a holiday falls on Sunday, Monday, or Tuesday, the above stipulations apply from 1200 hrs on the Friday before the holiday to 0300 hrs. on the day after the holiday.
 - b. If a holiday falls on Wednesday, the above stipulations apply from 1200 hrs on the Tuesday before the holiday to 0300 hrs. on the Thursday after the holiday.
 - c. If a holiday falls on Thursday, Friday, or Saturday, the above stipulations apply from 1200 hrs on the day before the holiday to 0300 hrs. on the Monday after the holiday.
3. During the Alaska State Fair:
 - a. Friday from 1600 hrs. to Sunday 2300 hrs on all streets except Palmer-Wasilla Highway. Weekend traffic restrictions not allowed on Palmer-Wasilla Highway.
 - b. From 1000 hrs to 2300 hrs no material hauling on the Glenn Highway, Trunk Road, Bogard Road, and Palmer-Wasilla Highway.
4. During the Mat-Su School District school year: Monday through Friday from 0600 hrs to 1800 hrs. Weekend restrictions are allowed.

CR643/CFHWY00453

Lane restrictions, if allowed shall be conducted so that no more than a 5 minute accumulated stopped delay, 20 vehicles, or 1/8 mile (660 feet) of traffic is detained, whichever occurs first, before releasing the detained motorists. During paving operations, a 10 minute stopped delay, 40 vehicles, or 1/4 mile (1320 feet) of traffic detained, allowed for motorists, except school buses. If a queue of traffic develops at a stop, empty the entire queue to include the last car that entered the queue at the time the queue was released.

Do not delay the school busses through the construction zone; obtain the local school bus schedule and coordinate work efforts. Submit the plan, as a TCP, to the Engineer for approval before the implementation of the school bus coordination plan.

CR643-24.0401/CFHWY00453

Do not restrict access to the Fire Station (MSB Public Safety Building 5-2). Do not restrict EMS vehicles and personnel through the construction area for the duration of the work.

Speed reductions on Bogard Road, if allowed, to 25 mph. All other speed reductions through the construction area require prior Department approval.

Road closures, if allowed:

1. Engstrom Road. A single closure for no longer than 14 consecutive days and not concurrent with Green Forest Drive closure.
2. Green Forest Drive. A single closure for no longer than seven consecutive days and not concurrent with Engstrom Road closure.

CFHWY00453

643-3.09 INTERIM PAVEMENT MARKINGS. Place permanent or interim pavement markings according to this Subsection, details shown on the Plans, approved TCPs, and Parts III and VI of the ATM before opening existing paved roadways, temporary paved roadways, detours, interim paving lifts, and roadways with seal coats and surface treatments for more than one continuous work shift. This work may include restriping the existing roadway before beginning construction, before seasonal suspension, and/or after seasonal suspension.

Remove conflicting pavement markings according to Subsection 670-3.04, Paint Removal.

Mark existing roadway sections that will be opened to traffic during the winter. Mark over the existing lines and markings, unless shown otherwise on the Plans or an approved TCP.

Maintain all interim pavement markings for their intended life including reapplication when necessary. There will be no compensation to upgrade interim pavement markings required for work operations lasting up to 2 weeks.

Use only temporary raised pavement markers as interim pavement markings on final pavement surfaces. Completely remove and dispose of them when placing the final markings. Completely remove any residual adhesive that might misguide motorists. Place final pavement markings on finished pavement surfaces and interim pavement surfaces before suspending work for the winter.

Stage the construction to avoid routing traffic over conflicting markings, for more than one continuous work shift. If traffic is routed over conflicting markings during a work shift, delineate the roadway with a complement of warning signs, channelizing devices, and flaggers as required by the ATM.

Use only temporary raised pavement markers meeting Subsection 712-2.16 as interim markings on seal coat and surface treatment pavements. Install the markers according to the manufacturer's instructions before applying the asphalt surface material and cover coat. Remove the vinyl protective covers after applying the asphalt pavement.

On multicourse surface treatments, install the temporary raised pavement markers after applying the full width of the first layer of cover coat. Install the markers on each day's completed surface before removing the pilot car operations and allowing unescorted traffic on the surface treatment.

Apply final pavement markings according to Subsection 670-3.01, Construction Requirements, of these Special Provisions.

Do not place final pavement markings until traffic has traveled over the seal coat or surface treatment for at least 15 days and no more than 21 days, as directed by the Engineer.

643-3.10 LIGHTING FOR NIGHT WORK. Illuminate the night work areas according to Table 643-4.

Table 643-4 does not provide a comprehensive list of operations that require lighting. Provide lighting for other operations when necessary.

Use balloon lighting as the main light sources. Do not use floodlights without prior approval by the Engineer. When approved, install floodlighting in a manner that minimizes glare for motorists, workers, and residents living along the roadway. Locate, aim, louver, and/or shield light sources to reduce glare.

The Engineer shall be the sole judge of when glare is unacceptable, either for traffic or for adjoining residences. When notified of unacceptable glare, modify the lighting system to reduce glare to an acceptable level.

**TABLE 643-4
NIGHT WORK ILLUMINATION EQUIPMENT AND LOCATION REQUIREMENTS**

Type of Work or Equipment	Lighting Configuration
Paving, Milling, Striping, Pavement Marking Removal, Rumble Strip Installation.	At least one machine-mounted balloon light of at least 2000 watts. Provide additional lights or wattage if necessary to provide complete coverage.
Rolling, Pavement Sweeping.	At least 4 sealed beam halogen lamps in the front and four in the back. Each should be at least 55 watts.
Flagging.	One balloon light of at least 2000 watts, located within 30 feet of the flagger location. Locate so the flagger and the flagging location are illuminated. Provide additional lights or wattage if necessary to provide complete coverage of the flagging location.
Truck Crossings where haul vehicles cross or enter a road with more than 10,000 ADT, or where the haul vehicle crossing or entering location is controlled by portable traffic signals or flaggers.	At least one balloon light of at least 2000 watts, located on the main road on the far right side of the intersection. Locate light within 30 feet of the edge of the side street. If there is a flagger at the crossing, locate the light or lights so the lighting requirements for Flagging are also satisfied.

If the Contractor fails to provide required lighting equipment or provides lighting that creates unacceptable glare, the Contractor shall cease all construction activities that require illumination, including flagging operations, until the condition or conditions are corrected.

Use lighting equipment in good operating condition and that complies with applicable state and local adopted codes and standards, and OSHA, NEC, and NEMA requirements.

Provide suitable brackets and hardware to mount lighting fixtures and generators on machines and equipment. Design mountings so lights can be aimed and positioned as necessary to reduce glare. Locate mounting brackets and fixtures so they don't interfere with the equipment operator or overhead structures. Connect fixtures securely in a manner that minimizes vibration.

Ensure ground, trailer, and equipment-mounted light towers or poles are sturdy and freestanding without the aid of guy wires. Towers shall be capable of being moved as necessary to keep pace with the construction operation. Position the ground and trailer-mounted towers and trailers, to minimize the risk of being impacted by traffic on the roadway, or by construction traffic, or equipment.

Raise trailer or equipment mounted lights to maximum height, except do not exceed the clearance required for overhead objects such as overhead signals, overhead signs, trees, aerial utilities, or bridges. Aim and adjust lights to provide the required light levels. Provide uniform illumination on the hopper, auger, and screed areas of pavers. Illuminate the operator's controls on all machines uniformly.

Furnish each side of non-street legal equipment with a minimum of 75 square inches high intensity retroreflective sheeting in each corner, so at least 150 square inches of sheeting is visible from each direction. Provide red sheeting on the rear of the equipment and yellow sheeting elsewhere.

Existing street and highway lighting and conventional vehicle headlights may supplement but do not relieve the Contract requirement to provide lighting for night work, according to the requirements of Table 643-4.

Provide sufficient fuel, spare lamps, spare generators, and qualified personnel to ensure that all required lights operate continuously during nighttime operations. Ensure generators have fuel tanks of sufficient capacity to permit operation of the lighting system for a minimum of 12 hours. In the event of any failure of the lighting system, discontinue the operation that requires illumination until the required level and quality of illumination is restored.

Maintain a supply of at least twenty emergency flares for use in the event of emergency or unanticipated situations. Comply with local noise ordinances.

Install all post-mounted electroliers located within the clear zone, on NCHRP 350 or MASH compliant breakaway bases.

643-3.11 HIGH VISIBILITY GARMENTS. Ensure all workers within project limits wear outer garments that are highly visible and comply with the following requirements:

1. **Standards.** Use high visibility garments conforming to the requirements of ANSI/ISEA 107-2004, Class 2 for tops or Class E for bottoms, and Level 2 retroreflective material.
2. **Labeling.** Use garments labeled in conformance with Section 11.2 of ANSI/ISEA 107-2004 or ANSI/ISEA 107-2010.
3. **Tops.** Wear high visibility vests, jackets, or coverall tops at all times.
4. **Bottoms.** Wear high visibility pants or coverall bottoms during nighttime work (sunset to sunrise). Worksite traffic supervisors, employees assigned to traffic control duties, and flaggers wear high visibility pants or coverall bottom at all times.
5. **Outer Raingear.** Wear raingear tops and bottoms conforming to the requirements of this Subsection 643-3.11.
6. **Exceptions.** When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility garments.
7. **Condition.** Furnish and maintain all vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards.

Payment for high visibility garments for workers is subsidiary to other traffic contract items.

643-4.01 METHOD OF MEASUREMENT. Section 109 and as follows: Quantities will not be measured during winter suspension of work.

1. **Traffic Maintenance.** Calendar Day: Every day shown on the calendar, beginning and ending at midnight. Measurement begins on the day following receipt of the Notice to Proceed or on the first day of work at the project site, whichever is later, and ends on the date of project completion.
2. **Traffic Control Device Items.** By the number of units of each bid item shown on the bid schedule (or the Traffic Control Rate Schedule, if item 643.0025.____, Traffic Control, is included) that are installed, accepted, and operational. Incomplete or unsatisfactory devices will not be measured. Special Construction Signs are measured by the total area of legend-bearing sign panel, as determined under Subsection 615-4.01. Compensation for a 24-hour period shall be made under Construction Signs in the Traffic Control Rate Schedule, Table 643-5. Items measured by the day are for each item per 24-hour period.
3. **Traffic Maintenance Setup Items.** By each lane closure or one-lane road in place per hour. By each detour or road closure in place per 24-hour period.
4. **Portable Concrete Barrier.** By each nominal 12.5-foot section placed according to the approved TCPs, for the initial placement and for each subsequent relocation when moved more than 10 feet in any direction. Each transition piece (sloping end) will be measured as a single section.
5. **Temporary Crash Cushion.** By each acceptable installation.
6. **Interim Pavement Marking.** By the single-stripe station. A single stripe is a marking or a temporary raised pavement marker 4 inches wide. Wider striping is measured in multiples of 4 inches. Centerline gaps are not deducted from measurements.
7. **Flagging and Pilot Car.** By the number of approved hours, supported by certified payroll.

8. **Street Sweeping.** By the number of operated hours, supported by certified payroll and approved by the Engineer.
9. **Watering.** By the 1,000 gallons (M-Gallon) of water applied. The Engineer may specify measurement by weight or volume. If by weight, convert to gallons at 8.34 pounds per gallon. If by volume, convert to gallons at 7.48 gallons per cubic foot.
10. **Traffic Price Adjustment.** By each minute that any lane of traffic is not open to full use by the traveling public, measured to the nearest minute. The Engineer will determine whether the roadway is opened to full use.
11. **Traffic Control.** By the units specified in the Special Provisions.
12. **Portable Changeable Message Board Sign.** By the 24-hour period for each sign, as shown on an approved TCP and displaying an approved message.
13. **Plastic Safety Fence.** By the linear foot, as placed, to protect or channelize pedestrian traffic as shown on an approved TCP. Any adjustment in configuration of the fence at the same location that does not result in an increased amount of fence is not measured. Opening and closing the fence to gain access to and from the worksite is not measured.
14. **Temporary Sidewalk Surfacing.** By the square yard as shown on an approved TCP.
15. **Temporary Guardrail.** By the linear foot, including end treatments, as shown on an approved TCP.
16. **Portable Steel Barrier.** By the linear foot placed according to the manufacturer's recommendation and approved TCPs, for the initial placement, and for each subsequent relocation when moved more than 10 feet in any direction.
17. **Hotline Road Report.** No measurement required to provide a 24-hour toll free (1-800 ###-####) "Hotline Road Report" telephone with a prerecorded message, and weekly notices with daily updates. Work will be subsidiary to Pay Item 643.0001.____ or 643.0002.____, Traffic Maintenance.

643-5.01 BASIS OF PAYMENT.

1. **Traffic Maintenance.** The contract price includes all resources required to provide the Worksite Traffic Supervisor, all required TCPs and public notices, the Construction Phasing Plan, and the maintenance of all roadways, approaches, crossings, intersections and pedestrian and bicycle facilities, as required. This item also includes any Traffic Control Devices required but not shown on the bid schedule.

Items required by the Contract that are not listed on the bid schedule or not included in other items are subsidiary to Item 643.0001.____ or 643.0002.____ Traffic Maintenance, except the following:

- a. Traffic Price Adjustment
- b. Traffic Maintenance Setup

2. **Traffic Control Device Items.** The contract price includes all resources required to provide, install, maintain, move, and remove the specified devices. Warning lights, high-level warning devices, vertical panels, and sign supports required for traffic control devices are subsidiary.
3. **Traffic Maintenance Setup Items.** Each setup consists of all traffic control devices, flaggers, pilot cars, and subsidiary items necessary to implement the TCP shown on the Plans. Warning lights, high-level warning devices, vertical panels, and sign supports required for traffic control devices are subsidiary.

Construction and obliteration of temporary roadways, when required on the Plans or approved TCP under a traffic maintenance setup item, is paid for under their respective roadway pay items.

When topsoil or seeding is required for detours, payment will be made under Sections 620 and/or 618.

4. **Portable Concrete Barrier.** The contract price includes all resources required to provide, install, maintain, and remove each barrier section.

5. **Temporary Crash Cushion.** The contract price includes all resources required to provide, install, maintain, repair, and remove each crash cushion.
6. **Interim Pavement Marking.** The contract price includes all resources required to provide, install, maintain, and remove the specified markings. Installation of word and symbol markings are subsidiary. The No-Passing Zone signing, described in Subsection 643-3.04, is subsidiary.
7. **Flagging and Pilot Car.** The contract price includes all required labor, vehicles, radios, flagger paddles and pilot car signs, and transportation to and from the worksite.

The Engineer will pay for Item 643.0032.____ Flagging on a contingent sum basis at the rate of \$82.00/hour. The Engineer does not require a change order/directive for the flagging Pay Item. Flagging associated with Change Order work paid at the prices according to Subsection 109-1.05 Compensation for Extra Work.

8. **Street Sweeping.** The contract price includes all resources required to keep the roadway free of loose material.
9. **Watering.** The contract price includes all resources required to provide watering, as directed.
10. **Traffic Price Adjustment.** If Item 643.0023.____, Traffic Price Adjustment, is shown on the bid schedule, the total value of this contract will be adjusted, for unauthorized lane reductions or closures, at the rates listed in Table 643-3.
11. **Traffic Control.** Payment for Item 643.0025.____, Traffic Control, will be made at the unit rate value contained in the Traffic Control Rate Schedule shown in the Special Provisions for the accepted units of traffic control devices. The Engineer does not require a change order/directive for Pay Item 643.0025.____, Traffic Control.
12. **Portable Changeable Message Board Sign.** The contract price includes all resources required to furnish, move, and operate the sign.

Two Portable Changeable Message Board Signs used for Permanent Construction Signing paid for under Item 643.0003.____ Permanent Construction Signs. Additional portable changeable message board signs will be paid for under 643.0025.____, Traffic Control.
13. **Plastic Safety Fence.** The contract price includes all resources required to install, maintain, and remove the fence.
14. **Temporary Sidewalk Surfacing.** The contract price includes all resources required to construct, maintain, and remove the surfacing.
15. **Temporary Guardrail.** The contract price includes all resources required to construct, maintain, and remove the guardrail.
16. **Portable Steel Barrier.** The contract price includes all resources required to provide, install, maintain, move, and remove each barrier.
17. **Lighting for Night Work.** Payment for illuminating night work areas and any required adjustments to work zone illumination is subsidiary to other items.

CR643-24.0401/ CHFHWY00453

18. **Pavement Breaks.** Temporary hot mix asphalt at pavement breaks, as noted in Subsection 643-3.02. Gravel Surface Not Specified is subsidiary to Pay Item 306.0001.____.

CHFHWY00453

19. **Temporary Pavement Markings.** Except where specified as an individual Pay Item (Interim Pavement Markings) temporary pavement markings are subsidiary to Section 670 Pay Items. Refer to Section 670 Traffic Markings, for further information.

20. **Temporary Crash Cushion / Redirective.** The price listed in the Traffic Control Rate Schedule, Table 643-5, will be full compensation for the purchase, installation, maintenance during construction, removal, and salvaging the Temporary Crash Cushion / Redirective unit(s). Deliver the salvaged unit(s) to the nearest ADOT & PF Maintenance & Operations Station or as directed by the Engineer.

Traffic control devices, barriers, and crash cushions required to delineate or shield fixed objects will not be measured or paid for separately, but will be subsidiary

Traffic control devices, barriers, and crash cushions required to delineate or shield guardrail posts or non-crashworthy ends will not be measured or paid for separately, but will be subsidiary, when required for failure to meet completion timelines in subsection 606-3.01.

**TABLE 643-5
TRAFFIC CONTROL RATE SCHEDULE**

Traffic Control Device	Pay Unit	Unit Rate
Construction Signs	Each/Day	\$6.50
Special Construction Signs	Square Foot	\$31.00
Type II Barricade	Each/Day	\$3.30
Type III Barricade	Each/Day	\$11.00
Traffic Cone or Tubular Marker	Each/Day	\$1.10
Drums	Each/Day	\$3.30
Temporary Guardrail	Lineal Foot	\$35.00
Portable Concrete or Steel F Shape Barrier (12.5 foot long or \$8/foot for other lengths)	Each	\$100.00
Temporary Crash Cushion / Non-redirective Water Filled Barrier (all required per end)	Each	\$2500.00
Temporary Crash Cushion / Non-redirective Water Filled Barrels (all required per end)	Each	\$3285.00
Temporary Crash Cushion / Non-redirective Sand Filled Barrels (all required per end)	Each	\$4325.00
Temporary Crash Cushion / Redirective	Each	\$9230.00
Plastic Safety Fence	Lineal Foot	\$1.00
Temporary Sidewalk Surfacing	Square Foot	\$2.00
Flexible Markers (Flat Whip, Reflective)	Each	\$60.00
Cars and Trucks w/driver		
Pilot Car (4x2, 1/2 ton truck)	Hour	\$128.00
Watering Truck – up to 4900 gallon capacity	M-Gallon	\$40.00
Watering Truck – more than 4900 gallon	M-Gallon	\$30.00
Street Sweeping: Regenerative Sweeper, Vacuum Sweeper, Mechanical or Power Broom with Vacuum	Hour	\$214.00
40,000 GVW Truck with Crash Attenuator	Hour	\$162.00
Electronic Boards, Panels, and Signals		
Sequential Arrow Panel	Each/Day	\$60.00
Portable Changeable Message Board Sign	Calendar Day	\$210.00

PAY ITEM

Item Number	Item Description	Unit
643.0001.____	Traffic Maintenance	CDAY
643.0002.____	Traffic Maintenance	LS
643.0003.____	Permanent Construction Signs	LS
643.0004.____	Construction Sign	Day
643.0005.____	Type II Barricade	Day
643.0006.____	Type III Barricade	Day
643.0007.____	Traffic Cone/Tubular Marker	Day
643.0008.____	Plastic Safety Fence	LF
643.0009.____	Drum	Day
643.0010.____	Sequential Arrow Panel, Type C	Day
643.0011.____	Special Construction Signs	SF
643.0012.____	Portable Concrete Barrier	Each
643.0013.____	Temporary Crash Cushion	Each
643.0014.____	Interim Pavement Marking	STA
643.0015.____	Flagging	HR
643.0016.____	Pilot Car	HR
643.0017.____	Street Sweeping	HR
643.0018.____	Watering	MGAL
643.0019.____	Lane Closure	HR
643.0020.____	Detour	Day
643.0021.____	Road Closure	Day
643.0022.____	One Lane Road	HR
643.0023.____	Traffic Price Adjustment	CS
643.0024.____	Portable Changeable Message Board Sign	Day
643.0025.____	Traffic Control	CS
643.0026.____	Temporary Sidewalk Surfacing	SY
643.0027.____	Temporary Guardrail	LF
643.0030.____	Portable Steel Barrier	LF
643.0031.____	Interim Pavement Marking	LS
643.0032.____	Flagging	CS
643.0033.____	Detour	LS

CR643-24.0401/CFHWY00453

SECTION 644
SERVICES TO BE FURNISHED BY THE CONTRACTOR

Special Provisions

Replace Subsection 644-2.01 with the following:

644-2.01 FIELD OFFICE. Furnish and maintain a suitable office for the Engineer, available for occupancy from 2 weeks before beginning work, through 30 days after issuance of the notice of project completion as defined in Subsection 105-1.15. The following office requirements shall be met:

1. A minimum of 1000 square feet of floor area. The office area shall be divided so that it contains an office room separated by a closable door. The office room shall have a minimum of 160 square feet of floor area.
2. A thermostatically controlled interior heating system with necessary fuel.
3. Adequate electrical lighting and 120 volt, 60 hertz power, with a minimum of 6 electrical outlets.
4. A minimum of 100 square feet of window area and adequate ventilation.
5. Adequate parking for a minimum of 16 vehicles, with one handicap parking space meeting the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).
6. Attached indoor plumbing with sanitary lavatory facilities and potable drinking water provided.
7. Provide engineering communication services to the field office, Subsection 644-2.08.
8. If a part of the Contractor's building, it shall be completely partitioned off from the balance of the structure and provided with a separate outside door equipped with a lock.
9. Located within 3 miles of the project.
10. Weekly janitorial service consisting of emptying trash receptacles, vacuuming office area, and cleaning restrooms and counter areas.
11. Provide one mobilization and one demobilization of the Engineer's office equipment and furniture.
12. Provide a security system controlled by the Department for the office including camera coverage for the vehicle parking.

CR644.FOCOM-080120

644-2.05 VEHICLES.

Replace the second and third paragraphs with the following:

Pickup(LT)/Sport Utility Vehicle (SUV): Furnish full-size, four-wheel drive vehicles, either pickup/light truck(s) with crew cabs or sport utility vehicle(s). Provide vehicles less than three model years old, in good condition, and with less than 36,000 miles on the odometer. Furnish all fuels, maintenance and parts, and insurance during the Department's operation and use.

Equip each vehicle with lightbars wired into the vehicle's electrical system with a dash mounted switch easily accessible to the vehicle operator. Provide Code 3; Reflex C5590AA 15.3-inch mini lightbar, or approved equal. Approved equal equipment shall have the following characteristics:

- (4) 55 watt rotators with amber filters
- 1200 flashes per minute
- (2) diamond mirrors
- 55 inches in length

Equip each vehicle with hands-free communication connectivity.

If you are working after October 1, provide four studded snow tires mounted on each vehicle.

You are responsible for normal wear and tear, and any other incidental damage including broken windshields, occurring during the Department's operation and use. The State of Alaska is responsible for damage to any vehicle caused by its own negligent operation.

CR644.LTSUV-113020

Add the following Subsection 644-2.08 Engineering Communication and Office Equipment:

644-2.08 ENGINEERING COMMUNICATION AND OFFICE EQUIPMENT. Engineering Communications and Office Equipment, minimum service includes:

1. Three phone/facsimile lines and commercial phones (different phone numbers for each line)
 - a. One phone with built-in digital answering machine.
 - b. Ancillary equipment for operational service and as required by the Engineer.
2. High speed internet service with modem (DSL or Cable)
 - a. Send and receive capability supporting 10.0 Mbps download and upload speed or higher at all times.
 - b. Data usage, 10 GB minimum monthly.
 - c. Wireless router.
 - d. Battery backup.
 - e. Ancillary equipment for operational service and as required by the Engineer.
3. Equipment rental services
 - a. All-in-one printer/copier/scanner
 - (1) Black-white and color
 - (2) Pages per minute (ppm): 50
 - (3) Paper trays: 8.5" x 11" and 11" x 17"
 - (4) Capacity: 1100 sheets minimum

CR644.FOCOM-080120

644-4.01 METHOD OF MEASUREMENT.

Replace the third paragraph with following:

Vehicle (LT/SUV). For each vehicle provided. If a replacement vehicle is necessary, no additional measurement will be made.

CR644.LTSUV-113020

644-5.01 BASIS OF PAYMENT.

Add the following:

Pay Item 644.2007.____ Vehicle (LT/SUV):

1. A percentage of the Contract unit price, to be determined by the Engineer, will be paid as full compensation for furnishing the vehicle at the site.
2. The balance of the Contract unit price will be prorated over the anticipated active construction period with a portion included as part of each interim payment, for maintenance, repairs, and fuel and, at the end of the project, for removing it from the site. If anticipated construction period changes, the final increment will be held until final payment.

PAY ITEM

Item Number	Item Description	Unit
644.2007.____	Vehicle (LT/SUV)	Each

CR644.LTSUV-113020

Add the following:

Pay Item 644.2004.____ Engineering Communications:

Usage services including long distance calls made by State personnel and the Internet service provider will be reimbursed by the State. Payment for communication usage services and equipment rental agreements shall be based on paid receipts to the service provider plus 15%.

Connection fees (initial connection) local calls, providing equipment and disconnection are subsidiary to Pay Item 644.0001.____ Field Office and as such are paid by the Contractor.

PAY ITEM

Item Number	Item Description	Unit
644.2004.____	Engineering Communications	CS

CR644.FOCOM-080120

Special Provision

Add the following Section:

SECTION 645 TRAINING PROGRAM

645-1.01 DESCRIPTION. This Statewide Special Provision for on-the-job training (OJT) implements 23 CFR 230, Subpart A, Appendix B.

As part of the Equal Employment Opportunity Affirmative Action Program, the Contractor shall provide on-the-job training aimed at developing full journey status in the type of trade or job classification involved. The number of individuals to be trained and the number of hours of training to be provided under this contract will be as shown on the bid schedule.

