



TRANSPORTATION RESEARCH SYNTHESIS

Local Road Research Board
Minnesota Department of Transportation
Research Services & Library
651-366-3780
www.lrrb.org

TRS 1802S

March 2018

High Friction Surface Treatments Supplement

Prepared by CTC & Associates LLC



High Friction Surface Treatment in the Last Frontier

WASHTO 2017, Juneau AK

Anna Bosin, PE Alaska DOT&PF;
Ron Martindale, Kinney Engineering, LLC;
Jeanne Bowie PE, PhD, PTOE, Kinney Engineering, LLC

What We Will Cover

Alaska's HFST Installations: a Cradle-to-Grave synopsis

- What is HFST?
- Planning & Crash Analysis
- Design
- Construction
- Post-Construction Analysis & Experimental Feature Research



(Image Jake Goodell, EMC)

What is High Friction Surface Treatment (HFST)?

- A pavement treatment that dramatically and immediately reduces crashes, injuries, and fatalities associated with friction demand issues:
 - during wet conditions, and/or
 - due to vehicle speed and/or roadway geometrics.
- Pavement surfacing system with exceptional skid-resistant properties.
 - Skid resistance over 0.60 to 0.75
 - Polished Stone Value (PSV) >60
- Safety Treatment; Not intended for pavement preservation.



Calcined bauxite is the most commonly used HFST aggregate (Image: David Merritt)

What is High Friction Surface Treatment (HFST)?

- Two part system consisting of:
 1. Binder:
 - ◆ Bitumen – extended epoxy resins;
 - ◆ **Epoxy - resin;**
 - ◆ Polyester - resin;
 - ◆ Polyurethane - resin;
 - ◆ Acrylic - resin, or;
 - ◆ Methyl Methacrylate (MMA)
 2. Abrasion-resistant aggregate, 3-4 mm in size:
 - ◆ **Calcined Bauxite (most common)**
 - ◆ Flint
 - ◆ Granite



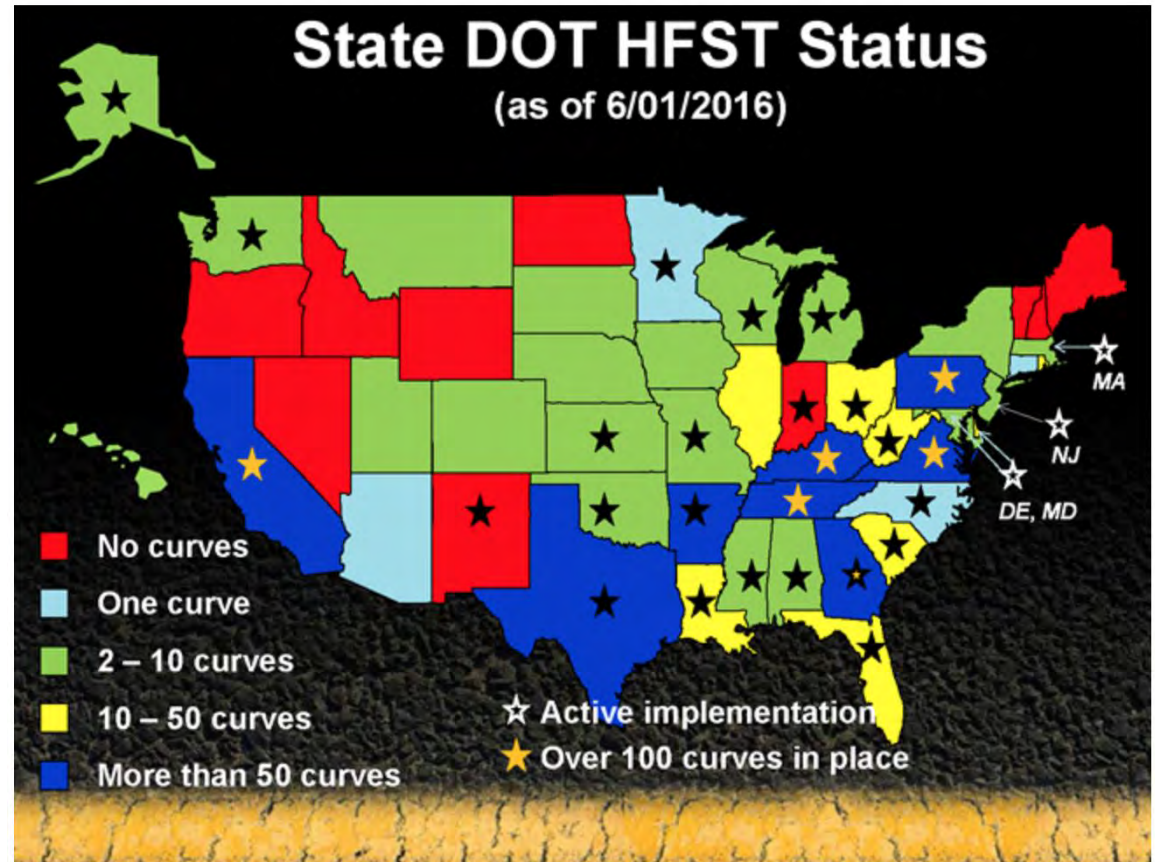
What is High Friction Surface Treatment (HFST)?

Current Implementation:

- In 40 States
- 24 States have an implementation program
- Before/After total crash reduction for signature projects:
 - Pennsylvania 100%
 - Kentucky 90%
 - South Carolina 57%

Source:

https://safety.fhwa.dot.gov/roadway_dept/pavement_friction/high_friction/





Planning and Crash Analysis

Planning Phase

- FHWA Everyday Counts Initiative in 2014
- AK DOT&PF directed to obligate safety funds towards High Risk Rural Roads with relatively fast obligation deadlines
- Although expensive (\$30-\$40/SY), FHWA studies indicate it is a cost-effective strategy for addressing SVROR crashes;
- HSIP Central Region Nomination that evaluated crashes during 2006-2010 study period:
 - Curves on high speed rural roadways;
 - Intersection approaches on steep grades;
 - Curves where existing super elevation is less than desirable;
 - Severe SVROR motorcycle crashes have occurred;
 - Geometric constraints limit reconstruction/upgrade of steep grades or curves;
 - Excluded bridge locations.





Planning

A Few Alaska Stats...

- 2011 Statewide Crash Data:
 - 12,576 total crashes
(7 Fatal, 340 SI, 3,000 MI, ~9K PDO)
- 2016- 78 fatal crashes, 84 fatalities
- 15 year trends:
 - SI down ~580 to ~400/yr
 - MI down ~6k to ~4K/yr
- Performance Measures-2018 Goals
 - Fatalities—75
 - SI—375

As of 6/22 31 fatal crashes

Planning Phase (Cont.)


2014 HSIP Project Crash Screening Summary

Posted Speed Limit (MPH)	Treatment Sites	Rural	Severe Crash* (KI +SI)	Minor Crash (MI)	Curve**	Grade**
55	4	2	3	14	4	0
50	1	0	4	1	0	1
45	29	24	38	60	24	11
35	1	0	5	14	0	1
45-30 Transitions	2	0	4	36	1	2
TOTAL	37	26	54	125	29	15

*KI=Fatal Crash, SI=Severe Injury Crash

**Some sites have both curves and grades

- Staff worked closely with FHWA, MOA, and Outside DOTs to select optimal sites;
- Initially 37 sites were approved;
- Conformed with the Strategic Highway Safety Plan by addressing:
 - SVRORs
 - Rear-End crashes at signalized intersections with steep grades
- Wide variety of sites in Kenai, Anchorage, and Mat-Su Borough that include intersection approaches as well as urban and rural horizontal curves.
- Reviewed studies including NCAT 15-04 HIGH FRICTION SURFACE TREATMENT ALTERNATIVE AGGREGATES STUDY



Planning Phase (Cont.)

Planning Level Estimate~ \$9.5M total project cost

Scope beyond HFST items included:

- Thin lift overlay for select locations to treat rutted pavements;
- Traffic control;
- Striping; and
- 2-year contract for asphalt cure time.



Design



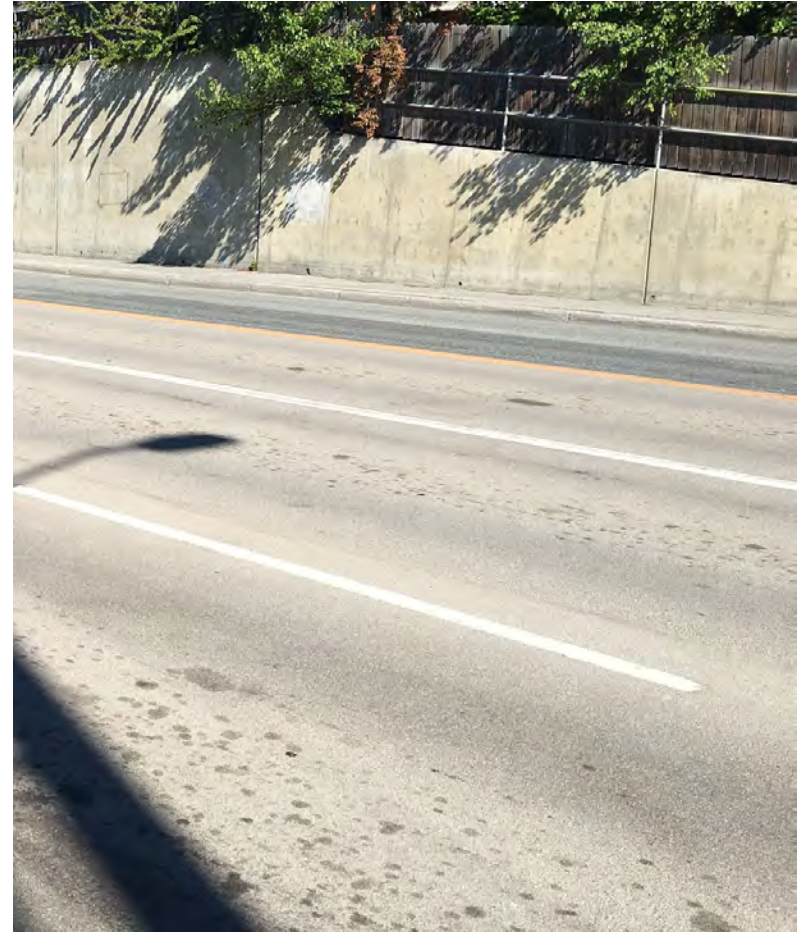
Design Considerations

FHWA recommends installation starts where vehicle begins braking

- Horizontal Curves
 - Outside of curve
 - Start at PC end at PT
 - Other considerations:
 - Verify safe curve speed
 - Curve warning signs
 - Superelevation
- Intersection Approach
 - Stopping sight distance
 - Start:
 - Beginning of downgrade
 - Beginning of auxiliary lane
 - End: at crosswalk (ADA)

Pavement Condition Criteria

- Unsuitable for pavements in failure
- Rut Depth
- 30-day waiting period for new asphalt applications
- Flood Zones
 - No elevation change
- 5-10 year design life



Ruts on 36th Avenue

Rut Depth

- Maximum Rut Depth
 - $<1/4$ " : apply HFST directly
 - $>1/4$ " : mill $3/4$ " , apply 1" overlay, then apply HFST
- Overlay
 - Type 4, Class A PG 58-34 HMA



Specification Assistance from Binder Vendors

- **Material Selection**
 - **Binder Resin Material**
 - Polymeric resin (Epoxy)
 - **Aggregate Topping**
 - Calcine Bauxite
- **Specifications**
 - Require technical supervisor from manufacturer onsite to supervise installation
 - Require test strip
 - Require Field Dynamic Friction Test
 - 80 km/hr
 - Value of at least 0.75



Surface Preparation

- Conform to binder supplier's specifications
 - Clean asphalt pavement surface
 - Remove pavement markings and delineation
 - Cracks
 - Remove loose material with compressed air
 - Fill cracks greater than 1/4" with mixed binder resin
 - Cover and protect surface features




HFST Application

- Mixing and Application Method
 - Be careful of specifying proprietary method
- Minimum paved surface age of 30 days
- Spread rate
 - Binder 0.28 to 0.32 gallons per square yard
 - Retained aggregate 13 to 20 lbs per square yard
- Minimum cure time (no traffic) of 1 to 2 hours
- Uniformity of finished surface equivalent to original underlying pavement



Construction



Traffic Control

- Short term
 - HFST cures in 1 to 2 hours
 - Curing time varies with surface temperature
 - After cure, surface is swept with mechanical broom street sweeper to remove excess aggregate
 - Friction testing performed prior to return to traffic
- Side streets may be blocked for an hour or more
- Consider need for workers to walk next to application truck



Acceptance Testing

- Aggregate
 - Manufacturer's Certification
 - Onsite Gradation
- Polymer Resin Binder
 - Third party lab (out of state)
- Surface roughness
 - Dynamic friction tester



Application Method

- Fully automated application
 - Hoses spray resin at specified rate
 - Additional width (turn lanes) requires additional pass
 - Uniformity depends on keeping hoses clean
- Semi-automated application
 - Hose sprays resin and then squeegee spreads it
 - Additional width accommodated easily
 - Specified thickness achieved using squeegee
 - Uniformity depends on frequently replacing squeegees.



- VIDEO: Fully automated method



- VIDEO: Semi-automated method



Application Method

- Resin Temperature
 - Heated to 100 degrees F prior to installation
 - Did not appear to speed cure, as resin temperature quickly conformed to surface temperature
 - Aided application, as viscosity changes with temperature
- Recycling aggregate
 - Roadway and shoulders cleaned prior to application
 - Loose aggregate could be reclaimed and reused



Removing Loose Aggregate

- **Sweeping**
 - Aggregate very dense, doesn't vacuum well
 - Recommend 6 passes of sweeper
 - Application “shed” aggregate under traffic
 - Recommend weekly sweeping for 4 weeks
- **Traffic warning signage**
 - Loose Gravel, Motorcycles Use Caution

Milled vs Paved Surface

- Application rates more variable on milled surface
- Squeegees wore out more quickly on milled surface





Spot Repair

- Spots where epoxy did not bond or set
- Possibly due to oil on existing surface not completely cleaned (difficult to see)
- Repair:
 - Ground HFST and top of existing pavement out
 - Re-applied binder and aggregate

Dynamic Friction Testing

- Tested daily after cure
- Minimum specified 0.75
- Daily measurements all around 1.00 or higher.





Pavement Markings

- Maintain existing
 - Requires existing markings be shaded
 - Limits area where HFST can be applied
- Surface applied (lower volume roads)
 - Texture of HFST makes this more difficult
 - Doesn't cover HFST completely
 - Thicker applications with more pressure elevated edges
- Inlaid (higher speed, higher volume roads)



Construction Costs

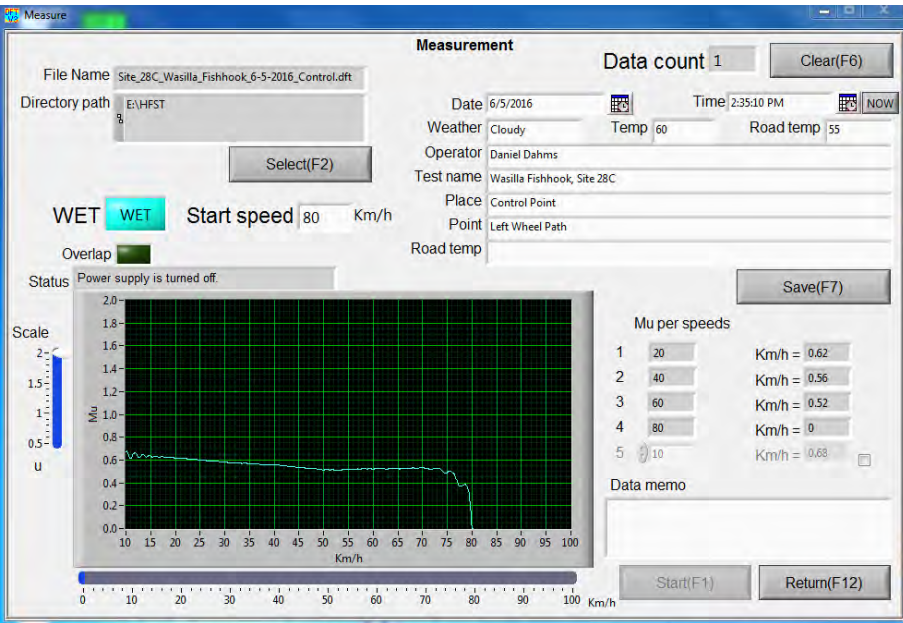
- Final construction cost
 - \$6,335,078.96
- Total high friction surface treatment
 - 148,000 square yards
- Average application rates
 - Resin spread rate 0.31 gallons per square yard
 - Aggregate spread rate 15.4 lb per square yard
 - HFST application rate 437.5 square yards per hour



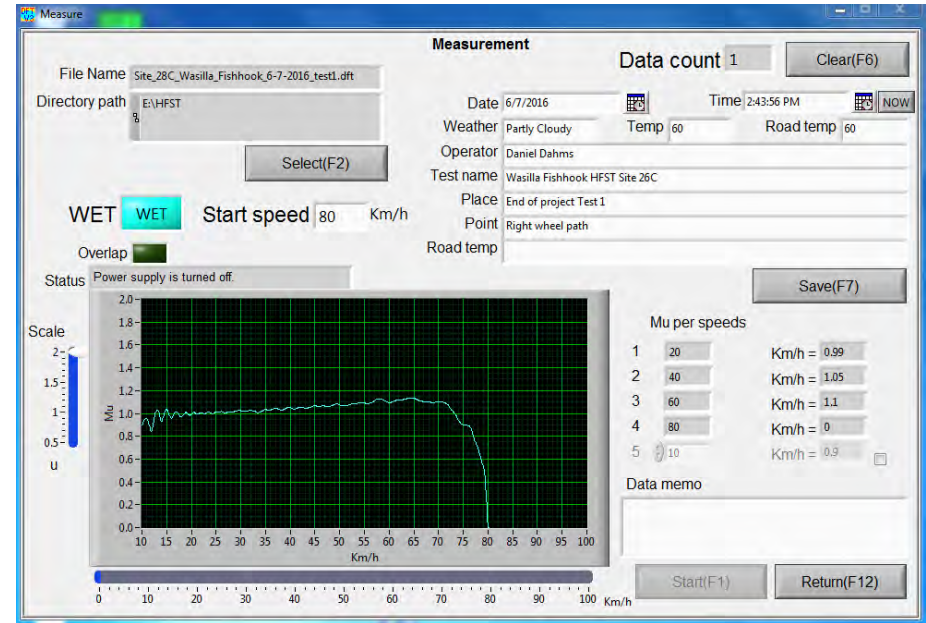
Experimental Feature Research

Post-Construction Analysis

- Initial Readings



Control site 28C



HFST site 28C- Wasilla-Fishhook Rd



Post-Construction Analysis

Winter Specific Case History

- Plow Truck Effects – Appears to perform well
 - Minimal, effects reported from Illinois, Vermont, and Michigan whom practice bare pavement policies.
 - The bauxite surface wears very well under heavy snow plowing.
 - No deterioration from steel-tipped plows has been observed.
 - Colorado: installed at altitudes of over 8,000 feet and being subjected to repetitive snow plowing
- Studded Tire Effects – Mixed results
 - Heavy trucks with chains are an issue
 - Studded tires and rutting unknown

Source: https://www.fhwa.dot.gov/innovation/everydaycounts/edc-2/pdfs/fhwa-cai-14-019_faqs_hfst_mar2014_508.pdf

- APD drag tested 1 site in black ice conditions-34' improved stopping compared to untreated section.

Experimental Feature Research

- HSIP conducts own safety related cost-effective analysis. (3 years post-construction)
- But how does HFST hold up in Alaska?
Experimental Feature approval from FHWA
Research allows DOT&PF to evaluate this product's material longevity for future investment consideration.



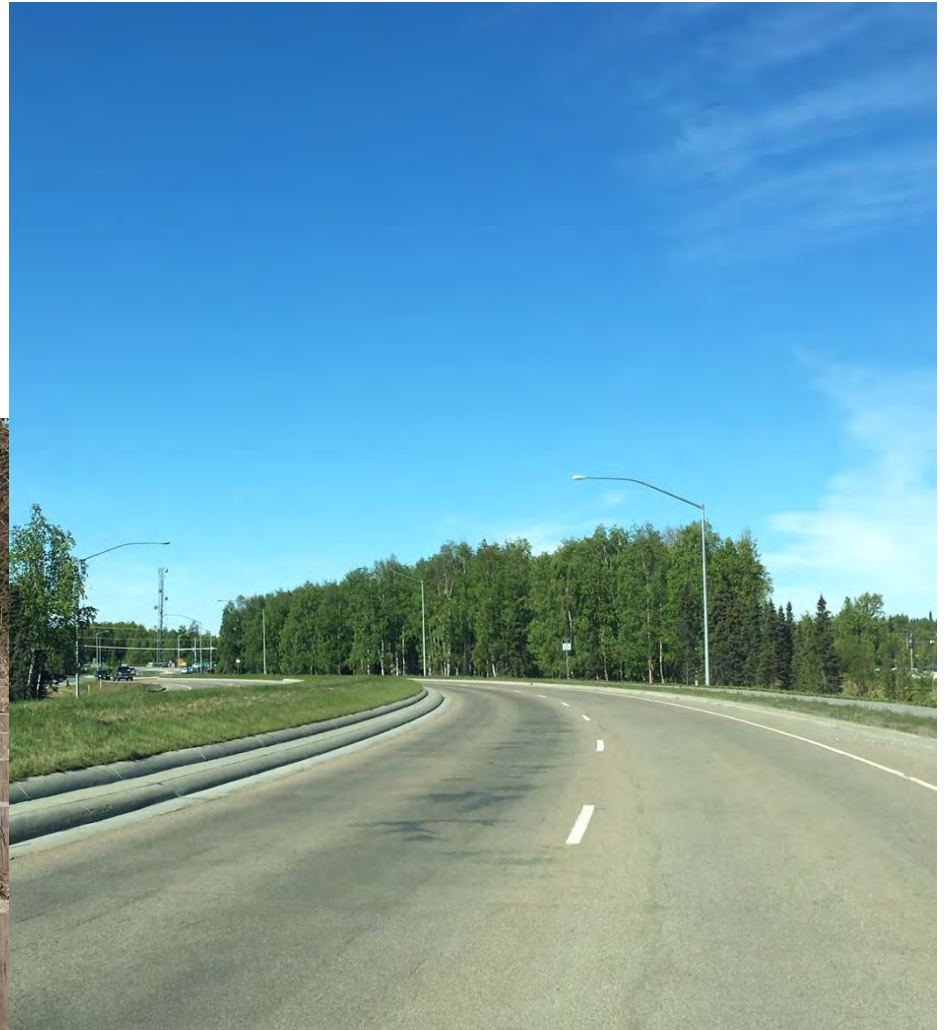
*DFT Test at Site 2
Sterling Highway*

Research Monitoring Plan:

1. At Construction (2016) (Complete);
 - a. Pavement condition, cure time between new pavement and HFST application,
 - b. Surface prep, temps, application rates;
 - c. Initial Dynamic Friction Tester (DFT) friction values per ASTM E 1911
2. Long Term Performance (3 years)- (Underway);
 - a. Visual overall conditions;
 - b. DFT testing per ASTM E 1911 using AKDOT&PF's Tester annually;
 - c. Rut depths, cracking, IRI (Highway Pavement Management System Data collection);
 - d. Raveling, binder exposure, condition of adjacent striping;
 - e. Adjacent control site values of non-HFST treated pavement.
3. Final Report (anticipated Dec. 2019)

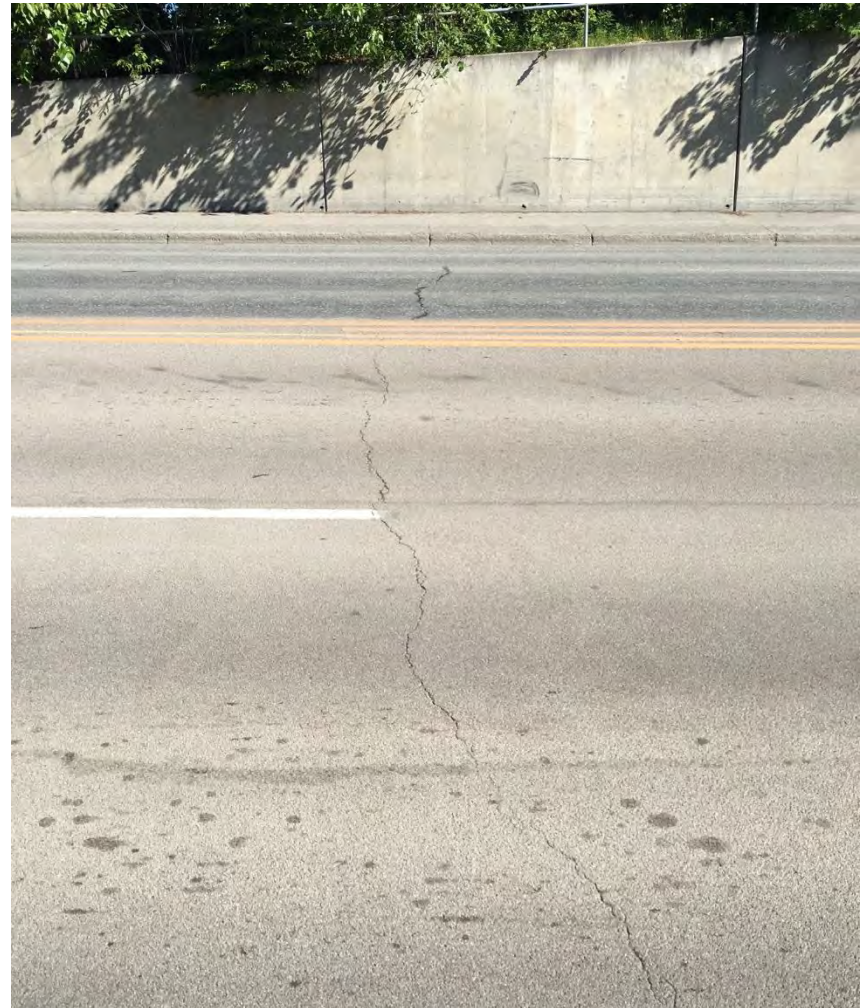
Initial Results and Observations

- High-volume, high-speed roadways in curves
 - Delamination or wear



Initial Results and Observations

- Cracks propagating through
36th Ave/Lake Otis
Intersection Approach



Initial Results and Observations

- Thin application in some places?
De Armoun Road



Initial Results and Observations

- MLK Jr. Drive- Inside lane gets more traffic



Initial Results and Observations

Old Glenn Highway- Milled only surface



Initial Results and Observations

- Plowing effectively cleared snow and ice in Anchorage



Experimental Feature Research



State of Alaska myAlaska My Government Resident Business in Alaska Visiting Alaska State Employees

Alaska Department of Transportation & Public Facilities
Statewide Design & Engineering Services

DOT&PF State of Alaska


DOT&PF > Statewide Design & Engineering Services

Home Bridge Design & Construction Environmental Materials Ports & Harbors **Research** Publications Asset Mgmt.

Welcome to Statewide Design & Engineering Services

The mission of Statewide Design & Engineering Services is to provide technical services to the Department, and other state and federal agencies and governments.

<http://www.dot.state.ak.us/stwddes/research/index.shtml>



KTVA Report

- <http://www.ktva.com/colored-pavement-puzzles-drivers-dot-calls-it-a-matter-of-safety-327/>

Sharp Curve Treatment Process

1. Ride the curve in both directions at the posted speed limit and note the reading on the Ball Bank Indicator.
2. Indicator readings registering 12 or more will receive the HFST.
3. Curves with readings of 12 or more on the indicator will need to be driven at a lesser speeds (5 MPH increments) until the reading on the indicator is less than 12. This speed shall be used for the advisory speed for that direction.
4. Any existing advance warning sign should be noted.
5. All existing advisory speed(s) should be noted.
6. All existing chevron(s) should be noted.
7. List and document all existing signs, signs that need to be replaced and any need for additional signs.
8. Document any special/unusual circumstances.

Note: Employees collecting data should be familiar with the following chapters of the 2009 MUTCD: Chapter 2C. Warning Signs and Object Markers, Chapter 3F. Delineators. After data is collected, coordination with the District Maintenance Office must be done to determine whether opportunities exist to incorporate recommendations into an upcoming maintenance project. Routes with CoPACES ratings below XX will need to be included in said routes' next re-surfacing project.

Ball-Bank Indicator



The ball-bank indicator consists of a curved glass tube which is filled with a liquid. A weighted ball floats in the glass tube. The ball-bank indicator is mounted in a vehicle, and as the vehicle travels around a curve, the ball floats outward in the curved glass tube. The movement of the ball is measured in degrees of deflection, and this reading is indicative of the combined effect of superelevation, lateral (centripetal) acceleration, and vehicle body roll. The amount of body roll varies somewhat for different types of vehicles, and may affect the ball-bank reading by up to one degree, but generally is insignificant if a standard passenger car is used for the test. Therefore, when using this technique, it is best to use a typical passenger car rather than a pickup truck, van, or sports utility vehicle. Also, the ball-bank indicator test is normally a two-person operation, one person to drive and the other to record curve data and the ball-bank readings, especially if advisory speeds are being determined for a series of curves.

The Ball-Bank Indicator method requires two people in the vehicle and multiple runs through the curve to get the correct advisory speed. In addition, reading the ball-bank indicator to determine the maximum degree of lean can be subjective.

Spreadsheet Example

State Route	Direction	County	Mile Post	Posted Speed	Existing Advance Warning Signs	Existing Advisory Speed	# of Existing Chevrons	Ball Bank Indicator					Comments
								55 MPH	50 MPH	45 MPH	40 MPH	35 MPH	
149	NB	Telfair	8.00	55	yes	None	0	22+	18	12	9		
149	SB	Telfair	8.00	55	yes	45	0	22+	18	12	9		
149	NB	Telfair	7.20	55	Yes	45	0	20+	18	12	9		
149	SB	Telfair	7.20	55	yes	45	0	20+	18	12	9		
119	NB	Bryan	9.50	55	yes	40	20	24	19	15	10		NEED TO PLACE FRICTION COURSE IN MAINT PROJECT!! Has chevrons. 20
119	SB	Bryan	9.50	55	Yes	40	20	24	15	10			NEED TO PLACE FRICTION COURSE IN MAINT PROJECT!! Has chevrons. 20 plates need replacing.
24	NB	Bulloch	9.10	55	yes - double	45	16	20	12	10			Surface Treatment. Currently
24	SB	Bulloch	9.10	55	yes	45	16	20	13	9			Surface Treatment. Currently signed correctly.
132	NB	Telfair	0.80	55	yes	35	0	17	14	10	9		
132	SB	Telfair	0.80	55	Yes	45	0	17	15	15	9		
121	NB	Appling	S curve at 169 split	55	yes	35	0	15	12	10			Change 35 to 45.
121	SB	Appling	S curve at 169 split	55	yes	45	0	15	12	9			Add 45 SB prior to split

Appendix C

Wet Weather Crash Reduction Program

The Michigan Department of Transportation (MDOT) has a long standing program for addressing wet weather crashes that has been in place for approximately 25 years.

Program Structure

The trunkline wet weather crash reduction program is part of the Safety Programs Unit. Pavement friction data is collected on all state trunklines by county on a three year cycle, with 1/3rd of counties tested each year. Data reported for 2015 includes data collected in 2013, 2014 and 2015. A small amount of data older than 2013 are retained to cover areas that could not be tested in their scheduled test year. This is typically areas under construction at the time of testing. Please note that due to the three year testing cycle, some roads may have been resurfaced or reconstructed since they were last tested. The 2015 data was compiled by Region, using the new Region boundaries that were adopted October 1, 2015. All network level testing is done with a locked-wheel trailer meeting the criteria of ASTM E-274. Normal testing is done in the left (driver's side) wheel path with the pavement wetted with potable water. An ASTM E-501 ribbed tire is used. ASTM E-274 recommends that tests be averaged along a length of pavement with a uniform surface (same age and condition) and that the average value is used for evaluation. The raw skid number is multiplied by a shift factor. The shift factor is determined by a yearly correlation of MDOT's test trailer with a national standard reference trailer. This allows direct comparison of friction data from year to year and from state to state.

The friction test results are available on MDOT's network server for the Region's to review. Intersections are only tested if a potential crash issue is identified. MDOT also sends the trailer to specific test locations identified with a high crash experience.

Analysis Procedures

The Safety Programs Unit develops a list of locations with a friction number of less than 30 on a two year cycle. The Regions conduct a crash analysis and field review of these locations to evaluate the need for action. The individual Regions are responsible for identifying improvements and must report the results of the analysis and course of action to the Safety Programs Unit.

Four factors are considered in the evaluation:

1. Wet surface friction tests result is less than 30;
2. Estimated reduction in the percentage of wet crashes to the Region Average Percentage is equal to at least three crashes per year per spot (intersection approach) or 0.5 mile segment location;
3. Field review to identify factors not related to surface friction qualities, such as "wheel tracking" or clogged drainage structures that may contribute to a high percentage of wet crashes; and
4. Time-of-Return (TOR) is five years or less, the safety benefit resulting from further analysis of locations identified in Factor #2.

MDOT developed an Excel spreadsheet for determining if the location warrants action. The spreadsheet contains the Region's number of wet crashes, wet crash percentages, and total crashes. The analyst must enter data for each of the locations identified based on the friction number, including project location, limits, number of non-wet crashes, number of wet crashes, and analysis period. The spreadsheet then calculates the expected reduction factor used in the TOR (cost/benefit). For each segment that is on the provided list with a friction number less than 30, the Region must analyze the crashes with the segment. A one-line listing and summary of the crash data should be collected from Roadsoft.

Mitigation Techniques

The Regions investigate the location, TOR cost analysis, and identify if the location is part of the departments five year plan. If a location is scheduled for resurfacing, the Region will determine if the project can be moved up in the schedule. If it is not in the five year plan, typically the Regions will evaluate the feasibility of an overlay, ultra-thin overlay, mill and resurface, micro surfacing, paver placed surface seal, chip seal, high friction surface treatment, or diamond grinding. The Regions can submit these improvements as part of the Annual Call for Safety Projects. Signing is used only as a short term solution.

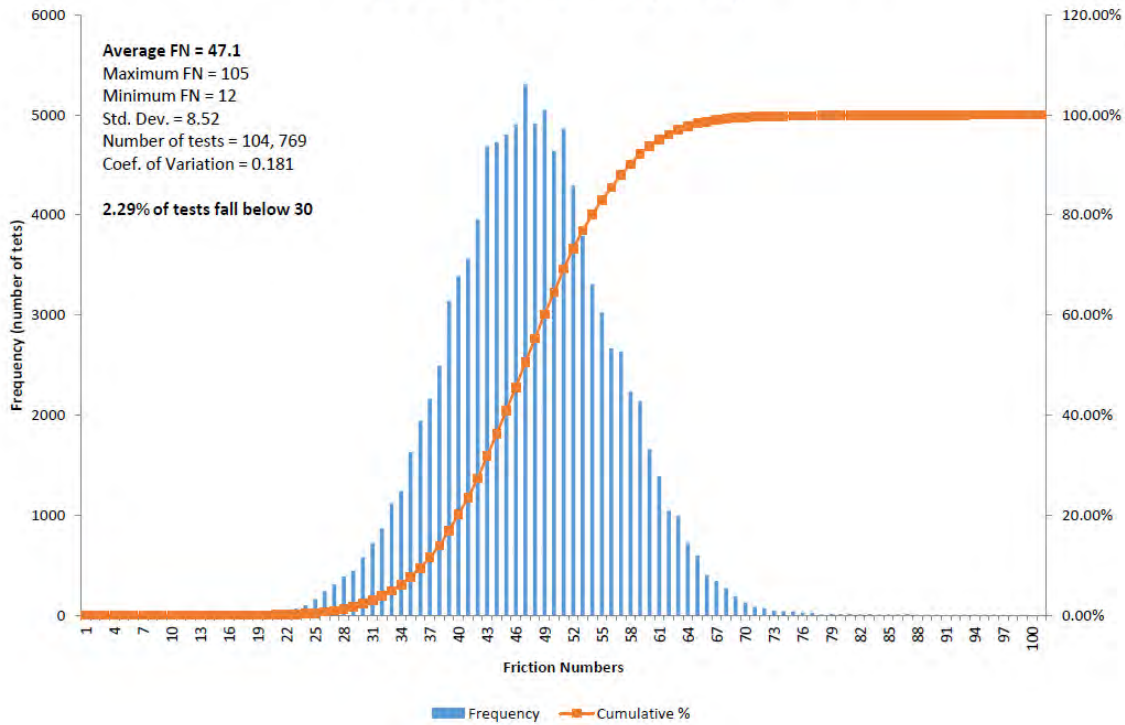
MDOT partnered with FHWA Office of Pavement Technology on a pilot project to install High Friction Surface Treatments (HFST) in Michigan. Five locations were installed in 2007 and 2008, and five locations were installed in 2010. The installation focused on freeway ramps with horizontal curves and areas with steep grades. From the results of the pilot project MDOT has created a Special Provision (SP) for the installation of the HFST. The SP is being used by MDOT and the Local Agencies of Michigan. MDOT Safety Programs is promoting the systemic use of HFST focusing on curved sections of roadways where wet crashes are occurring.

In the Detroit metropolitan area, wet weather tape has become the standard pavement marking for freeways. They have been installing it systematically as part of overlay projects.

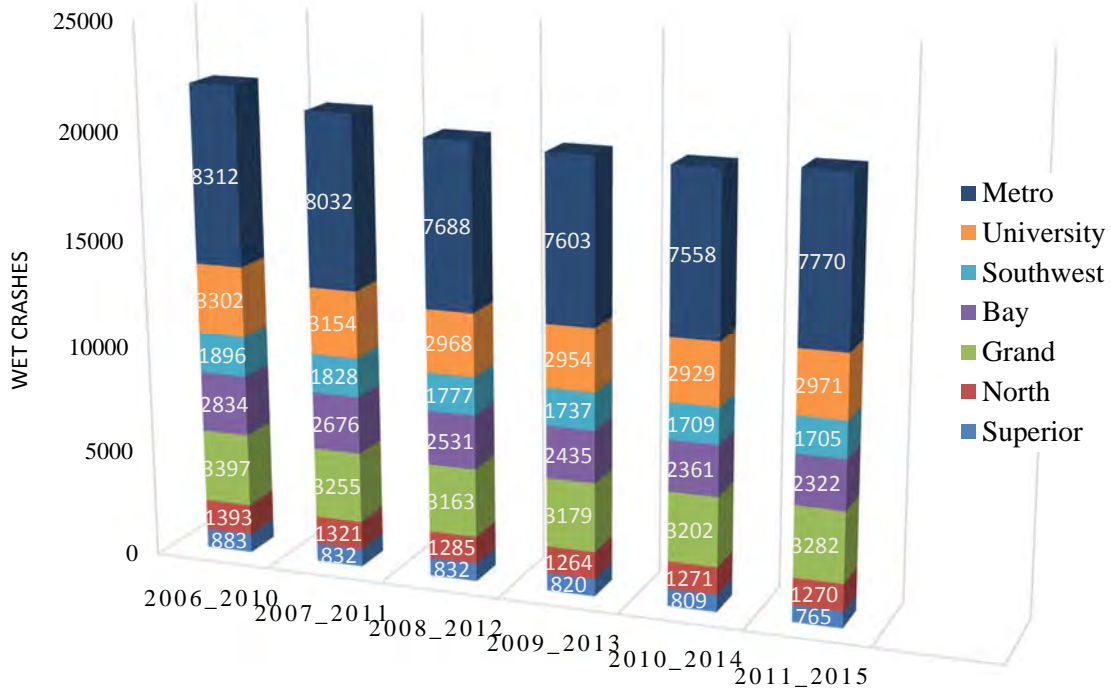
Program Results

Michigan is currently conducting an evaluation of their wet weather crash reduction program, the data below indicates the amount of test locations with a friction number less than 30 as well as the amount of wet related crashes per MDOT Region.

Histogram of Pavement Friction Numbers Statewide (2013-2015 collection period)



WET CRASHES 5 YEAR ROLLING AVERAGE



Illinois Department of Transportation
Bureau of Materials and Physical Research
QUALIFIED PRODUCT LIST OF HIGH FRICTION SURFACE TREATMENT
April 29, 2016

This list supersedes the August 14, 2015 list.
Special Provision for High Friction Surface Treatment (BMPR/BSE) (Effective: January 1, 2016)

Material Code No. 21639

**The materials on this list can be used on any
contract containing the
Special Provision for High Friction Surface Treatment (BMPR/BSE).**

For information regarding new product submittal, click the "New Submittal" bookmark to the left.

Part A – Epoxy Resin Binder*

*An epoxy resin binder from Part A shall be used with a calcined bauxite aggregate from Part B.

Cornerstone Construction Material, LLC
1618 East Elm Street
Harrisonville, MO 64701
816-380-1082
Attn: Mr. Julian Yan
www.ccmaterial.com
"CE330 EPOXY BINDER"
DESC1: CC-C330

Dayton Superior
3101 Gardner Avenue
Kansas City, MO 64120
Phone: 800-745-3700 x44347
Attn: Mr. Josh Kuetemeyer
www.daytonsuperior.com
"PRO-POXY TYPE III DOT"
DESC1: DS-PPT3

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 219-448-1416
Attn: Mr. Robert Lansdown
www.sikausa.com
"SIKADUR 22, LO-MOD FS"
DESC1: SC-22LFS

Illinois Department of Transportation
Bureau of Materials and Physical Research
QUALIFIED PRODUCT LIST OF HIGH FRICTION SURFACE TREATMENT
April 29, 2016

This list supersedes the August, 2015 list.
Special Provision for High Friction Surface Treatment (BMPR/BSE) (Effective: January 1, 2016)

Material Code No. 21639

**The materials on this list can be used on any
contract containing the
Special Provision for High Friction Surface Treatment (BMPR/BSE).**

For information regarding new product submittal, click the "New Submittal" bookmark to the left.

Part B – Calcined Bauxite Aggregate*

* An epoxy resin binder from Part A shall be used with a calcined bauxite aggregate from Part B.

Hickman, Williams & Company
Attn: Mr. John Kingston
Phone: 630-207-1862

Illinois Department of Transportation
Bureau of Materials and Physical Research
QUALIFIED PRODUCT LIST OF HIGH FRICTION SURFACE TREATMENT
April 29, 2016

This list supersedes the August 14, 2015 list.
Special Provision for High Friction Surface Treatment (BMPR/BSE) (Effective: January 1, 2016)

Material Code No. 21639

**The materials on this list can be used on any
contract containing the
Special Provision for High Friction Surface Treatment (BMPR/BSE).**

List of conditionally approved applicators

ACC West Coast, Inc.
3701 Mallard Drive
Benicia, California 94510
Phone: 707-742-6456
707-746-8028
Attn: Mr. Cliff Barber
P/S Number: 6905-01

DBI
2080 South State Route 19
Oak Harbor, Ohio 43449
Phone: 804-213-0335 (o)
804-539-5582 (c)
Attn: Mr. Richard Baker
P/S Number: 6906-01

Venture Construction
42 Locke Road
Concord, New Hampshire 03301
Phone: 314-420-8803
Attn: Mr. Eric Toman
P/S Number: 6907-01

Appendix E

Illinois Department of Transportation
Bureau of Materials and Physical Research

High Friction Surface Treatment Part A – Epoxy Resin Binder Submittal for Review and Approval

Effective: June 6, 2014

Revised: April 29, 2016

A. Scope

The following guidelines are provided to clarify the submittal requirements and expedite the review process for approving epoxy resin binder according to the current Special Provision for High Friction Surface Treatment (BMPR/BSE).

B. Procedure

When submitting an epoxy resin binder to the Department, the following shall be included.

- Manufacturer Name;
- The specific product brand name;
- Epoxy resin binder sample – 0.125 gal (0.5 L) sample of each component;
- Independent laboratory test results showing the product meets Department specifications:

Property	Test Method	Requirements
Viscosity, Poises	ASTM D 2556	7 - 30
Ultimate Tensile Strength, psi	AASHTO M 235	2,500 - 5,000
Compressive Strength, psi	ASTM C 579	1,000 min. (3 hours) 5,000 min. (7 days)
Gel Time, minutes	AASHTO M 235	10 min.
Water Absorption, %	AASHTO M 235	1 max.
Durometer Hardness (Shore D)	ASTM D 2240	60 - 80
Cure Rate (Dry through time), hours	ASTM D 1640, 55 mil wet thickness @ 75 °F	3 max.
Elongation at Break Point, %	AASHTO M 235	30 - 70
Mixing Ratio	Provide manufacturer's recommendations a minimum of 60 days prior to construction.	Per Manufacturer
Adhesion Strength, psi @ 24 hrs	ASTM D 4541	250 min. or 100% substrate failure
Infrared Spectrum	AASHTO T 237	Note 1

- Safety Data Sheet;
- Technical Data Sheet;
- A signed letter stating the subject material will not be changed without written notification to the Department;
- Contact person's name, title, address, email address, and phone number; and
- Acknowledgement by Company (see last page of this document).

The sample and submittal information shall be sent to:

Melinda Winkelman
Illinois Department of Transportation
Bureau of Materials & Physical Research
126 East Ash Street
Springfield, IL 62704-4766

The manufacturer/producer/supplier will be notified upon completion of the Department's review. For questions regarding the review and approval process, contact Melinda Winkelman at 217-782-0117.

Illinois Department of Transportation
Bureau of Materials and Physical Research

**High Friction Surface Treatment
Part A – Epoxy Resin Binder
Submittal for Review and Approval**

Effective: June 6, 2014

Revised: April 29, 2016

C. Recertification

Annual recertification of epoxy resin binder is required. During the last quarter of the calendar year, a recertification letter will be sent to the manufacturer. The recertification paperwork is due January of the following year. For example, the recertification letter is mailed late November 2016 and due by mid-January 2017. New independent laboratory test results will be due every even number calendar year. For example, new test reports will be due in January 2018.

In addition to the annual recertification, any changes in formulation of the epoxy resin binder outside the manufacturer's original parameters will necessitate new submittal of independent laboratory test results.

Illinois Department of Transportation
Bureau of Materials and Physical Research

**High Friction Surface Treatment
Part A – Epoxy Resin Binder
Submittal for Review and Approval**

Effective: June 6, 2014
Revised: May 8, 2015

Instructions for Acknowledgement by Company:

The owner, partner, or corporate officer shall complete the following and return a signed and dated copy with the product submittal or recertification.

_____ desires to obtain advance approval of materials to be
(Insert name of company)
supplied to Department of Transportation contractors as more fully described herein. I
and _____ understand that the Department of Transportation
(Insert name of company)
reserves the right in its contracts to approve materials at the source of supply as
provided in Article 106.01 of the Standard Specifications for Road and Bridge
Construction. I and _____ further understand that approval of
(Insert name of company)
company supplied material pursuant to this request does not constitute a contract to
supply material to the State of Illinois or any of its contractors, and that the Department
of Transportation does not assure or guarantee that any materials approved hereunder
will be supplied to the State or any of its contractors. In consideration of approval, I and
_____ agree to the terms, conditions and performance
(Insert name of company)
standards of the Standard Specifications for Road and Bridge Construction.

Type of Company: Individual Partnership Corporation

Company Name _____

Printed Name _____

Signature _____

Title _____

Business Address _____

City/State/Zip Code _____

Date of Signature _____

**High Friction Surface Treatment
Part B – Calcined Bauxite Aggregate
Submittal for Review and Approval**

Effective: June 6, 2014
Revised: April 29, 2016

A. Scope

The following guidelines are provided to clarify the submittal requirements and expedite the review process for approving calcined bauxite aggregate according to the current Special Provision for High Friction Surface Treatment (BMPPR/BSE).

B. Procedure

When submitting a calcined bauxite aggregate to the Department, the following shall be included.

- Producer/Supplier Name;
- The specific material name;
- Independent laboratory test results showing the product meets Department specifications;

Property	Test Method	Requirements
Gradation <u>Sieve Designation</u> No. 4 (4.75 mm) No. 6 (3.35 mm) No. 16 (1.18 mm)	AASHTO T 27	<u>Percent Passing (min.)</u> 100 95.0-100.0 0.0-5.0
Moisture Content, %	AASHTO T 255	0.2 max.
Aluminum Oxide, %	ASTM C 25	87 min.
LA Abrasion Test, %	AASHTO T 96, (D grading)	20 max.

- Calcined bauxite aggregate sample – two 40-lb (18-kg) bags;
- Safety Data Sheet;
- Technical Data Sheet;
- A signed letter stating the source of origin will not be changed without written notification to the Department;
- Contact person's name, title, address, email address, and phone number; and
- Acknowledgement by Company (see last page of this document).

The sample and submittal information shall be sent to:

Melinda Winkelman
Illinois Department of Transportation
Bureau of Materials & Physical Research
126 East Ash Street
Springfield, IL 62704-4766

The manufacturer/producer/supplier will be notified upon completion of the Department's review. For questions regarding the review and approval process, contact Melinda Winkelman at 217-782-0117.

C. Recertification

Annual recertification of calcined bauxite aggregates is required. During the last quarter of the calendar year, a recertification letter will be sent to the producer/supplier. The recertification paperwork is due January of the following year. For example, the recertification letter is mailed late November 2016 and due by mid-January 2017. New independent laboratory test results will be due every even number calendar year. For example, new test reports will be due in January 2018.

In addition to the annual recertification, any changes in the source of origin will necessitate new submittal of independent laboratory test results.

Illinois Department of Transportation
Bureau of Materials and Physical Research

**High Friction Surface Treatment
Part B – Calcined Bauxite Aggregate
Submittal for Review and Approval**

Effective: June 1, 2014

Instructions for Acknowledgement by Company:

The owner, partner, or corporate officer shall complete the following and return a signed and dated copy with the product submittal or recertification.

_____ desires to obtain advance approval of materials to be
(Insert name of company)
supplied to Department of Transportation contractors as more fully described herein. I
and _____ understand that the Department of Transportation
(Insert name of company)
reserves the right in its contracts to approve materials at the source of supply as
provided in Article 106.01 of the Standard Specifications for Road and Bridge
Construction. I and _____ further understand that approval of
(Insert name of company)
company supplied material pursuant to this request does not constitute a contract to
supply material to the State of Illinois or any of its contractors, and that the Department
of Transportation does not assure or guarantee that any materials approved hereunder
will be supplied to the State or any of its contractors. In consideration of approval, I and
_____ agree to the terms, conditions and performance
(Insert name of company)
standards of the Standard Specifications for Road and Bridge Construction.

Type of Company: Individual Partnership Corporation

Company Name _____

Printed Name _____

Signature _____

Title _____

Business Address _____

City/State/Zip Code _____

Date of Signature _____

**High Friction Surface Treatment
Conditionally Approved Applicators for HFST
Submittal for Review and Conditional Approval**

Effective: April 29, 2016

A. Scope

The following guidelines are provided to clarify the submittal requirements and expedite the review process for a contractor to obtain conditional approval to apply high friction surface treatment (HFST) according to the current Special Provision for High Friction Surface Treatment (BMPR/BSE).

B. Procedure

When applying for conditional approval, a contractor shall submit the following:

- Contractor's legal operating company name,
- Contact person's name, title, address, email address, and phone number,
- A signed and dated letter stating the equipment is either owned or leased. If the equipment is leased, provide the name and contact information of the equipment owner. The letter shall also include a statement indicating the equipment lease agreement will not be changed without notification to the Department.
- A signed and dated letter stating the equipment complies with the current Special Provision for High Friction Surface Treatment (BMPR/BSE):

“Truck Mounted Application Machine. The HFST application machine shall be an approved self-propelled, fully automated truck mounted application machine capable of continuously applying resin and aggregate at a uniform thickness and rate, respectively, in varying widths of up to 12 ft (3.6 m).

The application machine shall be capable of continuously and thoroughly mixing epoxy resin binder components to the ratio recommended by the epoxy resin manufacturer. The epoxy resin shall be uniformly applied to the pavement surface at a minimum coverage rate of 10 gal/min (38 L/min) with a minimum uniform application thickness of 50 mils (1.25 mm).

The aggregate shall be applied by the same application machine which includes an aggregate drop spreader capable of mechanically continuously spreading bauxite aggregate at a minimum rate of 11 lb/sq yd (6 kg/sq m), with a minimum height from spreader to pavement surface of 12 in. (300 mm) to achieve proper spread of aggregate. The use of chip spreaders, vehicle tires, rollers, vibratory compactors or devices that throw loose aggregate onto any part of the live roadway lanes will not be allowed to apply the aggregate onto the wet uncured resin.

The HFST application machine shall be capable of the uniform application of the binder and aggregate at a minimum continuous application rate of 2,300 sq yd/hour (1,925 sq m/hour).”

- A color photograph of the application equipment, and
- Documentation showing HFST or equivalent experience on at least three projects with similar state highway agencies.

Illinois Department of Transportation
Bureau of Materials and Physical Research

**High Friction Surface Treatment
Conditionally Approved Applicators for HFST
Submittal for Review and Conditional Approval**

Effective: April 29, 2016

Continued

The submittal information shall be sent to:

Melinda Winkelman
Illinois Department of Transportation
Bureau of Materials & Physical Research
126 East Ash Street
Springfield, IL 62704-4766

The contractor will be notified upon completion of the Department's review. For questions regarding the review process, contact Melinda Winkelman at 217-782-0117.

C. Recertification

Annual recertification of conditionally approved applicators is required. During the last quarter of the calendar year, a recertification letter will be sent to the contractor. The recertification paperwork is due January of the following year. For example, the recertification letter is mailed late November 2016 and due by mid-January 2017.

In addition to the annual recertification, any changes in equipment will necessitate a new submittal.

Appendix F

SECTION 5 – SEAL COAT

Seal Coat

A. Description

- (1) This section describes applying asphaltic material, aggregate cover, and fog seal on a previously completed asphalt surface.

B. Materials

B.1 Asphaltic Material

- (1) Furnish asphaltic materials for seal coats and fog seals conforming to section 455 of the standard specifications.
- (2) Provide CRS-2P or HFRS-2P, asphaltic material for seal coat. Provide CRS-2P or HFRS-2P, asphaltic material for fog seal when fog seal is applied in conjunction with seal coat. The CRS-2P and HFRS-2P, asphaltic material for seal coat, and for fog sealing, shall meet the following requirements for the type and grade specified. Only Asphaltic Material supplied from a certified source is approved for use.
- (3) The asphalt emulsion shall be compatible with the cover aggregate. Provide the supplier of the asphalt emulsion test results from the aggregate sample. The supplier of the emulsion will provide a certification that the emulsion is compatible with the aggregate.
- (4) The emulsified asphalt shall meet the requirements of AASHTO M-316 subject to the following modification:
 - a) Polymer-modified cationic emulsified asphalt, (CRS-2P), and polymer-modified anionic emulsified asphalt, (HFRS-2P) shall be produced by using polymer modified base asphalt only. The use of Latex modification shall not be allowed. Any emulsion not meeting this requirement shall not be used.

B.2 Aggregate

- (1) Provide aggregate conforming to section 475 of the standard specifications. Use aggregates, uniform in quality and free from wood, bark, roots, and other deleterious materials. Furnish aggregate conforming to the following table:

Table 5-1

Sieve Size	Percent Passing By Weight		
	#1	#2	#3
3/8 inch (9.5mm)	100	100	100
#4 (4.75mm)	90-100	90-100	85-100
#8 (2.36mm)	45-75	5-10	10-40
#16 (1.19mm)	-	-	0-10
#40 (.425mm)	0-8	-	-
#200 (.075mm)	0-2	0-1	0-1

- (2) At least two weeks before construction, sample the cover aggregate from the various sources. The engineer and county will jointly obtain the samples. The department's engineer will submit the aggregate sample to the department's laboratory for testing of gradation. Sample the aggregate in accordance with Chapter 8 of the department's Construction and Materials Manual. The engineer will provide the results to the county.
- (3) The engineer may take a sample of the aggregate and re-test the gradation of the cover aggregate during seal coat operations.

B.3 Water

Use potable water, compatible with the seal coat.

B.4 Seal Coat Design

- (1) Provide the following to the engineer at least two weeks before beginning construction:
 - a) Seal coat aggregate design application rate (Lbs/SY),
 - b) Asphalt emulsion design application rate (Gal/SY), and
 - c) Source(s) of aggregate and asphalt emulsion.
- (2) The department may postpone the start of work until receipt of the seal coat design and approval by the engineer.
- (3) If the aggregate material specified in Table 1 is unavailable or is cost prohibitive to obtain, the County may submit a proposed seal coat design prior to providing a quote. The proposed design should include a listing of projects and roadways where the seal coat design has been utilized within the last four years. The proposed alternative design will be reviewed and approved by the engineer with concurrence from the Bureau of Highway Maintenance prior to the county providing a quote for the project.

B.5 Temporary Raised Pavement Markers

- (1) Provide single or multi-cover tabs in color shown in plans. Markers shall be of polyurethane material and a minimum size of 4" (width) x 2" (height). A reflective

surface shall be affixed along the top of the marker body on one or both sides. The reflective surface shall be 4" wide and 0.25" high.

B.6 Permanent and Temporary Pavement Markings

Provide pavement marking materials conforming to sections 646 to 649 of the standard specifications.

C. Construction

C.1 General

- (1) Schedule a meeting at least seven calendar days before beginning seal coat operations. The purpose of the meeting will be to discuss the seal coat operations, equipment, material sources, traffic control, and staffing for the project. Coordinate the time and location with the department's engineer.
- (2) Construct seal coat to the full width of the existing surface unless the contract or engineer specify otherwise.

C.2 Equipment

- (1) Distributor: use a distributor as specified in section 455.3.2.2 of the standard specifications.
- (2) Aggregate Spreader: Use a self-propelled mechanical type aggregate spreader capable of distributing the aggregate uniformly to the required width and at the designed rate. Use a self-propelled type mounted on pneumatic-tired wheels.
- (3) Rollers: Provide a minimum of two self-propelled rollers. At least one roller will be a pneumatic-tire roller. Steel-wheel rollers must weigh between 6 and 9 tons. The compaction width of the rollers shall be of sufficient width so that the entire width of the treatment area is covered in one pass by all the rollers.
- (4) Brooms: Provide motorized brooms with a positive means of controlling vertical pressure and capable of cleaning the road surface prior to spraying asphaltic material and removing loose aggregate after seal coating.

C.3 Weather Limitations

Construct seal coat operations in accordance with the following:

- a) Not before May 1 or after August 31,
- b) Work only during daylight hours,
- c) Start when the pavement and air temperature are 60°F and rising,
- d) The road surface is dry and there shall be no standing water,
- e) Do not apply before impending rains if rain will damage the material before placing and rolling the cover aggregates, and
- f) Do not perform work during foggy weather.

C.4 Road Surface Preparation

- (1) Immediately before applying the asphaltic material, clean the pavement surface with a power broom to remove dirt, clay or other objectionable matter. Clean depressions not reached by the power broom, using hand brooming.
- (2) Remove vegetation from cracks or joints.
- (3) Cover iron fixtures in or near the pavement to prevent adherence of the asphaltic material. Suitable covering includes plywood disks, sand, Kraft paper, roofing felt or other approved methods. Remove the protective coverings before opening the road to traffic.

C.5 Temporary Raised Pavement Markers

- (1) Install Temporary Raised Pavement Markers, Type II in accordance with manufacturer recommendations. Bonding surface must be free of dust, dirt, oil and moisture. Place within 3 inches of the centerline longitudinal joint; do not place over the joint.
- (2) Temporary Raised Pavement Markers shall be used to substitute for pavement markings that are covered during seal coat operations. The temporary pavement markers shall be placed in accordance with the standard detail drawing "Standard Application for Temporary Raised Pavement Markers, Type II".
- (3) If temporary same day pavement marking is being applied or if the road is detoured during construction, a reduced amount of temporary raised pavement markers may be used to locate the centerline and the channelizing lines. The following spacing requirements shall be used if temporary raised pavement markers are used in conjunction with same-day pavement markings operations or detours:
 - a. Center line, lane line, and edge line: Place markers at 100-foot spacing
 - b. Barrier lines: Place marker at the beginning and end of barrier line
 - c. 8-inch channelizing line: Place two markers side-by-side at the beginning and the end of the channelizing line
 - d. Dashed 8-inch Line: Place one marker at the beginning of every other segment of the dashed line
- (4) Remove protective covers from the reflective tabs prior to opening the closed lane(s) to traffic.

C.6 Traffic Control

For roadways with annual daily traffic (ADT) less than 3,500 vehicles per day (vpd), use of pilot vehicles to lead traffic through the work zone shall be optional. Use of pilot vehicles shall be required on roadways with ADT greater than or equal to 3,500 vpd.

C.7 Application of Asphaltic Material

Begin the rate of application for the asphaltic material as determined by the seal design. After sealing 200 feet of the road segment, pause sealing operations to ensure the application rate of the asphaltic material is adequate given the field conditions. After applying the asphaltic material to 200-foot segment, place the seal coat aggregate at the design application rate. Inspect the aggregate in the wheel paths for proper embedment. Make adjustments to the rate of application, if necessary. At a minimum, construct one full lane width at a time. Make additional adjustments to the rate of application during the project if needed.

C.8 Application of Aggregate

- (1) Apply the aggregates at the rate identified in the seal design.
- (2) Place aggregate within minutes of applying the asphaltic material. Make additional adjustments to the rate of application during the project if needed.
- (3) The speed of the spreader shall be such that the aggregate does not turn over, and starting and stopping of the spreader is minimized. The edges of the aggregate applications shall be sharply defined. Do not use previously applied aggregates.

C.9 Rolling Operations

- (1) Roll the surface immediately after spreading the aggregate. Begin at the edges and continue to the center, lapping $\frac{1}{2}$ the roller width on each pass. Roll the aggregate so the entire width of the treatment area is covered in one pass by all the rollers. After this initial rolling, perform subsequent rolling using both steel wheel rollers and pneumatic-tire rollers until thoroughly embedding the aggregate and the surface is smooth and uniform in texture. Take care when reversing the roller direction to avoid displacing or loosening the cover aggregate, or damaging the asphaltic material.
- (2) Proceed at a recommended speed less than or equal to 5 miles per hour (7 feet per second), to prevent turning over aggregate.
- (3) Make at least three complete passes over the aggregate. Roll the aggregate so the entire width of the treatment area is covered in one pass by all the rollers.
- (4) Self-propelled pneumatic tired compacting equipment must have a compaction width of at least five feet.

C.10 Sweeping

- (1) A light brooming of the seal coat should occur before vehicular traffic is allowed on the surface. No downward pressure should be exerted on the broom during the initial sweeping. Care should be taken not to dislodge the cover aggregate from the emulsion during the initial sweeping.

- (2) Re-sweep seal coat areas the day after the initial sweeping. Dispose of the surplus seal coat aggregate in a manner satisfactory to the engineer.

C.11 Protection of the Surface

No traffic is permitted on the seal coat until after the initial rolling has been completed and the asphaltic material has set and will not pick up on vehicle tires.

C.12 Application of Asphaltic Material for Fog Sealing

- (1) A fog seal shall not be installed as a standalone product and shall be in addition to seal coat installation.
- (2) Fog seal completed seal coated areas, after the final sweeping and before placement of permanent pavement markings. Construct the fog seal as follows: Construct a 100 foot test strip. Review the application of diluted (1:1) asphaltic material and adjust the application rate as needed. Apply between 0.07 to 0.18 gallons per square yard, diluted. Apply the fog seal to minimize the amount of overspray. Do not allow traffic on the fog seal until it has cured.

C.13 Pavement Markings

- (1) Pavement markings shall conform to sections 646 through 648 of the standard specifications.
- (2) Place Seal Coat – Temporary Pavement Marking Same Day Paint in accordance with 646.3.1.3 of the standard specifications.
- (3) Apply permanent markings to the surface within 14 days of completing the seal coat placement.

D. Measurement

- (1) The department will measure Seal Coat-Installation by the square yard acceptably completed.
- (2) The department will measure Seal Coat-Asphaltic Material (Item) by the gallon acceptably completed.
- (3) The department will measure Seal Coat-Aggregate Material by the square yard acceptably completed.
- (4) The department will measure Seal Coat-Pavement Marking Paint by the linear foot acceptably completed.

- (5) The department will measure Seal Coat – Special Pavement Marking Paint as each individual special pavement marking acceptably completed.
- (6) The department will measure Seal Coat-Temporary Pavement Marking Same Day Paint by the linear foot acceptably completed.
- (7) The department will measure Temporary Raised Pavement Markers, Type II as each individual raised pavement marker acceptably completed.

E. Payment

- (1) The department will pay for measured quantities at the unit price under the following work items:

ITEM NUMBER	DESCRIPTION	UNIT
475.9000.M	Seal Coat-Installation	SY
475.9100.M	Seal Coat-Asphaltic Material for Seal Coat	GAL
475.9110.M	Seal Coat-Asphaltic Material for Fog Seal	GAL
475.9120.M	Seal Coat-Aggregate Material	SY
646.9000.M	Seal Coat-Pavement Marking Paint	LF
646.9010.M	Seal Coat-Special Pavement Marking Paint	EACH
646.0402.M	Seal Coat – Temporary Pavement Marking Same Day Paint	LF
649.2102.M	Temporary Raised Pavement Markers, Type II	EACH

- (2) Payment for Seal Coat-Installation and Seal Coat-Aggregate Material is full compensation for preparing the surface; for heating and applying asphaltic material; for drying or moistening, applying, and rolling the cover aggregate; and for brooming, finishing and maintaining the surface.
- (3) Payment for Seal Coat-Asphaltic Material bid items is full compensation for providing the asphaltic material; and for transporting and heating.
- (4) Payment for the Pavement Marking bid items under this section is full compensation for preparing the surface, for providing all temporary and permanent marking, and for protecting marking until dry or cured.
- (5) Payment for Temporary Raised Pavement Markers, Type II is full compensation for preparing the surface; providing and installing temporary pavement marking reflective tabs; and removing protective covers.

Appendix G

High Friction Surfaces

Prepared By:
Kimberly M. Ault, P.E.
Heidi J. Spangler, P.E.
Traffic and Safety
December 1, 2013



HIGH FRICTION SURFACES: INTRODUCTION:	1
MATERIALS:	1
FIGURE 1: FRICTION VALUES (FN) FOR SURFACE TREATMENTS	2
FIGURE 2: FRICTION VALUES (FN) FOR VARIOUS ROAD SURFACE CONDITIONS	2
TABLE 1: HIGH FRICTION SURFACE LOCATIONS – NOVEMBER 2013 DATA	3
TABLE 2: EPOXY OVERLAY SKID RESISTANCE DATA FOR BRIDGE DECKS– NOVEMBER 2013 DATA.....	4
INSTALLATION:	5
RESULTS:	6
FUTURE CONSIDERATIONS:	6
SITE LOCATIONS:	7
1. NB I-75 RAMP TO NB ROCHESTER RD. (2 OUTSIDE LANES OF RAMP) (PR 682608):	7
2. NB I-75 RAMP TO NB BALDWIN ROAD (INTERSECTION APPROACH) (PR 669001):.....	8
3. NB I-75 RAMP TO SB BALDWIN ROAD (LOOP RAMP) (PR 669003):	9
4. WB I-69 RAMP TO SB I-75/US-23 (LOOP RAMP) (PR 1495309):.....	10
5. WB I-96 RAMP TO NB US-131 (SHORT DECEL/TIGHT RADIUS CURVE) (PR 406104):	11
6. NB M-39 RAMP TO EB US-12 (PR 4719481):	12
7. EB US-12 RAMP TO SB M-39 (PR 1589508):	13
8. EB I-94 RAMP TO NB GRATIOT AVE (PR 801102):	14
9. M-35 (DOWNHILL HORIZONTAL CURVE) (PR 1349906):.....	15
10. NB US-127 AT I-496 CURVE (PR355201):	16

Introduction:

High Friction Surfaces (HFS) were installed in Michigan as a collaboration between FHWA and MDOT. Five locations were part of the FHWA Pilot HFS installation in September 2010. Five other locations were installed in 2007 and 2008 as demonstrations from several HFS contractors. The FHWA/MDOT installation focused on freeway ramps with horizontal curves and areas with steep grades.

A high friction surface is an application that is applied to an existing roadway that increases the coefficient of friction allowing better traction. This application consists of an epoxy resin for the adhesive, and polish resistant and abrasion resistant aggregates. High friction surfaces are not only a pavement surface treatment, but also a safety countermeasure. A high friction surface is primarily used to restore or improve the skid resistance of a pavement surface. There are a variety of uses for HFS applications including but not limited to; horizontal curves and ramps, intersection approaches, steep grades, bridge decks, and pavement surfaces susceptible to icing. Based on prior research from the FHWA, HFS can help decrease highway fatal and serious injury crashes. The following will discuss in detail the FHWA Pilot HFS installation.

Materials:

Two types of aggregates were used; Flint and Bauxite, in combination with three adhesive products; PolyCarb, Tyregrip, and Crafcoc. Table 1 below shows the distribution of each of the HFS combinations. Figure 1 below shows the Michigan Friction Values for surface treatments including bauxite, flint, and micro surfacing in comparison with the regular surface of concrete and bituminous. The bauxite surface produces larger friction values after installation and continues to maintain higher friction numbers several years after installation. Flint loses a majority of its friction within the first year of service after installation. Figure 2 below indicates Friction numbers (Fn) for various surface materials under a wet surface condition. The figure clearly shows that bauxite has the highest friction number under the wet surface condition. The chip seal application improves the friction value of the road as seen Figure 2, the value gained does not compare to the flint/bauxite friction values. Chip seals are indented as a pavement restoration technique, while the HFS is intended to increase the overall friction of the existing surface.

MDOT Bridge Field Services has been tracking several different types aggregates and epoxy overlays for use on bridge decks. Four types of aggregates were used; Taconite, Chipped Flint, Calcined Bauxite, and Basalt. Table 2 below illustrates the current skid numbers of the bridge decks along with the aggregate material that was placed. Bridge Field Services plans to take yearly skid numbers to compare each of the bridge overlay material combinations to see which of the aggregate materials will provide the best friction over time.

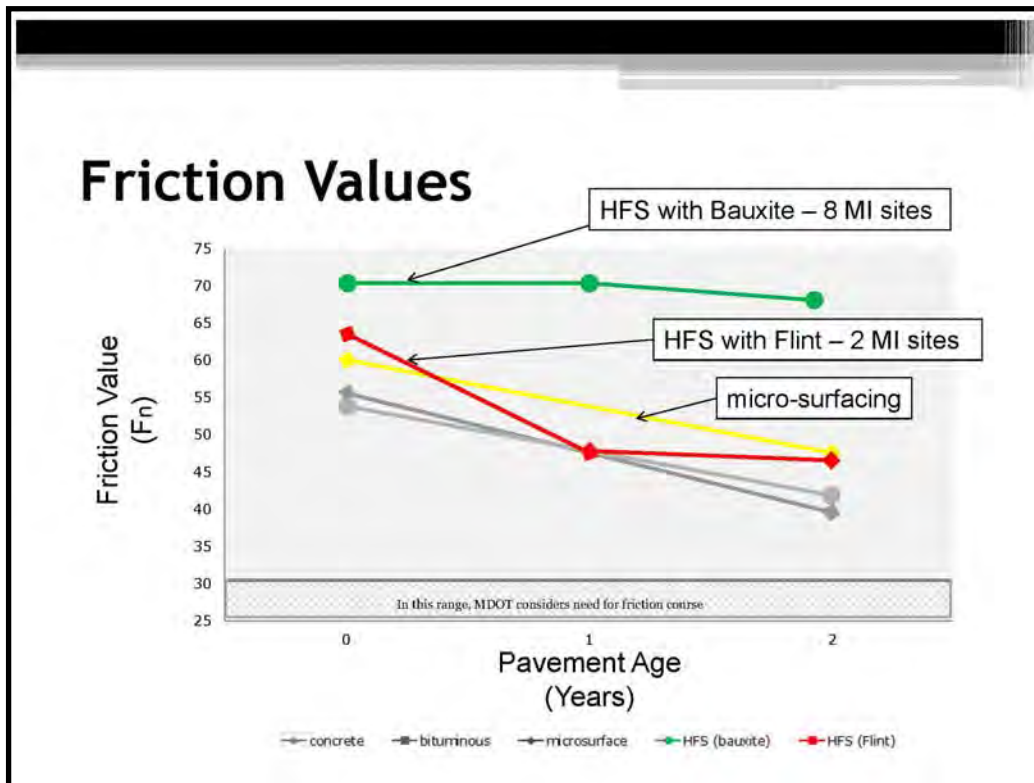


Figure 1: Friction Values (Fn) for Surface Treatments

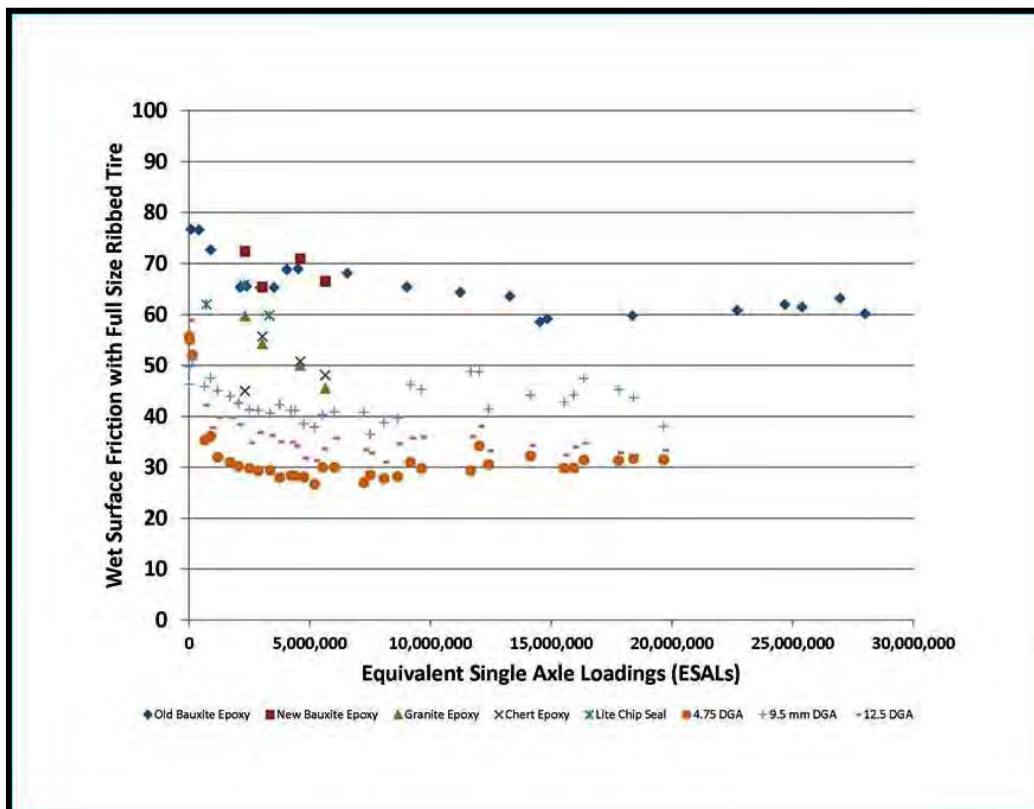


Figure 2: Friction Values (Fn) for Various Road Surface Conditions

Location	Road Condition (10/2013)	Region	Michigan County	ADT	Product	Cost	Aggregate Material	Date Installed	Friction Rating Before Installation (Ft)	Friction Rating After Installation (Ft)	Friction 1 Year After Installation (Ft)	Friction 2 Years After Installation (Ft)	Friction 3 Years After Installation (Ft)	Crashes 3 Years Before HFS Installation				Years of Crash Data Used	Crashes After HFS Installation				Average No. of Crashes Per Year (After HFS)	Wet Crashes Per Year (Before HFS Installation)	Wet Crashes Per Year (After HFS Installation)	Crash Reduction (%) (Negative values represent an increase in Crashes Since Installation)	Crash Reduction in Wet Crashes (%)	Local Crash Reduction (%) (Corresponding County - State Trunkline)	Local Crash Reduction (%) (Corresponding County - State Trunkline)				
														Wet Crashes	Icy Crashes	Snowy Crashes	Dry Crashes		Average Number of Crashes Per Year (Before HFS)	Wet Crashes	Snowy Crashes	Icy Crashes								Dry Crashes			
1 NB I-75 ramp to NB Rochester Rd (2 outside lanes of ramp)	Small amount of surface spalling at the joint lines, good condition	Metro	Oakland	13,689	PolyCarb	FHWA Pilot	Bauxite	9/13/2010	30	68	75	68	62	2	1	1	2	2.00	3.1	0	0	0	2	0.64	0.67	0.00	68.03	100.00	2.30	0.80			
2 NB I-75 ramp to NB Baldwin Rd (intersection Approach)	Small amount of surface spalling at the joint lines with maintenance patching over the HFS, good condition	Metro	Oakland	5,500	PolyCarb	FHWA Pilot	Bauxite	9/14/2010	No Data	No Data	60	No Data	No Data	3	3	0	10	5.33	3.1	2	2	0	19	7.36	1.00	0.64	-38.00	36.00	2.30	0.80			
3 NB I-75 ramp to SB Baldwin Rd (loop ramp)	Large amount of surface spalling along joint lines, fair condition	Metro	Oakland	3,300	PolyCarb	FHWA Pilot	Bauxite	9/14/2010	36	67	70	68	64	8	1	1	15	8.33	3.1	3	0	0	17	6.40	2.67	0.96	23.20	64.00	2.30	0.80			
4 WB I-69 ramp to SB I-75/US-23 (loop ramp)	Large amount of surface spalling along joint lines, fair condition	Bay	Genesee	10,510	PolyCarb	FHWA Pilot	Flint	9/15/2010	30	63	48	46	44	7	3	3	15	9.33	3.1	4	1	0	13	5.77	2.33	1.28	38.23	45.09	8.10	14.30			
5 WB I-96 ramp to NB US-131 (short decel/ tight radius curve, downhill grade)	Large amount of surface spalling on joint lines and the right side of the travel lane, poor condition	Grand	Kent	4,291	PolyCarb	FHWA Pilot	Flint	9/16/2010	30	62	48	49	44	12	0	3	10	8.33	3.1	1	0	2	4	2.24	4.00	0.32	73.07	91.99	-0.30	-13.90			
6 NB M-39 Ramp to EB US-12	Resurfaced Ramp over HFS material in October 2012, last ~10 Feet remains, good condition	Metro	Wayne	15,500	Tyregrip	HFS Demonstration	Bauxite	09/2007	No Data	No Data	No Data	No Data	No Data	0	0	1	0	0.33	6.0	0	0	0	0	0.00	0.00	0.00	100.00	-	17.40	29.60			
7 EB US-12 ramp to SB M-39	Large amount of surface spalling along joint lines, fair condition	Metro	Wayne	15,000	Tyregrip	HFS Demonstration	Bauxite	09/2007	No Data	No Data	No Data	No Data	No Data	2	0	0	2	1.33	6.0	2	1	0	6	1.50	0.67	0.33	-12.50	50.00	17.40	29.60			
8 EB I-94 ramp to NB Gratiot Ave (Macomb CO)	There is only a small amount of spalling on the surface., good condition	Metro	Macomb	10,500	Tyregrip	HFS Demonstration	Bauxite	10/2008	No Data	No Data	No Data	No Data	No Data	1	2	1	3	2.33	5.0	1	0	6	6	2.60	0.33	0.20	-11.43	40.00	10.50	13.70			
9 M-35, downhill horizontal curve 0.39 mile west of US-2	Small amount of surface spalling at the joint lines, good condition	Superior	Delta	6,000	Crafco	\$25/sq yd.	Bauxite	9/24/2009	No Data	No Data	No Data	No Data	No Data	2	0	4	4	3.33	4.1	1	0	0	4	1.22	0.67	0.24	63.39	63.39	13.50	5.20			
10 NB US-127 curve at I-496	A portion of the HFS was resurfaced in 2012. There is a large amount of surface spalling, fair condition	University	Ingham	29,700	Flint Rock	MMDOT Maint.	Flint	9/13/2008	37	No Data	60	No Data	No Data	26	9	5	23	21.00	5.1	17	4	12	43	14.82	8.67	3.32	29.42	61.75	11.90	19.90			
																																Average Total Crash Reductions (%)	
																																33.34	
																																61.36	
																																8.54	
																																10.08	

Table 1: High Friction Surface Locations - November 2013 Data

Structure Type	Region	Facility Carried	Feature Intersected	Skid Number Lane 1 (Avg.)	Skid Number Lane 2 (Avg.)	Product Manufacturer	Aggregate Material	Gradation	Year Placed
S08	North	I-75 NB	McCoy Rd	66	63	-	Taconite	-	2011
S02	University	Clark Rd WB	I-69/US 127	66	-	Flint Rock Products	Chipped Flint	#7	2013
S02	University	Clark Rd EB	I-69/US 127	68	-	Flint Rock Products	Chipped Flint	#7	2013
B01	University	M-106 NB	Portage River	83	-	CE Minerals	Calcined Bauxite	6 x 14C	2013
B01	University	M-106 SB	Portage River	83	-	CE Minerals	Calcined Bauxite	6 x 14C	2013
S11	Bay	I-75 SB	US 23 NB	65	68	Washington Rock Quarries	Basalt	#4 x #16	2013
S08	Bay	M-46 WB	US 127	60	-	Washington Rock Quarries	Basalt	#4 x #16	2013
S08	Bay	M-46 EB	US 127	61	70	Washington Rock Quarries	Basalt	#4 x #16	2013
B03-1	Bay	US 127 NB	Pine River	68	64	Washington Rock Quarries	Basalt	#4 x #16	2013
B03-2	Bay	US 127 SB	Pine River	67	64	Washington Rock Quarries	Basalt	#4 x #16	2013
S06-1	Bay	US 127 NB	Michigan Ave	68	62	Washington Rock Quarries	Basalt	#4 x #16	2013
S06-2	Bay	US 127 SB	Michigan Ave	67	63	Washington Rock Quarries	Basalt	#4 x #16	2013
R02-1	Bay	US 127 NB	Mid Mich RR	67	65	Washington Rock Quarries	Basalt	#4 x #16	2013
R02-2	Bay	US 127 SB	Mid Mich RR	67	64	Washington Rock Quarries	Basalt	#4 x #16	2013
S04-1	Bay	US 127 NB	US 127 BR	70	64	Washington Rock Quarries	Basalt	#4 x #16	2013
S04-2	Bay	US 127 SB	US 127 BR	68	66	Washington Rock Quarries	Basalt	#4 x #16	2013
S02	Bay	US 127 SB	US 127 BR (Polk Rd)	70	66	Washington Rock Quarries	Basalt	#4 x #16	2013
S03	Bay	US 127 NB	US 127 BR (Polk Rd)	70	67	Washington Rock Quarries	Basalt	#4 x #16	2013
S11	Bay	St. Charles Rd WB	US 127	74	-	Washington Rock Quarries	Basalt	#4 x #16	2013
S11	Bay	St. Charles Rd EB	US 127	74	-	Washington Rock Quarries	Basalt	#4 x #16	2013

Table 2: Epoxy Overlay Skid Resistance Data for Bridge Decks– November 2013 Data

Installation:

HFS materials can be installed on any road type. Prior to installation the roadway shall be properly cleaned in order to create a proper bond with the overlay material. The roadway should be in good structural condition before applying any HFS. Any surface imperfections will decrease the lifespan of the HFS. Once the surface is properly prepared the epoxy can be spread equally on the surface and the aggregate material can be spread. Any excess aggregate is removed once the epoxy layer has dried. The pictures below illustrate the installation of a HFS.



Figure 3: Epoxy Resin Applied to Pavement



Figure 4: Spreading Aggregate Over Epoxy Resin



Figure 5: Spreading Aggregate



Figure 6: Loose Stone Awaiting to be Swept (Left) and Loose Stone Already Swept

Results:

Table 1 above shows data related to the FHWA Pilot locations and the five previous demonstration locations. The table illustrates that the HFS helps in the reduction of wet crashes. The overall reduction for all crashes for the ten sites was 33.78%. Wet crashes were reduced by 61.31%. The overall and wet crash reductions/increases for the ten locations are shown in the table. An analysis was completed for each county of the corresponding HFS location. The analysis calculated the overall and wet crash reductions/increases for State Trunklines within the corresponding county. Overall crashes in the corresponding counties had an average crash reduction of 8.54% and a wet crash reduction of 10.08%. Although not statistically significant due to the number of test locations and the before/after crash data, the high friction surface did provide a reduction of overall and wet crashes.

Future Considerations:

MDOT Safety Programs is currently developing a Special Provision (SP) for the future use of HFS materials on State Trunkline as well as local agency roadways. The SP is currently in the review process. FHWA is also working with the ATSSA High Friction Council to develop a guide specification which is being reviewed by AASHTO. The SP includes information on surface preparation, material information, and construction practices. HFS costs may vary from \$19/SY to \$35/SY. Since the HFS locations are small areas, bundling several sites together will help reduce the per square yard cost. Our goal is to use HFS as a safety countermeasure by helping fund the installation via the Local Agency Program and HSIP funding processes.

Site Locations:

1. NB I-75 ramp to NB Rochester Rd. (2 outside lanes of ramp) (PR 682608):

Install Date: 09/13/2010

Field Review Date: 10/23/2013

Product: PolyCarb

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in good condition. There is some surface spalling located mainly at the joint lines. There are several surface patches for maintenance purposes.



Location Overview



Start of the HFS Treatment



Close Up of the Installed HFS



Close Up of Spalling at the Joint Lines

2. NB I-75 ramp to NB Baldwin Road (Intersection Approach) (PR 669001):

Install Date: 09/14/2010

Field Review Date: 10/23/2013

Product: PolyCarb

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in good condition. There are several surface patches for maintenance purposes and surface spalling at the joint lines.



Location Overview



End of the HFS and Surface Spalling



Surface Spalling at the Joint Lines



Maintenance Patching on HFS

3. NB I-75 ramp to SB Baldwin Road (Loop Ramp) (PR 669003):

Install Date: 09/14/2010

Field Review Date: 10/23/2013

Product: PolyCarb

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in fair condition. There is a large amount of surface spalling on the right side of the travel lane.



Location Overview



Start of the HFS



Start of the Surface Spalling at the Joint Lines



Large Amount of Surface Spalling-Right Side of Travel Lane

4. WB I-69 ramp to SB I-75/US-23 (Loop Ramp) (PR 1495309):

Install Date: 09/15/2010

Field Review Date: 10/24/2013

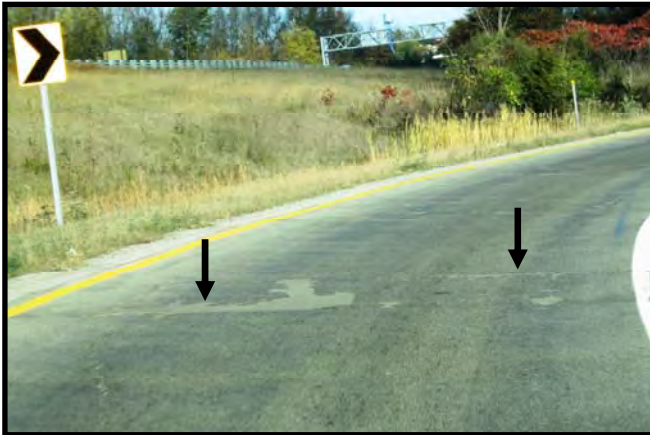
Product: PolyCarb

Aggregate Material: Flint

Current Field Conditions: The current overall surface is in poor condition. There is a large amount of surface spalling mostly located around the joint lines and at the end of the ramp.



Location Overview



Surface Spalling at the Joint Lines



Surface Spalling in the Travel Lane



Surface Spalling at the End of Ramp

5. WB I-96 ramp to NB US-131 (short decel/tight radius curve) (PR 406104):

Install Date: 09/16/2010

Field Review Date: 10/24/2013

Product: PolyCarb

Aggregate Material: Flint

Current Field Conditions: The current overall surface is in poor condition. There is a very large amount of surface spalling on the entire ramp most occurring on the right side of the travel lane and joint lines.



Location Map



Start of the HFS



Surface Spalling in the Travel Lane



Surface Spalling at the End of the Ramp

6. NB M-39 Ramp to EB US-12 (PR 4719481):

Install Date: 09/2007

Field Review Date: 10/23/2013

Product: Tyregrip

Aggregate Material: Bauxite

Current Field Conditions: A majority of this HFS location was resurfaced in October 2012. There is a small section at the start of the ramp that still includes the HFS, which is currently in good condition.



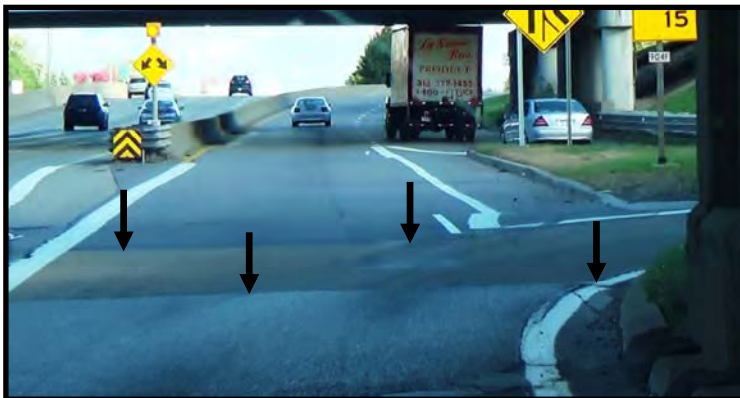
Location Map



HFS Install Condition 09/2007



HFS Install Condition 09/2007



HFS Remaining On Ramp



HFS Current Condition and Resurfaced Area

7. EB US-12 ramp to SB M-39 (PR 1589508):

Install Date: 09/2007

Field Review Date: 10/23/2013

Product: Tyregrip

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in fair condition. There is a fair amount of surface spalling occurring on the entire surface.



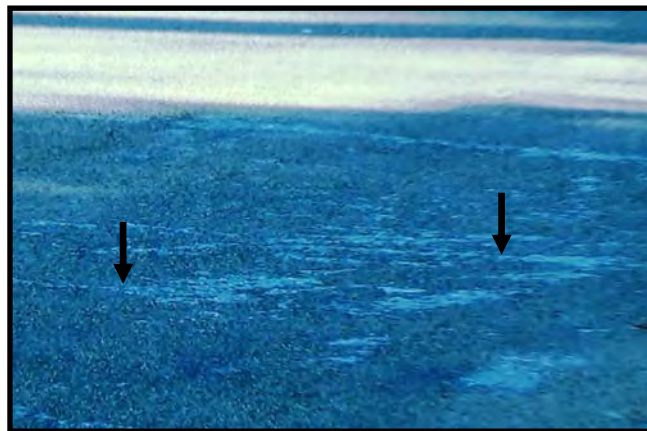
Location Map



Start of the HFS



Current Condition of the HFS



Surface Spalling

8. EB I-94 ramp to NB Gratiot Ave (PR 801102):

Install Date: 09/2008

Field Review Date: 10/23/2013

Product: Tyregrip

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in good condition. There is only a small amount of spalling on the surface.



Location Map



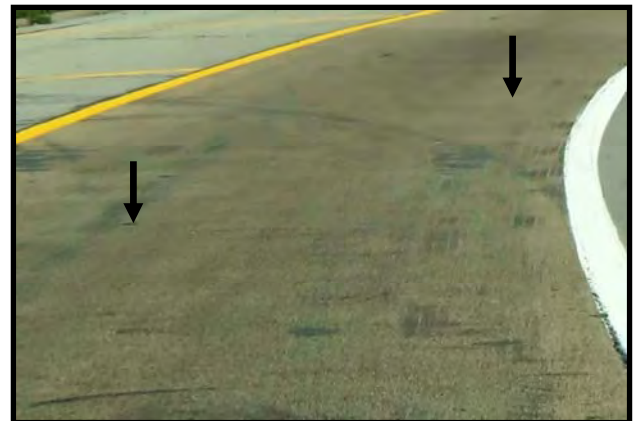
HFS Install Condition 09/2008



HFS Install Condition 10/2008



Beginning of HFS Area



HFS Area Current Condition

9. M-35 (Downhill Horizontal Curve) (PR 1349906):

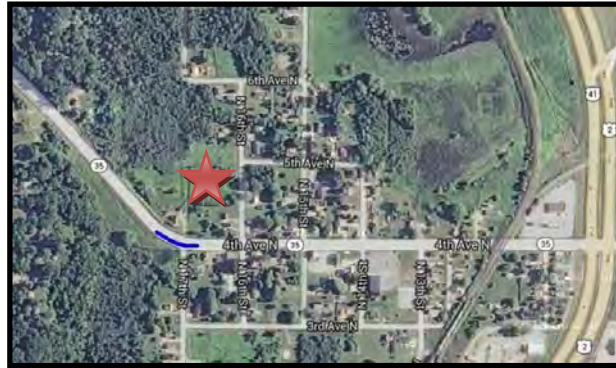
Install Date: 09/24/2009

Field Review Date: 11/20/2013

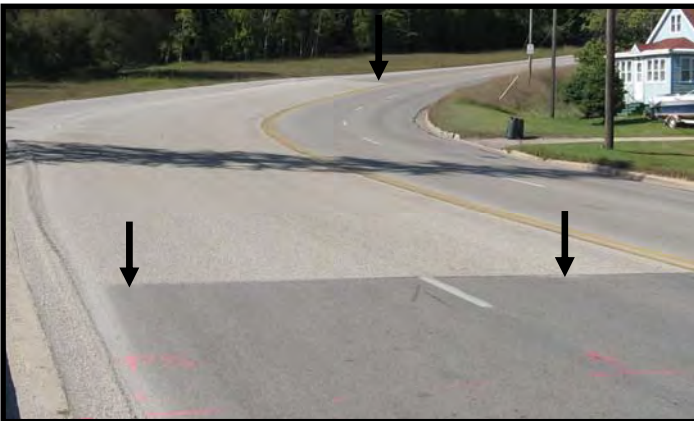
Product: Crafc

Aggregate Material: Bauxite

Current Field Conditions: The current overall surface is in good condition. There are small spots of spalling at the joint lines.



Location Map



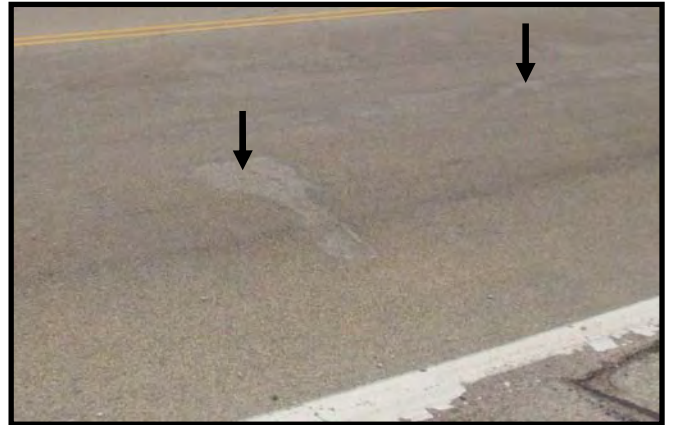
HFS Install Condition 09/2009



HFS Install Condition 09/2009



HFS Current Condition



HFS with Surface Spalling

10. NB US-127 at I-496 Curve (PR355201):

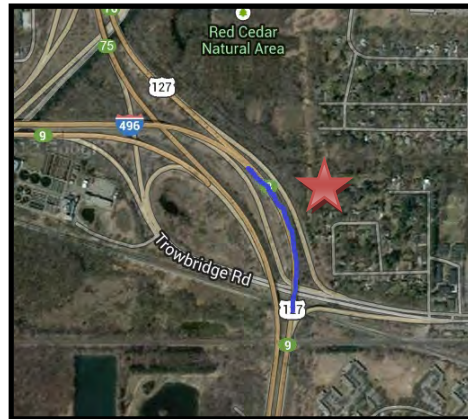
Install Date: 09/13/2008

Field Review Date: 11/19/2013

Product: Flint Rock Products

Aggregate Material: Flint

Current Field Conditions: A portion of the HFS was resurfaced in 2012. The current overall remaining surface is in fair condition. There is a large amount of surface spalling.



Location Map



Surface Condition July 2011



Surface Condition November 2013



Surface Spalling Area and End of Surface

Appendix H

2017
INFRASTRUCTURE MAINTENANCE
SYMPOSIUM

NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA

DANNY LANE
TENNESSEE DEPARTMENT OF TRANSPORTATION

Tennessee Transportation System Overview Highway System

Bridges: 19,855, including 8,412 state owned bridges, 11,443

locally owned bridges

Interstate miles: 1,181

18 interstate rest areas

15 interstate welcome centers

10 truck weigh stations

State maintained highway miles: 13,807

Total highway miles: 95,523

Tennessee Department of Transportation History of Polymer Concrete Overlays

➤ 90'S

- POLYMER, POLYMER MODIFIED CEMENT
- FIRST EPOXY BINDER (DOUBLE LIFT) WITH WASHINGTON STATE GRANITE

➤ EARLY 2000'S

- FIRST EPOXY BINDER WITH BAUXITE FOR INCREASE FRICTION
- CREATED HIGH FRICTION SURFACE TREATMENT QPL
- ADDED THESE TO THE QPL

➤ MID 2000'S TO PRESENT

- THIN OVERLAY (LOW MOD EPOXY AND EPOXY URETHANE) WITH BAUXITE / FLINT ROCK
- DOUBLE LIFT FOR ABOVE GRADE STRUCTURES
- BRIDGE PRESERVATION PROGRAM (NEW SPECIAL PROVISION 2017)

**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**

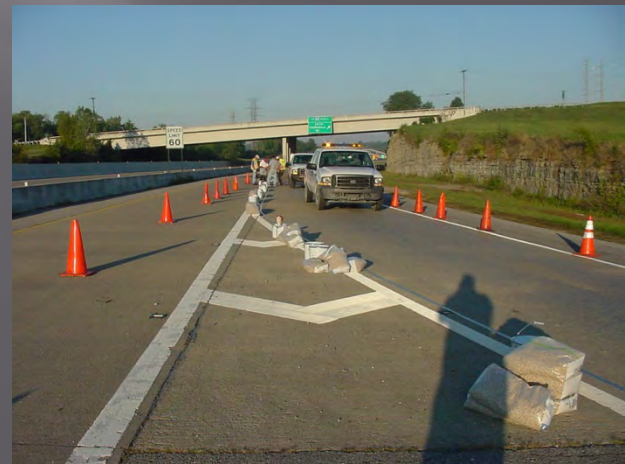


- ❑ **Ramp to SR 386**
- ❑ **Accidents**
- ❑ **Request from Traffic Division**

- **Polished Aggregate**
- **Surface Friction**
- **Sodium Intrusion**

**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**

**SET UP & TRAFFIC
CONTROL**



**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**

MIXING & APPLICATION



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

CONFERENCE DRIVE RAMP TO 386 SOUTH

APPLICATION



**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**



**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**



**DIVISION OF MATERIALS AND TESTS
RESEARCH AND PRODUCT EVALUATION
CONFERENCE DRIVE RAMP TO 386 SOUTH**



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

Bridge I-440 over I-24 Nashville



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

Bridge I-440 over I-24 Nashville



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

Bridge I-440 over I-24 Nashville



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

Bridge I-440 over I-24 Nashville



DIVISION OF MATERIALS AND TESTS RESEARCH AND PRODUCT EVALUATION

Bridge I-440 over I-24 Nashville



High-Friction Surface Council Meeting Nashville, Tennessee

Standard Practice for High Friction Surface Treatment for Asphalt and Concrete Pavements

AASHTO Designation: PP XX-14

Standard Practice for

High Friction Surface Treatment for Asphalt and Concrete Pavements

AASHTO Designation: PP XX-14

AASHTO

1. SCOPE

- 1.1. This practice describes finishing and applying a High Friction Surface Treatment (HFST) for asphalt and concrete pavements. The HFST is comprised of a minimum of a single layer using a Binder/Resin System and surface applied aggregate. Binder/Resin Systems include Polymeric and



444 North Capitol Street, N.W., Suite 245
Washington, D.C. 20001

ASTM D 2240 Standard Test Method for Rubber Property—Durometer Hardness
Materials by Retentional (Beckfield type) Viscometer
ASTM D 2240 Standard Test Method for Rubber Property—Durometer Hardness

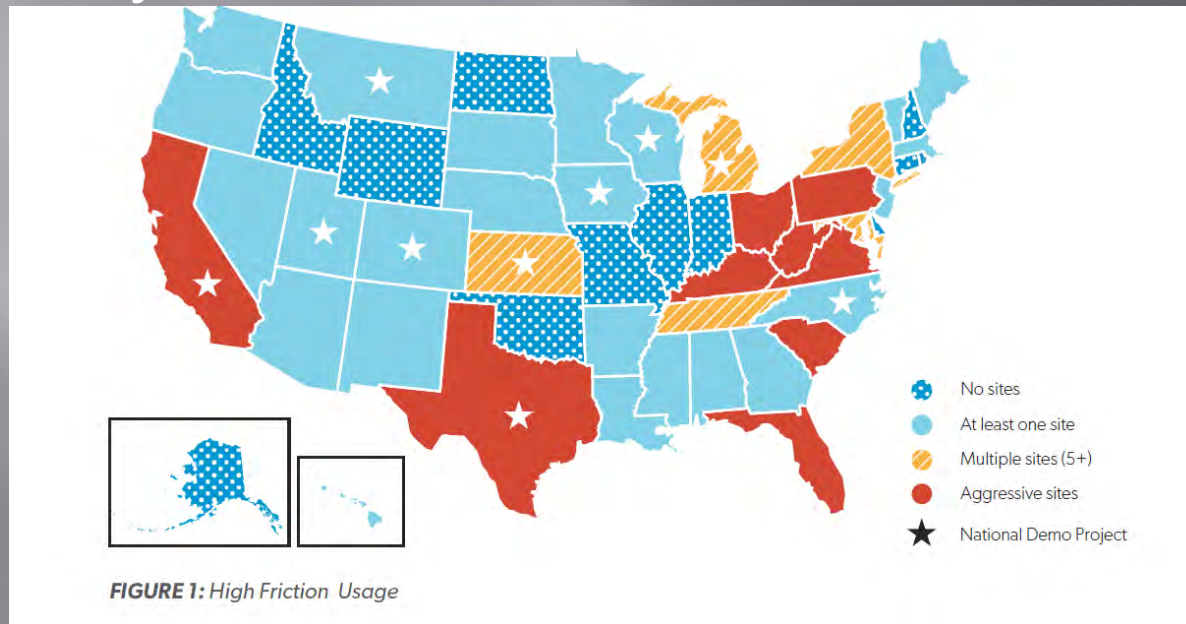
TS-4C

PP XX-14

AASHTO

FEDERAL HIGHWAY ADMINISTRATION (FHWA) EVERY DAY COUNTS (EDC)

- <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-2/hfst.cfm>



HIGH FRICTION SURFACE TREATMENTS

A ROAD SURFACE TREATMENT

for Critical Safety Spot Locations that Helps Vehicles Stay in Their Lane

U.S. Department of Transportation
Federal Highway Administration

**2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM
NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA**



**National
Transportation
Product
Evaluation
Program**

Work Plan

**Polymer Concrete Overlays
For Bridges and Pavements (PCO)**



**NTPEP
Polymer Concrete Overlays (PCO)
Test Decks**

Asphalt Pavement

Concrete Pavement

Bridge Deck

**2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM
NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA**

**NTPEP
Polymer Concrete Overlays (PCO)
Test Decks**

LABORATORY EVALUATION

NEAT AND CURED RESIN

- VISCOSITY
- GEL TIME
- INFRARED
SPECTROSCOPY
- TENSILE STRENGTH
- TENSILE ELONGATION
- COMPRESSIVE
STRENGTH

AGGREGATE

- GRADATION
- SOUNDNESS
- ABSORPTION
- LA WARE
- SPECIFIC GRAVITY
- XRF SPECTROSCOPY

ABSORPTION

2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM
NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA

Polymer Concrete Overlay(PCO)
Test Deck Prep



**2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM
NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA**

Application

Asphalt Pavement



2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM NOVEMBER 6TH - 10TH, 2017 ATLANTA, GEORGIA

Application

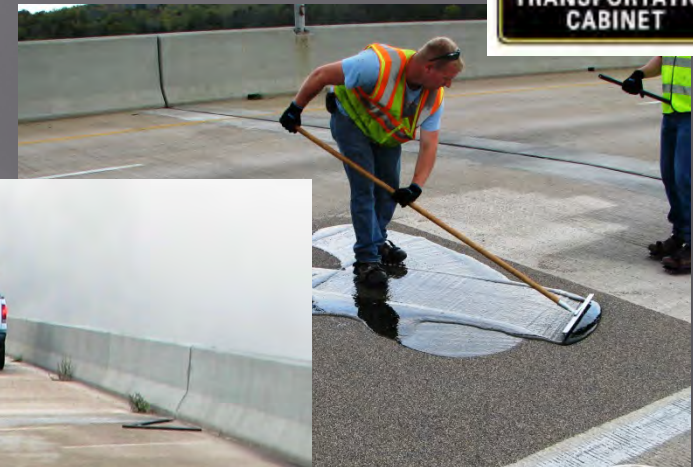
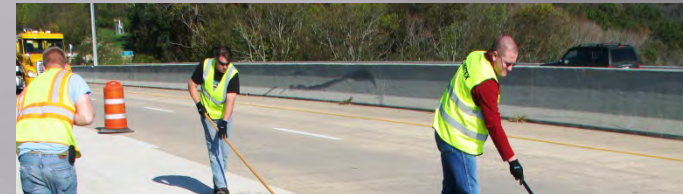
Concrete Pavement



2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM NOVEMBER 6TH - 10TH, 2017 ATLANTA, GEORGIA



Application Bridge Deck



2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM

NOVEMBER 6TH - 10TH, 2017

ATLANTA, GEORGIA



OF

SPECIAL PROVISION

REGARDING

HIGH FRICTION SURFACE TREATMENT

consist of the application of High Friction Surface Treatments to concrete pavements in accordance with these specifications. A single layer of a Binder Resin System and surface treatments shall be applied to concrete pavements and a double layer of a Binder Resin System shall be applied to concrete above grade surfaces.



Surface Treatments

All HFST systems used shall be from the Departments Qualified Products List, 31: High Friction Surface Treatments.

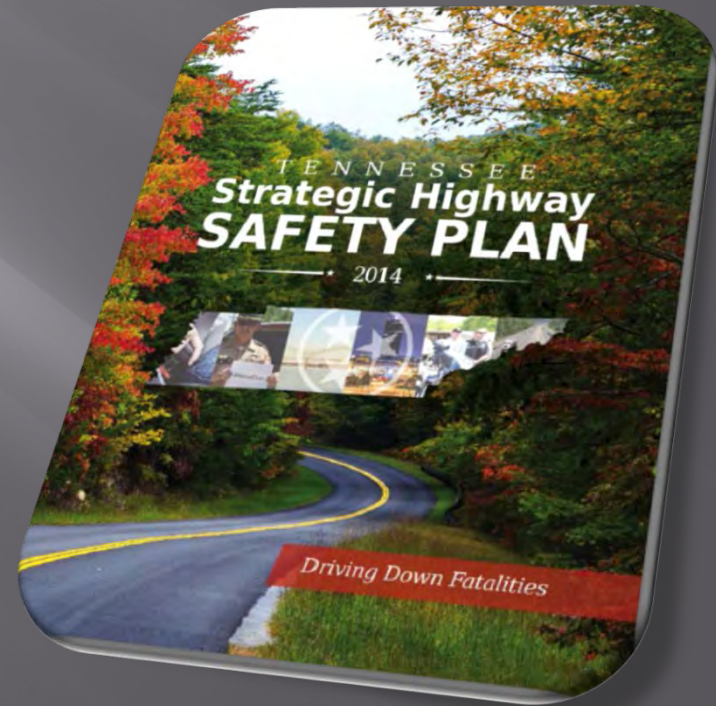
Aggregate shall consist of Calcined Bauxite. Only aggregate shall be angular, having less than 0.2% moisture and foreign or organic materials. The aggregate shall meet the requirements listed in Table 1— Physical and Chemical Requirements

	Test Method
Wear Resistance	ASTM D7428
Grading	AASHTO T27
Moisture Content	AASHTO T255
Iron Oxide	ASTM C25



TDOT STRATEGIC HIGHWAY SAFETY PLAN

- ▣ Roadway Departure type crashes account for ~60% of all fatalities in Tennessee (50% nationally)
 - Occurs when a driver loses control of their vehicle and departs the travel lane resulting in the vehicle colliding with either a fixed object or another vehicle.



TDOT STRATEGIC HIGHWAY SAFETY PLAN

- ▣ Infrastructure improvements emphasis area plan
 - **1.3 High-friction Surface Safety Initiative** – Identify road segments of interstate and state routes such as horizontal curves, steep grades and intersection approaches where drivers brake excessively and prematurely “polishes” the pavement or bridge surface which reduces the surface friction and leads to skidding. Develop plans for such road segments to replace the pavement surface with skid resistant high-friction pavement surface and to install skid resistant high-friction surface overlay to bridge decks.

PAVEMENT FRICTION...

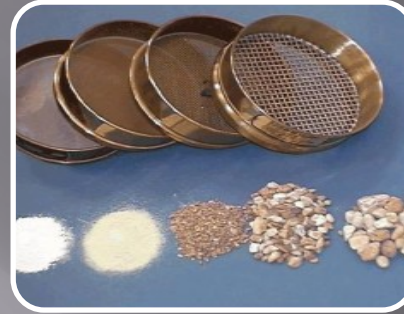
- ▣ Pavement friction design is .. selecting the right combination of pavement surface micro-texture and macro-texture to optimize available pavement friction for a given design situation.
- ▣ For both asphalt and concrete surfaces, micro-texture is defined by the surface aggregate material properties. The important aggregate properties that influence short- and long-term micro-texture are:

Aggregate Properties

- ▣ Mineralogical and petrographic properties
 - Aggregate composition/structure and mineral hardness
- ▣ Physical and geometrical properties
 - Angularity, shape, and texture
- ▣ Mechanical properties
 - Abrasion/wear resistance
 - Polish characteristics
- ▣ Durability properties.
 - Soundness



Aggregate Properties



Consensus Properties

- Sp. Gravity Coarse Agg. (AASHTO T 85) Bulk
- Gradation Physical Lab
- LA Abrasión, % loss (AASHTO T 96)
- Soundness of Aggregates by use of Sodium Sulfate % Loss
- BPN British Pendulum no.

