APDES INSPECTION REPORT

Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street, Anchorage, AK 99501

Section 1: General Data

Authorization Number	Announced / Unannounced	Receiving Waters	Inspection Date
Number: AKR10GG00, AKR10GG03	Announced	Ship Creek	Date: 7/22/2020
Effective: AKR10GG00: 5/15/2020 AKR10GG03: 5/19/2020			Entry Time: 5:00 pm
Expiration: 1/31/2021			Exit Time: 8:00 pm

Section 2: Facility Data

Name of Facility: AMATS Post Rd 3rd Ave to Reeve Blvd

On-Site Representative/Physical Address: AKDOT Name: Athena Marinkovic Title: SWPPP Manager Address: PO Box 196900, Anchorage AK 99519 Phone: (907) 644-3923 Email: athena@emcalaska.com	Responsible Party/Mailing Address: AKDOT Name: Frank Lee Title: Project Engineer Address: PO Box 196900, Anchorage AK 99519 Phone: (907) 269-0450 Email: frank.lee@alaska.gov
On-Site Representative/Physical Address: Granite Construction Name: Duane Davison Title: SWPPP Manager/Storm Water Lead Address: 11471 Lang Street, Anchorage AK 99515 Phone: (907) 267-5278 Email: duane.davison@gcinc.com	Responsible Party/Mailing Address: Granite Construction Name: Curtis Huffman Title: Superintendent Address: 11471 Lang Street, Anchorage AK 99515 Phone: (907) 317-8703 Email: curtis.huffman@gcinc.com
Additional Inspection Participants: Dave Laster, Granite Josh James, AKDOT&PF	*For internal use only:* *SIC: 1611*

Section 3: Findings

Background/Regulatory Status/Compliance History

Granite Construction and the Alaska Department of Transportation and Public Facilities (AKDOT&PF) are authorized to discharge storm water per the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit, authorization numbers AKR10GG00 and AKR10GG03, respectively.

This project's function according to the storm water pollution prevention plan (SWPPP) submitted to the Alaska Department of Environmental Conservation (DEC) is to improve safety, eliminate ruts and cracks,

reduce maintenance costs, and extend the useful life of the roadway by resurfacing Post Road between 3rd Avenue and Reeve Boulevard.

The proposed actions include:
• Improve 1.4 miles of Post Road from 3rd Avenue to the Reeve Boulevard intersections.
• Improve drainage with reestablished ditching, reconstructing road grade, storm drain system replacement in select locations, and adding and replacing curb and gutter along sections of the corridor.
• Mill 1.75" of existing roadway pavement and replace with 2" of hot mix asphalt (HMA) from the Viking Road intersection to the edge of pavement.
• Excavate roadway to a depth of 26" from the 3rd Avenue intersection to the Viking Road intersection, and three other short sections in the middle and end of the project corridor. Replace with 18" Borrow, 2" Aggregate base course, grading D-1, 4" asphalt treated base (ATB), and 2" HMA.
• Curb ramps will be improved to meet Alaska DOF&PF safety and ADA standards.
• Guardrail, bridge rail, and guardrail end terminals will be replaced to meet Alaska DOT&PF safety standards.
• Upgrade, replace, and relocate gages in select locations.
• Restripe pavement.

Records of the facility's APDES permit compliance with wastewater discharge regulations are publicly available on the Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) website: http://epa.echo.gov.

This is the first inspection by the DEC. The inspection covers the time period from the authorization's effective date on May 15, 2020 through the inspection date on July 22, 2020. This was a routine inspection.

Field Inspection

Upon arrival at the AKDOT&PF project office, introductions were exchanged and inspector credentials were presented.

The following information was provided verbally by onsite representatives:

- The AKDOT&PF contracted Granite Construction for milling and paving work on Post Road between 3rd Avenue and Reeve Boulevard.
- Milling and paving is scheduled to begin the week of July 20.
- The project is slated to be completed by June 15, 2021 but is subject to change.
- Currently the existing pavement has been removed and preparations for milling and paving are underway.
- Best Management Practices added prior to inspection include maintaining vegetative buffer areas, use of composite socks around stockpiles and disturbed areas, use of inlet protection around storm drains, and rock sections at the entrance to the culvert section located within the project area.
- The original Notice of Intent (NOI) estimated the area of disturbance at 11 acres.
- There have been no reportable spills or leaks.
- There is no fixed fueling station on-site. All fueling is done using fuel trucks.
- There are no chemicals or hazardous materials kept on-site.
- There are no public water systems that cross the site.
- There is no equipment washing done on-site. All equipment washing takes place at the AggPro facility.
- There is no concrete washout done on-site. All concrete washout is performed at the AggPro facility.
- Recycled asphalt is taken to the QAP facility to be reused.
- Trash is removed once a week.

- There is one porta-potty on site. It is strapped down to prevent tipping and is located far away from any water sources.
- No chemicals or pesticides were used on the project. Fertilizer will be included with hydroseed mix and loaded at the AggPro facility.
- Designated parking areas use recycled asphalt pavement (RAP) to help control sediment.

The following observations were made by DEC inspectors:

- Visual inspections are performed by Athena Marinkovic for AKDOT&PF and by Duane Davison for Granite Construction. The inspection reports are signed by Frank Lee and Curtis Huffman.
- The first inspection was conducted on June 23, 2020.
- Weekly inspections have been conducted 11 acres.
- Granite Construction is responsible for BMP maintenance.
- It is anticipated the site will be stabilized before winter occurs, and winter stabilization will not be required.

Sampling	**YES** ☐	**NO** ☒

No sampling was performed during inspection

Records Review

The following records were reviewed as part of the inspection and are considered complete:

- SWPPP
- Signature Delegation Form
- Copy of the Construction General Permit
- Notice of Intent
- NOI Modification
- Authorization Letter
- Site Maps
- SWPPP Amendment Log
- Corrective Action Log
- Grading and Stabilization Log
- Employee Training Log
- AK-CESCL Certifications
- Rainfall Records
- Inspection Reports

Closing Conference

The following participants were present during the closing conference:

- Dave Laster
- Josh James
- Frank Lee
- Curtis Huffman
- Athena Marinkovic
- Duane Davison

Upon completion of inspection at AMATS Post Rd 3rd Ave to Reeve Blvd project, a closing conference was held. AKDOT&PF and Granite Construction were provided with preliminary inspection findings, and a follow

up visit around the time a notice of termination is planned to be issued to ensure all requirements are met. The timeline for issuance of the inspection reports and accompanying correspondence was discussed, and the inspection concluded.

Section 4: Compliance

Violations

No violations were noted during this inspection.

Areas of Concern

Follow up will be necessary to ensure temporary BMPs are removed and disturbed ground has been stabilized.

Section 5: Appendixes

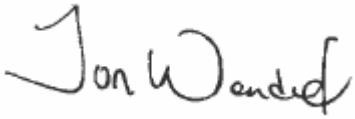
1. Photo Addendum

Signature

Inspector – Andrew Mohrmann
Credential Number: R-0103
Phone: (907) 269-8117
E-mail: andrew.mohrmann@alaska.gov

Reviewed By – Jon Wendel
Credential Number: R-0317
Phone: (907) 465-5364
E-mail: jon.wendel@alaska.gov

Date: Click here to enter a date.



Date: 8/3/2020

Photo Addendum	
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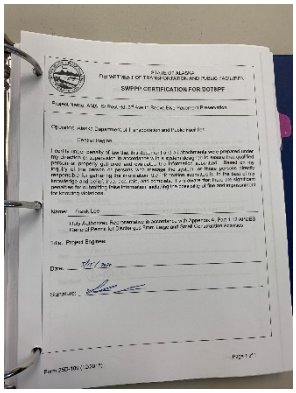
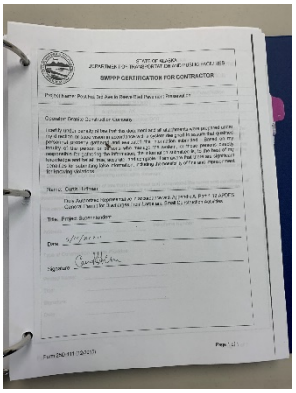
	
AKDOT&PF SWPPP Certification	Granite Construction SWPPP Certification

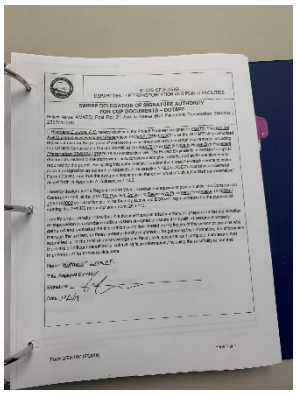
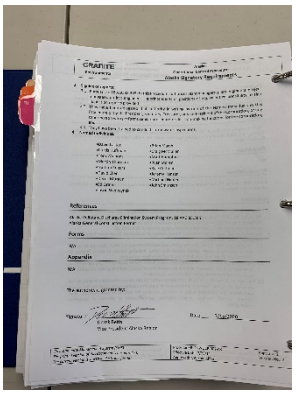
Photo 03	**Photo 04**
	
AKDOT&PF Signature Authority Delegation Form	Granite Construction Signature Authority Delegation Form

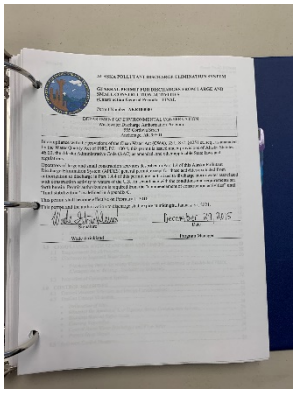
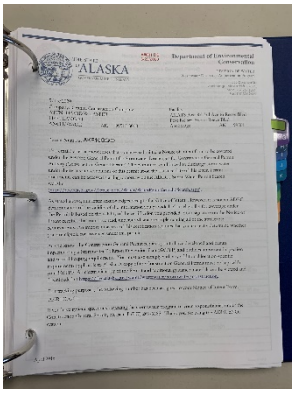
Photo 05	**Photo 06**
	
AKR100000 Construction Storm Water General Permit	AKR10GG00 Authorization Letter

Photo Addendum	
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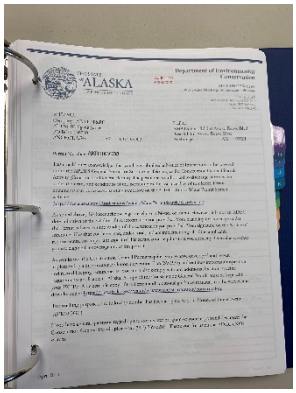
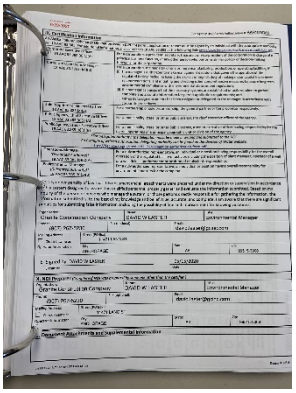
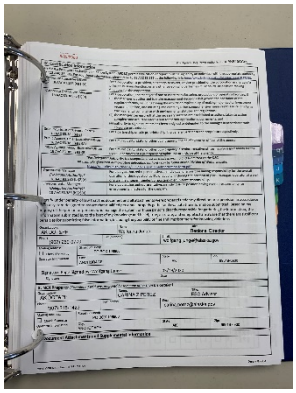
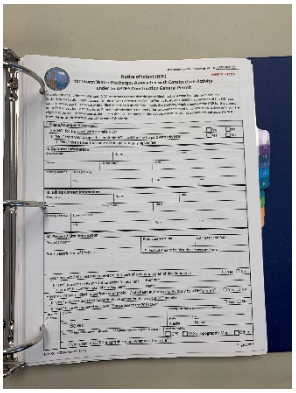
	
AKR10GG03 Authorization Letter	AKR10GG00 NOI Signature Page

Photo 09	**Photo 10**
	
AKR10GG03 NOI Signature Page	AKR10GG03 NOI Modification

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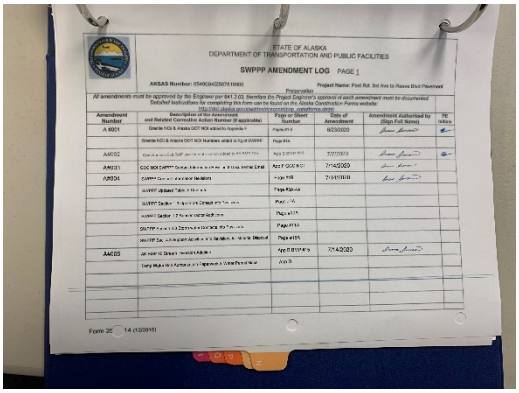
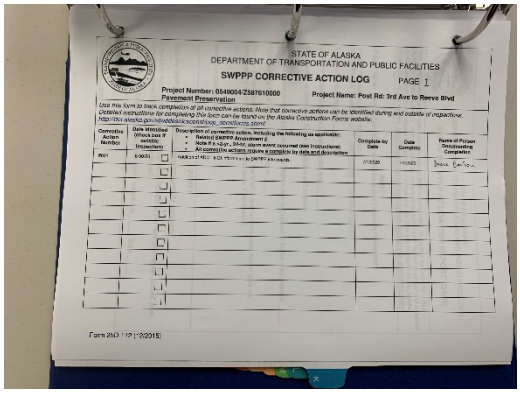
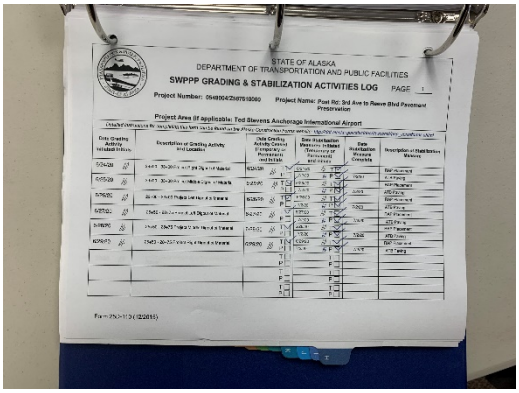
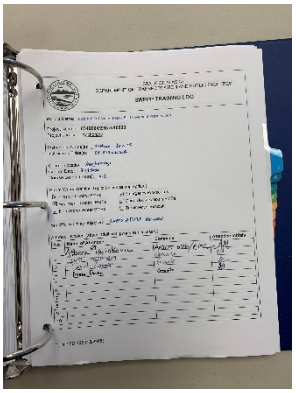
	
SWPPP Amendment Log	SWPPP Corrective Action Log

Photo Addendum	
Photo 13	**Photo 14**
	
SWPPP Grading and Stabilization Log	SWPPP Training Log

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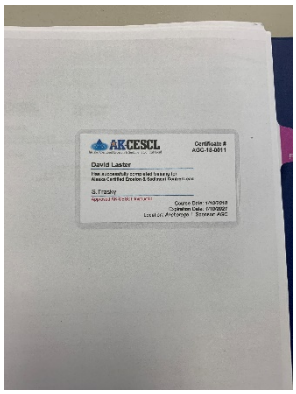
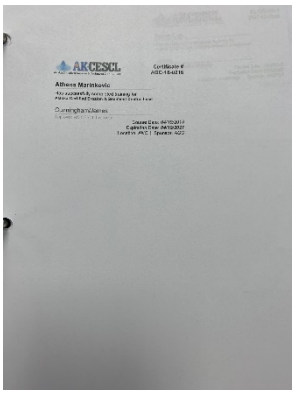
	
David Laster AK-CESCL Certificate	Athena Marinkovic AK-CESCL Certificate

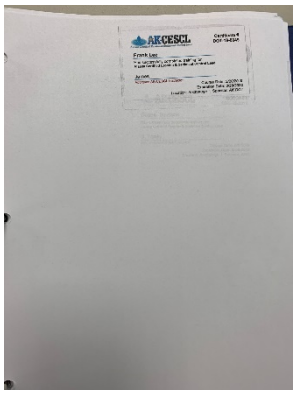
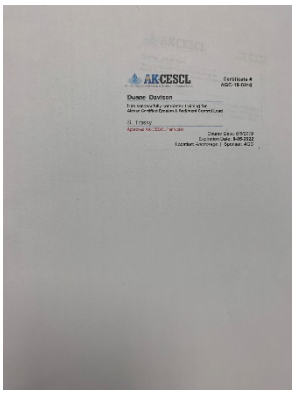
Photo 17	**Photo 18**
	
Frank Lee AK-CESCL Certificate	Duane Davison AK-CESCL Certificate

Photo Addendum	
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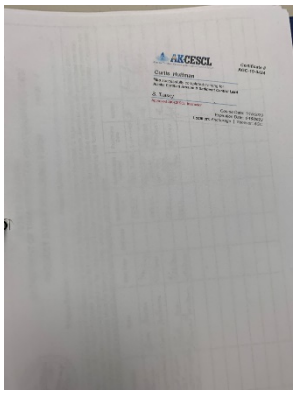
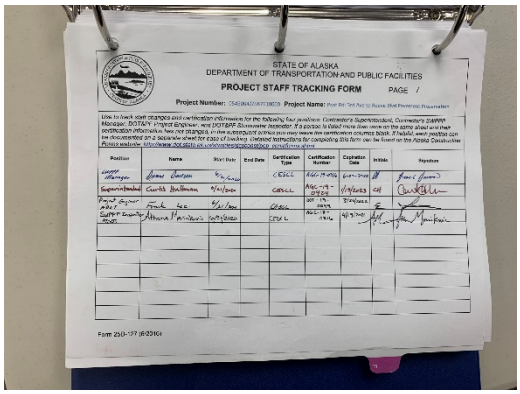
	
Curtis Huffman AK-CESCL Certificate	AKDOT&PF Project Staff Tracking Form

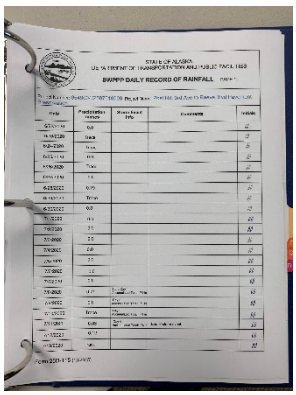
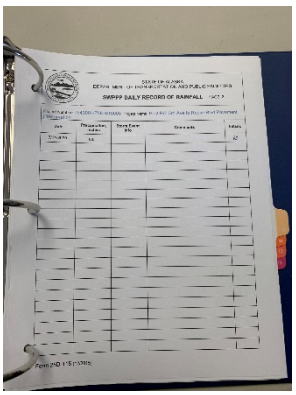
Photo 21	**Photo 22**
	
SWPPP Daily Rainfall Record Page 1	SWPPP Daily Rainfall Record Page 2

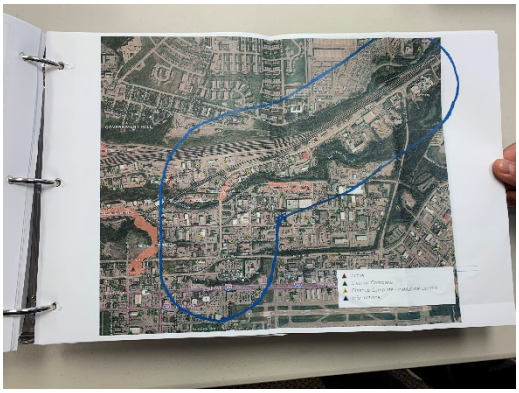
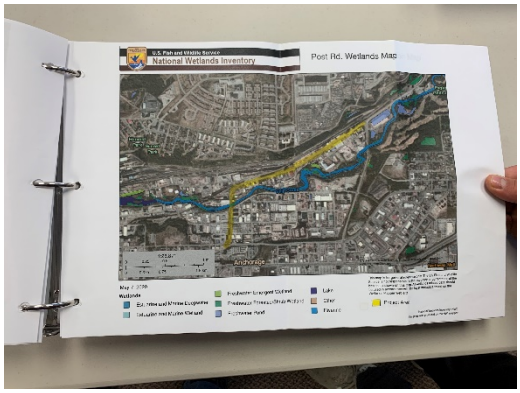
Photo 23	**Photo 24**
	
Aerial Map	Wetlands Map

Photo Addendum	
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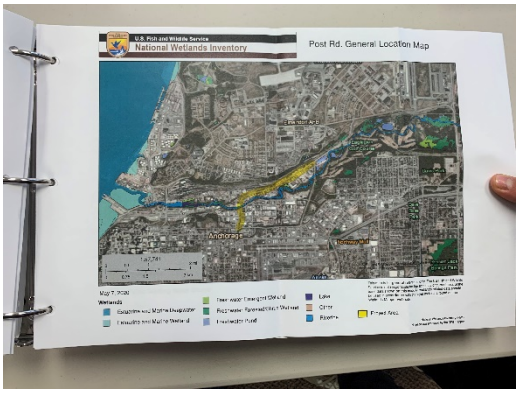
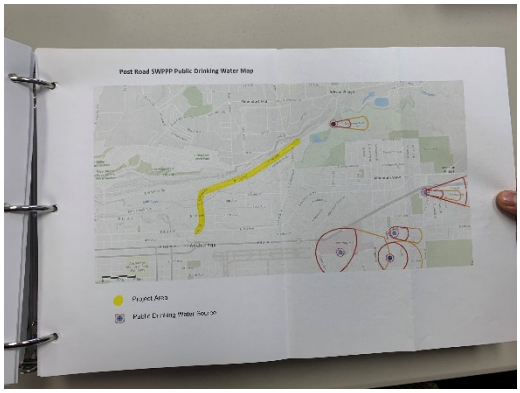
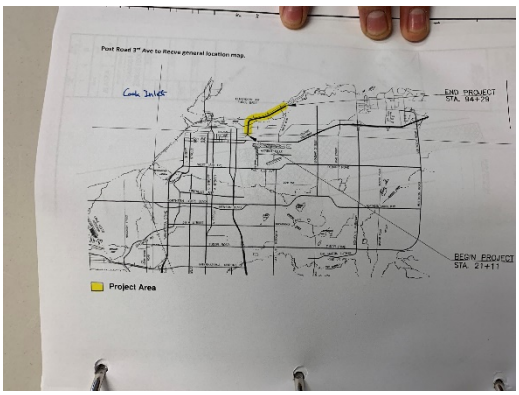
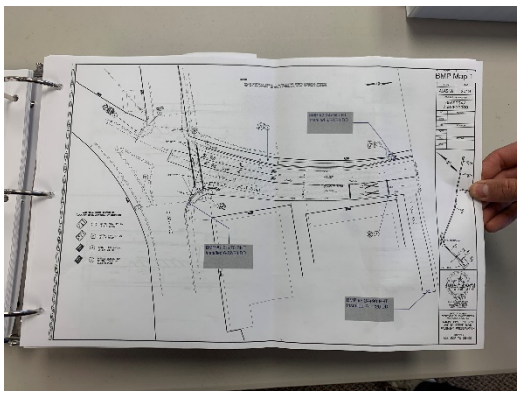
	
Post Road General Location Map	Public Drinking Water Map

Photo 27	Photo 28
	
Project General Location Map	Best Management Practices Map 1

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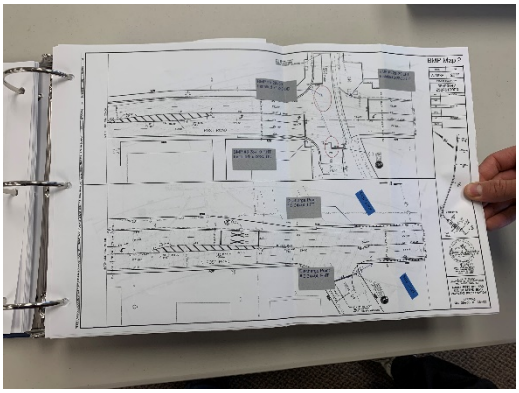	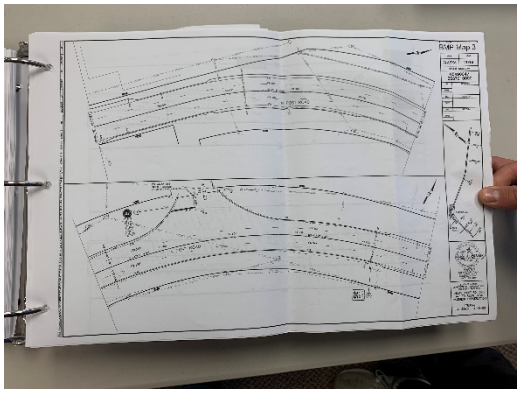
Best Management Practices Map 2	Best Management Practices Map 3

Photo Addendum	
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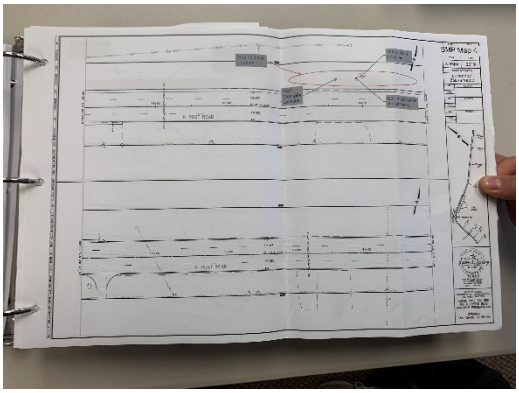	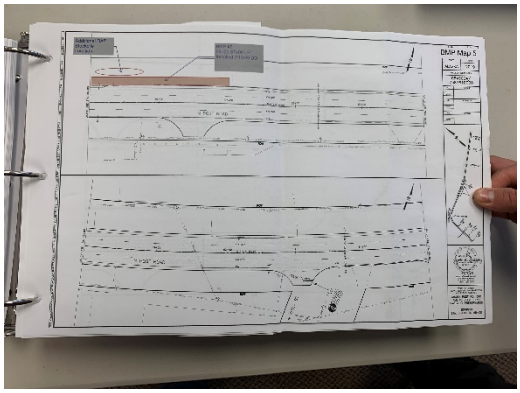
Best Management Practices Map 4	Best Management Practices Map 5

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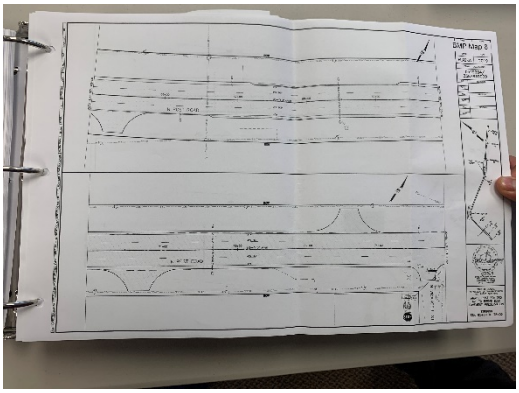	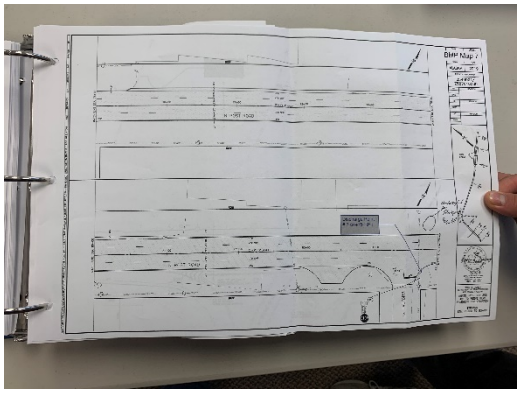
Best Management Practices Map 6	Best Management Practices Map 7

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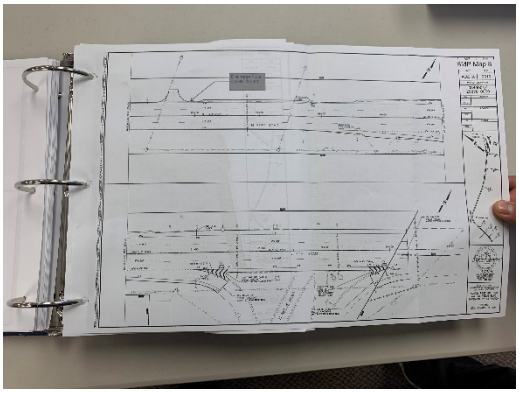	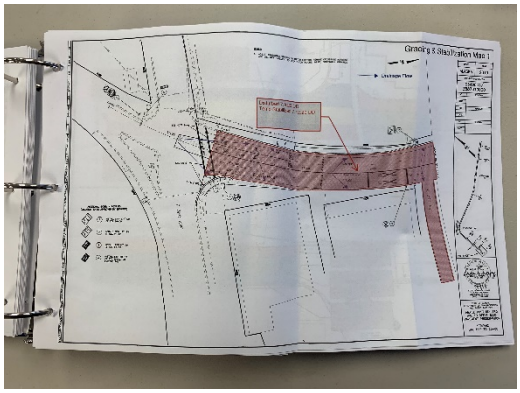
Best Management Practices Map 8	Grading And Stabilization Map 1

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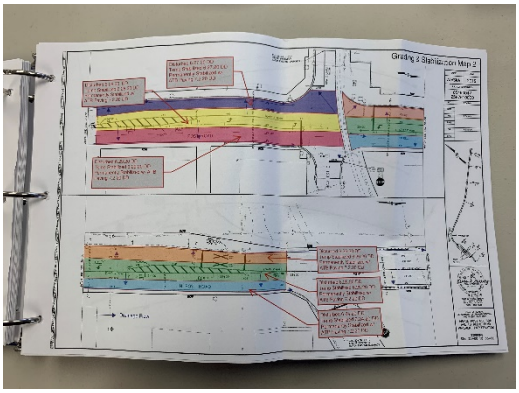	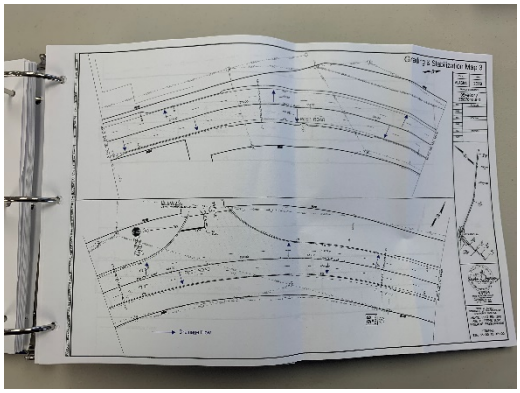
Grading And Stabilization Map 2	Grading And Stabilization Map 3

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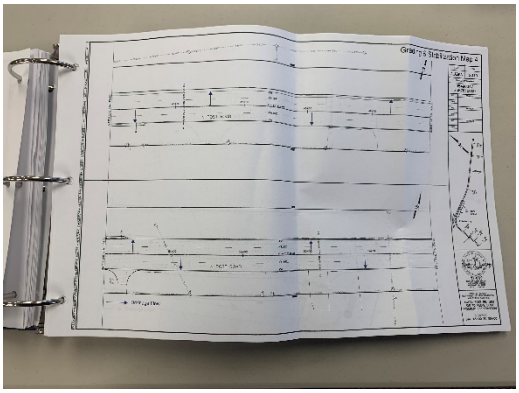	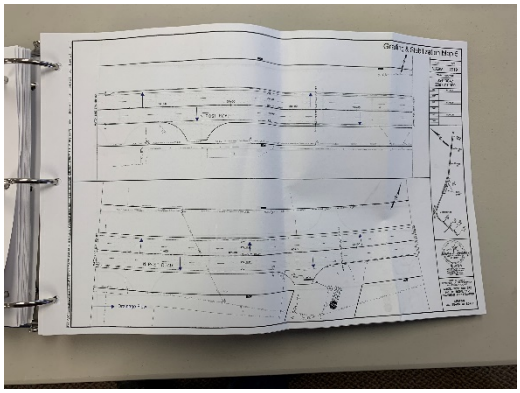
Grading And Stabilization Map 4	Grading And Stabilization Map 5

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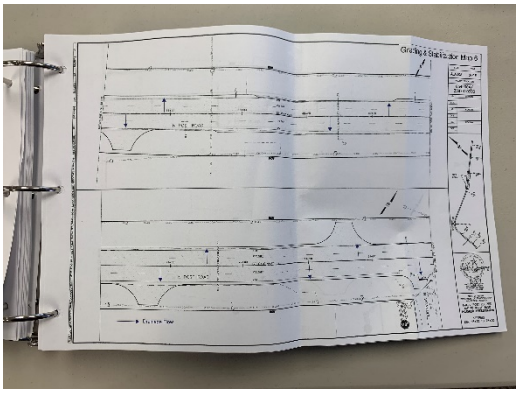
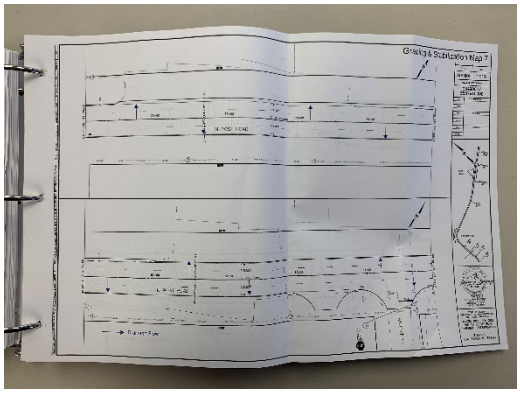
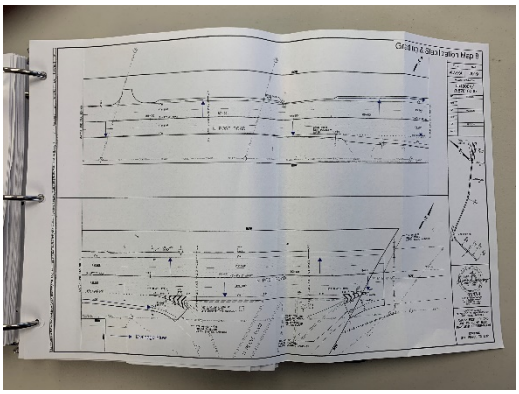
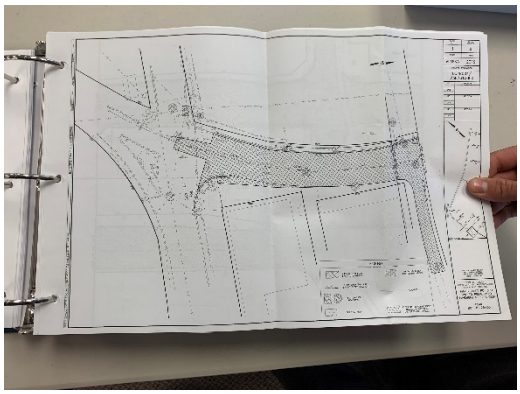
	
Grading And Stabilization Map 6	Grading And Stabilization Map 7

Photo Addendum	
Photo 43	**Photo 44**
	
Grading And Stabilization Map 8	Site Map

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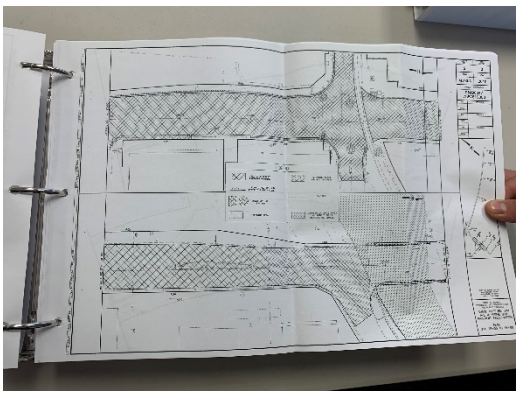	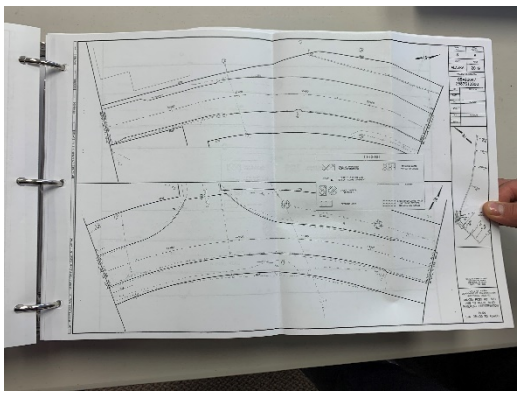
Site Map	Site Map

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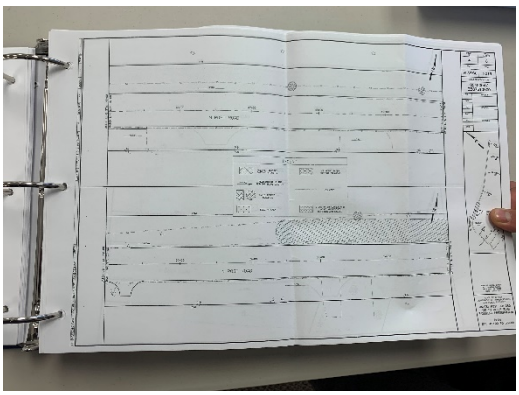	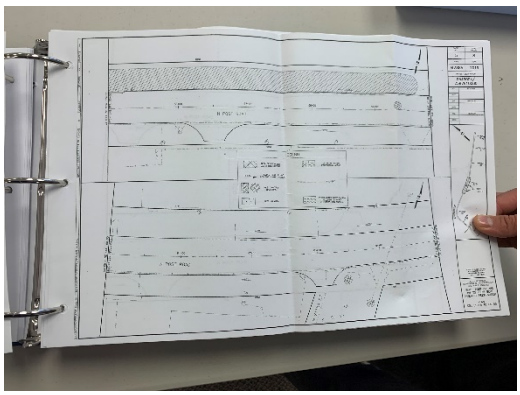
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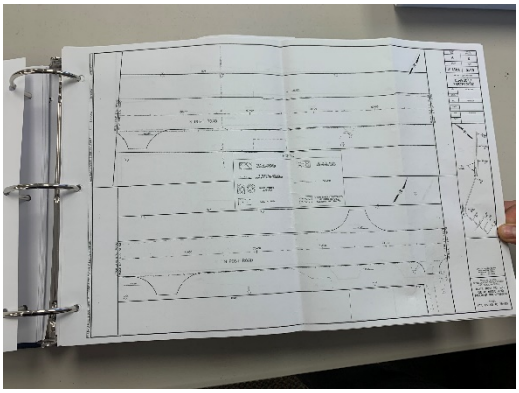	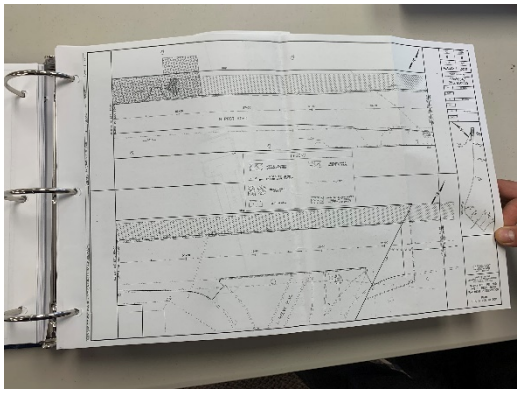
Site Map	Site Map

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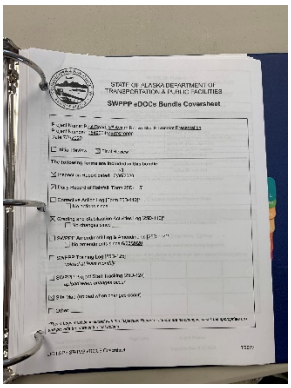	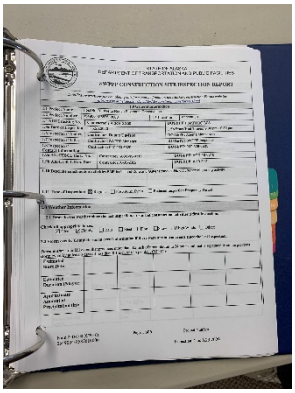
6/23/20 Inspection Report Cover Page	6/23/20 Inspection Report Page 1

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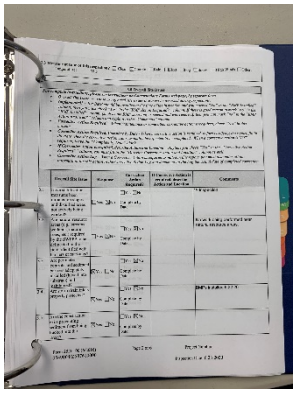	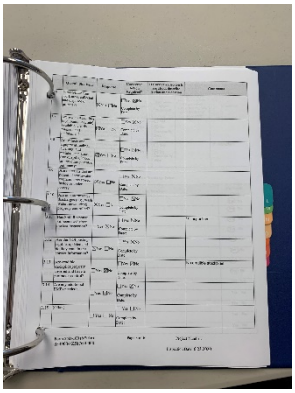
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Photo Addendum	
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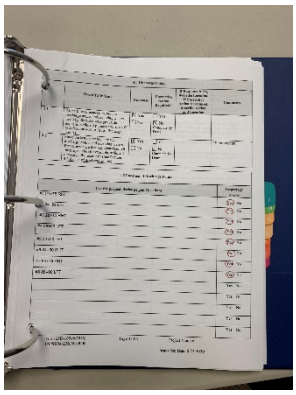
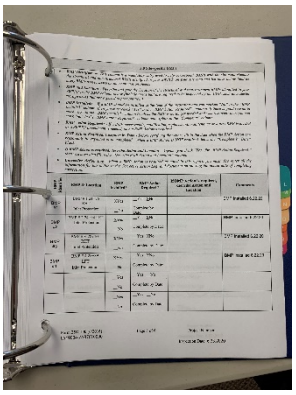
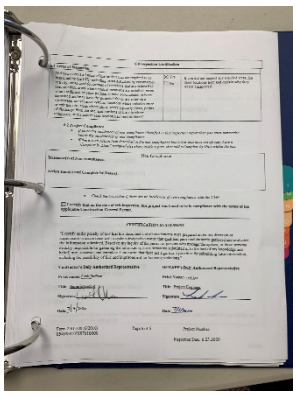
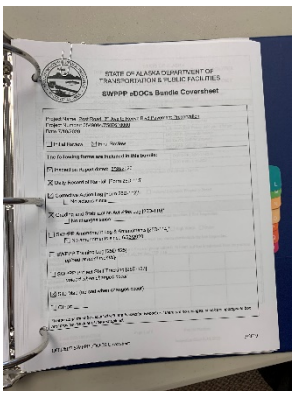
	
6/23/20 Inspection Report Page 4	6/23/20 Inspection Report Page 5

Photo 57	**Photo 58**
	
6/23/20 Inspection Report Page 6	6/30/20 Inspection Report Cover Page

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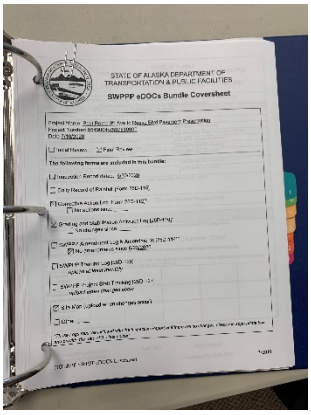	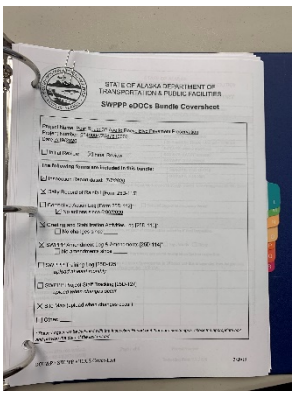
6/30/20 Inspection Report Cover Page	7/7/20 Inspection Report Cover Page

Photo Addendum	
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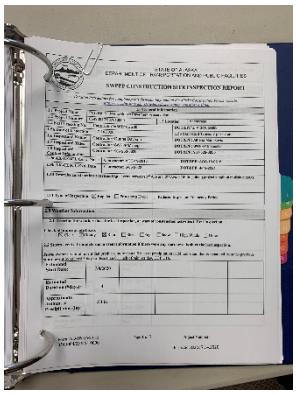
	
7/14/20 Inspection Report Page 1	Entry Point, Ground Covered in RAP

Photo 63	**Photo 64**
	
Actively Used Stockpile	Duck Pond Under Heavy Machinery

Photo 65	**Photo 66**
	
Entry Point, Ground Covered in Recycled Asphalt Pavement (RAP)	Spill Kit

Photo Addendum	
Photo 67	**Photo 68**
	
Porta-Potty, Secured and Far Removed From Water Body	Stockpile with Composite Sock Wrapped Around Base

Photo 69	**Photo 70**
	
Vegetative Buffer Left Along North Roadside	Working Area on North Side of Post Road

Photo 71	**Photo 72**
	
Actively Used Stockpile	Composite Sock Used to Keep Sediment Off Vegetation

Photo Addendum	
Photo 73	**Photo 74**
	
Composite Sock Used to Keep Sediment Off Vegetation	Composite Sock Used to Keep Sediment Off Vegetation

Photo 75	**Photo 76**
	
Composite Sock Around Entrance to Ditch	Rock Buffer Prior to Culvert Entrance

Photo 77	**Photo 78**
	
Exit to Culvert Headed To Ship Creek	No Sheen, Sediment or Floating Solids Seen in Water Leaving Project Site

Photo Addendum	
Photo 79	**Photo 80**
	
Witches Hat Used in Storm Drain	Witches Hat Used in Storm Drain

Photo 81	**Photo 82**
	
Witches Hat Used in Storm Drain	Witches Hat Used in Storm Drain

Photo 83

Witches Hat Used in Storm Drain

APDES INSPECTION REPORT

Alaska Department of Environmental Conservation
Division of Water
610 University Avenue, Fairbanks, AK 99709

Section 1: General Data

Authorization/Permit Number(s)	Announced / Unannounced	Receiving Waters	Inspection Date
Number: AKR10FY44 AKR10FY45	Announced	Eagle River	Date: 5/27/2020
Effective: 3/12/2019			Entry Time: 1000
Expiration: 1/31/2021			Exit Time: 1400

Section 2: Facility Data

Name of Facility: Glenn Highway Capacity Improvements Phase II – Southbound Hiland to Artillery

On-Site Representative/Physical Address:	Responsible Party/Mailing Address:
Name: Dan Petersen Title: Project Superintendent, Kiewit Infrastructure West Co. Address: 2000 W. Intl. Airport Rd. Ste/ C6 Phone: 907-231-6155 Email: dan.peterson@kiewit.com Name: Tal Maxwell Title: Storm Water Engineer, DOT&PF Address: 4111 Aviation Rd., Anchorage AK 99519 Phone: (907) 259-0450 Email: tal.maxwell@alaska.gov	Name: Jim Dilworth Title: District Environmental Manager, Kiewit Infrastructure West Co. Address: 2200 Columbia House Blvd, Vancouver, WA 98661 Phone: (360) 693-1478 Email: jim.dilworth@kiewit.com Name: David Kemp Title: Regional Director, DOT&PF Address: 4111 Aviation Rd., Anchorage AK 99519 Phone: (907) 268-0450 Email: david.kemp@alaska.gov
Tal Maxwell, Storm Water Engineer DOT&PF Johua James, Storm Water Engineer DOT&PF Katrina Chambon, Environmental Specialist IV DEC	*For internal use only:* *SIC: 1611* **Weather:** Sunny, ~60º F.

Section 3: Findings

Background/Regulatory Status/Compliance History

The Glenn Highway Capacity Improvements Phase II – Southbound Hiland to Artillery is a phased project by the Alaska Department of Transportation and Public Facilities (DOT&PF) in partnership with Kiewit Infrastructure West Co. The project has several components, each serving to fulfil the final goal of relieving congestion on the Glenn Highway near Eagle River to accommodate existing and future travel demand by improving traffic capacity, flow and safety. The current phase of the project involves reconstruction of the Glenn Highway southbound lanes from mile point 9.7 to mile point 12.2, widening of the southbound highway to three lanes, construction a new bridge crossing at Eagle River, construction of a new

section of roadway on Eagle River Drive providing an alternate link for traffic from Hiland Road Interchange to Artillery Road Interchange, and repair/stabilization of an existing Enstar gas line scour that lies below ordinary high water (OHW). The project has a total area of 65.5 acres, with a disturbance area of 56.5 acres according to the Notice of Intents (NOIs) submitted to the Alaska Department of Environmental Conservation (ADEC) by both Kiewit and the DOT&PF on March 12th, 2019. A project site map is provided in Figure 1. The current project is permitted to manage storm water by the ADEC per the Construction General Permit (CGP). The purpose of the inspection conducted May 27th, 2020 was a routine site visit to determine facility compliance with the Alaska Pollutant Discharge Elimination System (APDES) authorizations AKR10FY44 and AKR10FY45. The permit authorizations went into effect on March 12th, 2019 and will expire on January 31, 2021. Kiewit Infrastructure West Co. is listed on Section I Operator Information of the NOI as the permitted organization for authorization AKR10FY44, and the DOT&PF is listed in Section I Operator Information of the NOI as the permitted organization for authorization AKR10FY45.

The previous phase of the Glenn Highway Capacity Improvements project was completed under APDES authorizations AKR10EV84 and AKR10EV86, which became effective August 27th, 2014 and were terminated on August 28th, 2017. The scope of the project included design and construction of a new northbound three lane bridge across the Eagle River, expansion of northbound lanes from two to three lanes on the Glenn Highway near Eagle River, and conversion of the then current bridge section to a frontage road. The previous phases of the project were inspected by ADEC on January 21st, 2015, and a Compliance Letter was issued on February 4th, 2015 for failure to comply with Permit Parts 4.4.2.1.2 and 4.4.3.1.2 of the CGP requiring that Grading and Stabilization Logs accurately reflect that stabilization measures were initiated no more than 14 days after grading activities ceased. After required documentation was submitted, compliance was determined and the enforcement action was considered closed on March 12th, 2015.

The receiving water for this project has been identified as Eagle River. Located in the Municipality of Anchorage (MOA), Eagle River is considered a stream headed from the Eagle Glacier flowing for 40 miles in the northwest direction into Eagle Bay, located within the Knik Arm of Cook Inlet. The Alaska Department of Fish and Game (ADF&G) under 5 AAC 95.011 of the Alaska Administrative Code, has specified Eagle River to the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes based on the utilization, presence or rearing of the following anadromous fish species: Chinook salmon (*Oncorhynchus tshawytscha),* chum salmon (*Oncorhynchus keta)*, pink salmon (*Oncorhynchus gorbuscha)*, and sockeye salmon (*Oncorhynchus nerka).* The Environmental Protection Agency (EPA), under section 303(d)(1) of the Clean Water Act and 40 CFR § 130.7, has approved Total Maximum Daily Loads (TMDLs) published for metals (copper, lead, silver, ammonia and chlorine) for Eagle River. Known sources of these pollutants originate from two point sources, which include publicly owned treatment works and storm water. The Eagle River Wastewater Treatment Facility (AK0022543) is located downstream outside of the project area. There is no EPA-established or approved TMDL for turbidity or sediment. Storm water from the project site that does not infiltrate into the vegetaded buffer areas and into the ground flows into Eagle River. Two permanent, relatively small, storm water pipe networks on the north side of the Eagle River Bridge convey runoff waters. Potential sources of sediment to storm water runoff for this project include: petroleum products, earthwork, disturbed soils, soil stockpiles, Best Management Practices (BMPs) Material and sediment tracked onto paved surfaces and watering operations. United States Fish and Wildlife Service (USFWS), ADF&G, and National Marine Fisheries Service (NMFS) websites were utilized to determine that there are no state or federally-listed threatened or endangered species or critical habitat areas in the project area. Storm water from the project is therefore not likely to adversely affect threatened and/or endangered species and/or their habitats. ADF&G Division of Habitat under the authority of AS 16.05.871, issued a fish habitat permit (FH18-II-0191) required for the in-water gasline scour protection work. In addition, the Alaska Department of Natural Resources (DNR) under AS 46.15 issued a Temporary Water Use Authorization (TWUA A2019-12) for the excavation and

dewatering required for bridge construction and placement of scour protection on the existing Enstar gasline crossing Eagle River. The Alaska State Historic Preservation Office (SHPO) found that no historic properties or cultural resources will be affected by the project. The project boundary and associated drainage areas intersect a Public Water System (PWS) Drinking Water Protection Area (DPWA) identified as Saint Andrew Parish (AK2218748). Two active ADEC Contaminated Sites within 1,500 ft of the project area were identified as MOA Anchorage Regional Landfill site (2107.26.013), and the Highland Mountain Correctional Center UST 5 site (2107.26.027).

Records of the facility's APDES permit compliance with storm water regulations are publicly available on the Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) website: http://epa.echo.gov. No records of storm water-related violations exist from a search of the EPA's violations report for the time the authorization went into effect. A review of ADEC compliance records found one Non-Compliance Notification (NCN) dated March 14th, 2019. The NCN was reported to ADEC Spill Prevention and Response (SPAR) Division via the Spill Hotline and timely written notice was provided to ADEC Water Compliance Division. The notification was for a two gallon spill (Spill ID# 19239907301) of hydraulic oil leaked from an excavator that discharged both to land and water. Spill containment devices were employed, and the contaminated soils were properly disposed of. No further action was required by ADEC or Kiewitt.

This routine inspection covers the time period from March 12th, 2019 until May 27th, 2019.

Field Inspection

Upon arrival to the project site, introductions were exchanged and inspector credentials were presented. The inspection began with a records review and interview session followed by a project site walk-through. Prior to the inspection, a thorough review of the Storm Water Pollution Prevention Plan (SWPPP) was conducted by DEC Compliance personnel.

The following information was provided verbally by DOT&PF and Kiewitt Staff or found within the SWPPP:

- The project began in March of 2019. The estimated completion date for the project is December 2020. Kiewit staff expect that traffic will resume between the 1st and 15th of September 2020.
- Winter shutdown procedures included stabilization of stockpiles, temporary stabilization of conveyance channels, and temporary stabilization of exposed soils. Spring thaw procedures included placement of BMP's prior to winter shutdown mitigating potential erosion and sediment discharge.
- A SWPPP Pre-Construction Site Inspection was performed January 18th, 2019 by PND Engineers, Inc. Staff Engineer Nathan Harris (Photo 1).
- A SWPPP site inspection was last performed May 20th, 2020 by Kiewit SWPPP Manager Lindsy Dugan and DOT&PF Storm Water Inspector Tal Maxwell (Photo 2).
- Joint DOT&PF and Kiewit SWPPP inspections occur once a week on Wednesday, and within 24 hours of the end of a storm event that resulted in a discharge from the site.
- Rainfall monitoring data is collected and recorded daily in Form 25D-115 (Photo 3). The last dated entry was May 20th, 2020.
- The topography from the Hiland Road Interchange (MP 9.7) slopes downward towards the north until reaching the bridge crossing at Eagle River. From the Artillery Road Interchange (MP 12.2), the existing topography slopes downward towards the south until reaching the bridge crossing at Eagle River.
- Drainage in the project area from the Hiland Road Interchange runoff is generally conveyed in a south to north direction via man-made vegetated drainage ditches.
- Drainage in the project area from the from the Artillery Road Interchange runoff is generally conveyed in a north to south direction via man-made vegetated drainage ditches.

- Slopes in the project area generally range from two to six percent grade, with several isolated slopes above six percent.
- The project requires grading and fill activities which are documented in Form 25D-110 Grading and Stabilization Log. The last entry was dated May 11th, 2020 (Photo 4).
- The new project road profile is intended to reduce the overall grade profile of the existing highway requiring the disturbed areas to be permanently stabilized with permanent seeding stabilization methods.
- Debris at the construction site is placed into designated waste containers and taken to the landfill located by the project site.
- Equipment fueling occurs via a mobile vehicle with weekly delivery at designated areas of the project.
- At the time of inspection, Best Management Practices (BMPs) used on this construction site included: use of existing vegetative buffers, birch wattles, silt fences, temporary and permanent seeding, rip rap material down plumes, rock check dams, duck bill anchors and culverts (Photos 5-6).

The following observations were made by DEC inspectors:

- Birch wattles, hydroseeding and rip-rap BMPs have been placed to mitigate erosion in areas susceptible to run-off (Photo 7-8).
- Concrete washout waste is placed in designated area and the water is pumped and removed (Photo 9).
- Straw wattles have been placed on pre-existing drainage systems to control storm water discharges and flow (Photo 10).
- The staging area is located away from conveyance channels, storm water inlets, and water bodies. The construction site and staging area was clean and free of debris (Photo 11).
- Construction equipment and nonhazardous materials were stored at the designated staging areas
- within the project limits. Hazardous materials were stored in covered areas located away from possible impacts or damage due to traffic or moving equipment. All hazardous materials were clearly labeled and stored according manufacturer's requirements (Photo 12).
- A temporary garage was constructed at the staging area in order to conduct vehicle maintenance, servicing and inspections in order to minimize spills and avoid unauthorized discharges into the waterway (Photo 13).
- A spill of <1 gal of hydraulic fluid from the 65' Z Boom occurred on March 24th, 2020 and was cleaned up with appropriate methods. The leak was documented using the ADEC Monthly Oil Spill Log form (Photo 14).
- At the time of inspection, materials that were stockpiled on site were stabilized with BMPs such as silt fences, straw wattles, temporary seeding and mulching (Photos 15-17).
- Vehicle dust track-out BMP's were in place on the temporary pad constructed over the Eagle River preventing debris from entering the waterway (Photo 18).
- SWPPP signs were located at either end of the project site (Photo 19).
- Construction site had a designated and well-marked entrance/exit (Photo 20).
- The construction area including the staging area, material storage locations, vehicle maintenance garage, office and sanitary waste portable toilets (sani-cans) located throughout the project site were clean and free of debris.

Sampling	**YES** ☐	**NO** ☒
No Samples were taken during this inspection.		

Records Review

An extensive SWPPP review for AKR10FY44 and AKR10FY45 was conducted prior the inspection and considered complete. The following is a list of records made available to DEC staff on-site:

- A copy of Construction General Permit.
- Copies of the NOIs and DEC Authorization Letter.
- Copy of the Delegation Forms.
- SWPPP Modification Log – Last entry date May 13th, 2020.
- SWPPP Corrective Action Log – Last entry date May 7th, 2020
- SWPPP Grading and Stabilization Log – Last entry date May 11th, 2020.
- SWPPP Employee Training Log – Last entry date May 11th, 2020.
- Certified Erosion and Sediment Control Lead (CESCL) Certifications.
- SWPPP Daily Record of Rainfall Log– Last entry date May 20th, 2020.
- Copies of Inspection Reports – Signed and Dated.

Closing Conference

The following participants were present during the closing conference:

- Katrina Chambon, DEC
- Joshua James, DOT&PF
- Tal Maxwell, DOT&PF
- James Petersen, Kiewit
- Lindsy Dugan, Kiewit
- Jim Dilworth, Kiewit

Upon completion of inspection at project site, a closing conference was held. The DEC inspector provided the facility with preliminary inspection findings. The inspector found no deficiencies or areas of concern.

Section 4: Compliance

Violations

No violations were noted during this inspection.