645-2.01 OBJECTIVE. Training and upgrading of minorities and women toward journey status is the primary objective of this program. The Contractor shall enroll minorities and/or women, where possible, and document good faith efforts prior to the hire of non-minority males in order to demonstrate compliance with this Training Special Provision. Specific good faith efforts required under this Section for the recruitment and employment of minorities and women are found in the Federal EEO Bid Conditions, Form 25A-301.

645-3.01 GENERAL. The Contractor shall determine the distribution of the required number of apprentices/trainees and the required number of hours of training among the various work classifications based upon the type of work to be performed, the size of the workforce in each trade or job classification, and the shortage of minority and female journey workers within a reasonable area of recruitment.

Training will be provided in the skilled construction crafts unless the Contractor can establish prior to contract award that training in the skilled classifications is not possible on a project; if so, the Department may then approve training either in lower level management positions such as office engineers, estimators, and timekeepers, where the training is oriented toward construction applications, or in the unskilled classifications, provided that significant and meaningful training can be provided. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Credit for offsite training hours indicated above may only be made to the Contractor where the apprentices/trainees are concurrently employed on the project and the Contractor does one or more of the following: contributes to the cost of the training, provides the instruction to the apprentice/trainee, or pays the apprentice's/trainee's wages during the offsite training period.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

Prior to award of the contract, the Contractor shall submit Form 25A-311, Training Utilization Report, indicating the training program to be used, the number of apprentices/trainees to be trained in each selected classification, the number of hours of training to be provided, and the anticipated starting time for training in each of the classifications.

Training must begin within 2 weeks of the anticipated start date(s); unless otherwise authorized by a Directive. Such authorization will be made only after submission of documentation by the Contractor, and approval by the Engineer, of efforts made in good faith which substantiate the necessity for a change.

Contractors may use a training program approved by the U.S. Department of Labor, Office of Apprenticeship (USDOL/OA); or one developed by the Contractor using Form 25A-310 and approved prior to contract award by the OJT Coordinator in the DOT&PF Civil Rights Office.

The minimum length and type of training for each classification will be established in the training program selected by the Contractor. Training program approval by the Department for use under this section is on a project by project basis.

It is expected that each apprentice/trainee will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist or until training has been completed. It is not required that apprentices/trainees be continuously employed for the duration of the contract.

If, in the judgment of the Contractor, an apprentice/trainee becomes proficient enough to qualify as a journey worker before the end of the prescribed training period and the Contractor employs that individual as a journey worker in that classification for as long as work in that area remains, the individual's training program will be considered completed and the balance of training hours required for that apprentice/trainee shall be waived.

The Contractor shall furnish each ADOT&PF training program trainee a copy of the program (Form 25A-310) to be followed during training on the project, and with a written certification showing the type and length of training completed on the project. Existing USDOL/OA apprentices should already have a copy of their program. No employee shall be employed for credit as an apprentice/trainee in a classification in which that employee has previously worked at journey status or has previously completed a training course leading to journey status.

The Contractor shall periodically review the training and promotion potential of minority and women employees and shall encourage eligible employees to apply for such training and promotion.

The Contractor shall provide for the maintenance of records and the furnishing of periodic reports documenting the progress of each apprentice/trainee. The Contractor must submit Form 25A-313 by the 15th of each month and provide each ADOT&PF trainee written evaluation reports for each unit of training provided as established on Form 25A-310.

645-3.02 WAGES. Trainees in ADOT&PF approved training programs will be paid prevailing Davis-Bacon fringe benefits plus at least 60 (but less than 100) percent of the appropriate minimum journey rate specified in the contract for the first half of the training period, at least 75 (but less than 100) percent for the third quarter of the training period, and at least 90 (but less than 100) percent for the last quarter of the training period. Trainee wages shall be identified on Form 25A-310. Apprentices in USDOL/OA training programs shall be paid in accordance with their approved program. Beginning wages of each trainee/apprentice enrolled in a Section 645 Training Program on the project shall be identified on Form 25A-312.

645-3.03 SUBCONTRACTS. In the event the Contractor subcontracts a portion of the work, he shall determine how many, if any, of the apprentices/trainees are to be trained by the subcontractor. Any such subcontracts shall include this Section 645, Form 25A-311 and Form 25A-310, where appropriate. However, the responsibility for meeting these training requirements remains with the Contractor; compliance or non-compliance with these provisions rests with the Contractor and sanctions and/or damages, if any, shall be applied to the Contractor in accordance with subsection 645-5.01, Basis of Payment.

645-4.01 METHOD OF MEASUREMENT. The Contractor will be credited for each approved apprentice/trainee employed on the project and reimbursed on the basis of hours worked, as listed in the certified payrolls. There shall be no credit for training provided under this section prior to the Contractor's submittal and approval by the Engineer of Form 25A-312 for each apprentice/trainee trained under this Section. Upon completion of each individual training program, no further measurement for payment shall be made.

645-5.01 BASIS OF PAYMENT. Payment will be made at the contract unit price for each hour of training credited. Where a trainee or apprentice, at the discretion of the Contractor, graduates early and is employed as a journey worker in accordance with the provisions of Subsection 645-3.01, the Contractor will receive payment only for those hours of training actually provided.

This payment will be made regardless of any other training program funds the Contractor may receive, unless such other funding sources specifically prohibit the Contractor from receiving other reimbursement.

Payment for training in excess of the number of hours specified on the approved Form 25A-311 may be made only when approved by the Engineer through Change Order.

Non-compliance with these specifications shall result in the withholding of progress payments until good faith efforts documentation has been submitted and acceptable remedial action has been taken.

Payment will be at the end of the project following the completion of all training programs approved for the project. No payment or partial payment will be made to the Contractor if he fails to do any of the following and where such failure indicates a lack of good faith in meeting these requirements:

1. provide the required hours of training (as shown in the Bid Schedule and approved Form 25A-311),
2. train the required number of trainees/apprentices in each training program (as shown in the Bid Schedule and approved Form 25A-311), or
3. hire the apprentice/trainee as a journey worker in that classification upon completion of the training program for as long as work in that area remains.

Failure to provide the required training damages the effectiveness and integrity of this affirmative action program and thwarts the Department's federal mandate to bring women and minorities into the construction industry. Although precise damages to the program are impractical to calculate, they are at a minimum, equivalent to the loss to the individuals who were the intended beneficiaries of the program. Therefore, where the Contractor has failed, by the end of the project, to provide the required number of hours of training and has failed to submit acceptable good faith efforts documentation which establishes why he was unable to do so, the Contractor will be assessed an amount equal to the following damages to be deducted from the final progress payment:

Number of hours of training not provided, times the journey worker hourly scale plus benefits. The journey worker scale is that for the classification identified in the approved programs.

PAY ITEM

Item Number	Item Description	Unit
645.0001.____	Training Program, __ Trainees/Apprentices	LH

HSP20.2-113020

**SECTION 646
CPM SCHEDULING**

Special Provisions

Replace Subsection 646-2.01 with the following:

646-2.01 SUBMITTAL OF SCHEDULE.

Submit a detailed initial CPM Schedule at the preconstruction conference for the Engineer's acceptance as set forth below.

The construction schedule for the entire Project shall not exceed the specified contract time. Allow the Engineer 14 days to review the initial CPM Schedule. Revise promptly. The finalized CPM Schedule must be completed and accepted before beginning work on the Project.

646-3.01 REQUIREMENTS AND USE OF SCHEDULE.

Replace the first sentence of No. 2 Schedule Updates. with the following:

Hold job site progress meetings with the Engineer for the purpose of updating the CPM Schedule. Meet with the Engineer monthly or as deemed necessary by the Engineer.

CR646.1-23.0501

Special Provisions

Add the following Section:

SECTION 647 EQUIPMENT RENTAL

647-1.01 DESCRIPTION. This item consists of furnishing construction equipment, operated, fueled, and maintained, on a rental basis for use in construction of extra or unanticipated work at the direction of the Engineer. Construction equipment is defined as that equipment actually used for performing the items of work specified and shall not include support equipment such as, but not limited to, hand tools, power tools, electric power generators, welders, small air compressors and other shop equipment needed for maintenance of the construction equipment.

The work is to be accomplished under the direction of the Engineer, and the Contractor's operations shall at all times be in accordance with the Engineer's instructions. These instructions by the Engineer shall be to the Contractor's supervisory personnel only, not to the operators or laborers. In no case shall these instructions by the Engineer be construed as making the Department liable for the Contractor's responsibility to prosecute the work in the safest and most expeditious manner.

647-2.01 EQUIPMENT FURNISHED. In the performance of this work, the Contractor shall furnish, operate, maintain, service, and repair equipment of the numbers, kinds, sizes, and capacities set forth on the Bid Schedule or as directed by the Engineer. The operation of equipment shall be by skilled, experienced operators familiar with the equipment.

The kinds, sizes, capacities, and other requirements set forth shall be understood to be minimum requirements. The number of pieces of equipment to be furnished and used shall be, as the Engineer considers necessary for economical and expeditious performance of the work. The equipment shall be used only at such times and places as the Engineer may direct.

Equipment shall be in first class working condition and capable of full output and production. The minimum ratings of various types of equipment shall be as manufactured and based on manufacturer's specifications. Alterations will not be considered acceptable in achieving the minimum rating. Equipment shall be replaced at any time when, in the opinion of the Engineer, their condition is below that normal for efficient output and production.

Equipment shall be fully operated, which shall be understood to include the operators, oilers, tenders, fuel, oil, air hose, lubrication, repairs, maintenance, insurance, and incidental items and expenses.

647-2.02 EQUIPMENT OPERATORS AND SUPERVISION PERSONNEL. Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. Personnel furnished by the Contractor shall be, and shall remain during the work hereunder, employees solely of the Contractor.

The Contractor shall furnish, without direct compensation, a job superintendent or Contractor's representative together with such other personnel as are needed for Union, State, or Federal requirements and in servicing, maintaining, repairing and caring for the equipment, tools, supplies, and materials provided by the Contractor and involved in the performance of the work. Also, the Contractor shall furnish, without direct compensation, such transportation as may be appropriate for the personnel.

647-3.01 CONSTRUCTION REQUIREMENTS. The performance of the work shall be according to the instructions of the Engineer, and with recognized standards and efficient methods.

The Contractor shall furnish equipment, tools, labor, and materials in the kinds, number, and at times directed by the Engineer and shall begin, continue, and stop any of the several operations involved in the work only as directed by the Engineer.

Normally, the work is to be done when weather conditions are reasonably favorable, 6 days per week, Mondays through Saturdays, except holidays.

The Engineer will begin recording time for payment each shift when the equipment begins work on the project. The serial number and brief description of each item of equipment listing in the bid schedule and the number of hours, or fractions thereof to the nearest one quarter hour, during which equipment is actively engaged in construction of the project shall be recorded by the Engineer. Each day's activity will be recorded on a separate sheet or sheets, which shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative.

647-4.01 METHOD OF MEASUREMENT. Section 109.

Hourly Rental Rate: Includes the equipment rate plus the operating costs including: furnishing, travel time, operating, maintaining/servicing and repairing the equipment along with the costs incidental to the equipment and its' operation.

647-5.01 BASIS OF PAYMENT. Payment is for the time that fully operational equipment is engaged in the performance of the work directed by the Engineer. Time not paid for includes: idle periods, maintaining/servicing and repairing the equipment, making change-overs of equipment parts, and time to travel to and from the project. Payment will only be for time supported by certified payroll.

Furnishing and operating equipment that is heavier, has larger capacity, or greater power than specified will not entitle the Contractor to extra compensation.

Pay Item 647.2000.____ Wide Pad Dozer, 65-HP Minimum: paid at the rate of \$200/hour.

Pay Item 647.2002.____ Backhoe, 4WD, 1 CY Bucket, 75-HP Minimum, 15 ft Depth: paid at the rate of \$170/hour.

PAY ITEM

Item Number	Item Description	Unit
647.2000.____	Wide Pad Dozer, 65-HP Minimum	CS
647.2002.____	Backhoe, 4WD, 1 CY Bucket, 75-HP Minimum, 15 ft Depth	CS

CR647-110316R

Special Provision

Replace Section 651 with the following:

**SECTION 651
CONTROL OF WORK – SUPPLEMENTAL REQUIREMENTS**

651-1.01 DESCRIPTION. Supplemental requirements for Section 105, Control of Work.

651-1.02 RELATED SECTIONS. Section 105, Control of Work

651-1.03 UTILITIES. Request locates from the utilities having facilities in the area.

Use the Alaska Digline, Inc. "Locate Call Center" for the following utilities.

ALASKA DIGLINE, INC.

Locate Call Centers:		
Anchorage		278-3121
Statewide		(800) 478-3121
Call Centers will notify the following:		
AT & T Alascom (AT&T)		
ENSTAR Natural Gas (ENS)		
GCI Communication Corp.		
Matanuska Electric Association (MEA)		
Matanuska Telephone Association (MTA)		

State Facility Utilities: before beginning work, contact the Central Region Maintenance & Operations Office at (907) 269-0760 to obtain the District Superintendent's phone number where the project is located, and request locates.

CR651-020118R3

The contractor shall coordinate and provide all required support for utilities relocation during construction. This support work can include: SWPPP, traffic control, clearing, grubbing, and excavation.

The Contractor shall hold a utility coordination meeting with the utilities below prior to construction to coordinate the utility relocation work sequencing.

CFHWY00453

Utility Work by Others.

Utility work by others will occur concurrently with construction of this project. The Contractor shall give the Utility, through the Engineer, 15 calendar days advance written notice regarding the dates when the utility owner is required to begin and end operations.

Utility work is not anticipated for this project, however; if utility work is added to the project the Contractor shall give the Utility, through the Engineer, 15 calendar days advance written notice regarding the dates when the utility owner is required to begin and end operations.

For utility work by others, the Contractor shall:

1. include utility work on the Construction Phasing Plan and Progress Schedule;
2. provide erosion, sediment, and pollution control including the stabilization of areas disturbed during utility work. Identify all utility companies performing ground disturbing activity in the Storm Water pollution Prevention Plan (SWPPP). Refer to Section 641 for further information;

3. provide clearing and grubbing. Payment will be made under Section 201, Clearing and Grubbing;
4. provide traffic control and flagging. Payment will be made under Section 643, Traffic Maintenance;
5. provide Right-of-Way and/or Construction Surveying before utility relocation. Include:
 - Control for utility relocation - either ROW or Centerline staking with Station information.
 - Slope staking.
 - Proposed structures, not including utilities to be relocated by others.

Payment will be made as follows:

- a. Subsidiary to Pay Item 642.0001.____ Construction Surveying, if the Contractor is required to provide the surveying as part of the Contract and/or,
- b. Under Pay Item 642.0003.____ Three Person Survey Party, if the Construction or Right of Way staking required by the utility is either in advance of the 2 week work plan, or not required by the Contract.

The utility shall give the Contractor, through the Engineer, 15 calendar days advance written notice for required staking.

6. remove and replace pavement. Payment will be made under Section 202, Removal of Structures and Obstructions; Section 401, Hot Mix Asphalt and Surface Treatments; Section 408, Hot Mix Asphalt and Surface Treatments, Type V, and according to project typical section.
7. remove and replace sidewalk and curb and gutter. Payment will be made under Section 202, Removal of Structures and Obstructions, Section 608, Sidewalks, and Section 609, Curbing.
8. provide bedding and backfill material, and excavation, according to Section 204, Structure Excavation for Conduits and Minor Structures, and the project typical sections.
9. coordinate with the utility owner(s) and provide potholing services at the locations identified or as directed by the Engineer. Payment will be made under Section 682, Utility Potholing.

Work done by utility owner(s) is as follows:

TBD

CFHWY00453

651-1.04 COOPERATION BETWEEN CONTRACTORS. The following state owned projects may be under construction concurrently with this project.

Project Name:	Project No.:
Bogard Road Pavement Preservation: Trunk Rd to Wasilla Fishhook Rd	CFHWY00723
Seward Meridian Road Improvements, PH II: PWH to Seldon Rd	Z512210000

Coordinate traffic control, construction, and material hauling operations with the prime contractor of the above projects to minimize impact on the traveling public, and to minimize conflicts with the work being performed under the other contracts.

CR651-23.0601

Special Provisions

Replace Section 652 with the following:

SECTION 652 PROSECUTION AND PROGRESS – SUPPLEMENTAL REQUIREMENTS

652-1.01 DESCRIPTION. Supplemental requirements for Section 108. Prosecution and Progress.

652-1.02 RELATED SECTIONS. Section 108, Prosecution and Progress.

652-1.03 PROSECUTION AND PROGRESS. In Subsection 108-1.03:

- Replace the last sentence in the 1st paragraph with: "Submit the following at the Preconstruction Conference:"
- Replace No. 1 with: "A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order the work will be carried out, and the contemplated dates the Contractor, subcontractors, and utilities will start and finish each of the salient features of the work, including scheduled periods of shutdown. Indicate anticipated hours of operations and periods of multiple shift work. Revise the proposed schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer."

652-1.04 LIMITATION OF OPERATIONS. In Subsection 108-1.04:

- Add: "Limit ground disturbed by construction activities and not permanently stabilized between all roadways combined, at any specific time, to a maximum of 11,000 feet parallel to the roadway(s), unless additional length is approved. Stabilize disturbed ground according to Section 641 Erosion, Sediment, and Pollution Control."

CR652-23.0501

Special Provision

Replace Section 660 with:

SECTION 660 SIGNALS AND LIGHTING

660-1.01 DESCRIPTION. Furnish and install, modify, remove, or salvage one or more traffic signal systems, flashing beacon systems, highway lighting systems, sign illumination systems, traffic count systems, electrical equipment on structures, falsework lighting, partial installations for future systems, or combinations thereof, as specified.

Where an existing system is to be modified, reuse the existing material in the revised system as shown on the Plans or specified in the Special Provisions, and salvage or dispose of all other materials.

When required by the Special Provisions, provide an on-site manufacturer's representative to:

1. Energize and adjust the electrical system.
2. Provide acceptable instruction for the operation and maintenance of the electrical system.

660-1.02 DEFINITIONS.

Use the definitions in NEMA TS 2-2003 V02.06, *Traffic Controller Assemblies with NTCIP Requirements*, Section 1, Definitions, along with the following:

1. Electrolier. The complete assembly of pole, mast arm, luminaire, ballast or driver, and light source.
2. Luminaire. The assembly which houses the light source and controls the light emitted from the light source. Luminaires consist of hood (including socket, lamp, and ballast or driver), reflector, and glass globe or refractor.
3. Lighting Standard. The pole and mast arm which supports the luminaire.
4. Vehicle. Any motor vehicle licensed for highway use by the State of Alaska.

660-2.01 MATERIALS. Use materials that conform to Section 740, the Materials Certification List, the Plans, specifications, and the following:

Concrete	Section 501 (Class A)
Grout	Subsection 701-2.03
Reinforcing Steel	Section 503
Paint	Subsection 708-2.01
Steel Pipe Pile	Section 715
Anchor Plate	ASTM A709
Galvanizing	Subsection 716-2.07
Anchor Bolts	Section 740-2.02
Precast Concrete Products	Subsection 550-2.03

1. Equipment List(s) and Drawings. Within 30 days after the Contract award, submit an electronic portfolio of equipment and materials proposed for installation to the Department for review and approval. Include a table of contents in the portfolio(s) that includes each item's intended use(s) and the following:
 - a. Materials on the *Qualified Products List*. The *Qualified Products List* does not apply to the 660 items. Provide catalog cuts of materials to the Engineer for review and approval.
 - b. Materials Not on the *Qualified Products List*. Catalog cuts that include the manufacturer's name, type of product, size, model number, conformance specifications, and other data as may be required, including manufacturer's maintenance and operations manuals, or sample articles.
 - c. Pole Package. A complete set of design, fabrication, and installation proposals for each signal and lighting pole. Include stamped engineering calculations, mill certifications, shop drawings, welding plans, equipment lists, and pole installation plans.
 - d. Materials Not Requiring Certification. Only submit those materials for review and approval if they are included on the Materials Certification List (MCL).

2. As-Built Plans. Prepare 3 complete sets of red lined as-built plans and keep them current with the construction. Detail in the as-built plans all construction changes made to the Plans. Include the following information on the appropriate sheets:
 - a. Location and depth of conduit runs
 - b. Station and offset of all junction boxes
 - c. Heights of signal faces and overhead signs
 - d. A list of equipment, including manufacturer, brand, and model number installed in each controller cabinet

Furnish copies of the as-built plans at least twice a month during construction so that they may be reviewed for accuracy and completeness. Furnish any additional information required to clarify the as-built plans and correct all discrepancies. The Department will not make progress payments for the signal and illumination work completed until reviewing accurate as-built plans reflecting the construction progress. Correct any deficiencies before payment.

Before final inspection of the work, submit 3 complete sets of as-built plans to the Engineer. You may substitute 2 colored copies of the as-built plans in lieu of keeping the 3 separate original copies. If you elect to do this, a sample of the method of copying must be approved before starting any work on the signal and lighting items.

Place 1 copy of the controller cabinet diagram, detector assignment sheet and the intersection and phase diagram as reviewed by the Engineer inside of each controller cabinet.

3. Warranties, Guarantees, and Instruction Sheets. Deliver to the Engineer all manufacturers' warranties, guaranties, instruction sheets, and parts furnished with materials used in the work before the Department assumes maintenance responsibilities.

CONSTRUCTION REQUIREMENTS

660-3.01 GENERAL.

1. Scheduling of Work. Complete each new traffic signal system, highway lighting system, and sign illumination system and ensure it is ready for operation before opening to traffic the corresponding section of new alignment. Contact the regional DOT&PF Traffic Signal Technician 24 hours in advance of work on a signal or lighting system. Contact shall be made through the Engineer.

After staking pole foundations, verify there will be no overhead or underground utility conflicts with foundations, poles, mast arms, or conduits. Locate and protect existing underground and overhead utilities. The location of cables, conduits, junction boxes, foundations and poles that are shown on the Plan sheets are approximate and it is the Contractor's responsibility to verify the actual location when working in the area. See Subsection 105-1.06.

Existing signing and traffic markings shall not be allowed to conflict with new signal modifications. New signing and traffic marking modifications shall not conflict with existing signals and shall be kept current with signal modifications.

Incidental materials and other items that are not shown on the Plans, assembly drawings, or specified herein, that are necessary to complete the system, must be furnished and installed as though such materials and other items were shown on the Plans, assembly drawings, or specified herein.

Protect metallic materials against corrosion. Hot-dip galvanize ferrous metals such as bolts, braces, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous parts not of corrosion resistant steel, according to ASTM A 123 or A 153, except where other equivalent protection treatment is specifically approved in writing by the Engineer.

Asphalt patches placed in existing asphalt for loops and conduit crossings must be placed prior to the end of shift in which the loops and crossings are placed. Asphalt patches will match the thickness of the existing asphalt to a maximum of 3 inches thick. Where the existing asphalt is thicker than 3 inches, use compacted crushed aggregate base course to make up the difference.

Do not pull conductors or cables into conduit until the junction boxes are set to grade, crushed rock sumps are installed, grout is placed around the conduit, and metallic conduit is bonded.

In vehicular undercrossings, place soffit lights in operation as soon as practicable after removing falsework from the structure. Place lighting for pedestrian structures in operation before opening the structure to pedestrian traffic.

2. Safety Precautions. Before starting work on existing street lighting circuits, de-energize the system by opening disconnect switches, and/or opening bypass switch plugs, and tagging each opened device as detailed in Part 4, Section 44, Article 440 of NESC. Where said circuits are under the control of an electric utility, obtain written assurance daily from the utility that the circuit being worked on has been de-energized.

Prior to beginning work, perform lockout/tagout procedures and establish an electrically-safe work condition per NFPA 70E Article 120. Post suitable signs at load centers when any of the circuits from that load center are being worked on.

Existing circuits listed on the wiring diagrams and Plan sheets were obtained from as-built information and must be verified before work involving those circuits.

3. Excavating and Backfilling. Complete excavation and backfill required to install the signal and lighting components embedded in the roadway as shown in the Plans, including foundations, conduits, junction boxes, and loop detectors before final lift paving. Provide traffic control to complete this work according to the requirements of Section 643. Place excavated materials where it will not interfere with surface drainage.

Support and protect conduits and utilities scheduled to remain in service when encountering them during excavation.

Excavate trenches wide enough to install the number of conduits specified and to compact the bedding and backfill materials according to these specifications.

To install conduits, excavate trenches deep enough to allow for 6 inches of bedding material, the depth of the largest conduit, and the minimum burial depth specified between the top of the conduit and finished grade of the ground above the conduit. Keep the longitudinal profile of trench bottoms free of irregularities that would prevent the assembled conduit run from continuously contacting the top of the bedding material.

When conditions allow HDPE conduit to be installed by a plowed technique, restoring the area disturbed from the process shall be accomplished according to Subsection 204-3.01. Density testing may be waived and compactive effort substituted at the discretion of the Engineer. This work is subsidiary to conduit installation. Use Selected Material, Type A for backfill.

Dispose of, according to Subsection 203-3.01, excavated materials that remain after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in Subsection 703-2.07. Disposal of this material is subsidiary to the 660 Pay Items.

Dewater foundation and conduit excavations immediately before and during embedding and backfilling operations. Backfill excavations with materials that meet the following requirements:

- a. Backfill foundations with material that meets the requirements of Selected Material, Type A that passes through a 3 inch sieve.
- b. Within the limits of the typical section, embed conduits and backfill trenches using material that meets the requirements of the lift where it is located, reusing excavated materials if it meets the requirements of the applicable lift.
- c. In other locations, embed conduits and backfill trenches using material that meets the requirements of Selected Material, Type C, reusing excavated materials if it meets this requirement.
- d. Import, when ordered, embedment and backfill materials that satisfy the preceding materials requirements.

Embed conduit(s) between two 6 inch lifts of material cleaned free of rocks exceeding a 1 inch maximum dimension. Grade and compact the first lift to provide a surface that continuously contacts the assembled conduit run.

Within 6 feet of paved surfaces and around foundations, backfill in uniform layers no more than 6 inches deep and compact each layer according to Subsection 203-3.04. In other locations, compaction may be as approved by the Engineer.

4. Welding. Complete welding according to Subsection 504-3.01.7. Welding and approved shop drawings.

Submit shop drawings of the proposed work with the welding plans for approval. The shop drawings shall include material specifications, component dimensions, the types of welds that will be made, and the proposed type and extent of weld inspection.

Repair the holes that were used to mount equipment, in reused poles and mast arms by welding in disks flush with the adjoining surface. For the disk material, use steel that matches the ASTM designation, grade, and thickness of the steel used to fabricate each pole. Cut disks that match the dimensions of the hole being repaired from pieces of steel plate bent to match the pole's radius at the hole. Grind the welds smooth and flush with the adjoining pole and disk surfaces. Repair the damaged finish according to Subsection 660-3.01.8.