Sample Distribution

XRF laboratory
XRF Handheld



Chemical

- Chemical Analysis
 - %SiO₂
 - CaCo₃
 - MgO
 - Al₂O₃
 - Fe₂O₃
 - LOI
 - Acid Insoluble

AASHTO NTPEP AND SOM

- ▣ American Association of State Highway Transportation Officials
- ▣ National Transportation Product Evaluation Program (NTPEP) and Sub-committee on Materials (SOM)
- ▣ <http://www.ntpep.org>
- ▣ <http://materials.transportation.org/Pages/default.aspx>



TENNESSEE- LEAD NTPEP STATE FOR HIGH FRICTION AND THIN OVERLAYS (HFTO)

- ▣ Currently evaluating 33 test sections placed in June 2016
 - 11 Concrete bridge deck (double application)
 - 10 Asphalt pavement
 - 9 Concrete pavement
- ▣ Five (5) Aggregates
 - Calcined Bauxite
 - Flint
 - Taconite (Yawkee)- Silica/Iron Oxide
 - Basalt (Armorstone)(Washington State)
 - Feldspar- Wyoming

2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM NOVEMBER 6TH - 10TH, 2017 ATLANTA, GEORGIA



**2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM
NOVEMBER 6TH - 10TH, 2017
ATLANTA, GEORGIA**



2017 INFRASTRUCTURE MAINTENANCE SYMPOSIUM NOVEMBER 6TH - 10TH, 2017 ATLANTA, GEORGIA

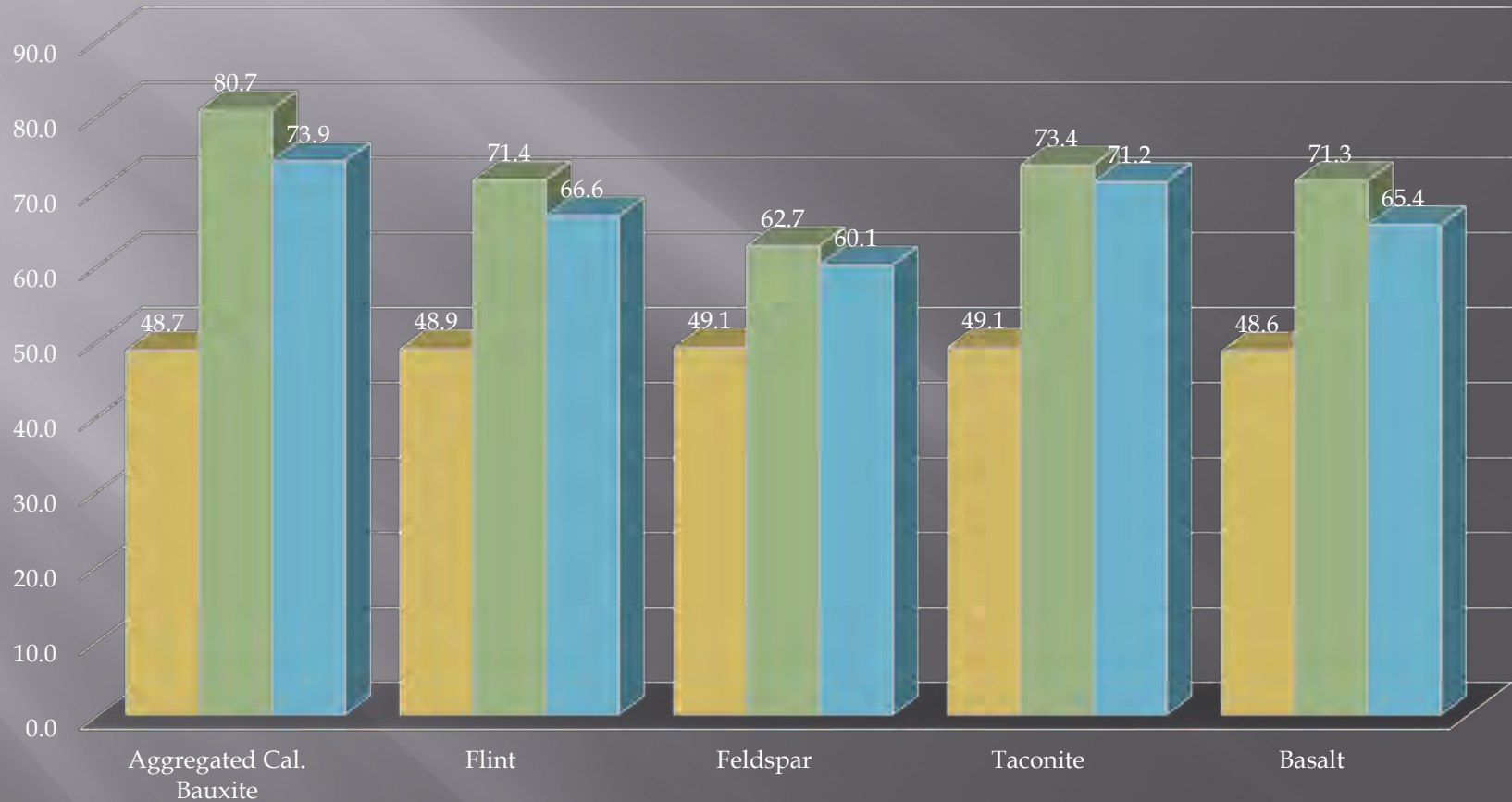


PAVEMENT FRICTION TESTER

- ❑ ASTM E 274- Standard Test Method for Skid Resistance Using a Full Scale Tire
- ❑ ASTM E 501 for Ribbed tire
- ❑ Test at 40 mph (65 kph) while spraying a stream of water
- ❑ ASTM E 524 Smooth tire also allowed



TEST DECK FRICTION TESTING (INITIAL)



■ Friction value- Before ■ Friction value- initial Section ■ Friction Value 1yr

Bond Strength Testing



BOND STRENGTH TESTING

174 psi

369 psi

132 psi



Substrate
Failure

Interface
Failure

59 psi

59 psi

59 psi



REPORTING THE DATA...

- ▣ TDOT will inspect for bonding/delamination
 - Photos and videos will be posted
- ▣ The sections will be tested for 3 years and the data will be reported
- ▣ Each State will individually decide what products and/or processes to approve for their State
- ▣ <https://data.ntpep.org/HFTO/Products>



AASHTO STANDARDS

- ▣ Current:
 - Standard Practice for **High-Friction Surface Treatment for Asphalt and Concrete Pavements-** PP 79-14 (2016)
- ▣ Proposed:
 - Standard Specification for **High Friction Surface Treatment for Asphalt and Concrete Pavements-** MP 79-17
 - Provisional Practice for **the Application of High Friction Surface Treatment for Asphalt and Concrete Pavements-** PP xx-17
 - Standard Specification for **Thin Overlay Treatments using a Binder Resin System and Aggregate for Concrete Surfaces-** MP xx-17
 - Provisional Practice for **the Application of Thin Overlay Treatments using a Binder Resin System and Aggregate for Concrete Surfaces-** PP xx-17

SECTION D: THIN OVERLAY SYSTEMS FOR BRIDGE DECKS (1/2 INCH THICKNESS OR LESS)

SECTION D1: POLYMER MODIFIED CEMENTITIOUS SYSTEM

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for polymer-modified cementitious, epoxy urethane and low modulus epoxy materials applied as thin overlays on bridge decks used to seal the decks and improve skid resistance.

SPECIFICATIONS

AASHTO T 219
AASHTO T 260
NTPEP

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and a sample of the product being tested must be submitted to the Division of Materials and Tests.

A six-inch by twelve-inch hardened Portland cement concrete cylinder will be used as a test specimen. The six-inch by twelve-inch concrete cylinder will be sawed in half at an angle of ninety degrees from the twelve-inch axis. The concrete surface shall be abraded using sandblasting techniques. Next place a dam around the top edge of the concrete cylinder. The submitted product will be applied to the concrete surface as recommended by the manufacturer and allowed to cure. The concrete specimen will be covered with a 3% solution of NaCl to a depth of one-half inch and maintained for ninety days in accordance with AASHTO T-219.

After ninety days of exposure the specimen shall be allowed to dry and then the surface shall be wire brushed until all salt crystal buildup is completely removed. A test sample will be taken at the one-half to one-inch depth from each end of the test cylinder. The untreated end of the test cylinder will be the control. The chloride content of each sample shall be determined in accordance with the procedure in AASHTO T-260. The amount of NaCl absorbed into the test cylinder will be determined by subtracting the control from the sample taken from the area treated with the submitted product and covered with a 3% solution of NaCl.

The maximum amount of chloride ion penetration allowed is 1.0 pound per cubic yard of concrete.

A one year field demonstration and evaluation period will be required prior to product approval. Smoothness, sealing capabilities and skid resistance will be evaluated on the in-place product.

QPL 31 HIGH FRICTION SURFACE TREATMENTS FOR ROADWAYS

POLYMER MODIFIED EPOXY SYSTEMS

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for a high friction surface treatments for roadways, applied as thin overlays on bridge decks or roadways used to improve skid resistance using basalt aggregate only.

SPECIFICATIONS

PP-xx-14 Standard Practice for High Friction Surface Treatment for Asphalt and concrete Pavements
SP406 HFST
AASHTO T277
NTPEP Evaluation

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information, and NTPEP test data, must be submitted to the Division of Materials and Tests. The Department bases product approval on a review of NTPEP data.

Review of NTPEP Evaluation Data

Laboratory Data

The results of the shall meet the minimum requirements for PP-xx-14 Standard Practice for High Friction Surface Treatment for Asphalt and concrete Pavements and SP406 HFST

Field Data

A three year field evaluation period through the NTPEP POO test deck will be required prior to product approval. Sealing capabilities, bond strength and skid resistance will be evaluated on the in-place product.

After one year of the evaluation a manufacturer may submit the product to the Division of Materials and Tests for inclusion on the Departments Qualified Products List

7406HFST

ESSEB
Feb 1, 2014

1) Forum on
2) compressed
gate - Only
ion Surface
3) pavement
4) recommended
5) horizontal
6) ion areas.7

= Qualified

packaging -
fill meet de-
age Break...

Standard
High Friction
and Concrete

AASHTO

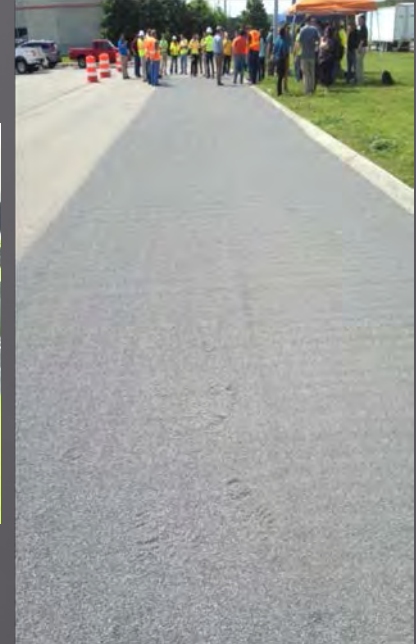
American Association
444 North Capitol
Washington, DC



**FULLY AUTOMATED
HIGH FRICTION SURFACE
TREATMENT
DEMONSTRATION
MAY 17, 2017
10:00 AM TO 12:00 PM**

**TDOT REGION 3 COMPLEX
6601 CENTENNIAL BLVD.
NASHVILLE, TENNESSEE, 37064**

FULLY AUTOMATED DEMONSTRATION MAY 17, 2017



FULLY AUTOMATED DEMONSTRATION

MAY 17, 2017



ACCIDENT AND RUN OFF THE ROAD CASE STUDIES

Has HFST Worked for TDOT

Accident Reduction on Curves

Davidson County (I-440)

3 Years Prior:

31 total crashes
1 fatal
0 serious injury
31 lane-departures
31 wet weather

7 Years After:

1 total crashes
0 fatal
0 serious injury
1 lane-departures
1 wet weather



Accident Reduction on Curves

Cocke County (LR-01326)

Years Prior:	Years After:
10 total crashes	4 total crashes
0 fatal	0 fatal
1 serious injury	0 serious injury
7 lane-departures	3 lane-departures
4 wet weather	1 wet weather



Accident Reduction on Curves

Cheatham County (SR-249)

3 Years Prior:

6 total crashes

0 fatal

0 serious injury

1 lane-departures

1 wet weather

3 Years After:

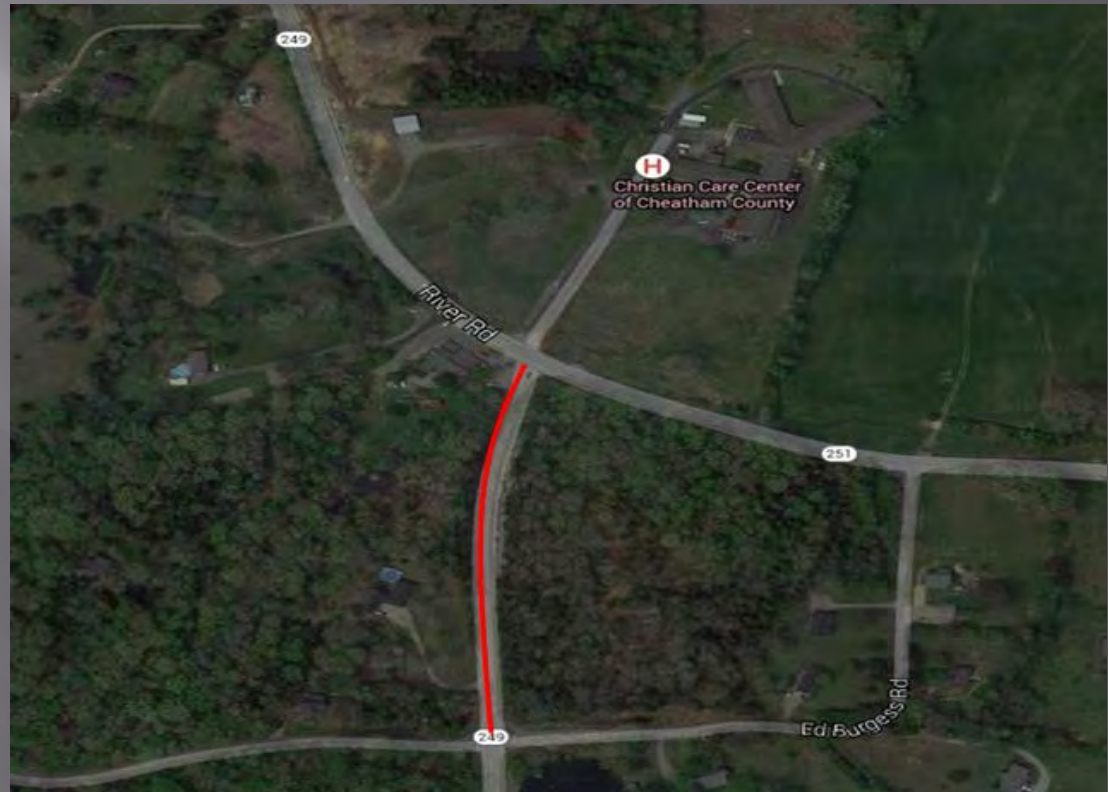
0 total crashes

0 fatal

0 serious injury

0 lane-departures

0 wet weather



Accident Reduction on Curves



In conclusion:

- In Tennessee, and the United States, there is great interest in using HFST as a Safety treatment to improve friction in order to reduce/eliminate run off the road accidents
- HFST has a proven track record of reducing accidents
- Use the Thin Overlay in a double lift application (Binder Resin System and Aggregate) for above Grade Concrete Surfaces (Bridges, Ramps, Overpasses, Directional Flyovers, Stacked Interchanges, and Viaducts).

Thank you for your attention !!

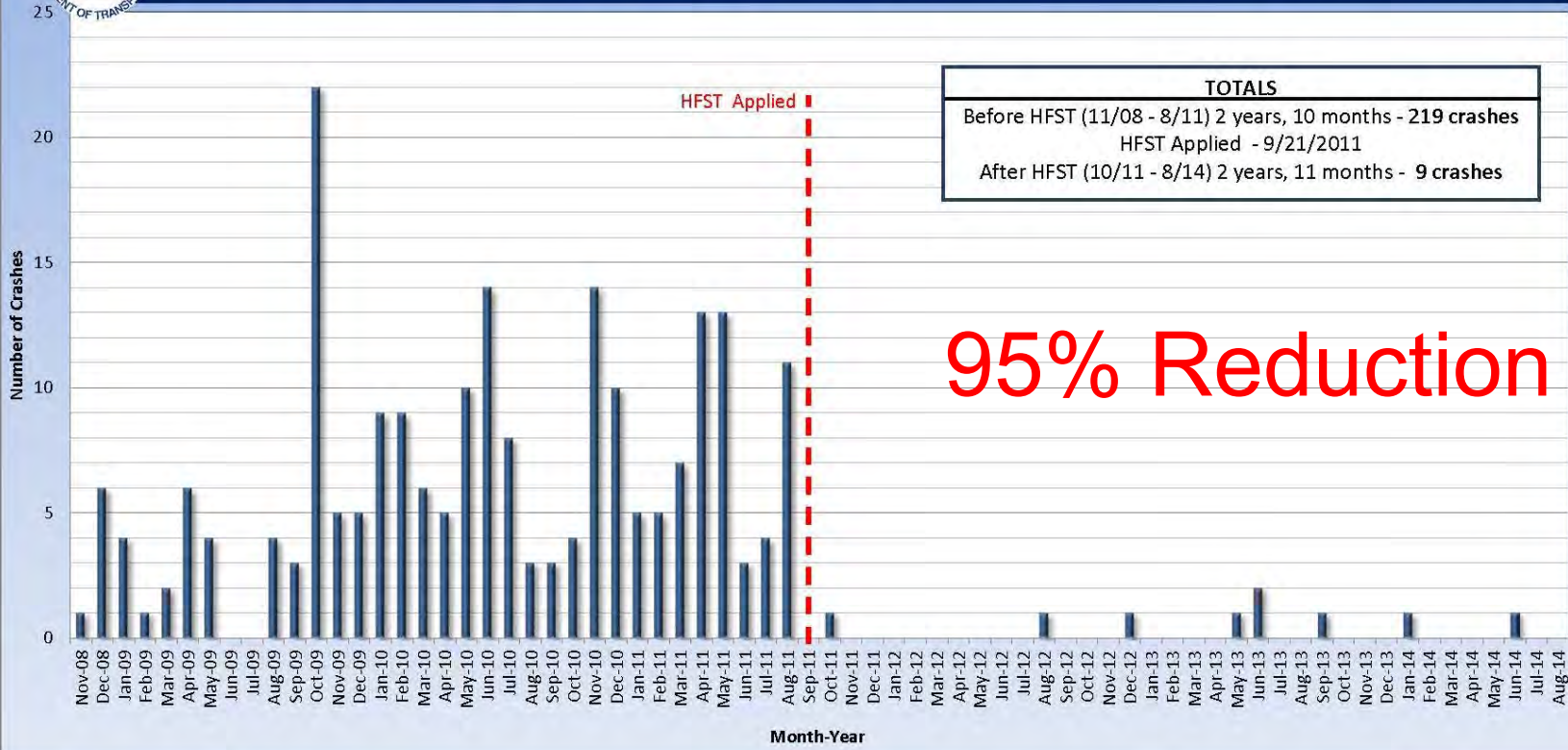
Questions ??



Appendix I



Marquette Interchange West to North Ramp Crashes Before & After High Friction Surface Treatment (HFST)



95% Reduction

TOTALS
 Before HFST (11/08 - 8/11) 2 years, 10 months - 219 crashes
 HFST Applied - 9/21/2011
 After HFST (10/11 - 8/14) 2 years, 11 months - 9 crashes

TOTALS
 Before HFST (11/08 - 8/11) 2 years, 10 months - 219 crashes
 HFST Applied - 9/21/2011
 After HFST (10/11 - 8/14) 2 years, 11 months - 9 crashes



Appendix J

Work Plan For

High Friction Surface Treatment Material Monitoring Project

Alaska Department of Transportation & Public Facilities

Anna Bosin, P.E.
Research Engineer

December 2015

Introduction

Central Region Alaska Department of Transportation and Public Facilities (DOT&PF) will be installing the first highway applications of High Friction Surface Treatment (HFST) in Alaska starting spring 2016. HFST is a pavement surfacing system with exceptional skid-resistant properties that are not typically acquired by conventional pavement materials. The treatment system is composed of a hard aggregate and binder. The aggregate is a thin layer of specially engineered Calcined Bauxite aggregate, a durable high friction topping. Binders vary by manufacturer and are generally proprietary products consisting of bitumen-extended epoxy resins, epoxy-resin, polyester-resin, polyurethane-resin, acrylic-resin, or Methyl Methacrylate (MMA) epoxy.

Although this treatment has been widely used in the lower 48 states, it is not currently in wide use in Alaska.

Background / History

HFST is a crash mitigation measure that has been researched and proven by Federal Highway Administration (FHWA) in other parts of the country to reduce single-vehicle-run-off-the-road (SVROR) crashes due in part to adverse geometric and environmental conditions. In addition, it has also been shown to reduce rear-end type crashes at intersections with steep grades. Ideal crash reduction sites for HFST within Central Region were selected where; geometric constraints limit reconstruction, shady/icy curves are located on high speed roadways, crash history shows clusters of SVROR and motorcycle crashes occurring, and skidding/road condition were recorded as a contributing factor for a crash.

Objectives and Scope

HFST will be applied at 28 sites within the DOT&PF Central Region based on criteria reviewed and approved through the Highway Safety Improvement Program (HSIP).

Existing pavement which is damaged or has rutting in excess of 0.25" depth will be milled 0.75" and repaved with 1" of Type IV, Class A PG 58-34 HMA prior to the application of HFST. DOT&PF Materials is recommending a minimum of 30 days between placing new pavement and applying HFST. Because of this delay, DOT&PF anticipates areas where pavement replacement is performed will have paving completed in year 1 and the HFST would follow in year 2.

For areas with pavement ruts less than 0.25", the HFST will be applied to the existing paved surface.

The primary objectives of the HFST Monitoring project are the following:

- 1. Assess existing asphalt surface preparation and material application during construction.**

For this project, DOT&PF is proposing to monitor the required surface preparation and material application including but not limited to:

- Minimum pavement conditions required for HFST application;
- Minimum amount of time that new pavement must be allowed to cure prior to HFST application. (DOT&PF Materials is requesting a 30 day period. Varying times of between 30 and 90 days are cited by different polymer resin binder material manufacturers.);
- Weather and minimum temperature conditions required for successful application;
- Ability to apply polymer resin binder material in a neat line within a specified distance from existing adjacent features to remain such as striping;
- Production rates utilizing automated equipment, and;
- Amount of time before roadway can be opened to traffic.

2. Monitor High Friction Surface Treatment Performance

Performance will be monitored by the following methods.

- Pavement friction will be measured before and after construction and then annually using a Dynamic Friction Tester (DFT) capable of dynamic friction testing in accordance with, ASTM E1911. The specific work plan is outlined herein.

3. Long-term performance monitoring under Alaska Conditions

For the long-term we are proposing that these HFST sites be monitored for a period of three years. Within the three-year period from construction DOT&PF anticipates all testing and analysis be completed for inclusion in a final report.

This project's 28 data driven locations are located in both urban and rural areas of Central Region (Kenai Peninsula Borough, Matanuska-Susitna Borough, Anchorage, and Eagle River) and are subject to the following cold climate conditions:

- Seasonal studded tire wear between September and May;
- Winter plowing operations;
- Anti-icing and de-icing applications, and;
- A freeze-thaw pavement cycle.

Work Plan

1. HFST Site Description and Construction Procedure

Location maps, a summary table, and as-advertised plans showing the proposed HFST locations are included in Appendix A. The project title is: HSIP: CR High Friction Surface Treatment Project No. 0001501/Z570920000.

Construction, materials, and methods used will conform to Section 405 of the "Special Provisions" of the project "Contract Documents and Specifications". The project calls for the placement of approximately 147,500 square yards of HFST at the 28 sites.

2. Method of Evaluation

A) During construction, DOT&PF staff will monitor and document the required surface preparation and material application including:

- The pavement condition at the time of HFST application including ruts, cracks, etc. and whether the application was on existing older pavement or surfaces milled and repaved prior to application;
- The amount of time for new pavement to cure before application of the binder (minimum 30 days required);
- Weather and temperature conditions at the time of polymer resin binder material application;
- The application of the polymer resin binder material to insure adjacent features are not affected;
- The production rates for the automated lay down equipment and equipment model information, and;
- Amount of time before roadway is opened to traffic.

B) Post-construction evaluation will consist of monitoring the condition and friction of the HFST treated areas over a three-year period. Monitoring will include summer evaluation of:

- Overall pavement condition;
- Pavement rut depths, cracking, IRI (from annual Pavement Management System survey);
- Pavement raveling, binder exposure, etc.;
- Pavement friction compared to time of application per friction testing plan; and,
- Condition of pavement markings placed over the HSFT material (both surface applied and grooved-in MMA).

C) Friction Testing Plan

- As previously mentioned, friction testing will follow the Dynamic Friction Tester, test method ASTM E1911 and will be administered by DOT&PF staff each summer post construction for three consecutive years.
- Testing will require traffic control per MUTCD requirements and a traffic control plan will need to be submitted to the CR Traffic Section for review and approval annually. The traffic control contract will be administered by DOT&PF CR Materials Section.
- Locations for administering the test for each site shall follow the below work plan:

Number of Tests per Site	Tangent	Curve
3	Wheel path, non-wheel path, plus control	PC/PT, MC, plus control

Where “control” means pavement adjacent to test site without HFST but is representative of the overall pavement condition for the lane. Test locations within each HFST Site should have GPS coordinates taken for repeatability and reporting. Photos are encouraged.

Reporting

Paving will be completed prior to placing HFST and the HFST will be completed by September 1, 2016. A construction report will be submitted by the end of November 2016.

Interim reports will be submitted at the end of summer of each of the three evaluation years. A final report, summarizing previous reports will be submitted by the end of 2019. At the end of the evaluation period, a synopsis will be provided that will provide a recommendation whether the use of HFST should continue in Alaska. It also will contain information concerning what pitfalls or construction/maintenance issues could have been avoided through improved specifications, construction plans and practices.

Schedule

- Construction completion of all HFST sites: Fall 2016
- Post-construction report: Winter 2016
- First year survey and report: Fall 2017
- Second year survey and report: Fall 2018
- Third year survey and report: Fall 2019
- Final report: December 2019.

Budget

No additional cost will be incurred for pavement rutting, cracking, or IRI data collection, as the annual Pavement Management System (PMS) survey will document pavement performance after initial construction testing is complete.

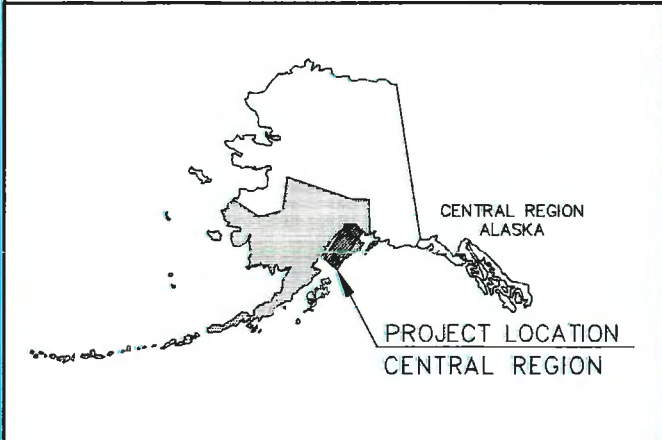
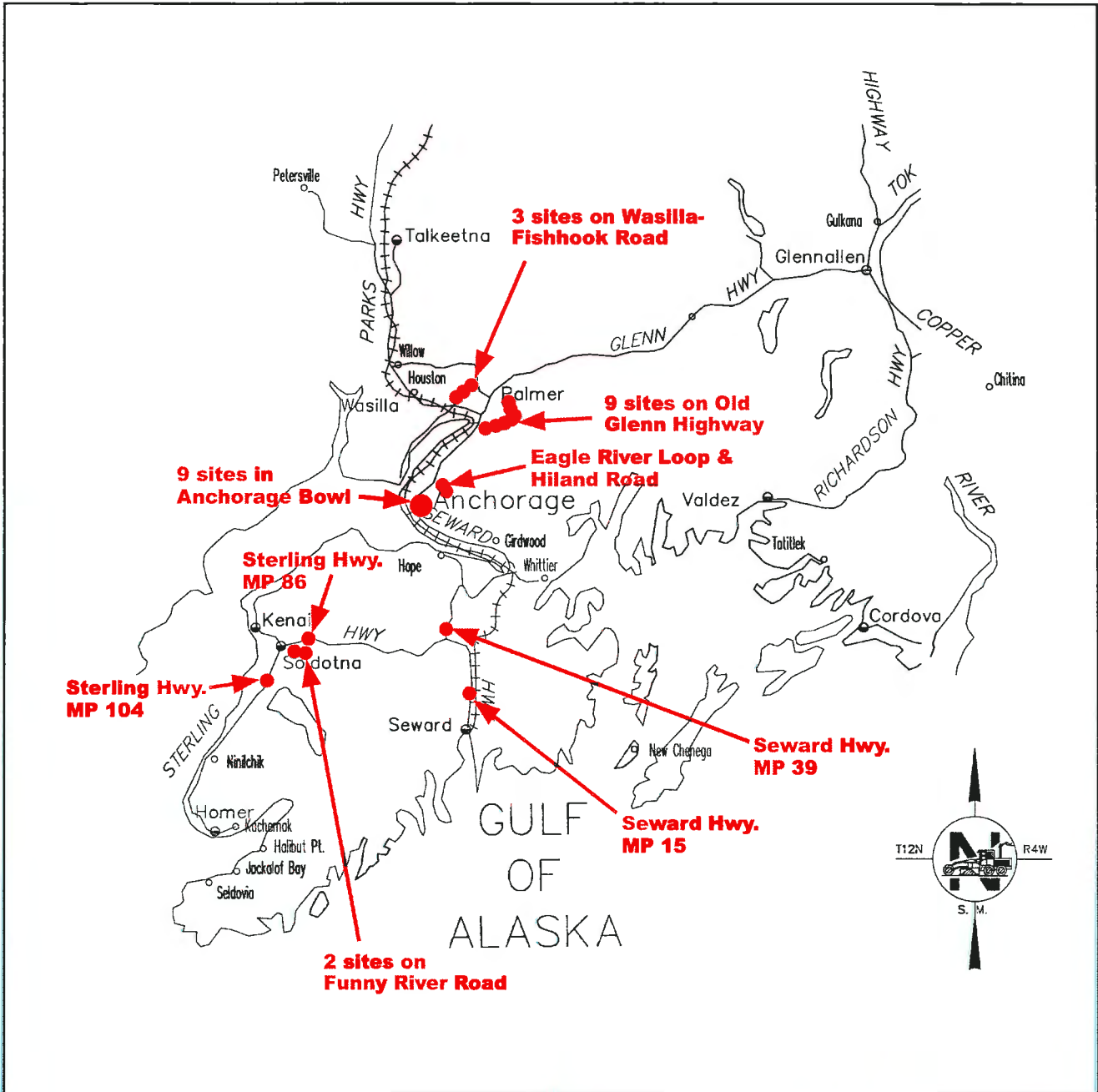
There will be a cost associated with the initial pavement friction measurements (prior to construction) and post-construction pavement evaluation. DOT&PF Materials staff will perform the above planned tasks for a total of \$138,500 which includes traffic control operations, ICAP, equipment use, reporting, and staff time. See Appendix B for detailed cost estimate.

Appendix A

HFST Location Maps

HFST Candidate Locations Summary Spreadsheet

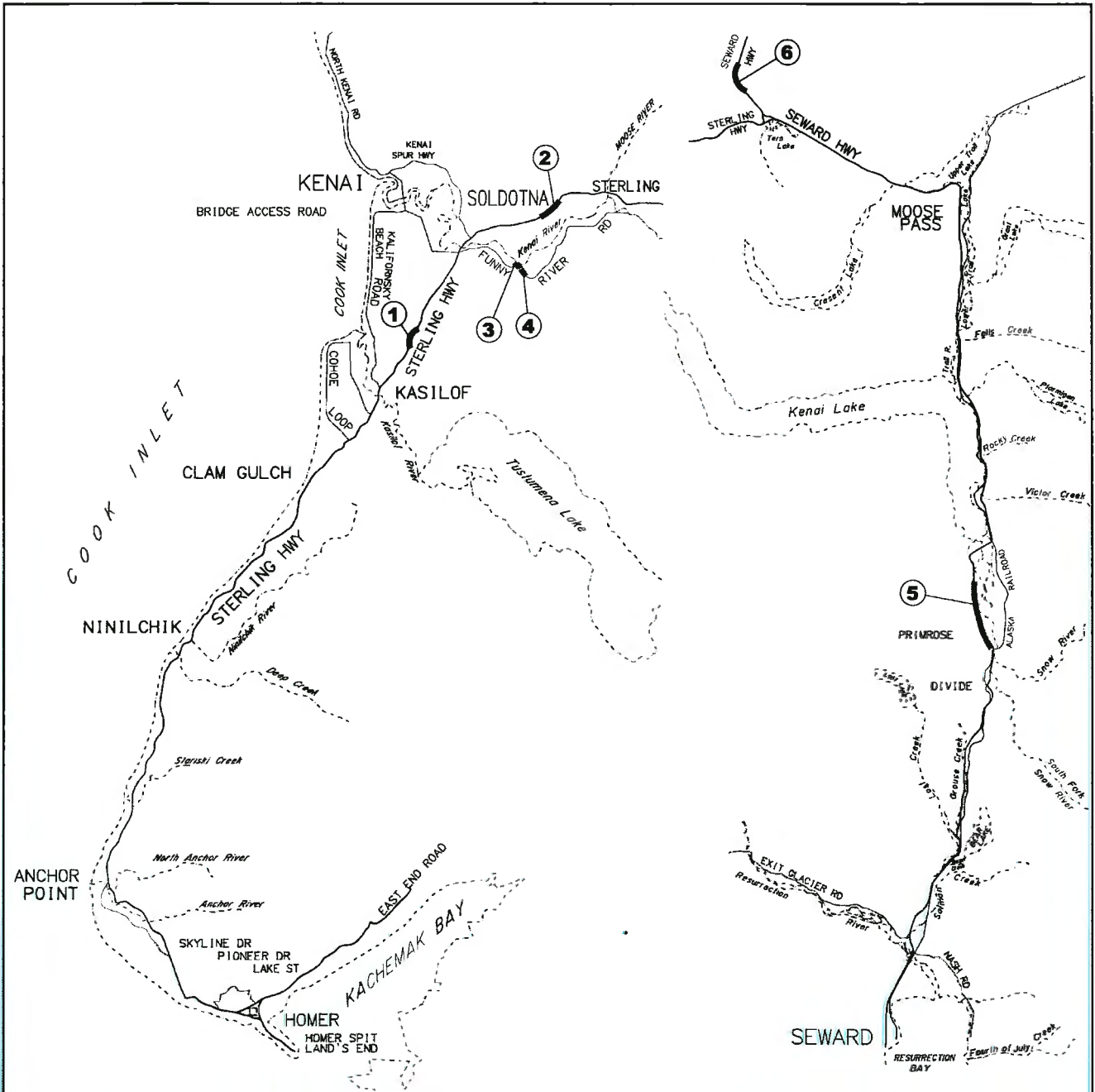
Conformed Planset



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

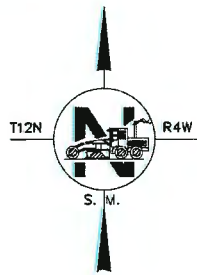
FIGURE 1
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092

LOCATION AND VICINITY MAP



Soldotna-Homer

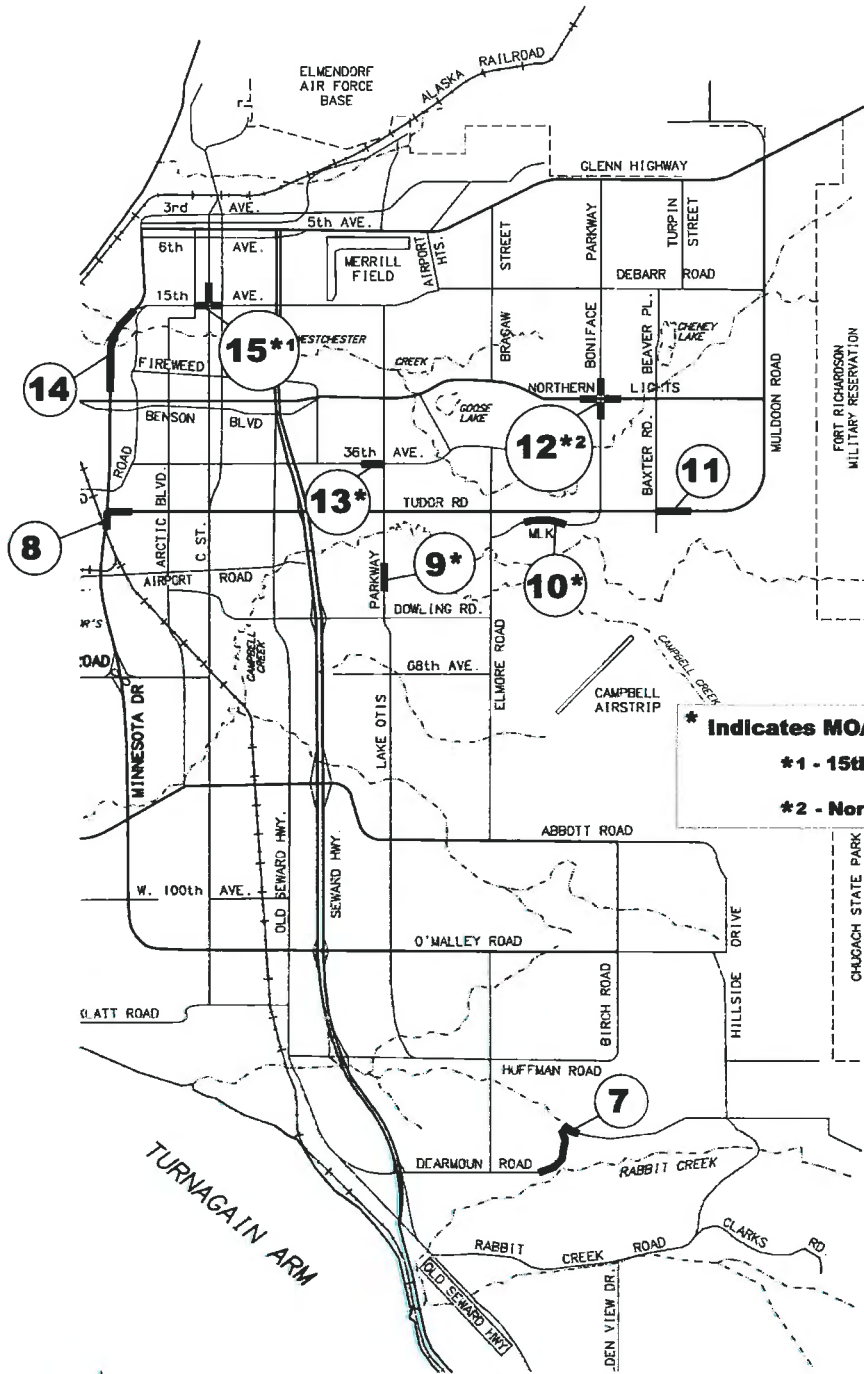
Seward Highway



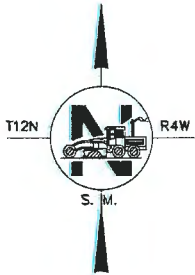
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

FIGURE 2
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092
 12/11/2014

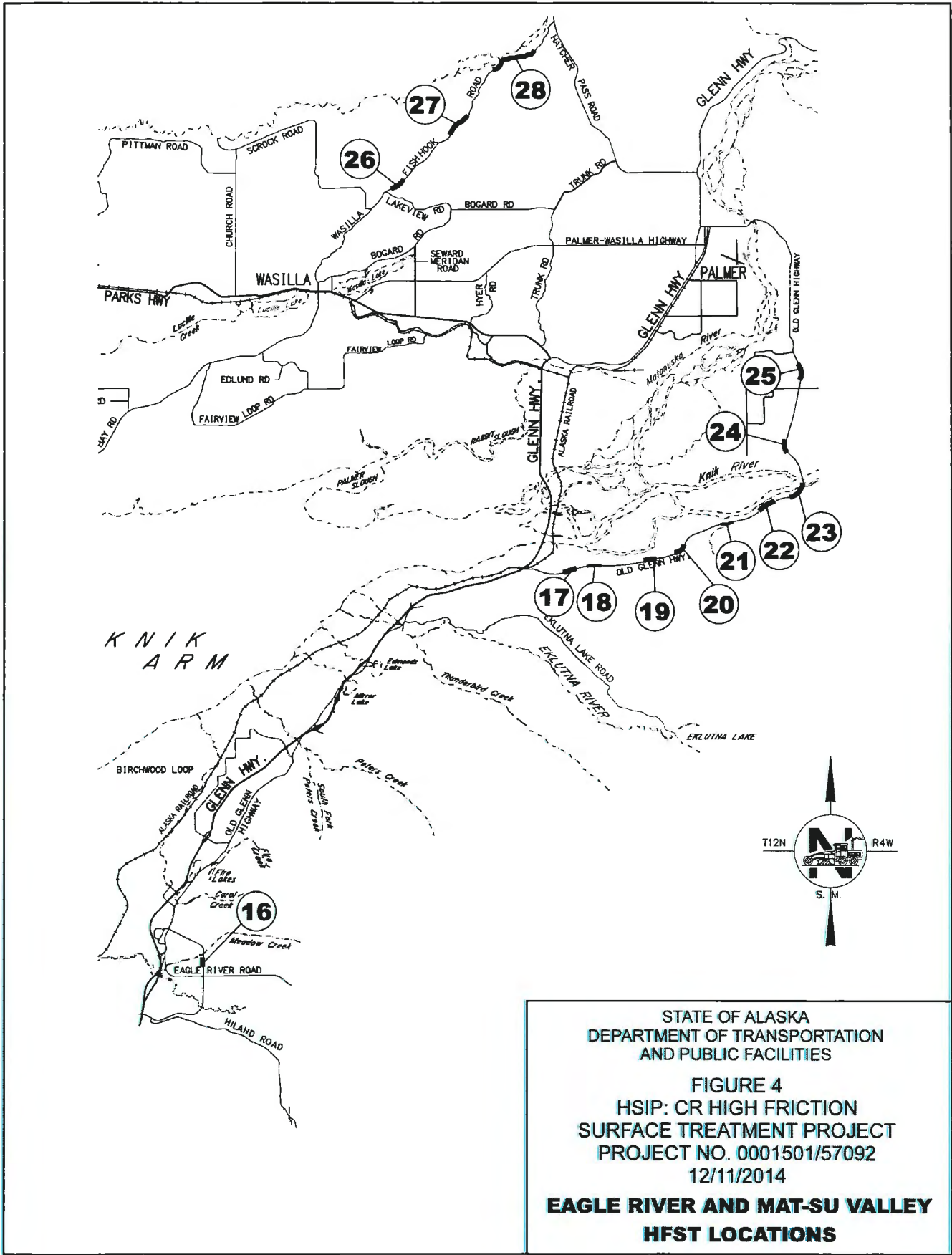
KENAI PENINSULA HFST LOCATIONS



*** Indicates MOA Owned Streets**
***1 - 15th Avenue**
***2 - Northern Lights Boulevard**



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
FIGURE 3
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092
 12/11/2014
ANCHORAGE AREA HFST LOCATIONS



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

FIGURE 4
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092
 12/11/2014

**EAGLE RIVER AND MAT-SU VALLEY
 HFST LOCATIONS**

Location Number	Road Segment/Intersection	Begin	End	Roadway Functional Classification	NHS, AHS or HRRR*
1	Sterling Hwy. MP 104	1200' south of Wolverine	260' north of MP 104	Principal Arterial-Other	NHS
2	Sterling Highway MP 86 (Evergreen)	2880' south of Evergreen Street	220' south of Evergreen Street	Interstate	NHS
3	Funny River Rd. (Bayberry to Wik)	700' east of Bayberry Street	Wik Circle	Minor Collector	HRRR. Not NHS or AHS
4	Funny River Rd. MP 6	2275' east of Wik Circle	1340' west of MP 6	Minor Collector	HRRR. Not NHS or AHS
5	Seward Highway MP 14-16	625- south of MP 15	1030' south of Greyling Creek Crossing	Principal Arterial-Other	NHS
6	Seward Highway MP 38-40	1050' north of Devils Pass Trailhead Access Road (55/65 MPH speed transition)	850' south of west side driveway access north of Jerome Lake.	Interstate	NHS
7	De Armoun Rd.	300' east of Mulligan Street	600' west of Crestview	Major Collector	Not NHS or AHS
8	Minnesota Drive @ Tudor Road	North Abutment north Railroad Overcrossing	South Crosswalk Line, Tudor Road	Principal Arterial-Other	NHS
9	Lake Otis Pkwy.	20' north of 52nd Avenue centerline	STOP bar line at Waldron Drive	Principal Arterial-Other	NHS
10	MLK Dr. Ballfields Access to Tudor Centre Drive	25' east of Ballfield Access	End of median island 280' west of Tudor Centre Drive	Minor Arterial	Not NHS or AHS
11	Tudor Rd. at Baxter Road	150' west of Baxter Road.	1050' east of Baxter Road.	Principal Arterial-Other	NHS
12	Northern Lights Blvd. at Boniface Parkway	350' west of near X-Walk Line at Boniface Parkway	415' east of near X-Walk Line at Boniface Parkway	Principal Arterial-Other	NHS
		260' south of near X-Walk line at Northern Lights Boulevard	330' north of near X-Walk line at Northern Lights Boulevard		
13	36th Ave. at Lake Otis Parkway	150' east of Randolph Street	Near X-Walk line at Lake Otis Parkway	Principal Arterial-Other	NHS
14	Minnesota Dr. 25th to 15th	25th Avenue	15th Avenue	Principal Arterial-Other	NHS
15	15th Avenue @ C Street	215' west of near X-Walk line at C Street	120' east of near X-Walk line at C Street	Minor Arterial	Not NHS or AHS
		310' north of near X-Walk line at 15th Avenue.	Near X-Walk line at 15th Avenue.		
16	Eagle River Loop Road @ Baranof/Citation	950' north of Baranof/Citation centerline	Near X-Walk line at Baranof/Citation	Minor Arterial	Not NHS or AHS
17	O'd Glenn -MP 2	200' east of MP 2	Winding Road sign 2000' east of MP 2	Major Collector	HRRR and AHS
18	O'd Glenn-MP 3 Twin Peaks	1740' west of MP 3. (Twin Peaks)	990' west of MP 3	Major Collector	HRRR and AHS

Location Number	Road Segment/Intersection	Begin	End	Roadway Functional Classification	NHS, AHS or HRRR*
19	Old Glenn-Power Plant	Curve to left sign 715' west of MP 4.	1930' west of MP 4 (100'+/- west of Eklutna Tailrace entrance)	Major Collector	HRRR and AHS
20	Old Glenn-MP 5	3160' east of MP 4. (at Curve to Left with 45 MPH plate)	Curve to right sign 1160' west of MP 5.	Major Collector	HRRR and AHS
21	Old Glenn-MP 6	400' west of western Goat Creek Bridge abutment. (AT EB curve to left sign Near MP 6)	840' east of east end of Goat creek bridge. (940' east of MP 6)	Major Collector	HRRR and AHS
22	Old Glenn-MP 7	400' west of MP 7 (winding road sign near MP 7)	2400' east of MP 7.	Major Collector	HRRR and AHS
23	Old Glenn-MP 8 to Knik River	Curve to left sign with 40 MPH plate 425' east of MP 8.	South Knik River Bridge abutment.	Major Collector	HRRR and AHS
24	Old Glenn-Our Road	At curve warning sign 825' north of Our Road.	Curve warning sign 275' south of Our Road.	Major Collector	HRRR and AHS
25	Old Glenn-MP 12	Curve to left sign 1330' south of Marilyn Drive.	At cross culvert 120' north of Marilyn Drive.	Major Collector	HRRR and AHS
26	Wasilla/Fishhook Rd. Lakeview to Paradise	1800' northeast of Lakeview Drive	900' south of Paradise (400' north of Olga Cir.)	Major Collector	HRRR. Not NHS or AHS
27	Wasilla/Fishhook Rd., Mariah to Pamela	E. Mariah Drive intersection	Pamela Drive intersection	Major Collector	HRRR. Not NHS or AHS
28	Wasilla/Fishhook Rd. King Cove to McCCasey	420' northeast of N King Cove Drive	N McCCasey Drive intersection	Major Collector	HRRR. Not NHS or AHS

*NHS: National Highway System, AHS: Alaska Highway System, HRRR: HSIP High Risk Rural Road

HSIP: CR High Friction Surface Treatment Candidate Locations

Appendix B

Memorandum for Friction Testing from CR Materials dated September 3, 2015

Sample Construction Evaluation Field Sheet

Sample Annual Post Construction Evaluation Sheet



MEMORANDUM

Department of Transportation and Public Facilities
 Central Region Materials
 5750 EAST TUDOR ROAD
 ANCHORAGE, AK 99507-1225
 Tel. 269-6200 Fax 269-6201

TO: Anna Bosin, P.E.

Date: September 3, 2015

THRU: Newton Bingham, P.E.

FILE NO: CR High Friction Surface
 Treatment #57092

Newton Bingham
 FROM: Craig Boeckman, C.P.G. *CB*

SUBJECT: Friction Testing

Central Region Materials offers the following geotechnical services;

TASK	Dates		Cost
Signed SSB from Project Manager	TBD		n/a
ADMINISTRATION: Gather data, prepare exploration plan, traffic control contract, etc.	TBD		\$3,500
CONSTRAINTS: See below.	TBD		n/a
FIELD INVESTIGATION: (6 days per testing event)	3 test events over 3 years		n/a
Traffic Control Contractor	TBD		\$45,000
CRM Engineer and assistant (equipment, lodging, per diem)	TBD		\$45,000
DFT Pads (total all 3 events)			\$3,000
REPORTING:	Draft	Final	
Friction Testing Results (total for three events plus final report compiling all 3 events)	30 days after testing event	60 days after testing event	\$42,000
Total Estimated Cost			\$138,500

Note: ICAP and CR Cap costs are included in the labor charges.

Overview of Field work: Perform High Surface Friction Testing for this Research Project. Currently twenty eight (28) sites are identified for this project (see maps attached).

Schedule for Friction Testing:

- Friction testing will be performed immediately before and after construction. This testing will be paid under the construction contract (anticipate construction in late summer 2016).
 - Post construction report will be paid under the construction budget.
- Perform Friction Testing annually for three years following construction (anticipate these annual events in 2017, 2018, and 2019).
 - Final report compiling all 3 testing events.

Sites identified for friction testing:

Kenai Peninsula

- Sterling Highway – MP 104
- Sterling Highway – MP 86
- Funny River Road – MP 5
- Funny River Road – MP 6

Kenai Peninsula, Continued

- Seward Highway – MP 14 to MP 16
- Seward Highway – MP 38.4 to MP 40.5

Municipality of Anchorage

- DeArmoun Road Milepoint 1.75 to 2.5
- Minnesota Drive and Tudor Road Intersection
- Lake Otis Parkway and Waldron Drive Intersection
- Martin Luther King Jr.: Ballfields to Tudor Centre
- Tudor and Baxter Road Intersection
- Boniface Parkway and Northern Lights Boulevard Intersection
- 36th Avenue and Lake Otis Parkway Intersection
- Minnesota Drive: 25th Avenue to 15th Avenue
- C Street and 15th Avenue Intersection
- Eagle River Loop and Baronoff Avenue/Citation Road

Mat-Su Borough

- Old Glenn Highway – MP 2
- Old Glenn Highway MP 3 (Twin Peaks)
- Old Glenn Highway – Power Plant
- Old Glenn Highway – MP 5
- Old Glenn Highway – MP 6
- Old Glenn Highway – MP 7
- Old Glenn Highway MP 8 to Knik River Road
- Old Glenn Highway – Our Road
- Old Glenn Highway – MP 12
- Wasilla/Fishhook Road: Lakeview Road to Paradise Lane
- Wasilla/Fishhook Road: Mariah Drive to Pamela Drive
- Wasilla/Fishhook Road: King Cove King to McCCasey Drive

Traffic control will be performed by a contractor during the annual events between 2017 and 2019. The testing plan may be modified each year based on performance of the road surface at each of the 28 sites. Friction testing will be performed by Central Region Material staff (2 personnel). Costs also include pads for the friction tester (about \$1,000 per year). After each test event a report will be issued that indicates the methods and test results for each of the 28 sites and any recommendations for the next test event(s).

Constraints by others: Contracts Section (Traffic control contract), Traffic Control Plan review and approval (Traffic Section).

Thank you for allowing us to present our estimate. Please sign below for approval to proceed:

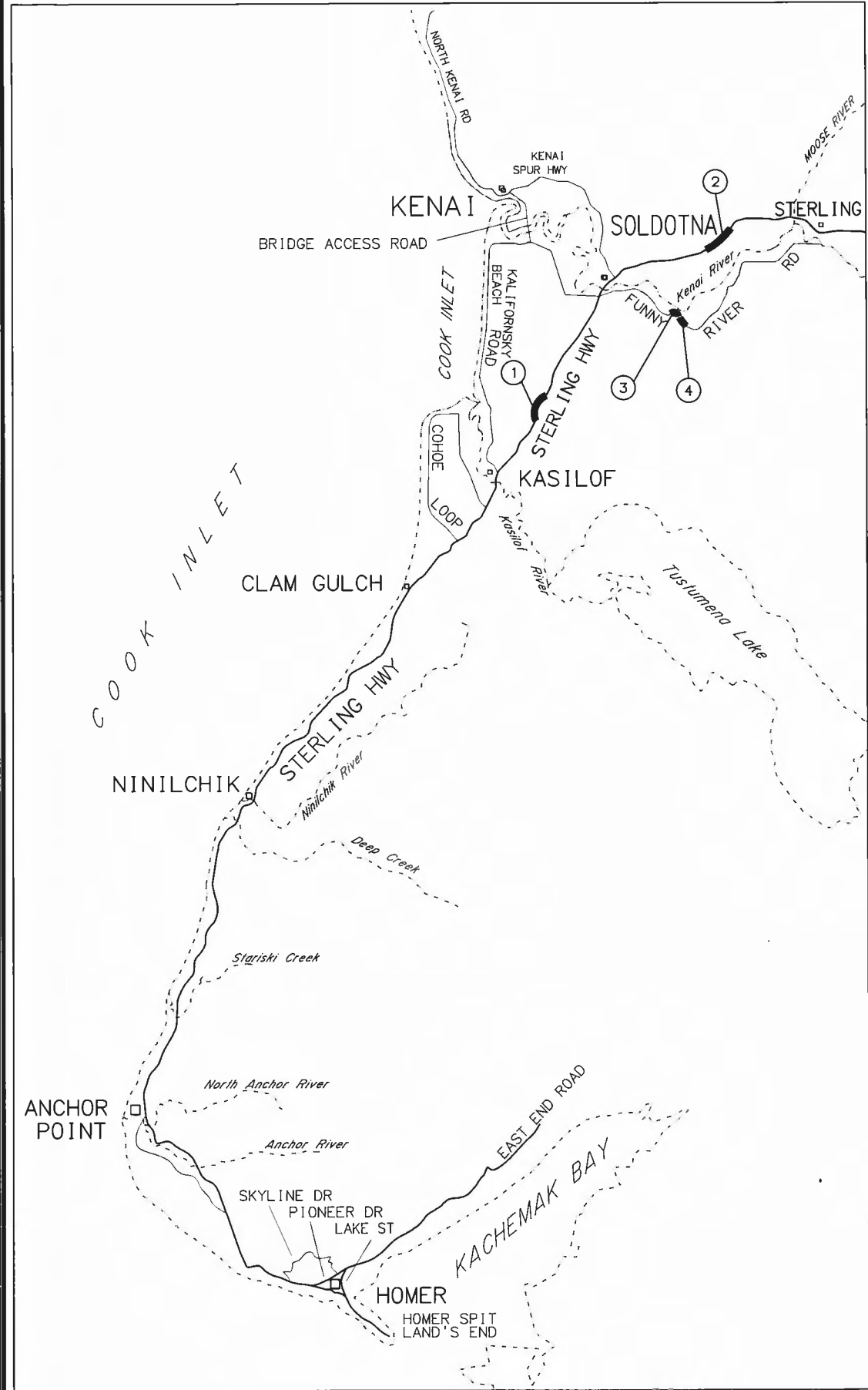
Anna Bosin, P.E. – Research Project Manager

Date

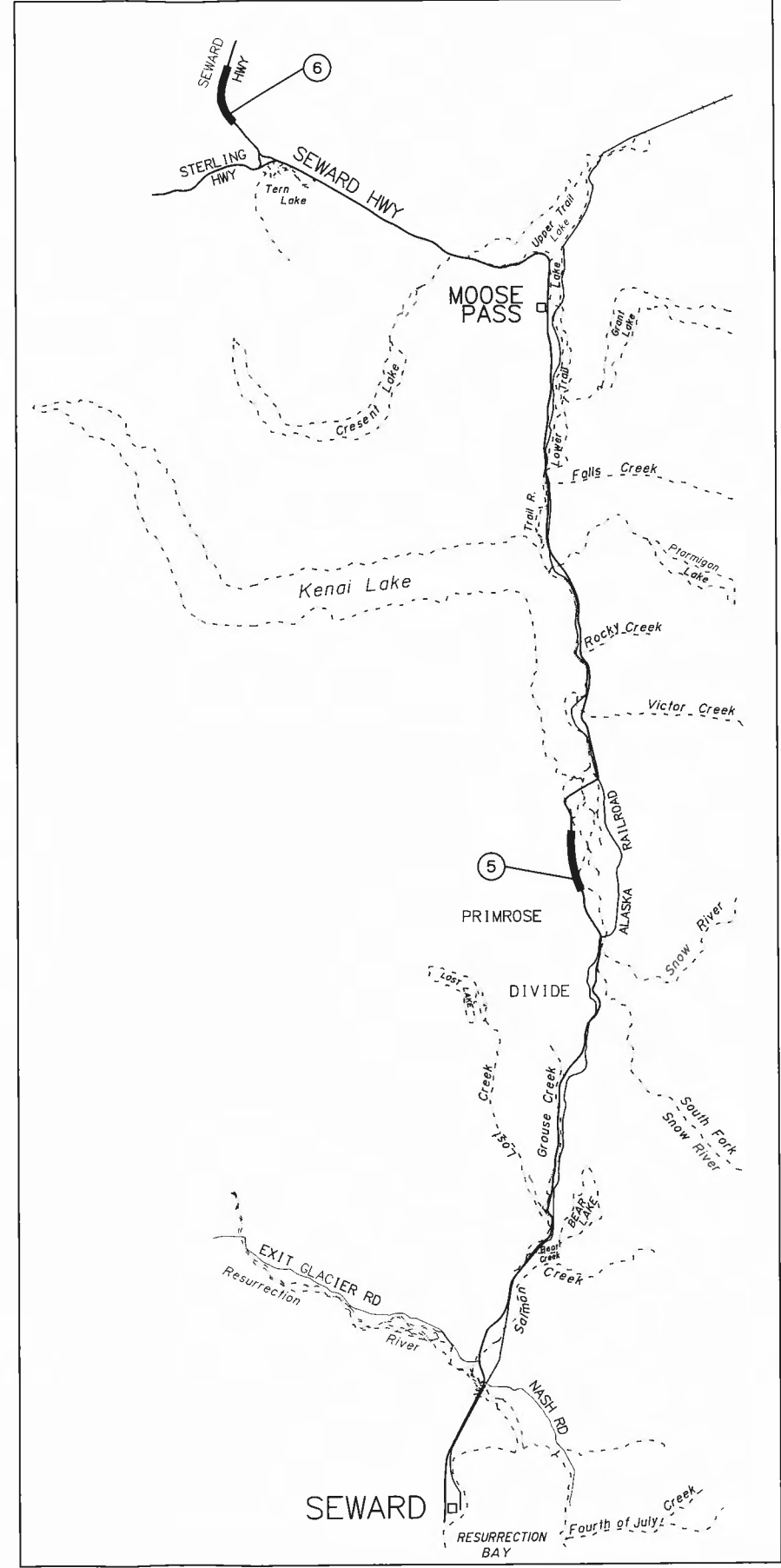
cc.: Andrew Pavey EA III CR Materials
Attachment: Map of Proposed Test Sites (28)

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/7570920000	2015	A4	A5

DESIGNED BY: AL/JP
 CHECKED BY: AL/JP
 DRAFTED BY: BSB
 SHEETS: N/A
 SCALE: N/A
 LAYOUT: A4
 DATE TIME: 4/1/2015 11:16 AM
 DRAWING LOCATION: C:\Users\Aiza.Miguel\Desktop\High Friction Surface Treatment\Production Drawings\37092_AZ_AJKEY.dwg



KENAI PENINSULA AREA MAP N.T.S.



KENAI PENINSULA AREA MAP N.T.S.

SITE LOCATION			
GROUP #	SITE #	DESCRIPTION	TOWN
A	1	STERLING HIGHWAY - MP 104	KASILOF
	2	STERLING HIGHWAY - MP 86	SOLDOTNA
	3	FUNNY RIVER ROAD - MP 5	SOLDOTNA
	4	FUNNY RIVER ROAD - MP 6	SOLDOTNA
B	5	SEWARD HIGHWAY - MP 14 TO MP 16	SEWARD
	6	SEWARD HIGHWAY - MP 38.4 TO MP 40.5	SEWARD "Y"

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

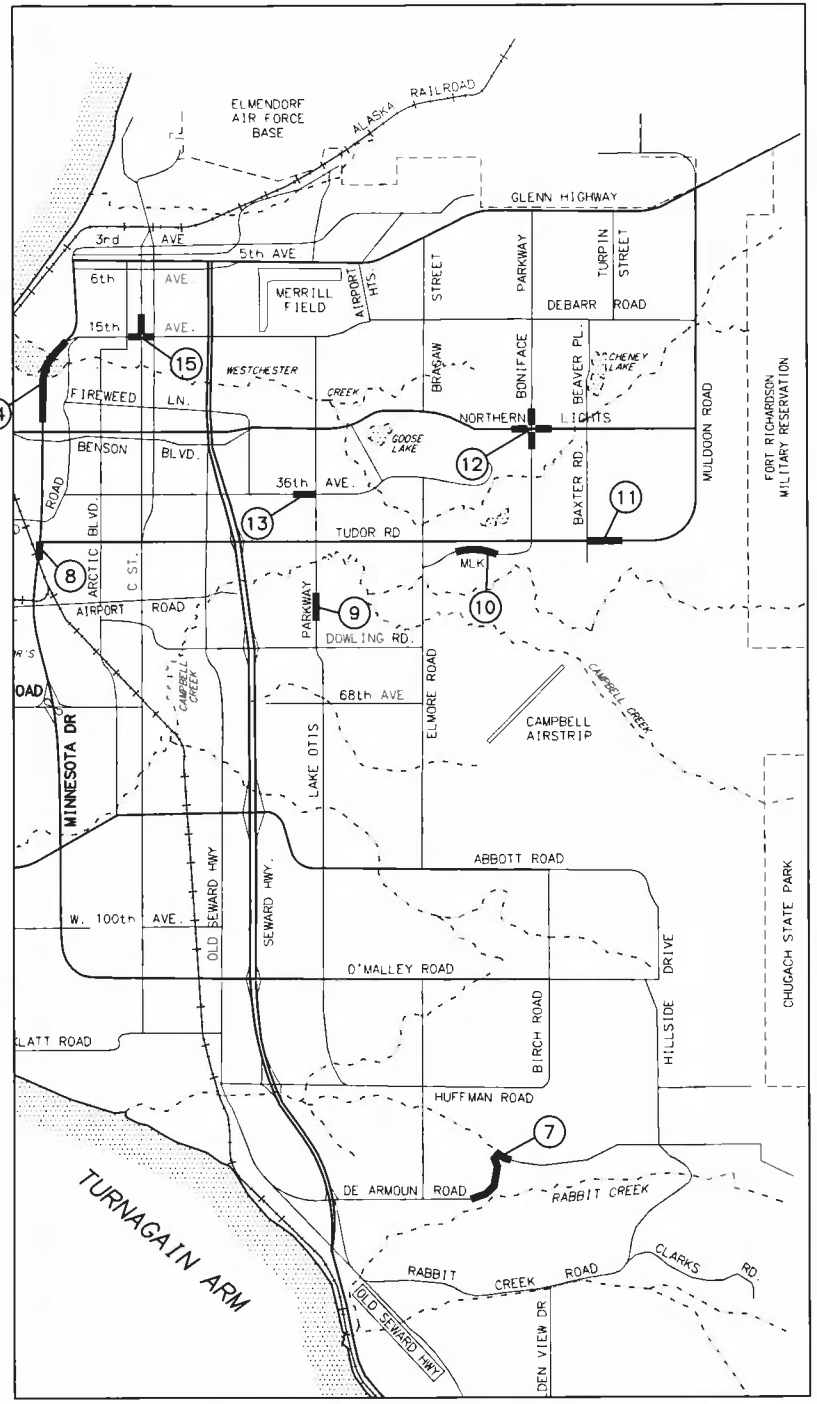
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

KEY PLAN

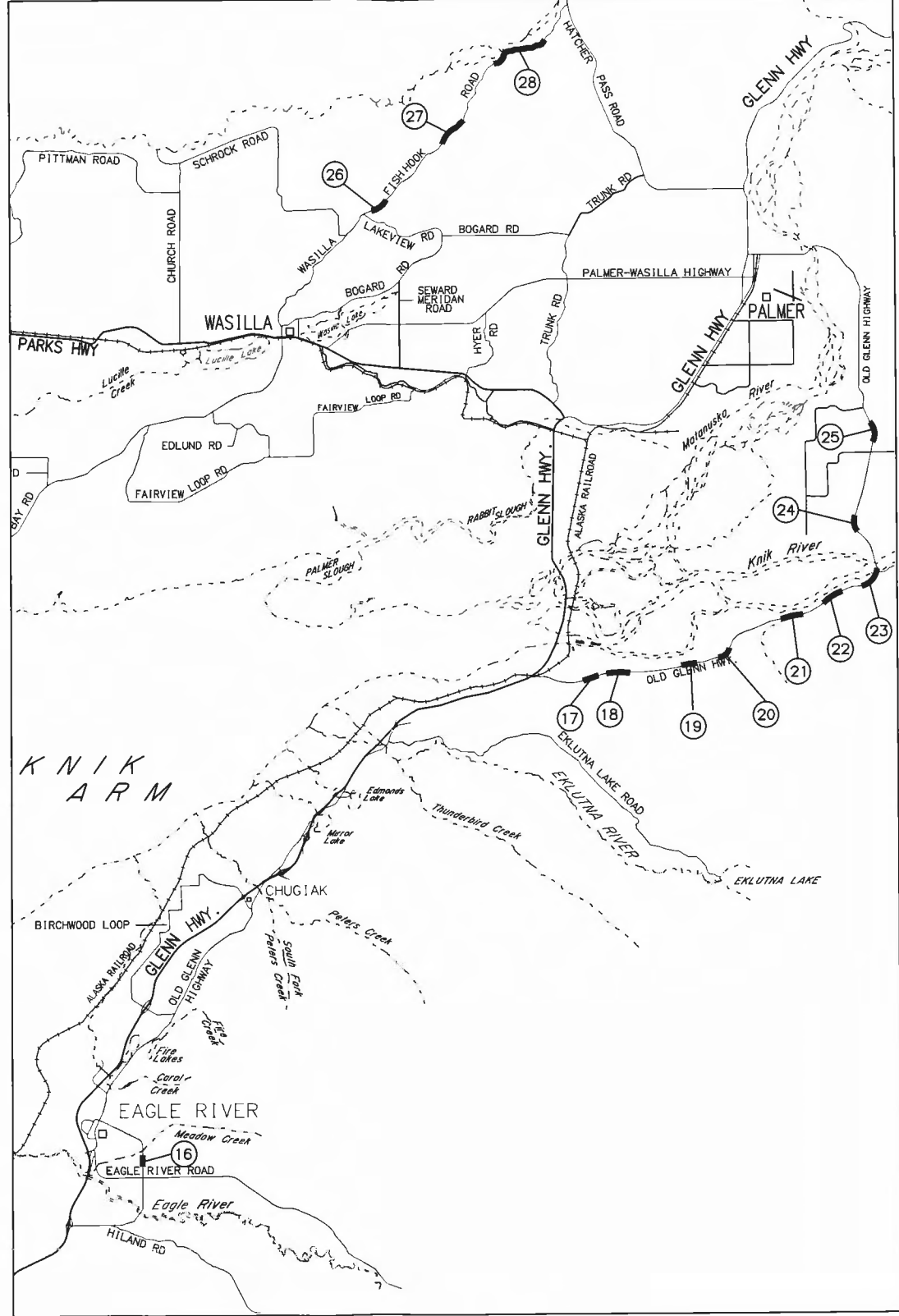
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	A5	A5

DESIGNED BY: LAJ/JP
 CHECKED BY: LAJ/JP
 DRAFTED BY: BSB
 XREFS: N/A
 SCALE: N/A
 LAYOUT: A5
 DATE: 4/17/2015 11:16 AM
 TIME: 11:16 AM
 DRAWING LOCATION: C:\Users\A1za.Miguel\Desktop\High Friction Surface Treatment\Production Drawings\57092_A2_A3KEY.dwg



ANCHORAGE AREA MAP N.T.S.



EAGLE RIVER, WASILLA AREA MAP N.T.S.

SITE LOCATION

GROUP #	SITE #	DESCRIPTION	TOWN
C	7	DE ARMOUN ROAD	ANCHORAGE
	8	MINNESOTA DRIVE AND TUDOR ROAD	ANCHORAGE
	9	LAKE OTIS PARKWAY - WALDRON DRIVE	ANCHORAGE
	10	MARTIN LUTHER KING JR DRIVE: BALLFIELDS TO TUDOR CENTRE DRIVE	ANCHORAGE
	11	TUDOR ROAD AND BAXTER ROAD	ANCHORAGE
	12	BONIFACE PARKWAY AND NORTHERN LIGHTS BOULEVARD	ANCHORAGE
	13	36TH AVENUE AND LAKE OTIS PARKWAY	ANCHORAGE
	14	MINNESOTA DRIVE (25TH AVENUE TO 15TH AVENUE)	ANCHORAGE
D	15	C STREET AND 15TH AVENUE	ANCHORAGE
	16	EAGLE RIVER LOOP ROAD AND BARONOFF AVENUE/CITATION ROAD	EAGLE RIVER
E	17	OLD GLENN HIGHWAY - MP 2	PALMER
	18	OLD GLENN HIGHWAY MP 3 (TWIN PEAKS)	PALMER
	19	OLD GLENN HIGHWAY - POWER PLANT	PALMER
	20	OLD GLENN HIGHWAY - MP 5	PALMER
	21	OLD GLENN HIGHWAY - MP 6	PALMER
	22	OLD GLENN HIGHWAY - MP 7	PALMER
	23	OLD GLENN HIGHWAY MP 8 TO KNIK RIVER ROAD	PALMER
	24	OLD GLENN HIGHWAY - OUR ROAD	PALMER
	25	OLD GLENN HIGHWAY MP12	PALMER
	F	26	WASILLA/FISHHOOK ROAD: LAKEVIEW ROAD TO PARADISE LANE
27		WASILLA/FISHHOOK ROAD: MARIAH DRIVE TO PAMELA DRIVE	WASILLA
28		WASILLA/FISHHOOK ROAD: KING COVE DRIVE TO MCCASEY DRIVE	WASILLA

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT

KEY PLAN

HFST Construction Field Evaluation Sheet

Site #	Description (CDS Route, NB/SB, GPS Coordinates)		
Date	Time	Staff Present	Weather

Pavement Condition:

1. Ruts, cracks (Review HPMS Data)?

2. Application was on existing older pavement?
 - 3a. or surface milled and repaved prior to application?

 - 3b. If so, how many days has pavement cured prior to HFST application?

Construction:

1. Temperature at time of resin application?

- 2a. What type of stripes are present? (Paint or Inlaid MMA)

- 2b. Resin within stripes? Or over stripes?

3. The production rate for the automated lay down equipment and equipment model information:

4. HFST DFT value per construction specifications:

5. General notes:

HFST Post-Construction Annual Field Evaluation Sheet

Testing will require traffic control per MUTCD requirements and a traffic control plan will need to be submitted to the CR Traffic Section for review and approval annually.

Site #	Description (CDS Route, NB/SB, GPS Coordinates)		
Date	Time	Staff Present	Weather

Pavement Condition:

1. Ruts, cracks, IRI (Review HPMS Data)?

2. Visual overall pavement condition:

3. Pavement raveling, binder exposure, etc?

HFST Condition:

Friction DFT value per plan below: Test method ASTM E1911

“Control” means pavement adjacent to test site without HFST but is representative of the overall pavement condition for the lane. Test locations should have GPS.coordinates taken for repeatability and reporting. Photos encouraged.

Number of DFT Tests per Site	Tangent	Curve	
3	Wheel path, non-wheel path, plus control	PC/PT, MC, plus control	DFT GPS Location

←CONTROL SITE VALUES

4. General notes:

Appendix K

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
CENTRAL REGION



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

HSIP: CR High Friction Surface Treatment Project No. 0001501/Z570920000

**AS ADVERTISED: November 10, 2015
Document Fee: \$100.00**

**To be used in conjunction with State of Alaska Standard Specifications for Highway
Construction dated 2015, and the Plans for the above referenced project.**

www.dot.alaska.gov - "Procurement"



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Labor and
Workforce Development
P.O. Box 111149
Juneau, Alaska 99811-1149
Main: 907.465.2700, Fax: 907.465.2784

Department of Transportation
and Public Facilities
P.O. Box 112500
Juneau, Alaska 99811-2500
Main: 907.465.3900, Fax: 907.586.8365

Dear Prospective Contractor:

If you are considering bidding on an Alaska public works project, please remember the positive benefits of hiring locally. Construction, maintenance, and operation of public works projects are vital to the local economy. Alaska Hire helps contractors too— your neighbors are more invested in our community than non-residents, they are more likely to show up to work on time and finish the job.

If you want to hire more Alaskans, we're here to help. Hiring local workers is cost-effective and can benefit your business in many ways. The Alaska Department of Labor and Workforce Development's Job Center staff can connect you with qualified, skilled Alaskan workers through the Alaska Labor Exchange (ALLEXsys) employee/employer database. Call (907) 465-2712 to get connected with a Job Center and potential employees in your community.

Work Opportunity Tax Credits (WOTC) are available to employers who hire qualified new employees who are unemployed disabled veterans, recipients of Temporary Assistance or food stamps, ex-offenders, and residents of Empowerment Zones or Renewal Communities. The WOTC program saved employers operating in Alaska over \$3.2 million last year. For information on the tax credit program call (907) 465-5952 or visit the WOTC website, www.jobs.alaska.gov/wotc.htm.

The Department of Transportation and Public Facilities, the Department of Labor and Workforce Development, the Alaska Native Coalition on Employment and Training (ANCFET), the Construction Education Foundation, and other industry training providers work closely together to recruit women, Alaska Natives, minorities and veterans for training and job referral. We can assist your business in finding qualified employees right now, as well as help you institute training programs to ensure a stable and skilled workforce over the long term. There are many high school and adult training programs across the state that prepare Alaska residents for construction jobs and to learn a trade as registered apprentice. Alaska has over 1,500 registered apprentices and our Job Centers can assist employers that want to hire apprentices. Alaska's prevailing wage is adjusted to allow employers to pay apprentices a reduced rate while they are learning their trade, offsetting your costs of training the apprentice. Additionally, there are on-the-job training wage incentives available for employers that hire apprentices.

If you are awarded a contract, we will send you additional information on the business benefit of hiring locally and how to use the free Alaska Labor Exchange System to find qualified Alaska residents. Your effort to hire locally is appreciated very much. We wish you well in the upcoming construction season and thank you for putting Alaskans to work.

Sincerely,

Handwritten signature of Heidi Drygas.

Heidi Drygas, Commissioner
Department of Labor
and Workforce Development

Handwritten signature of Marc Luiken.

Marc Luiken, Commissioner
Department of Transportation
and Public Facilities

"Keep Alaska Moving through service and infrastructure."

TABLE OF CONTENTS

(Federal-Aid Highways)

1. Invitation (yellow)

INVITATION TO BID	25D-7	(8/01)
-------------------	-------	--------

2. Bid Notices (yellow)

REQUIRED DOCUMENTS	25D-4A	(5/12, CR 7/15)
FEDERAL EEO BID CONDITIONS	25A-301	(12/14)

3. Forms (yellow)

SUBCONTRACTOR LIST	25D-5	(10/12)
BIDDER REGISTRATION	25D-6	(12/14)
CONTRACTOR'S QUESTIONNAIRE	25D-8	(8/01)
BID FORM	25D-9	(7/03)
BID SCHEDULE		
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	(8/01)
MATERIAL ORIGIN CERTIFICATE	25D-60	(8/01)
EEO-1 CERTIFICATION	25A-304	(8/01)
DOT&PF TRAINING PROGRAM REQUEST	25A-310	(5/13)
TRAINING UTILIZATION REPORT	25A-311	(3/15)
CONTACT REPORT	25A-321A	(1/02)
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. Contract Provisions and Specifications (white)

STANDARD MODIFICATIONS		
SPECIAL PROVISIONS		
APPENDIX A: CONSTRUCTION SURVEY REQUIREMENTS		
APPENDIX B: ENVIRONMENTAL PERMITS		
APPENDIX C: MATERIAL CERTIFICATION LIST		
REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID (FHWA) CONSTRUCTION CONTRACTS	25D-55H	(5/12)

5. Federal Wage Rates

Federal wage rates can be obtained at <http://www.wdol.gov/dba.aspx> 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. State Wage Rates

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: November 10, 2015

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

Location of Project: Central Region, Alaska
Contracting Officer: Joel G. St. Aubin, P.E., Director, Design & Construction
Issuing Office: Central Region

State Funded [] Federal Aid [X]

Description of Work:

This federally funded project will install hard aggregate surface treatment to increase friction at multiple locations within central region. Project work also includes signing, striping, milling and paving.

The Engineer's Estimate is between **\$5,000,000 and \$10,000,000**

All work shall be completed by: **September 15, 2016**

Interim Completion dates, if applicable, will be shown in the Special Provisions.

Bidders are invited to submit sealed bids, in single copy, for furnishing all labor, equipment, and materials and for performing all work for the project described above. Bids will be opened publicly at 2:00 p.m. local time, in the main conference room, 4111 Aviation Avenue, Anchorage, Alaska on December 2, 2015.

SUBMISSION OF BIDS

ALL BIDS INCLUDING ANY AMENDMENTS OR WITHDRAWALS MUST BE RECEIVED PRIOR TO BID OPENING. BIDS SHALL BE SUBMITTED ON THE FORMS FURNISHED AND MUST BE IN A SEALED ENVELOPE MARKED AS FOLLOWS:

<p>Bid for Project: HSIP: CR High Friction Surface Treatment Project No. 0001501/Z570920000</p>	<p>ATTN: Contracts State of Alaska Department of Transportation & Public Facilities P.O. Box 196900 Anchorage, AK 99519-6900</p>
--	---

Bids, amendments or withdrawals transmitted by mail must be received in the above specified post office box no later than 7 hours prior to the scheduled time of bid opening. Hand-delivered bids, amendments or withdrawals must be received by **Sharon L. Smith P.E., Chief of Contracts** at the Contracts Section, 4111 Aviation Avenue, prior to the scheduled time of bid opening. Faxed bid amendments must be addressed to **Sharon L. Smith, P.E., Chief of Contracts**. Fax number: (907) 269-0425.

A bid guaranty is required with each bid in the amount of 5% of the amount bid. (Alternate bid items as well as supplemental bid items appearing on the bid schedule shall be included as part of the total amount bid when determining the amount of bid guaranty required for the project.)

The Department hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises (DBEs) 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 are hereby notified that data to assist in preparing bids is available as follows:

See attached Special Notice to Bidders for this project.

Plans and Specifications may be ordered, for the price of \$100.00 from:

State of Alaska, Department of Transportation & Public Facilities
Plans Room
4111 Aviation Avenue
P.O. Box 196900
Anchorage, AK 99519-6900

Phone: (907) 269-0408

All questions relating to design features, constructability, quantities, or other technical aspects of the project should be directed to the following. Bidders requesting assistance in viewing the project must make arrangements at least 48 hours in advance with:

Carla Smith, P.E.

Primary method of contact: carla.smith@alaska.gov

Phone: (907) 269-0544

All questions concerning bidding procedures should be directed to:

Sharon L. Smith, P.E.
Chief of Contracts
P.O. Box 196900
Anchorage, AK 99519-6900

Phone: (907) 269-0414

The Bid Calendar, Planholder lists, 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 **2015 Standard Specifications for Highway Construction** can be obtained at
<http://dot.state.ak.us/stwddes/dcsspeecs/assets/pdf/hwyspeecs/sshc2015.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 or for download online:
 - a. Standard Specifications for Highway Construction, 2015 Edition (\$25.00). Available online at: <http://www.dot.state.ak.us/stwddes/dcspecs/assets/pdf/hwyspecs/sshc2015.pdf>
 - b. Alaska Test Methods Manual (Lab & Field), April 30, 2012 Edition (\$25.00). Available online at: http://www.dot.state.ak.us/stwddes/desmaterials/mat_waqtc/pop_testman.shtml
 - c. Alaska Storm Water Pollution Prevention Plan Guide, February, 2011. http://www.dot.state.ak.us/stwddes/desenviron/pop_swppp.shtml
 - d. Quantity Computations
 - e. Erosion, Sediment Control Plan (ESCP), HSIP: CR High Friction Surface Treatment, Project No. 0001501/Z570920000, April 2015, by AWR Engineering.
 - f. Traffic Control Plan (TCP), HSIP: CR High Friction Surface Treatment, Project No. 0001501/Z570920000, July 2015, by Kinney Engineering, LLC.

FED_SOA-CRSNB/Z570920000

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. Laborers Mechanics Minimum Rate of Pay. The current Laborers Mechanics Minimum Rate of Pay contains information on remote sites and per diem. The Department of Labor has issued WHPL #197, which further clarifies this requirement. See pay item 640(4).
5. 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.

Any questions about this notice may be directed to Dennis Good, Manager of the Civil Rights Office, (907) 269-0848, or email dennis.good@alaska.gov.

6. 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.

8. High Visibility Garments. The Department requires all workers within the project limits to wear an outer visible surface or layer of high visibility color and retroreflectivity. See subsection 643-3.11.
9. Asphalt Material Price Adjustment – Unit Price. 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 – Unit Price Pay Item.

FED_SOA-CRSNB-101015/Z570920000



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REQUIRED DOCUMENTS
Federal-Aid Contracts

REQUIRED FOR BID. Bids will not be considered if the following documents are not completely filled out and submitted at the time of bidding:

1. **Bid Form (Form 25D-9)**
2. **Bid Schedule**
3. **Bid Security**
4. Any bid revisions must be submitted by the bidder prior to bid opening on the following form:
Bid Modification (Form 25D-16)

REQUIRED AFTER NOTICE OF APPARENT LOW BIDDER. The apparent low bidder is required to complete and submit the following documents within 5 working days after receipt of written notification:

1. **Subcontractor List (Form 25D-5)**
2. **DBE Utilization Report (Form 25A-325C)**
3. In accordance with specification Section 120, the successful bidder shall submit documentation of good faith efforts by submitting the following:
Summary of Good Faith Effort Documentation (Form 25A-332A), and
Contact Reports (Form 25A-321A), as required the initial contact must be made within 7 calendar days prior to bid opening.
4. For each DBE to be used on the project, submit a **DBE Commitment (Form 25A-326)**

REQUIRED FOR AWARD. In order to be awarded the contract, the successful bidder must completely fill out and submit the following documents within the time specified in the intent to award letter:

1. **Construction Contract (Form 25D-10A) or (Form 25D-10H), as applicable.**
2. **Payment Bond (Form 25D-12)**
3. **Performance Bond (Form 25D-13)**
4. **Contractor's Questionnaire (25D-8)**
5. **Certificate of Insurance (from carrier)**
6. **EEO-1 Certification (Form 25A-304)**
7. On projects that include bid item 645, Training Program, the successful bidder shall submit the following:
Training Utilization Report (Form 25A-311), and/or
DOT&PF Training Program Request (Form 25A-310), if required
8. On Federal-aid highway projects: **Material Origin Certificate (Form 25D-60)**
9. On Federal-aid airport projects: **Buy American Certificate (Form 25D-61)**
10. Bidders must register annually with the Civil Rights Office in order to be eligible for award. If not registered, or if unsure, submit the following: **Bidder Registration (Form 25D-6)**



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

FEDERAL EEO BID CONDITIONS

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS FOR ALL NON-EXEMPT FEDERAL AND FEDERALLY-ASSISTED CONSTRUCTION CONTRACTS TO BE AWARDED IN THE STATE OF ALASKA

Authority and Guidelines.

The Alaska Department of Transportation & Public Facilities (Department), as a State Transportation Agency (STA), has authority under 23 U.S.C. 140 and its implementing regulations to conduct a compliance program addressing Equal Employment Opportunity (EEO) and Affirmative Action (AA) in employment on non-exempt federal and federally-assisted construction contracts that are awarded in the State of Alaska. The STA's authority to administer a contract compliance with Nondiscrimination, EEO and AA programs are authorized under 23 U.S.C., 49 U.S.C., Title VI of the Civil Rights Act of 1964, MAP-21 and implementing regulations. The provisions of 23 CFR 200 and 49 CFR 21 provide authority to determine, and where necessary obtain compliance with the nondiscrimination provisions of Title VI. Under the provisions of Title VI 23 USC and related regulations, including 49 CFR 21 and 26, and 23 CFR Part 200, 230 and 633, it is the STA's responsibility to ensure compliance with and to enforce on all projects of Federal-aid contractors and subcontractors, whether a particular contract or work-site involves Federal-aid funds or not.

These citations confirm the requirement for contractors to provide, and States to obtain information that ensure non-discrimination in employment on all of Federal and federally-assisted projects, and through these provisions, provide for EEO for minorities and women in all terms and conditions of their employment at all of their facilities and on all projects.

1. Definitions. As used in these specifications:

- a. **“Covered area”** means the geographical area described in the solicitation from which this contract resulted;
- b. **“Employer identification number”** means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- c. **“Minority”** includes:
 - (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race);
 - (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (4) American Indian or Alaska Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the DOL in the covered area, either individually or through an association, its affirmative action obligations on all work in the Plan area shall be in accordance with that Plan for those trades that have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make good faith effort to achieve an equal representation of minority and female employment under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to make good faith efforts to achieve the Plan.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 5(a) through 5(p) of these specifications.
5. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligations to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Civil Rights Office's Contract Compliance Officer when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 5(b) above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual

report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendent, general foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and dispositions of the subject matter.
 - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
 - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are nonsegregated except that separate or single-use toilet, necessary changing facilities and necessary sleeping facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulations of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
6. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations 5(a) through 5(p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any or more of its obligations under 5(a) through 5(p) of these specifications provided that the

Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual EEO obligations, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

7. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation if a particular group is employed in a substantially disparate manner.
8. The Contractor shall not use the equal employment or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
9. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts.
10. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in item 5(a-p) above, so as to achieve maximum results from its efforts to ensure equal employment opportunities.
11. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic apprentice, trainees, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that the existing records satisfy this requirement, Contractors shall not be required to maintain separate records.
12. Nothing herein provided shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Programs).
13. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
14. EEO/AA obligations are applicable to all of the Contractor's construction work (whether or not it is federal or federally-assisted) performed in the covered area. The hours on minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of equalizing minority and female employment percentages shall be a violation of the contract. Compliance with equal minority and female employment utilization will be measured against the total work hours performed.
15. The Contractor shall provide written notification to the Department, for all subcontracts documents as follows: the name, address and telephone number of subcontractors and their employer identification number; the estimated dollar amount of the subcontracts; estimated starting and completion dates of the subcontracts; and the geographical area in which the contract is to be performed.

This written notification shall be required for all construction subcontracts in excess of \$10,000 at any tier for construction work under the contract resulting from this project's solicitation.

16. As used in the Bid Notice, and in the contract resulting from this project's solicitation, the "covered area" is the State of Alaska.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SUBCONTRACTOR LIST

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

The apparent low bidder shall complete this form and submit it so as to be received by the Contracting Officer prior to the close of business on the fifth working day after receipt of written notice from the Department.

Failure to submit this form with all required information by the due date will result in the bidder being declared nonresponsive and may result in the forfeiture of the Bid Security.

Scope of work must be clearly defined. If an item of work is to be performed by more than one firm, indicate the portion or percent of work to be done by each.

Check as applicable: All Work on the above-referenced project will be accomplished without subcontracts greater than 1/2 of 1% of the contract amount.

or

Subcontractor List is as follows:

LIST FIRST TIER SUBCONTRACTORS ONLY

FIRM NAME, ADDRESS, PHONE NO.	AK BUSINESS LICENSE NO., CONTRACTOR'S REGISTRATION NO.	SCOPE OF WORK TO BE PERFORMED

CONTINUE SUBCONTRACTOR INFORMATION ON REVERSE

For projects with federal-aid funding, I hereby certify Alaska Business Licenses and Contractor's Registrations will be valid for all subcontractors prior to award of the subcontract. For projects without federal-aid funding (State funding only), I hereby certify the listed Alaska Business Licenses and Contractor's Registrations were valid at the time bids were opened for this project.

Signature of Authorized Company Representative

Title

Company Name

Company Address (Street or PO Box, City, State, Zip)

Date

()

Phone Number



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
Civil Rights Office – DBE Program

BIDDER REGISTRATION

All firms are required to submit a Bidder's Registration form before an Alaska Department of Transportation and Public Facilities (DOT&PF) project can be awarded. The Bidder Registration form must be submitted to the Civil Rights Officer (CRO) on an annual basis by January 1 and is valid thru December 31. Complete this form for each contractor and subcontractor. Firms will be listed on the bidder registration online directory <http://www.dot.state.ak.us/cvlrts/bidreg.shtml>.

Name of Firm: _____

Street Address: _____

Mailing Address: _____

Contact Name: _____

Telephone Number: _____

Fax number: _____

E-mail Address: _____

Date Firm was Established: _____

The firm listed above is a (check all that apply):

- Prime Contractor?
- Subcontractor? Identify specialty: _____
- Service Provider? Identify service: _____
- Material Supplier? Identify material: _____
- Manufacturer? Identify product: _____
- Certified DBE? * *DBE- Disadvantaged Business Enterprise
- Self-Certified SBE? * *SBE- Small Business Enterprise *(Complete page 2 of this form.)*

Firm's gross annual receipts:

- < \$500,000
- \$500,000- \$999,999
- \$1,000,000- \$4,999,999
- \$5,000,000- \$9,999,999
- \$10,000,000- \$16,999,999
- > \$17,000,000

Type of contracts/proposals bid by the firm (check all that apply):

- Highways Airports Transit AMHS

Signature of Company Representative

Title

Date

Send this completed form to:
ADOT&PF Civil Rights Office
PO Box 196900
Anchorage, Alaska 99519-6900

OR You may fax your completed form to:
(907) 269-0847

If you have any questions, please call (907) 269-0851.

SMALL BUSINESS ENTERPRISE PROGRAM (SBE) BIDDER'S REGISTRATION

Fostering Small Business Participation (SBE) (49 CFR 26.39):

To meet the requirements of 49 CFR 26.39, DOT&PF has implemented a Small Business Enterprise Program. This component is only applicable to federally funded projects.

[Complete the below only if you are a Self-Certified SBE Firm] All businesses wishing to be eligible as a SBE are required to submit a SBE Bidder's Registration form before a DOT&PF contract can be awarded. The bidder's Registration form must be submitted on an annual basis by January 1 and is valid thru December 31.

In order to verify your firm's compliance with business size standards under 49 CFR 26.67(2)(i) and 26.65(b), **at the time of award** you will be required to submit the following documents:

- SBE Affidavit of Certification Eligibility
- Personal Financial Statement
- Past three years of your corporations and/or individual tax returns
- If not a certified DBE, please provide documentation that you are self-certified as a small business (please contact Procurement Technical Assistance Center (PTAC) at 907-274-7232 if you require assistance on becoming a self-certified small business)

At time of award send required documentation to:

DOT&PF Civil Rights Office
Attn: Certification
PO Box 196900
Anchorage, Alaska 99519-690
Phone: (907) 269-0851
Fax: (907) 269-0847

A. SBE Directory Information

1. Can you verify at time of award that your firm does not exceed the business size standards of \$23.98 million for the last three years of gross annual receipts per 49 CFR 26.65(b)?

[] Yes [] No*

**If you marked "No" you do not qualify for the SBE Program*

2. Can you verify at time of award that your firm does not exceed the personal net worth standards of \$1.32 million per 49 CFR 26.67(2)(i)?

[] Yes [] No*

**If you marked "No" you do not qualify for the SBE Program*

3. Contact Info.

Name of Firm

Contact Name

Telephone Number

Fax Number

Email Address

Company Website

2. What percent of the total value of this contract do you intend to subcontract? _____ %

3. Do you propose to purchase any equipment for use on this project?
[] No [] Yes If YES, describe type, quantity, and approximate cost:

4. Do you propose to rent any equipment for this work?
[] No [] Yes If YES, describe type and quantity:

5. Is your bid based on firm offers for all materials necessary for this project?
[] Yes [] No If NO, please explain:

C. EXPERIENCE

1. Have you had previous construction contracts or subcontracts with the State of Alaska?
[] Yes [] No

Describe the most recent or current contract, its completion date, and scope of work:

2. List, as an attachment to this questionnaire, other construction projects you have completed, the dates of completion, scope of work, and total contract amount for each project completed in the past 12 months.

I hereby certify that the above statements are true and complete.

Name of Contractor

Name and Title of Person Signing

Signature

Date



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

BID FORM

For

**HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000**

by

Company Name

Company Address (Street or PO Box, City, State, Zip)

**TO THE CONTRACTING OFFICER,
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES:**

In compliance with your Invitation to Bid dated **November 10, 2015**, the Undersigned proposes to furnish and deliver all the materials and do all the work and labor required in the construction of the above-referenced Project, located at **Central Region, Alaska**, according to the plans and specifications and for the amount and prices named herein as indicated on the Bid Schedule consisting of **2** sheets, which is made a part of this Bid.

The Undersigned declares that he has carefully examined the contract requirements and that he has made a personal examination of the site of the work; that he understands that the quantities, where such are specified in the Bid Schedule or on the plans for this project, are approximate only and subject to increase or decrease, and that he is willing to perform increased or decreased quantities of work at unit prices bid under the conditions set forth in the Contract Documents.

The Undersigned hereby agrees to execute the said contract and bonds within fifteen calendar days, or such further time as may be allowed in writing by the Contracting Officer, after receiving notification of the acceptance of this bid, and it is hereby mutually understood and agreed that in case the Undersigned does not, the accompanying bid guarantee shall be forfeited to the State of Alaska, Department of Transportation and Public Facilities as liquidated damages, and the said Contracting officer may proceed to award the contract to others.

The Undersigned agrees to commence the work within 10 calendar days, and to complete the work within **N/A** calendar days, after the effective date of the Notice to Proceed, or by **September 15, 2016**, unless extended in writing by the Contracting Officer.

The Undersigned proposes to furnish Payment Bond in the amount of **50%** (of the contract) and Performance Bond in the amount of **50%** (of the contract), as surety conditioned for the full, complete and faithful performance of this contract.

The Undersigned acknowledges receipt of the following addenda to the drawings and/or specifications (give number and date of each).

Addendum Number	Date Issued	Addendum Number	Date Issued	Addendum Number	Date Issued

NON-COLLUSION DECLARATION

The Undersigned declares, under penalty of perjury under the laws of the United States, that neither he nor the firm, association, or corporation of which he is a member, has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

The Undersigned has read the foregoing and hereby agrees to the conditions stated therein by affixing his signature below:

Signature of Authorized Company Representative

Typed Name and Title

()

Phone Number

()

Fax Number

State of Alaska Department of Transportation & Public Facilities Central Region	BID SCHEDULE	HSIP: CR High Friction Surface Treatment AKSAS No. : Z570920000 Program No. : Federal No. : 0001501
--	-------------------------	--

Before preparing this bid schedule, read carefully, Section 102 of the applicable State of Alaska Standard Specifications for Highway Construction and the following: The Bidder shall insert, as called for, a unit price or a lump sum price in figures opposite each Pay Item for which an estimated quantity appears in the Bid Schedule. A unit price or lump sum price is not to be entered or tendered for any Pay Item not appearing in the Bid Schedule. The Estimated Quantity of work for payment on a lump sum basis will be "All Required" and as further specified in the Contract. Wherever a contingent sum is shown for any item in this Bid Schedule, such amount shall govern and be included in the Bid Total.

Conditioned or qualified bids will be considered Non-Responsive.

Contract award will be made on the basis of the Basic Bid.

The DBE Utilization Goal for this project is 0.0% of the total contract award amount.

The bidder shall insert a unit bid price for each pay item listed below. Type or print legibly.

Basic Bid					
Item No.	Item Description	Unit	Quantity	Unit Bid Price	Amount Bid
202 (15)	Pavement Planing	Square Yard	86,330		
401 (1A)	HMA, Type IV; Class A	Ton	4,220		
401 (4)	Asphalt Binder, Grade PG 58-34	Ton	230		
401 (15)	Asphalt Material Price Adjustment - Unit Price	Contingent Sum	All Req'd.	Contingent Sum	0.00
405 (3)	High Friction Surface Treatment	Square Yard	147,640		
604 (4)	Adjust Existing Manhole	Each	7		
615 (1)	Standard Sign	Square Foot	52		
615 (6)	Salvage Sign	Each	3		
627 (10)	Adjustment of Valve Box	Each	13		
640 (1)	Mobilization and Demobilization	Lump Sum	All Req'd.	Lump Sum	
640 (4)	Worker Meals and Lodging, or Per Diem	Lump Sum	All Req'd.	Lump Sum	
641 (1)	Erosion, Sediment, and Pollution Control Administration	Lump Sum	All Req'd.	Lump Sum	
641 (2)	Temporary Erosion, Sediment, and Pollution Control	Contingent Sum	All Req'd.	Contingent Sum	100,000.00
641 (6)	Withholding	Contingent Sum	All Req'd.	Contingent Sum	0.00
641 (7)	SWPPP Manager	Lump Sum	All Req'd.	Lump Sum	

State of Alaska Department of Transportation & Public Facilities Central Region	BID SCHEDULE	HSIP: CR High Friction Surface Treatment AKSAS No. : Z570920000 Program No. : Federal No. : 0001501
--	-------------------------	--

The bidder shall insert a unit bid price for each pay item listed below. Type or print legibly.

Basic Bid

Item No.	Item Description	Unit	Quantity	Unit Bid Price	Amount Bid
642 (1)	Construction Surveying	Lump Sum	All Req'd.	Lump Sum	
642 (3)	Three Person Survey Party	Hour	200		
642 (11)	Adjust Existing Monument Case	Each	26		
643 (2)	Traffic Maintenance	Lump Sum	All Req'd.	Lump Sum	
643 (15A)	Flagging	Contingent Sum	All Req'd.	Contingent Sum	170,000.00
643 (23)	Traffic Price Adjustment	Contingent Sum	All Req'd.	Contingent Sum	0.00
643 (25)	Traffic Control	Contingent Sum	All Req'd.	Contingent Sum	340,000.00
644 (1)	Field Office	Lump Sum	All Req'd.	Lump Sum	
644 (10)	Engineering Communications	Contingent Sum	All Req'd.	Contingent Sum	10,000.00
645 (1)	Training Program, 1 Trainees/Apprentices	Labor Hour	500		
646 (1)	CPM Scheduling	Lump Sum	All Req'd.	Lump Sum	
646 (2)	Schedule Price Adjustment	Contingent Sum	All Req'd.	Contingent Sum	0.00
660 (11A)	Traffic Loop Replacement	Contingent Sum	All Req'd.	Contingent Sum	20,000.00
670 (10A)	MMA Pavement Markings, Longitudinal Surface Applied	Linear Foot	163,960		
670 (10B)	MMA Pavement Markings, Symbols and Arrow(s) Surface Applied	Each	6		
670 (10D)	MMA Pavement Markings, Longitudinal Inlaid	Linear Foot	26,350		
670 (10E)	MMA Pavement Markings, Symbols and Arrow(s) Inlaid	Each	36		
Total Basic Bid				\$	



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

CONSTRUCTION CONTRACT

HSIP: CR High Friction Surface Treatment

Project No. 0001501/Z570920000

Project Name and Number

This CONTRACT, between the STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES, herein called the Department, acting by and through its Contracting Officer, and

Company Name

Company Address (Street or PO Box, City, State, Zip)

a/an Individual Partnership Joint Venture Sole Proprietorship Corporation incorporated under the laws of the State of _____, its successors and assigns, herein called the Contractor, is effective the date of the signature of the Contracting Officer on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the Department, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor required in the construction of the above-referenced project at the prices bid by the Contractor for the respective estimated quantities aggregating approximately the sum of

_____ Dollars

(\$ _____), and such other items as are mentioned in the original Bid, which Bid and prices named, together with the Contract Documents are made a part of this Contract and accepted as such. *The Alaska Standard Specifications for Highway Construction, 2015 Edition* is incorporated by reference and made a part hereof as if set forth in full. *The Alaska Standard Specifications for Highway Construction* can be downloaded at <http://www.dot.state.ak.us/stwddes/dcsspecs/index.shtml>.

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Department, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Department. In no event shall the Department be liable for any materials furnished or used, or for any work or labor done, unless the materials, work, or labor are required by the Contract or on written order furnished by the Department. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost, and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered and all labor shall be done and performed, in every respect, to the satisfaction of the Department, on or before: _____ or within _____ calendar days. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Department, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Department shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Department shall have the right to recover _____ dollars (\$ _____) per day for each calendar day elapsing between the time stipulated for the completion and the actual date of completion in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

The bonds given by the Contractor in the sum of \$ _____ Payment Bond, and \$ _____ Performance Bond, to secure the proper compliance with the terms and provisions of this Contract, are submitted herewith and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions.

CONTRACTOR

Company Name

Signature of Authorized Company Representative

Typed Name and Title

Date

(Corporate Seal)

**STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES**

Signature of Contracting Officer

Typed Name

Date



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

PAYMENT BOND

Bond No. _____

For

**HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000**

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That

of _____ as Principal,

and _____

of _____ as Surety,

firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____ A.D., 2015, for construction of the above-referenced project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall comply with all requirements of law and pay, as they become due, all just claims for labor performed and materials and supplies furnished upon or for the work under said contract, whether said labor be performed and said materials and supplies be furnished under the original contract, any subcontract, or any and all duly authorized modifications thereto, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____, this _____ day of _____ A.D., 2015.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Transportation & Public Facilities Authorized Representative

Date

See Instructions on Reverse

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, shall be used whenever a payment bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

PERFORMANCE BOND

Bond No. _____

For

**HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000**

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____ A.D., 2015, for construction of the above-named project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall well and truly perform and complete all obligations and work under said contract and if the Principal shall reimburse upon demand of the Department of Transportation and Public Facilities any sums paid him which exceed the final payment determined to be due upon completion of the project, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____, this _____ day of _____ A.D., 2015.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Transportation & Public Facilities Authorized Representative

Date

See Instructions on Reverse

INSTRUCTIONS

1. This form shall be used whenever a performance bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

BID BOND

For
HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

DATE BOND EXECUTED: _____

PRINCIPAL (Legal name and business address):

TYPE OF ORGANIZATION:

	<input type="checkbox"/> Individual	<input type="checkbox"/> Partnership
	<input type="checkbox"/> Joint Venture	<input type="checkbox"/> Corporation
STATE OF INCORPORATION:		

SURETY(IES) (Name and business address):

A.	B.	C.
PENAL SUM OF BOND:		DATE OF BID:

We, the PRINCIPAL and SURETY above named, are held and firmly bound to the State (State of Alaska), in the penal sum of the amount stated above, for the payment of which sum will be made, we bind ourselves and our legal representatives and successors, jointly and severally, by this instrument.

THE CONDITION OF THE FOREGOING OBLIGATION is that the Principal has submitted the accompanying bid in writing, date as shown above, on the above-referenced Project in accordance with contract documents filed in the office of the Contracting Officer, and under the Invitation To Bid therefore, and is required to furnish a bond in the amount stated above.

If the Principal's bid is accepted and he is offered the proposed contract for award, and if the Principal fails to enter into the contract, then the obligation to the State created by this bond shall be in full force and effect.

If the Principal enters into the contract, then the foregoing obligation is null and void.

PRINCIPAL

Signature(s)	1.	2.	3.
Name(s) & Title(s) (Typed)	1.	2.	3.

Corporate Seal

See Instructions on Reverse

CORPORATE SURETY(IES)

Surety A	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety B	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety C	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

INSTRUCTIONS

1. This form shall be used whenever a bid bond is submitted.
2. Insert the full legal name and business address of the Principal in the space designated. If the Principal is a partnership or joint venture, the names of all principal parties must be included (e.g., "Smith Construction, Inc. and Jones Contracting, Inc. DBA Smith/Jones Builders, a joint venture"). If the Principal is a corporation, the name of the state in which incorporated shall be inserted in the space provided.
3. Insert the full legal name and business address of the Surety in the space designated. The Surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. Individual sureties will not be accepted.
4. The penal amount of the bond may be shown either as an amount (in words and figures) or as a percent of the contract bid price (a not-to-exceed amount may be included).
5. The scheduled bid opening date shall be entered in the space marked Date of Bid.
6. The bond shall be executed by authorized representatives of the Principal and Surety. Corporations executing the bond shall also affix their corporate seal.
7. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
8. The states of incorporation and the limits of liability of each surety shall be indicated in the spaces provided.
9. The date that bond is executed must not be later than the bid opening date.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

EEO-1 CERTIFICATION
Federal-Aid Contracts

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

This certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor [41 CFR 60-1.7 (b) (1)] and must be completed by the successful Bidder and each proposed Subcontractor participating in this contract.

PLEASE CHECK APPROPRIATE BOXES

The Bidder Proposed Subcontractor hereby CERTIFIES:

PART A. Bidders and proposed Subcontractors with 50 or more year-round employees and a federal contract amounting to \$50,000 or more are required to submit one federal Standard Report Form 100 during each year that the two conditions exist (50 employees and a \$50,000 federal contract).

The company named below (Part C) is exempt from the requirements of submitting the Standard Report Form 100 this year.

NO (go to PART B) YES (go to PART C)

Instructions and blank Standard Report Form 100's may be obtained from a local U.S. Department of Labor office, or by writing to:

The Joint Reporting Committee
P.O. Box 779
Norfolk, Virginia 23501

Telephone number: (757) 461-1213

PART B. The company named below has submitted the Standard Report Form 100 this year.

NO YES

Note: Bidders and proposed Subcontractors who have not filed the required Standard Report Form 100 and are not exempt from filing requirements will not be awarded this contract or subcontract until Form 100 has been filed for the current year ending June 30.

PART C.

Signature of Authorized Company Representative

Title

Company Name

Company Address (Street or PO Box, City, State, Zip)

Date

() _____
Phone Number



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

DOT&PF TRAINING PROGRAM REQUEST

Federal-Aid Contracts

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

Project Hours: _____

Section 645, entitled "Training Program" in the Special Provisions, specifies the number of minorities and/or woman to be trained and the number of hours of training provided under the term of this contract. Contractors desiring to use DOT&PF OJT approved training program(s) (instead of those approved by USDOL/OA) must:

- Complete Sections 1(A) through 5; use additional sheets, if necessary and reference appropriately
- Must provide training in skilled construction trades
- Contractors complete OJT form
- Contractors are encouraged to contact the DOT&PF Civil Rights Office for assistance with developing approvable training programs prior to bid opening

Section 1: Contractor Information

Contractor Name: _____ Contact Person: _____

Telephone # _____ E-mail _____

Section 1A: Trainee Minimum Qualifications

Minimum Starting Age: _____

High School Diploma Yes No

Other Level of Education and/or Experience:

Section 2: Job Classification Information

Job Classification (Title): _____

REQUIRED SKILLS FOR POSITION	STARTING CAPABILITY DATE MEASURED
1. JOB SKILL NEEDED	NOT SKILLED: <input type="checkbox"/> SOME SKILL: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
2. JOB SKILL NEEDED	NOT SKILLED: <input type="checkbox"/> SOME SKILL: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
3. JOB SKILL NEEDED	NOT SKILLED: <input type="checkbox"/> SOME SKILL: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
4. JOB SKILL NEEDED	NOT SKILLED: <input type="checkbox"/> SOME SKILL: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
5. JOB SKILL NEEDED	NOT SKILLED: <input type="checkbox"/> SOME SKILL: <input type="checkbox"/> SKILLED: <input type="checkbox"/>

*ATTACH JOB DESCRIPTION

Section 3: Employer Training Information

Complete the training outline and estimated time for each skill.

TRAINING TO BE PROVIDED	ESTIMATED TRAINING HOURS	END CAPABILITY DATE MEASURED
1. SKILL TO BE ACQUIRED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
2. SKILL TO BE ACQUIRED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
3. SKILL TO BE ACQUIRED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
4. SKILL TO BE ACQUIRED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
5. SKILL TO BE ACQUIRED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
LIST EQUIPMENT AND TOOLS NEEDED FOR TRAINING RELATED TO THE POSITION:		

Section 4: Third-Party Related Instruction

Complete the training outline and estimated time for each skill.

SKILLS TO BE LEARNED:	ESTIMATED TRAINING HOURS	END CAPABILITY DATE MEASURED
1. SKILL TO BE LEARNED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
2. SKILL TO BE LEARNED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
3. SKILL TO BE LEARNED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
4. SKILL TO BE LEARNED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
5. SKILL TO BE LEARNED	ESTIMATED TRAINING HOURS	BEGINNING: <input type="checkbox"/> INTERMEDIATE: <input type="checkbox"/> SKILLED: <input type="checkbox"/>
LIST EQUIPMENT AND TOOLS NEEDED FOR TRAINING RELATED TO THE POSITION:		

Approved

Disapproved

Remarks: _____

ADOT&PF Civil Rights Office OJT Coordinator

Date

Section 7: Contractor Responsibility

1. It is the responsibility of the Contractor to provide each Trainee with a copy of the OJT Training Program, Job Description and Training Timeline prior to the start of the project.
2. Each Trainee will be reviewed upon completion of each section of training. The review shall be in writing and indicate the number of hours of training received.
3. The Trainee shall participate in the review, sign and receive a copy of the review.
4. The close out evaluation should indicate capability level reached.
5. The area in which the Trainee did not advance in level from its initial starting capability, the Contractor will attach documentation as part of the close out evaluation which explains the reason(s) a higher capability was not reached.
6. If the Contractor fails to comply with their OJT approved training program the ADOT&PF will enforce the measures outlined in the Spec 645-5.01

Section 8: DOT & PF Civil Rights Office (CRO) Monitoring

1. The CRO will conduct an on-site visit to assess the OJT Training program at the project hour's half-way mark when feasible.
2. The CRO will coordinate the on-site with the Project Engineer

Section 9: Trainee Assistance

1. On a case-by-case basis the CRO may be able to assist with partial funding for the Trainee to receive certification(s).
2. The CRO upon completion of the Trainee OJT Training Program will issue a "DOT&PF Civil Rights Office" Certificate of On-the-Job Completion for FHWA funded Projects" that will reflect completed hours.
3. The Trainee will go on a list that will be posted on the CRO website for Primes to solicit for future employment opportunities
4. The Trainee will be eligible for the OJT 50% Reimbursement Program not to exceed \$500 dollars which administer through the CRO. The dollar amount may change due to FHWA grant monies received per fiscal year.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

TRAINING UTILIZATION REPORT
Federal-Aid Highway Contracts

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

Project Name and Number

Training Program Special Provision, Section 645 specifies the number of minorities and/or women to be trained and the number of hours of training to be provided under this Contract. The Contractor may train non-minority males in compliance with Section 645, but only if documentation of good faith efforts has been submitted to, and approved by, the Engineer, prior to the employment of such non-minority male(s). Good faith efforts, at a minimum, must be as extensive as the recruitment efforts listed in the EEO Bid Conditions, 5b, 5c, 5d, 5e, 5i, 5j, and 5l (Form 25A-301).

The number of individuals to be trained under this Contract: _____.

The number of hours of training to be provided: _____.

This Training Special Provision implements 23CFR 230, Subpart A, Appendix B. Contractors can use either training programs approved by the U.S. Department of Labor, Office of Apprenticeship (USDOL/OA), or training programs approved by ADOT&PF. The Contractor must complete this form indicating the type of training to be provided, the number of individuals to be trained in each trade or job classification, the number of hours of training to be provided,¹ and the anticipated training start date.

1. To be completed by Contractors using USDOL/OA Training Program: Indicate below the number of apprentices, total number of hours, and anticipated start dates for each craft selected:

APPROVED CRAFTS, CERTIFICATION NUMBERS AND JURISDICTIONAL AREAS

STATEWIDE JURISDICTION				SOUTH OF THE 63° PARALLEL			
Craft/Cert Number	No. of Appr.	No. of Hrs.	Start Date	Craft/Cert Number	No. of Appr.	No. of Hrs.	Start Date
Asbestos Worker #90032				Carpenter #74032			
Bricklayer #85040				Painter #72820			
Cement Mason & Plasterer #78533				Pipefitter #72586 ³			
Electrician #81299				Plumber #83534 ³			
Ironworker #76779				Sheetmetal Worker #74072			
Op. Engineer #X90349				Other # _____			
Roofer #X90317				NORTH OF THE 63° PARALLEL			
Piledriver ² (3/30/75)				Carpenter #47990			
Camp Culinary ² (4/25/74)				Painter #77750			
Laborer #XAK92T017				Fitter/Plumber #75055			
Other # _____				Sheetmetal #76781			
Other # _____				Other # _____			
				Other # _____			

1. The total number of hours of training should equal the hours of training required under Section 645.
2. U.S. DOL does not assign Certification numbers to these training programs. Only approval dates.
3. Juneau Jurisdictional area is #83534 and Anchorage area is #72586.

2. **To be completed by Contractors using ADOT&PF training program:** Indicate below the type of training, number of trainees, number of hours of training (500 hours per trainee), and anticipated start dates.

Job Classification	No. Trainees	Total No. Hrs.	Anticipated Start Date(s)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. **To be completed by all Contractors.** As part of the Contractor's EEO affirmative action program, the Contractor certifies that all training will be provided as stated in Section 1 **OR** 2 above, in accordance with Training Program Special Provision, Section 645.