Section 5: Appendixes

1. Photo Addendum

Signature

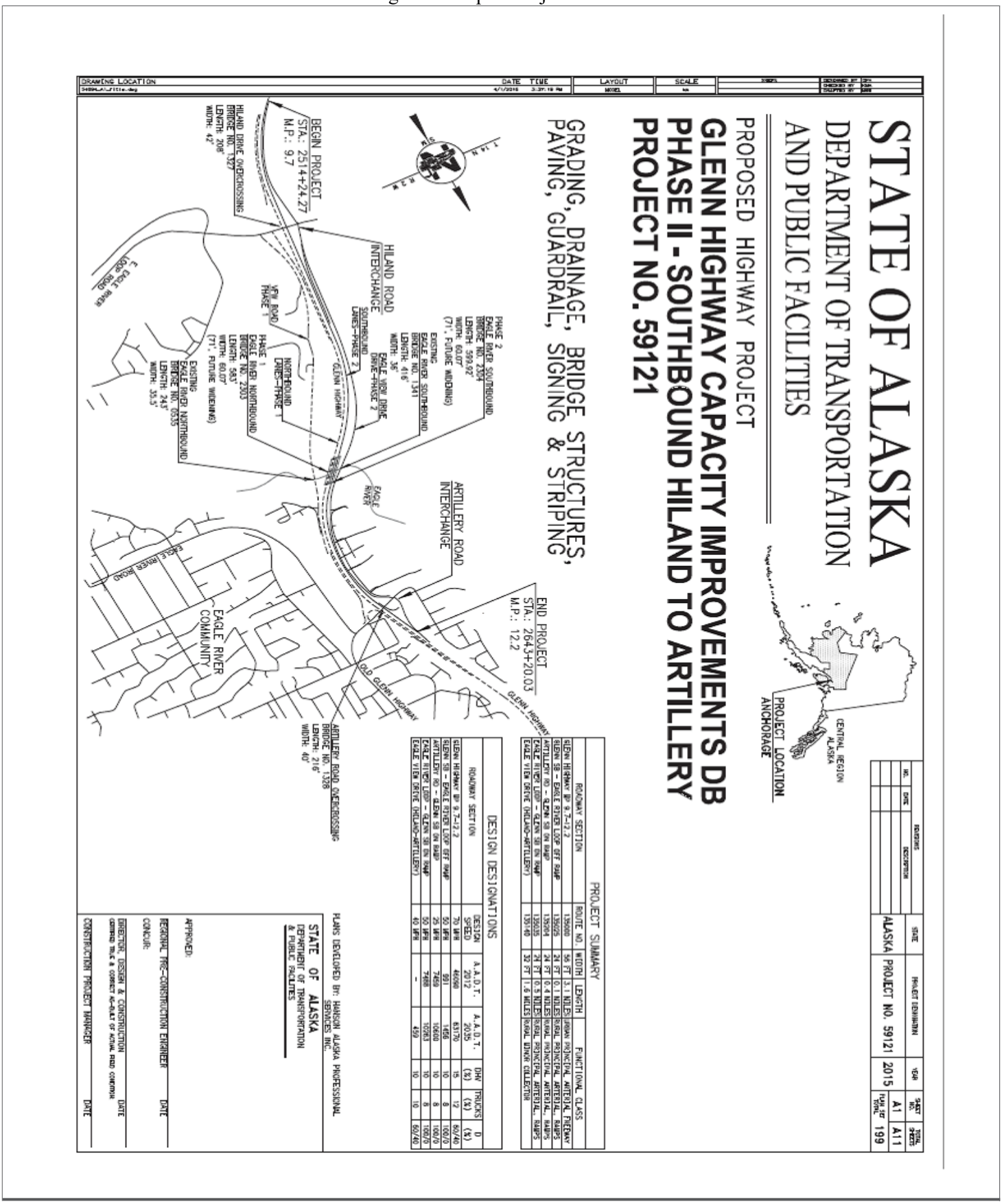
Inspector – Karolina Pavic
Credential Number: R-0518
Phone: (907) 451-2183
E-mail: karolina.pavic@alaska.gov

Reviewed By – Kalee Hotchkiss
Credential Number: R-0528
Phone: (907) 451-1605
E-mail: Kalee.Hotchkiss@Alaska.gov

kpavic
Date: 6/25/2020

Kalee Hotchkiss
Date: 06/25/2020

Figure 1. Map of Project Zone



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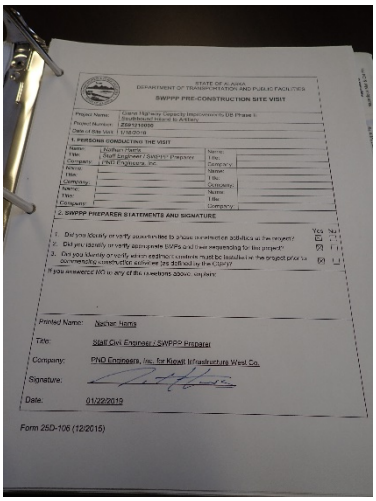
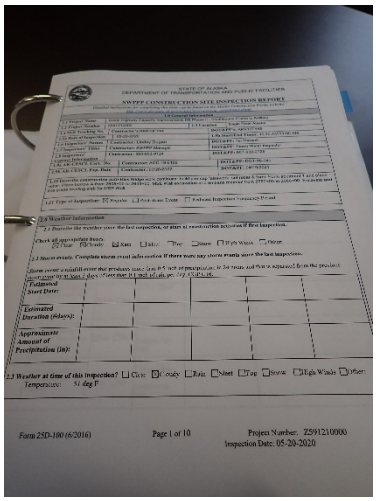
	
SWPPP Pre-Construction Site Inspection – 1 of 20	SWPPP Site Inspection – 2 of 20

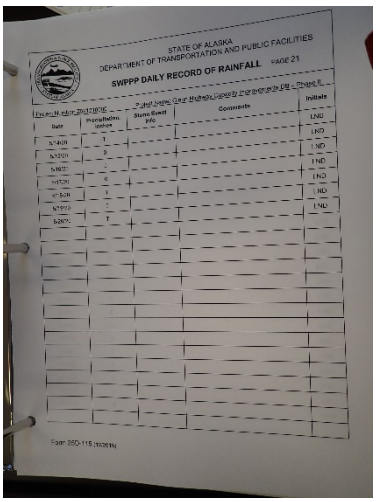
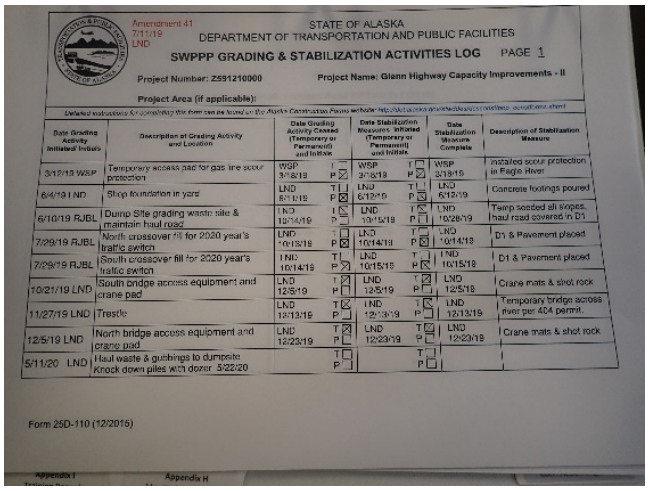
Photo 03	**Photo 04**
	
SWPPP Daily Record of Rainfall Log – 3 of 20	SWPPP Grading and Stabilization Log – 4 of 20

Photo Addendum	
Photo 05	**Photo 06**
	
BMP Erosion Control Straw Wattle, Silt Fence – 5 of 20	BMP Storm Water Control – 6 of 20

Photo 07	**Photo 08**
	
BMP Erosion Control Straw Wattle, Rip-rap, Hydroseeding – 7 of 20	BMP Erosion Control Straw Wattles, Rip-rap, Hydroseeding – 8 of 20

Photo 09	**Photo 10**
	
Concrete Washout Area on Project Site – 9 of 20	BMP Existing Storm Water Control – 10 of 20

Photo Addendum	
Photo 11	**Photo 12**
	
Project Staging Area – 11 of 20	Chemical Storage – 12 of 20

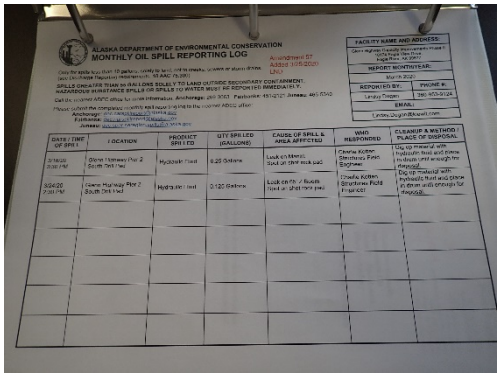
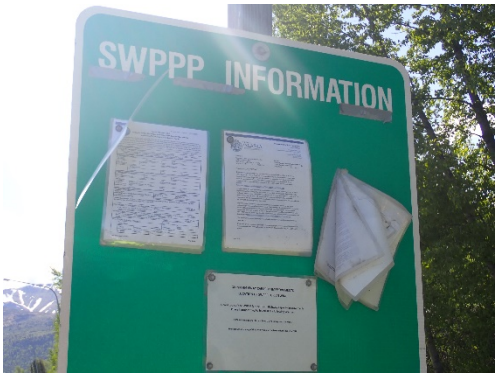
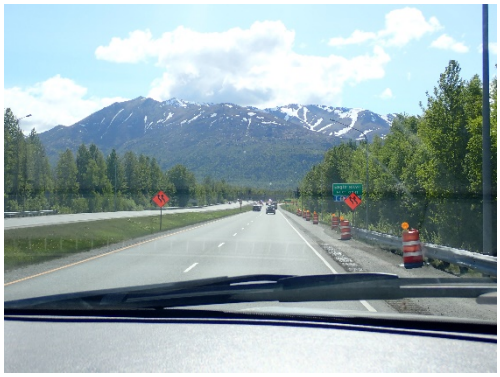
Photo 13	**Photo 14**
	
Vehicle Maintenance Temporary Garage – 13 of 20	ADEC Monthly Oil Spill Log Form – 14 of 20

Photo 15	**Photo 16**
	
BMP Stockpile Stabilization Control – 15 of 20	BMP Stockpile Stabilization Control – 16 of 20

Photo Addendum	
Photo 17	**Photo 18**
	
BMP Stockpile Stabilization Control – 17 of 20	BMP Vehicle Dust Track Out Control – 18 of 20

Photo 19	**Photo 20**
	
SWPPP Sign Posted – 19 of 20	Well Marked Entrance/Exit – 20 of 20

APDES INSPECTION REPORT

Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street, Anchorage, AK 99501

Section 1: General Data

Authorization/Permit Number	Announced / Unannounced	Receiving Waters	Inspection Date
Number: AKR10GC69	Announced	Wetlands, Blueberry Lake, Turnagain Arm, Campbell Creek, Campbell Lake, Fish Creek	Date: 5/8/2020
Effective: 8/11/2018			Entry Time: 10:00 am
Expiration: 3/31/2020			Exit Time: 1:00 pm

Section 2: Facility Data

Name of Authorization: Minnesota Seward to Tudor and Intl to Raspberry

On-Site Representative/Physical Address:	Responsible Party/Mailing Address:
Name: Greg Garney Title: SWPPP Manager Phone: (907) 952-3606	Name: Kevin Hendrickson, P.E. Title: Project Engineer Address: 8200 Homer Dr. Ste. A, Anchorage, AK 99518 Phone: (907) 522-5055 Email: kevin.hendrickson@alaska.gov
Additional Inspection Participants: Tom Monaghan, QAP Taber Hayes, QAP Kris Jensen, QAP Joshua Ian James, DOT	*For internal use only:* *SIC: 1611*

Section 3: Findings

Background/Regulatory Status/Compliance History

The Alaska Department of Transportation and Public Facilities (AKDOT&PF) is authorized to discharge storm water per the Alaska Pollutant Discharge Elimination System (APDES) construction general permit, authorization number AKR10GA69.

This project's scope according to the storm water pollution prevention plan (SWPPP) submitted to DEC is twofold:

- One project will resurface Minnesota Drive from the Seward Highway to Tudor Road. Work will include guardrail, drainage, signalization, ADA cub ramp improvements, signing and striping.
- The second project will add an auxiliary lane between the International Airport Road and Raspberry Road interchanges on Minnesota Drive. Work will include signing, striping, drainage, pavement improvements, dig-outs, guardrail, lighting and utility relocation.

Records of the facility's APDES permit compliance with wastewater discharge regulations are publicly available on the Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) website: http://epa.echo.gov.

This is the first inspection by the Department of Environmental Conservation (DEC). The inspection covers the time period from the authorization's effective date on July 31, 2019 through the inspection date on May 7, 2020. This was a routine inspection.

Field Inspection

Upon arrival at DOT Facility, introductions were exchanged, and inspector credentials were presented.

The following information was provided verbally by onsite representatives:

- The Alaska Department of Transportation and Public Facilities (AKDOT&PF) contracted Quality Asphalt Products (QAP) for the paving and earthquake repair on Minnesota Drive between the New Seward Highway and Tudor Drive.
- Paving began on August 14, 2019.
- The project is slated to be completed by June 30, 2020 but is subject to change.
- Currently, roughly 90% of milling and paving is completed, and 80% of piping is completed.
- The original Notice of Intent (NOI) estimated the area of disturbance at 64 acres, but the actual area of disturbance was far less.
- QAP is responsible for best management practices (BMP) maintenance, which include vegetative buffers, silt fencing, straw wattles, track walking, tacifier, hydroseeding and use of water trucks.
- Most BMPs were pulled at the end of the 2019 construction season for winter shut down.
- Winter shut down began on October 15, 2019 and spring thaw began May 15, 2019.
- There are no stockpiles that were in need of stabilization.
- Silt fencing was used for both storm water control and delineation.
- BMPs such as witches' hats on storm drains will be added back into active constructions areas during the final phase of paving.
- There have been no reported spills or leaks on site.
- There is no fixed fueling station on-site.
- There is no equipment washing done on-site. All equipment washing takes place at the AggPro facility.
- There is no concrete washout done on-site. All Concrete washout is performed at the AggPro facility.
- Recycled asphalt is taken to the QAP facility to be reused. Removed peat was taken to a topsoil yard. A 20 yard dumpster was used for all other miscellaneous construction debris and was typically emptied once a week, varying depending on work schedule.
- There was no designated entrance or exit to the project.
- Piping was staged at installation points, all other material was kept at the QAP facility.
- No chemicals or pesticides were used on the project. Fertilizer will be included with hydroseed mix and loaded at the AggPro facility.
- Rainfall is recorded using data from the Ted Stevens International Airport rain gage.

The following observations were made by DEC inspectors:

- Visual Inspections were conducted in 2019 by Kevin Ta, and in 2020 will be conducted by Tom Monaghan.
- The first inspection was conducted on August 8, 2019 by Kevin Ta. It was certified by Tab Hayes for QAP.
- The most recent inspection was performed on April 23, 2020 by Tom Monaghan. It was also signed by Tab Hayes for QAP.
- Winter Stabilization was being replaced with seeding for final stabilization.

- Silt fencing was used both for project boundary delineation as well as storm water control. It will be removed as part of final stabilization.
- Additional BMPs are being installed in the final section of construction.
- All required inspections had been performed and certified.

Sampling	**Sampling**	**Sampling**
No Sampling was performed		

Records Review

The following records were reviewed as part of the inspection and are considered complete:

- Storm Water Pollution Prevention Plan (SWPPP)
- Signature Delegation Form
- Copy of the Construction General Permit
- Notice of Intent
- NOI Modification
- Authorization Letter
- Site Maps
- SWPPP Amendment Log
- Corrective Action Log
- Grading and Stabilization Log
- Employee Training Log
- AK-CESCL Certifications
- Rainfall Records
- Inspection Reports

Section 4: Compliance

A non-compliance notification (NCN) was submitted on April 30, 2020 for two corrective actions identified on the project for spring start-up. The NCN sited covid-19 medical restrictions which restricted the ability to staff the required positions to provide corrective actions the inspections called for. The corrective actions were completed prior to the time of inspection.

Section 5: Appendixes

1. Photo Addendum

Signature

Inspector – Andrew Mohrmann
Credential Number: R-0103
Phone: (907) 269-8117
E-mail: andrew.mohrmann@alaska.gov

Reviewed By – Jon Wendel
Credential Number: R-0317
Phone: (907)465-5364
E-mail: Jon.Wendel@alaska.gov

Date: Click here to enter a date.

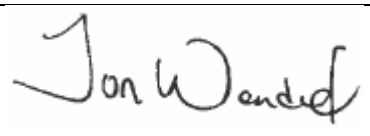
~~*Enforcement Name*~~ ~~Credential Number: XXXXXXX~~ ~~Phone: (907)XXX-XXXX~~ ~~E-mail: Address@alaska.gov~~	 ~~X~~ Date: 6/2/2020

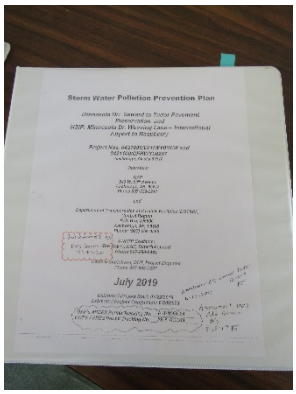
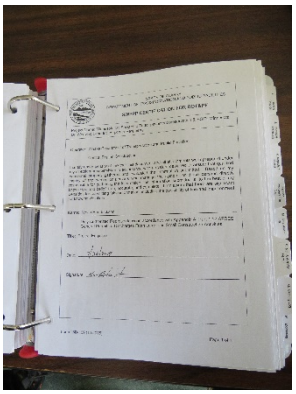
Photo Addendum	
Photo 01	**Photo 02**
	
Storm Water Pollution Prevention Plan (SWPPP)	SWPPP Certification Page

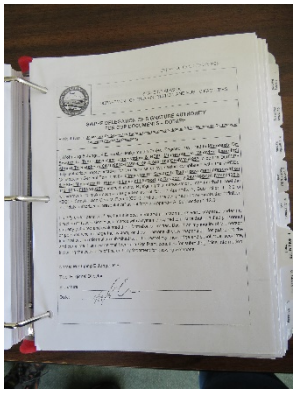
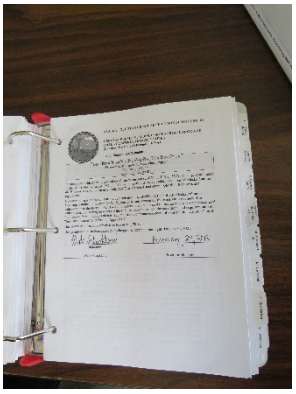
Photo 03	Photo 04
	
AKDOT&PF Delegation of Signature Authority Form	AKR100000 Construction General Permit

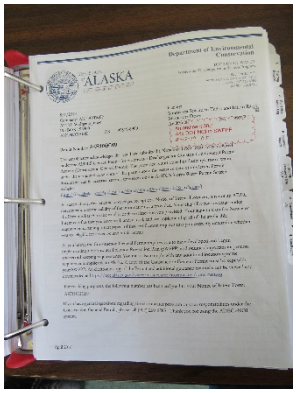
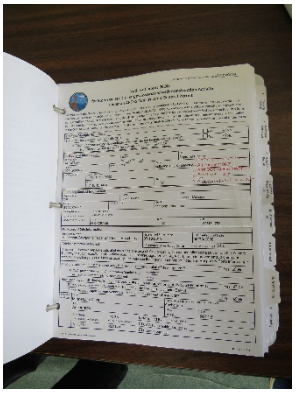
Photo 05	Photo 06
	
AKR10GC69 Authorization Letter	AKR10GC69 Notice of Intent (NOI)

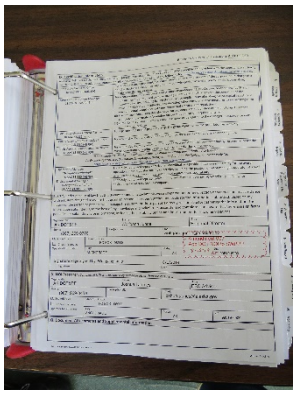
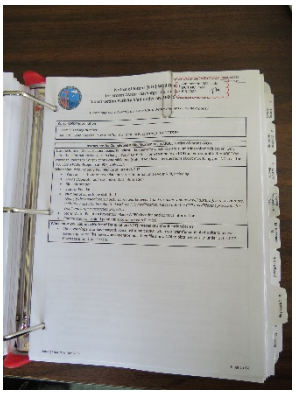
Photo Addendum	
Photo 07	**Photo 08**
	
AKR10GC69 NOI signature page	AKR10GC69 NOI Modification

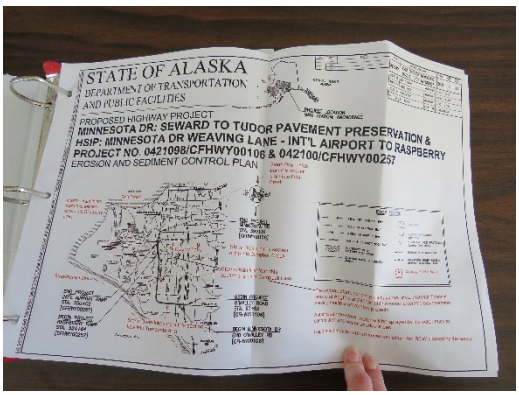
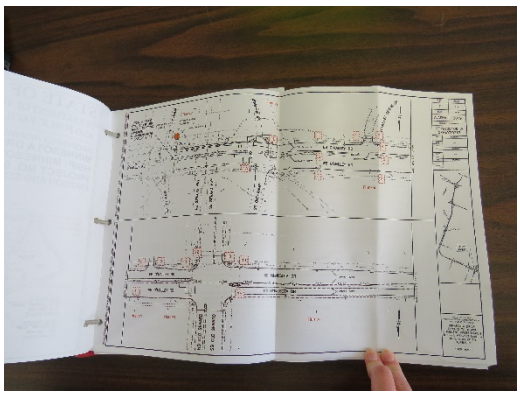
Photo 09	**Photo 10**
	
Project Site Map With Drainages	Site Map Section With BMP Notes

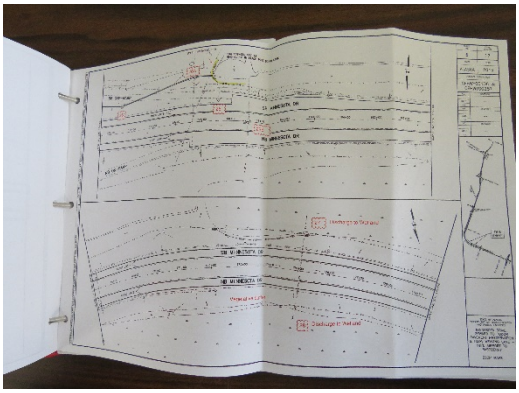
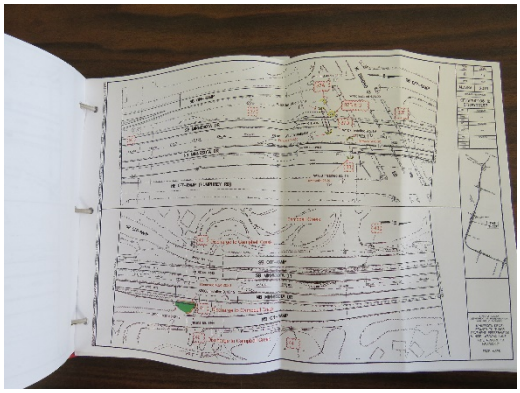
Photo 11	**Photo 12**
	
Site Map Section With BMP Notes	Site Map Section With BMP Notes

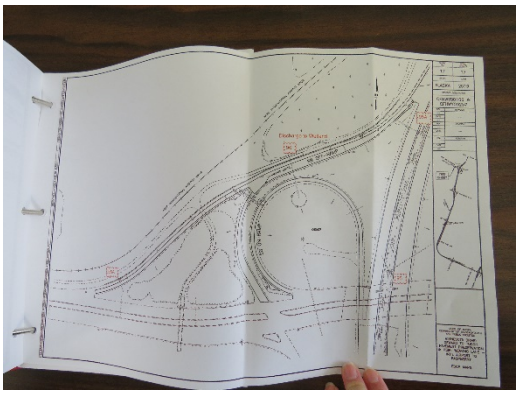
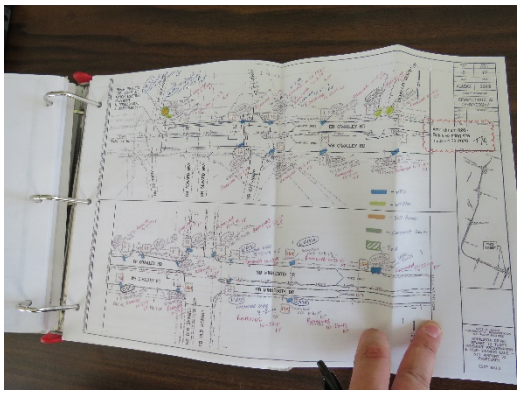
Photo Addendum	
Photo 13	**Photo 14**
	
Site Map Section With BMP Notes	Site Map Section With BMP Notes

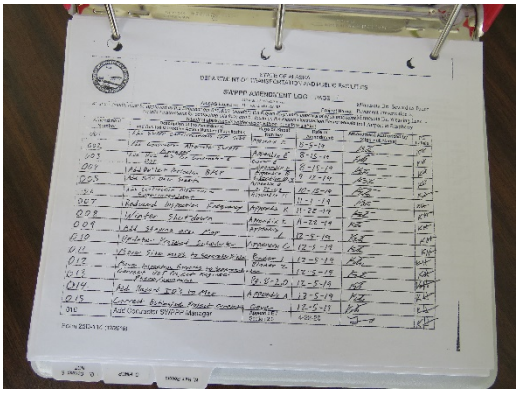
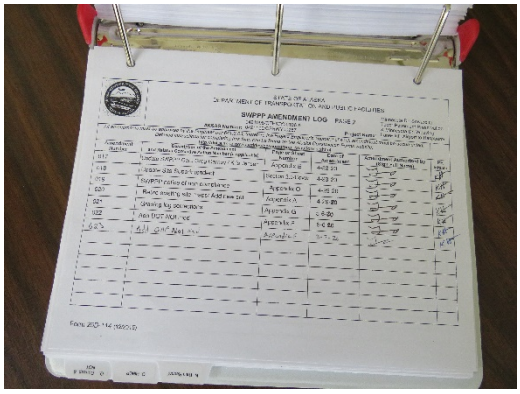
Photo 15	**Photo 16**
	
SWPPP Amendment Log Page 1	SWPPP Amendment Log Page 1

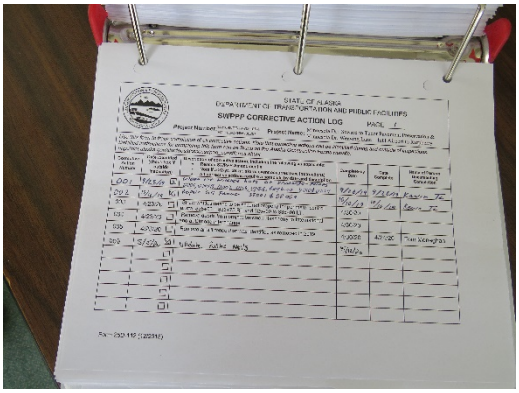
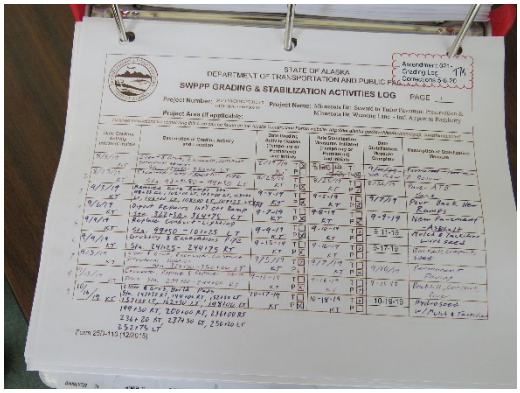
Photo 17	**Photo 18**
	
SWPPP Corrective Action Log	Grading and Stabilization Log Page 1

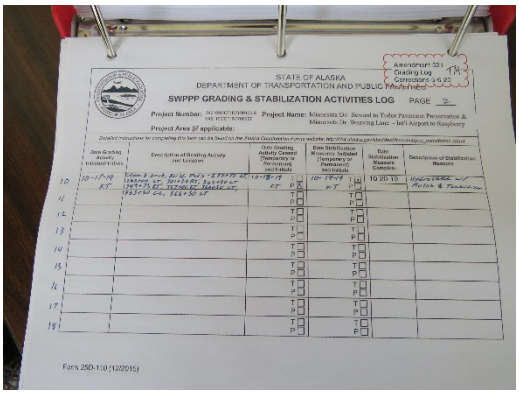
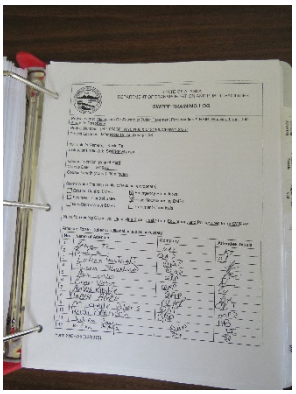
Photo Addendum	
Photo 19	**Photo 20**
	
Grading and Stabilization Log Page 2	SWPPP Training Log 8/26/19 Page 1

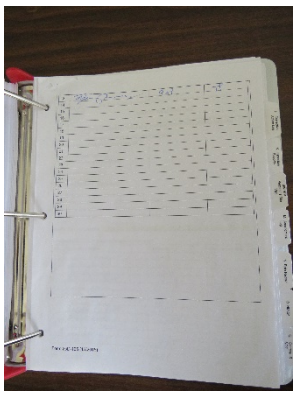
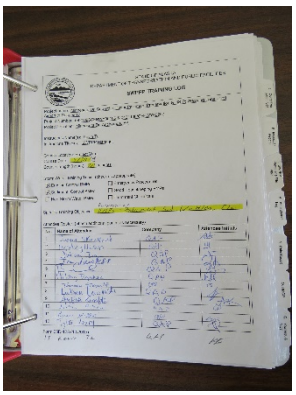
Photo 21	**Photo 22**
	
SWPPP Training Log 8/26/19 Page 2	SWPPP Training Log 9/24/19

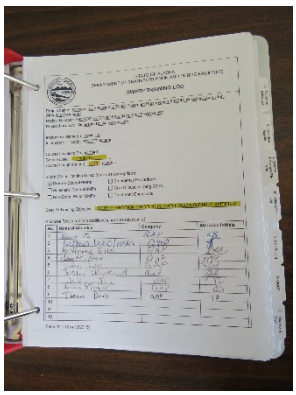
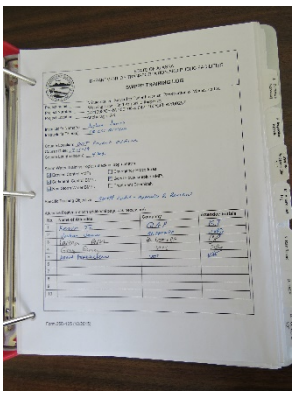
Photo 23	**Photo 24**
	
SWPPP Training Log 10/28/19	SWPPP Training Log 12/1/19

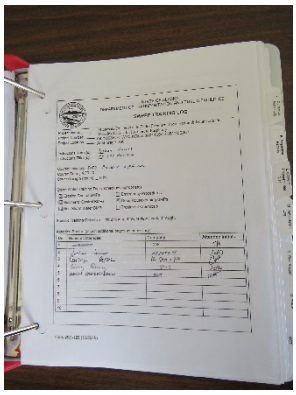
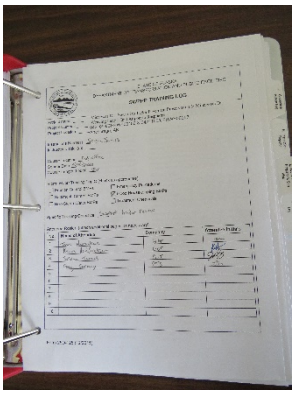
Photo Addendum	
Photo 25	**Photo 26**
	
SWPPP Training Log 12/1/19	SWPPP Training Log 5/5/20

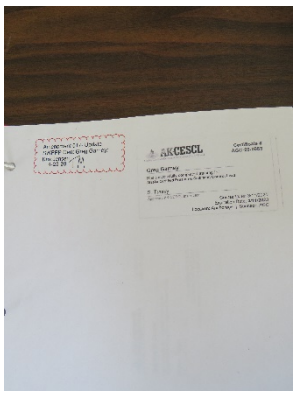
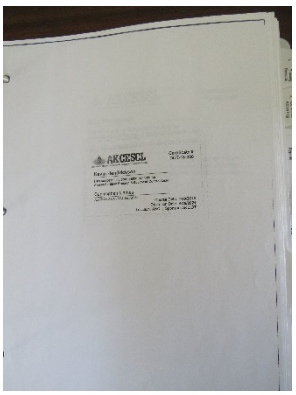
Photo 27	**Photo 28**
	
Greg Garney AK CESCL Certification, Expires 3/11/23	Kevin Hendrickson AK CESCL Certification, Expires 4/19/2021

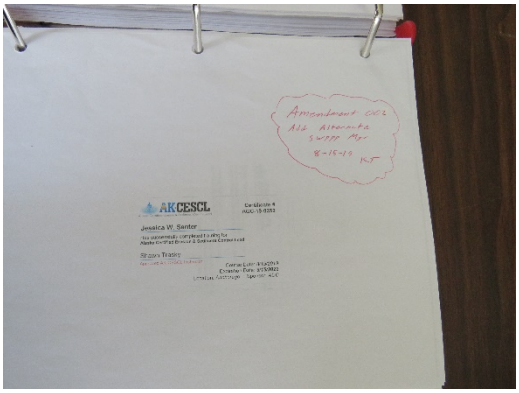
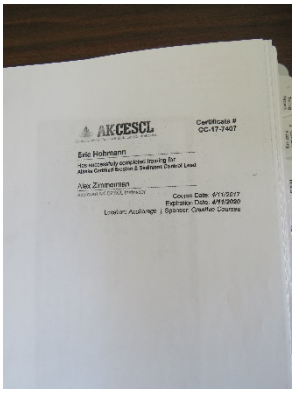
Photo 29	**Photo 30**
	
Jessica Senter AK CESCL Certification, Expires 8/15/22	Eric Hohmann AK CESCL Certification, Expires 4/11/2020

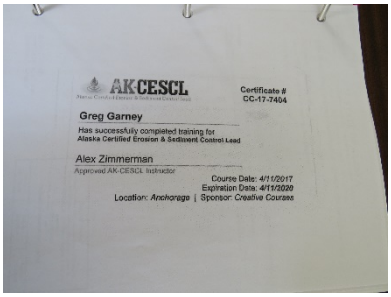
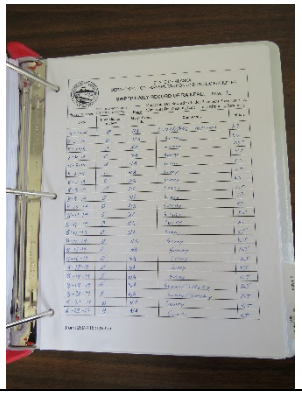
Photo Addendum	
Photo 31	**Photo 32**
	
Greg Garney, Expired 4/11/2020	SWPPP Rainfall Monitoring Log Page 1 (8/1-22/19)

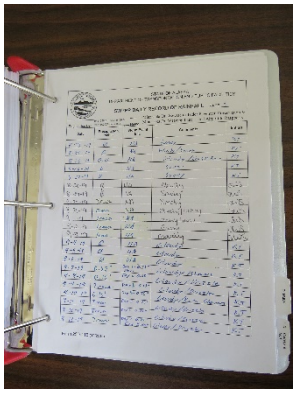
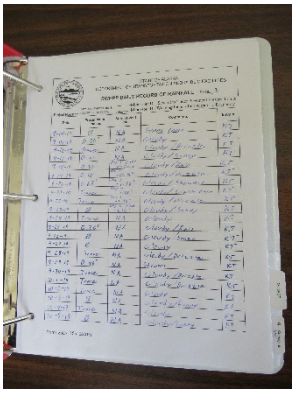
Photo 33	**Photo 34**
	
SWPPP Rainfall Monitoring Log Page 2 (8/23/19 – 9/13/19)	SWPPP Rainfall Monitoring Log Page 3 (9/14/19 – 10/5/19)

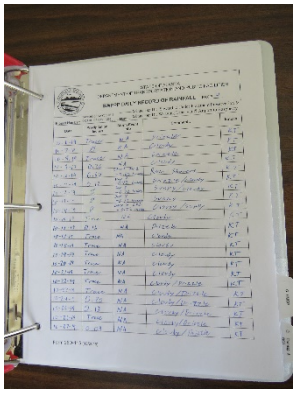
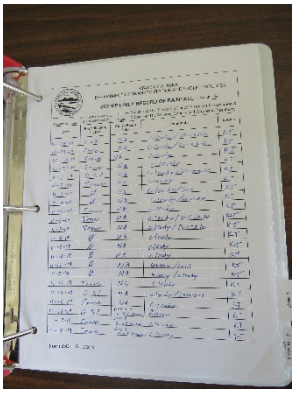
Photo 35	**Photo 36**
	
SWPPP Rainfall Monitoring Log Page 4 (10/6/19 – 10/27/19)	SWPPP Rainfall Monitoring Log Page 5 (10/28/19 – 11/18/19)

Photo Addendum

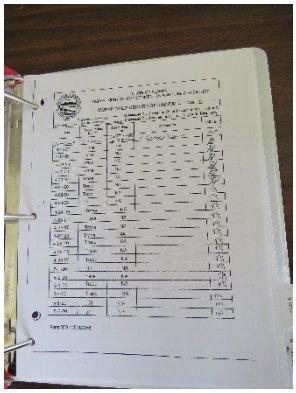
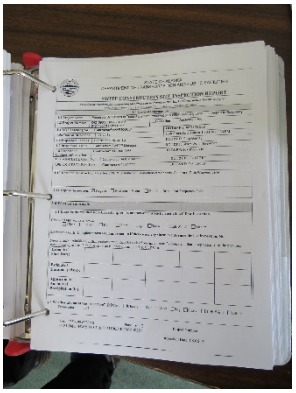
Photo 37	Photo 38
	
SWPPP Rainfall Monitoring Log Page 6 (11/19/19, 4/16/20 – 5/6/20)	SWPPP Inspection Report, Page 1, 8/6/19

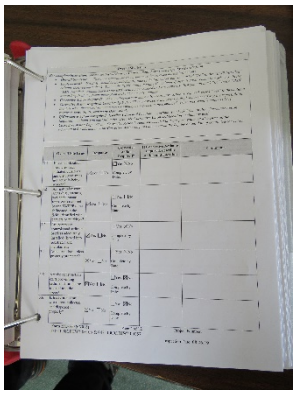
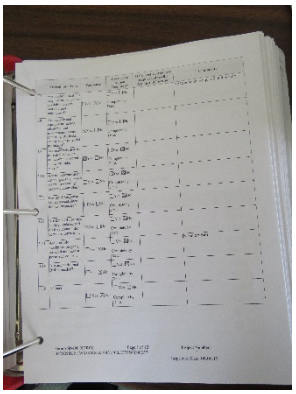
Photo 39	Photo 40
	
SWPPP Inspection Report, Page 2, 8/6/19	SWPPP Inspection Report, Page 3, 8/6/19

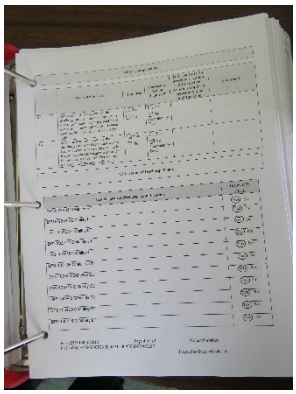
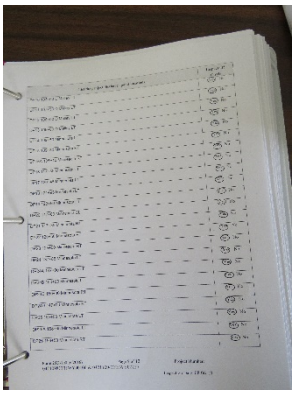
Photo 41	Photo 42
	
SWPPP Inspection Report, Page 4, 8/6/19	SWPPP Inspection Report, Page 5, 8/6/19

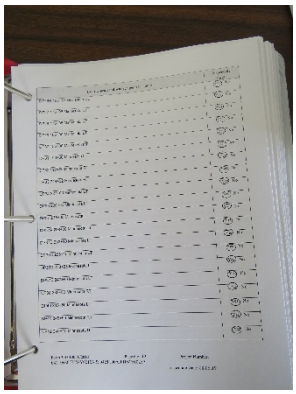
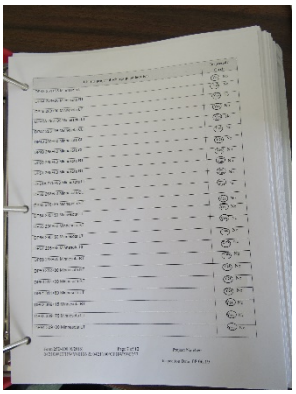
Photo Addendum	
Photo 43	**Photo 44**
	
SWPPP Inspection Report, Page 6, 8/6/19	SWPPP Inspection Report, Page 7, 8/6/19

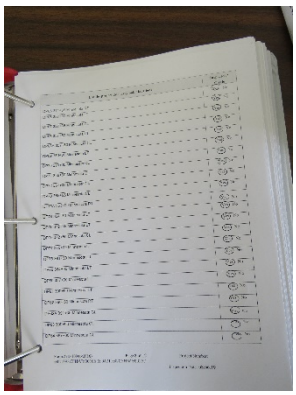
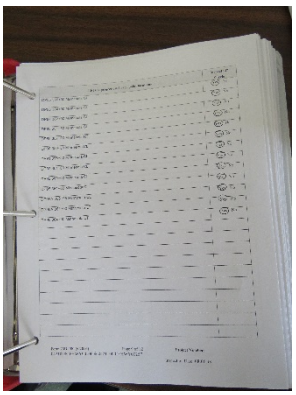
Photo 45	**Photo 46**
	
SWPPP Inspection Report, Page 8, 8/6/19	SWPPP Inspection Report, Page 9, 8/6/19

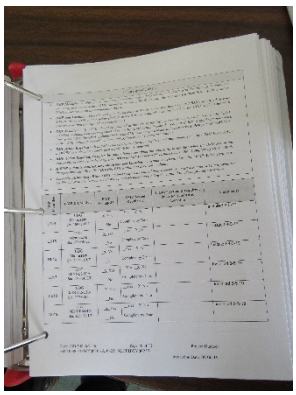
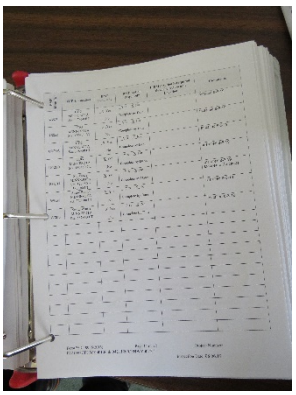
Photo 47	**Photo 48**
	
SWPPP Inspection Report, Page 10, 8/6/19	SWPPP Inspection Report, Page 11, 8/6/19

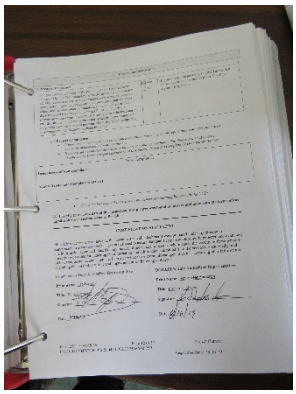
Photo Addendum	
Photo 49	**Photo 50**
	
SWPPP Inspection Report, Page 12, 8/6/19	Drinking Water Well Area Map

Photo 51	**Photo 52**
	
Mulch Laid Down As Winter Stabilization	Active Construction Area, Will Be Seeded Later

Photo 53	**Photo 54**
	
Hillside Track Walked And Mulched, Will Be Seeded Later	Witches Hats Pulled From Storm Drains As Part Of Winter Shutdown, Will Be Replaces As Construction Resumes

Photo Addendum	
Photo 45	**Photo 56**
	
Hillside Repair From Earthquake Damage	Drainage Ditch Repair And Modification

Photo 57	**Photo 58**
	
Embankment Repair from Earthquake Damage	New Culvert Added

Photo 59	**Photo 60**
	
Retaining Wall and Bike Path Repair	Mulch Laid Down As Winter Stabilization

Photo Addendum	
Photo 61	**Photo 62**
	
Mulch Laid Down As Winter Stabilization	Silt Fencing Primarily Used For Delineation Of Project Boundary

MEMORANDUM

State of Alaska

Department of Fish and Game
Division of Habitat

TO: Ron Benkert
Central Regional Supervisor

DATE: May 5, 2020

THRU: Megan Marie
Habitat Biologist

SUBJECT: Trip Report Seward Highway
Milepost 100-105

FROM: Will Frost
Habitat Biologist

PHONE NO: 267-2813

The Department of Transportation and Public Facilities (ADOT&PF) is rehabilitating 5 miles of the Seward Highway between mile post 100 and 105. The purpose of this project is to address safety problems, road deficiencies, and congestion south of Anchorage. The existing bridge over Indian Creek (Water Body No. 247-60-10290) will be replaced with a new bridge. As part of the bridge replacement, the ADOT&PF is relocating a tributary stream to accommodate a new pedestrian pathway. Three existing culverts located in Bear Creek will be replaced and a section of the stream channel upstream of Auriga Road will be relocated. One existing culvert located in Subdivision Creek will be replaced with a culvert designed for fish passage.

On May 3, 2020, I drove to the project site to conduct an inspection. The weather conditions were sunny and mild. I started my inspection at the Bear Creek stream diversion. The stream diversion is authorized under Fish Habitat Permit FH19-II-0049 (attached). About 300 linear feet of Bear Creek upstream of Auriga Road has been realigned to accommodate a new culvert location and temporary highway detour (Figures 1 and 2). Class I riprap and materials to prevent subsurface flows have not been placed in the stream channel. While the new stream channel closely matches the width of the existing channel, the stream channel depth does not match the plans and specifications referenced in the permit. The new stream channel will need to be constructed according to the plans referenced in FH19-II-0049 and salvaged vegetation will need to be placed along the stream channel riparian zone.

At the upper end of the stream diversion, I observed a pump intake hose in Bear Creek (Figures 3 and 4). Fish Habitat Permit FH 19-II-0049 requires a properly sized screen structure at the hose intake to avoid entrainment, impingement, or injury to fish when pumping water from Bear Creek. The intake screening observed does not meet the requirements of FH19-II-0049. The hose must be removed from Bear Creek and outfitted with the appropriate screening before use in a fish-bearing stream.

I walked downstream below Auriga Road to the point where Bear Creek enters a temporary culvert under the highway detour. I observed grey liquid sediment up to 8 inches deep contained behind a silt fence adjacent to the stream channel (Figure 5). The sediment may be from geotechnical drilling conducted on the highway detour. The sediment should be removed from the site and sediment controls re-established to avoid impacting Bear Creek.

I drove to Indian Creek to inspect the construction of a temporary bridge over Indian Creek and the tributary stream realignment adjacent to the bridge. The stream channel was moved to accommodate a new pedestrian pathway. The work is authorized by Fish Habitat Permit 19-II-0053(attached). About 325 linear feet of stream channel was constructed to match the channel length, slope, and conveyance capacity of the existing channel. Fish Habitat Permit FH19-II-0053 states that "The rip rap mix for the stream scour protection will include sufficient fines to seal the voids and reduce sub-surface flow. Existing woody and herbaceous vegetation bordering the new channel will be maintained." The stream substrate in the newly constructed channel does not contain enough fines to seal the voids and prevent sub-surface flow (Figures 6 and 7). Existing woody and herbaceous vegetation bordering the new channel was not maintained during construction. ADOT&PF will need to re-construct the channel and replace woody and herbaceous vegetation bordering the channel to ensure compliance with FH19-II-0053.
I inspected the temporary bridge over Indian Creek (Figure 8). I had no concerns with the temporary bridge.

I inspected an additional tributary channel adjacent to the Indian Creek bridge located on the north side of the creek (Figures 9 and 10). About 275 linear feet of the stream channel was excavated and vegetation cleared adjacent to the stream channel. I spoke with the landowner adjacent to the project area and he stated the stream is perennial and the headwater of the stream is on his property flowing from springs. The stream may provide rearing habitat for juvenile fish. The ADF&G requests that the stream channel is restored to closely match the habitat conditions prior to construction.

I inspected a water withdrawal pump located in Indian Creek. The intake screen is compliant with Fish Habitat Permit FH 20-II-0034 (Figure 11).

To avoid any further enforcement action, ADOT&PF will need to take the following measures to correct non-compliances observed during this inspection:

1. Ensure new Bear Creek stream channel is constructed according to the plans referenced in FH19-II-0049 and salvaged vegetation is placed along the stream channel riparian zone.
2. Remove water withdrawal intake from Bear Creek and ensure screening meets the requirements of FH19-II-0049 before use in Bear Creek or other fish-bearing streams in the project area.
3. Remove sediment accumulated adjacent to Bear Creek at the temporary highway detour and re-establish sediment controls to avoid impacting Bear Creek.
4. Re-construct the new Indian Creek tributary stream channel to ensure sufficient flow remains in the new channel and replace woody and herbaceous vegetation bordering the channel to ensure compliance with FH19-II-0053.
5. Re-construct the disturbed tributary stream channel on the north side of Indian Creek to closely match the habitat conditions prior to construction and ensure fish passage between Indian Creek and the stream outside of the project area.

I will work with ADOT&PF to ensure compliance and assist with any permit modifications necessary to accommodate the necessary in-stream work. I plan to return to the site within a week and will meet with the contractor and/or ADOT&PF to discuss any questions with the action items listed above.

Figure 1. Bear Creek stream diversion upstream of Auriga Road. View looking upstream.

Figure 2. Bear Creek stream diversion upstream of Auriga Road. View looking upstream.

Figure 3. Intake hose located in Bear Creek.

Figure 4. Water pump, Bear Creek.

Figure 5. Sediment located adjacent to Bear Creek. View looking downstream.

Figure 6. Subsurface flow in stream diversion adjacent to Indian Creek Bridge. View looking upstream

Figure 7. Subsurface flow in stream diversion adjacent to Indian Creek Bridge. View looking upstream.

Figure 8. North bridge abutment on temporary bridge over Indian Creek.

Figure 9. Disturbed tributary stream to Indian Creek. View looking south.

Figure 10. Undisturbed reach of the tributary stream to Indian Creek. View looking north.

Figure 11. A properly sized intake screen on an intake hose in Indian Creek.

Enc: FH19-II-0049
FH19-II-0053

Email cc: A. Ott, ADF&G
J. Baumer, ADF&G
J. Rypkema, ADEC
C. Larson, ADNR
H. Brooks, ADNR
B. Effinger, ADOT&PF
N. Warton, ADOT&PF
T. Tobish, MOA
S. Ellis, MOA
USACE, Regulatory Branch
H. Arnett, R&M Consulting

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game
DIVISION OF HABITAT
Southcentral Region Office
333 Raspberry Road
Anchorage, Alaska
Main: 907.267.2342
Fax: 907.267.2499

FISH HABITAT PERMIT FH19-II-0049

ISSUED: April 12, 2019
EXPIRES: Life of Structure

Alaska Department of Transportation and Public Facilities
Attn: Bob Effinger
P.O. Box 196900
Anchorage, AK 99519-6900

RE: Culvert Replacement – Bear Creek (Bird House Creek)
Section 10, T 10 N, R 1 W, SM
Location: 60.9653 N, 149.4427 W

Dear Mr. Effinger:

Pursuant to the fishway act at AS 16.05.841, the Alaska Department of Fish and Game (ADF&G) Division of Habitat has reviewed your proposal to replace an existing culvert in Bear Creek located under Auriga Road (Figure 2).

Project Description
You propose to replace the existing culvert under Auriga Road with a 6-foot diameter 60-foot long corrugated aluminum culvert (P3-2) (Sheets E7 and E8). Type I cast in place headwalls will be installed at the inlet and outlet of the culvert. The culvert will be installed on a 1.0% slope. The culvert will be backfilled to a depth of about 2 feet with material of similar gradation to the native streambed designed to remain stable at high flows. A 6-foot wide low-flow channel will be constructed in the streambed material inside the culvert. To reduce scour, class I riprap and material of similar gradation to the native streambed material will be placed about 24 feet downstream of the culvert outlet. The riprap mix for the culvert backfill and the scour protection apron will include sufficient fines to seal the voids and reduce sub-surface flow.

About 300 linear feet of Bear Creek upstream of Auriga Road will be realigned to accommodate the new Auriga Road culvert location and temporary highway detour. The new stream channel will closely match the width and depth of the existing channel. Class I riprap and material of similar gradation to the native streambed material will be placed in the stream channel. The riprap mix for the stream will include sufficient fines to seal the voids and reduce sub-surface flow. Boulder clusters consisting of three boulders set every 20 feet will be placed in the stream channel (Figure E8).

The culvert will be installed using a tracked excavator operating from the road. The work area will be isolated from Bear Creek by installing temporary coffer dams and the stream will continue to flow through the existing culvert during construction. Fish will be removed from the work area and abandoned stream channel and returned to Bear Creek in accordance with a valid Aquatic Resource permit. If groundwater is present in the work area during the culvert replacement, water will be pumped from the worksite. Pumped water will be discharged into upland vegetation to remove sediment. All work below the ordinary high water line will be conducted during periods of low water flow.

The streambanks upstream and downstream of the new culvert will be reconstructed with compacted salvaged native material and vegetative mats. All areas remaining disturbed areas will be stabilized with topsoil and native seed.

Fish Resources
Bear Creek supports resident Dolly Varden at your project location. Coho salmon have been documented downstream of the project location (Water Body No. 247-60-10278). Your project as proposed has the potential to obstruct the efficient passage and movement of fish.

Fishway Act
In accordance with AS 16.05.841, your project is approved subject to the project description and permit terms, and the following stipulations.

1. The new culvert and stream channel shall be designed, installed, and maintained to accommodate the efficient passage and movement of fish, both upstream and downstream.

2. A diversion plan, including specifications for coffer dam construction and fish relocation, shall be provided to the Division of Habitat for review and approval (postal mail or email william.frost @alaska.gov a minimum of two weeks prior to construction.

3. To avoid entrainment, impingement, or injury to fish, a properly sized and screened structure must surround the water intake when pumping water from Bear Creek. The screen mesh shall not exceed 0.1 inches (2.4 millimeter) and the water velocity at the screen surface shall not exceed 0.5 feet per second. The intake screen shall be periodically inspected during operations to ensure that the screening has not collapsed between the water intake and screen surface, that there are no openings in the mesh or gaps between the mesh and frame of the intake structure greater than 0.1 inches, and that the screen has not become blocked by debris.

Permit Terms
This letter constitutes a permit issued under the authority of AS 16.05.841 and must be retained on site during project activities. Please be advised that this determination applies only to activities regulated by the Division of Habitat; other agencies also may have jurisdiction under their respective authorities. This determination does not relieve you of your responsibility to secure other permits; state, federal, or local. You are still required to comply with all other applicable laws.

You are responsible for the actions of contractors, agents, or other persons who perform work to accomplish the approved project. For any activity that significantly deviates from the approved plan, you shall notify the Division of Habitat and obtain written approval in the form of a permit amendment before beginning the activity. Any action that increases the project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any provision contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of the Division of Habitat. Therefore, we recommend you consult the Division of Habitat immediately before considering any deviation from the approved plan.

You shall give an authorized representative of the state free and unobstructed access to the permit site, at safe and reasonable times, for the purpose of inspecting or monitoring compliance with any provision of this permit. You shall furnish whatever assistance and information the authorized representative reasonably requires for monitoring and inspection purposes.

In addition to the penalties provided by law, this permit may be terminated or revoked for failure to comply with its provisions or failure to comply with applicable statutes and regulations. You shall mitigate any adverse effect upon fish or wildlife, their habitats, or any restriction or interference with public use that the commissioner determines was a direct result of your failure to comply with this permit or any applicable law.

You shall indemnify, save harmless, and defend the department, its agents, and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from permitted activities or your performance under this permit. However, this provision has no effect if, and only if, the sole proximate cause of the injury is the department's negligence.

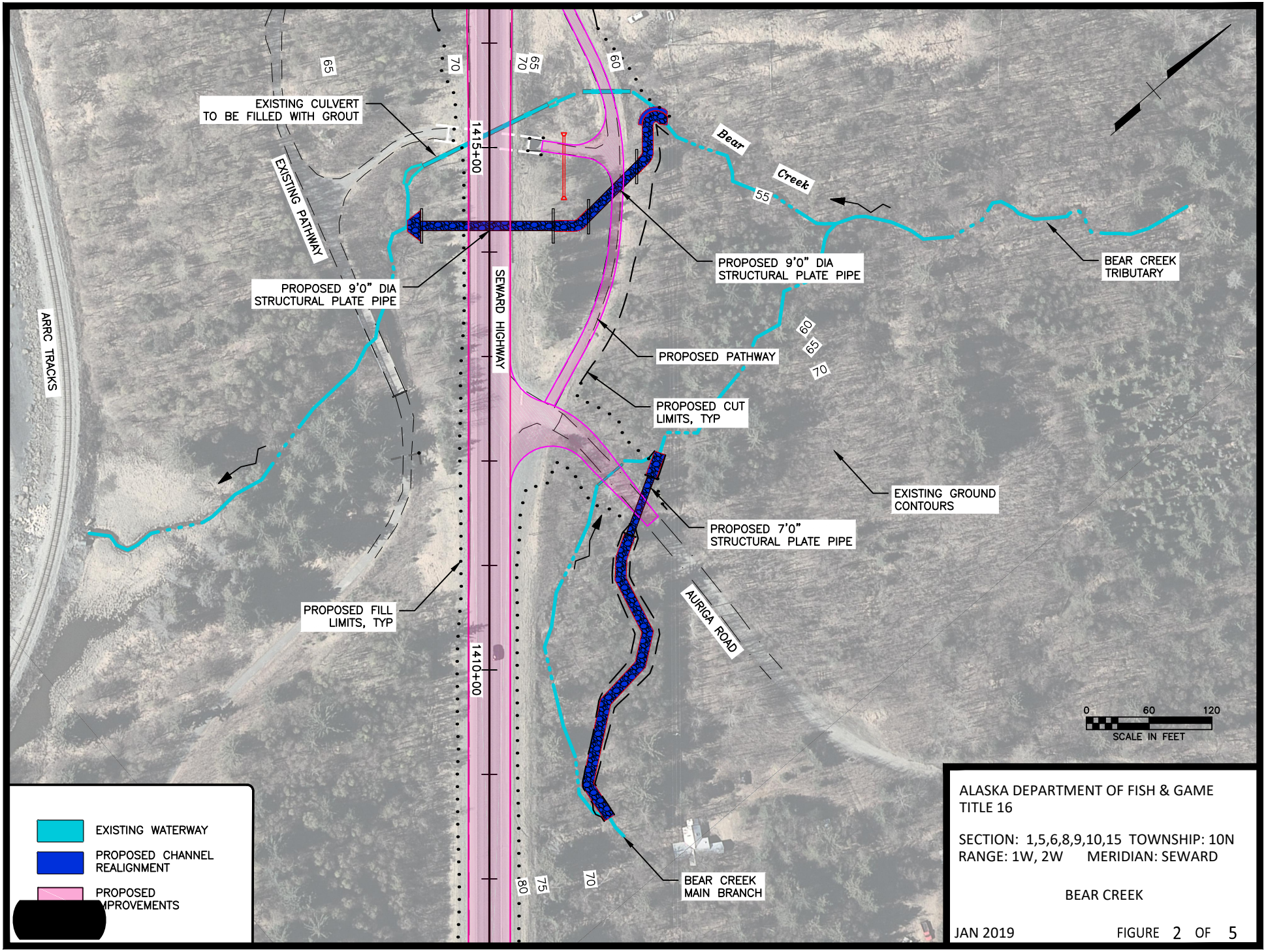
Please direct questions about this permit to Habitat Biologist Will Frost at 267-2813 or william.frost@alaska.gov.