5. Removing and Replacing Improvements. The Contractor shall complete the following work at the Contractor's expense.
 - a. Remove improvements that block completion of the work detailed in the Plans as specified herein.
 - b. Reconstruct with new materials the non-reusable improvements the Contractor removed to complete the work.
 - c. Replace with new materials the reusable items damaged by the Contractor, that are specified for reuse.
 - d. Reconstruct with new materials improvements damaged or removed by the Contractor not conflicting with the work and not scheduled for removal.

Nonreusable improvements consist of cast in place items, including: asphalt concrete pavement, sidewalks, curb and gutter, lawns, and traffic markings. Reusable improvements include the items that were made before installation. Crushed aggregate base material may not be used as backfill in the base course if excavation depth exceeds the thickness of the base course.

Complete reconstruction work, including materials, according to the applicable sections of the Alaska SSHC, and leave the work in a satisfactory and serviceable condition. In completing the reconstruction work, match the alignments, widths, thicknesses, shapes, sizes, cross sections, and finishes of the existing improvements.

If removing a portion of sidewalk or curb and gutter, remove an entire segment between the weakened plane contraction joints or between an expansion joint and a weakened plane contraction joint.

Before removing a segment of Portland or asphalt cement concrete material, cut completely through the material with a saw along the outline of the area to be removed. Make cuts neat and true and prevent shatter outside the area removed.

To replace lawns, leave the top of the backfilled excavation low enough to install 4 inches of compacted topsoil. Match the top of the topsoil with the bottom of the vegetative mat. Apply seed and keep the seeded areas watered according to Section 618.

Remove, keep alive, and replant trees, shrubs, and plants according to Section 621. Replace the trees, shrubs, and plants that do not survive with plants of like size and type.

6. Salvaging and Reusing Electrical Equipment. When the Plans include existing electrical equipment scheduled for removal or relocation, remove, and store the equipment listed in the following paragraph without damaging it. Deliver removed equipment not scheduled for reuse to the local District Maintenance Station or place specified in the Plans or Special Provisions. Notify the district superintendent or person specified by telephone one week before planned delivery date.

Salvage the controller assemblies, signal heads, mounting brackets, luminaires, lighting standards, signal posts and poles, mast arms, optical detectors, load centers, light emitting diode optical units, and the lids of junction boxes scheduled for removal and other materials scheduled for relocation. The Contractor shall replace at the Contractor's expense salvaged equipment damaged or destroyed before or during delivery or reinstallation.

Controller assemblies and load centers include the cabinet and equipment contained in the cabinet before Contract award.

Remove from the highway right-of-way materials associated with the equipment removed or relocated and not scheduled for reuse, including conduits, junction boxes, conductors, and foundations. Raze

the tops of foundations abandoned in place according to Subsection 660-3.02. Fill the holes left by removing junction boxes and foundations with Selected Material, Type A and compact as directed.

With approval, after removing conductors, buried conduits that do not interfere with other construction may be abandoned in place. The Department may require a credit for this waiver. Remove the ends of abandoned conduits from the junction boxes that will remain in service.

Within 15 days of the Notice to Proceed, complete an inventory of the materials that will be salvaged in the presence of the Engineer. Note the location and condition of the materials. When material specified for reuse is found in an unserviceable condition, the Engineer will determine whether to repair it or replace it with new material that will be paid for as extra work under Subsection 109-1.05. Retain a copy of the inventory and give the original documents to the Engineer.

When the Plans specify reinstalling existing equipment at new locations and installing State furnished equipment, complete the following work at the Contractor's expense.

- a. For poles, install new foundations, furnishing the new nuts, bolts, washers, and conduits needed to complete the installations.
- b. For lighting poles, install new illumination tap wires and fused disconnect kits.
- c. For luminaires, clean the luminaires inside and out and install new lamps of the same wattage.
- d. For signal heads, furnish and install the mounting brackets needed to complete the relocation, and clean the signal heads inside and out.
- e. For poles and undisturbed poles from which the Plans specify removing equipment, repair the holes that were made to mount equipment according to Subsection 660-3.01.4 Welding and repair the finishes according to Subsection 660-3.01.8 Repairing Damaged Finishes.

Repair holes left in the shafts of existing metal poles, due to removal of equipment or mast arms, by welding in a suitable disk, grinding smooth, and painting as provided for repair of damaged coatings in AASHTO M 36 or using a knockout seal.

When ordered, the Engineer will pay for repairing existing damaged finishes on existing equipment according to Subsection 660-3.01.8 as extra work.

If deciding to use new equipment rather than reusing the equipment specified, notify the Engineer of the change and include a submittal according to Subsection 660-2.01.1.

Deliver the salvaged materials undamaged to the local DOT & PF Maintenance and Operations Yard.

Contact the local state Electrician one week before planned delivery.

7. Field Tests. Electrical circuits must pass the following tests before the Engineer will accept the work for payment. Perform these tests in the presence of the Engineer, and document the results of each test on a per circuit basis. Retain a copy of test results and give the original documents to the Engineer. Furnish equipment needed to perform these tests.

Replace or repair at the Contractor's expense, and in an approved manner, faulty materials and work revealed by these tests. After making repairs, repeat tests on the repaired circuit and continue this process until circuits have passed required tests. The Department reserves the right to have the Contractor retest circuits, and to use the retest results to accept or reject individual circuits.

- a. Grounds. Before completing the circuitry and functional tests, physically examine conduits ends, junction box lids, load centers, and the foundations for signal posts and poles, lighting poles, and controller cabinets to ensure the grounding system required by Subsections 660-3.06 and 661-3.01 has been installed and splices and connections are mechanically firm.
- b. Continuity. When loop detector work is included, test each loop detector circuit for continuity at the roadside junction box before splicing the loop detector to the lead-in cable. Each loop detector must have a resistance less than 0.5 ohms.

After splicing the loop detectors to the lead-in cables, test each pair at the controller or detector cabinet. Each pair must have a value less than 5 ohms for single pair lead-in cables and 10 ohms for multipair lead-in cables. The continuity test ohm reading at the cabinet must be greater than the ohm reading measured for the loop detector at the junction box.

- c. Insulation Resistance (megohm) Test. Complete this test to verify the integrity of each conductor's insulation after pulling the conductors and cables into position and before terminating the conductors. At 500 VDC, each conductor's insulation shall measure a minimum resistance of 100 megohms or the minimum specified by the manufacturer. With single conductors, complete the test between each conductor and ground. In each multiconductor cable, complete the test between conductors and between each conductor and ground.

When loop detector work is included, after splicing the loops to the shielded pairs in the lead-in cables, measure each pair in the lead-in cables at the controller or detector cabinet between one conductor and the cabinet ground rod.

- d. Inductance Test. When loop detector work is included, measure each detector loop and lead-in cable system at the controller or detector cabinet. The inductance must be in the range of 50 to 500 microhenries.
- e. Circuit. Energize every signal indication circuit with lamps installed before installing the load switches.
- f. Functional. Perform the following tests on each signal and lighting system after the component circuits have satisfactorily passed the tests for continuity, grounding, insulation integrity, and circuitry.
 - (1) Perform the functional test for each highway lighting system and sign illumination system until the systems burn continuously 5 days without the photocell, followed by a 5 day operational test using the photocell.

A shut down of the electrical system due to a power interruption does not constitute discontinuity of the functional test if the system functions normally when power is returned.

- 8. Repairing Damaged Finishes. Examine new, reused, and State furnished equipment for damage to its finish before putting the equipment into service. Repair the damaged finishes found according to the following:

- a. Galvanized. Repair damaged areas more than 12 inches away from welds and slip fit areas, by applying minimum 7.8 mils of zinc based alloy applied according to ASTM A780.

If the damaged areas are within 12 inches of welds and slip fit areas, make the repair by applying a minimum 7.8 mils of zinc rich paint applied according to ASTM A780.

- b. Painted. Repair damage to painted finishes according to the following
 - (1) Wash the equipment with a stiff bristle brush using a solution containing two tablespoons of heavy duty detergent powder per gallon of water. After rinsing, wire brush surfaces to remove poorly bonded paint, rust, scale, corrosion, grease, or dirt. Remove dust or residue remaining after wire brushing before priming.
 - (2) Factory or shop cleaning methods may be used for metals if equal to the methods specified herein.
 - (3) Immediately after cleaning, coat bare metal with pretreatment, vinyl wash primer, followed by 2 prime coats of zinc chromate primer for metal.
 - (4) Give signal equipment, excluding standards, a spot finishing coat on newly primed areas, followed by 1 finishing coat over the entire surface.
 - (5) Give nongalvanized standards 2 spot finish coats on newly primed areas.

Paint coats may be applied either by hand brushing or by approved spraying machines. Perform the work in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unacceptable.

- 9. Regulation and Code. Complete work according to the standards of the NEC, the NESC, and local safety codes as adopted and amended by the Authority Having Jurisdiction.
- 10. Failed Equipment and Workmanship. For the term of the Contract, from initial equipment installation through final acceptance, Subsection 105-1.16, when directed, promptly replace failed equipment, equipment components and repair failed workmanship.

660-3.02 FOUNDATIONS. Use foundation type shown in Plans.

1. Cast-in-Place Foundations. Cast-in-place foundations for posts and poles in drilled holes. Use either precast or cast-in-place foundations for cabinets. Locate the tops of traffic signal post and pole foundations flush with the adjacent finished walkway, shoulder, or surrounding ground.
 - a. Form the entire controller foundation and the top 12 inches of pole or post foundations and give the top a smooth steel trowel finish.
 - b. Place conduits in the center of the pole-post foundations with clearance allowed for bushings. If subsurface conditions prevent completing a drilled hole, and when approved, use a corrugated metal pipe (CMP) form as a substitute for the drilled hole. Consider the savings in concrete to offset the cost of supplying and installing the CMP form. No additional payment will be made for the CMP formed foundation.
 - c. When a CMP is used, over-excavate the area around the form enough to allow for proper compaction around the form. Perform backfill operations according to Section 204. Do not use water for drilling operations or for any other purpose where it may enter the hole.
 - d. Use controller cabinet anchor bolts as recommended by cabinet manufacturer and set with a template.
 - e. Place Class A concrete meeting Section 501. Place reinforcing steel meeting Section 503. If required, use corrugated steel pipe that is at least 14 gage, meeting Subsection 707-2.01.
 - f. Drill holes or use forms that are vertical and true to the locations shown in the Plans. Before placing the form or reinforcing steel cage, remove loose material to ensure the foundation rests on firm, undisturbed ground.
 - g. If a reinforcing steel cage is required, place and secure it symmetrically about the vertical axis and securely block it to clear the sides of the foundation. Use a template to securely support all anchor bolt assemblies and conduit ends so they do not move during concrete placement.
 - h. Do not permit surface water to enter the hole. Before placing concrete, remove all water that may have infiltrated in the hole. Thoroughly moisten both the forms and the ground before placing concrete. Pour each foundation in one continuous pour.
 - i. Do not erect or place posts, poles, and pedestals on the foundation until 7 days after placing the concrete. Plumb the assembly by adjusting the nuts on the anchor bolts before attaching the skirt.
 - j. Replace, with no additional compensation, all finished foundations with anchor bolts that do not match the base plate of the pole or are out of plumb. Do not modify the anchor bolts or base plate to get the base plate set on the leveling nuts. Protect foundation anchor rods from damage before installing controller cabinets. The Engineer must approve the method used for protection. This work does not relieve the Contractor of responsibility specified under Subsection 107-1.15.
 - k. Furnish anchor rods that conform to ASTM F1554, the grade and supplementary Charpy V-Notch requirements listed in the Plans. Furnish each anchor bolt with three nuts and two washers.
 Install the bottoms of the bottom leveling nuts in a level plane within 1 inch of the top of foundations. Adjust nuts until their tops form a level plane. Install one washer on top of leveling nuts and, after setting the pole on these washers, install one washer under top nuts.
 Bring leveling nuts (bottom nuts) to full bearing on the bottom of the base plate.
 Generously lubricate the bearing surface and internal threads of top nuts with beeswax. Tighten top nuts to a "snug" condition. Use a click type torque wrench to apply 600 foot-pounds of torque to the "snug" top nuts.

- I. Attach a bare, copper wire as a grounding electrode conductor to the spiral bar in the reinforcing steel cage. Use an irreversible compression type connector to make the attachment. Protect the attachment during concrete placement. In foundations that lack reinforcing steel cages, install 21 feet of coiled #4 AWG, bare, copper wire as the grounding electrode. Route the conductor to protrude near the top, center of the foundations. Slide a minimum 6 inch long, Schedule 80 polyvinyl chloride (PVC) or high density polyethylene (HDPE), protective sleeve over the conductor. Allow 1 inch of the sleeve and 24 inches of conductor to protrude from the foundations.
2. Pile Foundations.
 - a. Install pipe piles according to Section 505.
 - b. Install pipe piles open-ended and to a minimum depth of 15 feet (less top projection).
 - c. Use CJP groove welds for all circumferential welds.
 - d. Inspect 100% of CJP welds using UT or RT.
 - e. Backfill and compact the work hole around upper portion of each pile in 8-inch lifts with a soil-cement mixture.
 - f. Certify steel pipe piles by matching the stencils on the pipe piles (by 300 foot lots) to the physical and chemical tests for the applicable lot.
 - g. Use no more than one splice per foundation. Locate the splice at least 10 feet from the top of the pile.
3. All Foundations.
 - a. Install frangible couplings according to the manufacturers written installation instructions. Use shims furnished by the coupling manufacturer.
 - b. Provide new foundations and anchor bolts of the proper type and size for standards that are to be relocated. Install the anchor bolts on a bolt circle that matches the base plate.
 - c. Install a raised Type III junction box on the door side of the controller cabinet, and butt it against the cabinet's foundation unless installing a one-piece cabinet/junction box foundation. Extend the top of the controller cabinet foundation 18 inches above the junction box and provide it with a 1-inch diameter drain. The drain connected to the cabinet interior must empty to the rear and above the ground. Place all conduits in the door side half of the foundation to provide adequate terminal block clearance.
 - d. Existing foundations may be abandoned-in-place unless otherwise stated in the Plans. However, remove the tops of the foundations, reinforcing steel, anchor bolts, and conduits to at least 12 inches below the roadway subgrade, sidewalk, or unimproved ground. Backfill the resulting hole with Selected Material, Type A and compact material as directed by the Engineer.

660-3.03 CONDUIT. Electrical conductors shall be installed in conduit, except for overhead wiring, wiring inside poles, and when otherwise specified. Use rigid metal conduits (RMC) and fittings for raceways, including bored casings, except when the Plans specify using polyethylene conduits. Install conduits of the sizes specified along the routes detailed on the Plans. When routing is not shown, route conduits as directed by the Engineer.

1. Install conduits at least 30 inches below the finished grade of the ground above the conduit, except conduits that will be sealed under a minimum 4 inch thick Portland cement concrete sidewalk may be installed a minimum of 18 inches below the top back of curb or surface above the conduit, whichever is lower.
2. Install conduits that cross unpaved areas and paved roadways that will be overlaid in excavated trenches. Excavate, bed conduits, and backfill trenches according to Subsection 660-3.01.3, Excavating and Backfilling.

3. Install conduit(s) under paved roadways and approaches that will not be overlaid by boring or drilling methods. Jacking conduits into position is allowed. However, if subsurface conditions prevent the successful completion of the work, install the conduit(s) by boring or drilling methods without additional compensation.
4. If encountering obstructions during jacking or drilling operations obtain approval and cut small holes in the pavement to clear the obstruction. Locate the bottom inside face of the bore pit no closer than the catch point of a 1 1/4 to 1 slope (a horizontal to vertical ratio) from the edge of pavement. Do not leave these pits unattended until installing an approved means of protection.
5. Sweep both rigid metal and polyethylene conduits through the open bottom of junction boxes by installing 90 degree rigid metal elbows on the ends of conduit runs. To each elbow, install a nipple that terminates 5 to 12 inches above the bottom edge of each junction box. At junction boxes where polyethylene conduits runs are to enter the junction box, install a 5 foot section of RMC on the horizontal end of the RMC sweeps.
6. When loop detector work is included, install the tails of loop detectors without elbows through the walls of junction boxes at elevations that ensure the loops drain into the box. Extend the ends a minimum of 2 inches beyond the inside wall of the box.
7. Drill a 3/8 inch drain hole in the bottom of the lower straight section of elbows and in the bottom of conduits at the low points of conduit runs. Smooth the edges of the drilled holes on the inside of elbows to prevent scraping the conductors. Cover the holes with a wrap of approved filter cloth secured with 2 self-clinching nylon cable ties.
8. Keep conduits clean. Install grounding bushings and approved plastic insert type plugs on the ends of conduit runs before backfilling around the conduit ends. Tapered or universal fit plugs are acceptable for temporary usage. Any permanent plug or cap shall be an approved watertight cap.
9. At the low points of conduit runs, install sumps containing a minimum 2 cubic feet of coarse concrete aggregate material that conforms to Subsection 703-2.02. Compact the aggregate sumps as directed to prevent settlement of the trench backfill.
10. Install conduits that must cross existing facilities such as storm drain pipes, duct systems, and other underground utilities at the minimum depths specified, going under the facilities if necessary. Install additional drains and aggregate sumps at the low spots, if any.
11. Position conduits in trenches, junction boxes, and foundations to provide clearances of at least 2 1/2 inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches.
12. Fabricate rigid metal conduits less than 10 feet long from standard lengths of conduit. Cut conduits squarely to ensure the threading die starts squarely on the conduit. Cut the same number of threads as found on the factory threaded ends. Ream the inside of conduit ends cut in the shop or field to remove burrs and sharp edges. Do not use slip joints or pieces of running thread pipe.
13. Coat drilled holes, shop and field cut threads, and the areas with damaged zinc coating with zinc rich paint.
14. When standard couplings cannot be used to join conduit components, use approved threaded unions.
15. Bury a continuous strip of 4 mils thick, 6 inch wide polyethylene marker tape above underground conduit runs. Install the tape 9 inches ($\pm$ 3 inches) below finished grade, using two strips side by side to mark road crossings. Furnish tapes with a black legend on a red background.
16. When the Plans specify using polyethylene conduit, install RMC in structures and foundations, between type 2 and 3 load centers and the nearest junction box, and on the surfaces of poles and other structures.
17. In foundations, install 90 degree elbows and conduits of the size and quantity shown on the Plans. Extend the conduits a maximum of 2 inches above the top of the foundations for posts and poles with breakaway bases and 4 inches above the top of foundations for fixed base structures.
18. Seal conduits leading to electrical equipment mounted on soffits, walls, and other locations below the grade of the serving junction box with an approved duct sealing compound.
19. Install expansion fittings in conduits that cross expansion joints.

20. Install a polypropylene pull rope with a minimum 200 pound tensile strength in future use or spare conduits, and reinstall the plugs. Double back pull rope, at least two feet, into both ends of each conduit. Tapered or universal fit plugs are acceptable for temporary usage. Any permanent plug or cap shall be an approved watertight cap.
21. Install a pull tape with a minimum 200 pound tensile strength in all traffic signal conduits entering signal poles, signal junction boxes, and signal controller cabinet foundations. Double back pull tape, at least two feet, into both ends of each conduit.
22. The Contractor may install conduits larger than the sizes specified. If used, it must be for the entire length of the run. Reducing couplings or bushings are not allowed. Complete work associated with installing conduits larger than specified without extra compensation.
23. Clean existing conduits that will remain in service using a heavy duty air compressor that delivers at least 125 cubic feet of air per minute at a pressure of 110 pounds per square inch. Clean the conduits before pulling in new cables and after removing cables to be removed or replaced as follows:
 - a. When the conduits contain cables that will remain in service, leave the cables in place during the cleaning, and
 - b. Ream empty conduits with a mandrel or cylindrical wire brush before blowing them out with compressed air.
24. When modifying existing conduit runs, complete the work as required for new installations using the same sizes and types of conduit. When extending existing conduits, add no more than a 90 degree horizontal bend to the extension.
25. When installing a junction box in a continuous run of existing conduit, remove a length of conduit in each conduit run and complete the work of installing the conduits, elbows, and nipples as required for a new installation.
26. When adjusting existing junction boxes to a new grade, remove cables and replace the nipples as required to provide the clearances specified for new installations.
27. Remove the ends of abandoned conduits from junction boxes that will remain in service.
28. When Plans call for connecting polyethylene conduit to RMC use a UL listed electrofusion coupler rated for direct bury application. The coupler must be rated for same wall thickness as the adjoining conduits. If electrofusion coupler fails to properly bond to conduits, the Engineer may give approval to use DuraLine Shur Lock type couplers or approved equivalent, but only after first attempting use of electrofusion couplers in each case. Thread the ends of the RMC with the same number of threads as found on the factory threaded ends of RMC. Ream the inside of conduit ends cut in the shop or field to remove burrs and sharp edges.

660-3.04 JUNCTION BOXES. Install precast reinforced concrete junction boxes of the types specified. For junction boxes that contain traffic signal conductors, furnish cast iron lids with the word TRAFFIC inscribed into them. For junction boxes that contain lighting conductors exclusively, furnish cast iron lids with the word LIGHTING inscribed into them.

Junction Box Location

When shown, install junction boxes at the station and offset locations specified. When lateral locations are not specified, install junction boxes 8 feet from the face of curb or edge of pavement. If the 8 feet offset falls:

1. In a pedestrian facility separated less than 7 feet from the roadway face of curb or edge of pavement, increase the offset and install the junction boxes on the backside of the facility. When lacking the right of way to install junction boxes outside the pathway, install at locations as directed, avoiding curb ramps, curb ramp landings, and the middle of walkways.
2. In a pedestrian facility separated at least 7 feet from the roadway face of curb or edge of pavement, reduce the offset and install the junction box next to the facility.
3. Outside the right of way, install the boxes just inside the right of way line.
4. In a raised median, install junction boxes near the center of the median.

5. In a ditch bottom or area that collects drainage, install the junction boxes at locations as directed.
6. Behind guardrails that shield slopes steeper than 3:1 (a horizontal to vertical ratio), install junction boxes between posts and at least 5 feet back from the face of rail.
7. On top of underground utilities or storm drains, install the junction boxes at locations as directed.

Longitudinally, install junction boxes adjacent to the loop detectors or pole they serve, except avoid installing Type 1A junction boxes in driveways and in locations subject to use by heavy trucks. When shown near the ends of medians, install junction boxes at least 10 feet from the median end. When the offsets for electroliers and flashing beacon posts place them near the junction boxes that serve them, install the junction boxes on the side of the electroliers and posts downstream of traffic flow.

Limitations

Limit the distance between adjacent junction boxes to the following dimensions:

1. 300 feet for conduits that contain a single cable other than signal interconnect.
2. 190 feet for conduits, that contains more than one cable.

If the preceding limitations require installing additional junction boxes not shown on the Plans, the Engineer will pay for them as extra work; otherwise, installing additional junction boxes will be at the Contractor's expense.

After grading the roadside, vertically adjust those junction boxes that do not conform to the following criteria. In unpaved areas that will not be seeded, in areas adjacent to pedestrian facilities, and in paved medians, install the tops of junction boxes 1 inch below finished grade. In seeded areas, adjust tops of junction boxes to be flush with final grade.

Bond junction box lids to an equipment grounding conductor according to Subsection 660-3.06. Attach the jumpers to the lids with brass or stainless steel hardware.

Install a porous backfill material under each junction box. Porous backfill material shall conform to Subsection 703-2.10, Gradation B. Dimensions for porous backfill material include an 18" depth and a length and width equal to those of the junction box it drains. Compact the porous backfill material as directed to prevent junction box settlement.

In every new and reused junction box, install an electronic marker. Conform markers to the American Public Works Association Standards including but not limited to:

1. Color - red
2. Material - high-density polyethylene
3. Shape - round (ball like)
4. Size - 4 to 5 inches in diameter
5. Configuration - encapsulating an antenna tuned to the appropriate frequency for locating power
6. Responsive range - up to 5 feet away from the locator device
7. Environmental conditions - including extremes in temperature at the installation site
8. Contain no internal power source

Acceptable marker manufacturers include:

1. 3M, Dynatel EMS ball marker model no. 1402-XR
2. Tempo (a Tectron Company), Omni Marker
3. Substituted, equivalent approved equal device

660-3.05 WIRING. Install power conductors serving the cabinet sized such that their ampacity rating is greater than the cabinet total connected load after applicable diversity factors have been applied. Make wiring neat in cabinets by cabling wires together with self-clinching nylon ties. Terminate all spare conductors on terminal blocks. Attach all conductors, including spares, to terminal blocks with "spade" type terminal lugs. Furnish additional terminal blocks if enough locations are unavailable in existing terminal blocks. Install signal cabling continuously without splices from the controller cabinet to the termination lugs in the signal housing.

1. Do not pull conductors into conduits until the following conditions are met:
 - a. The prescribed clearances around conduit ends are provided,
 - b. Crushed rock sumps are installed under junction boxes,

- c. Conduit ends protrude above the bottom of junction boxes within the prescribed range,
 - d. New conduits are free of material that became lodged in them during the completion of the work,
 - e. Reused conduits are cleaned according to Subsection 660-3.03,
 - f. Junction boxes are set to grade, and
 - g. Grounding bushings are installed on the ends of metallic conduits.
2. Pull conductors by hand or by approved commercially built cable-pulling equipment that is specially designed for that purpose. Do not pull cable by any other means. Equip the cable pulling device with a force limiting circuit and force gauge.
 3. Use wire-pulling lubricant when placing the cables and conductors in conduit. Do not allow the tension of the wire or cable to exceed the manufacturer's recommend allowable tension for the conductor or cable.
 4. When adding new conductors to a conduit with existing conductors, remove all conductors and clean the conduit with a mandrel or brush. Pull both old and new conductors through as a unit. In a new installation, pull all conductors through the conduit as a unit.
 5. Leave at least 1 foot of slack in the bottom of each lighting pole of each signal conductor or cable. Neatly leave at least 3 feet of slack illumination conductor curled up in the bottom of each junction box or splice location.
 6. Route highway illumination cable through each lighting pole designated for connection to that cable's circuit. Do not splice illumination cable between a load center and a pole or between poles. Join the individual conductors by using non-insulated, overlap type pressure connectors. Insulate with mastic-lined heat shrink tubing or 2 layers of one-half lapped UL listed electrical tape. Do not use wire binding screws, studs, or nuts. Stagger splices to minimize the overall diameter.
 7. Encapsulate illumination/power cable splices in four piece molds that are held together with stainless steel hose clamps. Two pieces form a cylinder and two flexible end caps. Seal the ends and allow the conductor entry. Use molds with dimensions suitable for the splice made, encase the cable jackets, and fill with an insulating and sealing epoxy resin. Furnish molds rated for 600 VAC operation, feature fill, and vent funnels for epoxy resin. Fill the splice mold bodies with epoxy resin that is resistant to weather, aromatic and straight chain solvents, and that will not sustain combustion.

