West Vancouver Freight Access Project

Project 03 Terminal 5

Vanexco Cap Construction Certification Report

August 2010

Prepared for:
Port of Vancouver
3103 NW Lower River Road
Vancouver, Washington 98660-1027

Prepared by:
HDR Engineering, Inc.
1001 SW Fifth Ave, Suite 1800
Portland, Oregon 97204

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APPENDIX

1.0 Introduction

As part of the West Vancouver Freight Access Project, the Port of Vancouver (Port) constructed a two-mile rail loop at Terminal 5 in 2010. This project extends west from Gateway Avenue to the edge of the contiguous Evergreen property and consists of a storage track, a car preparation track, and loop lead track (Figure 1). Construction of the loop lead track required disturbance of two areas protected under a restrictive covenant administered by the Washington Department of Ecology (Ecology): Spent Pot Liner (SPL) Landfill Area and Vanexco Cap (Figure 1).

Prior to construction the Port coordinated with Ecology to design a replacement cap for each site. In October 2009, Ecology approved the final design of the replacement caps (Appendix A).This report documents the construction of the Vanexco Cap at Terminal 5 at the Port of Vancouver as required by the Ecology, and certifies that construction was in accordance with the plans, specifications, and Construction Quality Assurance (CQA) plan. Documentation of as-built drawings, test results, daily reports, and acceptance forms for the base grades and liner are included in Appendix B and C.

2.0 Background

The floor slab of the former Vanexco rod mill, now called the Vanexco cap, protects the underlying soils and substructures from exposure to precipitation. These soils and substructures are likely contaminated with PCBs and petroleum hydrocarbons (TPH). Although the concrete foundation cap has been scarified, it may still have sections that have PCB concentrations above regulatory limits.

The Port performed sampling and analysis of the concrete and soils in April 2009 to ensure appropriate management of these soils during the construction of the rail and associated laydown area (PBS 2009). The results of this investigation showed that petroleum hydrocarbon and PCB contamination was found in soil samples from eight of the 12 borings. None of the concrete samples had PCB concentrations above the 1 mg/kg Model Toxic Control Act (MTCA) Method A cleanup level for unrestricted land use. Petroleum hydrocarbon and PCB concentrations were the highest in the soil sample from 9 to 10 feet below ground surface. High petroleum hydrocarbon concentrations were found in boring samples located near the edge of the Vanexco Cap. The Port prepared a Contaminated Media Management Plan to ensure safe and compliant management of these soils during construction (HDR 2009a).

The Vanexco Cap was remediated under Consent Decree 95-2-03268-4 (Ecology 1995) between Ecology and Alcoa. The Consent Decree required the long-term maintenance of a cap initially designated as the building floor (constructed of asphalt and/or concrete) and the roof was to be maintained to prevent ponding of precipitation. To facilitate the sale of the property, the Rod Mill building was demolished. The new surface (either sand or asphalt) above the asphalt/concrete floor was regraded to promote positive drainage away from the cap (i.e., the floor) in accordance with the Consent Decree.

During construction approximately 49,600 square feet of concrete slab would be removed and approximately 9,200 cubic yards of soil and 900 cubic yards of concrete would be removed below the concrete slab. The Port proposed to mitigate the cap removal by placing an impermeable high-density polyethylene (HDPE) liner beneath the new railroad track. The HDPE liner would be sloped southward away from the current building to ensure water does not percolate into the subsoil beneath the Vanexco Cap. It would include a drainage system to remove water from the liner's surface.

This final construction design was submitted to Ecology in October 2009 (HDR 2009c) and subsequently approved by Ecology (Appendix A) prior to construction.

3.0 Construction Narrative

The proposed construction of the cap was reviewed in the Pre-Construction meeting held on February 16, 2010 with the General Contractor, Rotschy Inc., Port, City of Vancouver (COV), and HDR staff. Construction of the replacement cap was completed in February 2010. Approved submittals (Submittal 122) related to the materials of construction and construction methods are listed in Table 1 and are included in Appendix B.

Table 1: Approved Submittals for Vanexco Cap Construction

Submittal
Geomembrane Panel Placement Log
Geomembrane Trial Weld Log
Geomembrane Destructive Test Log
Geomembrane Non-Destructive Test Log/Repair
Construction Field Notes
Geomembrane Certification
Geomembrane Roll Allocation and Roll Test Data Report
ASTM D 5397 – Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
ASTM D 3895 – Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
Certificate of Analysis – Marlex Polyethylene K306 Bulk
Geocomposite Certifications
Geocomposite Roll Allocation and Roll Test Data Report
Geotextile Certifications
Geotextile Roll Allocation and Roll Test Data Report
Geotextile Certificate of Compliance
Geotextile Certificate of Analysis
Certification of Acceptance of Subgrade
Certification of Material Acceptance of Propex Lot #1
Certification of Material Acceptance of GSE Lots #1-3
Certification of Material Installation of Panels
Certification of Material Joints
Certification of Placement of Adjacent Liner Components
Certification of Raw and Fabricated Material – Propex 1701 Nonwoven Cushion Geotextile
Certification of Raw and Fabricated Material – GSE 60 mil HDPE Liner
Certification of Raw and Fabricated Material – GSE Fabrinet HF
Geomembrane Limited Warranty – 60 mil HDPE
As built Drawings
Geomembrane Test Results

A minor modification to plans and specifications to accommodate conditions in the field was proposed and approved by the COV, Port, and HDR. This modification is provided in the as-builts in Appendix C and included:

- Request for Information (RFI) 60 noted that the saw cut line along the edge of the removed concrete slab was not linear as originally anticipated due to the presence of rebar and the poor condition of the slab. As a result the proposed airfield type expansion joint material could not be used in jagged areas. In areas where the saw cut line was jagged or varied the contractor filled the voids with concrete to create a flush surface and placed asphalt over the seams to seal the interface between the old and new concrete.

Construction was observed by the HDR Construction Quality Assurance Monitor (CQAM). Construction consisted of the following elements and met the construction specifications:

- Subgrade material placement and compaction to meet the construction specification of 94% compaction. This specification was verified by the COV.
- 60-mil HDPE material conforming to requirements for polyethylene membrane as listed in Geosynthetic Research Institute GM-13 (hydraulic conductivity of liner material not to exceed 10^{-7} cm/sec) was placed. Testing results are in Appendix B and conformed to requirements.
- Geonet geocomposite was placed directly over the HDPE membrane to facilitate drainage and prevent the development of hydraulic head on the liner. Testing results are in Appendix B and conformed to requirements.
- Protective soil cover (minimum thickness 2 feet) was placed over the liner.

4.0 Conclusions

Construction of the Vanexco Cap was observed by HDR CQAM. The equipment used in construction met the specified requirements, and materials delivered to the site were in good condition. Based on the CQAM construction observations and the results of material testing, the final Vanexco Cap was constructed in accordance with the design criteria, plans, and specifications, with the exception of the modifications noted in Section 3. The constructed Vanexco Cap meets the design requirements as approved by Ecology.

Kurt Reichelt, P.E.

HDR Project Manager

N

SCALE: 1" = 200'

VANEXCO CAP

NORTH 2
LANDFILL

NORTH
LANDFILL

EAST LANDFILL

SPL CAP

INGOT CAP

LEGEND

NEW RAILWAY

LIMITS OF CAPS

CARGO LAYDOWN AREA

HDR

RAIL IMPROVEMENT FOOTPRINT SHOWING
LANDFILL CAPS

DATE
MAY 2009

FIGURE
1

5.0 References

(Ecology) Washington State Department of Ecology
1995 Consent Decree No. 95-2-03268-4. Washington State Department of Ecology, Olympia, Washington

HDR Engineering, Inc.
2009a. Contaminated Media Management Plan, Terminal 5, Port of Vancouver, Washington. July 31, 2009. Portland, Oregon.
2009b. Final Request for Review and Approval of Disturbance of Landfills on Former Alcoa/Evergreen Properties. October 15, 2009. Portland, Oregon.

PBS
2009 Environmental Investigation, Port of Vancouver, Alcoa Vanexco Cap Area. May 2009. Portland, Oregon.

APPENDIX A

Ecology Approval of Final Request for Review and Approval of Disturbance of Landfills on Former Alcoa/Evergreen Properties

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000

711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

October 21, 2009

Ms. Patty Boyden
Director of Environmental Services
Port of Vancouver
3103 NW Lower River Rd.
Vancouver, WA 98660

Re: Review of Terminal 5 Rail Improvement Engineering.

Dear Ms. Boyden:

Ecology has reviewed the October 15, 2009 Terminal 5 Improvements - Final Request for Review and Approval of Disturbance of Landfills on Former Alcoa/Evergreen Properties work plan for the former Alcoa/Evergreen smelter facility. The site is located on the former Alcoa/Evergreen aluminum smelter west of Vancouver, WA. The Terminal 5 rail improvements consist of a two-mile rail loop that will traverse four of five covered areas on the site. These affected areas are known as: Vanexco Cap, Ingot Cap, North and North2 landfills, and Spent Potliner NPL site cap. Ecology received and commented on the draft work plan on July 15, 2009 by e-mail. The final work plan is the result of the July review.

The October 15, 2009 Final Request for Review and Approval of Disturbance of Landfills on Former Alcoa/Evergreen Properties is approved as submitted in the October 15 document. The revised document fulfills the requirements of the MTCA consent decrees that regulate the four areas. The Port of Vancouver is approved to begin work at the site once local permits are final.

We look forward to visiting the site once construction has begun. If you have any questions regarding the approval of the work plan, please contact me in Lacey (360) 407-6949 or psky461@ecy.wa.gov.

Sincerely,

Paul Skyllingstad
Industrial Section

Cc: B. Morson - HDR
M. Stiffler - Alcoa

APPENDIX B

Construction Submittal 122.2
QAQC Forms, As Built Drawings and Documents, and Project Specific Certificate Letters

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE: 04/16/2010

122.1 Resubmittal Previous Submittal No. [X]

This section to be completed by COV:

Submittal No. 122.2

TO: CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144

This section to be completed by contractor:

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	24	F-74	Geomembrane resubmittals	E, G, H	ACF West	GSE		

RECEIVED
APR 16 2010
CITY OF VANCOUVER
CONSTRUCTION DIVISION

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert. of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 4-16-10

Contractor certifies compliance with Contract Documents.

By: Hans Schmeusser / Jeff Boys

COV Review Comments:

Legend: Review Action

1 No exceptions taken [ ]
2 Note markings [ ]
3 Comments attached-Resubmit [ ]
4 Rejected [ ]
5 Submit WSDOT Pit # [ ]

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR			
Reviewed by:			
Reviewed by:			
COV, Construction			
Returned to contractor			

Contractor _____ Project File _____ Project Inspector _____ Materials Lab _____ Port of Vancouver _____ HDR Inc _____

Updated Jan 2009

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

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Received: 4-16-10

Contractor certifies compliance with Contract Documents.

By: Hans Schmeusser / Jeff Boys

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☐
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by:			
Reviewed by:			
Reviewed by:			
COV, Construction			
Returned to contractor			

Contractor _____ Project File _____ Project Inspector _____ Materials Lab _____ Port of Vancouver _____ HDR Inc _____

Updated Jan 2009

ACF WEST CONSTRUCTION COMPANY, INC.
8951 SE 76th Drive, Portland, OR 97206 503-771-5115 800-878-5115 Fax: 877-668-8730

Terminal 5 Unit Train Improvements Project #3

Geomembrane Cap System

QA/QC

As-Built Documents

As-Built Drawing

Project Specific Certificate Letters

QA QC Forms

GSE Panel Placement Log

Project Name: Terminal 5 Site Manager: AS Blair

Location: Port of Vancouver Material: HDPE

Job Number: Sheet Thickness: 60 mil

Q.A. Technician: Bill LIGHTLE Smooth: Textured: X

Panel Number	Roll Number	Deployment Date	Width (Feet)	Length (Feet)	Square Feet Smooth	Square Feet Textured
1	0126	2-13-10	22.5	82		1845
2	0126			83		1868
3	0126			83		1868
4	0126			84		1890
5	0126			84		1890
6	0126			84	total	1890
7	0130	2-13-10		84	13411	1890
8	0130	2-15-10		148		3330
9	0130			148		3330
10	0130			82		1845
11	0126			19		428
12	0130			53		1193
13	0127			148		3330
14	0127			148		3330
15	0127			148		3330
16	0127			61	total	1373
17	0113	2-15-10		90	23514	2025
18	0113	2-16-10		150		3375
19	0113			150		3375
20	0113			111	total	2498
21	0125	2-16-10		38	10103	855
22	0125	2-17-10		148		3330
23	0125			148		3330
24	0125			148		3330
25	0125			36		810
26	0116			112		2520
27	0116			148		3330
28	0116			148		3330
29	0116			108		2430
30	0128			40	total	900
31	0128	2-17-10	22.5	148	26640	3330