Sincerely,
Doug Vincent-Lang
Commissioner

By Ron Benkert
Southcentral Regional Supervisor

Enclosures: Figure 2
Sheets E-7 and E-8

Email cc:
A. Ott, ADF&G-HAB
J. Baumer, ADF&G-SF
J. Clark, ADF&G-SF
J. Rypkema, ADEC
C. Larson, ADNR
AWT, Anchorage
H. Brooks, ADNR
T. Tobish, MOA
S. Ellis, MOA
USACE, Regulatory Branch



ALASKA DEPARTMENT OF FISH & GAME
TITLE 16

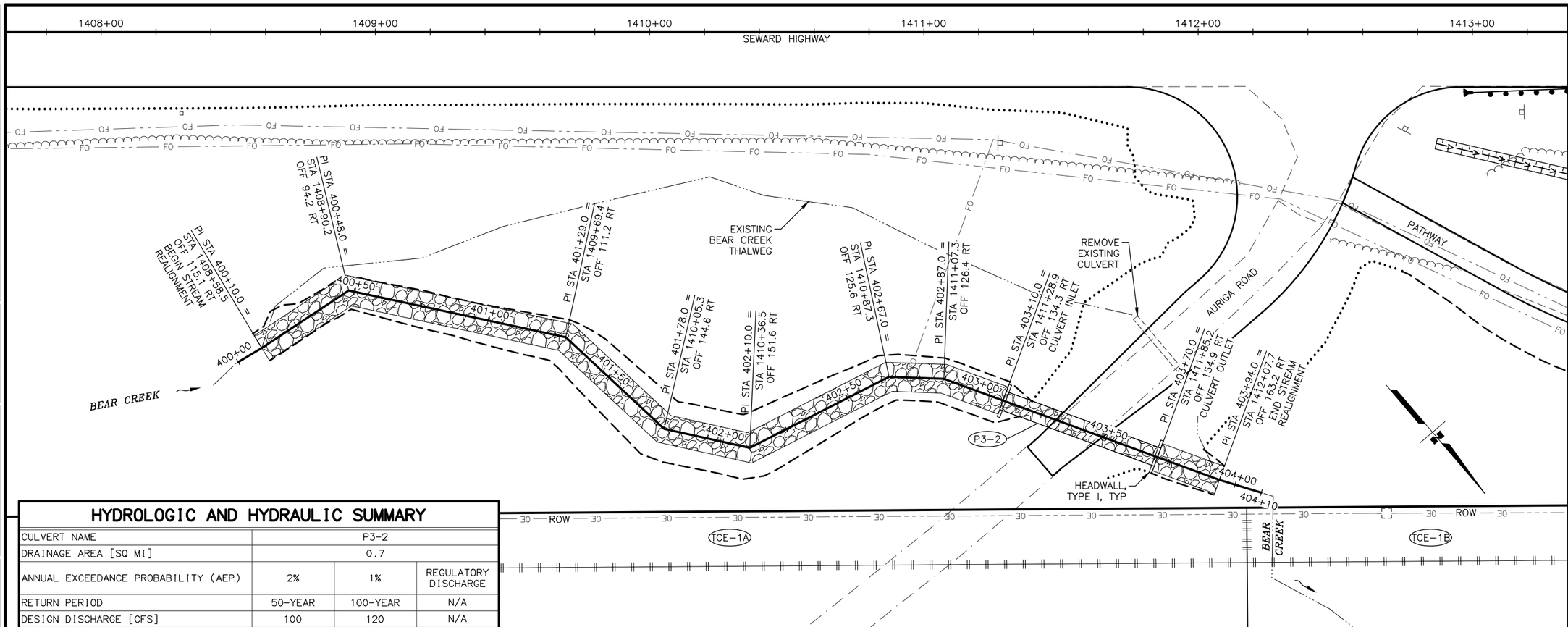
SECTION: 1,5,6,8,9,10,15 TOWNSHIP: 10N
RANGE: 1W, 2W MERIDIAN: SEWARD

BEAR CREEK

JAN 2019 FIGURE 2 OF 5

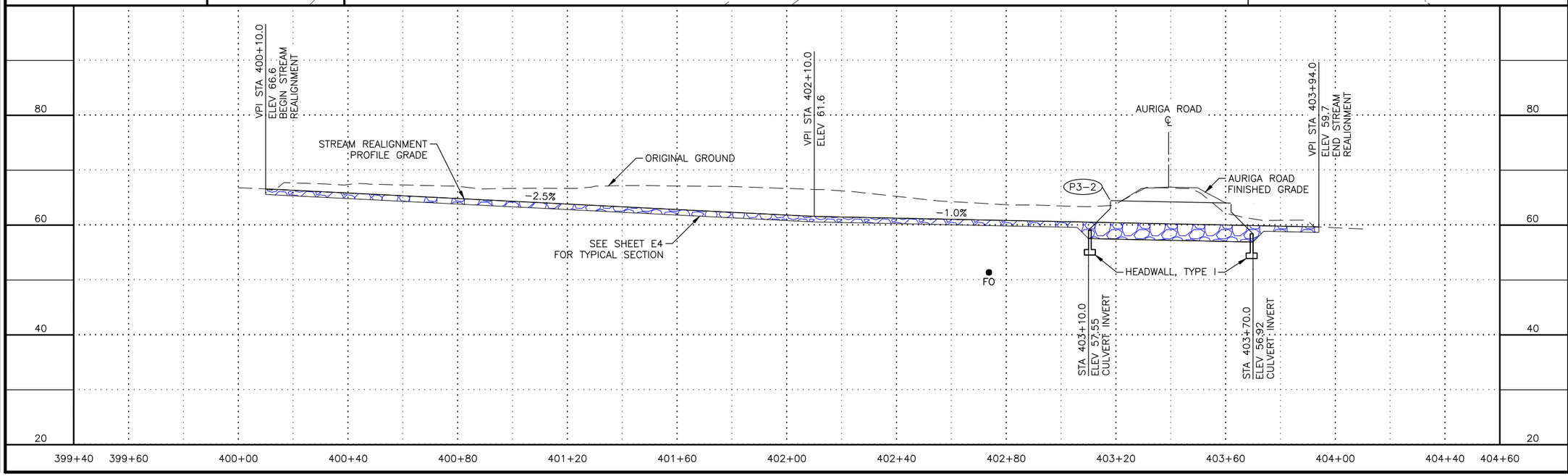
Z:\project\2129.00 DOT_C Seward Hwy MP 99 105\Civil\ACAD\Figures\ADF&G\ADFG Stream Figures.dwg

Plotted 1/31/2019 4:57 PM by Tony Liang



HYDROLOGIC AND HYDRAULIC SUMMARY

CULVERT NAME	P3-2		
DRAINAGE AREA [SQ MI]	0.7		
ANNUAL EXCEEDANCE PROBABILITY (AEP)	2%	1%	REGULATORY DISCHARGE
RETURN PERIOD	50-YEAR	100-YEAR	N/A
DESIGN DISCHARGE [CFS]	100	120	N/A
DESIGN HIGH WATER ELEVATION [FT]	62.9	63.2	N/A
ANTICIPATED ADDITIONAL BACKWATER AT 1% AEP = 0.0 FT			
OVERTOPPING FLOW = 180 CFS			



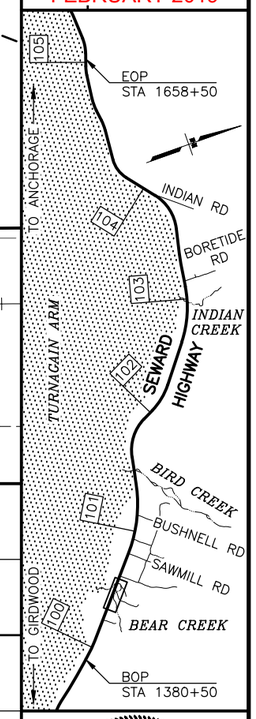
SHEET NO.	TOTAL SHEETS
E7	E18
STATE	YEAR
ALASKA	2019

PROJECT DESIGNATION

0A31056/CFHWY00011
0001497/Z570880000

NO.	REVISION
DATE	
NO.	REVISION
DATE	
NO.	REVISION

PS&E REVIEW
FEBRUARY 2019



STATE OF ALASKA
49TH
PROJECT ENGINEER
0000
REGISTERED PROFESSIONAL ENGINEER

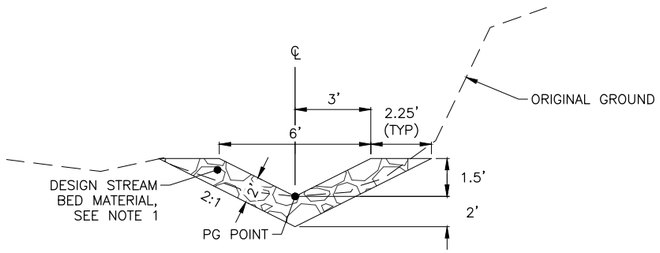
R&M CONSULTANTS, INC.
9101 VANGUARD DRIVE
ANCHORAGE, AK 99507
(907) 522-1707
CERT. OF AUTH. NO. AECC111

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SEWARD HWY: MP 100-105 IMPROVEMENTS & HSIP: CR TRAFFIC SAFETY CORRIDOR LEFT TURN LANES

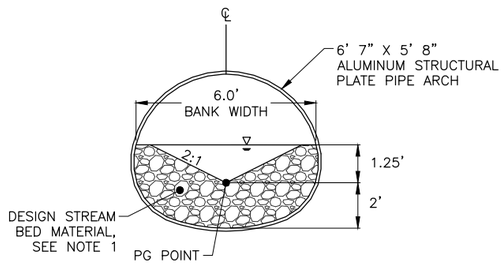
BEAR CREEK REALIGNMENT AT AURIGA ROAD PLAN AND PROFILE

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	0A31056/CFHWY00011 0001497/Z570880000	2019	E8	E18



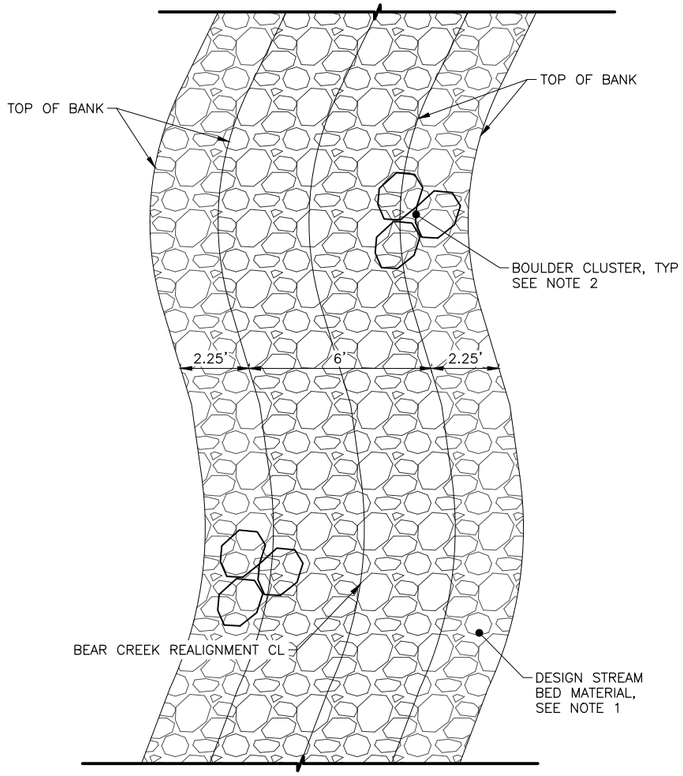
OPEN CHANNEL SECTION

STA 400+10 TO STA 403+10
STA 403+70 TO STA 403+94

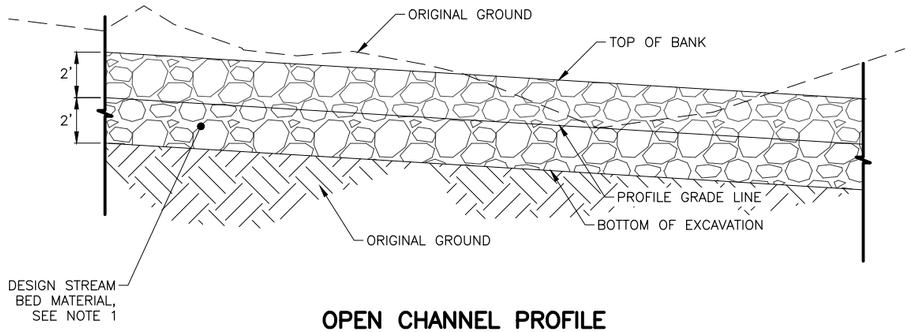


CULVERT SECTION

STA 403+10 TO STA 403+70



OPEN CHANNEL PLAN
BEAR CREEK REALIGNMENT AT AURIGA ROAD



OPEN CHANNEL PROFILE
BEAR CREEK REALIGNMENT AT AURIGA ROAD

BEAR CREEK REALIGNMENT AT AURIGA ROAD

NOTES:

1. DESIGN STREAMBED MATERIAL IS TO BE MADE UP OF RIPRAP, CLASS I WITH VOIDS FILLED IN USING SELECTED MATERIAL, TYPE A. THIS STREAMBED MATERIAL APPLIES TO THE FULL LENGTH OF BEAR CREEK REALIGNMENT AT AURIGA ROAD.
2. PLACE BOULDER CLUSTERS (THREE BOULDERS) EVERY 20 FEET ALONG THE CREEK CL AS DIRECTED BY FIELD ENGINEER.
3. 6'7" X 5'8" ALUMINUM STRUCTURAL PLATE PIPE ARCH SHALL BE PLACED WITH 2:1 BEVELS ON PIPE ENDS.
4. INSTALL CAST-IN-PLACE TYPE I HEADWALLS AT THE INLET AND OUTLET OF THE CULVERT PER ADOT&PF STANDARD DRAWING D-30.10.

PS&E REVIEW FEBRUARY 2019

STATE OF ALASKA
49TH
PROJECT ENGINEER
0000
REGISTERED PROFESSIONAL ENGINEER

R&M CONSULTANTS, INC.
9101 VANGUARD DRIVE
ANCHORAGE, AK 99507
(907) 522-1707
CERT. OF AUTH. NO. AECC111

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

SEWARD HWY: MP 100-105 IMPROVEMENTS & HSIP: CR TRAFFIC SAFETY CORRIDOR LEFT TURN LANES

BEAR CREEK REALIGNMENT AT AURIGA ROAD DETAILS

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game

DIVISION OF HABITAT
Southcentral Region Office

333 Raspberry Road
Anchorage, Alaska
Main: 907.267.2342
Fax: 907.267.2499

FISH HABITAT PERMIT FH19-II-0053

ISSUED: May 22, 2019
EXPIRES: Life of Project

Alaska Department of Transportation and Public Facilities
Attn: Bob Effinger
P.O. Box 196900
Anchorage, AK 99519-6900

Re: Bridge Replacement
Indian Creek (Water Body No. 247-60-10290)
Section 5, T 10 N, R 1 W, SM
Location: 60.9851 N, 149.5011 W

Dear Mr. Effinger:

Pursuant to AS 16.05.871(b), the Alaska Department of Fish and Game, Division of Habitat, has reviewed the Alaska Department of Transportation and Public Facilities (ADOT&PF) proposal to replace the existing bridge over Indian Creek (Bridge No. 644) (Location Map). The existing bridge does not meet current seismic standards. The bridge replacement is part of the Seward Highway Mile Post 100-105 improvement project.

Project Description
You propose to replace the existing 165-foot long bridge with a 210-feet long bridge supported by two piers. One pier will consist of five 3-foot diameter steel piles driven into the streambed below the ordinary high water mark (OHW) of Indian Creek (Sheets 3 and 4). One pier will be placed above the OHW. The piles will be driven to design depth using vibratory or impact pile driving methods. The bridge abutments will each consist of five 1.2-foot diameter steel piles located above the OHW. Class II riprap will be placed around the bridge abutments above and below OHW. A pedestrian pathway will be installed under the new bridge on the south side of Indian Creek.

A temporary traffic detour bridge will be installed adjacent to the existing bridge downstream of the existing bridge. Installation of the temporary bridge will require installing temporary piles below OHW (Sheet 8). The actual number and diameter of temporary piles located below OHW will be determined by the contractor. Temporary piles will be driven to design depth using

vibratory or impact pile driving methods. Once the old bridge has been removed and construction of the new bridge is complete, temporary piles and other temporary construction materials located below OHW will be removed.

Before demolition begins, a containment system will be placed under the bridge to catch falling debris. Once the containment system is in place, the asphalt and bridge railings will be removed and the concrete deck will be cut into pieces and transferred off-site via truck. Existing piles will be cut or broken using heavy equipment or possibly vibrated out of the sediment. Piles that are not removed will be cut or broken off at or below the bottom elevation of the channel and will be covered with mud from the tide. In-water demolition activities will be limited to low tide conditions whenever possible.

The new bridge will require the realignment of an unnamed tributary to Indian Creek. About 325 linear feet will be realigned to match the channel length, slope, and conveyance capacity of the existing channel (Sheets E-19 and E-20). The new channel segment will be constructed in dry conditions separate from the flow of the existing channel. The rip rap mix for the stream scour protection will include sufficient fines to seal the voids and reduce sub-surface flow. Existing woody and herbaceous vegetation bordering the new channel will be maintained. All remaining disturbed areas will be stabilized with topsoil and native seed. Fish will be removed from the existing stream channel prior to water diversion and returned to Indian Creek in accordance with a valid Aquatic Resource Permit.

Anadromous Fish Act
Water Body No. 247-60-10290 has been specified as being important for the spawning, rearing, or migration of anadromous fishes pursuant to AS 16.05.871(a). The water body provides habitat for Chinook, coho and pink salmon.

In accordance with AS 16.05.871(d), your project is approved subject to the project description, the following stipulations and the permit terms.

1. All instream activity below OHW will be conducted from October 15 to May 15 unless otherwise authorized by the Division of Habitat.

2. A temporary impacts plan describing the number of piles, diameter, and timing for in water work below OHW associated with the installation of the temporary bridge shall be provided to the Division of Habitat for review and approval (postal mail or email william.frost@alaska.gov) a minimum of two weeks prior to construction.

3. Bridge construction and demolition shall be conducted in a manner which avoids the introduction of sediments, contaminants, or other materials into the water of Indian Creek both during and after the project.

4. All bank cuts, slopes, fills, and other exposed earthwork arising from the bridge installation, demolition and maintenance shall be stabilized to prevent erosion which may occur during and after the project.

5. No fuel shall be stored, no vehicles shall be fueled or serviced, and vehicles leaking fuel, hydraulic fluids, or other pollutants shall not be operated below OHW of Indian Creek.

Permit Terms

This letter constitutes a permit issued under the authority of AS 16.05.871 and must be retained on site during project activities. Please be advised that this determination applies only to activities regulated by the Division of Habitat; other agencies also may have jurisdiction under their respective authorities. This determination does not relieve you of your responsibility to secure other permits; state, federal, or local. You are still required to comply with all other applicable laws.

You are responsible for the actions of contractors, agents, or other persons who perform work to accomplish the approved project. For any activity that significantly deviates from the approved plan, you shall notify the Division of Habitat and obtain written approval in the form of a permit amendment before beginning the activity. Any action that increases the project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any provision contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of the Division of Habitat. Therefore, we recommend you consult the Division of Habitat immediately before considering any deviation from the approved plan.

You shall give an authorized representative of the state free and unobstructed access to the permit site, at safe and reasonable times, for the purpose of inspecting or monitoring compliance with any provision of this permit. You shall furnish whatever assistance and information the authorized representative reasonably requires for monitoring and inspection purposes.

In addition to the penalties provided by law, this permit may be terminated or revoked for failure to comply with its provisions or failure to comply with applicable statutes and regulations. You shall mitigate any adverse effect upon fish or wildlife, their habitats, or any restriction or interference with public use that the commissioner determines was a direct result of your failure to comply with this permit or any applicable law.

You shall indemnify, save harmless, and defend the department, its agents, and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from permitted activities or your performance under this permit. However, this provision has no effect if, and only if, the sole proximate cause of the injury is the department's negligence.

You may appeal this permit decision relating to AS 16.05.871 in accordance with the provisions of AS 44.62.330-630.

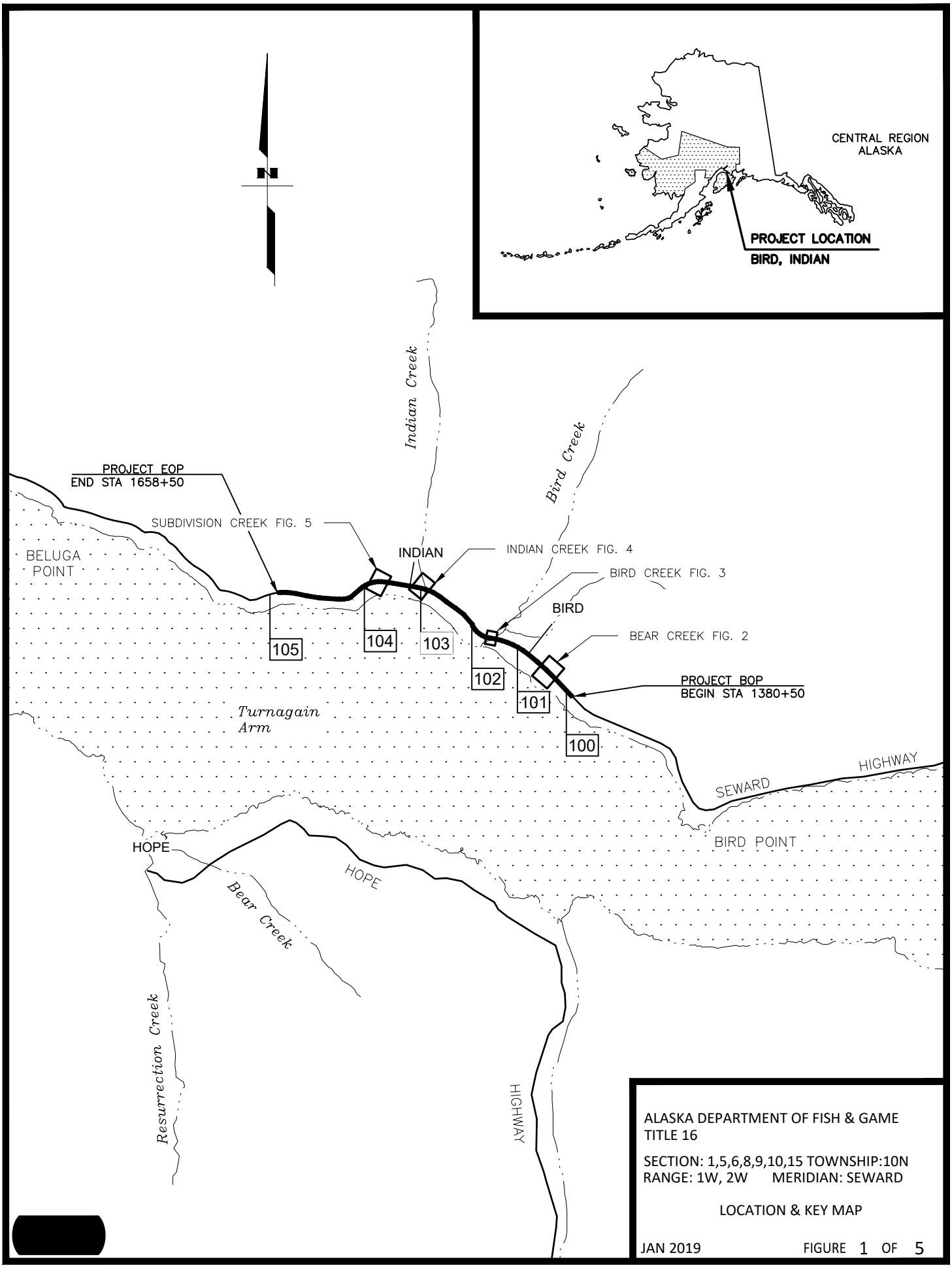
Please direct questions about this permit to Habitat Biologist Habitat Biologist Will Frost at 267-2813 or emailed to william.frost@alaska.gov.

Sincerely,
Doug Vincent-Lang
Commissioner

By Ron Benkert
Southcentral Regional Supervisor

encl: Location Map
Sheets 3 and 4, Sheet 8, N-19, and N-20

ecc: A. Ott, ADF&G
J. Baumer, ADF&G
J. Clark, ADF&G
J. Rypkema, ADEC
C. Larson, ADNR
AWT, Anchorage
H. Brooks, ADNR
T. Tobish, MOA
S. Ellis, MOA
Kendra Holman, USACE



ALASKA DEPARTMENT OF FISH & GAME
TITLE 16

SECTION: 1,5,6,8,9,10,15 TOWNSHIP:10N
RANGE: 1W, 2W MERIDIAN: SEWARD

LOCATION & KEY MAP

JAN 2019 FIGURE 1 OF 5

Z:\project\2129.00 DOT_C Seward Hwy MP 99 105\Civil\ACAD\Figures\ADF&G\ADFG Stream Figures.dwg

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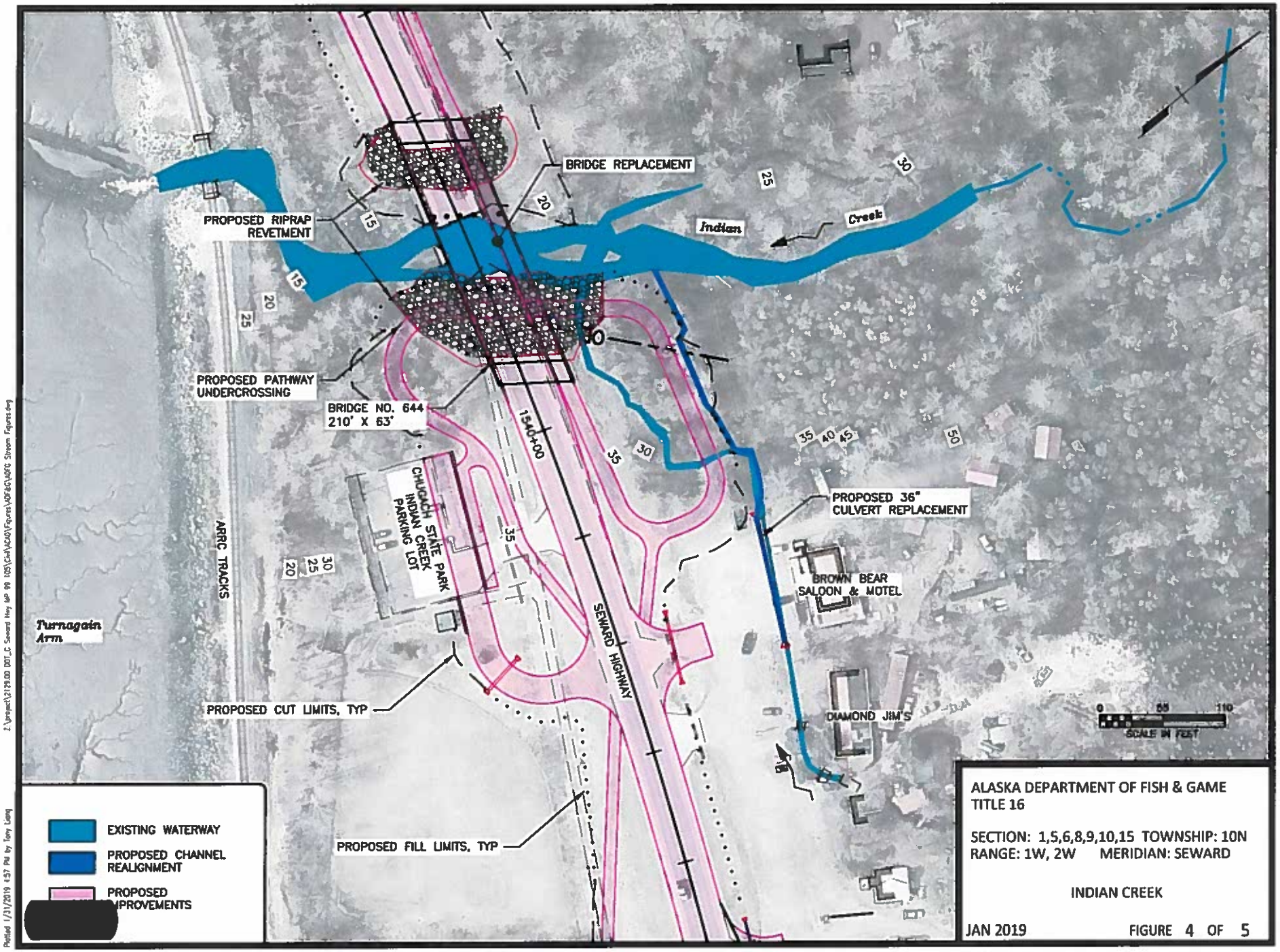


ALASKA DEPARTMENT OF FISH & GAME
TITLE 16

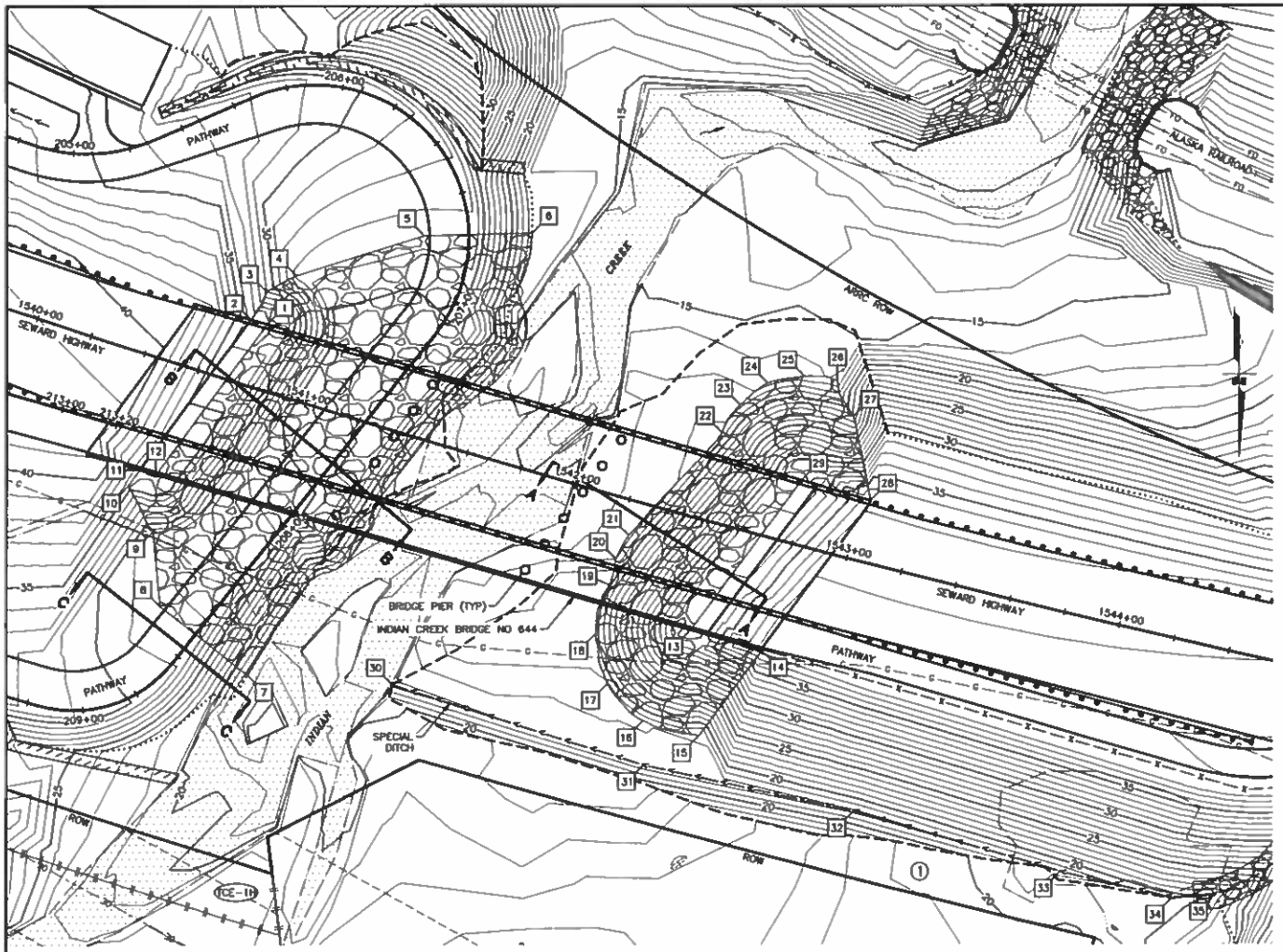
SECTION: 1,5,6,8,9,10,15 TOWNSHIP: 10N
RANGE: 1W, 2W MERIDIAN: SEWARD

INDIAN CREEK

JAN 2019 FIGURE 4 OF 5

Plotted: 1/31/2019 4:57 PM by Tony Liang

STATE	PROJECT DESIGNATION	YEAR	SHEET NO	TOTAL SHEETS
ALASKA	0A31056/CTHWY00011	2019	N6	N29



RIPRAP LAYOUT SCHEDULE

POINT	STATION	OFFSET	ELEVATION	REMARKS
1	1540+76.32	23.05 LT	33.56	
2	1540+72.30	22.93 LT	33.55	
3	1540+74.39	34.38 LT	31.00	
4	1540+82.80	42.77 LT	26.77	
5	1541+22.55	69.71 LT	26.33	
6	1541+59.75	81.66 LT	16.38	
7	1541+08.69	98.58 RT	17.57	
8	1540+72.55	84.33 RT	28.29	
9	1540+62.10	59.63 RT	28.52	
10	1540+48.96	46.73 RT	35.51	
11	1540+51.06	40.09 RT	35.37	
12	1540+57.01	39.94 RT	35.37	
13	1542+53.33	39.32 RT	33.08	
14	1542+79.48	39.88 RT	38.40	
15	1542+85.82	74.98 RT	18.12	
16	1542+45.78	74.79 RT	18.22	
17	1542+30.29	65.48 RT	18.91	
18	1542+21.60	49.62 RT	19.59	
19	1542+21.64	31.41 RT	19.85	
20	1542+20.91	21.65 RT	17.94	
21	1542+23.24	12.45 RT	17.53	
22	1542+45.37	31.58 LT	18.31	
23	1542+49.08	42.80 LT	17.59	
24	1542+56.52	52.86 LT	16.61	
25	1542+68.69	58.61 LT	16.37	
26	1542+80.44	60.05 LT	16.09	
27	1542+89.22	49.21 LT	21.20	
28	1543+02.90	22.02 LT	38.85	
29	1542+77.33	22.69 LT	31.55	
30	1541+58.00	87.00 RT	16.77	END SPECIAL DITCH
31	1542+50.00	90.00 RT	17.31	SPECIAL DITCH
32	1543+25.00	87.00 RT	17.75	SPECIAL DITCH
33	1544+00.00	90.00 RT	18.19	SPECIAL DITCH
34	1544+40.00	90.00 RT	19.62	SPECIAL DITCH
35	1544+54.52	85.51 RT	20.16	BEGIN SPECIAL DITCH

HYDROLOGIC & HYDRAULIC SUMMARY

FLOOD FREQUENCY (YR)	50	100	500
ANNUAL EXCEEDANCE PROBABILITY (%)	2	1	0.2
DISCHARGE (CFS)	1,320	1,520	2,010
WATER SURFACE ELEVATION (FT)	22.2	22.5	23.1
DESIGN HIGH WATER ELEVATION* (FT)	-	25.5	-
ANTICIPATED ADDITIONAL BACKWATER (FT)	0.4	0.4	0.4
ABUTMENT SCOUR (FT)	0.0	0.0	0.0
CONTRACTION SCOUR (FT)	3.5	3.8	4.5
PIER SCOUR (FT)	4.6	4.8	5.1
DRAINAGE AREA: 16 SQUARE MILES			
WATER SURFACE ELEVATION LOCATION: 18 FT UPSTREAM OF PROPOSED BRIDGE			

GRAPHIC SCALE
20 0 20 40
(IN FEET)

NOTES:

1. CONTOURS SHOWN ARE FINISHED GRADE PASTED INTO EXISTING GROUND AT 1' INTERVALS.

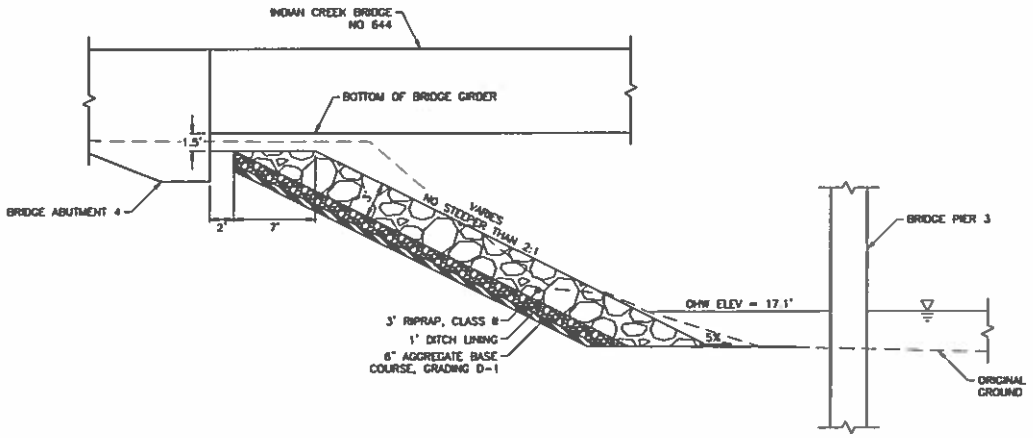
DESIGNED BY: ZZZZ	CHECKED: ZZZZ	PLANS DEVELOPED BY: R&M CONSULTANTS, INC. 9101 VANGUARD DR ANCHORAGE, AK 99507 (907) 522-1707 CERT. OF AUTH. NO. AECC111
DRAWN BY: M FRUTCHEY	CHECKED: ZZZZ	
QUANTITIES BY: ZZZZ	CHECKED: ZZZZ	

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION

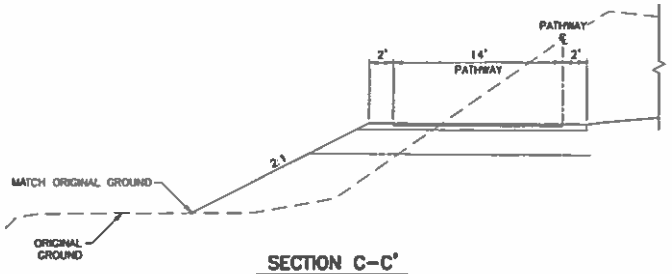
INDIAN CREEK BRIDGE
SEWARD HIGHWAY
RIPRAP LAYOUT

BRIDGE NO. 644
DWG. NO. 3

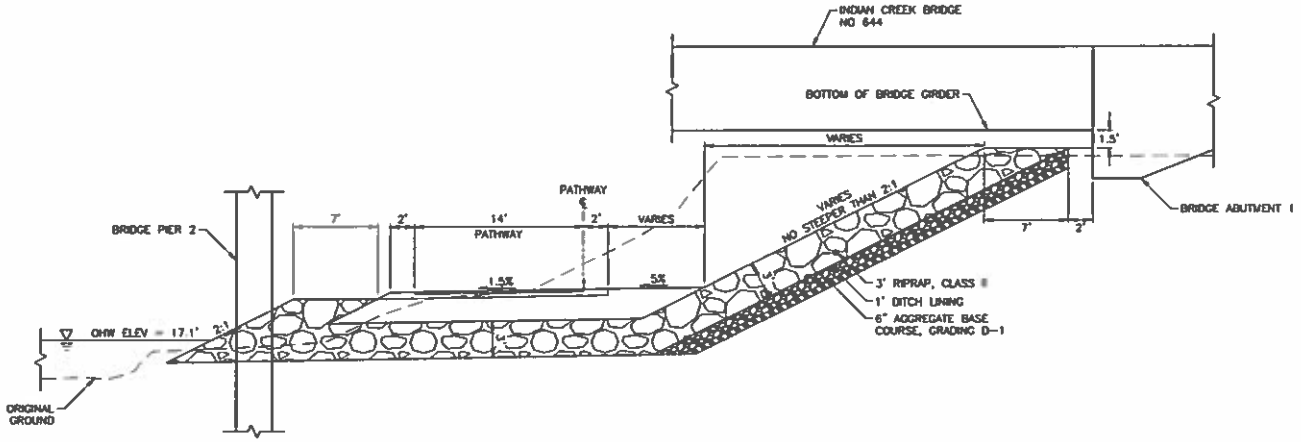
STATE	PROJECT DESIGNATION	YEAR	SHEET NO	TOTAL SHEETS
ALASKA	0A31056/CFHWY00011	2019	N/F	N29



SECTION A-A'



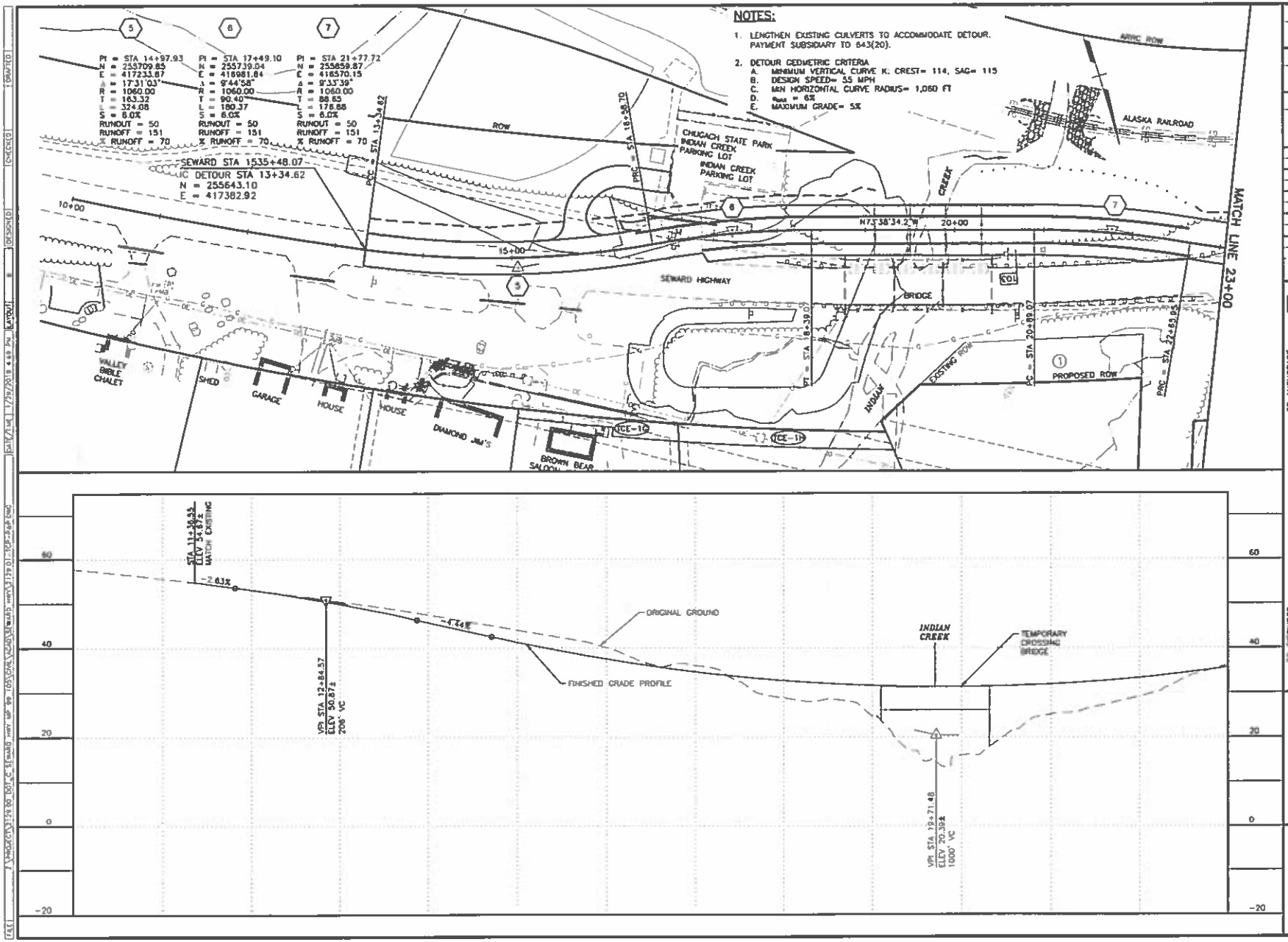
SECTION C-C'



SECTION B-B'

STA 206+75 TO STA 208+50

DESIGNED BY: xxxx	CHECKED: xxxx	PLANS DEVELOPED BY: R&M CONSULTANTS, INC. 9101 VANGUARD DR ANCHORAGE, AK 99507 (907) 522-1707 CERT. OF AUTH. NO. AECC111		STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES BRIDGE SECTION		INDIAN CREEK BRIDGE SEWARD HIGHWAY RIPRAP DETAILS	BRIDGE NO. 644 DWG. NO. 4
DRAWN BY:	CHECKED: xxxx						
QUANTITIES BY: xxxx	CHECKED: xxxx						



SHEET NO.	TOTAL SHEETS
8	9
STATE	YEAR
ALASKA	2019

PROJECT DESIGNATION
DA31056/CFHWY00011
0001497/Z570680000

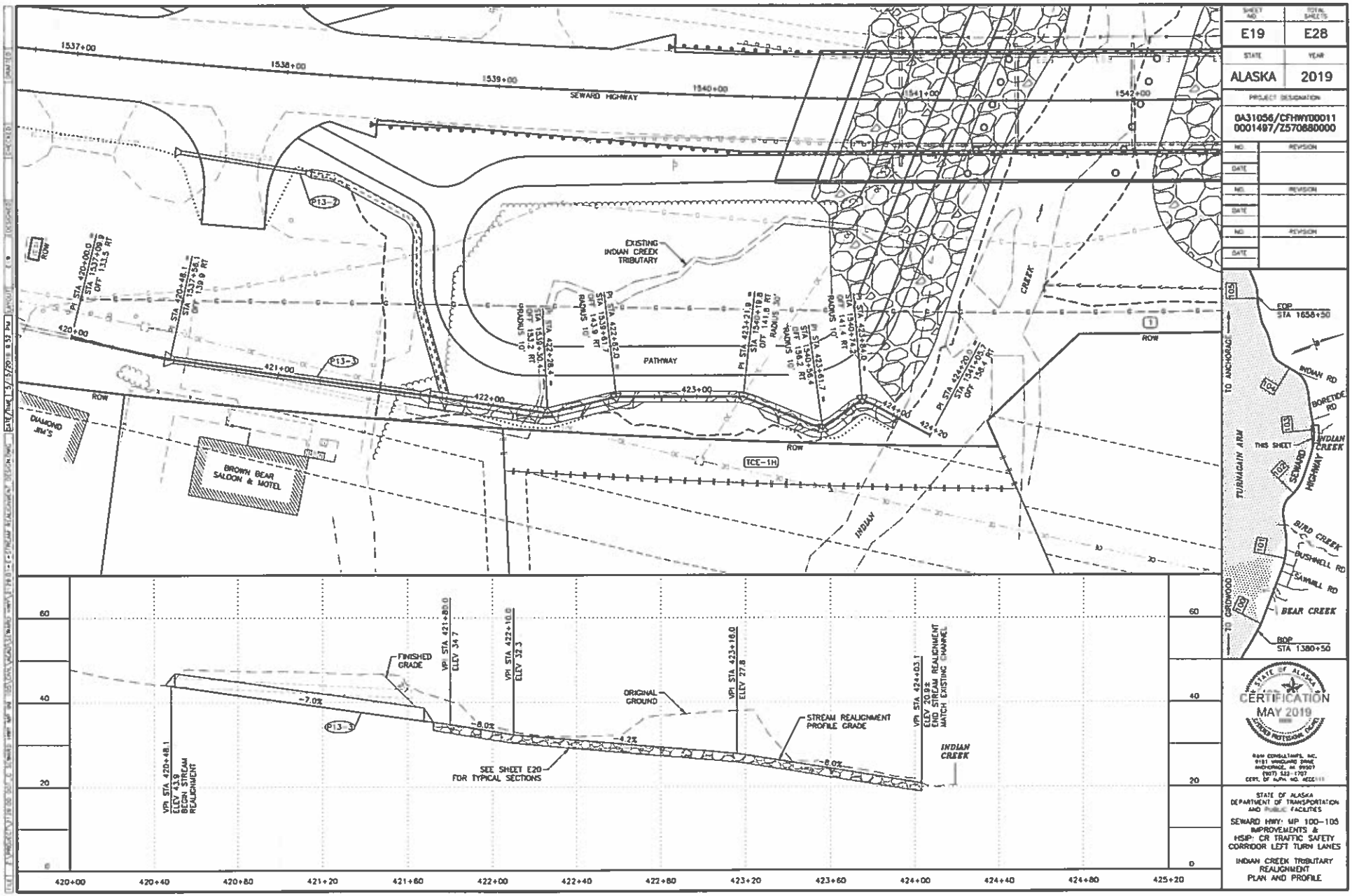
NO.	REVISION
DATE	
NO.	REVISION
DATE	
NO.	REVISION

PS&E REVIEW
FEBRUARY 2019

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SEWARD HWY: MP 100-105
IMPROVEMENTS &
HSIP: CR TRAFFIC SAFETY CORRIDOR LEFT TURN LANES

INDIAN CREEK DETOUR
STA 10+00-23+00



SHEET NO.	TOTAL SHEETS
E19	E28
STATE	YEAR
ALASKA	2019

PROJECT DESIGNATION
0A31056/CFHWY00011
0001497/Z570880000

NO.	REVISION
DATE	
NO.	REVISION
DATE	
NO.	REVISION
DATE	

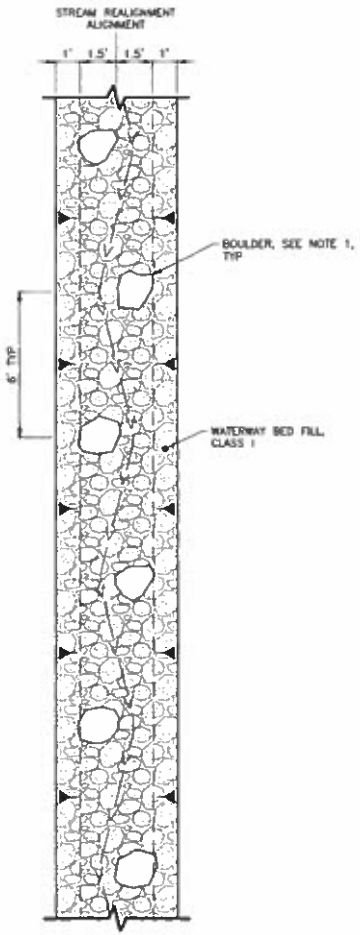
STATE OF ALASKA
CERTIFICATION
MAY 2019
REGISTERED PROFESSIONAL ENGINEER

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SEWARD HWY: MP 100–105
IMPROVEMENTS &
HSIP: CR TRAFFIC SAFETY
CORRIDOR LEFT TURN LANES

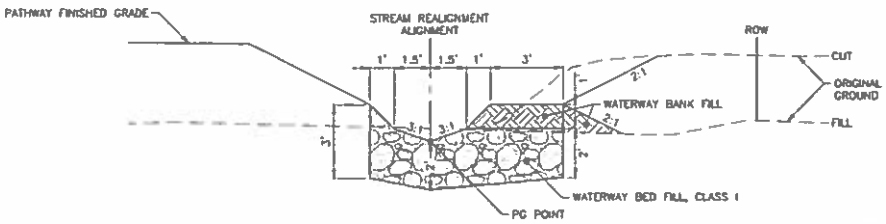
INDIAN CREEK TRIBUTARY
REALIGNMENT
PLAN AND PROFILE

NO	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
			ALASKA	0A31056/CFHWY00011 0001497/Z570680000	2019	E20	E28



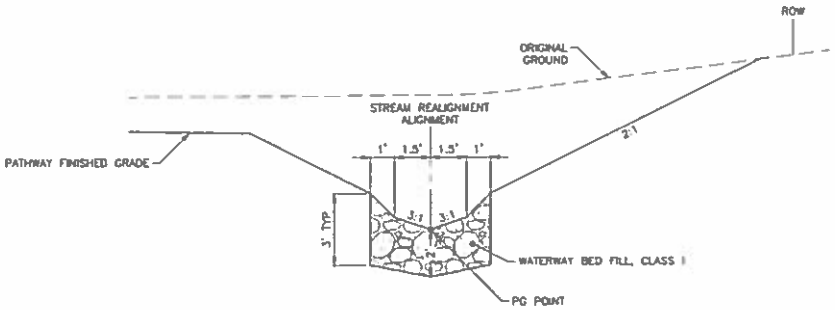
OPEN CHANNEL PLAN

STA 421+72 TO STA 424+03



OPEN CHANNEL TYPICAL SECTION

STA 421+72 TO STA 422+75
STA 423+30 TO STA 424+03



OPEN CHANNEL TYPICAL SECTION

STA 422+75 TO STA 423+30

NOTES:

1. PLACE 200 POUND BOULDERS AT SPACING SHOWN IN PLAN. BOULDERS SHALL BE EMBEDDED 50% IN WATERWAY BED FILL, CLASS I.

CERTIFICATION
MAY 2019

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

SEWARD HWY: MP 100–105 IMPROVEMENTS & HSIP: CR TRAFFIC SAFETY CORRIDOR LEFT TURN LANES

INDIAN CREEK TRIBUTARY REALIGNMENT DETAILS

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Environmental Conservation

DIVISION of Water
Anchorage

555 Cordova Street
Anchorage, AK 99501
Main: 907.269.6285
Fax: 907.334.2415
www.dec.alaska.gov

9/29/2020

Derek Betts, VP Alaska Region
Granite Construction Company
11471 Lang St.
Anchorage, AK 99515

Wolfgang Junge, Regional Director
Alaska Department of Transportation and Public Facilities
P.O. Box 196900
Anchorage, AK 99519

SUBJECT: APDES Inspection of Seward Hwy MP 114-Dimond Pavement Preservation Project, Authorization Numbers AKR10GF44 & AKR10GF48

Dear Sirs:

Per the Alaska Pollutant Discharge Elimination System, an inspection of the Seward Hwy MP 114-Dimond Pavement Preservation Project was conducted on September 1, 2020. We would like to provide you with a copy of the inspection report for your records. Thank you for your cooperation and assistance regarding this inspection and for your efforts in protecting human health and the environment.

Sincerely,

Monica Boyer

Monica Boyer, Environmental Program Specialist III
Credential No. R-0321

Check One:
( ) Personally Served
( ) Sent by Certified Mail
(X) Sent by email on the 29th day of September 2020

Enclosure: Inspection Report

cc: DEC.Water.APDESData@alaska.gov
Tiffany Larson, DEC; Alex Shahrokhi, DEC

APDES INSPECTION REPORT

Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street, Anchorage, AK 99501

Section 1: General Data

Authorizations/Permit Numbers		Announced / Unannounced	Receiving Waters	Inspection Date
Number: AKR10GF44	Number: AKR10GF48	Announced	Potters Marsh, Potters Creek, Little Survival Creek, Rabbit Creek, Cook Inlet	Date: 9/1/2020
Effective: 4/25/2020	Effective: 4/30/2020			Entry Time: 5:00pm
Expiration: 1/31/2021	Expiration: 1/31/2021			Exit Time: 7:30pm

Section 2: Facility Data

Name of Facility: Seward Hwy MP 114-Dimond Pavement Preservation

Contact information for owner/operator listed in AKR10GF44, NOI: OWNER: Granite Construction Company (GCC) OPERATOR: Derek Betts Title: VP Alaska Region Mailing Address: 11471 Lang St. Anchorage, AK 99515 Phone: (907) 344-2593 Email: derek.betts@gcinc.com	Contact information for owner/operator listed in the AKR10GF48, NOI: OWNER Alaska Department of Transportation and Public Facilities (AK DOT & PF) OPERATOR: Wolfgang Junge Title: Regional Director Address: P.O. Box 196900 Anchorage, AK 99519 Phone: (907) 269-0770 Email: wolfgang.junge@alaska.gov
Contact information for AKR10GF44 SWPPP onsite contact: OWNER: GCC Name: Michael Himler Title: Project Superintendent Mailing Address: 11471 Lang St. Anchorage, AK 99515 Phone: (907) 229-7289 Email: michael.himler@gcinc.com	Contact information for AKR10GF48 SWPPP onsite contact: OWNER: ADOT & PF Name: Chong Kim Title: Project Engineer Mailing Address: 8200 Homer Dr. Suite F Anchorage, AK 99518 Phone: (907) 770-2612 Email: chong.kim@alaska.gov
Latitude/Longitude of the outfalls: Discharge point 1: 61.0504/-149.7951. Near Potters Creek, per Drawing Sheet ESCP5 Discharge point 2: 61.047/-149.7932. Near Rabbit Creek, per Drawing Sheet ESCP9	*For internal use only:* *SIC: 1611*

Discharge point 3: 61.109/-149.8499. Near Huffman Rd, per Drawing Sheet ESCP14, *added on 5/8/2020 through a SWPPP modification	

Inspection Participants:

Department of Environmental Conservation (DEC): Monica Boyer, Shane Serrano
GCC: Mike Himler, David Laster, Alex Else, Mark Credito
ADOT & PF: Chong Kim, Joshua James
EMC Engineers, LLC: Cedar Bevis

Section 3: Findings

Background/Regulatory Status/Compliance History

The Seward Hwy MP 114-Dimond Pavement Preservation (project) encompasses 42 acres stretching 8.4 miles between Mile Post 114 of the Seward Highway and Dimond Boulevard (Blvd.) in the City of Anchorage, owned by the State of Alaska. Day-to-day construction operations are managed between GCC and AK DOT & PF. Construction activities include milling and repaving, culvert repair, the replacement or new installation of signs, markings and rails and metalizing a pedestrian bridge. Additional activities include grading and seeding.

Storm water discharges from the site are permitted by the Department of Environmental Conservation (DEC) per the Alaska Pollutant Discharge Elimination System (APDES) under the Construction General Permit (CGP) AKR100000 (Permit), authorization numbers AKR10GF44 & AKR10GF48. While storm water flows aren't expected to leave the construction sites, control measures and best management practices (BMPs) were planned and enacted to prevent or dissipate the flow of storm water from entering the creeks and marshes.

Several water bodies are listed as receiving waters for the project; Potters Marsh, Potters Creek, Little Survival Creek, Rabbit Creek and the Cook Inlet. Of the water bodies listed, Little Survival Creek and Rabbit Creek are both listed as impaired under Category 4a, fecal coliform bacteria from urban run-off, under the Clean Water Act, Section 303(d). Although the above listed creeks are noted as impaired, the impairments applicable to projects authorized under the CGP are turbidity and sediment. It is not expected that storm water discharges to the creeks contribute to the parameters which they are impaired.

The purpose of this inspection was a routine site visit to determine compliance with the CGP. This is the first inspection for authorizations AKR10GF44 & AKR10GF48 by the DEC. The inspection covers the authorizations earliest effective date of 4/25/2020 through the date of the inspection on 9/1/2020.

Field Inspection

Upon arrival at the site, introductions were exchanged, and inspector credentials were presented. The inspection began with an interview session, then a records review, followed by a tour of the site and ended with a close-out discussion. Prior to the inspection, a review of the Storm Water Pollution Prevention Plan (SWPPP) submitted by each permittee in 2020 was conducted by DEC personnel. An electronic file review, prior to the inspection was also conducted.

The following information was provided verbally by the onsite representatives:

- Construction started in early June 2020,
- Construction activities were divided into three (3) phases. At the time of the inspection, the project had progressed to phase 3,
- The project is outside the limits of the Municipality of Anchorage MS4 system,
- The project is expected to be completed on time, mid-October 2020,
- Routine site inspections are conducted every seven (7) days,

    - The SWPPP Manager and Storm Water Lead conduct inspections for GCC,
    - The SWPPP Storm Water Inspector conducts inspections for AK DOT & PF,
- The Contractor's Superintendent signs reports for GCC,
- The Project Engineer signs reports for AK DOT & PF,
- The stream diversion and replacement of the culvert at Rabbit Creek had taken place,
- A Fish Habitat Permit was issued to AK DOT & PF for the culvert repair,
- The metallization of the pedestrian walk bridge had taken place,
- Milling had taken place,
- Several areas to be repaved are pending completion,
- The installation or replacement of signs, markings and rails is pending completion,
- BMPs such as silt fencing and fiber rolls (temporary BMPs) are still in place at some locations,
- At several locations, the vegetative areas were stabilized by seeding. Fertilizers were applied,
- Water used for dust control was provided by GCC,
- A material washout station was utilized. The pre-formed washout station was hauled to GCC for disposal,
- No chemicals were stored at any of the staging areas. Construction debris was contained and hauled to GCC for disposal,
- Fueling took place at staging areas. Fueling was limited to GCC and AK DOT & PF vehicles only.