When approved by the Engineer, one splice may be used in the following cases:

- a. An in-line splice may be used when a planned cable run exceeds the length available from the manufacturer on a single spool of cable.
- b. In a run of 1,000 linear feet or more.

When a cable is spliced, it shall occur within an appropriately sized junction box or in the base of an electrolier designed for said splice.

Insert a loose woven polyester web that allows a full 1/4 inch of insulating compound to flow between the splice and the inside of the mold. Fill the PVC molds with epoxy resin that cures transparent, is nontoxic, is non-corrosive to copper, and does not support fungi or mold growth.

8. Encapsulate all loop lead-in cable splices in HDPE flexible corrugated approved conduit filled with re-entenable non-urethane encapsulating compound.

Use 2" HDPE flexible corrugated conduit, encase all conductor and cable jackets and completely fill the conduit section.

9. Permanently identify all cables and single wire conductors by labeling all pole bases and cabinets, at each detector loop tail/lead-in cable and illumination cable splices, and in junction boxes adjacent to lighting and signal poles. When modifying an existing system, label all new and existing lighting cables/conductors with circuit numbers at locations noted above. If the existing circuits are not identified, the Engineer will provide the required circuit numbers.
10. Label the cables used in the signal and illumination systems with the following legends:
 - a. Use the legends included in Table 740-2, for the cables listed.
 - b. Use the loop number shown on the Plans to label each tail of all loop detectors and the paired loop lead-in conductors in the controller cabinet.
 - c. For interconnect cables, use the first letter of the direction the cable follows to the adjacent intersection on each cable. Add a number suffix if more than one cable is routed to the adjacent intersection.
 - d. Furnish the two types of identification tags listed below that feature hand written legends. Write the legends specified neatly and legibly, using a black marking pen recommended by the tag manufacturer. Replace at no expense to the State all identification tags the Engineer deems illegible.
 - (1) Type 1 Tag: Use identification cable ties for labeling loop detector tails and the paired conductors included in each loop lead-in cable in the controller cabinet. Furnish identification cable ties made of nylon that feature a nonmagnetic stainless steel locking device embedded in the head and a tag attached "flag style" to the head. Use cable ties consisting of a single strap with a minimum size tag of 3/4 inch by 3/8 inch.
 - (2) Type 2 Tag: To label all other cables, use cable tags made of nylon reinforced vinyl impervious to the elements and which will not tear. Provide tags with a 4 inch by 1-3/4 inch minimum size that attach flag style at one corner to a single strap. Furnish yellow tags for labeling all signal and interconnect cables and red tags for labeling lighting and feeder cables.
 - e. Label all cables in the controller cabinet with Type 1 Tags only. All controller cabinet tags shall be within six inches of the termination of the cable.
 - f. Label all loop detector tails and paired loop conductors with Type 1 Tags only. All other cables shall be labeled with Type 2 Tags outside of the controller cabinet.
11. Terminate the control and power cables as shown in Table 740-2.
12. Telemetry cable termination shall be coordinated with a signal technician. Provide type No. 66B3-50 terminal blocks as required.
13. Wire luminaires using No. 10 AWG illumination tap conductors that run from the fused disconnect kit in the pole base.

Install a fused splice connector between the line and luminaire ballast tap conductors in the base of every pole equipped with a luminaire.

Attach the conductors to the connector halves with setscrew type pressure connectors. Provide the plug and socket assembly so that the fuse remains in the load side plug without exposing live metal parts when the connector separates and the coil springs are not included in the current carrying circuit. Make the fused connectors readily accessible from the handhole. Install tap conductors to prevent slack when their ends touch the top of the foundation.
14. Retrofit reused poles with new tap wires, fused disconnect kits, and fuses.
15. Whenever conductors cannot be terminated as specified in the Plans in circuit breakers due to size, splice a piece of #8 AWG copper power conductor onto the end of each conductor using an overlap type, irreversible compression connector. Insulate the splice with heat shrink tubing. Complete the splice in the space between the top of the load center foundation and the bottom of the cabinet. Limit the length of the #8 AWG conductors to 5 feet. Note: this splice is acceptable only if the overcurrent protective device protecting the #8 AWG conductors is rated 40A or less.

16. Spare lighting conductors shall be capped in the pole bases and load centers by cutting the wire flush with the end of the insulation and bending the conductor back against itself and securing with three layers of electrical tape to prevent any possibility of making contact with ground or current carrying conductors.

660-3.06 BONDING AND GROUNDING. All installations must comply with the grounding and bonding requirements of NEC Article 250 and the following requirements: Normally non-current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, including metallic cable sheaths, metal conduits, non-metallic conduit grounding wire, junction box lids and frames, cabinets, transformer cases, and metal posts and poles, must be electrically connected to earth ground, and must be connected together and to the electrical supply source in a manner that establishes an effective ground-fault current path. Make fixtures mounted on metal poles, including signal components and luminaires, mechanically and electrically secure to the pole. An equipment grounding conductor must be installed between the grounding lug near the base of the pole and the lighting fixture.

Install grounding bushings with insulated throats on the ends of metallic conduits.

Install an insulated or bare stranded copper wire for the equipment grounding conductor in conduits, except those conduits installed for future use. Install size #8 AWG grounding conductors, except in those conduits that contain circuit conductors larger than #8 AWG. In this case, install a wire equal in size to the largest circuit conductor. Attach the grounding conductors to the grounding bushings, leaving 12 inches of slack between each bushing. Connect grounding conductors together using irreversible compression type connectors to form a fully interconnected and continuous grounding system.

Retrofit existing spare conduits that will contain new cables exclusively with new grounding bushings. When the Plans require installation or removal of conductors from existing conduits, retrofit with new equipment grounding conductors sized according to the preceding paragraph.

Bond junction box lids to the equipment grounding conductor using copper braid with a cross sectional area equal to a #8 AWG and eyelet spaced at 6 inch intervals. Connect bonding jumpers to the grounding conductors using irreversible compression type connectors.

Replace missing or damaged conduit and junction box lid bonding jumpers.

Join the equipment grounding conductors from the conduits to the #4 AWG grounding electrode conductor using irreversible compression type connectors at Portland cement concrete foundations. For pile foundations, attach the equipment grounding conductor from the conduit to the pile cap adapter with a listed mechanical grounding connector.

When installing signal poles, signal posts, and lighting standards with frangible coupling bases, run a 5 feet long grounding conductor from the grounding bushing on the conduit to the grounding lug located in the handhole of each pole.

Bond slip base type standards and pedestals by using 2 conductors from the conduit, one attached with a ground rod clamp to an anchor bolt and the other connected to the grounding lug located in the handhole of each pole.

Solidly ground one side of the secondary circuit of a transformer.

Install a 3/4 inch by 10 feet copper clad ground rod inside each controller cabinet foundation and a #6 AWG bare stranded copper wire for the grounding electrode conductor. Furnish one piece bronze clamps with a hex head setscrew that are suitable for direct burial and for use with copper clad ground rods.

When routing a new conduit into an existing junction box or replacing an existing junction box, new and existing conduits shall have the grounding improved to current specifications.

660-3.07 SIGNAL AND LIGHTING INSTALLATION REQUIREMENTS. Install signal and lighting equipment according to the details shown on the Plans and the following:

Apply antiseizing compound to the following fasteners: frangible couplings, mechanical grounding connectors, bolts that secure handhole covers and signal mounting hardware to poles and mast arms. Remove the fasteners from luminaire mounting brackets, fused disconnect kits, grounding bushings, and signal faces that secure the visors, and apply antiseizing compound to these fasteners before completing the installation.

Before passing conductors through the holes made in posts, poles, and mast arms for wireways, remove the burrs and sharp edges from the inside and outside of these holes.

Until each traffic signal and/or flashing beacon goes into operation, keep the vehicular and pedestrian signal faces covered with beige colored canvas shirts sized to fit the signal faces shown in the Plans. Each signal shirt shall feature elasticized openings that fit over the visors and at least two straps to secure it to the signal. Provide shirts with a legend that reads "out of service" and a center section that allows an operator to see the indications during system tests.

When not shown in the Plans, determine the shaft lengths of lighting and signal poles and signal mast arm connector plate locations to provide the plan mounting heights of luminaires and traffic signal heads.

Furnish work to install foundations for relocated poles, including: conduit, excavation, reinforcing steel, class A concrete, anchor bolts, nuts, and washers.

1. Electrolier Installation. Before installing electroliers, check the socket position of each luminaire to verify it matches the position indicated in the instructions for the light distribution type shown on the Plans.

Install electroliers with mast arms with a slight rake by plumbing the side of the pole opposite the mast arm. After the pole has been plumbed, level the luminaire as recommended by the manufacturer. Install electroliers without mast arms with the centerline of the pole plumb.

2. Wood Pole Installation. Place the poles in the ground to at least 6 feet deep.

After setting each pole in the ground, backfill the space around the pole with selected earth or sand, free of rocks 4 inches and larger, or deleterious material. Place the material in layers approximately 4 inches thick and thoroughly compact them with mechanical tampers.

Furnish poles that provide a minimum vertical clearance of 21 feet between the pavement and low point of overhead conductor.

660-3.08 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS. This work consists of protecting and maintaining the existing and temporary electrical systems during the life of the Contract. The work includes: locating, repairing, replacing, adjusting, realigning, cleaning, and relocating components of traffic signals, lighting systems, interconnect, and flashing beacons to keep them wholly operational and positioned according to the following specifications.

Furnish the Engineer with the name and phone number of the person who will maintain the existing and temporary electrical facilities at the Preconstruction Conference. Make this person available at times until the date of Acceptance for Traffic and Maintenance and provide labor, materials, and equipment this person may need to complete repairs ordered by the Engineer.

When beginning work, the Engineer will notify the Contractor and the local maintenance agencies in writing of the transfer of maintenance responsibilities, providing an effective date and time. Maintenance does not include replacing defective equipment or repairing equipment damaged before the transfer of maintenance responsibility. Therefore, before starting work on the project, inventory the condition of the existing equipment with the Engineer and document the damaged and defective equipment. If beginning work before providing the Engineer with an inventory, the Contractor waives the right to claim extra compensation when the Engineer later finds damaged or defective equipment.

Keep components of the existing and temporary electrical systems operational during the progress of the work, except when the Engineer allows shutdowns to alter or remove the systems. The Engineer will consider these systems operational when no damaged or defective equipment is found in service, components are clean, located, and aligned as specified herein, and photoelectric controls operate the lighting systems. The State will pay for electricity used to operate the systems, if the public benefits from their operation. Furnish replacement equipment compatible with equipment used in the Central Region.

Begin work to repair, replace, adjust, realign, clean, and/or relocate components of an affected system within one hour when ordered by the Engineer. If work is not complete, the Engineer may have outside forces complete the repairs and deduct the amount billed from monies due the Contractor.

660-3.09 FALSEWORK LIGHTING. When required by the Special Provisions, install falsework lighting where vehicular traffic with or without pedestrian traffic crosses through or under structure falsework. Provide illumination of the portal faces of falsework during the hours from dusk to dawn. Provide illumination of the pavement and pedestrian openings through or under falsework 24 hours a day. Submit a plan for the proposed lighting installations and do not commence falsework construction until the Engineer has reviewed such plans. The Engineer will make a subsequent review after you place falsework lights in operation.

Falsework lighting equipment remains your property and must be removed from the site of the work upon completion of the project or when directed.

660-3.10 ARC FLASH HAZARD WARNING. Label traffic controller cabinets, and other electrical equipment that is likely to require examination, adjustment, servicing, or maintenance while energized, to warn qualified persons of potential electrical arc flash hazards per NEC 110.16. The labels must meet the requirements in NEC 110.21(B), and must contain the information required in NFPA 70E 130.5(H).

660-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

Signals and Lighting (Miscellaneous). Measured in accordance with the directive authorizing the work.

660-5.01 BASIS OF PAYMENT.

Payment Includes labor, equipment, and materials required to provide fully functional traffic signals and lighting systems, permanent and temporary, using new equipment. Remanufactured or rebuilt equipment will not be permitted.

Subsidiary to each Pay Item including but not limited to (Except when included as a separate Pay Item):

1. General construction requirements,
2. Bonding and grounding,
3. Bored Casings,
4. Completing tests,
5. Conductors,
6. Conduit,
7. Dewatering excavations,
8. Excavation, trenches in rock or soil, bedding, backfill for foundations, conduits, components,
9. Foundations including concrete to complete foundations,
10. Junction boxes including adjustment to final grade,
11. Labeling conductors,
12. Maintaining temporary and existing electrical systems,
13. Minor routing changes directed by the Engineer
14. Preparing as-builts
15. Removal and disposal of existing/new unused foundations, conduit, conductors, and junction boxes,
16. Removing, repairing and replacing improvements
17. Removal of signs and reinstallations required to install foundations, conduits, and junction boxes,
18. Repairing damage to finishes on new equipment
19. Salvaging reusable equipment and materials and delivering to the local Maintenance and Operations station including but not limited to existing signal structure. Refer to section 660-3.01 for delivery locations.
20. Wiring

21. Replacing failed equipment, equipment components and repairing failed workmanship.

660 Pay Items do not include: roadway planing, roadway paving, drainage structures, erosion, sediment and pollution control, signing, striping and pavement markings, traffic control, and components of the traffic signal communication system when included as separate pay items.

Pay Item 660.0003.____ Highway Lighting System Complete, ().

1. Lighting structures.
2. Includes salvage of existing lighting components not specified in plans to be reused, when not included as a separate item

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
660.0003.____	Highway Lighting System Complete, _____	LS

CFHWY00453

**SECTION 661
ELECTRICAL LOAD CENTERS**

Special Provisions

661-2.01 MATERIALS.

Add the following:

Precast Concrete Products

Subsection 550-2.03

CR661.3-060121

Add the following:

Anchor Bolts

Subsection 740-2.02

Load Center.

Replace the 1st and 2nd paragraphs with the following two paragraphs:

NEMA 3R enclosure constructed of .125" thick aluminum, with no external screws, bolts, or nuts.

Shop coat cabinet components with a 2-part urethane paint undercoat and 2-part urethane finish coat. Finish coats must be standard white for removable panels and non-gloss silver-gray, closely matching AMS-STD-595 Color No. 36622, for the enclosure.

CR661.1-21.1231R1

Equipment List(s) and Drawings.

Replace No. 1. with the following:

1. Materials on the *Qualified Products List*: The Qualified Products List does not apply to the 661 Pay Items. Provide catalog cuts of materials to the Engineer for review and approval.
3. Materials Not Requiring Certification: Replace the 2nd sentence with the following:

Submit these materials for review and approval if included on the Materials Certification List (MCL) or requested by the Engineer.

Add the following materials:

Ground Rods. Furnish one piece 3/4" diameter by 10 feet long copper clad steel rods.

Ground Rod Clamps. Furnish one piece bronze clamps with a hex head setscrew that are suitable for direct burial and for use with copper clad ground rods.

Meters. Furnish meter sockets and landing pads rated for 200 Ampere Service.

Photoelectric Controls.

Delete the first sentence and substitute the following:

Use three wire photoelectric controls that directly switch a circuit from one conductor to another. Furnish two piece photoelectric controls that consist of a plug-in control unit and a locking type receptacle set in a cast aluminum adapter.

1. Plug-in Control Unit.

Furnish photoelectric control units that consist of a light sensitive element connected directly to a normally closed, single-pole, single-throw, and control relay free of intermediate amplifications. For highway lighting, use horizontal or zenith type sensing units that:

- a. Operate at voltages between 120 and 277 VAC, 60 Hz,
- b. Handle loads up to 1,800 volt-amperes,
- c. Operate at temperatures from -40 °F to +150 °F,
- d. Consumes less than 10 watts of power,
- e. Feature a 3-prong, EEI-NEMA standard, twist-lock plug,
- f. Turn-on between 1.0 and 5.0 foot-candles and turn-off at light levels between 1.5 and 5.0 times those at turn-on.

Measurements must meet the procedures in EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices used in the Control of Roadway Lighting.

Screen the photoelectric control units to prevent artificial light from interfering with normal photoelectric control operation. Extend screens to the top of the control units. Use 3 inch wide x 0.063 inch thick (min) aluminum meeting ASTM B209, Alloy 3003-H14.

2. Locking Receptacles.

Furnish twist lock type, phenolic resin receptacles set in one of the following cast-aluminum adapters.

- a. For photoelectric controls installed on signal poles and load centers, furnish a mounting adapter with a threaded connection that fits conduit outlet bodies threaded for 1/2 inch rigid metal conduit, General Electric model MB-PECTL or approved equal.
- b. For photoelectric controls installed atop lighting poles (with mast arms,) furnish a pole top adapter: equipped with a terminal block, made to slip over the ends of poles 3 1/2 to 4 1/2 inches in outside diameter, and secured by set-screws, General Electric model PTA-PECTL or approved equal.

661-3.01 CONSTRUCTION REQUIREMENTS.

Replace the 11th paragraph with the following:

Install two ground rods at least 8 feet apart at each load center. Connect the neutral bus to the ground rods with a soft drawn bare copper grounding electrode conductor sized per the NEC, 6 AWG minimum. Bond non-current carrying metal parts in each load center to the ground bus. At Type 1 load centers, install one ground rod inside the base, readily accessible through the removable cover, and the second ground rod outside the base. Route the grounding electrode conductor to the second ground rod through one of the knockouts.

Replace the 12th paragraph with the following:

Install photoelectric controls at the locations indicated. Orient photoelectric control units to face the north sky. Install a screen to prevent artificial light from interfering with normal photoelectric control operation.

For photoelectric controls installed on load centers, install a Myers hub in a cabinet wall shielded from traffic. To the hub, attach an assembly that consists of a Type LB conduit body, a length of conduit, and a Type C conduit body. Fabricate the conduit at least 3 ft long and locate the photoelectric control 1 ft above the top of the load center. Mount the photoelectric control adapter on the Type C conduit body. Install a conduit hanger to brace the top of the conduit.

For photoelectric controls installed on signal poles, install a Myers hub in the center of the rain cap. Attach a Type C conduit body to the hub with a close nipple. Mount the photoelectric control adapter on the conduit body. Use five conductor 14 AWG wire to connect the photoelectric control to the load center.

For photoelectric controls installed on electroliers, install a pole top adapter. When the photoelectric control is on a lighting standard with a slip base or frangible coupling style base, use an approved breakaway disconnect in the base of the light standard. Restrain the cable in a similar manner as the illumination cable in the pole base. Use five conductor 14 AWG wire to connect the photoelectric control to the load center.

Add the following:

Coordinate new load centers with existing and or new service utilities.

Failed Equipment and Workmanship

For the term of the Contract from initial equipment installation through final acceptance, Subsection 105-1.16, when directed, promptly replace failed equipment, equipment components and repair failed workmanship.

661-5.01 BASIS OF PAYMENT.

Add the following:

The following work is subsidiary to 661 Pay Items:

- All necessary hardware for mounting (shelf angles, rack, shelving, harness, etc.).
- Removing existing load centers being replaced with new load centers, their foundations, and ground rods.
- Payment of fees required by the local authority for electrical inspection(s) and the costs of correcting the deficiencies noted during the inspection(s).
- All work including, but not limited to, contacting and coordinating with the utilities for service; maintenance and usage payments until the Engineer provides the notice of final acceptance.
- Replaced failed equipment, equipment components and repaired failed workmanship.

CR661.1-21.1231R1

SECTION 670 TRAFFIC MARKINGS

Special Provisions

670-1.01 DESCRIPTION. Add the following:

Furnish, locate and install Pavement Markings as shown on the Plans and as directed.

Pavement Marking Type: Methyl Methacrylate (MMA)

670-2.01 MATERIALS. Add the following:

Methyl Methacrylate Pavement Markings are a combination of methyl methacrylate, glass beads and anti-skid aggregate.

Replace the last sentence with the following:

Submit a single certification from the manufacturer of the marking material, for each material combination, certifying the combination of marking material, glass beads and anti-skid aggregate, as furnished, provides the durability, retroreflectivity, and skid resistance specified.

670-3.01 CONSTRUCTION REQUIREMENTS. Replace No. 4 with the following:

4. Methyl Methacrylate Pavement Markings (MMA).
 - a. General. 15 days before starting work meet with the Engineer for a prestriping meeting. At this meeting, do the following:
 - (1) Furnish a striping schedule showing areas and timing of work, placing materials and the Traffic Control Plans to be used.
 - (2) Discuss placement of materials, potential problems.
 - (3) Discuss work plan at off ramps, on ramps and intersections.
 - (4) Discuss material handling procedures.
 - (5) Provide copies of the manufacturer's installation instructions and copies of the Material Safety Data Sheets.
 - b. Manufacturer's Representative. Provide the services of a manufacturer's representative (the "Manufacturer's Representative"). Ensure the Manufacturer's Representative observes the application of the pavement marking materials. Cooperate with the Manufacturer's Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer's recommended procedures.
 - c. Manufacturer Certified Installers. Install pavement markings using only striping installers certified by the marking materials manufacturer for the specific striping material and method. Submit these certifications to the Engineer at the Preconstruction Conference.
 - d. Preparation. Prepare the roadway surface to receive pavement markings according to these Specifications and the manufacturer's recommendations. Clean and dry the roadway surface. Completely remove contaminants such as dirt, loose asphalt, curing agents, surface oils, or existing road marking materials before applying pavement marking material.

e. Equipment.

- (1) Grooving Equipment.
Use grooving equipment that produces a dry cut. Use vacuum shrouded equipment or other equally effective containment procedures.
- (2) Marking Equipment.
 - (a) Longitudinal Marking: Use truck mounted application equipment capable of installing a double centerline and a single shoulder line in a single pass. Use automatic bead applicators that place a uniform layer of beads on the lines. Hand units are not permitted.
 - (b) Other Markings: Use manual or automatic application equipment. Use stencils or extruders to form sharply defined markings.

- f. Application. Apply marking material according to these Specifications and the manufacturer's recommendations. Use equipment designed and capable of properly mixing at the place and time of application and approved by the manufacturer for the type of product being installed.

Anti-skid Aggregate. During marking material application, anti-skid aggregate will be evenly distributed and visible throughout the top 20 mils of the marking material mixture, and after the application, in the surface of the cured material.

SURFACE APPLIED

Marking thickness will be measured from the pavement surface.

- (1) Longitudinal Markings. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 60 mils.
- (2) Other Markings.
 - (a) Transverse and Symbol Markings:
Apply marking for symbols, arrows, stop bars, railroad symbols, and cross walks to yield a thickness of 60 mils.
 - (b) Gore Markings:
Apply diagonal gore markings to yield a thickness of 60 mils.

INLAID

Groove the area(s) designated in the Plans. Install markings in the same work shift as the grooving operation. Markings will be measured flush with the pavement surface.

- (1) Longitudinal Markings. Groove the pavement to a depth of 125 mils. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 125 mils.
- (2) Other Markings.
 - (a) Transverse and Symbol Markings:
Groove the area for inlaid markings to a depth of 125 mils. Apply marking for symbols, arrows, stop bars, railroad symbols, and cross walks to yield a thickness of 125 mils.
 - (b) Roundabouts:
As designated on the plans, groove the area for inlaid markings in roundabouts to a depth of 500 mils. Apply markings to yield a thickness of 500 mils.
 - (c) Gore Markings:
Diagonal gore markings will not be inlaid unless shown in the Plans.

- g. Disposal of Waste. Waste material(s) are the Contractor's property. This includes grindings and removed marking material. Do not dispose of or store waste material(s) on State property. Dispose of waste material(s) according to applicable Federal, State, and local regulations.
- h. Sampling. On the form provided by the Engineer, record the following readings and locations where they were taken using project stationing, and submit them to the Engineer with 24 hours for evaluation. Thickness of material and depth of slot are measured from the surface of the pavement.

SURFACE APPLIED

- (1) For surface applied longitudinal applications, measure the thickness of the lines (above the pavement surface) at the time of application, every 500 feet.
- (2) For surface applied other markings measure the thickness in three locations for each marking.

INLAID

- (1) For inlay longitudinal applications, record the depth of the slot every 500 feet during the grinding operation.
- (2) For inlay other markings measure the thickness in three locations for each marking.

Inspect the markings initially, and again two weeks after placement, to ensure the material has cured properly. Remove soft spots or abnormally darkened areas and replace with material meeting specifications.

The Engineer may elect to use the Contractor's readings or perform additional sampling.

Add the following:

Refer to the Survey Field Books identifying the no passing zones (see Subsection 642-3.01)

670-3.04 PAVEMENT MARKING REMOVAL. Add the following:

Coordinate removal work with construction activity. Remove pavement markings the same day permanent markings are applied, unless otherwise directed. Use vacuum shrouded equipment or other equally effective containment procedures.

Replace Subsection 670-3.06 with the following:

670-3.06 TOLERANCE FOR LANE STRIPING.

- 1. Length of Stripe. ± 2 inches.
- 2. Width of Stripe. $\pm 1/8$ inch.
- 3. Lane Width. ± 4 inches from the width shown on the Plans.
- 4. Stripes on Tangent. Do not vary more than 1 inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.
- 5. Stripes on Curves. Uniform in alignment with no apparent deviations from the true curvature.
- 6. All Stripes. Keep the center of the stripe within planned alignment.
- 7. Double Stripes. $\pm 1/4$ inch.
- 8. Thickness of Surface Applied. Minimum specified to a maximum of + 30 mils.
- 9. Depth of Inlay Slot. Minimum specified to a maximum of + 40 mils.
- 10. Thickness of Inlaid Marking Material. Fill inlay area completely from the bottom of the inlay to the surface of the pavement.

If it is determined that the material is being placed too thin, the beads are not properly placed, the anti-skid aggregate is not visible, or otherwise not to specification, make immediate adjustments to correct the problem.

Pavement markings applied by any method will be unacceptable if:

1. Marking is not straight or wide enough.
2. Thickness of line is not uniform.
3. Thickness of line is less than specified.
4. Material is uncured.
5. Material blackens or is inconsistent in color.
6. Inlay slot is not the specified depth.
7. Inlay slot is not filled to the specified depth.
8. Edge of the markings is not clear cut and free of overspray.
9. Reflective elements are not properly embedded.
10. Retroreflectivity of the markings is less than specified.
11. Anti-skid aggregate is not visible in the marking material during application and the dried surface.
12. Markings exhibit poor adhesion.
13. Color is not as specified.