GSE Panel Placement Log

Project Name: Terminal 5 — Site Manager: AS Blair

Location: Port of Vancouver — Material: HDPE

Job Number: — Sheet Thickness: 60 mil

Q.A. Technician: B. LIGHTLE — Smooth: — Textured: X

Panel Number	Roll Number	Deployment Date	Width (Feet)	Length (Feet)	Square Feet Smooth	Square Feet Textured
32	0128	2-17-10	22.5	148		3330
33	0128			148		3330
34	0128			34		765
35	0129			114		2565
36	0129			148		3330
37	0129			148		3330
38	0129			105	total	2363
39	0123	2-17-10		43	19981	968
40	0123	2-18-10		148		3330
41	0123			26		585
42	0123			26		585
43	0123			26		585
44	0123			82		1845
45	0123			83		1868
46	0123			61		1373
47	0124			22		495
48	0124			83		1868
49	0124			83		1868
50	0124			83		1868
51	0124			83		1868
52	0124			83		1868
53	0124			83		1868
54	0122			26		585
55	0122			26		585
56	0122			26	total	585
57	0122	2-18-10	22.5	26	24214	585
					= 117,593	

GSE Trial Weld Log

Project Name: TERM. 5
Location: VANCOUVER
Job Number:
Q.A. Technician: B. LIGHTLE

Site Manager: A.S. BLAIR
Material: 60MIL TEX II/DPE
Sheet Thickness: 60MIL
Smooth: Textured: X

Trial No	Date of Trial	Time of Trial	Technicians ID Number	Machine Number	Ambient Temp.	Wedge Mass	Speed Preheat	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	FTB Y/N	Pass Fail
1	2-13-10	12:20	CK	1	48°	845°	5.0	130 136	126 139	135 145	137 135	176	181	187	182	Y	P
2	2-15-10	8:45	CK	1	44°	845°	5.0	143 149	174 157	171 170	171 172	218	216	214	218	Y	P
CAL 3	2-15-10	10:45	RC	4	46°	500°	500°	132	128	138	140	188	185	180	182		
4	2-15-10	12:45	CK	1	49°	845°	5.0	128 144	149 146	143 136	148 124	192	180	189	191	Y	P
5	2-16-10	2:10	CK	1	59°	845°	5.0	139 135	146 141	138 134	140 137	163	153	160	159	Y	P
6	2-17-10	7:10	CK	1	41°	845°	5.0	163 158	160 161	170 160	164 146	202 209	205	209	200	Y	P
7	2/1/10	8:30	RK	3	42°	850°	5.0	110 102	115 101	113 105	111 101	137	194	185	191	Y	P
8	2-17-10	1:01	RK	3	52°	850°	5.0	155 147	165 146	163 146	166 148	184	187	188	186	Y	P
9	2-17-10	1:45	CK	1	52°	845°	6.0	158 149	156 158	157 153	158 162	176	178	186	197	Y	P

GSE Trial Weld Log

Project Name: TERMINALS PORT OF VAN
Location: VANCOUVER WA
Job Number:
Q.A. Technician: B. LIGHTLE

Site Manager: AJ. BLAIR
Material: HDPE
Sheet Thickness: 60 MIL
Smooth: ____ Textured: X

Trial No.	Date of Trial	Time of Trial	Technicians ID Number	Machine Number	Ambient Temp.	Wedge Mass	Speed Preheat	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	FTB Y/N	Pass Fail
10	2·18·10	7:30	CR	1	42°	845°	5.0	140 142	147 147	144 143	140 144	177	183	181	187	Y	P
11	2·18·10	12:15	CR	1	53°	845°	5.0	143 141	147 146	144 141	146 143	188	186	181	179	Y	P
12	2·18·10	1:30	TT	EXT 4	53°	500°	500°	131	127	128	132	183	183	184	181	Y	P
13	2·18·10	1:50	RC	EXT 5	53°	500°	500°	127	125	123	119	176	179	180	175	Y	P
14	2·19·10	1105	TT	EXT 4	57°	500°	500°	122	126	127	121	182	181	188	175	Y	P
15	2·19·10	1:25	RC	EXT 5	57°	500°	500°	132	128	131	131	185	186	185	182	Y	P

GSE Destructive Test Log

Project Name: Terminal 5	Site Manager: AJ Blair	Fusion (ppi)	Extrusion (ppi)
Location: Vancouver WA	Material: HDPE	Min. Peel 91	Min. Peel
Job Number:	Sheet Thickness: 60 mil	Min. Shear 120	Min. Shear
Q.A. Technician: B. Whitle	Smooth: Textured: X		

Sample No.	Date Welded	Seam Number	Technician ID Number	Machine Type & No.	Location	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	FTB Y / N	Pass/ Fail
1	2.15.10	6/7	CK	Fusion #1	W. EOS (End of Seam)	161 144	151 161	164 139	153 149	162 144	207	210	215	220	206	Y	P
2	2.15.10	10/13	CK	Fusion #1	WEST ~~North~~ EOS	157 138	166 149	168 152	159 144	141 144	218	198	214	213	208	Y	P
3	2.15.10	15/16	CK	Fusion #1	WEST ~~North~~ EOS	145 139	140 124	124 135	147 132	135 142	198	201	205	200	198	Y	P
4	2.17.10	20-22	CK	Fusion #1	T intersection of P20/21/22	141 130	135 146	155 165	155 152	151 155	183	185	187	180	182	Y	P
5	2.17.10	25-27	CK	Fusion #1	WEST ~~North~~ EOS	160 161	168 159	144 152	145 151	154 152	191	189	188	193	195	Y	P
6	2.17	29-31	RC	Fusion #3	WEST ~~North~~ EOS	141 147	153 155	151 151	149 147	139 145	180	182	183	180	181	Y	P
7	2.17	33-34	RC	Fusion #3	WEST ~~North~~ EOS	146 149	142 146	147 141	147 141	135 147	189	188	188	186	191	Y	P

GSE Destructive Test Log

Project Name: TERMINAL 5	Site Manager: A.J. BLAIR	Fusion (ppi)	Extrusion (ppi)
Location: VANCOUVER WA. PORT	Material: HDPE	Min. Peel 91	Min. Peel
Job Number:	Sheet Thickness: 60MIL	Min. Shear 120	Min. Shear
Q.A. Technician: B. LIGHTLE	Smooth: Textured: X		

Sample No.	Date Welded	Seam Number	Technician ID Number	Machine Type & No.	Location	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Peel ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	Shear ppi	FTB Y / N	Pass/ Fail
8	2.17	37.38	CR	FUSION 1	WEST [illegible] EOS	172	139	150	132	146	200	202	198	197	201	Y	P
						163	156	146	146	143							
9	2.18	46.48	CR	FUSION 1	WEST [illegible] EOS	147	148	147	146	148	197	199	201	198	198	Y	P
						150	144	150	144	150							
10	2.18	52.53	CK	FUSION 1	WEST [illegible] EOS	143	136	147	144	147	199	201	204	196	199	Y	P
						143	138	146	151	149							

GSE Non-Destuctive Test / Repair Log

Project Name: TERMINAL 5 Site Manager: A.S. BLAIR

Location: PORT OF VANCOUVER Material: HDPE

Job Number: _____ Sheet Thickness: 60 MIL TEX

Q.A. Technician: B. LIGHTLE

Seam Number	Test Date	Technician ID Number	Test Type (A or V)	Air Pressure Test psi start	Air Pressure Test psi finish	Test Result (P or F)	Repair Locations
1-2	2-15-10	BL	A	31	31	P	
2-3	"	"	"	32	32	"	
3-4	"	"	"	33	33	"	
3-4	"	"	"	33	33	"	@ 29' → 3
4-5	"	"	"	33	33	"	
5-6	"	"	"	34	34	"	
6-7	"	"	"	34	33	"	
7-8	"	"	"	32	31	"	
8-9	"	"	"	42	42	"	@ Pipe Boot @ 136' → E
8-9	"	"	"	34	34	"	@ 120' → E
8-9	"	"	"	36	36	"	@ 17' → E
8-9	"	"	"	34	34	"	
9-10	"	"	"	32	32	"	@ T @ 81' → E
9-11	"	"	"	35	34	"	@ T @ 120' → E
9-12	"	"	"	32	31	"	
12-13	"	"	"	33	32	"	@ T @ 53' → W
11-13	"	"	"	33	32	"	@ T @ 72' → W
10-13	"	"	"	34	32	"	
13-14	"	"	"	35	34	"	
14-15	2-15-10	BL	A	34	34	P	

GSE Non-Destuctive Test / Repair Log

Project Name: Terminal 5 Site Manager: A.T. Blair

Location: Port of Vancouver Material: Hype

Job Number: _____ Sheet Thickness: 60Mil TEX

Q.A. Technician: Bill Lightle

Seam Number	Test Date	Technician ID Number	Test Type (A or V)	Air Pressure Test psi start	Air Pressure Test psi finish	Test Result (P or F)	Repair Locations
1-2/16	2-15-10	BL	A	35	34	P	@ T @ 61' → E
16-17	1	1	1	32	32	1	Butt Seam P16/P17
15-17	2-15-10			35	34		
10-11	2-16-10			34	34		Butt Seam P10/P11
11-12	1			32	32		Butt Seam P11/P12
1-6, 18				34	34		@ 55' → W
16-18				37	37		@ T @ 61' → W
17-18				35	35		
18-19				33	33		
19-20				32	32		
19-21	2-16-10			31	31		@ T @ 111' → W
20-21	2-17-10			32	31		Butt Seam
20-22	1			32	32		@ T @ 111' → W
21-22				31	33		
23-22				32	32		
23-24				33	33		
24-25				32	32		@ T @ 36' → W
25-26				32	32		Butt Seam
24-26				31	31		
25-27	2-17-10	BL	A	35	35	P	@ T @ 36' → W

GSE Non-Destuctive Test / Repair Log

Project Name: Texmunal "S" Site Manager: A. J. Blair

Location: Port of Vancouver Material: HDPE

Job Number: _____ Sheet Thickness: 60mil Tex.

Q.A. Technician: B. Lisitle

Seam Number	Test Date	Technician ID Number	Test Type (A or V)	Air Pressure Test psi start	Air Pressure Test psi finish	Test Result (P or F)	Repair Locations
21-28	2-17-10	BL	A	33	32	P	
28-29	"	"	"	33	33	"	T@ 108' → W
29-30	"	"	"	33	33	"	Butt Seam
28-30	"	"	"	32	32	"	
29-31	"	"	"	30	30	"	T@ 1108' → W
30-31	"	"	"	33	33	"	
31-32	"	"	"	35	33	"	
32-33	"	"	"	33	33	"	
33-34	"	"	"	35	35	"	T@ 34' → W
34-35	"	"	"	33	33	"	Butt Seam
33-35	"	"	"	35	34	"	
34-36	"	"	"	32	31	"	T@ 34' → W
35-36	"	"	"	32	32	"	
36-37	"	"	"	33	32	"	
37-38	"	"	"	38	33	"	T@ 105' → W
38-39	"	"	"	34	34	"	Butt Seam
37-39	2-17-10	"	"	34	34	"	
38-40	2-18-10	"	"	32	31	"	T@ 105' → W
40-41	"	"	"	33	33	"	@ 18' → E
40-41	2-18-10	BL	A	32	32	P	

GSE Non-Destuctive Test / Repair Log

Project Name: Terminal 5 Site Manager: A.J. Blair

Location: Port of Vancouver Material: HDPE

Job Number: _____ Sheet Thickness: 60 mil Tex

Q.A. Technician: B. Lightle

Seam Number	Test Date	Technician ID Number	Test Type (A or V)	Air Pressure Test psi start	Air Pressure Test psi finish	Test Result (P or F)	Repair Locations
40-42	2.18.10	BL	A	31	31	P	@ 27' FE
40-42				32	32		
41-42				33	33		
42-43				31	31		
43-44				33	33		@ 17' FN
43-44				32	32		
40-44				32	32		@ 61' FE
40-44				32	32		@ 25' FE
40-44				34	34		
43-43				32	31		
44-45				35	35		
44-45				36	37		@ T 61' FW
45-46				34	34		
46-47				34	33		Butt Seam
45-47				35	35		
47-48				33	33		@ T @ 22' FE
46-48				36	36		
48-49				33	33		
49-50				34	33		
50-51	2.18.10	BL	A	33	33	P	

GSE Non-Destuctive Test / Repair Log

Project Name: Terminal 5" Site Manager: A. J. Blair

Location: Port of Vancouver Material: HDPE

Job Number: _____ Sheet Thickness: 60 Mil Tex.