The following observations were made by DEC inspectors:

- SWPPP signage at both the beginning and end of the project were posted. Both authorization numbers were noted (photos 1 & 2),
- Discharge point 2 (photos 3 to 7):
    - A delineation fence was placed between the railroad and vegetative buffer; south-bound lane,
    - The vegetative buffer at the culvert replacement site has been reestablished,
    - Silt fencing, fiber rolls, socks and matting remain in place. No evidence of sediment entering the creek,
    - Reference: Sheet drawing ESCP9. Drawing includes updated BMPs,
- Pullout, adjacent to Potters Marsh (photos 8 to 11):
    - Repaving had been completed,
    - The vegetative buffer between the pavement and stone and the marsh has been reestablished,
    - Silt fencing, fiber rolls, socks and matting remain in place. No evidence of sediment or gravel entering the marsh,
    - Reference: Sheet drawing ESCP7. Drawing includes updated BMPs,
- Discharge point 1: (photo 12)
    - Repaving of the 2-lane highway has been completed,
    - Aprons at Potter Valley Rd. and parking area for the Turnagain Arm Trail have been completed,
    - Reference: Sheet drawing ESCP5,
- 2-lane, repaving sites between Potter Marsh and Dimond Blvd. are at different stages (photos 13 to 18),
    - Repaved; near Weigh Station,
    - Milled, prepped for membrane and repaving; near Huffman Rd.,
    - Repaved and guardrails replaced. Prepped for striping; near O'Malley Rd.,
    - Reference: Sheet drawings ESCP 4, 14, 16,
- Metallized and pedestrian walk bridge, near Rabbit Creek Elementary School (photos 19 to 23),
    - Remetallization has been completed.; performed by a sub-contractor,
    - A delineation fence was placed between the sidewalk and vegetative buffer; north-bound,

- The area just below the bridge was hydroseeded. Vegetation has just begun to be established. No evidence of sediment entering the roadway,
- Fiber storm drain protectors remain in place,
- Secondary containment surrounded the portable toilet,
- Reference: Sheet drawing ESCP 12. Drawing includes updated BMPs,

- The areas visited appear free from oils or residue,
- No evidence of storm water run-off or channeling at the sites visited,
- No evidence of material wash-out, such as paint/concrete at the sites visited,
- No evidence that hazardous materials, chemicals or fertilizers stored on sites visited,
- No construction debris were found at the sites visited.

Sampling	**YES** ☐	**NO** ☒

n/a

Records Review

The following records were reviewed as part of the inspection and are considered complete:

- SWPPP and signed certifications (photos 24 to 26),
  - AKR10GF44, dated 4/27/2020
  - AKR10GF48, dated 4/24/2020
- Delegation forms (photos 27 & 28),
  - AKR10GF44, no date
  - AKR10GF48, dated 4/2/2020
- Copy of the CGP dated 12/29/2015 (photo 29),
- Notice of Intent (NOI) (photos 30 & 31),
  - AKR10GF44, dated 4/25/2020
  - AKR10GF48, dated 4/28/2020
- DEC letter of Authorization (photos 32 & 33),
  - AKR10GF44, dated 4/25/2020
  - AKR10GF48, dated 4/30/2020
- Site Map, revised 7/22/2020 (photo 34),
- SWPPP Modification Log, most recent date of 8/19/2020 (photo 35),
- Corrective Action Log, most recent date of 8/28/2020 (photo 36),
- Grading and Stabilization Log, recent date of 8/17/2020 (photo 37),
- Employee Training Log, most recent date of 8/20/2020 (photo 38),
- CESCL Certifications, most recent date of 8/19/2020 (photo 39),
- Rainfall Monitoring Data, most recent date of 8/31/2020 (photo 40),
- Inspection Reports, most recent date of (photos 41 to 44),
- Non-Compliance Notices (NCNs) (photo 45),
  - AKR10GF44: n/a
  - AKR10GF48: A NCN, dated 5/11/2020, was submitted to DEC due to the lack of CESCL training courses available for new applicants. The issue has since been resolved.
- Hazardous Materials Control Plan, dated 3/20/2020 (photo 46),
- Fish Habitat Permit, dated 5/21/2019 (photo 47)

Closing Conference

The following participants were present during the closing conference:

DEC: Monica Boyer
GCC: Mike Himler, David Laster, Alex Else, Mark Credito
ADOT & PF: Chong Kim, Joshua James
EMC Engineers, LLC: Cedar Bevis

Upon completion of inspection at the site, a closing conference was held. The DEC inspector provided the permittee with preliminary inspection findings. The inspector identified areas of concern and discussed follow-up procedures.

Section 4: Compliance

Violations

No violations were identified while onsite by either permittee.

Areas of Concern

1) Metallization of the pedestrian bridge near DeArmoun Road, was conducted by Graham Industrial Coatings LLC, a sub-contractor listed in SWPPP Part 1.2. The process of metallization included sandblasting to remove the former bridge covering and utilizing zinc at high temperatures, to complete the process. At the closing conference, DEC requested the submittal of the quality assurance plan utilized by the sub-contractor.
    a. On 9/8/2020, the Field Metallization Plan, approved by the AK DOT & PF on 5/22/2020 was submitted to DEC (photo 48).

Section 5: Appendixes

1) Photo Addendum

Signature

Inspector – Monica Boyer Credential Number: R-0321 Phone: (907) 269-7420 E-mail: monica.boyer@alaska.gov	X Monica Boyer Date: 9/25/2020
Reviewed By – Jon Wendel Credential Number: R-0317 Phone: (907) 465-5364 E-mail: jon.wendel@alaska.gov	X Jon Wendel Date: 9/23/2020

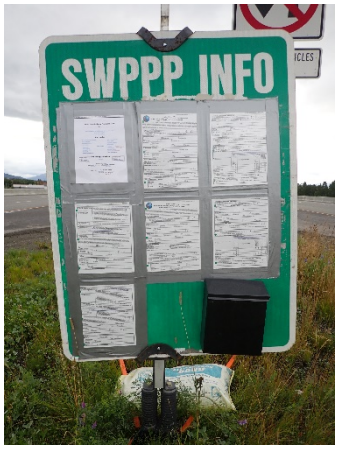
Photo Addendum	
Photo 01	**Photo 02**
	
SWPPP Sign, beginning of project	SWPPP Sign, end of project

Photo 03	**Photo 04**
	
Fencing between railroad and vegetative buffer, near discharge point 2	Culvert replacement, Rabbit Creek, discharge point 2. BMPs still in place, surrounding culvert.

Photo 05	**Photo 06**
	
Culvert replacement at Rabbit Creek, discharge point 2. BMPs still in place along water's edge, facing south. Vegetative buffer established.	Culvert replacement at Rabbit Creek, discharge point 2. BMPs still in place to protect below-grade components, north of culvert. Vegetative buffer established.

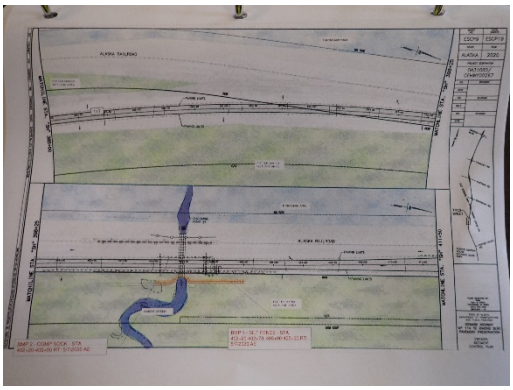
Photo Addendum	
Photo 07	**Photo 08**
	
Sheet drawing ESCP9, revised. Rabbit Creek area, discharge point 2	Pullout adjacent to Potters Marsh. Repaving complete.

Photo 09	**Photo 10**
	
Pullout adjacent to Potters Marsh. BMPs remain in place, facing south. No evidence of sediment or gravel entering the marsh.	Pullout adjacent to Potters Marsh. The vegetative buffer between the pavement and stone and the marsh has been reestablished, facing north.

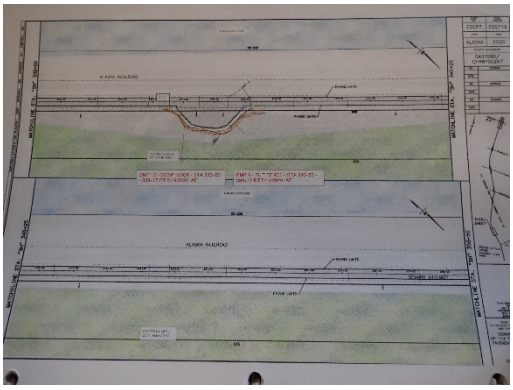
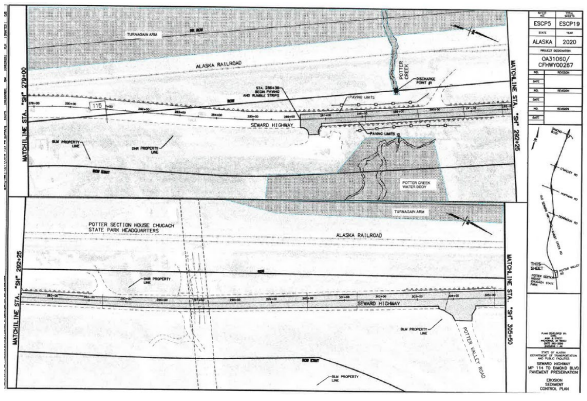
Photo 11	**Photo 12**
	
Sheet drawing ESCP7, revised. Potters Marsh area	Sheet drawing ESCP5. Potters Creek area, discharge point 1

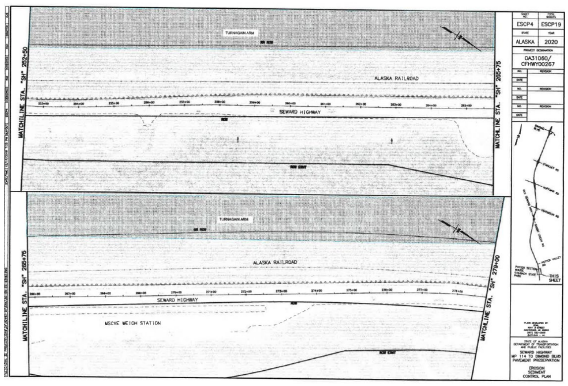
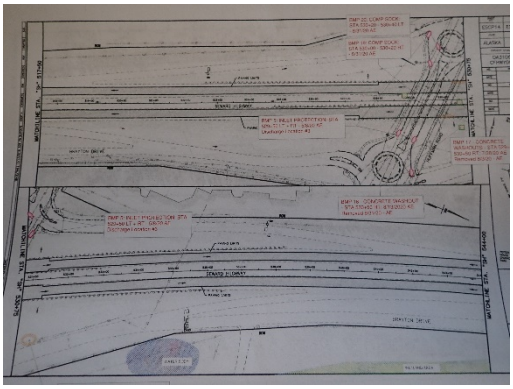
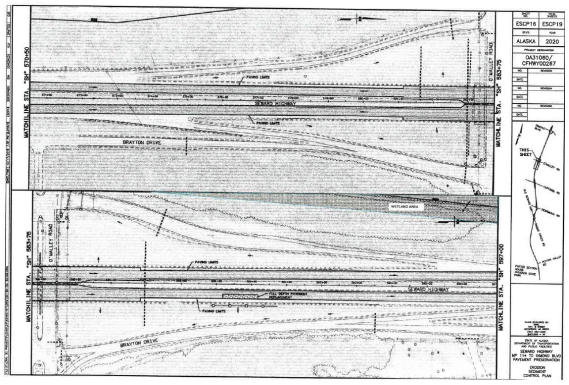
Photo Addendum	
Photo 13	**Photo 14**
	
Sheet drawing ESCP 4. Weigh station area.	Milled, prepped for membrane and repaving; near Huffman Rd.
Photo 15	**Photo 16**
	
Sheet drawings ESCP 14, revised. Huffman Rd. area. *Drawing also depicts new discharge point 3	Repaved and guardrails replaced. Prepped for striping; near O'Malley Rd
Photo 17	**Photo 18**
	
Repaved and guardrails replaced. Near O'Malley Rd.	Sheet drawings ESCP 16. O'Malley area.

Photo 19	**Photo 20**
	
Remetallized pedestrian bridge, near Rabbit Creek Elementary School.	Area below bridge had been hydroseeded. No evidence of sediment entering roadway

Photo 21	**Photo 22**
	
Storm drain below bridge; filter protectors remain in place	Secondary containment surrounded the portable toilet; below bridge, near Brayton Drive

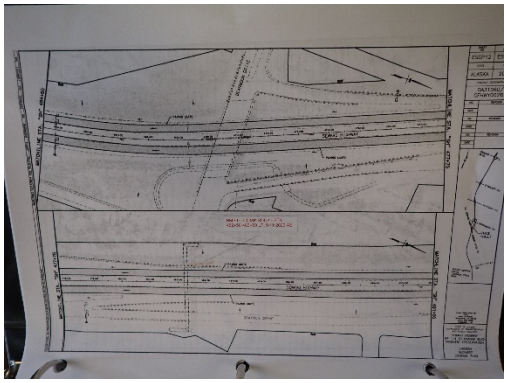
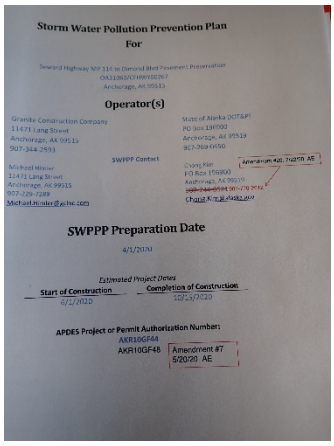
Photo 23	**Photo 24**
	
Sheet drawing ESCP 12, revised. Brayton Dr. and DeArmoun Rd. areas	SWPPP, cover revised

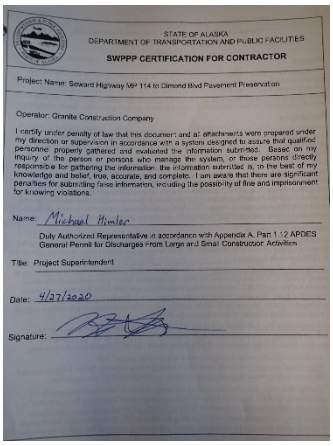
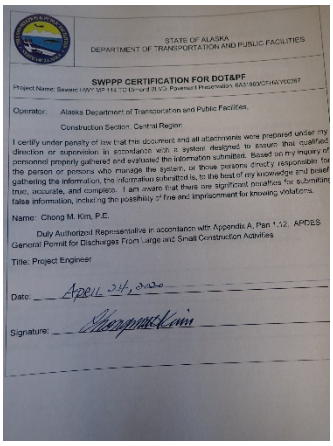
Photo 25	**Photo 26**
	
Signed certification, GCC	Signed certification, AK DOT & PF

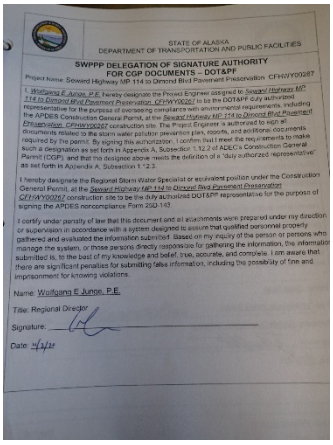
Photo 27	**Photo 28**
	
Signed delegated authority, GCC	Signed delegated authority, AK DOT & PF

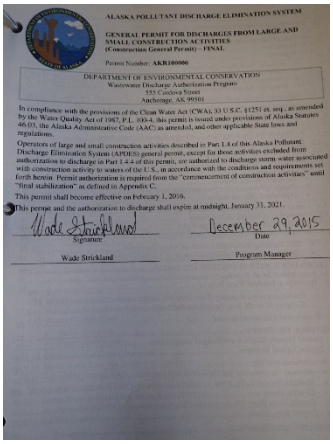
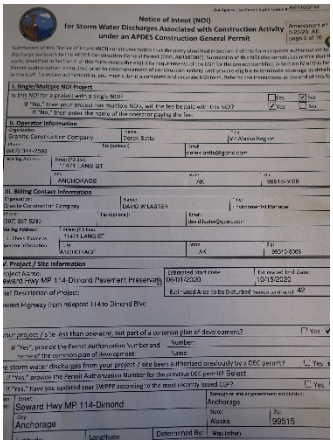
Photo 29	**Photo 30**
	
Copy of CGP	Signed NOI, GCC

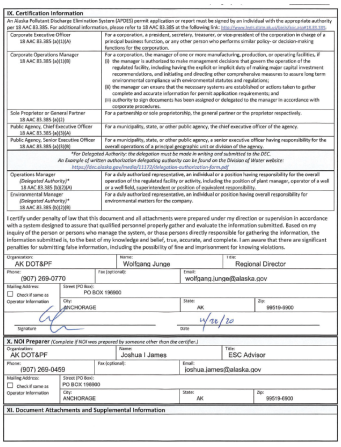
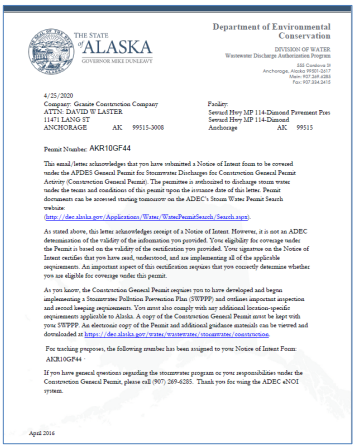
Photo 31	Photo 32
	
Signed NOI, AK DOT & PF	Authorization, GCC

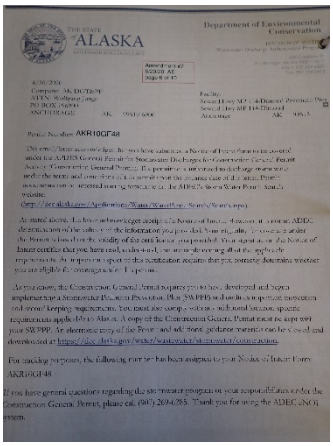
Photo 33	Photo 34
	
Authorization, AK DOT & PF	Site map, revised

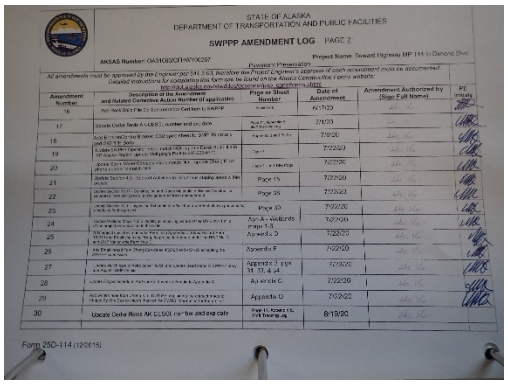
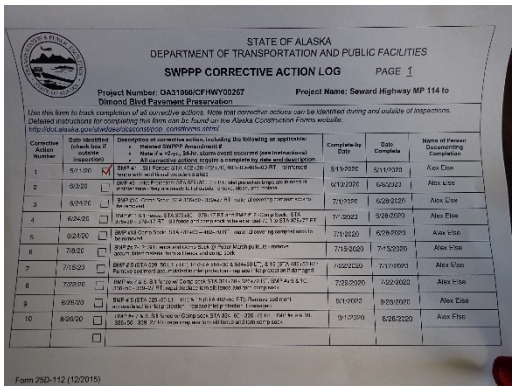
Photo 35	Photo 36
	
Modification log	Corrective action log

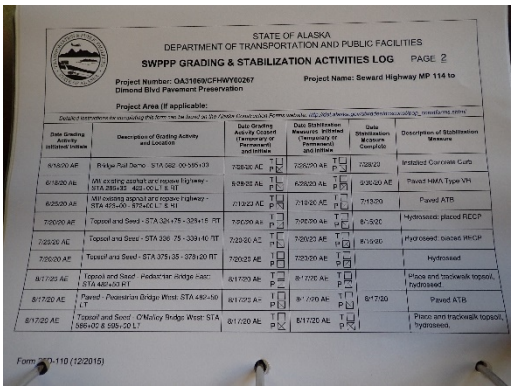
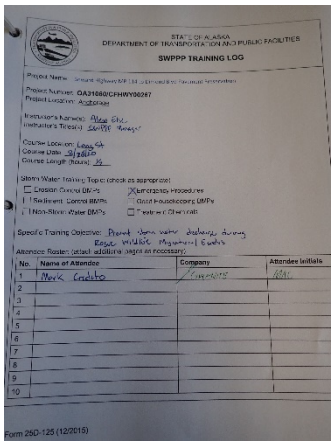
Photo 37	**Photo 38**
	
Grading and stabilization log	Employee training log

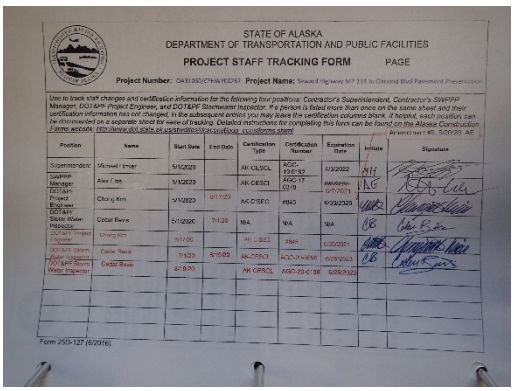
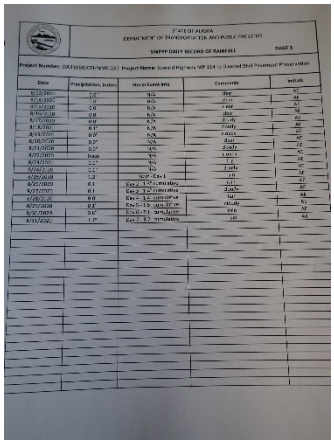
Photo 39	**Photo 40**
	
CESCL certification log	Rainfall records

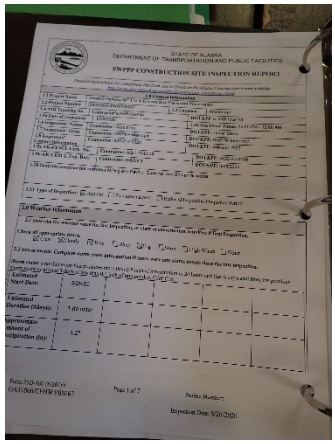
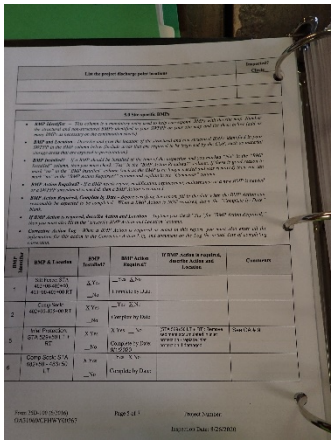
Photo 41	**Photo 42**
	
Inspection report, pg. 1	Inspection report, pg. 2

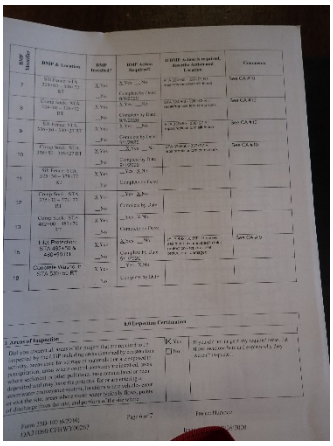
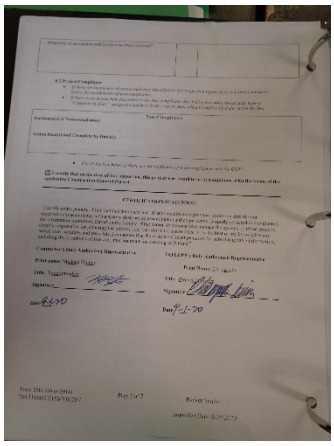
Photo 43	**Photo 44**
	
Inspection report, pg. 6	Inspection report, pg. 7

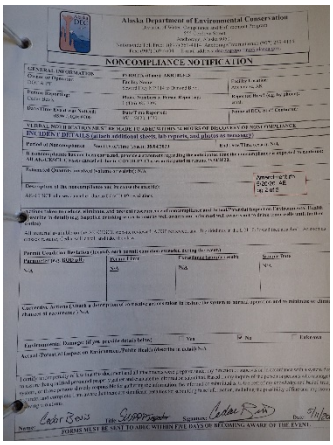
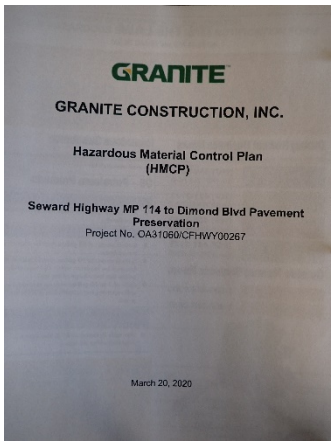
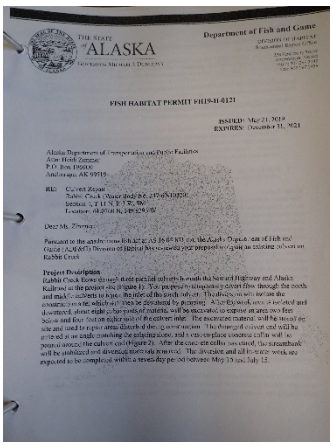
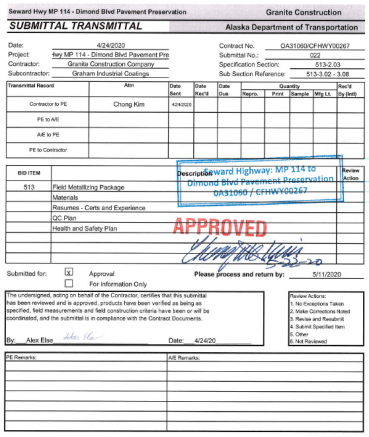
Photo 45	**Photo 46**
	
NCN, AK DOT & PF	Hazardous materials control plan

Photo 47	**Photo 48**
	
Fish habitat permit	Field metallization plan

Seward Hwy MP 114 - Dimond Blvd Pavement Preservation | **Granite Construction**

SUBMITTAL TRANSMITTAL

Alaska Department of Transportation

Date: 4/24/2020
Project: Hwy MP 114 - Dimond Blvd Pavement Pre
Contractor: Granite Construction Company
Subcontractor: Graham Industrial Coatings

Contract No. OA31060/CFHWY00267
Submittal No.: 022
Specification Section: 513-2.03
Sub Section Reference: 513-3.02 - 3.08

Transmittal Record	Attn	Date Sent	Date Rec'd	Date Due	Quantity Repro.	Quantity Print	Quantity Sample	Quantity Mfg Lt.	Rec'd By (Intl)
Contractor to PE	Chong Kim	4/24/2020							
PE to A/E									
A/E to PE									
PE to Contractor									

BID ITEM	Description	Review Action
513	Field Metallizing Package	
	Materials	
	Resumes - Certs and Experience	
	QC Plan	
	Health and Safety Plan	

Seward Highway: MP 114 to Dimond Blvd Pavement Preservation
OA31060 / CFHWY00267

APPROVED
5-22-20

Submitted for: [X] Approval [ ] For Information Only

Please process and return by: 5/11/2020

The undersigned, acting on behalf of the Contractor, certifies that this submittal has been reviewed and is approved, products have been verified as being as specified, field measurements and field construction criteria have been or will be coordinated, and the submittal is in compliance with the Contract Documents.

By: Alex Else Date: 4/24/20

Review Actions:
1. No Exceptions Taken
2. Make Corrections Noted
3. Revise and Resubmit
4. Submit Specified Item
5. Other
6. Not Reviewed

PE Remarks:	A/E Remarks:

GRAHAM
INDUSTRIAL COATINGS, LLC
Trust, Loyalty, Excellence!

A Woman-Owned, HubZone Alaska Company

1320 S. Industrial Way
Palmer, AK 99645
Phone: 907-745-1520
Fax: 907-745-1529
www.paintalaska.com

Submittal 513-2.01

Materials

---

1) **Section 1 – Metallic Wire**

2) **Section 2 – Clear Sealer**

3) **Section 3 – Abrasive Blast Media**

Thermion®

Data Sheet

TH700 Zinc

DESCRIPTION

TH700 is a pure zinc alloy drawn down to specific sizes within tightly maintained tolerances that can be heat treated to match clients request. Thermal spray is well known for its superior corrosion protection and can be found used in a number of industries such as Infrastructure, DOT, Maintenance, Bridge Fabrication Oil & Gas, Power Gen, Marine and Electrical to name a few.

TYPICAL DEPOSIT CHARACTERISTICS:

- Bond Strength — 500 psi +
- Typical Hardness — 80-85
- Deposit Rate — 18-189 lbs. per hr.
- Deposit Efficiency — 60-73%
- Wire Coverage — 2 sq. ft. per lbs. at 8-10 mils thick - **1.3sqft / lbs. @ 14mils:**
- Surface Finish — Textured **11,900/1.3*1.1 = 10,070lbs**

SURFACE PREPARATION:

Surface should be clean, white metal, with no oxides (rust), dirt, grease, or oil on the surface to be coated. NOTE: It is best not to handle surfaces after cleaning. Recommended method of preparation is, to grit blast with 24 mesh aluminum oxide, rough grind, or rough machine in a lathe. *Thermion recommends a 3.5 mil minimum anchor tooth profile.

Applications:

- I-Beams
- Dam Gates
- Piles
- Transmission Towers
- Frames
- Cabinets
- Bridges
- Wind Towers
- Pipe Condensers
- Any metal that is going to see a corrosive environment

NOMINAL CHEMICAL COMPOSITION (wt. %):

Sn	Cu	Pb	Cd	Fe	Zn
.0001	.0002	.0018	.0002	.0006	Remainder

RECOMMENDED SPRAY PARAMETERS:

Diameter	Air Pressure	Voltage	Amperage	Standoff
1/16", 3/32", 1/8", 3/16"	80-100 psi	30-33 volts	150-650 amps	6-8"

Parameters are typical and may vary depending on equipment used.

STANDARD SIZES & PACKAGING:

Diameter	Packaging	Drums
1/16" (1.6mm)	55#	550#
2mm	55#	550#
3/32" (2.3mm)	55#	550#
1/8" (3.175mm)	55#	550#
3/16" (4.76mm)	55#	550#

Sealers for Thermal Spray Metalizing

Thermal Spray Metalizing is a process where metallic particles are deposited on an abrasive blast cleaned steel surface to enhance corrosion protection. The surface created is very course and uneven and will have a high profile. Very often owners require the application of a clear sealer to protect the metallized surface and a subsequent pigmented finish coat for protection and aesthetic purposes. The sealer coat is designed to cover the peaks and valleys of the course metalized surface while maintaining some degree of profile to promote adhesion of subsequent top coats and to minimize outgassing.

Acceptable Sealers

METHOD	MACROPOXY© 920 PRE-PRIME	ARMORSEAL REXTHANE	MACROPOXY© 646 FAST CURE EPOXY
REX	B58T101/B58V10	B65C60	B58-600/ B58V600
	100% Solids Epoxy	Moisture Cured Urethane	Epoxy
COLOR	Clear/ Amber	Clear	Pigmented
	Recommended Spreading Rate		
WFT	1.5 – 2.0 mils 35-50 microns	1st Coat: Mist with 20 Min Flash 2nd Coat: 3.0 – 4.5 75-115 microns	1st Coat: Mist with 30 Min Flash 2nd Coat: 2.8 – 4.0 70-100 microns
DFT	1.5 -2.0 mils 35-50 microns	2.0 – 3.0 + mist coat 50-75 microns	2.0 - 3.0 + mist coat 50-75 microns
COVERAGE	800 – 1050 Sq. Ft./ Gal 19.6-25.2 m^2/L	350 – 537 Sq. Ft/ Gal 8.6-13.1 m^2/L	385 – 575 Sq. Ft./Gal 9.4-14.1 m^2/L
DRY SCHEDULE	@ 77°F (25°C) 50% RH – other temperatures as listed on Product Data Sheet		
WFT	2 Mils Wet	3 Mils Wet	4 Mils Wet
TO TOUCH	9.5 Hours	2 Hours	1 Hour
TACK FREE	17 Hours	24 Hours	4 Hours
RECOAT MIN	12 Hours	9 Hours	4 Hours
RECOAT MAX	30 Days	14 Days	1 Year

Data Pages

ArmorSeal Heavy Duty Floor Coatings

ARMORSEAL® REXTHANE™ I

B65-60 SERIES

Revised: April 16, 2020

PRODUCT INFORMATION

8.51

RECOMMENDED SYSTEMS

		Dry Film Thickness / ct. Mils	(Microns)
Concrete:			
1 ct.	ArmorSeal 1000 HS, reduced 10%	1.5-2.0	(40-50)
1-2 cts.	ArmorSeal Rexthane I	2.0-3.0	(50-75)
Concrete-smooth:			
2 cts.	ArmorSeal Rexthane I	2.0-3.0	(50-75)
Steel with Zinc Metalizing*:			
1 ct.	ArmorSeal Rexthane I Clear, mist coat, reduced 30% with R7K100. Allow to flash for 20 minutes.		
1 ct.	ArmorSeal Rexthane I Clear (Reduced 10% with R7K100)	2.0-3.0	(50-75)
Wood:			
1-2 cts.	ArmorSeal Rexthane I	2.0-3.0	(50-75)

*Optional finish coats: Hi-Solids Polyurethane, Hi-Solids Polyurethane 250, Envirolastic 940 LV, Acrolon Ultra, or Polylon HP

The systems listed above are representative of the product's use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Concrete:	SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 1-3
Wood:	Clean, dry, sound, smooth
Steel with Zinc Metalizing:	Clean, dry, sound (clear coat only)

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	SSPC	NACE
White Metal		Sa 3	SP 5	1
Near White Metal		Sa 2.5	SP 10	2
Commercial Blast		Sa 2	SP 6	3
Brush-Off Blast		Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	SP 2	-
	Pitted & Rusted	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	SP 3	-
	Pitted & Rusted	D St 3	SP 3	-

TINTING

Tint bases use Maxitoner colorants, only at 100% tint strength must be used within seven (7) days after tinting.

Do not shake beyond two minutes.

APPLICATION CONDITIONS

Temperature:	
air and surface	20°F (-7°C) minimum, 100°F (38°C) maximum
material:	40°F (4.5°C) minimum Do not apply over surface ice
Relative humidity:	30% minimum, 99% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	
All colors:	1 gallon (3.78L) containers
Haze Gray and Clear:	1 gallon (3.78L) and 5 gallon (18.9L) containers
Weight:	12.09 ± 0.2 lb/gal ; 1.45 Kg/L (may vary with color)

SAFETY PRECAUTIONS

Refer to the SDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

ArmorSeal Heavy Duty Floor Coatings

ARMORSEAL® REXTHANE™ I

B65-60 SERIES

Revised: April 16, 2020

APPLICATION BULLETIN

8.51

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mixing Instructions: Mix paint thoroughly with low speed power agitation prior to use.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**3.0** (75)	**4.5** (112)
Dry mils (microns)	**2.0** (50)	**3.0** (75)
~Coverage sq ft/gal (m^2/L)	**358** (8.8)	**537** (13.1)
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil / 25 microns dft	**1072** (26.3)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

NOTE: Thermal spray metalizing is too porous to measure actual film thickness. A Project Reference Standard is recommended to confirm application thickness and coverage rate.

Drying Schedule @ 3.0 mils wet (75 microns):

	@ 40°F/4.5°C	@ 77°F/25°C *50% RH*	@ 100°F/38°C
To touch:	4 hours	2 hours	30 minutes
To recoat:			
minimum:	48 hours	9 hours	3 hours
maximum:	14 days	14 days	14 days
Foot Traffic:	48 hours	24 hours	12 hours
Heavy Traffic:	7 days	3 days	3 days
To cure:	7 days	3 days	3 days

Drying time is temperature, humidity, and film thickness dependent.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Aromatic 100, R2K5. Clean tools immediately after use with Aromatic 100, R2K5. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

PERFORMANCE TIPS

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Anti-slip additives, such as H&C SharkGrip®, may be added to the coating to provide some slip resistance. This product should not be used in place of a non-skid finish.

Urethane floor coatings may exhibit tire tracking.

Pour a small amount of Aromatic 100, R2K5 over the top of the paint in the can to prevent skinning or gelling.

Place a temporary cover over the pail to keep excessive moisture, condensation, fog, or rain from contaminating the coating.

Tinted colors must be used within seven (7) days after tinting

It is recommended that partially used cans not be sealed/closed for use at a later date.

Anti-slip additives, such as H&C SharkGrip®, may be added to the coating to provide some slip resistance. This product should not be used in place of a non-skid finish.

Do not shake beyond two minutes.

Can be used as a metalizing sealer. Consult Technical Bulletin - Sealers for Thermal Spray Metalizing, or your local Sherwin-Williams representative.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the SDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRODUCT INFORMATION - SOLVENT SELECTION

12.00

Sherwin-Williams offers reducers and solvents which will assure the correct tailor-made properties are obtained for each coating or application requirement. The following chart provides a list of solvents and blended solvents and some specific properties. For the proper selection of a reducer or thinner, see the respective Product Data Page which then can be tied in with the chart below.

Product Name	Evaporation Rate-Minutes 1*	Solvent Strength 2*	Flash Point 3*	Flow 4*	Set Up Time 5*	Non-Photo-chemically Reactive	Characteristic Summary
ALIPHATIC/AROMATIC							
R1K4 - Mineral Spirits	50	1	105	6	6	YES	Weak, slow evaporating, used predominately in alkyds.
R2K4 - Xylene: Reducer No. 4	11	6	80	4	3	NO	Medium fast evaporating for use in epoxies and alkyds.
R2K1 - Toluene	4	6	40	2	1	NO	Fast evaporating.
R1K3 - VM&P Naphtha	4	2	50	2	2	YES	Weak, fast evaporating, very good for solvent cleaning when using alkyd topcoats.
R2K5 - Hi-Flash Naphtha	40	5	105	6	6	NO	Slow evaporating, overuse may cause sagging.
BLENDED SOLVENTS							
R7K54 - Reducer #54	15	6	55	5	5	NO	Medium-fast evaporating for epoxy spray application.
Reducer #58	20	6	80	8	7	NO	Slow evaporating for epoxies and urethanes, use with brush and roll application.
R7K100 - Reducer #100	40	5	105	6	6	NO	Slow evaporating, overuse may cause sagging.
255-C-005 - Reducer	10	6	40	4	6	NO	Medium to fast evaporating, for use with epoxies.
R7K145 - Reducer #145	18	6	80	6	6	NO	Medium-slow evaporating for use with epoxies; brush, roll, or spray application
R7K155 - Reducer #155	20	7	75	8	7	YES	Medium-slow evaporating, strong cutting solvent for use in epoxies.
KETONES							
R6K10 - MEK	2	10	18	2	2	YES	Very fast evaporating for spray application with zinc rich coatings. Used in small amounts.
R6K9 - Acetone	1	10	1	1	1	YES	Very fast evaporating
R7K195 - Reducer #195	14	8	60	5	4	YES	Medium fast evaporating, for use with spray applications of epoxies.
POLYURETHANE SOLVENTS							
R7K69 - Reducer #69	8	6	35	4	4	NO	Medium-fast evaporating for use with polyurethanes.
R7K216 - Reducer #216	21	9	102	8	8	YES	Slow evaporating for brush and roll application of polyurethanes.
R7K132 - Reducer #132	18	8	108	9	6	NO	Medium-slow evaporating, strong cutting solvent for use in polyurethanes
R7K15 - Reducer #15	12	8	<100	5	7	NO	Medium-fast evaporating for use with moisture cure urethanes.

*

1. Measure of time in minutes required for 90% to evaporate. ASTM -D3539.
2. Ratings express the approximate ability to dissolve resin and reduce viscosity. Rated 1 to 10 (10 best).
3. Temperature (°F) at which sufficient vapors are given off to ignite by open flame (Closed Cup Method).
4. Rated from 1 to 10 (10 best). Good flow permits paint film to level out into a smooth film of uniform thickness without orange peel, brush marks, etc.
5. Rates from 1 to 10 (10 slow) relative rating of time necessary to obtain surface or dry-free drying of film.

ENVIRONMENTAL DATA SHEET

(Certified Product Data Sheet)

Date of Preparation
May 20, 2019

11 00 [0335]

PRODUCT NUMBER
B65C60

PRODUCT NAME
ARMORSEAL® REXTHANE™ I Urethane Floor Coating, Clear

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 W. Prospect Avenue
Cleveland, OH 44115

This document includes all data required by 40 CFR 63.801(a) for a Certified Product Data Sheet under criteria specified in 40 CFR 63.805(a). All data given below are MAXIMUM THEORETICAL VALUES based on the product AS CURRENTLY FORMULATED. Variations may occur on individual batches due to adjustments made during production.

Hazard Category (for SARA 311.312)
B65C60 = | Acute | Chronic | Fire |

Product Weight	Specific Gravity	FLASH POINT
8.88 lb/gal	1.07	109 °F TCC

AS MIXED: B65C00060 reduced 10% with R2K5

AS MIXED

Product Weight	Specific Gravity	FLASH POINT
8.73 lb/gal	1.05	92 °F TCC

Volatile Ingredients

Chemical / Compound	SARA 302 EHS	CERCLA	SARA 313 TC	HAPS 112	% by Weight	% by Volume
Ethylbenzene 100-41-4	N	Y	Y	Y	1	1
Xylene 1330-20-7	N	Y	Y	Y	6	7
Light Aromatic Hydrocarbons 64742-95-6	N	N	N	N	1	1
1,2,4-Trimethylbenzene 95-63-6	N	N	Y	N	2	2
Methyl n-Amyl Ketone 110-43-0	N	N	N	N	8	11
Ethyl 3-Ethoxypropionate 763-69-9	N	N	N	N	2	2
n-Butyl Acetate 123-86-4	N	Y	N	N	4	5

Volatile Ingredients AS MIXED

Chemical / Compound	SARA 302 EHS	CERCLA	SARA 313 TC	HAPS 112	% by Weight	% by Volume
Ethylbenzene 100-41-4	N	Y	Y	Y	0.9	1
Xylene 1330-20-7	N	Y	Y	Y	6	7
Light Aromatic Hydrocarbons 64742-95-6	N	N	N	N	3	4
1,3,5-Trimethylbenzene 108-67-8	N	N	N	N	1	2
1,2,4-Trimethylbenzene 95-63-6	N	N	Y	N	5	6
Methyl n-Amyl Ketone 110-43-0	N	N	N	N	8	10
Ethyl 3-Ethoxypropionate 763-69-9	N	N	N	N	2	2
n-Butyl Acetate 123-86-4	N	Y	N	N	4	4

Volatile Organic Compounds - EU Directive 2004/42/EC

	B65C60		AS MIXED B65C00060 reduced 10% with R2K5	
	By wt	By vol	By wt	By vol
Total Volatiles	25.5%	31.6%	31.1%	37.8%
VOC Content	LB/Gal	g/L	LB/Gal	g/L
Total	2.26	271	2.71	325

Volatile Organic Compounds - EU Directive 2010/75/EU

	B65C60		AS MIXED B65C00060 reduced 10% with R2K5	
	By wt	By vol	By wt	By vol
Total Volatiles	25.5%	31.6%	31.1%	37.8%
VOC Content	LB/Gal	g/L	LB/Gal	g/L
Total	2.26	271	2.71	325

Volatile Organic Compounds - Mexico

	B65C60		AS MIXED B65C00060 reduced 10% with R2K5	
	LB/Gal	g/L	LB/Gal	g/L
Coating Density	8.88	1064	8.73	1046
	By wt	By vol	By wt	By vol
Total Volatiles	25.5%	31.6%	31.1%	37.8%
Exempt solvents				
Water	0.0%	0.0%	0.0%	0.0%
Organic Volatiles	25.5%	31.6%	31.1%	37.8%
Percent Non-Volatile	74.5%	68.4%	68.9%	62.2%
VOC Content	LB/Gal	g/L	LB/Gal	g/L
Total	2.26	271	2.71	325
Less exempt solvents	2.26	271	2.71	325
Of solids	3.30	396	4.36	523
Of solids	0.34 lb/lb	0.34 kg/kg	0.45 lb/lb	0.45 kg/kg

Hazardous Air Pollutants (Clean Air Act, Section 112(b))

	B65C60		AS MIXED B65C00060 reduced 10% with R2K5	
	LB/Gal	kg/L	LB/Gal	kg/L
Volatile HAPS	0.62	0.074	0.58	0.070
Of solids	0.90	0.109	0.94	0.112
Of solids	0.09 lb/lb	0.09 kg/kg	0.09 lb/lb	0.09 kg/kg

Air Quality Data

Density of Organic Solvent Blend
7.18 lb/gal
Photochemically Reactive
Yes
Density of Organic Solvent Blend AS MIXED
7.19 lb/gal
Photochemically Reactive AS MIXED
Yes

Additional Regulatory Information

US EPA TSCA:
Not Applicable
Relevant identified uses of the substance or mixture and uses advised against:
Not Applicable

ENVIRONMENTAL DATA SHEET

(Certified Product Data Sheet)

Date of Preparation
Jan 24, 2019

11 00 [0137]

PRODUCT NUMBER
R7K100

PRODUCT NAME
Reducer No. 100

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 W. Prospect Avenue
Cleveland, OH 44115

This document includes all data required by 40 CFR 63.801(a) for a Certified Product Data Sheet under criteria specified in 40 CFR 63.805(a). All data given below are MAXIMUM THEORETICAL VALUES based on the product AS CURRENTLY FORMULATED. Variations may occur on individual batches due to adjustments made during production.

Product Weight
7.32 lb/gal

Specific Gravity
0.88

FLASH POINT
105 °F TCC

Hazard Category (for SARA 311.312)
| Acute | Chronic | Fire |

Volatile Ingredients

Chemical / Compound	SARA 302 EHS	CERCLA	SARA 313 TC	HAPS 112	% by Weight	% by Volume
Xylene 1330-20-7	N	Y	Y	Y	1	2
Light Aromatic Hydrocarbons 64742-95-6	N	N	N	N	15	15
Cumene 98-82-8	N	Y	Y	Y	3	3
1,2,3-Trimethylbenzene 526-73-8	N	N	N	N	2	2
1,3,5-Trimethylbenzene 108-67-8	N	N	N	N	7	7
1,2,4-Trimethylbenzene 95-63-6	N	N	Y	N	23	23
Heavy Aromatic Naphtha 64742-94-5	N	N	N	N	42	43
Naphthalene 91-20-3	N	Y	Y	Y	7	5

Volatile Organic Compounds - U.S. EPA / Canada

	R7K100	
	LB/Gal	g/L
Coating Density	7.32	877
	By wt	By vol
Total Volatiles	100.0%	100.0%
Federally exempt solvents		
Water	0.0%	0.0%
Organic Volatiles	100.0%	100.0%
Percent Non-Volatile	0.0%	0.0%
VOC Content	LB/Gal	g/L
Total	7.32	877
Less exempt solvents	7.32	877
Of solids	0.00	0
Of solids	0.00 lb/lb	0.00 kg/kg
	By wt	
By wt LVP-VOC	51.1%	

Maximum Incremental Reactivity (MIR) (per US EPA Aerosol Ctg Rule, MIR Values 2009) **5.49**

Volatile Organic Compounds - Mexico

	R7K100	
	LB/Gal	g/L
Coating Density	7.32	877
	By wt	By vol
Total Volatiles	100.0%	100.0%
Exempt solvents		
Water	0.0%	0.0%
Organic Volatiles	100.0%	100.0%
Percent Non-Volatile	0.0%	0.0%
VOC Content	LB/Gal	g/L
Total	7.32	877
Less exempt solvents	7.32	877
Of solids	0.00	0
Of solids	0.00 lb/lb	0.00 kg/kg

Hazardous Air Pollutants (Clean Air Act, Section 112(b))

	R7K100		
	LB/Gal	kg/L	
Volatile HAPS	0.80	0.096	10.98 % by wt
Of solids	lb/gal	kg/l of solids	Not applicable
Of solids	lb/lb	kg/kg of solids	Not applicable

Air Quality Data

Density of Organic Solvent Blend
7.32 lb/gal
Photochemically Reactive
Yes

Additional Regulatory Information

US EPA TSCA:
Not Applicable
Relevant identified uses of the substance or mixture and uses advised against:
Not Applicable

Waste Disposal

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Addition of reducers or other additives to this product may substantially alter the above data. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SAFETY DATA SHEET

B65C60

Section 1. Identification

Product name : ARMORSEAL® REXTHANE™ I Urethane Floor Coating Clear

Product code : B65C60

Other means of identification : Not available.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Paint or paint related material.

Manufacturer : THE SHERWIN-WILLIAMS COMPANY
101 W. Prospect Avenue
Cleveland, OH 44115

Emergency telephone number of the company : US / Canada: (800) 424-9300
Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year

Product Information Telephone Number : US / Canada: (800) 524-5979
Mexico: Not Available

Regulatory Information Telephone Number : US / Canada: (216) 566-2902
Mexico: Not Available

Transportation Emergency Telephone Number : US / Canada: (800) 424-9300
Mexico: SETIQ 01-800-00-214-00 / (52) 55-5559-1588 24 hours / 365 days a year

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY (inhalation) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 2
TOXIC TO REPRODUCTION (Fertility) - Category 1B
TOXIC TO REPRODUCTION (Unborn child) - Category 1B
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
ASPIRATION HAZARD - Category 1

Percentage of the mixture consisting of ingredient(s) of unknown acute dermal toxicity: 1.8%
Percentage of the mixture consisting of ingredient(s) of unknown acute inhalation toxicity: 1.8%

GHS label elements

ction 2. Hazards identification

treatment. Have this label with you. Reacts with water in closed container to produce pressure which may cause container to burst.

Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

Ingredient name	% by weight	CAS number
Hexamethylene Diisocyanate Polymer	≥50 - ≤75	28182-81-2
Methyl n-Amyl Ketone	≤10	110-43-0
Xylene, mixed isomers	≤10	1330-20-7
n-Butyl Acetate	≤5	123-86-4
1,2,4-Trimethylbenzene	≤2.4	95-63-6
Ethyl 3-Ethoxypropionate	≤3	763-69-9
Light Aromatic Hydrocarbons	≤1.6	64742-95-6
Ethylbenzene	≤1.3	100-41-4
p-Toluenesulfonyl Isocyanate	<1	4083-64-1
pentamethyl-4-piperidyl)sebacate	≤1	41556-26-7
,5-Trimethylbenzene	<1	108-67-8
UV Light Absorber	≤1	104810-48-2
Benzotriazole Hydroxyphenyl Polymer	≤0.3	104810-47-1
Cumene	≤0.3	98-82-8
Dibutyltin Dilaurate	≤0.3	77-58-7
1,2,3-Trimethylbenzene	≤0.3	526-73-8
Pentamethyliperidyl Sebacate	≤0.3	82919-37-7
Hexamethylene Diisocyanate (max.)	≤0.3	822-06-0

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. In the event of any complaints or symptoms, avoid further exposure.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 8. Exposure controls/personal protection

Xylene, mixed isomers	1330-20-7	**ACGIH TLV (United States, 3/2019).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes. **OSHA PEL (United States, 5/2018).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.
n-Butyl Acetate	123-86-4	**NIOSH REL (United States, 10/2016).** TWA: 150 ppm 10 hours. TWA: 710 mg/m³ 10 hours. STEL: 200 ppm 15 minutes. STEL: 950 mg/m³ 15 minutes. **OSHA PEL (United States, 5/2018).** TWA: 150 ppm 8 hours. TWA: 710 mg/m³ 8 hours. **ACGIH TLV (United States, 3/2019).** STEL: 150 ppm 15 minutes. TWA: 50 ppm 8 hours.
1,2,4-Trimethylbenzene	95-63-6	**ACGIH TLV (United States, 3/2019).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
yl 3-Ethoxypropionate	763-69-9	None.
Light Aromatic Hydrocarbons	64742-95-6	None.
Ethylbenzene	100-41-4	**ACGIH TLV (United States, 3/2019).** TWA: 20 ppm 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 100 ppm 10 hours. TWA: 435 mg/m³ 10 hours. STEL: 125 ppm 15 minutes. STEL: 545 mg/m³ 15 minutes. **OSHA PEL (United States, 5/2018).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.
p-Toluenesulfonyl Isocyanate	4083-64-1	None.
Bis(pentamethyl-4-piperidyl)sebacate	41556-26-7	None.
1,3,5-Trimethylbenzene	108-67-8	**ACGIH TLV (United States, 3/2019).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
UV Light Absorber	104810-48-2	None.
Benzotriazole Hydroxyphenyl Polymer	104810-47-1	None.
Cumene	98-82-8	**ACGIH TLV (United States, 3/2019).** TWA: 50 ppm 8 hours. **NIOSH REL (United States, 10/2016).** **Absorbed through skin.** TWA: 50 ppm 10 hours. TWA: 245 mg/m³ 10 hours. **OSHA PEL (United States, 5/2018).** **Absorbed through skin.** TWA: 50 ppm 8 hours. TWA: 245 mg/m³ 8 hours.

Section 8. Exposure controls/personal protection

		TWAEV: 100 ppm 8 hours. TWAEV: 434 mg/m³ 8 hours. STEV: 150 ppm 15 minutes. STEV: 651 mg/m³ 15 minutes. **CA Ontario Provincial (Canada, 1/2018).** STEL: 150 ppm 15 minutes. TWA: 100 ppm 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 150 ppm 15 minutes. TWA: 100 ppm 8 hours.
Normal butyl acetate	123-86-4	**CA Alberta Provincial (Canada, 6/2018).** 15 min OEL: 200 ppm 15 minutes. 15 min OEL: 950 mg/m³ 15 minutes. 8 hrs OEL: 150 ppm 8 hours. 8 hrs OEL: 713 mg/m³ 8 hours. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 20 ppm 8 hours. **CA Ontario Provincial (Canada, 1/2018).** TWA: 150 ppm 8 hours. STEL: 200 ppm 15 minutes. **CA Quebec Provincial (Canada, 1/2014).** TWAEV: 150 ppm 8 hours. TWAEV: 713 mg/m³ 8 hours. STEV: 200 ppm 15 minutes. STEV: 950 mg/m³ 15 minutes. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 200 ppm 15 minutes. TWA: 150 ppm 8 hours.
1,2,4-Trimethylbenzene	95-63-6	**CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 123 mg/m³ 8 hours. 8 hrs OEL: 25 ppm 8 hours. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 25 ppm 8 hours. **CA Quebec Provincial (Canada, 1/2014).** TWAEV: 25 ppm 8 hours. TWAEV: 123 mg/m³ 8 hours. **CA Ontario Provincial (Canada, 1/2018).** TWA: 25 ppm 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 30 ppm 15 minutes. TWA: 25 ppm 8 hours.
Ethylbenzene	100-41-4	**CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 100 ppm 8 hours. 8 hrs OEL: 434 mg/m³ 8 hours. 15 min OEL: 543 mg/m³ 15 minutes. 15 min OEL: 125 ppm 15 minutes. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 20 ppm 8 hours. **CA Ontario Provincial (Canada, 1/2018).** TWA: 20 ppm 8 hours. **CA Quebec Provincial (Canada, 1/2014).**

Section 8. Exposure controls/personal protection

Dibutyltin Dilaurate	77-58-7	TWA: 20 ppm 8 hours. **NOM-010-STPS-2014 (Mexico, 4/2016).** **Absorbed through skin.** TWA: 0.1 mg/m³, (as Sn) 8 hours. STEL: 0.2 mg/m³, (as Sn) 15 minutes.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
Hexamethylene Diisocyanate Polymer	LC50 Inhalation Vapor	Rat	18500 mg/m³	1 hours
Methyl n-Amyl Ketone	LD50 Oral	Rat	1600 mg/kg	-
Xylene, mixed isomers	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LD50 Oral	Rat	4300 mg/kg	-
n-Butyl Acetate	LD50 Dermal	Rabbit	>17600 mg/kg	-
	LD50 Oral	Rat	10768 mg/kg	-
1,2,4-Trimethylbenzene	LC50 Inhalation Vapor	Rat	18000 mg/m³	4 hours
	LD50 Oral	Rat	5 g/kg	-
Ethyl 3-Ethoxypropionate	LD50 Oral	Rat	3200 mg/kg	-
Light Aromatic Hydrocarbons	LD50 Oral	Rat	8400 mg/kg	-
Ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-
p-Toluenesulfonyl Isocyanate	LD50 Oral	Rat	2234 mg/kg	-
1,3,5-Trimethylbenzene	LC50 Inhalation Vapor	Rat	24000 mg/m³	4 hours
	LD50 Oral	Rat	5000 mg/kg	-
Cumene	LC50 Inhalation Vapor	Rat	39000 mg/m³	4 hours
	LD50 Oral	Rat	1400 mg/kg	-
Dibutyltin Dilaurate	LD50 Oral	Rat	2071 mg/kg	-
Hexamethylene Diisocyanate (max.)	LC50 Inhalation Dusts and mists	Rat	124 mg/m³	4 hours

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Hexamethylene Diisocyanate Polymer	Eyes - Moderate irritant	Rabbit	-	100 mg	-
	Skin - Moderate irritant	Rabbit	-	500 mg	-
Methyl n-Amyl Ketone	Skin - Mild irritant	Rabbit	-	24 hours 14 mg	-
Xylene, mixed isomers	Eyes - Mild irritant	Rabbit	-	87 mg	-
	Eyes - Severe irritant	Rabbit	-	24 hours 5 mg	-
	Skin - Mild irritant	Rat	-	8 hours 60 Ul	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Moderate irritant	Rabbit	-	100 %	-
n-Butyl Acetate	Eyes - Moderate irritant	Rabbit	-	100 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 mg	-
Ethyl 3-Ethoxypropionate	Skin - Mild irritant	Rabbit	-	24 hours 500 mg	-
Light Aromatic Hydrocarbons	Eyes - Mild irritant	Rabbit	-	24 hours 100 Ul	-
Ethylbenzene	Eyes - Severe irritant	Rabbit	-	500 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 mg	-
p-Toluenesulfonyl Isocyanate	Eyes - Moderate irritant	Rabbit	-	100 Ul	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 Ul	-
1,3,5-Trimethylbenzene	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 mg	-
Cumene	Eyes - Mild irritant	Rabbit	-	24 hours 500 mg	-
	Eyes - Mild irritant	Rabbit	-	86 mg	-
	Skin - Mild irritant	Rabbit	-	24 hours 10	-

Section 11. Toxicological information

			irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Methyl n-Amyl Ketone	Category 2	Not determined	Not determined
Xylene, mixed isomers	Category 2	Not determined	Not determined
Light Aromatic Hydrocarbons	Category 2	Not determined	Not determined
Ethylbenzene	Category 2	Not determined	Not determined
Cumene	Category 2	Not determined	Not determined
Dibutyltin Dilaurate	Category 1	Oral	Not determined

Aspiration hazard

Name	Result
Xylene, mixed isomers	ASPIRATION HAZARD - Category 1
1,2,4-Trimethylbenzene	ASPIRATION HAZARD - Category 1
Light Aromatic Hydrocarbons	ASPIRATION HAZARD - Category 1
Ethylbenzene	ASPIRATION HAZARD - Category 1
1,3,5-Trimethylbenzene	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1
1,2,3-Trimethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Harmful if inhaled. May cause respiratory irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : Causes skin irritation. May cause an allergic skin reaction.

Ingestion : May be fatal if swallowed and enters airways.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin contact : Adverse symptoms may include the following:
irritation
redness
reduced fetal weight
increase in fetal deaths
skeletal malformations

Section 12. Ecological information

		subcapitata	
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 6.53 mg/l Marine water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 2.93 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
1,3,5-Trimethylbenzene	Acute LC50 13000 µg/l Marine water	Crustaceans - Cancer magister - Zoea	48 hours
	Acute LC50 12520 µg/l Fresh water	Fish - Carassius auratus	96 hours
	Chronic NOEC 400 µg/l Fresh water	Daphnia - Daphnia magna	21 days
Cumene	Acute EC50 2600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 7.4 mg/l Marine water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 10.6 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2700 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Dibutyltin Dilaurate	Chronic EC10 >2 mg/l Fresh water	Algae - Scenedesmus subspicatus	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
...yl n-Amyl Ketone	-	-	Readily
Xylene, mixed isomers	-	-	Readily
n-Butyl Acetate	-	-	Readily
Light Aromatic Hydrocarbons	-	-	Readily
Ethylbenzene	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Hexamethylene Diisocyanate Polymer	-	367.7	low
Xylene, mixed isomers	-	8.1 to 25.9	low
1,2,4-Trimethylbenzene	-	243	low
Light Aromatic Hydrocarbons	-	10 to 2500	high
1,3,5-Trimethylbenzene	-	161	low
Cumene	-	35.48	low
Dibutyltin Dilaurate	-	2.91	low
1,2,3-Trimethylbenzene	-	194.98	low
Hexamethylene Diisocyanate (max.)	-	57.63	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 14. Transport information

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Proper shipping name : Not available.

Ship type : Not available.

Pollution category : Not available.

Section 15. Regulatory information

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

International regulations

International lists : **Australia inventory (AICS)**: Not determined.
China inventory (IECSC): Not determined.
Japan inventory (ENCS): Not determined.
Japan inventory (ISHL): Not determined.
Korea inventory (KECI): Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.
Taiwan Chemical Substances Inventory (TCSI): Not determined.
Thailand inventory: Not determined.
Turkey inventory: Not determined.
Vietnam inventory: Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

Procedure used to derive the classification

Section 2. Hazards identification

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Causes serious eye irritation.
Causes skin irritation.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling.