_____	_____
Company Name	Company Address
_____	_____
Point of Contact/Email Address	Phone Number
_____	_____
Signature of Authorized Company Representative	Date

To be completed by the ADOT&PF OJT Coordinator prior to contract award:

Training Program(s) approve for this Project and Date Approved:

Training Program	Trainee (s) / Apprentice (s)	Hours	Date Approved

_____	_____
Signature of ADOT&PF OJT Coordinator	Date



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

CONTACT REPORT
Federal-Aid Contracts

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

Specific Work or Materials (by pay Item): _____

DBE Firm Contacted:

Name	Address	Phone Number
------	---------	--------------

A. INITIAL CONTACT: (See important contact information on instruction sheet)

1. Date _____ Method: Phone Mail FAX Other

2. Person Contacted _____
 Name _____ Title _____

3. DBE's Response: Date: _____ Method: Phone Mail FAX Other
 Submitted an acceptable sub-bid. (If sub-bid accepted, skip to Section D)
 Not interested: Indicate Reason(s) _____
 Needs more information: Date Prime provided requested information _____
 Will provide quote by: Date _____
 Received unacceptable sub-bid (complete Section C)

B. FOLLOW-UP CONTACT

1. Date _____ Method: Phone Mail FAX Other

2. Person Contacted _____
 Name _____ Title _____

3. DBE's Response: Date: _____ Method: Phone Mail FAX Other
 Submitted an acceptable sub-bid. (If sub-bid accepted, skip to Section D)
 Received unacceptable sub-bid (complete Section C)
 Other result: _____

C. EXPLANATION OF FAILURE TO ACHIEVE AN ACCEPTABLE SUB-BID:

1. Were the following required efforts made?
 - a. Yes No Identified specific items of work, products, materials, etc. when asking for quote(s).
 - b. Yes No Offered assistance in acquiring necessary bonding & insurance.
 - c. Yes No Provided all appropriate information concerning the specific work items or materials.
2. Was the DBE's quote non-competitive (i.e., more than 10% higher than the accepted quote)? Yes No
3. Was the DBE unable to perform in some capacity? Yes No If "Yes", explain: _____

D. CERTIFICATION: I certify that the information provided above is accurate and that efforts to solicit sub-bids were made in good faith.

Signature of Company Representative	Title	Date
-------------------------------------	-------	------

Name of DOT&PF Reviewer	Title	Date
-------------------------	-------	------

INSTRUCTIONS

Project Name and Number: Enter project name and number as they appear on bid documents.

Work or Materials: Identify the specific work item or material that you requested this firm to furnish.

Firm Contacted: Enter name of firm as it appears in the current DOT&PF DBE directory.

Address: Enter address of firm contacted. **Phone Number:** Enter phone number of firm contacted.

A. INITIAL CONTACT (Must be made at least seven calendar days prior to bid opening.)

1. **Date and Method of Initial Contact:** Indicate the method and date that actual contact was made or the date correspondence was postmarked. Leaving a "please call me" message does not constitute a contact. Attach a copy of dated letter or fax.
2. **Name and Title of Person Contacted.** Enter name and title of company representative with whom you corresponded or discussed submitting a sub-bid.
3. **DBE's Response:** Indicate one or more of the responses listed. If a firm bid was received and accepted, skip to section D.

B. FOLLOW-UP CONTACT

If no response or an inconclusive response was received from the initial contact, a follow-up contact is required to determine for a certainty that the firm does not intend to submit a sub-bid or to conclude discussions with a sub-bid submittal.

1. **Date and Method of Follow-up Contact:** Indicate the method and date that actual contact was made or the date correspondence was postmarked. Leaving a "please call me" message does not constitute a contact. Attach a copy of dated letter or fax.
2. **Name and Title of Person Contacted.** Enter name and title of company representative with whom you corresponded or discussed submitting a sub-bid.
3. **DBE's Response:** Indicate one or more of the responses listed. If a firm bid was received and accepted, skip to section D.

C. EXPLANATION OF FAILURE TO ACHIEVE AN ACCEPTABLE SUB-BID

1. A NO response to items 1a., b., or c. will result in rejection of this contact. Be specific on results of discussions.
2. A YES answer to item 2. is grounds for rejecting a DBE sub-bid.
3. A YES answer to item 3. is grounds for rejecting a DBE sub-bid, only if the inability to perform is in an area of work specifically identified as a sub-item under the applicable bid item.

D. CERTIFICATION

This certification of accuracy and good faith by the Contractor will be verified by contact with the listed firm. Falsification of information on the DBE Contact Report is grounds for debarment action under AS 36.30.640(4).



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SUMMARY OF GOOD FAITH EFFORT DOCUMENTATION
Federal-Aid Contracts

HSIP: CR High Friction Surface Treatment
Project No. 0001501/Z570920000

Contractor: _____

List all items considered for DBE utilization. GFE requires at a minimum that the Contractor consider all items identified on Form 25A-324.

a. MATERIAL OR SPECIFIC ITEM OF WORK (SPECIFY PAY ITEM)	b. ACCEPTABLE DBE QUOTE RECEIVED	c. # OF DBEs CONTACTED IN DBE DIRECTORY	d. # OF DBEs THAT RESPONDED ²	e. # OF DBE QUOTES RECEIVED
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

1. Check if acceptable DBE quote was received (if so, skip c, d, and e)
2. Attach completed Contact Reports, Form 25A-321A

LIST ADDITIONAL ITEMS ON REVERSE SIDE

a. MATERIAL OR SPECIFIC ITEM OF WORK (SPECIFY PAY ITEM)	b. ACCEPTABLE DBE QUOTE RECEIVED ¹	c. # OF DBEs CONTACTED IN DBE DIRECTORY	d. # OF DBEs THAT RESPONDED ²	e. # OF DBE QUOTES RECEIVED
9.				
10.				
11.				
12.				
13.				
14.				
15.				
1. Check if acceptable DBE quote was received (if so, skip c, d, and e) 2. Attach completed Contact Reports, Form 25A-321A				
Comments:				

PART 4

**STANDARD MODIFICATIONS
AND
SPECIAL PROVISIONS**

To the **STATE OF ALASKA**

**STANDARD
SPECIFICATIONS
FOR
HIGHWAY CONSTRUCTION**

**2015
EDITION**

TABLE OF CONTENTS

Section		Page
DIVISION 100 — GENERAL PROVISIONS		
105	Control of Work	3
107	Legal Relations & Responsibility to Public	5
108	Prosecution & Progress.....	9
109	Measurement & Payment.....	10
120	Disadvantaged Business enterprise (DBE) Program	11
DIVISION 200 — EARTHWORK		
202	Removal of Structures & Obstructions	21
DIVISION 400 — ASPHALT PAVEMENTS AND SURFACE TREATMENTS		
401	Hot Mix Asphalt Pavement.....	31
405	High Friction Surface Treatment	35
DIVISION 600 — MISCELLANEOUS CONSTRUCTION		
604	Manholes and Inlets	45
615	Standard Signs.....	47
627	Water System	48
641	Erosion, Sediment, and Pollution Control	50
642	Construction Surveying & Monuments.....	51
643	Traffic Maintenance.....	52
644	Services to be Furnished by the Contractor.....	60
645	Training Program.....	62
646	CPM Scheduling.....	65
651	Work by Others (Reserved)	66
652	Interim Completion Dates (Reserved).....	67
660	Signals and Lighting	68
670	Traffic Markings	69
DIVISION 700 — MATERIALS		
702	Asphalt Materials.....	77
703	Aggregates	78
712	Miscellaneous.....	80
724	Seed	81
726	Topsoil	82
727	Soil Stabilization Material	83
730	Sign Materials.....	88
740	Signals & Lighting Materials	89
Appendix A	Construction Survey Requirements	
Appendix B	Environmental Permits	
Appendix C	Material Certification List	

DIVISION 100 — GENERAL PROVISIONS

Blank Page

**SECTION 105
CONTROL OF WORK**

Special Provisions

105-1.06 UTILITIES. Add the following: 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:

- Alaska Communications Systems (ACS)
- Anchorage Water & Wastewater Utility (AWWU)
- AT & T Alascom (AT&T)
- Chugach Electric Association (CEA)
- ENSTAR Natural Gas (ENS)
- General Communications, Inc. (GCI)
- Homer Electric Association (HEA)
- Matanuska Electric Association (MEA)
- Matanuska Telephone Association (MTA)
- Municipality of Anchorage Signal & Street Maintenance
- Municipal Light & Power (ML&P)
- State of AK, DOT/PF Anchorage Street Lights (DOT)
- Telalaska Inc. (Interior Phone, Eyecom TV & Mukluk Telecom)

CR105.3/Z570920000

Call the following utilities and agencies directly:

Contact the Central Region Maintenance & Operations Office at (907) 269-0760 to obtain the appropriate District Superintendent's phone numbers for this project.

CR105.3-042015/Z570920000

1. last paragraph 1st sentence, replace: "Section 651." with "the special provisions."

CR105.8-042015

105-1.07 COOPERATION BETWEEN CONTRACTORS. Add the following: The following state owned projects may be under construction concurrently with this project.

Project Name:	Project No.:
C St: Port Access Rd to 40th Ave Paving	Z589890000
Tudor Rd: Minnesota - East 36th Paving	Z590180000

CR105.1/Z570920000

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.

CR105.1-110309/Z570920000

105-1.15 PROJECT COMPLETION.

3rd paragraph 1st sentence, replace: "621-3.04" with "618-3.06 and 621-3.04"

CR105.7-042015

**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. Municipality of Anchorage Noise Permit – Municipality of Anchorage HFST Locations
 - b. Kenai River Center Multi-Agency Permit #11229 – Seward Highway Site #5 and 6

CR107.2/Z570920000

The Contractor shall:

Add to No. 11:

The state Historic Preservation Officer is with the Department of Natural Resources in Anchorage, and may be contacted at (907) 269-8715. If cultural resources are discovered during construction activities, stop work at the site and notify the Engineer.

Add No. 12:

12. 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.

Add No. 13:

13. A Municipality of Anchorage (MOA) Right-of-Way Use permit will be required. The Municipality will require a copy of the approved Traffic Control Plan and a copy of the Notice to Proceed from the Contractor.

Provide the Engineer a copy of permits or clearances received before using sites outside the project limits. Additionally, provide the Engineer a written statement that permits or clearances have been obtained. Also, provide a written statement to the Engineer listing agencies or offices contacted that responded that no additional action is required.

CR107.2-042015/Z570920000

Standard Modifications

107-1.05 FEDERAL AID PROVISIONS. Add the following after paragraph two:

Form 25D-55H Required Contract Provisions for Federal-Aid (FHWA) Construction Contracts. The FHWA no longer requires the Contractor to fill out FHWA Form 47, Statement of Materials and Labor Used By Contractors on Highway Construction Involving Federal Funds. Section VI Records of Materials, Supplies and Labor of Form 25D-55H is no longer applicable to highway construction contracts.

Title VI Requirements. During the performance of this Contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

- (1) **Compliance with Regulations:** The Contractor shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") title 49, Code of Federal Regulations, Part 21, and the Federal Highway Administration (hereinafter "FHWA") Title 23, Code of Federal Regulations, Part 200 as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.
- (2) **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin, sex, age, and disability/handicap in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by 49 CFR, Section 21.5 of the regulations, including employment practices when the Contract covers a program set forth in Appendix B of the Regulations.
- (3) **Solicitation for Subcontractors, Including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin, sex, age, and disability/handicap.
- (4) **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the DOT&PF or the FHWA to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information the Contractor shall so certify to the DOT&PF, or the FHWA as appropriate, and shall set forth what efforts it has made to obtain the information.
- (5) **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the DOT&PF shall impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:
- (a) withholding of payments to the Contractor under the Contract until the Contractor complies, and/or
 - (b) cancellation, termination, or suspension of the Contract, in whole or in part.
- (6) **Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The Contractor shall take such action with respect to any subcontract or procurement as the DOT&PF or the FHWA may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request the DOT&PF to enter into such litigation to protect the interests of the DOT&PF, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

E67-101509

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:**Nonmunicipal 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.

CR107.2-042015

Add the following:**Bald Eagles.**

Bald Eagles are protected under the Bald Eagle Protection Act (16 U.S.C. 668-668c) which prohibits "takes" of bald 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 a minimum 330 ft as an undisturbed habitat buffer around nesting bald eagles. If topography or vegetation does not provide an adequate screen or separation, extend this buffer to 0.25 miles, 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 ft and 660 ft from eagles 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, this buffer shall extend up to 0.5 miles. No blasting, logging and other noisy, disturbing activities should occur during the nesting period (March 1 – August 31) within the primary or secondary zones.

Extremely noisy activities such as road construction or other activities that occur within the Secondary Zone shall be conducted outside the nesting period to avoid disturbance to eagles. If activities occur in proximity to a nest site, employ an individual qualified to observe and assess the impact of such activities on nesting eagles. Behavior generally associated with disturbed eagles includes alarm calls, birds flushed from their nest or perch, and aggressiveness.

If nest trees are discovered within the vicinity of the project site, the U.S. Fish and Wildlife Service must be notified immediately by calling (907) 786-3503 or (907) 271 – 2772, before starting construction activities, for further site evaluation. This is an advisory. Do what is required to keep from disturbing a nesting eagle.

CR107.1-081210

Add the following subsection:

107-1.21 FEDERAL AFFIRMATIVE ACTION. The Federal Equal Employment Opportunity Disadvantaged Business Enterprise and On-the-Job Training affirmative action program requirements that are applicable to this Contract are contained in the project Special Provisions and Contract Forms, and may include:

Disadvantaged Business Enterprise (DBE) Program	Section 120
Training Program	Section 645
Federal EEO Bid Conditions	Form 25A 301
EEO-1 Certification	Form 25A 304
ADOT&PF Training Program Request.....	Form 25A 310
Training Utilization Report.....	Form 25A 311
Contact Report.....	Form 25A 321A
DBE Subcontractable Items	Form 25A 324
DBE Utilization Report	Form 25A 325C
Summary of Good Faith Effort Documentation.....	Form 25A 332A
Required Contract Provisions, Federal-Aid Contracts	Form 25D 55

In addition to the sanctions provided in the above references, non-compliance with these requirements is grounds for withholding of progress payments.

S80-081398

**SECTION 108
PROSECUTION AND PROGRESS**

Special Provisions

108-1.03 PROSECUTION AND PROGRESS. Delete the last sentence of the first paragraph and substitute the following:

Submit the following at the Preconstruction Conference:

Delete the last sentence of the first paragraph in No. 1. A progress schedule, and substitute the following:

1. 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 periods of multiple shift work in the CPM Schedule. Revise to the proposed CPM Schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer.

CR108.2-042015

**SECTION 109
MEASUREMENT AND PAYMENT**

Special Provisions

109-1.02 MEASUREMENT OF QUANTITIES. Replace item, "14. Weighing Procedures" with "Weighing Procedures". "Weighing Procedures" is a subtopic under item "13. Ton (2,000 pounds)."

CR109.3-042015

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.

CR109.2-042015

Standard Provisions

Add the following Section:

SECTION 120 DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

120-1.01 DESCRIPTION. Provide Disadvantaged Business Enterprises (DBEs), as defined in Title 49 CFR Part 26, the opportunity to participate fairly with other contractors in the performance of contracts financed with federal funds. The Contractor and subcontractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor will carry out applicable requirements of 49 CFR Part 26 in the award and administration of U.S. DOT assisted contracts.

The Department, in coordination with the Federal Highway Administration (FHWA), adopted a Race-Neutral DBE Program with an overall DBE Utilization Goal of 8.46% for Alaska's FHWA Federal-Aid program. Although the Race-Neutral program does not establish or require individual project DBE Utilization Goals, 49 CFR establishes the Bidder is responsible to make a portion of the work available to DBEs and to select those portions of the work or material needs consistent with the available DBEs to facilitate DBE participation.

If the Department, in collaboration with our contractors, does not meet the overall program DBE Utilization Goal and cannot demonstrate good faith effort to meet the program goal, the program may be modified to Race-Conscious, with individual DBE Utilization Goals established for each Federal-Aid project. The Department and FHWA will use the data collected under Section 120 to evaluate the program for compliance with Section 120 and with 49 CFR Part 26.

120-1.02 INTERPRETATION. This section implements the requirements of 49 CFR Part 26, and the Department's federally approved DBE Program.

120-1.03 ESSENTIAL CONTRACT PROVISION. Failure to comply with the provisions of this section is a material breach of contract, which may result in cancelation of intent to award, contract termination, or other remedy as DOT&PF deems appropriate. Failure to comply with this section is justification for debarment action as provided in AS 36.30.640(4).

120-1.04 DEFINITIONS AND TERMS.

1. **Civil Rights Office.** The Department's Civil Rights Office. (CRO)
2. **Commercially Useful Function.** Action within the scope of the Contract where a Disadvantaged Business Enterprise (DBE) is responsible for execution of the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The DBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself.
3. **Contract Compliance Officer.** Individual within the Department's CRO with the authority to administer the Department's compliance programs.
4. **Disadvantage Business Enterprise (DBE).** A commercial entity which is a for-profit small business certified in accordance with 49 CFR Part 26 and listed in the Alaska DBE Directory.
5. **DBE Broker.** A DBE certified for the delivery of creditable materials, supplies, equipment, transportation/hauling, insurance, bonding, etc., within its certified category, that is necessary to complete the project. A DBE Broker of materials certified in a supply category must be responsible for scheduling the delivery of materials and ensuring that the materials meet specifications before credit will be given.

6. **DBE Key Employee.** Employee of the DBE who is identified by the DBE owner in the DBE's certification file at the CRO.
7. **DBE Manufacturer.** A DBE certified in a supply category that changes the shape, form, or composition of original material in some way. The DBE Manufacturer must provide that altered material to the general public or the construction industry at large on a regular basis.
8. **DBE On-Site Representative.** On-site representatives approved by the DBE owner and the CRO to represent a DBE owner. These representatives must have technical knowledge and the ability to answer questions regarding the work being performed on a project.
9. **DBE Regular Dealer.** A DBE certified in a supply category who operates in a manner consistent with industry practice and who:
 - a. maintains an in-house inventory on a regular basis of the particular product provided to this project; and
 - b. keeps an inventory in an amount appropriate for the type of work using that product; and
 - c. offers that inventory for sale to the general public or construction industry at large (private and public sectors), not just supplied as needed on a project by project basis during the construction season, except where the product requires special or heavy equipment for delivery and the DBE possesses and operates this equipment on a regular basis throughout the construction season in order to deliver the product to the general public or construction industry at large. If the distribution equipment is rented or leased, it must be on a repetitive, seasonal basis; and may additionally fabricate (assemble large components) for use on a construction project, consistent with standard industry practice, for delivery to the project.

A person may be a DBE Regular Dealer in bulk items such as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business, if the person both owns and operates distribution equipment for the products. Any supplementing of DBE Regular Dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis.
10. **DBE Utilization Goal.** The percent of work to be performed by certified DBEs.
11. **DBE Officer.** Individual designated in writing as a representative of the Contractor concerning DBE issues.
12. **Good Faith Effort (GFE).** Bidder's actions, performed prior to bid opening and demonstrated through detailed and comprehensive documentation, to take all necessary and reasonable steps to achieve DBE participation. Lower case "good faith effort", refers to the Department's and all or contractors' collaborative efforts to meet the overall program DBE Utilization Goal.
13. **Plan Holder Self-Registration List (PHSRL).** The Department's online portal that allows contractors, DBEs and non-DBEs to self-register as an interested contractor to bid.
14. **Race-Conscious Participation.** DBE participation used to meet an individual project specific DBE Utilization Goal.
15. **Race-Neutral DBE Participation.** DBE participation when no DBE Utilization Goal is specified in the Contract and DBE participation that exceeds the goal amount when an individual project specific DBE Utilization Goal is specified in the Contract.

120-2.01 RESERVED.

120-3.01 DETERMINATION OF COMPLIANCE.

1. **Phase I - Bid.** All Bidders' GFEs must be completed prior to bid opening.
2. **Phase II - Award.** The apparent low bidder shall submit evidence of DBE commitment(s) within 5 working days after receipt of written notification by the Department of the successful low bid. The apparent low bidder may not supplement its DBE efforts after opening, nor offer new or additional DBE participation after submitting the DBE Utilization Report (Form 25A-325C).
 - a. **Written DBE Commitment.** Complete Form 25A-326 for each DBE subcontractor.
 - b. **DBE Utilization Report.** Submit a completed DBE Utilization Report Form 25A-325C. All listed DBEs must be certified in the appropriate work categories prior to bid opening to be used to meet the DBE contract goal.
 - c. **GFE Documentation.** Submit a completed Summary of GFE Documentation Form 25A-332A (with attachments) and Contact Report Form 25A-321A.

120-3.02 GOOD FAITH EFFORT (GFE). Although evaluation of GFE for sufficiency is not a condition of award, documenting GFE is required and is necessary for the Department's and FHWA's determination of compliance with 49 CFR Part 26.

1. **GFE Criteria.** If the Department does not meet the overall program DBE Utilization Goal, the Department and FHWA will use the following criteria to judge whether the Department, in collaboration with our contractors, demonstrated good faith effort to meet the overall program DBE Utilization Goal.
 - a. **Consider All Subcontractable Items.** Before bid opening, seek DBE participation by considering those portions of the work or material needs consistent with the available DBEs to facilitate DBE participation.
 - b. **Initial DBE Notification.** Contact DBEs listed in the Department's Plan Holders Self-Registration List for the particular project being bid at least 7 calendar days prior to bid opening to solicit their interest. Log each contact with a DBE firm on a Contact Report, Form 25A-321A.

Give DBEs at least 7 calendar days to quote. The bidder may reject DBE quotes received after the deadline. Responsive DBE quotes should be accepted unless they are determined non-competitive. Consistently apply deadlines for quote submission and responsiveness determinations for DBEs and non-DBEs.

Methods of initial and follow up notification are:

- (1) By fax with a confirmation receipt of successful transmission to the DBE's fax number listed in the DBE Directory. A fax transmission without receipt of successful transmission is unsatisfactory.
 - (2) By email to the DBE's email address listed in the DBE Directory, with confirmation of successful receipt. Email without confirmation of successful receipt is unsatisfactory.
 - (3) By telephone solicitation made to the DBE's telephone number listed in the DBE Directory, with a record of the date and time of the telephone contact. Telephone solicitation without a record of date and time is unsatisfactory.
 - (4) By publication, with the names and dates of each advertisement in which a request for DBE participation was placed. Attach copies of advertisements or proof of publication.
- c. **Non-Acceptance of DBE Quotes.** When a DBE quote is not accepted, the work must be performed by the non-DBE subcontractor whose quote was used to provide the basis of the determination. Include evidence in support of the determination not to use the DBE subcontractor.

d. **Assistance to DBEs.** Provide DBEs with:

- (1) Information about bonding or insurance required by the bidder.
- (2) Information about securing equipment, supplies, materials, or business development related assistance or services.
- (3) Adequate information about the requirements of the contract regarding the specific item of work or service sought from the DBE.
- (4) Document all efforts to provide assistance to DBEs on Federal-Aid projects.

e. **Follow-up DBE Notifications.** If there is no response from the initial DBE notification, contact the DBEs again to determine if they will be quoting.

Failure to submit a quote by the deadline is evidence of the DBE's lack of interest in bidding. Log follow-up contacts on the Contact Report Form 25A-321A.

f. **GFE Evaluation.** The Department will review the GFE documentation for content but will not evaluate sufficiency. Failure to provide GFE documentation may result in cancellation of the notice of intent to award and forfeiture of the bid security according to subsection 103-1.03.

2. **Reserved.**

120-3.03 DBE CREDITABLE AND NON CREDITABLE WORK.

1. **DBE Creditable Work.** The Commercially Useful Function work items and creditable dollar amounts shown on the DBE Utilization Report, Form 25A-325C, shall be included in any subcontract, purchase order or service agreement with that DBE.

2. **DBE Decertification.**

a. If a DBE performing a Commercially Useful Function loses its DBE certification at any time prior to execution of a subcontract, purchase order or service agreement, as the result of a determination of ineligibility pursuant to 49 CFR Part 26.87, the work of that firm will not be credited toward the DBE Utilization Goal and the Contractor must either:

- (1) meet the contract goal by subcontracting with an eligible DBE firm or demonstrate a GFE to do so; or
- (2) continue with the decertified DBE and find other work not already committed to DBEs in an amount that meets or exceeds the DBE Utilization Goal.

b. If a DBE performing a Commercially Useful Function loses its DBE certification after execution of a subcontract, purchase order or service agreement, as the result of a determination of ineligibility pursuant to 49 CFR Part 26.87, the de-certified DBE may continue to perform, and the work may be credited toward the DBE Utilization Goal.

c. If a DBE goes out of business and cannot perform the work, the Contractor must meet the contract goal by subcontracting with an eligible DBE Firm or demonstrate a GFE to do so.

The provisions of 120-3.03(3) Termination of a DBE and 120-3.03(4) DBE Replacement or Substitution do not apply to this section.

A Contractor must notify the CRO within one business day if they become aware of any change in a DBE's circumstances that might lead to a DBE's decertification.

3. Termination of a DBE.

- a. In accordance with 49 CFR 26.53(f)(1) the Contractor shall not terminate a DBE without good cause and the prior written consent of the Engineer. For purposes of this paragraph, good cause includes the following circumstances:
- (1) DBE defaults on their obligation for any reason;
 - (2) The DBE fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor.
 - (3) The DBE fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;
 - (4) The DBE becomes bankrupt, insolvent, or exhibits credit unworthiness;
 - (5) The DBE is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215, and 1,200 or applicable state law;
 - (6) The Engineer determines the DBE is not a responsible contractor.
 - (7) The DBE voluntarily withdraws from the project and provides a written notice of its withdrawal;
 - (8) The DBE is ineligible to receive DBE credit for the type of work required;
 - (9) A DBE owner dies or becomes disabled with the result that the DBE is unable to complete its work; or
 - (10) Other documented good cause that the Engineer determines, compels the termination of the DBE, provided that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE was engaged or so that the Contractor can substitute another DBE or non-DBE after contract award.
- b. The Contractor must give written notice to the DBE of its intent to request to terminate and/or substitute, and the reason for the request. The request to terminate and/or substitute must be submitted to the Engineer.
- c. The Contractor must give the DBE 5 working days to respond to the written notice. Any response from the DBE must be submitted to the Engineer.

4. DBE Replacement or Substitution.

- a. The Contractor shall submit to the Engineer a written request to replace or substitute a DBE who fails or refuses to execute a written subcontract or who is terminated under 120-3.03(3).
- b. If the Contractor cannot obtain replacement DBE participation, the DBE Utilization Goal will not be adjusted. However, the Engineer may consider the following criteria as satisfying that portion of DBE participation that cannot be replaced:
- (1) The Contractor was not at fault or negligent and that the circumstances surrounding the replacement or substitution were beyond the control of the Contractor; and
 - (2) The Contractor is unable to find replacement DBE participation at the same level of DBE commitment and has adequately performed and documented the GFE expended in accordance with Subsection 120-3.02; or

(3) It is too late in the project to provide any real subcontracting opportunities for DBEs.

If the Engineer agrees that additional DBE participation is not available, the DBE may be replaced or substituted with a non-DBE or the Contractor may self-perform the work.

120-3.04 COMMERCIALY USEFUL FUNCTION (CUF).

1. **Creditable Work.** Measuring the DBE Utilization Goal will be based upon the actual dollars paid to the DBEs for creditable CUF work on this project. This is determined by the Engineer in accordance with this section. CUFs are limited to:
 - a. Prime Contractors;
 - b. Subcontractors;
 - c. Manufacturers;
 - d. Regular Dealers;
 - e. Brokers; or
 - f. Joint Ventures
2. **Determination of CUF.** In order for the CUF work of the DBE to be credited toward the goal, the Contractor will ensure that the DBE is certified in the appropriate category at the time of the submittal of the subcontract, or the issuance of a purchase order or service agreement. Subcontracts, purchase orders and service agreements shall be consistent with the written DBE commitment.
 - a. The CUF performed by a DBE certified in a supply category will be evaluated by the Engineer to determine whether the DBE performed as either a broker, regular dealer, or manufacturer of the product provided to this project.
 - b. The following factors will be used in determining whether a DBE trucking company is performing a CUF:
 - (1) The DBE must be responsible for the management and supervision of the entire trucking operation for which it is performing on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.
 - (2) The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
 - (3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
 - c. The Contractor will receive credit for the CUF performed by DBEs as provided in this Section. Contractors are encouraged to contact the Engineer in advance of the execution of the DBE's work or provision of goods or services regarding CUF and potential DBE credit.
 - d. The DBE may perform work in categories for which it is not certified, but only work performed in the DBE's certified category meeting the CUF criteria may be credited toward the DBE Utilization Goal.
 - e. DBE work shall conform to the following requirements to be a CUF:
 - (1) It will be necessary and useful work required for the execution of the Contract.
 - (2) The scope of work will be distinct and identifiable with specific contract items of work, bonding, or insurance requirement.

- (3) It will be performed, controlled, managed, and supervised by employees normally employed by and under the control of the certified DBE. The work will be performed with the DBE's own equipment. Either the DBE owner or DBE On-Site Representative will be at the work site and responsible for the work. Leased equipment may also be used provided the DBE has exclusive use of the equipment and it is operated by a driver the DBE employs. In remote locations or rare situations, a DBE may use equipment and/or personnel from the Contractor or its affiliates. Should this situation arise, a prior arrangement must be in place. The duration of the arrangement must be short term and prior written approval from the Engineer must be obtained.
- (4) The manner in which the work is sublet or performed will conform to standard industry practice within Alaska, as determined by the Department. The work or provision of goods or services will have a market outside of the DBE program (and must also be performed by non-DBE firms within the Alaskan construction industry). Otherwise, the work or service will be deemed an unnecessary step in the contracting or purchasing process and no DBE credit will be allowed.

There will be no DBE credit for lower-tier non-DBE subcontract work.

- (5) The cost of the goods and services will be reasonable and competitive with the cost of goods and services outside the DBE program within Alaska. Materials or supplies needed as a regular course of the Contractor's operations such as fuel, maintenance, office facilities, portable bathrooms, etc. are not creditable.

The cost of materials actually incorporated into the project by a DBE subcontractor is creditable toward the DBE goal only if the DBE is responsible for ordering and scheduling their delivery and fully responsible for ensuring that they meet specifications. The cost of materials purchased from the contractor or its affiliates is not creditable.

- (6) Subcontract work, with the exception of truck hauling, shall be sublet by the same unit of measure as is contained in the Bid Schedule unless approved in advance by the Engineer.
- (7) The DBE will control all business administration, accounting, billing and payment transactions. The Contractor cannot perform these functions for the DBE.

In accordance with AS 36.30.420(b), the Engineer may inspect the offices of the DBE and audit their records to assure compliance.

3. **Rebuttal of a Finding of No CUF.** Consistent with the provisions of 49 CFR Part 26.55(c)(4)&(5), before the Engineer makes a final finding that no CUF has been performed by a DBE, the Engineer will coordinate transmittal of the presumptive finding to the Contractor, who will in-turn, notify the DBE. The Contractor will provide the DBE the opportunity to provide rebuttal information. The Contractor shall present the information to the Engineer.

The Engineer will make a final determination on whether the DBE is performing a CUF. Under no circumstances will the Contractor take any action with respect to the DBE until the final determination is made. The Engineer's decisions on CUF matters are subject to review by the Department, but are not administratively appealable to the U.S. DOT.

4. **Monthly Required Reporting.** On a monthly basis, the Contractor shall submit the Monthly Summary of DBE Participation, Form 25A-336, to the Engineer. Reports are due by the 15th of the following month. Also attach copies of canceled checks or bank statements that identify payer, payee, and amount of transfer to verify payment information shown on the form.

120-4.01 DETERMINING DBE CREDIT. The Contractor is entitled to count toward the DBE Utilization Goal, monies actually paid to certified DBEs for CUF work performed by the DBE as determined by the Engineer. The Contractor will receive credit toward the DBE Utilization Goal, as follows:

1. Credit for the Commercially Useful Function of a DBE prime contractor is 100 percent of the monies actually paid to the DBE under the contract for creditable work and materials in accordance with 49 CFR Part 26.55.
2. Credit for the CUF of a subcontractor is 100 percent of the monies actually paid to the DBE under the subcontract for creditable work and materials.
3. Credit for the CUF of a subcontractor performing hauling/transportation is 100 percent of the monies actually paid to the DBE under the subcontract for creditable work for those firms certified in the 100 percent category. Credit for the CUF of a subcontractor performing hauling/transportation is 5 percent of the monies actually paid to the DBE under the subcontract for creditable work for those firms certified in the 5 percent credit category.
4. Credit for the CUF of a manufacturer is 100 percent of the monies paid to the DBE for the creditable materials manufactured.
5. Credit for the CUF of a regular dealer of a creditable material, product, or supply is 60 percent of its value. The value is the actual cost paid to the DBE not to exceed the bid price for such item.
6. Credit for the CUF of a broker performed by a DBE certified in a supply category for providing a creditable material, product or supply is limited to a reasonable brokerage fee. The brokerage fee will not exceed 5 percent of the cost of the procurement contract for the creditable item.
7. Credit for the CUF of a broker performed by a DBE certified in a bonding or insurance category is limited to a reasonable brokerage fee, not to exceed 5 percent of the premium cost.
8. Credit for the CUF of a joint venture (JV) either as the prime contractor or as a subcontractor may not exceed the percent of the DBE's participation in the JV agreement, as certified by the CRO. The DBE joint venture partner will be responsible for performing all of the work as delineated in the certified JV agreement.

120-5.01 ACHIEVEMENT OF DBE GOALS. Work under this item is subsidiary to other contract items and no payment will be made for meeting or exceeding the DBE Utilization Goal.

If the Contractor fails to utilize the DBEs listed on Form 25A-325C as scheduled or fails to submit proof of payment, requested documentation, or otherwise cooperate with a DBE review or investigation, the Department will consider this to be unsatisfactory work. If the Contractor fails to utilize GFE to replace or substitute a DBE, regardless of fault (except for Subsection 120-3.03(4)(b)(3)), the Department will also consider this unsatisfactory work. Unsatisfactory work may result in disqualification of the Contractor from future bidding under Subsection 102-1.13 and withholding or progress payments consistent with Subsection 109-1.06.

SSP-38-070115

DIVISION 200 — EARTHWORK

Blank Page

**SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Special Provisions

202-1.01 DESCRIPTION. Add the following:

This work also includes:

Pavement Planing. Remove, and or reuse, or dispose of planed pavement materials as noted herein.

CR202.3-060115

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. Add the following:

Removed pavement material, including sidewalks and curbs, is the property of the Contractor. Handle and transport materials according to the Alaska Department of Environmental Conservation (DEC) regulations. Store materials at a Contractor DEC approved site.

Removed pavement, sidewalks, and curbs may be used for embankment construction if it is not exposed at the completed embankment surface. Maximum allowable dimension of broken materials is 6 inches. The use of pavement, sidewalk, and curb in the embankment requires written approval and direction for use from the Engineer.

Dispose of removed pavement, sidewalks, and curbs not wanted by the Contractor and not used in the project, according to Subsection 3.09.

CR202.2-010610

Add the following Subsection 3.06:

202-3.06 PAVEMENT PLANING. Remove existing asphalt pavement by cold planing at locations shown in the Plans. Adjust planing machine to remove all ruts in the roadway surface and as directed by the Engineer. The surface of the pavement after planing shall be a uniformly fine milled textured surface.

Notify the Engineer of pavement areas that may be thin or unstable. Where the planing equipment breaks through the existing pavement, repair as specified in the Division 400, Sections 401, 408, and 409. Repair with Section 401 HMA; Type II, Class B. If Section 401 is not included in the project special provisions use the HMA Type specified for the immediate layer of HMA to be placed over the planed surface. Repair work and materials are subsidiary to HMA Pay Items

Remove planed material from the project immediately after planing.

Stockpiled Planed Material

Kenai Peninsula

Pavement material planed from the project roadway sites #3, 4, 5, and 6 is the property of the State. Remove planed material from the project immediately after planing. The Kenai Peninsula District Maintenance and Operations (M&O) Superintendent will accept planed material from the Funny River Road sites (#3 and 4). This material shall be delivered to a pullout at mile 6.5 of Funny River Road. Material from the Seward Highway site #5 shall be stockpiled at Primrose Station and material from Seward Highway site #6 shall be stockpiled at the M&O pit at mile 40.5 of the Seward Highway. Coordinate with Carl High, Superintendent at (907) 262-2199 for acceptance of material and desired location of stockpile.

Matanuska-Susitna Valley

Pavement material planed from the project roadway sites #17 and 18 is the property of the State. Remove planed material from the project immediately after planing. The Matanuska-Susitna Maintenance and Operations (M&O) Superintendent will accept the material from the Old Glenn Highway sites #17 and 18. This material shall be delivered to the M&O pit at mile 8.5 of the Old Glenn Highway. Coordinate with Steve Banse, Superintendent at (907) 745-2159 for acceptance of material and desired location of stockpile.

Anchorage Area

Pavement material planed from the project roadway within the Anchorage Maintenance District is the property of the Contractor. Remove planed material from the project immediately after planing. Handle and transport materials according to the Alaska Department of Environmental Conservation (DEC) regulations. Store materials at a Contractor DEC approved site.

CR202.3/Z570920000

Planed material not acceptable to the Maintenance Chief will be disposed of in an acceptable manner, or incorporated into the road structure prism as directed by the Engineer. Handle, transport, store, or dispose material according to Subsection 3.05, Removal of Pavement, Sidewalks, and Curbs.

Dispose of planed material not accepted by the maintenance yard, not used in the project, and not wanted by the Contractor according to Subsection 3.09.

Planed material may be:

- incorporated into the embankment construction, Section 203;
- used as shoulder buttressing as specified in Section 301;
- used as recycled asphalt pavement as specified in Section 306;
- and as directed by the Engineer.

The use of planed material requires written approval and direction from the Engineer.

The Local DOT Maintenance and Operations Station may be able to accept planed materials not used in the project and not wanted by the Contractor. If the Local Maintenance and Operations Station is able to accept some or all of the material, coordinate the delivery, time of delivery and quantity of delivery with the Station Manager. Contact the Central Region Maintenance & Operations Office at, (907) 269-0760, to obtain the appropriate District Station Managers phone number for this project.

Dispose of planed materials not wanted by the Contractor, not used in the project, and not accepted by the Local Maintenance and Operations Station according to Subsection 3.09.

During planing operations, sweep the streets according to 643-3.04 Traffic Control Devices, No. 6. Street Sweeping and Power Brooming to control dust and remove loose material from the planed areas. The removal operation shall follow within 50 feet of the planing machine.

Do not allow traffic to travel on surfaces that have an abrupt longitudinal planed edge greater than 2 inches. In the event it is necessary to route traffic across such edges, an asphalt pavement transition 2 feet in width shall be placed adjacent to the edge and to gutters.

Where existing asphalt pavement overlays gutters adjacent to the area being planed remove the existing pavement.

The existing curb, gutter, and edge of existing Portland cement pavement not designated for removal shall not be damaged or disturbed. Damage caused by the planing operation shall be removed and replaced by the Contractor at the Contractor's expense.

The planing machine shall have the following capabilities:

1. Self propelled and capable of milling at speeds from 0 ft to 40+ ft per minute.
2. Able to spray water inside the milling chamber to reduce dust.
3. Able to mill adjacent to a gutter without damaging gutter.
4. Automatic cross slope and depth control combined with automatic longitudinal grade control actuated by sonic or laser ski sensors.
5. Produce a "fine milled" textured surface with a tool spacing of 5/16 inch.
6. Able to uniformly maintain a planar surface across adjacent lanes (no elevation differential or ridges between adjacent passes).

Provide a small machine (producing a "fine milled" textured surface) to trim areas that are inaccessible to the larger machine at manholes, valve covers, curb returns, and intersections.

The Engineer may reject any machine that does not comply with the above noted requirements.

CR202.3/Z570920000

Add the following Subsection 3.09.

202-3.09 DISPOSAL OF PAVEMENT, SIDEWALKS, AND CURBS.

Pavement, sidewalk and curb materials not being used in the project, stored at a Contractor DEC approved site, provided to the local DOT Maintenance and Operations Yard, or disposed of at a previously approved DEC disposal site require a DEC Solid Waste Disposal Permit.

Disposal sites shall be outside the project limits unless directed otherwise, in writing, by the Engineer. Obtain written consent from the property owner. Dispose of solid waste materials, pavement, sidewalk, and curb (including handling, transporting, storing and disposing) according to the Alaska Department of Environmental Conservation (DEC) Regulations.

A DEC Permitting Officer in Anchorage may be contacted at (907) 269-7590.

CR202.1-010114

202-4.01 METHOD OF MEASUREMENT. Add the following:

Item 202(15). Pavement planing is measured by the square yard of the pavement planed.

CR202.3-060115/Z570920000

202-5.01 BASIS OF PAYMENT. Add the following:

Acquiring a solid waste disposal permit from DEC is subsidiary to 202 Pay Items.

CR202.1-010114

Item 202(15). At the Contract Unit Price - payment is full compensation for activities and equipment associated with pavement planing including:

- removal of pavement from curbs and gutters;
- mechanical sweepers and power brooms used during the planing operation;
- stockpiling planed material when required;

Replace damaged loop detectors, piezoelectric sensors, RWIS or other highway data sensors outside the specified planing depth according to the requirements of section 660 and 669 at no expense to the Department.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
202(15)	Pavement Planing	Square Yard

CR202.3-060115

**DIVISION 400 — ASPHALT PAVEMENTS
AND
SURFACE TREATMENTS**

Blank Page

**SECTION 401
HOT MIX ASPHALT PAVEMENT**

Special Provisions

401-1.01 DESCRIPTION. Add the following:

1. In this Section, HMA refers to 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

Replace Section 401-2.01 with the following:

401-2.01 ASPHALT BINDER. Conform to Subsection 702-2.01. If binder performance grade is not specified, use PG 52-28.

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.

401-2.02 LIQUID ANTI-STRIP ADDITIVE. Delete the last sentence: "A minimum of .30% by weight of asphalt binder is required."

401-2.08 RECYCLED ASPHALT PAVEMENT. In the last sentence replace: "2.15" with "2.16."

401-2.09 JOB MIX DESIGN.

Replace row and columns of Table 401-1,

Asphalt Cement Content, Min. %	5.0	5.0
--------------------------------	-----	-----

with:

Asphalt Cement Content, Min. % @ 4% VTM	5.0	5.0
---	-----	-----

Replace subtopic and content "Changes." with the following:

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 401-1
- 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 401-2.10 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 401-2.10.

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 401-5.01.

Add the following Subsection 401-2.10:

401-2.10 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 401-3.01, 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 401-4.02

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 401-3.04. 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 401-5.01 for payment of test strips.

CONSTRUCTION REQUIREMENTS

Replace Subsection 401-3.01 Pre-Paving Meeting, with the following:

401-3.01 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, make adjustments to 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. Summary of plant modifications (if applicable) for production of WMA
 - 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

401-3.03 WEATHER LIMITATIONS. Delete from the last sentence: "leveling course"

401-3.04 EQUIPMENT, GENERAL. Add the following to the 2nd sentence: "and test strip HMA."

401-3.06 HAULING EQUIPMENT. Add the following:

When directed by the Engineer cover the HMA in the hauling vehicle(s).

401-3.08 ROLLERS. Add the following: Use both steel-wheel (static or vibratory) and pneumatic-tire rollers.

401-3.10 PREPARATION OF EXISTING SURFACE. Add the following to the 1st paragraph: 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.

401-3.15 PLACING AND SPREADING. Add the following:

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 pave against new Portland cement concrete curbing until it has cured for at least 72 hours.

401-3.16 COMPACTION. Add the following:

Prevent indentation in the mat, do not leave rollers or other equipment standing on HMA that has not sufficiently cooled.

401-3.17 JOINTS. Replace the 5th paragraph with the following:

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.

In the last paragraph 1st sentence replace: "200 °F" with "150 °F"

401-3.18 SURFACE REQUIREMENTS AND TOLERANCE. 2nd paragraph 1st sentence replace "16-foot straightedge" with "10-foot straightedge."

Replace the 3rd paragraph with the following:

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.

Replace the 4th paragraph with the following:

Profiler measurements will not be taken in turn lanes, intersections, ramps, lane transitions, or within 25 feet of bridge abutments and transverse joints with pre-existing pavement.

Replace Subsection 401-3.18 with the following:

401-3.18 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 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.

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 the 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 mill 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.

401-4.01 METHOD OF MEASUREMENT. Delete the 2nd sentence in number 12, 13, and 14.

401-4.02 ACCEPTANCE SAMPLING AND TESTING. 401-4.02, 4. Replace the last sentence with the following:

Retesting will be performed by the region Department laboratory.

401-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE.1 HMA Price Adjustment.

Replace PAB:

$$\text{PAB} = \text{Price Adjustment Base} = [\text{Bid Unit Price for 401(1_)} + (n/100) \times \text{Bid Unit Price for 401(4_)}],$$

Where

n = Optimum asphalt binder content percent, established by the JMD.

With the following:

$$\text{PAB} = \text{Price Adjustment Base} = \$130.00 \text{ per ton.}$$

3. Pavement Smoothness Price Adjustment. Not applicable to this project.

Replace Subsection 5.01 with the following:

401-5.01 BASIS OF PAYMENT.

The following items, unless included as individual Pay Items, are subsidiary to the Section 401 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 401-2.10 Process Quality Control
- Repair work and materials when planing equipment breaks through existing pavement – Subsection 401-3.10 Preparation of Existing Surface
- Work and materials associated with Subsection 401-3.06 Hauling Equipment
- Work and materials associated with Subsection 401-3.20 Roadway Maintenance

Test Strips: Subsection 401-2.10 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 401(8_), 401(9), 401(10) and 401(15) do not apply.
- b. Failed. The materials, construction of, removal and disposal of a failed test strip will be at the Contractor's expense.

Item 401(5) HMA, Temporary, Type __; Class __. Removal and disposal of temporary HMA is subsidiary.

The following price adjustment Pay Items, unless included as individual Pay Items in the bid schedule, are paid under 401(8_) HMA Price Adjustment, Type __; Class __ :

401(8_) HMA Price Adjustment, Type __; Class __,
 401(9) Longitudinal Joint Density Price Adjustment,
 401(10) Pavement Smoothness Price Adjustment, Method __.

Item 401(8_) HMA Price Adjustment, Type __; Class __, is 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.

Item 401(8_) HMA Price Adjustment, Type __; Class __, does not apply to:

- HMA, when contract quantity is less than 1500 tons
- 401(2) and 401(3) HMA, Leveling Course, Type __, Class __,
- 401(5) HMA, Temporary, Type __, Class __,
- 401(11) and 401(12) HMA, Driveway, Type __, Class __.

Item 401(15) Asphalt Material Price Adjustment.

For each Section as included in Subsection 401-4.04 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.

Item 401(16) Crack Repair. Cleaning loose material from cracks, asphalt binder, and HMA to fill cracks are subsidiary.

Item 401(17) Prelevel for Ruts, Delaminations, and Depressions. Cleaning loose material, asphalt binder, and HMA are subsidiary.

Item 401(18) Repair Unstable Pavement. Removal of pavement and base course, asphalt binder, and HMA are subsidiary.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
401(1A)	HMA, Type IV; Class A	Ton
401(2)	HMA, Leveling Course, Type <u>IV</u> ; Class <u>B</u>	Lane-Station
401(3)	HMA, Leveling Course, Type <u>IV</u> ; Class <u>B</u>	Ton
401(4)	Asphalt Binder, Grade PG 58-34	Ton
401(5)	HMA, Temporary, Type <u>II</u> ; Class <u>B</u>	Ton
401(6)	HMA, Type __, Class __	Square Yard
401(7)	Liquid Anti-Strip Additives	Contingent Sum
401(8_)	HMA Price Adjustment, Type __; Class __	Contingent Sum
401(9)	Longitudinal Joint Density Price Adjustment	Contingent Sum
401(10)	Pavement Smoothness Price Adjustment, Method __	Contingent Sum
401(11)	HMA, Driveway, Type __; Class __	Lump Sum
401(12)	HMA, Driveway, Type __, Class __	Ton
401(13)	Job Mix Design	Each
401(14)	Joint Adhesive	Linear Foot
401(15)	Asphalt Material Price Adjustment	Contingent Sum
401(16)	Crack Repair	Linear Foot
401(17)	Prelevel for Ruts, Delaminations, and Depressions	Square Yard
401(18)	Repair Unstable Pavements	Square Yard

CR401.1-101015

Special Provision

Replace Section 405 with the following:

**SECTION 405
HIGH FRICTION SURFACE TREATMENT**

405-1.01 DESCRIPTION. This work consists of providing all labor, materials and equipment required to prepare asphalt pavement surfaces and to furnish and apply a High Friction Surface Treatment (HFST). Preparation of pavement surfaces, application of materials, quality control, and testing must be in accordance with this special provision and the manufacturer's recommendations. Any discrepancies between the two must be brought to the attention of the Engineer.

MATERIALS

405-2.01 BINDER RESIN SYSTEM Use a polymeric or methyl methacrylate resin meeting the requirements in Table 405-1.

**TABLE 405-1
PHYSICAL REQUIREMENTS OF THE BINDER RESIN SYSTEM**

Property	Requirement		Test Method
	Polymeric resin	MMA Resin	
Viscosity (poises)	Class C: 7 - 30	Class C: 12 - 20	ASTM D 2556*, mix for 2 to 3 minutes before testing. Use X1.1 for Spindle Selection. Perform testing at a temperature of 73 ± 2F.
Gel Time (minutes)	10 minimum	10 minimum	AASHTO M 235*, prepare a 60 g sample, test at 73 ± 2F.
Ultimate Tensile Strength (psi)	2,500-5,000	1,500-5,000	AASHTO M 235*, prepare Type I specimen in accordance with ASTM D 638
Durometer Hardness (Shore D)	60 to 80	40 to 75	ASTM D 2240*, use the Type 1 Precision—Type D Durometer Method. Cure specimens for 7 days at 73 ± 2F and relative humidity at 50% ± 2%. Test specimens at 73 ± 2F without delay.
Compressive Strength (psi)	1,000 min. at 3 hours 5,000 min. at 7 days	1,000 min. at 3 hours 2,000 min. at 7 days	ASTM C 579*, prepare specimen according to Method "B", 2 inch x 2 inch cube, using 2.75 parts of sand to one part of mixed Binder by volume. Use sand meeting ASTM C 778, 20-30 sand. Cure specimens for 7 days at 73 ± 2F and relative humidity at 50% ± 2%. Test specimens at 73 ± 2F without delay.
Cure Rate (hours)	3 max.	3 max.	ASTM D 1640*, prepare a specimen of 50-55 wet mil thickness. Cure specimens for 3 hours max at 50 ± 2F and relative humidity at 50% ± 2%. Test specimens at 50 ± 2F without delay.
Water Absorption (%)	1 max.	1 max.	AASHTO M 235*, cure specimens for 7 days at 73 ± 2F and relative humidity at 50% ± 2%. Test specimens at 73 ± 2F without delay after immersion.
Adhesive Strength (psi) @ 24 hours	250 min. or 100% substrate failure	250 min. or 100% substrate failure	ASTM C 1583*, cure specimens for 24 hours at 73 ± 2F and relative humidity at 50% ± 2%. Test specimens at 73 ± 2F without delay.

*prepare the samples in accordance with the manufacturers' recommendations.

Binder resin systems shall be recommended by the manufacturer as suitable for use on the intended pavement surface and for the potential range of atmospheric exposure. A primer shall be used before application of the binder resin system when recommended by the manufacturer.

Binder resin system components shall be packaged in suitable, well-sealed containers clearly labeled as to the type material and the ratio of the components to be mixed by volume. Any special instructions regarding mixing shall be included.

The label shall show resin or hardener components, brand name, name of manufacturer, lot or batch number, temperature range for storage, expiration date and the quantity contained therein. Caution warnings regarding contact of the binder with skin and eyes shall be included on the labels.

405-2.02 AGGREGATE TOPPING Furnish an aggregate topping of calcined bauxite aggregate. The aggregate topping is to be clean, dry, and free from deleterious matter. The aggregate topping must meet the requirements of Table 405-2.

**TABLE 405-2
AGGREGATE TOPPING REQUIREMENTS**

Properties	Test Methods	Specifications	
Color	-----	Buff or grey	
Polish Stone Value	AASHTO T 279	38 min.	
Resistance to Degradation	AASHTO T 96	20% max.	
LA Abrasion Test	AASHTO T 96 "C" Grading (on parent aggregate)	20.0 max.	
Moisture Content	AASHTO T 255	0.2% max.	
Aluminum Oxide	ASTM C 25	87% min.	
Aggregate Gradation	AASHTO T 27	Sieve Designation	Total Percent Passing
		No. 4	100%
		No. 6	95%-100%
		No. 16	0%-5%

All aggregates shall be furnished in appropriate packaging that is clearly labeled and protects the aggregate from any contaminants on the jobsite and from exposure to rain or other moisture. The label shall show the name of the manufacturer and location of processing.

405-2.03 DYNAMIC FRICTION TESTER The Engineer will furnish a portable Dynamic Friction Tester (DFT) capable of dynamic friction testing in accordance with ASTM E 1911.

405-2.04 SUBMITTALS AND QUALITY CONTROL PLAN. Submit a HFST Quality Control Plan (QCP). The plan review time will be 5 working days.

The HFST QCP must include:

1. Schedule for the trial HFST work and the production HFST work
2. Description of equipment for placing HFST
3. Description of equipment for measuring, mixing, placing, and finishing HFST
4. Method for protecting areas not to receive HFST
5. Cure time estimates for HFST
6. Storage and handling of HFST components
7. Disposal of excess HFST and containers
8. Contingency plan for possible failure during the HFST application
9. Name of the certified independent testing laboratory.
10. Location and source for aggregate topping and binder resin system.
11. Environmental and weather constraints for the application of the binder resin system.

Submit a material safety data sheet (MSDS) for each shipment of HFST components before use.

Submit a certificate of compliance for the binder resin system and the calcined bauxite aggregate topping. The manufacturer of the resin binder and calcined bauxite aggregate topping shall certify that the resin binder and calcined bauxite aggregate topping meet the requirements of this specification. Such certification shall consist of either a copy of the manufacturer's test report or a statement by the manufacturer, accompanied by a copy of the current test results, that the resin binder and calcined bauxite aggregate topping has been sampled and tested. Such certification shall indicate the date of testing and shall be signed by the manufacturer. The manufacturer shall maintain and make available upon request complete records of sampling, testing, actions taken to correct problems and quality control inspection results.

Have the binder resin system and calcined bauxite aggregate topping tested at a certified independent testing laboratory and then furnish the verifications to the Engineer that the materials meet all requirements listed in these specifications.

Submit the binder resin system manufacturer's approval of the use of the proposed automated continuous application device with their material.

Allow 2 working days for the Engineer to review each MSDS submittal, certificate of compliance, the mix design and certified independent testing laboratory test results.

Do not begin a trial HFST until authorized by the Engineer in writing.

Per site, submit binder resin system Manufacturer's HFST Technical Supervisor site preparation recommendations including any use of mechanical sweeping, water cleaning, and/or use of detergent.

405-2.05 MANUFACTURER'S HFST TECHNICAL SUPERVISOR. Provide onsite the binder resin system manufacturer's technical supervisor to supervise the HFST installation process and the related process control of the product. The technical supervisor shall have supervised the installation of HFST on a minimum of 5 previous successful projects and his resume shall be submitted to the Engineer for approval 1 week prior to the HFST Pre-Work Meeting.

Provide a submittal that includes the following information:

1. Resume of the Technical Supervisor;
2. A list of successful projects; provide owners contact, address, and telephone number; location of projects.

405-2.06 HFST PRE-WORK MEETING After HFST submittals and the contractor's quality control plan submittals are approved by the Engineer the contractor shall schedule a HFST Pre-Work Meeting with the Engineer prior to performing HFST work. Discuss the HFST requirements, submittals, test strip, and construction work plan and operations. Discuss potential failures of the HFST and the remedy.

Attendance at the HFST Pre-Work Meeting is mandatory for:

1. HFST Technical Supervisor;
2. HFST Foreman; and
3. Project Superintendent

CONSTRUCTION REQUIREMENTS

405-3.01 WEATHER LIMITATIONS. Do not apply the binder resin system on a wet surface or when the ambient temperature is below 50°F unless the manufacturer of the binder resin system can demonstrate "dry through time" cure rate in less than 3 hours at representative field conditions, or when the anticipated weather conditions would prevent the proper application and cure of the surface treatment as determined by the Engineer. Do not apply before May 15 or after September 1 unless recommended by the HFST technical supervisor and approved by the Engineer in writing.

405-3.02 TEST STRIP. Complete a HFST test strip on asphalt concrete pavement before starting HFST production work at a location approved by the Engineer.

The HFST test strip shall:

1. Be at least 12 feet wide by 100 feet long.
2. Be constructed using the automated continuous application method required for the production work in accordance with Section 405-3.04.
3. Replicate field conditions, including ambient and surface temperatures, anticipated for the production work.
4. Demonstrate surface preparation requirements.
5. Remove pavement markers and delineation within the area to receive HFST, for the lane and length involved, prior to placing the resin binder.
6. Calibrate equipment before it is used on the test strip. Document the settings on the applicator equipment, initial quantities of resin and aggregate topping, and unused quantities of resin and aggregate topping remaining in the applicator equipment after applying the HFST. This documentation shall be provided to the Engineer before beginning production HFST installation.
7. Determine the initial set time for the resin binder in HFST.
8. Have temporary or permanent pavement markers and delineation in place when lanes are open to public traffic.
9. Determine that work can be completed within time permitted.
10. Have a 20 km/hr Field Dynamic Friction value of at least 0.75 when tested in conformance with ASTM E 1911 Dynamic Friction Tester. If the Field Dynamic Friction test value is below 0.75, correct or remove and replace the HFST test strip to meet or exceed the specified value of 0.75.

Do not begin production HFST until authorized by the Engineer in writing after successful completion of the HFST test strip. A test strip that meets specification shall be measured and paid at the contract unit price.

405-3.03 CONSTRUCTION. The HFST technical supervisor shall be on-site during the entire time the surface treatment is being installed.

1. Surface Preparation

Surfaces must be clean, dry, and free of all dust, oil, debris and any other material that might interfere with the bond between the binder resin system material and existing surfaces. Adequate cleaning of all surfaces will be performed to the satisfaction of the binder resin system Manufacturer's HFST Technical Supervisor.

Cover and protect the following surface features against the application of HFST as directed by the Engineer before performing surface preparation:

- all existing pavement markings not being replaced as part of this contract and permanent pavement markings installed in new asphalt pavement as part of this contract prior to HFST installation,
- drainage structures,
- curbs,
- survey monuments,
- utilities (manholes/inlets/water key boxes) and,
- any other structures within or adjacent to the treatment location.

Remove pavement markings and delineation within the area to receive HFST, prior to placing binder resin system in accordance with Subsection 670-3.04

Prepare all pavement surfaces immediately before the installation of HFST. Mechanically sweep only if recommended by the binder resin system Manufacturer's HFST Technical Supervisor or as directed by the Engineer prior to high pressure air cleaning. All equipment shall have sufficient oil traps to prevent contamination of the surface.

Clean asphalt pavement surfaces using high pressure air wash to remove dirt, loose aggregate, debris, and deleterious material. Vacuum sweep or air wash, using a minimum of 180 cubic feet per minute and 80 pounds per square inch of clean and dry compressed air, all surfaces to remove all dust, debris, and deleterious material. Maintain air lance perpendicular to the surface and the tip of the air lance within 12 in. of the surface.

High pressure water cleaning may impregnate the pavement with moisture and shall only be used if recommended by the binder resin system Manufacturer's HFST Technical Supervisor or as directed by the Engineer. Pavement surfaces that require washing with a mild detergent solution to remove oils, grease, or other deleterious materials that remained after the surface preparation, shall be rinsed with clear potable water, and dried using a hot compressed air lance. If detergent is used, it shall be vacuumed up before leaving the pavement surface.

Where cracks are present, remove loose material with compressed air and pre-treat cracks 1/4 inch or greater in width with the mixed binder resin system. If cracks do not remain filled with the binder resin system allow pre-treated cracks to gel before adding additional mixed binder or if cracks are wide add calcined bauxite and fill with mixed binder.

Perform surface preparation before placing new or temporary pavement markers and delineation.

Temporary or permanent pavement markers and delineation must be in place before lanes are open to public traffic.

The Engineer will inspect the construction equipment and cleaned asphalt surface before test strip construction, and prior to project production/application of the HFST materials.

2. HFST Application

Application of the HFST shall conform to the following:

- a. Do not apply HFST to asphalt pavement surfaces that are less than 30 days old. If the binder resin system supplier's written recommendations require a greater asphalt pavement age, schedule the greater of the two time requirements between Section 401 and Section 405 work items.
- b. Surface preparation work, surface temperature, placement of the HFST must be in conformance with the binder supplier's specifications, these special provisions and as approved by the Engineer.
- c. Verify the existing surface variance with a 12-ft. straightedge, per each location, or 1 per every 1,500 lane-feet, whichever is shorter at locations and orientation directions selected by the Engineer.
- d. The spread rate for binder resin system is 0.28-0.32 gal./ sq. yd.
- e. The spread rate of retained aggregate is 13-20 lb./sq. yd.
- f. HFST must be allowed to cure for the minimum duration as recommended by the manufacturer's specifications and during that time the application area must be closed to all vehicle and Contractor equipment traffic.
- g. The surface texture of the HFST must be uniform and have a Field Dynamic Friction value at 20 km/hr not less than 0.75 as tested by a Dynamic Friction Tester following ASTM E 1911. Provide a correction plan in accordance with Section 405-3.06 for HFST that fails to meet the Field Dynamic Friction value of 0.75. The Engineer will verify the friction value.
- h. The uniformity of the finished surface after application of the HFST should equal that of the underlying asphalt concrete pavement (either existing surface, repaved surface, or surface treated with a leveling course) will be tested with a straightedge and accepted by the Engineer. The surface shall not vary more than 0.02 foot from the lower edge of a 12-ft. straightedge placed in any direction. Any surface that fails to conform to the above tolerance must be removed and replaced at the contractor's expense.
- i. Provide daily records of the quantity of each component of resin used and of the aggregate topping.

405-3.04 MIXING AND APPLICATION METHODS. Utilize the automated continuous application method to apply the resin binder and aggregate wearing course, in accordance with manufacturer's recommendations.

Automated Continuous Application.

Automated continuous application shall be performed by an applicator vehicle with a minimum aggregate capacity of 30,000 lbs and a minimum of 550 gallons of the resin binder. The binder resin system manufacturer shall approve the use of said automated continuous application device with their material. The applicator shall continuously mix, meter, monitor, and apply the resin binder and high friction aggregate in one continuous pass.

The applicator vehicle shall be equipped with a data management unit which is capable of producing real time data flow showing the volume of resin, the resin mil thickness on average throughout the application width, and the volume of aggregate applied throughout the application width. The automated continuous application vehicle will have continuous pumping and portioning devices that blend the binder resin system within a controlled system. The binder resin system shall be blended and mixed in the ratio per the manufacturer's specification (+/- 2% by volume); the binder resin system shall be continuously applied once blended. The application vehicle shall be capable of applying a uniform application thickness of 50-65 mils (25-32 sq. ft. / gal). Coverage rate is based upon expected variances in the surface profile of the pavement.

The high friction aggregate shall be applied by the same automated continuous application vehicle that applies the resin binder to the pavement section. The automatic aggregate spreader shall be capable of applying up to a continuous 12-foot width uniform application. The high friction aggregate shall be applied within 3 seconds (+/- 1 sec) of the base binder resin system application onto the pavement section, from a height of 12 to 16 inches from above the pavement section surface, at the minimum spread rate. It is the responsibility of the HFST installer to ensure full embedment of the calcined bauxite aggregate.

No exposed wet spots of the binder resin system shall be visible once the aggregate is installed. The operations should proceed in such a manner that will not allow the mixed material to separate, cure, dry, be exposed, or otherwise harden in such a way as to impair retention and bonding of the high friction surfacing aggregate. Any form of contact (walking, standing, or scraping of surface) or contamination with the wet uncured resin will result in that section of resin being removed and replaced at the contractor's expense.

Aggregate Cleanup

After the Binder treatment has cured, and before opening to traffic, remove excess and loose aggregate from the traveled way and shoulders with a vacuum sweeper. Application of HFST on highway ramps requires a second vacuum sweeper pass 24-48 hours after application on the ramp.

Collected aggregate can be reused if it is clean, uncontaminated and dry. If contaminated aggregate is mixed with virgin aggregate, all the aggregate in the container will be considered contaminated and not acceptable for use in the HFST.

Between 48 to 72 hours after placing the HFST, reclaim any loose aggregate using a vacuum sweeper. This reclaimed aggregate cannot be reused unless it is cleaned of all contamination, dry, and meets the requirements for virgin aggregate.

Field Dynamic Friction Testing

Before opening HFST areas to public traffic, the Engineer will test for the coefficient of friction per ASTM E 1911 using the Dynamic Friction Tester.

405-3.06 Performance Testing/Acceptance. After first aggregate vacuum sweeper pass as specified in Section 405-3.04 at localized areas with poor aggregate retention where Binder material is visible, reapply the HFST as directed by the Engineer at no additional cost to the Department.

The Engineer will test dynamic friction per ASTM E 1911 following HFST application and accept the HFST application in accordance with Table 405-3.

**TABLE 405-3
MEASURED DYNAMIC FRICTION VALUE AND HFST ACCEPTANCE**

Field Measured 20 km/hr Dynamic Friction Value	HFST Acceptance	Required action for sites not meeting Field Measured 20 km/hr Dynamic Friction Value Contract Requirement
> 0.75	Yes	No Action
< 0.75	No	Remove and replace, or reapply, at no additional cost to the Department to obtain acceptable Dynamic Friction values. Manufacturer's Technical Supervisor must approve any proposed reapplication treatments, and be present during all corrective work. Manufacturer's Technical supervisor must approve all corrective work plans before implementation.

405-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

High Friction Surface Treatment. By the square yard of the treatment placed.

405-5.01 BASIS OF PAYMENT.

Except where specified as individual Pay Items:

All work, including test strips, materials, micro-milling for removal and quality control is subsidiary to 405 Pay Items.

High Friction Surface Treatment. Payment includes all materials and equipment required to perform the specified work including the HFST technical supervisor.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
405(3) Z570920000	High Friction Surface Treatment	Square Yard

DIVISION 600 — MISCELLANEOUS CONSTRUCTION

Blank Page

**SECTION 604
MANHOLES AND INLETS**

Special Provisions

604-1.01 DESCRIPTION. Add the following:

Sanitary Sewer and Storm Drain Facilities – Condition Inspections and Item Replacement

Sanitary Sewer Facilities:

Coordinate with the Engineer and AWWU; and participate in a pre-construction condition inspection, and a post-construction condition inspection of the sanitary sewer facilities.

Storm Drain Facilities:

Coordinate with the Engineer and participate in a pre-construction condition inspection of the storm drain facilities.

The pre-construction inspections may identify additional items, manhole metal frames, covers, lids, catch basin inlets and grates, to be repaired and or replaced. Make repairs and or replace additional facility items as directed by the Engineer.

604-3.01 CONSTRUCTION REQUIREMENTS. Add the following:

Sanitary Sewer and Storm Drain Facilities – Condition Inspections and Item Replacement

Contractor furnishes the required traffic control, including personnel to assist, while performing inspections.

The Contractor forfeits all right to assert pre-existing damage if the Contractor fails to participate in the inspections.

Make repairs and install the replacement facility items as shown in the Plans.

Sanitary Sewer Facilities:

During inspections the AWWU representative, the Engineer and the Contractor will observe each facility's location and condition. The Engineer will indicate the additional facility items to be replaced.

Provide 3 days advance written notice to AWWU scheduling a pre-construction inspection of the facilities. Conduct this inspection before pavement removal begins. Contact the AWWU Project Manager to determine where to send the written notice, (907) 564-2717.

AWWU furnishes the sanitary sewer manhole frames and covers. Contact the AWWU Project Manager to schedule the pick-up of the furnished materials. Allow 3 working days from the time contact is made to pick-up of the materials.

Salvage the replaced manhole frames and covers. Coordinate with, and deliver to AWWU the salvaged materials.

Provide written notice to AWWU scheduling a post-construction inspection of the facilities, after the paving operations are complete and 3 days in advance of the inspection.

Provide the Engineer a copy of the written notices.

Storm Drain Facilities:

Contact the Engineer, a minimum of 15 days in advance, to schedule a pre-construction inspection of the storm drain facilities. Conduct this inspection before pavement removal begins.

During inspections the Engineer and Contractor will observe each facility's location and condition. The Engineer will indicate the additional facility items to be replaced.

Contractor furnishes the storm drain manhole frames and lids; and catch basin inlets and grates.

Dispose of storm drain materials and sanitary sewer materials not wanted by AWWU, according to the Municipality of Anchorage rules and regulations.

604-5.01 BASIS OF PAYMENT. Add the following:

Pay Items 604(13B), Item 604(13D), and Item 604(13E) include full compensation for labor, equipment, and incidental materials for installation, complete-in-place after final paving as accepted by the Engineer, including but not limited to:

- inspections
- removal and disposal of existing manhole metal frame and cover/lid; and catch basin inlets and grates
- repairs and installing the replacement materials
- adjusting the facility item down prior to the planing operation
- adjusting the facility item up prior to the paving operation

Repairs to facilities damaged or rendered inoperable, after the pre-construction inspection and before the final inspection, are the responsibility of the Contractor and no additional payment will be made.

All traffic control required for the inspections will be paid under the 643 Pay Items.

Except as being paid under Pay Item 604(13B), (13D), and (13E), existing manholes being adjusted by raising or lowering the frame or ring casting 12" or less – comply with Subsection 604-3.01, paragraph beginning, "adjust existing manhole or inlet ..." The corresponding Pay Item for this adjustment is 604(4) Adjust Existing Manhole.

Add the following Pay Items:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
604(13B)	Remove and Replace Storm Drain Inlet Frame and Grate	Each
604(13D)	Remove and Replace Sanitary Sewer Manhole Frame and Cover	Each
604(13E)	Remove and Replace Storm Drain Manhole Frame and Lid	Each

CR604.1-060115

SECTION 615
STANDARD SIGNS

Special Provisions

615-2.01 MATERIALS.

2. Sign Fabrication. Replace item 2a., with the following:

- a. Orange Background Signs. Use Type IX fluorescent orange reflective sheeting placed on sheet aluminum panels, except:
- (1) For temporary installations, the reflective sheeting may be placed 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.

CR615.1-022015

615-3.01 CONSTRUCTION REQUIREMENTS.

7. Add the following after the first paragraph:

Deliver salvaged sign panels, posts, and hardware to the State Maintenance Yard, located at:

Soldotna Maintenance Station (for Kenai Peninsula Borough HFST locations)

CR615.2/Z570920000

CR615.2-091311/Z570920000

**SECTION 627
WATER SYSTEM**

Special Provisions

627-1.01 DESCRIPTION. Add the following:

Coordinate with the Engineer and AWWU; and participate in a pre-construction condition inspection, and a post-construction condition inspection of the water system facilities.

The inspections may identify main valve boxes, the top section, the lid and additional items, to be replaced. Replace additional facility items as directed by the Engineer.

627-3.01 GENERAL. Add the following:

Contractor furnishes the required traffic control, including personnel to assist, while performing inspections.

The Contractor forfeits all right to assert pre-existing damage if the Contractor fails to participate in the inspections.

Install the replacement facility items as shown in the Plans.

During inspections the AWWU representative, the Engineer and the Contractor will observe each facility's location and condition. The Engineer will indicate the additional facility items to be replaced.

Provide 3 days advance written notice to AWWU scheduling a pre-construction inspection of the facilities. Conduct this inspection before pavement removal begins. Contact the AWWU Project Manager to determine where to send the written notice, (907) 564-2763. Provide the Engineer a copy of the written notice.

AWWU furnishes the valve box top sections and lids. Contact the AWWU Project Manager to schedule the pick-up of the furnished materials. Allow 3 working days from the time contact is made to pick-up of the materials.

If service connection locates are required, contact AWWU Field Services at (907) 564-2762. Allow 3 working days from the time of the request to the time of locate.

Salvage the replaced valve box top sections and lids. Coordinate with, and deliver to AWWU the salvaged materials. Dispose of water system facility materials not wanted by AWWU, according to the Municipality of Anchorage rules and regulations.

Provide a written notice to AWWU scheduling a post-construction inspection of the facilities, after the paving operations are complete and 3 days in advance of the inspection.

627-5.01 BASIS OF PAYMENT. Add the following:

Pay Item 627(10A) includes full compensation for labor, equipment, and incidental materials for installation, complete-in-place after final paving as accepted by the Engineer, including but not limited to:

- inspections
- removal and disposal of existing valve box top sections and lids
- installing the replacement materials
- adjusting the facility item down prior to the planing operation
- adjusting the facility item up prior to the paving operation

Repairs to facilities damaged or rendered inoperable, after the pre-construction inspection and before the final inspection, are the responsibility of the Contractor and no additional payment will be made.

All traffic control required for the inspections will be paid under the 643 Pay Items.

Add the following Pay Items:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
627(10A)	Remove and Replace Water Valve box and Lid	Each

CR627.1-060115

**SECTION 641
EROSION, SEDIMENT, AND POLLUTION CONTROL**

Special Provisions

641-1.07 UTILITY. Add the following:

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.

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.

3. SWPPP Considerations and Contents.

Identify the inspection frequency in the SWPPP:

Replace the inspection frequencies "For projects where the mean annual precipitation is less than 40 inches, a. and b." and "For Projects where the mean annual precipitation is forty (40) inches or greater, a. and b." and replace with the following:

- a. For areas where the mean annual precipitation is 15 inches or less, inspect at least once every 14 days during construction and within 24 hours of the end of a storm event that resulted in a discharge.
- b. For areas where the mean annual precipitation is between 15 to 40 inches, inspect once every seven days.
- c. For areas where the mean annual precipitation is 40 inches or greater, inspect twice every seven days.

641-3.01 CONSTRUCTION REQUIREMENTS.

4. Corrective Action and Maintenance of BMPs.

Add the following between f. and g.:

Implement corrective actions so that they comply with the following time requirements:

641-4.01 METHOD OF MEASUREMENT.

Add to TABLE 641-2 VERSION B, Code J.:

**TABLE 641-2 Version B
EROSION, SEDIMENT, AND POLLUTION CONTROL – LIQUIDATED DAMAGES**

Code	Specification Subsection Number and Description	Deductible Amount in Dollars	Cumulative Deductible Amounts in Dollars
J	641-3.04 Failure to comply with the most restrictive requirements of the CGP, approved SWPPP, or Section 641, except as listed above	\$750 per occurrence for the first day of noncompliance	Additional \$750 for every day the deficiency remains uncorrected

CR641.1-022015

SECTION 642

CONSTRUCTION SURVEYING AND MONUMENTS

Special Provisions

642-2.01 MATERIALS. Add the following:

4. Digital Measuring Instrument: Nu-metrics, Nitestar DMI (www.ae-traffic.com), or approved equal.

642-3.01 GENERAL. Add No. 11:

11. Before work on the project starts, stake and reference the existing centerline on both sides of the roadway alignment. Stake the existing centerline on tangents at 100 ft, and 50 ft intervals on curves from the beginning and ending of super-elevation changes when the roadway is no longer at normal crown. Stake sign locations at proper offset. Stakes shall be a minimum of 1" x 2" x 2'-0" and be offset 4 to 8 ft from the shoulder on both sides of the roadway. Extend lath stakes a minimum of 2 ft above ground. Show the offset distance to centerline and the station from the beginning of the project. Maintain staking until the final roadway striping is completed. Staking accuracy work requires an electronic distance measuring instrument (DMI) be installed in the Contractor's vehicle. Calibrate the DMI to roadway alignments as stationed in the Plans before beginning work. Record the calibration and staking information in the field book.

Install a reference sign every 500 ft. These reference signs shall meet the following requirements:

1. mounted with the base a minimum of 5 ft above the shoulder,
2. located a minimum of 10 ft from the edge of shoulder,
3. marked with the station from the beginning of the project, in 6 inch high permanent black lettering with a letter proportion height to width ration of 1:0.6 and a stroke width to height ratio of 1:6, on an orange background.

CR642.1-022015

Add No. 12

11. Record and stake the existing centerline and edge striping for striping replacement at Locations 1-7, and 17-28. The Engineer will review and determine final centerline and shoulder striping replacement at these locations. This work is subsidiary to 642(1).

Z570920000

642-5.01 BASIS OF PAYMENT. Add the following after paragraph 7:

Work required to reference and reset land monuments and property corners discovered in the work zone is subsidiary to 642(1).

Furnishing and installing monument case risers is subsidiary to Section 642 pay items.

Z570920000

**SECTION 643
TRAFFIC MAINTENANCE**

Special Provisions

643-1.03 TRAFFIC CONTROL PLAN. Replace the last paragraph with the following:

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.

Add the following:

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.

CR643.1-072815

643-2.01 MATERIALS.

10. Temporary Crash Cushions. Replace with the following:

Temporary Crash Cushions. Must have FHWA Acceptance letter for National Cooperative Highway Research Program (NCHRP) 350 or Manual for Assessing Safety Hardware (MASH), Test Level 3. Use reflective sheeting that meets AASHTO M 268 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 are considered nonredirective and may only be used when the forecasted temperature during their use is above 32 degrees Fahrenheit.

CR643.2-022015

12. Portable Changeable Message Board Sign. Replace with the following:

Portable Changeable Message Board Sign. 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 and Mobile Signs, paragraph 600.10(c) (2) ground fault circuit interrupter (GFCI). The chord will have integral GFCI protection located either in the attachment plug or 12 inches or less from the plug.

CR643.1-072815

13. Plastic Safety Fence. Replace a., b., and c. with the following:

- 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.

CR643.2-022015

Add No. 19:

19. Flexible Markers. Refer to Subsection 606-2.01 Materials.

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. Add the following:

Add the following:

Where construction activity encroaches onto the safe route in a traffic control zone, station a flagger at the encroachment to assist pedestrians and bicyclists past the construction activity.

Maintain business access(s) during flagging operations.

CR643.1-072815

643-3.02 ROADWAY CHARACTERISTICS DURING CONSTRUCTION. Add the following:

CR643.5/Z570920000

Pave lanes next to the median 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.

CR643.5-022015/Z570920000

643-3.04 TRAFFIC CONTROL DEVICES. Replace items 1, 3, and 6 with the following:1. Embankments. Add the following:

Close trenches and excavations at the end of each continuous work shift, except as indicated by the Engineer.

3. Fixed Objects. Add the following:

Remove obstructions greater than 4 inches above the nominal foreslope grade at the end of each continuous work shift.

6. Street Sweeping and Power Brooming. Replace with the following:

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 be caught through a vacuum system.
- b. Vacuum Sweeper: Sweeper that creates a vacuum at the paved surface sucking dirt, dust, and debris into the 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.

CR643.1-072815

Add No. 11:

11. Parallel Guardrail Terminal. The price listed in the Traffic Control Rate Schedule, Table 643-4, will be full compensation for the purchase, installation, maintenance during construction, removal, and salvaging the Parallel Guardrail Terminal unit(s). Deliver the salvaged unit(s) to the nearest ADOT & PF Maintenance & Operations yard or as directed by the Engineer.

CR643.2-022015

643-3.05 AUTHORITY OF THE ENGINEER. Replace the first sentence with:

When existing conditions adversely affect the public's safety or convenience, the Contractor will receive an oral notice. A written notice will follow the oral notice according to Subsection 105-1.01, Authority of the Engineer.

Add the following after the second sentence:

In no case shall this time exceed 24 hours.

643-3.06 TRAFFIC PRICE ADJUSTMENT. Add the following after the 3rd paragraph:

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.

Replace Table 643-3 with the following:

**TABLE 643-3
ADJUSTMENT RATES**

Published ADT	Dollars/Minute of Delay/Lane
0 – 5,000	\$ 30
5,000 +	\$ 40

CR643.1-072815

643-3.08 CONSTRUCTION SEQUENCING. Replace the 3rd paragraph with:

Site locations designated for HFST have been grouped into the following subareas:

Subarea	Roadway Segments Included
Group A - Kenai	Sterling Highway MP 86 and MP 104, Funny River Road (2 locations)
Group B – Seward Highway	Seward Highway MP 14-16 and MP 38-40
Group C – Anchorage Bowl	DeArmoun Road, Minnesota Drive (both locations), Tudor Road, Lake Otis Parkway, Dr. Martin Luther King, Jr. Drive, Boniface Parkway Northern Lights Boulevard, 36th Avenue, C Street, 15th Avenue.
Group D – Eagle River	Eagle River Loop Road
Group E – Palmer	Old Glenn Highway (all 9 locations)
Group F - Wasilla	Wasilla/Fishhook Road (all 3 locations)

Work will be allowed in one subarea group at a time with a maximum of 3 site locations within a subarea under traffic control at any one time unless an exception is approved by the Engineer.

Areas to be planed shall be paved within 24 hours from the beginning of pavement removal. Failure to do so will result in a price adjustment under pay item 643(23) of \$1,000 per day per lane, and traffic control will become subsidiary.

Rural Roadway Locations

Rural roadway locations include the following routes:

- Sterling Highway MP 86 and MP 104
- Funny River Road (both locations)
- Seward Highway MP 14-16 and MP 38-40
- Old Glenn Highway (all 9 locations)
- Wasilla/Fishhook Road (all 3 locations)

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 1630 hrs to 1900 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: Friday from 1600 hrs to Sunday 2300 hrs on the Old Glenn Highway and Wasilla/Fishhook Road.

Lane restrictions, if allowed, shall be conducted so that no more than a 10 minute accumulated stopped delay, 40 vehicles, or 1/4 mile (1320 feet) of traffic is detained, whichever occurs first, before releasing the detained motorists. During paving operations, a 20 minute stopped delay, 80 vehicles, or 1/2 mile (2640 feet) of traffic detained, will be allowed for motorists, except school buses. If a queue of traffic develops at a stop, the entire queue must be emptied to include the last car that entered the queue at the time the queue was released.

Urban Roadway Locations

Urban roadway locations include the following routes in the Municipality of Anchorage:

- DeArmoun Road
- Minnesota Drive (both locations)
- Tudor Road
- Lake Otis Parkway
- Dr. Martin Luther King, Jr. Drive
- Boniface Parkway
- Northern Lights Boulevard
- 36th Avenue
- C Street
- 15th Avenue
- Eagle River Loop Road

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 2000 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.

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, will be allowed for motorists, except school buses. If a queue of traffic develops at a stop, the entire queue must be emptied to include the last car that entered the queue at the time the queue was released.

All Locations

Obtain the local school bus schedule and coordinate work efforts to ensure the school buses are not delayed through the construction zone. This plan shall be submitted, as a TCP, to the Engineer for approval before the implementation of the school bus coordination plan.

Z570920000

643-3.09 INTERIM PAVEMENT MARKING. In the second paragraph, delete the words:

“or cover them with black removable preformed marking tape.”

Replace the first sentence in the last paragraph with the following:

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.

CR643.7-022015

Add the following at the end of the Subsection:

Temporary markings will not be measured and paid for separately but will be subsidiary to 670 pay items.

Z570920000

643-4.01 METHOD OF MEASUREMENT.

2. Traffic Control Device Items. Replace the 3rd sentence with the following:

Special Construction signs are measured by the total area of legend bearing sign panel, as determined under Subsection 615-4.01 and compensation for a 24 hour period shall be made under Construction Signs in the Traffic Control Rate Schedule, Table 643-5.

Add No. 17:

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(1) or 643(2), Traffic Maintenance.

643-5.01 BASIS OF PAYMENT.7. Flagging and Pilot Car. Add the following:

The Engineer will pay for Item 643(15A) Flagging on a contingent sum basis at the rate of \$53.00/hour. The Engineer does not require a change order/directive for the flagging Pay Item. Flagging associated with Change Order work will be paid at the prices according to Subsection 109-1.05 Compensation for Extra Work.

11. Traffic Control. Add the following:

The Engineer does not require a change order/directive for Pay Item 643(25), Traffic Control.

12. Portable Changeable Message Board Sign. Add the following:

Two Portable Changeable Message Board Signs used for Permanent Construction Signing will be paid for under Item 643(3) Permanent Construction Signs. Additional portable changeable message board signs will be paid for under 643(25), Traffic Control.

CR643.1-072815

Add No. 19:19. Temporary Pavement Markings. Except where specified as an individual Pay Item (Interim Pavement Markings) temporary pavement markings are subsidiary to Section 670 Pay Items.

CR643.7-022015

Add the following:

**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	\$28.00
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
Sequential Arrow Panel	Each/Day	\$36.00
Portable Concrete or Steel F Shape Barrier (12.5 foot long or \$8/foot for other lengths)	Each	\$100.00
Temporary Crash Cushion / Sand or Water Filled Barrels or Barrier (all required per end)	Each	\$4325.00
Temporary Crash Cushion / Redirective	Each	\$9230.00
Pilot Car	Hour	\$71.00
Watering	M-Gallon	\$28.50
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
Plastic Safety Fence	Lineal Foot	\$1.00
Portable Changeable Message Board Sign	Calendar Day	\$130.00
Temporary Sidewalk Surfacing	Square Foot	\$2.00
Flexible Markers (Flat Whip, Reflective)	Each	\$60.00
Temporary Guardrail	Lineal Foot	\$25.00

Replace Pay Item 643(15A) with the following:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
643(15A)	Flagging	Contingent Sum

CR643.1-072815

SECTION 644
SERVICES TO BE FURNISHED BY THE CONTRACTOR

Special Provisions

644-2.01 FIELD OFFICE. Delete this subsection in its entirety and substitute the following:

Furnish and maintain a suitable office for the Engineer, available for occupancy from 4 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 Anchorage or at a location designated by the Engineer.
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.

CR644.FOCOM-022015/Z570920000

Standard Modifications

Add the following subsection:

644-2.08 ENGINEERING COMMUNICATION. Engineering Communications, minimum service includes:

- a. Three phone/facsimile lines (different phone numbers for each line)
- b. High speed internet service with modem (DSL or Cable)

CR644.FOCOM-022015

644-5.01 BASIS OF PAYMENT. Add the following:Add the following:

Pay Item 644(10) 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 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(1) Field Office and as such are paid by the Contractor.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
644(10)	Engineering Communications	Contingent Sum

CR644.FOCOM-022015

Special Provision

Add the following Section:

SECTION 645

TRAINING PROGRAM

645-1.01 DESCRIPTION. This Training Special Provision 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, items 6.b, 6.c, 6.d, 6.e, 6.i, 6.j and 6.l, located in the "green pages" of this document.

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, Bureau of Apprenticeship & Training (USDOL/OA), or one developed by the Contractor and approved prior to contract award by the Alaska Department of Transportation and Public Facilities (ADOT&PF) Training Program Representative, using Form 25A-310.

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 written certification showing the type and length of training completed on the project. Existing USDOL/BAT 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/BAT 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 on the approved Form 25A-311)
2. train the required number of trainees/apprentices in each training program (as shown on the 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.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
645(1)	Training Program, 1 Trainees/Apprentices	Labor Hour

S99-092112

**SECTION 646
CPM SCHEDULING**

Special Provisions

646-2.01 SUBMITTAL OF SCHEDULE. Replace this Subsection with the following:

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. Delete No. 2.

2. 60-Day Preliminary Schedule.

Delete the first sentence of No. 3. Schedule Updates. and substitute 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.

CR646.1-070214

646-4.01 METHOD OF MEASUREMENT. Add the following:

Schedule Price Adjustment. By each calendar day that the required schedule, preliminary schedule or schedule update has not been submitted measured to the nearest day.

646-5.01 BASIS OF PAYMENT. Add the following:

Schedule Price Adjustment. If Item 646(2), Traffic Price Adjustment, is shown on the bid schedule, the total value of this contract will be adjusted by \$500 per calendar day for failure to provide the initial CPM Schedule, 60 day Preliminary Schedule or CPM Schedule updates as required.

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
646(2)	Schedule Price Adjustment	Contingent Sum

Z570920000

Special Provision

Delete Section 651:

**SECTION 651
WORK BY OTHERS (RESERVED)**

CR651.1-022015

Special Provision

Delete Section 652:

**SECTION 652
INTERIM COMPLETION DATES (RESERVED)**

CR652.1-022015

**SECTION 660
SIGNALS AND LIGHTING**

Special Provisions

660-4.01 METHOD OF MEASUREMENT. Add the following:

Pay Item 660(11A) Traffic Loop Replacement. By each loop unit damaged during the milling operation, complete and in place, including all conduit, conductors, and other items necessary per this section to replace fully functioning loops. Work to include splicing of loops to existing lead-in cable.

Z570920000

660-5.01 BASIS OF PAYMENT. Add the following:

Pay Item 660(11A) Traffic Loop Replacement. Replace loops within the specified depth of planning that are damaged during the planning operation at a rate of \$1250 each. Loops outside the specified depth of planning that are damaged during the planning operation are replaced at no expense to the Department per 202-5.01.

Add the following Pay Item:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
660(11A)	Traffic Loop Replacement	Contingent Sum

Z570920000

**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. Replace the material reference,

“Methyl Methacrylate Markings	Subsection 712-2.17”, <u>with,</u>
Methyl Methacrylate Pavement Markings	Subsection 712-2.17

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. Delete No. 4 and substitute 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 250 mils. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 250 mils.

(2) Other Markings.

(a) Transverse and Symbol Markings:

Groove the area for inlaid markings to a depth of 250 mils. Apply marking for symbols, arrows, stop bars, railroad symbols, and cross walks to yield a thickness of 250 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 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.

Delete No. 3 and replace 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.

Add the following No. 4:

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

Replace Item 670(10) with the following:

Payment will be made under:

<u>Pay Item No.</u>	<u>Pay Item</u>	<u>Pay Unit</u>
670(10)	MMA Pavement Markings	Lump Sum
670(10A)	MMA Pavement Markings, Longitudinal Surface Applied	Linear Foot
670(10B)	MMA Pavement Markings, Symbols and Arrow(s) Surface Applied	Each
670(10C)	MMA Pavement Markings, Transverse and Gore Surface Applied	Linear Foot
670(10D)	MMA Pavement Markings, Longitudinal Inlaid	Linear Foot
670(10E)	MMA Pavement Markings, Symbols and Arrow(s) Inlaid	Each
670(10F)	MMA Pavement Markings, Transverse and Gore Inlaid	Linear Foot

Delete Items 670(11) and 670(12).

CR670.1-110812

Blank Page

DIVISION 700 — MATERIALS

BLANK PAGE

**SECTION 702
ASPHALT MATERIALS**

Special Provision

702-2.03 EMULSIFIED ASPHALT.

2. Special Tack Emulsion, STE-1.

TESTS ON RESIDUE

<u>Replace the first line:</u>	Penetration @ 77 °F	100-200,
<u>with:</u>	Penetration @ 77 °F	100-250

CR702.2-060115

**SECTION 703
AGGREGATES**

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
Degradation Value, min.	ATM 313	30	30	30	30
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	75-90	100	100	65-90
3/8 inch	48-78	60-84	80-90	80-95	55-80
No. 4	28-63	33-70	44-81	55-70	40-60
No. 8	14-55	19-56	26-70	35-50	≤ 45
No. 16	9-44	10-44	16-59	20-40	≤ 35
No. 30	6-34	7-34	9-49	15-30	≤ 25
No. 50	5-24	5-24	6-36	10-24	≤ 20
No. 100	4-16	4-16	4-22	5-15	≤ 12
No. 200	4-7	4-7	4-7	4-7	4-7

703-2.07 SELECTED MATERIAL.

Replace 1. 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

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.

CR703.1-081115.SSHC2015

**SECTION 712
MISCELLANEOUS**

Special Provisions

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.

2. Performance Properties: Add the following:

- k. Color: Yellow, PR-1 Chart, 33538 Federal Yellow. White, minimum daylight reflectance of 84.

712-2.18 GLASS BEADS FOR METHYL METHACRYLATE PAVEMENT MARKINGS. Replace the bead table with the following:

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.

CR712.1-010109

**SECTION 724
SEED**

Special Provision

724-2.02 MATERIALS.

Delete Table 724-1 and replace with the following:

**TABLE 724-1
SEED REQUIREMENTS**

Species	Sproutable Seed, %, Min.
Arctared Red Fescue	78
Egan American Sloughgrass	67
Norcoast Bering Hairgrass	71
Nortran Tufted Hairgrass	71
Wainwright Slender Wheatgrass	88
Alyeska Polargrass	71
Bluejoint	71
Tulesy Sagebrush	71
Tundra Glaucous Bluegrass	76
Gruening Alpine Bluegrass	72
Nugget Kentucky Bluegrass	76
Beach Wildrye	70
Annual Ryegrass	76
Perennial Ryegrass	76

*Sproutable Seed is the mathematical product of Germination and Purity.

CR724.1-101711

**SECTION 726
TOPSOIL**

Special Provision

Delete Subsection 726-2.01, except for Table 726-1 and replace with the following:

726-2.01 TOPSOIL. Furnish topsoil that is representative of the existing, natural organic blanket of the project area. 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.

CR726.1-112707

Special Provisions

Replace Section 727 with the following:

SECTION 727 SOIL STABILIZATION MATERIAL

727-2.00 GENERAL. Free of noxious weeds, 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 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, 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 Weed Management Association (NAWMA) 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 NAWMA 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, or other approved grain crops that are free from noxious weeds, seeds, mold, or other materials detrimental to plant life. ECB may contain coconut or fiber to reinforce the straw. Straw material shall be certified weed-free straw using NAWMA 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.
- 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 52-10.
2. Compost Filter Berms and Filter Socks. Standard Practice for Compost for Erosion/Sediment Control (Filter Berms and Filter socks) R 51-10.

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.

CR727-050812

**SECTION 730
SIGN MATERIALS**

Special Provision

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

**SECTION 740
SIGNALS AND LIGHTING MATERIALS**

Special Provisions

740-2.05 CONDUCTORS.

Replace No. 5. with the following:

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.

Replace "6 twisted pairs" in the second sentence of the 4th subparagraph of No. 6. with the following:

"7 twisted pairs"

CR740.3-021414

Replace Subsection 740-2.06 with the following:

740-2.06 ELECTRICAL CONDUIT AND FITTINGS. 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.

CR740.3-021414

APPENDIX A
CONSTRUCTION SURVEY REQUIREMENTS



**Alaska
Department of
Transportation
and
Public Facilities**

**Alaska
Construction
Surveying
Requirements (US
Customary Units)**

Alaska Construction Surveying Requirements (US Customary Units)

Table of Contents

Description	Page
1. Survey accuracy requirements	1
2. Survey frequency requirements	2
3. Typical section drawing	3
4. Survey point materials requirements	4
5. Typical alignment notes	5
6. Typical clearing notes	6
7. Typical level notes	7
8. Typical slope stake notes	8
9. Typical culvert notes	9
10. Typical culvert camber diagram	10
11. Typical blue or red tops and grade stake notes	11

1. Survey accuracy requirements

Third order survey

- ✓ Use a 1/5000 horizontal closure.
- ✓ Use an angle closure of $30\sqrt{N}$ seconds, where N equals the number of angles in the traverse.
- ✓ An Alaska-registered professional land surveyor must perform or supervise replacement of survey monuments (property, USGS, USC&GS, BLM, etc.) or establishment of monuments (including centerline).
- ✓ All monument work must comply with AS 34.65.040 and meet standards in the latest version of the Alaska Society of Professional Land Surveyors' *Standards of Practice Manual*.
- ✓ The allowable vertical error for misclosure is $e = 0.05\sqrt{M}$ e = maximum misclosure in feet, M = length of the level circuit in miles.

Table 1—Survey accuracy requirements (in feet)

	Stationing	HI	Closure	Horizontal Angle	Distance To center line	Grade
Additional cross sections	1.0	0.01	0.04	**	0.1	0.1
Benches		0.01	0.02			
Blue tops***	1.0	0.01	0.04		0.1	0.02
Bridges	*	0.01	0.02			0.01
Centerline	*			*		
Clearing & Grubbing	1.0				1.0	
Culverts	1.0	0.01	0.04	**	0.1	0.1
Curb & gutter	1.0	0.01	0.02		0.1	0.02
Grade stakes	1.0				0.1	0.1
Guardrail	1.0				0.1	
Manholes, catch basins & inlets	1.0	0.01	0.02		0.1	0.02
Monuments	*			*		
Red tops***	1.0	0.01	0.02		0.1	0.05
Riprap	1.0	0.1	0.04		1.0	0.1
Signs	1.0				0.1	
Slope stakes & RP's	1.0	0.01	0.04	**	0.1	0.1
Under drains & sewer	1.0	0.01	0.02		0.1	0.02

* Third order survey

**Right angle prism or transit angles from center line

*** Use blue tops for top of base course and red tops for the bottom of base course.

1. Survey frequency requirements

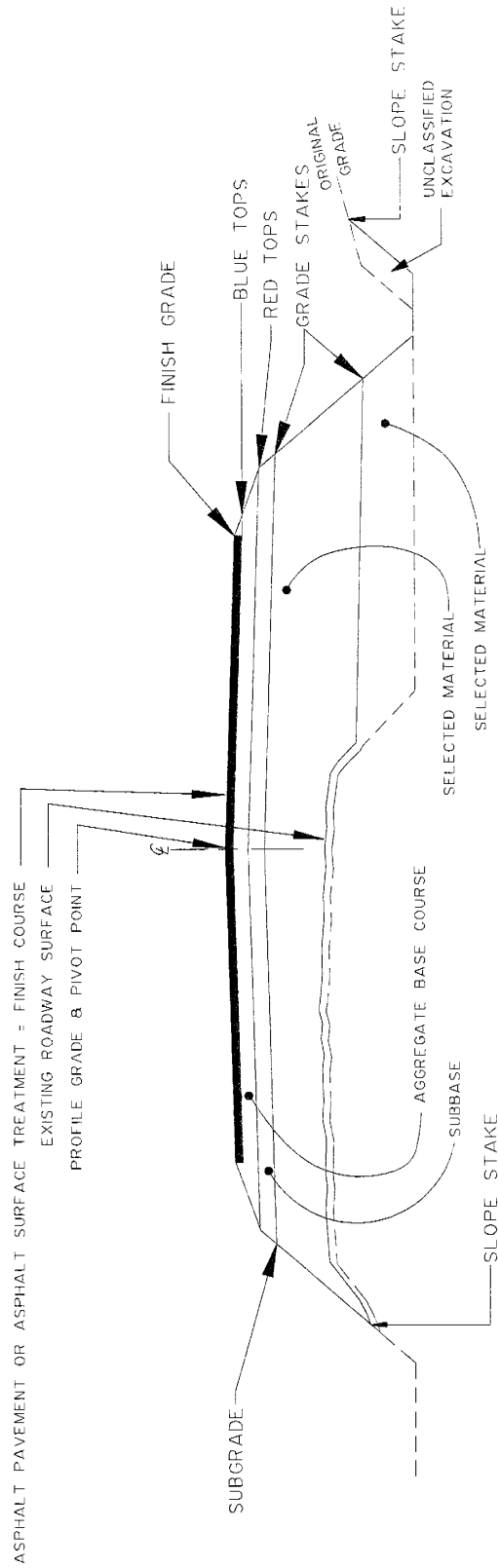
Table 2—Survey frequency requirements (in feet)

	Tangents	Curves	Interchange ramps	Stake each per plan	See special instructions on sample notes
Additional cross sections	*	*	*		
Bench marks					X
Blue tops	100	100**	25		X
Blue tops within 100 feet both sides of railroad track crossings and bridge approaches	25	25	25		X
Bridges				X	X
Center line	100	100**	25		
Clearing	100	100**	25		X
Culverts				X	X
Curb and gutter	25	25	25		
Grade stakes	100	100**	50		
Guardrail	25	25	25		
Manholes, catch basins & inlets				X	
Monuments				X	
Red tops	100	100**	25		X
Riprap	50	50	50		
Signs				X	
Slope stake / cross sections	100	100**	25		X
Under drains and sewers	50	25	25		

* Establish additional cross sections and slope stakes at all breaks in topography and where structures begin and end.

**Curves shall be staked on 50-foot stations if the curve is greater than six degrees.

2. Typical Section Drawing



TYPICAL SECTION

NOT TO SCALE

3. Survey point materials requirements

- ✓ These are minimum requirements; larger sizes may be necessary.
- ✓ Use only stakes with planed sides.

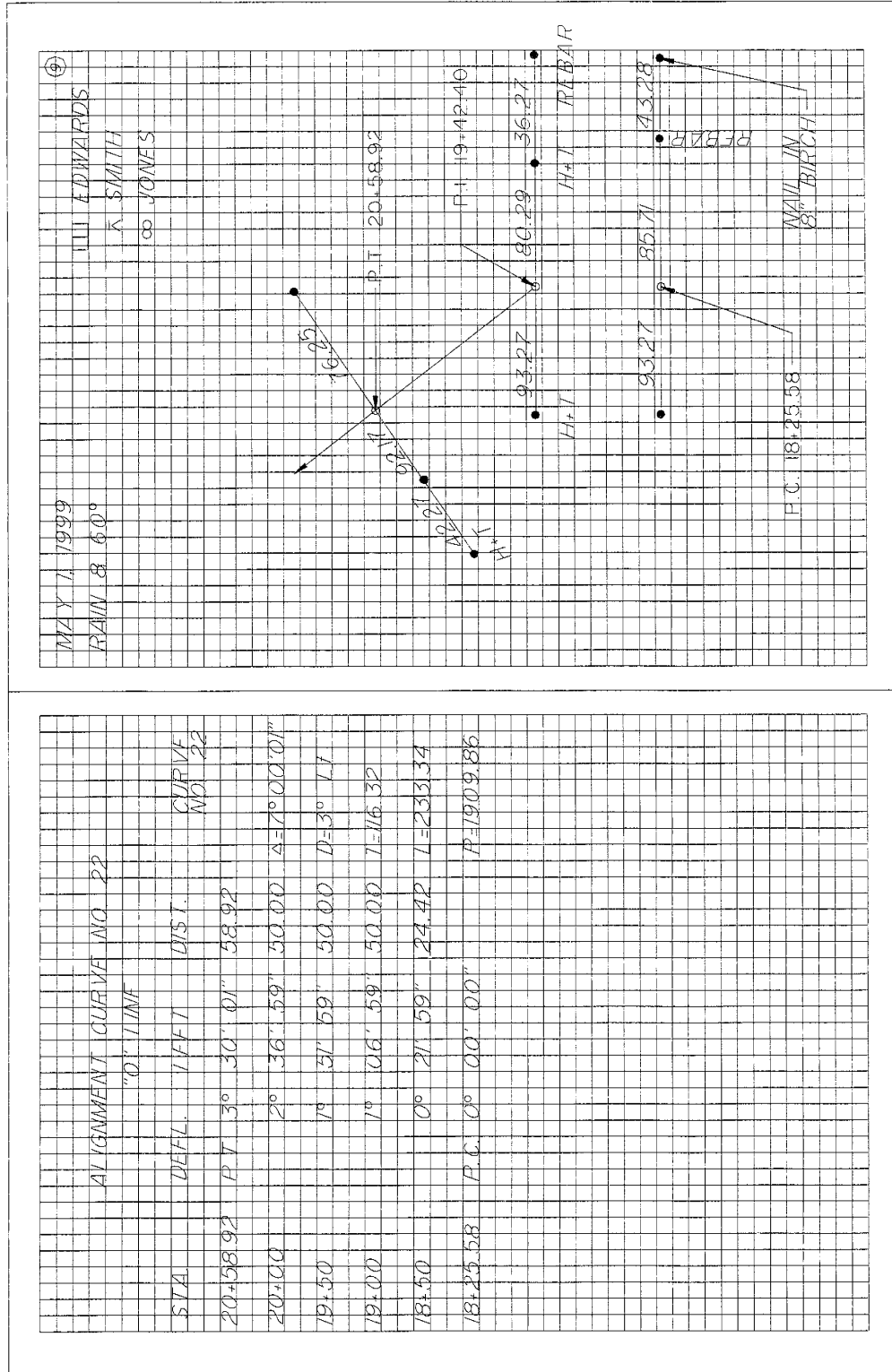
Table 3—Survey point materials requirements

	24" lath or whiskers	2" x 2" x 8" hub	2" x 2" x 12" hub	1" x 2" x 18" stake	1" x 2" x 24" stake	48" lath	Hub and tack	40d nail	60d nail	1/2" x 24" rebar
Benchmarks									X	
Blue tops	X	X								
Centerline P.C., P.T., P.O.T.			X	X			X *			X*
Centerline reference points			X	X			X *			X *
Centerline station				X				X		
Clearing						X				
Culvert stake			X		X	X				
Culvert stake references			X		X	X				
Curb and gutter			X		X		X			
Guardrail								X		
Major structures			X	X *	X *	X	X *			X *
Red tops	X	X								
Signs						X				
Slope stake					X	X				
Slope stake references			X		X	X				

* Optional depending on conditions, and to be determined by the Project Engineer.

4. Typical alignment notes

- ✓ The Chief of Parties must prepare the alignment book before actual staking.
- ✓ Don't use swing ties for reference points.
- ✓ Use three point right angle ties, two to the right and one left, or vice versa.
- ✓ Reference P.C., P.I., P.T., and P.O.T.



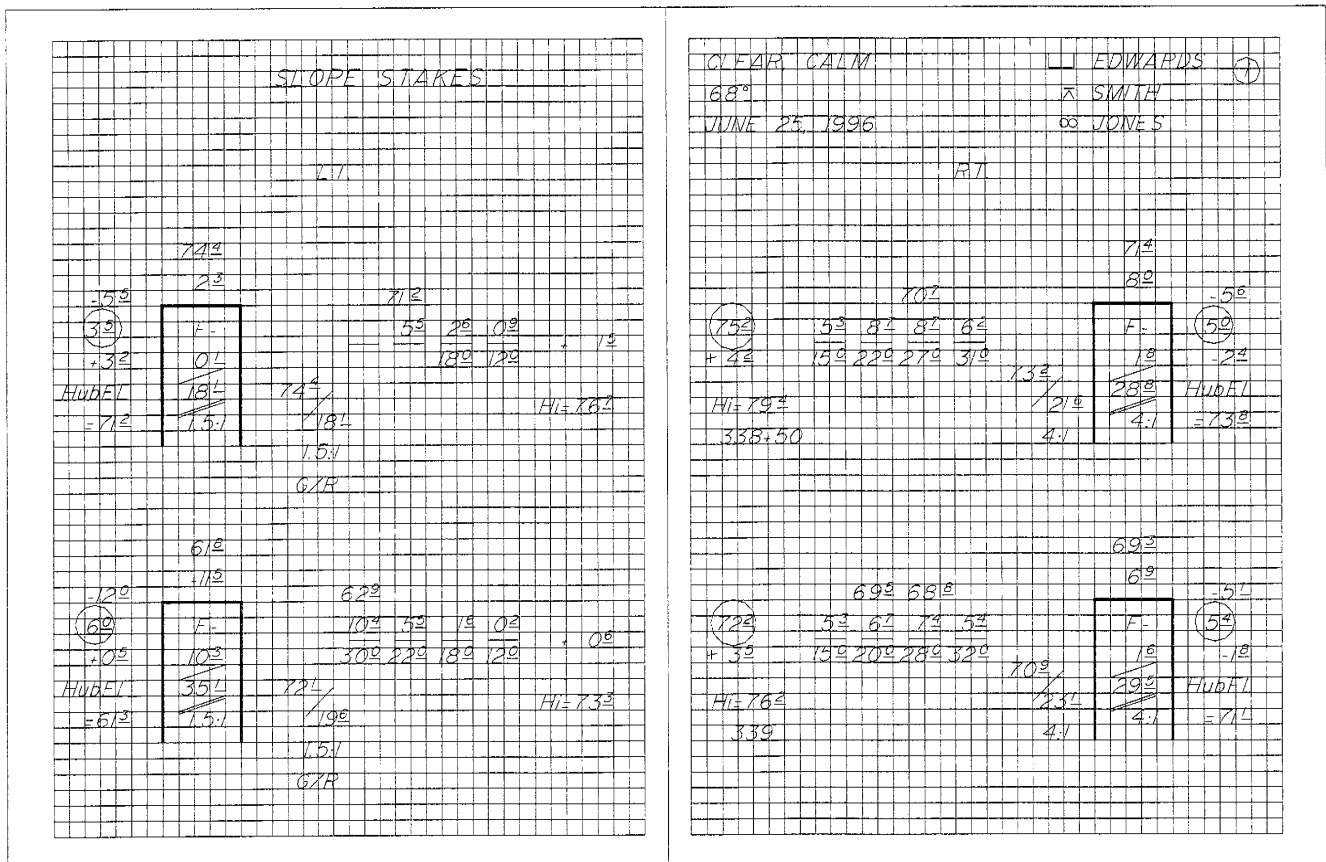
6. Typical level notes

- ✓ Balance back sights and foresights.
- ✓ Establish all benchmarks and take the centerline profile before doing any staking involving elevations.
- ✓ Don't set benchmarks in utility poles.
- ✓ Don't use side shots on benchmarks.
- ✓ Use the turn through method when establishing benchmarks.
- ✓ Re-check benchmarks after each major freeze/thaw cycle and/or any environmental event that may change the benchmark elevation.
- ✓ Do not use double rodding.
- ✓ Run separate level loops between all benchmarks.
- ✓ Set benchmarks in trees of at least six-inch diameter, unless approved by the Project Engineer.
- ✓ Correct errors in benchmark elevations so they will not affect the elevations of succeeding benchmarks.
- ✓ Consult with the Project Engineer before placing benchmarks in areas of permafrost or other unstable ground.
- ✓ Establish benchmarks at intervals and locations consistent with good engineering practice, and generally not more than 1000 feet.
- ✓ Completely describe benchmarks when establishing or re-establishing their elevation. Give centerline stationing, offset, benchmark projection, and observable benchmark characteristics. When checking into or out of benchmarks, note the book and page number that contains the most recent elevation establishment for that benchmark.
- ✓ Write the station on the top twelve inches facing centerline, with numerals a minimum of one inch in height.