Q.A. Technician: B Lisitle

Seam Number	Test Date	Technician ID Number	Test Type (A or V)	Air Pressure Test psi start	Air Pressure Test psi finish	Test Result (P or F)	Repair Locations
51-52	2-18-10	BL	A	32	32	P	
52-53	"	"	"	34	34	"	
53-54	"	"	"	34	34	"	
53-55	"	"	"	40	40	"	
55-56	"	"	"	33	32	"	
53-57	"	"	"	33	33	"	
54-55	"	"	"	34	34	"	
55-56	"	"	"	34	34	"	
56-57	"	"	"	32	32	"	1' FS
56-57	2-18-10	BL	A	31	31	P	

Field Notes

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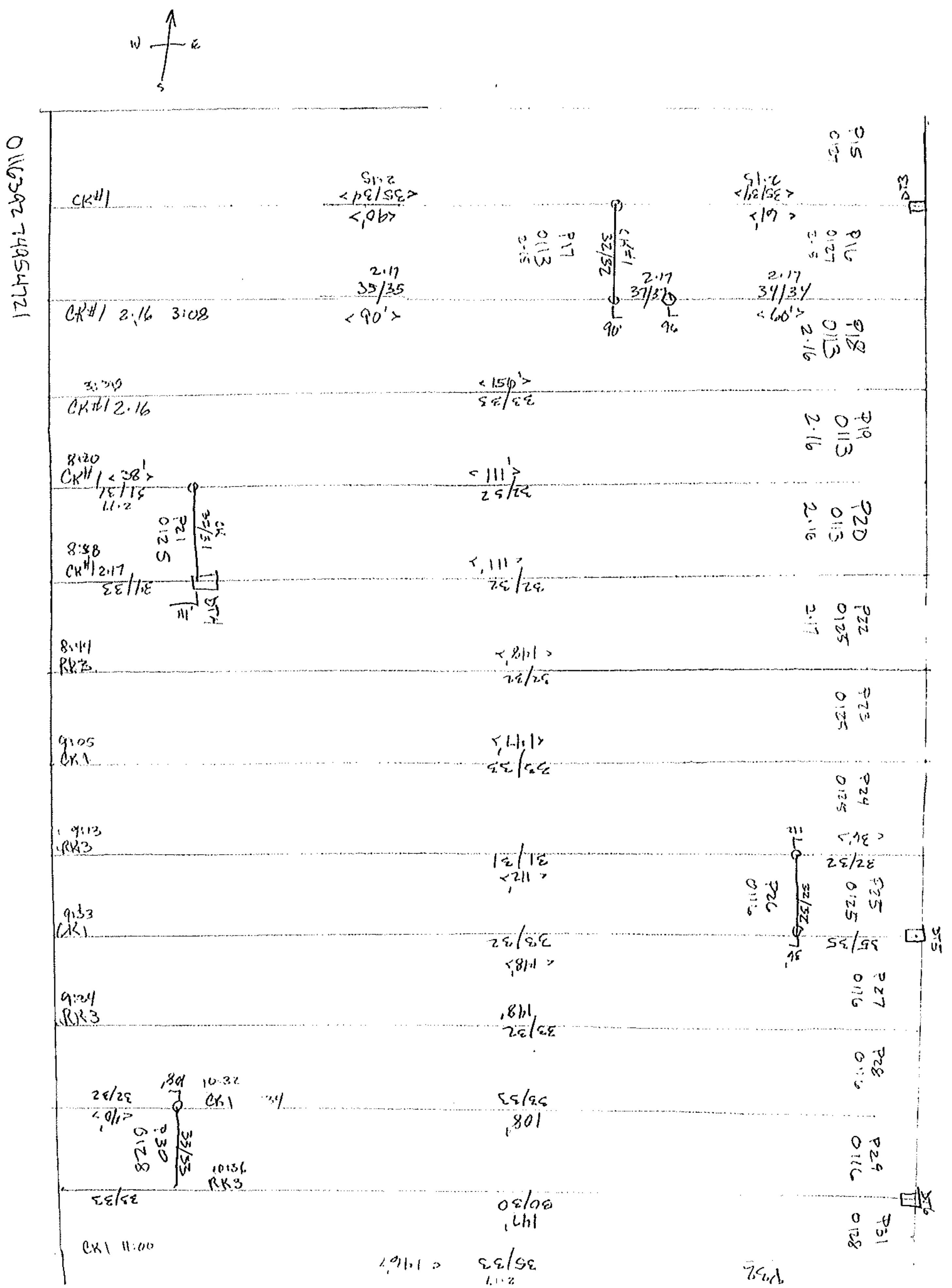

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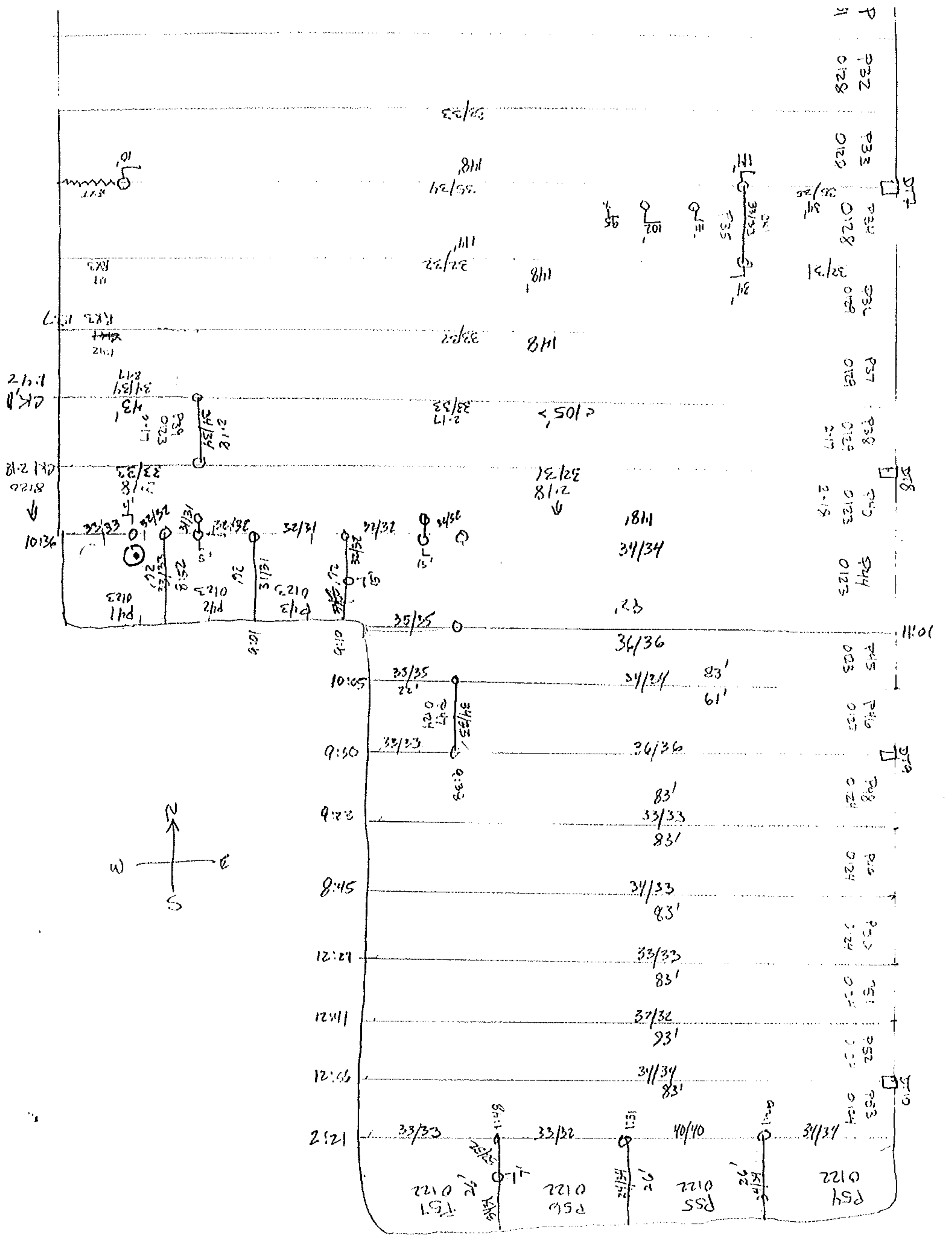

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Geomembrane Material Certs

The Pioneer Of Geosynthetics

S I N C E 1 9 7 7

Product Data Sheet

GSE HD Textured Geomembrane

GSE HD Textured is a co-extruded textured high density polyethylene (HDPE) geomembrane available on one or both sides. It is manufactured from the highest quality resin specifically formulated for flexible geomembranes. This product is used in applications that require increased frictional resistance, excellent chemical resistance and endurance properties.

Product Specifications *These product specifications meet or exceed GRI GM13.*

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE VALUE				
			~~30 mil~~	~~40 mil~~	60 mil	~~80 mil~~	~~100 mil~~
Thickness, (minimum average) mil (mm)	ASTM D 5994	every roll	30 (0.75)	40 (1.00)	60 (1.50)	80 (2.00)	100 (2.50)
Lowest Individual reading (-10%)			27 (0.69)	36 (0.91)	54 (1.40)	72 (1.80)	90 (2.30)
Density, g/cm³	ASTM D 1505	200,000 lb	0.94	0.94	0.94	0.94	0.94
Tensile Properties (each direction)	ASTM D 6693, Type IV	20,000 lb					
Strength at Break, lb/in-width (N/mm)	Dumbell, 2 ipm		66 (11)	75 (13)	115 (20)	155 (27)	230 (40)
Strength at Yield, lb/in-width (N/mm)			68 (11)	90 (15)	132 (23)	177 (31)	225 (39)
Elongation at Break, %	G.L. 2.0 in (51 mm)		100	100	100	100	100
Elongation at Yield, %	G.L. 1.3 in (33 mm)		12	12	12	12	12
Tear Resistance, lb (N)	ASTM D 1004	45,000 lb	24 (106)	32 (142)	45 (200)	60 (266)	75 (333)
Puncture Resistance, lb (N)	ASTM D 4833	45,000 lb	65 (289)	95 (422)	130 (578)	160 (711)	190 (845)
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lb	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	Note[1]	Note[1]	Note[1]	Note[1]	Note[1]
Asperity Height, mil (mm)	ASTM D 7466	second roll	16 (0.40)	18 (0.45)	18 (0.45)	18 (0.45)	18 (0.45)
Notched Constant Tensile Load[2], hr	ASTM D 5397, Appendix	200,000 lb	1,000	1,000	1,000	1,000	1,000
Oxidative Induction Time, min	ASTM D 3895, 200° C; O_2, 1 atm	200,000 lb	>100	>100	>140	>140	>140
TYPICAL ROLL DIMENSIONS							
Roll Length[3], ft (m)	Double-Sided Textured		830 (253)	700 (213)	520 (158)	400 (122)	330 (101)
	Single-Sided Textured		840 (256)	650 (198)	~~420 (128)~~	320 (98)	250 (76)
Roll Width[3], ft (m)			22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)	22.5 (6.9)
Roll Area, ft² (m²)	Double-Sided Textured		18,675 (1,735)	15,750 (1,463)	11,700 (1,087)	9,000 (836)	7,425 (690)
	Single-Sided Textured		18,900 (1,755)	14,625 (1,359)	~~9,450~~ (878)	7,200 (669)	5,625 (523)

NOTES:

- [1]Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- [2]NCTL for GSE HD Textured is conducted on representative smooth membrane samples.
- [3]Roll lengths and widths have a tolerance of ± 1%.
- GSE HD Textured Double-Sided is available in rolls weighing approximately 4,000 lb (1,800 kg) and Single-Sided weighing approximately 3,000 lb (1,360 kg).
- All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and ETB of <-77° C when tested according to ASTM D 746.
- *Modified.