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. FOR INDUSTRIAL USE ONLY.

Please refer to the SDS for additional information. Keep out of reach of children. Do not transfer contents to other containers for storage.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

number/other identifiers

ction 4. First aid measures

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Flammable liquid and vapor. Runoff to sewer may create fire or explosion hazard. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

ial protective actions fo. ire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits (OSHA United States)

Ingredient name	CAS #	Exposure limits
Heavy Aromatic Naphtha	64742-94-5	None.
1,2,4-Trimethylbenzene	95-63-6	**ACGIH TLV (United States, 3/2019).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
Light Aromatic Hydrocarbons	64742-95-6	None.
1,3,5-Trimethylbenzene	108-67-8	**ACGIH TLV (United States, 3/2019).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
Naphthalene	91-20-3	**ACGIH TLV (United States, 3/2019).** **Absorbed through skin.** TWA: 10 ppm 8 hours. TWA: 52 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 10 ppm 10 hours. TWA: 50 mg/m³ 10 hours. STEL: 15 ppm 15 minutes. STEL: 75 mg/m³ 15 minutes. **OSHA PEL (United States, 5/2018).** TWA: 10 ppm 8 hours. TWA: 50 mg/m³ 8 hours.
Cumene	98-82-8	**ACGIH TLV (United States, 3/2019).** TWA: 50 ppm 8 hours. **NIOSH REL (United States, 10/2016).** **Absorbed through skin.** TWA: 50 ppm 10 hours. TWA: 245 mg/m³ 10 hours. **OSHA PEL (United States, 5/2018).** **Absorbed through skin.** TWA: 50 ppm 8 hours. TWA: 245 mg/m³ 8 hours.
,3-Trimethylbenzene	526-73-8	**ACGIH TLV (United States, 3/2019).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **NIOSH REL (United States, 10/2016).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.

Section 8. Exposure controls/personal protection

		STEV: 15 ppm 15 minutes. STEV: 79 mg/m³ 15 minutes. **CA Saskatchewan Provincial (Canada, 7/2013). Absorbed through skin.** STEL: 15 ppm 15 minutes. TWA: 10 ppm 8 hours.
Cumene	98-82-8	**CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 50 ppm 8 hours. 8 hrs OEL: 246 mg/m³ 8 hours. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 25 ppm 8 hours. STEL: 75 ppm 15 minutes. **CA Ontario Provincial (Canada, 1/2018).** TWA: 50 ppm 8 hours. **CA Quebec Provincial (Canada, 1/2014).** TWAEV: 50 ppm 8 hours. TWAEV: 246 mg/m³ 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 74 ppm 15 minutes. TWA: 50 ppm 8 hours.
Hemimellitene	526-73-8	**CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 123 mg/m³ 8 hours. 8 hrs OEL: 25 ppm 8 hours. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 25 ppm 8 hours. **CA Quebec Provincial (Canada, 1/2014).** TWAEV: 25 ppm 8 hours. TWAEV: 123 mg/m³ 8 hours. **CA Ontario Provincial (Canada, 1/2018).** TWA: 25 ppm 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 30 ppm 15 minutes. TWA: 25 ppm 8 hours.
Xylene	1330-20-7	**CA Alberta Provincial (Canada, 6/2018).** 8 hrs OEL: 100 ppm 8 hours. 15 min OEL: 651 mg/m³ 15 minutes. 15 min OEL: 150 ppm 15 minutes. 8 hrs OEL: 434 mg/m³ 8 hours. **CA British Columbia Provincial (Canada, 5/2019).** TWA: 100 ppm 8 hours. STEL: 150 ppm 15 minutes. **CA Quebec Provincial (Canada, 1/2014).** TWAEV: 100 ppm 8 hours. TWAEV: 434 mg/m³ 8 hours. STEV: 150 ppm 15 minutes. STEV: 651 mg/m³ 15 minutes. **CA Ontario Provincial (Canada, 1/2018).** STEL: 150 ppm 15 minutes. TWA: 100 ppm 8 hours. **CA Saskatchewan Provincial (Canada, 7/2013).** STEL: 150 ppm 15 minutes.

Section 8. Exposure controls/personal protection

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Melting point/freezing point : Not available.

Boiling point/boiling range : 138°C (280.4°F)

Flash point : Closed cup: 41°C (105.8°F) [Tagliabue Closed Cup]

Evaporation rate : 0.53 (butyl acetate = 1)

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 0.7%
Upper: 7%

Vapor pressure : 1.3 kPa (10 mm Hg) [at 20°C]

Vapor density : 3.66 [Air = 1]

Relative density : 0.88

Solubility : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Kinematic (40°C (104°F)): <0.205 cm^2/s (<20.5 cSt)

Molecular weight : Not applicable.

Aerosol product

Heat of combustion : 45.961 kJ/g

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Section 11. Toxicological information

Product/ingredient name	OSHA	IARC	NTP
Naphthalene	-	2B	Reasonably anticipated to be a human carcinogen.
Cumene	-	2B	Reasonably anticipated to be a human carcinogen.
Xylene, mixed isomers	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Heavy Aromatic Naphtha	Category 3	Not applicable.	Narcotic effects
1,2,4-Trimethylbenzene	Category 3	Not applicable.	Respiratory tract irritation
Light Aromatic Hydrocarbons	Category 3	Not applicable.	Narcotic effects
	Category 3	Not applicable.	Respiratory tract irritation
1,3,5-Trimethylbenzene	Category 3	Not applicable.	Respiratory tract irritation
Naphthalene	Category 3	Not applicable.	Narcotic effects
	Category 3	Not applicable.	Respiratory tract irritation
mene	Category 3	Not applicable.	Narcotic effects
	Category 3	Not applicable.	Respiratory tract irritation
1,2,3-Trimethylbenzene	Category 3	Not applicable.	Respiratory tract irritation
Xylene, mixed isomers	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Light Aromatic Hydrocarbons	Category 2	Not determined	Not determined
Naphthalene	Category 2	Not determined	Not determined
Cumene	Category 2	Not determined	Not determined
Xylene, mixed isomers	Category 2	Not determined	Not determined

Aspiration hazard

Name	Result
Heavy Aromatic Naphtha	ASPIRATION HAZARD - Category 1
1,2,4-Trimethylbenzene	ASPIRATION HAZARD - Category 1
Light Aromatic Hydrocarbons	ASPIRATION HAZARD - Category 1
1,3,5-Trimethylbenzene	ASPIRATION HAZARD - Category 1
Naphthalene	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1
1,2,3-Trimethylbenzene	ASPIRATION HAZARD - Category 1
lene, mixed isomers	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Not available.

Potential acute health effects

Section 11. Toxicological information

Route	ATE value
Oral	3251.23 mg/kg
Dermal	39048.78 mg/kg
Inhalation (gases)	165485.27 ppm
Inhalation (vapors)	38.07 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
1,2,4-Trimethylbenzene	Acute LC50 4910 µg/l Marine water	Crustaceans - Elasmopus pectenicrus - Adult	48 hours
	Acute LC50 7720 µg/l Fresh water	Fish - Pimephales promelas	96 hours
1,3,5-Trimethylbenzene	Acute LC50 13000 µg/l Marine water	Crustaceans - Cancer magister - Zoea	48 hours
	Acute LC50 12520 µg/l Fresh water	Fish - Carassius auratus	96 hours
	Chronic NOEC 400 µg/l Fresh water	Daphnia - Daphnia magna	21 days
Naphthalene	Acute EC50 1.6 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2350 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 213 µg/l Fresh water	Fish - Melanotaenia fluviatilis - Larvae	96 hours
	Chronic NOEC 0.5 mg/l Marine water	Crustaceans - Uca pugnax - Adult	3 weeks
	Chronic NOEC 1.5 mg/l Fresh water	Fish - Oreochromis mossambicus	60 days
Cumene	Acute EC50 2600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 7.4 mg/l Marine water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 10.6 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2700 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Xylene, mixed isomers	Acute LC50 8500 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 13400 µg/l Fresh water	Fish - Pimephales promelas	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Light Aromatic Hydrocarbons	-	-	Readily
Xylene, mixed isomers	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Heavy Aromatic Naphtha	-	99 to 5780	high
1,2,4-Trimethylbenzene	-	243	low
Light Aromatic Hydrocarbons	-	10 to 2500	high
1,3,5-Trimethylbenzene	-	161	low
Naphthalene	-	36.5 to 168	low
Cumene	-	35.48	low
1,2,3-Trimethylbenzene	-	194.98	low
Xylene, mixed isomers	-	8.1 to 25.9	low

Section 14. Transport information

	combustible liquids are not regulated as hazardous materials in package sizes less than the product reportable quantity. **ERG No.** 128	**ERG No.** 128	**ERG No.** 128		

Special precautions for user : Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (sea, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport. People loading and unloading dangerous goods must be trained on all of the risks deriving from the substances and on all actions in case of emergency situations.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Proper shipping name : Not available.

Ship type : Not available.

Pollution category : Not available.

Section 15. Regulatory information

SARA 313

SARA 313 (40 CFR 372.45) supplier notification can be found on the Environmental Data Sheet.

California Prop. 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

International regulations

International lists : **Australia inventory (AICS)**: Not determined.
China inventory (IECSC): Not determined.
Japan inventory (ENCS): Not determined.
Japan inventory (ISHL): Not determined.
Korea inventory (KECI): Not determined.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): Not determined.
Taiwan Chemical Substances Inventory (TCSI): Not determined.
Thailand inventory: Not determined.
Turkey inventory: Not determined.
Vietnam inventory: Not determined.

Section 16. Other information

or the use or addition of products in proportions not specified by the manufacturer. Regulatory requirements are subject to change and may differ between various locations and jurisdictions. The customer/buyer/user is responsible to ensure that his activities comply with all country, federal, state, provincial or local laws. The conditions for use of the product are not under the control of the manufacturer; the customer/buyer/user is responsible to determine the conditions necessary for the safe use of this product. The customer/buyer/user should not use the product for any purpose other than the purpose shown in the applicable section of this SDS without first referring to the supplier and obtaining written handling instructions. Due to the proliferation of sources for information such as manufacturer-specific SDS, the manufacturer cannot be responsible for SDSs obtained from any other source.

GRAYSTAR LLC

A Manufacturer and Distributor of
Abrasive Materials and Specialty Products

Headquarters
9 Simmonsville Rd
PO Box 1670
Bluffton, SC 29910

Phone: 843-815-5600
Fax: 843-815-5601
www.graystarllc.com

Technical Data Sheet

Product: Brown Fused Aluminum Oxide Powders (Microgrits)

Description: Aluminum Oxide is manufactured in an electric arc furnace that produces an extremely tough, high bulk density grain which is graded to exacting standards. By water classifying and chemically treating, our powders can be used in the most critical of applications.

Applications: Aluminum Oxide powders are used for micro blasting, precision lapping, fine grit grinding wheels, break lining fillers, tumbling, polishing compounds, etc.

Typical Chemical Analysis:

Aluminum Oxide (Al_2O_3)	94.1%
Titanium Dioxide (TiO_2)	3.9%
Silicon Dioxide (SiO_2)	1.15%
Iron Oxide (Fe_2O_3)	0.39%
Others (MgO, CaO, Cr_2O_3)	0.46%

Physical Characteristics:

Crystal Form:	Alpha-Alumina
True Density:	3.95 g/cm^3
Hardness:	Mohs 9.0
Melting Point:	2000°C
Color:	Brown - Tan

Sizing Test Methods:

FEPA Standard 42-2: 2006
JIS R 6001 - 1998
Micron sizes based on Coulter Multisizer

Packaging & Shipping:

Warehousing in Bluffton, SC and Niagara Falls, NY
55 lb. paper bags
325 lb. fiber drums (grade sizes F280 – F500)
250 lb. fiber drums (grade sizes F600 – F800)
2200 lb supersacks
Plastic pails, sealed bags, etc. for a surcharge (SC only)

Products Available:

FEPA F240 – F1200
JIS #240 - #8000
Micron/Optical sizes 50.0um – 1.0 um

Certifications Available:

FEPA
JIS
Agency and Mil-specs

FEPA F Standard – Powders/Microgrits

Size	D3% Max.	D50%	D94% Min.
240	70	42.5-46.5	28
280	59	35.0-38.0	22
320	49	27.7-30.7	16.5
360	40	21.3-24.3	12
400	32	16.3-18.3	8
500	25	11.8-13.8	5
600	19	8.3-10.3	3
800	14	5.5-7.5	2
1000	10	3.7-5.3	1
1200	7	2.5-3.5	1(80%)

FIRST AID:

- If Swallowed: Call doctor if you feel unwell.
- If on Skin: Wash with soap and water. Seek medical advice if symptoms persist.
- If in Eyes: Flush with warm water for 15 minutes (remove contacts if possible). Seek medical attention if symptoms persist.
- If Inhaled: If breathing is difficult - Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms or feels unwell - Seek immediate medical attention.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Typical

Ingredient	CAS#	Weight(%)	PEL-OSHA (mg/m^3)	TLV-ACGIH (mg/m^3)	Carcinogen (Y/N)
Alumina (Al_2O_3)	1344-28-1	92 – 96	10*	10	No
Titanium Dioxide (TiO_2)	13463-67-7	1 - 4	15	10	Yes**
Silicon dioxide (SiO_2)	7631-86-9	0 – 2	16		No
Iron Oxide (Fe_2O_3)	1309-37-1	0 – 1.5	10	5	No
* Respirable Fraction			5	5	

** Titanium Dioxide is suspected of causing cancer via inhalation (Carc.2 H351)

Materials are regulated under OSHA 29 CFR 1900.1200, Hazard Communication Standard.
Source of exposure limit data; ACGIH Threshold Limit Values; (OSHA Tables Z-1-A, Z-2, Z-3)
All ingredients are listed under TSCA.

4. FIRST-AID MEASURES

EYES: Flush eyes with lukewarm water for 15 minutes, opening and closing eyelids to ensure adequate rinsing. If redness, irritation, pain, or tearing occurs, seek medical attention.

SKIN: Wash contaminated area with soap and water. Wash contaminated clothing. Seek medical attention if symptoms persist.

INHALATION: If inhalation of high concentrations occurs, move to fresh air. If breathing has stopped, a certified professional should give CPR. Seek immediate medical attention.

INGESTION: Do not induce vomiting unless suggested by a doctor. Seek medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable
FLAMMABLE LIMITS: **LEL**: Not Applicable **UEL**: Not Applicable
AUTO IGNITION TEMPERATURES: Not Applicable.
EXTINGUISHING MEDIA: Use media appropriate for surrounding fire.
FIRE AND EXPLOSION HAZARDS: Non-flammable, non-combustible. Product will not burn.
HAZARDOUS DECOMPOSITION PRODUCTS: None
FIRE FIGHTING INSTRUCTIONS: Firefighters should wear a NIOSH/MSHA approved full-faced self-contained breathing apparatus (SCBA) operated in positive pressure mode, and full turnout or bunker gear.

NFPA CLASSIFICATION: **HEALTH**: 1 **FLAMMABILITY**: 0 **REACTIVITY**: 0

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal ambient conditions of temperature and pressure.

THERMAL DOCOMPOSTION: No decomposition if used and stored to specifications.

POSIBLE HAZARDOUS REACTIONS: Reacts with strong acids, oxidizing agents, and with strong alkali.

CONDITIONS TO AVOID & INCOMPATIBLE MATERIALS: No further relevant information available.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic metal oxide smoke.

11. TOXICOLOGICAL INFORMATION

EYE:	Particulate matter may cause physical injury to the eye.
SKIN:	May cause minor irritation.
INHALATION:	May cause respiratory irritation through single use. May cause damage to lungs or pulmonary disease through prolonged/repeated exposure to dust. Minor component titanium dioxide (TiO2) is suspected of causing cancer via inhalation.
INGESTION:	Ingestion of large quantities may result in gastrointestinal irritation and eventually interference with phosphate absorption which results in rickets.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity:	Generally not hazardous for water.
Persistence & Degradability:	Inorganic, is not eliminable from water by means of biological cleaning processes.
Bioaccumulative Potential:	Does not accumulate in organisms.
Mobility In Soil:	No further relevant information available

13. DISPOSAL CONSIDERATIONS

Dispose of according to applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (D.O.T.): **Not Regulated as a Hazardous Material**
D.O.T. HAZARD CLASS (49 CFR 172.101): **N/A**
D.O.T. PROPER SHIPPING NAME (49 CFR 172.101): **N/A**
D.O.T. LABELS REQUIRED (49 CFR 172.101): **N/A**
D.O.T. PLACARDS REQUIRED: **N/A**
IMDG: **Not Regulated under IMDG (is not hazardous cargo for sea transportation).**

15. REGULATORY INFORMATION

TSCA: Aluminum Oxide is listed on the TSCA (Toxic Substance Control Act) inventory under CAS# 1344-28-1.

Canadian WHMIS: D2B

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A Woman-Owned, HubZone Alaska Company

1320 S. Industrial Way
Palmer, AK 99645
Phone: 907-745-1520
Fax: 907-745-1529
www.paintalaska.com

Submittal 513-3.02

Applicator's Certifications and Experience

1) **QC Supervisor:** Jonathan Martin, NACE Level II Coatings Inspector #65151, meets the requirements of AASHTO/NSBA Steel Bridge Collaboration S8.2/SSPC-PA18.

2) **Thermal Spray Operators:** Kapena "Sonny" Lavea, and Aaron Alexander meet the requirements of AASHTO/NSBA Article 4.2

NACE INTERNATIONAL

NACE COATING INSPECTOR
LEVEL 2 - CERTIFIED

Jonathan Martin

Cert No. 65151 Expires: November 14, 2022

The person to whom this has been issued has fulfilled the examination and experience requirements of the NACE Institute in order to attain the status of *NACE Coating Inspector Level 2 - Certified* certification.

Helena Seelinger

Helena Seelinger - Executive Director

ALASKA DEPARTMENT OF LABOR

Certificate of Fitness

HAZARDOUS PAINT HANDLER 20150560

Issued 05/24/2019

Expires 05/21/2022

JONATHAN L MARTIN
2850 N RED SKY COURT
WASILLA, AK 99623

WGT 260

DOB 12/08/1988

HGT 6'

404140

RENEWAL

Dr. Tamika L. Ledbetter
Commissioner

Beacon

800 Cordova Street
Anchorage, AK 99501
(907) 222-7612

Name: Jonathan L. Martin

Test Date: 04/03/2020

Employer: Graham Industrial Coatings LLC

Exp. Date: 04/03/2021

Respiratory Medical Clearance Exp. Date: 04/03/2021

Fit Test was completed in accordance with
OSHA Standard 29 CFR 1910.134

Instructor's Signature:

Certificate of Completion

OSHA EDUCATION CENTER®

AMERICAN SAFETY COUNCIL

JONATHAN MARTIN

has successfully completed the following course:

CPR Training

GRADUATION DATE

2/12/2020

Certificate of Completion

OSHA EDUCATION CENTER®

AMERICAN SAFETY COUNCIL

JONATHAN MARTIN

has successfully completed the following course:

First Aid Basics

GRADUATION DATE

2/14/2020

ENVIRONMENTAL
MANAGEMENT
INCORPORATED

Certificate of Training

T - 28229 - 21055
Certificate Number

This is to certify that

Kapena S. Lavea

has satisfactorily completed 8 hours

of

Hazardous Painter Certification Refresher

Alaska Administrative Code 8 AAC 61.800 - 8 AAC 61.890

Class Start Date: 4/7/2020 *Class End Date: 4/7/2020*

Shirley Lord	4/7/2020	4/7/2023	Stuart M. Jacques
	Exam Date	*Cert. Exp. Date*	*Director*

Environmental Management Inc. 206 E. Fireweed Lane Suite 201, Anchorage Alaska 99503 907-272-8852

If you set your printer to "Landscape" mode the certificate and wallet card will print larger than printing in "Portrait" mode (your printer default).

Certificate of Completion

Kapena Lavea

has successfully completed

Construction Fall Protection
OSHA 1926 Subpart M Training
Tested On: Apr 1, 2020

HRS/CEU/CME: 2.0/0.2/2.0

certificate number
F11F8959-7457-11EA-95C6-0050568D5CA3

Trained & Tested at:
www.ComplianceTrainingOnline.com

compliance training ONLINE
a division of KRIST INCORPORATED

CTO

If you set your printer to "Landscape" mode the certificate and wallet card will print larger than printing in "Portrait" mode (your printer default).

Certificate of Completion

Kapena Lavea

has successfully completed

Lead Standard for the Construction Industry
OSHA 29 CFR 1926.62 Training
Tested On: Mar 30, 2020
Valid Thru: Mar 30, 2021
HRS/CEU/CME: 2.0/0.2/2.0

certificate number
AEE07E23-72CE-11EA-95C6-0050568D5CA3

Trained & Tested at:
www.ComplianceTrainingOnline.com

compliance training ONLINE
a division of KRIST INCORPORATED

CTO

Beacon

800 Cordova Street
Anchorage, AK 99501
(907) 222-7612

Name: Kapena S. Lavea

Test Date: 04/02/2020

Employer: Graham Industrial Coatings LLC

Exp. Date: 04/02/2021

Respiratory Medical Clearance Exp. Date: 04/02/2021

Fit Test was completed in accordance with
OSHA Standard 29 CFR 1910.134

Instructor's Signature:

Mask Style	Mask Size	Overall FF
North 7700 1/2 Face	M	6405

Fit testing method: Quantitative

CARD NOT VALID IF FACIAL HAIR IS PRESENT

If you set your printer to "Landscape" mode the certificate and wallet card will print larger than printing in "Portrait" mode (your printer default).

Certificate of Completion

Aaron Alexander

has successfully completed

Construction Fall Protection
OSHA 1926 Subpart M Training
Tested On: Mar 31, 2020

HRS/CEU/CME: 2.0/0.2/2.0

certificate number
A8F21D6F-7395-11EA-95C6-0050568D5CA3

Trained & Tested at:
www.ComplianceTrainingOnline.com

compliance training ONLINE
a division of KRIST INCORPORATED

CTO

Certificate of Completion

Aaron Alexander

has successfully completed

Lead Standard for the Construction Industry
OSHA 29 CFR 1926.62 Training
Tested On: Apr 8, 2020
Valid Thru: Apr 8, 2021
HRS/CEU/CME: 2.0/0.2/2.0

certificate number
7F54F791-79CD-11EA-95C6-0050568D5CA3

Trained & Tested at:
www.ComplianceTrainingOnline.com

compliance training ONLINE
a division of KRIST INCORPORATED

CTO

ENVIRONMENTAL
MANAGEMENT
INCORPORATED

Certificate of Training

T - 28228 - 38751
Certificate Number

This is to certify that

Aaron W. Alexander

has satisfactorily completed 16 hours

of

Hazardous Painter Certification

Alaska Administrative Code 8 AAC 61.800 - 8 AAC 61.890

Class Start Date: 4/6/2020 *Class End Date: 4/7/2020*

Shirley Lord

4/7/2020	4/7/2023	Stuart M. Jacques
Exam Date	*Cert. Exp. Date*	*Director*

Environmental Management Inc. 206 E. Fireweed Lane Suite 201, Anchorage Alaska 99503 907-272-8852

Beacon

800 Cordova Street
Anchorage, AK 99501
(907) 222-7612

Name: Aaron Alexander

Test Date: 04/02/2020

Employer: Graham Industrial Coatings LLC

Exp. Date: 04/02/2021

Respiratory Medical Clearance Exp. Date: 04/02/2021

Fit Test was completed in accordance with
OSHA Standard 29 CFR 1910.134

Instructor's Signature:

GRAHAM
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A Woman-Owned, HubZone Alaska Company

1320 S. Industrial Way
Palmer, AK 99645
Phone: 907-745-1520
Fax: 907-745-1529
www.paintalaska.com

Submittal 513-3.03

Required Contractor Experience

Douglas & Priscilla Graham and their team are excited to introduce you to Graham Industrial Coatings, LLC. We are a Professional Commercial / Industrial Painting, and General Construction Company built upon the foundation of 85 years of combined experience. We relentlessly pursue worker safety, regulatory compliance, and service excellence and efficiency.

We do this by partnering with industry experts, investing in state-of-the-art equipment, insisting on using the best materials, and by employing reliable and proven methods for our craft.

Through fairness, efficiency, and careful management, we provide best-value to our customers. We pride ourselves in offering a superior product at a competitive price and working diligently to achieve project and client objectives.

Our vision is to become a "city on a hill" (Matthew 5:14-16) by following principles of integrity, sound business practices, and engaging in acts of generosity towards those in need.

Toward that vision, we value...

- *Our Clients:* To exceed the expectations of our Clients, by providing responsive, innovative, and value-added solutions; by engaging in a fierce loyalty to their needs and objectives; and by doing our best to maintain an attitude of humility and service
- *Our Employees:* To empower our employees to become the best in the industry by pursuing personal integrity, ongoing training and safe work practices, by cultivating a faith-and-family first culture, and by reminding ourselves that work and the ability to do so is a gift, not a burden
- *Our Work.* To excel in the industry by looking for intelligent and profitable growth opportunities; by making and keeping commitments, by engaging in a relentless pursuit of excellence, and inspiring others through the gift of craftsmanship, and engaging the entrepreneurial spirit.

Safety, Health, and Environmental Impacts are our first consideration as we consider means, methods, and materials. We insist on the creation and configuration of a clean, healthy, safe, and relationally productive jobsite for our team members.

Finally, we treat our partners, suppliers, and the governing authorities with the honor and respect they deserve, and do our best engage them with fairness, and honesty.

Section A: Company Information

Legal Company Name:	Graham Industrial Coatings, LLC (dba G5 Services – Washington and Oregon)
Corporate Address:	1320 S Industrial Way Palmer, AK 99645
Office:	907-745-1520
Fax:	907-745-1529
Date Company Est:	January 2014 – Rollover from Alaska Painting Contractors, est. 1997
AK Entity #:	10018082
Federal Tax ID:	46-4576479
Alaska Bus Lic.:	1003208
AK Cont. License:	39394
Primary NAICS:	238320
Primary SIC:	17210300
DUNS No.:	079345219
CAGE Code:	7BX47

Corporation – Officers:

Priscilla T. Graham, CEO
Cell: 907-347-1568
Email: pgraham@paintalaska.com

Douglas R. Graham, COO
Cell: 907-347-1523
Email: dgraham@paintalaska.com

General Insurance

Alaska USA Commercial Insurance
500 W 36th Ave, Suite 300
Anchorage, AK 99503

- Brittany Allen: 907-365-1000 ballen@risqconsulting.com
- General Liability, Auto, Worker's Comp, Umbrella – Limits, As Required

Section B: Surety Bonding

International Fidelity Insurance Company
550 Kirkland Way, Suite 400
Kirkland WA 98033

- Jason Valle: 425-636-828 jvalle@IFIC.com
- Single Limit: $5,200,000
- Aggregate Limit: $5,200,000

Statement of Business Size Status in Relation to NAICS 238320

Graham Industrial is a "Small Disadvantaged Business Enterprise" with less than 49 Employees, and 4.5 to 8.5mil in annual sales.

Company Overview

Graham Industrial has worked in the painting / coatings / linings / containment / abatement, and corrosion control industry since 1997. Much of the coatings related work we have done in Alaska has been on Military / Federal Infrastructure, and Large Fuels, Utilities Infrastructure, as well as Private Fuels Refining and Storage Infrastructure.

We have an Excellent Record of EH&S Performance and Compliance: We understand our business and the hazards associated with our work. We utilize all required engineering and administrative controls to mitigate hazards, prevent fugitive release, and protect people. Our equipment is state-of-the-art, our people are always trained, certified, and monitored, and when required or beneficial, we utilize 3rd Party professionals to provide QC Surveillance, and QA Oversight.

We both abate and encapsulate lead and asbestos; utilize numerous abrasive blasting and mechanical surface preparation technologies; we paint structures, apply coatings and linings, install cementitious and epoxy intumescent fireproofing systems; build secondary containment systems for petroleum and waste-water treatment infrastructure; restore concrete; thermal-arc spray metalize carbon steel, and powder coat steel and aluminum.

We provide information and education to our Clients regarding corrosion problems, coatings specifications, and the mitigation of hazardous materials and substrates. We are not an engineering firm and do not make final decisions.

We are a company owned and run by NACE Coatings Inspectors. Doug Graham is a Level III Inspector and is an instructor for the NACE CIP Institute. Our PM's are typically Level II inspectors, and our General Foremen are typically Level I Inspectors. We are currently in the due diligence process SSPC QP-1 & QP-3 Certification, and are awaiting final audit.

Industry Partnerships

Graham Industrial is currently teamed with AHTNA Environmental Services, AHTNA Design-Build (ADB), and STG Pacific, Inc. on various military infrastructure projects. However, we are fully capable without these teaming agreements.

We were recruited by ANTNA to team with them on work for the POL Fuels Group at JBER, Eielson, and Ft. Greely. Graham is the prime-sub for all paint abatement and new coatings install. This work has been ongoing from 2016 until present.

We are currently teamed with STG Pacific, a Calista company and are a prime subcontractor for facility construction, as well as various protective coatings projects in Alaska, Washington, and Oregon.

Graham owns more than 3mil in specialty equipment and employs up to 32 trained craftsmen annually. We are a smart company and are both teachable and teaching at all times.

Principal Projects / Clients

Graham Industrial and its Principals, have an unbroken contracting history dating to 1991, in the Pacific Northwest, and since 1997 in Alaska.

There is no history of default, bankruptcy, federal claims, or worker death in our past. When vetted, our clients discover a company that is fiercely loyal to its customers, and who keeps its word.

Not only are we a liquid-applied coatings company, but we also have substantial facility restoration/ maintenance, and general construction experience the length and breadth of Alaska and Washington. Furthermore, due to our Arctic Construction History and Capability, we are a company that is called upon to provide support services, weather protection, containment, and environmental controls to other contractors who are fighting their Arctic Construction Battles.

Recent Project History – 36 Mos – As Follows: Numerous Other Projects, Upon Request

Project Name:	North - South Plat Crossing
Project Owner or General Contractor:	North Creek Estates, LLC
Project Location:	Gig Harbor, Washington
Type of Contract:	Cost Reimbursable
Brief Description of Work:	Acrow Bridge Construction and Metallizing
Percentage as Prime Contractor:	100%
Project Value:	$540,000
Project Contact:	Nick Howard: 541-670-0011; nick@cghcivil.net

Project Name:	Clear AFS - LRDR Metallzing
Project Owner or General Contractor:	STG Pacific
Project Location:	Clear AFB, Clear Alaska
Type of Contract:	Lump Sum
Brief Description of Work:	Structural Steel Abrasive Blasting and Metallizing
Percentage as Prime Contractor:	0%
Project Value:	$.8mil
Project Contact:	Brian Midyett: 907-301-5986; bmidyett@stgpacific.com

Project Name:	Whittier Corrosion Inspection and Repairs
Project Owner or General Contractor:	Brice Inc
Project Location:	Whittier, AK
Type of Contract:	Lump Sum
Brief Description of Work:	ARRC Bridge Ramp Abrasive Blast & Metallize
Percentage as Prime Contractor:	0%
Project Value:	$221,327
Project Contact:	Bryce Erickson: 907-750-3503; brycee@briceinc.com

Project Name:	PSI Truck and Rail Terminal
Project Owner or General Contractor:	Petro Star Inc.
Project Location:	Fairbanks, AK
Type of Contract:	Lump Sum Subcontracted
Brief Description of Work:	Tank External Coatings; Tank Internal Linings; Pipeline Coatings
Percentage as Prime Contractor:	0%
Project Value:	1mil
Project Contact:	Bob Eder: REder@askw.asrc.com; Mark Dooley: mdooley@petrostar.com

Other Projects / Clients:

AHTNA Design-Build: Cape Newenham / Tatalina LRRS Fuel System Upgrade - $788,000; Coatings,

Linings STG Pacific: Sparrevohn LRRS Fuel System Upgrade - $1,043,000; Coatings, Linings

STG Pacific USFW Morphology Lab - $1,500,000; Vertical Construction

STP Tank Farm Coatings Upgrade - $760,000; City of Saint Paul, AK

Flint Hills Resources - POA North Tank Farm Fuel Resistant Secondary Containment Lining $3.8mil

United Management Group - 188 WNL Traffic Membrane $441,000

Point Thomson Project CH2M Hill / Exxon-Worley - $3.2mil Coatings, Linings, Containment

Sparrevohn LRRS Fuel Terminal Upgrade: STG Pacific - $1.4mil Tank and Pipeline Coatings

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QUALITY CONTROL PLAN

WORK PLAN

Seward Hwy. MP114 to Dimond Blvd. Asphalt Preservation

Metallize Rabbit Creek Ped Crossing

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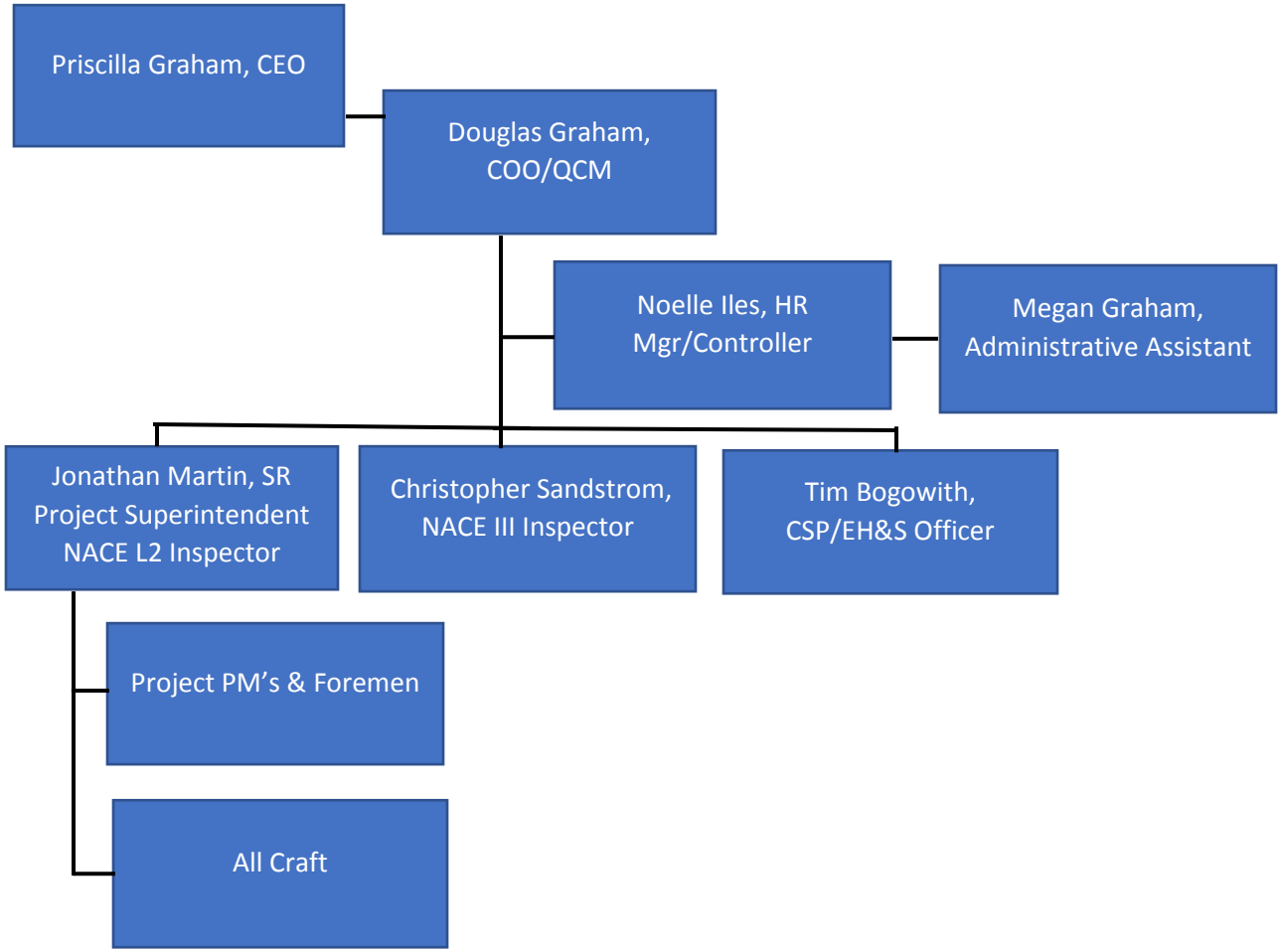
ORGANIZATIONAL CHART 2020



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Phone: 907-745-1520
Fax: 907-745-1529
www.grahamindus.com

Graham Industrial Coatings Key Personnel

Priscilla Graham, CEO

Douglas Graham, MA, COO/QC Manager, NACE III CIP

Inspector

Noelle Iles, MS, Contracts Manager

Megan Graham, Administrative Assistant/Purchasing

Christopher Sandstrom, NACE III CIP Inspector

Tim Bogowith, CSP/EH&S Manager

Eric Hammon, Senior Estimator/Superintendent

Jonathan Martin, Sr. Project Superintendent NACE II CIP

Inspector

Christian Mitchey, C12 - Coatings Foreman

Joshua Duncan, C7 - Blasting Foreman

Travis Hatten, NSTC - Scaffold Foreman

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www.paintalaska.com

MISSION AND VISION STATEMENT

Douglas & Priscilla Graham and their team are excited to introduce you to Graham Industrial Coatings, LLC. We are a Professional Industrial Protective Coatings/Linings Company built upon the foundation of 85 years of combined experience in many sectors and technologies related to liquid applied coatings/linings systems, industrial corrosion mitigation, and asset preservation.

We do this by partnering with industry experts, investing in a reliable and motivated craft and management workforce, investing in state-of-the-art equipment and processes, insisting on the use the best materials, and relying proven technologies and methods.

As a result of our relentless pursuit of excellence; an unwillingness to compromise on worker safety and environmental concern; through fairness, efficiency, and careful management, **we provide best-value to our Clients**. We pride ourselves in offering a superior product at a competitive price, and working diligently to achieve project and client objectives.

Our vision is to become a "city on a hill" (Matthew 5:14-16) within the protective-coatings industry, in our community, throughout the state of Alaska, and around the globe by following biblical principles, sound business practices, and engaging in acts of generosity towards those in need.

Toward that vision, we value...

- *Our Clients:* To exceed the expectations of our Clients, by providing responsive, innovative, and value-added solutions; by engaging in a fierce loyalty to their needs and objectives; and by doing our best to maintain an attitude of humility and service
- *Our Employees:* To empower our employees to become the best in the industry by pursuing personal integrity, ongoing training and safe work practices, by cultivating a faith-and-family first culture, and by reminding ourselves that work and the ability to do so is a gift, not a burden
- *Our Work.* To excel in the industry by looking for intelligent and profitable growth opportunities; by making and keeping commitments, by engaging in a relentless pursuit of excellence, and inspiring others through the gift of craftsmanship, and engaging the entrepreneurial spirit.

Worker safety and health are our first consideration as we consider means, methods, and materials. We insist on a clean, healthy, safe, and relationally productive jobsite for our team members.

We carefully consider sustainability and environmental impact in our affairs, and utilize state-of-the-art low or zero VOC technology for many of our protective coatings solutions.

We treat our partners, suppliers, and the governing authorities with the honor and respect they deserve, and do our best engage them with fairness, and honesty.

And when we make mistakes, we are quick to take responsibility and ownership of those mistakes, and proceed with haste in correcting them.

Thank you for your consideration,
Priscilla T. Graham, CEO

Graham Industrial Coatings, LLC

GRAHAM
INDUSTRIAL COATINGS, LLC
Trust, Loyalty, Excellence!
A Woman-Owned, HubZone Alaska Company

Palmer, AK 99645
Phone: 907-745-1520
Fax: 907-745-1529
www.paintalaska.com

Seward Highway MP-114 to Dimond Blvd. - Metallize Rabbit Creek Pedestrian Crossing

Work Planning with Quality Control Hold-Points

For

Surface Preparation, Metallizing, and Clear Sealer Application

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Narrative: Graham Industrial will conform our means and methods to all relevant project specifications, applicable regulations, and as follows

- All Bid Documents and Addendum's
- Plans dated 1/22/20
- Section 513 - "Field Coating of Structural Steel"
- Specification SSPC-CS23.00/AWS-C2.23/NACE No. 12
- ASTM A780; D4417; D4541; D3363;
- SSPC SP-1; SP-5; SP-7; PA-2

Scaffold and Containment:

We will utilize a suspended scaffold system engineered and furnished by Brand Safeway. GIC's Certified Scaffold Superintendent – Travis Hatten, and Brand-Safeway's Technical Lead – David Hagen have inspected project plans, specifications, and the physical jobsite and have developed their plan.

This scaffold will consist Brand-Safeway's Cuplock System with Tube/Clamp Bracing in accordance with ANSI / ISTA 1E Standards

The Containment system will be as follows: 6mil UV-resistant/Fire Rated string-poly (See Product Data / SDS)

- The scaffold skeleton will be used to mechanically fasten / retain string-poly membrane, which will form the full containment of the work-area.

- The membrane is affixed to the structural steel and scaffold rails with a combination of industrial magnets, snap grommets, and tent bungies.

- Before pressure-washing, 10oz non-woven geotextile fabric will be placed and fastened to the scaffold deck and up the sides of scaffold rail system a minimum of 12". This will provide a catchment system for any debris, nests, etc. which will potentially come loose from girder. The fabric will allow the non-hazardous pressure-washing water to flow through the fabric while retaining debris.

satellite collection area.

- Before commencement of abrasive blasting, Dust Collector will be started, and function checked.
- Dust Collector will run continuously during all abrasive blasting operations and cleanup to prevent fugitive emission of dust outside of containment area
- All spent media will be removed at the close of each shift / phase. Upon cleanup of bulk media, the containment will first be internally blown down with clean air (while dust collector is running) and then vacuumed as required to achieve a dust free enclosure before close of shift

513-3.05 QUALITY CONTROL AND QUALITY ASSURANCE.

Quality control consists of designating a QC Supervisor to control the quality of work in each phase established by Quality Control Points (QCPs). Suspend work if the QC Supervisor is not onsite or not able to perform required duties.

1. Quality Control Points. QCPs are points in time when one phase of the work is complete and approved by the QC Supervisor and ready for inspection by the Engineer before commencing the next phase of the work. At a QCP, provide quality control tests signed by the QC Supervisor. Provide the Engineer access to inspect all affected surfaces. If inspection identifies a deficiency, correct the deficiency according to the Contract before starting the next phase of work. Discovery of defective work or material after a QCP is past or failure of the final product before final acceptance, shall not, in any way, prevent the Engineer from rejecting the final product or obligate the Engineer to final acceptance.

QCP	TABLE 513-1 QCP DESCRIPTIONS
1. Job Reference Standards	Establish Visual and Reference Standards
2. Solvent Cleaning	Remove Visible Contamination
3. Grinding Edges	Remove sharp corners and thermally hardened edges
4. Abrasive Blasting	Blast Surface to Receive Metallizing
5. Remove Fins, Tears, and Slivers	Remove Surface Defects, and re-profile
6. Metallizing Coat Application	Check surface cleanliness, surface profile, apply metallized coating and check coating thickness
7. Adhesion Tests	Check adhesion of Metallized coating
8. Sealer Application	Check surface cleanliness, dryness, apply coat of sealer, check sealer thickness

Provide documentation of inspection, testing, conditions and material information to the Engineer. Submit sufficient photographs to document the condition of the work at QCPs 1, 4, 7 and 8.

2. Job Reference Standards (QCP #1). Ensure the QC Supervisor witnesses and documents the establishment of Job Reference Standards (JRSs) as specified in this Section. Produce JRSs in the presence of the Engineer. Do not begin metallizing production work until the Engineer approves the specified JRSs and the JRSs are documented by replica tape, adhesion values and photographs. The QC Supervisor and Engineer will use the JRSs and the contract to inspect the work. In all cases of dispute, testing specified in 513-10, 513-13 and 513-13.8 governs. Perform the abrasive blast, adhesion, cut and bend tests as part of the JRSs at the beginning of each shift of metallizing.

a. Abrasive Blast Plate Standard. Supply an 18x18x1/4 inch steel plate and one 2 x 8 x 0.50 inch steel plate per each shift of metallizing of the same specification and grade as the steel being metallized. Grind the plate edges and abrasively blast both sides of the 18 x 18 x 1/4 inch plate and one side of the 2 x 8 x 0.050 inch steel plate according to **845.12.** Record profile depth per ASTM D4417, method B or C.

b. Metallized Plate Standards.

(1) Adhesion and Cut Tests: Metallize one side of the 18 x 18 x1/4 inch plate per 845.13. The other side is to remain in the blast cleaned condition. Supply a uniform surface texture that is free of lumps, dust, debris, inclusions and blisters. Record the coating thickness. Record the application temperature. Perform 3 adhesion tests on the coated side according to ASTM D4541 and record the adhesion value. All 3 adhesion tests shall exceed a minimum value of 500 psi. Perform a cut test on the coated side by placing the plate on a solid surface and

hitting the test plate with a sharp1.5-inch wide mason's chisel impacted with a 3-pound drilling hammer. Cut the metallizing with the mason's chisel oriented at 60 degrees from the horizontal plane of the plate; strike the chisel with sufficient force to cut completely through the metallizing but minimize the damage to the base steel. Cut the metallizing in 3 locations
½ to 1 inch apart. The coating must adhere to the face of the test plate after cutting. No delamination of the coating is permitted. No cracking of the coating is permitted. The cut test fails if any coating can be picked off with a knife blade. After the Engineer approves the plate was prepared to the requirements of the Contract, the metallized side of the plate becomes the Job Reference Plate Standard. A picture of the unmetallized side of the plate becomes the Job Reference Visual Standard.

(2) Bend Tests: Metallize the2 x 8 x 0.050 inch steel plate according to 845.13. Record the application temperature. Record the coating thickness. Cold bend the coupon 180 degrees around a ½ inch diameter mandrel. The metallizing must be on the outside radius of the bent coupon. No delamination of the coating is permitted. Delamination is defined as a coating that can be picked off with a knife blade. Cracking of the coating is

permitted, provided the coating adheres to the face of the coupon.

Proper spray equipment set up, calibration, and operating procedures shall be verified by passing a bend test on one 2 x 8 x 0.050 inch steel plate at the beginning of each work shift that metallizing is to be applied. Perform this bend test in accordance with this Section.

513-3.07 TRAINING.

- See training documents in APP

513-3.08 HEALTH AND SAFETY.

In the work plan required by Subsection 513-3.04 address protection from potential health and safety hazards not limited to electric shock; fine particulates dusts and fumes; exposure to high-intensity noise, ultraviolet, infrared and intense visible light radiation.

- Graham Accident Prevention Plan, with subsections, and Activity Hazard Analysis (AHA's)
- Thermal ARC Spray PPE Program

513-3.10 SURFACE PREPARATION.

1) Solvent Cleaning (QCP #2). Solvent clean by methods described in SSPC-SP1 areas containing oils, greases, asphalt cement, diesel fuel deposits and other petroleum products that interfere with coating adhesion or reduce coating life.

2) Grinding Edges (QCP #3). Before abrasive blasting, grind smooth all metal defects, fins, slivers, burrs, weld splatter, slag, flux, and sharp edges. Round all corners of thermally cut or sheared edges as necessary to achieve a 1/16 inch radius or equivalent flat surface at a 45-degree angle. Grind the sides of thermally cut material 1.5 inches or thicker to remove the heat affected zone, as necessary, to achieve the specified surface cleaning. Perform this work as necessary to produce a metallized coating on edges and thermally cut surfaces capable of meeting the Job Reference Plate Standard cut test according to 513-3.05.2. Perform the Job Reference Plate Standard cut test on these surfaces if requested by the Engineer

3) Abrasive Blasting (QCP #4). Abrasive blast all steel to be metallized according to SSPC-SP 10, Near White Metal Finish, as shown on the pictorial surface preparation standards for painting steel surfaces SSPC-VIS 1. Maintain the steel to a SSPC-SP 10 blast cleaned condition until metallized.

Produce a sharp angular shaped profile with a minimum profile depth of 3 mils to 5 mils as determined according to ASTM D4417, Method B or C. Provide a profile with a sharp angular shape that is visually comparable to the Job Reference Visual Standard.

Control the abrasive blasting work as necessary to develop a metallized coating meeting the adhesion test requirements of 513-13.8, or meeting the cut test requirements of 513-3.05.2 for the plate edges and areas that are not accessible to adhesion tests.

Ensure the QC Supervisor takes a profile reading at least every 200 square feet of blasted surface. Provide readings at locations on flanges, webs, cross bracing stiffeners etc. and as determined by the

Engineer.

Ensure the QC Supervisor checks abrasives for oil content and water-soluble contamination by placing a small sample of abrasives and tap water into a jar. Reject the abrasive if an oil film is detected on the water surface. Check abrasives used at the job site at the beginning of each shift and at 4-hour intervals. Also check each load of abrasive delivered to the job site for contamination before use.

Ensure the QC Supervisor check the compressor for oil contamination by blowing air from the nozzle for 30 seconds onto a white cloth or blotter held in a rigid frame. If the cloth or blotter retains oil or other contaminants, suspend abrasive blasting until retests verify the problem was corrected. Perform this test at the start of each shift and at 4-hour intervals.

Use recyclable steel grit or a recyclable natural mineral, low dusting abrasive. Do not use silica sands, mineral slags, and other types of nonmetallic abrasives that contain more than 0.5 percent free silica, by weight, have a chlorides salts content more than 25 ppm, or contain any organic material. Clean the abrasive of paint, chips, rust, mill scale, and other foreign material after each use and before each reuse. Use equipment specifically designed for cleaning the abrasive.

Do not abrasive blast areas that contain asphalt cement, oil, grease, or diesel fuel deposits. Before abrasive blasting, completely remove all dirt, sand, bird nests, bird droppings.

Cover and protect surfaces not intended to be metallized from damage caused by blasting operations. Do not allow blasting material to damage bearings or bearing seats or enter hinges. Repair adjacent coatings damaged during the blasting operation. Backwalls and landings not sealed nor specified to be sealed do not need to be covered and protected.

Simultaneously abrasive blasting and metallizing the same bridge is acceptable provided the abrasive blasting debris and dust does not contaminate surfaces to be metallized.

Remove abrasives and residue from all surfaces to be metallized. Keep all surfaces to be metallized dust free.

Metallize steel that was blast cleaned within the time specified by 513-3.13. If the steel is not metallized within the specified time, re-blast the steel before metallizing. Remove all dust or abrasives from adjacent work and from the metallized surfaces.

Provide the Engineer and Inspectors with field wash facilities and adequate supply of running potable water, soap, and towels for washing face and hands during the surface preparation operation. Properly contain, test, and dispose of the wastewater. Locate a ash facility in an area that will not be contaminated by the blasting debris..

4) Removing Fins, Tears, or Slivers (QCP #5). Remove all fins, tears, slivers and burred or sharp edges that appear after the blasting operation then re-blast to meet the requirements of QCP #4. Document all visible weld defects and report them to the Engineer immediately.

513-3.11 WEATHER LIMITATIONS.

Apply metallizing within the environmental limitations of SSPC-CS23.00/AWS C2.23/NACE No. 12 and meet the substrate surface temperature and moisture conditions specified below:

1. Temperature. Metallize when the steel surface temperature is greater than or equal to 40° F. Monitor temperature using the recording thermometer.

   If using a heated enclosure, uniformly and continuously heat the enclosure to maintain the required minimum steel surface temperature during blasting and metallizing operations. If combustion type heating units are used, vent the units away from the enclosure and do not allow exhaust fumes to enter the enclosure. Do not use open combustion in the enclosure.

2. Moisture. Do not abrasively blast or metallize under any of the following conditions:

   a. the steel surface temperature is less than 5 °F above the dew point.
   b. the steel surface is wet, damp, frosted, or ice-coated.
   c. the relative humidity is 85% or greater.
   d. during periods of rain, fog, or mist unless the above moisture criteria is met.

Industrial dehumidification equipment within an enclosure may be used to achieve humidity

requirements.

513-3.13 METALLIZED COAT APPLICATION AND THICKNESS (QCP #6).

1. General. Metallize all exposed structural steel surfaces as shown on the Plans.

   Coat areas inaccessible to metallizing such as behind snipes and non-connection holes with high zinc content products that meet the repair requirements of Subsection 716-2.07.

2. Surface Cleanliness. Apply metallizing to surfaces meeting the cleanliness of the Job Reference Visual Standard and the profile of the unmetallized side of the Job Reference Plate Standard.

   If the surface is degraded or contaminated, restore the surface to the specified surface cleanliness and profile before metallizing.

   Apply metallizing to steel surfaces within 6 hours of the beginning of abrasive blasting. If work is done in a heated and dehumidified enclosure that meets the requirements of Subsection 513-3.11, apply metallizing within 24 hours of the beginning of abrasive blasting.

3. Equipment and Techniques. Metallize using electric arc equipment operated in accordance with the manufacturer's latest written instructions and as demonstrated in 513-3.05.2. Flame spray equipment may be used on repair or limited access areas, if operated in accordance with the manufacturer's latest written instructions and demonstrated in 513-3.05.2. Preheating the starting area is required for flame spraying.

   Apply metallizing in a manner that promotes uniform coverage and prevents discontinuity of the applied coating. Produce a uniform surface texture that is free of lumps, dust, debris, inclusions and blisters. Perform spraying in a block pattern, typically 2 to 3 feet square. Overlap 50 percent on each pass to ensure uniform coverage. Obtain the required coating thickness in

multiple layers. Do not exceed 4 mils in thickness in a single layer. Apply each layer at right angles to the previous layer. Control the spraying distance to the work to ensure the zinc is plastic upon impact. Immediately correct any defects. Do not perform startup and adjustment of thermal spray equipment on the surface being metallized.

4. Record Environmental Conditions. Ensure that the QC Supervisor verifies and records the ambient temperature, the steel temperature and the dew point no more than 1 hour before application of the metallizing. Monitor and record environmental conditions every 4 hours during the metallizing operation.

5. Holding Time. A flash coat of metallizing 2 to 4 mil thick may be applied within the required 6 hours required by Subsection 513-3.13.2 in order to hold the surface condition for an additional 4 hours. Maximum holding time is 4 hours provided the metallized coating can be maintained free of contamination. Do not exceed the maximum holding time between each successive 2 to 4 mil thick metallized coat.

6. Application Approval. If the Engineer discovers defects, production may be stopped. The Engineer may require additional testing as necessary to produce the thickness, adhesion or impact test results developed by the Job Reference Plate Standard.

7. Record Coating Thickness. Determine the metallizing thickness using Type 2 magnetic gage, calibrated according to SSPC-PA 2, as follows:

   The QC Supervisor is responsible for randomly selecting and measuring metallizing thickness at separate, evenly spaced, spot measurement locations over one 100-square feet of area within each
   300 square foot unit of surface area of structural steel that is metallized. Locate 5 spot measurements on each of the following locations: top flanges, bottom flanges, webs, cross bracing, stiffeners, etc. At each spot location, take 3 gage thickness readings on the metallized surface. Move the probe 1 to 3 inches for each new gage reading. Discard an unusually high or low gage reading that is not consistently repeated. The spot thickness measurement is the average of the 3 gage readings.

   The average of 5 spot measurements for each location in the 100-square foot area shall not be less that the specified thickness. No single spot measurement area shall be less than 80 percent of the specified minimum thickness nor greater than 24 mils. Any 1 of 3 readings which are averaged to produce each spot measurement may underrun or overrun by a greater amount.

   The above procedure is the minimum specified level of Metallizer Contractor-performed quality control. Monitor his metalizing application to the extent necessary to assure that any random spot reading meets the thickness requirements specified above.

   Install metallizing with the following thickness:

Location	**Min. Spec. Thickness**	**Min. Spot Thickness**	**Max Spec. Thickness**	**Max Spot Thickness**
All Steel Surfaces	10.0 mils	8.0 mils	16.0 mils	24.0 mils

Test areas of metallizing that exceed the maximum spot thickness by adhesion testing. If the values meet the requirements of 513-3.15.8, the coating is acceptable. In an area where the adhesion test cannot be performed, cut test the coating according to 513-3.05.

Metallized Coat-Adhesion Tests (QCP #7). Ensure the QC Supervisor performs and documents the results of adhesion tests in accordance with ASTM D4541 at locations randomly selected by the Engineer in each 500-square feet area metallized or on companion coupons sprayed at the same time for each 500-square foot coated area, at the Engineer's discretion. Perform the test in the presence of the Engineer. The minimum acceptable adhesion value is 500 psi. Make repairs according to Subsection 513-5.15

At the selected areas check the plate edges and areas that are not accessible for adhesion testing by performing at least 3 cut tests. If the cut tests for that area do not meet the requirements of 513- 3.05.2, additional measurements will be taken to determine the extent of the deficient coatings.

The above procedure is the minimum specified level of Contractor-performed quality control. Monitor application to the extent necessary to assure that any random spot reading meets the specified metallizing adhesion value.

513-3.14 SEAL COAT APPLICATION (QCP # 8). If the surface is degraded or contaminated, restore the surface to the specified surface cleanliness before applying the sealer.

If moisture is present in the pores of the metallized surface, heat the surface to 250° F to remove the moisture prior to seal coat application.

Apply the sealer to all previously metallized surfaces as soon as possible after thermal spraying. Do not allow the metallized surface to stand for longer than 8 hours before application of the seal coat. Do not apply seal coat over visible oxidation of the metallizing.

Apply the sealer in a two-coat operation, a mist coat and a full coat. Thin the mist coat up to the manufacturer's written maximum amount using the recommended thinner in order to penetrate the metallizing layer. Apply the full finish sealer coat without thinning.

Apply the sealers to all metalized surfaces at the manufacturers recommended dry film thickness (mils).

If conventional spray is used, verify that the compressed air supply is clean and dry as determined by the blotter test. When spraying, use extreme care to avoid contamination of surrounding areas or property by overspray. Brushes or rollers may be used to control overspray, or for localized application such as touch- up, in areas of limited accessibility for spraying, or for stripe coating.

Do not apply the sealer to faying surfaces prior to assembly. Mask faying surfaces of all bolted connections prior to the application of the seal coat. Apply touch-up sealer to the connections after assembly.

Apply sealer in a manner that coats are well-adherent to each other and to the underlying surface. If the application of any coat causes lifting of an underlying coat, or there is poor adhesion between coats or to the substrate, remove the coating in the affected area to adjacent sound, adherent, coating, and reapply the material. If sealer adhesion appears deficient, conduct adhesion tests in

accordance with ASTM D4541, Type 4 or ASTM D3363 as determined by the Engineer and repair all test areas. For coatings testing according to ASTM D4541, meet or exceed 400 psi adhesion between coats. For sealer tested according to ASTM D 3363, meet or exceed scale of hardness HB for the coating.

513-3.15 METALLIZING REPAIR. Repair areas of metallizing that do not have acceptable adhesion or cut tests by removal and replacement.

Repair areas of metallizing that have low coating thickness, but have acceptable cut or adhesion tests, by brush blasting according to SSPC-SP 7 to establish the cleanliness of the Job Reference Visual Standard and the profile of the unmetallized side of the Job Reference Plate Standard. Then metallize according to Subsection 513-3.13. Control blasting to create the cleanliness and profile standards with minimal removal of acceptable metallizing.

Repair damage areas, including destructive test locations, of less than 1 square foot by using hand or power tools to establish the cleanliness of the Job Reference Visual Standard and the profile of the Job Reference Plate Standard. Then metallize according to Subsection 513-3.13.

Repair damage areas greater than 1 square foot by abrasive blasting according to Subsection 513-5.10 to establish the cleanliness of the Job Reference Visual Standard and the profile of the Job Reference Plate Standard. Then metallize according to Subsection 513-3.13

Overlap all repairs at least 2 inches into the accepted coating to provide a feathered-area overlay between the accepted metallized areas and the repair area. Metallize the feathered-area and the repair area, so that the repair, overlay and accepted areas are a uniform coating of the thickness specified in Subsection 513-3.13.