Perform repairs using equipment similar to the equipment initially used to place the materials. Do not perform repairs in a "patch work" manner. If more than one repair is required in a single 500 foot section, grind and repair the entire section.

670-4.01 METHOD OF MEASUREMENT. Add the following:

Thickness will be measured from the top of the marking to the top of the pavement surface. Marking material placed in a depression left by pavement line removal will not be included in measuring the thickness of the line.

Delete No. 2.

Replace No. 3 with the following:

3. Each. Pavement markings using letters, numbers, and arrows will be measured on a unit basis with each separate word or symbol constituting a unit. Railroad Markings will be measured by the complete unit shown for each lane of travel.

Replace No. 4 with the following:

4. Foot Basis. Longitudinal pavement markings, transverse, and gore markings, surface applied or inlaid will be measured by the linear foot of 4 inch wide line. Wider striping will be measured in multiples of 4 inches.

670-5.01 BASIS OF PAYMENT. Add the following:

For all phases of construction: There will be no separate payment for:

- Over-runs of material caused by the variation of the gradation of the asphalt
- Additional material required to achieve the thickness specified on open graded pavement

All work and materials associated with pavement markings are subsidiary to 670 items, including but not limited to:

- Milling for installation of the inlaid pavement markings including the removal of millings
- Temporary pavement markings and removal of conflicting markings, including repair of the roadway surface, milled surface or otherwise
- Traffic Control required for the installation of permanent and temporary pavement markings, removal of conflicting markings, and repairs

Add the following Pay Items:

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
670.2000____	MMA Pavement Markings	LS

CR670.1-23.0501

Special Provision

Add the following Section:

**SECTION 682
UTILITY POTHOLING**

682-1.01 DESCRIPTION. Expose subsurface utilities using a vacuum-extract truck. Record the location of the utility(s). Backfill the pothole and dispose of waste materials.

682-2.01 MATERIALS.

Backfill Material:	Aggregate Base Course, Grading D-1	Section 703
Asphalt Patch Material:	Hot Mix Asphalt Type II, Class B	Section 401

682-3.01 CONSTRUCTION. Submit the utility potholing schedule to the Engineer and utility companies not less than 7 days before starting potholing.

Deliver the vacuum-extract truck to the job-site with the debris tank empty.

Expose the subsurface utilities. Log the as-built information, subsection 682-3.02. Backfill the pothole immediately after the Engineer accepts the logged data. Backfill the first 6 inch lift using the excavated material, compact the material. Backfill the balance of the pothole using Aggregate Base Course, Grading D-1, compact the material. In paved areas, use Hot Mix Asphalt Type II, Class B to patch over the pothole, match the thickness of the surrounding pavement.

Dispose of excavations off-site. Before beginning potholing, provide to the Engineer a certificate, signed by the owner or owner's representative, identifying the disposal site and acceptance of the project potholing excavations.

Utilities damaged by the potholing operation require the Engineer to be immediately notified. The Contractor is responsible for the repairs and the associated costs. Contact and coordinate repairs with the utility owner.

682-3.02 AS-BUILTS. Create a utility pothole log, as-built, recording for each pothole: the date of potholing operation, utility type and size, station, offset, elevation, groundwater, and other pertinent data. Survey the utility location using the project horizontal and vertical control; comply with the requirements of Section 642. Submit the completed log to the Engineer within two working days following the completion of the pothole excavation.

682-4.01 METHOD OF MEASUREMENT. The pay unit, contingent sum, is measured by the hour of work performed.

682-5.01 BASIS OF PAYMENT. Pay Item No. 682.2000.____ is paid at \$450/hour for the work to pothole; expose the utility(s), backfill the hole, patch disturbed pavement and dispose of excavations. The paid time includes the work; labor, and the fully operated vacuum truck or combination of vacuum truck and other Engineer approved equipment engaged in potholing at the area(s) identified in the Plans and/or identified by the Engineer. The paid time includes the time to empty the vacuum truck of excavation material, including the travel time, from this project only, to a certified disposal site.

Travel time to and from the project, idle time, maintenance and repairs (labor, material and time) are incidental and not included in the measured time.

As-built, utility pothole log, per subsection 682-3.02, will be paid under Section 642.

Potholes for the Contractor's information and potholes not accepted by the Engineer will not be paid for by the Department.

Payment will be made under:

PAY ITEM		
Item Number	Item Description	Unit
682.2000._____	Vac-Truck Pothole	CS

CR682-010114R

Add the following Section:

SECTION 688

UTILITIES SUPPORT

688-1.01 DESCRIPTION. Coordinate the project work with all utility work by others in accordance with subsection 105-1.06 and these Specifications. Utility work by others includes all installation, service connections and disconnections. The Contractor shall perform utility support work including scheduling work by others; erosion, sediment, and pollution control; excavation, backfill, surveying, and traffic maintenance.

688-1.02 UTILITY NOTIFICATION AND CONTACT INFORMATION. Make initial contact with each Utility Company through the Engineer.

Contact information for the Utilities:

AT&T Alascom Inc.

Name of Contact	Raphael Otero
Address	505 E. Bluff Drive Anchorage, Alaska 99501-1100
Phone	Work: (907) 264-7797 Cell: (907) 268-7634
Email	ro900r@att.com

ENSTAR Natural Gas Company

Name of Contact:	Jake Stephl
Address:	401 E. International Airport Road Anchorage, AK 99518-1219
Phone:	(907) 334-7915 (907) 831-0267
Email:	jake.steph1@enstarnaturalgas.com

Name of Contact: Lucas Portera
Address: 401 E. International Airport Road
Anchorage, AK 99518-1219
Phone: (907) 334-7794
(423) 298-5701
Email: lucas.portera@enstarnaturalgas.com

GCI Communication Corp

Name of Contact: Jayson Mcdonald
Address: 2550 Denali Street, Suite 1000, 11th Floor
Anchorage, AK 99503
Phone: (907) 360-3715
Email: JMcDonald@gci.com

Matanuska Electric Association, Inc

Name of Contact:	Eric Sanford
Address:	163 E. Industrial Way Palmer, Alaska 99645-2929
Phone:	(907) 761-9274 (907) 715-0869
Email:	Eric.Sanford@mea.coop

Matanuska Telecom Association, Inc

Name of Contact: Cliff Burris
 Address: 1740 South Chugach Street
 Palmer, Alaska 99645
 Phone: (907) 761-2724
 (907) 355-1679
 Email: cburris@mtasolutions.com

688-1.03 SCHEDULING AND COORDINATING THE UTILITY WORK BY OTHERS. Prior to commencing Utility related ground breaking activities the Contractor shall develop a detailed schedule for the complete installation of all utility work. The Contractor shall develop and maintain the schedule based on information provided by the Utilities. Develop and furnish a project schedule identifying utility support work in accordance with subsections 105-1.06 and 108-1.03. The schedule shall be incorporated into the CPM schedule and updated as required.

The Contractor shall work with the Engineer and Utilities to develop two week look ahead schedules. The Contractor's Superintendent, or Engineer approved designee, shall be the singular point of contact for coordinating scheduling with the Engineer. Two week look ahead schedules shall be submitted to the Engineer on a weekly basis and in sufficient detail to plan any supplemental needs for traffic maintenance, Storm water management, surveying support, and/or other activities authorized by the Engineer through directive.

The Contractor shall ensure that support work and coordination with the Utilities is performed in a manner that limits utility outages and outage durations. The Contractor shall expect longer utility outages will be scheduled during non-peak hours and anticipate performing support activities during these times which may include night and weekend work.

Each Utility has determined the timeframes that their utility relocation work is anticipated to take place, see section 651 Control of Work – Supplemental Requirements for these timeframes. These general work timeframes are subject to change.

688-2.01 RESERVED.**CONSTRUCTION REQUIREMENTS**

688-3.01 WORK BY UTILITIES. The Utilities will perform installation of permanent utilities and removal or abandonment of utilities that are decommissioned in accordance with the Utility Agreements and dispositions completed between the Department and each Utility.

688-3.02 WORK BY THE CONTRACTOR SUPPORTING UTILITIES. Provide support to facilitate work by the Utility Company, including an Engineer-approved representative, on site during utility work by others.

688-4.01 METHOD OF MEASUREMENT. Measure Utility support work according with the Engineer's directive authorizing the work.

688-5.01 BASIS OF PAYMENT. Provide work necessary to support installation of permanent utilities by others. Payment is for work, authorized by directive, for time and materials to support utility work by others, per Section 109-1.05.

Erosion, Sediment, and Pollution Control work in support of Utilities will be paid for under Section 641.

Excavation and backfill in support of Utilities will be paid for under Section 203.

Surveying in support of Utilities will be paid for under item 642.0003.____ Three Person Survey Party.

Traffic Maintenance in support of Utilities will be paid for under Section 643.

Utility Support Price Adjustment. The total value of this contract will be adjusted by (\$1,500) per calendar day for failure to provide the utility support or scheduling of utility work.

Payment will be made under:

Item Number	Item Description	Unit
688.2001.____	Utility Support	CS
688.2002.____	Utility Support Price Adjustment	CS

CHFWY00453

DIVISION 700 — MATERIALS

Blank Page

SECTION 702 ASPHALT MATERIALS

Standard Modification

Replace Subsection 701-2.01 with the following:

702-2.01 ASPHALT BINDER. Meet AASHTO M 320 or M 332 for the specified Performance Grade, except as indicated in Table 702-2.01-1 Exceptions to Performance-Graded Binder Specifications.

**TABLE 702-2.01-1
EXCEPTIONS TO PERFORMANCE GRADED ASPHALT BINDER SPECIFICATIONS**

Performance Grade	AASHTO Specification	Viscosity AASHTO T 316	MSCR, AASHTO T 350			PAV, Dynamic Shear AASHTO T 315	Direct Tension AASHTO T 314
			J _{NR3.2} kPa ⁻¹	J _{NR} Diff	% Recovery _{3.2}		
PG 52-28	M 320	None	—	—	—	None	Delete
PG 52-34 E	M 332	None	None	Delete	60 min.	None	Delete
PG 58-28 E	M 332	None	None	Delete	60 min.	None	Delete
PG 58-34 V	M 332	None	None	Delete	60 min.	None	Delete
PG 64-28 E	M332	None	None	Delete	60 min.	None	Delete
PG 52-40 E	M 332	None	None	Delete	75 min.	None	Delete
PG 58-34 E	M 332	None	0.25 max.	Delete	85 min.	None	Delete
PG 64-40 E	M 332	1 Pa•s max.	0.10 max.	Delete	95 min.	5000 max. @ 4°C	Delete

None indicates no exceptions from the listed test. Delete indicates this property is not required from the listed test.

Use asphalt binders without re-refined engine oil bottoms (REOB)/vacuum tower extenders (VTAE) as a modifier. REOB/VTAE are materials as defined in the Asphalt Institute document IS-235. Furnish a certificate of compliance according to Subsection 106-1.05.1 certifying that REOB/VTAE were not used as a modifier of asphalt binder.

HSM20.44-23.0801

702-2.03 EMULSIFIED ASPHALT.

Replace item 1. with the following:

- Cationic Emulsified Asphalt. Meet AASHTO M 208, except CRS-2P meet AASHTO M316.

HSM20.32-21.1231

702-2.07 WARM MIX ASPHALT (WMA). Add the following to Table 702-3:

WMA Technology	Process Types	WMA Supplier
AD-here ULTRA 1	Chemical Additive	Arkema – Road Science
Cecabase RT	Chemical Additive	Arkema – Road Science

HSM20.44-23.0801

SECTION 703 AGGREGATES

Standard Modification

703-2.03 AGGREGATE FOR BASE AND SURFACE COURSE.

In Table 703-1 replace the line for Degradation Value with the following:

**TABLE 703-1
AGGREGATE QUALITY PROPERTIES FOR BASE AND SURFACE COURSE**

PROPERTY	BASE COURSE	SURFACE COURSE	TEST METHOD
Micro-Deval	15%, max.	15%, max.	AASHTO T 327

HSM20.40-050122

Special Provisions

Replace Subsection 703-2.04 with the following:

703-2.04 AGGREGATE FOR HOT MIX ASPHALT. Process and crush aggregate that is free from clay balls, organic matter, other deleterious material, and not coated with dirt or other finely divided mineral matter. Aggregate used must consist of sound, tough, durable rock of uniform quality.

Remove all natural fines passing a No. 4 sieve before crushing aggregates for Type IV, and VH mixes.

Coarse Aggregate. Aggregate retained on the No. 4 Sieve.

Meet Table 703-3 requirements:

**TABLE 703-3
COARSE AGGREGATE QUALITY FOR HMA**

Description	Specification	Type II, Class A	Type I; Type II, Class B; Type III	Type IV	Type VH
LA Wear, % max.	AASHTO T 96	45	45	45	45
Micro-Deval, % max.	AASHTO T 327	18	18	18	18
Sodium Sulfate Loss, % max. (5 cycles)	AASHTO T 104	9	9	9	9
Fracture, % min.	ATM 305	90, 2 face	80, 1 face	90, 2 face	98, 2 face
Flat-Elongated Pieces, % max.	ATM 306				
1:5		8	8	8	8
Absorption, % max.	ATM 308	2.0	2.0	2.0	2.0
Nordic Abrasion, % max.	ATM 312	-	-	-	8 ^a

a. Hard Aggregate that meets the Nordic Abrasion values specified may be obtained from, but not limited to, the following sources:

- MS 52-068-2, located at MP 217 on the Parks Highway near Cantwell
- Alaska Lime Co, Jim Caswell, located at MP 216.5 on the Parks Highway near Cantwell
- CalPortland plants located in Dupont Washington
- Jack Cewe Ltd located in Coquitlam British Columbia, Canada

Fine Aggregate. Aggregate passing the No. 4 sieve.

Aggregate shall meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness.

Aggregate for Type II, Class A mix shall not contain more than 10% natural fines (blend sand and mineral filler) added to the crushed aggregate, and shall not exhibit rut depth larger than 1/4-inch, as determined by ATM 419.

Fine aggregate for Type IV and VH mixes:

- do not blend back natural sand
- shall be non-plastic as determined by ATM 205
- shall have a minimum uncompacted void content (Fine Aggregate Angularity) determined by AASHTO T 304, Method A, of 45%

TABLE 703-4
BROAD BAND GRADATIONS FOR HOT MIX ASPHALT AGGREGATE
Percent Passing by Weight

SIEVE	GRADATION				
	Type I	Type II	Type III	Type IV	Type VH
1 inch	100	-	-	-	-
3/4 inch	80-90	100	-	-	100
1/2 inch	60-84	77-99	100	100	65-90
3/8 inch	48-78	68-88	80-90	80-95	55-80
No. 4	28-63	48-68	44-81	55-70	40-60
No. 8	14-55	33-53	26-70	35-50	≤ 45
No. 16	9-44	20-40	16-59	20-40	≤ 35
No. 30	6-34	14-30	9-49	15-30	≤ 25
No. 50	5-24	9-21	6-36	10-24	≤ 20
No. 100	4-16	6-16	4-22	5-15	≤ 12
No. 200	4-7	3-6	4-7	4-7	4-7

CR703.1-050122

703-2.05 AGGREGATE FOR COVER COAT AND SURFACE TREATMENT.

In Table 703-5 replace the line for Degradation Value with the following:

TABLE 703-5
QUALITY PROPERTIES FOR COVER COAT AND SURFACE TREATMENT

Micro-Deval	AASHTO T 327	15%, max.

HSM20.40-050122

Special Provision

703-2.07 SELECTED MATERIAL.

Replace 1. Type A with the following:

1. Type A. Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by ATM 204 and ATM 205. Meet the following gradation as tested by ATM 304:

<u>Sieve</u>	<u>Percent Passing by Weight</u>
No. 4	20-55%
No. 200	0-6%, determined on the minus 3-inch portion of the sample

CR703.1-050122

703-2.09 SUBBASE.

In Table 703-8 replace the line for Degradation Value with the following:

**TABLE 703-8
QUALITY PROPERTIES FOR SUBBASE**

Micro-Deval	AASHTO T 327	25%, max.

HSM20.40-050122

703-2.10 POROUS BACKFILL MATERIAL.

Add the following to the end of the paragraph:

Use Gradation A unless otherwise specified.

HSM20.33-123121

Special Provision

703-2.13 STRUCTURAL FILL. Replace Table 703-12 with the following:

**TABLE 703-12
AGGREGATE GRADATION FOR STRUCTURAL FILL**

SIEVE	PERCENT PASSING BY WEIGHT
3-inch	100
3/4-inch	75-100
No. 4	20-55
No. 200	0-6

Replace Subsection 703-2.16 with the following:

703-2.16 RECYCLED ASPHALT PAVEMENT (RAP). RAP shall be free of contamination and deleterious materials. RAP maximum particle size shall not exceed 1.5-inch.

CR703.1-050122

**SECTION 706
CONCRETE AND PLASTIC PIPE**

Special Provisions

Replace Subsection 706-2.07 with the following:

706-2.07 CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR CULVERTS, STORM DRAINS, AND UNDERDRAINS. Meet the following:

Corrugated Pipe and Fittings (non-pressurized)

AASHTO M 294 and 252

Type S

Perforations

1. Underdrains
2. Underdrains and Storm Drains

Class 2
Class 1

Joints

Subsection 705-2.05.3.

Polyethylene Pipe Manufacturer

1. Participate in the National Transportation Product Evaluation Program (NTPEP) work plan for HDPE thermoplastic pipe and listed on the NTPEP audit website displaying NTPEP compliance.
2. Conduct and maintain a quality control program under the NTPEP.
3. Provide a manufacturer's certificate of compliance identifying production lots for all materials.

Provide corrugated polyethylene pipe and fittings manufactured from high-density polyethylene (HDPE) virgin compounds. May use clean, reworked polyethylene materials from the manufacturer's own production.

Do not install pipe that is more than two years from the date of manufacture.

CR706.1-050119

SECTION 710 FENCE AND GUARDRAIL

Special Provision

Replace Subsection 710-2.04 with the following:

710-2.04 METAL BEAM RAIL.

1. W-Beam and Thrie Beam Guardrail. Meet AASHTO M 180, Class A, Type II.
2. Box-Beam Guardrail. Meet ASTM A500 Grade B, or ASTM A501.
3. Symmetric and Asymmetric W-Thrie Beam Transition Section. Meet AASHTO M 180, Class B, Type II.

Galvanize the rail per AASHTO M 111 after fabrication.

710-2.06 GUARDRAIL POSTS AND BLOCKOUTS.

Add the following:

4. Transition Posts. Meet the section and length specified on the Plans. Meet ASTM A992 or ASTM A709, Grade 50.
5. Transition Blockouts. Meet the shape and dimensions shown on the Plans. Meet ASTM A500. Grade B or Grade C.

Replace Subsection 710-2.11 with the following:

710-2.11 GUARDRAIL TERMINALS.

W-beam shall meet requirements of AASHTO M 180, Class A, Type II. Box beam shall meet requirements of ASTM A500 Grade B, or ASTM A501. Galvanize after fabrication.

Components made from rolled pressed and forged shapes, castings, plates, bars, and strips shall meet the coating requirements of AASHTO M 111. Galvanize after fabrication.

All hardware or fasteners supplied shall meet the coating requirements of AASHTO M 232.

Guardrail Terminals shall be AASHTO MASH Test Level 3.

1. W-Beam. Provide one of the following terminal types, as shown on the plans, for single-rail W-beam guardrail. Design requirements: 31-inch top of rail height, 8-inch blockouts, W6x8.5 steel posts, 12 ft x 6-inch w-beam panels, and mid-span splice connection to run of rail.
 - a. Parallel Terminals. Provide terminals meeting the following:
 - (1) Length: 50 ft nominal effective length.
 - (2) End Offset: 0 ft to 2 ft (25:1 or flatter straight taper). Offset end as shown on the plans.
 - b. Buried in Backslope Terminal. Provide terminals as shown on the Plans.
2. Box Beam. Provide terminals, as shown on the plans for box beam guardrail. Design requirements: 28-inch top of rail height, designed for use with 6-inch by 6-inch by 3/16-inch box beam.
 - a. Parallel Terminals. Provide terminals meeting the following:

- (1) Length: 33 ft nominal effective length, or a minimum 18 ft of box beam rail and standard 3-inch weak posts beyond the 1/8-inch tube rail, or as recommended by the manufacturer's installation manual.
- (2) End Offset: 25:1 or flatter straight taper. Offset end as shown on the plans.

Add the following Subsection 710-2.12 Transition Connection:

710-2.12 TRANSITION CONNECTION.

1. Thrie Beam Terminal Connector. Meet AASHTO M 180, Class B, Type II.
2. Guardrail Connection Plate. Meet ASTM A709, Grade 50.

HSM20.34-123121

SECTION 712 MISCELLANEOUS

Standard Modification

712-2.08 GLASS BEADS.

Replace the 2nd sentence with the following:

Glass Beads shall contain no more than 200 ppm of lead or 200 ppm of arsenic when tested in accordance with EPA testing methods 3052, 6020B, or 6020C.

HSM20.35-123121

Special Provision

712-2.17 METHYL METHACRYLATE PAVEMENT MARKINGS. Replace No. 1. Quality Requirements: with the following:

1. Quality Requirements: Use a marking material formulated for the application type specified. Use a marking material manufactured from new materials and free from dirt and other foreign material. Use a methyl methacrylate based resin system for part "A". Use benzoyl peroxide system for part "B".

Extruded or stenciled application: Material formulated for extruded or direct stenciled application with factory intermix beads, and anti-skid aggregate and the application of additional surface applied beads.

Submit a manufacturer certification for both the methyl methacrylate material, glass beads and anti-skid aggregate to ensure that the materials furnished conform to these Specifications.

4. Performance Properties: Add the following:

- k. Color: Yellow, PR-1 Chart, 33538 Federal Yellow. White, minimum daylight reflectance of 84.

Replace Subsection 712-2.18 with the following:

712-2.18 GLASS BEADS FOR METHYL METHACRYLATE PAVEMENT MARKINGS. Use the type and quantity of beads specified in writing by the marking material manufacturer required to satisfy the specified performance requirements. The written certification will note the bead coating is compatible with the marking material binder.

1. Bead Manufacturer and Type.

- a. Swarco, Megalux-Beads or
 - b. Approved equal beads

Approved Equal Beads. Equal beads will demonstrate:

- (1) Bead coatings compatible with marking materials. Marking Material Manufacturer will certify compatibility.
- (2) Lasting retro reflectivity.

CR712.1-010109R

SECTION 724 SEED

724-2.01 DESCRIPTION. Grass seed to provide a living vegetative cover.

724-2.02 MATERIALS. Provide seed mix as specified in the Special Provisions. Provide seed collected or harvested within 2 years of the targeted seeding date. Provide all seed in pure live seed (PLS) unless otherwise directed.

Furnish seed true of genus and species. Meet applicable requirements of the State of Alaska *Seed Regulations*, Alaska Administrative Code, Title 11, Chapter 34, (11 AAC 34), and the Federal Seed Act, 7 CFR Part 201.

The Engineer will review requests for genus, species, or cultivar substitutions(s). The Contractor shall submit a proposed seed mix accompanied by approval from the Alaska Plant Materials Center, and confirmation the vendor can provide the requested mix in quantities adequate for the project.

1. Prohibited and Restricted Noxious Weeds and Quarantined Pests. Furnish seed certified to be free of prohibited noxious weeds or quarantined pests, and certified to contain no more than the maximum allowable tolerances for restricted noxious weeds, according to 11 ACC 34.
 - a. Seed found to contain prohibited noxious weeds or quarantined pests will be rejected, according to 11 AAC 34.020(a) and 11 AAC 34.105 through 34.180, respectively.
 - b. Seed found to contain restricted noxious weed seed in excess of the maximum allowable tolerance per pound will be rejected, according to 11 AAC 34.020(b).

Prohibited and restricted noxious weeds are listed in 11 AAC 34.020, and can be viewed at the following URL: <http://plants.alaska.gov/invasives/noxious-weeds.htm>.

2. Labeling. Ensure each bag or container of individual seed species is labeled to meet requirements of 11 AAC 34.010. Do not remove labels from bags or containers.
3. Certification. Certify seed is free of prohibited noxious weeds and restricted noxious weeds are within allowable tolerances. Furnish to the Engineer a statement signed by the vendor identifying the lot number or lot numbers, certifying each lot of seed has been tested within the preceding nine months, by a recognized seed testing laboratory, a member of the Association of Official Seed Certifying Agency (AOSCA), or the Alaska Plant Materials Center.

Seed will be rejected if:

- a. Contains prohibited noxious weeds;
- b. Contains restricted noxious weeds above maximum allowable tolerances;
- c. Not certified as tested within the preceding nine months;
- d. Wet, moldy, or otherwise damaged in transit or storage; or
- e. Containers do not have labels or the labels have been removed.

Seed may be rejected for:

- a. Discrepancies in the lot numbers listed on the statement to the lot numbers indicated on the labels of the seed containers.

The Contractor shall immediately remove rejected seed from the project premises. If seed is rejected for containing prohibited noxious weeds or for exceeding maximum allowable tolerances of restricted noxious weeds, dispose of rejected seed according to 11 AAC 34.075(g).

CR724-113020

Special Provision

Replace Section 726 with the following:

**SECTION 726
TOPSOIL**

726-2.01 TOPSOIL. Furnish topsoil that is representative of the existing, natural organic blanket of the project area, and free of prohibited and restricted noxious weeds (Prohibited and Restricted Noxious Weeds 11AAC 34.020 <http://plants.alaska.gov/invasives/noxious-weeds.htm>). Perform a quality test, as defined by ATM 203, on the soil to determine the organic content of the soil. Supply the results to the Engineer.

Soil with an organic content of 5 percent or more may be reused and spread on the finished slopes where topsoil is noted on the plans. Remove roots, stumps, unnatural material, and rocks greater than 3 inch in diameter from the organic material before it is graded onto the finished slope.

Soil with an organic content of less than 5 percent cannot be used as topsoil for the project. In this case furnish topsoil consisting of a natural friable surface soil without admixtures of undesirable subsoil, refuse or foreign materials having an organic content of 5 percent or more, as determined by ATM 203. The material shall be reasonably free from roots, clods, hard clay, rocks greater than 3 inches in diameter, noxious weeds, tall grass, brush, sticks, stubble or other litter, and shall be free draining and nontoxic. Notify the Engineer of the topsoil source location at least 30 calendar days before delivery of topsoil to the project from the identified location. The Engineer will inspect the topsoil and its sources before approval will be granted for its use.