DS HDT 09/01/09

GSE Roll Allocation

Order 61037
Customer ACF West, Inc.
Site Terminal 5 Cap Port of Vancouver

Roll#	*Resin Lot*	*Product Code*	*Description*	*Mfg. Date*	*Length*
108150113	8290671	HDT-060AE-BBB-B-W0	HDT060AW00	12/15/2009	520
108150116	8290671	HDT-060AE-BBB-B-W0	HDT060AW00	12/15/2009	520
108150120	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150122	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150123	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150124	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150125	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150126	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/22/2009	520
108150127	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/23/2009	520
108150128	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/23/2009	520
108150129	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/23/2009	520
108150130	8290685	HDT-060AE-BBB-B-W0	HDT060AW00	12/23/2009	520

GSE Lining Technology, Inc

Roll Test Data Report

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
61037		ACF West, Inc.	Vancouver, WA	HDT-060AE-BBB-B-W0	1/29/2010

GSE QC APPROVED

	ASTM D 5994		ASTM D638,Type IV / D6693								ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 4218/1603	ASTM D 5596	GRI GM 12	
	Average Thickness	Minimum Thickness	TD Strength @ Yield	MD Strength @ Yield	TD Strength @ Break	MD Strength @ Break	TD Elongation @ Yield	MD Elongation @ Yield	TD Elongation @ Break	MD Elongation @ Break	TD Tear Resistance	MD Tear Resistance	Puncture Resistance	Density	Carbon Black Content	Carbon Black Dispersion	Asperity Height Side A	Asperity Height Side B
	(mils)	(mils)	(ppi)	(ppi)	(ppi)	(ppi)	(%)	(%)	(%)	(%)	(lbs)	(lbs)	(lbs)	(g/cc)	(%)	Views in Cat1 - Cat2	(mils)	(mils)
Roll No.	every roll		every 4th								every 4th		every 4th	every 4th	every 4th	every 4th	every 2nd	
108150113	60	55	172	162	174	192	15	18	459	474	61	60	152	0.945	2.32	10	26	27
108150116	61	54	172	162	174	192	15	18	459	474	61	60	152	0.945	2.32	10	27	27
108150120	61	57	163	155	186	195	17	17	534	517	58	59	152	0.946	2.48	10	26	28
108150122	61	55	161	160	174	194	16	18	393	469	58	59	153	0.946	2.66	10	25	28
108150123	61	57	161	160	174	194	16	18	393	469	58	59	153	0.946	2.66	10	25	28
108150124	61	56	161	160	174	194	16	18	393	469	58	59	153	0.946	2.66	10	25	28
108150125	60	57	168	165	167	203	15	16	405	501	58	59	150	0.946	2.56	10	25	28
108150126	61	56	168	165	167	203	15	16	405	501	58	59	150	0.946	2.56	10	25	28
108150127	62	58	168	165	167	203	15	16	405	501	58	59	150	0.946	2.56	10	26	26
108150128	61	57	168	165	167	203	15	16	405	501	58	59	150	0.946	2.56	10	26	26
108150129	63	58	173	166	199	203	16	18	501	483	59	51	156	0.945	2.65	10	25	25
108150130	61	57	173	166	199	203	16	18	501	483	59	51	156	0.945	2.65	10	25	25

Laboratory Manager: Jane Allen

GSE-8.2.4-029 Rev -- 03/05

19103 Gundle Road - Houston, Texas 77073

Report Date
3/17/2010

Quality Assurance Laboratory Test Results

Job Name: Terminal 5 Cap Port of Vancouver
Sales Order: 61037

Required Testing: ASTM D 5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Custom Frequency: 1/Resin Lot

Custom Criteria: 1000 hours

Product Code	Resin Lot Number	Test Results
HDT-060AE-BBB-B-W0	8290671	PASS
HDT-060AE-BBB-B-W0	8290685	PASS

Approved By:	Debra Gortemiller
Date Approved:	January 29, 2010

Report Date
3/17/2010

Quality Assurance Laboratory Test Results

Job Name: Terminal 5 Cap Port of Vancouver
Sales Order: 61037

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry

Custom Frequency: 1/200,000 lbs.

Custom Criteria: 140 Minutes

Product Code	Resin Lot Number	Test Results
HDT-060AE-BBB-B-W0	8290671	PASS
HDT-060AE-BBB-B-W0	8290685	PASS

Approved By:	Debra Gortemiller
Date Approved:	January 29, 2010

Report Date
3/17/2010

Quality Assurance Laboratory Test Results

Job Name: Terminal 5 Cap Port of Vancouver
SO Number: 61037

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after Oven and UV Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Chevron Phillips Marlex® K306 + Carbon Black	697	661	94	80	697	565	81	50

Approved By: Debra Gortemiller
Date: January 29, 2010

CoA Date: 10/27/2009

Certificate of Analysis

Shipped To: CHEVRON PHILLIPS CHEM. CO LP: GSE
19103 GUNDLE ROAD
WESTFIELD TX 77090
USA

Recipient: UP TRACK 14732 Phouangsavanh
Fax:

CPC Delivery #: 87945747
PO #: 46822
Weight: 189500 LB
Ship Date: 10/27/2009
Package: BULK
Mode: Hopper Car
Car #: CHVX890373
Seal No: 271119

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: 8290671

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	12.0	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Production Date		09/01/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

Chevron Phillips Chemical Company LP

CoA Date: 11/06/2009

Certificate of Analysis

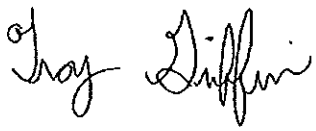
Shipped To: CHEVRON PHILLIPS CHEM. CO LP: GSE 19103 GUNDLE ROAD WESTFIELD TX 77090 USA	CPC Delivery #: 87952348 PO #: 03-060547 Weight: 188900 LB Ship Date: 11/06/2009 Package: BULK
Recipient: UP TRACK 14732 Phouangsavanh Fax:	Mode: Hopper Car Car #: PSPX009173 Seal No: 270689

Product:
MARLEX POLYETHYLENE K306 BULK

Lot Number: 8290685

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.1	g/10mi
HLMI Flow Rate	ASTM D1238	11.4	g/10mi
Density	D1505 or D4883	0.936	g/cm3
Production Date		09/04/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.



Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212

Geocomposite Material Certs

The Pioneer Of Geosynthetics

S I N C E 1 9 7 2

Product Data Sheet

GSE FabriNet HF Geocomposite

GSE FabriNet HF geocomposite consists of a 250 mil thick GSE HyperNet HF geonet heat-laminated on one or both sides with a GSE nonwoven needlepunched geotextile. The geotextile is available in mass per unit area range of 6 oz/yd² (200 g/m²) to 16 oz/yd² (540 g/m²). The geocomposite is designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions.

Product Specifications

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE VALUE[1]		
Geocomposite			~~6 oz/yd²~~	8 oz/yd²	~~10 oz/yd²~~
Transmissivity[2], gal/min/ft (m²/sec)	ASTM D 4716	1/540,000 ft²			
Double-Sided Composite			2.41 (5 x 10^{-4})	2.41 (5 x 10^{-4})	1.45 (3 x 10^{-4})
Single-Sided Composite			7.24 (1.5 x 10^{-3})	7.24 (1.5 x 10^{-3})	4.83 (1 x 10^{-3})
Ply Adhesion, lb/in (g/cm)	ASTM D 7005	1/50,000 ft²	1.0 (178)	1.0 (178)	1.0 (178)
Geonet Core[3] - GSE HyperNet HF					
Transmissivity[2], gal/min/ft (m²/sec)	ASTM D 4716		14.49 (3 x 10^{-3})	14.49 (3 x 10^{-3})	14.49 (3 x 10^{-3})
Density, g/cm³	ASTM D 1505	1/50,000 ft²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035/7179	1/50,000 ft²	55 (9.6)	55 (9.6)	55 (9.6)
Carbon Black Content, %	ASTM D 1603*/4218	1/50,000 ft²	2.0	2.0	2.0
Geotextile[3,4]					
Mass per Unit Area, oz/yd²(g/m²)	ASTM D 5261	1/90,000 ft²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft²	160 (710)	220 (975)	260 (1155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft²	90 (395)	120 (525)	165 (725)
AOS, US sieve (mm)	ASTM D 4751	1/540,000 ft²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec⁻¹)	ASTM D 4491	1/540,000 ft²	1.5	1.3	1.0
Flow Rate, gpm/ft² (lpm/m²)	ASTM D 4491	1/540,000 ft²	110 (4480)	95 (3,865)	75 (3050)
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70
NOMINAL ROLL DIMENSIONS					
Geonet Core Thickness, mil (mm)	ASTM D 5199	1/50,000 ft²	250 (6.3)	250 (6.3)	250 (6.3)
Roll Width[5], ft (m)			15 (4.5)	15 (4.5)	15 (4.5)
Roll Length[5], ft (m)	Double-Sided Composite		230 (70.1)	230 (70.1)	210 (64.0)
	Single-Sided Composite		260 (79.2)	260 (79.2)	250 (76.2)
Roll Area, ft² (m²)	Double-Sided Composite		3,450 (321)	3,450 (321)	3,150 (293)
	Single-Sided Composite		3,900 (362)	3,900 (362)	3,750 (348)

NOTES:

- [1] AOS in mm is a maximum value.
- [2] Gradient of 0.1, normal load of 10,000 psf, water at 70°F between steel plates for 15 minutes. Contact GSE for performance transmissivity value for use in design.
- [3] Component properties prior to lamination.
- [4] Refer to geotextile product data sheet for additional specifications.
- [5] Roll widths and lengths have a tolerance of ±1%.
- *Modified.

DS-FabriNet HF 07/10/09

The Pioneer Of Geosynthetics

S I N C E 1 9 7 2

GSE FabriNet HF Geocomposite

GSE FabriNet HF geocomposite consists of a 250 mil thick GSE HyperNet HF geonet heat-laminated on one or both sides with a GSE nonwoven needlepunched geotextile. The geotextile is available in mass per unit area range of 6 oz/yd^2 (200 g/m^2) to 16 oz/yd^2 (540 g/m^2). The geocomposite is designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions.

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Carbon Black Content, %	ASTM D 1603*/4218	1/50,000 ft²	2.0	2.0	2.0
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Permittivity, (sec⁻¹)	ASTM D 4491	1/540,000 ft²	1.5	1.3	1.0
Flow Rate, gpm/ft² (lpm/m²)	ASTM D 4491	1/540,000 ft²	110 (4480)	95 (3,865)	75 (3050)
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NOTES:

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- [4]Refer to geotextile product data sheet for additional specifications.
- [5]Roll widths and lengths have a tolerance of ±1%.
- *Modified.

GSE Roll Allocation

Order 61038
Customer ACF West, Inc.
Site Terminal 5 Cap Port of Vancouver

Roll#	*Resin Lot*	*Product Code*	*Description*	*Mfg. Date*	*Length*
131334278	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334279	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334280	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334281	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334282	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334283	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334284	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334285	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334286	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334287	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334288	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334289	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334290	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334291	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334292	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/9/2010	210
131334293	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334294	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334295	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334296	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334297	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334298	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334299	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334300	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334301	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334302	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334307	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334308	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334309	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334310	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334311	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334312	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334313	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334314	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334315	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210

Order 61038
Customer ACF West, Inc.
Site Terminal 5 Cap Port of Vancouver

Roll#	*Resin Lot*	*Product Code*	*Description*	*Mfg. Date*	*Length*
131334316	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334317	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334318	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334319	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210
131334320	C100107A02	FS2-250E-08-08-E-	FS2-250E-08-08-E-00	2/10/2010	210

GSE

Geocomposite Traceability

Customer ACF West, Inc.
Location Vancouver, WA

Job Name Terminal 5 Cap Port of
Order 61038

Roll_No	*Product*	*Resin Lot*	*Top Geo*	*Bottom Geo*
131334278	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334279	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334280	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334281	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334282	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334283	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334284	FS2-250E-08-08-E-00	C100107A02	130356377	130356379
131334285	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334286	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334287	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334288	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334289	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334290	FS2-250E-08-08-E-00	C100107A02	130356374	130356376
131334291	FS2-250E-08-08-E-00	C100107A02	130356372	130356376
131334292	FS2-250E-08-08-E-00	C100107A02	130356372	130356380
131334293	FS2-250E-08-08-E-00	C100107A02	130356372	130356380
131334294	FS2-250E-08-08-E-00	C100107A02	130356372	130356380
131334295	FS2-250E-08-08-E-00	C100107A02	130356373	130356380
131334296	FS2-250E-08-08-E-00	C100107A02	130356373	130356380
131334297	FS2-250E-08-08-E-00	C100107A02	130356373	130356380
131334298	FS2-250E-08-08-E-00	C100107A02	130356378	130356380
131334299	FS2-250E-08-08-E-00	C100107A02	130356378	130356380
131334300	FS2-250E-08-08-E-00	C100107A02	130356378	130356380
131334301	FS2-250E-08-08-E-00	C100107A02	130356378	130356380
131334302	FS2-250E-08-08-E-00	C100107A02	130356378	130356380
131334307	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334308	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334309	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334310	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334311	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334312	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334313	FS2-250E-08-08-E-00	C100107A02	130356375	130356371
131334314	FS2-250E-08-08-E-00	C100107A02	130356367	130356381
131334315	FS2-250E-08-08-E-00	C100107A02	130356367	130356381

Roll_No	*Product*	*Resin Lot*	*Top Geo*	*Bottom Geo*
131334316	FS2-250E-08-08-E-00	C100107A02	130356367	130356381
131334317	FS2-250E-08-08-E-00	C100107A02	130356367	130356381
131334318	FS2-250E-08-08-E-00	C100107A02	130356367	130356381
131334319	FS2-250E-08-08-E-00	C100107A02	130356367	130356381
131334320	FS2-250E-08-08-E-00	C100107A02	130356367	130356353

GSE Lining Technology, Inc

Roll Test Data Report

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
61038		ACF West, Inc.	Vancouver, WA	FS2-250E-08-08-E-00	2/11/2010

GSE QC APPROVED

	ASTM D 5199	ASTM D 7179 / D 4218 / D 1	ASTM D 1505		GRI GC7* / ASTM D7005			
	Average Thickness (mils)	Geonet Tensile Strength (ppi)	Carbon Black Content (%)	Density (g/cc)	Peel Strength Side A - Minimum (ppi)	Peel Strength Side B - Minimum (ppi)	Peel Strength Side A - Average (ppi)	Peel Strength Side B - Average (ppi)
Roll No.	every 14th	every 14th	every 14th	every 14th	every 14th			
131334278	263	76	2.5	0.959	2.09	2.77	2.37	3.10
131334279	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334280	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334281	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334282	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334283	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334284	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334285	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334286	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334287	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334288	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334289	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334290	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334291	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334292	255	72	2.5	0.954	1.66	1.86	1.85	2.15
131334293	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334294	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334295	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334296	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334297	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334298	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334299	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334300	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334301	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334302	256	72	2.5	0.957	5.11	3.42	5.57	3.76
131334307	257	73	2.4	0.954	2.22	1.96	2.51	2.24
131334308	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334309	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334310	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334311	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334312	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334313	264	78	2.5	0.950	2.66	2.31	2.85	2.54