Graham Industrial Coatings

Daily Coatings Inspection Form

NOTE: DO NOT CHANGE BLUE SECTIONS

Report No.:	**Project:**	Rabbit Crk Ped Xing		**Spec No.:**	513	
Date:	**Work Area:**			**GIC - QC:**	J. Martin	
Day:	**Substrate:**	Structural Steel		**GIC - PM:**	D. Graham	
AMBIENT CONDITIONS	***Time:***					
Air Temp						
Surface Temp						
RH						
DP Temp						
DeltaT			0	0	0	0
Cleared to Blast/Coat Yes/No		YES				

SURFACE PRE-CLEANING		***Standard:***	CS23.0
Surface Defects:		**Cleaning Method:**	Pressure Wash with Chlor-Rid
Solvent:		**Result:**	
Comments:			

SURFACE CONTAMINANTS TEST		***Standard:***	ASTM D4940
Contaminant:	***Method:***	C-S-N Test Kit	***Result:***
Chloride:			
Sulphate:			
Nitrate:			
Grease/Oil:			
Comments:			

SURFACE PREPARATION		***Standard:***	SSPC SP-5
Method:	Open Dry Blast	**Equipment:**	Portable Abrasive Blaster
Media:	20/50 NS	**APP Spec:**	3.0 - 5.0 Sharp/Angular
Test Method:	SPG Gauge	**Result:**	
Comments:			

PRE-COATINGS CLEANUP		***Standard:***	
Method:		**Equipment:**	
Test Method:		**Result:**	
Comments:			

METALLIZING		***Standard:***	Nace No.12 / SSPC CS23.0
Method:	Thermal ARC Spray	**Equipment:**	Thermion Precision Arc 4.8
Required Thickness:	10 - 14mils Min.	**Metal Type:**	TH700 - Pure Zinc Alloy 99.9% Pure
Test Method:	CS23 Mandrel Bend	**Result:**	(pass/fail)

Comment:

NOTES

Signed:	**Title:**	**Date:**
Signed:	**Title:**	**Date:**

GRAHAM INDUSTRIAL COATINGS, LLC
Trust, Loyalty, Excellence!

Contract Review Procedure

GIC ESTIMATOR - IMPENDING AWARD

- Obtains DRAFT Copy of Contract and All Attachments and Exhibits.
- Reviews Contract for Scope and Pricing Accuracy
- Reviews Final Drawings, Addenda, Specifications
- Reviews Proposed Schedule
- Sends Contract and Recommendations to Contract Reviewer.

GIC CONTRACT REVIEWER (COO, PM)

- Reviews Contract and Recommendations.
- Completes Contract Reviewer's Checklist (attached)
- When Appropriate, Forwards Contract and Checklists to Company General Counsel. General Counsel will Return Material to the Contract Reviewer.
- Contract, Recommendations, and Completed Checklists to Contract Admin.

GIC CONTRACT ADMINISTRATOR

- Incorporates Any Necessary Changes.
- Forwards Contract and Completed Checklists to GIC CEO

GIC CONTRACT AUTHORITY (CEO)

- Reviews Final Contract Draft, Final Consult with COO and Counsel
- Signs 2 Original Contracts.
- Sends Contracts to Awarding Entity / Client / Contractor

GIC CONTRACT ADMINISTRATOR

- Obtains Signature(s) from Contractor(s).
- Retains a Copy of Fully Executed Contract.
- Forwards a Fully Executed Original Contract to COO and PM

GRAHAM INDUSTRIAL COATINGS - CONTRACT REVIEW CHECKLIST

Project Name: _____ **Reviewer:** _____

Estimator: _____ **Signer:** _____ **Date:** _____

	Topics	Yes	No	N/A	Comments
1.	Review definition of scope of work, confirm all work is defined				
2.	Are there any design obligations?				
3.	Review shop drawing and submittal process				
	a. Determine the requirements				
	b. Determine if there is a time limit for review				
4.	Are all sections in the Specs listed in the TOC?				
5.	Are all sections listed in the TOC contained in the specs?				
6.	Do page numbers correctly show the placement of specification content?				
7.	Check cross – references (include the drawings)				
8.	Look for missing content				
9.	Is the contract price correct?				
10.	Have we reviewed the G/C's contract with the Owner?				
11.	Has legal counsel reviewed the contract?				
	a. If so, do we have their comments?				
12.	Have we had an in depth conversation regarding billings and payments?				
	a. Have we provided a Schedule of Values?				
	b. Have we provided a Billings Projection?				
	c. When are our billings due in the Contractor's office?				

	Topics	Yes	No	N/A	Comments
	d. When will our monthly billings be paid?				
	e. Who is the Lender for the project? Provide name and contact information.				
	f. What are the retention terms and when will it be released?				
	g. Are there any prevailing wage requirements?				

13	Have the insurance requirements been reviewed and approved by our insurance agent?				
14	Are we (or our suppliers) obligated to provide E&O Insurance?				
15	Are bonds required?				
16	Are disputes resolved by Litigations or Arbitration? Where?				
17	Is there a Liquidated Damage Clause?				
	a. What are the terms/limits?				
18	Are there any design build or bidder design elements?				
19	Is the schedule acceptable?				
20	Is the list of Drawings and Specs correct?				
21	Are the Inclusions/Exclusions complete and correct?				
22	Has Sales reviewed and agreed that the scope of work and contract value are correct?				
23	Does the owner/GC have a builder's risk policy?				
	a. If so, are we responsible for the deductible?				
	b. Value?				
24	Have we reviewed the indemnity agreement?				
25	Do we have indemnity for our negligence only?				
26	OR is it for any and all items occurring on the project?				
27	For scope/schedule changes, what is the required notice time frame to preserve our rights for a claim?				
28	Is there anything unusual or out of the ordinary with this contract?				
Topics		**Yes**	**No**	**N/A**	**Comments**
29	Inspection Requirement				
	a. In-House				
	b. 3rd Party				
30	Are We Capable?				
31	Manpower/Training Certification Requirements?				
32	Company Certification Requirements?				
33	Are We Equipped?				
34	Are We Tooled?				
35	Do We Require Subcontractors?				

GRAHAM
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Document Control Procedures

1. Purpose

The purpose of this document is to define methods for document control at GIC. The purpose of this procedure is to define the controls required to:

- Approve documents for adequacy prior to use
- Shared Network Drive
- Internal/Informal Design Documents
- Review and update documents as necessary
- Naming and numbering files/documents
- Ensure that changes and the current revision status of documents are identified
- Ensure that relevant versions of applicable documents are available at points of use
- Ensure that documents remain legible and identifiable
- Ensure that distribution of external documents remain controlled
- To prevent the unintended use of obsolete documents ad to apply suitable identification to them if retained

2. Approving Documents for Adequacy

- Once an official document has been drafted, the document will go through a process of review with select management officials where it is read, commented on, and amended if needed prior to the release of the document.
- After the document has been through the review process, it should be signed by the quality manager. Upon signature, the approval will be signified by the placement of the document into the "shared network drive" used by GIC.

3. Shared Network Drive/Filing System

GIC employs a shared network drive feature where all electronic documents are filed and stored and can be accessed by trusted members of GIC management. Important accounting, financial, and administrative documents pertaining to the current fiscal year that are accessed and reviewed frequently are stored in physical files within the office.

As the current fiscal year ends, essential accounting, financial, and administrative documents that may be utilized in the following fiscal year are uploaded electronically to the shared public drive, non-essential documents are boxed, documented, and stored.

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4. Internal/Informal Design Documents

During developmental/design stages of a project, there may be documents that are generated to capture ideas, concepts and points of discussion. These documents are not necessarily formal in nature. These documents shall not be required to follow the formal document control process, but they will be required to be retained. These documents shall not be required to have document control numbers, or revision numbers associated with them.

5. Review and Updating documents

- GIC will conduct a document review on an as-needed basis. GIC will conduct a review of documents during times of significant organizational change, or if there has been a formal request by either a member of management or an employee to review certain documents.
- Upon request to review specified documents, all changes to the current document will be recorded and the old version of the document will be archived and replaced with the new version which will be clearly marked with the amended sections.
- Administrators will be charged with maintaining a record sheet showing a brief description of each change made to a document.
- To protect from un-authorized editing, GIC password protects electronic documents to allow a "read-only" on certain documents.

6. Naming/numbering files/documents

All GIC documents will be required to have the minimum identification

- Title of document as listed
- Type of document (QA/QC, Financial, Administrative, Project Management, Policies and Procedures, etc)
- Revision number (Starting as R01 indicating no official revisions)
- Last date of revision

As an example, this document will have the following identification: Document Control Procedure_PP_R01.doc

Documents such as Quality Control/Quality assurance, security, equipment operation, employee policy and procedure, health and safety, and environmental handbooks/manuals will be required to have a change table available with the following fields:

- Date of change
- Revision number
- Author
- Description of change
- Documents with many versions there will be an included revision number in the header and footer of every page.

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7. Availability of applicable documents at points of use

- All administrators function as "Document Controller" and have access to master copies of every document as mostly everything at GIC is held electronically. GIC has a server-based system with on-site backup.
- Document controllers (GIC administrators) are responsible for ensuring that all individuals effected by the change to the document are notified. This can be achieved by face-to-face meetings, or with email correspondence between administrators and employees/managers.

8. Legible and Identifiable documents

- It is the responsibility of both the creators and the users of the documents to ensure they remain legible and easily identifiable using the GIC document labeling system as mentioned in Section 6.
- If there is an issue found with a document, administrators of GIC should be informed immediately and notify those involved when the change is made.
- Grammatical or spelling errors that are brought forward will not result in a formal notification or update in revision number to the document upon editing.

9. Distribution of External Documents

GIC will control external documents using the same procedures as internal documents. All external documents sent from clients/subcontractors will be reviewed by the managing members that the document pertains to. Once reviewed and approved, it will be identified and controlled.

10. Preventing the unintended use of obsolete documents

- Documents that are obsolete will either be disposed of by deleting it from the file, or if that document needs to be retained for any purpose will be archived electronically and marked appropriately.
- If the document needs to be retained for future use, document controllers will remove the document from the shared network drive and electronically archive it to a designated area in a controlled network folder. Electronic access will be read-only files.
- Physical documents that are obsolete will be either shredded if not needed for future use, or will be boxed and physically archived in a designated storage area.

GRAHAM
INDUSTRIAL COATINGS, LLC
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A Woman-Owned, HubZone Alaska Company

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QUALITY CONTROL PROGRAM

INTRODUCTION

This Quality Control Program represents the corporate policies and procedures that Graham Industrial Coatings, LLC utilizes to control the quality of the work performed, and to demonstrate compliance with the requirements of SSPC Qualification Procedure No. 1 (SSPC-QP 1), "Standard Procedure for Evaluating the Qualifications of Industrial/Marine Painting Contractors (Field Application to Complex Industrial Steel Structures)." This program is adapted to address project-specific needs or contract requirements using the appended forms.

The attached forms represent the type of information that will be recorded. Graham Industrial Coatings, LLC may, at its sole discretion, use forms different than those which are appended that provide similar information.

APPROVALS

This Quality Control Program is approved for use by Graham Industrial Coatings, LLC (GIC). The QC program is reviewed and revised (if required) at least annually. The GIC Quality Control Manager (QCM) or designee assigned to the project has complete authority to implement the portions of this program that are applicable to the project. This same individual has the authority to stop work operations if work is not in compliance with this program or the governing project specification.

Priscilla T. Graham, CEO

Graham Industrial Coatings, LLC
23 December, 2019

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1.0 MANAGEMENT PROCEDURES

1.1 Company Policy

1.1.1 General Mission Statement

A. It is the policy and goal of Graham Industrial Coatings, LLC to provide painting, protective coatings, and related services to the high quality requirements of the industry, government agencies, and our customers in accordance with their requirements and specifications.

B. The management of Graham Industrial Coatings, LLC hereby acknowledges its total support of the Quality Control Program described herein, and requires that this program be implemented by all personnel directly or indirectly involved in the painting operations.

C. Management reviews this Quality Control Program on a periodic basis, but not less than annually.

D. Graham Industrial Coatings, LLC has established a detailed safety program to be implemented and enforced by each competent person on all company work sites. Safety is of the greatest importance to the proper execution of all projects, and is given the highest priority. Graham Industrial Coatings, LLC maintains separate environmental, safety and health compliance programs. These are not included in this program.

1.1.2 Disseminating Company Policies within the Organization

A. Company policies are first introduced to personnel upon hiring during initial indoctrination. The topics covered and the documents issued during initial indoctrination are recorded on Form 1, "New Hire Orientation Record." Policies are also introduced during periodic management, safety, or quality control meetings. As new policies are adopted and issued, personnel are informed via interoffice memos or similar. These policies are disseminated by management to effected personnel throughout the company.

1.2.2 Environmental, Health and Safety (EH&S) Manager

A. Responsible for keeping track of new, revised and withdrawn regulations and informing the CEO and/or other management personnel of the impact of regulatory changes on the company's operations and managing compliance environmental health and safety programs.

B. The EH&S Manager is the primary author of the contractor's corporate health and safety program approved by executive management or shall have successfully completed training from one of the following:

1. OSHA-500 or 5400 training (for marine industry, OSHA 501 or 500 training) or

2. SSPC C-3 training plus OSHA 30 Training or

3. A minimum of 40 contact hours of training covering those elements listed in Section 10 of SSPC-Guide 17 applicable to the contractor's operations.

C. The EH&S Manager has at least 3 years of experience in industrial painting safety or related construction safety, and is the primary author of, or has documented training on, the contents of the company's Environmental Compliance Program.

1.2.3 Applicators/Surface Preparation Personnel[1]

A. Preparation of surfaces, and the mixing and the application of coatings are the responsibility of production personnel.

B. Production personnel have been formally trained in the various methods of surface preparation and coating application and have a minimum of two years of documented experience.

C. Management identifies and records the name of the individual within the company who possesses the highest level of knowledge and experience related to the surface preparation and coating application process.

D. Production personnel are continually assessed by the QC Supervisor in the field for proficiency.

[1] *This quality control program is not intended to meet the SSPC-QP1 requirements for Coating Applicator Specialist (CAS) Certification. Additional information on the CAS program is available at www.sspc.org.*

1.2.4 Quality Control Personnel

A. Inspection of the surface preparation, mixing, and application of coatings is the responsibility of the quality control personnel who are managed by the QC Supervisor. This ensures total independence from production.

B. QC personnel are fully trained and capable of the following:

1. Verifying that the surface preparation and coating work complies with the project specification.

2. Identifying coating quality problems, recommending potential solutions, and verifying that the quality problems are ultimately resolved.

C. The Graham Industrial Coatings, LLC inspectors are fully trained and qualified in accordance with the guidelines outlined in Section 3.0 (Quality Control) of this program.

D. Attachment 2, "Quality Control Inspection Procedures" defines the responsibilities of the QC Inspectors.

1.2.5 Quality Control (QC) Supervisor

A. The QC Supervisor has the authority and responsibility for the implementation and enforcement of all quality related functions.

B. The QC Supervisor is independent from production, reporting only to the Principal Administrator responsible for the program integrity.

C. The QC Supervisor is responsible for maintenance and distribution of this Quality Control Program and for supervising revisions to this program as necessary for management approval.

D. The QC Supervisor is authorized to identify problems relating to quality and to recommend and initiate solutions to those problems.

E. The QC Supervisor, in matters relating to quality, is authorized to mediate disputes between various personnel within the company as well as disputes between the company and outside agents such as customers, third party inspectors, regulatory agents, etc.

1.2.6 Resumes for key QC personnel are provided upon request

1.2.7 A list of names, titles, duties, and job descriptions for key management personnel, including QC Supervisor, Production Manager, and EH&S Manager, are provided after the organizational chart in Attachment 4. Key management personnel are full time employees of Graham Industrial Coatings, LLC and report directly to executive management.

1.2.8 Management and Supervisory Training

A. Management and supervisory personnel attendance at training courses and the satisfactory completion of each course is maintained in the employee personnel file and included on the individual's resume.

1.3 Administrative and Management Procedures

1.3.1 Method of Financial Recordkeeping

A. Graham Industrial Coatings, LLC utilizes computerized accounting software to assist in the management of payroll, accounts payable, accounts receivable, and job costing. Graham Industrial Coatings, LLC utilizes a purchase order number system, which contains the project code number. With this numbering system, accurate project costs and records are tracked against the project code number. When accounts payable invoices are received, the job number, vendor name, amount, and payment terms are entered.

B. Job cost accounting system

1. The information in 1.3.1.A is consolidated into a job cost accounting program which includes all labor costs, insurance, taxes, materials, rentals, and other cost data.

C. Accounting systems, principles and practices are confirmed in writing by a CPA or equivalent.

1.3.2 Procedures for Contract Estimating, Scheduling, and Job Cost Accounting

A. Estimating

1. Upon receipt of an inquiry or a bid notice, the specifications and scope of work are carefully reviewed (See Section 1.3.3). If drawings are made available, a quantity take-off may be prepared of the surfaces scheduled to receive surface preparation and coatings. Any documentation received for a project is recorded on Form 2, "Receipt of Client Documentation Tracking Log." A site visit may be conducted (as necessary) to verify the scope of work.

2. Pre-bid meetings are attended, as required, to discuss contract / specification requirements.

3. The areas of work are recapped in the form of total area (square footage) by coating system or by surfaces to be coated. These quantities are used to estimate material requirements.

a. Labor is determined by using the square footage and any special job conditions that would affect the cost of performance.

b. Quality control costs are factored in depending upon contract requirements.

c. Equipment is factored in as required for surface preparation, scaffolding, safety, and environmental controls.

d. Costs for the control, storage, testing and disposal of waste (hazardous and/or non-hazardous) are considered.

e. The availability of water, electricity, and sanitary facilities are considered.

f. Labor costs are calculated with local labor rates, applicable insurance, and tax rates.

4. All costs are recapped and a reasonable profit is applied to the project.

B. Scheduling

1. Upon award of a project, the Owner or its representative indicates required completion dates. A work plan is prepared utilizing the man-hours from the estimate and required completion dates to derive project manpower loading. Each project is properly positioned into a priority schedule to assure project completion dates are maintained.

2. Qualified personnel and required equipment are assigned to the specific project.

C. Job Cost Accounting

1. Prior to project start-up, a project budget is prepared which estimates monthly job costs. Actual job costs are compiled and updated on a weekly basis and include labor costs, all accounts payable to the project and all associated costs.

2. The procedures outlined above are followed when all bids are prepared.

1.3.3 Use of Sub-Contractors

A. When necessary, Graham Industrial Coatings, LLC utilizes sub-contractors to assist in meeting project and/or inspection requirements. Sub-contractors are chosen based on their ability to perform the work.

B. When sub-contractors are utilized, Graham Industrial Coatings, LLC retains ultimate responsibility for performing the work in accordance with project specification, and meeting any QP-1 requirements.

C. All sub-contractors performing coating application and surface preparation activities are QP-1 certified if the project requires QP-1 certification.

D. Graham Industrial Coatings, LLC ensures that surface preparation and coating application performed by sub-contractors meets QP-1 requirements even if the project does not require QP-1 certification.

1.3.4 Method used to Review Job Specifications and Other Bid Documentation

A. Graham Industrial Coatings, LLC management coordinates the bidding process by reviewing specifications and other bid documents with the project estimator and QC Supervisor. Documentation received for each project is recorded on Form 2, "Receipt of Client Documentation Tracking Log." The QC Supervisor assesses all quality related requirements and determines the QC staffing and instrumentation required. Items of significance are highlighted. After the estimate recap is complete and costs are applied by the project estimator, management reviews the estimate and makes any necessary changes.

B. If awarded a contract, job performance is monitored on a routine basis by reviewing job costs against the project budget.

1.3.5 Procedures for Researching and Achieving Compliance with Current Federal, State, and Local Environmental, Health, and Safety Regulations

A. Graham Industrial Coatings, LLC recognizes the ever-changing environmental, health, safety, and other governmental regulations in the painting industry.

B. Regulations are reviewed periodically by the EH&S Manager using the internet to review OSHA and EPA websites, correspondence with consultants, membership in local and national organizations (i.e., SSPC, NACE, and ASTM), and review of technical journals such as the Journal of Protective Coatings and Linings and other publications for current regulatory information.

C. Changes in regulatory requirements are disseminated to field personnel as part of the monthly mandatory meetings held by Graham Industrial Coatings, LLC .

D. Records of citations or fines levied as a result of violations of any federal, state, or local safety and health, wage and hour, tax, or other applicable code, law, or governing regulation are maintained at the home office. The actions taken to avoid repeat violations are maintained at the home office as well.

2.0 TECHNICAL CAPABILITIES

2.1 Craft Worker Qualifications

2.1.1 Training Programs

A. Field personnel who perform repairs, surface preparation, and coating and lining application are trained in all aspects of surface preparation and coating application commonly performed by Graham Industrial Coatings, LLC

.

B. The training curriculum consists of visual, auditory and kinesthetic learning methods associated with surface preparation and coating application equipment. Training is performed in-house and/or provided by recognized outside agencies (i.e., labor organizations, manufacturers, trade schools, and consultants). In-house training attendance is documented using Form 7. Documentation of all training related to surface preparation and coating application is maintained in the employee personnel file and on Form 9, "Surface Preparation and Coating Application Training Record."

C. Surface Preparation

1. The following surface preparation specifications developed by the SSPC form part of the training curriculum:

   a. SSPC-SP 1, "Solvent Cleaning"

   b. SSPC-SP 2, "Hand Tool Cleaning"

   c. SSPC-SP 3, "Power Tool Cleaning"

   d. SSPC-SP 5, "White Metal Blast Cleaning"

   e. SSPC-SP 6, "Commercial Blast Cleaning"

   f. SSPC-SP 7, "Brush-off Blast Cleaning"

   g. SSPC-SP 10, "Near White Blast Cleaning"

   h. SSPC-SP 11, "Power Tool Cleaning to Bare Metal"

   i. SSPC-SP 13, "Surface Preparation of Concrete"

   j. SSPC-SP 14, "Industrial Blast Cleaning"

   k. SSPC-SP 15, "Commercial Grade Power Tool Cleaning"

   l. SSPC-SP 16, "Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals"

m. SSPC-SP WJ 1, 2, 3 ,4, Waterjetting Standards

n. SSPC-WAB 7, 14, 6, 10, 5, Wet Abrasive Blas Cleaning Standards

2. The cleanliness requirements and indirect requirements of the surface preparation standards listed in 2.1.1 (C) are described and the visual acceptance criteria are demonstrated by qualified Graham Industrial Coatings, LLC or other outside source personnel.

3. Surface preparation equipment set-up and operation is demonstrated and explained by qualified Graham Industrial Coatings, LLC or supplier personnel and personnel are qualified using a hands-on or skills assessment in accordance with SSPC C-7. This may be performed in-house, through SSPC or other recognized outside agency.

D. Mixing/Application of Coating Materials

Various methods of mixing and application of the most common coatings used on typical industrial painting projects are explained and demonstrated by qualified and knowledgeable Graham Industrial Coatings, LLC or supplier personnel. Documentation of training in specific materials or application techniques is maintained in the employee personnel file. Typical coating materials, mixing and application methods follows:

1. Coatings Materials:

a. Epoxy

b. Urethane

c. Zinc Rich Primers (IOZ and OZ)

d. Alkyd

e. Others (as applicable)

2. Mixing Methods:

a. Proper blending of components

b. Power operated mechanical mixing blades

c. Boxing

d. Screening

e. Pot Agitation

f. Others (as applicable)

3. Application Methods:

a. Airless Spray

b. Conventional Spray

c. Brush/Roller

d. Others (as applicable)

E. Specialty Skills or Materials

1. Employees are qualified in special processes (such as UHP water jetting, plural component spraying, etc.) in-house or through manufacturer, suppliers or outside agencies.

2.1.2 Applicator Qualifications[2]

A. Applicator qualifications are based upon one or both of the following:

1. Satisfactory previous performance on similar projects related to the mixing and application of a specific coating. Form 8, "Applicator Qualification Record" is used to document previous experience.

2. Demonstration of proficiency in the mixing and application of a specific coating material. Form 10, "Blaster/Applicator Proficiency Record" is used to document demonstrations of proficiency.

B. The criteria for establishing applicator qualifications include, but are not limited to the following:

1. Coatings mixed in accordance with manufacturers' written instructions.

2. Coatings applied using recommended application equipment.

3. Coatings applied in accordance with manufacturers' written instructions and/or specification requirements and standard industry practice.

4. Coatings applied at the correct wet film thickness to achieve the specified dry film thickness free of any defects or as specified by the project specification.

[2] This quality control program is not intended to meet the SSPC-QP1 requirements for Coating Applicator Specialist (CAS) Certification. Additional information on the CAS program is available at www.sspc.org.

C. Records of qualifications are maintained and updated as required. Copies are maintained in the project file and in the employee personnel file.

2.1.3 Proficiency Monitoring

A. The project superintendent verifies that site personnel are on the company list of "qualified" applicants monthly or whenever site personnel changes are made. Only qualified personnel or supervised trainees are permitted to apply coatings.

B. Application personnel are monitored periodically throughout a project by the project superintendent.

C. The applicator's technique is observed by the project superintendent to verify that proper application techniques are employed to achieve a quality end product. Form 10, "Blaster/Applicator Proficiency Record" is used to document demonstrations of proficiency.

D. If improper techniques are observed, the applicator is informed by the project superintendent of the observed deficiency, reminded of the proper technique, and retrained if required.

E. Continued use of improper techniques results in appropriate disciplinary action.

2.2 Technical Resources

2.2.1 Industry Associations

Graham Industrial Coatings, LLC maintains affiliations with specific industry organizations. Form 14, "List of Affiliations with Industry Organizations" is used to identify Graham Industrial Coatings, LLC association with specific trade organizations, technical societies, and other industry groups.

2.2.2 Library of Current Technical Standards

A. Office, key management and production personnel maintain current versions of project specifications, engineering standards, Product Data and Safety Data Sheets, Standard and Safe Operating Procedures for equipment; industry standards (e.g. SSPC, ASTM, NACE, AWWA, API), regulations (e.g. DOL, Workers Compensation, OSHA, EPA, other federal, state or local agencies having jurisdiction over the job site or shop) applicable to the specific projects.

B. Hard paper copy, current versions of applicable standards, regulations, specifications, data sheets, etc. are available to personnel at the job site during the daily course of production and quality control operations, and there is evidence of their use at the job site.

2.3 Procedures

2.3.1 Records of Job Specification/Document Revisions Distribution

A. Form 4, “Document Receipt Acknowledgement Form” is maintained by the QC Supervisor to indicate job specification/documents assigned to project personnel as well as revision numbers and dates. This assures all involved project personnel are provided with the most current job site specification/document revisions.

2.3.2 Procedures for Acknowledging Receipt of the Specification/Document Revisions

Graham Industrial Coatings, LLC’ QC Supervisor distributes to field production and quality control personnel the original project specifications and related documents, and subsequent revisions. Form 4, “Document Receipt Acknowledgement Form” is attached to each document distributed, and is signed, dated and returned to the QC Supervisor by each recipient to acknowledge receipt of the documents.

2.3.3 Procedures for Clarifying Specifications

A. An "in house" pre-job meeting is conducted between the Graham Industrial Coatings, LLC Project Manager/Superintendent and the QC Inspector to review the project specifications. During the meeting, ambiguous areas within the specification are discussed. Clarification is obtained from the owner/specification writer and confirmed in writing. All such communications/notations beyond what is written in the specification are documented on Form 3, “Specification Clarification Form."

2.3.4 Communication of Job Specification/Documents to Quality Control and Production Supervisors

A. During scheduled meetings between the home office and key field personnel, project specifications and procedures are reviewed to assess whether the work is being performed in accordance with current specifications and procedures. In addition, if any revisions have occurred, these revisions are immediately transmitted to the appropriate site personnel via Form 4, "Document Receipt Acknowledgement Form." This form is signed by the recipient, returned to the home office and placed in the project file.

2.4 Experience, Facilities, and Equipment

2.4.1 Experience/Facilities

A. Graham Industrial Coatings, LLC maintains a list of all coating materials and amounts applied for all projects. Copies of these records are maintained in the home office.

B. Records indicating the coating manufacturers that have approved Graham Industrial Coatings, LLC for the application of their products are kept current and are updated on a regular basis. This information is maintained at the home office.

C. Form 5, “Project Record” provides a list of completed projects and descriptions of scopes of work. This form is maintained on file at the home office.

2.4.2 Equipment

A. A record of equipment either owned or leased by Graham Industrial Coatings, LLC for surface preparation and coating application is maintained at the home office using Form 15, “Record of Equipment.”

B. For each piece of equipment, Graham Industrial Coatings, LLC maintains Form 6, "Record of Equipment Maintenance/Repair.” The procedure utilized for evaluation of each piece of equipment and completion of Form 6 is as follows:

1. All equipment is returned to the shop at the completion of a job.

2. All equipment is inspected and operated by the maintenance department personnel. Any necessary repairs are made and documented on Form 6.

3. All equipment powered by internal combustion engines is serviced according to the Preventative Maintenance Protocol every 2,500 operating hours or in accordance with the manufacturer's instructions, whichever is sooner. All such service is noted on Form 6.

3.0 QUALITY CONTROL

3.1 Personnel Qualifications

3.1.1 QC Supervisor

A. The QC Supervisor is responsible for all quality control-related activities of Graham Industrial Coatings, LLC.

B. The QC Supervisor has at least three years of protective coatings industry experience and has successfully completed the SSPC Quality Control Supervisor Course, and SSPC BCI or PCI Level 2 or NACE CIP Level 2 certification or equivalent third-party training/certification acceptable to SSPC.

3.1.2 QC Inspectors

A. All Quality Control Inspectors have at least two years field experience in protective coatings.

B. QC inspectors have the physical (including visual acuity) capability to perform required inspections.

C. All Graham Industrial Coatings, LLC QC personnel receive at least 24 hours of training delivered by the QC Supervisor or a recognized training provider that covers subjects for coating inspection described in ASTM D 3276., and are specifically trained for each new job assignment regarding quality related functions of the project by the QC Supervisor.

D. All Graham Industrial Coatings, LLC QC personnel receive formal training in the use of inspection instruments, industry guides and standards, kits and other essential aspects of inspections (record keeping, communication, etc.). This training is conducted either in house by the QC Supervisor or by a qualified outside training provider. Documentation of attendance at in-house training is recorded on the Form 7, "In-house Training Attendance Record." Additionally, QC personnel have a minimum of two years of experience in industrial coatings application.

E. Successful training is confirmed through a hands-on practicum and written examination.

3.1.3 Training/Qualification of Inspection Personnel

A. Training programs for QC personnel are conducted on an as-needed basis. The personnel file and resume for QC personnel are updated following each completed training course. Graham Industrial Coatings, LLC completes a resume for each QC Inspector and submits the resume(s) for client approval.

B. The Quality Control training includes lectures, discussions, reading materials, hands-on use of coating inspection instruments and documentation practices, and development of inspection plans.

C. Inspection instrumentation training includes:

1. Instruction on the principles of calibration, verification of accuracy, adjustment, proper use, and limitations of each piece of inspection equipment.

2. Demonstrations on the use of inspection instrumentation.

3. "Hands on" use and proof of proficiency.

D. Reading materials include participant workbooks guiding the training process, industry standards and test methods, this quality control program, coating materials product information, project specifications, etc.

E. Surface Preparation and Coating Application Demonstrations

1. Explain various surface preparation operations and demonstrate the proper use of the SSPC Visual Guides (SSPC VIS 1, 3, 4, 5) by evaluating various degrees of surface cleanliness on prepared test panels.

2. Explain various methods of coating application and demonstrate the spray application of coatings.

F. Field Documentation

1. Explains the purpose of an inspection plan and demonstrates the preparation of an inspection plan based on a project specification.

2. Explains the importance and purpose of documentation.

3. Demonstrates documentation of quality control inspections.

G. Following completion of the training program, the QC Inspector is administered an objective written examination on the technical training materials and is required to successfully complete a practical examination on use of inspection instruments and visual guides. Upon satisfactory completion of the written and practical examinations (scores of 70% or greater on both examinations), the personnel file and resume for the QC Inspector are updated.

3.2 Development of Project-Specific Work Plans

A. Graham Industrial Coatings, LLC develops a written Work Plan, inclusive of an inspection plan, for each project. The Work Plan addresses each production task prior to the start of work or during work on the specific project, as well as environmental compliance (i.e., proper disposal of paint and solvent waste, VOC compliance, etc.). The Work Plan contains a

revision number and issuance date so that revisions can be prepared and disseminated to project personnel (production and quality) according to updates/changes to contract requirements. The Work Plan addresses all of the processes that make up the required work. Each process that will be performed on the project is addressed by the Plan, including: a written description of the process (i.e., how limited access areas will be addressed); the qualification requirements for personnel performing the work; the methods used to ensure personnel performing the work have direct knowledge of the requirements prior to beginning work; the procedures that will be used to control the quality of workmanship and project specification conformance; and the methods that will be employed to accept/reject the work.

B. Graham Industrial Coatings, LLC prepares separate Work Plans and Quality Control Plans when required by the Client.

3.3 System for Filing Inspection Reports

3.3.1 "Daily Coating Inspection Reports" (Form 11) are completed, signed, and dated by the QC Inspector. Individual field log books are maintained. Copies of the reports are maintained at both the home office and project site office and reviewed prior to filing. In-process and final inspection records are maintained for a minimum of three years after completion of the project, unless the project requires that records be kept for a longer period. The original "Daily Coating Inspection Report" is sent to the Owner/Client's designated Project Engineer.

3.4 Inspection Equipment and Accuracy Verification Standards

3.4.1 Inspectors are equipped with the following inspection tools and accuracy verification standards. Inspection equipment is calibrated annually, or as required by the equipment manufacturer.

Inspection Check Point	Instrumentation
Ambient Conditions	Sling or Battery Powered Psychrometer
	Electronic Psychrometer
	Dew Point/Relative Humidity Charts
	Surface Temperature Thermometers
	Wind Meter
	Recording Hygrometer
Surface Preparation – Productivity	Hypodermic Needle Pressure Gage
	Pressure Blast Analyzer (nozzle orifice) Gage
Surface Preparation – Abrasive Cleanliness	Conductivity Meter
	Vial and Water
Surface Preparation – Air Cleanliness	Blotter Paper

Inspection Check Point	Instrumentation
Surface Preparation – Profile (one or more)	Visual Comparator, Depth Micrometer (digital or analog), Replica Tape, Portable Stylus Instrument
Surface Preparation – Cleanliness	SSPC VIS 1, 3, 4, 5
	Surface Salt Contamination Test Kit
Paint Temperature	Paint Temperature Thermometer
Wet Film Thickness	Wet Film Thickness Gage (optional)
Dry Film Thickness	Type 1 Magnetic Pull-off Gage
	Type 2 Electronic Gage
	Certified Coating Thickness Standards
	Plastic Shims (foils)
Adhesion	Tape/Knife Adhesion Test Kit
	Tensile (pull-off) Adhesion Test Kit
Pinhole/Holiday Detection (as required)	Low Voltage (wet sponge) Pinhole Detector
	High Voltage (spark) Holiday Detector
Illumination	Light Meter

3.4.2 The QC Inspectors are provided other coating inspection equipment as required by project specifications.

3.4.3 Calibration, verification of accuracy, and use of the inspection equipment is performed in accordance with Attachment 1, "Calibration and Use of Inspection Instrumentation" and/or the specific equipment manufacturer's instructions.

3.5 Procedures for Stop Work Order and Documenting Non-Conforming Work

3.5.1 The QC Inspector has the authority (in writing from a management designee) to stop work found to be non-conforming (both during hold point inspections and general inspections) and the responsibility to inform the Project Manager/Superintendent and the Site Superintendent of non-conforming work. Non-conformance items and the corresponding resolution are documented by the QC Inspector on Form 13, "Non-Conformance Report." For recurring non-conformance items, the root cause, corrective actions taken, and any required follow-up are also documented by the QC Inspector on Form 13, "Non-Conformance Report."

3.5.2 Whenever non-conforming work is identified and is remediated, Form 13, "Non-Conformance Report" is completed. Whenever non-conforming work is identified and remediation cannot be or is not undertaken within a reasonable time period, the QC Inspector notifies the designated QC Supervisor within 24 hours. This action, at

the discretion of the QC Inspector, is accomplished by a stop work directive, which, by company policy, must be observed by all jobsite production managers.

3.6 Procedures for Verifying Proper Surface Preparation and Coating Application

3.6.1 The QC Inspector reviews surface preparation, coating mixing, thinning and application procedures prior to start of work and periodically during each production day. The observations (employee name, date, location, and operation) are recorded on the "Daily Coating Inspection Report" (Form 11).

3.6.2 Hold Point Inspections (inspection checkpoints)

A. Hold point inspections (inspection checkpoints) are conducted to verify that surface preparation and coating application are conducted in accordance with the project specification and industry standards. The QC Inspector is responsible for inspecting and documenting the work at the established checkpoints. Work does not proceed until the QC Inspector conducts applicable inspections during surface pre-cleaning, surface preparation, primer application, intermediate coat(s) application, finish coat application and cure. Specific checkpoints and observations are based on the requirements of the project specification. The following inspections are recorded on the "Daily Coating Inspection Report" (Form 11) as applicable:

1. Compressed air cleanliness
2. Dry film thickness for each coat (recorded on Form 17, "Dry Film Thickness Measurement Log")
3. Air temperature (dry and wet bulb)
4. Relative humidity
5. Dew point temperature
6. Substrate surface temperature
7. Abrasive cleanliness
8. Surface preparation cleanliness specified and achieved
9. Surface profile specified and achieved
10. Illumination of work area (foot candles for surface preparation, coating application, and inspection).
11. Batch numbers of coatings and thinners
12. Mixing of coatings (quantity, mix numbers, satisfactory or unsatisfactory (for mixes witnessed)
13. Inspection instruments used (manufacturer, model, and serial number)
14. Documentation of conformance to any indirect requirements of specified technical standards

3.6.3 Most industrial coatings have a shelf life, which is the period of time the unopened containers can be stored (under the manufacturer's stated temperature and relative humidity ranges) and remain available for use. The shelf life (in months or years) is typically stated on the coating manufacturer's product data sheet (e.g., Packaging and Storage). The date of manufacture is critical to determining whether the material remains within shelf life. Many coating manufacturers code the manufacturer date into the batch number; therefore, the QC Inspector must be provided with the specific coating manufacturer's process for assigning batch numbers. One manufacturer publishes the following process:

Three digit Julian Date corresponding to the day of the year, followed by a fourth digit for the year of the decade. For example:

January 4, 2019:	0049 (if this product had a 3-year shelf life, it would expire January 4, 2022)
December 31, 2015:	3655 (if this product had a 2-year shelf life, it would expire December 31, 2017)
May 31, 2020:	1520 (if this product had a 1-year shelf life, it would expire May 31, 2021)

Batch Numbers may also include letters as a prefix and/or suffix to the manufacturing date to denote the plant location and multiple batches manufactured in the same plant on the same day.

3.6.4 Inspections are performed in accordance with specification requirements, the Inspection Plan, and Attachment 2, "Quality Control Inspection Procedures" and are documented on Form 11, "Daily Coating Inspection Report."

3.6.5 Documentation of the above-listed inspection activities is recorded in the daily field book and on the "Daily Coating Inspection Reports." Copies of this documentation are provided to the QC Supervisor and the client representative.

3.7 Procedures for Calibration and Verification of Accuracy of Inspection Equipment

3.7.1 The QC Supervisor is responsible for the control of all testing, inspection, and measuring equipment. These consist of inventory records and the issuing, reclaiming, and storing of equipment. All equipment is assigned a unique serial number, calibrated, and accuracy verified prior to, during, and after use as appropriate.

3.7.2 Calibration of inspection instruments is performed annually (or as required) by the equipment manufacturer or an accredited laboratory. Documentation of calibration is maintained in the home office. Proof of calibration labels are attached to each piece of inspection equipment and contain the calibration date and calibration expiration date.

3.7.3 Verification of accuracy is performed in accordance with Attachment 1, "Calibration and Use of Inspection Instrumentation" and/or in accordance with manufacturer's instructions, standard industry practices and the project specifications.

3.7.4 The QC Supervisor maintains a calibration equipment report, maintains files of all equipment calibration certificates, and verifies that equipment is tagged with calibration status. The QC Supervisor also verifies the following:

A. Each instrument has a unique serial number.

B. Form 12, "Inspection Equipment Calibration Record" has been completed, documenting the calibration for each of the inspection instruments. "Inspection Equipment Calibration Records" are maintained at the home office.

C. Form 16, "Jobsite Inspection Instrument Log" is used to record and track what inspection instrumentation has been assigned to a project. Form 16 is maintained in the Project Quality Control Manager's files. The following information is recorded:

1. Name of project or worksite
2. Serial number of the instrument
3. Brief description of the instrument and model number
4. Manufacturer of the instrument
5. Initial date and required frequency of accuracy verification
6. Date issued to and returned from the project

3.7.5 Calibration, loss, damage, and non-conformance

A. For instruments requiring verification of accuracy prior to, during and after each use, the initial date of accuracy verification is entered on Form 16 when issued to the project. The dates of subsequent accuracy verifications are not entered as this is an ongoing process and an integral daily step of the instrument operation. However, each day the instrument is used, verification of accuracy is noted on Form 11, "Daily Coating Inspection Report."

B. The date and description of accuracy verification for "no calibration necessary" instrumentation is entered on Form 11 on a monthly basis.

C. If an instrument is found to be out of tolerance, all data obtained using the instrument since the last verification of accuracy is re-evaluated. If the corrected results do not affect quality, rework is not required. If the corrected results are believed to have impacted quality, rework is required.

ATTACHMENT 2

QUALITY CONTROL INSPECTION PROCEDURES

1.0 SCOPE

1. These quality control inspection procedures are used in conjunction with the contract documents. In the event of a conflict, the contract documents govern.

2.0 REFERENCE DOCUMENTS

ASTM D4285, "Standard Test Method for Indicating Oil or Water in Compressed Air"

ASTM D4414, "Standard Practice for Measurement of Wet Film Thickness by Notched Gages"

ASTM D4417, "Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel"

ASTM D4940, "Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blast Cleaning Abrasives"

ASTM D5162, "Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates"

ASTM D7091, "Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals"

ASTM D7393, "Standard Practice for Indicating Oil in Abrasives"

ASTM E337, "Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of the Wet- and Dry-Bulb Temperatures)"

NACE SP0188, "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates"

NACE SP0287, "Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape"

SSPC-PA 2, "Procedure for Determining Conformance to Dry Coating Thickness Requirements"

SSPC-SP 1, "Solvent Cleaning"

SSPC-SP 2, “Hand Tool Cleaning”

SSPC-SP 3, “Power Tool Cleaning”

SSPC-SP 5/NACE No. 1, “White Metal Blast Cleaning”

SSPC-SP 6/NACE No. 3, “Commercial Blast Cleaning”

SSPC-SP 7/NACE No. 4, “Brush-Off Blast Cleaning”

SSPC-SP 10/NACE No. 2, “Near-White Blast Cleaning”

SSPC-SP 11, “Power Tool Cleaning to Bare Metal”

SSPC-SP WJ-1/NACE WJ-1, “Waterjet Cleaning of Metals - Clean To Bare Substrate”

SSPC-SP WJ-2/NACE WJ2, “Waterjet Cleaning of Metals - Very Thorough Cleaning

SSPC-SP WJ-3/NACE WJ-3, “Waterjet Cleaning of Metals - Thorough Cleaning”

SSPC-SP WJ-4/NACE WJ-4, “Waterjet Cleaning of Metals - Light Cleaning”

SSPC-SP 7 (WAB), “Brush-Off Wet Abrasive Blast Cleaning”

SSPC-SP 14 (WAB), “Industrial Wet Abrasive Blast Cleaning”

SSPC-SP 6 (WAB), “Commercial Wet Abrasive Blast Cleaning”

SSPC-SP 10 (WAB), “Near-White Metal Wet Abrasive Blast Cleaning”

SSPC-SP 5 (WAB), “White Metal Wet Abrasive Blast”

SSPC-SP 14/NACE No. 8, “Industrial Blast Cleaning”

SSPC-SP 15, “Commercial Grade Power Tool Cleaning”

SSPC-SP 16, “Brush Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steel, and Non-ferrous Metals”

SSPC Technology Guide 12, “Guide for Illumination of Industrial Painting Projects”

SSPC Technology Guide 15, “Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Non-Porous Substrates”

SSPC-VIS 1, “Guide and Reference Photographs for Steel Surfaces Prepared by Abrasive Blast Cleaning”

SSPC-VIS 3, “Guide and Reference Photographs for Steel Surfaces prepared by Power and Hand Tool Cleaning”

SSPC-VIS 4/NACE VIS 7, “Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting”

SSPC-VIS 5/NACE VIS 9, “Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning”

3.0 GENERAL REQUIREMENTS FOR INSPECTIONS

1. The area to be inspected is prepared and is ready for inspection.

2. Adequate lighting is available. The requirements for minimum lighting according to SSPC Guide 12 are followed when required by the contract documents.

3. Adequate accessibility to areas to be inspected is provided.

4. Inspection is conducted in a planned and controlled manner in accordance with this inspection plan. The large areas are mentally divided into smaller segments to organize for proper inspection coverage.

5. All inspections are documented on the Daily Coating Inspection Report (Form 11).

6. Inspection instrumentation and Visual Guides are used in accordance with Attachment 1, “Calibration and Use of Inspection Instrumentation.”

4.0 PRE-SURFACE PREPARATION INSPECTION

1. When required by the contract documents, verify removal of existing debris, rust scale and pack rust is sufficient to provide suitable surface to receive protective coatings.

2. When required by the contract documents, verify the removal of sharp edges, weld spatter, and laminations is sufficient to provide a suitable surface to receive protective coatings.

3. Inspect for deposits of grease, oil, cutting compounds, lubricants, and other visible contaminants. If detected, remove in accordance with SSPC-SP 1 "Solvent Cleaning" and re-inspected prior to mechanical methods of surface preparation.

4. Verify protective coverings are properly installed on areas that are not scheduled for surface preparation and painting.

5.0 SURFACE PREPARATION INSPECTION AFTER SURFACE CLEANING / WASHING

1. If required by the contract documents, verify that surfaces have been cleaned or washed.

2. If required by the contract documents, measure surface soluble salt concentrations and verify concentrations are below the specified tolerance threshold.

6.0 PRIOR TO FINAL SURFACE PREPARATION

1. Ambient conditions and surface temperature are measured approximately every four hours and recorded in the Daily Coating Inspection Report. Final surface preparation will not proceed when the surface temperature is less than 5°F (3°C) above the dew point temperature, or when fog or rain is present.

2. Compressed air cleanliness is verified once per shift (more often if required by the contract documents), according to ASTM D4285. Verification is performed prior to abrasive blast cleaning and prior to blow down using compressed air.

3. Abrasive cleanliness is verified prior to use according to ASTM D7373 (oil) and ASTM D4940 (water soluble contaminants via conductivity).

7.0 SURFACE PREPARATION INSPECTION AFTER CLEANING

1. If required by the contract documents, the surface is re-inspected for the presence of sharp edges, weld spatter, or additional laminations. If present, they are reported immediately to the production superintendent and recorded on the Daily Coating Inspection Report form.

2. The resulting surface profile (if specified) is measured according to ASTM D4417, Methods, A, B or C as required by the contract documents.

3. Prepared surfaces are visually inspected for conformance to the respective SSPC Surface Preparation Standard(s) listed in the specification and recorded. SSPC Visual Guides (SSPC-VIS 1, VIS 3, VIS 4, or VIS 5, as appropriate) are used in conjunction with the written definitions when evaluating the cleanliness of cleaned steel.

4. Prepared surfaces are inspected with the unaided eye or with corrected vision. A handheld mirror may be used to inspect difficult to access areas.

5. The surface is inspected from various angles to ensure that the angle of incidence of the profile is not causing shadowing that is mistaken as staining.

6. Areas that are not in conformance with the specification requirements are marked for rework.

7. Reworked areas are re-inspected. Previously acceptable areas are spot checked to verify that rust back has not occurred. Deficient areas are continued to be marked and re-inspected until the surface conforms to specification requirements. The final condition of the surface is recorded.

8. If the coating thickness gage is verified for accuracy using smooth, traceable certified coated standards, measure and record the base metal reading (BMR) in accordance with ASTM D7091 and SSPC-PA 2. If the coating thickness gage is adjusted using measured or certified shims (foils) placed onto the prepared, uncoated steel, then no BMR is measured or recorded.

8.0 CLEANLINESS INSPECTION PRIOR TO COATING

1. The surfaces are inspected prior to coating to verify that all abrasive residue and surface dust have been removed and the results are recorded.

2. The prepared surfaces are primed within the time period specified in the contract documents, and before rust back occurs.

9.0 COATING APPLICATION INSPECTION

1. The ambient conditions and surface temperatures are monitored and recorded approximately every four hours.

2. If conventional spray equipment is used, the quality of the compressed air is verified according to the procedure described in ASTM D4285.

3. A coating material receipt inspection is performed. Materials are stored according to the manufacturer's requirements. If specified, the temperature and relative humidity in the storage area are constantly monitored and recorded.

4. The batch numbers of the material are recorded.

5. Mixing and thinning procedures are witnessed and the, induction period, and pot life of the material (as applicable) are observed and recorded.

6. The applicators and/or Quality Control Inspector measure the wet film thickness according to ASTM D4414. The wet film thickness is recorded, if required.

10.0 INSPECTION AFTER COATING APPLICATION

1. Inspection is performed after each applied coating has sufficiently dried per the manufacturer Product Data Sheet.

2. Each applied coating is visually inspected for defects per the contract documents. Deficient areas are noted and marked for rework.

3. Areas where stripe coats were applied to bolts, rivets, and other similar surface geometries are inspected for complete coverage and visual condition.

4. The coating is inspected for holidays and pinholes, as required by the contract documents.

5. The thickness of each coat and the total system thickness are measured and documented in accordance with ASTM D7091 and SSPC-PA 2, as required by the contract documents.

6. Ambient conditions are monitored between coats to confirm proper dry time at the prevailing conditions of temperature and humidity.

7. If non-conforming high coating thickness measurements are identified, they are recorded, the QC Manager is notified, and non-conformance reports may be issued to obtain client disposition. Insufficient coating thickness may be corrected by the addition of build-up applications (within the allowable recoat time) if allowed by the specification.

8. Reworked areas are re-inspected to verify specification compliance.

9. If required, ambient conditions are monitored during cure.

GRAHAM
INDUSTRIAL COATINGS, LLC
Trust, Loyalty, Excellence!
A Woman-Owned Alaska Company

1320 S. Industrial Way
Palmer, AK 99645
Phone: 907-745-1520
Fax: 907-745-1529
Web: www.grahamindus.com

PURCHASING PROCEDURE

I. Purpose
   a. Ensure materials such as paint, abrasives, consumables, or other service items confirm to requirements governed by QOM and contract specifications
   b. Ensure purchase orders are clearly defined to suppliers
   c. Maintain accurate and records of acceptable suppliers and subcontractors
   d. Maintain accurate job costs

II. Responsibilities
   a. The Project Manager is responsible to:
      i. Write purchase orders based on company and contract documents and specifications
      ii. Negotiate new purchase orders, or amend existing purchase orders
      iii. Ensure all items are ordered correctly and in a timely manner as defined by contract specifications, contract schedules, and delivery schedules
      iv. Select vendors who are capable of meeting the above requirements in respect to quality, timely delivery and service
      v. Coordinate with Office Manager, Payroll, and A/P to maintain accurate job costs in accordance with Graham Industrial Coatings policy and accounting software
      vi. Direct the reorder of items received that do not meet specified criteria or are nonconforming based on delivery schedule
      vii. Verifies the shipping bills match purchase order for quantity and delivery requirements per contract standards
   b. The QC Manager is responsible for:
      i. Performing inspections on materials or other items for acceptability (In some cases, the project manager can perform inspections for acceptability of materials).

III. Records
   a. Records maintained include customer QC lists, materials lists, drawings and specifications, SDS's, MSDS's, etc
   b. Any reports pertaining to the discrepancies or nonconforming materials in accordance with the contract specifications document
   c. Executive management is required to review the procedure for the purchase and inventory of materials in the 1st quarter following the end of the previous fiscal year

MATERIAL IDENTIFICATION PROCEDURE

I. Purpose/Scope
   a. Establish procedure to ensure materials used in surface preparation and coating processes can be accurately identified during the estimating phase of the contract to ensure accurate estimates are given to the Client.
   b. Ensure coatings are identified in accordance with client drawings and project specifications
   c. Procedure is to apply to all materials, parts, and other coatings or inspections materials ordered and used during the production process or used during other business operations

II. Responsibilities
   a. The Project Manager is to direct material and support material use processes as required by each job based on the project specifications
   b. The Project Manager is to apply drawings, project specifications, work orders and client requests when ordering materials based on the project specifications
   c. The QC Manager or other approved personnel will ensure materials delivered meet project specific criteria and other project specifications
   d. Materials will be delivered, staged, and shipped to avoid coatings and item damage in accordance with the project specifications
   e. Delivery of product and material will be shipped and delivered in accordance with the project specifications and schedules. If applicable, any damages and deteriorations to the product in the course of shipping will be discussed by Project Manager and Foreman to determine course of action.

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www.paintalaska.com

GRAHAM INDUSTRIAL CORRECTIVE ACTION PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to establish and define the process for identifying, documenting, analyzing and implementing corrective actions in order to eliminate actual non-conformances. Any corrective action taken to eliminate the causes of actual non-conformances will be appropriate to the degree appropriate to the magnitude of problems and commensurate with the risks to product quality.

2.0 REVISION AND APPROVAL

Rev.	Date	Brief Description of Changes	Approved By
0	3/16/18	Original issue.	ST

3.0 DEFINITIONS/ABBREVIATIONS:

Corrective Action: The action or actions undertaken to identify and eliminate the root cause of a product or process Nonconformance to prevent its recurrence. *Corrective Action is not the repair or rework of identified nonconforming product or process to meet specified requirements.*

Corrective Measure: The measure taken to bring a nonconforming product or process into conformance with specified requirements.

Nonconformance: Attributes of materials, consumables, painted product (in-process or final), and processes that do not meet contract, regulatory, or GI's defined requirements.

CA: Corrective Action
CAR: Corrective Action Request
NC: Nonconformance
QAP: Quality Assurance Program
QCM: Quality Control Manager or his appointed QCM
QC: Quality Control
GIC: Graham Industrial

4.0 RESPONSIBILITIES

4.1. The Quality Control Manager is responsible and has the authority to ensure this procedure is followed. The QCM may delegate tasks to qualified personnel as needed.

4.2. Executive Management is ultimately responsible for ensuring adherence to this procedure as well as the process for reporting and recordkeeping, implementing any necessary actions to achieve resolution, and review the effectiveness of the corrective actions taken.

5.0 PROCEDURE

5.1. Periodic reviews of records or summaries of nonconformances are performed in accordance to GIC's Project Management Procedure.

5.2. Periodic reviews of records or summaries of internal and external quality audits are performed in accordance with GIC's Internal Audit Procedure.

5.3. A Corrective Action Request (CAR) is generated when a nonconformance is identified in one of the following ways:

- When a nonconformance is found during the day to day execution of the Quality Assurance Program.
- When a customer complaint has been received.
- When there is a repetitive non-conformance that can be identified.
- When there is an unacceptable non-conformance due to severity or cost.
- When nonconformances are found during internal and external audits indicating the QAP may not be implemented and functioning as stated in the QA manual.

5.4. The CAR will include a description of the nonconformance that will be addressed and the requirement has not been met at that time.

5.5. The QCM is authorized and responsible for issuing a CAR and is the initiator of the Corrective Action process.

5.6. The priority of the CAR is the driving factor in determining the timeframe to respond. The QCM makes this determination.

- **LOW:** Respond as availability allows; may extend deadline with permission of the QCM.
- **MEDIUM:** Respond as soon as feasible; deadline established, but may be interrupted by higher priority activities.

- **HIGH**: Respond by established deadline, which may interrupt other staff working low or medium priority activities.
- **URGENT / CRITICAL**: Respond immediately with sustained effort using all available resources until resolved. An example of this may be if the company at legal or other compliance risk.

5.6.1. The QCM is responsible for ensuring the scope of the CAR is investigated and documented, a thoughtful root cause analysis is performed, (the Root Cause Analysis Worksheet may be used to assist in this exercise), corrective measures are taken and the actions to prevent recurrence is listed.

END

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CORRECTIVE ACTION REQUEST

CAR #

Type
Check one

☐ Corrective Action (existing issue) ☐ Preventive Action (potential issue) **Name:**

☐ Opportunity for Improvement / Suggestion **Date:**

Source
Check one

☐ Employee Feedback ☐ Customer Feedback ☐ Supplier / Subcontractor Feedback

☐ External Audit Finding ☐ Internal Audit Finding ☐ Management Review Action Item

☐ Other:

Process
Check one

☐ Drawing & Specification Contr ☐ Material Control ☐ Fabrication Control

☐ Inspection ☐ Calibration Equipment ☐ Independnt Party Inspection

☐ Records ☐ Maintenance Program ☐ Audits

☐ Training ☐ Other:

Priority
Check One

☐ Low ☐ Medium ☑ High ☐ Urgent / Critical

Describe the issue or problem in detail.

CAR Assigned to: **Date Assigned:** **Respond by:**

To be completed by the Assignee.

Root Cause of Problem: *(Required for all corrective and preventive issues; optional for suggestions for improvement. The Root Cause Analysis Worksheet (QF 16.3) may be used.)*

Action Plan: *(Actions to be taken to eliminate root cause, resolve issue and prevent recurrence.)*

Date Action Completed: **Name:**

CAR Effectiveness verified by: **Date:**

Result: ☐ PASS ☐ FAIL: Returned for Further Processing

Notes and justification:

Certificate of Completion

OSHA EDUCATION CENTER®

AMERICAN SAFETY COUNCIL

JONATHAN MARTIN

has successfully completed the following course:

CPR Training

GRADUATION DATE

2/12/2020

Certificate of Completion

OSHA EDUCATION CENTER®

AMERICAN SAFETY COUNCIL

JONATHAN MARTIN

has successfully completed the following course:

First Aid Basics

GRADUATION DATE

2/14/2020

NACE INTERNATIONAL INSTITUTE

NACE COATING INSPECTOR LEVEL 2 - CERTIFIED

Jonathan Martin

Cert No. 65151 Expires: November 14, 2022

The person to whom this has been issued has fulfilled the examination and experience requirements of the NACE Institute in order to attain the status of *NACE Coating Inspector Level 2 - Certified* certification.

Helena Seelinger - Executive Director

ALASKA DEPARTMENT OF LABOR

Certificate of Fitness

HAZARDOUS PAINT HANDLER 20150560

Issued 05/24/2019

Expires 05/21/2022

JONATHAN L MARTIN

2850 N RED SKY COURT

WASILLA, AK 99623

WGT	DOB	HGT
260	12/08/1988	6'

404140

RENEWAL

Dr. Tamika L. Ledbetter

Commissioner

NACE INTERNATIONAL INSTITUTE

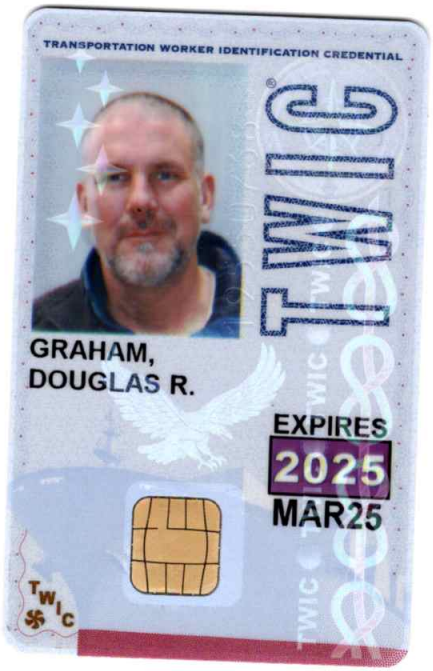
NACE CERTIFIED COATING INSPECTOR - LEVEL 3

Douglas R Graham

Cert No. 9944 Expires: January 31, 2021

The person to whom this has been issued has fulfilled the examination and experience requirements of the NACE Institute in order to attain the status of *NACE Certified Coating Inspector - Level 3* certification.

Helena Seelinger - Executive Director



QA Services, Inc.

An Alaskan Owned and Operated Testing and Inspection Company

Quality Assurance * Weld Inspection * Coating Inspection * Nondestructive Testing * API 653 Tank Inspection * Special Inspections

Qualifications and References

QA Services, Inc. is an Alaskan owned and operated company providing fully qualified nondestructive and destructive inspection, consulting, industrial inspection and quality surveillance and assurance services. Our detailed services include assembly, welding, special inspections, quality control plan review and development, and industrial coatings for all facets of steel buildings, bridges, tanks, pipelines and steel structures at both shop and field locations.