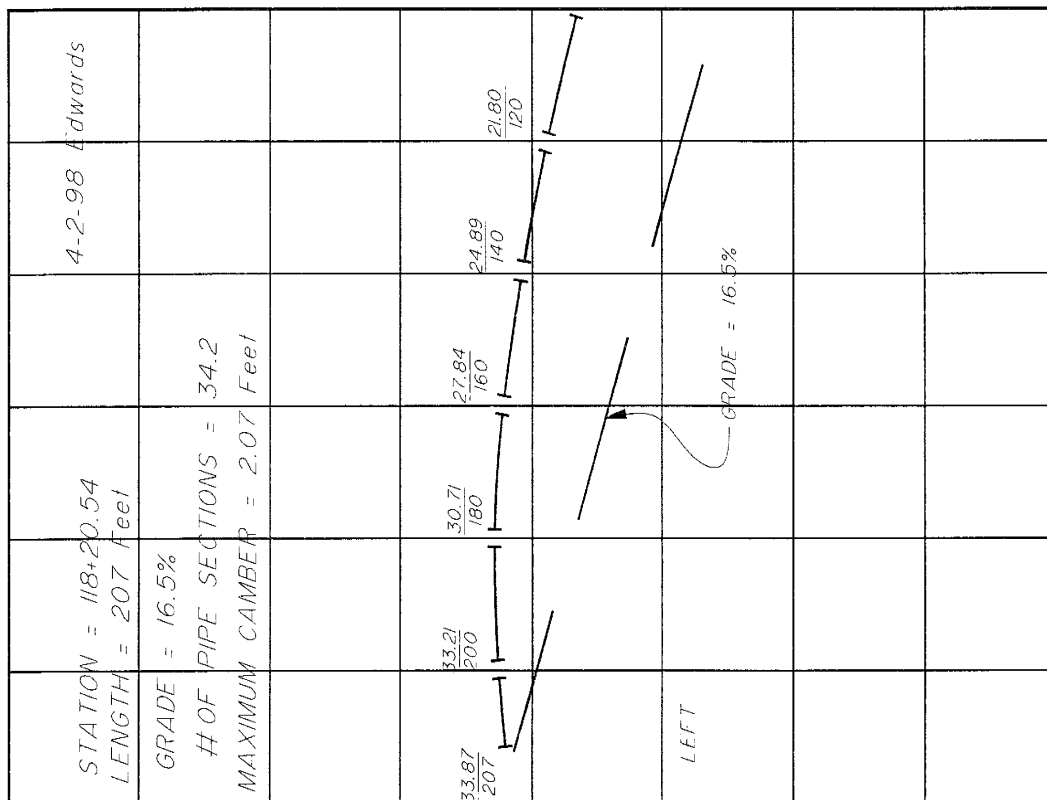
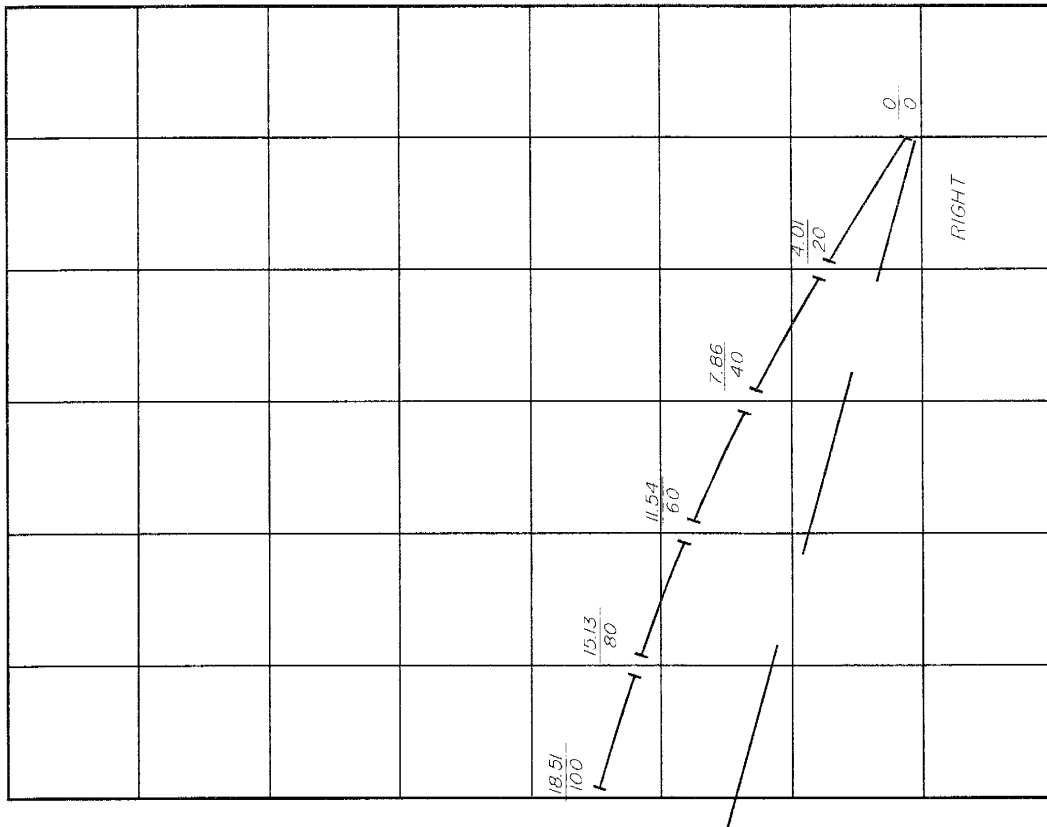
STA.	BS+	HI	FS-	ELEV.	45'± CLEAR WARM CALM WILD 413579	3-23-90	⊗ □ EDWARDS ⊕ SMITH
TBM #101							
6+72				161.309	Nail in base of 12" Spruce		6+72
	3.877	165.186			85' 10" LT.		
6+00			1.95	163.24			
6+25			2.32	162.87			
6+50			2.96	162.23			
T.P.			3.246	161.940			
	1.103	163.043					
6+75			2.31	160.73			
7+00			2.56	160.48			
T.P.			2.823	160.220			
	2.332	162.552					
					Nail in base of 18" stump		
TBM #102			1.143	161.409	60' 4" RT	7+21	Elev. 161.413

7. Typical slope stake notes

- ✓ Enter the station, elevations, shoulder distance or ditch distances, and slope in the slope stake book before staking begins.
- ✓ In areas where slides or overbreak are anticipated, extend the sections beyond the construction limits.
- ✓ Slope-stake each section that is cross-sectioned.
- ✓ Final re-cross sections are required where there are overbreaks, undercuts, etc. Re-cross section book and page numbers shall be noted on the original cross-section and slope staking page for the relevant stations.
- ✓ Include at least the following information on the stake: (1) where to begin the cut or fill (2) the slope ratio (3) the depth of cut or height of fill and (4) the station.
- ✓ Use a hand level only for one turn up or down from the instrument.
- ✓ Clearly note hand level turns.
- ✓ Use a reference point that is 10-20 feet beyond the slope stake.
- ✓ The reference point must show the cut or fill to the slope stake and must include the slope stake information.
- ✓ Slope stake all abrupt changes in typical sections.
- ✓ Position all laths to face centerline.

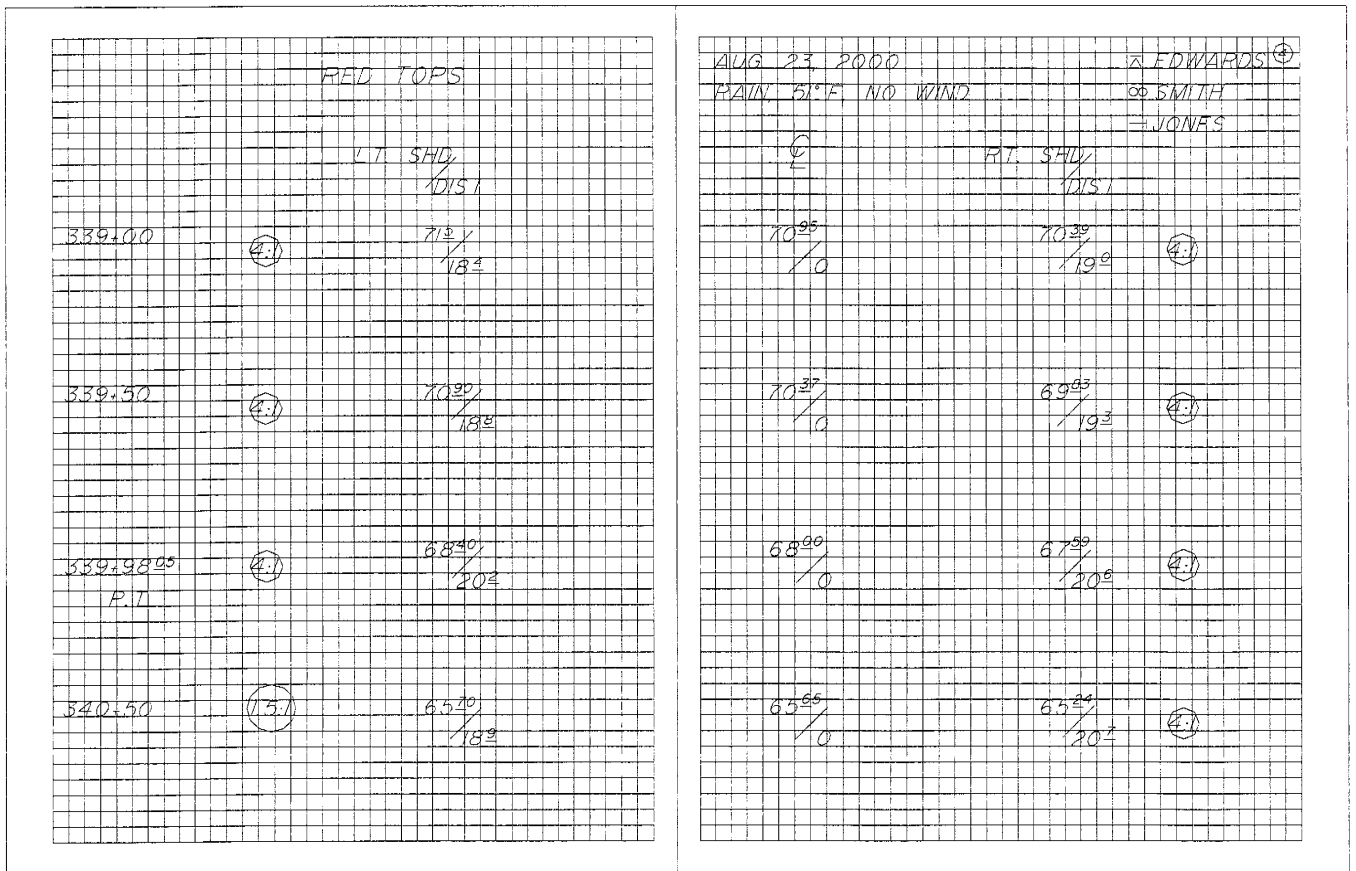


9. Typical culvert camber diagram



10. Typical blue or red tops and grade stake notes

- ✓ Place blue and red tops at each break in typical section and on centerline.
- ✓ Use blue tops for top of base course.
- ✓ Use red tops for the bottom of the base course.
- ✓ Evenly space red/blue tops at and between crown section break points with a maximum spacing of 25 feet between red/blue tops.
- ✓ Establish horizontal control from centerline references and vertical control from benchmarks.
- ✓ Place blue tops at the same interval as slope stakes.
- ✓ Stake all curve transitions.



APPENDIX B
ENVIRONMENTAL PERMITS



Municipality of Anchorage
Department of Health and Human Services
Food Safety and Sanitation
825 "L" Street
P.O. Box 196650 Anchorage, Alaska 99519-6650
<http://www.ci.anchorage.ak.us>



NOISE PERMIT

PERMIT NO. FA0011947 - 2015
PERMIT VALID FROM: 11/1/2015 TO 10/31/2016
PERMIT FEE 540.00

In accordance with AMC 15.70.070, a noise permit has been granted to:

NAME OF ORGANIZATION: ADOT AND PUBLIC FACILITIES PHONE # 9072690530
CONTACT KATHLEEN SHEA
MAILING ADDRESS: P.O. BOX 196900
ANCHORAGE, AK 995196900

TYPE OF NOISE PERMIT: NOISE - CONSTRUCTION

LOCATION(S) PROJECT NO.57092
MULTIPLE LOCATIONS

This noise permit is subject to the following conditions:

1. The permit holder agrees to take measures to minimize noise between 10 PM - 6 AM, particularly in residential areas.
2. If DHHS or APD receive founded complaints at any time during the course of the event, DHHS or APD may require reduction of noise levels or may otherwise modify or cancel permit.
3. Hazardous noise emission standards in AMC 15.70.100 shall not be exceeded.
4. Permit holder agrees to provide written notice to all residents within 500 feet at least 24 hours in advance of night-time noise activity. The notice must describe the extent, duration and nature of the activity. A copy must also be given to DHHS.

SPECIAL CONDITIONS - PROJECT 57092 Friction Surface Treatment - Multiple locations

5. Prior to commencing work at each site, public will be notified according to project Public Involvement Plan
6. Generators & compressors must have built-in sound dampening or site-built noise shroud
7. Backup alarms used at night must be ambient sensitive or manually adjustable to reduce noise levels
8. Noise levels are limited to 80 dBA Leq (1-hour) from 6 AM to 10 PM
9. Noise levels are limited to 70 dBA Leq (1-hour) from 10 PM to 6 AM and on Sundays and State holidays

LOCATIONS:

Dearmoun Rd switchback; Minnesota at Tudor & 15th Ave - 25th Ave; Eagle River Lp Rd; Tudor at Baxter; Lake Otis at Waldron; N. Lights & Boniface; 36th Ave at Lake Otis; 15th & "C"; MLK Drive

NON-COMPLIANCE WITH ANY TERM OR CONDITION OF THIS PERMIT WILL BE CAUSE FOR IMMEDIATE REVOCATION AND WILL SUBJECT PERMIT HOLDER TO THE APPLICABLE PROVISIONS OF AMC15.70. A COPY OF THIS PERMIT MUST BE ON SITE AND BE AVAILABLE UPON REQUEST.

Tomy Barnett Environmental Specialist 4/27/2015
Signature of Issuer Title Date

I certify that I am familiar with Anchorage Municipal Code 15.70. Noise Control, and that the activity described in my permit application will be conducted in accordance with this law and in accordance with the terms stated above.

Lakleen S. Guo 4/28/2015
Signature of Applicant Date

Receipt #: 87117
Check #: _____
Payment Type: CC



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

**Department of Transportation
and Public Facilities**

DESIGN & ENGINEERING SERVICES
PRELIMINARY DESIGN & ENVIRONMENTAL

PO Box 196900
Anchorage, Alaska 99519-6900
Main: 907.269.0542
Toll Free: 800.770.5263
TDD: 907.269.0473

April 8, 2015

Project: HSIP: CR High Friction Surface Treatment
Project No. 57092

Trish Maxwell Municipality of Anchorage
Department of Health & Human Services
Environmental Services Division
825 L St.
Anchorage, AK 99517-6650

Re: MOA Noise Permit Application

The Alaska Department of Transportation and Public Facilities (DOT&PF) is requesting a Noise Permit for a project that would improve safety at multiple locations in Anchorage (See attached Figures 1 and 2, and Municipality of Anchorage Site Locations Table). Proposed work includes resurfacing and applying a High Friction Surface Treatment to the roadway. Work is anticipated to begin in July 2015 and end in September 2016.

Upon issuance, the Noise Permit will be attached to the project construction specifications and the Contractor will be contractually required to comply with its provisions. The DOT&PF will monitor and direct Contractor operations to ensure compliance with the Noise Permit.

If you have any questions or require additional information, please contact me at the address above, by phone at (907) 269-0530, or via email at kathy.shea@alaska.gov.

Sincerely,

A handwritten signature in black ink that reads "Kathleen Shea".

Kathleen Shea
Environmental Team Leader

Enclosures:

Noise Permit Application

Public Involvement Plan

Figure 1: Location and Vicinity Map

Table: High Friction Surface Treatment Locations

Cc:

Brian Elliott, CR Regional Environmental Manager, DOT&PF PD&E

Sean Baski, P.E., Project Manager, DOT&PF Highway Design



NOISE PERMIT APPLICATION

Please submit at least 20 days prior to the commencement of the noise. (IAW AMC 15.70.070.B)

Name of Applicant (Please Print): Kathleen Shea Date: 4/6/15
 Name of Organization / Company: Alaska Department of Transportation & Public Facilities Phone: 907-269-0530
 Mailing Address: PO Box 196900, Anchorage, AK 99519-6900

Type of activity: Construction Explosives, firearms, fireworks Public event Snow removal Motor vehicle racing

Dates and times of planned activity: 7/1/15-9/30/16, 24 hours per day/7 days per week

Location(s) of activity (street address or legal description): Multiple locations in Anchorage (see attached Figure 1) and at Eagle River Loop Road from the signal at Eagle River Road to the intersection of Baranof and Citation.

Description of event, noise source(s), equipment: The proposed work includes resurfacing and adding a layer of High Friction Surface Treatment, see attached. A temporary increase in noise levels will occur during construction due to the use of heavy equipment (milling machine, paver, roller, etc.)

Estimated noise level(s) during event: Up to 85 decibels 25 feet from source.

Number of persons expected to attend or participate: The size of construction crews will vary.

Zoning of location and surrounding area: Residential, Business Distance to nearest residential property line varies
 (e.g. residential, industrial, business)

Demonstration of need for permit. Why are you requesting the permit? What hardship will result for you, the community or others if the permit is not granted? (See AMC 15.70.070B) Attach additional sheets or supporting documentation if necessary.
Some of the project locations experience high traffic volume during daytime hours. Limiting work to daytime hours would cause severe traffic delays, increase costs, and impose greater impacts on local residents and businesses.

Describe any actions you intend to take to abate the impacts of the noise created by the planned activity. Please attach supporting documentation if necessary.
The public will be notified of the project prior to construction via a Public Involvement Plan (attached). This permit would allow nighttime construction operations which would alleviate traffic congestion during the day.

Without this permit, DOT&PF expects severe traffic delays and subsequently, a longer time to construct.

Kathleen Shea Signature of Applicant Date: 4/6/15

FOR OFFICIAL USE ONLY
 Permit is: Denied See Below Approved, Subject to conditions listed on Permit # _____

Public Involvement Plan
HSIP: CR High Friction Surface Treatment 2015
Project No.57092

This is the Department of Transportation and Public Facilities' public involvement plan to provide the notification required by Condition 2 of the Municipal Noise Permit. Notification will be provided utilizing a number of tools. At the beginning of project construction, the Department will send out mailers to all property owners within 500 feet of the project notifying them that project is about to commence. It will provide general project information and explain that construction will involve construction nighttime operations. It will also provide information on the construction methods and provide a construction schedule. It will also advise the public to expect temporary high noise levels at night when construction activities are adjacent to their residences. It will also explain that a noise permit has been obtained from the Municipality and the measures that will be taken to reduce the noise impact. A Department contact and phone number will be provided for more information.

At the commencement of the project, the Department also commits to distributing informational door hangers on all residences and businesses immediately abutting the project limits. The information provided in these door hangers will summarize the information discussed above. It is expected that the door hangers will reach all the people residing or having businesses along the project corridor including renters/leasers.

In addition to the notification provided above, signs providing notice of road closures and other construction activity will be implemented throughout the duration of construction as needed. This will keep residents and roadway users apprised of the construction activity and when to expect construction in specific areas of the project.

Weekly updates on construction progress will be provided in the Alaska Dispatch News Navigator section. This would be implemented at the start of construction and will continue through the duration of construction. These notices will reach potentially affected parties in a broad geographic area of the construction.

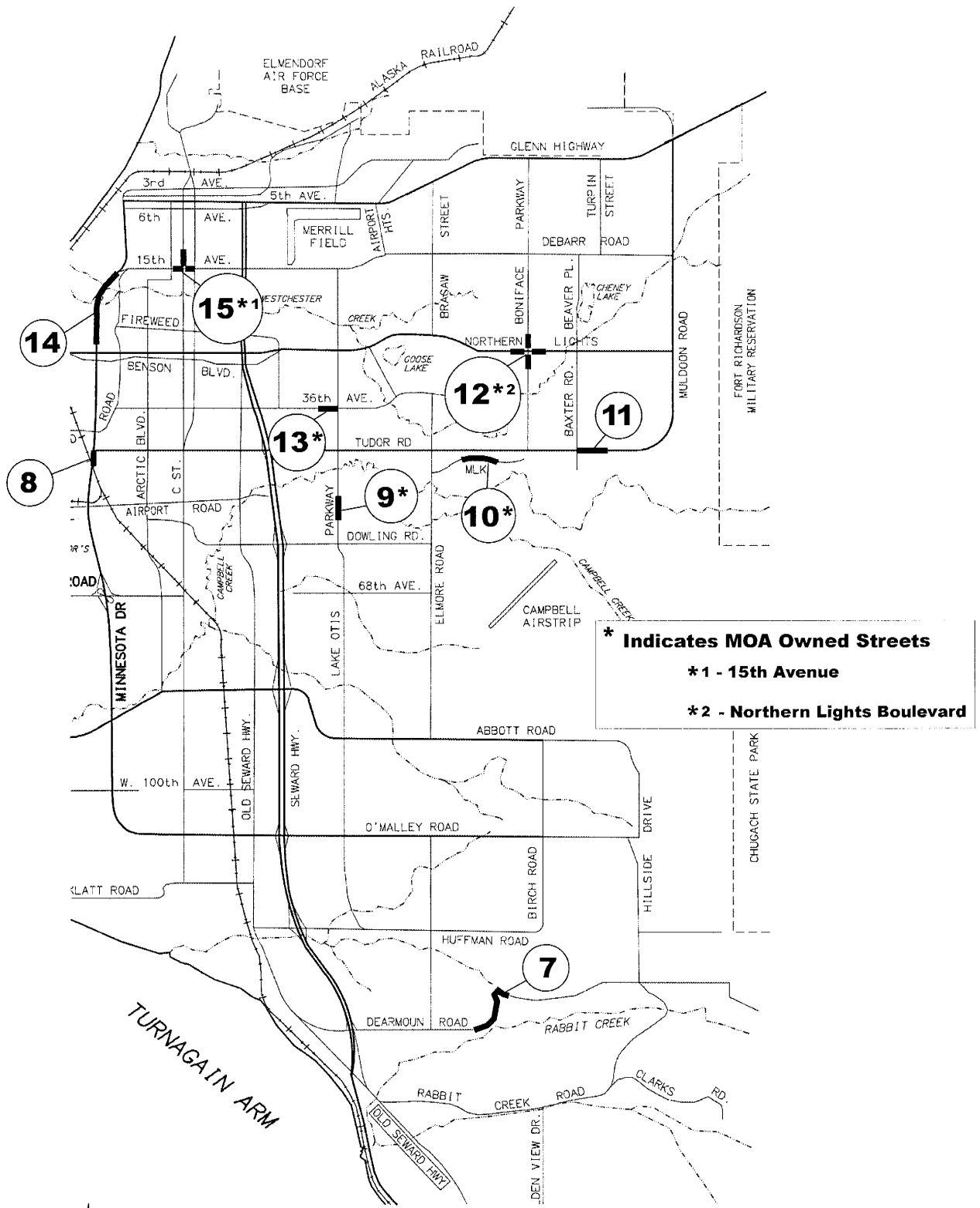
The Department will also update the Carrs 511 System with weekly updates on project construction.

Changeable Message Boards will be located throughout the project as needed to give the driving public up to date notice of construction operations in specific areas. Local residents, business owners, the roadway users will be constantly informed by these message boards of activities to be expected.

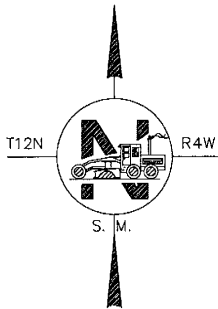
Notice of roadway closures and other construction operation will also be announced as needed on local radio stations to keep the public informed on project activities.


Signature of Applicant

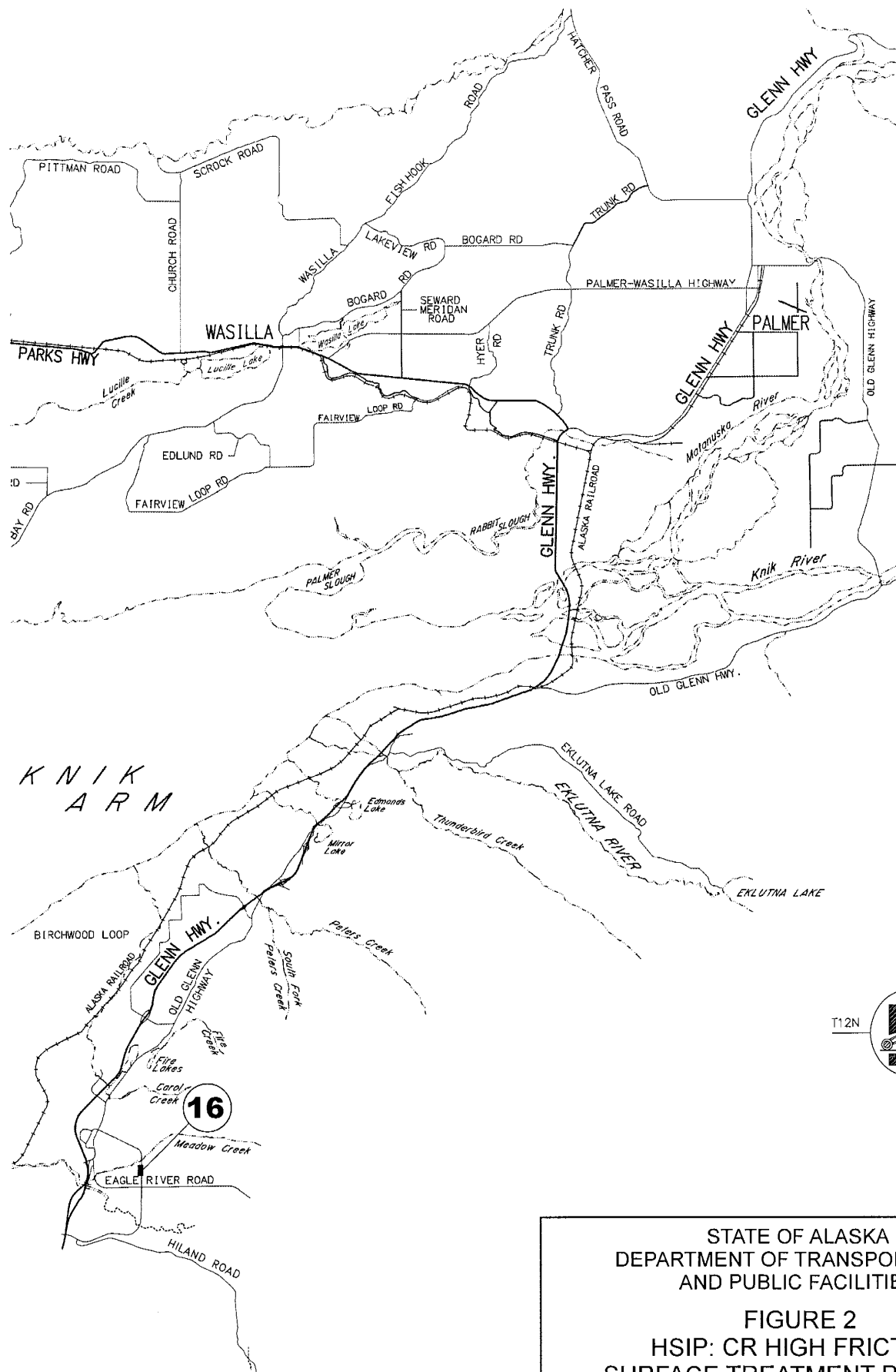

Date



*** Indicates MOA Owned Streets**
***1 - 15th Avenue**
***2 - Northern Lights Boulevard**



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
 FIGURE 1
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092
 3/16/2015
ANCHORAGE AREA HFST LOCATIONS



STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

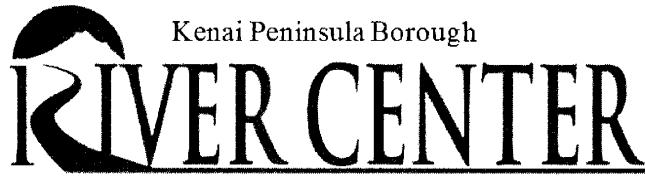
FIGURE 2
 HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT
 PROJECT NO. 0001501/57092
 3/16/2015

**EAGLE RIVER
 HFST LOCATION**

High Friction Surface Treatment 2015
 Project #57092
 3/17/15

Municipality of Anchorage Site Locations

Site Description	Latitude	Longitude	Section, Township, Range	USGS Quad
Dearmoun Road switchback, Mulligan St to Griffin	61.096936	-149.789200	S27, S34 T12N R3W	ANC A8
Minnesota 25th to 15th	61.198510	-149.912920	S24 T13N R4W	ANC A8
Minnesota at Tudor	61.180688	-149.913060	S25, S36 T13N R4W	ANC A8
Eagle River Loop Rd Signal to Citation Rd/Baranof Dr	61.314445	-149.539017	S12 T14N R2W S7 T14N R1W	ANC B7
MLK Drive	61.177997	-149.796536	S34 T13N R3W	ANC A8
Tudor WB at Baxter	61.180820	-149.764415	S 26, S35 T13N R3W	ANC A8
Lake Otis at Waldron Dr. NB	61.173705	-149.838057	S32, S33 T13N R3W	ANC A8
Northern Lights & Boniface	61.195219	-149.778337	S22, S23, S26, S27 T13N R3W	ANC A8
36 th at Lake Otis	61.188021	-149.838467	S29 T13N R3W	ANC A8
15 th & C	61.207687	-149.887374	S19 T13N R3W	ANC A8



514 Funny River Road • Soldotna, AK 99669 • (907) 714-2460 • Fax: (907) 260-5992

Mike Navarre
Borough Mayor

FLOODPLAIN DEVELOPMENT PERMIT – NOT REQUIRED RC# 11229

4/3/2015

ADOT PF
PO Box 196900
Anchorage, AK 99519-6900

Dear Ms. Kathy Shea:

Pursuant to KPB Chapter 21.06, the Kenai Peninsula Borough (KPB) River Center has reviewed your permit application and finds that your project is not within the borough's regulatory floodplain; therefore, no floodplain review is required. Other borough, state, and federal permits may still be required.

The location of the work is as follows:

Legal Desc: MP 14-16, MP 38-40 Seward Highway

Applicant's Project Description

This is a safety project to add High Friction Surface Treatment (HFST) on the road surfaces.

Permitted Activity within the Regulatory Floodplain

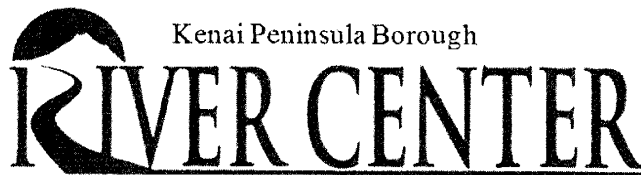
The project is located outside the regulatory floodplain. Flood information is based on the Regulatory Floodplain Map for the Kenai Peninsula Borough. This document does not imply the referenced project areas will or will not be free from flooding or damage. This information does not create liability on the part of the Borough, or its officers or employees for any damage that results from reliance on this information.

Please contact me with any questions or modifications of this project at (907) 714-2464.

Sincerely,

A handwritten signature in black ink, appearing to read "HJC".

Harmony J. Curtis
Floodplain Administrator
Donald E. Gilman River Center



514 Funny River Road • Soldotna, AK 99669 • (907) 714-2460 • Fax: (907) 260-5992

Mike Navarre
Borough Mayor

KENAI PENINSULA BOROUGH – HABITAT PROTECTION DISTRICT

4/9/2015

RC Number: 11229

ADOT PF
PO Box 196900
Anchorage, AK 99519-6900

Dear ADOT PF:

Pursuant to KPB 21.18, the Kenai Peninsula Borough (KPB) River Center has reviewed your permit application and finds that your project is within the prior existing footprint of the road and is an allowable use. The new signs are not within the borough's Anadromous Water body Habitat Protection District and therefore no habitat review is required. If the sign locations change to a location within the Habitat Protection District, a conditional use permit will be required. Other borough, state and federal permits may be required.

The location of the work is as follows:

Parcel ID: Multiple
Legal Description: MP 14-16, MP 38-40 Seward Highway
Waterbody: Snow River, Jerome Creek

Applicant's Project Description

This is a safety project to add High Friction Surface Treatment (HFST) on the road surfaces.

Permitted Activity within the Habitat Protection District

The sign project is located more than 50-feet landward of the Ordinary High Water Mark of the water bodies referenced above. No habitat permit is required. The road treatment is on the prior existing road and is an allowable use.

Please call me if you have questions regarding this No Review determination at 907-714-2468.

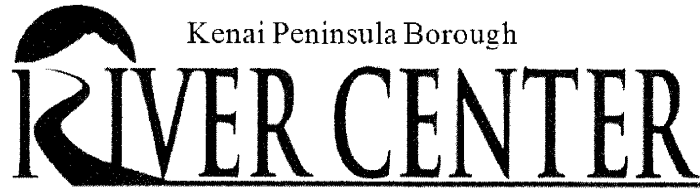
Sincerely,

A handwritten signature in black ink, appearing to read "Karyn Noyes".

Karyn Noyes

Resource Planner

Donald E. Gilman River Center



514 Funny River Road • Soldotna, AK 99669 • (907) 714-2460 • Fax: (907) 260-5992

Mike Navarre
Borough Mayor

Dear ADOT PF:

PROJECT DESCRIPTION: This is a safety project to add High Friction Surface Treatment (HFST) on the road surfaces.

Enclosed please find the individual permits from the following River Center Agencies:

Expiration	Agency
<input type="checkbox"/> <i>Not Required</i>	Kenai Peninsula Borough, Habitat Protection
<input type="checkbox"/> <i>Not Required</i>	Kenai Peninsula Borough, Floodplain Development
<input type="checkbox"/> <i>Not Required</i>	State of Alaska, Division of Parks & Outdoor Recreation
<input type="checkbox"/> <i>Not Required</i>	State of Alaska, Department of Fish & Game Habitat Division

Each of these permits have expiration dates. Please review them carefully. If you are unable to complete your project by the expiration dates, you must apply for an extension to your permits.

The permittee is responsible for the actions of the contractors, agents, or other persons who perform work to accomplish the approved plan. For any activity that deviates from the approved plan, the permittee shall notify the River Center and obtain written approval before beginning the activity.

If you have any questions regarding your project please contact the River Center at (907) 260-4882.

PLEASE DISPLAY THIS SIGN SO IT IS VISIBLE FROM THE RIVER. THIS SIGN SHOULD BE POSTED DURING ALL PHASES OF CONSTRUCTION.

RIVER CENTER

11229

RC#

RIVER CENTER PERMITTED PROJECT

Applicant ADOT PF

Authorized Work: This is a safety project to add High Friction Surface Treatment (HFST) on the road surfaces.

Permits Issued:

Expiration:

KPB Floodplain

Not Required

KPB Habitat Protection

Not Required

Legal Description : MP 14-16, MP 38-40 Seward Highway

Questions regarding this permit should be directed to the Gilman River Center, (907) 260-4882

APPENDIX C
MATERIAL CERTIFICATION LIST

HIGHWAY MASTER MATERIALS CERTIFICATION LIST, EXCEPT SECTION 660/661/740 (current 1/30/12)

Project Name **HSIP: CR High Friction Surface Treatment Project**
 Project Number **Z57092000/0001501**

Project Engineer Signature _____
 Unshaded boxes indicate who approves the manufacturer's certificate of compliance or materials submittals. If two boxes not shaded, either approving authority may be used.

Materials Item	Specification 2015 or Special Provision if noted	Construction		Design		Statewide Materials			Manufacturer/ Remarks	Certificate Location e.g. Binder #
		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		
401 ASPHALT CONCRETE PAVEMENT										
Mix Design	401-2.01									
Asphalt Binder	401-2.01									
Joint Adhesive	401-3.14									
Joint Sealant	401-3.14									

405 HIGH FRICTION SURFACE TREATMENT										
Materials Item	Specification	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	Manufacturer/ Remarks	Certificate Location e.g. Binder #
Polymeric Resin or MMA Resin Binder	405-2.01									
Aggregate Topping	405-2.01									
Dynamic Friction Tester	405-2.01									

604 MANHOLES & INLETS										
<u>Frames, Grates, Covers & Ladder Rungs</u>										
Materials Item	Specification	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	Manufacturer/ Remarks	Certificate Location e.g. Binder #
Gray Iron Castings	712-2.06									
Carbon-Steel Castings	712-2.06									

*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 not shaded, either approving authority may be used.

Materials Item	Specification 2015 or Special Provision if noted	Construction		Design		Statewide Materials		Manufacturer/ Remarks e.g. Binder #	Certificate Location e.g. Binder #
		Project Engineer	Regional Materials or QA Engineer	Design Engineer of Record	State Bridge Engineer	Regional Traffic Engineer	*Qualified Products List (QPL)		
615 STANDARD SIGNS									
Sheet Aluminum	730-2.01/Plans								
High Density Overlay Plywood	730-2.02								
Sign Framing Members	Std. Dwg. S-20.10								
Reflective Sheeting	730-2.03								
Orange Background Signs	615-2.01								
Reflective Sheeting Warranty	615-2.01								
Sign Posts									
Perforated Steel Posts	730-2.04								
Zinc Coating for Repairs	730-2.04								
Sign Bases									
Slip Base	615-2.01/Plans								
Breakaway Base	615-2.01/Plans								
Fragible Couplings	615-2.01/Plans								
Concrete	615-2.01/ 501- 3.01								
627 WATER SYSTEM									
Valve Boxes									
For Valves larger than 3 Inch	712-2.11								
For Valves 3 Inch and Smaller	712-2.11								

*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 not shaded, either approving authority may be used.

Materials Item	Specification 2015 or Special Provision if noted	Construction		Design		Statewide Materials		Manufacturer/ Remarks	Certificate Location e.g. Binder #	
		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										
BMP Installations	641-2.05								641 Control and Stabilization Materials identified and documented in SWPPP and approved on project.	
642 CONSTRUCTION SURVEYING AND MONUMENTS										
Monument Cases	642-2.01									
Primary Monument	642-2.01									
Secondary Monument	642-2.01									
643 TRAFFIC MAINTENANCE										
Traffic Control Devices	643-2.01								643 Materials approved on project with TCP conforming to Alaska Traffic Manual (ATM).	
670 TRAFFIC MARKINGS										
Traffic Paint, Beads Combined Cert.	708-2.03, 712- 2.08									
Methyl Methacrylate Markings, Beads, Anti-Skid Combined Cert.	712-2.17, 712- 2.08									

*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.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
REQUIRED CONTRACT PROVISIONS
for
FEDERAL-AID (FHWA) CONSTRUCTION CONTRACTS

FHWA-1273 -- Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

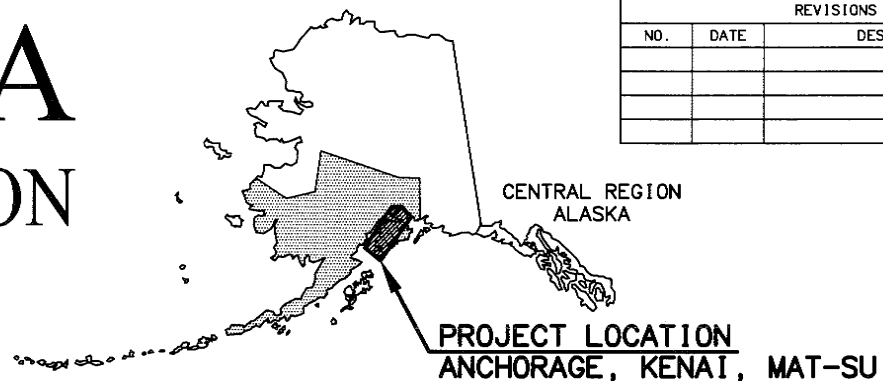
5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.



STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES



REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL 'A' SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/Z570920000	2015	A1	A5
						PLAN SET TOTAL	57

Appendix L

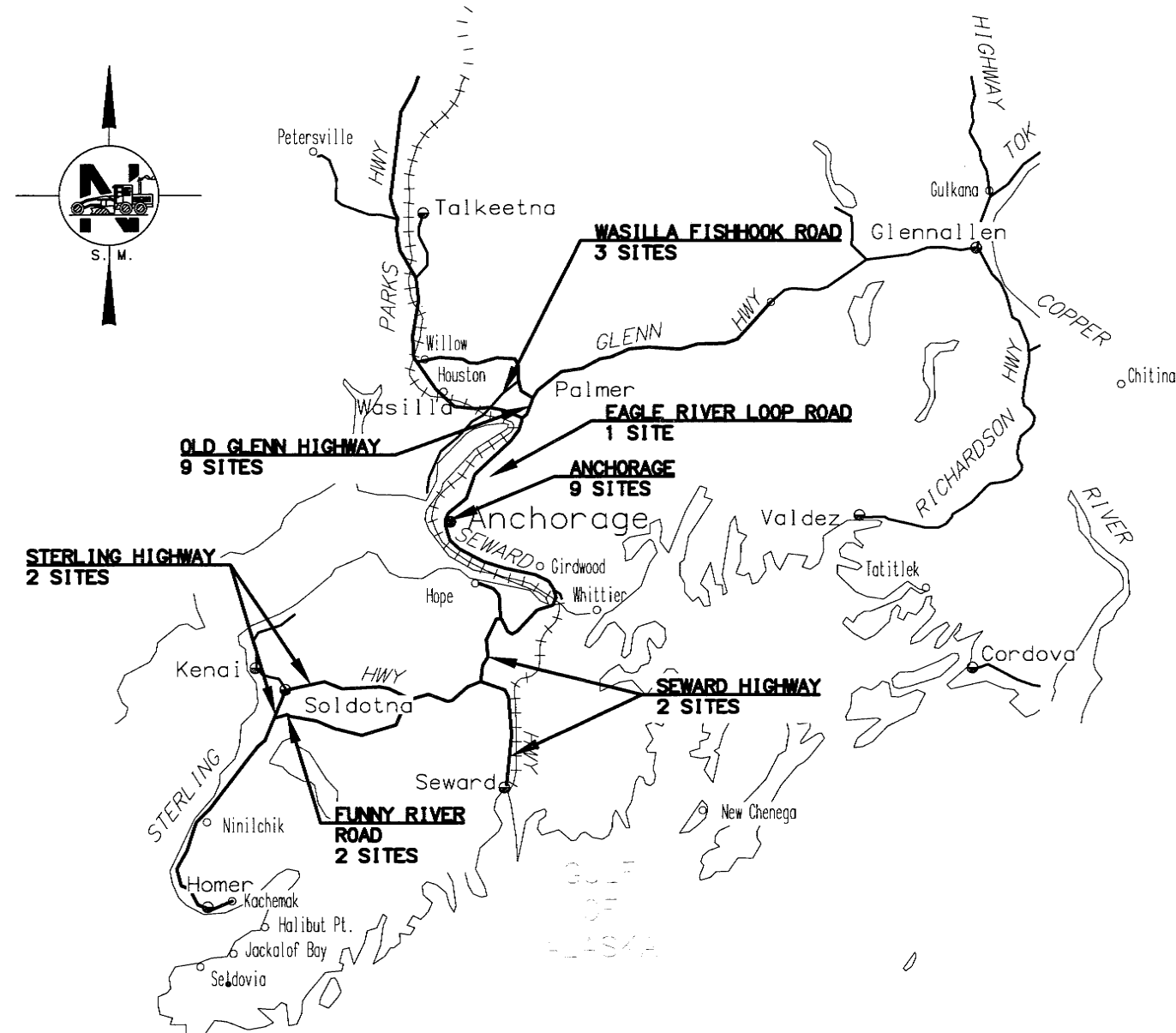
PROPOSED HIGHWAY PROJECT

HSIP: CR HIGH FRICTION SURFACE TREATMENT

PROJECT NO. 0001501/Z570920000

HIGH FRICTION SURFACE TREATMENT, PAVING, SIGNING, AND STRIPING

PROJECT SUMMARY			
ROAD SEGMENT/INTERSECTION	ROADWAY FUNCTIONAL CLASSIFICATION	POSTED SPEED	2013 AADT
STERLING HIGHWAY MP 86	INTERSTATE	55 MPH	8340
STERLING HIGHWAY MP 104	PRINCIPAL ARTERIAL-OTHER	55 MPH	4360
FUNNY RIVER ROAD.: BAYBERRY DRIVE TO MP 6	MINOR COLLECTOR	45 MPH	1670
SEWARD HIGHWAY MP 14-16	PRINCIPAL ARTERIAL-OTHER	55 MPH	2270
SEWARD HIGHWAY MP 38-40	INTERSTATE	55 MPH	4430
DE ARMOUN ROAD	MAJOR COLLECTOR	40 MPH	2020
MINNESOTA DRIVE @ TUDOR ROAD	PRINCIPAL ARTERIAL-OTHER	50 MPH	44120
LAKE OTIS PARKWAY. AT WALDRON DRIVE	PRINCIPAL ARTERIAL-OTHER	45 MPH	21100
DR. MARTIN LUTHER KING JR. DRIVE: BALLFIELDS ACCESS TO TUDOR CENTRE DRIVE	MINOR ARTERIAL	45 MPH	18430
NORTHERN LIGHTS BOULEVARD AT BONIFACE PARKWAY	PRINCIPAL ARTERIAL-OTHER	45 MPH	18460-22290
BONIFACE PARKWAY AT NORTHERN LIGHTS BOULEVARD	PRINCIPAL ARTERIAL-OTHER	45 MPH	20140-23920
36TH AVENUE AT LAKE OTIS PARKWAY	PRINCIPAL ARTERIAL-OTHER	40 MPH	12350
MINNESOTA DRIVE: 25TH AVENUE TO 15TH AVENUE	PRINCIPAL ARTERIAL-OTHER	45 MPH/30 MPH	34460
15TH AVENUE AT C STREET	MINOR ARTERIAL	30 MPH	9050-11450
EAGLE RIVER LOOP ROAD @ BARANOFF AVENUE/CITATION ROAD	MINOR ARTERIAL	40 MPH	8940
OLD GLENN HIGHWAY: MP 2 TO KNIK RIVER ROAD	MAJOR COLLECTOR	55 MPH	2030
OLD GLENN HIGHWAY: KNIK RIVER ROAD TO MP 12	MAJOR COLLECTOR	55 MPH	2640-3560
WASILLA/FISHHOOK ROAD: LAKEVIEW ROAD TO NORTH KING COVE DRIVE	MAJOR COLLECTOR	45 MPH	3620
WASILLA/FISHHOOK ROAD: NORTH KING COVE DRIVE TO MCCASEY DRIVE	MAJOR COLLECTOR	45 MPH	1620



DESIGNED BY: [blank] DRAWN BY: [blank] SCALE: N/A LAYOUT: A1 DATE: 7/21/2015 10:04 AM TIME: 10:04 AM
 DRAWING LOCATION: Z:\PROJECTS\DOT\HSIP High Friction Surface Treatment\Production Drawings\57092_A01_Title Sheet.dwg

CENTRAL REGION AS-ADVERTISED NOVEMBER 2015

PLANS DEVELOPED BY: KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

APPROVED: [Signature] REGIONAL PRE-CONSTRUCTION ENGINEER DATE

CONCUR: [Signature] DIRECTOR, DESIGN & CONSTRUCTION DATE 10/23/2015

CERTIFIED TRUE & CORRECT AS-BUILT OF ACTUAL FIELD CONDITION:

CONSTRUCTION PROJECT MANAGER DATE

DRAWING LOCATION
 Z:\PROJECTS\DOT\FP\High Friction Surface Treatment\Production\Drawings\A2\Drawing Index and General Notes.dwg
 DATE TIME 10/27/2015 12:49 PM
 LAYOUT A2
 SCALE N/A
 SHEETS N/A
 DESIGNED BY LAJ/JP
 CHECKED BY LAJ/JP
 DRAFTER BY LBS

ABBREVIATIONS

A.A.D.T.	ANNUAL AVERAGE DAILY TRAFFIC	N	NORTH
ADA	AMERICANS WITH DISABILITIES ACT	NA	NOT APPLICABLE
ADOT	ALASKA DEPARTMENT OF TRANSPORTATION	NB	NORTHBOUND
ARRC	ALASKA RAIL ROAD CORPORATION	NE	NORTH EAST
ATB	ASPHALT TREATED BASE	NIC	NOT IN CONTRACT
AVE	AVENUE	NO, No.	NUMBER
BLVD	BOULEVARD	NTS	NOT TO SCALE
BOP	BEGINNING OF PROJECT	NW	NORTH WEST
CF	CUBIC FEET	o.c.	ON CENTER
CIR	CIRCLE	OG	ORIGINAL GROUND
CL	CENTERLINE	PC	POINT OF CURVATURE
CS	CONTINGENT SUM	PI	POINT OF INTERSECTION
CY	CUBIC YARD	PL	PLACE
DHV	DESIGN HOUR VOLUME	POT	POINT OF TANGENT
DIA	DIAMETER	PRC	POINT OF REVERSE CURVE
DR	DRIVE	PT	POINT OF TANGENCY
E	EAST	R	RADIUS
EA	EACH	RD	ROAD
EB	EASTBOUND	REF.	REFERENCE POINT
EOP	END OF PROJECT/END OF PAVEMENT	REQ'D	REQUIRED
EX	EXISTING	ROW	RIGHT OF WAY
F.O.C.	FACE OF CURB	RP	RADIUS POINT
FT	FEET	RR	RAILROAD
HFST	HIGH FRICTION SURFACE TREATMENT	RT	RIGHT
HSIP	HIGHWAY SAFETY IMPROVEMENT PROGRAM	S	SOUTH
HWY	HIGHWAY	SB	SOUTHBOUND
HR	HOUR	SD	STORM DRAIN
IN	INCH	SE	SOUTH EAST
L	LENGTH	SEC	SECTION
LB	POUND	SF	SQUARE FOOT
LF	LINEAR FOOT	SLDR	SHOULDER
LN	LANE	SM	SEWARD MERIDIAN
LP	LOOP	SP	SPECIAL PROVISION
LS	LUMP SUM	SQ	SQUARE
LT	LEFT	ST	STREET
M	METER	STA	STATION
MAX	MAXIMUM	STD	STANDARD
ME	MATCH EXISTING	SW	SOUTH WEST
MIN	MINIMUM	SY	SQUARE YARD
MMA	METHYL METHACRYLATE	T	TANGENT
M.O.A.	MUNICIPALITY OF ANCHORAGE	TBC	TOP BACK OF CURB
MON	MONUMENT	T/W	TRAVELED WAY
MP	MILEPOST	TYP	TYPICAL
MPH	MILES PER HOUR	V	VELOCITY
		WB	WESTBOUND
		W	WEST
		W	WHITE
		Y	YELLOW
		YD	YARD

GENERAL NOTES:

- ALL WORK WILL BE CONTAINED WITHIN THE RIGHT-OF-WAY. NO EXCESS MATERIAL SHALL BE DISPOSED OF WITHIN THE RIGHT-OF-WAY, UNLESS SPECIFICALLY CALLED FOR IN THE PLANS OR DIRECTED BY THE ENGINEER.
- SURVEY MONUMENTS ARE PRESENT IN THE ROADWAY SURFACE. ALL MONUMENTS HAVE BEEN REFERENCED BY OTHERS. THE CONTRACTOR SHALL NOT DISTURB EXISTING MONUMENTS, BUT SHALL ADJUST MONUMENTS CASES AND REPLACE MONUMENT CASES IF NECESSARY. IF OTHER MONUMENTS ARE FOUND BY THE CONTRACTOR, THEY WILL BE REFERENCED BY THE CONTRACTOR PER SECTION 642 OF THE STANDARD SPECIFICATIONS.
- LOCATIONS DEPICTED FOR THE UTILITIES AND OTHER EXISTING FEATURES ARE APPROXIMATE. SOME UTILITIES HAVE BEEN LOCATED FROM RECORD DRAWINGS AND UTILITY LOCATES. CONTRACTOR SHALL LOCATE AND VERIFY UTILITIES PRIOR TO CONSTRUCTION. ADJUST INSTALLATIONS AS DIRECTED BY THE ENGINEER.
- ALL PAVEMENT CUTS SHALL BE MADE WITH A SAW OR ALTERNATIVE METHOD APPROVED BY THE ENGINEER.
- ADJUST ALL PAVEMENT PENETRATIONS TO FINAL GRADE PRIOR TO TOP LIFT OF PAVING. IF ANY PAVEMENT PENETRATION REQUIRES GRADE ADJUSTMENT AFTER FINAL LIFT PAVING, AS DETERMINED BY THE ENGINEER, SAW CUT A NEAT LINE ALONG THE PAVEMENT TO BE REMOVED. USE AN INFRARED HEATER TO HEAT THE EXISTING PAVEMENT. EQUIPMENT AND MAXIMUM TEMPERATURE SHALL BE APPROVED BY THE ENGINEER. REPLACE THE REMOVED ASPHALT WITH NEW HOT MIX ASPHALT AND THOROUGHLY COMPACT. SEAL JOINTS AT LEAST 12 INCHES WIDE USING ASPHALT SYSTEMS GSB-88 OR APPROVED EQUAL, WHILE THE HOT MIX ASPHALT IS CLEAN, FREE OF MOISTURE AND PRIOR TO STRIPING. THERE SHALL BE NO PAYMENT FOR ADDITIONAL WORK CAUSED BY FAILURE TO ADJUST PAVEMENT PENETRATIONS TO FINAL GRADE.
- THE DROP OFF BETWEEN THE EXISTING SHOULDER AND ANY NEW ASPHALT SHALL BE A MAXIMUM OF 1/2 INCH. IF THE DROP OFF IS GREATER THAN 1/2 INCH, BUTTRESS THE PAVEMENT WITH AGGREGATE BASE COURSE, GRADING D-1, WITHIN 48 HOURS.
- PLACE 4" OF TOPSOIL AND SEED IN ANY AREAS WITHIN THE RIGHT-OF-WAY DISTURBED BY CONSTRUCTION, AND AS DIRECTED BY THE ENGINEER. DO NOT COVER SIGNAL AND LIGHT POLE FOUNDATION BOLTS AND BASE PLATES. THIS WORK SHALL NOT BE MEASURED AND PAID FOR SEPARATELY, BUT WILL BE SUBSIDIARY TO 641 PAY ITEMS.
- REPLACE THE "SAFETY FENCE" AND "TYPE II BARRICADES OR TUBULAR MARKERS" AS SHOWN IN THE PEDESTRIAN DETOUR TYPICAL SECTION ON STANDARD DRAWING C-03-10 WITH ADA COMPLIANT BARRICADES.

SIGNING AND STRIPING NOTES

- ALL LOCATIONS FOR SIGN INSTALLATION ARE APPROXIMATE. INSTALL SIGNS AT LOCATIONS AS DIRECTED BY THE ENGINEER.
- ALL NEW SIGNPOSTS SHALL BE PERFORATED STEEL TUBE (PT) AS SHOWN IN THE SIGN SUMMARY.
- USE THE CONCRETE FOUNDATION OPTION SHOWN ON STANDARD DRAWING S-30.03 FOR ALL SIGNPOSTS. TRIM EACH PT POST TO LIMIT THE LENGTH INSERTED INTO THE FOUNDATION TO 12 INCHES.
- FABRICATE ALL SIGNS FROM 0.125 INCH ALUMINUM SHEETING UNLESS OTHERWISE NOTED.
- WHEN SIGNS ARE CALLED FOR ON THE PLANS, ERECT NEW SIGNS BEFORE REMOVAL OF EXISTING SIGNS WITH SIMILAR MESSAGE. NOTIFY THE ENGINEER A MINIMUM OF 14 DAYS PRIOR TO BEGINNING SIGN REMOVAL AND SALVAGE OR DISPOSAL ACTIVITIES.
- PERFORM AN AS-BUILT OF EXISTING STRIPING FOR SITES 1-7 AND SITES 17-28. ACTUAL CENTERLINE AND SHOULDER STRIPING REPLACEMENT WILL BE DETERMINED BY THE ENGINEER IN ACCORDANCE WITH SUBSECTION 642-3.01.
- FOR ALL FINAL PAVEMENT MARKINGS USE METHYLMETHACRYLATE MATERIALS. LONGITUDINAL MARKINGS SHALL BE EITHER 60 MILS SURFACE APPLIED OR 250 MILS INLAID AS CALLED FOR ON THE PLANS.
- DIMENSIONS REFER TO THE CENTER OF STRIPE AND THE EDGE OF PAVEMENT OR FACE OF CURB WHEN PRESENT UNLESS OTHERWISE NOTED IN THE PLANS.
- WHERE NEW STRIPING IS TO EXTEND BEYOND PAVING LIMITS, REMOVE EXISTING STRIPING IN ACCORDANCE WITH SUBSECTION 670-3.04 TO THE EXTENT OF STRIPING LIMITS.

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/2570920000	2015	A2	A5

INDEX OF SHEETS	DESCRIPTION
SHEET NO.	
A1	TITLE SHEET
A2-A3	INDEX, GENERAL NOTES, ABBREVIATIONS AND LEGEND
A4-A5	KEY PLANS
B1	TYPICAL SECTIONS
C1	ESTIMATE OF QUANTITIES AND TABLE OF ESTIMATING FACTORS
D1-D3	SUMMARY SHEETS
F1-F28	PLAN SHEETS (43 F SHEETS TOTAL)
H1	SIGN SUMMARY AND TRAFFIC MARKING DETAILS
H2	SIGN SALVAGE SUMMARY
H3-H4	SIGN ATTACHMENT AND LIGHT SIGN FRAMING DETAILS

**STANDARD DRAWINGS
THE FOLLOWING STANDARD DRAWINGS
APPLY TO THIS PROJECT:**

C-03.10* (SEE GENERAL NOTE 8), C-04.12, C-05.20,
S-00.11*, S-05.01, S-30.03, S-32.00
T-20.03, T-21.03, T-22.03

* AS MODIFIED HEREIN

SPECIFICATION:

CONSTRUCT THE IMPROVEMENTS COVERED BY THESE PLANS IN ACCORDANCE WITH THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES 2015 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND THE PROJECT SPECIAL PROVISIONS AS OF THE ADVERTISEMENT DATE OF THIS PROJECT.

PAVEMENT MARKING LEGEND

PROPOSED	
	PROJECT CENTERLINE
	8" WHITE SOLID STRIPE
	4" WHITE SOLID STRIPE
	4" WHITE SKIP STRIPE 10' STRIPES AND 30' SPACES
	8" WHITE LANE GUIDE SKIP LANE CONTINUATION OR TURN SKIP 1' STRIPES AND 3' SPACES
	8" YELLOW SOLID STRIPE
	4" YELLOW SOLID STRIPE
	4" YELLOW SKIP STRIPE 10' STRIPES AND 30' SPACES
	2' CROSSWALK OR STOPBAR

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**DRAWING INDEX
AND GENERAL NOTES**

DRAWING LOCATION Z:\PROJECTS\DOT\HSIP\High Friction Surface Treatment\Production Drawings\M4_LEGEND.dwg
 DATE TIME 8/26/2015 9:45 AM
 LAYOUT A3
 SCALE N/A
 DESIGNED BY AJ/JP
 CHECKED BY AJ/JP
 DRAFTED BY TBS

UTILITIES

PIPELINES:

STORM DRAIN STRUCTURE AND PIPE NUMBERS, APPLICABLE IF SHOWN

STORM DRAIN

MANHOLE STORM DRAIN

CURB INLET CATCH BASIN

FIELD INLET CATCH BASIN

PIPE CULVERT w/ END SECTION

CLEANOUT

SANITARY SEWER

MANHOLE SANITARY SEWER

SEPTIC VENTS

WATER

FIRE HYDRANT

WELL

VALVE OR RISER

NATURAL GAS

OIL OR GASOLINE PIPELINE

(OVERHEAD)

ELECTRIC

(DIRECT BURY)

(OVERHEAD)

UTILITY POLE

UTILITY POLE WITH LUMINAIRE

GUY POLE

GUY WIRE ANCHOR

TRANSMISSION TOWER [WOOD]

TRANSMISSION TOWER [STEEL]

ELECTRICAL PEDESTAL

ELECTRICAL TRANSFORMER

ELECTRIC METER

ELECTRICAL OUTLET

ELECTRIC MANHOLE

TELEPHONE

(OVERHEAD)

(DIRECT BURY)

(DIRECT BURY)

TELEPHONE PEDESTAL

TELEPHONE MANHOLE

FIBER OPTIC

FIBER OPTIC MANHOLE

CABLE TV

(OVERHEAD)

(DIRECT BURY)

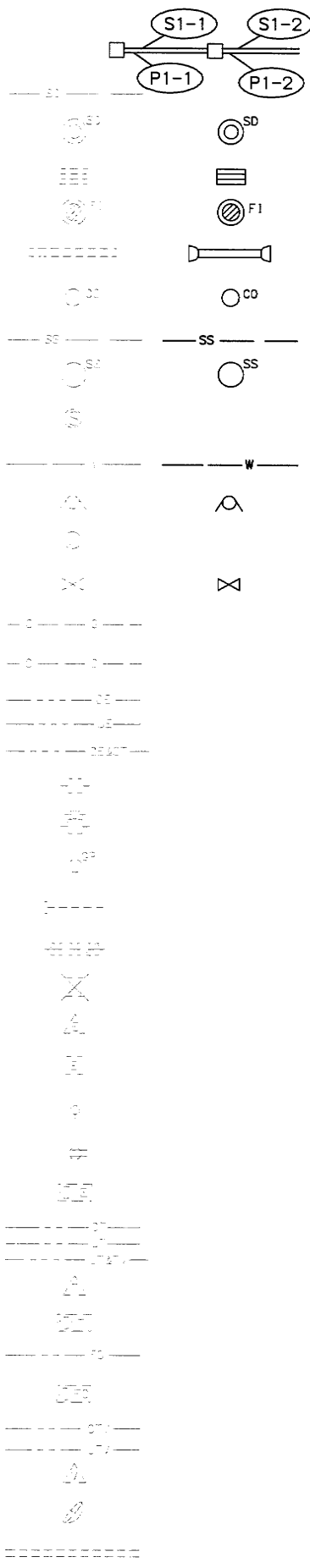
CABLE T.V. PEDESTAL

SATELLITE DISH

U.G. DUCT (E, T, FO)

EXISTING

PROPOSED



UTILITIES

EXISTING

PROPOSED

ELECTROLIER

HIGHTOWER

SIGNAL POLE WITH MAST

PEDESTRIAN PUSH BUTTON

RURAL BEACON

SCHOOL ZONE BEACON

RIGHT OF WAY

EXISTING

PROPOSED

PRIMARY CENTERLINE MONUMENT

SECONDARY CENTERLINE MONUMENT

PROJECT RIGHT-OF-WAY LINES

CONTROLLED ACCESS LINE

TEMPORARY CONSTRUCTION EASEMENT/PERMIT

PROJECT CENTERLINE

RAILROAD CENTERLINE

EXISTING TOPOGRAPHY

CONIFER TREE OR TREES

DECIDUOUS TREE OR TREES

SHRUB OR SHRUBS

WETLANDS

CREEK

RIVER

LAKE / POND

EXISTING/PROPOSED

DRAINAGE FLOW

CONTOURS - MAJOR

CONTOURS - MINOR

MISCELLANEOUS

EXISTING

PROPOSED

BUILDING

TANKS

ABOVE GROUND

UNDERGROUND

PRIVATE SIGN

POST/BOLLARDS

MAILBOX

TRAFFIC SIGN

TRAFFIC SIGN POST #

VENT

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	A3	A5

ROADWAY

EXISTING

PROPOSED

ROADWAY OBLITERATION

LIMIT OF CUT SLOPE

LIMIT OF FILL SLOPE

EDGE OF PAVEMENT

CONCRETE CURB

CONCRETE CURB & GUTTER

CONCRETE CURB CUT

SIDEWALK

CURB RAMPS

PARALLEL CURB RAMP

PERPENDICULAR CURB RAMP

MID-BLOCK CURB RAMP

UNIDIRECTIONAL CURB RAMP

DETECTABLE WARNING TILES

DRIVEWAY APPROACH

GRAVEL EDGE

PATH / TRAIL

BRIDGE

TUNNEL

NOISE BARRIER

FENCE

RETAINING WALL

HEAD & WINGWALLS

GUARDRAIL

END SECTION

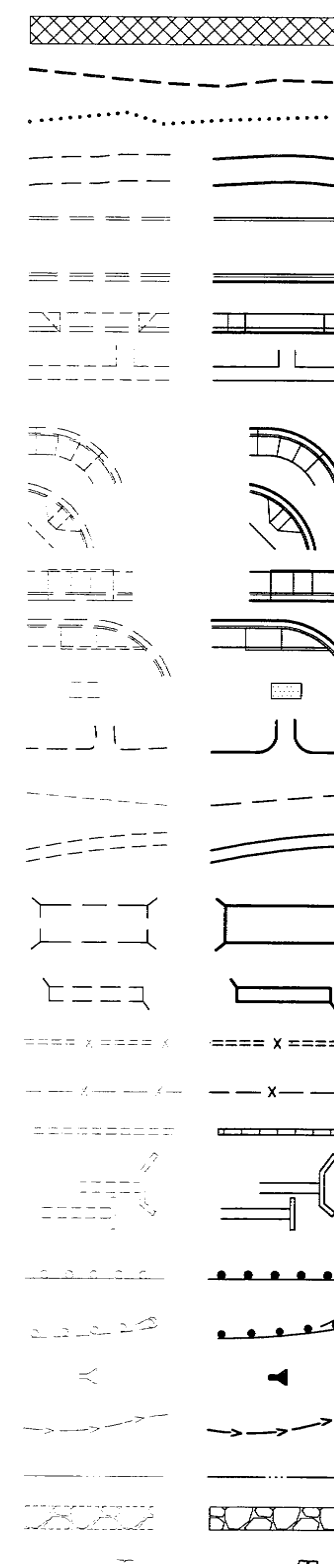
PARALLEL GUARDRAIL SECTION

SPECIAL DITCH

BOTTOM OF DITCH

RIPRAP

BOULDER OR BOULDERS



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

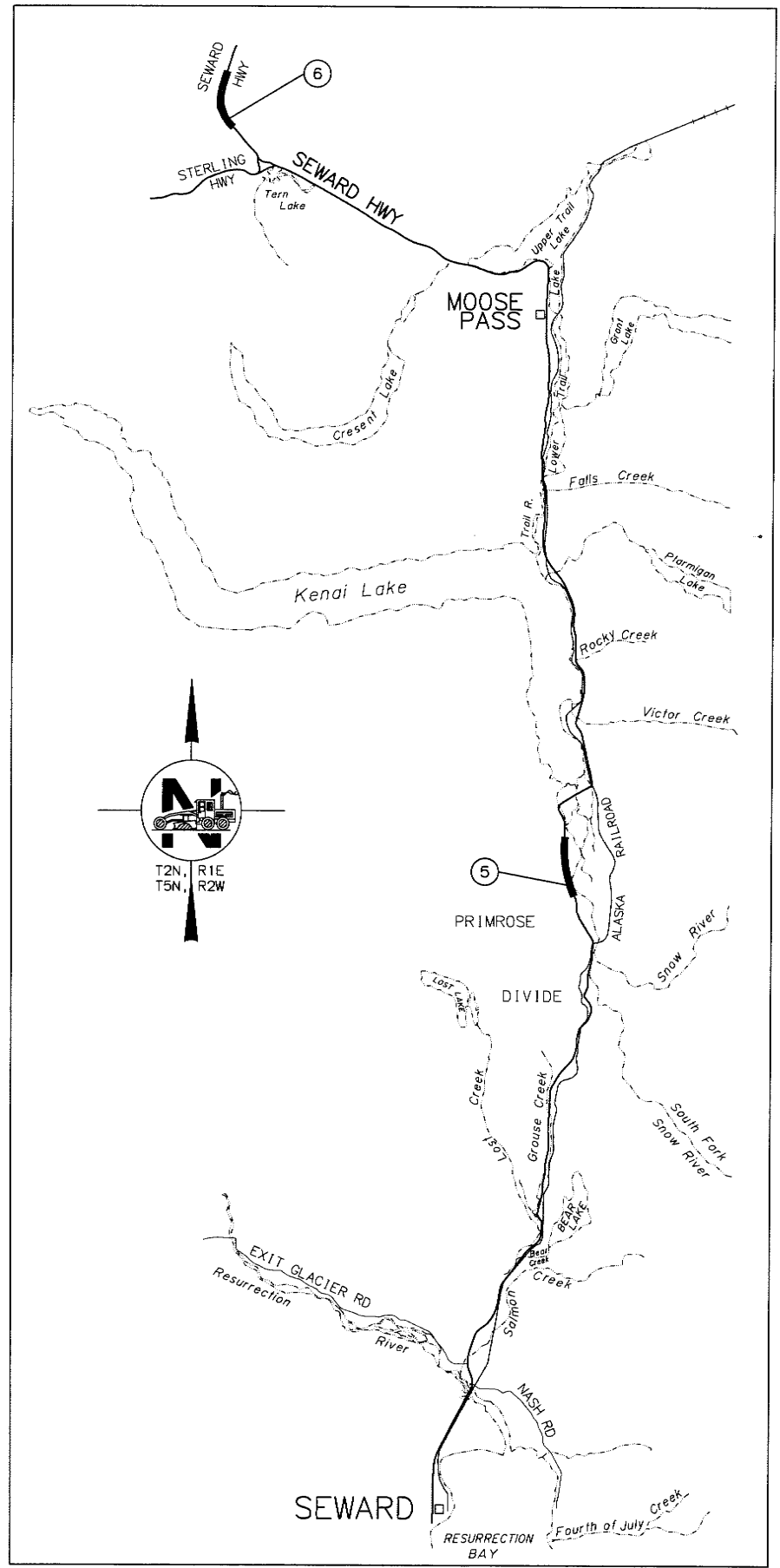
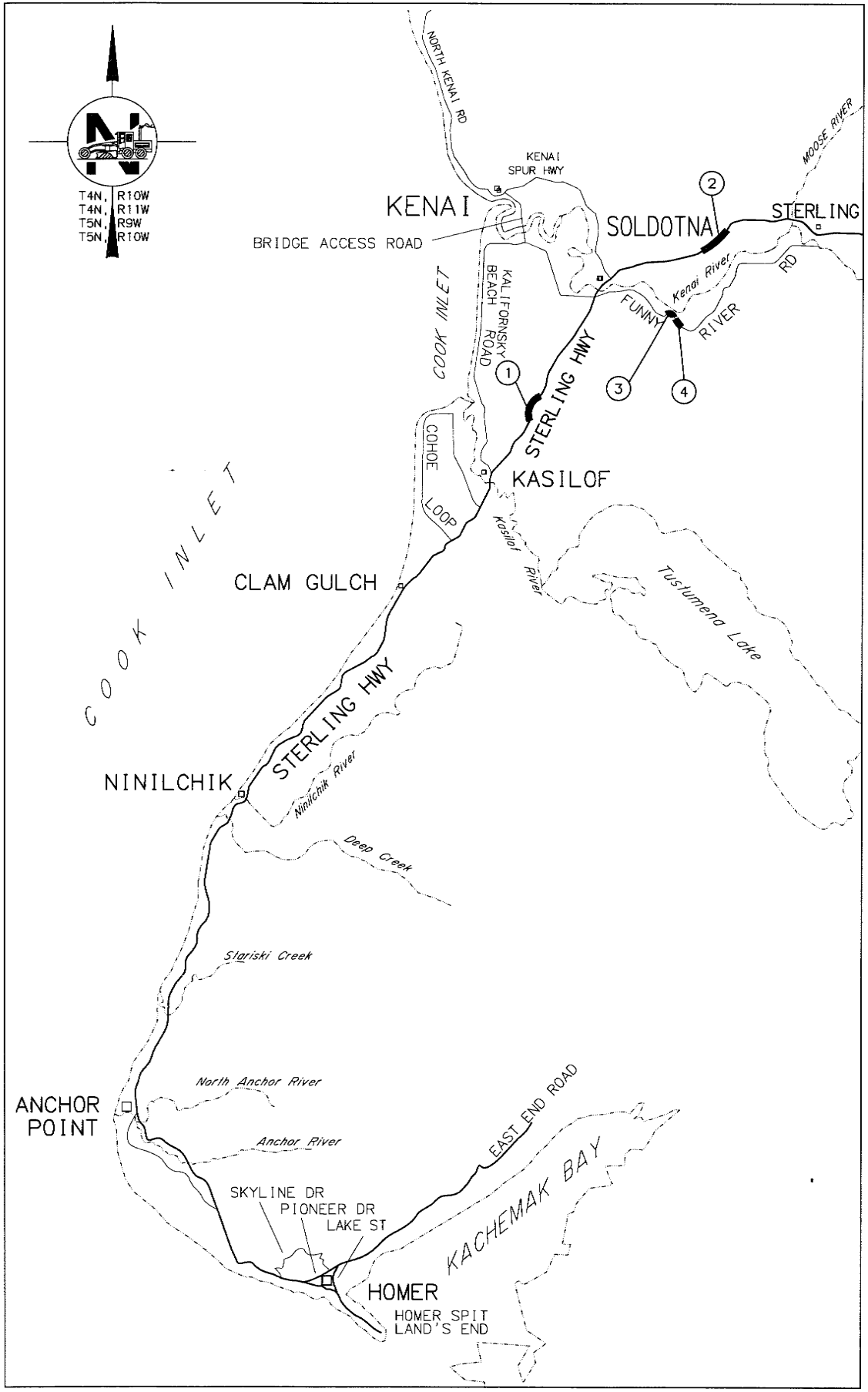
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

LEGEND

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/Z570920000	2015	A4	A5

DESIGNED BY: A/J/P
 CHECKED BY: A/J/P
 DRAFTED BY: BSB
 REFERENCE: N/A
 SCALE: N/A
 LAYOUT: A4
 DATE: 10/27/2015 12:58 PM
 TIME: 12:58 PM
 FILE: Z:\PROJECTS\DOT\HSIP\High Friction Surface Treatment\Production Drawings\57092_A2_A3KEY.dwg



SITE LOCATION			
GROUP #	SITE #	DESCRIPTION	TOWN
A	1	STERLING HIGHWAY - MP 104	KASILOF
	2	STERLING HIGHWAY - MP 86	SOLDOTNA
	3	FUNNY RIVER ROAD - MP 5	SOLDOTNA
	4	FUNNY RIVER ROAD - MP 6	SOLDOTNA
B	5	SEWARD HIGHWAY - MP 14 TO MP 16	SEWARD
	6	SEWARD HIGHWAY - MP 38.4 TO MP 40.5	SEWARD "Y"

PLANS PREPARED BY

John B. Pekar
 CE No. 10591
 Oct 28, 2015
 REGISTERED PROFESSIONAL ENGINEER

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

KEY PLAN

DESIGNED BY: LAJ/JP
 CHECKED BY: LAJ/JP
 DRAFTED BY: LBS

SCALE: N/A

LAYOUT: A5

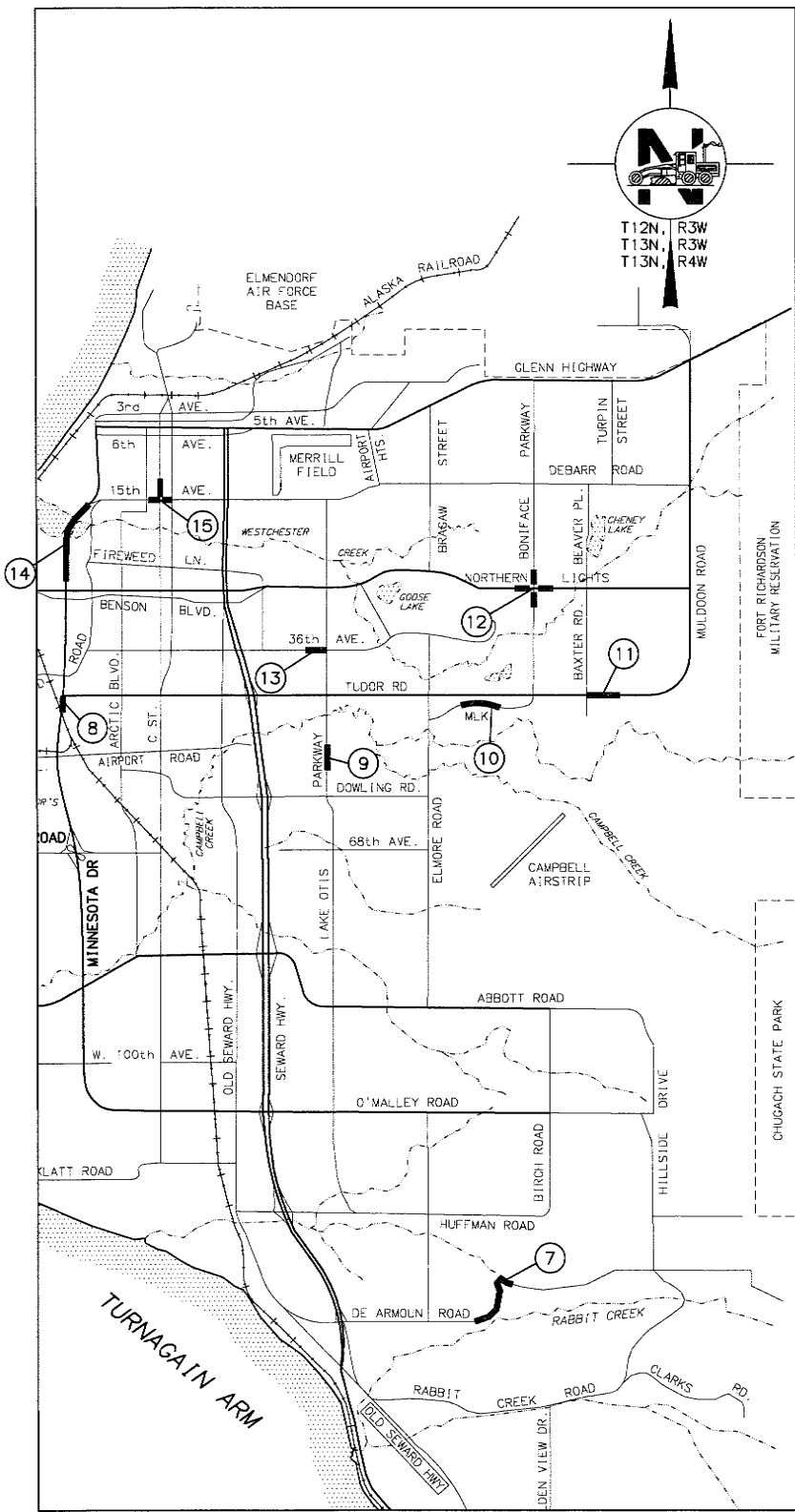
DATE TIME: 10/27/2015 12:58 PM

Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\57092_A2_AKEY.dwg

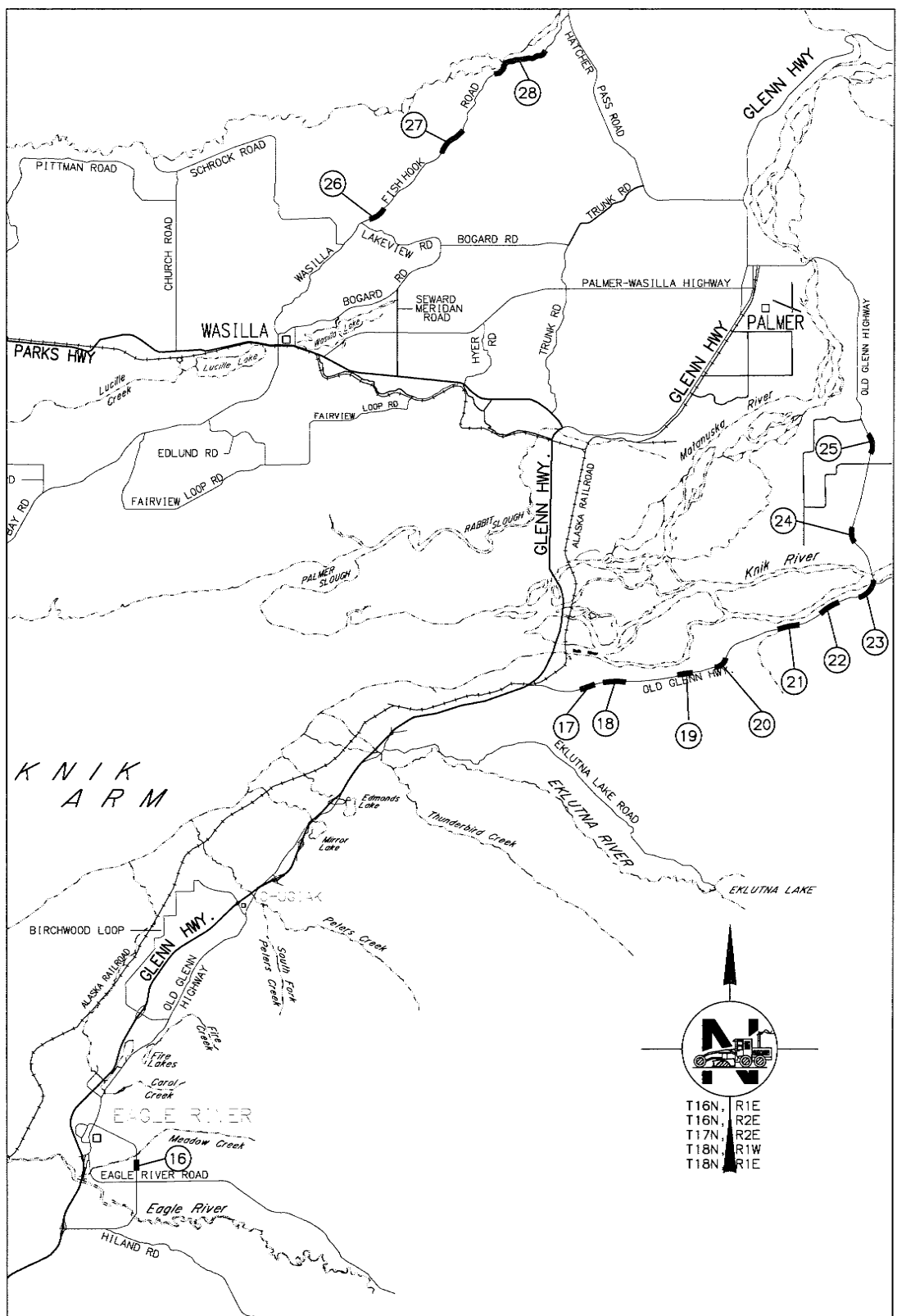
DRAWING LOCATION

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	A5	A5



ANCHORAGE AREA MAP N.T.S.



EAGLE RIVER, WASILLA AREA MAP N.T.S.

SITE LOCATION			
GROUP #	SITE #	DESCRIPTION	TOWN
C	7	DE ARMOUN ROAD	ANCHORAGE
	8	MINNESOTA DRIVE AND TUDOR ROAD	ANCHORAGE
	9	LAKE OTIS PARKWAY - WALDRON DRIVE	ANCHORAGE
	10	MARTIN LUTHER KING JR DRIVE: BALLFIELDS TO TUDOR CENTRE DRIVE	ANCHORAGE
	11	TUDOR ROAD AND BAXTER ROAD	ANCHORAGE
	12	BONIFACE PARKWAY AND NORTHERN LIGHTS BOULEVARD	ANCHORAGE
	13	36TH AVENUE AND LAKE OTIS PARKWAY	ANCHORAGE
D	14	MINNESOTA DRIVE (25TH AVENUE TO 15TH AVENUE)	ANCHORAGE
	15	C STREET AND 15TH AVENUE	ANCHORAGE
	16	EAGLE RIVER LOOP ROAD AND BARONOFF AVENUE/CITATION ROAD	EAGLE RIVER
E	17	OLD GLENN HIGHWAY - MP 2	PALMER
	18	OLD GLENN HIGHWAY MP 3 (TWIN PEAKS)	PALMER
	19	OLD GLENN HIGHWAY - POWER PLANT	PALMER
	20	OLD GLENN HIGHWAY - MP 5	PALMER
	21	OLD GLENN HIGHWAY - MP 6	PALMER
	22	OLD GLENN HIGHWAY - MP 7	PALMER
	23	OLD GLENN HIGHWAY MP 8 TO KNIK RIVER ROAD	PALMER
	24	OLD GLENN HIGHWAY - OUR ROAD	PALMER
	25	OLD GLENN HIGHWAY MP12	PALMER
	F	26	WASILLA/FISHHOOK ROAD: LAKEVIEW ROAD TO PARADISE LANE
27		WASILLA/FISHHOOK ROAD: MARIAH DRIVE TO PAMELA DRIVE	WASILLA
28		WASILLA/FISHHOOK ROAD: KING COVE DRIVE TO McCASEY DRIVE	WASILLA

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

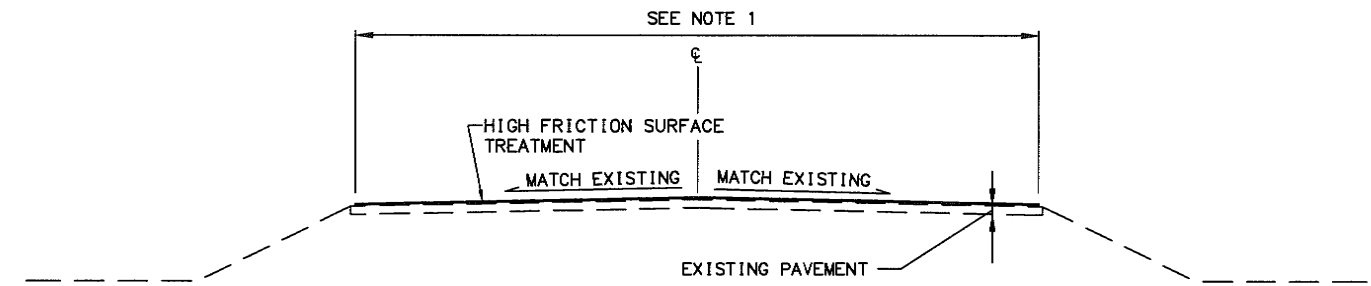
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

KEY PLAN

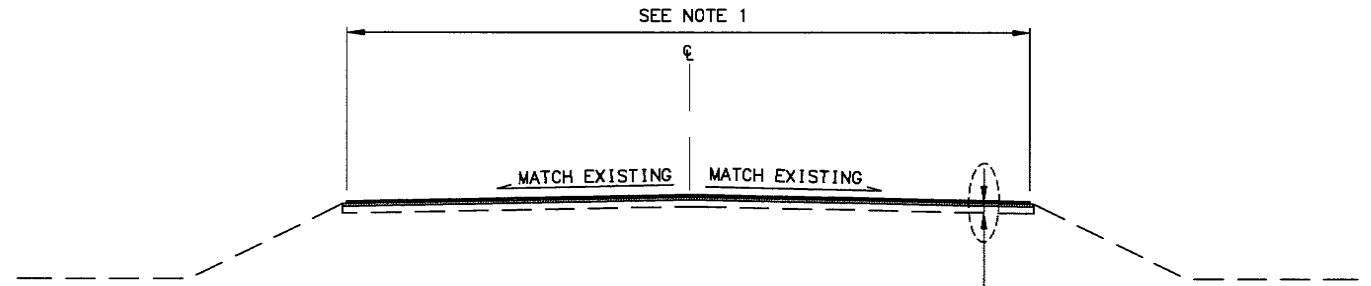
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/7570920000	2015	B1	B1

DESIGNED BY: LAJ/JP
 CHECKED BY: LAJ/JP
 DRAFTED BY: LBSB
 REFS: N/A
 SCALE: N/A
 LAYOUT: B1
 DATE TIME: 11/4/2015 12:46 PM
 Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\7092_B Typical Section.dwg



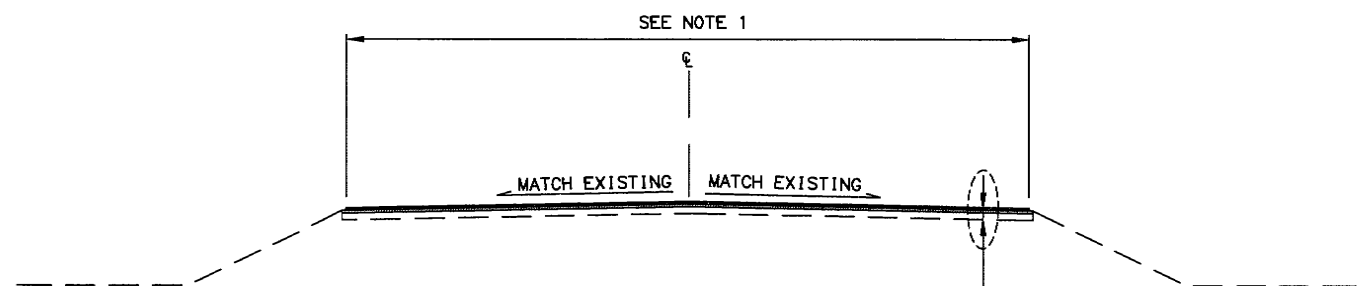
HFST ON EXISTING

SITES 1, 2, 7, 9, 12 (WB APPROACH), 21, 22, 26, 27, AND 28.



HFST ON PLANED AND REPLACED PAVEMENT

STRUCTURAL SECTION 1: SITES 3, 4, 5, 6, 8, 10, 11, 12 (NB, SB, AND EB APPROACHES), 13, 15, 16, 17, AND 18.
 STRUCTURAL SECTION 2: SITE 14

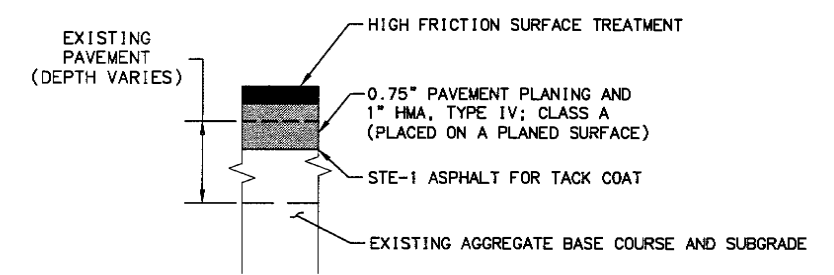


HFST ON PLANED PAVEMENT

SITES 19, 20, 23, 24, AND 25

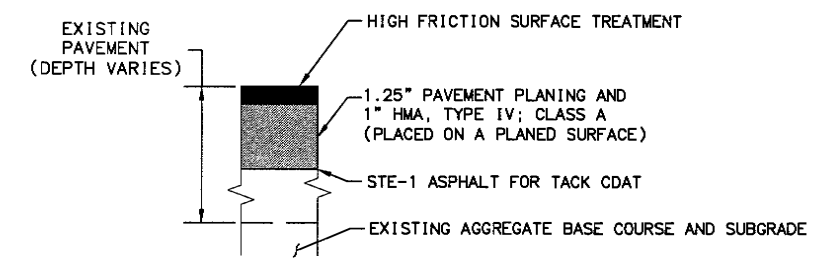
NOTES:

- PAVEMENT PLANING AND HFST TREATMENT LIMITS ARE SHOWN ON 'F' SHEET PLANS AND SECTIONS FOR EACH SITE LOCATION. NEW HOT MIX ASPHALT (HMA) LIMITS CORRESPOND WITH PAVEMENT PLANING LIMITS.
- CURB AND GUTTER NOT SHOWN. PROTECT CURB AND GUTTER IN PLACE.
- SEE SPECIFICATION SECTION 405 FOR TIMING RESTRICTIONS BETWEEN DIVISION 400 WORK ITEMS.



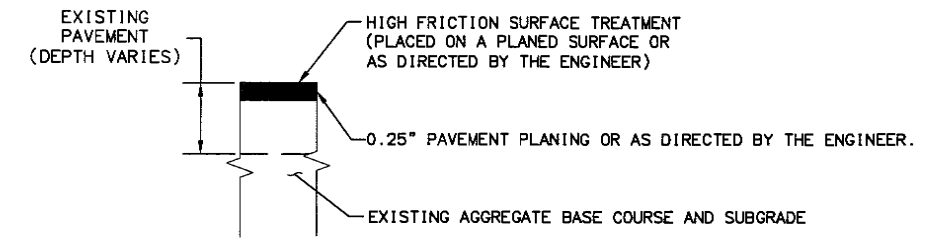
STRUCTURAL SECTION 1

N.T.S.



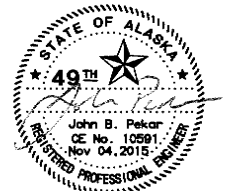
STRUCTURAL SECTION 2

N.T.S.



STRUCTURAL SECTION 3

N.T.S.

PLANS PREPARED BY  JOHN B. PEKAR REGISTERED PROFESSIONAL ENGINEER	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT TYPICAL SECTIONS
KINNEY ENGINEERING, LLC	

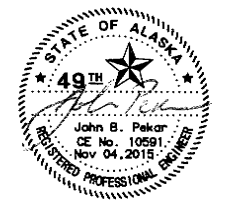
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/Z570920000	2015	C1	C1

DESIGNED BY: AN/JP
 CHECKED BY: AN/JP
 DRAFTED BY: BSB
 XREFS: N/A
 SCALE: N/A
 LAYOUT: C1
 DATE TIME: 11/4/2015 8:30 AM
 DRAWING LOCATION: Z:\PROJECTS\001PP\HSIP High Friction Surface Treatment\Production Drawings\57092.C Estimate of Quantities.dwg

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
202(15)	PAVEMENT PLANING	SQUARE YARD	86,330
401(1A)	HMA, TYPE IV; CLASS A	TON	4,220
401(4)	ASPHALT BINDER, GRADE PG 58-34	TON	230
401(15)	ASPHALT MATERIAL PRICE ADJUSTMENT - UNIT PRICE	CONTINGENT SUM	ALL REQUIRED
405(3)	HIGH FRICTION SURFACE TREATMENT	SQUARE YARD	147,640
604(4)	ADJUST EXISTING MANHOLE	EACH	7
615(1)	STANDARD SIGN	SQUARE FOOT	52.0
615(6)	SALVAGE SIGN	EACH	3
627(10)	ADJUSTMENT OF VALVE BOX	EACH	13
640(1)	MOBILIZATION AND DEMOBILIZATION	LUMP SUM	ALL REQUIRED
640(4)	WORKER MEALS AND LODGING, OR PER DIEM	LUMP SUM	ALL REQUIRED
641(1)	EROSION, SEDIMENT, AND POLLUTION CONTROL ADMINISTRATION	LUMP SUM	ALL REQUIRED
641(2)	TEMPORARY EROSION, SEDIMENT, AND POLLUTION CONTROL	CONTINGENT SUM	ALL REQUIRED
641(6)	WITHHOLDING	CONTINGENT SUM	ALL REQUIRED
641(7)	SWPPP MANAGER	LUMP SUM	ALL REQUIRED
642(1)	CONSTRUCTION SURVEYING	LUMP SUM	ALL REQUIRED
642(3)	THREE PERSON SURVEY PARTY	HOUR	200
642(11)	ADJUST EXISTING MONUMENT CASE	EACH	26
643(2)	TRAFFIC MAINTENANCE	LUMP SUM	ALL REQUIRED
643(15A)	FLAGGING	CONTINGENT SUM	ALL REQUIRED
643(23)	TRAFFIC PRICE ADJUSTMENT	CONTINGENT SUM	ALL REQUIRED
643(25)	TRAFFIC CONTROL	CONTINGENT SUM	ALL REQUIRED
644(1)	FIELD OFFICE	LUMP SUM	ALL REQUIRED
644(10)	ENGINEERING COMMUNICATIONS	CONTINGENT SUM	ALL REQUIRED
645(1)	TRAINING PROGRAM, 1 TRAINEE/APPRENTICES	LABOR HOUR	500
646(1)	CPM SCHEDULING	LUMP SUM	ALL REQUIRED
646(2)	SCHEDULE PRICE ADJUSTMENT	CONTINGENT SUM	ALL REQUIRED
660(11A)	TRAFFIC LOOP REPLACEMENT	CONTINGENT SUM	ALL REQUIRED
670(10A)	MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED	LINEAR FOOT	163,960
670(10B)	MMA PAVEMENT MARKINGS, SYMBOLS AND ARROW(S) SURFACE APPLIED	EACH	6
670(10D)	MMA PAVEMENT MARKINGS, LONGITUDINAL INLAID	LINEAR FOOT	26,350
670(10E)	MMA PAVEMENT MARKINGS, SYMBOLS AND ARROW(S) INLAID	EACH	36

ITEM NO.	ITEM DESCRIPTION	ESTIMATING FACTOR
401(1A)	HMA, TYPE IV; CLASS A	2.053 TONS / C.Y.
401(4)	ASPHALT BINDER, GRADE PG 58-34	5.5% WEIGHT OF 401(1A)

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

ESTIMATE OF QUANTITIES

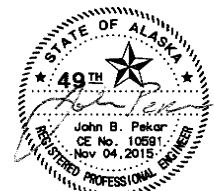
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/2570920000	2015	D1	D3

202(15), 401(1A), 405(3), 670(10A), 670(10B), 670(10D), 670(10E), 615(1), 615(6) SITE LOCATION SUMMARY

SITE LOCATION NUMBER	ROAD SEGMENT/INTERSECTION	PAVEMENT PREPARATION		405(3)	STRIPING REPLACEMENT		615(1) AND 615(6)	REMARKS
		202(15) ONLY	202(15) AND 401(1A)		670(10A) AND 670(10B)	670(10D) AND 670(10E)		
1	STERLING HIGHWAY MILEPOST 104			X	X			
2	STERLING HIGHWAY MILEPOST 86 (EVERGREEN)			X	X			
3	FUNNY RIVER ROAD (BAYBERRY STREET TO WIK CIRCLE)		X	X	X			
4	FUNNY RIVER ROAD MILEPOST 6		X	X	X			
5	SEWARD HIGHWAY MILEPOST 14-16		X	X	X		X	
6	SEWARD HIGHWAY MILEPOST 38-40		X	X	X			
7	DE ARMOUN ROAD			X	X			
8	MINNESOTA DRIVE AT TUDOR ROAD		X	X		X		
9	LAKE OTIS PARKWAY @ WALDRON DRIVE			X		X		PAVEMENT OVERLAY SCHEDULED FOR 2015.
10	DR. MARTIN LUTHER KING, JR. DRIVE-BALL FIELDS ACCESS TO TUDOR CENTRE DRIVE		X	X		X		
11	TUDOR ROAD AT BAXTER ROAD		X	X		X		
12	NORTHERN LIGHTS BOULEVARD AT BONIFACE PARKWAY (EASTBOUND, NORTHBOUND AND SOUTHBOUND APPROACHES)		X	X		X		
	NORTHERN LIGHTS BOULEVARD AT BONIFACE PARKWAY (WESTBOUND APPROACH)			X		X		
13	36TH AVENUE AT LAKE OTIS PARKWAY		X	X		X		
14	MINNESOTA DRIVE - 25TH TO 15TH AVENUE		X	X		X		
15	15TH AVENUE @ C STREET		X	X		X		15TH AVENUE APPROACHES ONLY.
16	EAGLE RIVER LOOP ROAD @ BARANOFF AVENUE/CITATION ROAD		X	X	X			
17	OLD GLENN HIGHWAY - MILEPOST 2		X	X	X			
18	OLD GLENN HIGHWAY - MILEPOST 3 TWIN PEAKS		X	X	X			
19	OLD GLENN HIGHWAY POWER PLANT	X		X	X			
20	OLD GLENN HIGHWAY MILEPOST 5	X		X	X			
21	OLD GLENN HIGHWAY MILEPOST 6			X	X			
22	OLD GLENN HIGHWAY - MILEPOST 7			X	X			
23	OLD GLENN HIGHWAY MILEPOST 8 TO KNIK RIVER ROAD	X		X	X			
24	OLD GLENN HIGHWAY OUR ROAD	X		X	X			
25	OLD GLENN HIGHWAY MILEPOST 12	X		X	X			
26	WASILLA/FISHHOOK ROAD - LAKEVIEW ROAD TO PARADISE LANE			X	X			
27	WASILLA/FISHHOOK ROAD - MARIAH DRIVE TO PAMELA DRIVE			X	X			
28	WASILLA/FISHHOOK ROAD - KING COVE DRIVE TO MCCASEY DRIVE			X	X			

DESIGNED BY: AJ/JIP
 CHECKED BY: AJ/JIP
 DRAFTED BY: BSS
 XREFS: N/A
 SCALE: N/A
 LAYOUT: D1
 DATE TIME: 11/4/2015 8:10 AM
 DRAWING LOCATION: Z:\PROJECTS\DOTPF\HSIP High Friction Surface Treatment\Production Drawings\57092.D Summary Sheets.dwg
 KINNEY ENGINEERING, LLC

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

**SUMMARY OF WORK
 TO BE PERFORMED**

DRAWING LOCATION: Z:\PROJECTS\DOT\PP\HSIP High Friction Surface Treatment\Product\Drawings\57092.D Summary Sheets.dwg
DATE TIME: 11/4/2015 8:10 AM
LAYOUT: D2
SCALE: N/A
XREFS: N/A
DESIGNED BY: AL/JP
CHECKED BY: AL/JP
DRAFTED BY: BSS

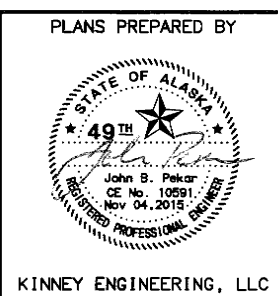
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/7570920000	2015	D2	D3

627(10)

ADJUSTMENT OF VALVE BOX				
SHEET	AS-BUILT STATIONING		APPROXIMATE PLAN LOCATION	REMARKS
	STATION	OFFSET		
F9	67+77	30' RT	NORTHBOUND LAKE OTIS PARKWAY, 270' SOUTH OF WALDRON DRIVE CROSSWALK (RIGHT LANE)	MOA PAVEMENT OVERLAY PENDING FOR 2015.
F9	69+01	28' RT	NORTHBOUND LAKE OTIS PARKWAY, 145' SOUTH OF WALDRON DRIVE CROSSWALK (RIGHT LANE)	MOA PAVEMENT OVERLAY PENDING FOR 2015.
F11A	285+88	5' LT	WESTBOUND TUDOR ROAD, 95' EAST OF BAXTER ROAD CROSSWALK LINE (IN WB LT TURN LANE)	
F11C	294+03	13' LT	WESTBOUND TUDOR ROAD, 900' EAST OF BAXTER ROAD CROSSWALK LINE (LEFT LANE)	
F12A	9+040	9m RT	EASTBOUND NORTHERN LIGHTS BOULEVARD, 275' WEST OF BONIFACE PARKWAY NEAR CROSSWALK LINE (IN EB RT LANE)	
F12A	9+075	11m RT	EASTBOUND NORTHERN LIGHTS BOULEVARD, 60' WEST OF BONIFACE PARKWAY NEAR CROSSWALK LINE (IN EB RT LANE)	
F12A	9+090	3.4m RT	EASTBOUND NORTHERN LIGHTS BOULEVARD, 3' WEST OF BONIFACE PARKWAY NEAR CROSSWALK LINE. (IN LT THRU LANE)	
F13	9+21	RT	EASTBOUND 36TH AVENUE, 20' WEST OF LAKE OTIS PARKWAY CROSSWALK LINE (IN LEFT THRU LANE)	
F14A	456+52	33' RT	NORTHBOUND MINNESOTA DRIVE, 10' NORTH OF 25TH AVENUE (RIGHT LANE)	
F14C	501+95	7' LT	NORTHBOUND MINNESOTA DRIVE, 500' SOUTH OF 15TH AVENUE CROSSWALK LINE (CENTER LANE)	
F14C	506+95	9' LT	NORTHBOUND MINNESOTA DRIVE, 0' SOUTH OF 15TH AVENUE CROSSWALK LINE (LEFT LANE)	
F15B	334+55	12' LT	SOUTHBOUND C STREET, 230' NORTH OF 15TH AVENUE CROSSWALK LINE (RIGHT LANE)	
F15B	334+70	12' LT	SOUTHBOUND C STREET, 250' NORTH OF 15TH AVENUE CROSSWALK LINE (RIGHT LANE)	

604(4)

ADJUST EXISTING MANHOLE				
SHEET	AS-BUILT STATIONING		APPROXIMATE PLAN LOCATION	REMARKS
	STATION	OFFSET		
F8B	388+00	0' LT	NORTHBOUND MINNESOTA DRIVE, 250' SOUTH OF TUDOR ROAD STOP BAR. (IN NB LT LANE)	
F8B	390+00	0' LT	NORTHBOUND MINNESOTA DRIVE, 50' SOUTH OF TUDOR ROAD STOP BAR. (IN NB LT LANE)	
F12B	9+232	4m LT	WESTBOUND NORTHERN LIGHTS BOULEVARD, 340' EAST OF BONIFACE PARKWAY NEAR CROSSWALK LINE. (INSIDE WB THRU LANE)	
F14A	457+56	27' RT	NORTHBOUND MINNESOTA DRIVE, 75' NORTH OF 25TH AVENUE (RIGHT LANE)	
F14C	504+67	6' RT	NORTHBOUND MINNESOTA DRIVE, 230' SOUTH OF 15TH AVENUE CROSSWALK LINE (CENTER LANE)	
F15A	1+753	7.3m RT	EASTBOUND MINNESOTA DRIVE 10' WEST OF C STREET CROSSWALK LINE (IN CENTER LANE)	
F16	188+78	3' RT	SOUTHBOUND EAGLE RIVER LOOP, 290' NORTH OF EAGLE RIVER ROAD CROSSWALK LINE (CENTER LANE)	



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

SUMMARY SHEET

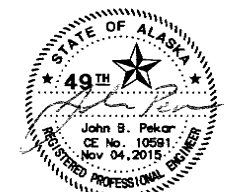
DESIGNED BY: AJ/JP
 CHECKED BY: AJ/JP
 DRAFTED BY: BSB
 SHEETS: N/A
 SCALE: N/A
 LAYOUT: D3
 DATE TIME: 11/4/2015 8:08 AM
 DRAWING LOCATION: Z:\PROJECTS\DOTPF\HSIP\High Friction Surface Treatment\Production Drawings\57092_D3_MONUMENT Sheet.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	D3	D3

642(11)

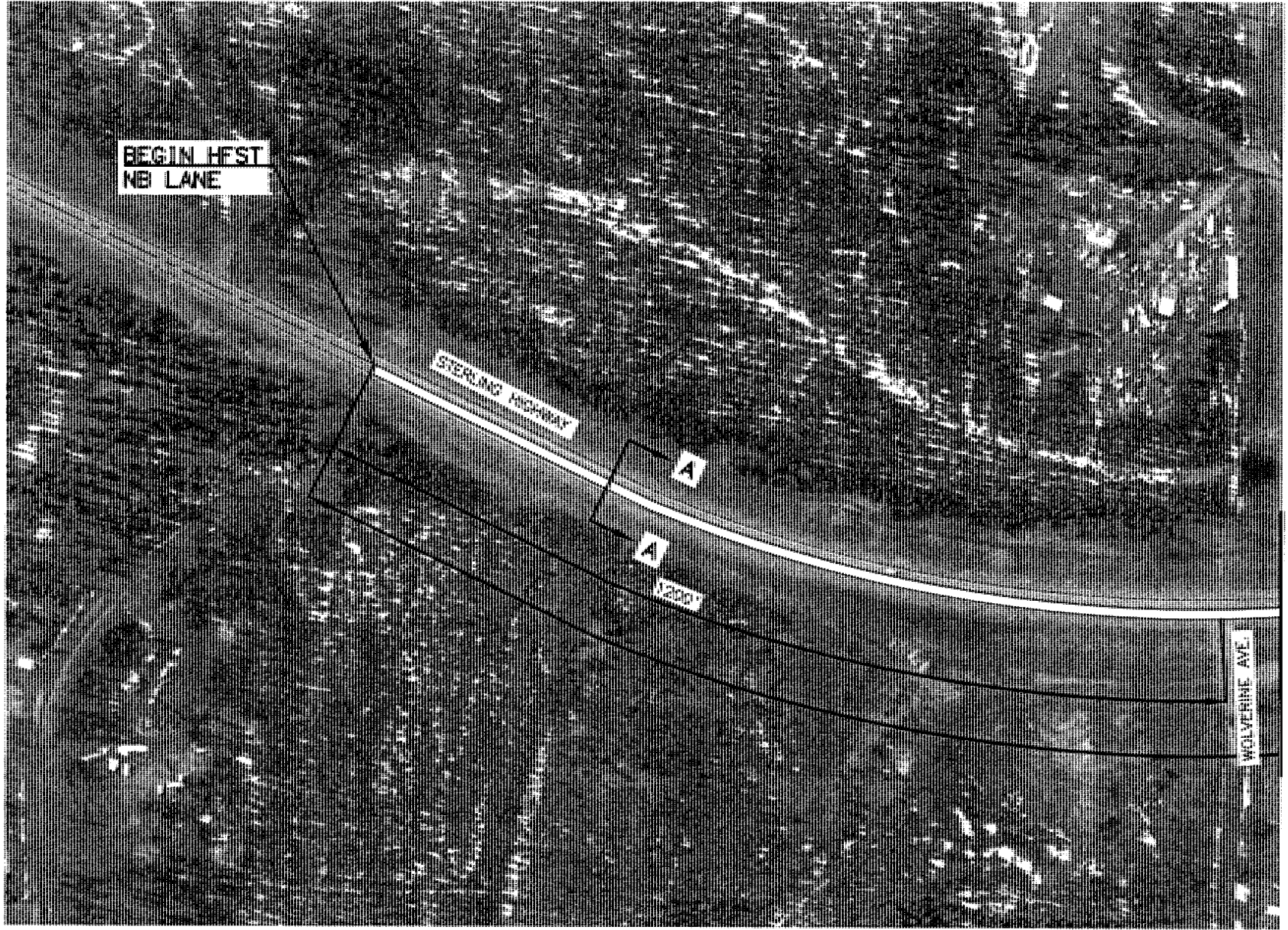
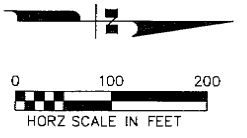
ADJUST EXISTING MONUMENT CASE				
SHEET	AS-BUILT STATIONING		APPROXIMATE PLAN LOCATION	REMARKS
	STATION	OFFSET		
F5A	24+275	CENTERLINE	740' SOUTH OF MP 15	
F5A	24+416	CENTERLINE	285' SOUTH OF MP 15	
F5A	24+649	CENTERLINE	525' NORTH OF MP 15	
F5A	24+708	CENTERLINE	720' NORTH OF MP15	
F5B	25+045	CENTERLINE	1825' SOUTH OF GRAYLING CREEK CULVERT	
F5B	25+140	CENTERLINE	2140' SOUTH OF GRAYLING CREEK CULVERT	
F5B	25+348	CENTERLINE	1460' SOUTH OF GRAYLING CREEK CULVERT	
F6A	2433+05	CENTERLINE	1250' SOUTH OF MP 39	
F6A	N/A	N/A	1180' SOUTH OF MP 39	
F6A	2437+61	CENTERLINE	790' SOUTH OF MP 39	
F6A	N/A	N/A	280' SOUTH OF MP 39	
F6B	N/A	N/A	560' NORTH OF MP 39	
F6B	2454+03	CENTERLINE	850' NORTH OF MP 39	
F6B	2459+26	CENTERLINE	1370' NORTH OF MP 39	
F6B	N/A	N/A	1020' SOUTH OF DEVILS CREEK TRAILHEAD ACCESS	
F6B	2467+29	CENTERLINE	350' SOUTH OF DEVILS CREEK TRAILHEAD ACCESS	
F6B	N/A	N/A	AT DEVILS CREEK TRAILHEAD ACCESS	
F6B	N/A	N/A	1000' NORTH OF DEVILS CREEK TRAILHEAD ACCESS	
F8A	382+89	CENTERLINE	850' SOUTH OF MINNESOTA AND TUDOR INTERSECTION	
F10	15+59	CENTERLINE	150' NORTH OF BALL FIELD ACCESS RD	
F10	22+56	CENTERLINE	700' WEST OF MLK AND TUDOR CENTER DR INTERSECTION	
F14A	469+28	CENTERLINE	560' NORTH OF HILLCREST DR OVERPASS	
F14B	477.79	CENTERLINE	550' SOUTH OF END OF LANDSCAPED MEDIAN	
F14B	482+40	CENTERLINE	85' SOUTH OF END OF LANDSCAPED MEDIAN	
F14C	490+02	CENTERLINE	125' SOUTH OF CHESTER CREEK TRAIL OVERPASS	
F14C	503+46	CENTERLINE	390' SOUTH OF MINNESOTA DRIVE AND 15TH AVE INTERSECTION	

<p>PLANS PREPARED BY</p>  <p>KINNEY ENGINEERING, LLC</p>	<p>STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES</p> <p>HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT</p> <p>SUMMARY SHEET</p>
---	---

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F1A	F43

SITE #1
(SHEET 1 OF 2)

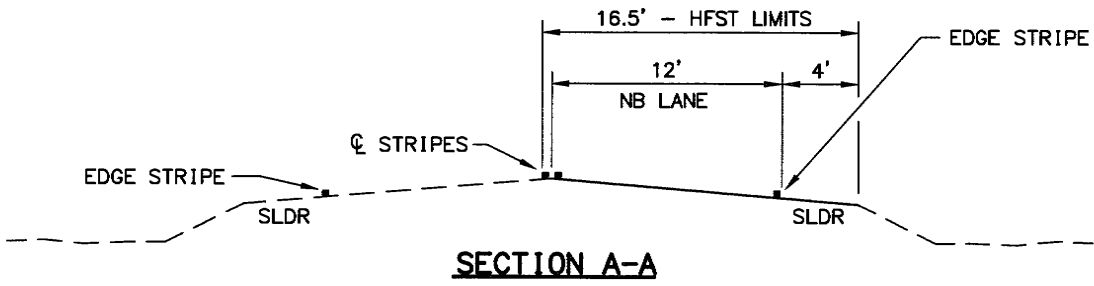


DESIGNED BY: _____ CHECKED BY: _____ DRAFTED BY: _____
 XREFS: _____
 SCALE: _____
 LAYOUT: F1A
 DATE TIME: 11/4/2015 11:24 AM
 Z:\PROJECTS\DOT\PF\HSIP_High Friction Surface Treatment\Production Drawings\001501_Sterling Hwy_MP104.dwg

MATCH LINE SHEET F1B

SITE NOTES:

1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

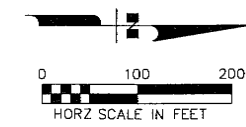
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**STERLING HIGHWAY
MP 104**

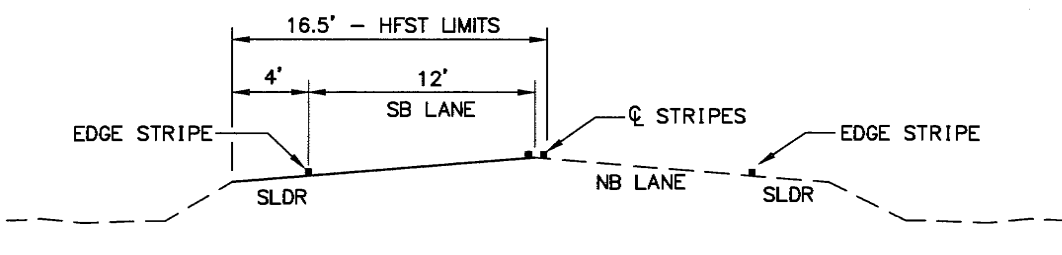
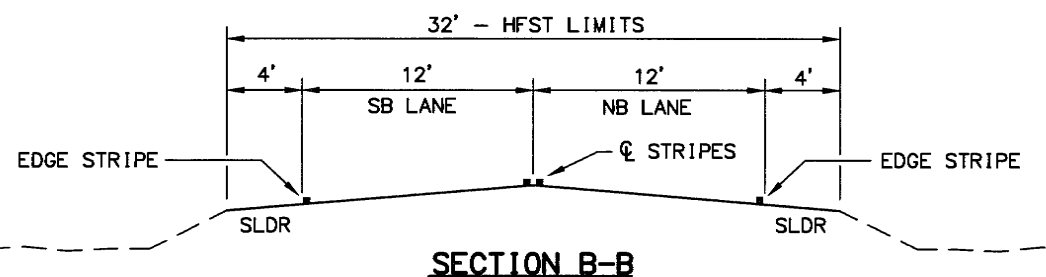
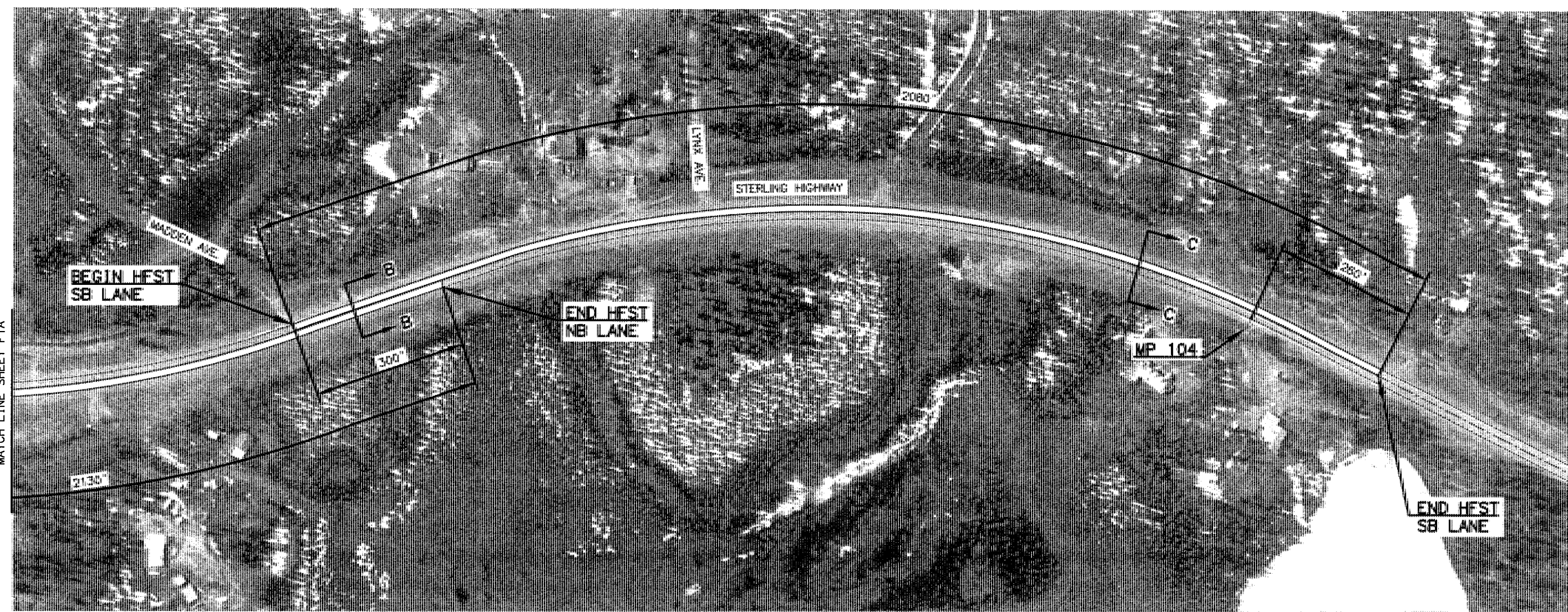
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F1B	F43

**SITE #1
(SHEET 2 OF 2)**



DESIGNED BY: _____ CHECKED BY: _____ DRAFTED BY: _____
 XREFS: _____
 SCALE: _____
 LAYOUT: F1B
 DATE TIME: 7/21/2015 12:11 PM
 Z:\PROJECTS\DOT\PP\HSIP High Friction Surface Treatment\Production Drawings\001501 Sterling Hwy_MP104.dwg
 DRAWING LOCATION: _____
 Z:\PROJECTS\DOT\PP\HSIP High Friction Surface Treatment\Production Drawings\001501 Sterling Hwy_MP104.dwg



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

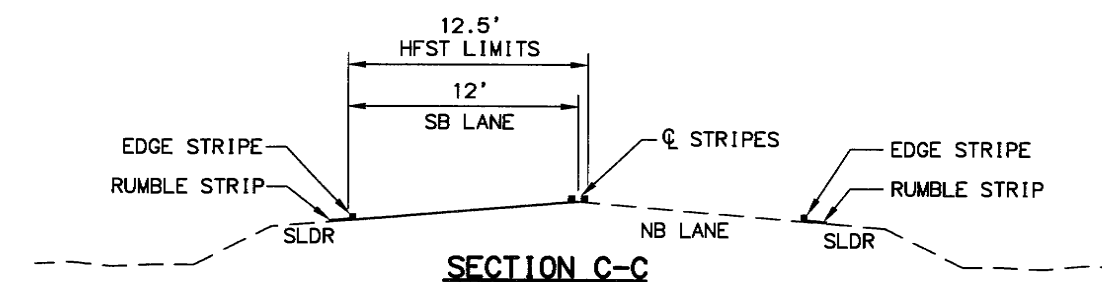
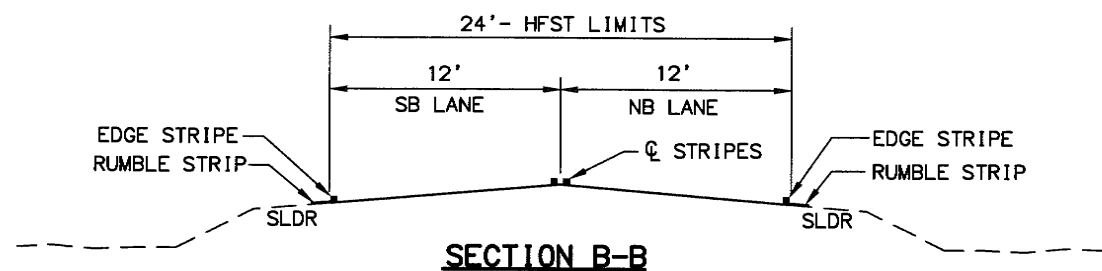
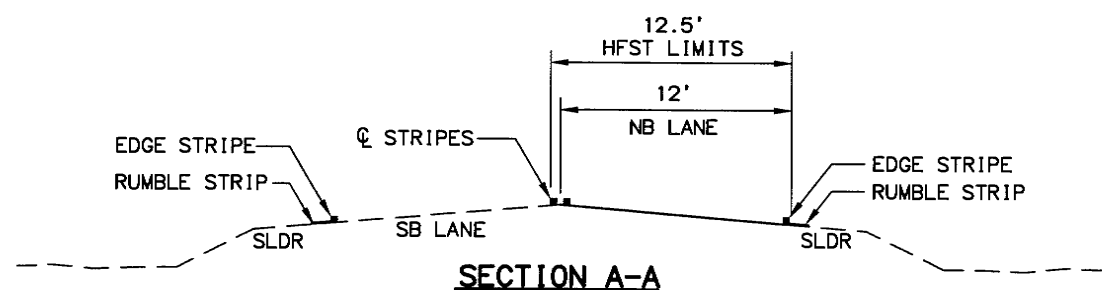
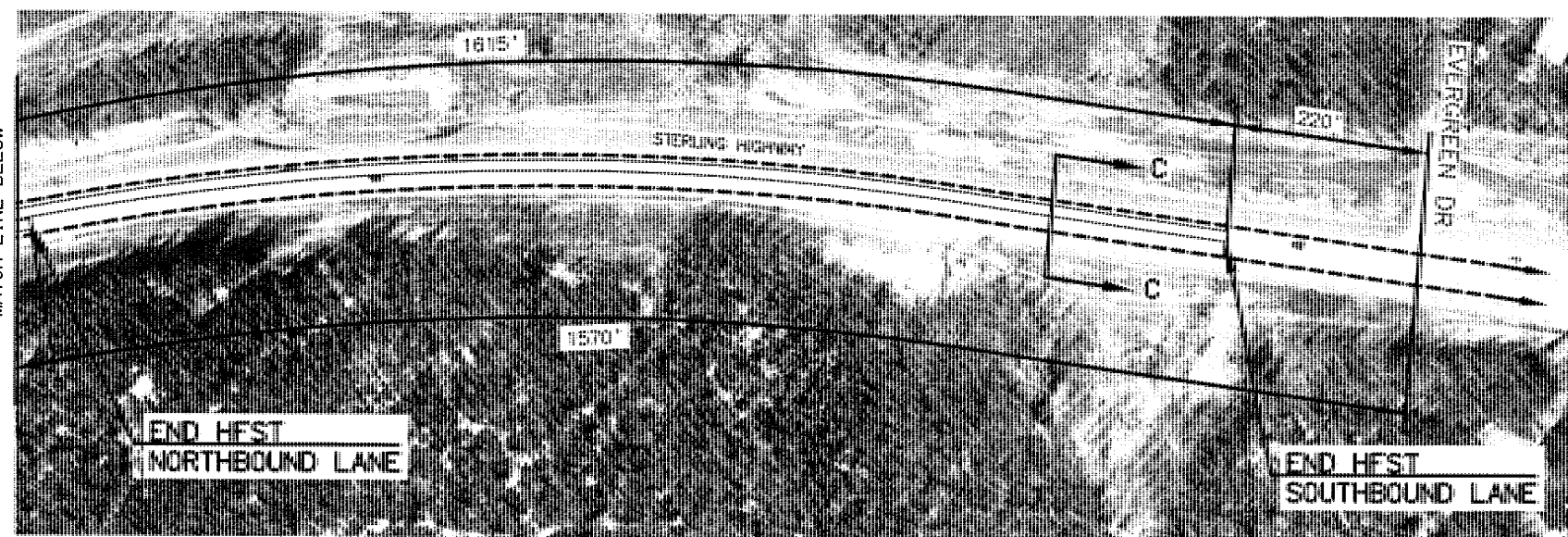
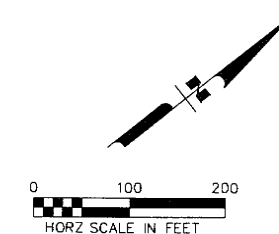
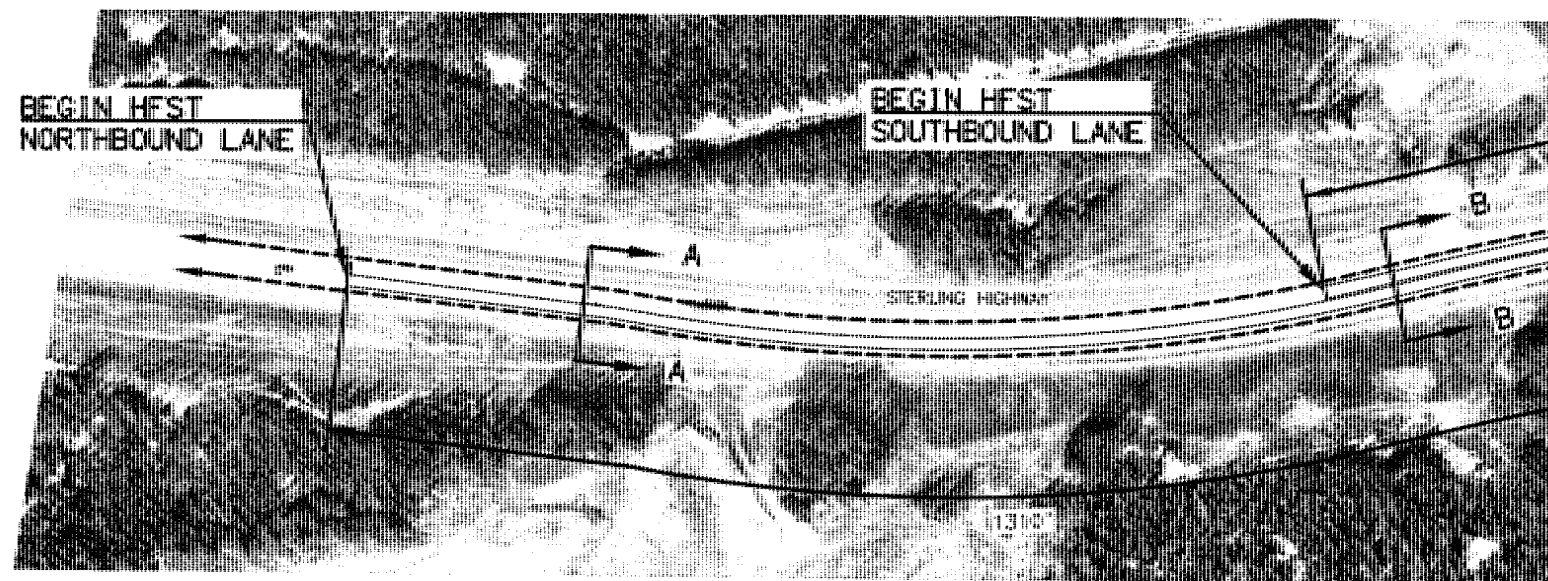
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**STERLING HIGHWAY
MP 104**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F2	F43

SITE #2
(SHEET 1 OF 1)



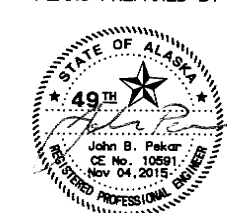
LEGEND

----- SHOULDER RUMBLE STRIPS

SITE NOTES:

1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.
4. OMIT SHOULDER HFST IN AREAS WHERE SHOULDER RUMBLE STRIPS ARE PRESENT.