Roll Test Data Report

Lining Technology, Inc

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
61038		ACF West, Inc.	Vancouver, WA	FS2-250E-08-08-E-00	2/11/2010

GSE QC APPROVED

	ASTM D 5199	ASTM D 7179 M D 4218 / D 1	ASTM D 1505		GRI GC7* / ASTM D7005			
Roll No.	Average Thickness (mils) every 14th	Geonet Tensile Strength (ppi) every 14th	Carbon Black Content (%) every 14th	Density (g/cc) every 14th	Peel Strength Side A - Minimum (ppi)	Peel Strength Side B - Minimum (ppi) every 14th	Peel Strength Side A - Average (ppi)	Peel Strength Side B - Average (ppi)
131334314	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334315	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334316	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334317	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334318	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334319	264	78	2.5	0.950	2.66	2.31	2.85	2.54
131334320	264	78	2.5	0.950	2.66	2.31	2.85	2.54

Laboratory Manager: Jane Allen

GSE-8.2.4-029 Rev – 03/05

Kingstree Lab - US

Roll Test Data Report

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Repo
61038		ACF West, Inc.	Vancouver, WA	FBR-080E-EBC-E-00	2/1

GSE QC APPROVED

	ASTM D 4491		ASTM D 4751	ASTM D 4833	ASTM D 4533		ASTM D 4632				ASTM D 5261
	Average Sample Flow Rate	Permittivity	Apparent Opening Size	Puncture Resistance	Trap Tear Strength CD	Trap Tear Strength MD	Grab Elongation CD	Grab Elongation MD	Grab Strength CD	Grab Strength MD	Mass per Unit Area
	(gallon/min/ft2)	(Sec-1)	(mm)	(lbs)	(lbs)	(lbs)	(%)	(%)	(lbs)	(lbs)	(oz./yd2)
Roll No.			every roll	every 4th	every 4th				every 4th		every 4th
130356353	129	1.70	0.180	139	137	117	127	110	297	255	8.5
130356367	129	1.70	0.180	143	125	110	129	95	311	249	8.7
130356371	129	1.70	0.180	128	178	119	127	115	288	238	8.3
130356372	106	1.40	0.180	138	170	116	124	115	270	224	8.7
130356373	106	1.40	0.180	138	170	116	124	115	270	224	8.7
130356374	106	1.40	0.180	138	170	116	124	115	270	224	8.7
130356375	106	1.40	0.180	138	170	116	124	115	270	224	8.7
130356376	106	1.40	0.180	137	162	122	130	117	289	224	8.4
130356377	106	1.40	0.180	137	162	122	130	117	289	224	8.4
130356378	106	1.40	0.180	137	162	122	130	117	289	224	8.4
130356379	106	1.40	0.180	137	162	122	130	117	289	224	8.4
130356380	106	1.40	0.180	139	181	103	124	116	289	228	8.9
130356381	106	1.40	0.180	139	181	103	124	116	289	228	8.9

Laboratory Manager: Jane Allen

GSE-8.2.4-029 Rev – 03/05

Kingstree Lab - US

GeoTextile Material Certs

The Pioneer Of Geosynthetics
SINCE 1972

GSE Nonwoven Geotextile

GSE Nonwoven Geotextile is a family of polypropylene, staple fiber, needlepunched geotextiles. The geotextile is manufactured using an advanced manufacturing and quality system, to produce the most uniform and consistent nonwoven needlepunched geotextile currently available in the industry. GSE combines a fiber selection and approval system with in-line quality control and a state-of-the-art laboratory to ensure that every roll shipped meets customer specifications and for various applications.

Product Specifications *These product specifications meet or exceed GRI GT12, GRI GT13 and AASHTO M288.*

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE VALUE NW4	NW6	NW8	NW10	NW12	NW16
AASHTO M288 Class						>10	>11	>>>1
Mass per Unit Area, oz/yd² (g/m²)	ASTM D 5261	90,000 ft²	(135)	(200)	(270)	10 (335)	12 (405)	16 (540)
Grab Tensile Strength, lb (N)	ASTM D 4632	90,000 ft²	(530)	(700)	(945)	(1,155)	(1,420)	390 (1,735)
Grab Elongation, %	ASTM D 4632	90,000 ft²	50	50	50	50	50	50
Puncture Strength, lb (N)	ASTM D 4833	90,000 ft²	(285)	(385)	(515)	(735)	(885)	240 (1,055)
Trapezoidal Tear Strength, lb (N)	ASTM D 4533	90,000 ft²	(280)	(280)	(385)	(485)	(585)	150 (665)
Apparent Opening Size, Sieve No. (mm)	ASTM D 4751	540,000 ft²	(0.212)	(0.212)	(0.180)	(0.150)	(0.150)	100 (0.150)
Permittivity, sec⁻¹	ASTM D 4491	540,000 ft²	1.50	1.50	1.30	1.00	0.80	0.60
Water Flow Rate, gpm/ft² (l/min/m²)	ASTM D 4491	540,000 ft²	(5,495)	(4,480)	(3,665)	(3,050)	(2,440)	45 (1,830)
UV Resistance (% retained after 500 hours)	ASTM D 4355	per formulation	70	70	70	70	70	70
NOMINAL ROLL DIMENSIONS								
Roll Length[1], ft (m)			(182)	(269)	(182)	(182)	(122)	300 (91)
Roll Width[1], ft (m)			(45)	(45)	(45)	(45)	(45)	15 (4.5)
Roll Area, ft² (m²)			9,000 (836)	12,750 (1,185)	9,000 (836)	7,500 (698)	6,000 (557)	4,500 (418)

NOTES:

- The property values listed are in weaker principal direction. All values listed are Minimum Average Values except apparent opening size in mm and UV resistance. Apparent opening size (mm) is a Maximum Value. UV is a typical value.
- [1]Roll lengths and widths have a tolerance of ±1%.

GSE Roll Allocation

Order 61038
Customer ACF West, Inc.
Site Terminal 5 Cap Port of Vancouver

Roll#	*Product Code*	*Description*	*Mfg. Date*	*Length*
130358359	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358360	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358361	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358362	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358363	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358364	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358365	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358366	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358367	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358368	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358369	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358370	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358371	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358372	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358373	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358374	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358375	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358376	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358377	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358378	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358379	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358380	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358381	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358382	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358383	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358384	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358385	GEO-160E-EBC-E-00	NW16	2/2/2010	300
130358386	GEO-160E-EBC-E-00	NW16	2/2/2010	300

GSE Lining Technology, Inc

Roll Test Data Report

Sales Order No.	Project Number	Customer Name	Project Location	Product Name	Report Date
61038		ACF West, Inc.	Vancouver, WA	GEO-160E-EBC-E-00	2/4/2010

GSE QC APPROVED

	ASTM D 4491		ASTM D 4751	ASTM D 3786	ASTM D 4833	ASTM D 4533		ASTM D 4632				ASTM D 5261
	Average Sample Flow Rate	Permittivity	Apparent Opening Size	Mullen Burst Strength	Puncture Resistance	Trap Tear Strength CD	Trap Tear Strength MD	Grab Elongation CD	Grab Elongation MD	Grab Strength CD	Grab Strength MD	Mass per Unit Area
	(gallon/min/ft2)	(Sec-1)	(mm)	(psi)	(lbs)	(lbs)	(lbs)	(%)	(%)	(lbs)	(lbs)	(oz./yd2)
Roll No.	every 120th		every roll	every 20th	every 20th	every 20th			every 20th			every 20th
130358359	57	0.80	0.150	772	277	338	274	130	118	641	518	17.2
130358360	57	0.80	0.150	772	277	338	274	130	118	641	518	17.2
130358361	57	0.80	0.150	772	277	338	274	130	118	641	518	17.2
130358362	57	0.80	0.150	772	277	338	274	130	118	641	518	17.2
130358363	57	0.80	0.150	772	277	338	274	130	118	641	518	17.2
130358364	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358365	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358366	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358367	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358368	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358369	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358370	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358371	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358372	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358373	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358374	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358375	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358376	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358377	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358378	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358379	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358380	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358381	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358382	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358383	57	0.80	0.150	846	247	381	243	130	112	710	531	16.9
130358384	57	0.80	0.150	788	249	332	251	134	114	653	504	16.3
130358385	57	0.80	0.150	788	249	332	251	134	114	533	504	16.3
130358386	57	0.80	0.150	788	249	332	251	134	114	653	504	16.3

Laboratory Manager:

Kingstree Lab - US

PRODUCT DATA SHEET

GEOTEX®1701

GEOTEX 1701 is a polypropylene, staple fiber, needlepunched nonwoven geotextile produced by Propex, and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. The fibers are needled to form a stable network that retains dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

GEOTEX 1701 conforms to the property values listed below.[1] Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

		MARV[2]	
PROPERTY	**TEST METHOD**	**ENGLISH**	**METRIC**
Physical			
Mass/Unit Area	ASTM D-5261	16.0 oz/yd²	542 g/m²
Thickness	ASTM D-5199	165 mils	4.2 mm
Mechanical			
Tensile Strength (Grab)	ASTM D-4632	390 lbs	1736 N
Elongation	ASTM D-4632	50%	50%
Puncture	ASTM D-4833	250 lbs	1112 N
Mullen Burst	ASTM D-3786	800 psi	5515 kPa
Trapezoidal Tear	ASTM D-4533	155 lbs	690 N
Endurance			
UV Resistance	ASTM D-4355	70%	70%
Hydraulic			
Apparent Opening Size (AOS)[3]	ASTM D-4751	100 US Std. Sieve	0.150 mm
Permittivity	ASTM D-4491	0.7 sec⁻¹	0.7 sec⁻¹
Permeability	ASTM D-4491	0.27 cm/sec	0.27 cm/sec
Water Flow Rate	ASTM D-4491	50 gpm/ft²	2037 l/min/m²
Roll Sizes		15 ft x 300 ft	4.57 m x 91.5 m

NOTES:

1. The property values listed above are effective 08/2006 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum average roll value.

PROPEX | THE ADVANTAGE CREATORS.™

GEOSYNTHETICS

Propex Inc.
6025 Lee Highway, Suite 425
PO Box 22788
Chattanooga, TN 37422

PH: 423 899 0444
PH: 800 621 1273
FAX: 423 899 7619
www.propexinc.com

PROPEX®

Certificate of Compliance

Chad Judkins
Quality Manager

BOL: 80471589
BOL date: 12/07/2009
Sales Order: 369052

MV: 1004461 1701 15ftx300ft blk GEOTEX

Style: 1701
Customer Contact:
Customer PO: 35715

Customer: Northwest Geosynthetics, Inc
8951 S.E. 76th Drive
PORTLAND OR 97206

It is certified that the material referenced above:
* Meets the minimum average roll values (MARV) listed below.
* Was tested as prescribed by approved test methods.