Quality Control and Assurance inspections include, but are not limited to:

Homer Water Treatment Facility

Supplier Quality Surveillance (SQS)

Quality Audits

Nondestructive inspection in the forms of:

Ultrasonic
Magnetic Particle
Eddy Current
Liquid Penetrant
Bubble Leak Testing (Vacuum Box)

Visual Testing and Remote Visual
MFE (Magnetic Flux Leakage)

Anchorage International Airport Concourse C

JL Tower, Anchorage

Certified Welding Inspections
Welding Inspection
Writing & Testing of Welding Procedures
Welder Qualification Testing

NACE: Certified Coating Inspections

API 653 Suitability for Service Inspections

API 570 Pressure Piping Inspections

STI SP001 Certified Tank Inspections

IBC/ICC Special Inspections

Corrosion Inspections and Consulting

Failure Analysis of Coatings and Steel

CORPS of Engineers CQC

AWWA D100 Water Reservoir Inspections

Hyundai Bridge Plant Quality Audit, Korea

AES Fab Facility, Oilfield Piping and Module Inspection

Conoco Phillips CD5 Nigliq Bridge

Our inspection personnel are qualified and/or certified to National Standards, i.e. ASTM E329 & E543, AWS, ASNT, API, AWWA, NACE, ICBO/IBC, etc. All of our equipment is calibrated and certified to National Standards. Reports are normally furnished at the time of inspection; however reports will be (re)submitted with invoicing for time verification. QA Services, Inc. is an equal opportunity employer and is committed to provide a work place free of unlawful discrimination

Respectfully,

Tyrell C. Amberg, President

P.O. Box 112328 * Anchorage, AK 99511-2328 * Ph: (907) 522-1969 * FAX: (907) 344-1980

The following is a brief list of previous experience in similar services under similar circumstances. These services include Special Fabrication & Structural Inspections, Non-destructive Testing, Welding/Welder Procedures Qualifications, Quality Control & Quality Assurance, and Industrial Blasting & Coating.

AK DOT&PF
5820 East Tudor, Anchorage, AK 99507
Kimberly Hays, 907-269-6212
Steve Lee, 907-465-8895

QA/QC, NDE, Coating Inspections
Bridges, Illumination Towers, Pilings,
and numerous structures

ASRC Energy Services / APC
200 East 100th Ave., Anchorage, AK 99515
Rich Metzger, 907-339-5569

Welding, NDE, Coating Consulting and Inspection
Numerous Structural Modules and Mechanical Projects

Udelhoven Oilfied System Services
184 E53rd Ave, Anchorage, AK 99518
Cody Mesick, 907-375-1567

Welding, NDE, Coating Consulting and Inspection
Numerous Structural Modules and Mechanical Projects

R&M Consultants, Inc.
9101 Vanguard, Anchorage, AK 99507
Mike Wariner, 907-646-9674

Special Inspection & NDE
Alaska Airlines Hangar, and numerous other projects.

Alaska Test Labs
4040 B Street Suite 102, Anchorage, AK 99503
Maria Kampsen, 907-205-1987

Special Inspection & NDE
Fairbanks Natural Gas 1.5m BBL Tank
Anchorage School District Term Contract
Numerous other projects

Hilcorp Alaska, LLC
Stephen Morgan, 907-283-1330

QA and SQS
Kenai & Nikiski Area

HDL Engineering Consultants LLC.
3335 Arctic Blvd Suite 100, Anchorage, AK 99503
John Buzdor, 907-564-2120

Special Inspection & NDE
A & W Services Hangar
JBER Bldg 296 F-22 Raptor Hangar 18
and numerous other projects

Ridge Contracting, Inc.
9600 Vanguard, Anchorage, AK 99507
Cory Smith, 907-222-7518

QA/QC, NDE, Coating Inspections
Kipnuk Tank Farm & Power Upgrades
Togiak Tank Farm

Yukon Kuskokwim Health Corp.
Box 528, Bethel , AK 99559
Scott Winner, 907-799-5348

Special Inspections & NDE
Bethel Hospital Renovations

PCL Construction Services, Inc
4852 Old International Airport Rd, Anchorage, AK 99502
Andy Clapper, 907-243-7252

QA/QC, NDE, Coating Inspections
Anchorage International Airport Concourse B
ConocoPhillips CD-5 Bridges

Additional addresses, phone numbers, and contact names upon request.

Organization Structure

President: Tyrell Amberg

Managment:

Tyrell Amberg — President - NACE CIP-3 (#1808) - AWS Certified Welding Inspector (#91051251) - MOA Special Inspector (#048) for; Structural Steel, Welding, High Strength Bolting, Drilled-In Concrete Anchors, and Racks - ICC Structural Steel, Welding, & Bolting Special Inspector

Joshua R. Smith — General Manager - AWS Certified Welding Inspector (#13111451) - MOA Special Inspector for; Structural Steel, Welding, High Strength Bolting, Drilled-In Concrete Anchors, and Racks - ICC Structural Steel & Bolting Special Inspector - ASNT Level II MT, UTT, PT NDE Technician – STI SP001 Tank Inspector (#AST-T10369)– NACE Certified Coatings Inspector Level 2 (#60668)

Caprice Springer — Accounting Manager

ASNT Level III:

Steve Lockman — ASNT Level III (#56126) PT, RT, MT, and UT - AWS Senior Certified Welding Inspector (#08040078) - NACE CIP-3 (#13547) - API 653 Aboveground Storage Tank Inspector (#26712) - API 570 Piping Inspector (#41306) - API 510 Pressure Vessel Inspector (#42876)

Inspectors:

Douglas Burdick — AWS Certified Welding Inspector (#02050071) - MOA Special Inspector (#049) for; Structural Steel, Welding, High Strength Bolting, Drilled-In Concrete Anchors, and Racks - ICC Structural Steel & Bolting Special Inspector - ASNT Level II MT & PT NDE Technician

Joey Batchelder — NACE CIP-3 (#8317)

James Adams — AWS Certified Welding Inspector (#14051101) - MOA Special Inspector for; Welding - ASNT Level II UT, MT, and PT NDE Technician

Kevin Moore — AWS Certified Welding Inspector (#02020301) - ICC Special Inspector for; Structural Steel & Bolting - MOA Special Inspector for Structural Steel, Welding, High Strength Bolting, Drilled-In Concrete Anchors, and Racks - ICC Structural Steel & Bolting Special - ASNT Level II UT, MT, and PT NDE Technician, currently being trained and certified in PAUT level II.

<CONTINUED>

Jennifer Sullivan	AWS Certified Welding Inspector (#11110053) - MOA Special Inspector for; Welding - ICC Special Inspector for; Welding - ASNT Level II UT & MT NDE Technician, NACE Certified Coatings Inspector Level 2 (#71163), and API 570.
Ty Edmonson	AWS Certified Welding Inspector (#15021761) - MOA Special Inspector for; Structural Steel, Welding, High Strength Bolting, Drilled-In Concrete Anchors, and Racks - ICC Structural Steel & Bolting Special - ASNT Level II UT, MT, and PT NDE Technician

Seward Hwy MP114 to Dimond Blvd. Pavement Preservation

Contract No. CFHWY00267

ACCIDENT PREVENTION PLAN

Prepared by:
Graham Industrial Coatings, LLC
1320 S Industrial Way
Palmer, Alaska 99645

April 9, 2020

Persons authorized to obligate the company in any and all matters:

Douglas Graham

Tim Bogowith
Safety and Health Manager
19520 Wingham Circle
Eagle River, AK. 99577
(907) 360-8301

AK ANG
QA Superintendent / Safety & Risk Manager/ First Sergeant
Mar 2007 – Feb 2010

U.S. Air Force
QA Manager / Safety Liaison
Jun 1989 – Mar 2007

for the project along with the Activity Hazard Assessments required. Completed project well under budget with no incidents.

Fort Wainwright AAFES Underground Storage Tank Removal and Remediation; Site Safety and Health Officer/Contractor Quality Control Manager; 2016
HSE Lead and Quality Control Manager for a $2.2M Alaska Department of Environmental Conservation project consisting of the removal of three 10,000-gallon underground storage tanks (USTs), a portion of the USTs ballast pad, bollards, associated piping, and all associated utilities; perform an initial abatement to include confirmation sampling transport, treatment, and disposal of contaminated soils; transport and dispose of UST materials; backfill and compact all impacted areas, all along side of an active railroad track. Conducted exposure monitoring and evaluated air quality data, and recommend changes to engineering controls, work practices, and PPE. Conducted and documented daily safety and health meetings and prepared daily submittal reports.

Saint-Gobain Performance Plastics EHS Audit. HSE Lead Auditor; 2015
The key objective of the audit program was to provide a clear and comprehensive compliance assessment of the facility. The audit examined permit status, compliance with permit conditions, and conformance with Federal and state HSE requirements and overall safety of the facility. Focus areas included, but not limited to, hazardous waste and chemical storage areas, petroleum storage areas, operational areas, maintenance shops, outdoor laydown areas and other areas throughout the site.

ExxonMobil Point Thompson Remediation Project; Project HSE Lead; 2014-2015
HSE Lead for an $8M corrective action project that included removal of two exploration gravel pads on Alaska's North Slope near Point Thomson. We managed several thousand cubic yards of petroleum contaminated gravel/tundra, mostly by using it to cap drilling waste in the open reserve pit at one of the sites. Field work was performed February through April 2015, and ERM contracted a 60-person man-camp to support the clean-up operation (access via a 50-mile long ice road). We managed extensive metal debris (North Slope Oxbow Landfill) and hazardous waste (chromium-impacted soil) encountered during the removal operation.

Tim Bogowith
Safety and Health Manager
19520 Wingham Circle
Eagle River, AK. 99577
(907) 360-8301

Dormatory Construction and Acceptance, Alaska, US Air Force; QA and Safety Manager; 2007-2008
Performed oversight and construction safety for the construction of a 37,674 square foot installation dormitory building project, providing housing for 75+ personnel that reside more than 35 miles away. Code inspections were performed at different stages in the project to ensure state and federal requirements were met.

Clear Air Force Station, Alaska, Government Installation; Safety and Operational Risk Manager; 2007-2010

- As Safety Manager, provided general safety and program management for 11,500-acre Air Force Station comprised of 59 buildings and 300+ military, DOD civilian and contractor personnel. Developed a safety training database and was noted by the Air Force Inspector General as a "Best Practice." Created and implemented unit safety policies and programs and performed over 40 annual facility safety inspections to ensure they meet OSHA and NFPA standards. Worked hand-in-hand with state, federal and local government agencies.

- As Operational Risk Manager, authored Risk Installation and Sustainment Plan. Performed risk analysis and tracked risk data to recognize possible trends and future prevention. Member of the Emergency Operations Center - ensured installation safety in case of a natural disaster. Member of internal Environmental, Safety, Occupational Health, Compliance Assessment and Management Program (ESOCAMP) team.

Communications Squadron, Elmendorf Air Force Base, Alaska; Radar Manager and Safety Manager; 1999-2003
Project manager for removal and replacement of $6.5M precision approach radar system. Coordinated and managed the removal through necessary agencies, meeting strict timelines. Planned and implemented installation of new radar unit, including the integrity management plan for the lifecycle of the system. Worked with several agencies to ensure delivery coordination and construction on an active military flightline; ensured the safety of radar, construction, ground and flight crews. Developed the maintenance plans and schedules including daily preventive maintenance inspections through annual overhaul maintenance.

Range Control Group, Nellis Air Force Base, Nevada; Safety Manager and QA Evaluator; 1995 –1999

B. BACKGROUND INFORMATION

1. **Contractor Name:** Graham Industrial Coatings, LLC

2. **Contract Number:** CFHWY00267

3. **Project Name:** Seward Hwy MP114 to Dimond Blvd. Pavement Preservation

4. **Project Description:**

a. Brief Project Description

Protective Coatings Upgrade on Pedestrian Crossing Bridge

b. Description of Work to be Performed

Install Scaffold / Aerial Work Platform, Containment, Dust Collection; Abrasive Blasting; Metallize and Seal Structural Steel Bridge Components

c. Location of Project (Map)

See 'APPENDIX C' for site map

d. Equipment

During performance of this contract, the following equipment is expected to be utilized:

1. Air Compressor
2. Air Treatment
3. Precision Arc 4.8 Metallizer
4. 35K Generator
5. Speedflow PowerTwin 3600 Airless Paint Sprayer
6. Telescoping Forklift
7. Scissor Truck

C. STATEMENT OF SAFETY AND HEALTH POLICY

1. Safety and Health Policy Statement

The Occupational Safety and Health Act of 1970 clearly states our common goal of safe and healthful working conditions. The safety and health of our employees continues to be the first consideration in the operation of Graham Industrial Coatings, LLC.

Safety and health in our business must be a part of every operation. Without question it is every employee's responsibility at all levels.

Graham Industrial Coatings, LLC will maintain a safety and health program conforming to the best management practices of organizations of this type. To be successful, such a program must embody the proper attitudes toward injury and illness prevention not only on the part of supervisors and employees, but also between each employee and his or her co-workers. Only through such a cooperative effort can a safety program in the best interest of all be established and preserved.

It is the intent of Graham Industrial Coatings, LLC to comply with all laws. To do this, we must constantly be aware of conditions in all work areas that can produce injuries. No employee is required to work at a job he or she knows is not safe or healthful. Employees' cooperation in detecting hazards and, in turn, controlling them is a condition of their employment and requires them to inform their supervisor immediately of any situation beyond their ability or authority to correct.

The personal safety and health of each employee of this company is of primary importance. The prevention of occupationally-induced injuries and illnesses is of such consequence that it will be given precedence over operational productivity at all times. To the greatest degree possible, management will provide all mechanical and physical facilities required for personal safety and health in keeping with the highest standards.

Our objective is a safety and health program that will eliminate all preventable injuries and illnesses, not merely in keeping with, but surpassing, the best experience of operations similar to ours. Our goal is nothing less than zero accidents and injuries.

2. Contractor Accident Experience and Exposure Data

Per OSHA's Form 300 Log of Work Related Injury and Illness, Graham Industrial Coatings, LLC experienced 0 incidents in calendar year 2019. GIC's Lost Work Day Incident Rate (LWDIR) for 2019 is 0.00 and their Recordable Incident Rate (RIR) is 0.00 . A completed OSHA Form 300 has been inserted at the end of this section for record.

Graham Industrial Coatings, LLC's 2019 Experience Modification Rating (EMR) is 0.93. GIC's exposure data is based on 0 total hours worked during the 2019 calendar year.

D. RESPONSIBILITIES AND LINES OF AUTHORITY

1. Employer's Responsibility

The CEO of GIC, Priscilla Graham, has ultimate responsibility for the implementation of Graham Industrial Coatings, LLC's Safety and Health Program, including all GIC employees, all subcontractors, all vendors, and all other visitors to the project site, and as such, will ensure the strict enforcement of the program.

2. Responsible Personnel

The Corporate Safety Officer, Mr. Timothy Bogowith, has the responsibility for implementation of the Graham Industrial Coatings, LLC Safety and Health Program and reports directly to Ms. Graham. The Corporate Safety Officer is responsible for plan creation, training, and adherence of all GIC employees and subcontractors to the program.

The Project Manager for CFHWY00267, Seward Hwy MP114 to Dimond Blvd. Pavement Preservation is Mr. Douglas Graham. The Project Manager is responsible for ensuring that the SSHO understands the safety program and properly implements and enforces the safety program for their respective projects.

The Site Safety and Health Officer (SSHO) for this project is Mr. Timothy Bogowith, and as such, is required to meet all applicable requirements for the EM 385-1-1 for the position **(for appointment letter and certifications, please refer to Appendix A)**.Mr. Bogowith is responsible for ensuring the overall safety of the jobsite. He will ensure that all GIC employees, subcontractors and visitors adhere to the provisions of the safety plan. In addition, every employee and subcontractor employee is accountable for the safety of their portion of the work.

Mr. Bogowith shall exercise his authority as SSHO, to contact the GDA immediately and directly if needed, to convey any Mishap of note, to include all Accident, Incidents and Near-Misses; and will, with the assistance of the Site Superintendent and QCM, conduct a thorough investigation of such, to including documenting all pertinent data, inclusive of the OSHA 300 Log (i.e., Contractor Accident Experience form).

To achieve the goal of ensuring the overall safety of the job site, the SSHO will have a full understanding of the project specifications and drawings, the project APP and applicable safety reference material, the GIC Safety Program and the project Environmental Protection Plan, if applicable. In addition the Safety Officer has enough experience with projects of similar size and scope together with proper training, so that he will be able to recognize unsafe work practices and conditions.

The SSHO is responsible for ensuring that any GIC employee or subcontractor employee who will be working on the project is given a full safety briefing, or indoctrination, including a page by page review of the project APP and a review of any and all AHAs specific to the employees' duties. He will also ensure that visitors to the project site are given a safety briefing before being allowed on to the job site. The SSHO

reviewed and approved by the GDA prior to the start of work for the corresponding DFOW and shall be modified, as necessary with changing conditions, operations, or personnel.

Prior to the start of work, each worker is required to review the AHA for their DFOW with the CP/QP and SSHO, and sign the document. Each crew/worker must have the current AHA in their possession while the work is being performed and shall be readily accessible on the site by all personnel.

6. Risk Management Process

Graham Industrial Coatings, LLC team believes that risk is an inherent in all activities of any construction project. To be successful, a risk management process is needed such that risk can be continually evaluated and managed in order to maximize safety, mitigate risks, and achieve a "zero accidents" safety record.

Risk management is a business process that includes the identification, assessment, and prioritization of risks, followed by coordinated and economical application of resources to minimize, monitor and control the probability and/or impact of unfortunate events to and acceptable level.

Graham Industrial Coatings, LLC uses the Activity Hazard Analysis (AHA) as part of its total risk management process. AHAs provide the ability to plan, identify, assess, categorize, quantify, handle and report/track risks associated with the achievement of the project requirements and goals for the Seward Hwy MP114 to Dimond Blvd. Pavement Preservation Project, and strives to incorporate knowledge of "best practices" from all stakeholders and from previous construction projects.

AHAs are intended to be developed and used by the field crews/workers performing the work, with the assistance of others, such as the SSHO, QC Manager, or Superintendent, as needed. Each AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or changes of the CP(s)QP(s). If changes made to the initial AHA increases the RAC, the AHA is required to be re-submitted to the GDA for acceptance prior to work proceeding.

7. Work Restrictions/Requirements

To ensure overall safety of the job site, no work is permitted to take place in support of construction operations without the SSHO on-site. Furthermore, no work is permitted to take place which requires the presence of a Competent/Qualified Person without the Competent/Qualified Person on-site. Persons designated as Competent and/or Qualified Person(s) must provide proof of competency or qualification which must be reviewed and approved by the District SOHO prior to the start of the activity.

It is the responsibility of the SSHO to determine operations requiring Competent/Qualified Persons, incorporate that requirement into the specific AHA, and verify the presence of the Competent/Qualified Person(s) during the specific operation(s).

that the Safety Officer understands the safety program and properly implements and enforces the safety program for their respective projects. The Project Manager reports directly to the president of Graham Industrial Coatings, LLC, Ms. Priscilla Graham.

10. Management Accountability

Graham Industrial Coatings, LLC requires that all employees and supervisors strictly adhere to the safety rules set forth in the Code of Safe Practices. If anyone violates a safety rule, he/she will be disciplined in accordance with the severity of the infraction. The discipline imposed will be at the sole discretion of Graham Industrial Coatings, LLC (limited only by contractual or legal restrictions), and may range from a warning, to a disciplinary suspension with pay, up to and including discharge (The Three Strikes and You're Out Program is discussed in Section 8.C). The Supervisor, Manager, Superintendent, or the Corporate Safety Officer, imposing the discipline will be responsible for documenting it on the form included in Appendix E. A copy of the forms shall be sent to Graham Industrial Coatings, LLC's Corporate Safety Officer.

F. TRAINING

1. **Requirements for New Hire SOH Orientation - Corporate Safety Indoctrination Subjects** (*See Indoctrination Form in Appendix B*)

All new employees will be given a copy of GIC's Employee Safety and Health Indoctrination (ESHI) safety orientation packet with their new employee packet. Employees will be required to read the safety orientation and adhere to its provisions. They will be briefed as to the location of emergency equipment and phone numbers. GIC employees will attend the weekly jobsite safety meeting conducted by the Project Superintendent. Any additional specialized safety training will be provided as required.

The Safety Orientation topics are listed below. All employees and subcontractor employees are required to complete the safety orientation form prior to entering the jobsite. Upon completion of the Safety Orientation, each individual will be given a safety sticker to be placed on his/her hard hat designating that individual as having completed the safety orientation.

- 100% Hard Hat Project
- Personal Protective Wear required. No sneakers. Safety shoes, safety glasses and hearing protection
- Proper and adequate protective clothing. NO shorts. Shirts/long pants at all times.
- "HORSEPLAY" will not be permitted.
- No Workmen authorized to enter other than buildings assigned
- Location of Bulletin Board
- Location of emergency telephone number - medical facilities/treatment posted
- Location of fire extinguishers - firefighting and other emergency procedures
- Report all accidents to general contractor's trailer immediately
- Location of pay phones
- Report any property damage immediately
- Location of personal comfort stations
- Drugs, intoxicants, ammunition, weapons, guns are **PROHIBITED**
- Understand company Safety and Accident Prevention Program
- Observe and practice all Government safety and health requirements
- Daily housekeeping
- Vehicle parking and regulations. Parking lot speed limit is 5 MPH
- Safe clearance procedures
- Overhead safety and safety belts required
- Employee responsible for property/safety of others. Security of ladders, tools, unused supplies/materials
- Temporary Vehicle Pass

Classification and Labeling of Chemicals (GHS).

- The procedure to train new employees at the time of their initial assignment to work with a hazardous chemical, and to train employees when a new hazard is introduced into the workplace, will be the same as that stated above.

3. Safety and Health Training for Supervisors and Employees

The Site Safety and Health Officer (SSHO) is responsible for and will conduct pre-emergency planning and coordination with the Contracting Authority and local emergency service providers. Before the commencement of work, an emergency response network will be established. The SSHO will ensure that all personnel on the site are familiar with the proper procedures to follow in the event of an emergency.

4. Emergency Response Training

The Site Safety and Health Officer (SSHO) is responsible for and will conduct pre-emergency planning and coordination with the Government Designated Authority and local emergency service providers. Before the commencement of work, an emergency response network will be established. The SSHO will ensure that all personnel on the site are familiar with the proper procedures to follow in the event of an emergency.

Procedures & Tests

Prior to the commencement of work, the SSHO will have obtained the following information, so that it is readily available in the event of an emergency:

- Location of the nearest telephone at or near the work site.
- Confirm emergency telephone numbers and route to the hospital.
- Identify the locations of emergency equipment and supplies.
- Locate and identify safety, chemical, and other hazards particular to the job site.
- Maintain a "Notify in case of emergency" list for each person working on the site.
- Update emergency plans and procedures should job site conditions change.
- Emergency Numbers

H. ACCIDENT REPORTING

1. Exposure Data Reporting

As required, Graham Industrial Coatings, LLC will complete and submit updated Exposure Data, including applicable OSHA 300 Forms, to Mr. Derek Betts. Updated OSHA 300 Forms will be formally submitted each month at time of invoice. Additionally, updated forms will be submitted as part of any accident investigation or as otherwise requested by the Contracting Authority.

Ms. Priscilla Graham and Mr. Douglas Graham shall be responsible for keeping record of man-hours worked.

2. Accident Investigations, Reports, Logs

Accident investigation is primarily a fact-finding procedure; the facts revealed are used to prevent recurrences of similar accidents in the future. The focus of accident investigation at Graham Industrial Coatings, LLC is to prevent future accidents and injuries in order to increase the safety and health of all our employees. This standard practice instruction establishes uniform requirements to ensure that accidents are evaluated; controls and procedures are implemented to reduce or prevent future occurrences, and that the proper hazard information is transmitted to all affected workers.

A mishap is defined as *"any unplanned, or undesired event that occurs during the course of work being performed, including accidents, incidents, and near misses"*. With no exception, employees are required to report ALL mishaps immediately to their employers and/or supervisor. The contractor shall report, thoroughly investigate, and analyze all mishaps occurring on the project. The end result of each of each mishap should be the implementation of corrective actions as soon as possible to prevent a re-occurrence.

a. Written program

Graham Industrial Coatings, LLC will review and evaluate this standard practice instruction on an annual basis, or when changes occur that prompt revision of this document, or when facility operational changes occur that require a revision of this document. Effective implementation requires a written program for job safety, health, that is endorsed and advocated by the highest level of management within this company and that outlines our goals and plans. This written program will be communicated to all required personnel. It encompasses the total workplace, regardless of number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

b. General requirements

Graham Industrial Coatings, LLC has established accident investigation procedures,

- Days Away Illnesses
- Restricted/Transfer Injuries

Only DART (**D**ays **A**way, **R**estricted Duty, Lost **T**ime) incidents need to be entered into the FAIR system. An injury must be considered as a recordable DART Case if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or worker loss of consciousness.

After rendering first aid, including obtaining emergency medical care if required, and securing the accident site to prevent any further injuries, immediate notification to the GDA must occur for any accident listed below:

- Fatal Injury/Illness
- Any Mishap resulting in Injury/Illness requiring Emergency Response Personnel
- One (1) or more persons hospitalized as inpatients as a result of a single occurrence
- Permanent totally disabling Injury/Illness
- Permanent partial disabling Injury/Illness
- Accidental property damage in excess of $500,000
- Three (3) or more individuals becoming ill or requiring medical attention due to a suspected site condition or a hazardous or toxic agent on site

It is the responsibility of the Contractor to notify OSHA in accordance with 29 CFR 1904.39 within 8-hours when their employee(s) is fatally injured or one (1) or more employee/person is hospitalized as inpatients as a result of a single occurrence.

In addition to those listed above, any of the following types of mishaps shall be immediately reported to the GDA and shall be investigated in depth to identify all causes and to arrive at recommendations for hazard control measures to be implemented to prevent further occurrences. The GDA has the responsibility to immediately notify the SOHO within 24-hours and to provide follow-up investigative findings within ten (10) days.

will be to prevent future accidents and injuries to increase the safety and health of all our employees.

Immediate concerns:

- Ensure any injured person receives proper care.
- Ensure co-workers and personnel working with similar equipment or in similar jobs are aware of the situation. This is to ensure that procedural problems or defects in certain models of equipment do not exist.
- Start the investigation promptly.

A Contractor Incident Report System (CIRS) form (E), which details specific company requirements for investigation, is provided and will be used to gather data to determine causes and corrective actions. As a minimum, the form contains the following areas of concern.

Required Accident Investigation form data includes the following:

- Injured employee's name
- Date and time of injury
- Occupation or task being performed when injured
- Shift and department
- Company ID number
- Employee's address
- Sex/age/DOB
- Social security number
- Length of service
- Length of time at specific job
- Time shift started
- Overtime length when injury occurred
- Physician's and hospital name (if transported)
- Type of injury

- Reducing the production rate of construction operations where possible.
- Providing additional periodic breaks, when warranted, to relieve mental or physical fatigue.
- Increasing the number of employees assigned to a task to alleviate severe conditions, i.e. in lifting heavy objects, etc.
- Implementation of additional safety inspection procedures or increased frequency in order to identify potential hazards.

IMMEDIATE ACTIONS UPON MAJOR ACCIDENTS, INJURIES, ILLNESSES

1. ***When an accident occurs, first determine the medical condition of the injured employee(s) and get the required medical care. If required, CALL FOR EMERGENCY SERVICES AT 911. Secure the site.***
2. ***CALL the Government Designated Authority (GDA) to report the accident/incident.***
3. ***Next, Call Timothy Bogowith at 907-745-1520 / Cell # 907-360-8301*** as soon as possible after getting medical attention for the injured employee.
4. Keep the accident scene intact until an accident investigation can be completed and the Government Designated Authority (GDA) provides written permission releasing the site. This may be several days.
5. **All information on the accident report shall be filled out and completed within 4 hours of the accident. Complete CIRS and instructions are included in this document as "APPENDIX E'**
6. The accident report must be submitted to the GDA via hand delivery or electronically within 24 hours of the accident.

transported to the nearest medical facility ASAP. Responsible people shall determine the best emergency facility to send injured employees at that time.

a. Procedures and Tests.

Emergency plans to ensure employee safety in case of fire or other emergency shall be prepared in writing and reviewed with all affected employees. Emergency plans shall be tested to ensure their effectiveness. Plans shall include escape procedures and routes, critical site operations, accounting for employees after an evacuation, rescue and medical duties, means of reporting emergencies, and persons to be contacted for information or clarification.

In case of fire or other potential threat requiring evacuation from the Seward Hwy MP114 to Dimond Blvd. Pavement Preservation project site, employees should leave the area immediately and proceed to GIC Construction's Job Site Office Trailer, and wait for further instructions.

The Project Superintendent or Safety Officer will immediately take roll to verify that all GIC and subcontractor employees are accounted for and assess the situation to determine if any injuries have occurred.

After all personnel are to safety and accounted for, the Project Superintendent or Safety Officer will immediately call **911** using cell phone to report the incident and seek appropriate assistance.

Emergency plans will be reviewed at the start of the project and during site visits with the Fire Department or other appropriate entities. Emergency plans will also be reviewed with GIC and subcontractor employees at the pre-construction meeting, AHA meetings, Preliminary and Initial QC meetings, and at all employee indoctrinations.

The Emergency evacuation plan shall be posted in the common area of the jobsite trailer next to the posted emergency phone numbers. Plans should be reviewed periodically throughout the project and revised, if necessary, according to the needs of the project. If any changes are made to the plan, changes should be conveyed to the Fire Department or other appropriate entities, employees and subcontractors, the Contracting Authority personnel, and should be posted in the jobsite trailer immediately.

b. Spill Plan.

For the Seward Hwy MP114 to Dimond Blvd. Pavement Preservation project, a spill containment kit will be kept in a sealed container next to the jobsite trailer. In the event of a hazardous spill, the Project Superintendent or Site Safety and Health Officer shall assess the situation for appropriate response.

The Fire Department and other appropriate entities should be contacted immediately by calling **911** and informed of the type and extent of the spill. Appropriate

Each piece of heavy equipment, such as a forklift, bulldozer, backhoe/loader, dump truck, etc. shall be equipped with at least a 5-B:C portable fire extinguisher. During refueling of these machines, the engine shall be turned off.

The storage of combustible or flammable materials shall be stored in proper containers. Gasoline or diesel fuels shall be stored in metal safety cans in quantities of 5-gallons or less. **NO PLASTIC GAS CANS OR 5-GALLON JERRY CANS ARE ALLOWED ON THE PROJECT.**

d. Posting of Emergency Telephone Numbers.

Emergency Phone numbers should be posted in a clear, visible location in the common area of the jobsite trailer and in the secure, external bulletin board located outside the jobsite trailer.

e. Man Overboard/Abandon Ship.

Not Applicable.

f. Plan for Prevention of Alcohol and Drug Abuse.

Not Applicable.

3. Site Sanitation Plan

Drinking water, hand wash stations, toilet facilities, and waste disposal shall be provided at the Seward Hwy MP114 to Dimond Blvd. Pavement Preservation Project, as per the requirements of the EM 385-1-1.

4. Medical Support Agreement

a. On-site Medical Support.

On-site medical support includes procurement and upkeep of the following basic First Aid requirements in the site trailer. The Safety Officer will ensure that the proper emergency equipment is maintained on the site and the locations of the emergency equipment will be posted in a visible location within the job site as necessary. The following emergency equipment will be maintained on the site as a minimum and additional equipment will be added as necessary:

Industrial first aid kit
20 lb. ABC fire extinguisher
Telephone
Water supply
Eyewash

The Safety Officer will have CPR and basic first aid training, as required. It is

Not Applicable.

6. **Exposure Control Plan**

   Not Applicable.

7. **Automatic External Defibrillator (AED) Program.**

   Not Applicable

8. **Site Layout Plan (Site Usage Plan).**

   See 'APPENDIX C'

9. **Access/Haul Road Plan.**

   Not Applicable

10. **Hearing Conservation Program.**

    See 'APPENDIX J'

11. **Respiratory Protection Plan.**

    To be provided by Abatement Contractor, if applicable.

12. **Health Hazard Control Program.**

    Not Applicable

13. **Hazard Communication Program - see 'APPENDIX I' for more information**

    a. When hazardous substances are scheduled to be utilized or when a hazardous substance is brought onto the jobsite, the written hazard communication program shall be amended to address the following:

        i. training (to include potential safety and health effects from exposure)
        ii. labeling
        iii. current inventory of hazardous chemicals on the jobsite
        iv. location and use of the Safety Data Sheets (SDS)

    b. Any time that hazardous substances are brought onto the job site, all employees potentially exposed to the substance will be advised of information in the SDS for the substance.

Not Applicable

23. Chromium (VI) Exposure Evaluation.

Not Applicable

24. Crystalline Silica Evaluation.

Not Applicable.

25. Lighting Plan for Night Operations.

Not Applicable

26. Traffic Control Plan.

Not Applicable

27. Fire Prevention Plan.

Not Applicable.

28. Wild Land Fire Management Plan.

Not Applicable

29. Arc Flash Hazard Analysis.

See 'APPENDIX H'

30. Assured Equipment Grounding Control Program (AEGCP).

Not Applicable.

31. Hazardous Energy Control Program & Procedures.

Not Applicable.

32. Standard Pre-Lift Plan - Load Handling Equipment.

Not Applicable

33. Critical Lift Plan - Load Handling Equipment.

Not Applicable

45. Compressed Air Work Plan for Underground Construction.

Not Applicable

46. Erection and Removal Plan for Formwork and Shoring.

Not Applicable

47. Precast Concrete Plan.

Not Applicable

48. Lift-Slab Plans.

Not Applicable

49. Masonry Bracing Plan.

Not Applicable

50. Steel Erection Plan.

Not Applicable

51. Explosives Safety Site Plan (ESSP).

Not Applicable

52. Blasting Plan.

Not Applicable

53. Dive Operations Plan.

Not Applicable

54. Safe Practices Manual for Diving Activities.

Not Applicable

55. Emergency Management Plan for Diving.

J. RISK MANAGEMENT PROCESS

1. Activity Hazard Analysis Requirements

Graham Industrial Coatings, LLC uses the Activity Hazard Analysis (AHA) as part of its total risk management process. Subcontractors and suppliers to this project are encouraged to use the project specific AHA form provided/requested by the GDA, but may use their own equivalent form, if approved. A sample AHA will be found in 'Appendix F' for use by project participants.

AHAs are to be developed and created by the field crews/workers actually performing the work, along with the assistance of the site management team, as necessary. AHAs shall be reviewed and modified, as necessary, to address changing conditions, operations, or designated competent/qualified persons.

Individual AHAs are required for every activity within a Definable Feature of Work (DFOW). Detailed project-specific hazards and controls shall be provided within each AHA and the overall Risk Assessment Code (RAC) shall be determined for each AHA based on the highest RAC assessed to an individual step within each AHA.

Subcontractors/suppliers must submit their required AHAs to Graham Industrial Coatings, LLC for review by the Project SSHO. Once accepted, Graham Industrial Coatings, LLC will forward the AHA to the GDA for review. Note that no work will be allowed to begin on any activity until the GDA has reviewed and accepted the corresponding required AHA(s).

Prior to the start of any activity, a Preparatory Meeting shall be held during which the approved AHA(s) for that activity is reviewed and discussed in-depth by the entire field team associated with the work, including the Superintendent, SSHO, QC Manager, Foremen, and every member of the field crews/workers performing the work.

Each crew member/worker performing the work must sign the AHA signifying that he/she understands the steps, hazards, and required actions to minimize each risk, and agrees to follow the steps and actions while performing the work. If additional or new crew members/workers are assigned to the activity, an additional Preparatory Meeting must be held in order to review the AHA and each must sign prior to performing any associated work.

Workers/crews shall have in their possession a copy of the current, up-to-date AHA that reflects the current site conditions, personnel, equipment, control measures, etc. while performing the work. The current, up-to-date AHA, with original signatures of all crew members, shall be readily available for reference in the project trailer.

Graham Industrial Coatings, LLC's Site Management Team and the GDA shall use the AHA to assure work is being performed in a safe manner consistent with the approved procedures. If at any time it is found that work is not being conducted in a safe manner and/or not in accordance with the approved AHA, the Contractor and/or the GDA shall stop the work until it is in compliance with the EM 385-1-1, the APP, and/or the AHA or

Certificate of Completion

OSHA EDUCATION CENTER

AMERICAN SAFETY COUNCIL

JONATHAN MARTIN

has successfully completed the following course:

CPR Training

GRADUATION DATE

2/12/2020

Beacon

800 Cordova Street
Anchorage, AK 99501
(907) 222-7612

Name: Jonathan L. Martin Test Date: 04/03/2020

Employer: Graham Industrial Coatings LLC Exp. Date: 04/03/2021

Respiratory Medical Clearance Exp. Date: 04/03/2021

Fit Test was completed in accordance with
OSHA Standard 29 CFR 1910.134

Instructor's Signature:

Appendix A

Certificate of Completion

OSHA EDUCATION CENTER®

AMERICAN SAFETY COUNCIL

CHRISTIAN MITCHEY

has successfully completed the following course:

First Aid Basics

GRADUATION DATE

3/31/2020

SITE USAGE MAP

(LAYDOWN AREA)

HOSPITAL ROUTE MAP AND DIRECTIONS TO Providence Alaska Medical Center

3. General Information	Incident Information
Date of Accident:	**Time of Accident:**

Describe the accident in detail in your words: *(Use the back of page if you need additional space)*

Exact Location of Accident:

Were Hazardous Material(s) Involved ☐ Yes ☐ No

If Yes, Explain What Hazardous Materials Were Involved and Why:

Who Provided Clean-up? ☐ Onsite ☐ Base ☐ Public

Activity of the injured person at the time of incident:

Personal Protective Equipment: (Check/Bold Response)

☐ Available and used ☐ Available and not used ☐ Not Required

☐ Not related to Mishap ☐ Wrong PPE for job

List PPE Used:

5. Contributing Factors: Continued	Incident Information
Other Contributing Factors:	

6. Attached Documents

Attached Documents/Files Name/Description:	Date Added:	Uploaded By:

4. License (if applicable) Person

Are Appropriate License and Certification/Medical Current: (Check/Bold) ☐ Yes ☐ No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

5. Training

Was all the contract-required training provided to the employee: (Check/Bold) ☐ Yes ☐ No

Explain:

6. Attached Documents

Attached Documents Name/Description:	Date Added:	Uploaded By:

4. License (if applicable) Property Damage

Are Appropriate License and Certification/Medical Current: (Check/Bold) ☐ Yes ☐ No

Describe or Explain:

Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:

5. Training

Was all the contract-required training provided to the employee? (Check/Bold) ☐ Yes ☐ No

Explain:

If Yes, Explain What Hazardous Materials Were Involved and Why: Check or Bold appropriate block and list name(s) and quantities of hazardous materials spilled/released during the mishap. List why the hazardous chemicals were being used.

Activity at the time of incident: What type of work/task was being performed by the injured when the injury took place or property damage occurred.

Personal Protective Equipment– Check/Bold appropriate items and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)

Section 4 Fully Explain What Allowed or Caused the Incident - Incident Information
Direct Cause(s): The direct cause is that single factor which most directly lead to the accident. See examples below.

Indirect Cause(s): Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:
1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: Failure to provide fall protection at elevation
Indirect causes: Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)
Direct cause: Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

Additional Action Taken: Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue in the additional box and or on additional sheets of paper if necessary to fully explain and attach to the completed report form.

Please Include a Begin Date and Estimated Completion Date in Description
(1) Begin: Enter the date when the corrective action(s) identified above will begin.
(2) Est. End Date - Enter the date when the corrective action(s) identified above will be completed.

Section 5 Contributing Factors Incident Information: Check/Bold appropriate items fill in information where required
Other Contributing Factors: Describe in detail any additional contributing factors not listed in previous information provided.

Section 6 Attached Documents: Provide the appropriate information for each document/file attached or uploaded.

Injured Data Person

Complete Pages 5 and 6 for each injured person At the upper right hand corner of page 5 and 6 differentiate between each person by using a numerical value (e.g. Person #1, Person #, Person #3, etc.)
Section 1 Injured Data: Fill in all applicable information, Check/bold appropriate responses.

Section 2 General Information:
Check/bold appropriate responses

Section 3 Injury/Illness Fatality Information: Check/bold appropriate responses
Part of Body Affected: Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist: abdomen: single eye; jaw: both elbows: second finger: great toe: collar bone: kidney, etc.).

Activity Hazard Analyses

Sample AHA

Site Specific Project AHAs

ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Put on your personal protective equipment.	Head, foot, or eye injury Personnel being struck by equipment/trucks Hearing damage Injury from falling Injuries from dropping scaffold components	- Workers entering the job site must wear a hard hat and Class II reflective vest AT ALL TIMES. Routinely inspect hard hats for dents, cracks or deterioration. Replace hard hat after any hard blow or electrical shock. - Safety glasses or face shields must be worn any time work operations can cause foreign objects to get into the eye. - Workers must wear safety-toed work boots with slip-resistant and puncture-resistant soles AT ALL TIMES. - Wear gloves when handling sharp objects. Gloves should fit snugly. Wear the right glove for the job. - Workers shall wear earplugs/earmuffs in high noise work areas where loud or heavy equipment is being used. Clean or replace earplugs regularly. - Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery. - Always wear fall-protection equipment when working at or above 6' from ground EM 385-1-1, Sect. 5.A, 5.B, 5.C, 5.D, 5.E, 5.F	L
Inspect tools & equipment	Injury due to defective or improperly functioning power tools Electric shock from defective tools. Impact injuries, splinters Impact injuries from spinning tool Spills - Fuel, Oil, Coolant	- Remove defective tools from the job site. - Wooden handles for tools are secured tightly in the tool and free of cracks and splinters. - All saws are equipped with properly functioning manufacture installed guards. - Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch. - Only use tools for their intended use. - GFCI protection shall be provided on all circuits serving portable electric hand tools. Use only GFCI protected outlets. - Tag defective tools and remove them from the workplace. EM 385-1-1, Sect. 11.D.05, 13.A, 13.B, 13.C, 13.D, 13.H	L

UFGS 013526 11/15 1.9 Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.
UFGS 013526 1.9.1 Review the AHA list periodically (at least monthly) at supervisory safety meetings, update when procedures, scheduling or hazards change
UFGS 013526 1.9.2 Each employee performing work ... must review the AHA and sign a signature log for that AHA prior to starting work. The SSHO must maintain a signature log on site for every AHA.

ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Hoist and Set Material/Components (Forklift)	Unexpected movements Materials striking and injuring workers Crushed by falling material Swinging loads striking and injuring workers	- Assure that there is good communication between workers and the lift operator. - Never walk under a raised load. - Use a tag line on all loads to help stabilize the load and maneuver it into position. EM 385-1-1, Sect. 13.D, 14.A, 21.A, B, C, H, 27.A, B, C See Activity Hazard Analysis on Forklift Operation	L
Preparatory to Scaffold Erection	Improper Design Improper Erection Scaffold Collapse Falling Injury, Death	- Erection, moving, dismantling, or altering of work platforms shall be under the supervision of a competent person. - Scaffolds shall meet the requirements in ANSI A10.8 and be capable of supporting at least 4 times the maximum anticipated load. - Work platforms shall not be erected in the immediate vicinity of power lines until they are de-energized. - Anyone involved in erecting, disassembling, moving, operating, using, repairing, maintaining, or inspecting a scaffold shall be trained by a Competent Person to recognized any hazards with the scaffold system or its intended use and function. EM 385-1-1, Sect. 22.A	L
Erect the scaffold frame	Falling Struck by falling components	- Secure and brace each section of scaffolding as soon as possible. - Scaffold Grade Planking used as a walkway for scaffold erection shall be at least 2 planks wide or 18". - Planks overlap the end of the scaffold no less than 12". EM 385-1-1, Sect. 22.B	L
Securing the scaffolding	Scaffold tipping or falling	- Scaffolds are restrained from tipping by ties, guys, or braces when the height exceeds 4 times the width of the base and then every 26' vertically and 30' horizontally. EM 385-1-1, Sect. 22.B.12	L

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ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Responding to an emergency	Delayed emergency response- further injury or loss of life	- Respond quickly and decisively in case of an accident. Call 911 immediately. - Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid. - Only persons trained in first aid should be allowed to administer first aid. EM385-1-1, Sect. 3.A, 3.B	L
Administering First Aid	Exposure to blood-borne pathogens	- Use appropriate PPE when administering first aid such as gloves, masks, eye protection and/or resuscitation equipment especially when blood is present - Wash after contact with blood or other body fluids - Dispose of soiled material in a labeled leak-proof container EM 385-1-1, Sect. 3.A, 3.B, 3.D	L

Equipment to be Used	Training Requirements & Competent or Qualified Personnel Names	Inspection Requirements
Forklift	Forklift Operator Training and Certification/License Review of Manufacturer's Operating Manual Activity Hazard Analysis Review	- Conduct Daily Inspection prior to Use - including Back-up Alarm and Maintenance Records. - Operators Manual shall be on ALL equipment. - Forklift will be equipped with Fire Extinguisher.
Personal Fall Protection System	All workers will be trained in the proper donning and use of Personal Fall Arrest Equipment before beginning work.	- Inspect personal fall arrest equipment (lanyard, harness, D-rings), for frays, burns, hair line cracks, or other defects prior to use.
Hand Tools	Trained by site supervisor before use.	- Inspected daily for broken parts, loose handles or components etc. Any equipment found defective will be tagged, taken out of service and replaced immediately.
Personal Protective Equipment (PPE)	All workers will be trained in the proper donning and use of PPE before beginning work.	- Inspect ALL PPE prior to each use. Any damaged PPE will be replaced immediately.
First Aid Kits	A MINIMUM of 2 individuals trained in CPR/First Aid will be on-site and available to render aid at all times.	- First Aid Kits will be inspected weekly for damage and/or missing items which shall be replaced immediately.

Competent Person _____ Signature _____

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EM385-1-1 (30NOV14) [illegible] 103526 11/15

Activity Hazard Analysis (AHA)

Activity/Work Task	TEMPORARY DUST BARRIERS	Overall Risk Assessment Code (RAC) (Use highest code)	M
AHA Signature Log #			
Project Location	Anchorage, AK		
Contract Number	CFHWY00267		
Date Prepared	April 21, 2020		
SSHO Signature			
Superintendent Signature			
QC Manager Signature			
Subcontractor Foreman Name:	Travis Hatten		
Signature:			
QA Reviewed by (Name/Title)	Josh Smith, Inspector		
Notes: (Field Notes, Review Comments, etc)			

Risk Assessment Code (RAC) Matrix

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).

Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely

Severity: The outcome if a mishap occurred. Identify as Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (probability vs. severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA

RAC CHART

- **E = Extremely High Risk**
- **H = High Risk**
- M = Moderate Risk
- L = Low Risk

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
Site-specific/Job-specific training for workers	Employees not trained in the safe execution of their tasks may harm themselves or others	- Use this Activity Hazard Analysis and other formal and informal training as a means to train workers. NOTE: If the scope of work detailed below changes in any way, contact the Safety Department and complete an AHA amendment detailing the new scope of work.	L

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ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Roll out tools and containment membrane	Tripping - Hoses, Cords, Materials Falling objects Hand injuries	- Completely unroll all hoses and cords, avoid tangles. - Arrange hoses and cords in an orderly fashion. - Clean up scrap materials and debris before and after working in an area. - Maintain Good housekeeping. - All trash and debris shall be put in appropriate locations. - Do not leave tools and materials laying around on the ground. EM385-1-1, Sect. 14.C	L
Working from an elevated position	Falling- Injury, Death	- Whenever you are working from an elevated location that is 6' or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system. - Workers must wear a full body harness and lanyard secured to a safe anchorage point. This may be a bracket specifically designed for fall protection or a structural member. - Lines shall be checked after each move to ensure correct length. - Never allow material or tools to fall on workers below. EM 385-1-1, Sect. 21.A, B, C, H Note: It is a requirement that a Site-specific Fall Rescue Plan be developed, implemented, and reviewed daily prior to the start of work.	M
Working from a scissor lift	See AHA for scissor lift	See AHA for scissor lift	M
Responding to an emergency	Delayed emergency response- further injury or loss of life	- Respond quickly and decisively in case of an accident. Call 911 immediately. - Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid. - Only persons trained in first aid should be allowed to administer first aid. EM385-1-1, Sect. 3.A, 3.B	L
Administering First Aid	Exposure to blood-borne pathogens	- Use appropriate PPE when administering first aid such as gloves, masks, eye protection and/or resuscitation equipment especially when blood is present - Wash after contact with blood or other body fluids - Dispose of soiled material in a labeled leak-proof container EM 385-1-1, Sect. 3.A, 3.B, 3.D	L

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Activity/Work Task: TEMPORARY DUST BARRIERS - 01 56 16

Contract Name: SEWARD HWY MP-114 TO DIMOND BLVD. PAVEMENT PRESERVATION

Contract Number: CFHWY00267

Competent Persons

Name: Signature: Date:

Meeting Attendees

Name: Signature: Date: Name: Signature: Date:

ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Inspect tools	Injury due to defective or improperly functioning power tools Electric shock from defective tools. Impact injuries, splinters Impact injuries from spinning tool	- Remove defective tools from the job site. - Wooden handles for tools are secured tightly in the tool and free of cracks and splinters. - All Bull Hoses, and Blast Hoses positively secured with Whip-Checks, or Locking Pins/Wire - Check blast nozzle to make sure it's fully seated in nozzle holder, and tight - Check deadman switch function to assure proper operation - Only use tools for their intended use. - GFCI protection shall be provided on all circuits serving portable electric hand tools. Use only GFCI protected outlets. - Tag defective tools and remove them from the workplace. EM 385-1-1, Sect. 11.D.05, 13.A, 13.B, 13.C, 13.D, 13.H	L
Mechanically Ventilate the Space	Poor visibility Slips, Trips, Falls Combustion or explosion Injury / Death	- Set up approved ventilation system: Dust Collector, and / or Dehumidifier - Ventilate the space a minimum rate of at least four (4) volumes per hour - Verify that air supply is not contaminated. Ventilation air supply must be from fresh air source and uncontaminated with flammables, toxins, and ambient moisture	L

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ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Loading Abrasive Material into Hopper	Pulls and Strains from lifting Unexpected movements Materials striking and injuring workers Crushed by falling material Swinging loads striking and injuring workers Struck or crushed by moving equipment Tripping or falling	- Team lift heavy or awkward materials. - Use safe lifting techniques. - Use material handling aids whenever possible. - Be aware of your surroundings and watch where you are going while carrying material. - Never move materials above coworkers. - When receiving/stocking material through a wall or floor opening, do not stand in front or above the opening where you could fall. - (See training and inspection requirements for reach-lifts below.) - When stocking material above ground level up to 35-feet , a reach-lift will place the pallet as close to the material's final destination as possible, then hand stocking will occur. EM 385-1-1, Sect. 14.A (See Activity Hazard Analysis on forklift operation)	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Working from an elevated position	Falling- Injury, Death	- Whenever you are working from an elevated location that is 6' or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system. - Workers must wear a full body harness and lanyard secured to a safe anchorage point. This may be a bracket specifically designed for fall protection or a structural member. - Lines shall be checked after each move to ensure correct length. - Never allow material or tools to fall on workers below. - Secure blast hose in such a manner as to minimize physical rigor of moving / relocating EM 385-1-1, Sect. 21.A, B, C, H Note: It is a requirement that a Site-specific Fall Rescue Plan be developed, implemented, and reviewed daily prior to the start of work.	M
Responding to an emergency	Delayed emergency response- further injury or loss of life	- Respond quickly and decisively in case of an accident. Call 911 immediately. - Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid. - Only persons trained in first aid should be allowed to administer first aid. EM385-1-1, Sect. 3.A, 3.B	L
Administering First Aid	Exposure to blood-borne pathogens	- Use appropriate PPE when administering first aid such as gloves, masks, eye protection and/or resuscitation equipment especially when blood is present - Wash after contact with blood or other body fluids - Dispose of soiled material in a labeled leak-proof container EM 385-1-1, Sect. 3.A, 3.B, 3.D	L

Equipment to be Used	Training Requirements & Competent or Qualified Personnel Names	Inspection Requirements
Abrasive blasting machine	Trained by site supervisor and authorized to use power tools.	- Inspected daily for broken parts, damaged cords etc. Any equipment found defective will be tagged, taken out of service and replaced immediately.
Air hoses	AHA training of each operator, Manufacturer's Recommendations	Daily before use or shift.

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Activity/Work Task: SURFACE REMOVAL DECONTAMINATION BY SAND BLASTING - 02 51 33.16

Contract Name: SEWARD HWY MP-114 TO DIMOND BLVD. PAVEMENT PRESERVATION

Contract Number: CFHWY00267

Competent Persons

Name:	Signature:	Date:

Meeting Attendees

Name:	Signature:	Date:	Name:	Signature:	Date:

ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Put on your personal protective equipment.	Head, foot, or eye injury Personnel being struck by equipment/trucks Hearing damage	- Workers entering the job site must wear a hard hat and Class II reflective vest AT ALL TIMES. Routinely inspect hard hats for dents, cracks or deterioration. Replace hard hat after any hard blow or electrical shock. - Safety glasses or face shields must be worn any time work operations can cause foreign objects to get into the eye; #5 Shades for Metallizer Operator - Workers must wear safety-toed work boots with slip-resistant and puncture-resistant soles AT ALL TIMES. - Wear gloves when handling sharp objects. Gloves should fit snugly. Wear the right glove for the job; electrically insulated gloves for metallizer - Workers shall wear earplugs/earmuffs in high noise work areas where loud or heavy equipment is being used. Clean or replace earplugs regularly. - Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery. EM 385-1-1, Sect. 5.A, 5.B, 5.C, 5.D, 5.E, 5.F	L
Inspect tools	Injury due to defective or improperly functioning power tools Electric shock from defective tools. Impact injuries, splinters Impact injuries from spinning tool	- Remove defective tools from the job site. - Metallizer is properly grounded to generator - Metallizer leads/cables are free from defects / cracks/ breaks in the insulation - All saws are equipped with properly functioning manufacture installed guards. - Hand held power tools (saws, drills, grinders) are equipped only with a constant pressure switch. - Only use tools for their intended use. - GFCI protection shall be provided on all circuits serving portable electric hand tools. Use only GFCI protected outlets. - Tag defective tools and remove them from the workplace. EM 385-1-1, Sect. 11.D.05, 13.A, 13.B, 13.C, 13.D, 13.H	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Prepare the area for Thermal Arc Spraying	Overexposure to fumes Fire/Explosion	- Use adequate ventilation and/or exhaust to keep the air free from fugitive zinc dust - Remove flammable materials from thermal spray work area or shield from hot metal and from heat. - Keep a fire watch in area during and after thermal spraying. - Keep a fire extinguisher in the thermal spray work area. - Use non-flammable welding/hot work screens to protect others.	L
Put on your PPE for Thermal Arc Spraying	Skin Irritation Eye Damage Hearing Damage Respiratory Irritation Electric Shock/Electrocution Burns	- Always use a helmet and/or appropriate head, face and eye protection during thermal spray surfacing application. - Select a proper filter lens which provides adequate protection for your eyes and is comfortable for you while thermal spraying. Eye shades of No. 3-6 for combustion and 9-12 for electrical processes are recommended. - Process generates UV radiation. Wear flame resistant clothing which provides full coverage for your skin. - Use earplugs when thermal spraying to keep noise, sparks and molten metal from damaging your ears. - Wear dry gloves free of holes or split seams. Change as necessary to keep gloves dry. - If exposure to thermal spray fume cannot be controlled or if spraying outside and natural air movement is not enough to keep thermal spray fume out of your breathing zone, donn a respirator. If a respirator is to be used, all requirements for its use must be fulfilled prior to use and must comply with ANSI Z88.2. - Thermal spray process generates noise levels that require hearing protection by the operator. Earmuffs and noise control procedures should be provided to conform to the standard limits of OSHA 29 CFR 1910.95.	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Responding to an emergency	Delayed emergency response- further injury or loss of life	- Respond quickly and decisively in case of an accident. Call 911 immediately. - Know where the emergency numbers are posted, where the first aid kit is, and who is trained in first aid. - Only persons trained in first aid should be allowed to administer first aid. EM385-1-1, Sect. 3.A, 3.B	L
Administering First Aid	Exposure to blood-borne pathogens	- Use appropriate PPE when administering first aid such as gloves, masks, eye protection and/or resuscitation equipment especially when blood is present - Wash after contact with blood or other body fluids - Dispose of soiled material in a labeled leak-proof container EM 385-1-1, Sect. 3.A, 3.B, 3.D	L
Operating the scissor lift	Accidents due to - Poor Visibility Not being able to stop Falling from the machine Crushed by or pinched by/between machine parts Improper use of machine / uneven or unstable ground / outriggers	- Assure that the operator's view is unobstructed when moving in any direction - Workers shall not ride on any part of the machine other than in operator's basket - Never stand on anything other than floor of the basket(don't stand or sit on the handrails) - All workers in the lift must wear a full body harness with lanyard attached to anchorage points - Do not allow workers to stand or walk under the elevated portion of the machine - Do not place body parts between pinch points on the machine or between the machine and a stationary object - Familiarize yourself with the directional controls of the machine, especially prior to work in tight spaces Per instruction manual - A warning device or signal person shall be provided where there is danger from moving equipment EM 385 18.B.02, 18.C.16, 18.D.04, 18.G.21, 22.M.06	M

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ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Inspection of Scaffold	Scaffold Collapse Falling Injury, Death	- Scaffold shall be inspected by the Competent Person PRIOR to the start of each shift. - Competent Person shall tag the scaffold with a color-coded tag placed in a readily visible location(s). - Green tags indicate the scaffold has been inspected and is safe; red tags indicate the scaffold is unsafe to use. - Tags shall have the Competent Persons name, signature, and dates of initial and last inspection. EM 385-1-1, Sect. 22.A.06	L
Getting on and off the scaffold	Falling	- Always use a ladder to gain access to scaffold work platforms - Do not use cross bracing to climb onto a scaffold. - Ensure ladder rails extend 3' above the platform and are securely tied off, EM 385-1-1, Sect. 22.B.11, 24.B	L
Monitor Weather Conditions	Wind driven rain Electrocution Death	- Weather conditions shall be continually monitored. - If Lightning or wind-driven rain is observed, all work on Metallizing shall be stopped immediately - If Lighting is observed, all work in open areas shall stop immediately. EM 385-1-1, Sect. 01.E.01.d.(4)., 18.H.10.a.	L
High winds	High winds	Abandon exterior work at height in the event of high winds. Seek shelter in the event of high winds. Do not stand near objects with the potential to fall, collapse.	M

Equipment to be Used	Training Requirements & Competent or Qualified Personnel Names	Inspection Requirements
Air Compressor Air Treatment Precision Arc 4.8 Metallizer 35K Generator Speeflow PowerTwin 3600 Airless Paint Sprayer Telescoping Forklift Scissor Truck	Thermal Arc Training Forklift Competent Person Scaffold Competent Person	Check all fluids daily Inspect for leaks Warm up thoroughly before putting into service Check for proper amperage, pressure, temperature

Competent Person _____ Signature _____

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Activity Hazard Analysis (AHA)

Activity/Work Task	COVID-19 JOB SITE PRACTICES	Overall Risk Assessment Code (RAC) (Use highest code)	L
AHA Signature Log #			
Project Location	Anchorage, AK		
Contract Number	CFHWY00267		
Date Prepared	April 21, 2020		
SSHO Signature			
Superintendent Signature			
QC Manager Signature			
Subcontractor Foreman Name:	Travis Hatten		
Signature:			
QA Reviewed by (Name/Title)	Josh Smith, Inspector		
Notes: (Field Notes, Review Comments, etc)			

Risk Assessment Code (RAC) Matrix

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).

Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely

Severity: The outcome if a mishap occurred. Identify as Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (probability vs. severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA

RAC CHART

- **E = Extremely High Risk**
- **H = High Risk**
- M = Moderate Risk
- L = Low Risk

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC

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ob Steps (Work Sequences)	Specific Anticipated H s	Controls	RAC
Management Responsibilities (continued)	Lack of planning contributing to increased risk of infection	- Management shall provide tissues and encourage employees to cover their noses and mouths with a tissue (or elbow or shoulder if a tissue is not available) when coughing or sneezing. - Management shall provide disposable hand towels and no-touch trash receptacles. - Limit the exchange/sharing of paper documents by encouraging use of electronic communication whenever possible. - Do not allow sharing of tools or any multi-user devices and accessories such as iPads, laptops, hand-held radios, computer stations, etc. - Provide soap and water and hand sanitizer with alcohol content between 65% and %90% in the workplace. Ensure that adequate supplies are maintained. Place hand sanitizers in multiple locations on the job site, in the office, in or around portable toilets, or in conference rooms to encourage hand hygiene. - Provide disposable gloves where appropriate; instruct workers to wash hands after removing gloves. - Communicate key CDC recommendations (and post signage where appropriate) to your staff and tradespeople: 1. How to Protect Yourself 2. If You are Sick 3. COVID-19 Frequently Asked Questions 4. Place posters that encourage staying home when sick, cough and sneeze etiquette, and hand hygiene at the entrance to your workplace and in other workplace areas where they are likely to be seen. - Management shall communicate the company's Human Resources practices for managing sick time related to COVID-19. References: COVID-19 Job Site Practices, AGC Oregon Columbia Chapter, 18 March 2020; COVID-19 Recommended Best Practices for Construction Jobsites, The Builders' Association, 19 March 2020; COVID-19 Recommended Practices for Construction Jobsites, AGC Houston Chapter, 18 March 2020.	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Prior to Coming to Work	Unknowingly Being Infected Infecting Other on the Job	- It is critical that individuals NOT report to work while they are experiencing illness symptoms, such as fever, cough, shortness of breath, sore throat, runny/stuffy nose, body aches, chills, or fatigue. - Individuals should seek medical attention if they develop these symptoms. - Supervisors should ask the following questions to all individuals prior to entering the jobsite or building. If the answer "yes" to any, the individual should be asked to leave the jobsite or building immediately. 1. Have you, or anyone in your family, been in contact with a person that is in the process of being tested for COVID-19? 2. Have you, or anyone in your family traveled outside of the United States within the last two weeks? 3. Have you been medically directed to self-quarantine due to possible exposure to COVID-19? 4. Are you having trouble breathing or have you had flu-like symptoms within the past 48 hours, including: fever, cough, shortness of breath, sore throat, runny/stuffy nose, body aches, chills, or fatigue? Anyone asked to leave should not return to work until 24-hours after they are free from a fever or signs of a fever without the use of fever-reducing medication. References: COVID-19 Job Site Practices, AGC Oregon Columbia Chapter, 18 March 2020; COVID-19 Recommended Best Practices for Construction Jobsites, The Builders' Association, 19 March 2020; COVID-19 Recommended Practices for Construction Jobsites, AGC Houston Chapter, 18 March 2020.	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Additional PPE Recommendations for COVID-19	Lack of Protection from COVID-19 Exposure	- Gloves should be worn at all times while on site. If gloves are not typically required for the task, then any type of glove is acceptable, including latex gloves. - Remember: The type of glove worn should be appropriate to the task. - Eye protection should be worn all times while on site. - The CDC is currently not recommending that healthy people wear face masks. On March 17, 2020, the government asked all construction companies to donate N95 face masks to local hospitals and forego future orders for the time being. Contractors should continue to provide and direct employees to wear face masks if required by the work. - Do not share personal protection equipment (PPE). - Utilize disposable gloves where appropriate; instruct workers to wash hands after removing gloves. - Ensure used PPE is disposed of properly. - Sanitize reusable PPE per manufacturer's recommendation prior to each use. References: COVID-19 Job Site Practices, AGC Oregon Columbia Chapter, 18 March 2020; COVID-19 Recommended Best Practices for Construction Jobsites, The Builders' Association, 19 March 2020; COVID-19 Recommended Practices for Construction Jobsites, AGC Houston Chapter, 18 March 2020.	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Proper Hand Washing	COVID-19 Spreads by improperly washed/unwashed hands Touching Face with contaminated hands	- All job sites should have hand washing stations readily available to all workers on the project and should be well stocked and maintained. - Hand washing stations should be cleaned and sanitized every hour. - All workers should wash hands frequently and thoroughly using soap and water for at least 20 seconds, especially before and after eating, smoking, or drinking, and after blowing your nose, coughing, or sneezing. - Refer to the CDC guideline; When and How to Wash Your Hands - Do not touch your face, eyes, mouth, nose, or ears. References: COVID-19 Job Site Practices, AGC Oregon Columbia Chapter, 18 March 2020; COVID-19 Recommended Best Practices for Construction Jobsites, The Builders' Association, 19 March 2020; COVID-19 Recommended Practices for Construction Jobsites, AGC Houston Chapter, 18 March 2020.	L

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ob Steps (Work Sequences)	Specific Anticipated H ls	Controls	RAC
Decontaminating Post-Shift	Unknowingly Exposing Family or Friends to COVID-19 After Working	- Workers must utilize the provided shoe sanitation tubs (non-bleach sanitizer solution) prior to entering/leaving job site. - Ensure used PPE is disposed of properly. - Workers must wash hands thoroughly after removing PPE and prior to leaving job site. - Workers must change work clothes prior to arriving home. - Workers must wash clothes in hot water with laundry sanitizer. References: COVID-19 Job Site Practices, AGC Oregon Columbia Chapter, 18 March 2020; COVID-19 Recommended Best Practices for Construction Jobsites, The Builders' Association, 19 March 2020; COVID-19 Recommended Practices for Construction Jobsites, AGC Houston Chapter, 18 March 2020.	L

Equipment to be Used	Training Requirements & Competent or Qualified Personnel Names	Inspection Requirements
Soap and Water (Any Kind/Brand)	Scrub surface diligently for at least 30 seconds. Interferes with fats in virus shell.	Rinse off with water. Properly discard of towels.
Isopropyl Alcohol/Rubbing Alcohol (at least 70% denatured alcohol)	Clean surface with soap and water. Dry. Wipe Alcohol on. (do not dilute) Let evaporate.	Use and store per manufacturer's recommendations. Flammable. Use in well-ventilated areas. Poisonous. For topical use only. Do not ingest.

Competent Person

Signature

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Fall Protection Program

For

Graham Industrial Coatings, LLC

1. Written Program

Graham Industrial Coatings, LLC will review and evaluate this standard practice instruction:

- On an annual basis
- When changes occur to 29 CFR, that prompt revision of this document
- When facility operational changes occur that require a revision of this document
- When there is an accident or close-call that relates to this area of safety
- Review the program any time fall protection procedures fail

Effective implementation of this program requires support from all levels of management within this company. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

2. Statement of Policy.

The hazards of potential falls at heights of 6 feet and above will be addressed in this document. This instruction describes a systematic approach that must be used to protect and prevent people from falling. This instruction also lists some of the most common fall hazards, and provides recommendations and guidelines for selecting fall arrest systems.

4. Training.

A training program will be provided for all employees who will be exposed to fall hazards in the work area, and will be conducted by competent personnel. The program will include but will not be limited to:

- A description of fall hazards in the work area
- Procedures for using fall prevention and protection systems
- Equipment limitations
- The elements encompassed in total fall distance
- Prevention, control and fall arrest systems
- Inspection and storage procedures for the equipment

Generally, workers will be trained to recognize the hazards of falling from elevations and to avoid falls from grade level to lower levels through holes or openings in walking/working surfaces. Training programs will include prevention, control and fall arrest systems. It must be ensured that appropriate fall arrest systems are installed, and that employees know how to use them before beginning any work that requires fall protection.

4.1 Initial training. Training will be conducted prior to job assignment. This employer will provide training to ensure that the purpose, function, and proper use of fall protection is under¬stood by employees and that the knowledge and skills re¬quired for the safe application, and usage is acquired by employees. This standard practice instruction will be provided to, and read by all employees receiving training. The training will include, as a minimum the following:

4.1.1 Types of fall protection equipment appropriate for use.

4.1.2 Recognition of applicable fall hazards associated with the work to be completed and the locations of such.

4.1.3 Load determination and balancing requirements.

4.1.4 Procedures for removal of protection devices from service for repair or replacement.

4.1.5 All other employees whose work operations are or may be in an area where fall protection devices may be utilized, will be instructed to an awareness level concerning hazards associated with fall protection operations.

4.1.6 Fall protection equipment identification. Fall protection equipment having identification numbers will be checked for legibility. Fall protection equipment having illegible identification markings will be turned in to the supervisor for inspection.

5. Fall Hazard Control Procedures (Fall Prevention).

5.1 Control Procedures Development. Once a facility evaluation has been accomplished, procedures will be developed, documented and utilized for the control of potential fall hazards. A Fall Prevention Plan will be designed by company competent individuals or other competent personnel. Company engineers (where utilized) or other competent personnel will be provided with any required specialized training to recognize fall hazards, to understand and address fall prevention techniques, and to become familiar with fall arrest equipment and procedures. It is critical that they consider fall protection design for the safety of operations where employees must work at elevated heights. Safety during access and egress from elevated work sites will also be considered. The following guidelines will be used when planning work at elevated heights:

- Involve the Safety Department early in the project planning/job planning so that they can recommend appropriate fall-protection measures and equipment.
- Involve qualified Engineers when load rating of anchorage points must be determined or is in doubt. Required training will be provided as necessary.
- Involve Engineering and Maintenance when anchorage points must be installed.
- The Safety Officer and Engineering Departments will use the expertise of fall protection equipment manufacturers such as Rose Manufacturing Company., Miller Equipment Company, Research and Trading Company and DBI/SALA.
- This Company will be specific in dealing with fall hazards when developing Fall Prevention Plans. Contractors will be required to provide a written fall protection program which describes the Contractors' fall protection policies and procedures when they will be working at elevated heights.

5.2 Procedural Format. The following format will be followed when developing fall p rotection procedures. The Safety Officer will be responsible for the implementation of these procedures. The procedures will clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized to control fall hazards, and the means to enforce compliance including, but not limited to, the following:

5.2.1 A specific statement of the intended use of the procedure.

5.2.2 A review of accident records, including OSHA 300 logs and Workers' Compensation documentation.

5.2.3 Interviews with employees and groups of employees whose work environment includes or may include fall hazards.

5.2.4 Physical observations of the work environment(s) that involve fall hazards

6. Protective Materials and Hardware.

Appropriate fall protection devices will be provided for potential fall hazards. Selection of the equipment will be based on the fall protection evaluation. Evaluations will be conducted by the following personnel authorized to evaluate fall protection requirements:

Competent Persons

1. Mr. Travis Hatten
2. Mr. Jonathan Martin
3. Mr. Aaron Alexander
4. _____
5. _____
6. _____

6.1 Selection Criteria.

6.1.1 Fall Protection devices will be singularly identified; will be the only devices(s) used for controlling falls; will not be used for other purposes; and will meet the following requirements:

6.1.1.1 Capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

6.1.1.2 Anchor points will not deteriorate when located in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

6.1.1.3 Capable of withstanding the ultimate load of 5,000 lbs. for the maximum period of time that exposure is expected.

6.1.1.4 Standardization within company facilities. Fall protection devices will be standardized whenever possible.

7. Fall Protection Systems.

When fall hazards cannot be eliminated through any other means, fall arrest systems will be used to control falls. Proper training on the use of fall arrest equipment is essential and will be provided prior to use.

7.1 Full Body Harness Systems. A full body harness system consists of a full-body harness, lanyard, energy shock absorber, and self-locking snap hook. Before using a full-body harness system, the SSHO and/or the user must address such issues as:

7.1.1 Has the user been trained to recognize fall hazards and to use fall arrest systems properly?

7.3 Standard Harnesses. Harnesses for general purpose work should be Class III, constructed with a sliding back D-ring. Standard harnesses are suitable for continuous fall protection while climbing, riding, or working on elevated personnel platforms. They are suitable for positioning, fall arrest, and the rescue and evacuation of people who are working at elevated heights

8. Inspection and Maintenance

To ensure that fall protection systems are ready and able to perform their required tasks, a program of inspection and maintenance will be implemented and maintained. The following as a minimum, will comprise the basic requirements of the inspection and maintenance program:

8.1 Equipment manufacturer's instructions will be incorporated into the inspection and preventive maintenance procedures.

8.2 All fall protection equipment will be inspected prior to each use, and a documented inspection at intervals not to exceed 6 months, or in accordance with the manufacturers guidelines.

8.3 The user will inspect his/her equipment prior to each use and check the inspection date.

8.4 Any fall protection equipment subjected to a fall or impact load, will be removed from service immediately and inspected by a qualified person (sent back to the manufacturer).

8.5 Check all equipment for mold, damage, wear, mildew, or distortion.

8.6 Hardware should be free of cracks, sharp edges, or burns.

8.7 Ensure that no straps are cut, broken, torn or scraped.

8.8 Special situations such as radiation, electrical conductivity, and chemical effects will be considered.

8.9 Equipment that is damaged or in need of maintenance will be tagged as unusable, and ***will not be stored*** in the same area as serviceable equipment.

8.10 A detailed inspection policy will be used for equipment stored for periods exceeding one month.

8.11 Anchors and mountings will be inspected before each use by the user and supervisor for signs of damage.

devices.

Body belt means a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Competent person means a person who is capable of identifying hazardous or dangerous conditions in any personal fall arrest system or any component thereof, as well as in their application and use with related equipment.

Connector means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system.

Deceleration device means any mechanism with a maximum length of 3.5 feet, such as a rope grab, ripstitch lanyard, tearing or deforming lanyards, self-retracting lifelines, etc. which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Energy shock absorber means a device that limits shock-load forces on the body.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Fall arrest system means a system specifically designed to secure, suspend, or assist in retrieving a worker in or from a hazardous work area. The basic components of a fall arrest system include anchorage, anchorage connector, lanyard, shock absorber, harness, and self-locking snap hook.

Free fall means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.
Free fall *distance* means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall (maximum of 6 feet). This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Hole means a gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

Lanyard means a flexible line of rope, wire rope, or strap which generally has a

receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of two types:

- The locking type with a self-closing , self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
- The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. As of January 1, 1998, the use of a non-locking snaphook as part of personal fall arrest systems and positioning device systems is prohibited.

Toeboard means a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

Walking/Working surface means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning line system means a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

Work area means that portion of a walking/working surface where job duties are being performed.

TABLE OF CONTENTS

This written hazard communication program will be available in the construction site office for review and use by all workers on this project.

III. PROGRAM RESPONSIBILITIES

A. Corporate Management

Management has the following responsibilities:

1. To establish guidelines for hazard communication that meets the need of the company and is compliant with OSHA and local regulations.
2. To ensure that employees are provided with the proper materials for communicating hazards to employees.
3. To designate an employee to administrate and supervise the hazard communication program.
4. To provide training to employees on hazard communication.
5. To ensure the company is operating in accordance with this policy by performing periodic reviews and audits.
6. To review this safety policy for effectiveness periodically and when program deficiencies are discovered.

B. Hazard Communication Program Manager

The company Hazard Communication Program Manager is Mr. Timothy Bogowith and can be contacted at 907-360-8301. The Hazard Communication Program Manager has the following responsibilities:

1. To supervise the implementation and execution of the hazard communication program.
2. To provide or coordinate hazard communication training for employees.
3. To ensure that materials received to the company are properly labeled and have safety data sheets (SDS).
4. To ensure that all chemicals used at the facility are included on the chemical inventory list.
5. To ensure that the company hazard communication program meets the requirements of OSHA.
6. To schedule periodic audits to monitor program effectiveness.

C. Site Hazard Communication Manager

The Site Hazard Communication Manager is Mr. Jonathan Martin and can be contacted at 907-707-9318. The Site Hazard Communication Manager has the following responsibilities:

- Signal word
- Hazard statement(s)
- Pictogram(s)
- Precautionary statement(s)

Portable containers of hazardous materials do not require labeling if the materials are transferred from labeled containers and are intended for immediate use by the employee who performs the transfer. Portable containers not immediately used will be emptied and cleaned when necessary, or prior to the end of each shift.

Where a hazardous chemical is, or may be present in a specific area (e.g., where extensive welding occurs), the entire area will be labeled with a warning placard.

Workplace labels or other forms of warning will be legible, in English and prominently displayed on the container or readily available in the work area throughout each work shift. If employees speak languages other than English, the information in the other language(s) may be added to the material presented providing the information is presented in English as well.

V. SAFETY DATA SHEETS

The manufacturer or importer of a chemical is required by OSHA to develop a Safety Data Sheet (SDS) that contains specific, detailed information about the chemical's hazard using a specified format. The distributor or supplier of the chemical is required to provide this SDS to the purchaser.

If problems arise in obtaining an SDS from the chemical manufacturer, importer or distributor, a phone call will be made to request an SDS and to verify that the SDS has been sent. The phone call will be logged and a letter will be sent the same day. The company will maintain a written record of all efforts to obtain SDSs. If these efforts fail to produce an SDS, the local OSHA office will be contacted for assistance.

Prior to the start of each specific construction activity, Safety Data Sheets shall be submitted with each Activity Hazard Analysis (AHA) in which a hazardous chemical will be used during the construction activity. During Preparatory Meetings where AHAs are reviewed with all field personnel, the applicable Safety Data Sheet(s) will also be reviewed for each hazardous chemical. The Site Hazard Communication Officer will maintain all SDSs in an organized fashion in the construction site office for all employees to view at will.

A duplicate set of SDS information will be maintained by the Hazard Communication Program Manager at Graham Industrial Coatings, LLC's corporate office. SDS books and the Hazardous Chemical List will be maintained and kept up to date by the Hazard Communication Program Manager. As obsolete SDSs are replaced by updated copies, the obsolete SDSs will be retained for 30 years.

VI. EMPLOYEE INFORMATION AND TRAINING

Employees included in the hazard communication program will receive the following information

VIII.RECORDKEEPING

Records pertaining to the hazard communication program will be maintained by the safety coordinator. The safety coordinator will keep the following records:

- Chemical inventory list
- Hazardous material reviews
- Copies of phone call logs and letters requesting SDSs
- Employee training records
- Warnings issued to employees for not following the hazard communication program

ATTACHMENT B

Sample Hazardous Materials and Chemicals List

INDEX NUMBER	PRODUCT	HAZARD CLASSIFICATION SYSTEM (HMIS)	DATE INTRODUCED	DATE DISCONTINUED
1	**Clorox**	**Health – 3** **Fire – 0** **Reactivity - 1**	04-15-1999	
2	**WD40**	**Health – 1** **Fire – 1**	4-12-1998	10-01-2000

CORROSION	EXCLAMATION MARK*	FLAME OVER CIRCLE
		
Skin Corrosion/Burns Eye Damage Corrosive to Metals	Irritant (skin and eye) Skin Sensitizer Acute Toxicity Narcotic Effects Respiratory Tract Irritant Hazardous to Ozone Layer *(Non-Mandatory)	Oxidizers

Class Notes:

ATTACHMENT D

Pictogram Memory Exercise

(Name this Pictogram)

(Name this Pictogram)

(Name this Pictogram)

(Name this Pictogram)

(Name this Pictogram)

(Name this Pictogram)

(Name this Pictogram)

Name this Pictogram)

(Name this Pictogram)

ATTACHMENT F

Sample Label

PRODUCT IDENTIFIER

CODE

Product Name

SUPPLIER IDENTIFICATION

Company Name

Street Address

City State

Postal Code Country

Emergency Phone Number

PRECAUTIONARY STATEMENTS

Keep container tightly closed. Store in cool, well ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measure against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or carbon dioxide (CO_2) fire extinguisher to extinguish.

First Aid

If exposed call Poison Center.

If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.

HAZARD PICTOGRAMS

SIGNAL WORD

Danger

HAZARD STATEMENT

Highly flammable liquid and vapor.
May cause liver and kidney damage.

SUPPLEMENTAL INFORMATION

Directions for use
Fill weight: Lot Number
Gross weight: Fill Date:
Expiration Date:

ATTACHMENT H

OSHA Resources

The following items can be downloaded from the OSHA website at https://www.osha.gov/pls/publications/publication.html or ordered from OSHA by calling (800) 321-6742:

Hazard Communication: Hazard Communication Wallet Card
OSHA 3658 - 2013

Hazard Communication Standard: December 1st, 2013 Training Requirements for the Revised Standard Fact Sheet
OSHA FS-3642 - 2013

Hazard Communication Standard: Labels and Pictograms- Brief

OSHA BR-3636 - 2013

Hazard Communication Safety Data Sheets
OSHA 3493 – 2012

Hazard Communication Standard Pictograms
OSHA 3491 - 2012

Hazard Communication Standard: Safety Data Sheets – Brief
OSHA BR-3514 - 2013

Hazard Communication: Steps to an Effective Hazard Communication Program for Employers That Use Hazardous Chemicals Fact Sheet
OSHA FS-3696 – 2014

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protective equipment.

Graham Industrial Coatings, LLC shall designate individuals who shall participate in development and maintaining of the Hearing Conservation Program and who shall be responsible to ensure its ongoing implementation.

Supervisors.
It is the responsibility of each supervisor to implement all aspects of this program, including documentation of the inspections and training. Supervisors have been designated this responsibility, as they are involved with employees on a daily basis. Supervisors must:

- Conduct hazard assessments and ensure that employees are informed, trained, and provided with the appropriate training.
- Notify the Environmental Health & Safety Department of noise complaints, potential noise hazards, or employees which may have noise exposure approaching the action level.
- Notify the Environmental Health and Safety Department of process, materials or equipment changes that may alter noise exposures.
- Ensure that employees are provided with hearing protectors when required
- Ensure that employees properly use and care for hearing protectors
- Ensure that noise-hazardous equipment/areas are properly labeled or posted (greater than or equal to the action level)
- Notify Environmental, Health and Safety of process, materials or equipment changes that may alter noise exposures
- Ensure that potentially overexposed employees are provided with a baseline audiometric hearing test prior to the initial work assignment and then annually thereafter. High noise exposure must be avoided for 14 hours prior to an exam.
- Enforce the use of hearing protectors or noise reduction procedures in the designated areas/assignments
- Ensure new employee complete Hearing Conservation Program orientation/training and annual refresher Hearing Conservation Program training of employees is provided to all potentially overexposed personnel.

Employees.
It is the responsibility of each employee to comply with this program and any further safety recommendations provided by supervisors and Graham Industrial Coatings, LLC Safety Department requirements regarding the Hearing Conservation Program, including the following:

- Conduct all assigned tasks in a safe manner including following required noise reduction procedures and the proper use of hearing protectors.
- Store and maintain hearing protectors in a clean and sanitary manner.
- Report any unsafe or unhealthy work conditions and job-related injuries or illnesses to the

Pre-molded, Reusable Plugs

Pre-molded plugs are made from silicone, plastic or rubber and are manufactured as either "one-size-fits-most" or are available in several sizes. Many pre-molded plugs are available in sizes for small, medium or large ear canals.

A critical tip about pre-molded plugs is that a person may need a different size plug for each ear. The plugs should seal the ear canal without being uncomfortable. This takes trial and error of the various sizes. Directions for fitting each model of pre-molded plug may differ slightly d epending on how many flanges they have and how the tip is shaped. Insert this type of plug by reaching over your head with one hand to pull up on your ear. Then use your other hand to insert the plug with a gentle rocking motion until you have sealed the ear canal.

Advantages of pre-molded plugs are that they are relatively inexpensive, reusable, washable, convenient to carry, and come in a variety of sizes. Nearly everyone can find a plug that will be comfortable and effective. In dirty or dusty environments, you don't need to handle or roll the tips.

Canal Caps

Canal caps often resemble earplugs on a flexible plastic or metal band. The earplug tips of a canal cap may be a formable or pre-molded material. Some have headbands that can be worn over the head, behind the neck or under the chin. Newer models have jointed bands increasing the ability to properly seal the earplug.

The main advantage canal caps offer is convenience. When it's quiet, employees can leave the band hanging around their necks. They can quickly insert the plug tips when hazardous noise starts again. Some people find the pressure from the bands uncomfortable. Not all canal caps have tips that adequately block all types of noise. Generally, the canal caps tips that resemble stand-alone earplugs seem to block the most noise.

Earmuffs

Earmuffs come in many models designed to fit most people. They work to block out noise by completely covering the outer ear. Muffs can be "low profile" with small ear cups or large to hold extra materials for use in extreme noise. Some muffs also include electronic components to help users communicate or to block impulsive noises.

Workers who have heavy beards or sideburns or who wear glasses may find it difficult to get good protection from earmuffs. The hair and the temples of the glasses break the seal that the earmuff cushions make around the ear. For these workers, earplugs are best. Other potential drawbacks of earmuffs are that some people feel they can be hot and heavy in some environments.

7. CHOOSING A HEARING PROTECTOR

Employees exposed to noise levels at or above an 8-hour TWA of 90 dBA shall wear hearing protectors. Employees exposed to noise levels at or above the action level of an 8-hour TWA of 85 dBA shall wear hearing protectors if they have experienced a documented standard threshold shift or have not obtained a baseline audiogram.

Posting Noise Hazards Guidelines

- Post DA Poster 40-501A, OSHA Occupational Noise Exposure Standard and Hearing Conservation Amendment (available through APHC - see Resources below) in all noise hazardous areas. DA Poster 40-501A outlines the requirements of Title 29, Code of Federal Regulations, Section 1910.95.
- Post all noise-hazardous areas, equipment and vehicles with appropriate signs and decals. Signs can be purchased from U.S. Disciplinary Barracks, Ft. Leavenworth, KS. Contact information: DSN 552-4805 or COMM (913) 651-7377. Click here for additional information.

9. ENGINEERING CONTROLS

For hearing purposes, engineering controls are defined as any modification or replacement of equipment or related physical change at the noise source or along the transmission path (with the exception of hearing protectors) that reduce the noise levels. Equipment should be maintained in good working order and, if necessary, isolate the noise in order to reduce noise levels at the source and eliminate any harmful health effects. In addition, purchase equipment that offers safe noise limits when economically and technologically feasible.

Typical engineering controls involve:

- Reducing the noise at the source
- Interrupting the noise path (noise barriers or walls)
- Reducing echoes with sound absorbing materials
- Reducing structure borne vibration with vibration mounts or damping materials
- Increasing the distance between the noise source and the operation

Examples of engineering controls include:

- Moving affected personnel further from the noise
- Using noise shelters
- Using mufflers

10. REFERENCES

A. 29 CFR 1910.95, Occupational noise exposure
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9735

B. 29 CFR 1904.10, Recording criteria for cases involving occupational hearing loss
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9641

C. 29 CFR 1910.1020, Access to employee exposure and medical records.

BASELINE AUDIOGRAM
An audiogram obtained after 14 hours of quiet. The audiogram will be the baseline against which future audiograms are compared.

COMPETENT PERSON
One who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

CONTINUOUS NOISE
Noise levels that vary with intervals of one second or less.

DECIBELS (dB)
A measure of the sound level (loudness). The decibel scale is a logarithmic scale; as an example, a 90 dB noise is ten times louder than 80 dB noise.

DECIBELS, A-RATED (dBA)
The A weighted is the scale used for most occupational noise measurements. The A weighting approximates the range of human hearing by reducing the effects of lower and higher frequency noises with respect to the medium frequencies.

DECIBELS, C-WEIGHTED (dBC)
The C weighted scale filters include both high and low frequency noise and are used for impact noise and in the selection of hearing protection.

EARMUFFS
These devices fit against the head and enclose the entire external ears. The inside of the muff cup is lined with an acoustic foam which can reduce noise by as much as 15 to 30 decibels. Earmuffs are often used in conjunction with ear plugs to protect the employee from extremely loud noises, usually at or above 105 decibels.

EAR PLUGS
Preformed ear plugs come in different sizes to fit different sizes of ear canals. Formable or foam ear plugs, if placed in the ear correctly, will expand to fill the ear canal and seal against the walls. This allows foam ear plugs to fit ear canals of different sizes.

ENGINEERING CONTROLS
May include purchasing quieter equipment using barriers, damping, isolating, muffling, installing noise adsorption material, mechanical isolation, variations in force, pressure or driving speed or any combination of methods to decrease noise levels.

FREQUENCY
A sound's pitch measured in hertz (hz); high pitches are high frequency sounds.

HEARING CONSERVATION PROGRAM (HCP)
Program established when employees are exposed to noise exceeding the Action Level. Program must include noise surveys, audiometric testing, hearing protectors, training, and

SOUND LEVEL METER
An instrument used for the measurement of noise in sound level surveys.

SPEECH INTERFERENCE LEVELS (SILs)
The frequencies most associated with speech, which are the 500- 4000 hz (frequency) range. Vowels (a, e, i, o, u) are low frequency sounds (below 2000 hz) and consonants (b, c, d, etc) are high frequency sounds. The low frequencies are the least affected by noise. If the high frequencies are affected, t's and p's or s's and f's may be easily confused.

STANDARD THRESHOLD SHIFT (STS)
An average shift from the baseline measurement in either ear of 10 dB or more at 2000, 3000 and 4000 Hz. These frequencies are the most important frequencies in communication and the most sensitive to damage by industrial noise exposure. See Section 3.5 Stanford Risk Management for a definition of a OSHA reportable STS.

TIME-WEIGHTED AVERAGE SOUND LEVEL (8-hr TWA)
That sound level, which if constant over an 8-hour exposure, would result in the same noise dose measured in an environment where noise level varies.

THRESHOLD OF PAIN
A noise level of 120 dB causes pain.

PERMISSABLE EXPOSURE LIMIT (PEL)
90 dBA TWA. Employees may be exposed to 90 dBA for an 8-hour time weighted average (TWA) exposure without experiencing serious hearing effects.

PITCH
Another term for sound frequency. Higher pitches are higher frequency sounds.

WEIGHTING FILTERS, SCALES OR NETWORKS
Sound level meters and dosimeters use a selective weighting system (filters) to eliminate certain frequencies from the measurements that are unimportant in the noise exposure.

i. When using a dosimeter that is capable of C-weighted measurements:

A. Obtain the employee's C-weighted dose for the entire work shift, and convert to TWA (see appendix A, II).
B. Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

ii. When using a dosimeter that is not capable of C-weighted measurements, the following method may be used:

A. Convert the A-weighted dose to TWA (see appendix A).
B. Subtract 7 dB from the NRR.
C. Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

iii. When using a sound level meter set to the A-weighting network:

A. Obtain the employee's A-weighted TWA.
B. Subtract 7 dB from the NRR and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

iv. When using a sound level meter set on the C-weighting network:

A. Obtain a representative sample of the C-weighted sound levels in the employee's environment.
B. Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.

v. When using area monitoring procedures and a sound level meter set to the A-weighing network.

A. Obtain a representative sound level for the area in question.
B. Subtract 7 dB from the NRR and subtract the remainder from the A-weighted sound level for that area.

vi. When using area monitoring procedures and a sound level meter set to the C-weighting network:

APPENDIX II

Sound Level dBa Slow Response for Corresponding Duration per Day

Duration per day, hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

NOTE: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions, C[INF]1[/INF]/T[INF]1[/INF]+C[INF]2[/INF]/ T[INF] 2[/INF]Cn/Tn, exceeds unity, then the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

Guidelines for the Use of Personal Protective Equipment (PPE) in Thermal Spraying

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Comments, criticisms, and suggestions are invited, and should be forwarded to the Thermal Spray Society of ASM International®.

2 RELATED STANDARDS AND DOCUMENTS

Where standards and other documents are referenced in this publication, they refer to the latest edition.

U.S. Standards		
Publication	**Title**	**Available from:**
ASTM Publications: ASTM F2413-11:	Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear.	American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428-2959 www.astm.org
ANSI Publications: ANSI Z87.1-2010 ANSI Z89.1-1986 ANSI 105-2011 ANSI Z359.1	Standard for Occupational and Educational Eye and Face Protection Devices. Standard for Industrial Head Protection Standard for Hand Protection Selection Criteria Safety Requirements for personal Fall Arrest Systems	American National Standards Institute 1430 Broadway New York, NY 10018 www.ansi.org
ASM-TSS Publications:	Thermal Spray Booth Design Guidelines Safety Guidelines for Performing Risk Assessments	ASM International® 9639 Kinsman Road Materials Park, OH 44073-0002 www.asminternational.org
AWS Publication	AWS C2.16 Guide for Thermal Spray Operator Qualification	American Welding Society 550 NW. LeJeune Road Miami, Florida 33126 1-800-443-9353 e-mail: info@aws.org

European Directives		
Publication	**Title/Contents**	**Available from:**
Council Directive 89/655/EEC	of 30 November 1989 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)	
Council Directive 2003/10/EC	on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise)	

The remainder of this page is purposely blank.

LPPS – Low Pressure Plasma Spray. See preferred term Vacuum Plasma Spray Deposition.

Lock-out/Tag-out – The process of locking and tagging any energy source (typically a valve or electrical shutoff) to isolate sources of energy during maintenance/repair and prevent inadvertent operation – or release of energy or hazardous material.

MSDS (or SDS) – An abbreviation used for Material Safety Data Sheet, also known as Safety Data Sheet.

NFPA (National Fire Protection Association) – A U.S. based organization providing advisory standards offered for use in law and for regulatory purposes in the interest of life and property protection.

NIOSH – National Institute for Safety and Health

Noise - Unwanted sound which may be hazardous to health, interferes with communications, or is disturbing.

OSHA – Occupational Safety and Health Administration (USA).

Permissible Exposure Limit (PEL) – is the maximum amount or concentration of a chemical that a worker may be exposed to under OSHA regulations.

Personal Fall Arrest System – A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998 the use of a body belt for fall arrest is prohibited.

Process Equipment – The mechanical and/or electrical devices and associated control systems that are used to produce coatings or produce surface enhancements, and whose operation directly affects the chemistry, or the physical properties, of the final product. Typically, this includes gas consoles, regulator panels, hose bundles, powder feeders, gases and gas supplies, and the thermal spray gun or torch.

Qualified Person – A person, who by reason of experience or instruction has demonstrated familiarity with the operation to be performed and the hazards involved.

REL (Recommended Exposure Limit) – An 8 or 10-hour time-weighted average (TWA) or ceiling (C) exposure concentration recommended by NIOSH that is based on an evaluation of health effects data.

Sound – A vibrational disturbance, exciting hearing mechanisms, transmitted in a predictable manner determined by the medium through which it propagates.

Sound Pressure – Fluctuations in air pressure caused by the presence of sound waves.

Sound Pressure Level - The intensity of a sound, expressed in decibels (dB).

Spray Booth – An enclosure for thermal spray processes that is specifically designed to mitigate process hazards. A spray booth is NOT designed for human occupancy during routine spray operations; however, it is routinely occupied for maintenance and process setup.

Spray (Coating) Box – A spray (coating) box is an enclosure for thermal spray processes that is specifically designed to mitigate process hazards. These boxes are NOT designed for human occupancy during routine spray operations, process setup and routine maintenance.

Spray Enclosure – A term used in this document whenever a statement is equally applicable to either a spray booth or a spray (coating) box.

Threshold Limit Value (TLV) – are guidelines prepared by the *American Conference of Governmental Industrial Hygienists, Inc (ACGIH)* to assist in making decisions regarding safe levels of exposure to various hazards found in the workplace. A TLV reflects the level of exposure that the typical worker can experience without an unreasonable risk of disease or injury.

Vacuum Plasma Deposition (VPD) – A thermal spraying process variation utilizing a plasma gun confined to a solid enclosure. The enclosure is evacuated and the spraying performed under low pressure, also known as Vacuum Plasma Spray (VPS), Low Pressure Plasma Spray (LPPS®).

Ventilation System – A complete air handling and filtration system for a thermal spray booth from the intake of air into the process to the exhaust of the air back into the atmosphere. In this document, the spray booth is considered as part of the exhaust system in regard to air flow.

- Wearing PPE as required and when required.
- Performing required training.
- Caring for, cleaning, and maintaining PPE as required.
- Informing the supervisor of the need to repair or replace PPE.
- Observing and coaching other employees to encourage safe behaviors.
- Utilizing individual "Stop Work" authority if unsafe conditions exist. Note: It is important to recognize that PPE will not save you if conditions are inherently unsafe. PPE is just a line of defense.

5 CLEANING AND MAINTENANCE OF PPE

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection: dirty or fogged lenses could impair vision: a contaminant could be ingested, inhaled, or absorbed through exposed skin or mucus membranes. PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. Personal protective equipment should not be shared between employees until it has been properly cleaned and sanitized. PPE should be distributed for individual use whenever possible.

It is also important to ensure that contaminated PPE, which cannot be decontaminated, is disposed of in a manner that protects employees from exposure to hazards.

6 EYE AND FACE PROTECTION

Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, researchers, contractors, or others passing through an identified eye hazard area. Note: any place where thermal spray is conducted is an eye hazard area. To provide protection for these personnel, a sufficient quantity of goggles and/or plastic eye protectors should be available. If personnel wear personal glasses, eye protectors suitable to wear over them should be provided. Five common categories of protective eyewear are defined below. Signs indicating that an area requires use of eye protection should be posted. Safety glasses should be made available at all access points to the eye protection area.

6.1 Safety Glasses

Protective eyeglasses are made with safety frames, tempered glass or plastic lenses, temples and side shields which provide eye protection from moderate impact and particles encountered in job tasks such as carpentry, woodworking, grinding, scaling, etc. Safety glasses are also available in prescription form for those persons who need corrective lenses. Personnel requiring prescription safety glasses should follow their corporate procedures obtaining PPE to obtain their prescription safety glasses.

6.2 Single Lens Goggles

Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. These goggles are available with clear or tinted lenses, perforated, port vented, or non-vented frames. Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to insure protection along with proper vision.

6.3 Welders/Chippers Goggles

These goggles are available in rigid and soft frames to accommodate single or two eyepiece lenses.

Welder's goggles provide protection from sparking, scaling, or splashing metals and harmful light rays. Lenses

6.8 Eye Protection Cleaning and Maintenance

The lenses of eye protectors must be kept clean as dirty lenses restrict vision, which can cause eye fatigue and lead to accidents. Scratched eye protectors or those that cannot be cleaned should be discarded. There are two methods for cleaning eye protectors. Glass, polycarbonate and other plastic lenses can be cleaned by thoroughly wetting both sides of the lenses and drying them with a wet strength absorbent paper. Anti-static and anti-fog lens cleaning fluids may be used, daily if necessary, if static or misting is a problem. Alternatively lenses can be 'dry' cleaned by removing grit with a brush and using a silicone treated non-woven cloth. However plastic or polycarbonate lenses should not be 'dry' cleaned as the cloth used in this method can scratch them.

Eye protectors should be issued on a personal basis and used only by the person they are issued to. If eye protectors are re-issued they should be thoroughly cleaned and disinfected. Being placed in suitable cases when not in use should protect eye protectors.

Eye protector headbands should be replaced when worn out or damaged. Lenses that are scratched or pitted must be replaced as they may impair vision and their resistance to impact may be impaired. Transparent face-shields must be replaced when warped, scratched or have become brittle with age.

See the Eye and Face Protection Selection Chart on the following page.

the protective hat is hard enough to resist the blow and the headband and crown straps keep the shell away from the wearer's skull. Protective hats can also protect against electrical shock.

Head protection needs to be furnished to, and used by, all personnel engaged in construction type work or other general industry work where overhead hazards exist: especially when spraying the interior surfaces of a large space, applying coatings overhead, or working with cranes and forklifts. Head protection should also be worn by engineers, inspectors, and visitors at construction sites when hazards from falling or fixed objects, or electrical shock are present. Bump caps/skull guards may be issued and worn for protection against scalp lacerations from contact with sharp objects. However, they must not be worn as substitutes for safety caps/hats because they do not afford protection from high impact forces or penetration by falling objects. Hard hat areas should always be clearly posted.

Protective hats are made in the following types and classes:

- Type I - Helmets with a full brim.
- Type 2 - Brimless helmets with a peak extending forward from the crown.
- Class A - General service, limited voltage: Intended for protection against impact hazards. Used in mining, construction, and manufacturing.
- Class B - Utility service, high voltage. Used by electrical workers.
- Class C - Special service, no voltage protection: Designed for lightweight comfort and impact protection. Used in certain construction, manufacturing, refineries, and where there is a possibility of bumping the head against a fixed object.

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

7.1 Head Protection Cleaning and Maintenance

Head protection must be maintained in good condition. It should:

- Be stored, when not in use, in a safe place, for example, on a peg or in a cupboard. It should not be stored in direct sunlight or in excessively hot, humid conditions;
- Be visually inspected regularly for signs of damage or deterioration;
    - Have defective harness components replaced (if the design or model allows this). Harnesses from one design or model of helmet cannot normally be interchanged with those from another;
    - Have the sweatband regularly cleaned or replaced.

7.1.1 Damage to shell

Damage to the shell of a helmet can occur when:

- Objects fall onto it;
- It strikes against a fixed object.
- It is dropped or thrown.

7.1.2 Deterioration in shock absorption or penetration resistance

Deterioration in shock absorption or penetration resistance of the shell can occur from:

- Exposure to certain chemical agents.

materials) are present:

3. When working with corrosives, caustics, cutting oils, and petroleum products, neoprene or nitrile boots are often required to prevent penetration.
4. Foundry or "Gaiter" style boots feature quick-release fasteners or elasticized insets to allow speedy removal should any hazardous substances get into the boot itself.
5. When working with electricity, special electrical hazard boots are available and are designed with no conductive materials other than the steel toe (which is properly insulated).

Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

9 HAND PROTECTION

Suitable gloves need be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, biological agents, and harmful temperature extremes are present. Glove selection shall be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. Any one type of glove will not work in all situations. Skin contact is a potential source of exposure with toxic materials; it is important that the proper steps be taken to prevent such contact. Most accidents involving hands and arms can be classified under four main hazard categories: chemicals, abrasions, cutting, and heat. There are gloves available that can protect workers from any of these individual hazards or any combination thereof.

Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The types of glove materials to be used in these situations include leather, welder's gloves, aluminum-backed gloves, and other types of insulated glove materials.

The first consideration in the selection of gloves for use against chemicals is to determine, if possible, the exact nature of the substances to be encountered. Read instructions and warnings on chemical container labels and MSDS's before working with any chemical. Recommended glove types are often listed in the section for personal protective equipment.

Chemicals eventually permeate all glove materials. However, they can be used safely for limited time periods if specific use and other characteristics (i.e., thickness and permeation rate and time) are known.

Careful attention must be given to hand protection when working with tools and machinery. Power tools and machinery must have guards installed or incorporated into their design that prevent the hands and gloves from contacting the point of operation, power train, or other moving parts. To protect hands from injury due to contact with moving parts, it is important to:

- Ensure that guards are always in place and used.
- Always lockout machines or tools and disconnect the power before making repairs.
- Treat a machine without a guard as inoperative; and
- Do not wear gloves around moving machinery, such as drill presses, mills, lathes, and grinders.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against:

- Disposable Gloves. Disposable gloves, usually made of lightweight plastic, can help guard against mild irritants. Disposable gloves are often used for powder handling and for general hand protection when working with dusty equipment in a spray booth because they prevent nuisance dusts and powders from contacting the skin.
- Fabric Gloves. Made of cotton or fabric blends are generally used to improve grip when handling slippery objects. They also help insulate hands from mild heat or cold.
- Leather Gloves. These gloves are used to guard against injuries from sparks or scraping against

categories are *air-purifying* and *air-supplied* respirators. It is critical to select the proper type of respiratory protective equipment, to supply it to workers, and to train workers to use it correctly.

An air monitoring program **must** be conducted to determine type and level of chemical exposure and what level of protection is required. If respirators are required then a formal respiratory protection program be set up for workers. An industrial hygiene professional should be be consulted as part of the process.

Respiratory protection must be considered for several thermal spray activities. The most common respiratory hazards associated with thermal spray are particulates and fumes:

- Surface preparation techniques, for example grit blasting, can also generate fine particulates of the grit medium and of the substrate. These particles can be inhaled by the worker and do present a respiratory hazard.
- Sand blasting with silicon dioxide creates a cloud of particles that should not be breathed.
- Loading and emptying grit blast cabinets should be done while wearing the proper respirator.
- Powder handling activities such as loading, unloading, and cleaning hoppers should similarly be performed with respirators.
- The thermal spray operation itself potentially exposes the worker to the feedstock particulate as well as to fumes produced by the vaporization and condensation of the feedstock.

Appropriate respiratory protection should always be used when hand spraying or working around an operating spray device. Cleaning operations within the thermal spray enclosure should always be performed with the awareness that fine particulates will be stirred up and inhaled by unprotected workers. Vapors from solvents can also be of concern since they are often used during the part-cleaning process. The respiratory threats posed by thermal spray activities can introduce either acute or chronic risks to the worker that have to be mitigated.

In general, it is **recommended** that engineering and administrative controls be introduced to minimize worker exposure to respiratory hazards. For example, not entering a spray booth after a part has been coated until several air exchanges have been completed is a method that can be used to reduce exposure. A respiratory protection program should train workers as to what type of protection to wear, when to wear it, and how to properly wear and care for the equipment.

10.1 Air purifying respirators

Air-purifying respirators are typically negative pressure units in which the user's inhalation draws contaminated air in through a filtration medium and exhalation pushes air out through one-way valves back into the atmosphere. Straps are used to hold the respirator in place on the wearer's head. A half-face mask that covers the nose and mouth is the most commonly used style for thermal spray operations. Full-face masks are used whenever the contaminant in the air can harm the eyes or rest of the face, or when a higher protection factor is required.

Cloth or paper nuisance dust masks, similar in style to surgical masks, are tempting to use because they are inexpensive; however, they do not provide adequate protection for thermal spray operations and should not be used.

Air-purifying respirators typically use a pair of replaceable filter cartridges. There are several different types of cartridges to choose from, depending on the contaminant in the air. Some cartridges remove particles from the air, others remove organic vapors given off by solvents, while still others can handle chemical vapors such as acid fumes. Combination filters that remove both organic vapors and suspended particles are also available, if they are needed. It is essential that the correct cartridge type is chosen for the worker to wear. It should also be recognized that all cartridges have to be replaced periodically.

Particulate filtering is the most common need in thermal spray operations. Particles in the size range of ~0.3 microns are the most difficult to filter out of the air. Coarser particles get embedded in the filter medium as air is drawn through it. Finer particles get trapped by Brownian motion in the filter material. Particles that are a few tenths of a micron in diameter penetrate most deeply through the filter and are of the greatest concern. The lower end of powder size distributions often contain quantities of submicron-sized particles. Fumes from partially vaporized powders and atomized wire droplets also contain particles in this size range. In order to

The following are examples of situations where both earplugs AND earmuffs must be worn.

- When either hand spraying, entering a booth during spraying, or working around a spray booth that has open doors or frequently opened doors or access panels while spraying with:
  - HVOF,
  - Argon-helium plasma-arc where gas flow and current are equal to or higher than [Ar 130-150 psi (234-267 scfh), He 150-200 psi (74-99 scfh), 900 Amps DC],
  - Using Argon-hydrogen plasmas
  - Using nitrogen as a primary plasma-arc gas, or
  - EAS with air pressures above 80 psi with current levels above 200 Amps DC and any operating current above 100 psi air pressure.

As mentioned above, the NRR value for plugs and muffs cannot be applied directly to the noise field and the NRR's of plugs and muffs are NOT arithmetically additive when used together. For example, if hearing protection has an NRR of 25, and is used in a noise field of 125 dBA, the exposure is NOT reduced to 100 dBA. Likewise, if plugs and muffs are used, each with an NRR of 25 the combined NRR is NOT 50. See below for further explanation.

MSHA, NIOSH, and OSHA do not treat the effectiveness the same way. The following is the guideline that the Thermal Spray Safety Committee recommends based on our best understanding of the issues at hand. The effectiveness of either plugs or muffs should be calculated using the following formula:

$$\text{Effective NRR} = (\text{NRR}-7) / 2$$

Therefore the use of ear plugs with an NRR of 29 provides the following Effective NRR:

$$\text{Effective NRR} = (29-7) / 2 = 11 \text{ dBA reduction}$$

Additive Example of double protection:

As stated above the use of ear plugs with an NRR of 29 provides the following Effective NRR:

$$\text{Effective NRR} = (29-7) / 2 = 11 \text{ dBA reduction}$$

The addition of a second level of protection, for example earmuffs with an NRR of 29, would double the overall effectiveness of the combined hearing protection. However, because sound is measured on a logarithmic scale a doubling of effectiveness is equivalent to an additional 3 dBA reduction. Therefore the total effectiveness of ear plugs AND ear muffs would be:

$$11 \text{ dBA (plugs)} + \text{an additional } 3 \text{ dBA (muffs)} = 14 \text{ dBA}$$

In accordance with OSHA, there can be no unprotected exposure above 90 dBA TWA. Using the above calculation, the operator could be exposed to 90 + 14 = 104 dBA TWA for 8 hours.

Continuous exposure to HVOF at 125 dBA would follow this calculation.

$$125 \text{ dBA} - 14 \text{ dBA} = 111 \text{ dBA}$$

In accordance with OSHA noise exposure tables, under these conditions, an operator would be limited to a maximum of 30 minutes in an eight-hour period.

- **Limited Approach**
- **Restricted Approach**
- **Prohibited Approach (inner boundary)**

Flash Protection Boundary (outer boundary): The flash boundary is the farthest established boundary from the energy source. If an arc flash occurs this boundary is where an employee would be exposed to a curable second degree burn (1.2 calories/cm2). The issue here is that the heat generated from a flash results in burns.

Limited Approach: This is an approach limit at a distance from an exposed live part where a shock hazard exists.

Restricted Approach: This is an approach limit at a distance from an exposed live part which there is an increased risk of shock.

Prohibited Approach (inner boundary): This is a distance from an exposed part which is considered the same as making contact with the live part. This distance is not common between equipment. Some equipment will have a greater flash protection boundary while other equipment will have a lesser boundary.

Ways to Protect the Workers

There exists a number of ways to protect workers from the threat of electrical hazards. Some of the methods are for the protection of qualified employees doing work on electrical circuit and other methods are geared towards non-qualified employees who work nearby energized equipment.

Here are a few of the protective methods:

- De-energize the circuit
- Work Practices
- Insulation
- Guarding
- Barricades
- Ground Fault Circuit Interrupters (GFCI)
- Grounding (secondary protection)

If You Must Work on Energized Circuits

If it has been determined that de-energizing a circuit is not feasible and the employee must work "hot", the employer shall develop and enforce safety-related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

These safety related work practices could include:

- Energized Electrical Work Permit
- Personal Protective Equipment
- Insulated Tools
- Written Safety Program
- Job Briefing

The most effective and fool-proof way to eliminate the risk of electrical shock or arc flash is to simply de-energize the equipment.

Understanding the Arc Flash Warning Labels

Each piece of equipment operating at 50 volts or more and not put into a de-energized state must be evaluated for arc flash and shock protection. This evaluation will determine the actual boundaries (i.e. prohibited, limited, restricted, etc.) and will inform the employee of what PPE must be worn.

Once the evaluation is complete an Arc Flash Hazard warning label must be affixed to the equipment and readily accessible to employees who may work on the energized equipment.

The Employees Obligation

Arc Flash PPE Requirements from 2012 NFPA 70E

Level 0	Level 1	Level 2	Level 3	Level 4
Protective Clothing: Non-melting or Untreated Natural Fiber (i.e. untreated cotton, wool, rayon, or silk, or blends of these materials) With a fabric weight of at least 4.5 oz/yd² • Shirt (long sleeve) • Pants (long)	**Protective Clothing:** Arc-rated clothing, minimum arc rating of 4 cal/cm² (See Note 3.) • Arc-rated long-sleeve shirt and pants or arc-rated coverall • Arc-rated face shield (See Note 2.) or arc flash suit hood • Arc-rated jacket, parka, rainwear, or hard hat liner (AN)	**Protective Clothing:** Arc-rated clothing, minimum arc rating of 8 cal/cm² (See Note 3.) • Arc-rated long-sleeve shirt and pants or arc-rated coverall • Arc-rated flash suit hood or arc-rated face shield (See Note 2.) and arc-rated balaclava • Arc-rated jacket, parka, rainwear, or hard hat liner (AN)	**Protective Clothing:** Arc-rated clothing selected so that the system arc rating meets the required minimum arc rating of 25 cal/cm² (See Note 3.) • Arc-rated long-sleeve shirt (AR) • Arc-rated pants (AR) • Arc-rated coverall (AR) • Arc-rated arc flash jacket (AR) • Arc-rated arc flash pants (AR) • Arc-rated arc flash suit hood • Arc-rated gloves (See Note 1.) • Arc-rated jacket, parka, rainwear, or hard hat liner (AN)	**Protective Clothing:** Arc-rated clothing selected so that the system arc rating meets the required minimum arc rating of 40 cal/cm² (See Note 3.) • Arc-rated long-sleeve shirt (AR) • Arc-rated pants (AR) • Arc-rated coverall (AR) • Arc-rated arc flash suit pants (AR) • Arc-rated arc flash suit jacket (AR) • Arc-rated arc flash suit hood • Arc-rated gloves (See Note 1.) • Arc-rated jacket, parka, rainwear, or hard hat liner (AN)
Protective Equipment: • Safety glasses or safety goggles (SR) • Hearing protection (ear canal inserts) • Heavy duty leather gloves (See Note 1.)	**Protective Equipment:** • Hard Hat • Safety glasses or safety goggles (SR) • Hearing protection (ear canal inserts) • Heavy duty leather gloves (See Note 1.)	**Protective Equipment:** • Hard Hat • Safety glasses or safety goggles (SR) • Hearing protection (ear canal inserts) • Heavy duty leather gloves (See Note 1.) • Leather work shoes	**Protective Equipment:** • Hard Hat • Safety glasses or safety goggles (SR) • Hearing protection (ear canal inserts) • Leather work shoes	**Protective Equipment:** • Hard Hat • Safety glasses or safety goggles (SR) • Hearing protection (ear canal inserts) • Leather work shoes

AN = As needed (optional)

SR = Selection required

Note 1. If rubber insulating gloves with leather protectors are required by Table 130.7(C)(15)(a) or 130.7(C)(15)(b), additional leather or arc flash gloves are not required. The combination of rubber insulating gloves with leather protectors satisfies the arc flash protection requirement. Note 2. Face shields are to have wrap-around guarding to protect not only the face but also the forehead, ears, and neck or, alternatively, an arc–rated arc flash suit hood is required to be worn. Note 3. Arc rating is defined in Article 100 and can be either ATPV or EBT.

Personal Protection Equipment

As a general rule, PPE must be provided, used and maintained in reliable conditions whenever hazards in the workplace can cause injury or impairment from physical contact [29 CFR 1910.132(a)]. If, after securing the workplace by installing mandatory safeguards, employees still are at risk from falling hazards, then employers must select, provide and train their employees in the proper use and care of their personal protective equipment.

The safety and health regulations for general industry do not have standards for specific fall protection PPE. However, there are specifications for certain fall prevention and fall arrest systems within the safety and health regulations for construction [29 CFR 1926). While these regulations may not directly apply to non-construction-related practices, they may serve as a basis for demonstrating the general requirements at 29 CFR 1910.132. In addition, there may be consensus standards that pertain to a workplace scenario that may provide assistance to the employer in assuring that fall protection PPE has been evaluated and implemented properly under the general industry regulations.

14 TRAINING

Any worker required to wear PPE shall receive training in the proper use and care of PPE. Periodic retraining shall be offered by EH&S to both the employees and the supervisors, as needed. The training shall include, but not necessarily be limited to, the following subjects:

- When and where PPE is necessary to be worn.
- What PPE is necessary?
- How to properly don, doff, adjust, and wear PPE.
- The limitations of the PPE.
- The proper care, maintenance, useful life and disposal of the PPE.

After the training, the employees shall demonstrate that they understand the components of the PPE Program and how to use PPE properly, or they shall be retrained.

15 RECORDKEEPING

Written records shall be kept of the names of persons trained, the type of training provided, and the dates when training occurred. The Supervisor should maintain their employees' training records for at least 3 years. The company should maintain the Hazard Assessment Certification Form for each work site evaluated for at least 3 years.

16 REFERENCES

American National Standards Institute, American National Standard ANSI Z41-1991, "Personnel Protection - Protective Footwear".

American National Standards Institute, American National Standard ANSI Z87.1-1989, "Practice for Occupational and Educational Eye and Face Protection".

American National Standards Institute, American National Standard ANSI Z89.1-1986, "Safety Requirements for Industrial Protection".

OSHA Standard 29 CFR 1910.132, "General Requirements"

OSHA Standard 29 CFR 1910.133, "Eye and Face Protection"

OSHA Standard 29 CFR 1910.135, "Head Protection"

OSHA Standard 29 CFR 1910.136, "Occupational Foot Protection"

OSHA Standard 29 CFR 1910.138, "Hand Protection"

17.2 Appendix B: Glove Type and Chemical Use

- *** Limited service**
- **VG= Very Good**
- **G= Good**
- **F=Fair**
- **P=Poor (not recommended)**

Chemical	Neoprene	Natural Latex or Rubber	Butyl	Nitrile Latex
*Acetaldehyde	VG	G	VG	G
Acetic acid	VG	VG	VG	VG
*Acetone	G	VG	VG	P
Ammonium hydroxide	VG	VG	VG	VG
*Amyl acetate	F	P	F	P
Aniline	G	F	F	P
*Benzaldehyde	F	F	G	G
*Benzene	F	F	F	P
Butyl acetate	G	F	F	P
Butyl alcohol	VG	VG	VG	VG
Carbon disulfide	F	F	F	F
*Carbon tetrachloride	F	P	P	G
Castor oil	F	P	F	VG
*Chlorobenzene	F	P	F	P
*Chloroform	G	P	P	E
Chloronaphthalene	F	P	F	F
Chromic Acid (50%)	F	P	F	F
Citric acid (10%)	VG	VG	VG	VG
Cyclohexanol	G	F	G	VG
*Dibutyl phthalate	G	P	G	G
Diesel fuel	G	P	P	VG
Diisobutyl ketone	P	F	G	P
Dimethylformamide	F	F	G	G
Dioctyl phthalate	G	P	F	VG
Dioxane	VG	G	G	G
Epoxy resins, dry	VG	VG	VG	VG
*Ethyl acetate	G	F	G	F
Ethyl alcohol	VG	VG	VG	VG
Ethyl ether	VG	G	VG	G
*Ethylene dichloride	F	P	F	P
Ethylene glycol	VG	VG	VG	VG
Formaldehyde	VG	VG	VG	VG
Formic acid	VG	VG	VG	VG
Freon 11	G	P	F	G
Freon 12	G	P	F	G
Freon 21	G	P	F	G
Freon 22	G	P	F	G
*Furfural	G	G	G	G
Gasoline, leaded	G	P	F	VG
Gasoline, unleaded	G	P	F	VG
Glycerine	VG	VG	VG	VG
Hexane	F	P	P	G
Hydrochloric acid	VG	G	G	G
Hydrofluoric acid (48%)	VG	G	G	G
Hydrogen peroxide (30%)	G	G	G	G
Hydroquinone	G	G	G	F
Isooctane	F	P	P	VG

17.3 Appendix C: Job Hazard Analysis Example

This job hazard analysis is part of a written Hazard Communication Program designed to comply with OSHA's Hazard Communication Standard (29 CFR 1910.1200)

Job or Area Title: Plasma Spray Coating

Location: S&P Coatings Inc., Anytown, USA

Date of Analysis: 06-12-07

Job Step or Task		Potential Hazard	Required PPE or Procedure
Hopper Cleaning	Eyes:	Nuisance Dust	Safety glasses
	Lungs:	Nuisance Dust	Respirator
	Hands:	Nuisance Dust	Latex/Nitrile Gloves
Plasma Spray	Eyes:	Bright Light and Bright UV	Face Shield w/ 10-12 Shade Lens
	Lungs	Respirable Dust and Fumes	Respirator
	Skin:	Bright Light and Bright UV	Leather apron
	Hands:	Thermal Burns / Bright UV	Leather gloves
	Hearing:	Noise above 80db	Ear plugs or muffs

Special Instructions (example)

Spray operators and Spray Process Monitors shall use an integrated system of hearing protection:Ear plugs of suitable NRR Rating as well as ear muffs of suitable NRR Rating due the extremely high occupational noise exposure hazards associated with metal spraying processes.

Approvals

Environment, Health & Safety: _____ Date: _____

Department Manager: _____ Date: _____

Department Supervisor: _____ Date: _____