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

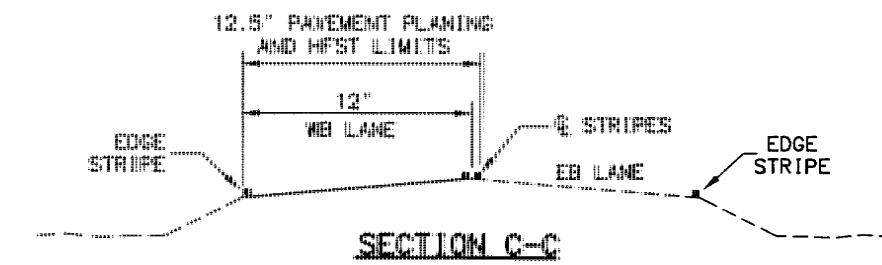
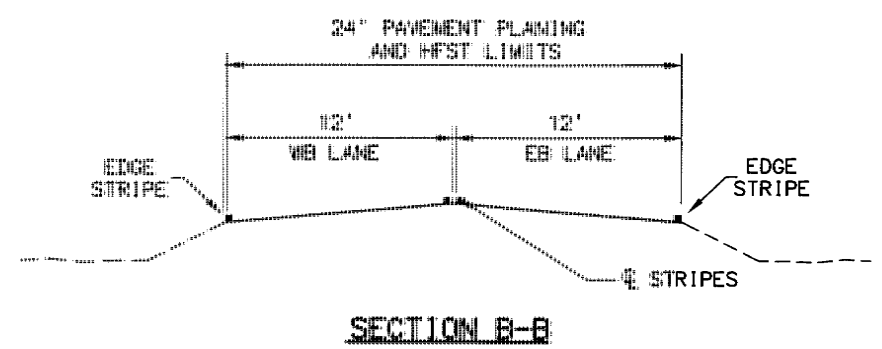
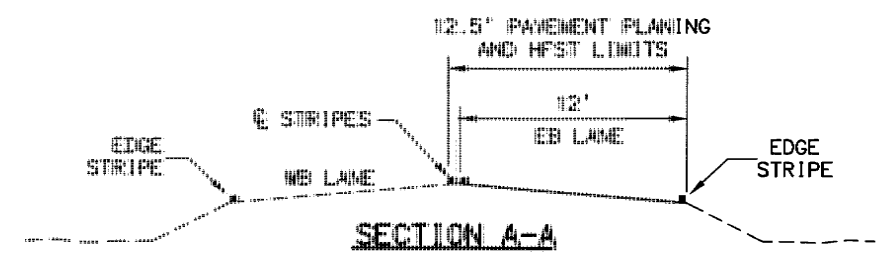
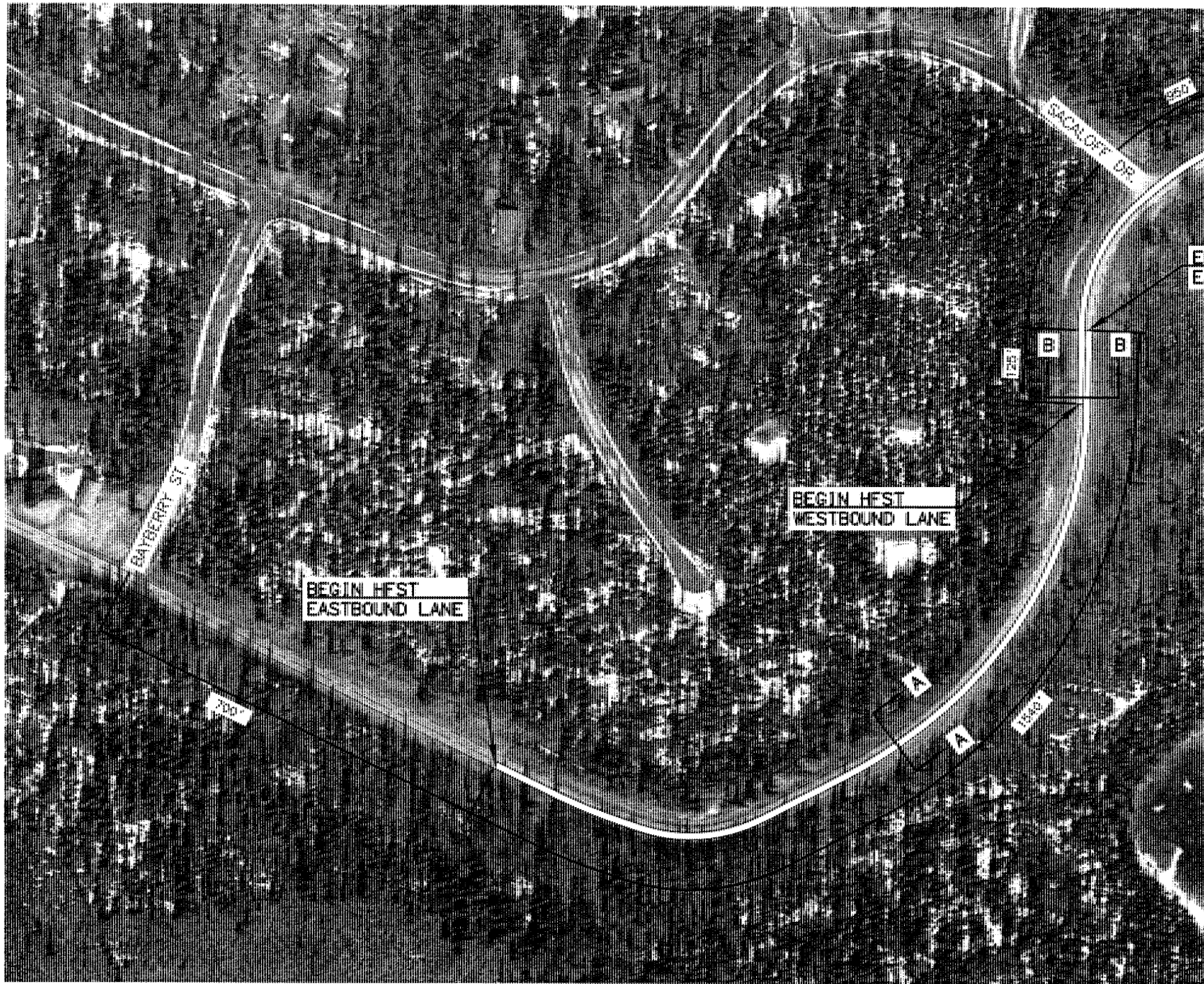
**STERLING HIGHWAY
MP 86**

DRAWING LOCATION: Z:\PROJECTS\DOT\HSIP\High Friction Surface Treatment\Production Drawings\001501 Sterling Hwy_STRELING.dwg
 DATE TIME: 11/4/2015 11:25 AM
 LAYOUT: F2
 SCALE:
 DESIGNED BY: XREFS
 CHECKED BY: XREFS
 DRAFTED BY: XREFS

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F3	F43

SITE #3
(SHEET 1 OF 1)



SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

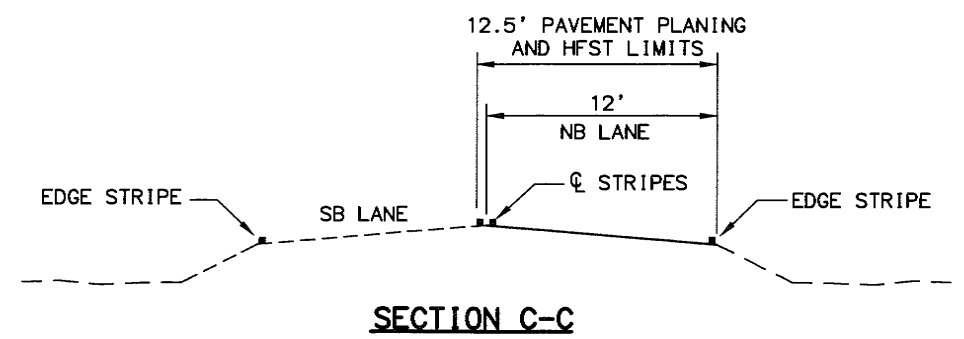
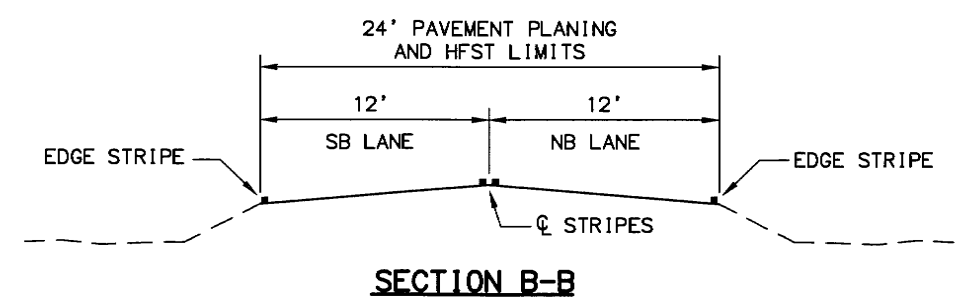
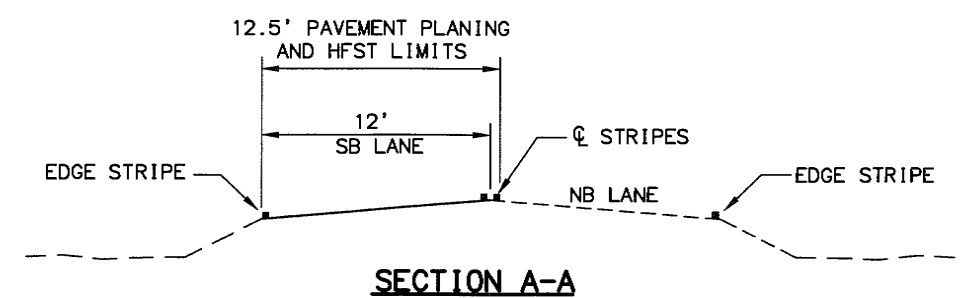
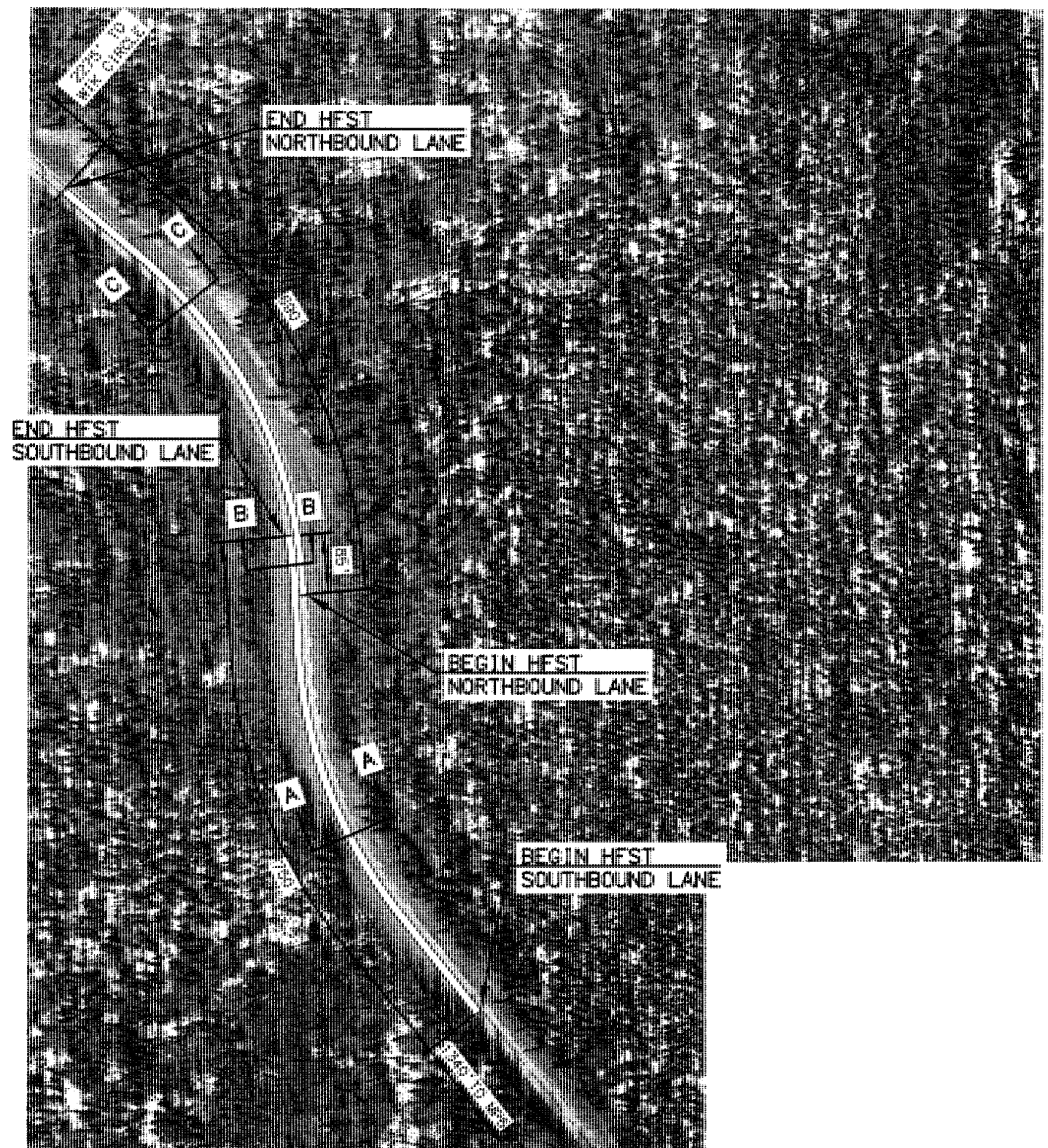
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

FUNNY RIVER ROAD
MP 5

DRAWING LOCATION: Z:\PROJECTS\DOT\PR\HSIP High Friction Surface Treatment\Production Drawings\0001501_Funny River_Road.dwg
 DATE TIME: 11/4/2015 11:25 AM
 LAYOUT: F3
 SCALE: XREFS
 DESIGNED BY: [blank]
 CHECKED BY: [blank]
 DRAFTED BY: [blank]

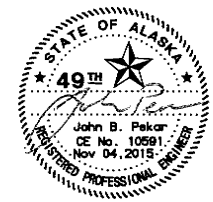
DRAWING LOCATION Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Funny River Road.dwg
 DATE TIME 11/4/2015 11:25 AM
 LAYOUT F4
 SCALE
 DESIGNED BY
 CHECKED BY
 DRAFTED BY

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/2570920000	2015	F4	F43
SITE #4							(SHEET 1 OF 1)



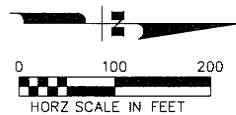
SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY  KINNEY ENGINEERING, LLC	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT FUNNY RIVER ROAD MP 6
---	---

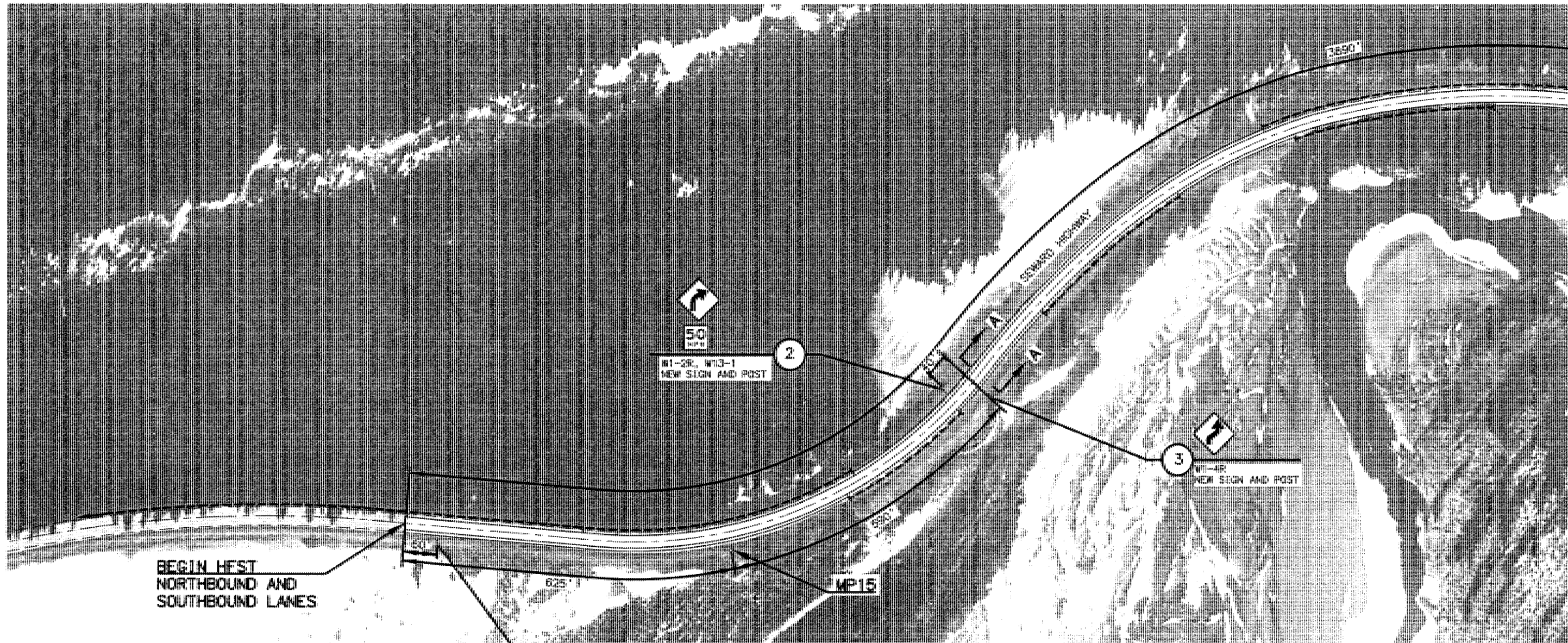
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F5A	F43



SITE #5
(SHEET 1 OF 2)

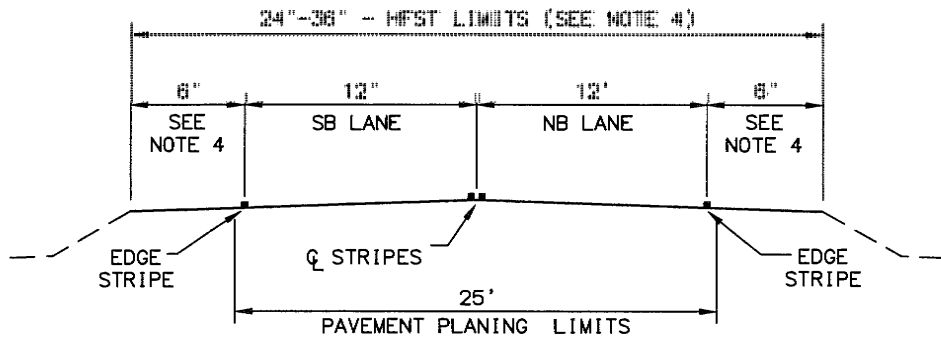
DRAWING LOCATION: Z:\PROJECTS\DOTPF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Seward Hwy_Seward.dwg
 DATE TIME: 11/4/2015 11:26 AM
 LAYOUT: F5A
 SCALE:
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:



BEGIN HFST NORTHBOUND AND SOUTHBOUND LANES

SITE #5
(SHEET 1 OF 2)

- SITE NOTES:
1. APPLY THE "HFST ON PLAVED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 842.
 3. INSTALL MMV PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.
 4. OMIT SHOULDER HFST IN AREAS WHERE SHOULDER RUMBLE STRIPS ARE PRESENT.



SECTION A-A

1

W1-2L, W13-1
REPLACE EXISTING W1-5L AND W13-1 SIGNS. USE EXISTING POST.

LEGEND

----- SHOULDER RUMBLE STRIPS

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

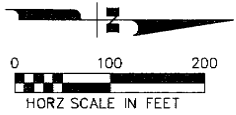
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT

SEWARD HIGHWAY, SEWARD
MP 14 TO MP 16

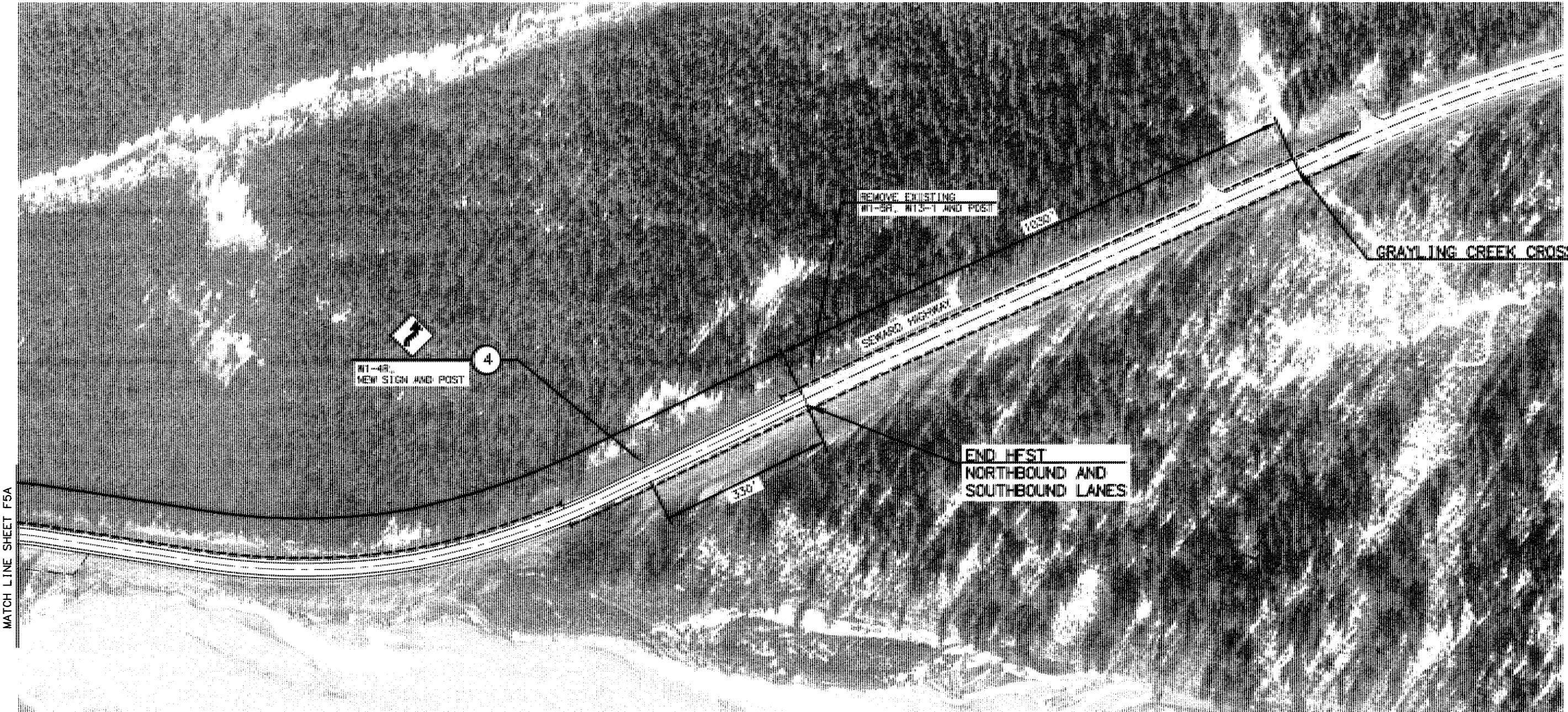
REVISIONS		
NO.	DATE	DESCRIPTION

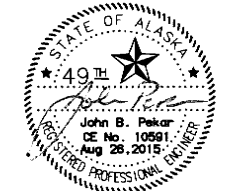
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F5B	F43



SITE #5
(SHEET 2 OF 2)

DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Seward Hwy_Seward.dwg
 DATE TIME: 8/26/2015 9:35 AM
 LAYOUT: F5B
 SCALE: XREFS
 DESIGNED BY: []
 CHECKED BY: []
 DRAFTED BY: []

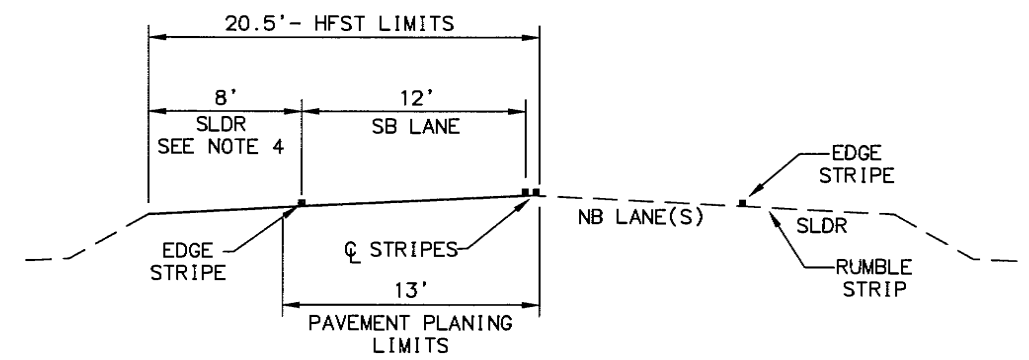
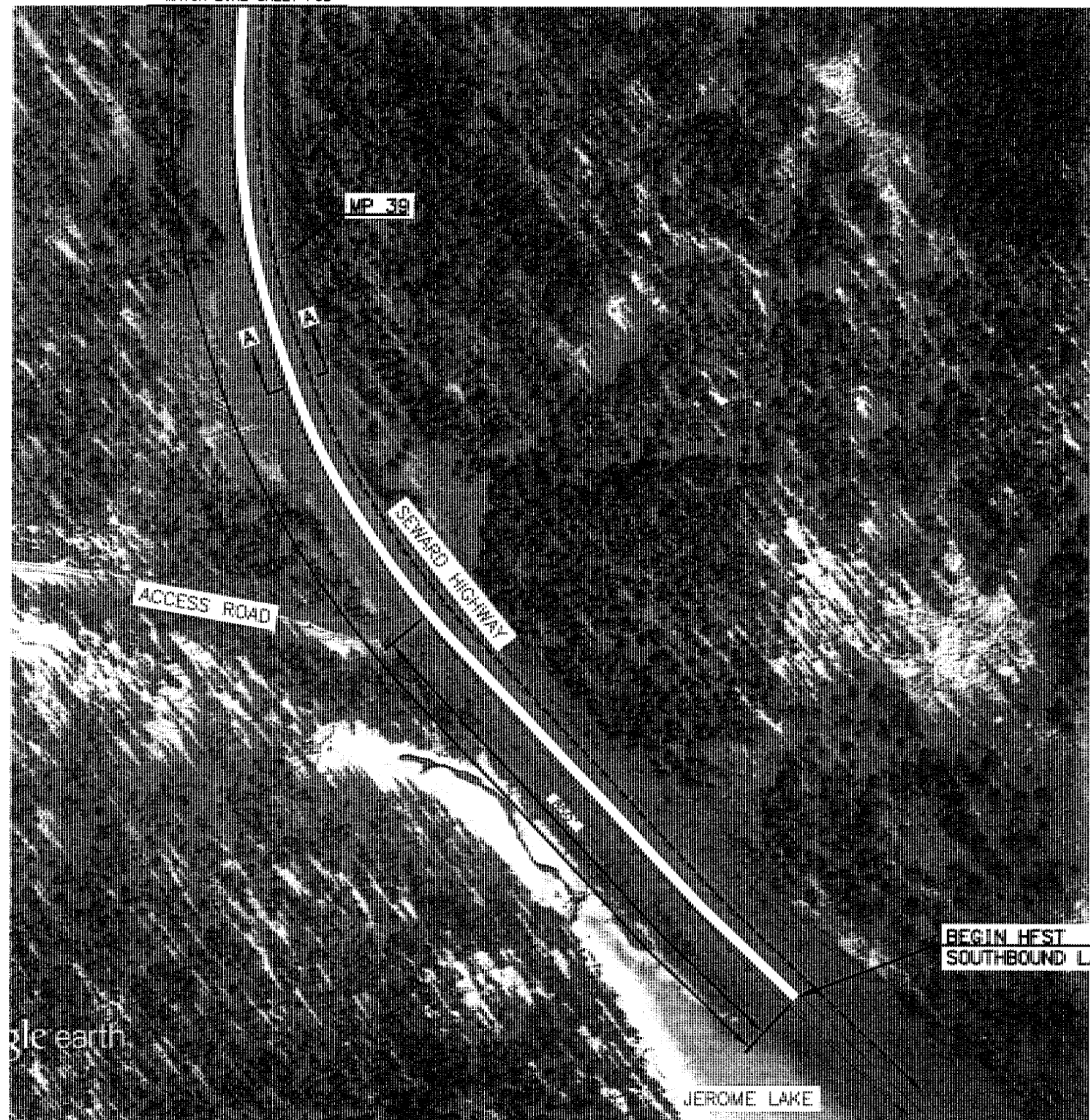
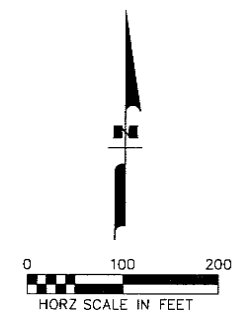


PLANS PREPARED BY  JOHN B. PEKAR REGISTERED PROFESSIONAL ENGINEER	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
	HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT SEWARD HIGHWAY, SEWARD MP 14 TO MP 16

KINNEY ENGINEERING, LLC

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/7570920000	2015	F6A	F43

SITE #6
(SHEET 1 OF 2)



SECTION A-A

LEGEND

----- SHOULDER RUMBLE STRIPS

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.
4. OMIT SHOULDER HFST IN AREAS WHERE SHOULDER RUMBLE STRIPS ARE PRESENT.

BEGIN HFST
SOUTHBOUND LANE

DRAWING LOCATION: Z:\PROJECTS\DOT\F6A\HSIP High Friction Surface Treatment\Production Drawings\0001501_Seward Hwy_North.dwg
 DATE TIME: 11/4/2015 1:32 PM
 LAYOUT: F6A
 SCALE:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:
 XREFS:
 XREFS:
 XREFS:
 XREFS:

PLANS PREPARED BY

 KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**
 SEWARD HIGHWAY, SEWARD
 MP 38.4 TO MP 40.5

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

AREAS: _____

SCALE: _____

LAYOUT: F6B

DATE: 11/4/2015 4:06 PM

TIME: 4:06 PM

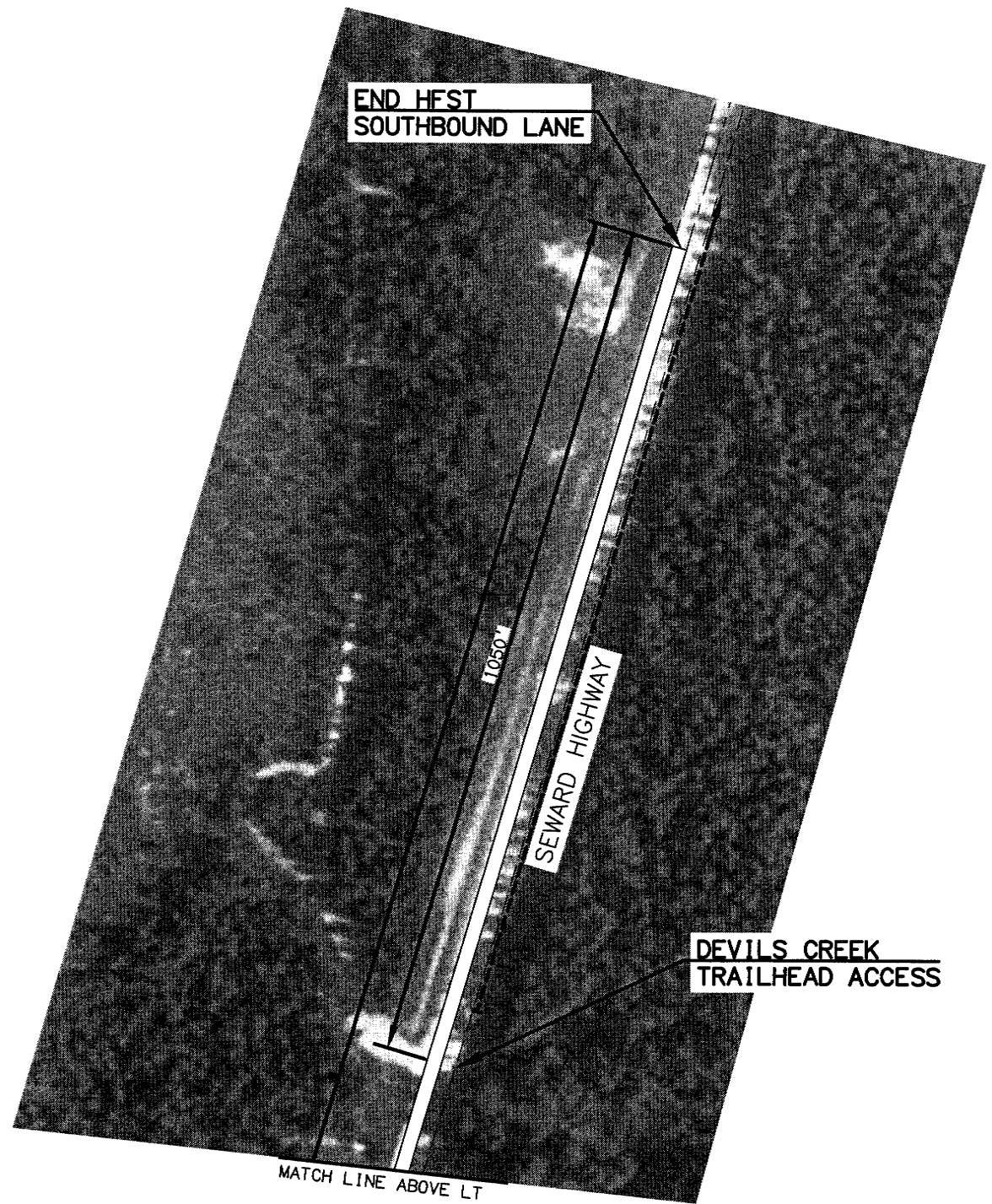
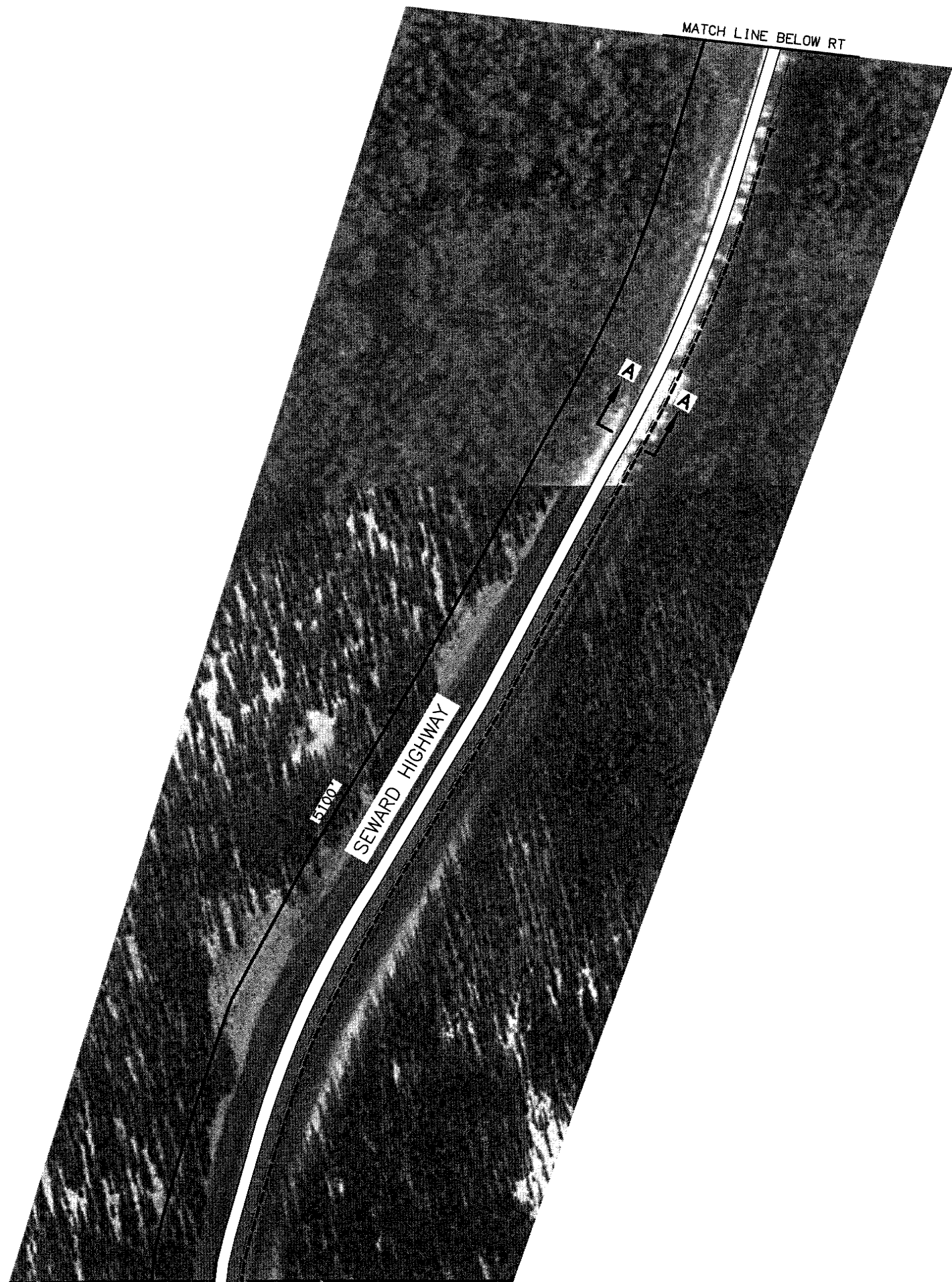
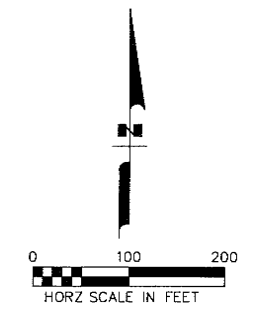
FILE: z:\PROJECTS\001501\HSIP High Friction Surface Treatment\Production Drawings\0001501_Seward Hwy_Nor.th.dwg

DRAWING LOCATION: z:\PROJECTS\001501\HSIP High Friction Surface Treatment\Production Drawings\0001501_Seward Hwy_Nor.th.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F6B	F43

SITE #6
 (SHEET 2 OF 2)



LEGEND
 - - - - - SHOULDER RUMBLE STRIPS

SEE SHEET F6A FOR SECTION A-A

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

**SEWARD HIGHWAY, SEWARD
 MP 38.4 TO MP 40.5**

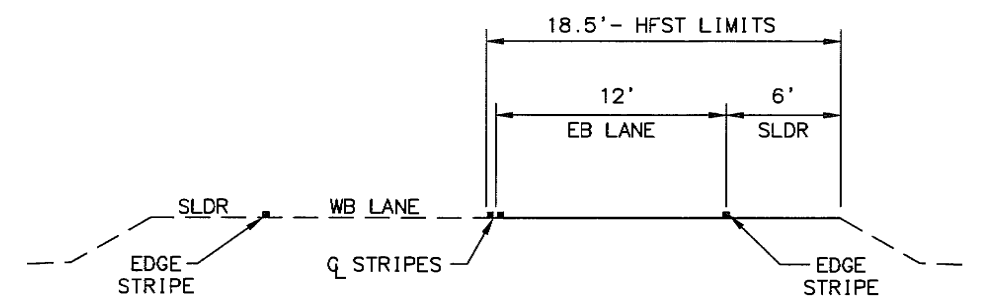
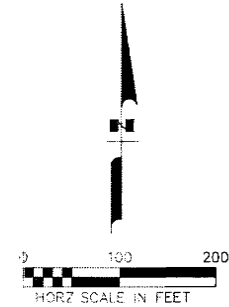
DRAWING LOCATION: Z:\PROJECTS\001501_VisIP_High Friction Surface Treatment\Production Drawings\001501_Dearmoun Road.dwg
 DATE TIME: 11/4/2015 3:42 PM
 LAYOUT: F7A
 SCALE:
 DESIGNED BY: XREFS
 CHECKED BY:
 DRAFTED BY:

MATCH LINE SHEET F7B

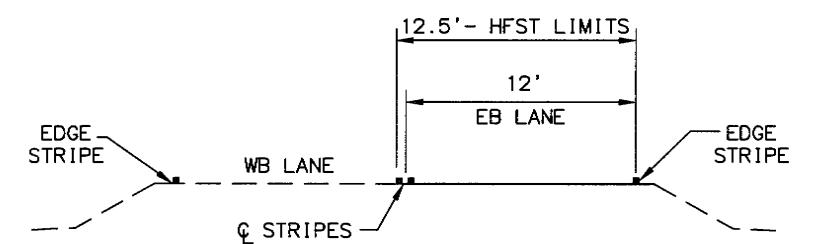


REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/2570920000	2015	F7A	F43

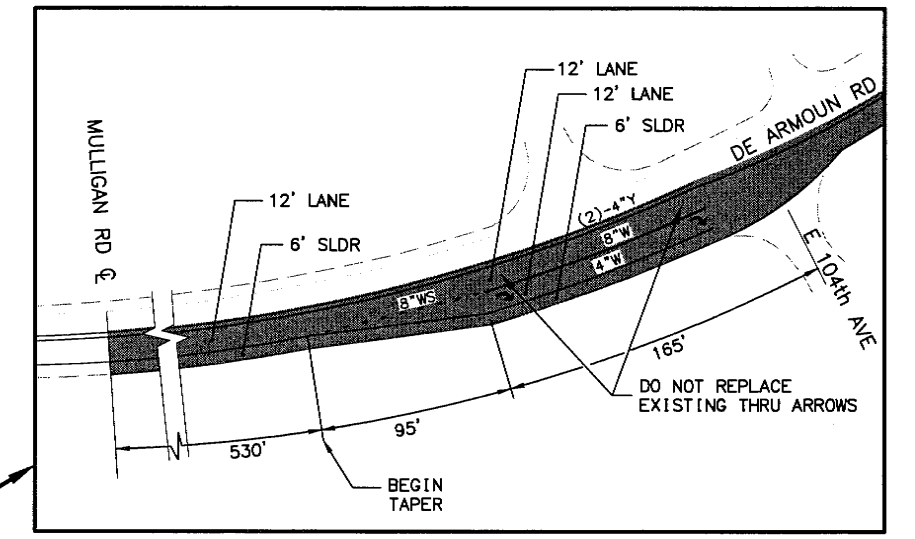
**SITE #7
(SHEET 1 OF 2)**



SECTION A-A



SECTION B-B



HFST LIMITS AT E. 140th AVENUE

SITE NOTES:

1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY AS MODIFIED BY THE DETAIL ABOVE OR AS DIRECTED BY THE ENGINEER.

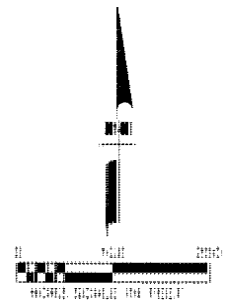
PLANS PREPARED BY JOHN B. PECKAR REGISTERED PROFESSIONAL ENGINEER	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT DE ARMOUN ROAD
---	--

KINNEY ENGINEERING, LLC

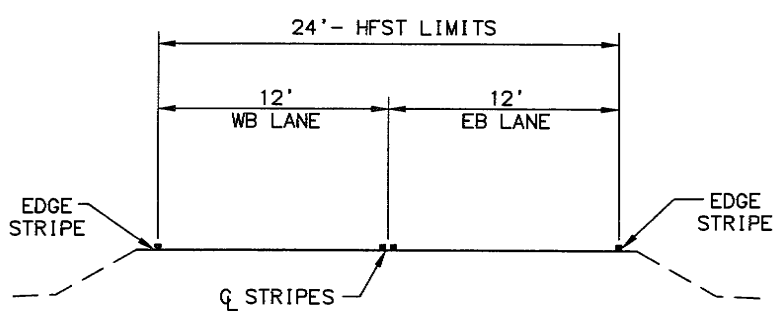
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F7B	F43

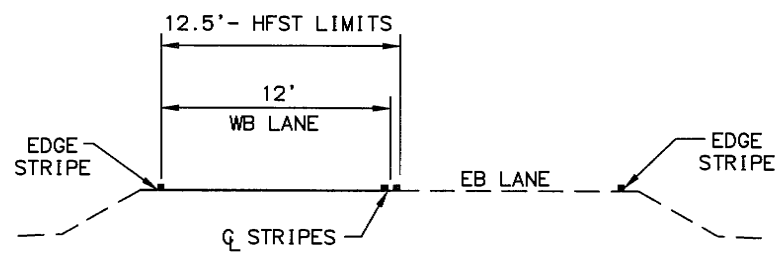
SITE #7
(SHEET 2 OF 2)



DRAWING LOCATION: Z:\PROJECTS\DOT\FVISIP High Friction Surface Treatment\Production Drawings\0001501_Dearmoun Road.dwg
 DATE TIME: 11/4/2015 3:42 PM
 LAYOUT: F7B
 SCALE:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:



SECTION C-C



SECTION D-D

PLANS PREPARED BY

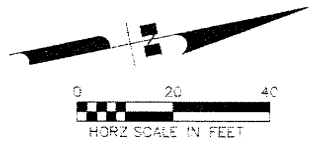
KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

DE ARMOUN ROAD

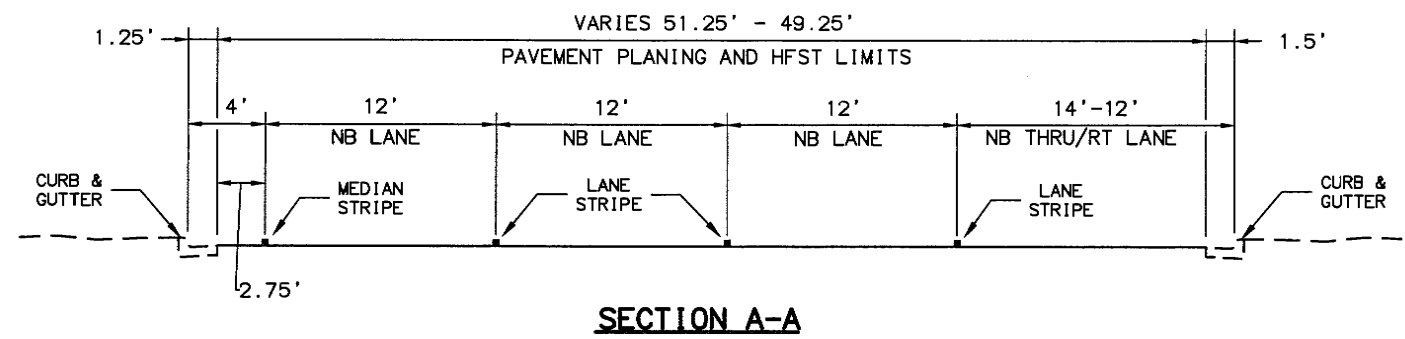
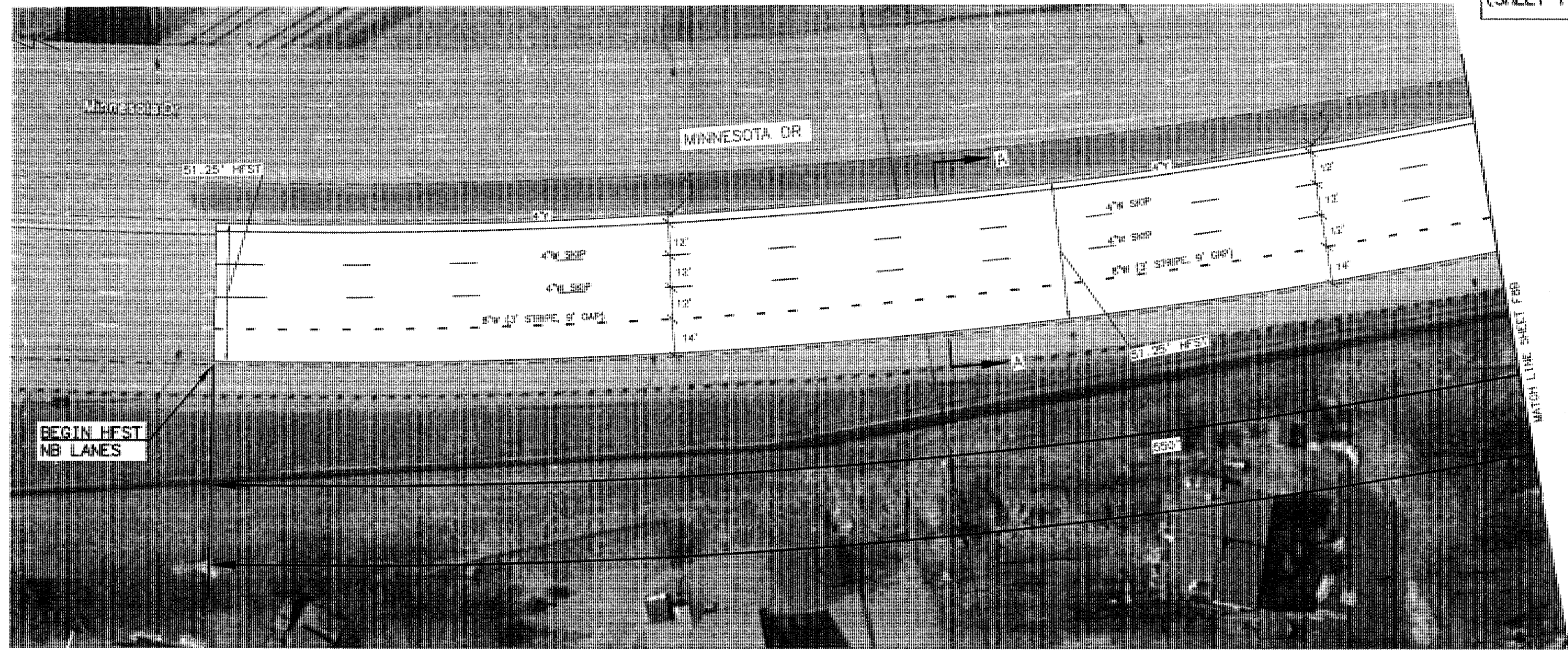
DESIGNED BY: _____ CHECKED BY: _____ DRAFTED BY: _____
 REFS: _____
 SCALE: _____
 LAYOUT: FBA
 DATE: 11/4/2015 3:45 PM
 FILE: Z:\PROJECTS\DOT\HSIP\High Friction Surface Treatment\Production Drawings\0001501_Minnesota_Tudor_south.dwg



REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F8A	F43

SITE #8
(SHEET 1 OF 2)



SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
3. EXISTING CROSSWALK AND STOP BAR LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

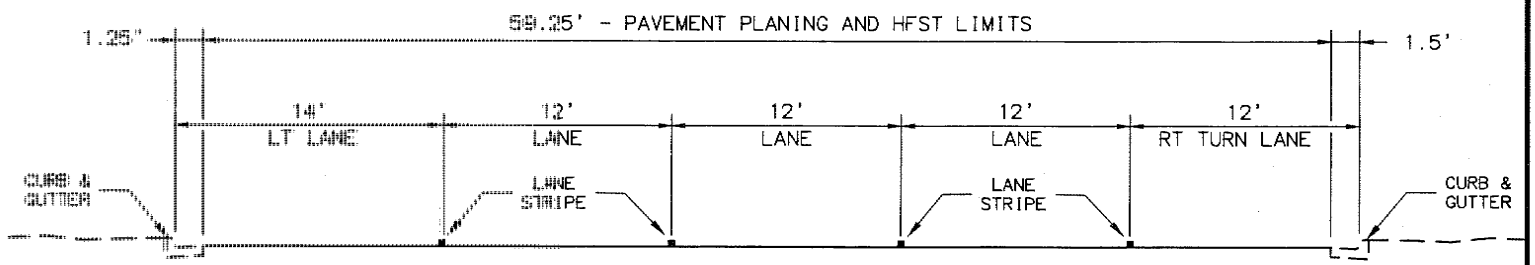
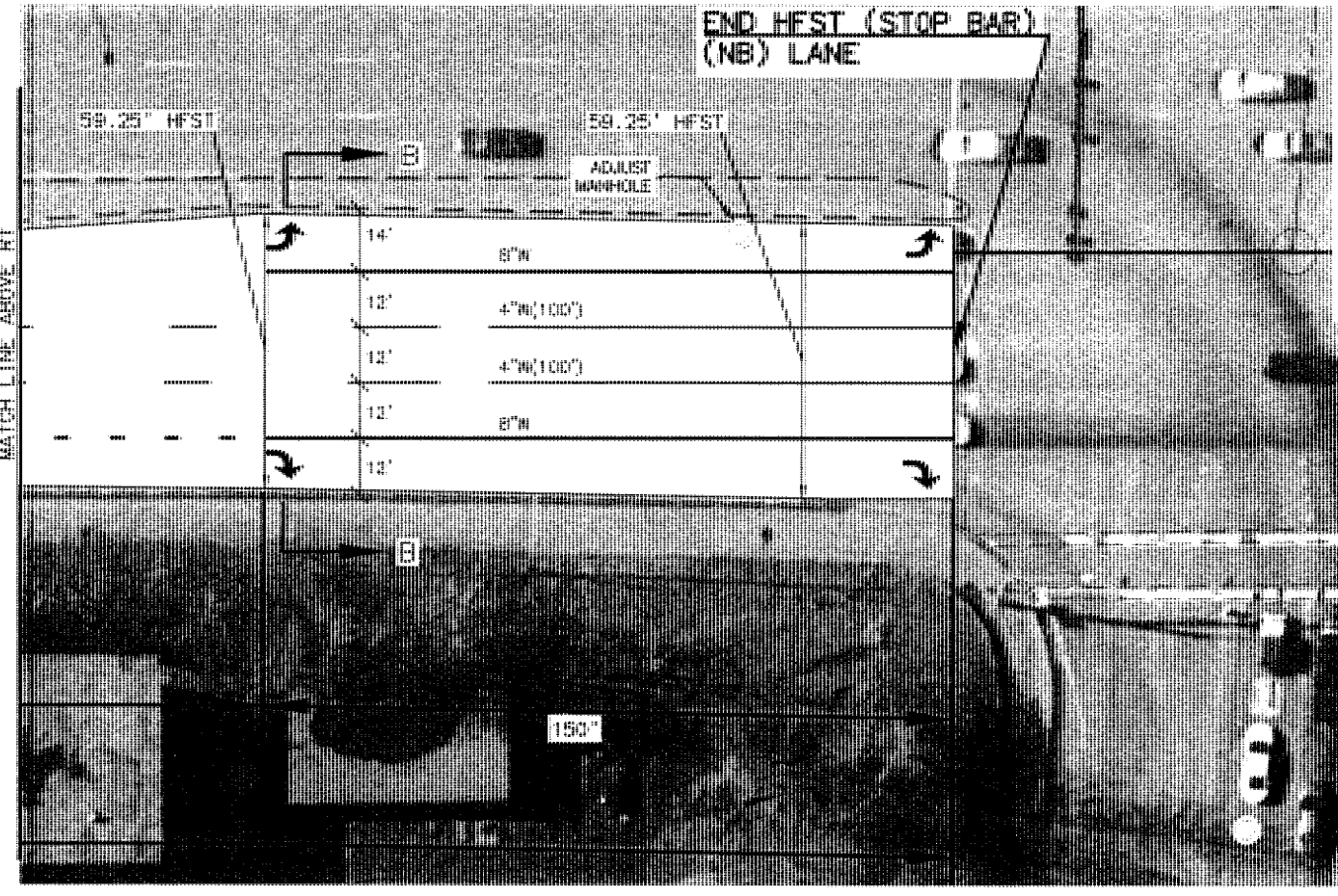
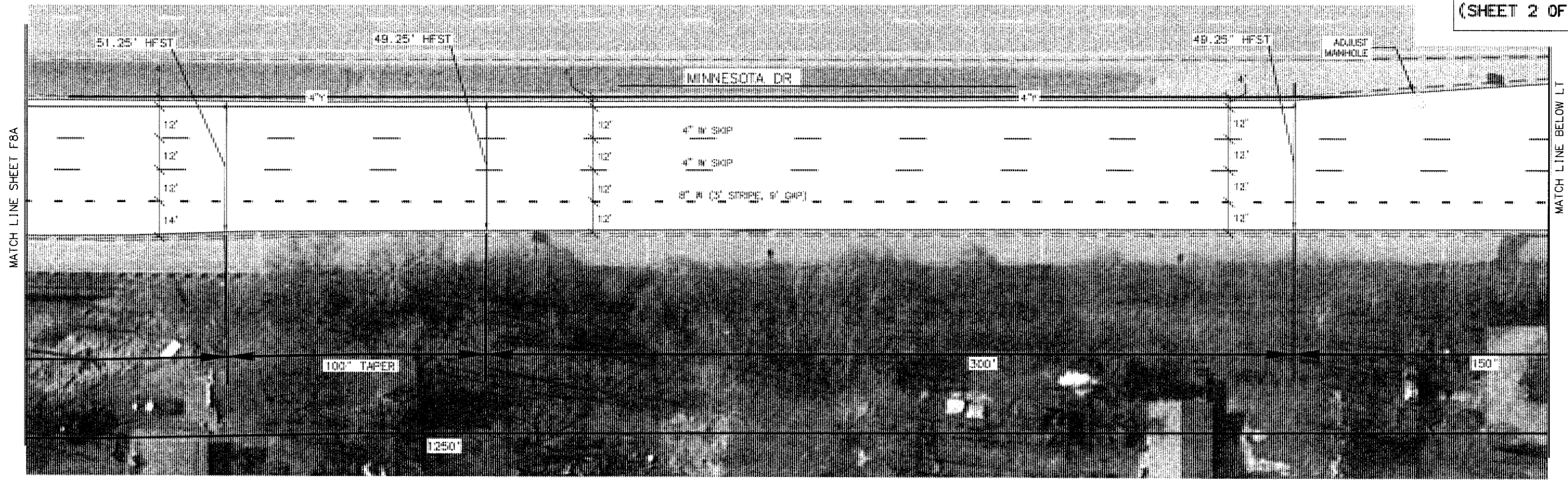
**MINNESOTA DRIVE
AT TUDOR ROAD**



REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F8B	F43

SITE #8
(SHEET 2 OF 2)



DRAWING LOCATION
Z:\PROJECTS\001501\HSIP High Friction Surface Treatment\Production Drawings\0001501_Minnesota_Tudor_south.dwg

DATE TIME 8/27/2015 10:08 AM

LAYOUT F8B

SCALE

PLANS PREPARED BY

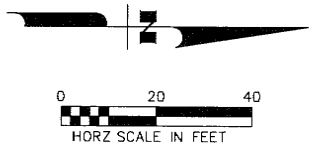
KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**MINNESOTA DRIVE
AT TUDOR ROAD**

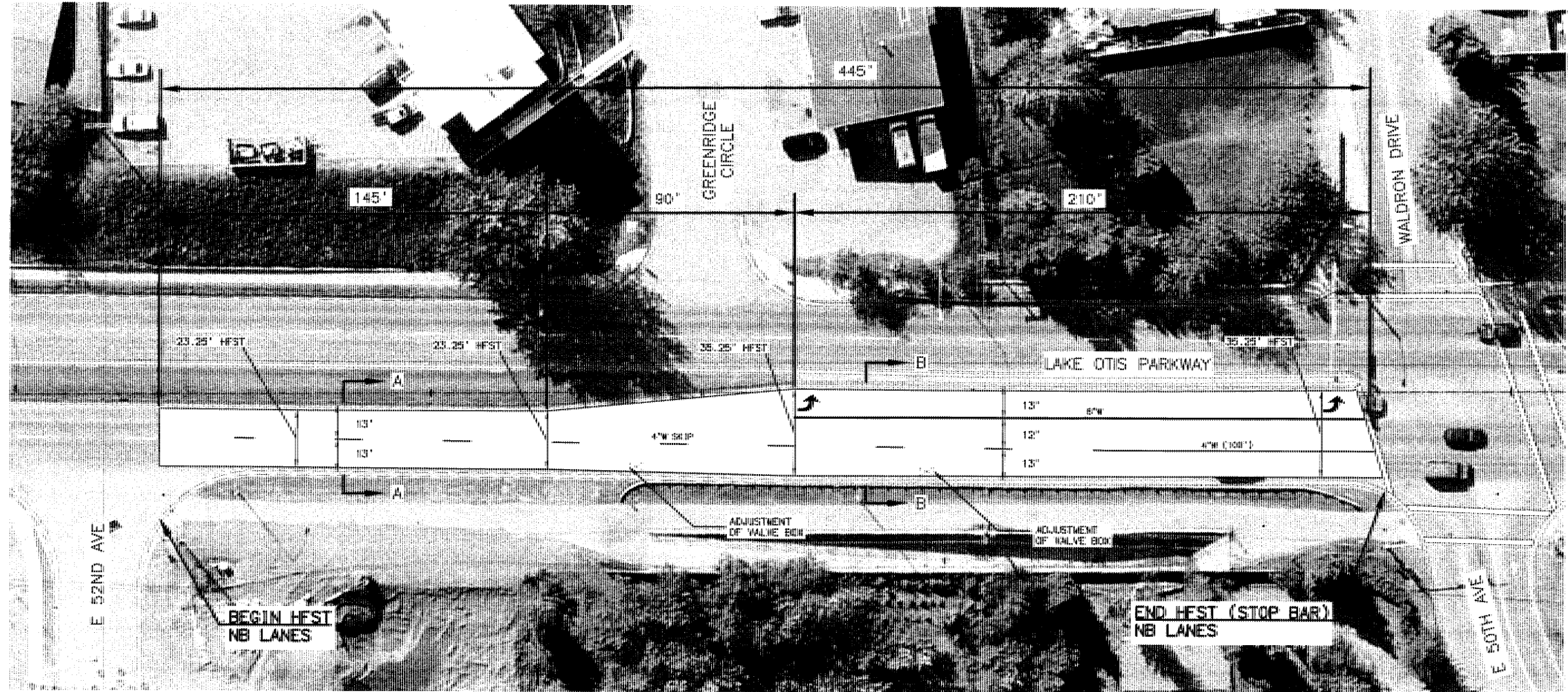
DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\0001501_Lake Otis.dwg
 DATE TIME: 8/25/2015 10:12 AM
 LAYOUT: F9
 SCALE: XREFS
 DESIGNED BY: [blank]
 CHECKED BY: [blank]



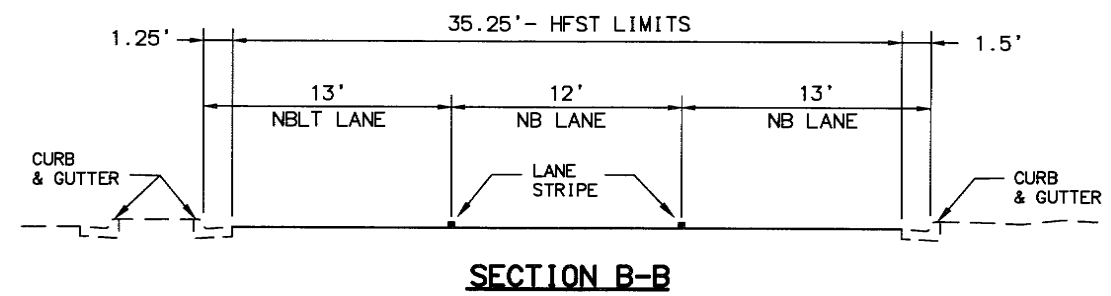
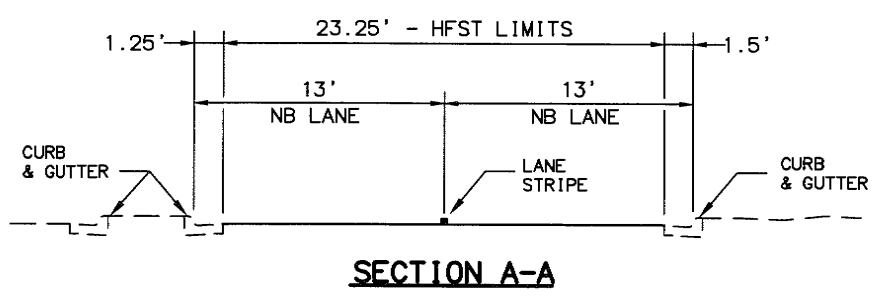
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F9	F43

SITE #9
(SHEET 1 OF 1)



- SITE NOTES:**
1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
 3. THE MUNICIPALITY OF ANCHORAGE HAS A PAVEMENT OVERLAY AT THIS SITE SCHEDULED FOR SUMMER 2015. HFST SHALL BE APPLIED AFTER THE OVERLAY IN ACCORDANCE WITH THE TIMING RESTRICTIONS IN SECTION 405-3.03.



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

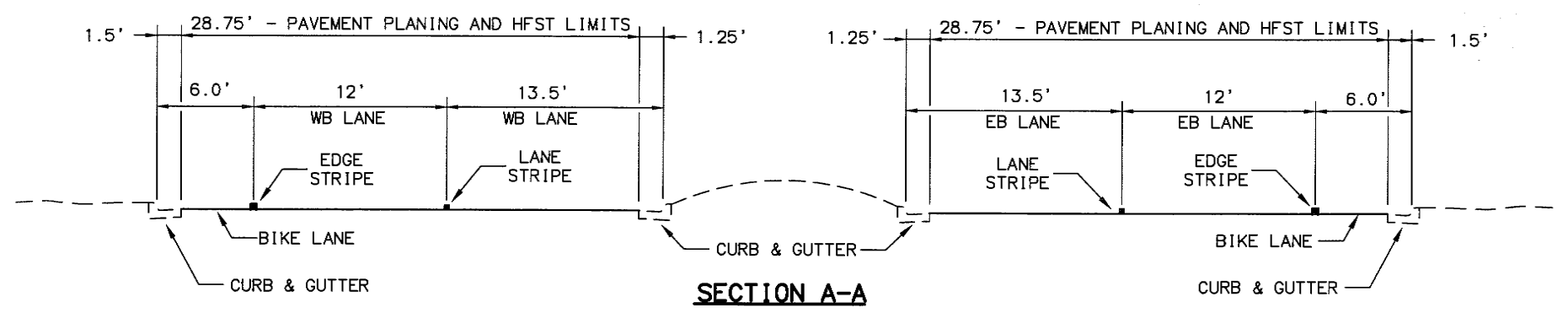
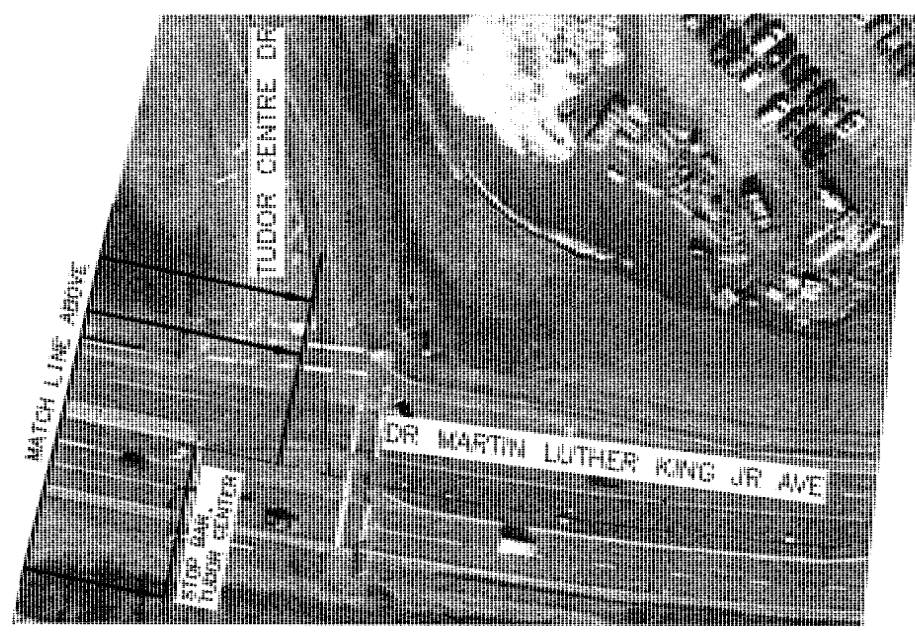
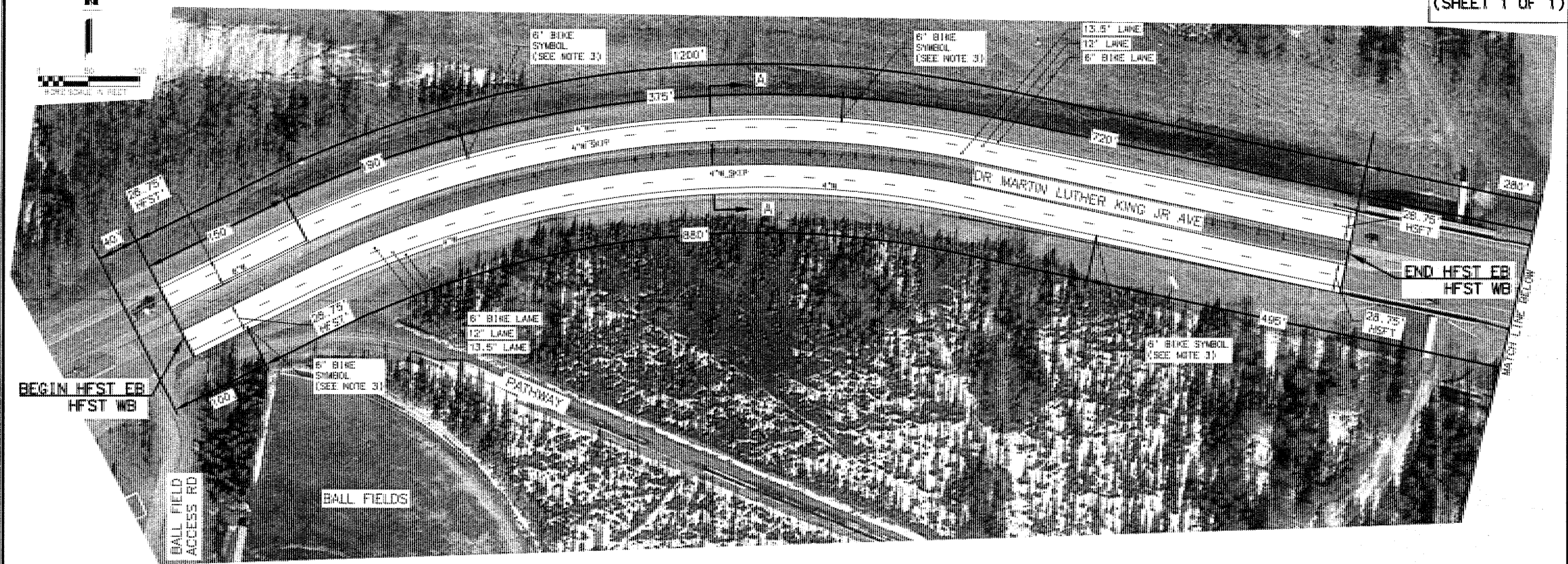
LAKE OTIS PARKWAY

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F10	F43

SITE #10
(SHEET 1 OF 1)

DRAWING LOCATION
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_MLK.dwg
 DATE TIME 11/4/2015 9:02 AM
 LAYOUT F10
 SCALE
 XREFS
 DESIGNED BY
 CHECKED BY
 PRINTED BY



- SITE NOTES:**
1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
 3. SEE SHEET H1 FOR BIKE SYMBOL LAYOUT.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

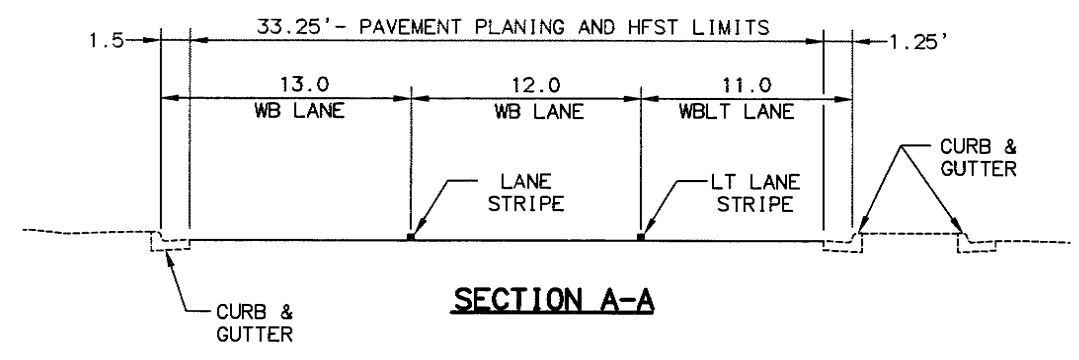
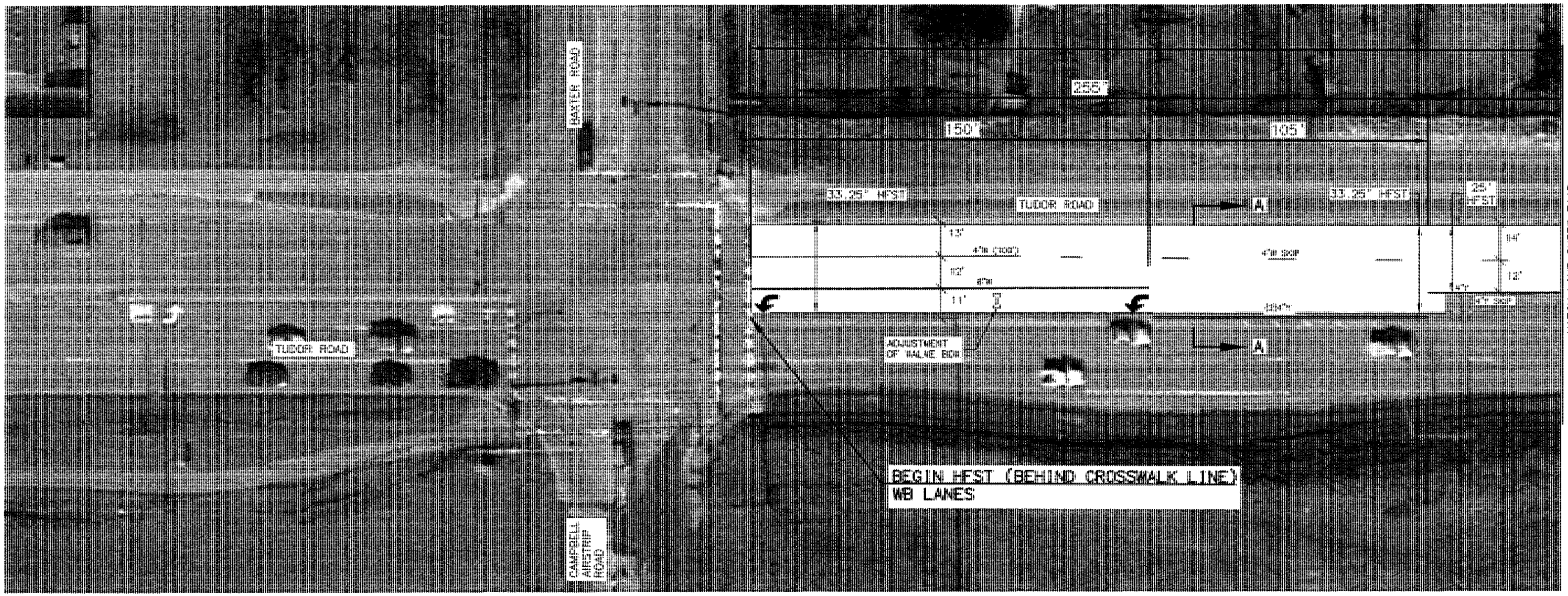
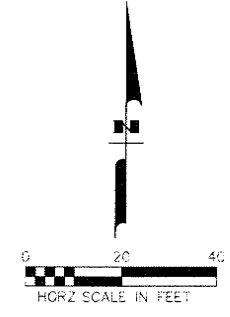
**DR MARTIN LUTHER KING JR
AVENUE**

DRAWING LOCATION Z:\PROJECTS\DOT\FHISIP High Friction Surface Treatment\Production Drawings\0001501_Tudor_Baxter.dwg
 DATE TIME 11/4/2015 2:06 PM
 LAYOUT SCALE F11A
 XREFS
 DESIGNED BY
 CHECKED BY
 DRAFTED BY

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F11A	F43

SITE #11
(SHEET 1 OF 3)



SITE #11
(SHEET 1 OF 3)

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
3. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**TUDOR ROAD EAST
FROM BAXTER**

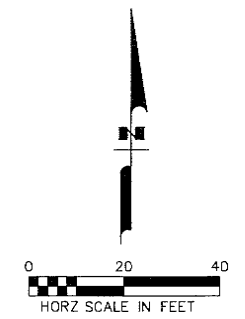
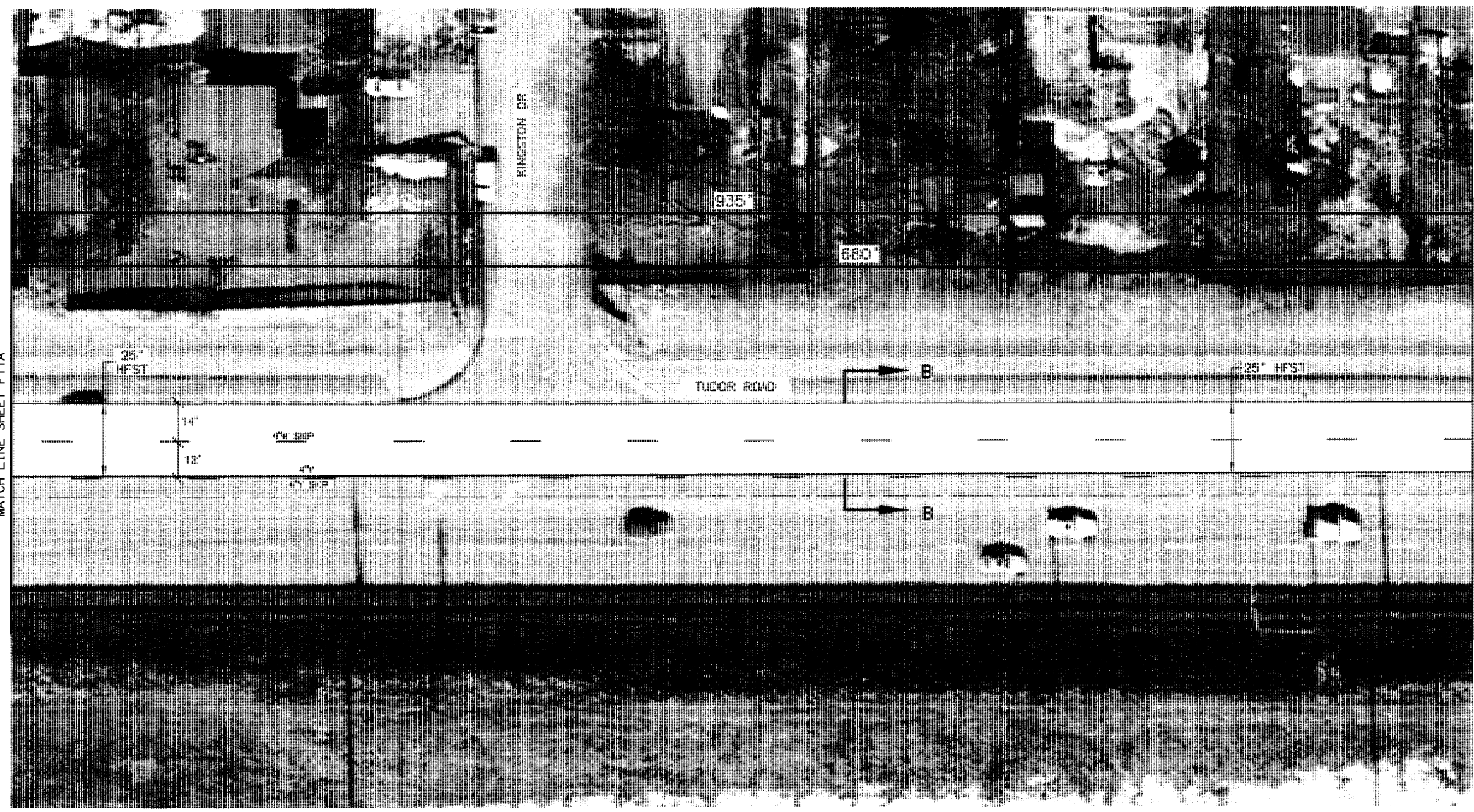
MATCH LINE SHEET F11B

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F11B	F43

SITE #11
(SHEET 2 OF 3)

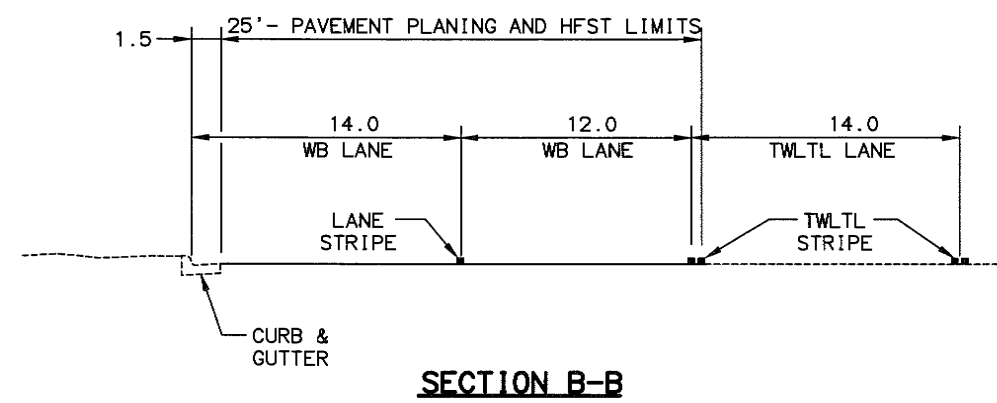
DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Tudor_Baxter.dwg
 DATE: 8/25/2015 10:31 AM
 TIME: 10:31 AM
 LAYOUT: F11B
 SCALE: 1"=40'
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:



MATCH LINE SHEET F11A

MATCH LINE SHEET F11C

SITE #11
(SHEET 2 OF 3)



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

TUDOR ROAD AND
BAXTER ROAD

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

XREFS

SCALE

LAYOUT
F11C

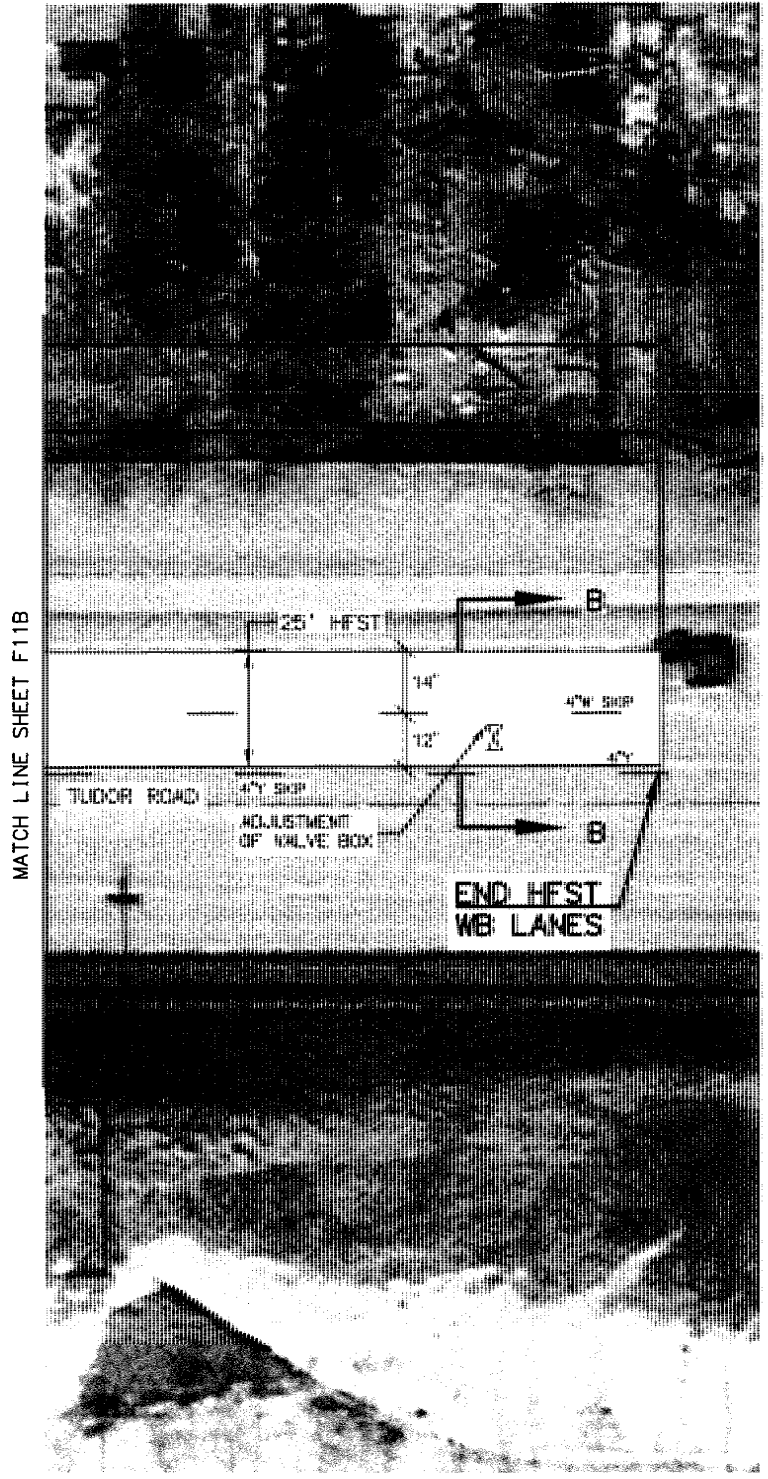
DATE TIME 8/25/2015 10:31 AM
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Tudor_Baxter.dwg

DRAWING LOCATION
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Tudor_Baxter.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F11C	F43

SITE #11
 (SHEET 3 OF 3)



MATCH LINE SHEET F11B

SEE F11B FOR SECTION B-B



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

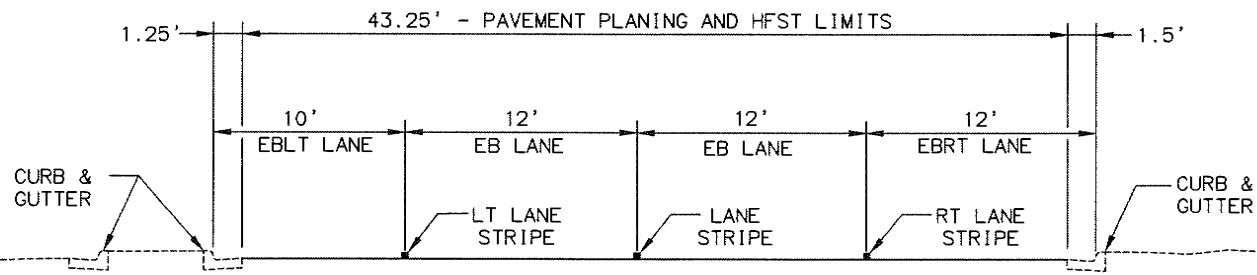
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

**TUDOR ROAD EAST
 FROM BAXTER**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F12A	F43

**SITE #12
(SHEET 1 OF 4)**



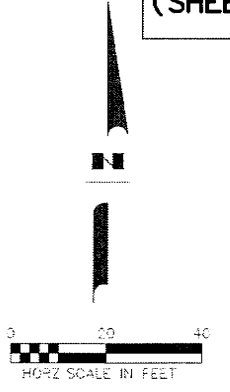
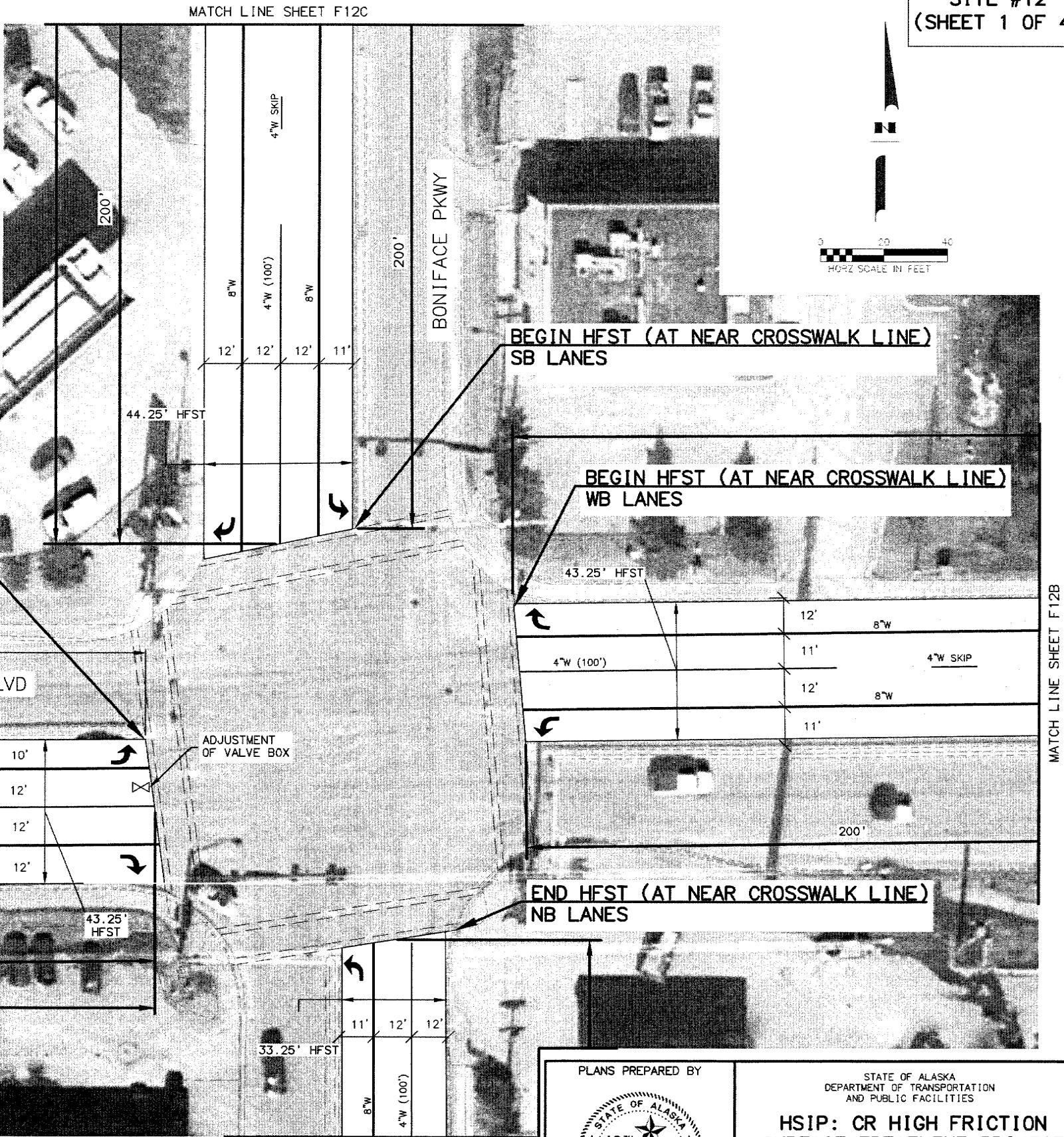
SECTION A-A

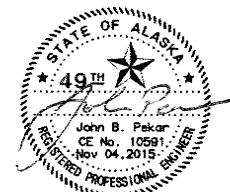
EASTBOUND NORTHERN LIGHTS BLVD

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THE EASTBOUND NORTHERN LIGHTS BLVD. AND SOUTHBOUND/NORTHBOUND BONIFACE PARKWAY APPROACHES. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THE WESTBOUND NORTHERN LIGHTS BLVD. APPROACH. SITE SECTIONS AND PLANS PROVIDE HFST LIMITS.
3. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
4. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

DRAWING LOCATION
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Northern Lights_Boniface.dwg
 DATE TIME 11/4/2015 1:22 PM
 LAYOUT F12A
 SCALE
 SHEETS



PLANS PREPARED BY

 JOHN B. PELKAR
 CE No. 10591
 Nov 04, 2015
 REGISTERED PROFESSIONAL ENGINEER
 KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**
 NORTHERN LIGHTS BLVD AND
 BONIFACE PKWY

MATCH LINE SHEET F12D

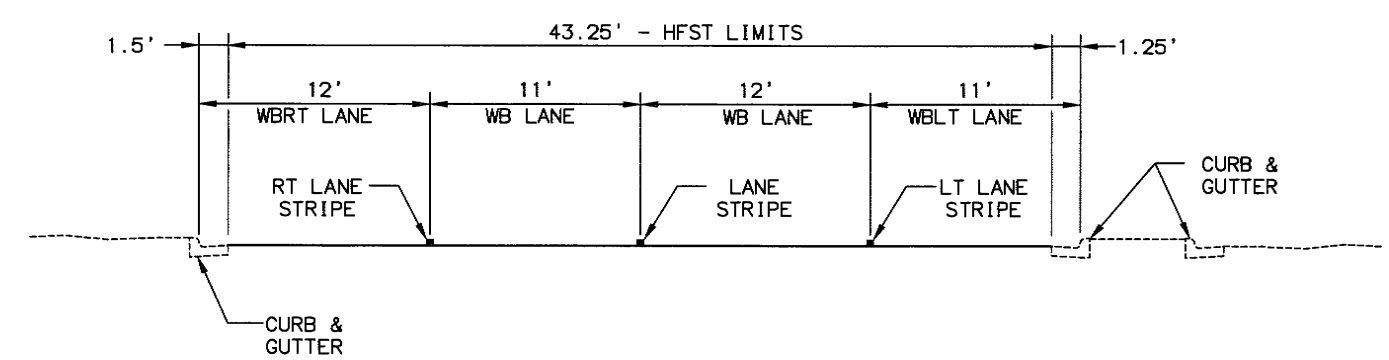
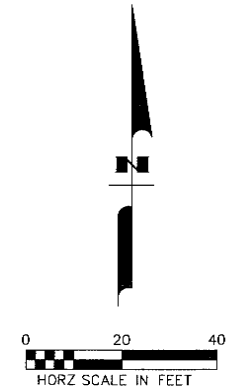
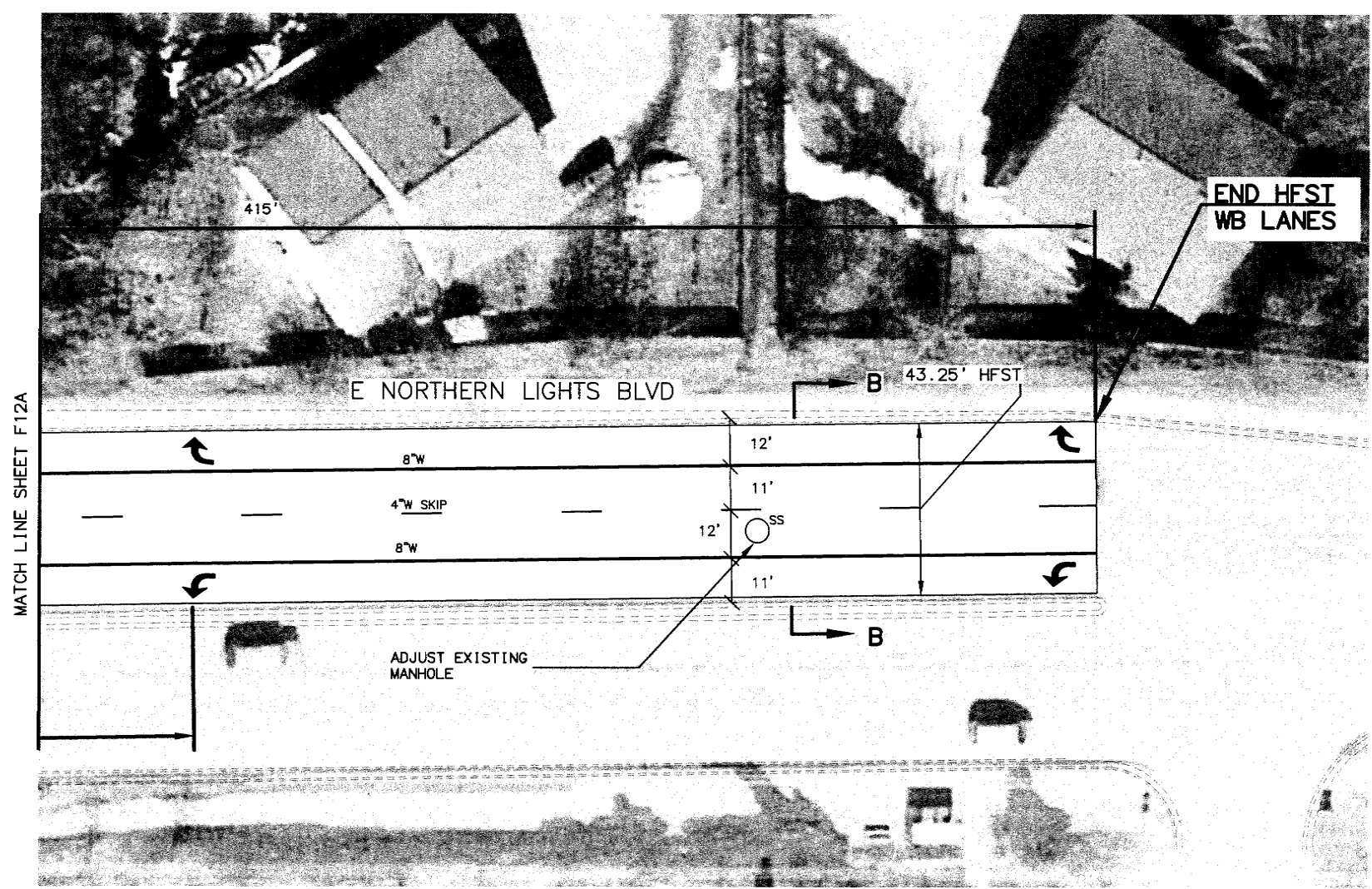
MATCH LINE SHEET F12B