Property	Test method	Units	English	Metric Units	Metric
Mass/Unit Area	ASTM D-5261	oz/yd2	16.00	gpm/ft2	542.40
MD Elong @ Break	ASTM D-4632	%	50	%	50.00
MD Tensile @ Break	ASTM D-4632	lb	390.00	N	1735.50
MD Trap Tear	ASTM D-4533	lb	155.00	N	689.75
XMD Elong @ Break	ASTM D-4632	%	50	%	50.00
XMD Tensile @ Break	ASTM D-4632	lb	390.00	N	1735.50
XMD Trap Tear	ASTM D-4533	lb	155.00	N	689.75
AOS (mm)	ASTM D-4751	mm	0.15	mm	0.15
CBR	ASTM D-6241	lb	1125.0	N	5006.25
Mullen Burst	ASTM D-3786	psi	800.00	kPa	5515.76
Permeability	ASTM D-4491	cm/s	0.270000	cm/sec	0.27000
Permittivity	ASTM D-4491	1/sec	0.700000	sec-1	0.70
Puncture	ASTM D-4833	lb	250.00	N	1112.50
Thickness	ASTM D-5199	mil	165	millimeters	4.19
Water Flow Rate	ASTM D-4491	gpm/sf	50.000000	l/min/m2	2037.29

Propex Operating Company, LLC, 6025 Lee Hwy, Suite 425, PO Box 22788, Chattanooga, TN 37422, USA - (800)-621-1273

PROPEX® Certificate of Analysis

Quality Manager

BOL: 80471589 **MV** 1004461 **1701 15ftx300ft blk GEOTEX** **style** 1701 **Cust PO:** 035715

HU#/Rolls Shipped		units	AOS (mm)	CBR	Mass/Unit Area	MD Elong @ Break	MD Tensile @ Break	MD Trap Tear	Mullen Burst	Permeability	Permittivity	Puncture
		ASTM Test	MM	LB	OSY	%	LB	LB	PSI	2M	1/S	LB
			D-4751	D-6241	D-5261	D-4632	D-4632	D-4533	D-3786	D-4491	D-4491	D-4833
2020484688		2213188	0.13	1345.0	17.82	86	488.45	182.95	860.00	0.418750	0.803500	277.19
2020484689		2213188	0.13	1345.0	17.82	86	488.45	182.95	860.00	0.418750	0.803500	277.19
2020484695	*	2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484697	*	2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484699		2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484700		2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484701		2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484702		2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484703		2213188	0.15	1478.9	18.86	95	479.46	195.92	845.71	0.525750	0.932500	288.09
2020484704	*	2213188	0.15	1478.9	20.62	96	512.25	198.49	845.71	0.525750	0.932500	288.09
2020484706	*	2213188	0.15	1478.9	20.62	96	512.25	198.49	845.71	0.525750	0.932500	288.09
2020549931	*	2215374	0.11	1501.1	16.12	83	390.56	157.81	861.43	0.583000	1.179000	274.94
2020549932	*	2215374	0.11	1501.1	16.12	83	390.56	157.81	861.43	0.583000	1.179000	274.94
2020549934	*	2215374	0.11	1501.1	16.12	83	390.56	157.81	861.43	0.583000	1.179000	274.94
2020552215		2215374	0.11	1501.1	20.07	89	565.75	187.72	861.43	0.583000	1.179000	274.94
2020552217		2215374	0.11	1501.1	20.07	89	565.75	187.72	861.43	0.583000	1.179000	274.94
2020552322	*	2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552323		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552324		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552325		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552326		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552327		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552328		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552329		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552330		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552331		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552332		2215551	0.13	1594.0	16.29	84	415.07	164.99	800.00	0.361000	0.710000	301.39
2020552333	*	2215551	0.13	1594.0	17.68	94	419.19	155.05	800.00	0.361000	0.710000	301.39
2020552414		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80
2020552415		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80
2020552416		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80
2020552417		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80

1. Data listed above was determined in accordance with standard test methods, frequencies and procedures defined internally by plant and product type
2. Rolls tested on this shipment are identified with an asterisk(*)
3. HU# is handling unit and is terminology for roll number and "production order" equates to lot number.
Our enterprise resource planning system generates sequential handling unit and production order designations independent of the manufacturing facility producing the product.
Therefore, handling unit numbers may not be in sequential order within a production order.

Propex Operating Company, LLC, 6025 Lee Hwy, Suite 425, PO Box 22788 Chattanooga TN 37422

PROPEX® Certificate of Analysis

Quality Manager

BOL: 80471589 **MV** 1004461 **1701 15ftx300ft blk GEOTEX** **style** 1701 **Cust PO:** 035715

HU#/Rolls Shipped		units	Thickness MIL	Water Flow Rate GMF	XMD Elong @ Break %	XMD Tensile @ Break LB	XMD Trap Tear LB
		ASTM Test	D-5199	D-4491	D-4632	D-4632	D-4533
2020484688		2213188	224	59.325000	106	549.24	246.00
2020484689		2213188	224	59.325000	106	549.24	246.00
2020484695	*	2213188	240	68.875000	123	534.34	237.95
2020484697	*	2213188	240	68.875000	123	534.34	237.95
2020484699		2213188	240	68.875000	123	534.34	237.95
2020484700		2213188	240	68.875000	123	534.34	237.95
2020484701		2213188	240	68.875000	123	534.34	237.95
2020484702		2213188	240	68.875000	123	534.34	237.95
2020484703		2213188	240	68.875000	123	534.34	237.95
2020484704	*	2213188	240	68.875000	108	668.80	293.89
2020484706	*	2213188	240	68.875000	108	668.80	293.89
2020549931	*	2215374	211	87.075000	100	508.38	222.53
2020549932	*	2215374	211	87.075000	100	508.38	222.53
2020549934	*	2215374	211	87.075000	100	508.38	222.53
2020552215		2215374	211	87.075000	93	756.85	268.72
2020552217		2215374	211	87.075000	93	756.85	268.72
2020552322	*	2215551	222	50.700000	103	497.14	215.49
2020552323		2215551	222	50.700000	103	497.14	215.49
2020552324		2215551	222	50.700000	103	497.14	215.49
2020552325		2215551	222	50.700000	103	497.14	215.49
2020552326		2215551	222	50.700000	103	497.14	215.49
2020552327		2215551	222	50.700000	103	497.14	215.49
2020552328		2215551	222	50.700000	103	497.14	215.49
2020552329		2215551	222	50.700000	103	497.14	215.49
2020552330		2215551	222	50.700000	103	497.14	215.49
2020552331		2215551	222	50.700000	103	497.14	215.49
2020552332		2215551	222	50.700000	103	497.14	215.49
2020552333	*	2215551	222	50.700000	102	610.41	235.03
2020552414		2215551	205	64.575000	95	579.06	265.67
2020552415		2215551	205	64.575000	95	579.06	265.67
2020552416		2215551	205	64.575000	95	579.06	265.67
2020552417		2215551	205	64.575000	95	579.06	265.67

1. Data listed above was determined in accordance with standard test methods, frequencies and procedures defined internally by plant and product type
2. Rolls tested on this shipment are identified with an asterisk(*)
3. HU# is handling unit and is terminology for roll number and "production order" equates to lot number.
Our enterprise resource planning system generates sequential handling unit and production order designations independent of the manufacturing facility producing the product.
Therefore, handling unit numbers may not be in sequential order within a production order.

PROPEX® Certificate of Analysis

Quality Manager

BOL: 80471589 **MV** 1004461 **1701 15ftx300ft blk GEOTEX** **style** 1701 **Cust PO:** 035715

HU#/Rolls Shipped		units	AOS (mm)	CBR	Mass/Unit Area	MD Elong @ Break	MD Tensile @ Break	MD Trap Tear	Mullen Burst	Permeability	Permittivity	Puncture
		ASTM Test	MM D-4751	LB D-6241	OSY D-5261	% D-4632	LB D-4632	LB D-4533	PSI D-3786	2M D-4491	1/S D-4491	LB D-4833
2020552418		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80
2020552419		2215551	0.13	1314.3	16.53	92	437.33	168.06	834.29	0.485750	0.874500	291.80
2020552420	*	2215551	0.13	1314.3	16.07	106	455.97	166.98	834.29	0.485750	0.874500	291.80
2020552423	*	2215551	0.13	1314.3	16.07	106	455.97	166.98	834.29	0.485750	0.874500	291.80

1. Data listed above was determined in accordance with standard test methods, frequencies and procedures defined internally by plant and product type
2. Rolls tested on this shipment are identified with an asterisk(*)
3. HU# is handling unit and is terminology for roll number and "production order" equates to lot number.
Our enterprise resource planning system generates sequential handling unit and production order designations independent of the manufacturing facility producing the product.
Therefore, handling unit numbers may not be in sequential order within a production order.

PROPEX

Certificate of Analysis

Quality Manager

BOL: 80471589 **MV** 1004461 **1701 15ftx300ft blk GEOTEX** **style** 1701 **Cust PO:** 035715

HU#/Rolls Shipped		units	Thickness	Water Flow Rate	XMD Elong @ Break	XMD Tensile @ Break	XMD Trap Tear
		ASTM Test	D-5199	D-4491	D-4632	D-4632	D-4533
			MIL	GMF	%	LB	LB
2020552418		2215551	205	64.575000	95	579.06	265.67
2020552419		2215551	205	64.575000	95	579.06	265.67
2020552420	*	2215551	205	64.575000	102	593.06	250.94
2020552423	*	2215551	205	64.575000	102	593.06	250.94

1. Data listed above was determined in accordance with standard test methods, frequencies and procedures defined internally by plant and product type
2. Rolls tested on this shipment are identified with an asterisk(*)
3. HU# is handling unit and is terminology for roll number and "production order" equates to lot number.
Our enterprise resource planning system generates sequential handling unit and production order designations independent of the manufacturing facility producing the product.
Therefore, handling unit numbers may not be in sequential order within a production order.

Propex Operating Company, LLC, 6025 Lee Hwy, Suite 425, PO Box 22788 Chattanooga TN 37422

Project Cert Forms

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.: #01 DATE: February 13, 2010

AREA REFERENCED: From West end anchor trench to 220 LF East,

from North to South limits

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

P1 thru P7

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE APPROPRIATE SPECIAL PROVISIONS AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

(Note: All exceptions shall be approved by Owner or Engineer prior to 60-mil HDPE Geomembrane Liner Installation)

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.: #02 DATE: February 15, 2010

AREA REFERENCED: 220 LF from West end anchor trench to 350 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

P8 thru P17

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE APPROPRIATE SPECIAL PROVISIONS AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

(Note: All exceptions shall be approved by Owner or Engineer prior to 60-mil HDPE Geomembrane Liner Installation)

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.: #03 DATE: February 16, 2010

AREA REFERENCED: 350 LF from West end anchor trench to 418 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

P18 thru P21

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE APPROPRIATE SPECIAL PROVISIONS AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

(Note: All exceptions shall be approved by Owner or Engineer prior to 60-mil HDPE Geomembrane Liner Installation)

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.: #04 DATE: February 17, 2010

AREA REFERENCED: 418 LF from West end anchor trench to 682 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

P22 thru P39

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE APPROPRIATE SPECIAL PROVISIONS AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

(Note: All exceptions shall be approved by Owner or Engineer prior to 60-mil HDPE Geomembrane Liner Installation)

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF ACCEPTANCE OF SUBGRADE - Daily Certification
(Circle Material Type)

REPORT NO.: #05 DATE: February 18, 2010

AREA REFERENCED: 682 LF from West end anchor trench to East limit, from North to South limits

LINER PANEL NUMBERS INSTALLED OVER REFERENCED AREA THIS DATE:

P40 thru P57

WE THE UNDERSIGNED CERTIFY THAT WE HAVE INSPECTED THE ENTIRE SURFACE, AND HAVE REVIEWED THE APPROPRIATE SPECIAL PROVISIONS AND RELATED SHOP DRAWINGS FOR MATERIAL AND PLACEMENT, AND FIND ALL CONDITIONS ACCEPTABLE FOR PLACEMENT OF THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*].

WE SPECIFICALLY TAKE THE FOLLOWING EXCEPTIONS TO THE ACCEPTANCE OF THE SUBGRADE ON THIS DATE:

(Note: All exceptions shall be approved by Owner or Engineer prior to 60-mil HDPE Geomembrane Liner Installation)

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.: #01 DATE: February 10, 2010

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES Propex Lot #1

WE THE UNDERSIGNED ACCEPT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.: #02 DATE: February 10, 2010

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES GSE Lot #1

WE THE UNDERSIGNED ACCEPT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.: #03 DATE: February 12, 2010

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES GSE Lot #2

WE THE UNDERSIGNED ACCEPT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.: #04 DATE: February 15, 2010

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES GSE Lot #3

WE THE UNDERSIGNED ACCEPT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL ACCEPTANCE FROM SHIPPER
(Per shipment; each roll or container) (Circle Material Type)

REPORT NO.: #05 DATE: February 15, 2010

PANEL, ROLL, AND CONTAINER NUMBER REFERENCES GSE Lot #4

WE THE UNDERSIGNED ACCEPT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FROM THE TRANSPORTER. THESE MATERIALS WERE RECEIVED IN UNDAMAGED CONDITION BASED UPON OUR VISUAL INSPECTION.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.: #01 DATE: February 13, 2010

AREA REFERENCED: From West end anchor trench to 220 LF East,

from North to South limits

LINER PANEL NUMBERS INSTALLED THIS DATE: P1 thru P7

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS INSTALLED IN ACCORDANCE WITH THE APPLICABLE SPECIAL PROVISIONS AND WITH APPROVED SHOP DRAWINGS.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.: #02 DATE: February 15, 2010

AREA REFERENCED: 220 LF from West end anchor trench to 350 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED THIS DATE: P8 thru P17

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS INSTALLED IN ACCORDANCE WITH THE APPLICABLE SPECIAL PROVISIONS AND WITH APPROVED SHOP DRAWINGS.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.: #03 DATE: February 16, 2010

AREA REFERENCED: 350 LF from West end anchor trench to 418 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED THIS DATE: P18 thru P21

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS INSTALLED IN ACCORDANCE WITH THE APPLICABLE SPECIAL PROVISIONS AND WITH APPROVED SHOP DRAWINGS.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.: #04 DATE: February 17, 2010

AREA REFERENCED: 418 LF from West end anchor trench to 682 LF East, from North to South limits

LINER PANEL NUMBERS INSTALLED THIS DATE: P22 thru P39

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS INSTALLED IN ACCORDANCE WITH THE APPLICABLE SPECIAL PROVISIONS AND WITH APPROVED SHOP DRAWINGS.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATE OF MATERIAL INSTALLATION - Daily Certification
(Circle Material Type)

REPORT NO.: #05 DATE: February 18, 2010

AREA REFERENCED: 682 LF from West end anchor trench to East limit,

from North to South limits

LINER PANEL NUMBERS INSTALLED THIS DATE: P40 thru P57

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS INSTALLED IN ACCORDANCE WITH THE APPLICABLE SPECIAL PROVISIONS AND WITH APPROVED SHOP DRAWINGS.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL JOINTS - Daily Certification Per Test
(As Shop Drawings and as a Compiled Report at the end of Project)
(Circle Material Type)

TEST REPORT NO.: #01 DATE: February 13, 2010

FIELD LOG NO.: N/A (See Attached QA/QC Docs)

LIST OF ALL DEFICIENCIES AND SUBSEQUENT REPAIRS, COPIES OF ALL FIELD AND FACTORY TESTS AND INSPECTION DATA INCLUDING RECORDS OF ALL NON-DESTRUCTIVE TESTING (Field Logs) AND REPAIRS ARE ATTACHED.