**TABLE 726-1
LIMESTONE REQUIREMENTS**

Soil pH	Limestone, tons/acre
Above 6.0	0
5.0-6.0	1.5
Below 5.0	3.0

CR726-20.0101R

Special Provisions

Replace Section 727 with the following:

SECTION 727 SOIL STABILIZATION MATERIAL

727-2.00 GENERAL. Free of restricted and prohibited noxious weeds (11 AAC 34), seeds, chemical printing ink, germination and growth inhibitors, herbicide residue, chlorine bleach, (except where specified: rock, metal, plastics) and other deleterious materials and not harmful to plants, animals and aquatic life. Wood cellulose "paper" fiber, wood chips, sawdust, and hay are not permitted as stand-alone stabilization materials.

727-2.01 MULCH. Flexible blanket/covering, temporary degradable (bio/photo) form of erosion control. Use one of the following:

Dry Erosion Control, Stabilization Products. Hand applied or spread with mulch blower equipment.

1. Straw. Use straw, in an air-dried condition, from oats, wheat, rye, barley, or other approved grain crops that are free from noxious weeds, seeds, mold, or other materials detrimental to plant life. Straw material shall be certified weed-free straw using North American Invasive Species Management Association (NAISMA) Standards. In-lieu of certified weed-free straw provide documentation that the material is steam or heat treated to kill seeds or provide U.S. or state's department of agriculture laboratory test reports, dated within 90 days prior to the date of application showing that there are no viable seeds in the straw.
2. Shredded Bark Mulch. Shredded bark and wood with the following characteristics:
 - a. Not containing resin, tannin, or other compounds in quantities harmful to plant life.
 - b. Maximum length of individual pieces is 2 inches with 75% passing through a 1 inch sieve.
 - c. Will form a uniform ground cover/mat, have moisture absorption, retention, and percolation properties, not be susceptible to spreading by wind or rain providing a good growth medium.
 - d. May contain up to 50% shredded wood material.
 - e. Shredded wood material aged 1 year minimum prior to use.

Hydraulic Erosion Control Products (HECPs) Applied hydraulically.

A fiber mulch matrix: biodegradable and composed of wood, straw, coconut and other fibers natural and man-made. When applied, create a continuous, porous, absorbent high water holding, flexible blanket/mat/mulch/covering making intimate contact with, and adhering to sloped soil surface; permitting water infiltration; resists erosion and promotes rapid germination and accelerated plant growth. The fibers may be thermally processed, and cross-linked with a hydro-colloidal or linear anionic tackifier (curing period 24-48 hours) or mechanically-bonded (no curing period). When agitated in slurry tanks with water the fibers will become uniformly suspended, without clumping to form homogeneous slurry.

The HECPs shall be delivered premixed by the manufacturer. The HECP will contain only the materials provided in the sealed containers from the manufacturer. No added components are permitted after the manufacturer seals the product container, before application, during application or otherwise. Submit documentation dated within 3 years of application, from an independent accredited laboratory as approved by the Engineer, showing that the product's testing performance meets the requirements for the slope(s) to be protected on the project, according to the National Transportation Product Evaluation Program (NTPEP), Erosion Control Technology Council (ECTC) and or the Texas DOT/Texas Transportation Institute (TTI) Laboratory.

If the HECP contains cotton or straw provide documentation that the material is certified weed free using NAISMA Standards. In-lieu of certified weed-free straw, provide documentation that the material is steam or heat treated to kill seeds or provide U.S. or state's department of agriculture laboratory test reports, dated within 90 days prior to the date of application showing that there are no viable seeds in the straw.

The HECP shall contain a dye to facilitate placement and inspection of the material.

1. Wood Strand, Fiber.

A blend of angular, loose, long thin wood pieces with a high length to width ratio and that are frayed. Minimum 95% of strands between 2 inches and 10 inches, at least 50% of the length shall have a width thickness between 1/16 and 1/8 inch. No single strand shall have a width or thickness greater than 1/2 inch. Processed wood fiber with the following characteristics:

- a. Will remain in uniform suspension in water under agitation and will blend with grass seed, fertilizer and other additives to form homogeneous slurry.
- b. Will form a blotter-like uniform ground cover on application, have moisture absorption, retention and percolation properties, the ability to cover, and hold grass seed in contact with soil, and not create a hard crust upon drying providing a good growth medium.

2. Dried Peat Moss. Partially decomposed fibrous or cellular stems and leaves of any of several species of Sphagnum mosses with the following characteristics:

- a. Chopped or shredded to allow distribution through normal hydraulic type seeding equipment and capable of being suspended in water to form part of a homogeneous slurry.
- b. Free from woody substances and mineral matter such as sulfur or iron and with a pH value of between 4.0 and 6.5.
- c. Furnished in an air dry condition and containing less than 35% moisture by weight. Have a water holding capacity of not less than 800% by weight on an oven dry basis.

3. Fiber Matrix (FM) Mulch - Types.

- a. Stabilized Mulch Matrices (SMMs)
- b. Bonded Fiber Matrices (BFMs)
- c. Mechanical Bonded Fiber Matrix (MBFM)
- d. Polymer Stabilized Fiber Matrix (PSFM)
- e. Fiber Reinforced Matrices (FRMs)
 - Flexible Growth Medium (FGM)
 - Extended-Term Flexible Growth Medium (ET-FGM)

727-2.02 MATTING. Fiber mulches, mulch matrices, nets and turf reinforcement mats manufactured from wood fibers, straw, jute, coir, polyolefins, PVC, nylon and others creating dimensionally stable nets, meshes, geotextiles and blankets; creating a continuous, porous, absorbent, flexible blanket/mat/mulch/covering making intimate contact with and adhering to sloped soil surface, resisting erosion and promoting rapid germination and accelerated plant growth.

Rolled Erosion Control Products (RECPs) (Temporary Degradable and Permanent Erosion Control)

Use RECPs that bear the Quality and Date Oversight and Review (QDOR) Seal from the ECTC. Independent test results from the NTPEP, that the mulch, when tested according to ASTM 6459 Standard Test Method for Determination of Rolled Erosion Control Products (RECP), Performance in Protecting Hillslopes from Rainfall-Induced Erosion, meets the performance requirement using the Revised Universal Soil Loss Equation (RUSL).

Functional Longevity.

1. Temporary Degradable.

a. Duration.

1) Short-Term RECPs. (RECPs 3 - 12 months)

C_{Factor} = .15 maximum

Test Soil Type = Sandy Loam

(National Resources Conservation Service (NCRS) Soil Texture Triangle)

2) Moderate (Extended) -Term RECPs. (RECPs 24 months)

C_{Factor} = .05 maximum

Test Soil Type = Sandy Loam (NCRS Soil Texture Triangle)

- 3) Long-Term RECPs. (RECPs 36 months)
 $C_{\text{Factor}} = .01$ maximum
 Test Soil Type = Sandy Loam (NCRS Soil Texture Triangle)

b. Product types.

- 1) Mulch-Control Nets (MCNs). Planar woven natural fiber or extruded geosynthetic mesh used to anchor loose fiber matting/mulches.
- 2) Erosion Control Blankets (ECBs). Processed natural and/or polymer fibers, yarns or twines mechanically, structurally, or chemically bound together to form a continuous matrix with a minimum weight of 8 oz/yd² and a limiting shear stress of 0.45 lb/ft².
- 3) Netless. Fibers mechanically interlocked and/or chemically adhered together.
- 4) Single-net and Double-net. Fibers mechanically bound together by single or double netting.
- 5) Open Weave Textiles (OWTs). Fibers woven into a continuous matrix.

c. Materials.

- 1) Burlap. Standard weave with a weight of 3.5 to 10 oz/yd².
- 2) Jute Mesh Fabric. Cloth of a uniform, open, plain weave of undyed and unbleached single jute yarn. Use yarn that is loosely twisted and not varying in thickness more than one-half its normal diameter. Furnish jute mesh in rolled strips meeting the following requirements:
 - a) Width: 45 to 48 inches, ± 1 inch
 - b) 78 warp-ends per width of cloth (minimum)
 - c) 41 weft-ends per yard (minimum)
 - d) Weight: 20 ounces per linear yard, $\pm 5\%$
- 3) Woven Paper or Sisal Mesh Netting. Woven from twisted yarns available in rolls 45 to 48 inches wide. Mesh may vary from closed to open weave, ranging from 1/8 to 1/4 inch openings. Shrinkage after wetting may not exceed 20% of the surface area.
- 4) Knitted Straw Mat. Commercially manufactured ECB. Use photodegradable netting and biodegradable thread. Use straw, in an air-dried condition, from oats, wheat, rye, barley, or other approved grain crops that are certified weed free of prohibited and restricted noxious weed seed and quarantined pests, according to Alaska Administrative Code, Title 11, Chapter 34 (11 AAC 34), and in conjunction with North American Invasive Species Management Association (NAISMA) standards, and free of mold, or other objectionable materials detrimental to plant life. When straw or straw products certified according to 11 AAC 34 are not available, use non-certified products manufactured within Alaska before certified products manufactured in another state, country, or territory. Non-certified products manufactured in Alaska In-lieu of certified weed-free straw, provide documentation that the material is steam or heat treated to kill seeds or provide U.S. or state's department of agriculture laboratory test reports, dated within 90 days prior to the date of application showing that there are no viable seeds in the straw. Non-certified straw or straw products manufactured in another state, country, or territory shall not be used. ECB may contain coconut or fiber to reinforce the straw.
- 5) Woven/Curled Wood blanket. Machine produced mat of curled wood shavings with a minimum of 80% 6-inch or longer fibers, with consistent thickness and the fibers evenly distributed over the entire area of the blanket. Smolder resistant without the use of chemical additives. Cover the top side of the blanket with biodegradable extruded plastic mesh.
- 6) Coconut (Coir Fiber). Machine produced mat, ECB of consistent thickness and coir fiber evenly distributed over the area of the mat. Use bio/photo degradable netting and thread.

2. Permanent.

a. Product Types and Materials.

- 1) Turf Reinforcement Mats (TRMs). A rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh, and/or other elements, processed into a permanent, three-dimensional matrix of sufficient thickness with a minimum weight of 8 oz/yd² and a minimum limiting shear stress of 1.5 lb/ft². TRMs (may be supplemented with degradable components) shall impart immediate erosion protection, enhance vegetation establishment during and after maturation and permanent vegetation reinforcement providing long-term functionality.

727-2.03 SEDIMENT RETENTION FIBER ROLLS (SRFRs). Fiber rolls also referred to as wattles. Manufacture of photodegradable or biodegradable fabric netting without preservative treatment, evenly woven, free of crusted material, cuts, and tears. Manufacture stakes of photodegradable or biodegradable material (wood stakes, except as approved by the Engineer).

1. Filter Sock (Wattle)

- a. Fabric netting.
- b. Filled with wood fiber, straw, flax, rice, coconut fiber material.
- c. Minimum diameter 5 inches.

2. Compost Sock.

- a. Extra Heavy weight fabric netting with a minimum strand width of 5 mils.
- b. Filled with coarse compost.
- c. Minimum diameter 8 inches.

3. Coir Log.

- a. Woven wrap bristle coir twine netting.
- b. Filled with 100% coconut (coir) fiber uniformly compacted.
- c. Segments maximum length 20 foot, diameter as suited to the application and a density of 7 lbs/pcf or greater.
- d. Coir twine strength equal to 80 lb minimum weaved to a 2 inch x 2 inch opening pattern.
- e. Ties made of hemp rope by 1/4 inch diameter.

727-2.04 COMPOST. Suitable for serving as a soil amendment or an erosion control material. Sanitized, mature compost meeting local, state, and Federal quality requirements tested and certified by the U.S. Composting Council (USCC) under the Seal of Testing Assurance (STA) Program. Biosolids compost must meet the Standards for Class A biosolids outlined in 40 Code of Federal Regulations (CFR) Part 503. Additionally, meet the requirements of the AASHTO specifications:

1. Compost Blankets. Standard Practice for Compost for Erosion/Sediment Control (Compost Blankets) R 52.
2. Compost Filter Berms and Filter Socks. Standard Practice for Compost for Erosion/Sediment Control (Filter Berms and Filter socks) R 51.

727-2.05 TACKIFIER. Tackifier, viscous overspray, generally composed of dry powered vegetable gums derived from guar gum, psyllium and sodium alginase; asphaltic emulsions; petroleum distillates; co-polymer emulsions; and lignosulfonates and used to anchor soil, compost, seed, the mulch fibers to one another, and the ground. Contain no growth or germination inhibiting materials nor significantly reduce infiltration rates. Tackifier shall hydrate in water and readily blend with other slurry material. Tackifier options include:

1. Type A. Organic tackifier with certification of plant sources; or
2. Type B. Synthetic tackifier with certification confirming product is not harmful to plants, animals, or aquatic life.

727-2.06 POLYACRYLAMIDE (PAM). Use as a tie-down for soil, compost, seed and as a flocculent. Polyacrylamide (PAM) products shall meet the requirements of American National Standards Institute (ANSI)/National Sanitation Foundation International (NSF) Standard 60 for drinking water treatment, be anionic (not cationic), linear and not cross-linked with an average molecular weight greater than 5 Mg/mole, minimum 30 percent charge density; contain at least 80% active ingredients and a moisture content not exceeding 10% by weight.

Deliver PAM in a dry granular powder or liquid form.

727-2.07 GEOTEXTILE-ENCASED CHECK DAM AND SEDIMENT BARRIER. Urethane foam core encased in geotextile material (silt fence material Section 633), minimum 8 inches height by minimum base width of 16 inches by minimum 7 foot length. Overhang the geotextile 6 inch minimum each end with apron type ties by 24 inches each side of the foam core.

727-2.08 SANDBAG.

1. Sandbag Sack Fabric. Fabric shall be a nonwoven, needle punched design meeting the Minimum Average Roll Values (MARV) verified in accordance with ASTM D4759.
2. Seam Thread. Similar durability to the sandbag sack fabric.
3. Sandbag Fill Material.
 - a. Selected Material 703-2.07 Type B
4. Cinch Ties. Plastic ties or equivalent tie recommended by the sandbag manufacturer.

727-2.09 MANUFACTURED INLET PROTECTION SYSTEM.

1. Manufacturers:
 - a. Ultra Tech International – Ultra-DrainGuard
 - b. Bowhead Environmental and Safety - StreamGuard Exert II Sediment Insert
 - c. Enpac - Catch Basin Insert, Oil and Sediment or
 - d. Approved equal.

727-2.10 CLEAR PLASTIC COVERING. A clear plastic covering meeting the requirements of the National Institute of Standards and Technology (NIST) voluntary Product Standard PS 17 - 69 for polyethylene sheeting having a minimum thickness of 6 mils.

727-2.11 STAPLES. U-shaped staples for anchoring matting, approximately 6 inches long and 1 inch wide. Machine-made: No. 11 gage or heavier steel wire. Hand-made: 12-inch lengths of No. 9 gage or heavier steel wire.

CR727-12.0508R2

SECTION 730 SIGN MATERIALS

Special Provisions

730-2.04 SIGN POSTS.

Add No. 7:

7. Structural Tubing and W-Shape Beams.

- a. Structural tubing shall conform to ASTM A500, Grade B, or ASTM A501. The tubing shall be square and of the dimensions called for in the Plans with 0.2 inch thick walls. 0.4 inch diameter holes shall be drilled as required to permit mounting of the sign.
- b. W-shape beams shall conform to ASTM A36.
- c. Structural tubing and W-shape beams shall be hot dip galvanized according to 1.b. of this subsection. Damaged and abraded tubes and beams shall be repaired according to 1.c. of this subsection.

CR730.1-062204

Replace Subsection 730-2.05 with the following:

730-2.05 FLEXIBLE DELINEATOR POSTS. Durable fiberglass composite, polymer, or plastic material meeting the dimensions and colors shown on the Plans. Resistant to ultraviolet light, ozone and hydrocarbon damage and remain flexible at a temperature of minus 40 °F. Provide posts with reflectors that are capable of self-erecting and remaining serviceable after 5 head-on impacts at 55 mph and 10 impacts at 35 mph with an automobile at an air temperature of plus 40 °F.

Terminal Markers - Flexible (marker). The marker includes the pole/post/rod (pole), reflective and retroreflective sheeting and mounting hardware.

Provide durable markers: resistant to impact from (snow and vehicle), vandals, ultraviolet light, moisture, ozone, and hydrocarbons.

When the pole is loaded, the marker shall bend/flex, remain flexible and oriented as installed continuing to function as designed without permanent displacement along the length of the member. Provide the flexibility in the primary vertical element, a connecting device between the vertical element and connection to the support member (spring or other) or a combination.

Provide a connection sufficient to transfer the loads from the pole to the supporting member without reducing the strength, flexibility, or durability of either. The connection shall not negatively influence the performance of the guardrail. Provide approval of the connection from the marker manufacturer and support member manufacturer (if proprietary).

- Design Loads:
 - Impact load from snow thrown by snowplows
 - Weight of snow covering the pole (snow thrown from snowplows)
 - Wind loads (100 mph, 3 sec gust)
- Service Temperature Range: -40° F to +140° F.

- Pole:

1. Material:

- Steel, or
- Stainless Steel, or
- Other Poles:
 - (a) Continuous glass fiber and marble reinforced thermosetting composite, or
 - (b) Engineered plastic alloy, or
 - (c) Fiberglass Reinforced Polyester (FRP)
 - (d) High-Impact Polyolefins

2. Dimensions

- Top of Pole: 60 inches to 84 inches above top of guardrail
- Width/Diameter: minimum = 1 1/4 inches, maximum = 2 inches (steel/stainless steel not be greater than 5/8 inch diameter)
- Thickness: as required by design

3. Visibility:

- Daytime: Pole - color orange
 - a. Steel and Stainless Steel Poles: Applied permanent finish.
 - b. Other Poles: Color pigment ultraviolet stabilized and solid through the cross section from end to end.
- Nighttime: Added retroreflective sheeting - color white
 - a. Approximately 12 square inches visible from the traveled way before and after the marker. Applied to a flag attached to the pole or as banding applied directly to the pole. (A flag is required when using steel/stainless steel poles.)
 - b. Place top edge of flag/banding 1 inch from top of pole.
 - (1) Flag: Single retroreflective sheet each face
 - (2) Banding: Two bands completely around marker, 4 inches between bands

- Hardware and Fasteners:

- Steel, and/or
- Stainless Steel, or
- Aluminum alloy (hardware only)

Manufacturers of flexible markers (snowpoles):

Manufacturer	Model	Type	Contact
Nordic Fiberglass, Inc.	FF2	Steel Pole w/ Flag	Ph: (218) 745-5095
PEXCO	Model 3639	High-Impact Polyolefins	Ph: (404) 564-8560
New Century Northwest, LLC	NCN2549	Engineered Plastic Alloy	Ph: (541) 485-5566
Carsonite Composites, LLC	SNFB	Continuous glass fiber and marble reinforced thermosetting composite	Ph: (800) 648-7916

Submit manufacturer's specifications to the Engineer for review and approval before ordering terminal markers.

CR730.2-122217

Special Provision

Replace Section 740 with the following:

SECTION 740 SIGNALS AND LIGHTING MATERIALS

740-2.01 GENERAL. Use electrical materials, devices, fittings, and hardware that conform to applicable NEMA and ANSI standards.

Use electrical products that are Third Party Labeled or Listed (by an approved independent electrical testing laboratory such as UL, Electrical Testing Laboratories (ETL), Canadian Standards Association (CSA), etc.), unless otherwise indicated on the Materials Certification List (MCL).

Ensure that all material and workmanship, as determined by the Department, conform to the standards of the NEC, the NESC, and local safety codes as adopted and amended by the authority having jurisdiction.

740-2.02 SIGNAL AND LIGHTING STRUCTURES.

1. Design. Design and fabricate structures to conform to:

- a. Highway Lighting Structures. 2013 Edition of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with 2013 Errata and 2015, 2019, and 2020 interim revisions and the highway lighting sheets in the Plans. Use a wind speed of 100 mph. Design each structure to support a sign with an area of 16 square feet with its centroid located 14 ft. above the pole base.

A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for the complete-in-place structure including the supported hardware.

- a. In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole and mast arm, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used. For highway lighting structures, submit the actual total combined mass of luminaire supports and attached fixtures.
- b. On the stamped shop drawings, provide design wind speed and the details for building the poles and mast arms, including: materials specifications, slip fit joint dimensions, pole component dimensions, welds that will be made, and the welding inspection that will be done.

Submit the mill certifications for the steel items (piles, plates, bolts, and other related items) to the Engineer for approval.

2. Fabrication. Fabricate signal and lighting structures from tapered steel tubes with a round or 16 sided cross section. Orient handholes located near the base of poles to face downstream of traffic flow.

Furnish poles and mast arms up to 40 feet long in one piece. Poles and mast arms longer than 40 feet may be furnished in one piece or in two segments with a slip type field splice. For slip type joints, provide the minimum overlap specified in the Plans. In mast arms, locate these splices at least one foot away from the Plan location of signal heads and signs. In signal poles, locate the edge of the female section at least 6 inches above the top of the signal mast arm connection.

Fabricate tubes with walls up to 1/2 inch thick from the prequalified base metals listed in AWS D1.1. Fabricate elements greater than 1/2 inch thick from steel that conforms to AASHTO M270 and meets the Fracture Critical Impact Test requirements for Zone 3. The Department will not accept structures that use laminated steel elements.

Fabricate the cross section of each tube from no more than 2 pieces of steel. When using 2 pieces, place the longitudinal welded seams directly opposite one another. Place the welded seams on adjacent sections to form continuous straight seams from the base to the top of the pole.

When tenons are needed to install traffic signals and luminaires, make them from two inch nominal schedule 40 pipe that conform to ASTM A 53 Grade B.

Fabricate breakaway signal poles in accordance with the Pole Sheet in the Plans. Fabricate signal poles 10 to 16 feet long from 7 gauge (US Standard) sheet steel. Fabricate each post with a minimum inside diameter at the base plate as shown in the Plans. Use 4 inch diameter by 4 inch Schedule 40, ASTM A53, Grade B pipe as a post-top adapter.

The Department does not allow holes made for lifting purposes in the ends of tubular segments, except in the free ends of luminaire mast arms. To add lift points, weld them to the tube opposite the longitudinal seam weld on the outside of female segments and on the inside of male segments. Before shipment, remove lift points added to the outside of the tubes, grind the area smooth with the base metal, and hot stick repair the finish according to Subsection 660-3.01.8.a. Lift points added to the inside of tubes in place may be left in place.

Hot-dip galvanize lighting and signal structures to meet AASHTO M 111 and these specifications. Galvanizing kettles will be large enough to completely submerge each element, the mast arm, and the pole. Submerge the complete/whole element in the galvanizing process. An element galvanized in sections will not be accepted. Galvanize bolts and fasteners to meet AASHTO M 232.

After the poles and mast arms are galvanized, remove all excess zinc from all drip lines and points and surfaces of all tube ends that form slip type joints to provide a smooth finish.

The Department will reject poles and mast arms that are:

- a. Not fabricated according to these specifications or the approved shop drawings,
- b. Bowed with sweeps exceeding 1 inch throughout the length of the pole, mast arm, or segment, if furnishing a 2-piece pole or mast arm,
- c. Out of round. Sections are out of round when the diameters of round members or the dimension across the flats of multisided members exceed 2 percent of the dimension specified on the shop drawings.

Fabricate pile cap adapters from Grade X52 steel line pipe that conforms to API 5L and from steel plate that conforms to ASTM A 709 Grade 50. Attach the anchor plate to the pile section with a complete joint penetration (CJP) weld. Fabricate the anchor plate to match the base plate of the lighting standard.

3. Welding. Perform welding to conform to Subsection 504-3.01.7 and the 2013 Edition of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, the Central Region Traffic Signal Details, and the following:
 - a. Make welds continuous. Grind exposed welds flush with the base metal at slip fit joints for the length of the slip fit joint plus one half the diameter of the female section.
 - b. On steels 5/16 of an inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).
 - c. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order. In steels less than 1/8 inch thick, complete the tests according to AWS D1.1.
 - d. Only visually inspect welds made on luminaire mast arms.
4. Anchor Rods & Bolts. Furnish 2 inch diameter (nominal) anchor rods for signal poles that meet ASTM F1554 Grade 105, are 96 inch minimum length and conform to Supplemental Requirements; S2, Permanent Manufacturer's Identification, S3, Permanent Grade Identification and S-5 Charpy Impact Requirements. Hot dip galvanize according to AASHTO M232. Use nuts that conform to AASHTO Specification M292 of the grade, surface finish, and style for 2 inch diameter anchor rods. Washers shall conform to AASHTO M293.
5. Miscellaneous. Finish the edges of poles and mast arms to conform to the following requirements. Before hot dip galvanizing, neatly round the following features to the radius specified.
 - a. On holes through which electrical conductors pass, provide a 1/16 inch radius on both the entrance and exit edges,
 - b. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,

- c. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments, respectively. Then for the length of the joint plus one half the diameter of the female section grind down welds until they feature a radius concentric with the mating surface and remove material protruding from the two surfaces.

Provide caps to cover the free ends of poles and mast arms.

Identify critical information for poles and arms with visible permanent aluminum tags that contain the information shown in Table 740-1. The measurements shown are for illustration purposes only. Use tags large enough to include required information using 1/4 inch high text, 3/8 inch of space between successive lines of text, and at least 3/8 inch of space between the edges of the tag and the text. Secure the tags with two 1/8 inch blind rivets at the base of poles and the underside of mast arms. If furnishing a two piece signal mast arm with slip type joint, mark both pieces with the same message. Provide the holes for the blind rivets before galvanizing.

TABLE 740-1
POLE MARKINGS

Note: Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.

POLES (Including Mast Arms)	MEASUREMENTS	TAG MARKINGS
Signal Poles		
Signal mast arm length	45 ft./55 ft.	SMA 45/SMA 55
Luminaire mast arm length	22 ft./18 ft.	LMA 22/LMA 18
Pole height	36 ft.	PH 36
Intersection number (if more than one) -pole number		1 - P 4
Sum of signal mast arm moments about centerline of signal pole		SM 4000/SM 3200
Design wind speed	100 mph	DWS 100
Light Poles		
Luminaire mast arm length	15 ft./15 ft.	LMA 15/LMA 15
Pole height	37 ft.	PH 37
Signal Mast Arm		
Mast arm length	40 ft.	SMA 40
Intersection number (if more than one) -pole number		1 - P 4
Sum of signal mast arm moments about centerline of signal pole		SM 3740
Design wind speed	100 mph	DWS 100
Luminaire Mast Arm		
Mast arm length	18 ft.	LMA 18
Pole number (if unique arm design)		P 4

740-2.03 WOOD POLES. Use wood poles for service or temporary installations of the class shown on the Plans or as specified in the Special Provisions.