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F12B	F43

SITE #12
(SHEET 2 OF 4)

DESIGNED BY: _____
 CHECKED BY: _____
 DRAFTED BY: _____
 AREFS: _____
 SCALE: _____
 LAYOUT: F12B
 DATE TIME: 8/25/2015 10:41 AM
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Northern Lights_Boniface.dwg



SECTION B-B
WESTBOUND NORTHERN LIGHTS BLVD

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

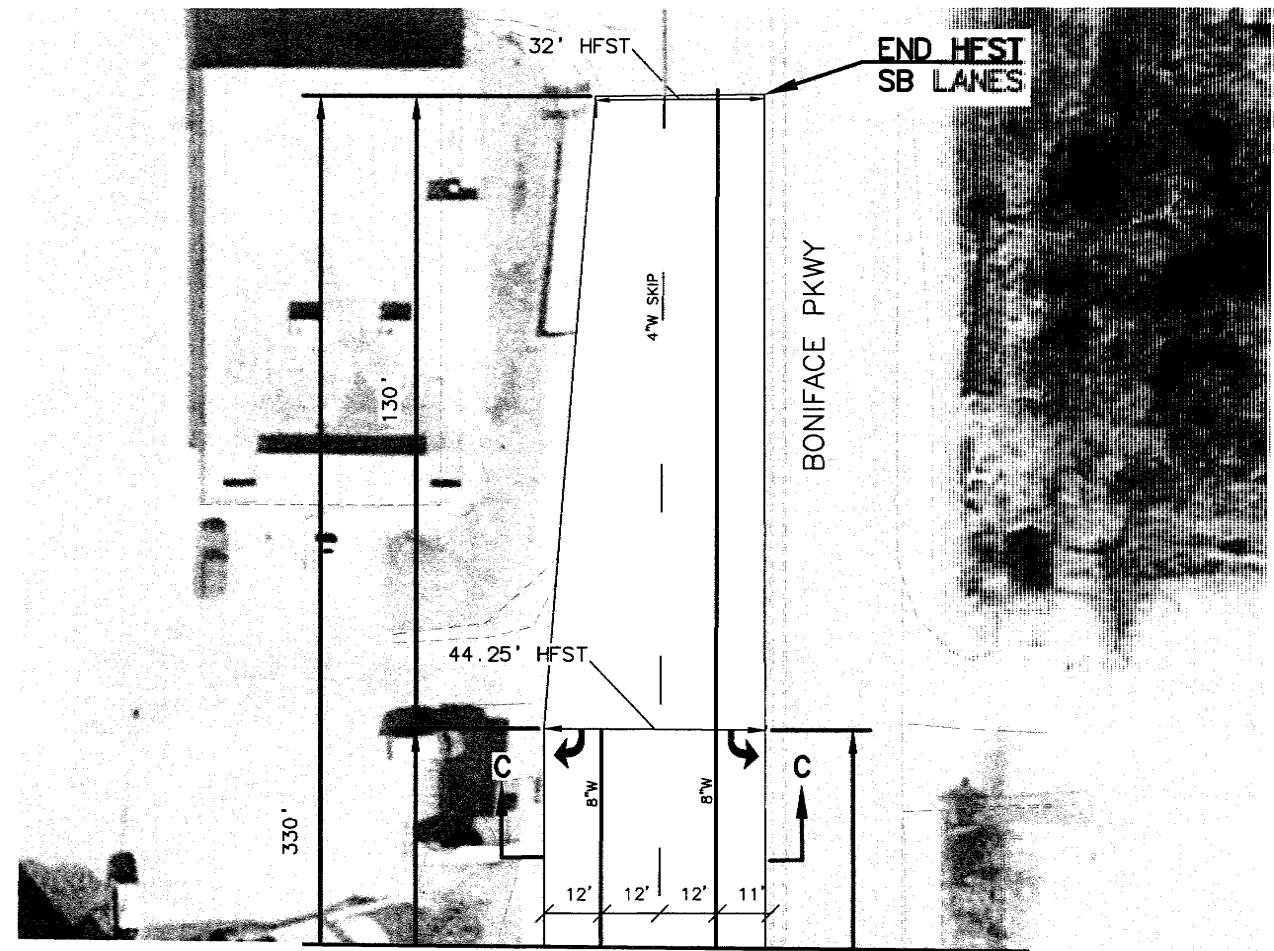
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

NORTHERN LIGHTS BLVD AND
BONIFACE PKWY

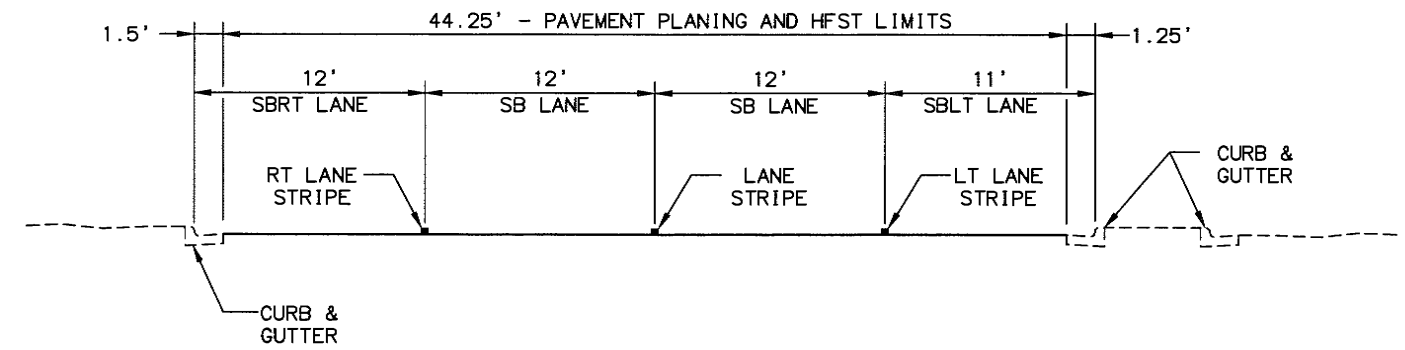
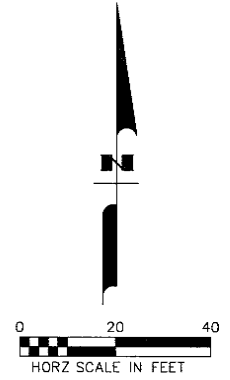
DRAWING LOCATION Z:\PROJECTS\DOT\HSIP High Friction Surface Treatment\Production Drawings\0001501_Northern Lights_Boniface.dwg
 DATE TIME 8/25/2015 10:41 AM
 LAYOUT F12C
 SCALE
 XREFS
 DESIGNED BY
 CHECKED BY
 DRAFTED BY

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F12C	F43
SITE #12 (SHEET 3 OF 4)				



MATCH LINE SHEET F12A



SECTION C-C
SOUTHBOUND BONIFACE PRWY

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

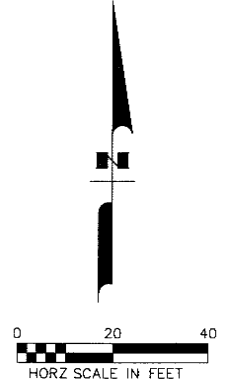
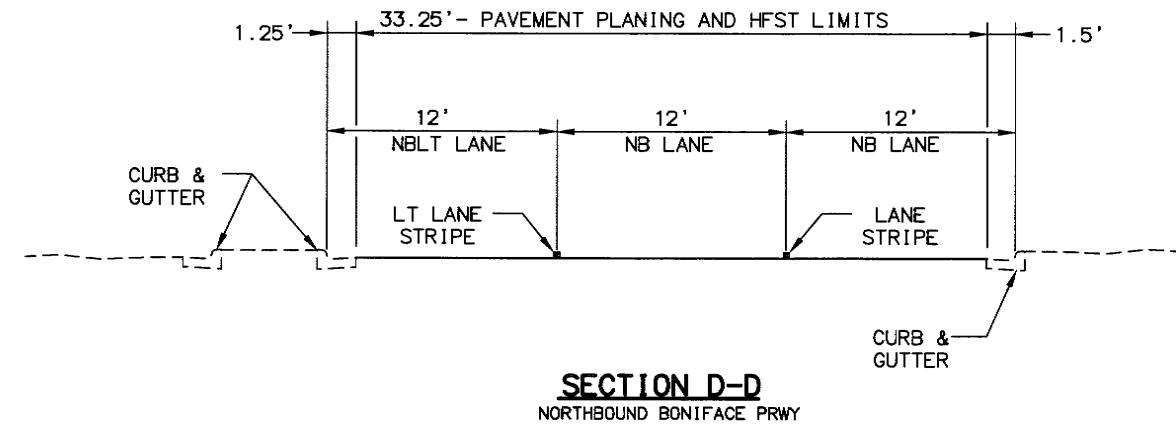
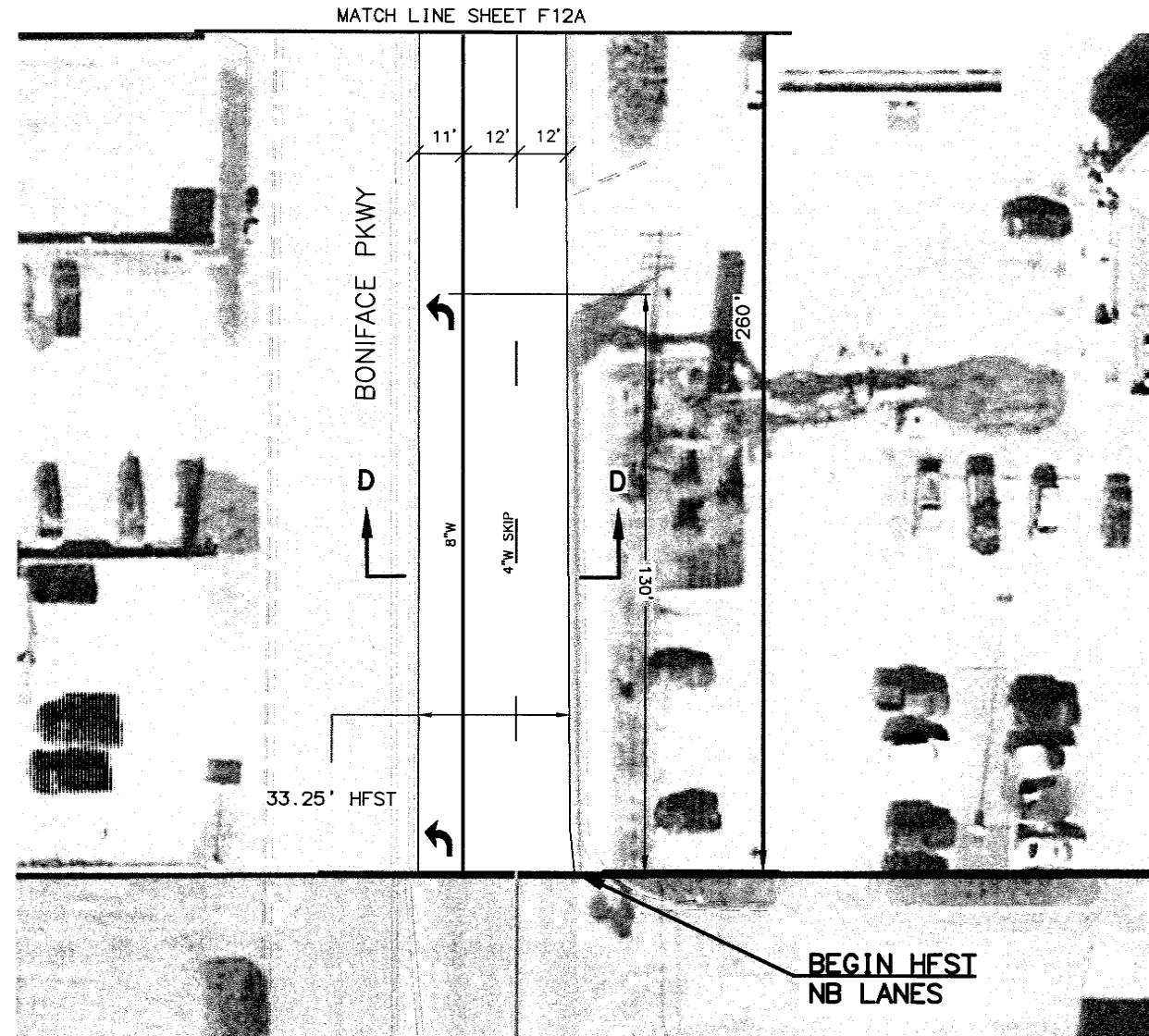
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**NORTHERN LIGHTS BLVD AND
BONIFACE PKWY**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F12D	F43
SITE #12 (SHEET 4 OF 4)				

DESIGNED BY: _____
 CHECKED BY: _____
 DRAFTED BY: _____
 XREFS: _____
 SCALE: _____
 LAYOUT: F12D
 DATE TIME: 8/25/2015 10:41 AM
 Z:\PROJECTS\DOT\PP\HSIP\High Friction Surface Treatment\Production Drawings\0001501_Northern Lights_BoniFace.dwg



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

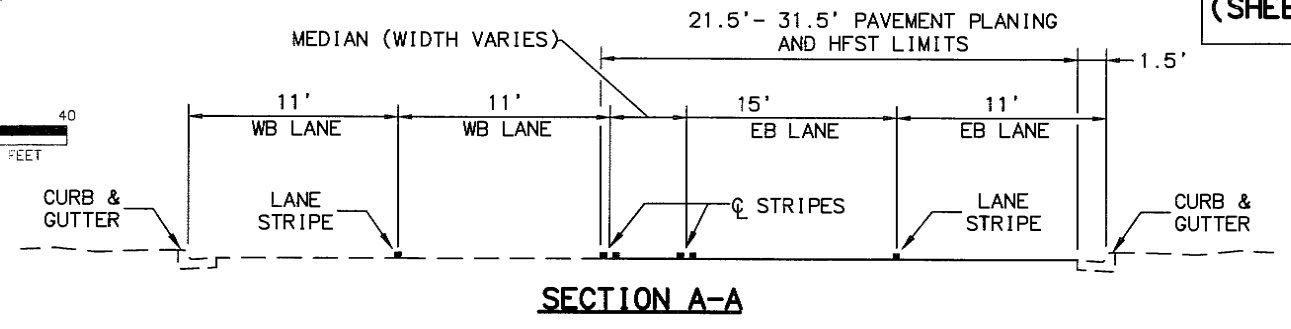
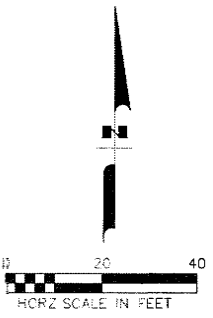
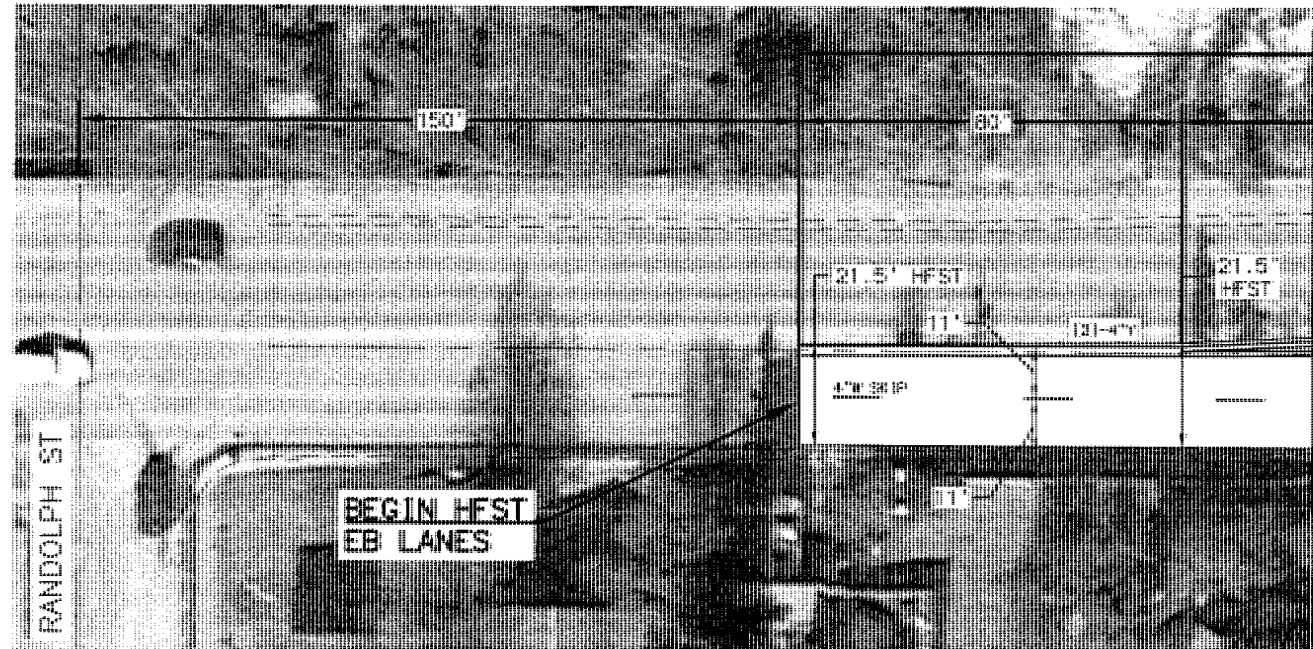
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**NORTHERN LIGHTS BLVD AND
BONIFACE PKWY**

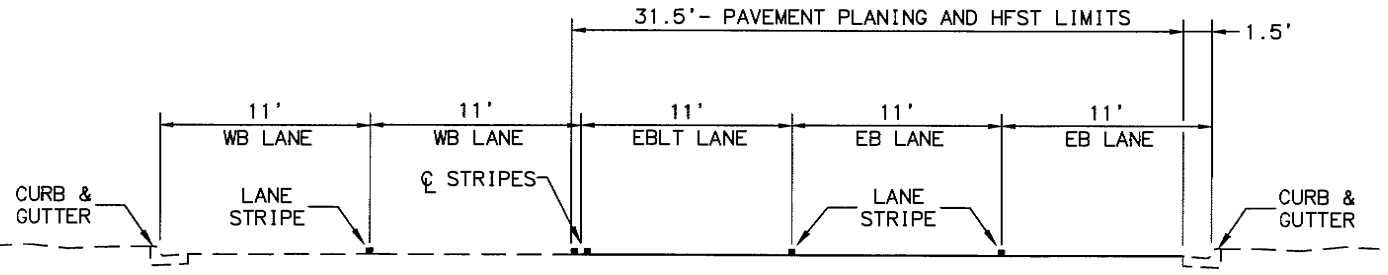
DESIGNED BY: [] CHECKED BY: [] DRAFTED BY: []
 XREFS: [] SCALE: [] LAYOUT: FT3
 DATE TIME: 11/4/2015 2:16 PM
 Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Drawings\0001501_36 Ave and Lake Otis.dwg
 DRAWING LOCATION: []

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/Z570920000	2015	F13	F43

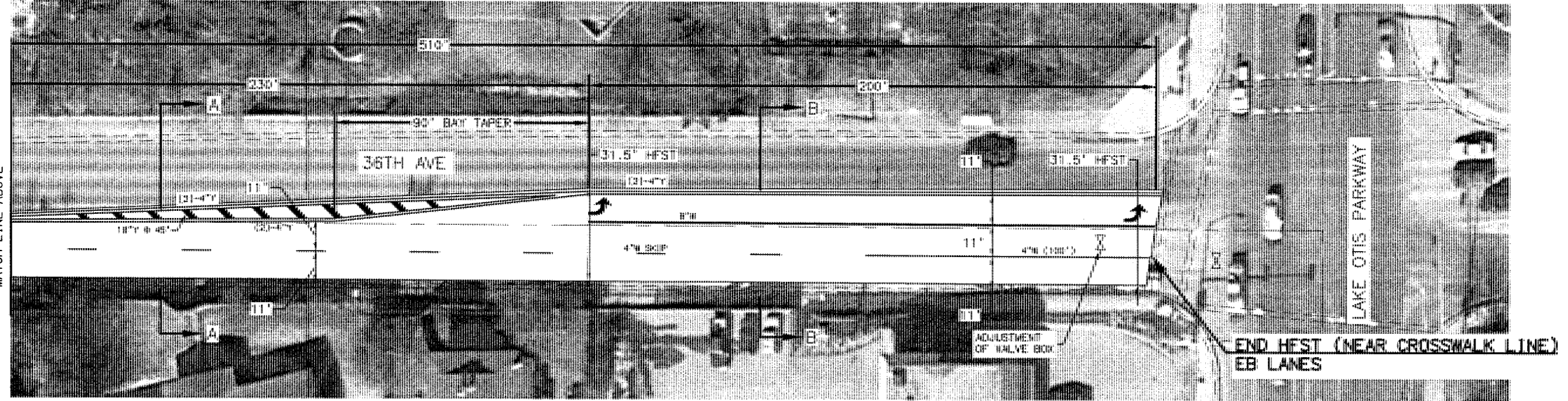
**SITE #13
(SHEET 1 OF 1)**



SECTION A-A



SECTION B-B



SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
3. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

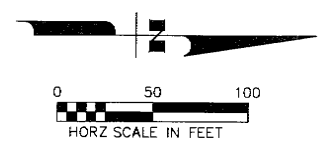
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

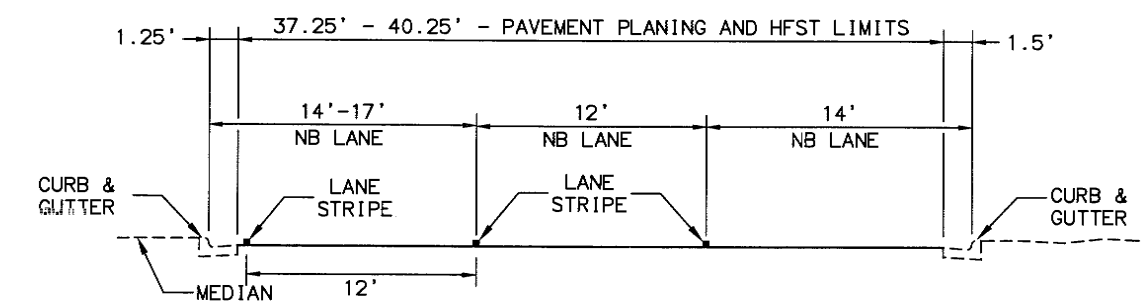
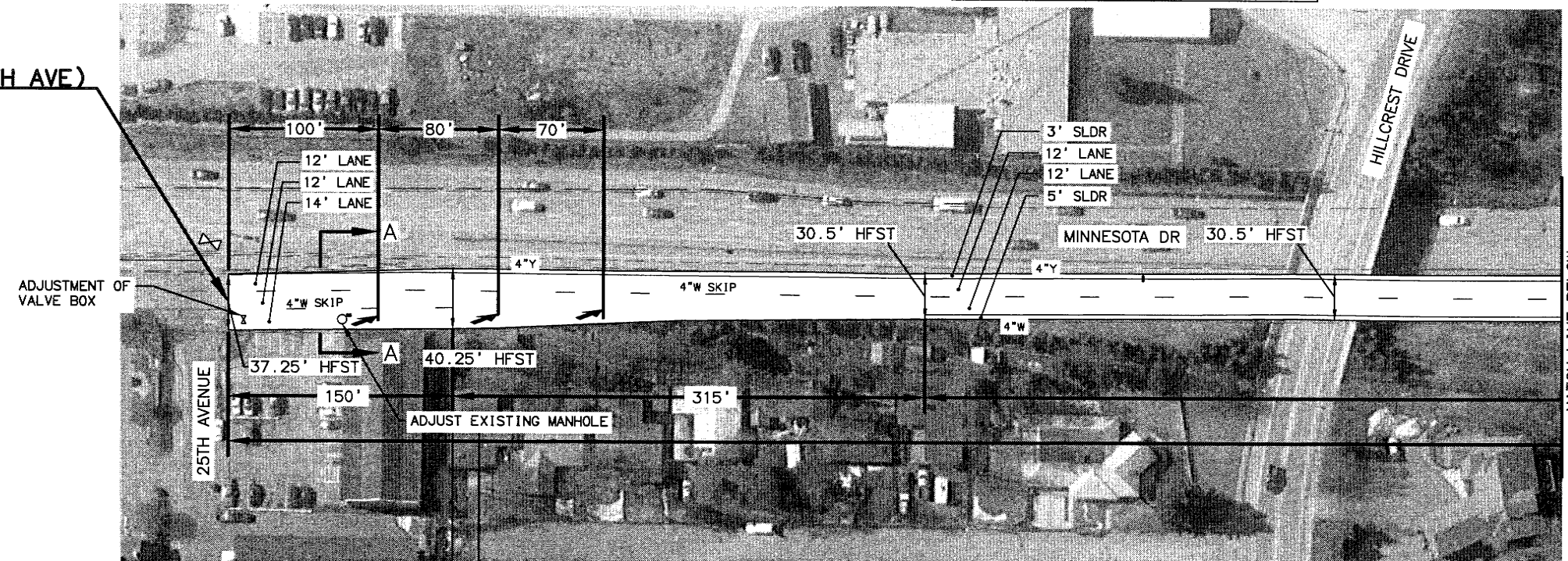
**36 AVENUE AND
 LAKE OTIS PARKWAY**

REVISONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/Z570920000	2015	F14A	F43

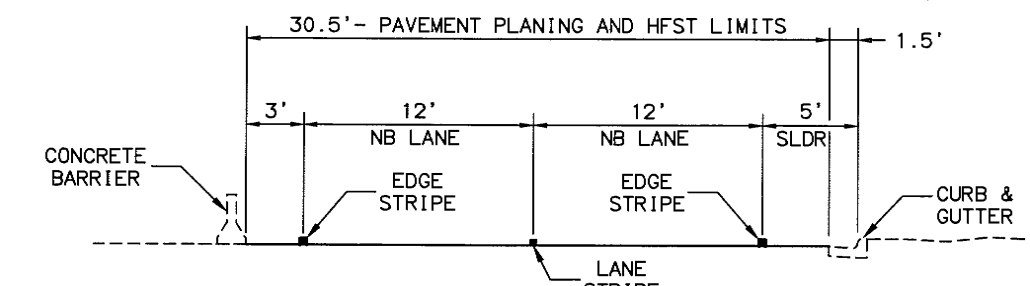
**SITE #14
(SHEET 1 OF 3)**



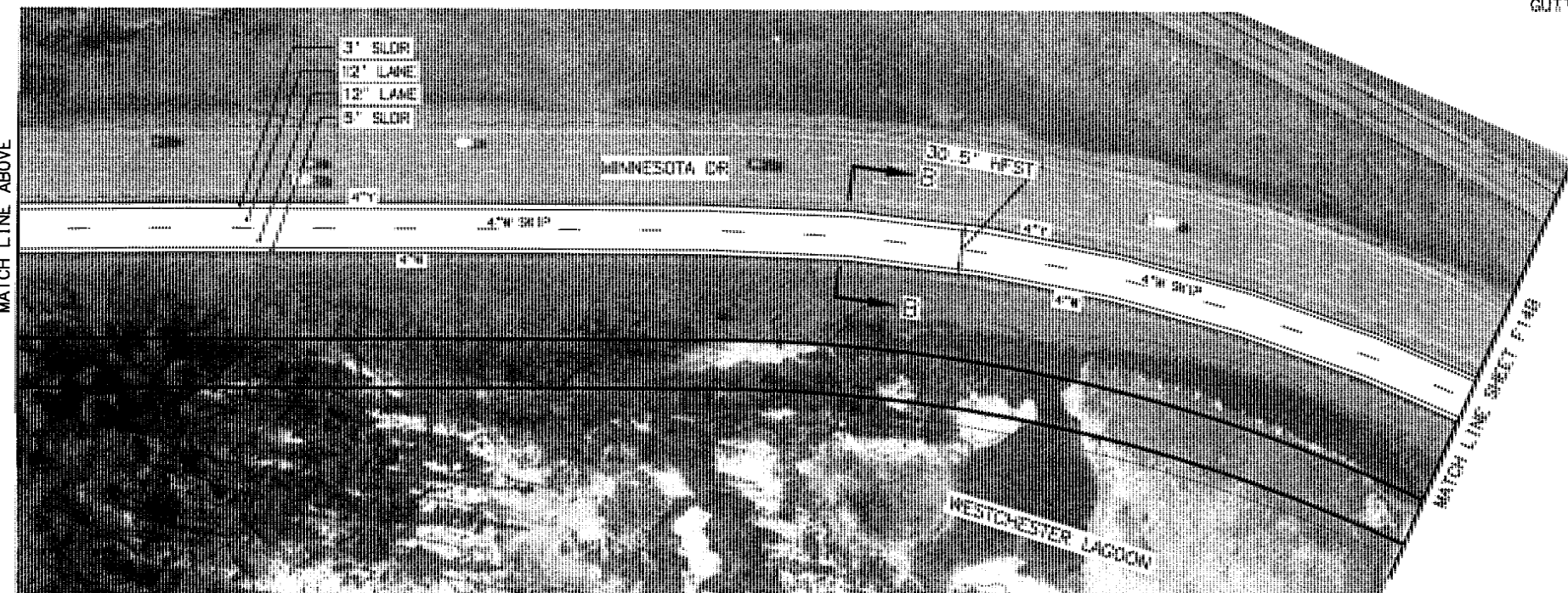
**BEGIN HFST (N. CURB LINE, 25TH AVE)
NB LANES**



SECTION A-A



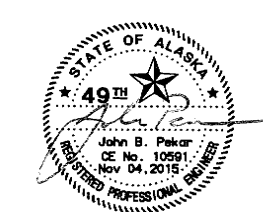
SECTION B-B



SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
3. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

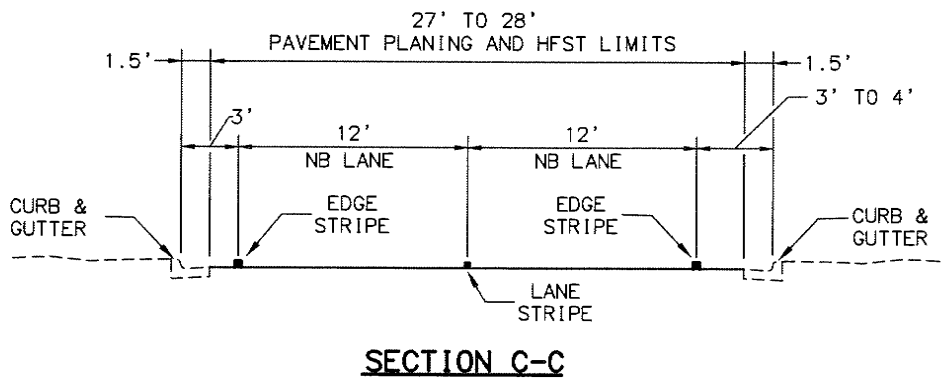
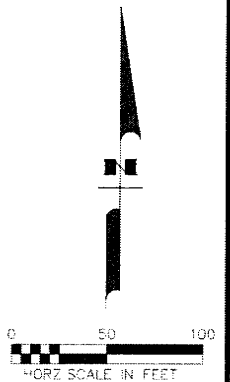
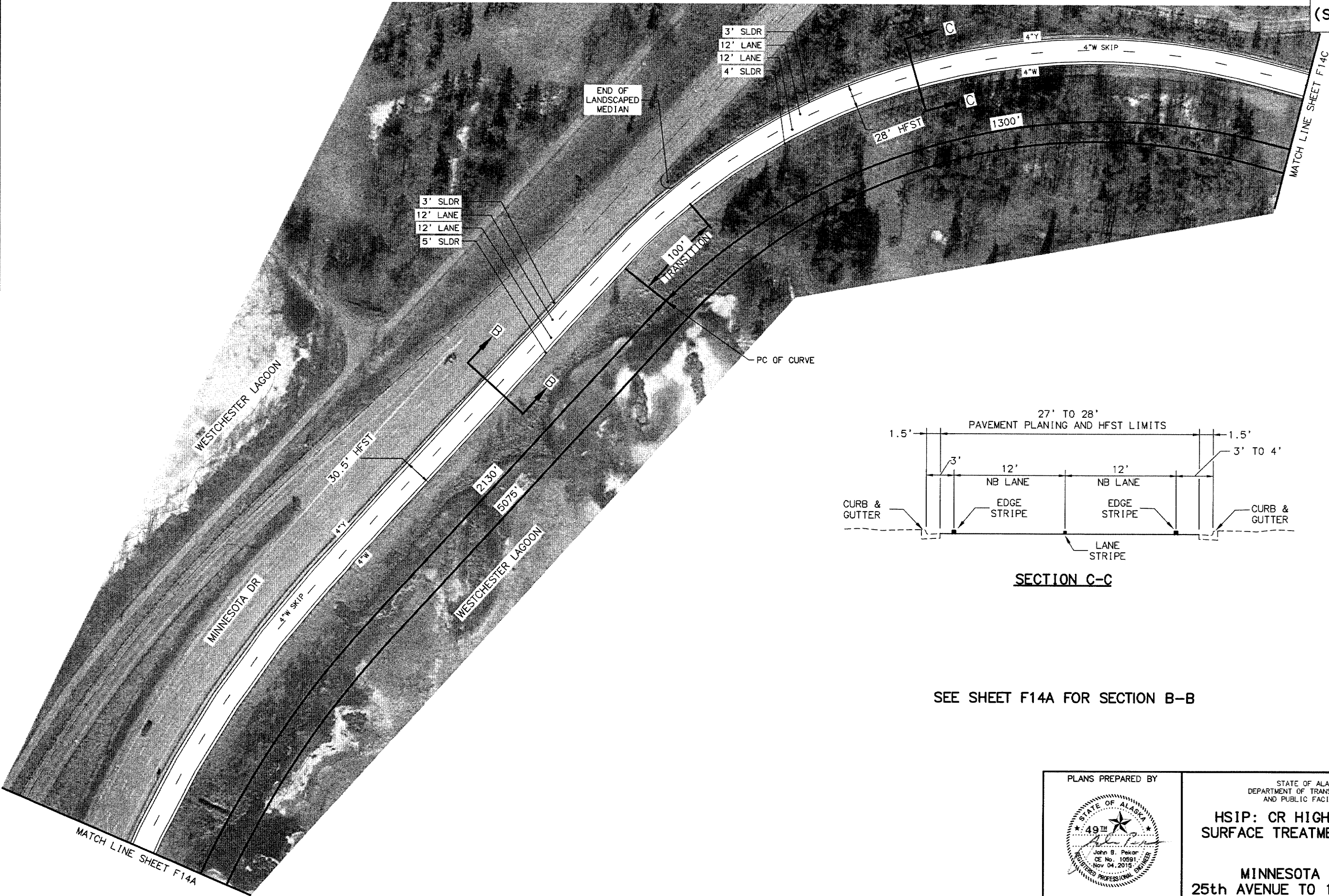
**MINNESOTA DRIVE
25th AVENUE TO 15th AVENUE**

DESIGNED BY: [] CHECKED BY: [] DRAFTED BY: []
 XREFS: [] SCALE: [] LAYOUT: F14A
 DATE TIME: 11/4/2015 1:37 PM
 Z:\PROJECTS\DOTPF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Minnesota_15ave to 26ave.dwg

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
			ALASKA	0001501/Z570920000	2015	F14B	F43

SITE #14
(SHEET 2 OF 3)

DESIGNED BY: []
 CHECKED BY: []
 SHEETS: []
 SCALE: []
 LAYOUT: F14B
 DATE TIME: 11/4/2015 3:48 PM
 DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Minnesota\Bove to 26ave.dwg



SECTION C-C

SEE SHEET F14A FOR SECTION B-B

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

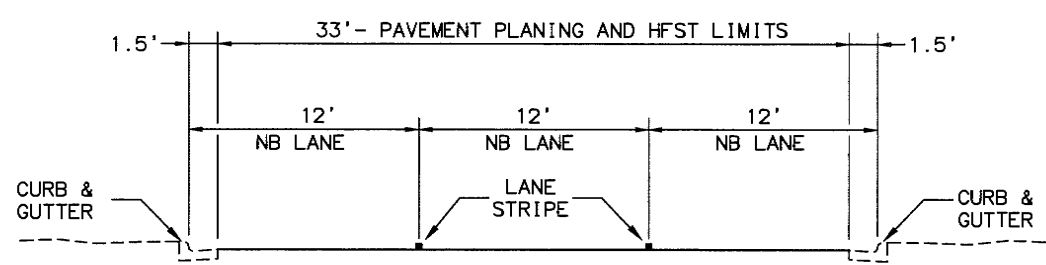
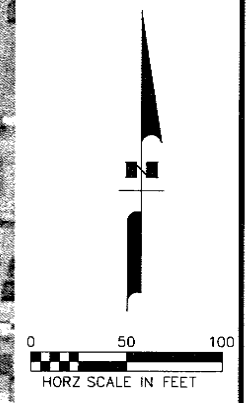
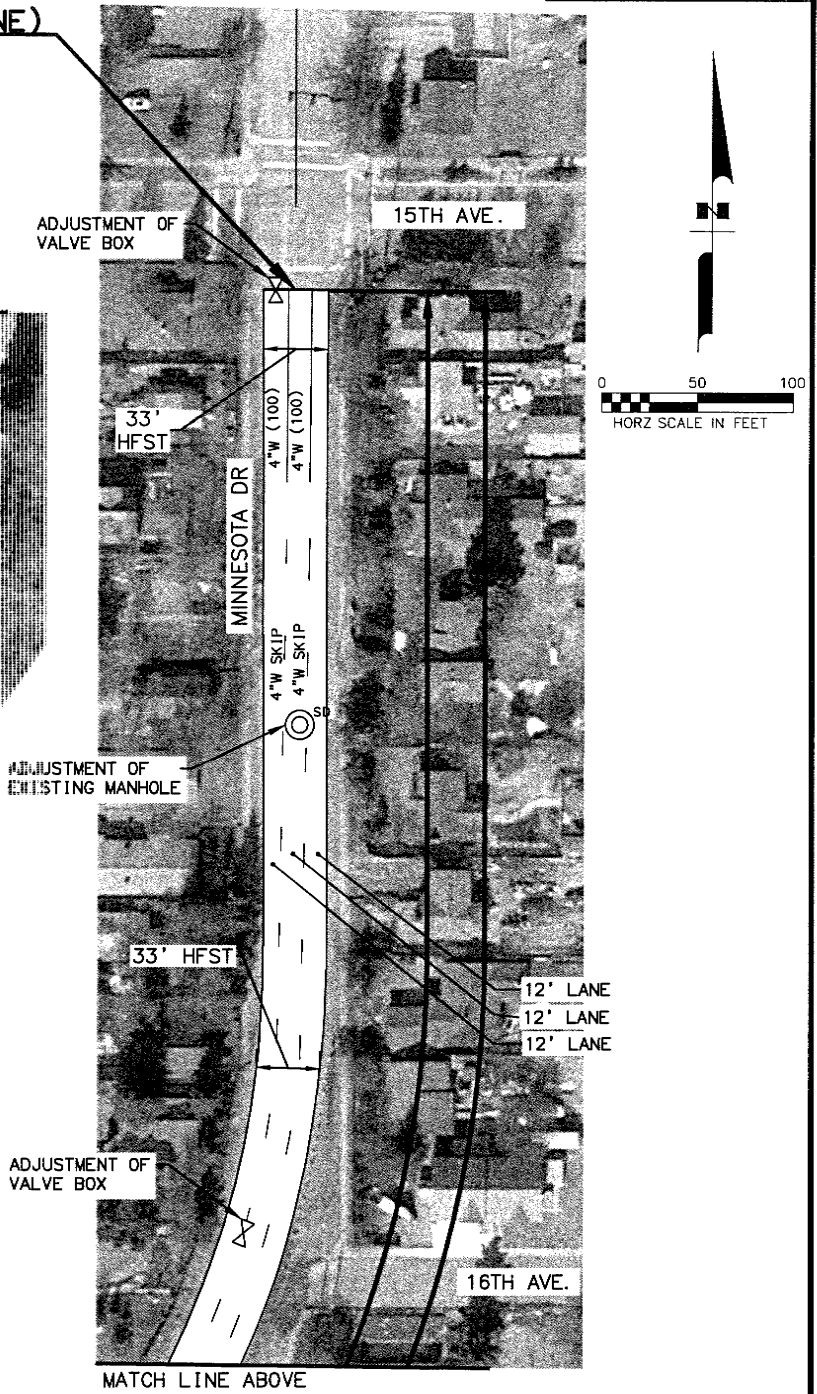
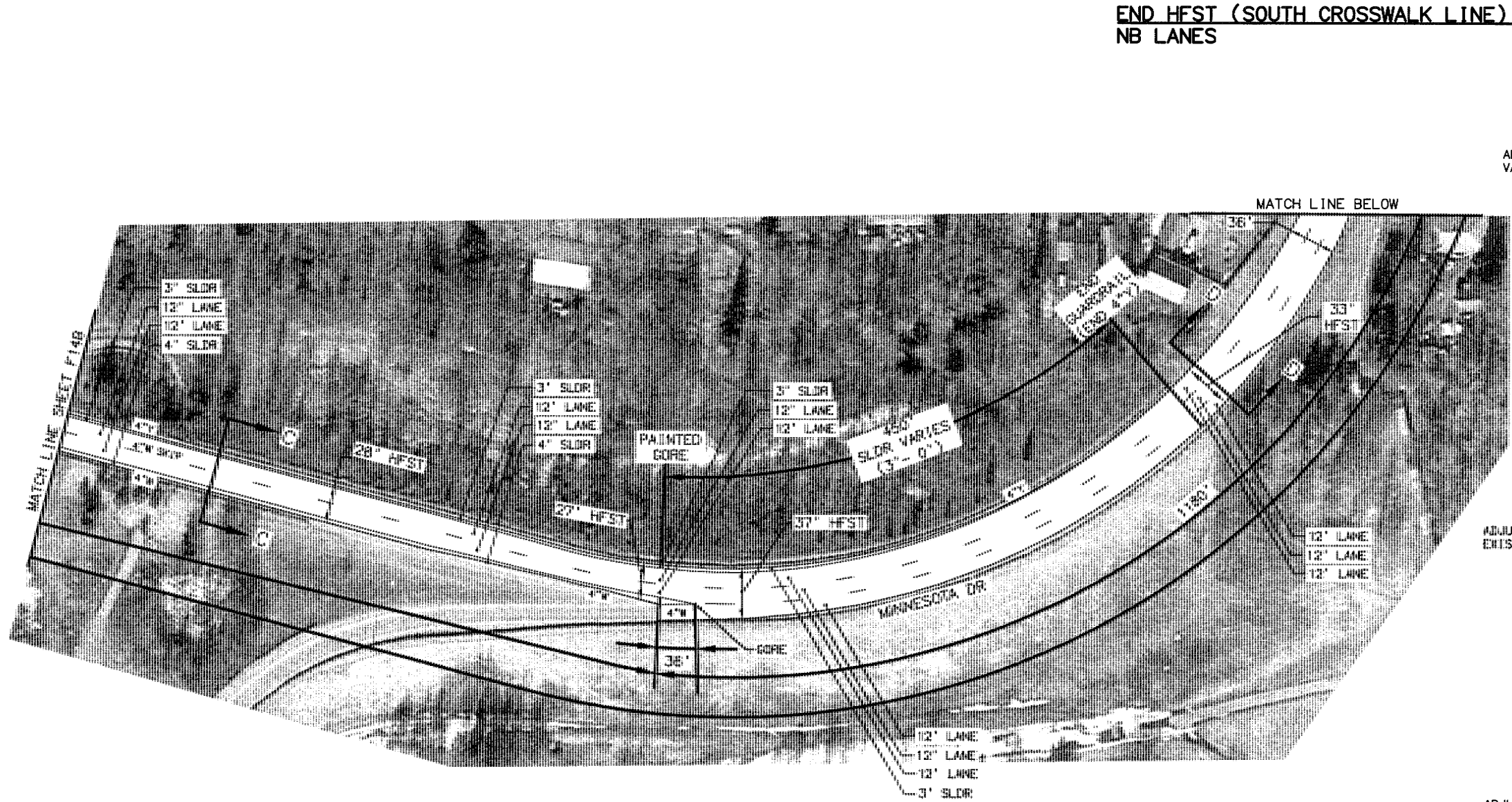
MINNESOTA DRIVE
25th AVENUE TO 15th AVENUE

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F14C	F43

SITE #14
(SHEET 3 OF 3)

DESIGNED BY: XREFS
 CHECKED BY: XREFS
 DRAFTED BY: XREFS
 SCALE: F14C
 LAYOUT: F14C
 DATE TIME: 9/9/2015 3:12 PM
 Z:\PROJECTS\DOT\FHSIP High Friction Surface Treatment\Production Drawings\0001501_Minnesota_15ave to 26ave.dwg



SECTION D-D

SEE SHEET F14B FOR SECTION C-C

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

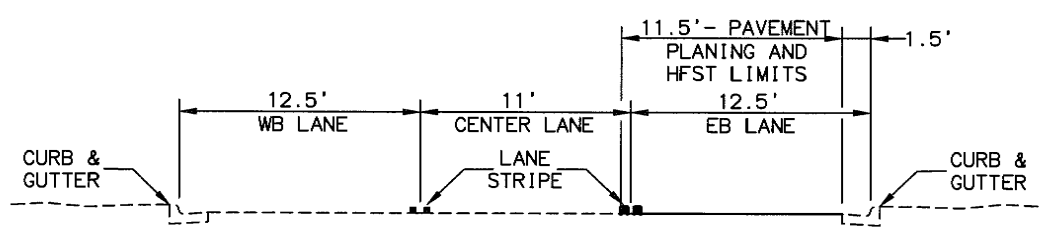
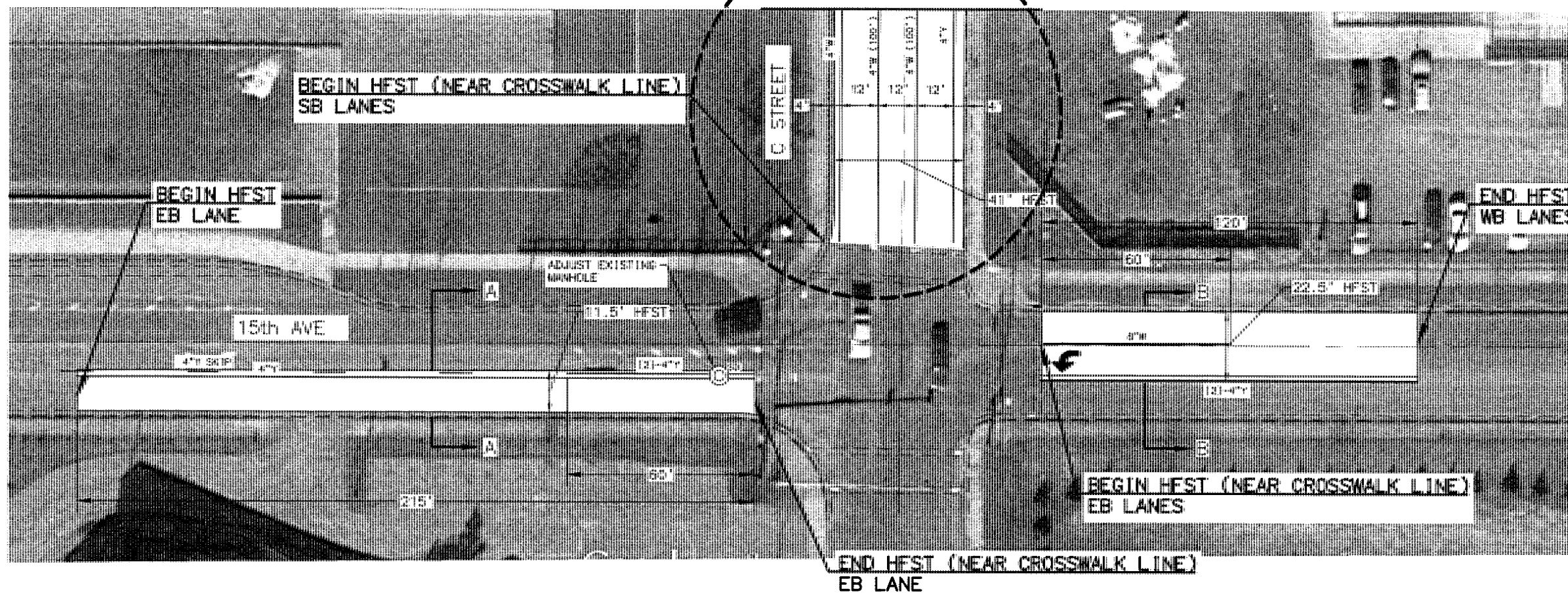
**MINNESOTA DRIVE
25th AVENUE TO 15th AVENUE**

DRAWING LOCATION Z:\PROJECTS\001501_VisIP_High Friction Surface Treatment\Production Drawings\001501_15th AVE_Cst.dwg
 DATE TIME 11/4/2015 1:41 PM
 LAYOUT F15A
 SCALE
 XREFS
 DESIGNED BY
 CHECKED BY
 DRAFTER BY

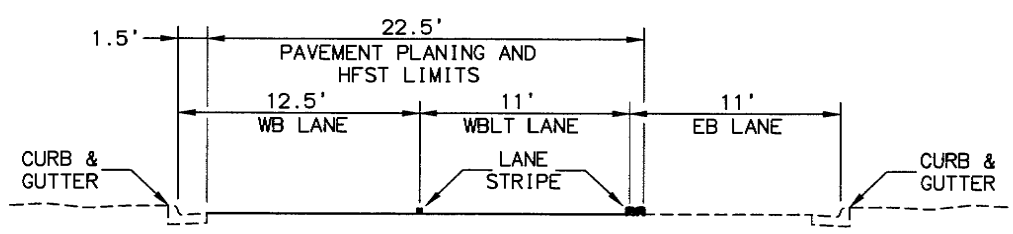
N.I.C.

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F15A	F43
SITE #15 (SHEET 1 OF 2)				



SECTION A-A
EASTBOUND 15th AVENUE



SECTION B-B
WESTBOUND 15th AVENUE

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. ALL PAVEMENT MARKINGS SHALL BE INLAID PER BID ITEM NUMBERS 670(10D) AND 670(10E).
3. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

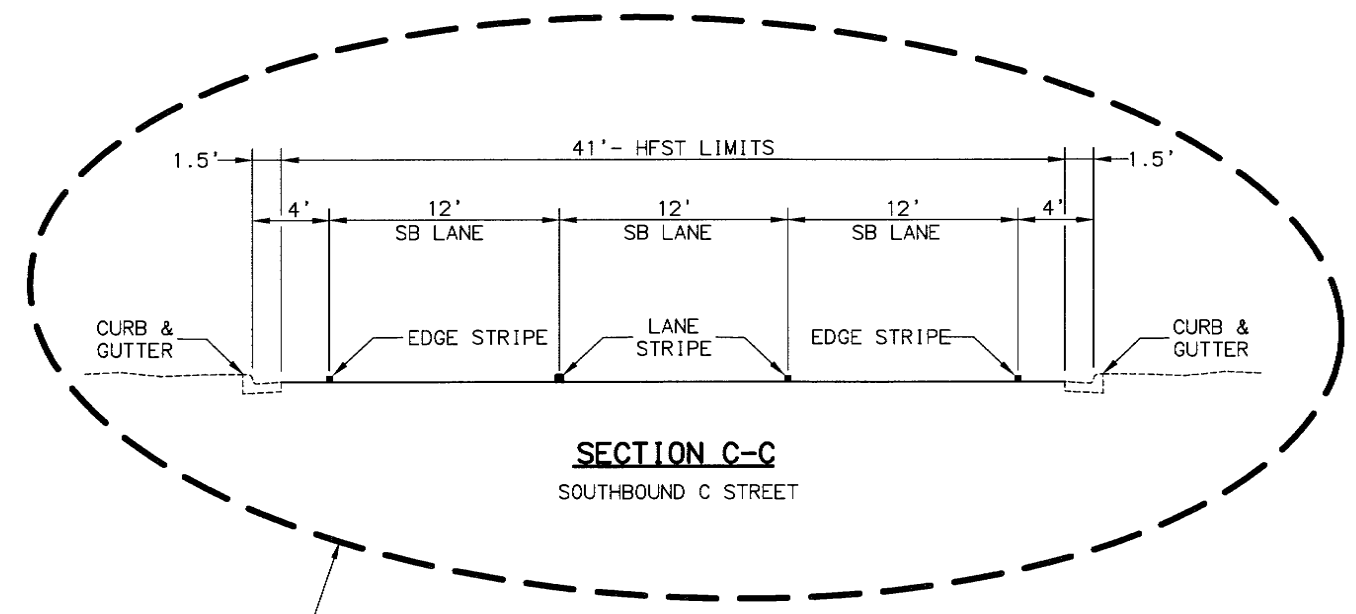
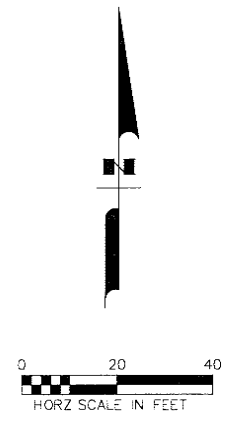
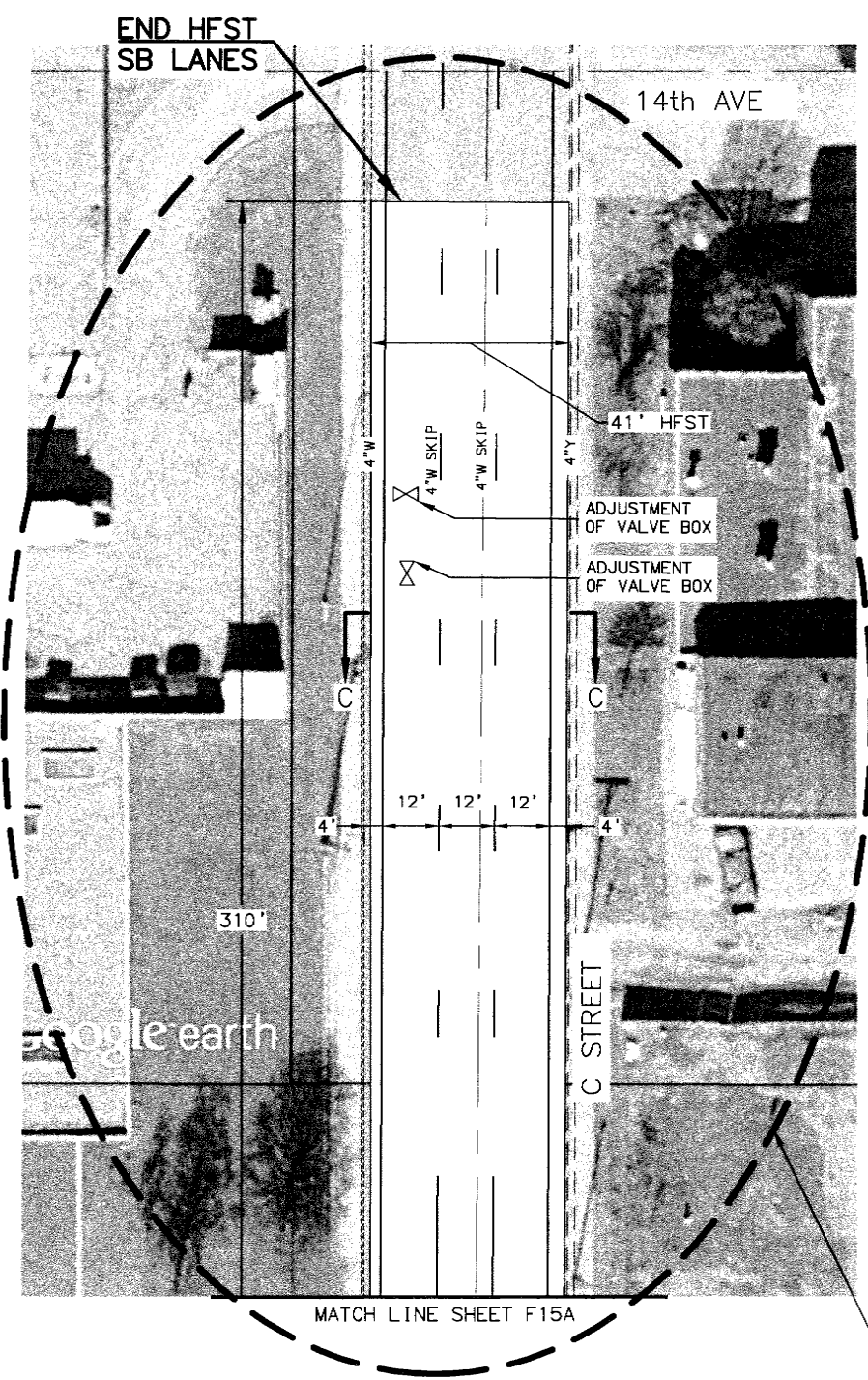
15TH AVE AND C STREET

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F15B	F43

SITE #15
(SHEET 2 OF 2)

DESIGNED BY: _____
 CHECKED BY: _____
 DRAFTED BY: _____
 AREAS: _____
 SCALE: _____
 LAYOUT: F15B
 DATE TIME: 10/27/2015 1:14 PM
 Z:\PROJECTS\DOTPF\NSIP High Friction Surface Treatment\Production Drawings\0001501_15th AVE_Cst.dwg



N . I . C .

PLANS PREPARED BY

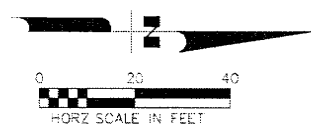
KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

15TH AVE AND C STREET

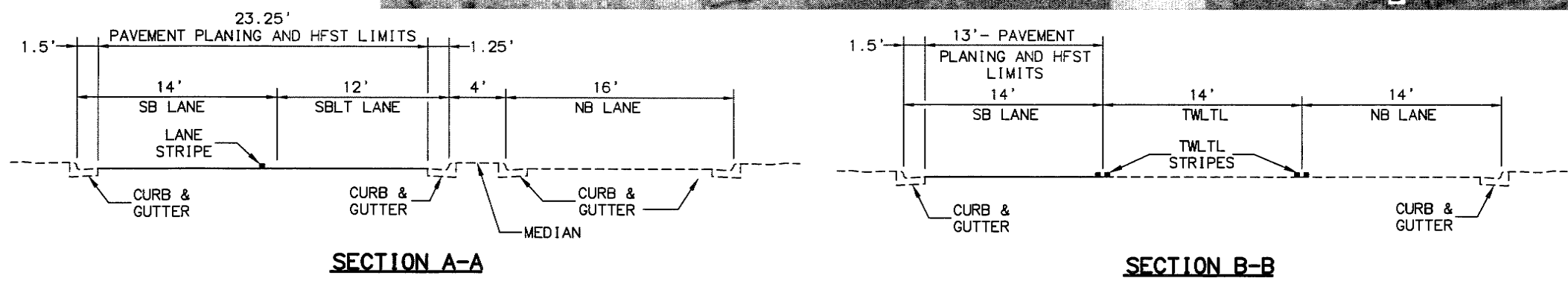
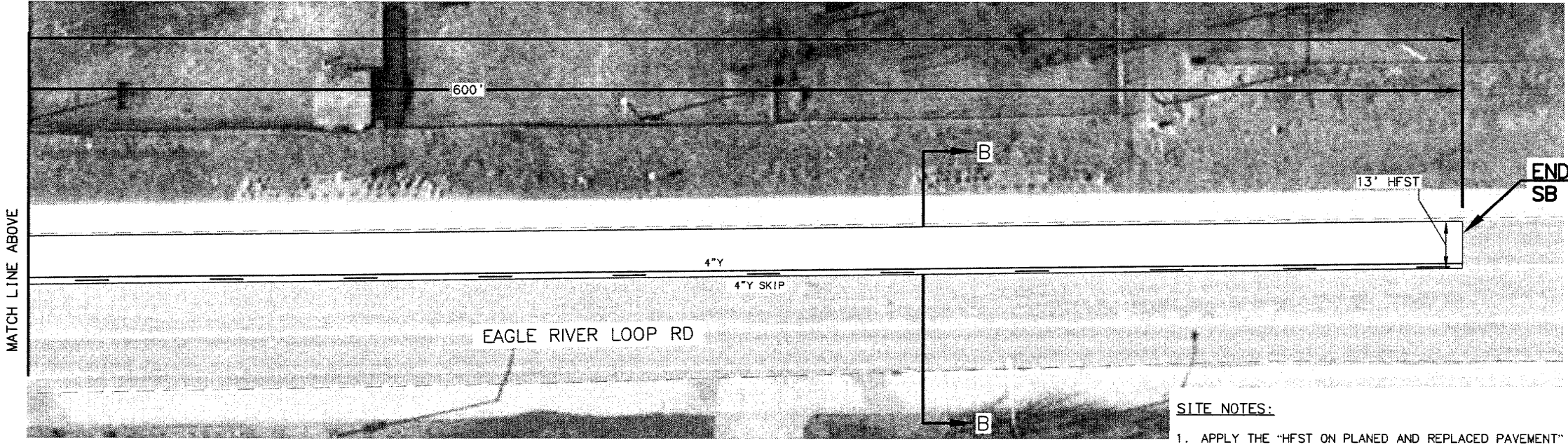
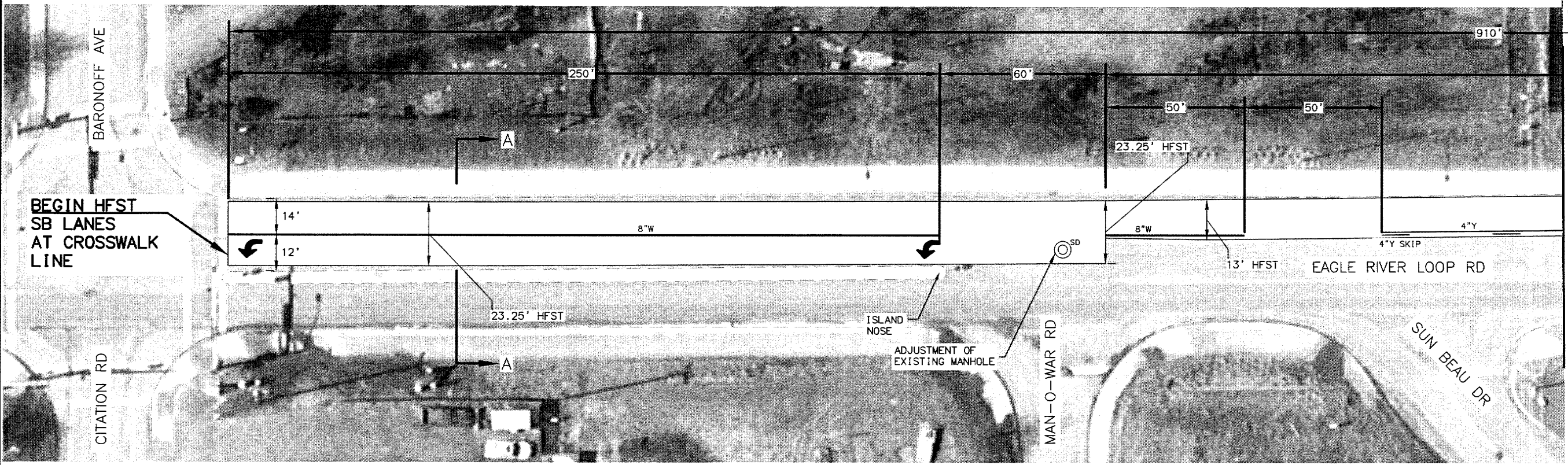
DESIGNED BY: [REDACTED] CHECKED BY: [REDACTED] DRAFTED BY: [REDACTED]
 XREFS: [REDACTED]
 SCALE: [REDACTED]
 LAYOUT: F16
 DATE TIME: 11/4/2015 1:45 PM
 Z:\PROJECTS\DOTPF\HSIP High Friction Surface Treatment\Production Drawings\0001501_Eagle River_Baronnoff.dwg



REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F16	F43

SITE #16
(SHEET 1 OF 1)



- SITE NOTES:**
1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. ALL PAVEMENT MARKINGS SHALL BE SURFACE APPLIED PER BID ITEM NUMBERS 670(10A) AND 670(10B).
 3. EXISTING CROSSWALK LINES TO REMAIN UNCOVERED.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

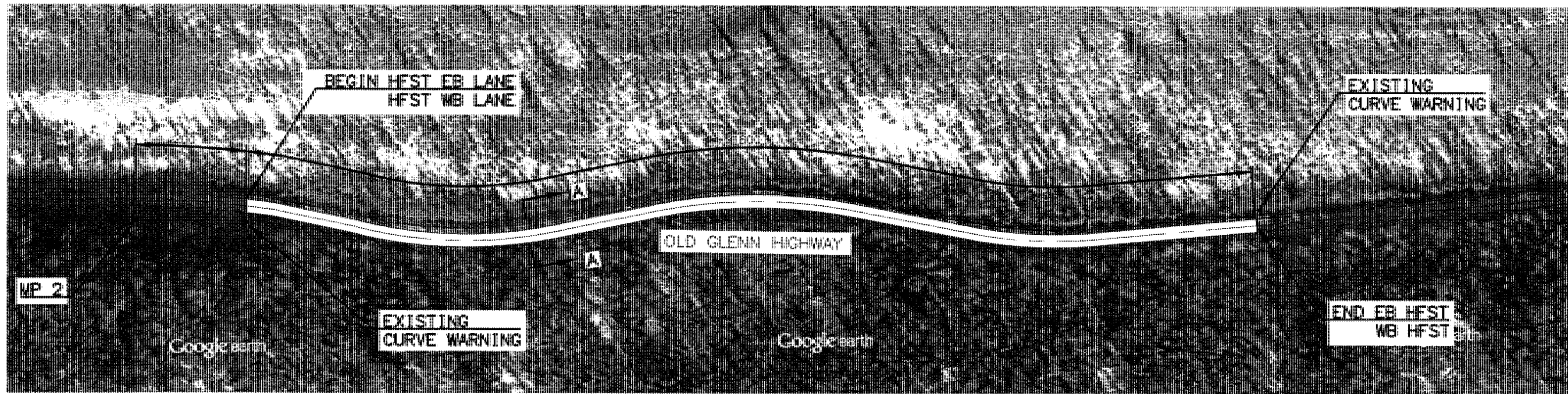
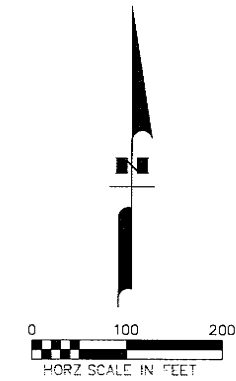
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**EAGLE RIVER LOOP ROAD
BARONOFF AVENUE/
CITATION ROAD**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F17	F43

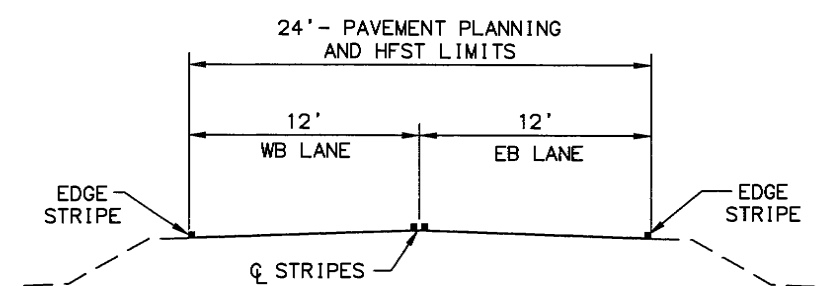
SITE #17
(SHEET 1 OF 1)



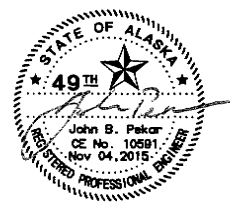
DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.Dwg
 DATE TIME: 11/4/2015 3:49 PM
 LAYOUT: F17
 SCALE:
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.



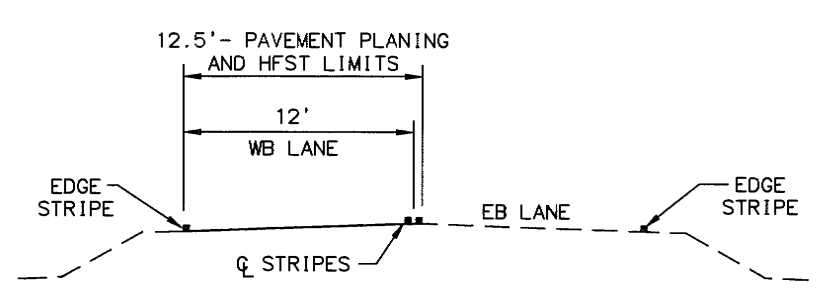
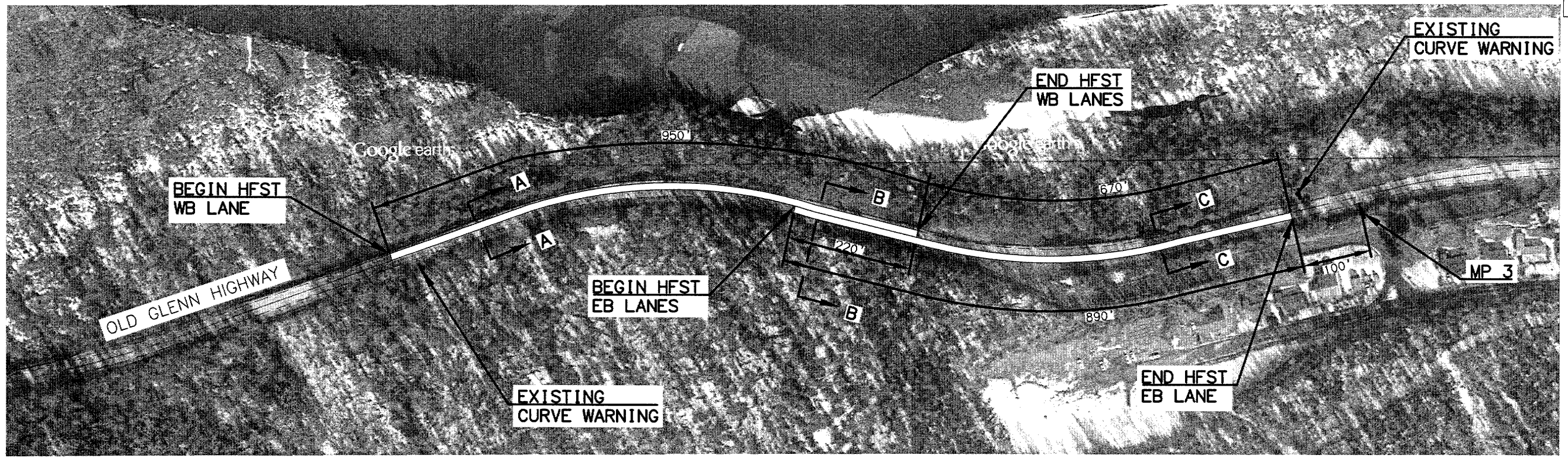
SECTION B-B

PLANS PREPARED BY  JOHN B. PELTON REGISTERED PROFESSIONAL ENGINEER KINNEY ENGINEERING, LLC	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT OLD GLENN HIGHWAY MILE 2.85 TO MILE 2.9 MP 2 & MP 3 (TWIN PEAKS)
---	---

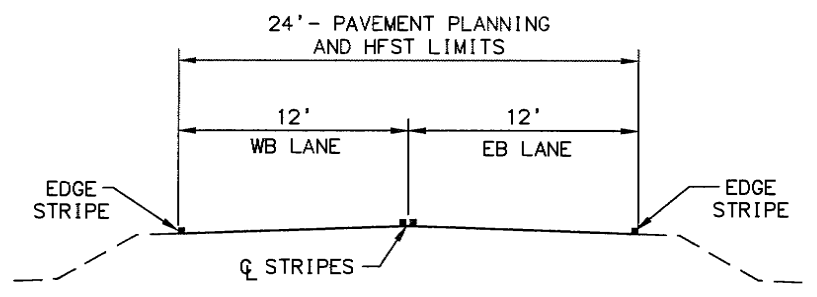
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F18	F43

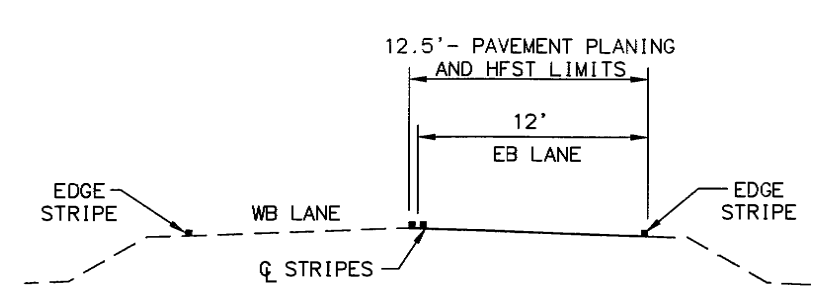
SITE #18
(SHEET 1 OF 1)



SECTION A-A



SECTION B-B

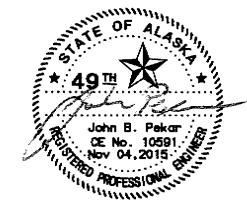


SECTION C-C

SITE NOTES:

1. APPLY THE "HFST ON PLANED AND REPLACED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

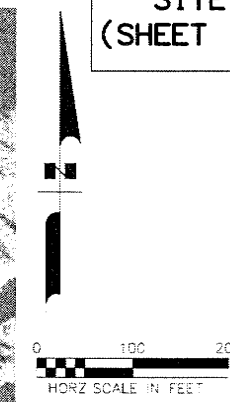
**OLD GLENN HIGHWAY
MILE 2.85 TO MILE 2.9
MP 2 & MP 3 (TWIN PEAKS)**

DRAWING LOCATION: Z:\PROJECTS\DOTPF\HSIP_High Friction Surface Treatment\Production\Drawings\0001501_01d Glenn Hwy.Dbf.dwg
 DATE: 11/4/2015 11:38 AM
 LAYOUT: F18
 SCALE:
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:

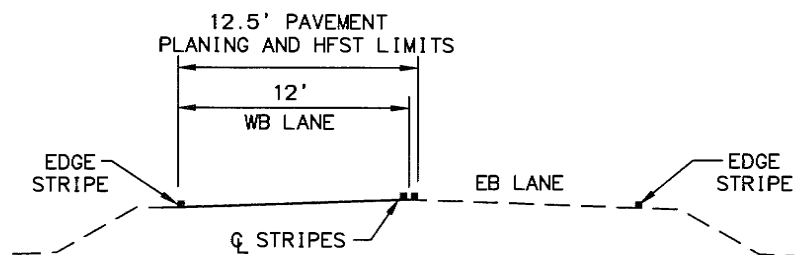
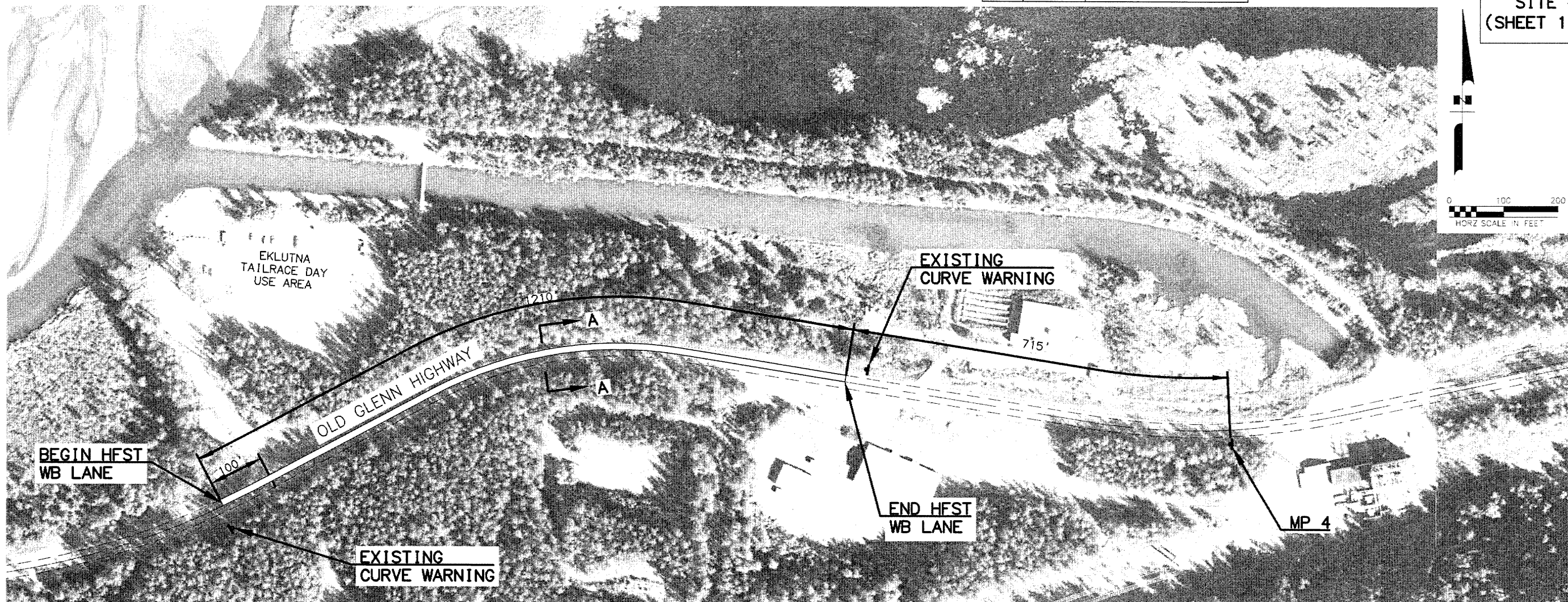
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F19	F43

SITE #19
(SHEET 1 OF 1)



DRAWING LOCATION
 Z:\PROJECTS\DOT\FP\HSIP High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.Dhr.dwg
 DATE TIME 11/4/2015 1:51 PM
 LAYOUT F19
 SCALE
 AREAS
 DESIGNED BY
 CHECKED BY
 DRAFTED BY

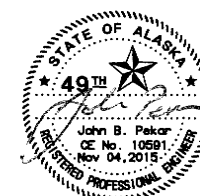


SECTION A-A

SITE NOTES:

1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

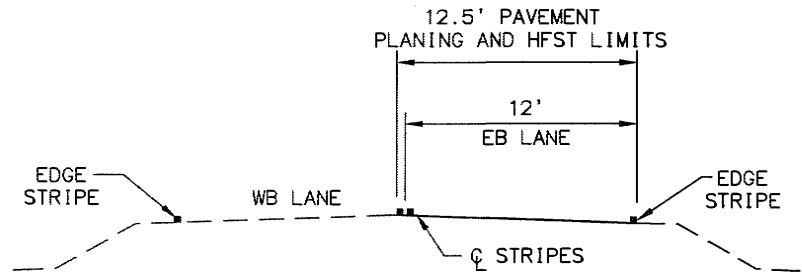
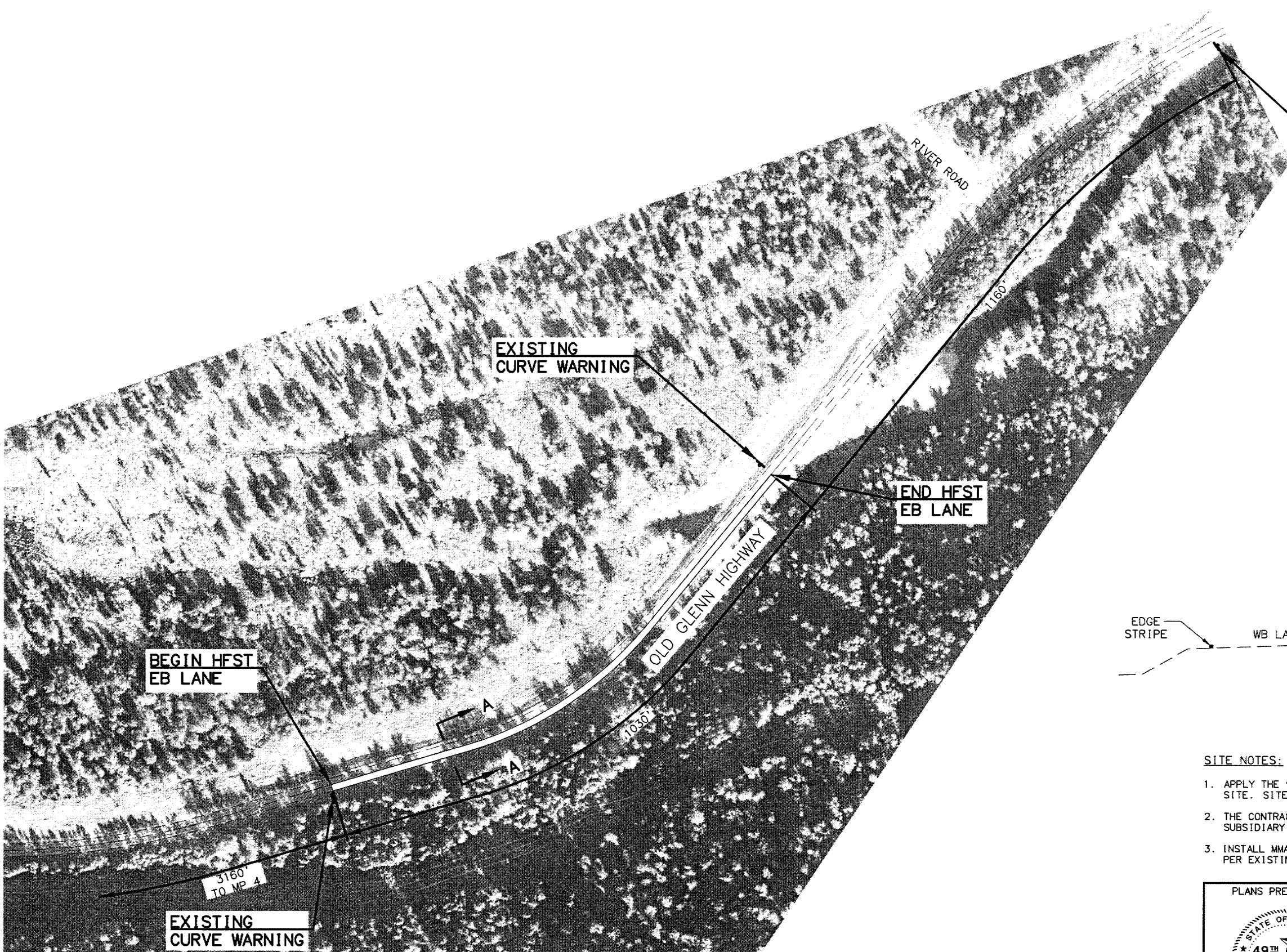
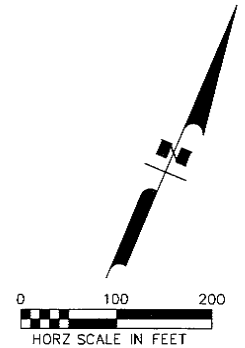
HSIP: OR HIGH FRICTION
SURFACE TREATMENT PROJECT

OLD GLENN HIGHWAY
MILE 3.6 TO MILE 4.2
POWER PLANT SITE

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/Z570920000	2015	F20	F43

SITE #20
(SHEET 1 OF 1)

DESIGNED BY: _____ CHECKED BY: _____ DRAFTED BY: _____
 XREFS: _____ SCALE: _____ LAYOUT: F20
 DATE: 11/4/2015 11:38 AM
 TIME: 11:38 AM
 FILE: Z:\PROJECTS\001501\HSIP High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.dwg
 DRAWING LOCATION: Z:\PROJECTS\001501\HSIP High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.dwg



SECTION A-A

SITE NOTES:

1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

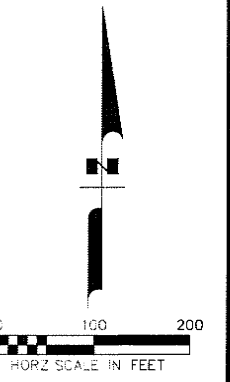
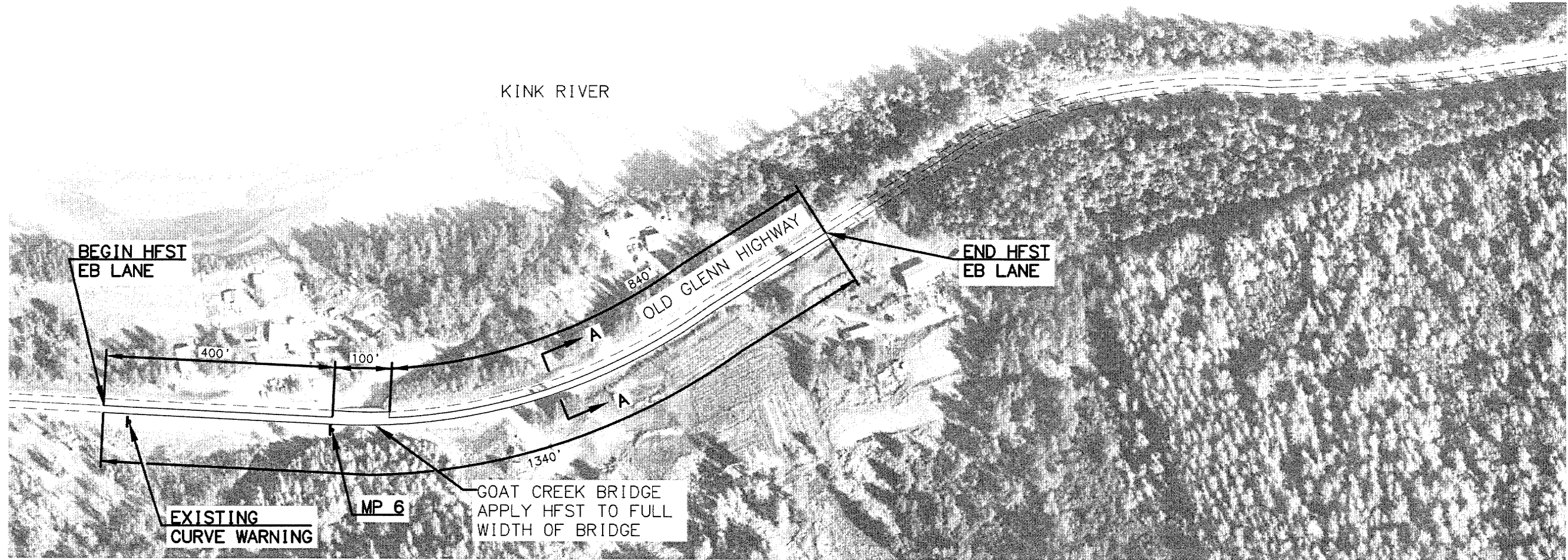
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**OLD GLENN HIGHWAY
MILE 4.5 TO MILE 4.8
MP 5 SITE**

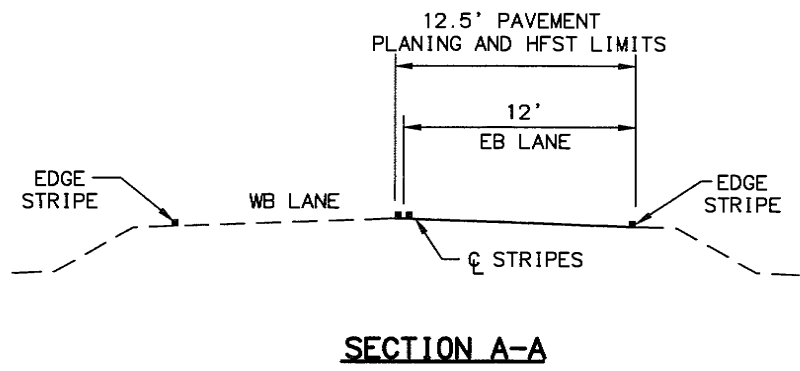
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/Z570920000	2015	F21	F43

SITE #21
(SHEET 1 OF 1)

DESIGNED BY: _____ CHECKED BY: _____ DRAFTED BY: _____
 XREFS: _____ SCALE: _____ LAYOUT: F21
 DATE: 11/4/2015 11:38 AM
 TIME: 11:38 AM
 FILE: Z:\PROJECTS\0101PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.dwg



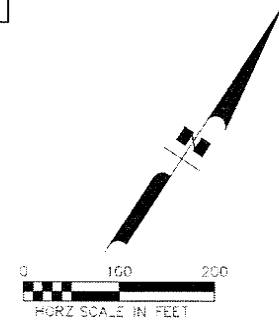
- SITE NOTES:**
1. APPLY THE "HFST ON EXISTING PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
 3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.



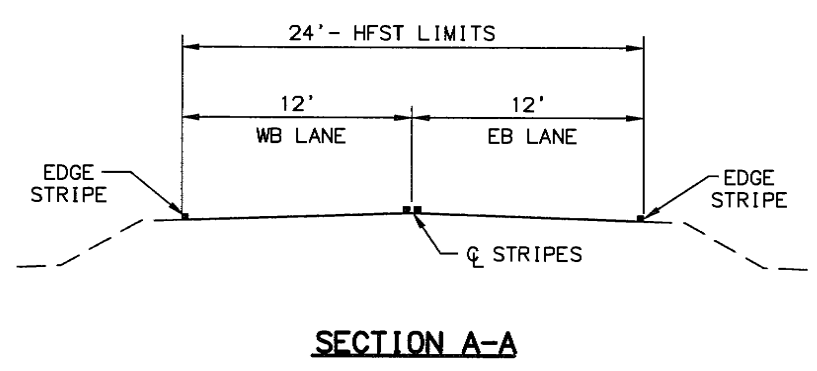
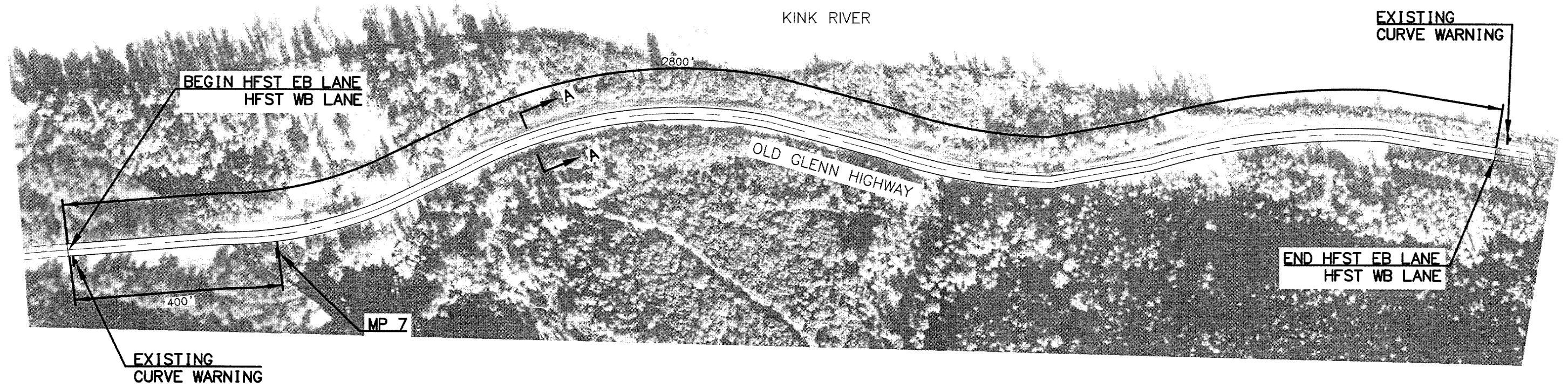
PLANS PREPARED BY KINNEY ENGINEERING, LLC	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT OLD GLENN HIGHWAY MILE 6.0 TO MILE 6.3 MP 6 SITE
--	---

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/Z570920000	2015	F22	F43

SITE #22
(SHEET 1 OF 1)



DESIGNED BY: _____
 CHECKED BY: _____
 DRAFTED BY: _____
 XREFS: _____
 SCALE: _____
 LAYOUT: F22
 DATE TIME: 11/4/2015 1:51 PM
 Z:\PROJECTS\DOT\PP\HSIP\High Friction Surface Treatment\Production\Drawings\0001501_01.dwg
 DRAWING LOCATION: Z:\PROJECTS\DOT\PP\HSIP\High Friction Surface Treatment\Production\Drawings\0001501_01.dwg



SITE NOTES:

1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

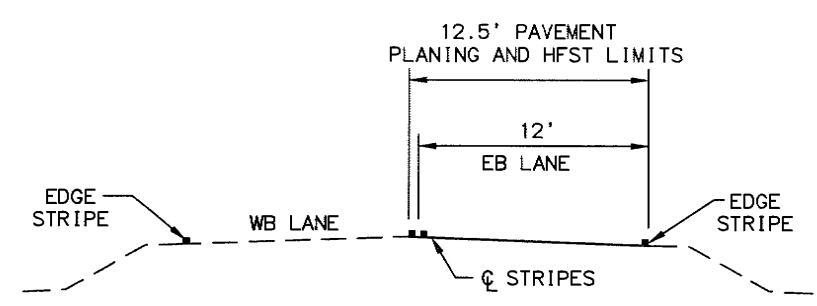
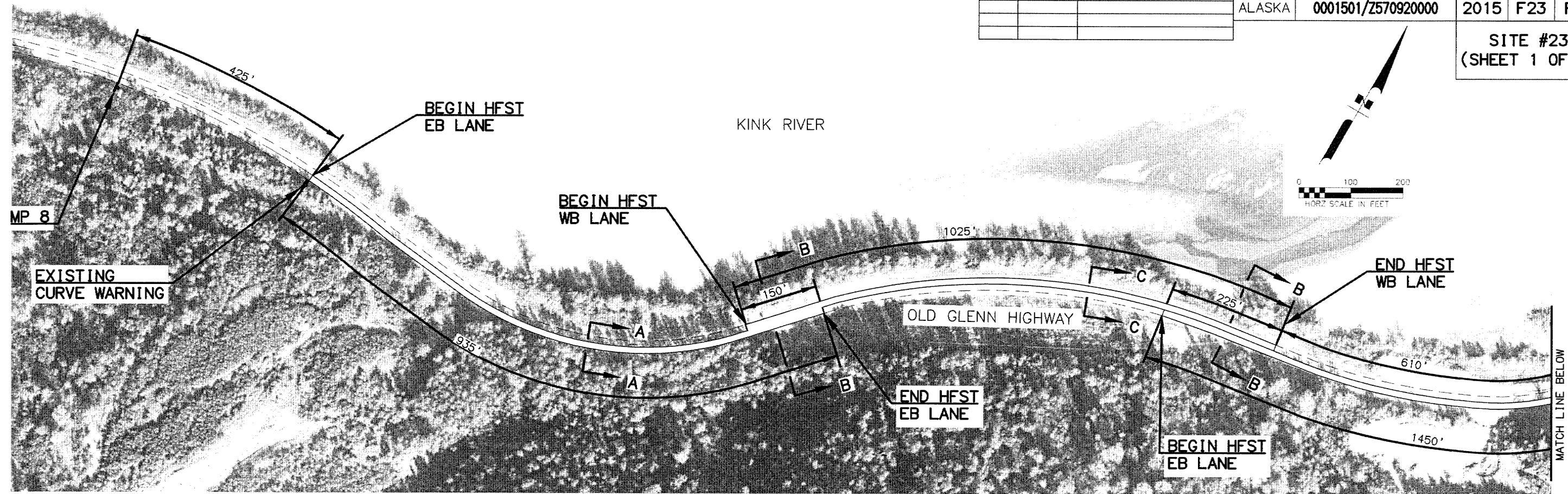
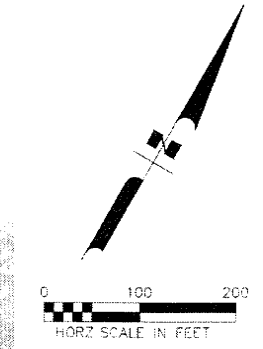
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**OLD GLENN HIGHWAY
MILE 7.1 TO MILE 7.5
MP 7 SITE**

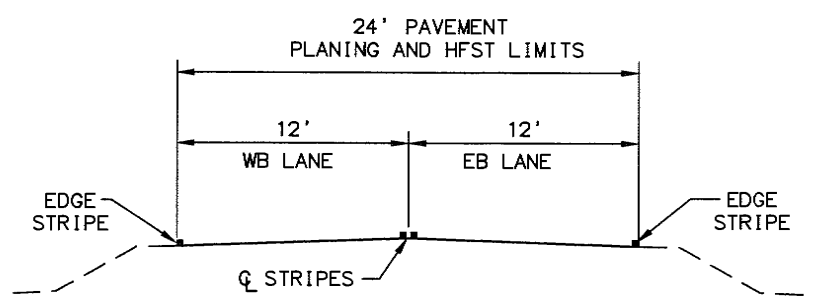
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F23	F43

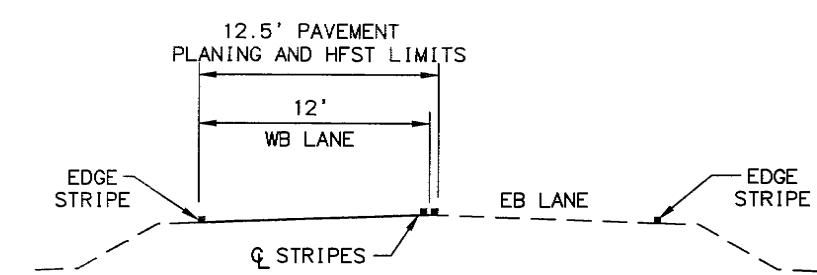
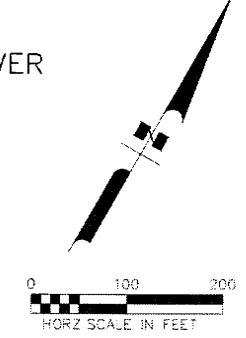
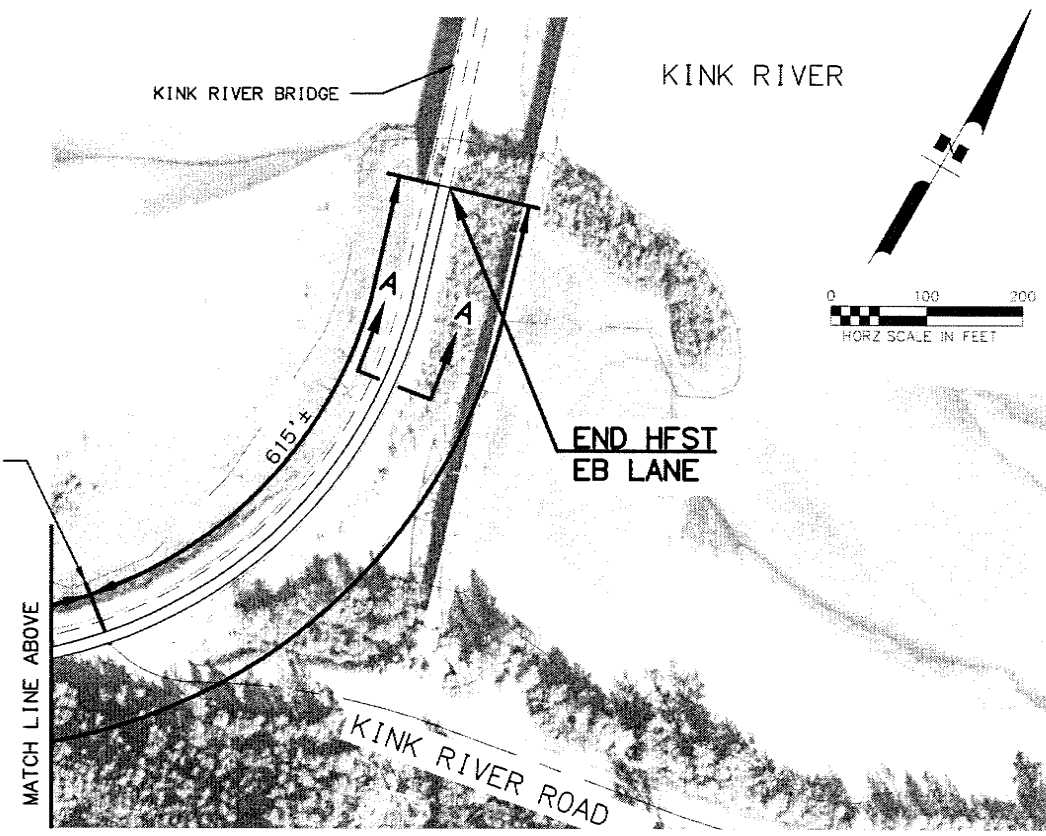
**SITE #23
(SHEET 1 OF 1)**



SECTION A-A



SECTION B-B



SECTION C-C

- SITE NOTES:**
1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
 3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

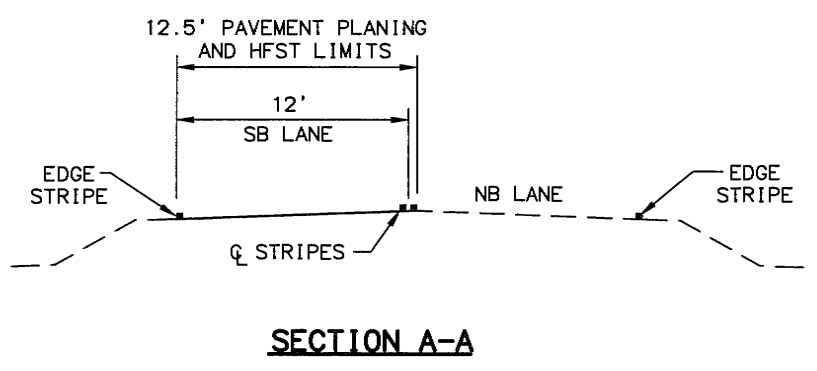
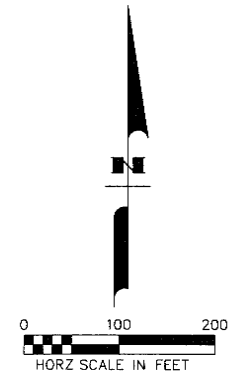
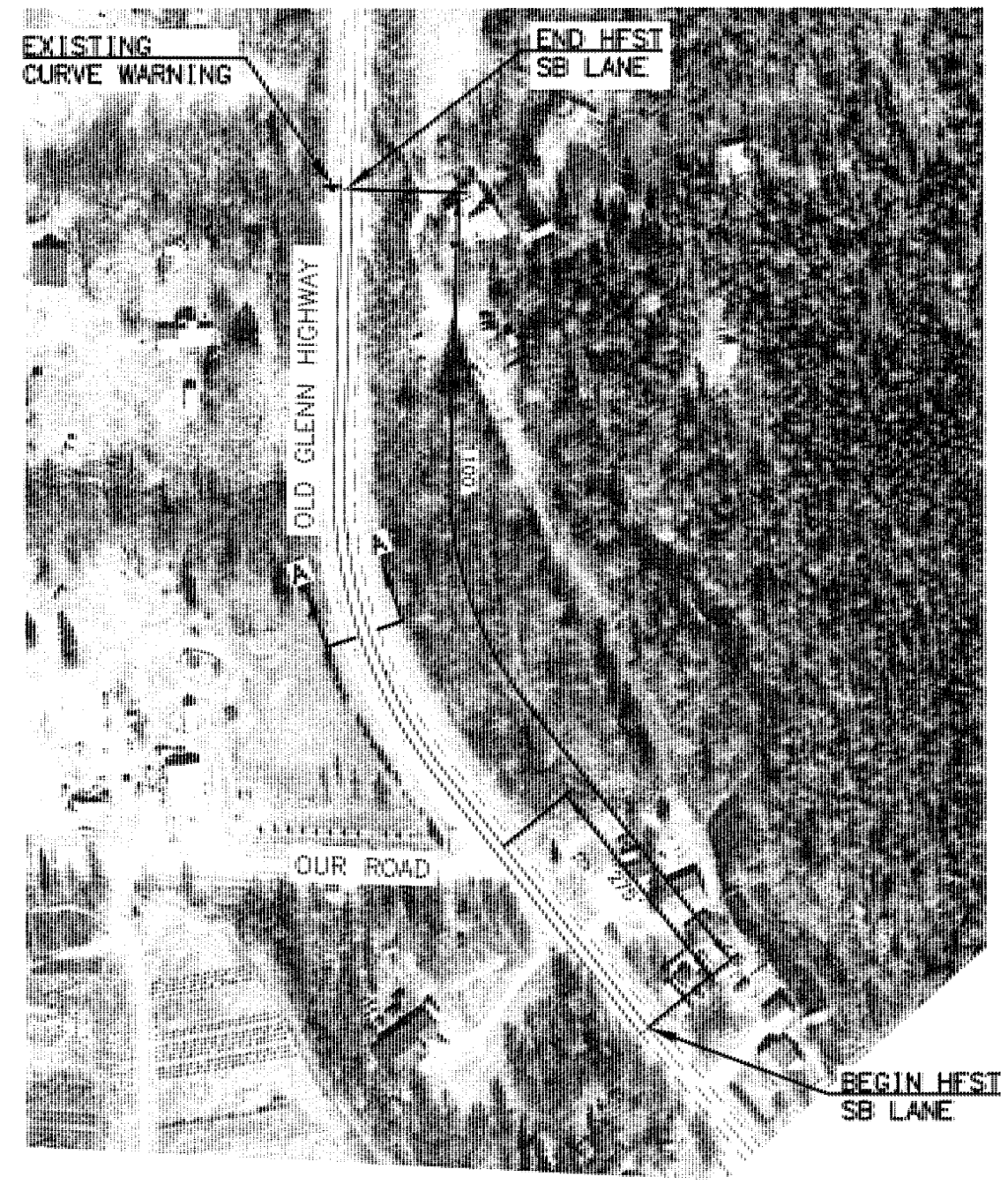
**OLD GLENN HIGHWAY
MILE 8.0 TO MILE 8.6
MP 8 TO KNIK RIVER SITE**

DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\0001501_Old Glenn Hwy.DIF.dwg
 DATE TIME: 11/4/2015 1:51 PM
 LAYOUT: F23
 SCALE: AS SHOWN
 DESIGNED BY: [Redacted]
 CHECKED BY: [Redacted]
 DRAFTED BY: [Redacted]

DRAWING LOCATION: Z:\PROJECTS\DOT\PE\VisIP_High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.DHF.dwg
 DATE TIME: 11/4/2015 11:38 AM
 LAYOUT: F24
 SCALE:
 DESIGNED BY: XREFS
 CHECKED BY:
 DRAFTED BY:

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F24	F43
SITE #24 (SHEET 1 OF 1)				



SITE NOTES:

1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

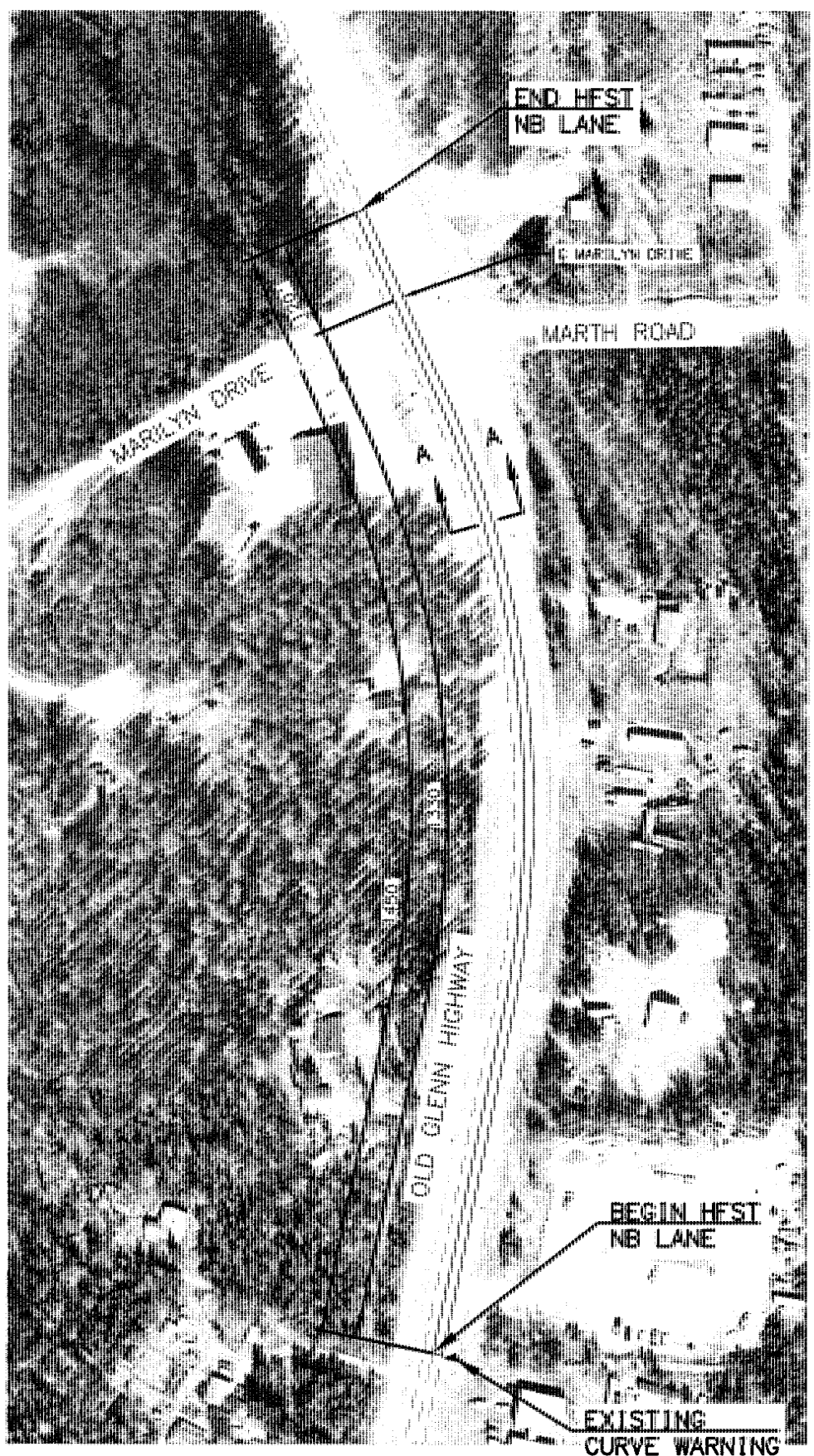
PLANS PREPARED BY

KINNEY ENGINEERING, LLC

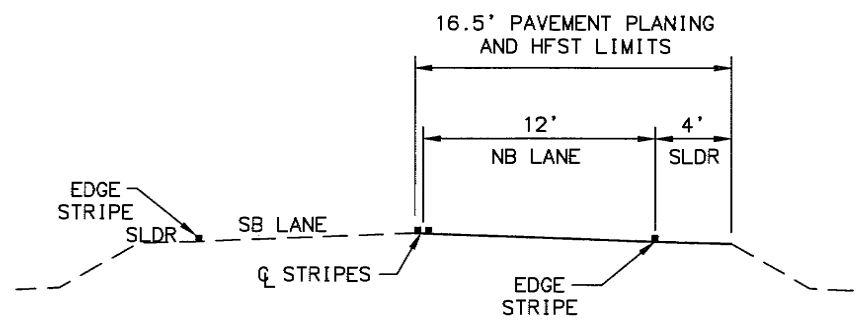
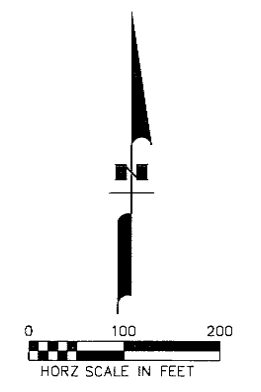
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

**OLD GLENN HIGHWAY
 MILE 9.72 TO MILE 9.9
 OUR ROAD SITE**

DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\0001501_01d Glenn Hwy.DWF.dwg
 DATE TIME: 11/4/2015 1:51 PM
 LAYOUT: F25
 SCALE:
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:



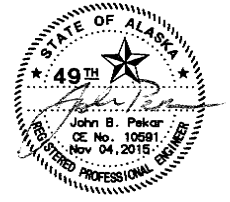
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/2570920000	2015	F25	F43



SECTION A-A

SITE NOTES:

1. APPLY THE "HFST ON PLANED PAVEMENT" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

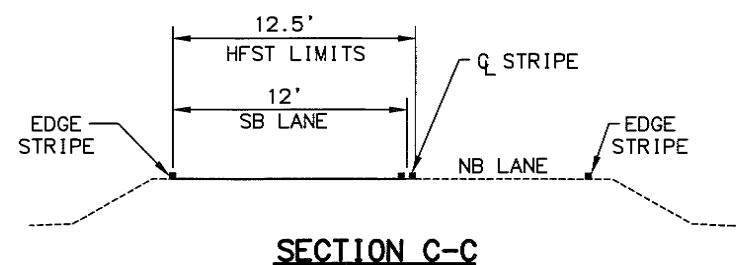
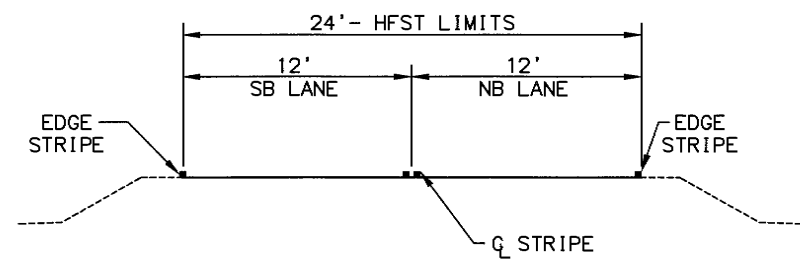
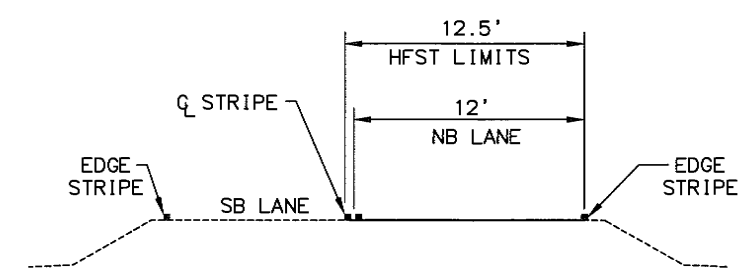
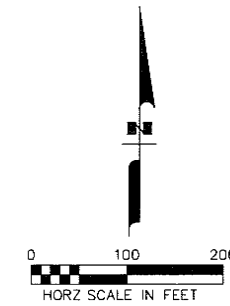
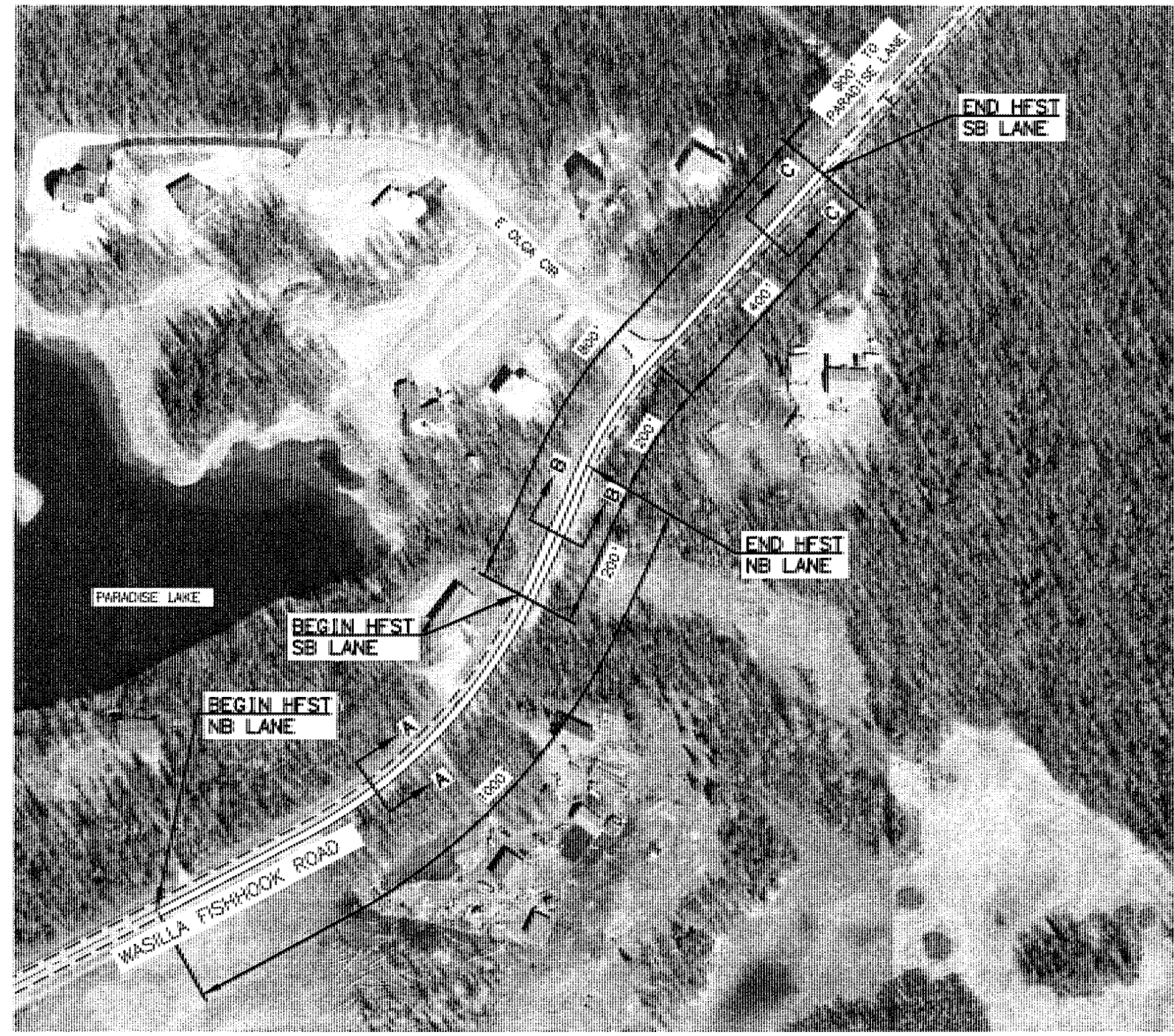
PLANS PREPARED BY  JOHN B. PEKAR REGISTERED PROFESSIONAL ENGINEER	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT OLD GLENN HIGHWAY MILE 11.9 TO MILE 12.1
KINNEY ENGINEERING, LLC	

DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_WFRD_30.dwg
 DATE: 11/4/2015 11:40 AM
 LAYOUT: F26
 SCALE:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:
 XREFS:

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F26	F43

SITE #26
(SHEET 1 OF 1)



- SITE NOTES:**
1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
 2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
 3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

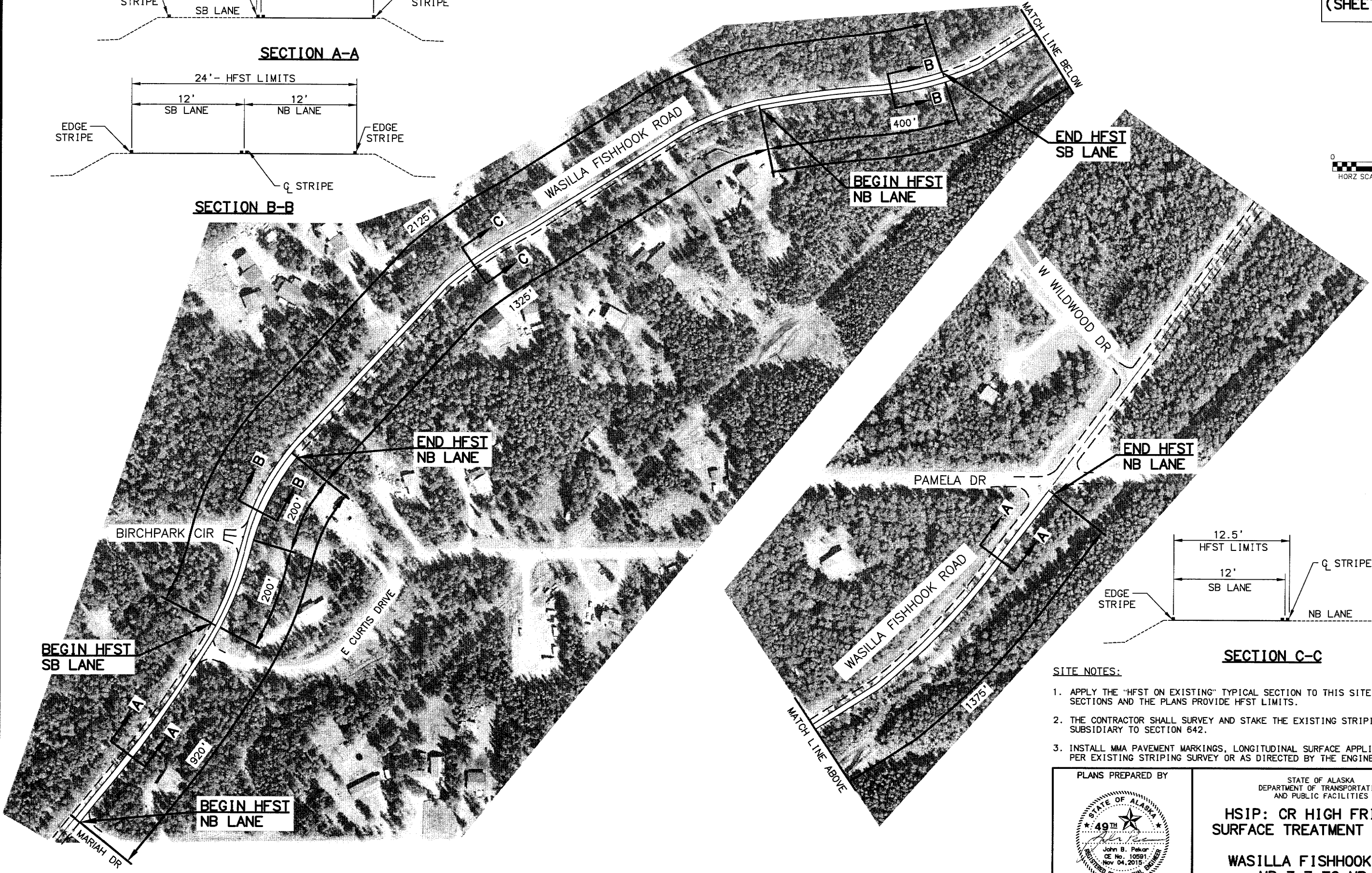
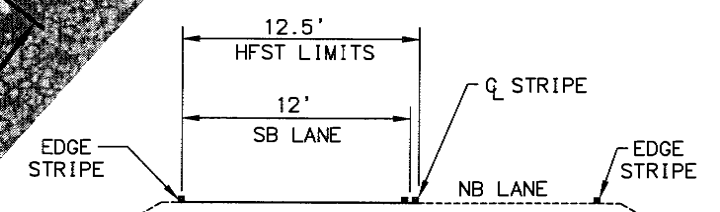
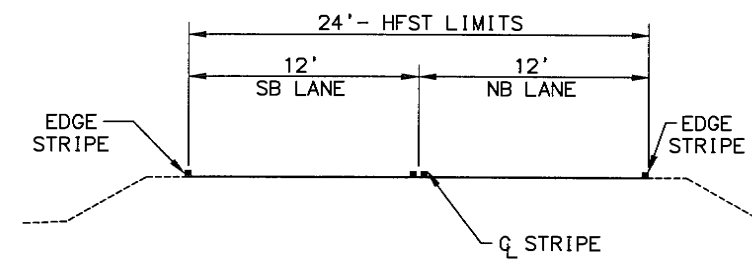
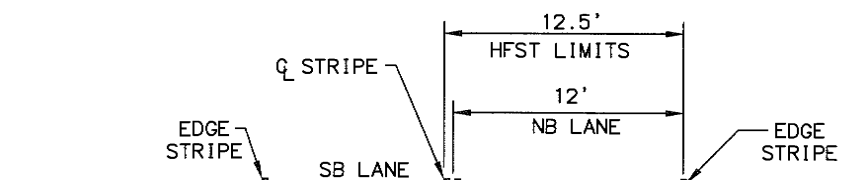
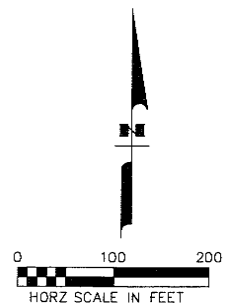
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**WASILLA FISHHOOK ROAD
MP 3.7 TO MP 4
(LAKEVIEW RD TO PARADISE LN)**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	F27	F43

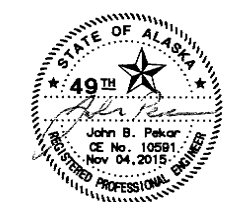
SITE #27
(SHEET 1 OF 1)



SITE NOTES:

1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

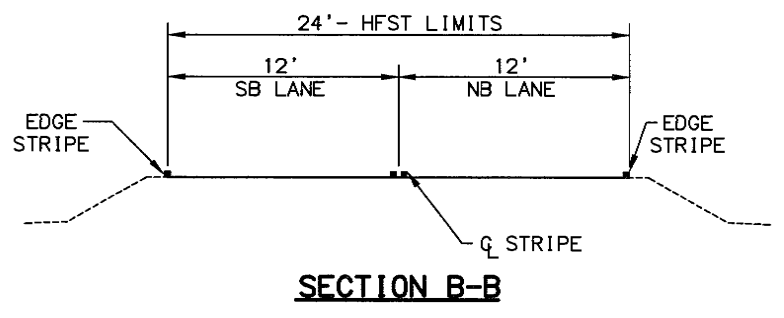
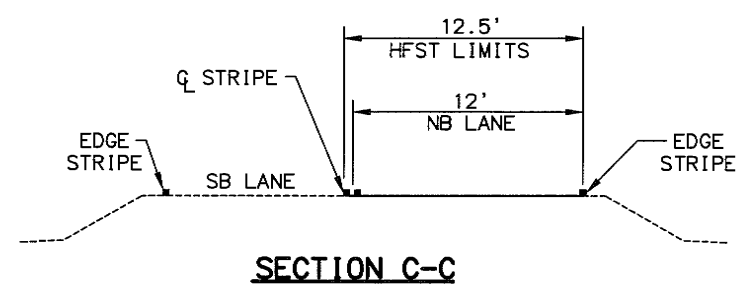
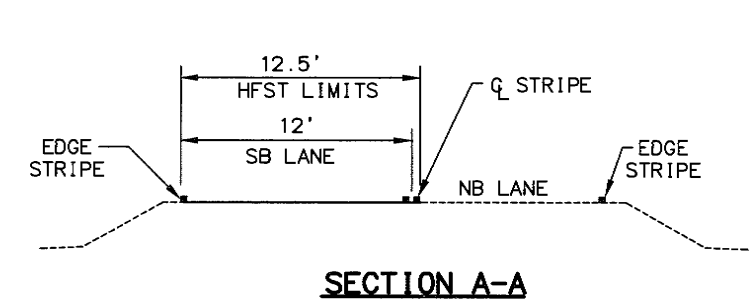
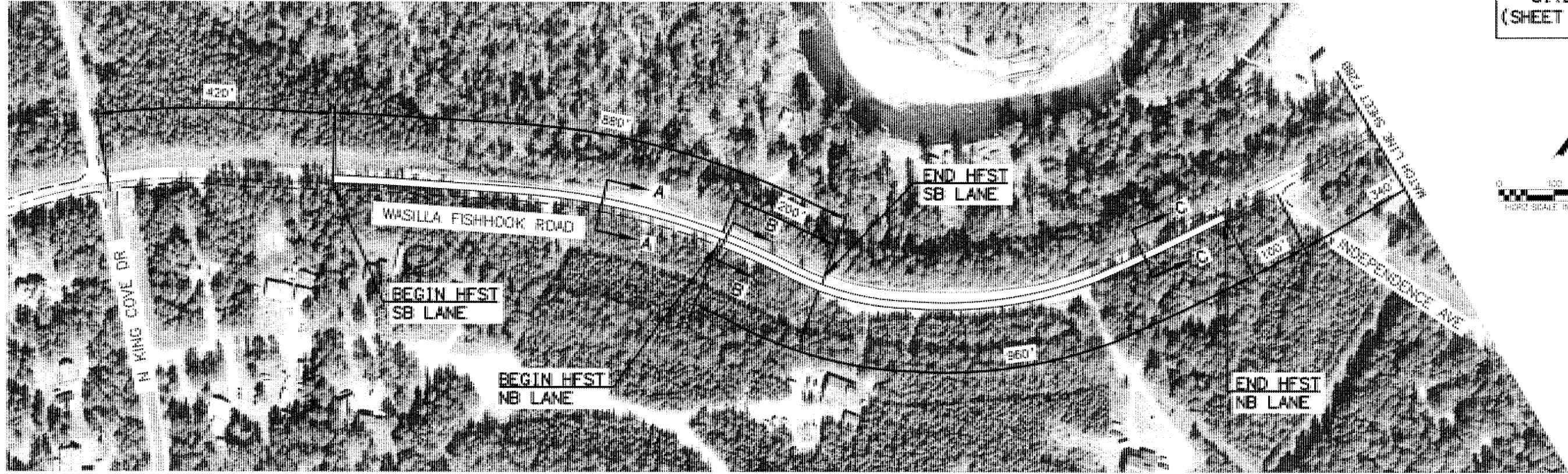
**WASILLA FISHHOOK ROAD
MP 3.7 TO MP 4
(MARIAH DR TO WILDWOOD DR)**

DRAWING LOCATION: Z:\PROJECTS\0101PF\HSIP High Friction Surface Treatment\Production Drawings\0001501_WFRD_30.dwg
 DATE TIME: 11/4/2015 11:40 AM
 LAYOUT: F27
 SCALE:
 XREFS:
 DESIGNED BY:
 CHECKED BY:
 DRAFTED BY:

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F28A	F43

SITE #28
(SHEET 1 OF 3)



SITE NOTES:

1. APPLY THE "HFST ON EXISTING" TYPICAL SECTION TO THIS SITE. SITE SECTIONS AND THE PLANS PROVIDE HFST LIMITS.
2. THE CONTRACTOR SHALL SURVEY AND STAKE THE EXISTING STRIPING SUBSIDIARY TO SECTION 642.
3. INSTALL MMA PAVEMENT MARKINGS, LONGITUDINAL SURFACE APPLIED PER EXISTING STRIPING SURVEY OR AS DIRECTED BY THE ENGINEER.

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

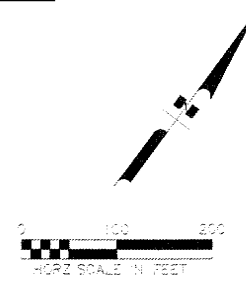
**WASILLA FISHHOOK ROAD
MP 5.2 TO MP 6.0
(KING COVE DR TO MCCASEY DR)**

DRAWING LOCATION: Z:\PROJECTS\DOT\PF\HSIP High Friction Surface Treatment\Production\Drawings\0001501_WFRD_30.dwg
 DATE TIME: 11/4/2015 11:40 AM
 LAYOUT: F28A
 SCALE:
 DESIGNED BY: XREFS
 CHECKED BY:
 DRAFTED BY:

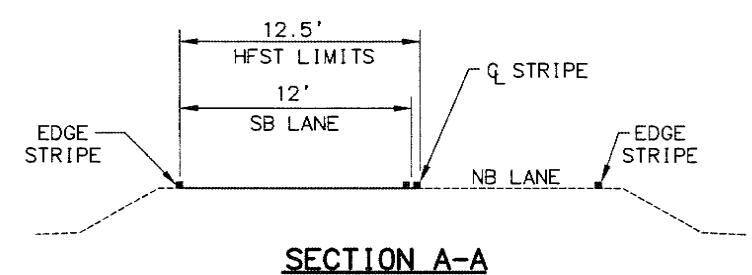
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/2570920000	2015	F28B	F43

SITE #28
(SHEET 2 OF 3)



DRAWING LOCATION: Z:\PROJECTS\001PR\HSIP High Friction Surface Treatment\Production Drawings\0001501_WFRD_30.dwg
 DATE TIME: 9/9/2015 3:12 PM
 LAYOUT: F28B
 SCALE:
 SHEETS:
 DESIGNED BY:
 CHECKED BY:
 DRAWN BY:
 DATE:
 TIME:
 PROJECT:
 SHEET:
 SCALE:
 LAYOUT:
 F28B



PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

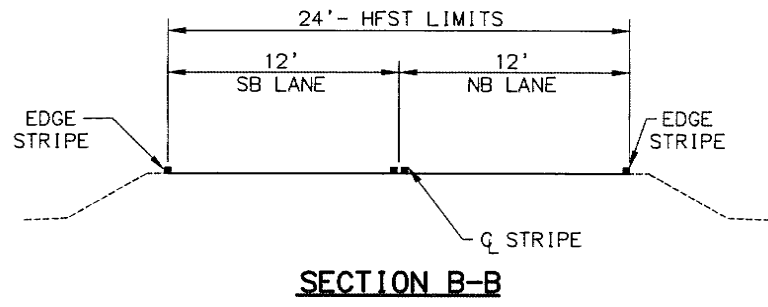
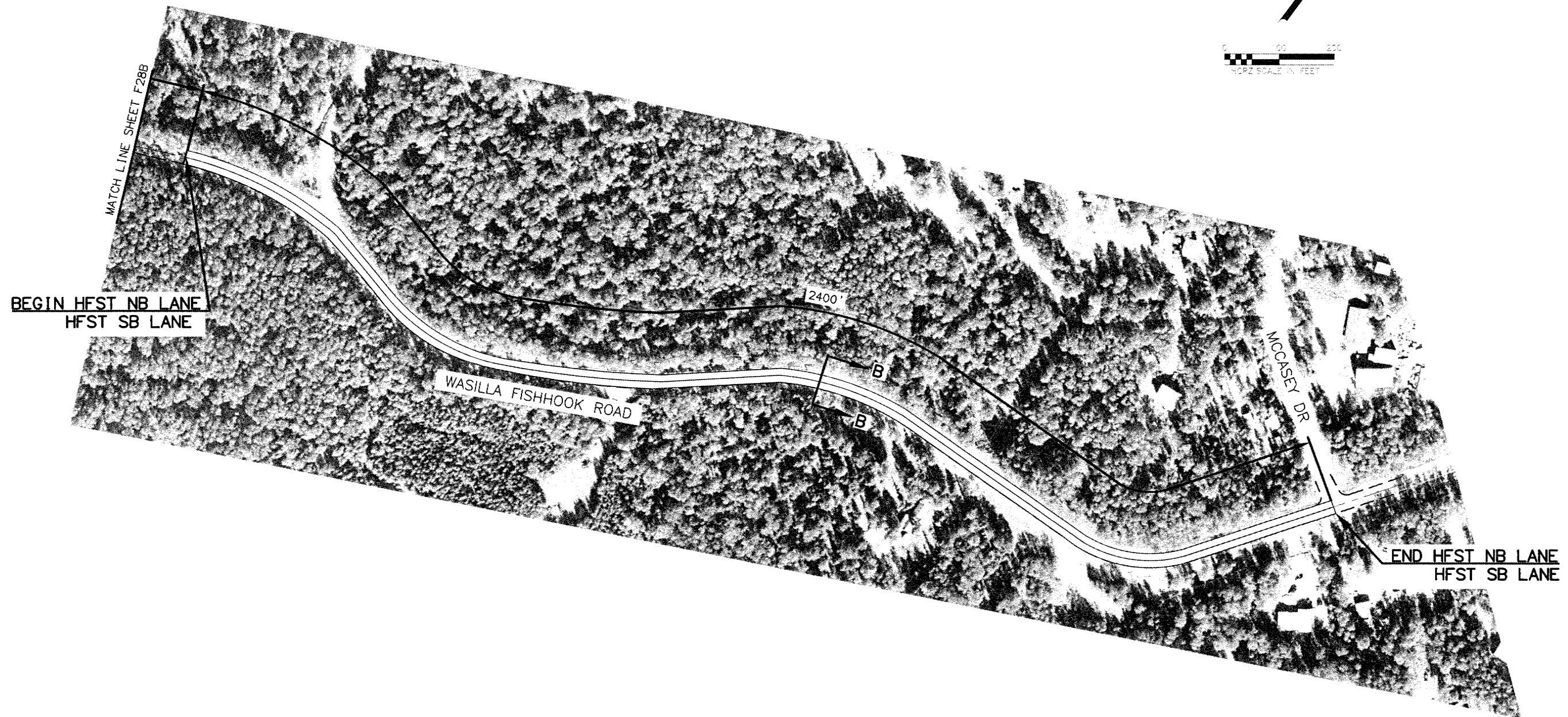
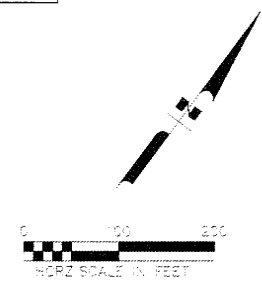
**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**WASILLA FISHHOOK ROAD
MP 5.2 TO MP 6.0
(KING COVE DR TO MCCASEY DR)**

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	F28C	F43

SITE #28
(SHEET 3 OF 3)



DRAWING LOCATION: Z:\PROJECTS\001PH\HSIP High Friction Surface Treatment\Production Drawings\0001501_WFRD_30.dwg
 DATE TIME: 9/9/2015 3:12 PM
 LAYOUT: F28C
 SCALE: SHEETS:

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES







**HSIP: CR HIGH FRICTION
SURFACE TREATMENT PROJECT**

**WASILLA FISHHOOK ROAD
MP 5.2 TO MP 6.0
(KING COVE DR TO MCCASEY DR)**

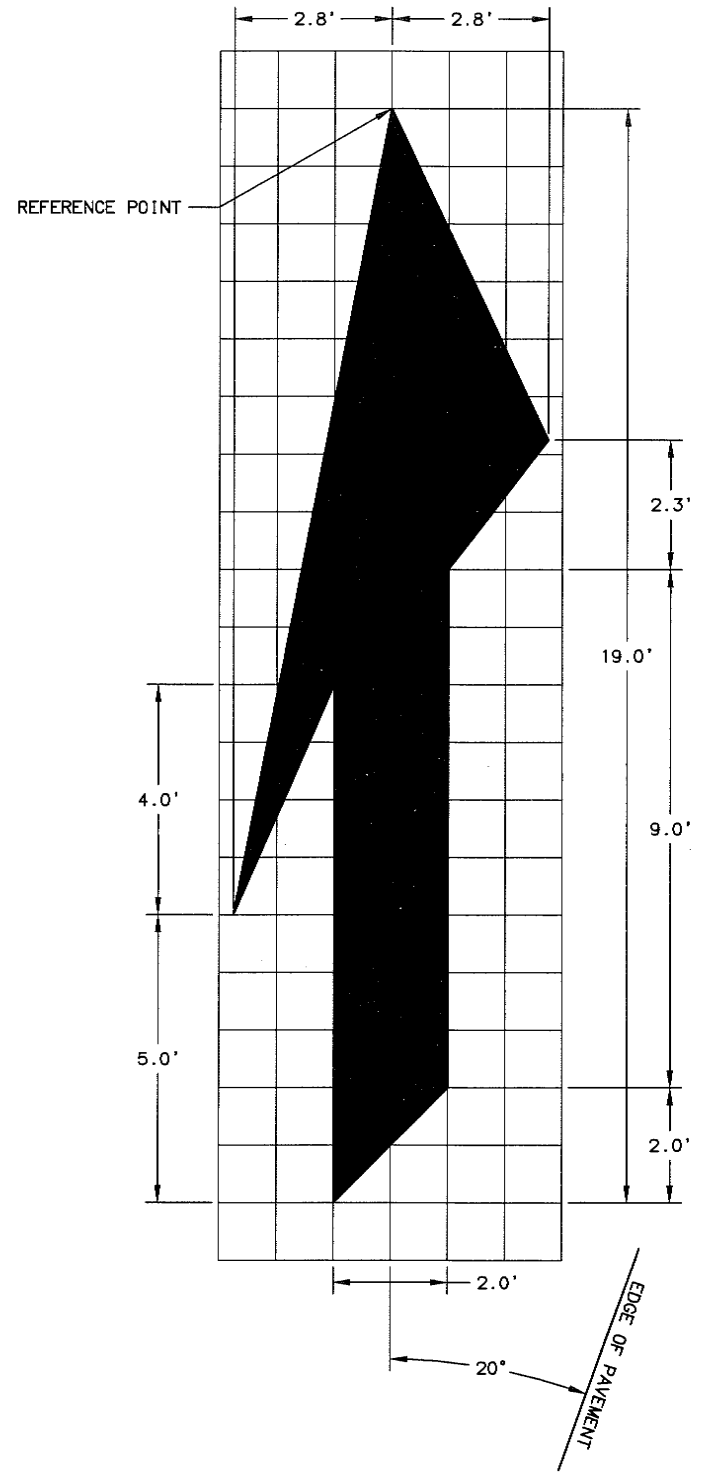
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/7570920000	2015	H1	H4

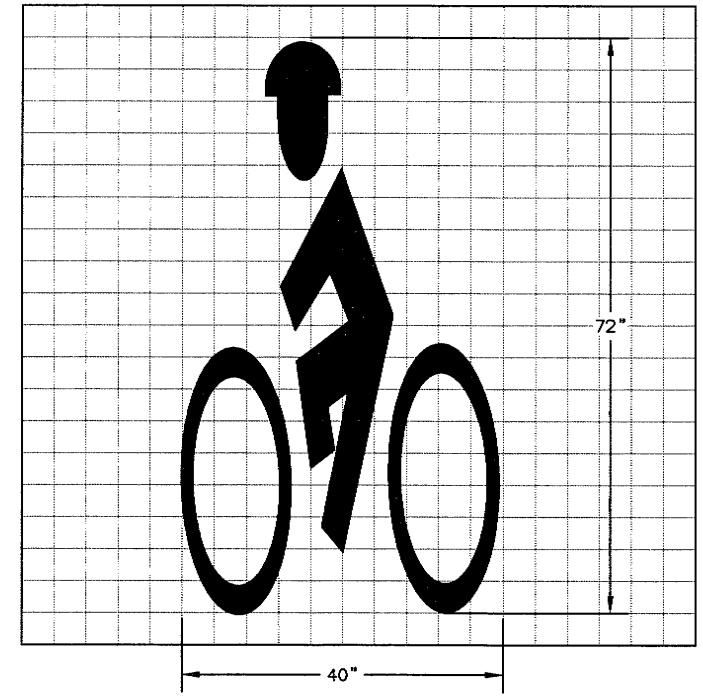
DESIGNED BY: AJ/JP
 CHECKED BY: AJ/JP
 DRAFTED BY: BSB
 XREFS: N/A
 SCALE: N/A
 LAYOUT: HI
 DATE: 11/4/2015 10:26 AM
 TIME: 10:26 AM
 FILE: Z:\PROJECTS\001PP\HSIP High Friction Surface Treatment\Production Drawings\757092_H Sign Summary.dwg

SIGN SUMMARY													
PAGE NO.	POST #	LOCATION	CENTERLINE REFERENCE	TYPE	LEGEND	SIZE (IN)		AREA (SQ FT)	SIGN FACES	POSTS NO., SIZE, & TYPE	FRAMED		REMARKS
						WIDTH	HEIGHT				YES	NO	
F5A	1	565' SOUTH OF MP 15	22.75' RIGHT*	W1-2L		36	36	9	S	EXISTING POST	X		REMOVE EXISTING W1-5L "WINDING ROAD TO LEFT" AND W13-1 "50 MPH" ADVISORY PLATE FROM EXISTING POST. SIGN LOCATED BEHIND GUARDRAIL.
				W13-1		24	24	4				X	
F5A	2	550' NORTH OF MP 15	22.75' LEFT*	W1-2R		36	36	9	N	3" X 3" T	X		SIGN LOCATED BEHIND GUARDRAIL.
				W13-1		24	24	4				X	
F5A	3	590' NORTH OF MP 15	22.75' RIGHT*	W1-4R		36	36	9	S	3" X 3" T	X		SIGN LOCATED BEHIND GUARDRAIL.
F5B	4	1360' SOUTH OF GRAYLING CREEK CULVERT	22.75' LEFT*	W1-4R		36	36	9	S	3" X 3" T	X		REMOVE EXISTING W1-5R "WINDING ROAD TO RIGHT" AND W-13 "50 MPH" SIGNS AND POST LOCATED APPROXIMATELY 1000' SOUTH OF GRAYLING CREEK CULVERT. SIGN LOCATED BEHIND GUARDRAIL.

* OFFSET DISTANCE IS APPROXIMATE. LOCATE SIGN IN ACCORDANCE WITH STANDARD DRAWING S-05.01.

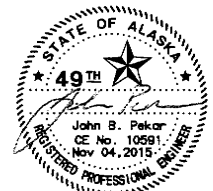


RIGHT LANE DROP ARROW



BIKE LANE LAYOUT TEMPLATES FOR STENCILS
 NTS (DR MARTIN LUTHER KING, JR. AVENUE)

PLANS PREPARED BY



KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

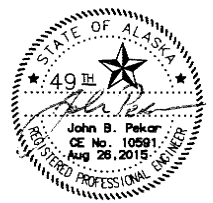
**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

SIGN SUMMARY

DRAWING LOCATION Z:\PROJECTS\DOT\PF\HSIP\High Friction Surface Treatment\Production Drawings\57092_H_Sign_Summary.dwg
 DATE TIME 7/21/2015 9:49 AM
 LAYOUT H2
 SCALE N/A
 REFS N/A
 DESIGNED BY AJ/JP
 CHECKED BY AJ/JP
 DRAFTED BY ESB

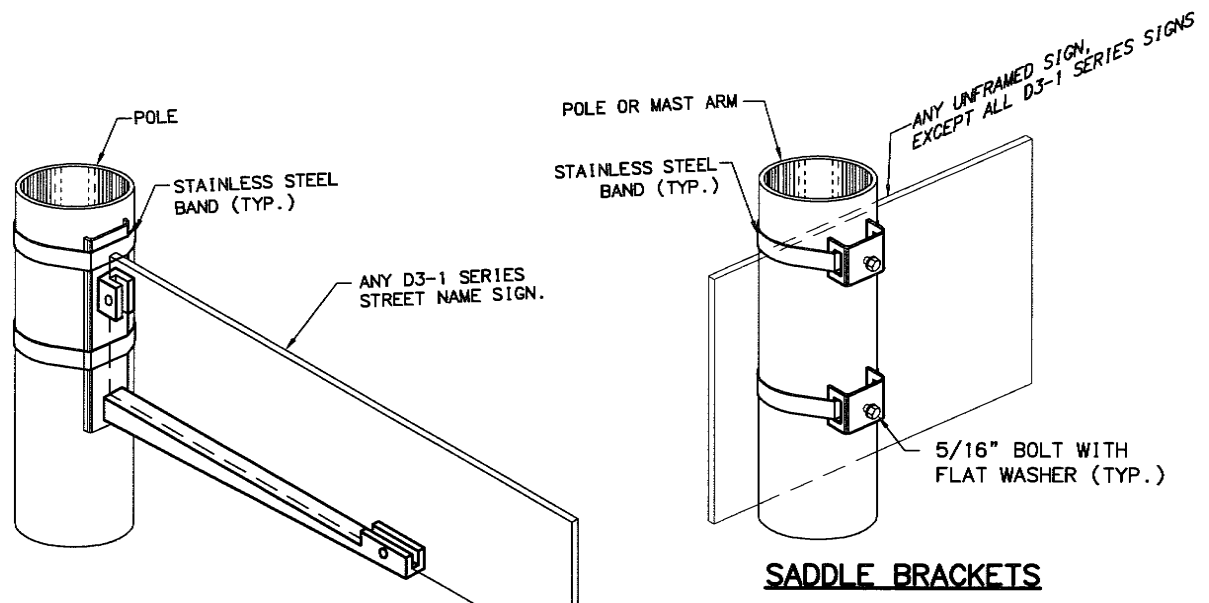
REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION	ALASKA	0001501/7570920000	2015	H2	H4

SIGN SALVAGE								
PAGE NO.	LOCATION	CENTERLINE REFERENCE	TYPE	LEGEND	NUMBER OF CONTRACTOR SALVAGED SIGNS	POST		REMARKS
						REMOVE	LEAVE IN PLACE	
F5A	565' SOUTH OF MP 15	RIGHT	W1-5L	WINDING ROAD LEFT	1		X	SIGNPOST #1 IN SIGN SUMMARY.
F5B	1000' SOUTH OF GRAYLING CREEK CULVERT	LEFT	W1-5R	WINDING ROAD TO RIGHT	1			
			W13-1	50 MPH ADVISORY SPEED PLATE	1	X		

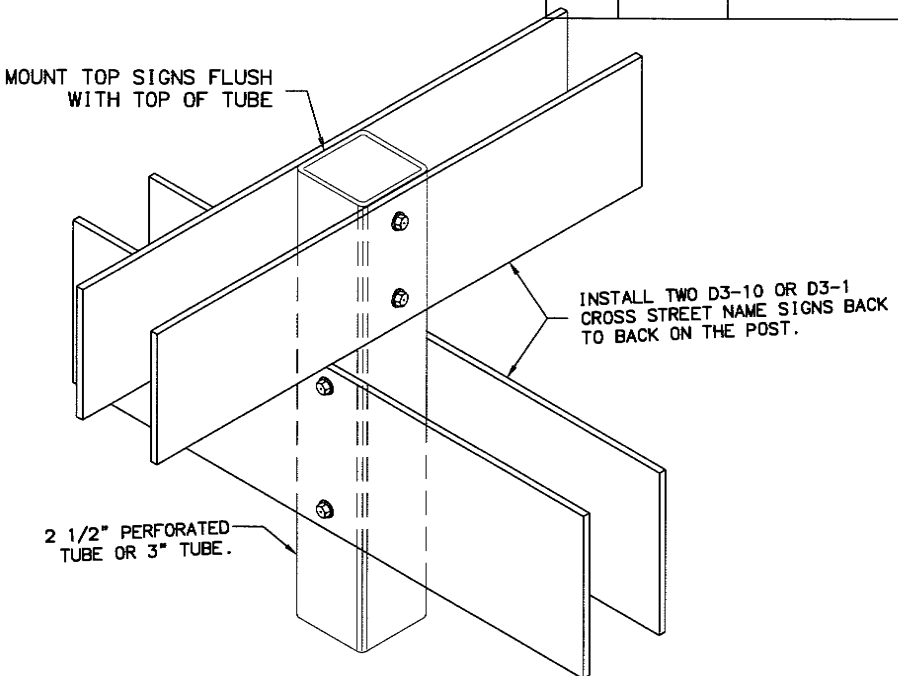
PLANS PREPARED BY  JOHN B. PEKAR REGISTERED PROFESSIONAL ENGINEER	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT SIGN SALVAGE SUMMARY
KINNEY ENGINEERING, LLC	

DESIGNED BY: AJ/IP
 CHECKED BY: AJ/IP
 DRAFTED BY: BSS
 REFS: N/A
 SCALE: N/A
 LAYOUT: H3
 DATE TIME: 7/21/2015 9:48 AM
 Z:\PROJECTS\DOT\HSIP High Friction Surface Treatment\Production Drawings\57092_H3_H4 Sign Details.dwg
 DRAWING LOCATION: Z:\PROJECTS\DOT\HSIP High Friction Surface Treatment\Production Drawings\57092_H3_H4 Sign Details.dwg

REVISIONS			STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
NO.	DATE	DESCRIPTION					
	06/27/2013	CENTRAL REGION DETAIL - REPLACES STD. DWG.	ALASKA	0001501/7570920000	2015	H3	H4
		S-20.10					

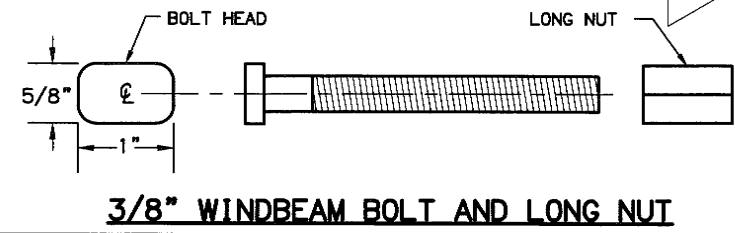
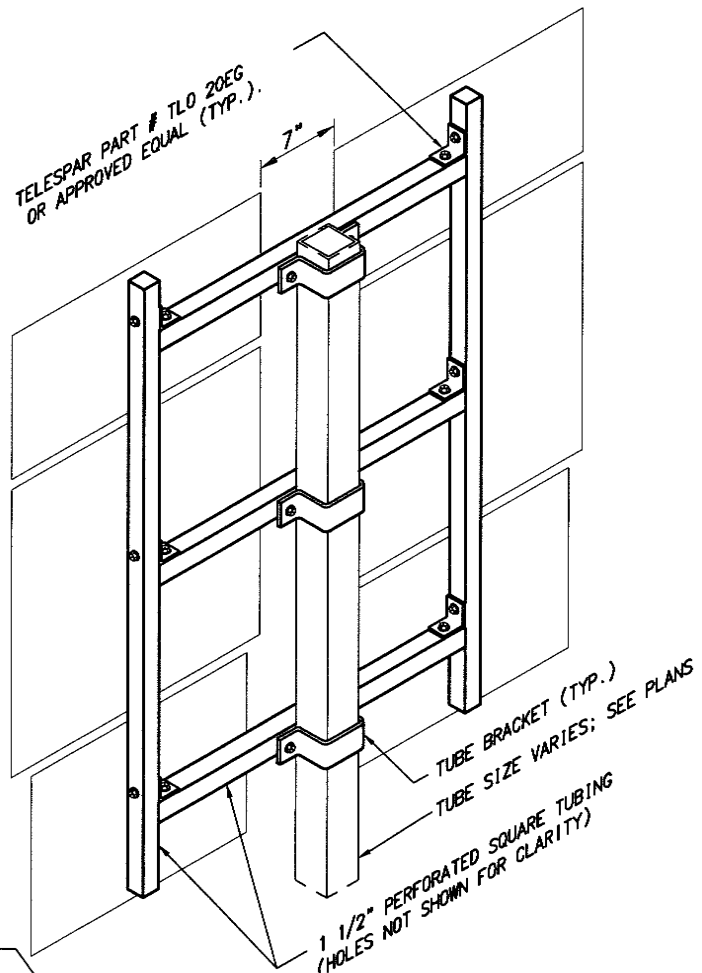
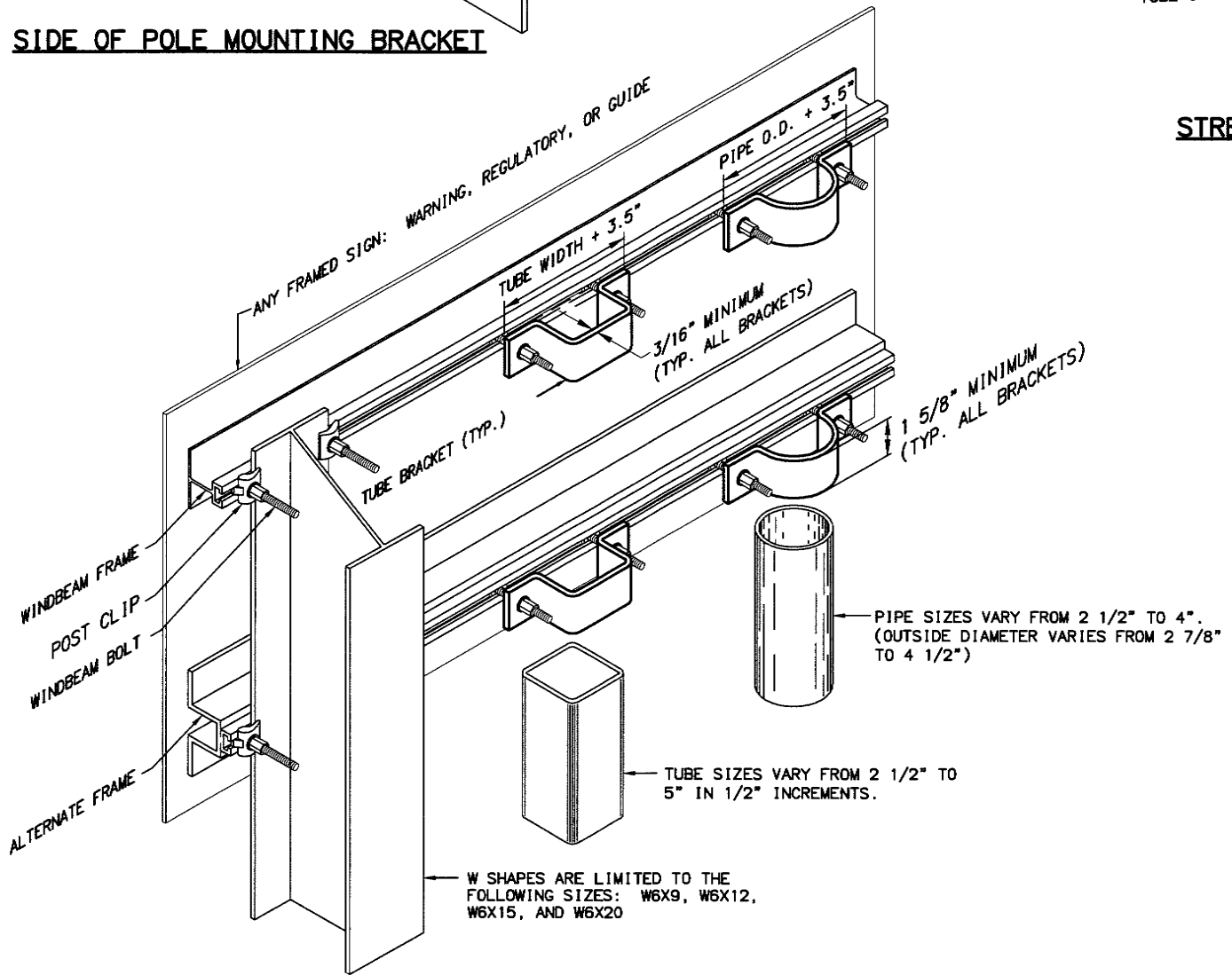


SIDE OF POLE MOUNTING BRACKET



NOTES:

- EXCEPT FOR POLES AND MAST ARMS, ONLY USE TUBES TO SUPPORT SIGNS MOUNTED ON ONE POST.
- ATTACH SIGNS, FRAMED AND UNFRAMED TO THEIR SUPPORTS WITH ZINC PLATED 3/8" BOLTS, EXCEPT ATTACH UNFRAMED SIGNS TO PERFORATED TUBES WITH ACCESSORY DRIVE RIVETS AND TO SADDLES WITH 5/16" BOLTS.
- BOLT UNFRAMED SIGNS DIRECTLY TO TUBES, AND ATTACH THEM TO POLES AND MAST ARMS WITH TWO SADDLES.
- ATTACH BRACKETS TO POLES AND MAST ARMS WITH DOUBLE WRAPS OF 3/4" WIDE BY 0.020" THICK STAINLESS STEEL BANDING MATERIAL. TIGHTEN EACH BAND UNTIL IT STOPS MOVING THROUGH THE BUCKLE.
- ATTACH FRAMED SIGNS TO POSTS WHEREVER THE FRAMES CROSS THE POSTS. AT EACH CROSSING, ATTACH THE SIGN USING TWO POST CLIPS ON W-SHAPE POSTS, A U-SHAPED BRACKET ON PIPES, AND A BRACKET WITH SQUARE CORNERS ON TUBES.
- THE TUBE BRACKETS USED ON EVEN INCH SIZE TUBES MAY ALSO BE USED ON TUBES 1/2" SMALLER IN SIZE.
- ONLY USE THE SPECIAL WINDBEAM BOLTS TO ATTACH SIGNS FRAMED WITH THE WINDBEAM FRAMING MATERIAL.
- ATTACH FRAMED SIGNS TO POLES AND MAST ARMS USING POLE PLATES INSTALLED ACCORDING TO STANDARD DRAWING S-23.00
- FOR ROUTE MARKER TREES, CUT PERFORATED TUBES TO ENSURE TIGHT FITTING JOINTS. ASSEMBLE THE PIECES WITH ACCESSORY ELL-SHAPED ANGLE BRACKETS.
- INSTALL THE TOP EDGE OF SIGNS 1" ABOVE THE TOPS OF POSTS, EXCEPT FOR THE D3-1 STREET NAME SIGNS.
- INSTALL THE TOP EDGE OF SIGNS 3" BELOW THE TOP OF POST, WHENEVER THEY ARE MOUNTED BELOW SIGNS SECURED BY POST TOP MOUNTING BRACKETS.
- THE BRACKET DETAILS SHOWN INDICATE GENERAL DESIGNS ONLY. DESIGNS MAY VARY BY MANUFACTURER.
- INSTALL WEATHER TIGHT CAPS ON ALL PIPE AND TUBE POSTS, EXCEPT PERFORATED TUBING.



FASTENER SPECIFICATION TABLE

FASTENERS	STEEL	STAINLESS STEEL
BOLTS	ASTM A 307	ASTM F 593
NUTS	REGULAR ASTM A 563	LOCK ASTM F 594
WASHERS	ASTM A 36	ASTM A 480
POST CLIPS		

PLANS PREPARED BY

KINNEY ENGINEERING, LLC

STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

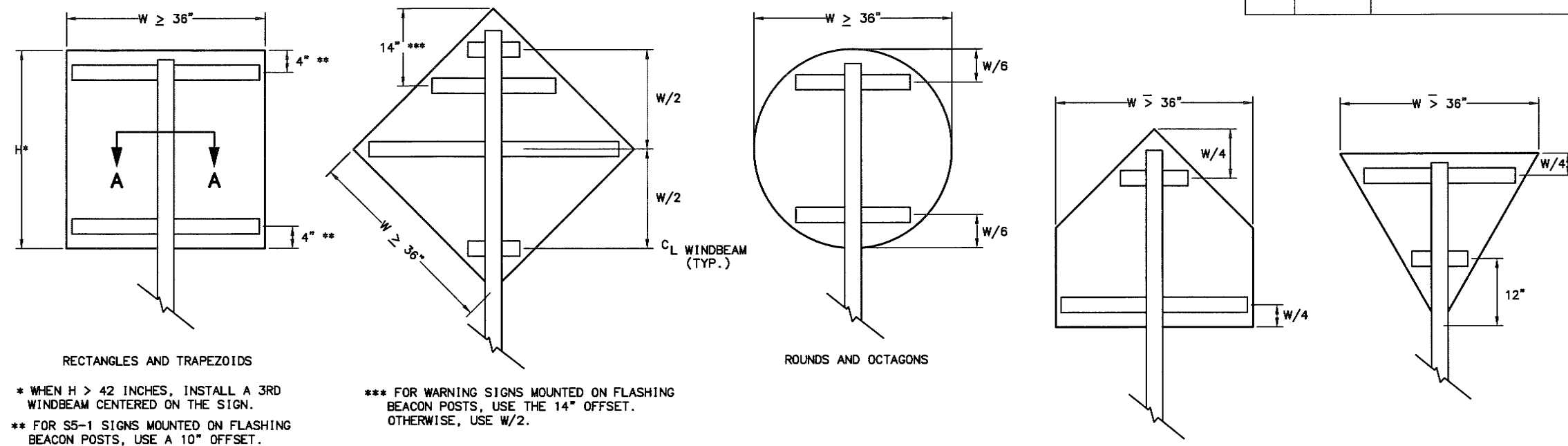
HSIP: CR HIGH FRICTION SURFACE TREATMENT PROJECT

SIGN ATTACHMENT DETAILS

DESIGNED BY: AJ/JIP
 CHECKED BY: AJ/JIP
 DRAFTED BY: BSB
 XREFS: N/A
 SCALE: N/A
 LAYOUT: H4
 DATE: TIME: 7/21/2015 9:48 AM
 Z:\PROJECTS\DOT\F\HSIP High Friction Surface Treatment\Production Drawings\57092_H3_H4 Sign Details.dwg

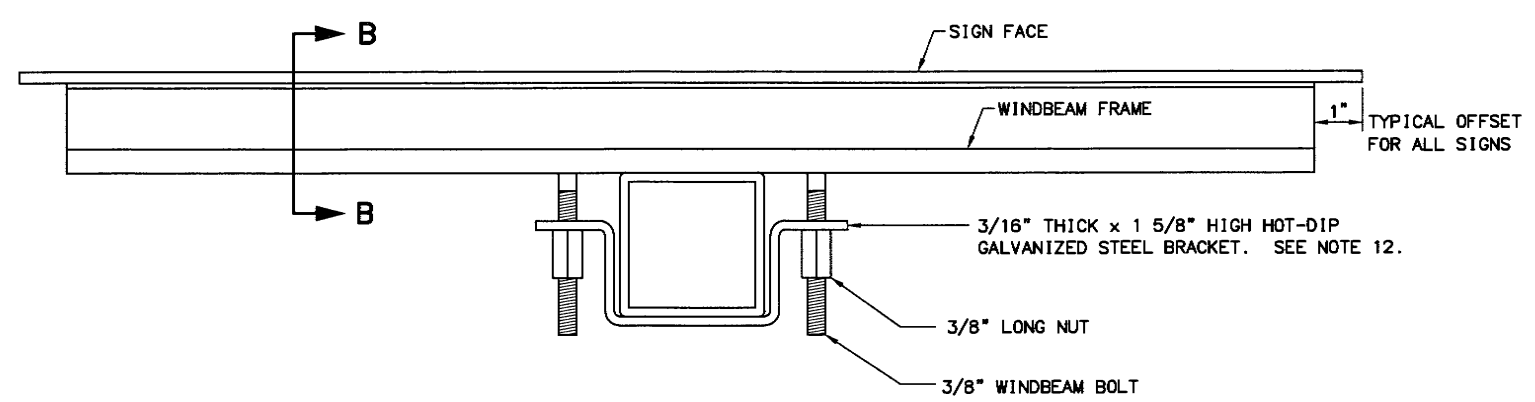
REVISIONS		
NO.	DATE	DESCRIPTION
1	03/04/2014	CENTRAL REGION DETAILS - THESE DETAILS SUPPLEMENT ONLY THE LIGHT SIGN FRAMING DETAILS AND SIGN POST SPACING NOTE 2.B. ON STD. DWG. 9-00.11, AND ENTIRELY REPLACES STD. DWG. 9-01.00

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	0001501/Z570920000	2015	H4	H4

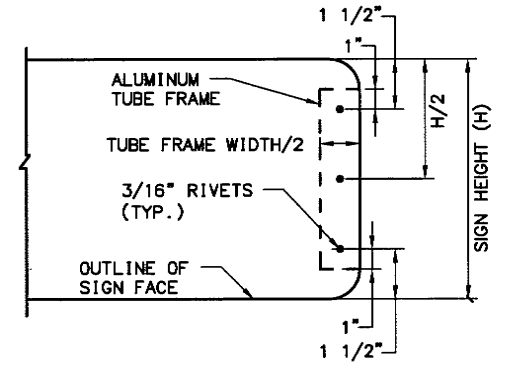


WINDBEAM LOCATIONS FOR EACH SIGN SHAPE
 ELEVATION VIEW

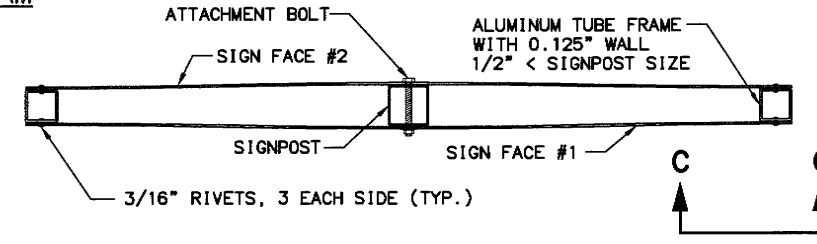
* WHEN H > 42 INCHES, INSTALL A 3RD WINDBEAM CENTERED ON THE SIGN.
 ** FOR S5-1 SIGNS MOUNTED ON FLASHING BEACON POSTS, USE A 10" OFFSET. OTHERWISE, USE 4".
 *** FOR WARNING SIGNS MOUNTED ON FLASHING BEACON POSTS, USE THE 14" OFFSET. OTHERWISE, USE W/2.



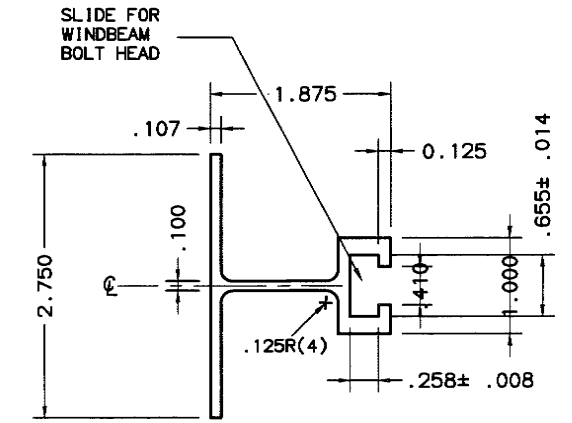
SECTION A - A TYPICAL SIGN ATTACHMENT DETAILS AT EACH WINDBEAM



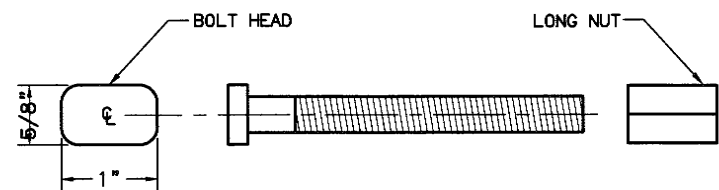
VIEW C - C



D3-1, D3-1A, D3-1D STREET NAME SIGN FRAMING DETAIL
 PLAN VIEW



SECTION B - B WINDBEAM CROSS SECTION



3/8" WINDBEAM BOLT AND LONG NUT

NOTES:

- EXCEPT FOR POLES AND MAST ARMS, ONLY USE SQUARE STEEL TUBES TO SUPPORT SIGNS MOUNTED ON SINGLE POSTS.
- INSTALL WINDBEAM OR ZEE SHAPED FRAMING MEMBERS ON DIAMOND SHAPED SIGNS 36 INCHES AND LONGER ON A SIDE AND ON OTHER SIGNS 36 INCHES WIDE AND WIDER.
- IN HIGH WIND AREAS, THE PLANS MAY REQUIRE SIGNS SMALLER THAN THOSE LISTED IN NOTE 2 BE FRAMED AS SHOWN HEREON.
- THIS DRAWING DEPICTS THE WINDBEAM FRAMING AND ATTACHMENT SYSTEM. ATTACH SIGNS FRAMED WITH ZEE SHAPED FRAMING ACCORDING TO REGIONAL DRAWING "SIGN ATTACHMENT DETAILS", USING "U" SHAPED BRACKETS AND TWO BOLTS WITH NUTS.
- THE ENGINEER MAY APPROVE OTHER FRAMING MEMBERS. SUBMIT DOCUMENTS THAT DETAIL THE FRAME'S CROSS SECTION AND STRENGTH, AND METHOD OF ATTACHING THE FRAME TO A POST.
- USE FRAMING MEMBERS MADE FROM ALUMINUM ALLOY 6061-T6.
- EACH FRAMING MEMBER SHALL BE ONE CONTINUOUS PIECE.
- ATTACH FRAMING MEMBERS TO THE SIGN PANELS WITH RIVETS OR AN ENGINEER APPROVED, DOUBLE SIDED, HIGH STRENGTH, ADHESIVE TAPE.
- WITH THE ADHESIVE TAPE, INSTALL TWO RIVETS IN BOTH ENDS OF EACH FRAMING MEMBER, AND ATTACH THE FRAMING MEMBERS TO THE SIGN PANELS ACCORDING TO THE TAPE MANUFACTURER'S WRITTEN INSTRUCTIONS, INCLUDING:
 - THE CLEANING AND HANDLING OF THE SIGN PANELS AND FRAMING MEMBERS.
 - THE APPLICATION OF THE ADHESIVE TAPE.
- WHEN RIVETS ARE USED TO ATTACH FRAMING MEMBERS, INSTALL 2 RIVETS IN EACH END AND THE BALANCE ON 8" MAXIMUM CENTERS.
- USE 3/16" DIAMETER RIVETS CONFORMING TO ALUMINUM ALLOY 6061-T6 FOR COLD DRIVEN RIVETS, OR ALUMINUM ALLOY 6061-T43 FOR HOT DRIVEN RIVETS.
- THE BRACKETS USED ON EVEN INCH SIZE TUBES MAY ALSO BE USED ON TUBES 1/2" SMALLER IN SIZE.
- USE ONE 2.5" P.T. FOR ALL STOP SIGNS WITHIN THE MOA, AND ALL POSTS WITH A SINGLE SIGN PANEL THAT ARE 30" WIDE OR LESS. ALL OTHER STOP SIGN POSTS OUTSIDE THE MOA SHALL BE ON A 3" TUBE.

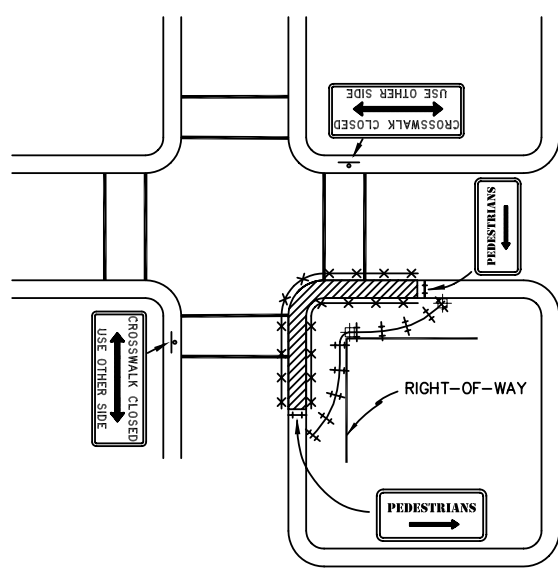
PLANS PREPARED BY

KINNEY ENGINEERING, LLC

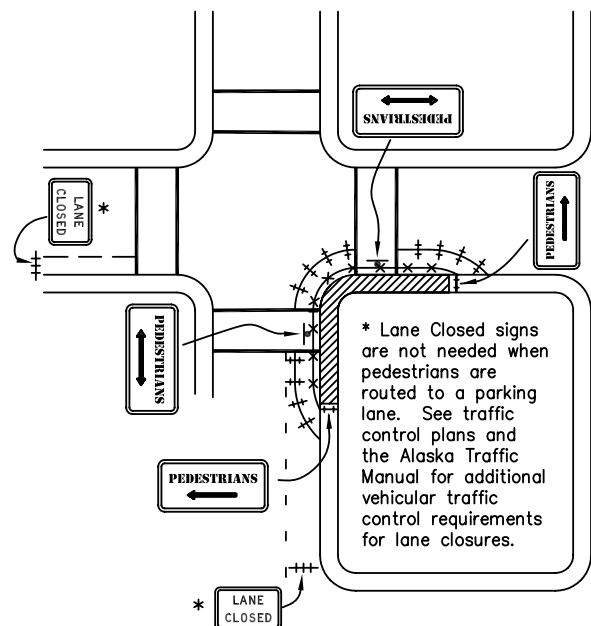
STATE OF ALASKA
 DEPARTMENT OF TRANSPORTATION
 AND PUBLIC FACILITIES

**HSIP: CR HIGH FRICTION
 SURFACE TREATMENT PROJECT**

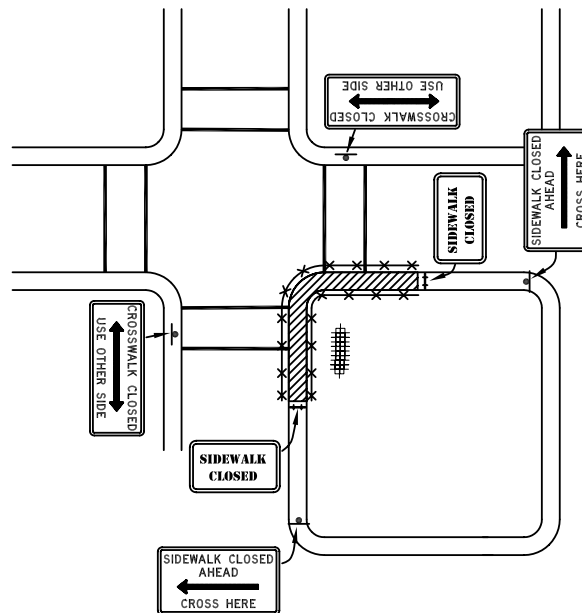
**LIGHT SIGN FRAMING
 & ATTACHMENT DETAILS**



A. Detour Away From Road



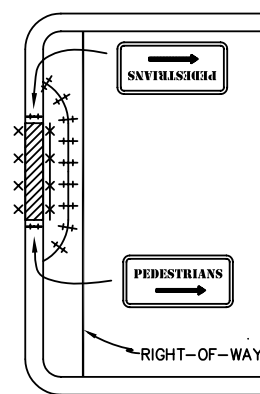
B. Detour to Closed Parking or Travel Lane



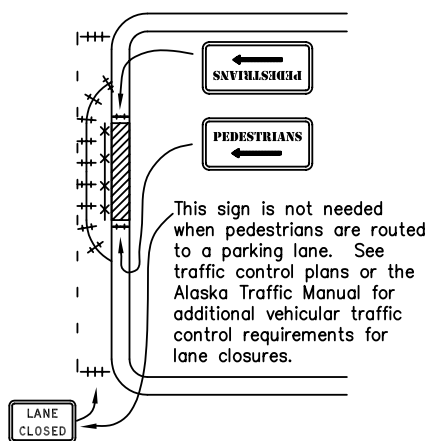
C. Detour to Other Side

INTERSECTION SIDEWALK PATHWAY OR SHOULDER CLOSURE

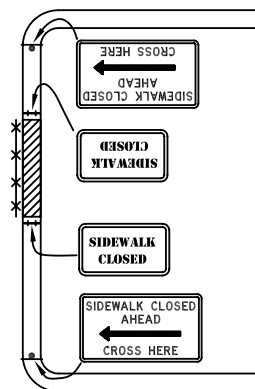
A to C In Order of Preference



D. Detour Away From Road



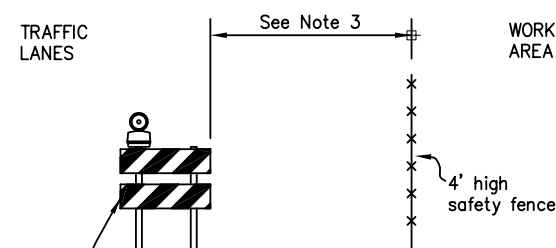
E. Detour to Closed Parking or Travel Lane



F. Detour to Other Side

MID-BLOCK SIDEWALK PATHWAY OR SHOULDER CLOSURE

D to F In Order of Preference



If the existing pedestrian facility is asphalt or concrete, provide a smooth, uninterrupted asphalt, concrete, or wood temporary surface without abrupt changes in elevation.

Type II barricades or tubular markers with flagger tape strung between them. A 4' high safety fence may be used instead of tape when greater control of pedestrian routing is desirable.

PEDESTRIAN DETOUR TYPICAL SECTION

NOTES.

1. Provide pedestrian traffic control devices when sidewalks or pathways are closed to pedestrians and where required by the Plans or Specifications.
2. Avoid routing pedestrians across roads unnecessarily. Use detail C or F only when it is not practical to use detail A, B, D, or E.
3. Maintain a minimum pedestrian facility width of 5 feet or the width of the facility that existed before construction, whichever is less.
4. Where the posted speed limit exceeds 45 MPH, separate pedestrians from roadway edge of pavement or face of curb by at least 5'. Where that is not feasible, install portable concrete barrier between pedestrians and the road.
5. When pedestrian traffic control devices required by the current traffic control plan are not in place or are temporarily removed, provide a worker to direct pedestrians through the work area.
6. Cover pedestrian traffic signal displays controlling closed crosswalks.
7. This sheet focuses on traffic control devices for pedestrians. Look elsewhere for vehicular traffic control requirements.
8. When using details C and F, route pedestrians to the best crossing point near the work area.

LEGEND:

- ++ Type II Barricade or Tubular Marker
- +++ Type III Barricade
- x-x-x- Safety Fence
- Sign
- Work Area

REVISIONS		
Date	Description	By

Sheet 1 of 1

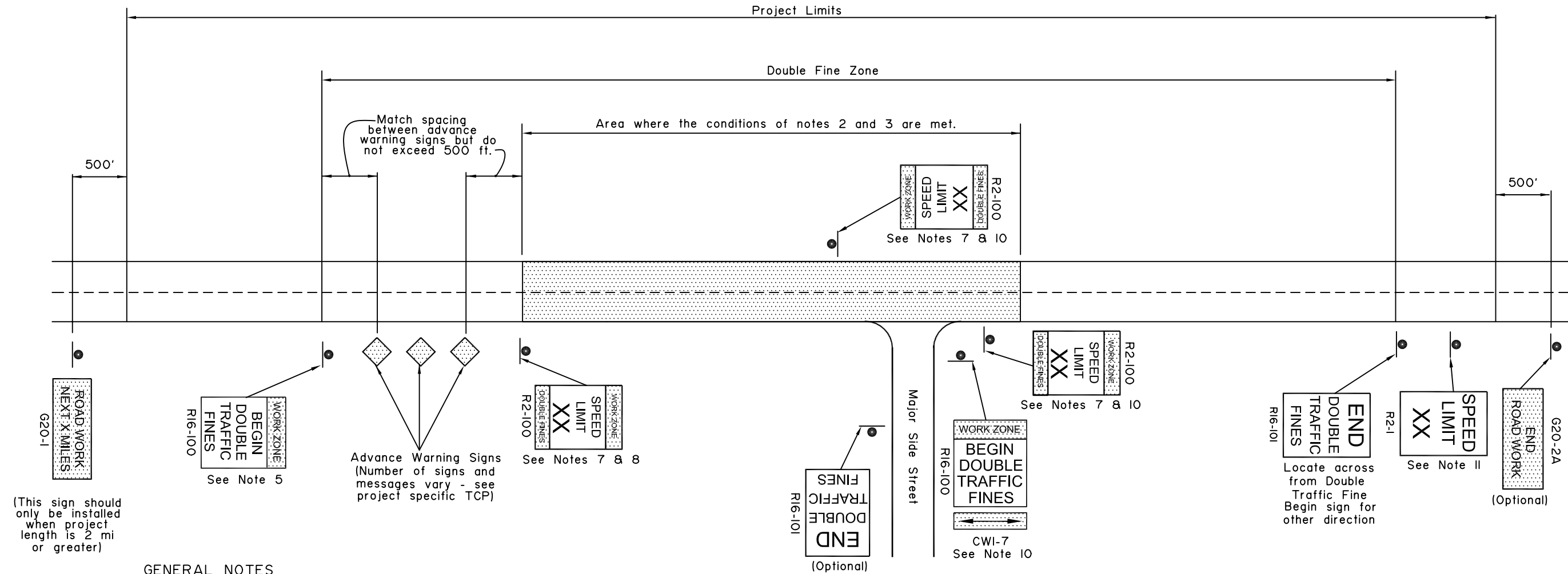
State of Alaska
Department of Transportation
& Public Facilities

PEDESTRIAN TRAFFIC CONTROL

APPROVED



Date 5/15/01



GENERAL NOTES

1. Signs are shown for one direction only (with one exception). Signs for the other direction mirror those shown.
2. Double fine signs shall be used only where one or more of the following conditions exist:
 - a. Active work areas (where road workers and/or machines are presently working on or adjacent to a road)
 - b. Detours on new temporary roads built for that purpose (this does not include detours on existing streets)
 - c. Sections of paved roads where pavement has been removed.
 - d. Roads being paved where unmatched asphalt lifts result in a vertical lip between lanes.
3. Double fine signs shall be confined to the areas where the above conditions exist, with the following exceptions:
 - a. 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.
 - b. 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.
4. 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.
5. 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.
6. 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.
7. "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.
8. 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.
9. All existing regulatory speed limit signs within double fine zones shall either be replaced with R2-100 signs or supplemented with CW20-102 plates.
10. 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 CWI-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.
 - ii. 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.

REVISIONS		
Date	Description	By
6/11/99	Revised Notes	KJS
2/28/03	Rev. Notes & Sign No's	KJS

State of Alaska
Department of Transportation
& Public Facilities

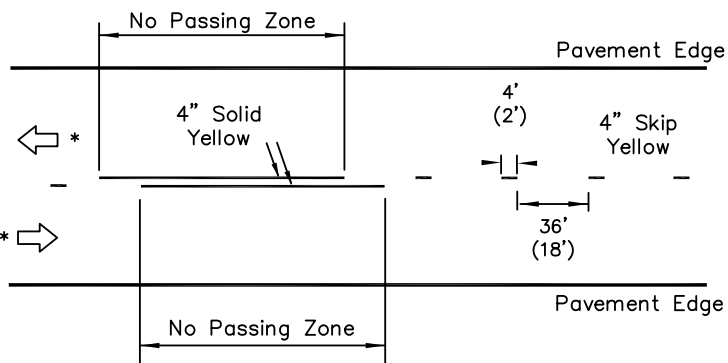
**LOCATION OF
DOUBLE TRAFFIC
FINE SIGNS**

APPROVED

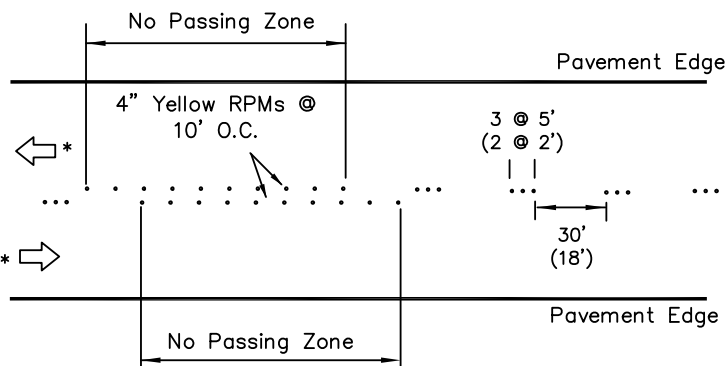
Date 3/31/99

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.



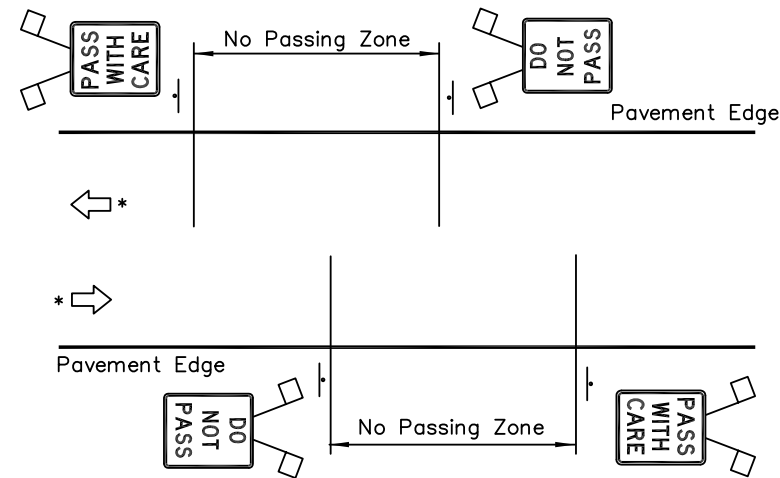
Striping



Temporary Raised Pavement Markers

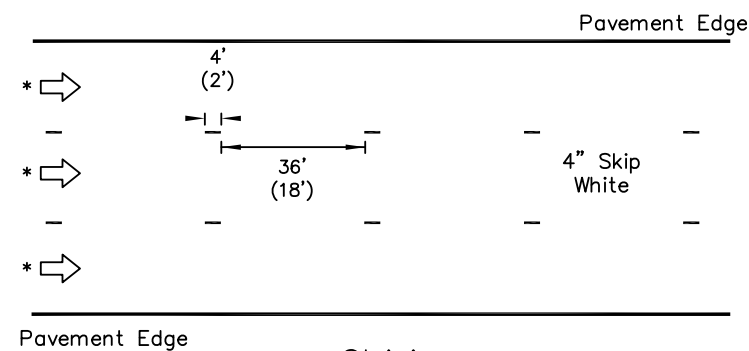
DETAIL A

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

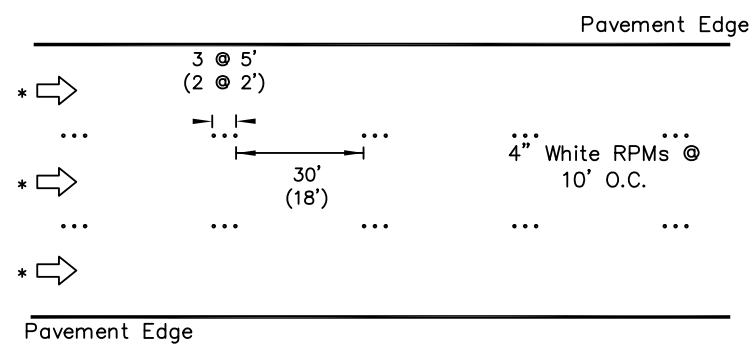


DETAIL C

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



Striping

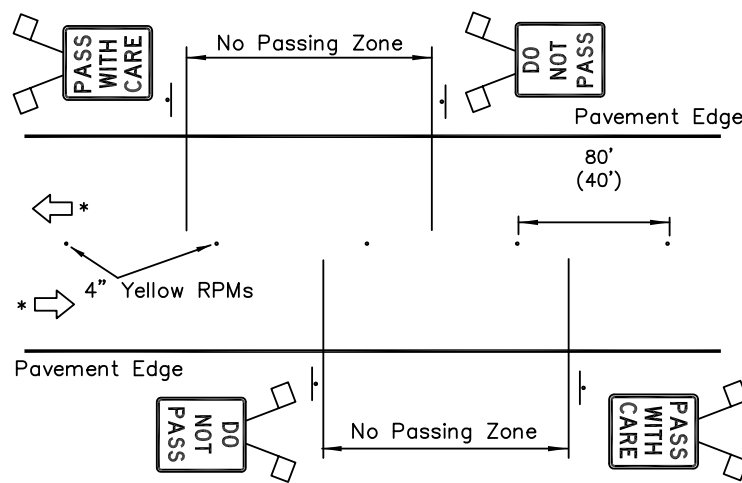


Temporary Raised Pavement Markers

DETAIL D

Multilane one-way road: Lane dividing lines

* Direction of Travel



DETAIL B

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

REVISIONS		
Date	Description	By
4/28/10	RPM spacing, signs	KJS

Sheet 1 of 1

State of Alaska
Department of Transportation
& Public Facilities
**INTERIM
PAVEMENT MARKINGS**



Date 5/31/12

S-00.11

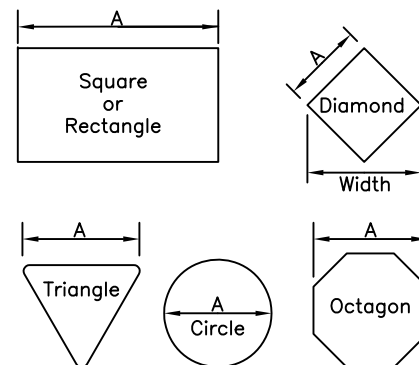
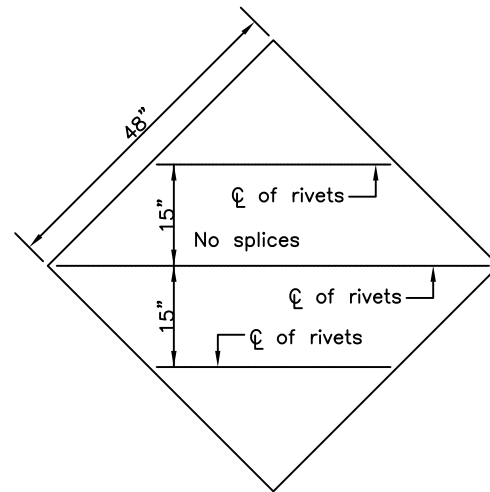
GENERAL NOTES

1. See the standard specifications for the aluminum alloys that you may use for sign sheeting and wind framing members.
2. Fabricate all signs from 0.125" thick aluminum sheeting.
3. Sign fabricators may use alternates to the zee shaped framing member with approval of the engineer, if the frame manufacturer certifies their design equals or exceeds the strength of the zee shaped design.
4. Install one piece wind framing members on all signs up to 23.5' wide. Use one splice in each wind frame on all signs wider than 23.5'. Locate splices at least 18" from all posts and panel edges. Stagger splices in adjacent framing members at least 8.0' apart.
5. Attach wind framing members with rivets or with an engineer approved, double sided, high strength, adhesive tape. Clean and handle sheeting and framing members and apply tape in accordance with the tape manufacturer's written instructions. Install two rivets in both ends of each framing member.
6. Use 3/16" diameter rivets conforming to aluminum alloy 6061-T6 for cold driven rivets, or aluminum alloy 6061-T43 for hot driven rivets.
7. Sign fabricators may use sign panels extruded with integral framing with approval of the engineer, if the manufacturer certifies their design equals or exceeds the strength of the 0.125" thick panel with framing attached to it.
8. Frame all signs taller than 8.0' with five wind framing members located $(H-0.15)/4$ spaces. If needed, make a horizontal splice at the middle wind frame.
9. Do not use round pipes for sign supports.

Sign Width (feet)	No. of Posts	Distance Between Posts	Sign Overhang	Post Type				Notes
				P.S.T.	Wood	Steel Tube	W-Shape	
0.5 to 4.0	1	-	0.5W	X	X	X		See Note 2.
4.5 to 10.0	2	0.6W	0.2W	X	X	X		See Note 3.
10.5 to 11.0	2	6	Varies	X	X	X		See Note 3.
11.5 to 13.0	2	8	Varies				X	
13.5 to 20.0	2	0.6W	0.2W				X	
20.5 to 22.5	3	8	Varies				X	
23.0 to 29.5	3	0.35W	0.15W				X	
30.0 to 31.5	4	8	Varies				X	
32.0 to 40.0	4	0.25W	0.125W				X	

SIGN POST SPACING NOTES:

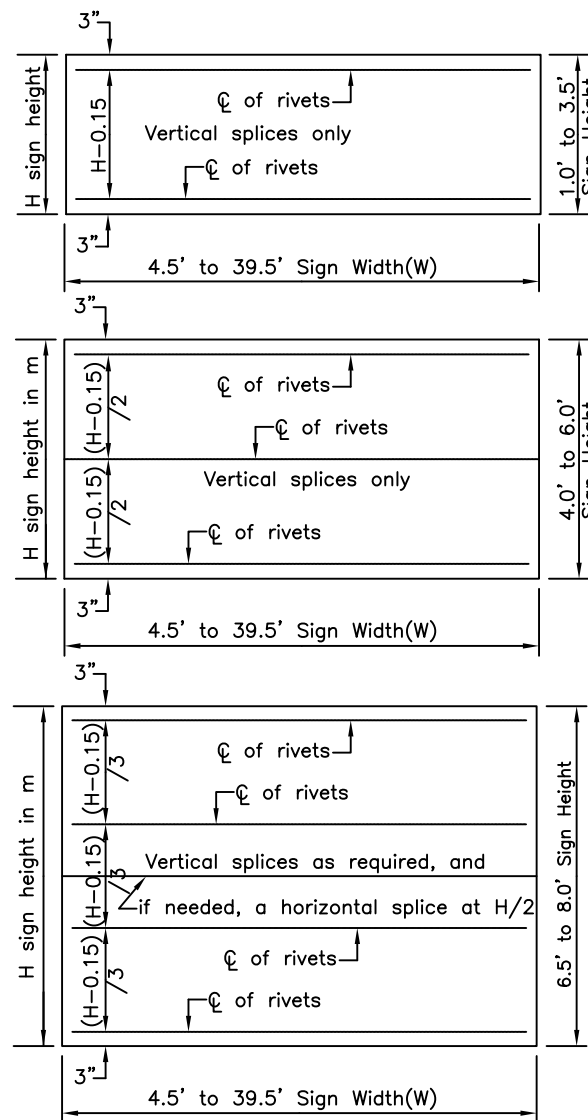
1. Install sign support in accordance with the table above, unless otherwise required by plans or specifications.
2. Exceptions:
 - a. Use one post for all E5-1 gore signs, regardless of width.
 - b. Use one 2.5" P.S.T. for all STOP signs, with or without street name signs.
3. Supports placed within 7' of each other must be acceptable for that use. See Standard Drawing S-30 for the sizes of wood posts and P.S.T.s that may be used within 7'. See Manufacturer's documentation for breakaway couplings and tubes that may be used within 7'.
4. See Standard Drawing S-31 for frangible couplings, hinges, and foundations for tube and W-shape sign supports.



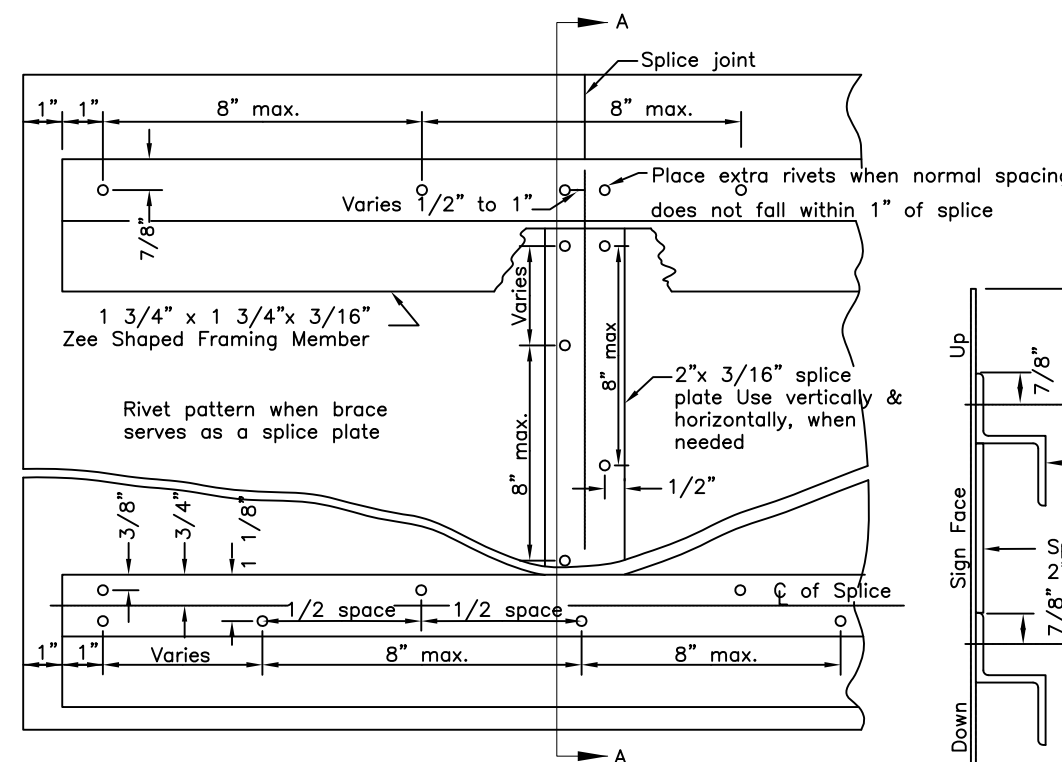
Maximum size unframed signs using 0.125" thick aluminum sheeting.	
Sign Shape	A
Squares, Shields, and Route Markers	48"
Rectangles	48"
Diamonds	48"
Triangles	48"
Rounds and Octagons	48"

Install wind framing on all signs that exceed the dimensions listed.

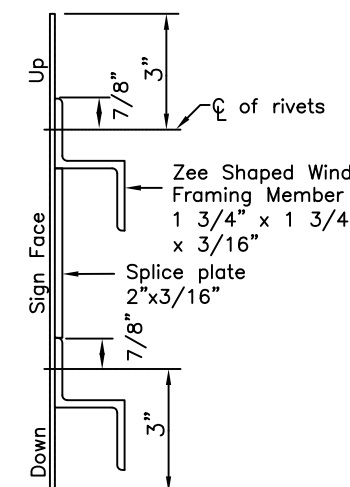
LIGHT SIGNS



WIND FRAMING LOCATIONS



RIVET DETAIL FOR ZEE SHAPED WIND FRAMING & SPLICE PLATE



SECTION A-A

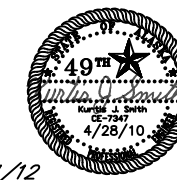
REVISIONS		
Date	Description	By
4/28/10	Delete pipe, rev notes	KJS

Sheet 1 of 1

State of Alaska
Department of Transportation
& Public Facilities

SIGN FRAMING AND POST SPACING

APPROVED

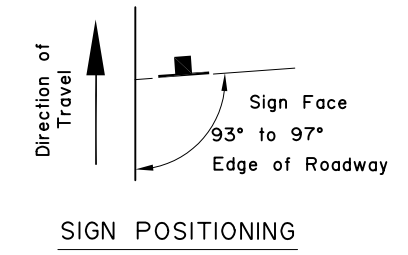
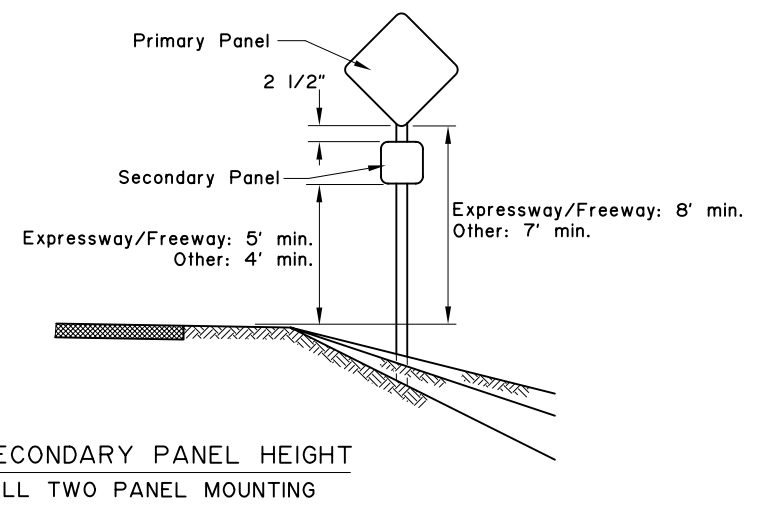
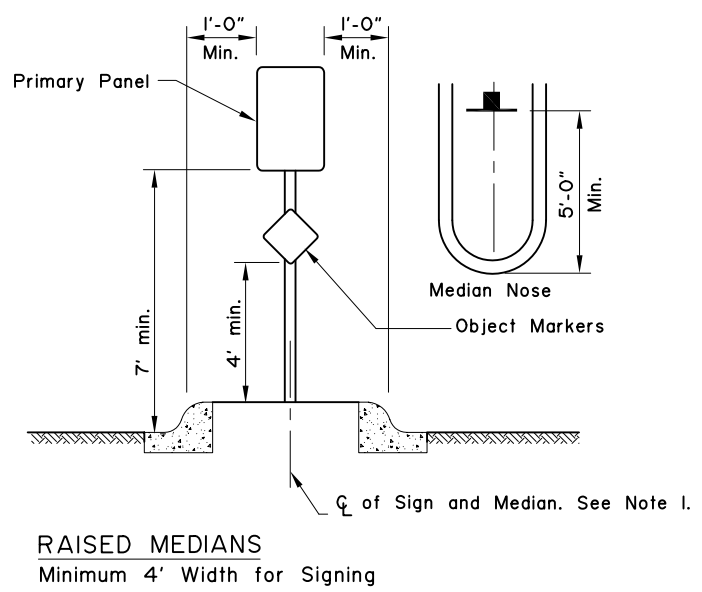
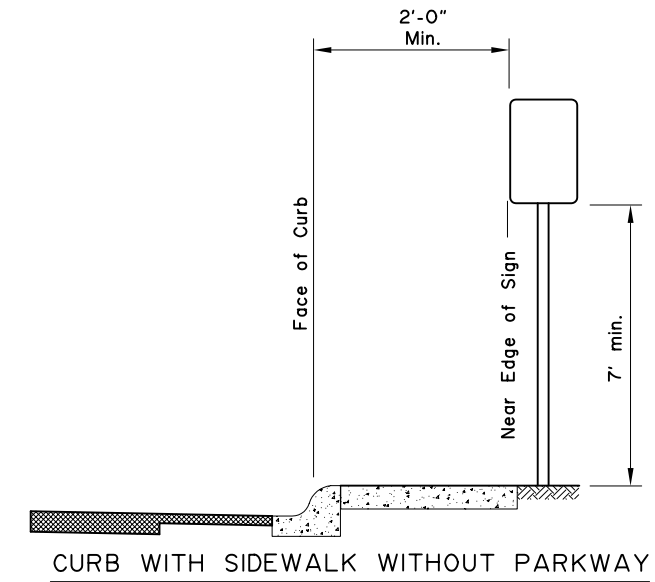
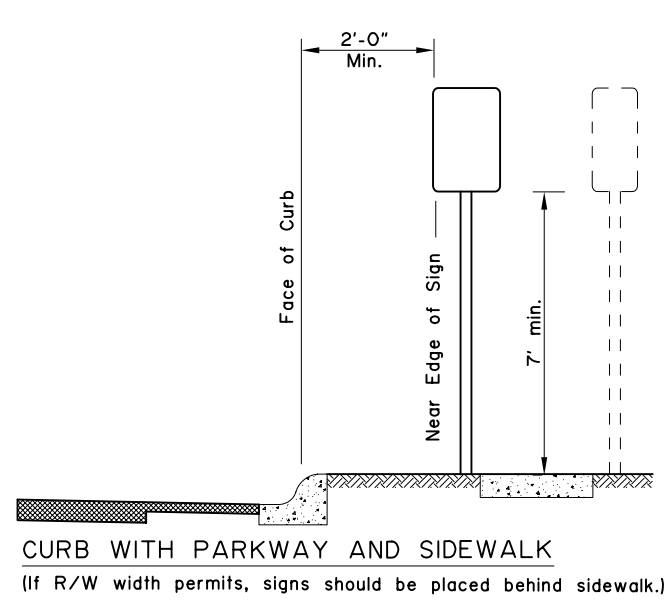
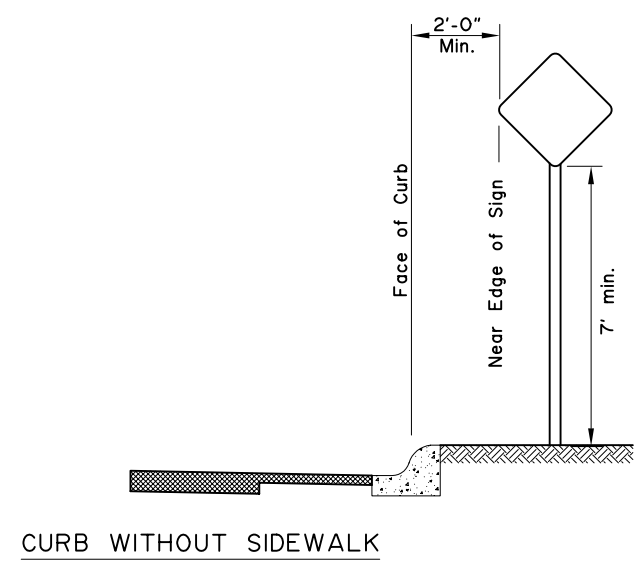
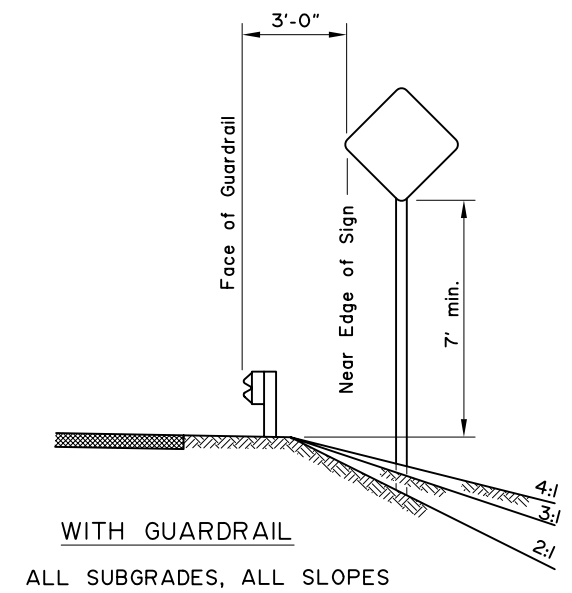
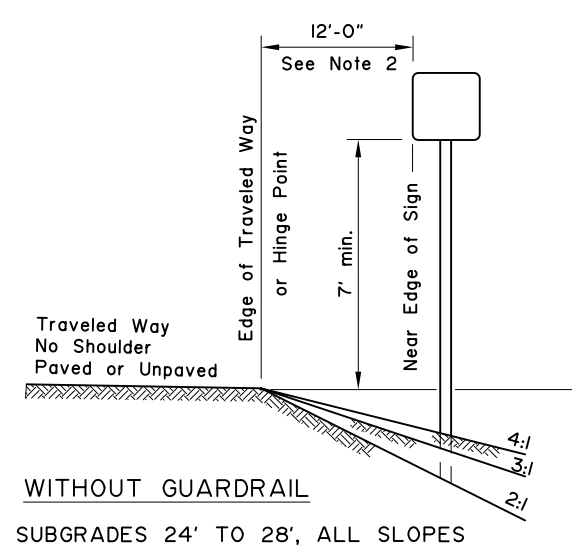
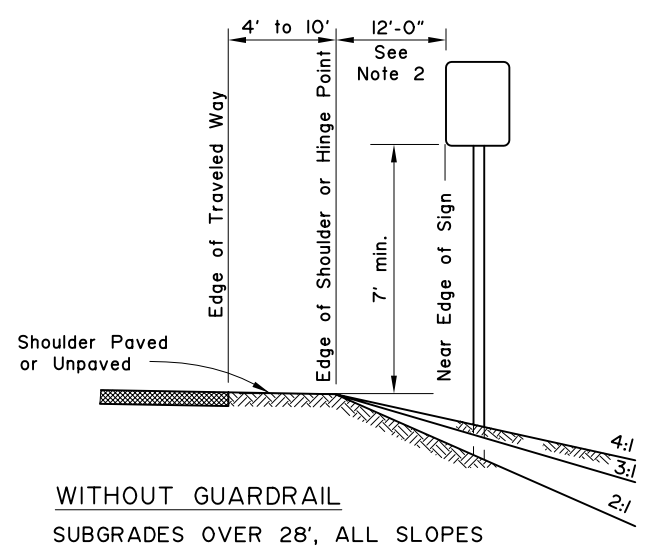


Date 5/31/12

S-00.11

GENERAL NOTES

1. Unless shown otherwise on the plans, the standard sign offset is 12'. The minimum is 6'.
2. If signs extend over sidewalks, the minimum vertical clearance is 7'-0".
3. Add 6" to mounting height on unpaved roads.
4. If signs extend over bike paths, the minimum vertical clearance is 8'-0".
5. When signs are placed 30' or more from the edge of traveled way, mount them with the bottom of the sign at least 5' above the road surface at the near edge of the road.
6. When multiple hinged sign supports are used, mount hinges at least 7' above the ground.



REVISIONS		
Date	Description	By
4/3/01	Revised Sign Heights	KJS

Sheet 1 of 1

State of Alaska
Department of Transportation
& Public Facilities

**POST MOUNTED SIGN
OFFSET AND HEIGHT**

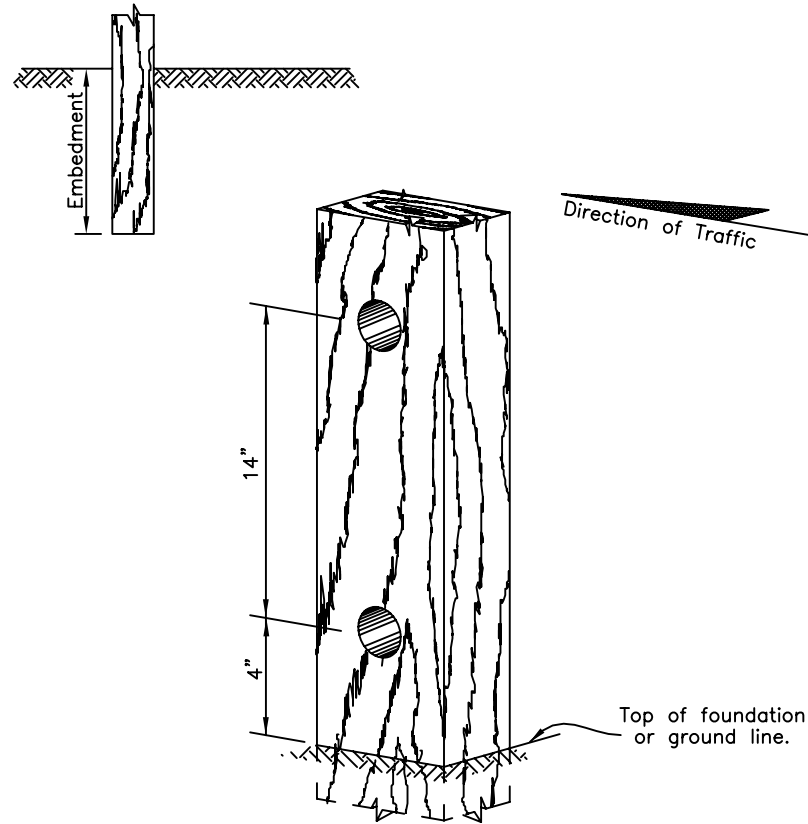
APPROVED

Date 7/15/82

S-30.03

GENERAL NOTES:

1. Refer to Standard Drawing "Sheet Aluminum Sign and Framing" for light sign details.
2. See plans for type of post, size and embedment type.
3. To maintain crashworthiness, install no more than the number of P.S.T.s or wood posts specified in the tables within 7' of each other.
4. Do not install wood posts larger than 6"x8".
5. Use larger posts than shown on this sheet, with hinges, for multiple support signs where the supports are separated by more than 7 feet.

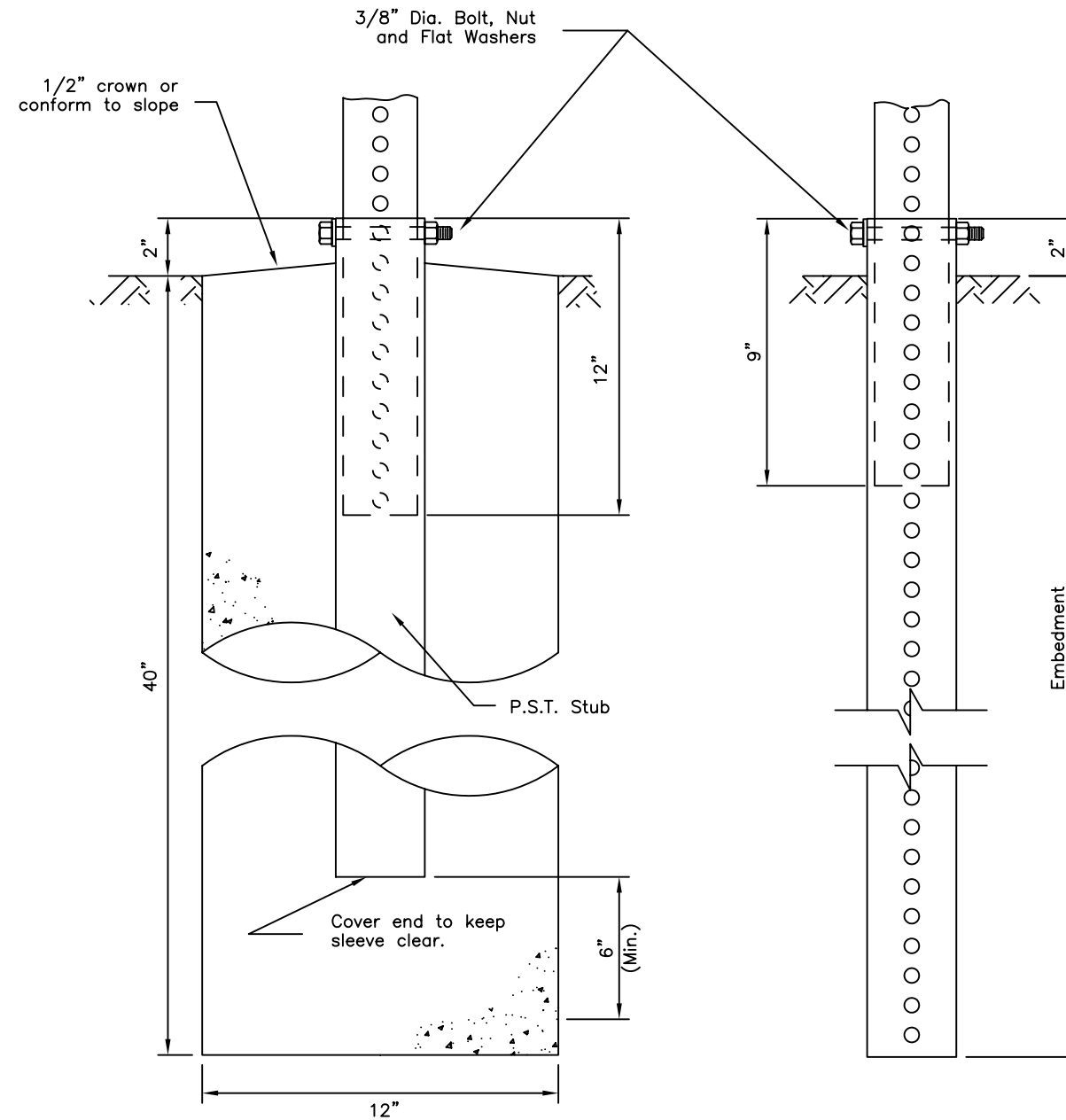


Note: If holes are field drilled after post has been treated, the holes shall be thoroughly swabbed with a 5% solution of pentachlorophenol and mineral spirits.

WOOD POSTS			
SIZE	HOLE DIA.	EMBEDMENT*	NUMBER OF POSTS WITHIN 7 Ft. PATH
4"x4"	NONE	36"	2
4"x6"	1 1/2"	36"	2
6"x6"	1 1/2"	40"	1
6"x8"	3"	48"	1

* Embedment depth applies in both strong and weak soil.

WOOD POSTS



SLEEVE TYPE
-CONCRETE FOUNDATION-

SLEEVE TYPE*
-SOIL EMBEDMENT-

PERFORATED STEEL TUBES (P.S.T.) (12 ga. - .105" Wall Thickness)		
POST SIZE (inch)	Embedment Depth	No. of P.S.T.s permitted within 7 ft path
1 1/2" x 1 1/2"	3'-0"	2
1 3/4" x 1 3/4"	3'-0"	2
2" x 2"	3'-6"	2
2 1/4" x 2 1/4"	4'-0"	1
2 1/2" x 2 1/2"	4'-6"	1

* Use 3"x3"x3/16" Stub for 2 1/2"x2 1/2" PST Applications.

PERFORATED STEEL TUBE (PST) POSTS

REVISIONS		
Date	Description	By
1/1/85	Redraft-Delete Post	Gdo
4/2/01	Revised PST table	Kjs
	Added note 3	
2/12/02	Revised Wood Posts	Kjs

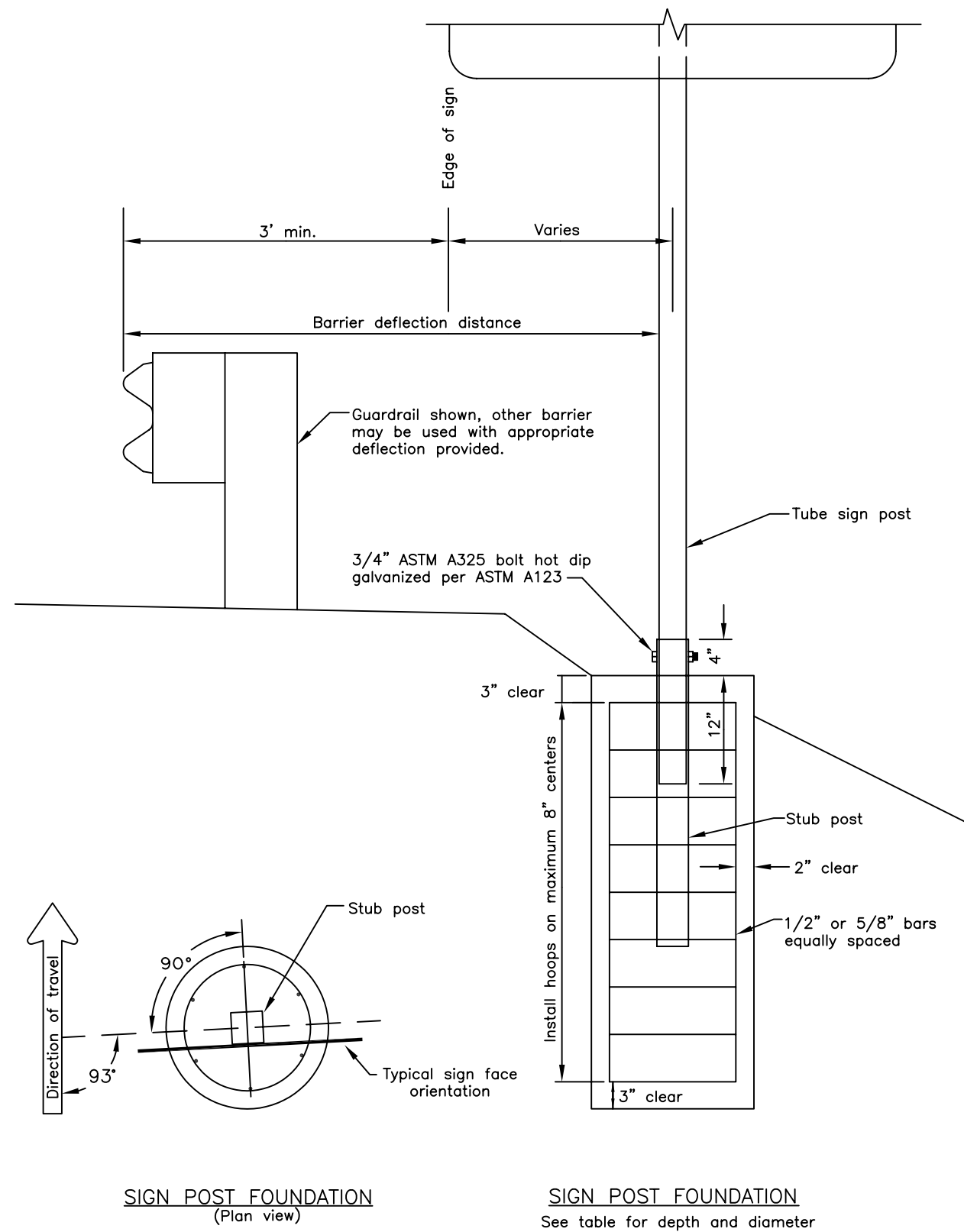
Sheet 1 of 1

State of Alaska
Department of Transportation
& Public Facilities

LIGHT SIGN STRUCTURE POST EMBEDMENT



Date 7/15/82



GENERAL NOTES

- This is a non-crashworthy sign support. It may only be used at locations shielded by a guardrail, barrier, or wall. It may not be used if the sign post is within 20' of the rail and is closer than 75' from the guardrail end post (measured along the rail). For this case use a breakaway sign support. See Standard Drawing G-20.
- Furnish steel tube sign post and stub post that conform to ASTM A500, grade B, and meet ASTM A123 for hot dip galvanizing.
- Install tubes and stub post with a 0.1875" wall thickness.
- For Perforated Tubes use Standard Drawing S-30.
- Spiral reinforcing steel may be substituted for hoops in concrete foundation. Spiral option shall consist of No. 3 plain spiral with 6" pitch with three flat turns at the top and one flat turn at the bottom.

POST SIZE & TYPE	FOUNDATION *			REINFORCEMENT				STUB POST		
	DIA.	MIN. DEPTH	C.Y. CONC.	VERTICAL BARS		HOOPS		SLEEVE		
				QTY.	SIZE	LGTH.	SIZE	DIA.	SIZE	LGTH.
2 1/2" TUBE	1'-0"	4'-6"	0.13	6	1/2"	4'-0"	1/2"	8"	3"	3'
3" TUBE	1'-6"	4'-0"	0.25	6	1/2"	3'-6"	1/2"	1'-2"	3 1/2"	3'
3 1/2" TUBE	1'-6"	4'-6"	0.27	6	1/2"	4'-0"	1/2"	1'-2"	4"	3'
4" TUBE	2'-6"	4'-0"	0.69	7	5/8"	3'-6"	1/2"	2'-2"	4 1/2"	3'
4 1/2" TUBE	2'-6"	4'-6"	0.78	7	5/8"	4'-0"	1/2"	2'-2"	5"	3'

* Foundation sized for use where there are no loose, high moisture, or fine grained soil.