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE AND ITS JOINTS WERE INSPECTED AND TESTED FOR STRENGTH AND CONTINUITY, GEOTEXTILE SEAMS WERE INSPECTED FOR CONTINUITY]* AND PASSED ALL INSPECTIONS AND TESTS. WHERE FAILING TESTS OR DEFICIENCIES OCCURRED, THE AREA OF FAILURE WAS IDENTIFIED IN ACCORDANCE WITH THE APPROVED QUALITY CONTROL PROGRAM FOR THE PROJECT AND REPAIRED. THE AREAS OF FAILING TESTS, DEFICIENCIES AND THE SUBSEQUENT RETESTS OR TESTS TO DELINEATE THE LIMITS OF FAILURE ARE IDENTIFIED IN THE ATTACHED SEAM TESTS AND INSPECTION DATA.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL JOINTS - Daily Certification Per Test
(As Shop Drawings and as a Compiled Report at the end of Project)
(Circle Material Type)

TEST REPORT NO.: #02 DATE: February 15, 2010

FIELD LOG NO.: N/A (See Attached QA/QC Docs)

LIST OF ALL DEFICIENCIES AND SUBSEQUENT REPAIRS, COPIES OF ALL FIELD AND FACTORY TESTS AND INSPECTION DATA INCLUDING RECORDS OF ALL NON-DESTRUCTIVE TESTING (Field Logs) AND REPAIRS ARE ATTACHED.

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE AND ITS JOINTS WERE INSPECTED AND TESTED FOR STRENGTH AND CONTINUITY, GEOTEXTILE SEAMS WERE INSPECTED FOR CONTINUITY]* AND PASSED ALL INSPECTIONS AND TESTS. WHERE FAILING TESTS OR DEFICIENCIES OCCURRED, THE AREA OF FAILURE WAS IDENTIFIED IN ACCORDANCE WITH THE APPROVED QUALITY CONTROL PROGRAM FOR THE PROJECT AND REPAIRED. THE AREAS OF FAILING TESTS, DEFICIENCIES AND THE SUBSEQUENT RETESTS OR TESTS TO DELINEATE THE LIMITS OF FAILURE ARE IDENTIFIED IN THE ATTACHED SEAM TESTS AND INSPECTION DATA.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL JOINTS - Daily Certification Per Test
(As Shop Drawings and as a Compiled Report at the end of Project)
(Circle Material Type)

TEST REPORT NO.: #03 DATE: February 16, 2010

FIELD LOG NO.: N/A (See Attached QA/QC Docs)

LIST OF ALL DEFICIENCIES AND SUBSEQUENT REPAIRS, COPIES OF ALL FIELD AND FACTORY TESTS AND INSPECTION DATA INCLUDING RECORDS OF ALL NON-DESTRUCTIVE TESTING (Field Logs) AND REPAIRS ARE ATTACHED.

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE AND ITS JOINTS WERE INSPECTED AND TESTED FOR STRENGTH AND CONTINUITY, GEOTEXTILE SEAMS WERE INSPECTED FOR CONTINUITY]* AND PASSED ALL INSPECTIONS AND TESTS. WHERE FAILING TESTS OR DEFICIENCIES OCCURRED, THE AREA OF FAILURE WAS IDENTIFIED IN ACCORDANCE WITH THE APPROVED QUALITY CONTROL PROGRAM FOR THE PROJECT AND REPAIRED. THE AREAS OF FAILING TESTS, DEFICIENCIES AND THE SUBSEQUENT RETESTS OR TESTS TO DELINEATE THE LIMITS OF FAILURE ARE IDENTIFIED IN THE ATTACHED SEAM TESTS AND INSPECTION DATA.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF MATERIAL JOINTS - Daily Certification Per Test
(As Shop Drawings and as a Compiled Report at the end of Project)
(Circle Material Type)

TEST REPORT NO.: #04 DATE: February 17, 2010

FIELD LOG NO.: N/A (See Attached QA/QC Docs)

LIST OF ALL DEFICIENCIES AND SUBSEQUENT REPAIRS, COPIES OF ALL FIELD AND FACTORY TESTS AND INSPECTION DATA INCLUDING RECORDS OF ALL NON-DESTRUCTIVE TESTING (Field Logs) AND REPAIRS ARE ATTACHED.

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE AND ITS JOINTS WERE INSPECTED AND TESTED FOR STRENGTH AND CONTINUITY, GEOTEXTILE SEAMS WERE INSPECTED FOR CONTINUITY]* AND PASSED ALL INSPECTIONS AND TESTS. WHERE FAILING TESTS OR DEFICIENCIES OCCURRED, THE AREA OF FAILURE WAS IDENTIFIED IN ACCORDANCE WITH THE APPROVED QUALITY CONTROL PROGRAM FOR THE PROJECT AND REPAIRED. THE AREAS OF FAILING TESTS, DEFICIENCIES AND THE SUBSEQUENT RETESTS OR TESTS TO DELINEATE THE LIMITS OF FAILURE ARE IDENTIFIED IN THE ATTACHED SEAM TESTS AND INSPECTION DATA.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #01 DATE: February 10, 2010

COMPONENT BEING PLACED: Propex 1701 Cushion Geotextile

SUBSTRATE: Sand - Native

LOCATION: Below panels P1 thru P18

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #02 DATE: February 16, 2010

COMPONENT BEING PLACED: GSE NW16 Cushion Geotextile

SUBSTRATE: Sand - Native

LOCATION: Below panels P18 thru P21

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #03 DATE: February 16, 2010

COMPONENT BEING PLACED: GSE Fabrinet HF Geocomposite

SUBSTRATE: 60 mil HDPE Liner (Textured 2 sides)

LOCATION: Above panels P1 thru P13

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #04 DATE: February 17, 2010

COMPONENT BEING PLACED: GSE NW16 Cushion Geotextile

SUBSTRATE: Sand - Native

LOCATION: Below panels P22 thru P57

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #05 DATE: February 17, 2010

COMPONENT BEING PLACED: GSE Fabrinet HF Geocomposite

SUBSTRATE: 60 mil HDPE Liner (Textured 2 sides)

LOCATION: Above panels P14 thru P21

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #06 DATE: February 18, 2010

COMPONENT BEING PLACED: GSE Fabrinet HF Geocomposite

SUBSTRATE: 60 mil HDPE Liner (Textured 2 sides)

LOCATION: Above panels P22 thru P38

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF PLACEMENT OF ADJACENT LINER COMPONENTS –
Daily Certifications; Per Material and Location (Circle Material Type)

REPORT NO.: #07 DATE: February 19, 2010

COMPONENT BEING PLACED: GSE Fabrinet HF Geocomposite

SUBSTRATE: 60 mil HDPE Liner (Textured 2 sides)

LOCATION: Above panels P39 thru P57

WE THE UNDERSIGNED CERTIFY THAT THE [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] WAS CAREFULLY PLACED UNDER MY DIRECT SUPERVISION/OBSERVATION THIS DATE, AND WITHOUT KNOWINGLY DAMAGING ANY OF THE UNDERLYING OR ADJACENT SUBSTRATE.

Jeff Boys - ACF West Construction Co., Inc.
INSTALLER SIGNATURE

CONTRACTOR SIGNATURE

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE: February 10, 2010

MATERIAL DESCRIPTION: Propex 1701 Nonwoven Cushion Geotextile placed under liner panels P1 thru P18 Lot #1 (roll #'s on certs provided)
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FURNISHED FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT COMPLY WITH APPLICABLE SPECIAL PROVISIONS FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT CONSTRUCTION.

Propex, Inc.
MANUFACTURER NAME

Jeff Boys - ACF West, Inc.
MANUFACTURER SIGNATURE (Authorized Representative)

N/A
FABRICATOR NAME

FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE: February 10, 2010

MATERIAL DESCRIPTION: GSE 60 mil HDPE Liner (Tex. 2 sides) panels P1 thru P25

Lot # 1 Roll #'s ending in 0113, 0125, 0126, 0127, 0130
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FURNISHED FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT COMPLY WITH APPLICABLE SPECIAL PROVISIONS FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT CONSTRUCTION.

GSE Lining Technology, Inc.
MANUFACTURER NAME

Jeff Boys - ACF West, Inc.
MANUFACTURER SIGNATURE (Authorized Representative)

~~N/A~~
FABRICATOR NAME

FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE: February 12, 2010

MATERIAL DESCRIPTION: GSE 60 mil HDPE Liner (Tex. 2 sides) panels P25 thru P57

Lot # 2 Roll #'s ending in 0116, 0122, 0123, 0124, 0128, 0129
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FURNISHED FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT COMPLY WITH APPLICABLE SPECIAL PROVISIONS FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT CONSTRUCTION.

GSE Lining Technology, Inc.
MANUFACTURER NAME

Jeff Boys - ACF West, Inc.
MANUFACTURER SIGNATURE (Authorized Representative)

N/A
FABRICATOR NAME

FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE: February 15, 2010

MATERIAL DESCRIPTION: GSE NW16 Nonwoven Cushion Geotextile placed under liner panels P19 thru P57 Lot #3 (roll #'s on certs provided)
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FURNISHED FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT COMPLY WITH APPLICABLE SPECIAL PROVISIONS FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT CONSTRUCTION.

GSE Lining Technology, Inc.
MANUFACTURER NAME

Jeff Boys - ACF West, Inc.
MANUFACTURER SIGNATURE (Authorized Representative)

N/A
FABRICATOR NAME

FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

TERMINAL 5 UNIT TRAIN IMPROVEMENTS
PROJECT NO. xxxxxxx
FOR THE PORT OF VANCOUVER, WA

CERTIFICATION OF RAW AND FABRICATED MATERIAL
(To Accompany Each Shipment) (Circle Material Type)

DATE: February 15, 2010

MATERIAL DESCRIPTION: GSE Fabrinet HF (8 oz. 2 sides) Geocomposite placed over liner panels P1 thru P57 Lot #4 (roll #'s on certs provided)
(include lot and roll/panel numbers)

WE THE UNDERSIGNED CERTIFY THAT THE RAW MATERIAL AND FINISHED [*60-MIL HDPE GEOMEMBRANE, GEONET/GEOTEXTILE DRAINAGE COMPOSITE, GEOTEXTILES, CUSHION GEOTEXTILE, TRIAXIAL GEOGRID*] FURNISHED FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT COMPLY WITH APPLICABLE SPECIAL PROVISIONS FOR THE TERMINAL 5 UNIT TRAIN IMPROVEMENT PROJECT CONSTRUCTION.

GSE Lining Technology, Inc.
MANUFACTURER NAME

Jeff Boys - ACF West, Inc.
MANUFACTURER SIGNATURE (Authorized Representative)

N/A
FABRICATOR NAME

FABRICATOR SIGNATURE (Authorized Representative, if different from Manufacturer)

Installation Warranty

ACF WEST CONSTRUCTION COMPANY, INC.
8951 SE 76th Drive, Portland, OR 97206 503-771-5115 800-878-5115 Fax: 877-668-8730

ATTN: Hans
Rostchy, Inc.

GEOMEMBRANE LIMITED WARRANTY
60 mil HDPE

Final Inspection Acceptance Date:	**April 1, 2010**
Beneficiary:	**Port of Vancouver**
Project:	**Terminal 5 Unit Train Improvements, Project #3**
Intended Use:	**Contaminated Material Cap**
Installer:	**ACF West Construction Co., Inc.**

ACF West Construction Co., Inc. warrants each 60 mil HDPE liner installed by our company to be free from defects resulting from installation for a period of 2 year from date of final inspection acceptance.

ACF West Construction Co., Inc. warrants each 60 mil HDPE liner supplied by our manufacturer to be free from defects in material and workmanship or from failure due to aging or weathering for a period of 20 years from date of final inspection acceptance.

This limited warranty does not include damages or defects in the lining material resulting from Acts of God (catastrophic events such as earthquakes, tornadoes, hurricanes, etc.). The term "normal use" does not include exposure of the liner fabric to materials or chemicals for which it has not been specifically tested or abuse by machinery or other equipment.

Sincerely,

Jeff Boys
Vice President

PRODUCT WARRANTY

PRO RATA LIMITED MATERIAL WARRANTY
FOR GSE LINING TECHNOLOGY, LLC
(U.S.A.)