Use 45-foot poles, except for service poles use 25-foot poles.

Use mast arms and tie rods for wood pole installations that conform to Subsection 740-2.02, and to the details shown on the Plans. Provide each mast arm with an insulated wire inlet and wood pole-mounting bracket for mast arm and tie rod crossarm.

Use structural timber meeting Section 713. Do not use poles that have more than 180 degrees twist in grain over the full length. Ensure that the sweep is no more than 4 inches. Pressure-treat wood poles, that are not to be painted, after fabrication. Meet Section 714.

740-2.04 RESERVED.

740-2.05 CONDUCTORS. Use conductor sizes based on the American Wire Gauge (AWG). Use sizes that conform to the Plans or, when not shown, to this subsection.

Use insulated conductors made of uncoated, stranded copper that conforms to the specifications of ASTM B8. Use grounding conductors that are bare copper of the gauge required by the NEC. They may be stranded, solid, or braided.

Provide the following markings on the outer coverings of conductors and cables on intervals of 2 feet or less: manufacturer, the number of conductors or pairs in cables, conductor size, 600V, the conductor or cable type and environmental conditions for which the conductor or cables are listed, and the symbol of an approved independent testing laboratory.

Use conductors meeting the referenced specifications for the following purposes:

1. Power Conductors. For individual conductors, install general-purpose building wire manufactured according to UL Standard 44, and NEMA No. WC7. Furnish conductors insulated with cross-linked polyethylene listed as type XHHW-2 and rated for 600 volts AC operation.

**TABLE 740-2
CONDUCTOR TERMINATION TABLE**

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
7	Vehicle Red	Red	14	Head No.
	Vehicle Yellow	Orange		
	Vehicle Green	Green		
	Common Neutral	White		
	Spare	White/Black		
	Spare	Black		
	Spare	Blue		
7	Vehicle Red Arrow	Red	14	Head No.
	Vehicle Yellow Arrow	Orange		
	Vehicle Green Arrow	Green		
	Common Neutral	White		
	Spare	White/Black		
	Spare	Black		
	Spare	Blue		
7	Vehicle Red	Red	14	Head No.
	Vehicle Yellow	Orange		
	Vehicle Green	Green		
	Common Neutral	White		
	Spare	White/Black		
	Vehicle Yellow Arrow	Black		
	Vehicle Green Arrow	Blue		
5 MOA Ped Signals	Pedestrian Don't Walk	Red	14	Head No.
	Pedestrian Walk	Green		
	Common Neutral	White		
	Spare	Orange		
	Spare	Black		
4 SOA Ped Signals	Pedestrian Don't Walk	Red	14	Head No.
	Pedestrian Walk	Green		
	Common Neutral	White		
	Spare	Black		
4 SOA Ped Buttons	Pedestrian Pushbutton	Black	14	Head No.
	Neutral	White		
	Spare	Red		
	Spare	Green		
3 MOA Ped Buttons	Pedestrian Pushbutton	Black	14	Head No.
	Neutral	White		
	Spare	Red		

TABLE 740-2
CONDUCTOR TERMINATION TABLE
(Continued)

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG NO.	BAND LEGEND
3	Flashing Beacon	Black	14	Head No.
	Neutral	White		
	Spare	Red		
3	Per Manufacturer Installation Instructions	Orange	20	"PRE"
		Blue		
		Yellow		
3	Preemption Confirmation	Black	14	"PRECON"
	Neutral	White		
	Spare	Red		
3	Highway Luminaire	Black	8 or 6	Circuit No.
	Highway Luminaire	Red		Circuit No.
	Highway Luminaire Spare	White		
5	Photo Electric Control	Black	14	PEC
	Load to Contactor	Red		
	Neutral	White		
	Spare	Orange		
	Spare	Green		
3	Service to Controller	Black	6 or 4	"SIG"
	Neutral	White		No Band
	Spare	Red		No Band
3	Sign Luminaire	Black	8	SIGN
	Sign Luminaire	Red		SIGN
	Sign Spare	White		

Use size 10 AWG wire for illumination tap conductors. In an electrolier, the illumination tap conductors run from the fused disconnect kit to the ballast in the luminaire. Furnish conductors with black, red, or white colored insulation as required to identify the two phase and neutral conductors, respectively. If conductors in controller cabinets carry the full signal load circuit, use size 10 AWG or larger conductors. Use orange-colored conductors from the flash transfer relay to program emergency flashing operation.

2. **Illumination Cables.** For cables that consist of three size 6 or 8 AWG conductors, furnish power cables that feature three conductors, each insulated with cross-linked polyethylene, and a black, low density, high molecular weight polyethylene jacket. Use insulated conductors listed as type XHHW-2. Furnish these cables with one black, one white, and one red colored conductor and no grounding conductor. Use cables rated for 600 volts AC operation.

Use insulated conductors meeting UL Standard 44. The jacket must also meet NEMA No. WC70.

3. Power Cables. For cables that consist of three size 4 AWG and larger conductors, furnish tray cables that feature three conductors, each insulated with cross-linked polyethylene that meets the requirements of XHHW-2, and a polyvinyl chloride (PVC) jacket. Furnish these cables without an integral grounding conductor. Use cables manufactured according to UL Standard 1277, ICEA S-95-658, and NEMA No. WC70. Provide cables listed for direct burial and resistance to sunlight and rated for 600 volts AC operation.

Furnish these cables with black conductor insulation with one printed number (1, 2, or 3) identifying each conductor.

4. Control Cables. Wire with signal cable meeting IMSA 20-1 all vehicular signal heads, pedestrian signal heads, pedestrian push button detectors, flashing beacons, hardwired local coordination and preemption devices, and photoelectric controls.
5. Detector Loops. Use No. 14 AWG conductors for detector inductive loops that meet IMSA Specification 51-3, Type RHW/USE, or IMSA Specification 51-5, when called for on the Plans or specified in the Special Provisions.
6. Loop Lead-In Cables. Unless otherwise specified, use a tray cable that conforms to the following specifications to connect the loop detectors to the terminal blocks in the controller cabinet. Furnish this cable, also known as Snyder Cable; manufactured according to UL Standard 1277. Supply these cables third party certified as Type TC and certified for use in underground conduit or as an aerial cable supported by a messenger and rated for 600 volts AC operation.

Use size 18 AWG, 16 strand, tinned copper conductors per ASTM B33 insulated with wet-rated, cross-linked polyethylene similar to XHHW. Furnish conductors with insulation colors that match Table 660-1 twisted into pairs.

Provide each twisted pair with an overall aluminum foil coated mylar shield that provides 100% coverage and a 20 AWG tinned copper drain wire that is in constant contact with the foil side of the shield. Apply a tight-fitting polyvinyl chloride jacket over the conductor assembly.

Only use the following loop lead-in cable, also known as shielded data cable, to rewire existing traffic signals when specified. Use cables that consist of 7 twisted pairs that consist of stranded, size 18 AWG tinned copper wire and polyethylene or polypropylene insulation. Furnish each pair covered with an aluminum foil shield, stranded copper drain wire, and an overall PVC or PE jacket. Use cable rated for 300 volts and whose colored pairs match those specified in Table 660-1.

7. Telemetry Cable. Use interconnect cable that consists of solid copper conductors of the number of pairs called for in the Plans meeting the requirements of Rural Utilities Service (formerly the Rural Electrification Administration (REA) specification PE-39 for filled telephone cables. The shield may be either copper or aluminum.

**TABLE 740-3
INTERCONNECT TERMINATION TABLE**

TELEMETRY CABLE: Type PE-39, No. 19 AWG, Solid Copper, as noted on the Plans or in the Special Provisions					
Pair No.	Tip	Ring	Pair No.	Tip	Ring
1	White	Blue	14	Black	Brown
2	White	Orange	15	Black	Slate
3	White	Green	16	Yellow	Blue
4	White	Brown	17	Yellow	Orange
5	White	Slate	18	Yellow	Green
6	Red	Blue	19	Yellow	Brown
7	Red	Orange	20	Yellow	Slate
8	Red	Green	21	Violet	Blue
9	Red	Brown	22	Violet	Orange
10	Red	Slate	23	Violet	Green
11	Black	Blue	24	Violet	Brown
12	Black	Orange	25	Violet	Slate
13	Black	Green			

HARDWARE CABLES: IMSA Type 20-1, (2) 7 conductor No. 14 AWG			
Cable No. 1		Cable No. 2	
Circuit	Color	Circuit	Color
Cycle 2	Green	Offset 1	Green
Cycle 3	Orange	Offset 2	Orange
Cycle 4	Red	Offset 3	Red
Free	Blue	Split 2	Blue
Common	White	Common	White
Spare	Black	Spare	Black
Spare	White/Black	Spare	White/Black

740-2.06 ELECTRICAL CONDUIT. Unless specified otherwise, use rigid metal conduit and fittings for raceways. Furnish galvanized rigid type conduit and elbows conforming to UL Standard 6 and are manufactured of mild steel according to ANSI C80.1. Furnish third party certified fittings designed for rigid metal conduit.

For loop detectors, use Schedule 80 polyvinyl chloride (PVC) conduit that conforms to UL Standard 651. Use PVC fittings meeting NEMA TC 3.

When polyethylene conduits are specified in the Plans, use a smooth wall, schedule 40, high-density polyethylene (HDPE) pipe that conforms to UL Standard 651 B and NEMA TC-7-2000.

Furnish insulated throat grounding bushings made of malleable iron or steel with a mechanically galvanized or zinc plated finish. Grounding lugs shall either be an integral part of the bushing or consist of an attached tin-plated copper saddle. Grounding lugs shall feature a stainless-steel screw, the centerline of which falls within 20 degrees of conduit centerline. The bushings furnished shall also feature a stainless steel or brass mounting screw that locks the bushing onto the conduit end.

Furnish conduit outlet bodies and their covers with a hot dip galvanized finish and stainless-steel screws. For loop detectors, furnish Type X bodies and, for photoelectric control installation, furnish Types C and LB conduit bodies.

When Myers hubs are specified, furnish rain tight, grounding type hubs made of malleable iron with a hot dip or mechanically galvanized finish.

At expansion joints, provide watertight expansion fittings capable of the following movements without damaging the conduits attached to it or the conductors that pass through it. The movements include: axial expansion or contraction to 3/4 inch, angular misalignments in any direction to 30 degrees, and parallel misalignment of the conduits to 3/4 inch. The fittings shall also include a braided copper bonding jumper equal to an 8 AWG conductor, bushings to prevent scraping the conductors, and a smooth inner sleeve that maintains a constant diameter regardless of conduit alignment.

740-2.07 FUSED SPLICE CONNECTORS. Use fused, quick disconnect, splice connector that is weather tight and has two halves: a single-unit line side socket and a load-side plug. For LED fixtures, use fuses that are 5 amperes, midget (13/32" x 1-1/2") ferrule type with a time delay (slow blow) type design. For all other fixtures, use 10 amperes, midget (13/32" x 1-1/2") ferrule type with a fast acting current limiting design.

740-2.12 STANDARD AUXILIARY EQUIPMENT.

Provide equipment meeting the requirements of Section 6 of the NEMA Standard Publication TS 2-2003 V02.06, Traffic Controller Assemblies with the National Transportation Communications for Intelligent Transportation Systems Protocol (NTCIP) Requirements (NEMA TS-2).

1. Three Circuit Solid State Load Switches. Use load switches conforming to NEMA TS-2, Section 6.2 Three Circuit Solid State Load Switches and as a minimum include Light Emitting Diode indicators on the DC input circuitry. The load switch must have three independent switching circuits, each being an individually replaceable solid state module.
2. Solid State Flasher. Use a NEMA Type III flasher unit that conforms to NEMA TS-2, Section 6.3 Solid State Flashers.
3. Malfunction Management Unit (MMU2). Provide Type 16 MMU2 to be fully compliant with the requirements of NEMA TS-2, Section 4. In addition, the MMU2 shall have a full intersection LCD back lighted signal on the front panel and shall be downward compatible with TS-1 CMUs.
4. Flash Transfer Relay. Use flash transfer relays that meet the requirements of NEMA TS-2, Section 6.4 Flash Transfer Relays.
5. Load Switch Test Socket. Provide 120V AC receptacle to allow for bump testing of indications.

740-2.18 LUMINAIRES. Furnish roadway and intersection luminaires that conform to the following specifications and provide the light distributions specified. When luminaire performance criteria are specified, luminaires shall also:

1. Meet or exceed the minimum initial light levels indicated.
2. Provide light distribution uniformity ratios and veiling luminance ratios equal to or less than the maximums indicated.

When luminaire performance criteria are specified, submit the following information for each luminaire type and light distribution type specified: luminaire specifications, the lumen output of the lamps that will be furnished, and current electronic photometric data to the Engineer for approval. Furnish the photometric data in Illuminating Engineering Society (I.E.S.) format. The Engineer will use software that calculates light levels and uniformity ratios according to the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S. RP-8 to verify each luminaire provides the light levels, uniformities, and veiling luminance ratios specified.

When cut off distributions are specified, furnish luminaires with flat glass lenses (when used) and a full cutoff light distribution as defined in the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S. RP-8, dated 2014.

Furnish each luminaire with a LED of the wattage specified and matching ballast with an input voltage equal to circuit voltage.

The following luminaires are proven to meet A.N.S.I./I.E.S. RP-8-14 light levels, uniformities, and veiling luminance ratios as specified in the plans, but are still subject to verification:

1. Roadway luminaire
 - a. Cree: STR-LW-3M-HT-09-E-UL-SV-700
 - b. GE Current: ERL2-0-21-C5-40-D-GRAY
 - c. Streetworks: ARCH-L-PA3-160-740-U-T4W-[Blank]-AP
2. Intersection luminaire
 - a. Cree: STR-LW-4M-HT-09-E-UL-SV-700-DIM,UTL,40K
 - b. GE Current: ERL2-0-21-D5-40-D-GRAY
 - c. Streetworks: ARCH-L-PA3-160-740-U-T3-[Blank]-AP

Luminaires General

Install luminaires that feature:

- a. Corrosion resistant enclosures with gray painted finish, cooling elements not required to be painted, and space for the ballast.
 - (1) Painted or finished luminaire surfaces exposed to the environment shall exceed a rating of six (6), after 1,000 hours or four (4) of 5,000 hours salt spray test according to ASTM D1654 and ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss, according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.
- b. All luminaires shall have ANSI C136.15 external labels and ANSI C136.22 internal labels. The luminaire shall be listed for wet locations by a nationally recognized testing laboratory (NRTL) as defined by OSHA and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by a tag/sticker on the inside of the luminaire.
- c. All hardware shall be stainless steel or suitably corrosion resistant to match the 20-year expected life of the fixture. Captive screws are required on any component that requires maintenance after installation.
- d. Glass lenses, unless polycarbonate resin refractors are specified.
- e. Terminal blocks for attaching the illumination tap conductors.
- f. Optical components free of substances that affect photometric performance, paint.
- g. Housings cast with no provision for a photoelectric control receptacle.

1. Luminaires – LED.

- a. General. The luminaire shall be assembled in the United States and shall be assembled by and manufactured by the same Manufacturer. For easy removal, quick-connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device, and optical assembly. The quick-connect/disconnect plugs shall be operable without the use of tools and while insulated gloves are worn. The luminaire shall be in compliance with ANSI C136.37 LED light source(s), and driver(s) shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.
 - (1) Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 20-year lifetime. The luminaire Manufacturer shall have a minimum of 5 years' experience manufacturing LED roadway luminaires. The Manufacturer shall have a minimum of 5,000 total LED roadway luminaires installed on a minimum of 30 separate installations, all within the United States.

- b. Housing. The housing shall be designed to ensure maximum heat dissipation and to prevent the accumulation of water, ice, dirt, and debris. A passive cooling method with no moving or rotating parts shall be employed for heat management. The effective projected area of the luminaire shall not exceed 1.2 sq. ft. The total weight of the luminaire(s) and accessories shall not exceed 55 lb.
- c. Optical Assembly. The LED optical assembly, consisting of LED packages, shall have a minimum ingress protection rating of 66 (IP66) as defined in ANSI/IEC 60529. Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LEDs.

The optical assembly shall utilize high-brightness, long-life LEDs with a minimum color rendering index (CRI) of 70, 3000 K (+/- 200 K) color temperature, and binned according to ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass. Provisions for house-side shielding shall be specified along with means of attachment.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 77°F (25°C).

The assembly shall have individual serial numbers or other means for Manufacturer tracking.

- (1) Photometric Performance Testing. Luminaires shall be tested according to IES LM-79. The laboratory performing this test shall hold accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST. Submitted reports shall have a backlight, uplight, and glare (BUG) rating according to IESNA TM-15, including a luminaire classification system graph with both the recorded lumen value and percent lumens by zone.

Lumen maintenance shall be measured for the LEDs according to LM-80, or when available for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6000 hours; however, 10,000-hour reports shall be provided for luminaires in cases in which tests have been completed.

Thermal testing shall be provided according to UL 1598. The luminaire shall start and operate in the ambient temperature range specified. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces such as heat sink fins shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted when available to show that the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

- (2) Calculations. Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided according to IES RP-8 recommendations. Lighting calculations shall be performed using AGI32 software with calculations performed to two decimal places (i.e., x.xx cd/m²). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the plans. Scotopic or mesopic factors will not be allowed.
- (3) Lumen Maintenance Projection. The LEDs shall have long-term lumen maintenance documented according to IESNA TM-21, or when available for the luminaires according to IESNA TM-28. The submitted calculations shall incorporate an in situ temperature measurement test (ISTMT) and LM-80 data with TM-21 inputs and reports according to the TM-21 calculator, or when available an ISTMT and LM-84 data with TM-28 inputs and reports according to the TM-28 calculator. Ambient temperature shall be 77°F (25°C).
- d. Driver. The driver for the luminaire shall be integral to the unit. It shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. The removable door or pad shall be secure when fastened in place, and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

The driver shall be installed in a manner to keep it mechanically separated from the LED array heat sink.

- (1) Circuit Protection. The driver shall tolerate indefinitely open and short-circuit output conditions without damage.
 - (2) Ingress Protection. The driver itself shall have an IP65 or IP66 rating, not the housing. Do not gasket the driver door or seal in order to prevent condensation and allow for draining.
 - (3) Input Voltage. The driver shall be suitable for operation over a range of 120 to 277 V or 347 to 480 V as required by the system operating voltage.
 - (4) Operating Temperature. The driver shall have an operating ambient temperature range of -40°F to 131°F (-40°C to 55°C).
 - (5) Driver Life. The driver shall provide a lifetime of 100,000 hours at an ambient temperature of 77°F (25°C).
 - (6) Safety/UL. The driver shall be listed under UL 1012 or UL 1310.
 - (7) Power Factor. The driver shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.
 - (8) Driver Efficiency. The driver shall have a minimum efficiency of 90% at maximum load and a minimum efficiency of 85% for the driver operating at 50% power, with driver efficiency defined as output power divided by input power.
 - (9) Electrical Interference. The driver shall meet the electromagnetic compatibility (EMC) requirements for Class A digital devices included in the FCC Rules and Regulations, Title 47, Part 15.
 - (10) Thermal Fold Back. The driver shall reduce the current to the LED module if the driver is overheating as a result of abnormal conditions.
 - (11) Dimming. The driver shall have 0 to 10 V dimming capability.
 - (12) Leakage Current. The driver shall comply with safety standards according to IEC 61347-1.
- e. Surge Protection Device (SPD). SPD shall be labeled as Type 4 in accordance with UL 1449 and be an integral part of the luminaire. It shall provide a minimum system protection level of 10 kV, 10 kA. To protect for a 10 kV, 10 kA surge the required clamping voltage of the external metal oxide varistor (MOV) or other SPD shall be lower than 1 kV at 8 kA $\{(10 \text{ kV} - 2 \text{ kV})/1 \text{ ohm} = 8 \text{ kA}\}$.

The SPD shall comply with the following standards:

- (1) IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,
- (2) IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,
- (3) IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits, and
- (4) ANSI C136.2, American National Standard for Roadway and Area Lighting Equipment — Luminaire Voltage Classification.

The SPD and performance parameters shall be posted at www.UL.com under category code VZCA2.

- f. Photoelectric Control. Furnish fixtures with a built in ANSI C136.41 7-pin twist type photo cell receptacle. Receptacles shall be provided with shorting caps. If a fixture product line does not offer an ANSI C136.41 7-pin twist type photo cell receptacle an ANSI C136.41 3-pin twist type photo cell receptacle is acceptable.
- g. Failed Equipment and Workmanship. The luminaire and all of its components, for the term of the Contract, from initial installation through final acceptance 105-1.16, when directed, promptly replace failed equipment and repair failed workmanship.
 - (1) Negligible light output from more than 10% of the LED packages,
 - (2) Moisture inside the optical assembly,
 - (3) Driver that continues to operate at a reduced output, and/or
 - (4) Other failed conditions that do not meet specifications.
- h. Submittal Requirements. The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGI32 files, and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide an electronic version of each of the following Manufacturers' product data sheets for each type of luminaire.
 - (1) Descriptive literature and catalog cuts for luminaire, LED package, driver, and surge protection device;
 - (2) LED drive current, total luminaire input wattage, and total luminaire current at the system operating voltage or voltage range and ambient temperature of 77°F (25°C);
 - (3) Luminaire efficacy expressed in lumens per watt (lpw) per luminaire;
 - (4) Initial delivered lumens at the specified color temperature, drive current, and ambient temperature;
 - (5) Computer photometric calculation reports;
 - (6) TM-15 BUG rating report;
 - (7) Certification of Manufacturers' experience and certification that luminaires were assembled in the United States;
 - (8) Supporting documentation of compliance with ANSI standards, as well as listing requirements;
 - (9) Supporting documentation of laboratory accreditations and certifications for specified testing;
 - (10) Thermal testing documents;
 - (11) IES LM-79, LM-80 (or LM-84), and TM-21 (or TM-28) reports;
 - (12) Salt spray (fog) test reports and certification;
 - (13) Vibration characteristics test reports and certification;
 - (14) IP test reports;
 - (15) Manufacturer written warranty; and
 - (16) Luminaire installation, maintenance, and washing instructions.

2. Lenses.

When polycarbonate resin lenses are specified, the fabricator shall furnish certified lenses conforming to the following criteria:

- a. The lenses are molded in a single piece from virgin polycarbonate resin.
- b. The lenses are free from cracks, blisters, burns, and flow lines, and furnished with the natural molded surface.
- c. The lenses are of uniform density throughout and free from air, gas, or moisture pockets, and uncured areas.
- d. The lenses are transparent with a clear bluish tint, produced from ultraviolet stabilized resin to reduce the effects of ultraviolet radiation on their color properties.
- e. The resins used meet the requirements for the self-extinguishing classification of ASTM D 635 and feature a minimum impact strength, Izod notched of 12 foot pounds per inch when tested according to ASTM D 256, Method A, using a 1/8 inch by 1/2 inch bar molded according to ASTM recommended practice.

740-2.20 ILLUMINATION CONTROL.

When indicated in the plans, provide a GE LightGrid™ ELWC-Cellular node for each load center. Prior to installing the nodes, the Contractor shall deliver them to DOT&PF M&O for programming. After the nodes have been programmed, the Contractor shall retrieve and install them. For each node, attach the barcode sticker from the manufacturer to the inside of the load center door.

Otherwise, provide each load center with photoelectric controls capable of directly switching multiple lighting systems. Furnish photoelectric units designed for pole top mounting which include a slip-fitter, terminal block, and cable supports or clamps to support pole wires.

1. Photoelectric Unit. A light sensitive element connected directly to a normally closed, single-pole throw control relay without intermediate amplifications. Plug the unit into a phenolic resin twist lock receptacle set in a cast aluminum mounting bracket with a threaded base. Screen photoelectric units to prevent artificial light from causing cycling.

Use either horizontal sensing or zenith sensing type units meeting the following:

- a. A supply voltage rating of 60 Hz, 105-277 volts
- b. A maximum rated load at a minimum of 1,800 volt-amperes
- c. An operating temperature range from -40 °F to +150 °F
- d. A power consumption of less than 10 watts
- e. A unit base with a 7-pin, EEI-NEMA standard, twist-lock plug mounting

Furnish units for highway lighting that have a "turn-on" between 10.8 and 54 lux and a "turn-off" at between 1.5 and 5 times "turn-on."

Furnish units for illuminated signs that have a "turn-on" level of between 215 and 270 lux. ("Turn-on" level specified above corresponds to a switching level of approximately 430 to 540 lux measured in the horizontal plane.) "Turn-off" level must not exceed 3 times "turn-on" level.

Measurements must meet the procedures in *EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting*.

2. Temperature Switch. When mercury vapor sign lighting fixtures are used, provide a temperature switch in each photoelectric control circuit for lighting systems which will:
 - a. bypass the photoelectric unit when the ambient temperature drops to -13 °F, and energize the mercury vapor light circuits;

- b. return switching functions to the photoelectric unit upon a temperature rise of 5 to 10 °F above the turn-on temperature; and
- c. have a minimum range of (-40 °F to +40 °F), and be setable in increments no greater than 5 °F.

740-2.21 BALLASTS. Include ballasts for high intensity discharge lamps as an integral part of each luminaire and design for the voltages and lamp types specified in the Plans or Special Provisions. Ensure that the current needed to start the lamps is less than the operating current.

Furnish regulator-type ballasts with copper windings electrically isolated from each other, which will start and operate the lamps in temperatures down to -40 °F. The allowable line voltage variation is plus and minus 10%.

Equip high-pressure sodium luminaires, except those with 1000 watt lamps, with magnetic regulator ballasts with the following additional operating characteristics:

1. The lamp wattage regulation spread at any time over the life of the lamp must not exceed 18% of nominal lamp watts at plus and minus 10% line voltage variations.
2. With nominal line and lamp voltages, the ballast must regulate the lamp output to within 5% of the ballast design center, and sustain lamp operation with a minimum 60% voltage drop lasting 4 seconds or less.

Equip luminaires with 1000 watt high pressure sodium lamps with auto-regulator ballasts that provide a maximum 30% lamp regulation spread, a minimum 35% voltage dip tolerance, and with nominal line and lamp voltages regulate lamp output to within 5% of the ballast design center.