REVISIONS		
Date	Description	By

Sheet 1 of 1

State of Alaska
Department of Transportation
& Public Facilities

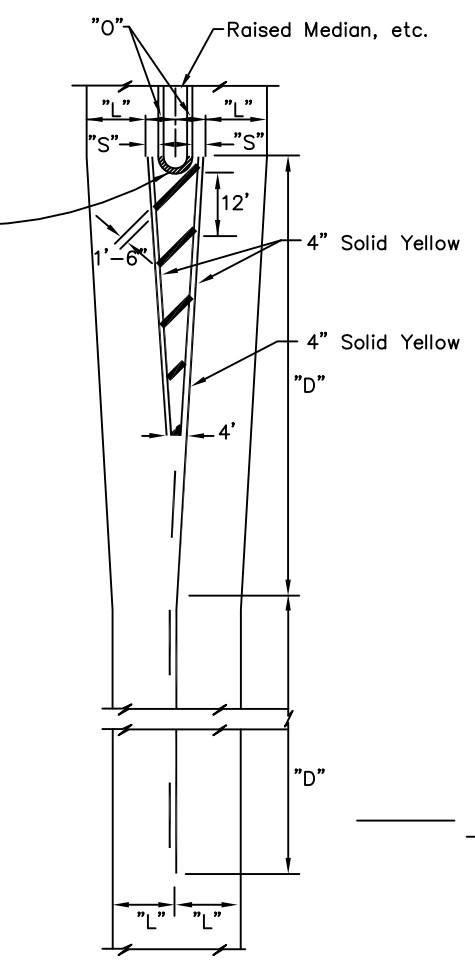
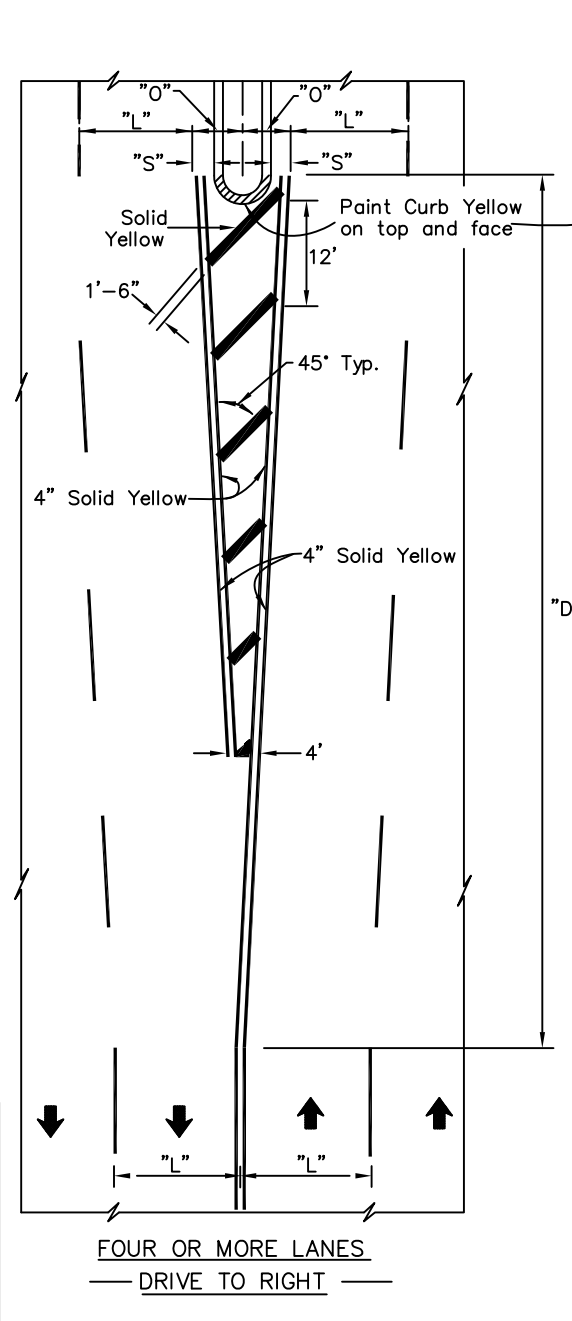
SIGN POST BASE AND
FOUNDATION BEHIND
BARRIER



APPROVED

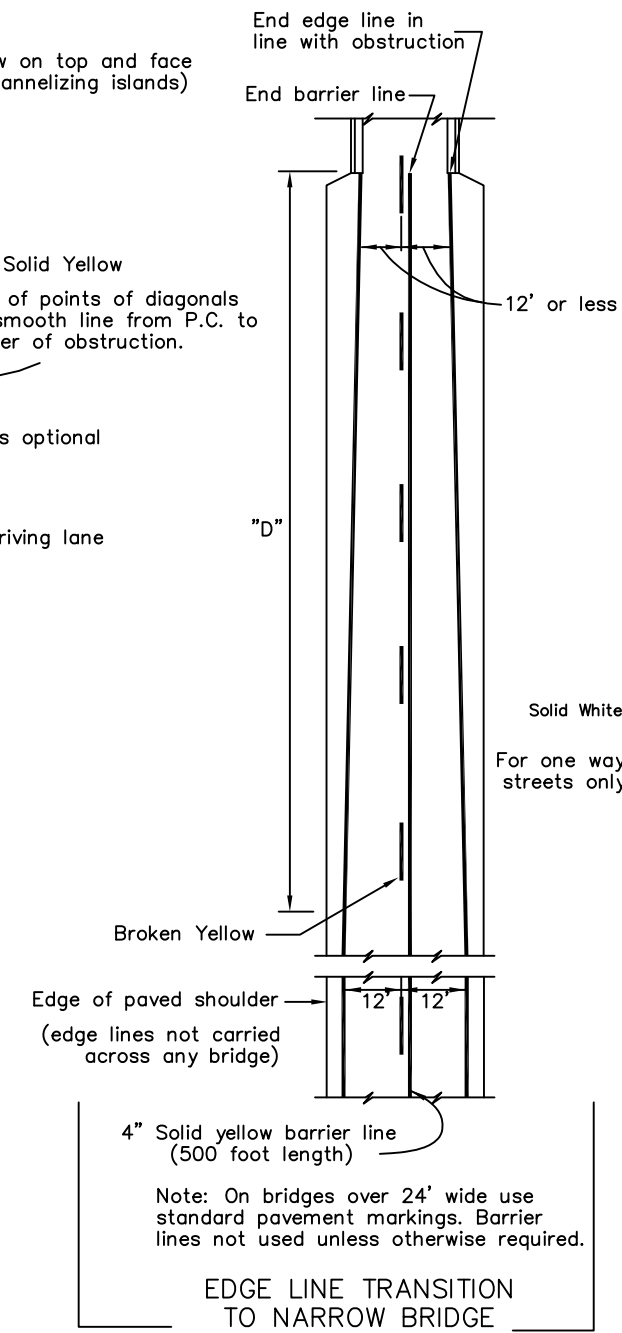
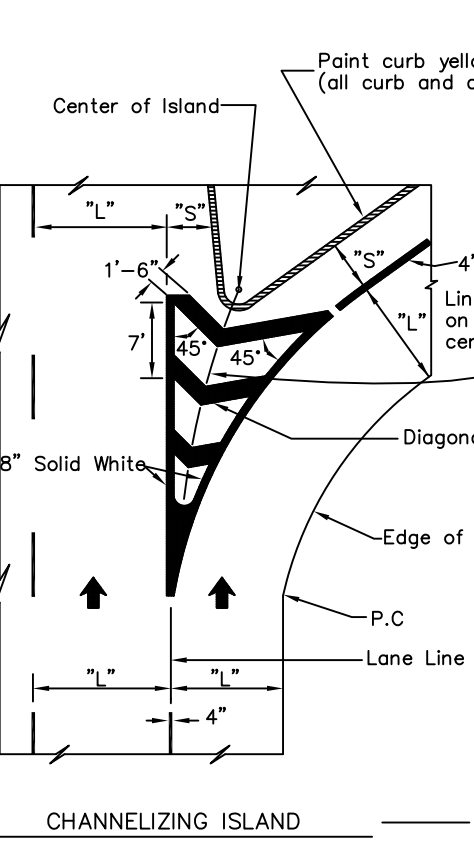


Date 2/28/03



TWO LANES DRIVE TO RIGHT
 White longitudinal and diagonal markers identical to Four Lane Arrangement.

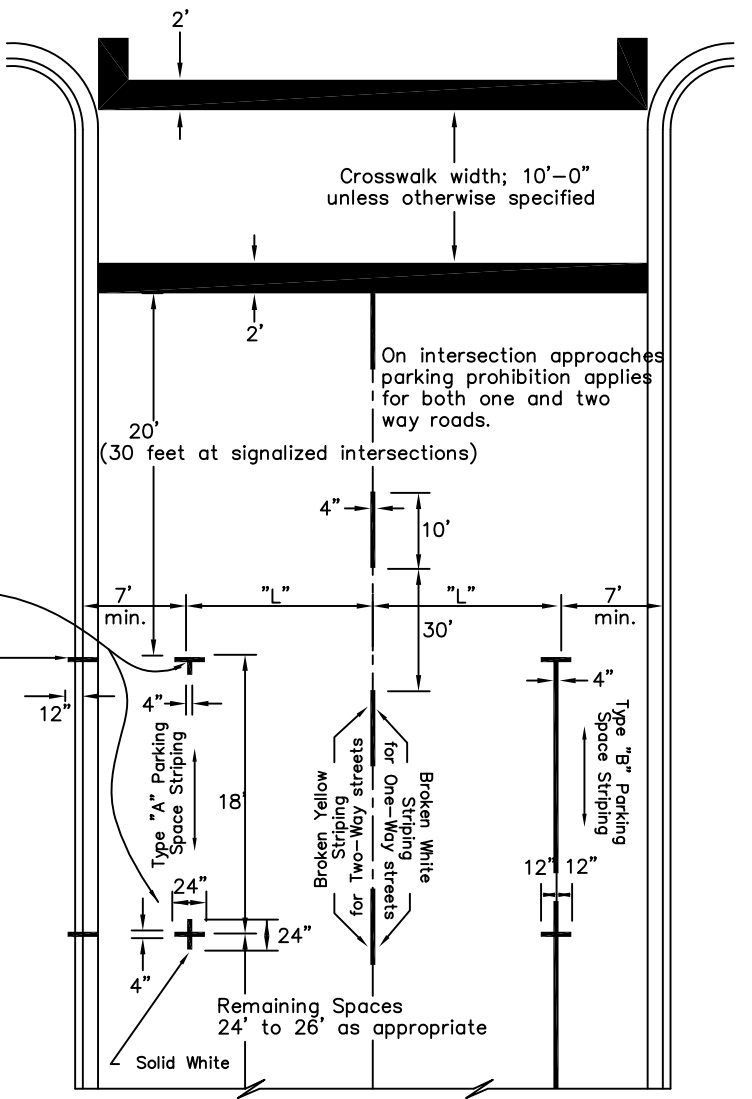
- NOTES:**
- "D" = Speed limit (mph) X "O" (offset width in feet) or as indicated on the plans. Minimum "D" = 100 feet urban, 200 feet rural.



EDGE LINE TRANSITION TO NARROW BRIDGE AND APPROACH BARRIER LINE

4" Solid yellow barrier line (500 foot length)

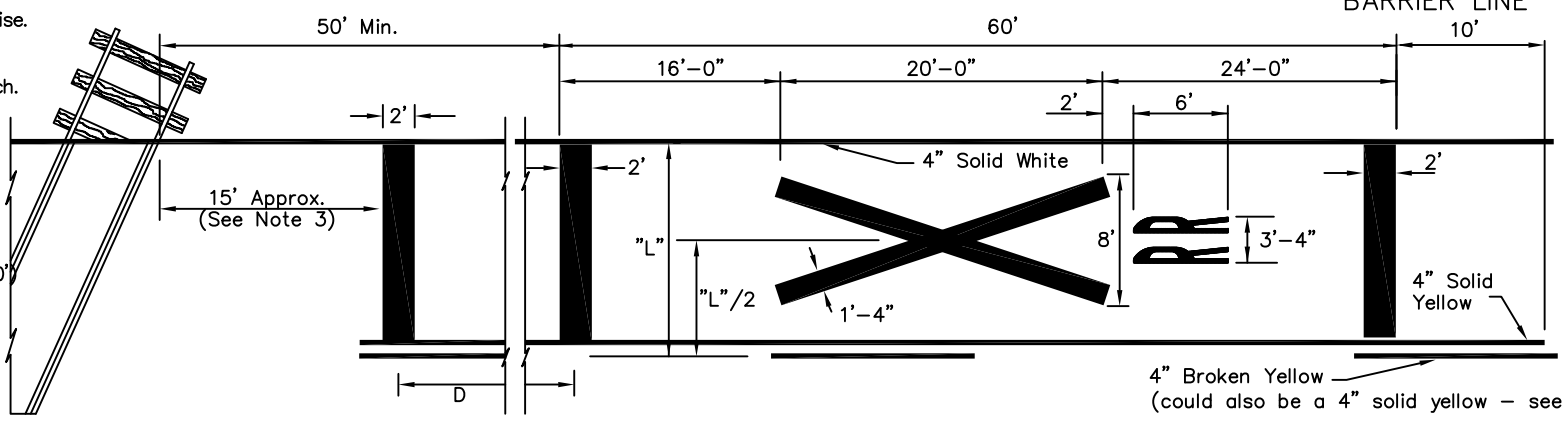
Note: On bridges over 24' wide use standard pavement markings. Barrier lines not used unless otherwise required.



CENTERLINES FOR TWO LANE TWO WAY URBAN ROADS-PARKING LIMIT LINES

- NOTES:**
- All markings solid white unless indicated otherwise.
 - On 4-lane roadways place railroad crossing approach markings in each lane of the approach.
 - Locate Stop Bar 15' from railroad track or 8' from gate, if present.
 - Place edge lines and lane lines on a uni-directional approach in a normal manner except that the lane line(s) shall be solid 4" white in lieu of broken for a distance of (D+60') in advance of the stop bands.

POSTED LIMIT	D
30 M.P.H.	225'
40	350'
50	475'
60	625'



APPROACH TO RAILROAD CROSSING ON 2 LANE 2 WAY HIGHWAY

- GENERAL NOTES:**
- "S"—offset distance as designated, otherwise 1 to 2 feet.
 - "L"—driving lane width.
 - See Alaska Traffic Manual for additional instruction and/or restriction on the use of TRAFFIC CONTROL DEVICES.

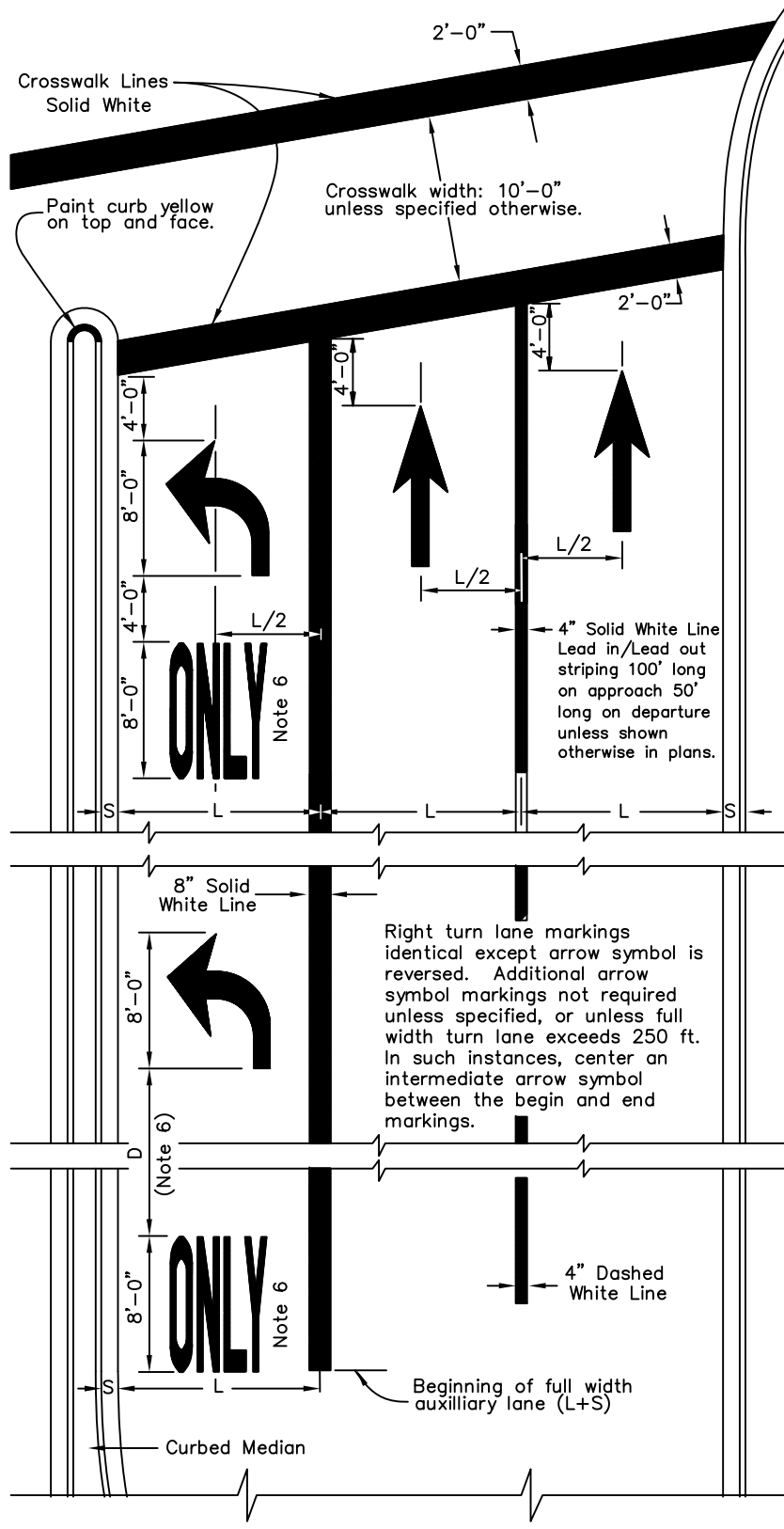
REVISIONS		
Date	Description	By
2/15/00	Changed "RR" location	KJS
10/31/03	Correct dim / text errors LRG	
4/28/10	Notes/details to MUTCD	KJS

Sheet 1 of 1
 State of Alaska
 Department of Transportation & Public Facilities
PAVEMENT MARKING APPLICATIONS

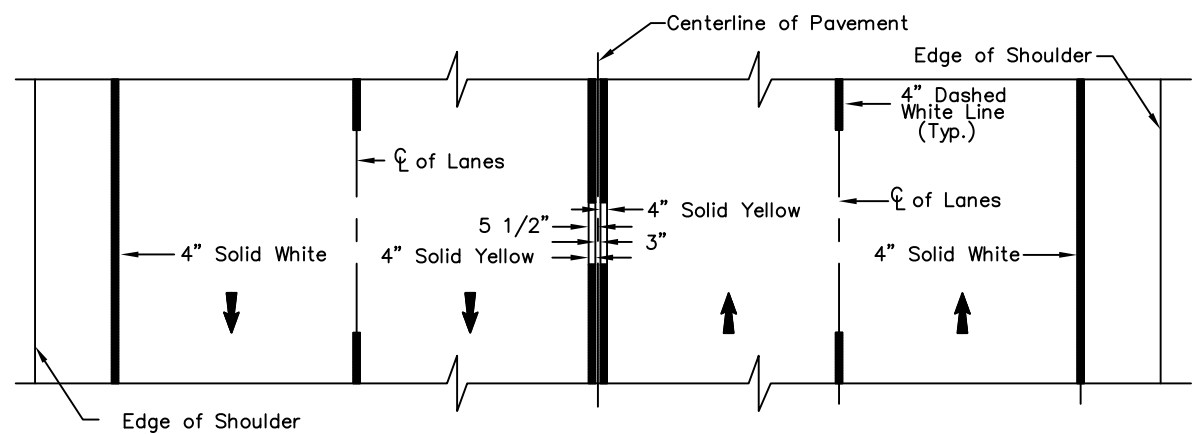
APPROVED

Date 5/31/12

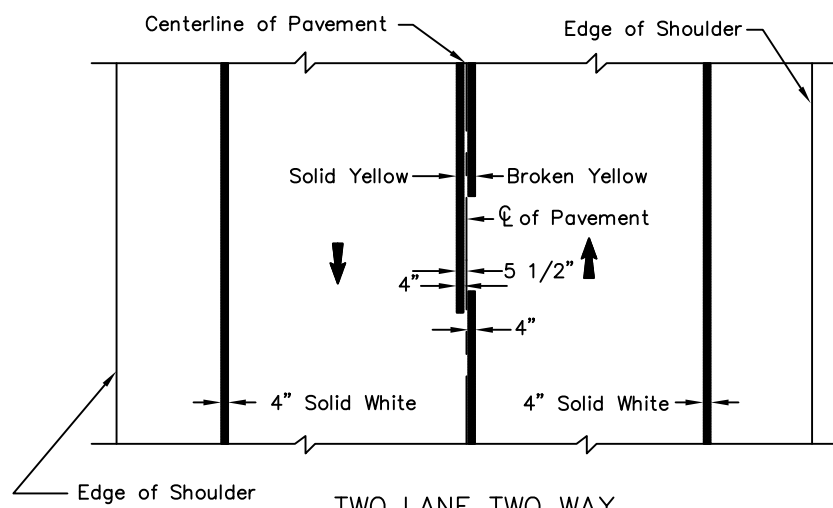
NOT TO SCALE



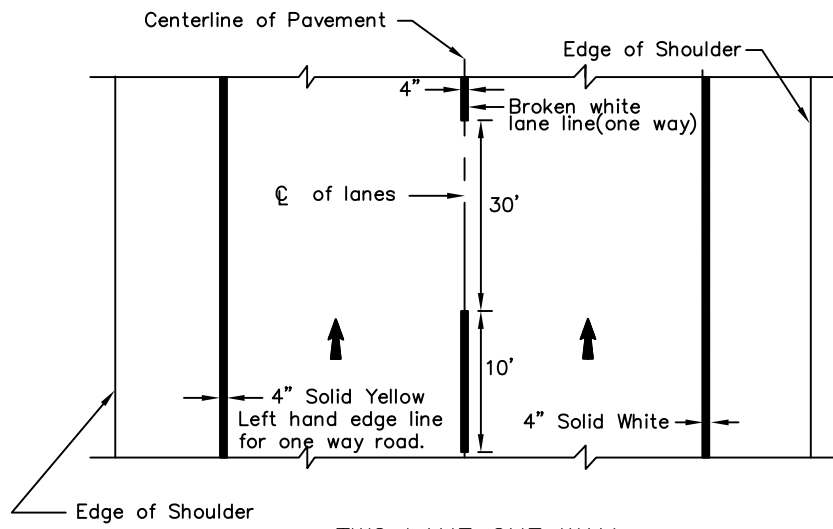
APPROACH TO INTERSECTION



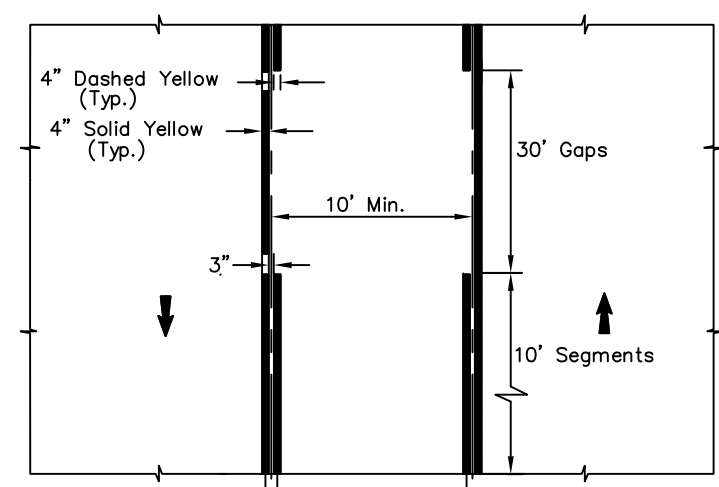
FOUR LANE TWO WAY



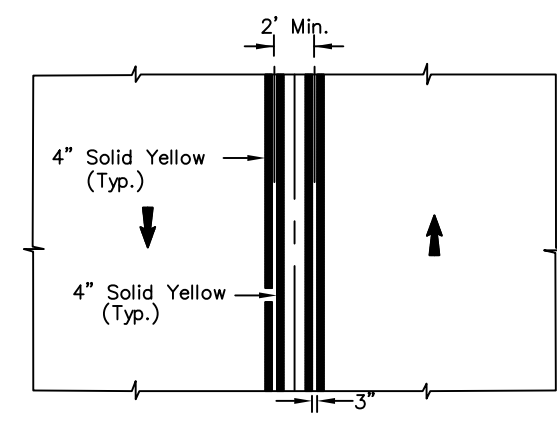
TWO LANE TWO WAY



TWO LANE ONE WAY



TWO-WAY LEFT TURN LANE



STRIPED MEDIAN

- GENERAL NOTES:**
1. All markings white unless indicated otherwise.
 2. Lengths of stripe and gap for lane and center lines identical.
 3. Lane lines for auxiliary lanes are unbroken solid lines.
 4. "L" = driving lane width.
 5. "S" = shy distance as shown on plans, otherwise 1 to 2 feet.
 6. ONLY markings are required where through lanes change to turn lanes. In other cases, apply ONLY markings as indicated on plans.
 7. See ALASKA TRAFFIC MANUAL for additional instruction on the use of TRAFFIC CONTROL DEVICES.
 8. 6. Adjust distance D between ONLY and Turn Arrow based on SPEED vs. D table.

SPEED	D
25 or less	35'
30	45'
35	50'
40	60'
45	65'
50	75'
55 or more	80'

REVISIONS		
Date	Description	By
1/1/86	Arrow Dimension	Gdo
1/1/96	Intersect. Note	Gdo
4/28/10	Details, labels, notes	KJS

State of Alaska
Department of Transportation
& Public Facilities

PAVEMENT MARKING APPLICATIONS

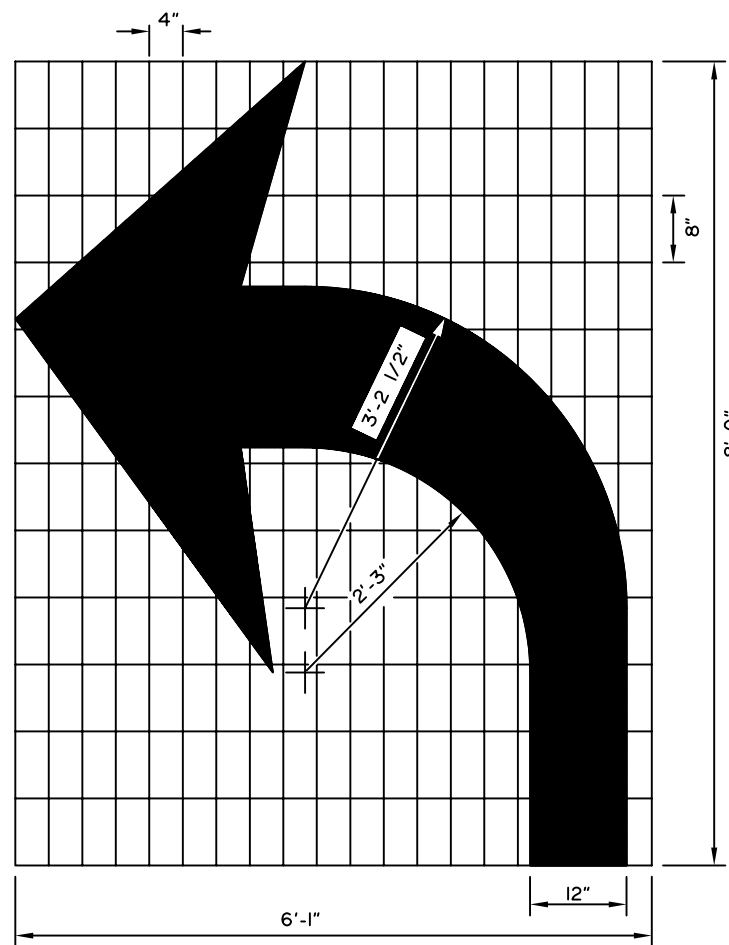
APPROVED

State of Alaska
Professional Engineer
William J. Smith
No. 49
Expires 4/28/10

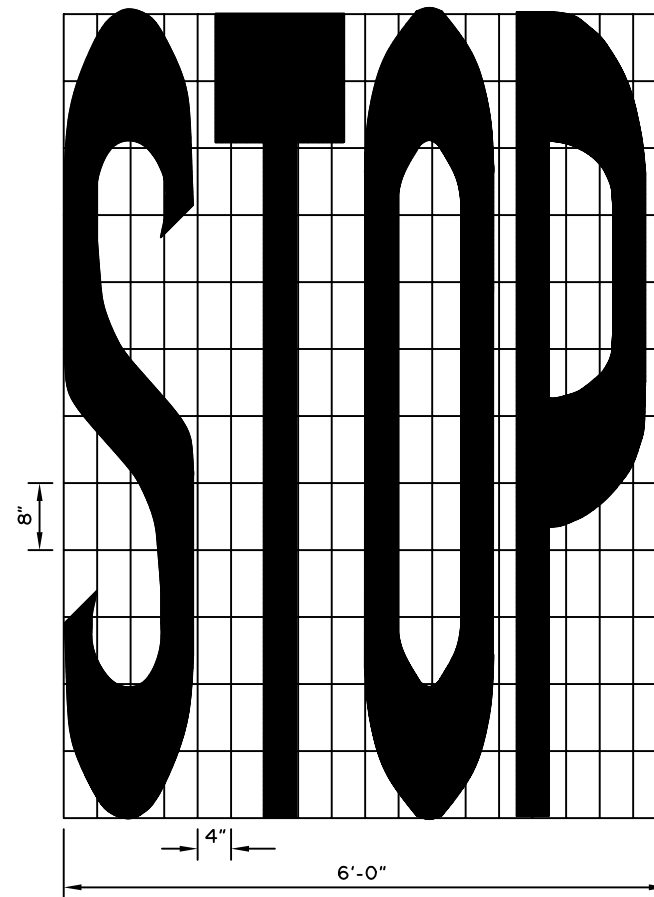
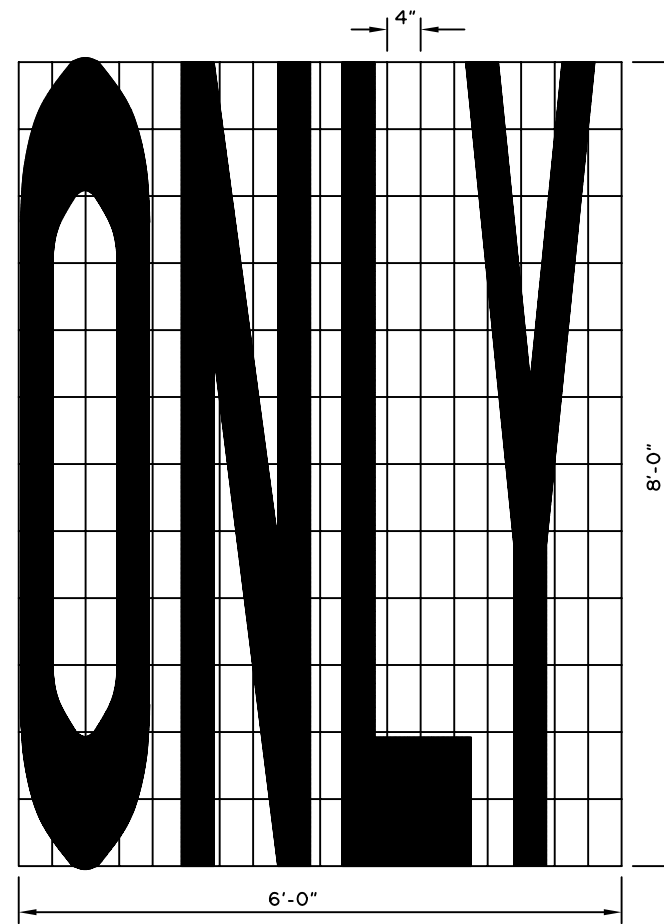
Date 5/31/12

GENERAL NOTES:

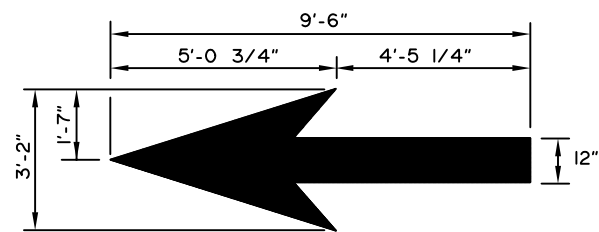
1. All symbols shown shall be white and reflectorized in accordance with the Special Provisions.
2. See "Standard Alphabets for Highway Signs and Pavement Marking" for letter layout.



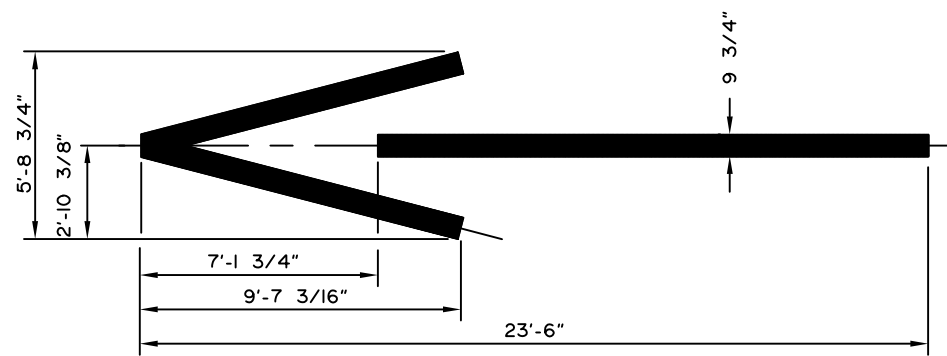
Right turn auxiliary lane usage markings identical except arrow symbol is reversed.



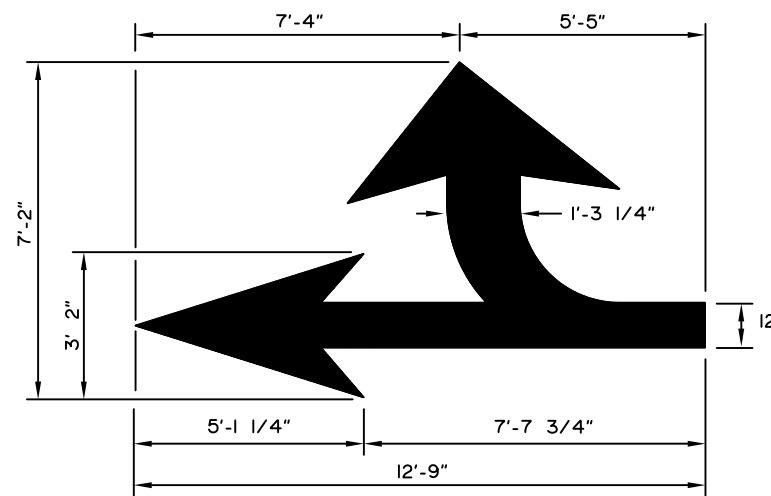
LAYOUT TEMPLATES FOR STENCILS



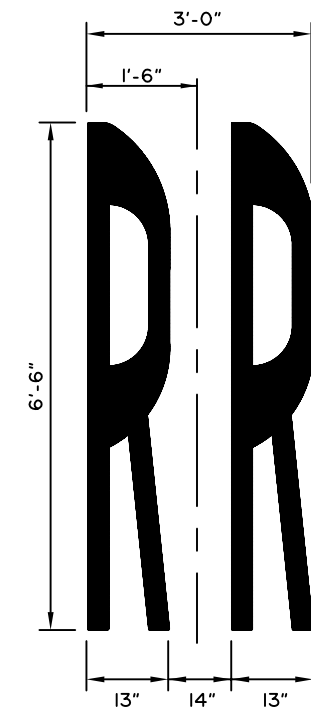
STRAIGHT AHEAD ARROW



WRONG WAY ARROW



COMBINATION ARROW



RAILROAD SYMBOL

REVISIONS		
Date	Description	By
1/1/86	Redraft Arrow Dim.	Gdo
4/1/93	Revise Arrow Markings	Gdo
2/15/00	Revise RR Symbol	KJS

State of Alaska
Department of Transportation
& Public Facilities

PAVEMENT MARKING
SYMBOL DIMENSIONS



Date 1/1/86

Appendix M

Add to section 37:

37-7 HIGH FRICTION SURFACE TREATMENT

37-7.01 GENERAL

37-7.01A Summary

Section 37-7 includes specifications for applying high friction surface treatment (HFST).

Applying HFST consists of spreading resin binder and calcined bauxite aggregate on asphalt concrete, polyester concrete, or concrete surfaces.

HFST shall be applied by a truck mounted machine, or may be applied by either hand on areas less than 200 square yards. The Department is aware of at least one automated continuous application method and equipment that is allegedly covered by United States Patents 9,109,332 and 9,115,473.

37-7.01B Definitions

batch: a specific quantity of material of homogenous composition that can be unambiguously identified, manufactured in a single operation or a series of operations according to a well-defined process.

resin binder: a modified epoxy or polyester resin binder used to bond a surface applied aggregate to an asphalt or concrete surface.

prime coat: a resin that is used to fill cracks and voids in existing surface that is compatible with resin binder.

37-7.01C Submittals

37-7.01C(1) General

Submit the names of your proposed independent laboratories that will perform QC testing.

Submit a certificate of compliance and certified test results for the resin binder and calcined bauxite aggregate. Test results must be from tests performed within 90 days from the date of submittal and must have been performed by an independent laboratory.

Submit a SDS for the resin binder and its components.

37-7.01C(2) Quality Control Plan

Submit a QC plan that must be project specific and includes:

1. Surface preparation methods for areas where HFST is to be placed
2. Method of protecting areas and exposed facilities not to receive HFST
3. Method of protecting and reestablishing existing longitudinal and transverse joints and working cracks in concrete pavements and structures
4. Type of resin binder to be used
5. Resin binder manufacturer's recommended mixing and placement instructions, including mixing ratios and temperatures
6. Resin binder manufacturer's estimated cure times for resin binder to be used
7. Method for safe storage and handling of HFST components
8. Disposal methods for excess HFST and containers for HFST components
9. Contingency plan that describes corrective actions you will take in the event of equipment failure or material issues during HFST placement

Submit QC test results for the quality characteristics within the reporting time allowance, after sampling, shown in the following table:

Quality Control Test Result Reporting

Quality characteristic	Test Method	Maximum reporting time allowance
Los Angeles rattler loss at 100 revolutions	California Test 211	2 business Days
Aggregate moisture content	California Test 226	2 business Days
Aggregate magnesium soundness	ASTM C88	7 Days
Aluminum oxide content	ASTM C25	5 Days
Gradation	California Test 202	1 business Day
Polish stone value	ASTM D3319	7 Days
Aggregate acid insolubility	ASTM D3042	7 Days
Resin binder spread rate	Calculated based on amount of materials used	1 business Day
Viscosity	ASTM D2196	2 business Days
Elongation at break point	ASTM D638	2 business Days
Ultimate tensile strength	ASTM D638	2 business Days
Cure rate	ASTM D1640	1 business Day
Gel time	ASTM C881	1 business Day
Adhesive strength at 24 hours	ASTM C1583	2 business Days
Coefficient of friction before opening to traffic	ASTM E1911	Same day of testing and before opening to traffic
Coefficient of friction 7-15 days after opening to traffic	ASTM E1911	1 business Day after testing

37-7.01D Quality Assurance

37-7.01D(1) General

Not Used

37-7.01D(2) Preconstruction Meeting

Schedule a preconstruction meeting with the engineer at a mutually agreed time and place. Make the arrangements for the meeting facility. Before the start of the trial HFST, hold the meeting with the Engineer and your (or applicable personnel):

1. Project Manager
2. QC Manager
3. Project Superintendent
4. Project Foreman
5. Traffic Control Foreman
6. Subcontractors' foreman
7. Resin supplier technical representative

Meeting attendees must sign an attendance sheet provided by the Engineer. The Engineer retains the attendance sheet.

Discuss the project specifications and the processes for producing materials and constructing each item of work, including:

1. Quality assurance
 - 1.1 QC plan
 - 1.2 Quality control
 - 1.3 Acceptance criteria
2. Placement of materials:
 - 2.1 Trial HFST requirements
 - 2.2 Application rates

- 2.3 Binder resin mixing methods and equipment
- 2.4 HFST application methods and equipment
- 3. Contingency plan
- 4. Issues specific to the project, including:
 - 4.1 Weather
 - 4.2 Alignment and geometrics
 - 4.3 Traffic control issues

Do not place trial HFST, or start production work until the listed personnel have attended the meeting,

37-7.01D(3) Quality Control

37-7.01D(3)(a) General

Perform QC testing for trial HFST and production work. QC testing except coefficient of friction testing must be performed by independent laboratories.

37-7.01D(3)(b) HFST

Perform sampling and testing at the specified frequency and sampling location for the following quality characteristics:

Calcined Bauxite Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of Sampling
Los Angeles rattler loss at 100 revolutions	California Test 211	1st day of production	Point of application or stockpile
Aggregate moisture content	California Test 226	1 per shift	Point of application or stockpile
Aluminum oxide content	ASTM C25	1st day of production	Point of application or stockpile
Gradation	California Test 202	1st day of production	Point of application or stockpile

Resin Binder Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of Sampling
Viscosity	ASTM D2196	1 per batch	Point of application
Elongation at break point	ASTM D638	1 per batch	Point of application
Ultimate tensile strength	ASTM D638	1 per batch	Point of application
Cure rate	ASTM D1640	1 per batch	Point of application
Gel time	ASTM C881	1 per batch	Point of application
Adhesive strength at 24 hours	ASTM C1583	1 per batch	Point of application

HFST Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of Sampling
Resin binder spread rate	Calculated based on amount of materials used	1 per Day	Point of application
Coefficient of friction before opening to traffic	ASTM E1911	Minimum of 1 every 500 ft ^a	Alternate between wheel paths
Coefficient of friction 7-15 days after opening to traffic	ASTM E1911	Minimum of 1 every 500 ft ^a	Alternate between wheel paths

^aFor application lengths <500 ft, test at every 200 ft interval

37-7.01D(4) Department Acceptance

The Department accepts HFST based on:

1. Visual inspection for the following:
 - 1.1. Uniform surface texture
 - 1.2. Raveling, which consists of the separation of the aggregate from the resin binder
 - 1.3. Streaking, which consists of alternating longitudinal bands of resin binder without uniform calcined bauxite aggregate retention, approximately parallel with the lane line
 - 1.4. Flushing, which consists of resin binder without or fully embedded calcined bauxite aggregate

Areas of raveling, streaking and flushing that are greater than 0.25 sq ft shall be considered defective and must be repaired at your own cost. These must be removed and replaced, and must conform to the maximum lateral dimensions of the defective area.

2. The Department's sampling and testing of calcined bauxite aggregate for compliance with the requirements shown in the following table:

Calcined Bauxite Aggregate Acceptance Criteria

Quality characteristic	Test method	Requirement
Los Angeles rattler loss at 100 revolutions ^a (max, %)	California Test 211	10
Aggregate moisture content (max, %)	California Test 226	0.2
Sand equivalent (min)	California Test 217	95
Gradation (% passing by weight) Sieve size:	California Test 202	
No. 4(min)		100
No. 6(min)		95
No. 16(max)		5

^aUse grading D from Table 1.

3. The Department's sampling and testing of resin binder for compliance with the requirements shown in the following table:

Resin Binder Acceptance Criteria

Quality characteristic	Test method	Requirement
Viscosity (centipoise) no. 2 spindle, 10 RPM	ASTM D2196	1,000 - 3,000
Cure rate (max, hrs) Specimen, 0.05 inch thick, Method A, Dry-Through Time	ASTM D1640	3
Gel time (minutes)	ASTM C881	10-30
Elongation at break point (min, %) Type I specimen,	ASTM D638	30
Ultimate tensile strength (min, psi) Type I specimen,	ASTM D638	2,650
Adhesive strength (psi)	ASTM C1583	250 or 100% substrate failure

4. The Department's sampling and testing for HFST for compliance with the requirements shown in the following table:

HFST Acceptance Criteria

Quality Characteristic	Test Method	Requirement
Coefficient of friction at 60 km/h before opening to traffic	ASTM E1911	0.75 ^a
Coefficient of friction at 60 km/h 7-15 days after opening to traffic	ASTM E1911	0.75 ^a

^a Report coefficient of friction values at 20 km/h, 40 km/h, 80 km/h.

Perform coefficient of friction calibration and testing in the presence of the Engineer. Notify the Engineer at least 48 hours before coefficient of friction testing.

37-7.01D(5) Trial HFST Application

Do not begin trial HFST until authorized.

Complete a trial of HFST application at an authorized location before starting production work. Resin binder manufacturer's representative must be present during the trial application.

Remove pavement markers and delineation within the area to receive HFST, for the lane and length involved, prior to placing the resin binder.

The trial HFST application must:

1. Be at least 12 feet wide and 20 feet long.
2. Be constructed using the same method and equipment as the production work. Construct an additional trial for each method proposed for the production work.
3. Replicate field conditions, including ambient and surface temperatures, anticipated for production work.
4. Demonstrate surface preparation requirements as outlined in the QC plan.
5. Document the area of application, quantities of resin binder and aggregate with a data management system capable of reporting coverage rates and thickness of the resin binder system after applying the HFST. Calculate and report HFST application rate.
6. Determine the initial set time for the resin binder.
7. Test the coefficient of friction using ASTM E1911 at 20 km/h, 40km/h, 60 km/h and 80 km/h on the HFST. If the coefficient of friction at 60 km/h speed is below 0.75, correct or replace the HFST until the coefficient of friction is greater than or equal to 0.75.

37-7.02 MATERIALS

37-7.02A General

Apply a prime coat to concrete or polyester concrete surfaces when polyester resin binder is used.

37-7.02B Prime Coat

Prime coat must be high-molecular-weight methacrylate resin conforming to section 60-3.03B(2) except:

1. Methacrylate resin must be free of wax
2. Tack-free time requirements do not apply
3. Friction testing is not required for the resin prime coat

37-7.02C Resin Binder

Resin binder must meet the requirements shown in the following table:

Resin Binder Requirements

Quality characteristic	Test method	Requirement
Viscosity (centipoises) no. 2 spindle, 10 RPM ^b	ASTM D2196	1,000 - 3,000
Cure rate (max, hrs) Specimen, 0.05 inch thick, Method A, Dry-Through Time	ASTM D1640	3
Gel time (minutes)	ASTM C881	10-30
Elongation at break point (min, %) Type I specimen,	ASTM D638	30
Ultimate tensile strength (min, psi) Type I specimen,	ASTM D638	2,650
Compressive strength (min, psi at 3 hours)	ASTM C579	1,000
Water absorption (max, %)	ASTM D570	1.0
Durometer hardness (Shore D)	ASTM D2240	65-75
Styrene content ^a (% by weight)	ASTM D2369	30-40

^aFor polyester resin binder only. Perform test before adding initiator.

37-7.02D Calcined Bauxite Aggregate

Calcined bauxite aggregate must be clean, dry, and free from clay and any other deleterious matter and meet the requirements shown in the following table:

Calcined Bauxite Aggregate Requirements

Quality characteristic	Test method	Requirement
Los Angeles rattler loss at 100 revolutions ^a (max, %)	California Test 211	10
Aggregate moisture content (max, %)	California Test 226	0.2
Sand equivalent (min)	California Test 217	95
Polish stone value (min)	ASTM D3319	38
Aluminum oxide content (min, %)	ASTM C25	87
Gradation (% passing by weight)		
Sieve size:		
No. 4	California Test 202	100
No. 6		95
No. 16		5

^aUse grading D from Table 1.

37-7.03 CONSTRUCTION

37-7.03A General

Do not begin HFST production work until authorized after successful completion of the trial HFST.

37-7.03B Surface Preparation

37-7.03B(1) General

Protect utilities, utility covers, drainage structures, curbs and other structures within or adjacent to treatment location from HFST materials using methods outlined in the QC plan.

Protect existing transverse and longitudinal joints, and working cracks in concrete pavement and structures by taping or other approved method to prevent intrusion of HFST resin and aggregate into the joints and working cracks.

Surfaces must be clean, dry, and free of any dust, oil, debris, organic matter, or any material that may interfere with the bond between resin binder and existing surfaces.

37-7.03B(2) Asphalt Pavement Surfaces

Perform the following before applying resin binder:

1. Remove pavement markers and delineation to a maximum depth of 0.01 foot from the area receiving HFST
2. Sweep the pavement surface
3. Blow the surface clean with pressurized air using a minimum 150 cfm compressor fitted with an air lance
4. Clean cracks greater than 0.25 inch wide with pressurized air and pretreat with mixed resin binder.

37-7.03B(3) Concrete Structures Surfaces

Perform the following activities in the order listed before applying resin binder:

1. Abrasive blast the surface with steel shot
2. Sweep the surface clean
3. Blow the surface clean with pressurized air
4. Pretreat and seal cracks under section 41-3

Steel shot used for abrasive blast must comply with SSPC-AB3 and recycled steel shot must comply with SSPC-AB2. The surface must be dry when abrasive blasting is performed. All laitance, contaminants, paint, markers, foreign material, etc., must be removed from the surface.

If the concrete structures surface becomes contaminated before placing the HFST treatment, abrasive blast clean the contaminated area, sweep and blow the surface clean.

37-7.03C HFST Application

37-7.03C(1) General

Utilize one of the following methods to apply the resin binder and aggregate wearing course, under manufacturer's recommendations:

1. Automated continuous application
2. Hand mixing and application

Application 2 must not be used on areas greater than 200 square yards.

Apply mixed resin binder under resin binder manufacturer's recommendations.

Do not apply resin binder on wet or damp surfaces. Asphalt concrete pavement surface must be greater than 30 days old before applying HFST.

For concrete structures surfaces, if polyester resin binder is the resin binder being used, comply with section for the application of a prime coat of methacrylate resin before placing polyester resin binder. Aggregate requirements in section for polyester concrete overlay do not apply.

Do not apply HFST when the ambient temperature is below 50 degrees F for epoxy type resin binders and 45 degrees F for other resin binders. Do not apply HFST when the ambient temperature is above 100 degrees F.

Spread resin binder at a minimum rate of 0.32 gal/sq yd to one lane width at a time. Narrower application widths are allowed as determined by the engineer.

Do not allow the mixed resin binder to do any of the following that may impair retention and bonding of aggregate:

1. Separate
2. Cure
3. Dry
4. Be exposed
5. Harden

Do not contaminate the exposed uncured mixed resin binder.

Replace contaminated areas of resin binder.

Spread aggregate until refusal within 3 minutes of resin binder application.

Cure HFST for a minimum period recommended by the resin binder supplier. During curing period do not allow vehicles, construction equipment, or foot traffic on the HFST.

HFST that has not completely cured is considered non performing and must be removed and replaced before opening to traffic.

Re-establish existing transverse and longitudinal joints, and working cracks in concrete pavement and structures by sawing or isolating the full depth of HFST, without damaging the joint or crack seal below, before opening to traffic. Match the width and location of the existing joints and working cracks in the concrete pavement within a tolerance of $\pm 1/4$ of an inch.

37-7.03C(2) Automated Continuous Application

Automated continuous application must be performed by an approved self-propelled truck-mounted application machine capable of continuously and thoroughly mixing resin binder components to the ratio recommended by the manufacturer (+/- 2 percent by volume). The machine shall include an aggregate drop spreader capable of mechanically and continuously spreading calcined bauxite aggregate.

The applicator vehicle must be equipped with a built-in data management unit which is capable of producing real time data flow showing:

1. The volume of resin
2. The resin mil thickness on average throughout the application width
3. The volume of aggregate applied throughout the application width

The binder must be continuously applied once blended. The application vehicle must be capable of applying the minimum binder spread rate. Clean the mix head and delivery lines if application of the mixed resin is stopped for more than 30 minutes.

The high friction aggregate must be applied by the same automated continuous application vehicle that applies the resin binder to the pavement section. The automatic aggregate spreader must be capable of applying up to a continuous 12-foot width application.

Exposed uncured mixed resin binder must not be visible after the aggregate topping is applied. If exposed uncured mixed resin binder is visible after applying the aggregate topping, apply aggregate topping to the exposed areas using an approved application method.

37-7.03(4) Hand Mixing and Application

For approved low volume areas and areas less than 200 square yards, hand-mix the resin binder under manufacturer's recommendations. Uniformly spread the resin binder onto the surface using a serrated edge squeegee. Immediately broadcast the high friction surfacing aggregates until refusal.

37-7.03D Excess Aggregate Removal and Reuse

Excess calcined bauxite aggregate must be recovered by a mechanical sweeper and may be reused for HFST. Before reuse of recovered calcined bauxite aggregate, blend with new calcined bauxite aggregate at a rate of 2 to 1 by volume. The recovered calcined bauxite must be clean, dry, and free from clay and any other deleterious material. Provide a record of all recovered calcined bauxite aggregate used and test results. Super sacks or stockpile containing the blended recovered calcined bauxite aggregate must be clearly marked "Recovered Calcined Bauxite Aggregate" and the contract number.

Before opening to public traffic, remove excess and loose aggregate from the traveled way and shoulders by sweeping. HFST must be completely cured before sweeping and there must be no damage or dislodging of aggregate from HFST surface. Perform additional sweeping before placement of pavement markers and delineation.

37-7.04 PAYMENT

Not Used

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
SPECIAL PROVISION**

Section 419—HIGH FRICTION SURFACE TREATMENT

419.1 General Description

This work includes furnishing and installing a textured, high friction surface treatment (HFST) system in accordance with this Section and in conformity with the lines and details shown on the plans.

Ensure the high friction surface treatment color is consistent throughout the project.

419.1.01 Definitions

General Provision 101 through 150.

Continuous Section – section of HFST that is placed in one continuous pass, whether by hand or with a machine. Any stoppages of the installation process resulting in a cold joint, or as described in Section 419.3.06 C-2 below, will constitute the beginning of another continuous placement.

Dynamic Friction Tester (DFT) – ASTM E 1911 friction testing device which reports pavement coefficient of friction versus speed at 20 kph, 40 kph, and 60 kph.

419.1.02 Related References

A. Standard Specifications

General Provision 101 through 150.

800 – Coarse Aggregate

801 – Fine Aggregate

886 – Epoxy Resin Adhesives

B. Referenced Documents

AASHTO PP79-14

AASHTO T255

AASHTO T27

AASHTO T96

AASHTO T104

ASTM C25

ASTM D1640

ASTM D695

ASTM D 570

ASTM D 638

ASTM D 2240

ASTM C 881

ASTM E 1911

419.1.03 Submittals

Submit independent laboratory reports from an AASHTO accredited laboratory documenting that the resin binder and aggregate meet the requirements of this specification. Submit documentation of pre-installation friction characteristics of the existing pavement. Submit documentation of the in-place friction characteristics of the high friction surface treatment in accordance with ASTM E 1911 within five days after the placement (once the surface is deemed cured) of each continuous section and again 90 days after the initial test of each continuous section. Using a DFT ensure a minimum of 0.90 is achieved within 5 days after placement of the high friction surface treatment and ensure a minimum of 0.80 is achieved 90 days after completion of the high friction surface treatment for each reading.

419.2 Materials

Use a two part modified resin binder treatment containing a binder capable of retaining a skid-resistant calcined bauxite aggregate topping under vehicular traffic conditions.

A. Resin Binder: Ensure the binder is a two-part modified exothermic resin treatment. Use a binder consisting of a thermosetting compound which holds aggregate firmly in position. Ensure the binder has the following physical properties:

TEST	REQUIREMENTS	TEST METHOD
Ultimate Tensile Strength	2,650 psi min.	ASTM D-638 (Type 1 Specimen)
Tensile Elongation	30 – 70%	ASTM D-638 (Type 1 Specimen)
Compressive Strength	1,600 psi min.	ASTM D-695
Gel Time	10 minutes min	ASTM C-881
Cure Rate	3 hours max (thin film @ 75° F)	ASTM D-1640
Water Absorption	1 % max	ASTM D-570
Hardness, Shore D	60 – 75	ASTM D-2240

Two part resin binder materials which are not exothermic in curing will not be allowed.

B. Aggregate: Use high friction calcined bauxite. Ensure the aggregate is virgin, clean, dry, and free from foreign matter. No recycled aggregate may be used on the project. Use aggregate that has the following properties:

TEST	REQUIREMENTS	TEST METHOD
Percent Wear	20% max	AASHTO T-96
Soundness	15% max	AASHTO T-104
Moisture content	0.2% max	AASHTO T-255
Aluminum Oxide (Al ₂ O ₃) Content	87% min	ASTM C-25

AGGREGATE GRADATION		
SIEVE SIZE	% PASSING BY WEIGHT	Test Method
No. 4	100	AASHTO T-27
No. 6	95-100	AASHTO T-27
No. 16	0-5	AASHTO T-27

419.2.01 Delivery, Storage and Handling

Deliver aggregate to construction site in clearly labeled bags or sacks that are uniquely identifiable and shall include the following: manufactures name, batch #, lot #, date and location of processing.

419.3 Construction Requirements

419.3.01 Personnel

General Provision 101 through 150.

419.3.02 Equipment

General Provisions 101 through 150.

419.3.03 Preparation

Remove crack sealant and any other material that might interfere with the bond between the resin binder material and existing surfaces. Ensure surfaces are clean, dry and free of all dust, oil, and debris. Clean existing surfaces by use of mechanical sweepers, high pressure air, or other methods approved by the Engineer prior to the installation. Pavement surfaces contaminated with oils, greases, or other deleterious materials not removed by the surface preparation shall be washed with a mild detergent solution, rinsed with clean potable water and dried using compressed air. Adequate cleaning of all surfaces will be determined and approved by the Engineer based on the recommendation of the manufacturer's representative.

Protect utilities, drainage structures, curbs and other structures within or adjacent to the application location of the high friction surface treatment materials. Cover and protect all existing pavement markings that are adjacent to the application surfaces as directed by the Engineer. Remove pavement markings that conflict with the surface application by grinding, hydro blasting or sand blasting as approved by the Engineer. Clean the surface prior to binder application by a method specified herein as approved by the Engineer.

Clean and fill all inadequately sealed joints and cracks greater than ¼ inch in width and/or depth. The joints and cracks shall be filled with a slurry created with the binder and aggregate specified herein. Once the slurry in the pretreated areas has gelled and cured, proceed with the installation of the high friction surface treatment.

For applications on new pavements, install the high friction surface treatment a minimum of 30 days after the placement of the underlying and adjacent asphalt pavement to reduce the likelihood of tracking or raveling.

Portable Shot Blast Equipment: Use approved portable shot blast equipment meeting the requirements to remove curing compound and prepare portland portland cement concrete surfaces prior to application of the polymeric resin binder a minimum of 30 days after the placement of the underlying and adjacent Portland cement concrete.

419.3.04 Fabrication

General Provisions 101 through 150.

419.3.05 Construction

A. Qualification of the Installer

Submit to the Department a minimum of two projects including the installer's contact information. The two projects must have a cumulative minimum of 5,000 square yards of HFST and must have been placed within the past three years. All submitted projects must have an average friction reading of at least .90, using a dynamic friction tester, within 5 days of the installation when tested in accordance with ASTM E 1911.

B. Quality Control (QC) Plan

Submit a project specific QC Plan for approval to the Engineer before any material placement. Discuss the QC Plan at the pre-construction meeting. The QC Plan must include key personnel, equipment, materials, proposed methods of installation and operation, and the following requirements:

1. A designated QC Plan Administrator, who has full authority to institute any action necessary for the successful

operation of the QC Plan and is responsible for the following:

- a. Identify and provide to the Engineer, contractor procedures for:
 - Documenting quantities used for binder and aggregate at each HFST site so that application rates (binder and aggregate) may be confirmed to be in accordance with the specification.
 - Moisture control methods of aggregate.
 - Cleaning and maintenance schedule for machinery and equipment.
 - Corrective actions for unsatisfactory construction practices. Any deviation from the approved QC Plan will be cause for immediate suspension of operations.
 - Creating slurry for filling joints and cracks
 - The chance and/or event of rain
 - b. Contractor performance of required field QC sampling, testing and record keeping in conformance with the approved QC Plan and contract documents.
 - c. Maintain and make available upon request, complete records of sampling, testing corrective actions, and QC inspection results.
 - d. Provide a copy of stored material as mentioned in section 419.3.04 C.
 - e. Installation and testing schedule.
2. A resin binder manufacturer's technical person, who is responsible for the following:
- a. Must be present for the pre-construction meeting.
 - b. Must be present at any job site that requires corrective work
 - c. Or must be present as otherwise approved by the Engineer in the QC Plan.

C. Delivery and Storage of Materials

Store materials in a clean, dry environment and in accordance with the manufacturer's recommendations. Do not expose the aggregate to rain or moisture. Obtain and post at the storage areas the Safety Data Sheet (SDS), Product Data Sheet, and other information from the manufacturer pertaining to the safe practices for the storage, handling, and disposal of the materials, and to their health hazards. Provide a copy of such information to the Engineer. Storage containers must have the manufacturer's name, date of manufacture, batch/lot number, trade name, quantity, and mixing ratio printed on the label.

D. Application Conditions

Do not place the resin binder on a wet surface or when the surface temperature of the pavement is below 50°F or greater than 105°F or per written recommendations received from the epoxy manufacturer. When there is a 40% or greater chance of rain forecasted within 24 hours of application the Contractor will discuss a plan of action as require by Section 419.3.05 B, QC Plan. Do not place the high friction surface treatment if the material can't be applied, cured and open to traffic prior to the ambient temperature decreasing to 40°F and/or it begins to rain; or the contractor will remove and replace said section of treatment.

E. Application Method

Table 1 shows the permissible main application methods, depending on the size and Average Daily Traffic (ADT) of each individual HFST installation sites. Manual application is permissible at sites as a secondary method where for reasons of access or geometry the mechanized equipment cannot be used, as approved by the Engineer. Do not allow the mixed Binder material to be separate, cure, dry, or otherwise harden in such a way as to impair retention and bonding of aggregate. Remove and replace any Binder that becomes contaminated at no additional expense to the Department. Immediately remove loose aggregate that falls onto any part of an active adjacent travel lane after the traffic is temporarily held. Contractor equipment and traffic are not allowed on the HFST during the curing period.

Table 1
Permissible Methods of Application

Average Daily Traffic	Site Size (Square Yards)	Main Application Method
Less than 25,000	Less than 300	Hand Mixing and manual Application or Automated Continuous Application
	300 and above	Automated Continuous Application
25,000 and above	Less than 300	Automated Continuous Application
	300 and above	Automated Continuous Application

1. Hand mixing and Manual Application

Provide calibrated containers for proper proportioning of the Binder components. Provide a clean, dry, container large enough to blend and mix the proper proportions of the Binder. Uniformly mix the Binder components to within $\pm 2\%$ of the manufacturer’s specifications (by volume) using a low-speed, high-torque drill fitted with a helical stirrer, moving the stirrer around to all the edges of the mixing container, or as approved by the manufacturer’s technical person. Do not use wheel mixers or paddle mixers. Hand squeegee the mixed components onto the prepared pavement surface using a serrated edge squeegee at a uniform application thickness of 60 ± 5 mils (2.7-3.6 square yards per gallon). The Contractor shall wear elevated or spiked shoes while squeegeeing the mixed components. The Engineer and the Contractor will measure and monitor placement of the Binder using a contractor supplied wet film thickness gauge a minimum rate of one (1) per one hundred (100) square yards placed to ensure proper application thickness. Immediately after the Binder application, mechanically or manually spread the aggregate onto the wet, uncured Binder at a uniform rate of 12-15 pounds per square yard. Completely cover the wet, uncured Binder with aggregate to achieve a uniform surface with no exposed Binder remaining visible on the surface. The high friction aggregate shall be applied within five (5) minutes of the base resin binder application onto the pavement section. Spread the aggregate without displacing the wet Binder film during placement. Minimize walking or standing on the Binder. Do not allow loose aggregate onto any part of the adjacent, active travel lanes.

2. Automated Continuous Application

Automated Application Machine: Machine mixing and application of Binder, machine application of aggregate, no hand squeegee work allowed. Perform automated application using equipment that continuously and thoroughly mixes, meters, monitors, and applies the Binder followed by application of the aggregate by use of equipment capable of placing Binder and aggregate in one continuous pass at a minimum of 12 foot in width. If recommended by the Binder manufacturer, use a heated metering pump. Blend and mix the Binder in accordance with the manufacturer’s specification ($\pm 2\%$ by volume) and place a uniform Binder thickness of 60 ± 5 mils (2.7-3.6 square yards per gallon). Flow meter readings shall be recorded and supplied to the Engineer. Apply the aggregate mechanically at a rate of 12-15 pounds per square yard (achieving saturation) by vertical drop onto the wet, uncured Binder with a maximum height of 24 inches to ensure there is no displacement of the Binder. Do not allow loose aggregate onto any part of the adjacent, active travel lanes. Use equipment capable of continuously monitoring Binder and aggregate application rates. Record the initial and ending readings of the tanks (binder and aggregate) at the start and end of each continuous section. No walking or standing on the Binder is permitted.

F. Curing

Allow the aggregate topped binder to cure in accordance with manufacturer recommendations until it is ready to accept traffic. Ensure that there are no visible wet spots after the aggregate has been applied. Protect treated surfaces from traffic and environmental effects until the area has cured. Remove the excess aggregates by one of the methods shown below before opening to traffic:

1. Remove the excess aggregate with a sweeper truck that has a built in internal hopper.

2. Self-Propelled Air Sweeper (SPAS): Use a SPAS with power brooms capable of cleaning the existing pavement and removing loose aggregate without dislodging the bonded HFST aggregate. The vacuum head shall have a minimum width of 6 feet (2 meters) and blast re-circulated, filtered air at a minimum rate of 20,000 cu ft/min (565 cu m/min). The SPAS must be capable of being used without water for dust suppression to ensure a dry surface will be maintained.

Three (3) calendar days after the initial installation, remove the excess aggregate with a sweeper truck that has a built in internal hopper. Excess aggregate cannot be reused.

419.3.06 Quality Acceptance

A. Testing Schedule

Submit a testing schedule to the Quality Assurance Branch Chief with the Office of Materials & Testing a minimum of three weeks prior to any testing being conducted on the project. The schedule shall be updated and resubmitted a maximum of every 14 calendar days or sooner if needed.

B. Pre-installation Testing

At no additional cost to the Department, the contractor will use a DFT to measure the friction characteristics of the existing pavement to be treated in accordance with ASTM E 1911. Pre-installation testing can be conducted prior to or on the same day as HFST installation. If conducted prior to the installation, the pre-installation testing shall be done within each installation section limits and noted on the shoulder so that the post-installation testing can take place in the same location. If pre-installation testing is to be conducted on the same day as HFST installation, it should be conducted on a section of adjacent pavement (e.g., just beyond the limits of the HFST), as long as the pavement appears to be similar in nature (e.g., constructed at the same time) to the pavement being treated. If there is a change in the pavement surface within the limits of the treated section, pre-installation testing should be conducted on each apparently different pavement. Whenever possible, pre-installation testing should be conducted not more than 20 LF beyond the limits of the HFST. Pre-installation testing should be conducted in one of the wheel paths where friction values are generally lower, but can also be conducted in the center of the lane as approved by the Engineer.

C. Post-installation Testing

At no additional cost to the Department, the Contractor will use DFT to measure the friction characteristics of the high friction surface treatment in accordance with ASTM E 1911 within five days after the placement (once the surface is deemed cured) of each continuous section and again 90 days after the initial test of each continuous section. The contractor may conduct the initial test of the surface as early as the same day and as late as the 5th day. The earliest the contractor may conduct the second round of testing on each continuous section shall be a minimum of 90 days after the installation. Using a DFT ensure a minimum of 0.90 is achieved within 5 days after placement of the high friction surface treatment and ensure a minimum of 0.80 is achieved 90 days after completion of the high friction surface treatment for each reading.

C-1 Contractor Testing

1. The Contractor shall conduct DFT testing on each continuous section as stated below.
2. The first test location should be within the first 25 LF of the continuous section, and the second test should be at least 200 LF beyond the first test, unless the continuous section is less than 225 LF, in which case it should be located at the approximate midpoint of the continuous section. Each subsequent test should be conducted 200 LF beyond the last test for each continuous section. If the first four DFT testing results are satisfactory, the frequency of testing may be decreased to one DFT test for every 1000 LF as approved by the Engineer.
3. Each test location shall contain 3 separate test in each lanes. Each test shall report the DFT values for 20, 40, and 60 kph.
4. Testing shall be conducted in right or left wheel path of a lane, approximately 3 LF from the centerline or shoulder stripe or in the apparent wheel path.
5. Conduct an additional DFT tests at the location of any surface anomalies or deficiencies, as directed by the Engineer. Anomalies which may require an additional test from the agency include but are not

limited to:

- a. Locations where the resin shows through the aggregate.
 - b. Locations of surface defects/impressions from construction operations (e.g., wheel and foot tracks).
 - c. Locations of manual patching after completion of installation.
 - d. Test locations where the friction values as described in Item 419.03.06 C-1(8) below.
6. Note the location of any continuous sections where any friction values fall below the specification limit of 0.90 at 60 kph.
 7. Note any continuous sections where the friction values from the two DFT tests differ by more than 10 percent, regardless of whether the friction value was above the specification limit. Note any continuous sections with a single DFT test where the friction value differs by more than 10 percent from the previous continuous section.
 8. The contractor shall submit proof of annual DFT calibration from an approved facility in accordance with ASTM E 1911 precision requirements.

C-2 A new continuous section of HFST placement shall be delineated whenever the following occur:

1. Installation process stops for a period of time exceeding the curing time of the resin binder, resulting in a cold joint in the HFST.
2. Any time there is a change in the installation process, such as a switch from machine applied to hand applied or hand applied to machine applied.

C-3 Agency Verification Testing for 5-Day Test:

1. The intent is to test at the same time as the Contractor. If this cannot be accomplished, the Agency will make every effort to test within five business days.
2. Conduct a single DFT test within each continuous section of HFST placement, as designated during the installation. Testing will be conducted in the same wheel path as the contractor's test.
3. Compare friction testing results at 20, 40, and 60 kph to the contractor's acceptance test results.
4. If friction values vary more than 10 percent (at 60 kph) from the contractor's test results, a second test at the same location will be conducted to verify results.
5. If friction values still vary more than 10 percent (at 60 kph) from the contractor's test results, additional testing by the contractor at the same location will be required at no additional cost to the Department.
6. If the contractor's new results do not agree with the Agency's results, then both testers will be examined to ensure they are calibrated to the manufacturer's recommendations. Calibration will be confirmed once the contractor's and state's values are within 10 percent (at 60 kph) of each other.
7. If contractor's new test results agree with agency results, and the friction value at 60 kph, using a DFT, is below the specification threshold, conduct additional testing upstream and downstream from this test location to identify the limits for removal and replacement of the HFST.
8. GDOT reserves the right to obtain random samples of materials listed under 419.2 for testing.

D. Removal and Replacement

At no additional cost to the Department, the Contractor will remove and replace high friction surface treatment placed that the Engineer determines has any raveling, delamination, streaking or failure to meet the DFT friction values after 90 days. Ensure the minimum replacement is the full lane width and no less than ten feet long and as approved by the Engineer. Replace with acceptable high friction surface treatment at the Contractor's expense. Random samples tested by GDOT or its representative laboratory shall pass all specified requirements. Ensure that any materials failing to meet specified requirements are to be removed and replaced with acceptable high friction surface treatment at the contractor's expense.

419.4 Measurement

The area to be measured is the number of square yards (meters) of high friction surface treatment completed and accepted.

419.4.01 Limits

The length and width is measured along the surface. The area to be paid for is determined on site.

419.5 Payment

The accepted area of high friction surface treatment will be paid for at the Contract Unit Price per square yard (meter) complete in the following separate payments:

- 1. 90% after acceptable 5 day testing
- 2. 10% after acceptable 90 day testing

Payment will be made under:

Item No. 419	High friction surface treatment	Per square yard (meter)
--------------	---------------------------------	-------------------------

Office of Traffic Operations

Appendix O

SPECIAL PROVISION FOR HIGH FRICTION SURFACE TREATMENT (CBM/BSPE)

Effective: January 1, 2014

Revised: March 10, 2017

Description. This work shall consist of constructing an experimental High Friction Surface Treatment (HFST) on a hot-mix asphalt (HMA) or portland cement concrete (PCC) pavement surface to restore or enhance the skid resistance. The HFST shall be composed of calcined bauxite aggregate bound with an epoxy resin.

Materials. Materials shall be according to the following requirements.

- (a) General. Materials shall be stored in a clean, dry environment and in accordance to the manufacturer’s recommendations.

Safety Data Sheet (SDS), Technical Data Sheet, and other information pertaining to the safe practices for the storage, handling, and disposal of the materials, and to their health hazards shall be obtained from the manufacturer and posted at storage areas. A copy of such information shall be provided to the Engineer.

- (b) Epoxy Resin Binder. The binder shall consist of a two part exothermic epoxy resin which holds the aggregate firmly in position, and conforms to the requirements of Table 1. The epoxy resin binder shall be on the Department’s current “Qualified Product List for High Friction Surface Treatment – Part A”. The epoxy resin binder manufacturer shall ensure that the material is suitable for temperatures that will be experienced at the time of placement. Epoxy resin binder materials which are not exothermic in curing and do not meet the viscosity requirements, will not be allowed.

Table 1 – Epoxy Resin Binder Material Properties Requirements

Property	Test Method	Requirements
Viscosity, Poises	ASTM D 2556	7 - 30
Ultimate Tensile Strength, psi	AASHTO M 235	2,500 - 5,000
Compressive Strength, psi	ASTM C 579	1,000 min. (3 hours) 5,000 min. (7 days)
Gel Time, minutes	AASHTO M 235	10 min.
Water Absorption, %	AASHTO M 235	1 max.
Durometer Hardness (Shore D)	ASTM D 2240	60 - 80
Cure Rate (Dry through time), hours	ASTM D 1640, 55 mil wet thickness @ 75 °F	3 max.
Elongation at Break Point, %	AASHTO M 235	30 - 70
Mixing Ratio	Provide manufacturer’s recommendations a minimum of 60 days prior to construction.	Per Manufacturer
Adhesion Strength, psi @ 24 hrs	ASTM D 7234	250 min. or 100% substrate failure
Infrared Spectrum	AASHTO T 237	Note 1

Note 1: To be established by each manufacturer for each individual component and combination of components.

- (c) Aggregate. The aggregate shall be calcined bauxite that is clean, dry, free from foreign matter, and conforms to the requirements in Table 2. The aggregate shall be on the Department’s current “Qualified Product List for High Friction Surface Treatment – Part B”.

Deliver the calcined bauxite to the construction site in clearly labeled super sacks weighing at least 2,200 lb (1,000 kg). When hand applications are necessary, 55 lb (25 kg) bags of material may be substituted.

Table 2 – Aggregate Material Properties Requirements

Property	Test Method	Requirements
Gradation <u>Sieve Designation</u> No. 4 (4.75 mm) No. 6 (3.35 mm) No. 16 (1.18 mm)	AASHTO T 27	<u>Percent Passing (min.)</u> 100 95.0-100.0 0.0-5.0
Moisture Content, %	AASHTO T 255	0.2 max.
Aluminum Oxide, %	ASTM C 25	87 min.
LA Abrasion Test, %	AASHTO T 96, (D grading)	20 max.

Equipment. Equipment shall be according to the following.

- (a) Truck Mounted Application Machine. The HFST application machine shall be an approved self-propelled, fully automated truck mounted application machine capable of continuously applying resin and aggregate at a uniform thickness and rate, respectively, in varying widths of up to 12 ft (3.6 m).

The application machine shall be capable of continuously and thoroughly mixing epoxy resin binder components to the ratio recommended by the epoxy resin manufacturer. The epoxy resin shall be uniformly applied to the pavement surface at a minimum coverage rate of 10 gal/min (38 L/min) with a minimum uniform application thickness of 50 mils (1.25 mm).

The aggregate shall be applied by the same application machine which includes an aggregate drop spreader capable of mechanically continuously spreading bauxite aggregate at a minimum rate of 11 lb/sq yd (6 kg/sq m), with a minimum height from spreader to pavement surface of 12 in. (300 mm) to achieve proper spread of aggregate. The use of chip spreaders, vehicle tires, rollers, vibratory compactors or devices that throw loose aggregate onto any part of the live roadway lanes will not be allowed to apply the aggregate onto the wet uncured resin.

The HFST application machine shall be capable of the uniform application of the binder and aggregate at a minimum continuous application rate of 2,300 sq yd/hour (1,925 sq m/hour).

- (b) Air Compressor. The air compressor shall be capable of producing a minimum pressure of 90 psi (620 kPa) at the end of the discharge hose. The air stream shall discharge onto the pavement through an appropriate air lance. The tool lubricator shall be bypassed and a filter installed on the discharge valve to keep water and oil out of the line.
- (c) Portable Shot Blast Equipment. The portable shot blast equipment shall meet the requirements of Article 1101.13.
- (d) Regenerative Air Sweeper (RAS). The Regenerative Air Sweeper (RAS) shall be self-propelled with power brooms capable of cleaning the existing pavement and removing

loose aggregate without dislodging the bonded HFST aggregate. The regenerative air vacuum sweeper shall blast re-circulated, filtered air through a vacuum head having a minimum width of 6.0 feet at a minimum rate of 10,000 cubic feet per minute (283 cu m/min). The RAS shall be capable of recycling loose aggregate into clean, uncontaminated, and dry aggregate. The RAS shall be capable of being used without water for dust suppression to ensure a dry surface will be maintained.

CONSTRUCTION REQUIREMENTS.

Qualifications. The Contractor that is placing the HFST shall be listed as a conditionally approved applicator on the Qualified Product List for High Friction Surface Treatment.

Quality Control (QC) Plan. Submit a QC Plan to the District Materials Engineer for approval at least 60 days prior to the placement. The QC Plan shall show proposed methods to control the equipment, materials, mixing, and placement operations to ensure conformance with these specifications. Discuss the QC Plan requirements at the pre-construction, pre-placement, and progress meetings. The QC Plan shall contain at a minimum the following information.

- (a) Key Personnel and contact information.
- (b) Epoxy resin production plants, location of plants, personnel qualifications, inspection and record keeping methods, equipment calibration records, and accreditation certificates.
- (c) Aggregate production plant locations, personnel qualifications, inspection and record keeping methods, equipment calibration records, and accreditation certificates.
- (d) Moisture control methods of aggregate.
- (e) List of manufacturer recommendations for storage of material, weather restrictions, curing time, and opening to traffic.
- (f) Cleaning and maintenance schedule for truck mounted application machine, including metering and monitoring devices.
- (g) Corrective actions that will be taken for unsatisfactory construction practices and deviations from specifications.
- (h) A technical expert representative from the epoxy resin manufacturer shall be present at the construction site to train construction personnel prior to placing the HFST and shall remain on the project for the first two days of placement. After the first two days, the representative shall be available during HFST application as necessary.

The QC Plan shall designate a QC Manager, who shall have full authority to institute any action necessary for the successful operation of the QC Plan. The QC Manager shall be on the jobsite at all times during placement of the HFST.

A field technician shall be present at the job site unless otherwise approved in the QC Plan. The field technician shall be responsible for the required field quality control sampling and testing in conformance with the approved quality control plan and contract documents. All sampling shall be performed in the presence of and in locations as directed by the Engineer. Maintain and make available upon request complete records of sampling, testing, actions taken

to correct problems, and quality control inspection results. Any deviation from the approved QC Plan shall be cause for immediate suspension of operations.

Weather Restrictions. The epoxy resin binder material shall be applied on dry surfaces (including no condensation moisture from construction vehicles in front of binder application), when the ambient temperature is within the following range.

Minimum Temperature: The minimum temperature at time of placement shall be 55 °F (13 °C) and rising, unless the epoxy resin manufacturer can provide test data to support installations at lower temperatures.

Maximum Temperature: The maximum temperature at time of placement shall be 105 °F (40 °C) or when the anticipated weather conditions or pavement surface temperature would prevent the proper application of the surface treatment in accordance with the manufacturer's recommendations.

Ensure the epoxy resin components are capable of being mixed at lower than ambient temperatures in the event that the components are stored outdoors.

HFST materials shall not be placed when rain is forecast within 24 hours of application.

There shall be no visible moisture present on the surface of the pavement at the time of application of the HFST. A plastic sheet left taped in place for a minimum of two hours, according to ASTM D 4263, shall be used to identify moisture in the pavement.

Preparation. Roadway patching shall be performed in accordance with Section 442 of the Standard Specifications.

All inadequately sealed joints and cracks 1/4 to 1-3/4 in. (6 to 43 mm) wide shall be cleaned and filled with a sealant approved by the epoxy resin manufacturer, which will bond to the specified epoxy resin binder. Cracks shall be blown clean using a compressed air lance. The cleaned cracks shall be filled with the approved sealant such that the surface is flush with no "band-aid" effect.

Remove existing pavement markings in areas to be covered with HFST in accordance with Section 783 of the Standard Specifications. Adequately cover and protect all utilities, preformed joint seal, raised pavement markers, and existing pavement markings (in areas where markings will be left in place) prior to HFST placement.

Where HFST will be applied on new surfaces or patches (either HMA or PCC) in a project, the HFST shall be placed a minimum of 30 days after the placement of the surfaces or patches.

Shot blast all (existing, new, and patched) HMA and PCC surfaces and clean with a RAS without dust suppression water, or by other methods approved by the QC Manager and the Engineer prior to application of the epoxy resin. Shot blasting shall completely remove all curing compounds on new PCC surfaces and remove all residues on HMA surfaces. Surfaces may need to be washed with a mild detergent, and then rinsed and dried using a hot compressed air lance. Receiving surfaces must be clean, dry and free of all dust, oil, debris and any other material that might interfere with the bond between the epoxy resin binder material and existing surfaces.

Test Section. Construct a test section (minimum of 200 sq yd (168 sq m)) within the project to demonstrate the truck mounted application machine has been properly calibrated. This test section shall be considered part of the HFST quantity on the project. Correct deficient areas before opening to traffic as directed at no additional cost to the Department. Open the test section to traffic after curing is complete, and no uncovered epoxy resin remains exposed.

HFST Application. The HFST shall be applied according to one of the following methods based on the quantity being placed.

(a) Projects Greater Than or Equal to 300 sq yd (250 sq m). A self-propelled, fully automated truck mounted application machine shall be used for application on projects with total HFST quantities of 300 sq yd (250 sq m) or more.

(1) Binder Application. The binder components shall be mixed proportionally in accordance with the manufacturer's recommended ratio. The epoxy resin binder shall be applied by a truck mounted application machine onto the pavement section to be treated within the temperature range specified. The binder shall be applied in varying widths of up to 12 ft (3.6 m) wide at an application rate of 25 to 32 sq ft/gal (0.6 to 0.8 sq m/L) onto the bridge deck. Do not allow the binder to separate in the mixing lines, cure, dry, chill, set up, or otherwise impair retention bonding of the high friction surfacing aggregate. Ensure that no seams are visible in the middle of the traffic lanes of the finished work after application of the surface aggregate.

(2) Aggregate Application. The aggregate shall be applied by the same truck mounted application machine, which includes an aggregate drop spreader, immediately after placing the epoxy resin binder. The aggregate shall be applied uniformly to ensure complete coverage of the "wet" epoxy resin binder and result in a retained rate of 11-15 lb/sq yd (6-8 kg/sq m). No exposed epoxy resin shall remain visible on the surface.

(b) Projects Less Than 300 sq yd (250 sq m). Manual application may be used on projects with total HFST quantities less than 300 sq yd (250 sq m).

(1) Binder Application. The binder components shall be mixed to the correct proportion within 4 percent by weight using a low speed high torque drill fitted with a helical stirrer. The mixed components shall be applied manually onto the prepared pavement surface using a serrated edged squeegee resulting in a minimum coverage rate of 3.5 sq yd/gal (0.75 sq m/L) with a uniform thickness of 60 mils (1.5 mm).

(2) Aggregate Application. The aggregate shall be sprinkled or dropped vertically without splashing the wet epoxy resin film during placement, whether by mechanical or manual means.

Curing and Clean Up. Allow the treatment to cure in accordance with epoxy resin manufacturer recommendations. Perform three separate clean up processes by removing the excess aggregate with a RAS on the treated area and adjacent areas. Perform initial clean up before opening to traffic. Excess aggregate can be reused on the following day's installation provided the reclaimed aggregate is clean, uncontaminated and dry. Perform secondary clean up 3 to 5 days after construction. Perform final clean up 3 to 5 weeks after construction.

Field Acceptance Testing. Ensure that the coverage rate of the retained aggregate is 11-15 lb/sq yd (6-8 kg/sq m). Remove and re-apply HFST where any patches of exposed epoxy

resin exist, at no additional cost to the Department. The HFST treated area will be tested by the Department within 60 days after construction in accordance with the requirements in Table 3. Remove and replace deficient locations as directed.

Table 3 – Field Acceptance Testing Requirements

Property	Requirements	Frequency	Test Method
FN40R (Corrected field FN by adding the correction in Table 4) OPTIONAL	72 min.	Every 0.1 mile in each lane. By Department	ASTM E 274 (Ribbed tire)
Field Dynamic Friction Value (20 km/hr) (By IDOT) OPTIONAL	0.90 min.	1 per each location, or 1 per every 1,500 lane-feet, whichever is shorter. By Department	ASTM E 1911
Mean Profile Depth (mm) OPTIONAL	1.0 min.	1 per each location, or 1 per every 1,500 lane-feet, whichever is shorter. By Department	ASTM E 2157

Table 4 – HFST Speed Correction Factors for ASTM E 274 Testing Using a Ribbed Tire

Test Speed (mph)	FN Correction	Test Speed (mph)	FN Correction	Test Speed (mph)	FN Correction
20	-9.3	30	-4.8	40	0.0
21	-8.9	31	-4.4	41	0.5
22	-8.4	32	-3.9	42	1.0
23	-8.0	33	-3.4	43	1.5
24	-7.6	34	-2.9	44	2.0
25	-7.1	35	-2.5	45	2.5
26	-6.7	36	-2.0	46	3.1
27	-6.2	37	-1.5	47	3.6
28	-5.8	38	-1.0	48	4.1
29	-5.3	39	-0.5	49	4.6

Method of Measurement. High Friction Surface Treatment will be measured for payment in square yards (sq m). The width for measurement will be the width of the top surface as shown on the plans or directed by the Engineer.

Patches will be measured for payment according to Article 442.10 of the Standard Specifications.

Pavement marking removal will be measured for payment according to Article 783.05 of the Standard Specifications.

Crack/joint filling will be measured for payment in feet (meters), measured along the crack.

Basis of Payment. High Friction Surface Treatment will be paid for at the contract unit price per square yard (square meter) for HIGH FRICTION SURFACE TREATMENT.

Patches will be paid for according to Article 442.11 of the Standard Specifications.

Pavement marking removal will be measured for payment according to Article 783.06 of the Standard Specifications.

Crack/joint filling will be paid for at the contract unit price per foot (meter) for HIGH FRICTION SURFACE TREATMENT CRACK FILLING.

Appendix P

SPECIAL NOTE FOR POLYMER CONCRETE OVERLAY SYSTEMS

I. DESCRIPTION

This work shall be performed in accordance with the Department's 2012 Standard Specifications, and applicable Standard or Sepia Drawings, except as hereafter specified. Article references are to the Standard Specifications.

The Contractor shall furnish all materials, labor, and equipment for the following work:

- (1) Maintaining and Controlling Traffic; (2) Cleaning and preparing the existing surface; (3) Installing a high friction surface treatment in accordance with the contract documents; and (4) All other work as specified as part of this contract.

II. MATERIALS

Provide for sampling and testing of all materials in accordance with the Department's Materials Field Sampling and Testing Manual. Make materials available, within the State of Kentucky, for sampling a sufficient time in advance of the use of the materials. Allow a minimum of 15 working days for testing. The Contractor shall use materials listed on the Department's List of Approved Materials for Polymer Concrete Overlay Systems (High Friction Surface and Bridge Deck Overlays).

A. Maintain and Control Traffic. See Traffic Control Plan.

B. High Friction Surface Treatment. The high friction surface treatment shall consist of a polymer resin binder and aggregate system chosen from the Department's List of Approved Materials. The Department will obtain samples of each binder component and aggregate at a frequency of one sample per lot per contract. The Department will obtain one, one-quart (32 ounce) sample of each binder component for testing. The Department will obtain one 60 to 70 pound composite sample of aggregate for testing. Reclaimed aggregate shall not be allowed for use.

- a) **Binder.** The polymer resin binder shall hold the aggregate firmly in position and meet the following requirements:

TWO-PART MODIFIED BINDER REQUIREMENTS		
Property	Specification Limits	Test Method
Ultimate Tensile Strength	17.0 – 25.0 MPa (19.65 MPa)	ASTM D638
Compressive Strength	5mm min.; > 13 MPa	ASTM D695
Gel Time	50 ml; 10 minutes min. (16 minutes)	ASTM D2471
Elongation at break	30% minimum (54.0%)	ASTM D638
Peak Exothermic Temperature	150°F min.	ASTM D2471
Water Absorption	Less than 0.25%	ASTM D570
Shore Hardness	70 min.	ASTM D2240, Shore D
Cure Rate	3 hours max	ASTM D1640 @ 75°F
Mixing Ratio	Per Manufacturer's Recommendation	n/a

- b) **Aggregate.** Ensure that the aggregate is clean, dry and free from foreign matter and meets the following requirements:

AGGREGATE REQUIREMENTS		
Property	Specification Limits	Test Method
SFC – Side Force Coefficient	0.70 min.	ASTM E670
SN – Skid Number	75 min SN40R	ASTM E274
PSV – Polished Stone Value	75.0 mm max. (70 mm)	ASTM E660
Texture Depth – Sand Patch Method	1 mm min. (1.2 mm)	ASTM E965
AAV – Aggregate Abrasion Value	20 max	AASHTO T96
Aggregate Gradation	95.0 – 100.0% Passing No. 6 0.0 – 5.0% Passing No. 16	AASHTO T27
Aluminum Oxide (Al ₂ O ₃)	87 min	ASTM C114

III. CONSTRUCTION METHODS

Prior to beginning work, provide the Engineer with a certification from the manufacturer of the binder stating that all material used in the work will meet the requirements of Section II B. a. in this Special Note. Also provide the Engineer with a certification stating that all aggregates used in the work will meet the requirements of Section II B. b. of this Special Note.

- A. Maintain and Control Traffic.** See Traffic Control Plan.
- B. Site Preparation.** Be responsible for all site preparation, including but not limited to the following:
- a) **Preparation and Restoration.** Ensure that a manufacturer’s representative is on site to provide technical assistance during the start up operations and as necessary during the surface preparation, material placement, and during any necessary remedial work.
 - b) **Protective Coverings.** Utilities, drainage structures, curbs, bridge joints, and any other structure within or adjacent to the high friction surface treatment location shall be protected from surface preparation activities and application of the surface treatment materials. Cover and protect all existing pavement markings that are adjacent to the surface treatment location. Pavement markings that conflict with the surface application shall be removed prior to performing the required surface preparation.
 - c) **Surface Preparation.** Prepare all surfaces in accordance with the following requirements. Ensure surfaces are dry and meet the requirements of the section immediately prior to installation of the high friction surface treatment. Surfaces contaminated with oils, greases, or other deleterious materials not removed by the required surface preparation shall be washed with a mild detergent solution, rinsed with clean potable water, and dried using a hot compressed air lance.
 - d) **Asphalt Pavement.** Clean asphalt pavement surfaces using mechanical sweepers and high pressure air wash. Mechanically sweep all surfaces to remove dirt, loose aggregate, debris, and deleterious

material. Air wash all surfaces using a minimum of 180 CFM clean and dry compressed air. Maintain the air lance perpendicular to the surface and the tip of air lance within 12 inches of the surface. For applications on new asphalt pavement, ensure the surface has cured a minimum of 30 days prior to performing surface preparation and installation of the high friction surface treatment.

- e) **Concrete Pavement.** Clean concrete pavement surfaces by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compound, loosely bonded mortar, surface carbonation, and deleterious material. The prepared surface shall comply with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep all surfaces to remove all dust, debris, and deleterious material.
- f) **Concrete Bridge Deck.** Clean the entire area of the deck surface and vertical faces of curbs, barrier walls and plinths up to a height of one inch above the top elevation of the overlay, and areas to receive epoxy-sand slurry, by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compound, loosely bonded mortar, surface carbonation, and deleterious material. Areas to receive epoxy-sand slurry shall be cleaned to a bright, clean appearance. The prepared bridge deck surface to receive high friction surface treatment shall comply with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep all surfaces to remove all dust, debris, and deleterious material.
- g) **Pre-Treating.** Pre-treat joints and cracks greater than 1/4 inch in width and depth with properly proportioned and mixed polymer resin binder. Once the binder in the pre-treated areas has gelled, the installation of the high friction surface treatment may proceed.

- C. **Mechanized Application.** Do not apply surface treatment on a wet surface, when the ambient air or surface temperature is below 50°F or above 110°F, or when the anticipated weather conditions or surface temperature would prevent the proper application of the surface treatment as determined by the manufacturer.

Apply the polymer resin binder by a truck or trailer mounted application machine that must be capable of continually mixing and delivering the binder components on demand within the temperature range specified in varying widths of up to 12 feet wide at a uniform application thickness. Ensure that the mechanically applied distributing equipment includes accurate measuring devices and/or calibrated containers and thermometers for measuring the binder temperature prior to placement should heating be required. Operations will proceed in such a manner that will not allow the binder material to separate in the mixing lines, cure, dry, or otherwise impair retention bonding of the high friction surfacing aggregate. The application machine shall be equipped with flushing systems such that blockages of lines will not occur, and installation operations are not delayed, stopped, or otherwise compromised. Ensure that mechanical applications are capable of applying binder uniformly at a minimum rate of 10 gallons per minute. The mixed components are mechanically applied onto a prepared surface with a minimum coverage rate of 3.5 square yards per gallon at a minimum uniform thickness of 50 mils onto the surface. In addition, ensure that the application machine complies with the requirements of the binder manufacturer.

The aggregate shall be applied within 120 seconds of the binder application onto the surface. Uniformly spread aggregate immediately without causing excessive overlap of aggregate outside of coverage area. Ensure that the mechanical aggregate spreader is capable of applying a continuous application of varying widths up to 12 feet wide, in a manner to not violently disturb the wet binder film, at a rate of approximately 13-15 lbs per square yard. Complete coverage of the “wet” binder with aggregate is necessary to achieve a uniform surface. No exposed wet spots of the binder shall be visible once the aggregate is installed. The operations should proceed in such a manner that will not allow the mixed binder material to separate, cure, dry, be exposed, or otherwise harden in such a way as to impair retention and bonding of the high friction surfacing aggregate. Do not use reclaimed aggregate. Do not use vibratory or impact type compaction on the aggregate after placement.

- D. Hand Application.** At the Engineers discretion, corrective work and application to areas such as intersections or areas less than 300 square yards, or where truck mounted application machines are not applicable to the specified locations because of logistical restrictions, may be performed by hand application of the high friction surface treatment.

Do not apply surface treatment on a wet surface, when the ambient air or surface temperature is below 50°F or above 110°F, or when the anticipated weather conditions or surface temperature would prevent the proper application of the surface treatment as determined by the manufacturer.

The polymer resin binder components Part (A) and Part (B) shall be proportioned to the correct ratio (+/- 2% by volume), mixed using a low speed high torque drill fitted with a helical stirrer.

The mixed components shall be hand applied onto a prepared surface at a minimum coverage rate of 3.5 square yards per gallon at a minimum uniform thickness of 50 mils onto the surface. Hand applied binder will be uniformly spread onto the prepared surface by the use of a continuous V notch serrated edged squeegee.

Immediately after placing the binder, apply the aggregate, in a manner to not violently disturb the wet binder film, at a rate of approximately 13-15 lbs per square yard. Do not use reclaimed aggregate. Do not use vibratory or impact type compaction on the aggregate after placement.

- E. Curing of Installed High Friction Surface Treatment.** Allow the installed high friction surface treatment to cure in accordance with manufacturer recommendations (approximately 3 hours at an ambient air temperature of at least 50 degrees Fahrenheit). Protect treated surfaces from traffic and environmental effects until the area has cured.
- F. Removal of Excess Aggregate.** Remove the excess aggregate from the treatment area and all adjacent surfaces by mechanical sweeping or vacuum sweeping the surfaces a minimum of 3 times before applying additional application and/or opening to traffic. In addition, re-sweep the treatment area and adjacent surfaces using mechanical sweeping or vacuum sweeping 48 hours after opening to traffic to remove all additional loose aggregate and aggregate shed by the action of traffic.
- G. Disposal of Waste.** All debris, excess aggregate, materials containers, and other waste shall be disposed of off the Right-of-Way at approved sites obtained by the Contractor at no cost to the Department. No separate payment will be made for the disposal of waste and debris from the project, but shall be incidental to the other items of the work.
- H. Restoration.** Any roadway features disturbed by the work or the Contractor's operations shall be restored in like kind materials and design as directed by the Engineer at no additional cost to the Department.
- I. Property Damage.** Be responsible for all damage to public and/or private property resulting from the work. Repair or replace damaged roadway features in like kind materials and design as directed by the Engineer at no additional cost to the Department. Repair or replace damaged private property in like kind materials and design to the satisfaction of the owner and the Engineer at no additional cost to the Department.
- J. On-Site Inspection.** Before submitting a bid for the work, make a thorough inspection of the site and determine existing conditions so that the work can be expeditiously performed after a contract is awarded. The Department will consider submission of a bid to be evidence of this inspection having been made. The Department will not honor any claims for money or time extension resulting from site conditions.
- K. Right-of-Way Limits.** All work is located within the existing right of way. Limit work activities to the Right-of-Way, and work and staging areas secured by the Contractor, at no additional cost to the Department. Be responsible for all encroachments onto private lands.
- L. Caution.** The information in this proposal and shown on the plans, and the type of work listed herein, are approximate only and are not to be taken as an accurate evaluation of the materials and conditions to be

encountered during construction; the bidder must draw his/her own conclusions. The Department does not give any guarantee as to the accuracy of the data and no claim for money or time extension will be considered if the conditions encountered are not in accordance with the information shown.

- M. Control.** Perform all work under the absolute control of the Department of Highways. Obtain the Engineer's approval of all designs required to be furnished by the Contractor prior to incorporation into the work. The Department reserves the right to have other work performed by other contractors and its own forces, and to permit public utility companies and others to do work during the construction within the limits of, or adjacent to, the project. Conduct operations and cooperate with such other parties so that interference with such other work will be reduced to a minimum. The Department will not honor any claims for money or time extension created by the operations of such other parties.

Should a difference of opinion arise as to the rights of the Contractor and others working within the limits of, or adjacent to, the project, the Engineer will decide as to the respective rights of the various parties involved in order to assure the completion of the Department's work in general harmony and in a satisfactory manner, and his/her decision shall be final and binding upon the Contractor.

IV. FIELD EVALUATION

High friction surface treatment locations that can be safely tested at 40 mph shall be evaluated by locked wheel skid test as per ASTM E274 between 60 and 90 days after installation. A minimum skid number of 75 SN40R is required. Installations that are not conducive to skid testing due to roadway geometrics or speed limitations shall be accepted based upon visual determination of acceptable bond and aggregate exposure.

Surface treatment applications not meeting average minimum skid test results of 75 SN **shall be removed and replaced** at no cost to the Department.

V. METHOD OF MEASUREMENT

- A. Maintain and Control Traffic.** See Traffic Control Plan.
- B. Site Preparation.** Other than the bid items listed, site preparation will not be measured for payment, but shall be incidental to high friction surface treatment.
- C. High Friction Surface Treatment.** The Department will measure the surface area coverage of High Friction Surface Treatment in Square Yards.

VI. BASIS OF PAYMENT

- A. Maintain and Control Traffic.** See Traffic Control Plan.
- B. High Friction Surface Treatment.** Payment for the accepted quantity at the Contract unit price per Square Yard shall be full compensation for furnishing all labor, materials, equipment, and incidentals for furnishing and installing High Friction Surface Treatment. Payment shall not be made prior to the final and accepted sweeping, 48 hours after installation.

Appendix Q

690. SPECIAL MISC. HIGH FRICTION EPOXY AGGREGATE SURFACE TREATMENT

DESCRIPTION:

THIS WORK SHALL CONSIST OF FURNISHING AND APPLYING EPOXY AND HIGH FRICTION AGGREGATE ON PAVEMENT SURFACE TO PROVIDE A HIGH FRICTION SURFACE

MATERIALS:

A. EPOXY BINDER

THE BINDER SHALL CONSIST OF TWO PART EXOTHERMIC EPOXY RESIN MEETING THE REQUIREMENTS IN TABLE 1.

TABLE 1. EPOXY BINDER REQUIREMENTS:

<u>PHYSICAL PROPERTIES OF THE CURED OVERLAY SYSTEM</u>		
<u>PROPERTY</u>	<u>VALUE</u>	<u>METHOD</u>
<u>COMPRESSIVE STRENGTH, MIN. PSI</u>	5,000	ASTM C 519
<u>TENSILE STRENGTH, MIN. PSI</u>	2,650	ASTM D 638
<u>TENSILE ELONGATION, MIN. PERCENT</u>	2,650	ASTM D 638
<u>WATER ABSORPTION, MAX. PERCENT BY WT</u>	1.0	ASTM D 570
<u>SHORE D HARDNESS, MIN. 77° F</u>	60-75	ASTM D 2240
<u>GEL TIME, MINUTES</u>	15-45	ASTM C 881
<u>ADHESION TO CONCRETE</u>	100% FAILURE IN CONCRETE	ACI-503-R, PULL OUT TEST
<u>FLEXURAL YIELD STRENGTH, MIN. PSI</u>	3,000	ASTM D 790
<u>PERCENT SOLIDS</u>	100	

EPOXY RESIN BINDER MATERIALS WHICH ARE NOT EXOTHERMIC IN CURING OR BLENDED EPOXY URETHANE BINDERS THAT DO NOT MEET THE TENSILE ELONGATION REQUIREMENTS WILL NOT BE ALLOWED. INDEPENDENT LABORATORY REPORT DOCUMENTS SHALL BE PROVIDED DOCUMENTING THAT THE EPOXY BINDER MEETS THE REQUIREMENTS OF THIS SECTION.

B. AGGREGATE SURFACE TOPPING:

THE AGGREGATE SHALL MEET THE REQUIREMENTS IN TABLE 2. THE HIGH FRICTION AGGREGATE SHALL BE CLEAN, DRY, AND FREE FROM FOREIGN MATTER. THE AGGREGATE ON THE INSTALLED SYSTEM SHALL PRODUCE A SKID RESISTANT READING OF 69 SRV (SKID RESISTANT VALUE) AS TESTED WITH A LOCK WHEEL TESTING APPARATUS. THE SKID TESTING SHALL BE CONDUCTED WITHIN 90 DAYS OF THE COMPLETED PROJECT INSTALLATION. SURFACE APPLICATIONS, NOT MEETING AVERAGE MINIMUM SKID RESULTS OF 65 SRV, SHALL BE REMOVED AND REPLACED. THE INSTALLED SYSTEM SHALL BE TESTED FOR SKID RESISTANCE AT APPROXIMATELY SIX MONTH INTERVALS OR WHEN THE PURCHASING AGENCY DEEMS IT NECESSARY FOR A ONE YEAR PERIOD AFTER THE INSTALLATION. IF THE SKID RESISTANCE READINGS ARE LESS THAN 65 SRV, THE INSTALLATION SHALL BE REMOVED AND REPLACED AT NO COST TO THE PURCHASING AGENCY.

TABLE 2. BAUXITE AGGREGATE REQUIREMENTS:

<u>SRV</u>	<u>SKID RESISTANCE VALUE TEST 65</u>	<u>ASTM E303</u>
<u>PSV</u>	<u>POLISHED STONE VALUE TO</u>	<u>ASTM E660</u>
<u>AGGREGATE GRADING # 6 SIEVE</u>	<u>0.5%</u>	
<u>SIZE 5% MAX +/-</u>	<u>0.5%</u>	
<u>NO. 16 SIEVE SIZE 5% MAX +/-</u>	<u>0.5%</u>	

THE INSTALLER SHALL SUBMIT A LIST OF PROJECTS WITH THE OWNER'S CONTACT INFORMATION ON WHICH A MINIMUM OF 10,000 SQUARE YARDS OF HIGH FRICTION SURFACE TREATMENT HAS BEEN PLACED WITHIN THE PAST THREE YEARS DEMONSTRATING A FRICTION READING OF 65 SRV

A. SAFETY PROVISIONS:

PERSONNEL SHALL BE THOROUGHLY TRAINED IN THE SAFE HANDLING OF MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. STORAGE OF MATERIALS:

MATERIALS SHALL BE STORED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 243 OF THE SPECIFICATIONS. MSDS AND OTHER INFORMATION PERTAINING TO THE SAFE PRACTICES FOR THE STORAGE, HANDLING AND DISPOSAL OF THE MATERIALS, AND TO THEIR HEALTH HAZARDS SHALL BE OBTAINED FROM THE MANUFACTURE AND POSTED AT STORAGE AREAS. A COPY OF SUCH INFORMATION SHALL BE PROVIDED TO THE ENGINEER.

C. APPLICATION CONDITIONS:

DO NOT APPLY THE EPOXY BINDER ON A WET SURFACE OR WHEN THE AMBIENT TEMPERATURE IS BELOW 40° F OR WHEN THE ANTICIPATED WEATHER CONDITIONS WOULD PREVENT THE PROPER APPLICATION OF THE SURFACE TREATMENT AS DETERMINED BY THE MANUFACTURER'S REPRESENTATIVE.

D. SURFACE PREPARATION:

SURFACES SHALL BE CLEAN, DRY, AND FREE OF ALL DUST, OIL, DEBRIS AND ANY OTHER MATERIAL THAT MIGHT INTERFERE WITH THE BOND BETWEEN THE EPOXY RESIN BINDER MATERIAL AND EXISTING SURFACE. ADEQUATE CLEANING OF ALL SURFACE WILL BE DETERMINED BY THE MANUFACTURER'S REPRESENTATIVE. UTILITIES, DRAINAGE STRUCTURES, CURBS AND ANY OTHER STRUCTURE WITHIN OR ADJACENT TO THE TREATMENT LOCATION SHALL BE PROTECTED FROM THE APPLICATION OF THE SURFACE TREATMENT MATERIALS. COVER AND PROTECT ALL EXISTING PAVEMENT MARKINGS THAT ARE ADJACENT TO THE APPLICATION AS DIRECTED BY THE ENGINEER. PAVEMENT MARKINGS THAT CONFLICT WITH THE SURFACE APPLICATION SHALL BE REMOVED BY GRINDING AND THE SURFACE SHALL BE SWEEP CLEAN PRIOR TO THE EPOXY BINDER APPLICATION.

PRE-TREAT JOINTS AND CRACKS GREATER THAN 1/4 INCH IN WIDTH AND DEPTH WITH THE MIXED EPOXY SPECIFIED HEREIN. ONCE THE EPOXY IN THE PRE-TREATED AREAS HAS GELLED, THE EPOXY BINDER AND AGGREGATE TOPPING INSTALLATION MAY PROCEED.

FOR APPLICATIONS ON NEW ASPHALT, A MANDATORY 30 DAY CURE PERIOD SHALL TAKE PLACE PRIOR TO THE INSTALLATION OF THE EPOXY BINDER AND HIGH FRICTION BAUXITE AGGREGATE. ON NEW CONCRETE SURFACES, ALL CURING COMPOUNDS SHALL BE REMOVED PRIOR TO INSTALLATION.

E. EQUIPMENT: AUTOMATED CONTINUOUS APPLICATION

AUTOMATED CONTINUOUS APPLICATION SHALL BE PERFORMED BY AN APPLICATOR VEHICLE WITH A MINIMUM AGGREGATE CAPACITY OF 30,000 LBS AND A MINIMUM OD 1200 GALLONS OF THE EPOXY BINDER. THE APPLICATOR SHALL HEAT, CONTINUOUSLY MIX, METER, MONITOR AND APPLY THE EPOXY BINDER AND HIGH FRICTION AGGREGATE IN ONE CONTINUOUS PASS.

E. EQUIPMENT: AUTOMATED CONTINUOUS APPLICATION (CONTINUED):

THE APPLICATOR VEHICLE SHALL BE EQUIPPED WITH AN IN-BUILT DATA MANAGEMENT UNIT WHICH IS CAPABLE OF PRODUCING REAL TIME DATA FLOW SHOWING THE VOLUME OF RESIN, THE RESIN MIL THICKNESS ON AVERAGE THROUGHOUT THE APPLICATION WIDTH, THE VOLUME OF AGGREGATE APPLIED THROUGHOUT THE APPLICATION WIDTH, THE TEMPERATURE OF THE HEATED RESIN AND THE AMBIENT TEMPERATURE. THE AUTOMATED CONTINUOUS APPLICATION VEHICLE WILL HAVE CONTINUOUS PUMPING AND PORTIONING DEVICES THAT BLEND THE EPOXY BINDER WITHIN A CONTROLLED SEALED SYSTEM. THE EPOXY BINDER SHALL BE BLENDED AND MIXED IN THE RATIO PER THE MANUFACTURER'S SPECIFICATION (+/- 2% BY VOLUME); THE EPOXY BINDER SHALL BE CONTINUOUSLY APPLIED ONCE BLENDED. THE APPLICATION VEHICLE SHOULD BE CAPABLE OF A MINIMUM EPOXY BINDER RATE OF 10 GAL/PER MINUTE WITH A MINIMUM UNIFORM APPLICATION THICKNESS OF 50 MILS.

THE HIGH FRICTION AGGREGATE SHALL BE APPLIED BY THE SAME AUTOMATED CONTINUOUS APPLICATION VEHICLE THAT APPLIES THE RESIN BINDER TO THE PAVEMENT SECTION. THE AUTOMATIC AGGREGATE SPREADER SHALL BE CAPABLE OF APPLYING UP TO A CONTINUOUS 12 FOOT WIDTH APPLICATION. THE HIGH FRICTION AGGREGATE SHALL BE APPLIED WITHIN 3 SECONDS (+/- 1 SEC) OF THE BASE RESIN BINDER APPLICATION ONTO THE PAVEMENT SECTION, FROM A MINIMUM HEIGHT OF 12 INCHES FROM ABOVE THE PAVEMENT SECTION SURFACE. AT MINIMUM CONTINUOUS RATE OF 11 LBS PER SQUARE YARD OF COVERAGE. THE USE OF CHIP SPREADERS, VEHICLE TIRES, ROLLERS, VIBRATORY COMPACTORS OR DEVICES THAT THROW LOOSE AGGREGATE ONTO ANY PART OF THE LINE ROADWAY LANES SHALL NOT BE ALLOWED TO APPLY HIGH FRICTION AGGREGATE ONTO THE WET UNCURED RESIN.

THE AUTOMATED CONTINUOUS APPLICATOR VEHICLE SHOULD BE CAPABLE OF THE UNIFORM APPLICATION OF THE HIGH FRICTION AGGREGATE TREATMENT AT A MINIMUM CONTINUOUS APPLICATION RATE OF 2,300 SQUARE YARDS PER HOUR. NO EXPOSED WET SPOTS OF THE EPOXY BINDER SHALL BE VISIBLE ONCE THE AGGREGATE IS INSTALLED. THE OPERATIONS SHOULD PROCEED IN SUCH A MANNER THAT WILL NOT ALLOW THE MIXED MATERIAL TO SEPARATE, CURE, DRY, BE EXPOSED OR OTHERWISE HARDEN IN SUCH A WAY AS TO IMPAIR RETENTION AND BONDING OF THE HIGH FRICTION SURFACE AGGREGATE. WALKING, STANDING OR ANY FORM OF CONTACT OR CONTAMINATION WITH THE WET UNCURED RESIN WILL RESULT IN THAT SECTION OF RESIN BEING REMOVED AND REPLACED AT THE INSTALLERS EXPENSE.

THE EXCESS AGGREGATE CAN BE REUSED; THE AGGREGATE SHALL BE RECLAIMED BY A SUCTION SWEEPER, THE RECOVERED AGGREGATE MUST BE CLEAN, UNCONTAMINATED AND DRY.

APPLICATIONS ON HIGH SPEED HIGHWAYS SUCH AS INTERSTATE RAMPS AND BRIDGE DECK WILL REQUIRED ADDITIONAL SWEEPING THREE DAYS AFTER THE INITIAL INSTALLATION IS COMPLETED.

MEASUREMENT AND PAYMENT

HIGH FRICTION EPOXY AGGREGATE SURFACE TREATMENT WILL BE MEASURED AND PAID FOR IN SQUARE YARDS, WHICH PRICE SHALL BE FULLY COMPENSATION FOR SURFACE PREPARATION, FOR FURNISHING AND APPLYING THE SURFACE TREATMENT, INCLUDING ANY INCIDENTALS NECESSARY TO COMPLETE THE WORK.