Furnish ballasts, for soffit luminaires, with mounting brackets attached and equip with terminal blocks for primary connections and lamp socket preconnected to the secondary for flush mounted luminaires and with terminal blocks for both primary and secondary connections for use with suspended luminaires.

Submit the ballast manufacturer's specification sheets for review and approval.

CR740.1-010120

APPENDIX A
CONSTRUCTION SURVEY REQUIREMENTS

Blank Page

APPENDIX B
ENVIRONMENTAL PERMITS

Blank Page

APPENDIX C
MATERIAL CERTIFICATION LIST

Blank Page

HIGHWAY MATERIALS CERTIFICATION LIST, EXCEPT SECTION 660/661/740

Project Name **HSIP: Bogard Road At Engstrom Road and Green Forest Drive Interesection Improvements**

Project Number **0001630/CFHWY00453**

Project Engineer Signature _____

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
306 ASPHALT TREATED BASE COURSE										
									CRSP = CR Special Provision	
Mix Design	306-2.01								CRSP	
Asphalt Binder	306-2.01								CRSP	
Anti-Strip Additives	306-2.01								CRSP	
408 HOT MIX ASPHALT PAVEMENT - TYPE V										
Mix Design	408-2.09								CRSP	
Asphalt Binder	408-2.01								CRSP	
Joint Adhesive	408-2.03								CRSP	
Joint Sealant	408-2.04								CRSP	
Warm Mix Asphalt	408-2.05								CRSP	
Asphalt Release Agent	408-2.06								CRSP	
505 PILING										
Steel for Piles										
Structural Steel HP Piling	715-2.02.1									
Structural Steel Pipe Piling	715-2.02.2									
Pile Tip Reinforcing	715-2.02.3									
Structural Steel Sheet Piling	715-2.02.4									

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
550 COMMERCIAL CONCRETE										
Concrete Mix Design	501-2.02									
	701-2.03, 501- 2.01.5, 712- 2.19									
Grout & Epoxy										
Concrete Anchor Bolts and Inserts	712-2.20									
Asphalt Felt	501-2.01.4									
Curing Materials	711-2.01									
Utiliduct, HDPE	706-2.08									
Utiliduct, Steel	716									
Structural Steel	716									
603 CULVERTS AND STORM DRAINS										
Flexible Watertight Gaskets										
Ring Gaskets for Rigid Pipe & Precast Manhole Sections	705-2.05.1									
Ring Gaskets for Flexible Metal Pipe	705-2.05.2									
Elastomeric Seals for Plastic Pipe	705-2.05.3									
Corrugated High Density Polyethylene (HDPE) Pipe										
Culverts, 18 Inch	706-2.07								CRSP	
Culverts, 24 Inch	706-2.07								CRSP	
Galvanizing	716-2.07									
Culvert Marker Posts (Flexible Delineator Posts)	730-2.05								CRSP	
Culvert Marker Strap and Seals	603-2.01								CRSP	

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
604 MANHOLES & INLETS										
Concrete Mix Design	550-2.02									
Curing Materials	711-2.01									
Clay or Shale Brick										
Sewer Brick	704-2.01									
Building Brick	704-2.01									
Concrete Brick	704-2.02									
Concrete Masonry Block	704-2.03									
Flexible Watertight Gaskets										
Ring Gaskets for Rigid Pipe & Precast Manhole Sections	705-2.05.1									
Ring Gaskets for Flexible Metal Pipe	705-2.05.2									
Elastomeric Seals for Plastic Pipe	705-2.05.3									
Reinforcing Steel										
Reinforcing Steel Bars	709-2.01.1									
Headed Reinforcing Steel Bars	709-2.01.2									
Epoxy-Coated Reinforcing Steel Bars	709-2.01.3									
Epoxy-Coating Patch Material	709-2.01.7									
Bar Supports	709-2.03									
Epoxy for Bonding Dowels	712.2.21									
Precast Concrete Manhole Sections	712-2.05									

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
<u>Frames, Grates, Covers & Ladder Rungs</u>										
Gray Iron Castings	712-2.06									
Carbon-Steel Castings	712-2.06									
Structural Steel	712-2.06									
Galvanizing	712-2.06									
Malleable Iron Castings	712-2.06									
Steps	See Plans									
Corrugated Metal Units	712-2.07									
605 UNDERDRAINS										
<u>Flexible Watertight Gaskets</u>										
Ring Gaskets for Rigid Pipe & Precast Manhole Sections	705-2.05.1									
Ring Gaskets for Flexible Metal Pipe	705-2.05.2									
Elastomeric Seals for Plastic Pipe	705-2.05.3									
Perforated Corrugated High Density Polyethylene (HDPE) Pipe 12 inch	706-2.07								CRSP	
Flexible Delineator Post	730-2.05								CRSP	
606 GUARDRAIL										
Concrete Mix Design	501-2.02									
Wire Cable	709-2.02									
Metal Beam Rail	710-2.04								CRSP	

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
<u>Guardrail Posts and Blocks</u> Wood Posts and Blockouts Timber treatment Steel Posts and Blockouts Synthetic Blockouts Guardrail Hardware Short Radius Guardrail										
	710-2.06.1									
	714									
	710-2.06.2									
	710-2.06.3									
	710-2.07									
	AK Std. Plan G-26									
<u>Terminals</u> Parallel Terminals Terminal Markers (Flexible) Guardrail Reflector Assembly Brackets Retroreflective Sheeting Type IX or XI										
	710-2.11.1									
	730-2.05								CRSP	
	606-2.01								CRSP	
	606-2.01								CRSP	
607 FENCE										
Concrete Mix Design Barbed Wire Woven Wire Chain Link Fabric Fence Posts	550-2.02									
	710-2.01									
	710-2.02									
	710-2.03									
	710-2.05									

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified. See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
608 SIDEWALKS										
Concrete Sidewalk										
Concrete Mix Design	550-2.02									
Joint Fillers	705-2.01									
Joint Sealer	705-2.02									
Asphalt Sidewalk										
Asphalt (HMA) Mix Design	608-2.01.2								CRSP	
Asphalt Binder	702-2.01								CRSP	
Detectable Warnings	608-3.04									
609 CURBING										
Concrete Mix Design	550-2.02									
Joint Fillers	705-2.01									
Joint Sealer	705-2.02									
Joint Mortar	705-2.04									
Precast Concrete Curbing	712-2.04									
Asphalt (HMA) Mix Design	609-2.01									
Asphalt Binder	702-2.01								CRSP	

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
615 STANDARD SIGNS										
Sheet Aluminum	730-2.01/Plans									
High Density Overlaid Plywood	730-2.02									
Sign Framing Members	Plans								CR Detail	
Retroreflective Sheeting	730-2.03									
Orange Background Signs	615-2.01.2								CRSP	
Railroad Crossbucks & Vertical Crossbuck Support Panels	615-2.01.2								CRSP	
Non-Illuminated Overhead Signs	615-2.01.2								CRSP	
Fluorescent Yellow-Green School Area Signs	615-2.01.2								CRSP	
Reflective Sheeting Warranty	615-2.01.5								CRSP	
<u>Sign Posts</u>										
Metal Pipe Posts	730-2.04.1									
Perforated Steel Posts	730-2.04.2									
Finished Wooden Posts	730-2.04.3									
Pressure Treatment for Wooden Posts	730- 2.04.3.b/714									
Preservative for Field cuts and holes	730-2.04.3.b									
Wide Flange Posts	730-2.04.4									
Flanged Channel Posts	730-2.04.5									

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
Square Non-Perforated Steel Tubes	730-2.04.6									
Zinc Coating for Repairs	730-2.04.6.b									
Flexible Delineator Posts	730-2.05								CRSP	
Acrylic Prismatic Reflectors	730-2.06									
Structural Tubing and W- Shape Beams.	730-2.04.7									
Sign Bases										
Slip Base	615- 2.01.3/Plans								CRSP	
Breakaway Base	615- 2.01.3/Plans								CRSP	
Frangible Couplings	615-2.01.3/ASP								CRSP	
Concrete Mix Design	615-2.01.3/ 501- 2.02/550-2.02								CRSP	
616 THAW PIPE AND THAW WIRES										
Thaw Pipe										
Pipe	616-2.01									
Fittings	616-2.01									
Pipe Hangers	616-2.01									
Braces for Stand Pipe	616-2.01									
Bolts and Nuts	616-2.01									
Galvanizing for Pipe and Braces for Stand Pipe	616-2.01									
Galvanizing Fittings and Bolts and Nuts	616-2.01									

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
Thaw Wire Materials, devices, fittings and hardware Conduits and Fittings Conduit, Couplings, Elbows and Nipples Fittings and Miscellaneous Conduit Hardware Heat Cable Controls Thermostat Contactors Switch Conductors Service and Feeder Cables Underground Wire Branch Circuit Wire Control Wire Device, Junction, and Pull Boxes Receptacles, Remote Power Circuit Breakers Grounding Terminal Posts Branch Circuit Panelboard										
	616-2.02									
	616-2.02.1.a									
	616-2.02.1.b									
	616-2.02.2									
	616-2.02.3.a									
	616-2.02.3.b									
	616-2.02.3.c									
	616-2.02.4.a									
	616-2.02.4.b									
	616-2.02.4.c									
	616-2.02.4.d									
	616-2.02.5									
	616-2.02.6									
	616-2.02.7/Plans									
	616-2.02.8									
	616-2.02.9									
616-2.02.10										

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
618 SEEDING										
Seed	724									
Fertilizer	618-2.01/725								CRSP	
Soil Stabilization Material	727								CRSP	
619 SOIL STABILIZATION										
Mulch	727-2.01								CRSP	
Matting	727-2.02								CRSP	
Sediment Retention Fiber Rolls (SRFRs)	727-2.03								CRSP	
Compost	727-2.04								CRSP	
Tackifier	727-2.05								CRSP	
Polyacrylamide (PAM)	727-2.06								CRSP	
Geotextile-Encased Check Dams and Sediment Barriers	727-2.07								CRSP	
Sandbags	727-2.08								CRSP	
Manufactured Inlet Protection System	727-2.09								CRSP	
Clear Plastic Covering	727-2.10								CRSP	
Staples	727-2.11								CRSP	

*Unshaded boxes under QPL do not indicate that the materials are currently on that list. They indicate materials with potential for being on the QPL once qualified.
See Section 106-1.05 for submittal requirements.

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
621 PLANTING TREES AND SHRUBS										
<u>Plant Stock</u> Nursery Stock At least 2 full growing seasons in age At least 1 but less than 2 full growing seasons in age Collected Stock Balled and Burlapped Plants Fertilizer Limestone Mulch Stakes Tree Wound Dressing										
	621-2.01.1									
	621-2.01.1.a									
	621-2.01.1.b									
	621-2.01.2									
	621-2.01.3									
	621-2.02								CRSP	
	712-2.03									
	621-2.04								CRSP	
	621-2.06									
	621-2.07									
631 GEOTEXTILE FOR SUBSURFACE DRAINAGE AND EROSION CONTROL										
<u>Geotextiles and Sewing Thread</u> Subsurface Drainage Erosion Control										
	729-2.01.1									
	729-2.01.4									
633 SILT FENCE										
Geotextile, Erosion Control	729-2.01.4									
Silt Fence	729-2.02									

Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes aren't shaded, either approving authority may be used.

Materials Item	Specification	Construction		Design			Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #
	2020 or Std. Mod./Special Provisions, if noted	Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)	State Materials or QA Engineer		
641 EROSION, SEDIMENT AND POLLUTION CONTROL										
Materials	641-2.05								CR Special Provision - 641 Control and Stabilization Materials identified and documented in SWPPP and approved on project.	
642 CONSTRUCTION SURVEYING AND MONUMENTS										
Monument Cases	642-2.01								CRSP	
Primary Monument	642-2.01								CRSP	
Secondary Monument	642-2.01								CRSP	
643 TRAFFIC MAINTENANCE										
Traffic Control Devices	643-3.04								CR Special Provision - 643 Materials approved on project with TCP conforming to Alaska Traffic Manual (ATM).	
670 TRAFFIC MARKINGS										
Traffic Paint, Glass Beads	708-2.03, 712- 2.08									
Methyl Methacrylate Pavement Markings, Beads, Anti-Skid Combined Cert.	712-2.17, 712- 2.18								CRSP	
Raised and Recessed Pavement Markers	712-2.15/Plans									
Additional Materials										

Project Name

HSIP: Bogard Rd. At Engstrom Rd. & Green Forest Dr. Intersection Improvement

Project Number

0001630/CFHWY00453

Project Engineer Signature

SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST												
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks	
				Construction		Design			Statewide			
				Project	QA/	Design	Bridge	Traffic	State			
				Engr	Matls	Engr	Engr	Engr	Materials Engineer			
					QPL							
660 SIGNALS AND LIGHTING												
HIGHWAY LIGHTING SYSTEMS												
PORTLAND CEMENT CONCRETE ELECTROLIER FOUNDATION: Cast in Drilled Hole Concrete Mix Design Reinforcing Steel Ferrule Anchor Corrugated Steel Pipe Frangible Couplings Precast Foundations			N									
			N									
	660-3.02	660-3.02	N									
	Std Plan. 709-2.01	Std. Plans 709-2.01	N									
	Std Plan.	Std. Plans	N									
	Std Plan. 660-3.02	Std. Plans 660-3.02	N									
	Std Plan.	Std. Plans	N									
	See Detail in Plans	See Detail in Plans	N									
PIPE PILE ELECTROLIER FOUNDATION:			N									
	See Detail in Plans 660-2.01 660-3.02	See Detail in Plans 660-2.01 660-3.02	N									
	See Detail in Plans 740-2.02	See Detail in Plans 740-2.02	N									
PCC / PIPE PILE HYBRID HIGHTOWER FOUNDATION:			N									
	Concrete Mix Design		N									
	Reinforcing Steel		N									

SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST											
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks
				Construction		Design			Statewide		
				Project	QA/	Design	Bridge	Traffic	State		
				Engr	Matls	Engr	Engr	Engr	Materials		
					Engr					Engineer	
Welded Headed Rebars			N								
			N								
			N								
JUNCTION BOXES: (from Manufacturers on APL)											
Type I / IA, II, III	See Detail in Plans 660-2.01 709-2.01 744-2.04	See Detail in Plans 660-2.01 709-2.01 744-2.04	N								
JUNCTION BOXES: (from Manufacturers NOT on APL)											
Type I / IA, II, III	See Detail in Plans 660-2.01 709-2.01 744-2.04	See Detail in Plans 660-2.01 709-2.01 744-2.04	N								
Concrete Mix Design		660-2.01	N								
Curing Materials		711-2.01	N								
Reinforcing Steel		709-2.01	N								
Electronic ball marker	See Detail in Plans 660-3.04	See Detail in Plans 660-3.04	N								Central Region
Junction Box Cover		See Detail in Plans 660-3.04	N								
Ground Wire from Bushing to Cover			N								
SIGNAL AND LIGHTING STRUCTURES											
STEEL POLES AND TOWERS:	See Detail in Plans 740-2.02	See Detail in Plans 740-2.02	N								
Galvanizing		740-2.02	N								
Shop Drawings	660-3.01 740-2.02	660-3.01 740-2.02	N								
Computations, Wind Stress Certification		740-2.02	N								
Welding Quality Control Plan	660-3.01 740-2.02	660-3.01 740-2.02	N								
Mill Certifications for Steel Products		740-2.02	N								
CONDUIT :											
Galvanized Rigid Metal Conduit		740-2.06	Y								

SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST											
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks
				Construction		Design			Statewide		
				Project		QA/ Matls Engr	Design Engr	Bridge Engr	Traffic Engr	State Materials Engineer	
					QPL						
High Density Polyethylene Conduit	740-2.06	740-2.06	Y								Central Region
High Density Polyethylene Couplings	660-3.03	660-3.03	Y								Central Region
RMC to HDPE Electrofusion Coupler	660-3.03	660-3.03	N								
Galvanized Couplings		740-2.06	Y								
Galvanized Split Couplings		740-2.06	Y								
Galvanized Elbows		740-2.06	Y								
Galvanized Nipples	740-2.06	740-2.06	Y								
Expansion Joints		660-3.03	Y								
Bored Casing	660-3.03	660-3.03	N								
Underground Marker Tape	660-3.03	660-3.03	N								
Electronic Marker Capsule (underground junction boxes - antenna encapsulated in a 4 inch red nolvethvlene ball - responsive to locator device up to 5			N								Central Region, Part# 3M-EMS 1402
Pull Rope	660-3.03	660-3.03	N								
Type "C" and "LB" Conduit Outlet Bodies with Covers, Gaskets & Plugs	See Detail in Plans 740-2.06	See Detail in Plans 740-2.06	Y								
BONDING & GROUNDING:											
Grounding Bushings	See Detail in Plans 740-2.06 660-3.01 660-3.06	See Detail in Plans 740-2.06 660-3.01 660-3.06	Y								
# 8, #6, or larger Bare Copper Ground Wire	See Detail in Plans 660-3.06	See Detail in Plans 660-3.06	N								
Braided Copper J-Box Lid Bonding Wire	See Detail in Plans 740-2.06 660-3.06	See Detail in Plans 740-2.06 660-3.06	Y								
Compresssion Tap Connectors	See Detail in Plans 740-2.06 660-3.06	See Details in Plans 660-3.02 660-3.06	Y								
CONDUCTORS / CABLES:											
3C#8 Illumination Cable - PE Jacket		740-2.05	Y								
3C#6 Illumination Cable - PE Jacket		740-2.05	Y								
Illumination Cable - PE Jacket	740-2.05	740-2.05	Y								
1C#10 Luminaire Tap Conductors		740-2.05	Y								

SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST											
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks
				Construction		Design			Statewide		
						Project Engr	QA/ Matls Engr	Design Engr	Bridge Engr	Traffic Engr	
					QPL						
Identification Labels		660-3.05	N								
SPLICES											
Overlap Type Crimp Connector			Y								
Heat Shrink Tubing	See Detail in Plans 660-3.05	See Detail in Plans 660-3.05	Y								
Electrical Tape	See Detail in Plans 660-3.05	See Detail in Plans 660-3.05	Y								
Power Cable Splice Kit (Lighting)	See Detail in Plans 660-3.05	See Detail in Plans 660-3.05	Y								
Double Fuse Connector Kits (Lighting)	See Detail in Plans 740-2.07	See Detail in Plans 740-2.07	Y								
Fuses for Double Fuse Connector Kits	See Detail in Plans 740-2.07	See Detail in Plans 740-2.07	Y								
Inline Resin Splice Kit (Lighting)			Y								
Wye Resin Splice Kit (Lighting)			N								
Fused Disconnect Kits (Lighting)			Y								
Fuses for Disconnect Kits			Y								
LIGHTING FIXTURES											
LED Luminaire (include all additional requirements)	See Detail in Plans 740-2.18	See Detail in Plans 740-2.18	Y								
Cobra Head Luminaire, Lamp, Ballast		See Detail in Plans 740-2.18	Y								
Offset Luminaire, Lamp, Ballast		See Detail in Plans 740-2.18	Y								
Hightower Luminaire, Lamp, Ballast		740-2.21	Y								
Pedestrian Undercrossing Luminaire, Lamp, Ballast			Y								
Underpass Luminaire, Lamp, Ballast	See Detail in Plans 740-2.22	See Detail in Plans 740-2.22	Y								
Hightower Obstruction Warning Lights (Red)			Y								Central Region
HIGHTOWER LOWERING DEVICE											
Head Frame			Y								
Luminaire Support Ring			Y								
Motor, Winch & Hoist Assembly			Y								

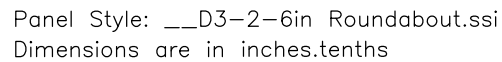
SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST											
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks
				Construction			Design			Statewide	
				Project		QA/	Design	Bridge	Traffic	State	
				Engr		Matis	Engr	Engr	Engr	Materials Engineer	
					QPL	Engr					
ILLUMINATION CONTROL											
Node		See Detail in Plans 740-2.20	N								Northern Region
Gateway		See Detail in Plans 740-2.20	N								Northern Region
Modem		See Detail in Plans 740-2.20	N								Northern Region
661 ELECTRICAL LOAD CENTERS											
TYPE 1 & TYPE 1A FOUNDATIONS	See Details in Plans 661-2.01	See Details in Plans 661-2.01	N								
Wood Posts (Type 2 & 3 Foundations)	See Details in Plans 661-2.01	See Details in Plans 661-2.01	N								
Treatment	See Details in Plans 714-2.01	See Details in Plans 714-2.01	N								
BONDING & GROUNDING:											
Copper Ground Rod	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Ground Clamps	661-2.01	661-2.01	Y								
# 6 Bare Copper Grounding Wire	See Details in Plans 660-3.06	See Details in Plans 660-3.06	N								
COMPONENTS IN COMMON											
Photoelectric Control	See Details in Plans 740-2.20 661-2.01	See Details in Plans 740-2.20 661-2.01	Y								
1-5C#14			Y								
Photocell Cable	See Details in Plans 740-2.05	See Details in Plans 740-2.05	Y								
Contactors	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
2-Pole Contactor for Type 1 Ld Ctr			Y								
Multi-Pole Contactor for Type 1A, 2, or 3 Ld Ctr			Y								
Load Panel	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Neutral Bus Bar System	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Ground Bus Bar System	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Terminals	661-2.01	661-2.01	Y								
Control Switch (selector switch)	See Details in Plans 661-3.01	See Details in Plans 661-3.01	Y								

SECTION 660/661/740 MASTER MATERIALS CERTIFICATION LIST											
Item	2017 Specifications	2020 Specifications	Third Party Listing or Labeling Required? (Y/N)	Acceptance By:							Remarks
				Construction		Design			Statewide		
				Project Engr	QA/ Matis Engr	Design Engr	Bridge Engr	Traffic Engr	State Materials Engineer		
Uninterruptible Power Supply Cabinet	See Detail in Plans 661-2.01	See Detail in Plans 661-2.01	Y								
Uninterruptible Power Supply Controller	See Detail in Plans 661-2.01	See Detail in Plans 661-2.01	Y								
Uninterruptible Power Supply Batteries	See Detail in Plans 661-2.01	See Detail in Plans 661-2.01	Y								
Power Transfer Switch	See Detail in Plans 661-2.01	See Detail in Plans 661-2.01	Y								
Meter Socket	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Manual Circuit Closing Device	661-2.01	661-2.01	Y								
Circuit Breakers	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Galvanized Rigid Metal Conduit	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Transformers			Y								
LOAD CENTER ASSEMBLIES											
Type 1	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Type 1A	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Type 1A with UPS	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
Type 2	See Details in Plans 661-2.01	See Details in Plans. 661-2.01	Y								
Type 3	See Details in Plans 661-2.01	See Details in Plans 661-2.01	Y								
TRANSFORMERS		661-2.01	Y								
ADDITIONAL MATERIALS											

APPENDIX D
SIGN SHOP DRAWINGS

Blank Page

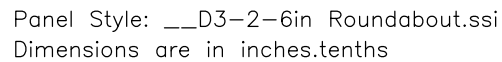
1:20



SYMBOL	ROT	X	Y	WID	HT
AR_Fishook	0	13.4	28.1	9.9	10.8
Divider	0	6	25.7	78	0.8
AR_Type D	270	73.9	16	6	9

[illegible]

1:20

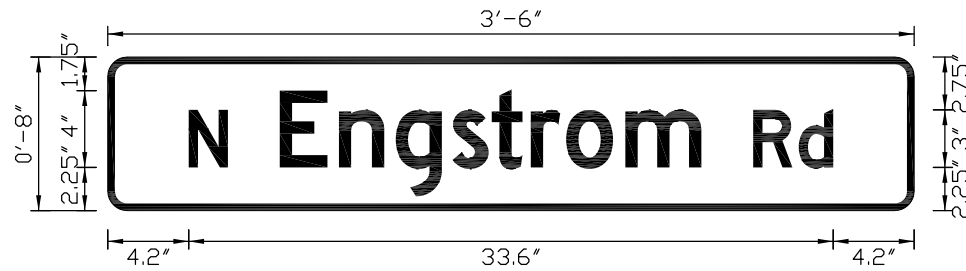


Letter locations are panel edge to lower left corner

SYMBOL	ROT	X	Y	WID	HT
AR_Fishhook	0	6.7	28.1	9.9	10.8
Divider	0	6	25.7	78	0.8
AR_Type D	270	67.1	16	6	9

[illegible]

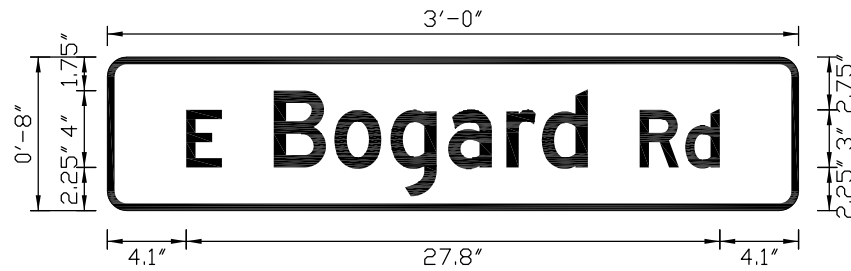
1:10

[illegible]

Letter locations are panel edge to lower left corner

[illegible]

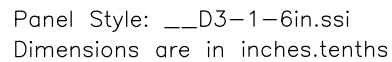
1:10

[illegible]

Letter locations are panel edge to lower left corner

[illegible]

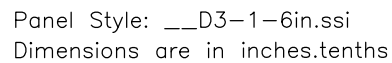
1:10



Letter locations are panel edge to lower left corner

[illegible][illegible]

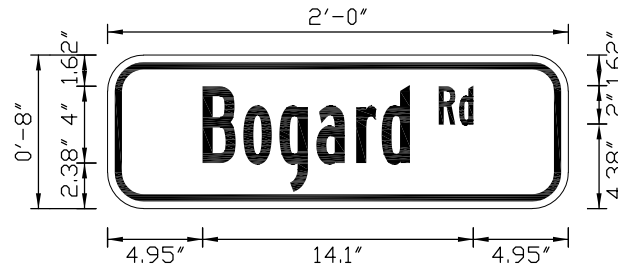
1:10



Letter locations are panel edge to lower left corner

[illegible][illegible]

1:10

[illegible]

Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

[illegible]

APPENDIX E
TEMPORARY CONSTRUCTION EASEMENTS

Blank Page

APPENDIX F
DRAFT PERMITS

Blank Page