Date:	4/16/10	Warranty No.:	**61037**
Purchaser Name:	Port of Vancouver	Project No.:	61037
Address:	3103 NW Lower River Road	Effective Date:	2/19/10
City, State:	Vancouver, WA. 98660	Project Name:	Terminal 5 Cap
Product Type/Description:	**GSE Geomembrane Products**	Project Address:	Vancouver, WA.

GSE Lining Technology, LLC ("GSE") warrants each GSE product described above to be free from material manufacturing defects (as described by the contract's material specifications) and to be able to withstand normal weathering for a period of **twenty(20) years** from the date of sale. This limited warranty does not include damages or defects in the GSE product resulting from acts of God, casualty or catastrophe, including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" does not include, among other things, the exposure of GSE's product to harmful chemicals, abuse by machinery, equipment or people; improper site preparation or placement of cover materials; excessive pressures or stresses from any source. This warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson-Moss Warranty Act.

Should defects or premature loss of use within the scope of this warranty occur, GSE will, at its option, repair or replace the GSE product on a pro rata basis at the current price in such manner as to charge the Purchaser only for that portion of the warranted life which has elapsed since the purchase of the product. GSE shall have the right to inspect and determine the cause of the alleged defect in the product and to take appropriate steps to repair or replace the product if a defect exists that is covered under this warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail or courier, to GSE Lining Technology, LLC, 19103 Gundle Road, Houston, TX 77073, with the words "Warranty Claim" clearly marked on the face of the envelope, within ten (10) days of Purchaser becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have rights under this warranty. GSE shall not be obligated to perform any inspection or obligated to perform any repair or replacement under this warranty until the area is made available free from all obstructions, water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this warranty, Purchaser shall reimburse GSE for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the product as GSE determines to have violated the warranty provided herein. GSE shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to: damages for loss of production, lost profits, personal injury or property damage. GSE shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser to GSE's product, unless GSE specifically authorized, in writing, said repairs, replacements, modifications or alterations in advance. GSE liability under this warranty shall in no event exceed the replacement cost of the product sold to the Purchaser for the particular installation in which it failed.

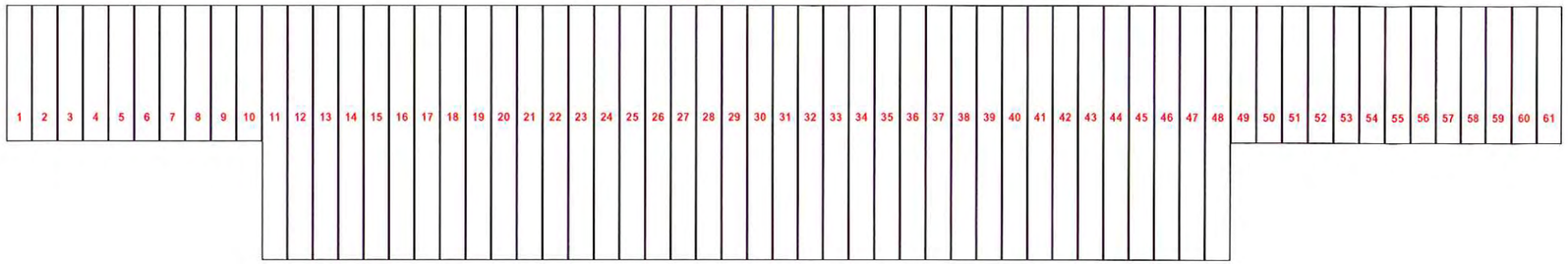
GSE neither assumes nor authorizes any person other than an officer of GSE to assume for it any other or additional liability in connection with the GSE product made on the basis of the Limited Warranty. **GSE MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN HEREIN AND HEREBY DISCLAIMS ALL WARRANTIES, INCLUDING BOTH EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, AND BY ACCEPTING DELIVERY OF THE PRODUCT, PURCHASER WAIVES ALL OTHER POSSIBLE WARRANTIES. GSE's WARRANTY BECOMES AN OBLIGATION OF GSE TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT.**

This warranty is extended to the Purchaser and is non-transferable and non-assignable, i.e. there are no third-party beneficiaries to this warranty.

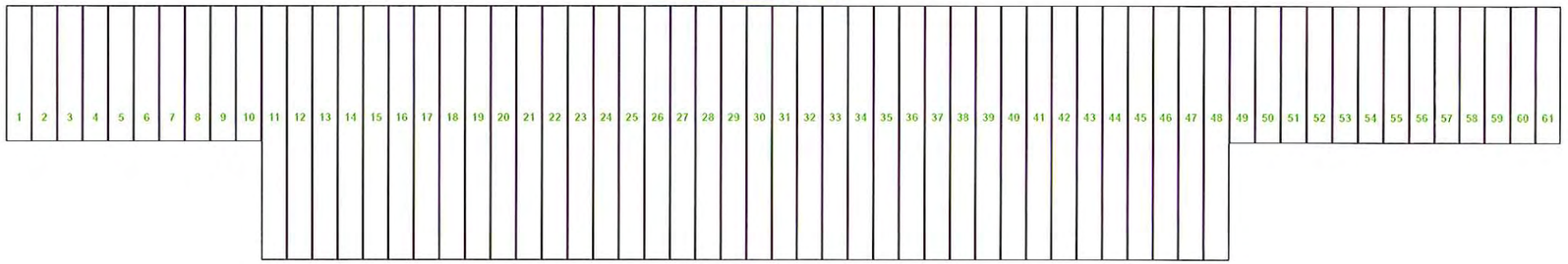
As-Built Drawing

ACF WEST CONSTRUCTION COMPANY, INC.

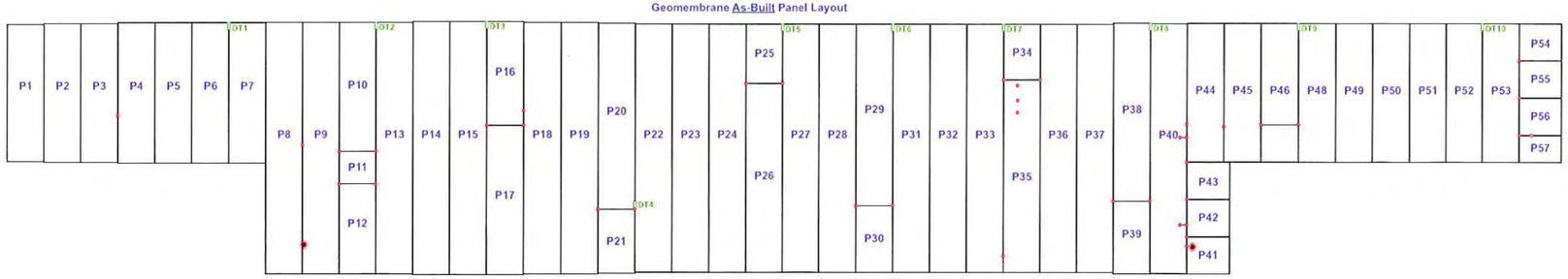
Geotextile As-Built Panel Layout



Geocomposite As-Built Panel Layout



Geomembrane As-Built Panel Layout



0 40' 80' 120'

Terminal 5 Unit Train Improvements, Project #3

Geomembrane As-Built Drawing Drawing #1

Installer: ACF West Construction, Co., Inc.
8951 SE 76th Drive
Portland, OR 97206

Date: March 5, 2010

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE 2/16/2009

Resubmittal ☐
Previous Submittal No

This section to be completed by COV:

Submittal No. 98

TO: CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144

This section to be completed by contractor:

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	24	1-84	Vanexco geomembrane sample #1 test results	H	N/A	N/A	1	

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert. of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 2-16-10

Contractor certifies compliance with Contract Documents.

By: Hans Schmeusser / TRI Enviromental

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☒
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR		SA	2/18/10
Reviewed by:			
Reviewed by: Const		SR	2/22/10
COV, Construction		SJMR	2/23/10
Returned to contractor			

Contractor ✓ Project File ____ Project Inspector ____ Materials Lab ____ Port of Vancouver ____ HDR Inc ____

Updated Jan 2009

TRI / Environmental, Inc.
A Texas Research International Company

February 16, 2010

Mail To:

Attn: Hans Schmeusser
Rotschy, Inc.
9210 N E 62nd Avenue
Vancouver, WA 98665

E-mail: hanss@rotschyinc com

Bill To:

<= Same
Project # : 9103

Dear Mr. Schmeusser:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs TRI is pleased to submit this final report for laboratory testing

Project:	**Terminal 5 Rail Loop**
TRI Job Reference Number	E2339-77-01
Material(s) Tested	1 Heat Fusion Weld Seam(s)
Test(s) Requested	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

TRI / Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-77-01

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN
	Sample ID:	GSE 60mil HDPE Liner		Panel: P7/P6				
	Weld:	Heat Fusion						
								Peel A
Side A	Peel Strength (ppi)		148	144	146	147	147	146
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10	
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE	
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB	
								Peel B
Side B	Peel Strength (ppi)		147	146	149	146	147	147
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10	
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE	
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB	
								Shear
	Shear Strength (ppi)		178	177	177	179	177	178
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50	

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

Rose, Gretchen

From: Hans Schmeusser [hanss@rotschyinc.com]
Sent: Tuesday, February 16, 2010 10:34 AM
To: Rose, Gretchen
Cc: 'Bennett Shoop'; 'Wineman, David K'
Subject: FW: Terminal 5 Rail Loop Seam Report

Attachments: 771-Rotschy-Terminal5-60HDSeam.pdf; Jennifer Tenney.vcf; Submittal form 2009.xls


771-Rotschy-Termi nal5-60HDSeam...


Jennifer Tenney.vcf (198 B)


Submittal form 2009.xls (79 KB...

Passing (per spec page F-84) geomembrane sample #1 test results attached; thanks!

Hans Schmeusser
Project Manager

O: 360.334.3128
F: 360. 334.3101
C: 360.608.5056

-----Original Message-----
From: Jennifer Tenney [mailto:JTenney@tri-env.com]
Sent: Tuesday, February 16, 2010 10:24 AM
To: hanss@rotschyinc.com
Subject: Terminal 5 Rail Loop Seam Report

Attached are your seam results.

Thanks
Jen

Jennifer Tenney
Project Manager
TRI Environmental Inc.
9063 Bee Caves Rd
Austin, TX 78733
ph: 800-880-8378
fax: 512-263-2558
email: jtenney@tri-env.com
www.geosynthetictesting.com

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE: 2/17/2009

Resubmittal ☐
Previous Submittal No.

This section to be completed by COV:
Submittal No. 100

TO: CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144

This section to be completed by contractor

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	Vaneco	F-84	Vanexco liner sample #2 and 3 test results – 60 mil HDPE	H	N/A	N/A	1	

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert. of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 2/17/2010

Contractor certifies compliance with Contract Documents

By: Hans Schmeusser / TRI Enviromental

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☒
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR		SB	2/24/10
Reviewed by:			
Reviewed by: Concl		SR	2/24/10
COV, Construction		SMR	2/25/10
Returned to contractor			

Contractor ✓ Project File _____ Project Inspector _____ Materials Lab _____ Port of Vancouver _____ HDR Inc _____

Updated Jan 2009

TRI / Environmental, Inc.
A Texas Research International Company

February 17, 2010

Mail To:

Attn: Hans Schmeusser
Rotschy, Inc.
9210 N E 62nd Avenue
Vancouver, WA 98665

E-mail hanss@rotschyinc.com

Bill To:

<= Same
Project # : 9103

Dear Mr Schmeusser

Thank you for consulting TRI/Environmental, Inc (TRI) for your geosynthetics testing needs
TRI is pleased to submit this final report for laboratory testing

Project	**Terminal 5 Rail Loop**
TRI Job Reference Number	E2339-78-09
Material(s) Tested	2 Heat Fusion Weld Seam(s)
Test(s) Requested	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at
1-800-880-8378

Sincerely,

Jennifer Tennay
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin TX 78733 / 512 263 2101 / fax 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-78-09

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJ. SPEC.
	Sample ID:	DT-2		Panel:					
	Weld:	Heat Fusion		P13/P10					
Side A	Peel Strength (ppi)		140	136	148	150	150	Peel A 145	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
Side B	Peel Strength (ppi)		139	128	156	140	140	Peel B 141	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
	Shear Strength (ppi)		174	171	173	175	172	Shear 173	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		
	Sample ID:	DT-3		Panel:					
	Weld:	Heat Fusion		P16P/15					
Side A	Peel Strength (ppi)		146	147	147	146	159	Peel A 149	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
Side B	Peel Strength (ppi)		134	140	137	133	141	Peel B 137	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
	Shear Strength (ppi)		167	166	167	167	168	Shear 167	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		

GeosyntheticTesting.com
9063 Bee Caves Road / Austin TX 78733 / 512 263 2101 / fax 512 263 2558

Rose, Gretchen

From: Hans Schmeusser [hanss@rotschyinc.com]
Sent: Wednesday, February 17, 2010 11:38 AM
To: 'Bennett Shoop'; Lee, Steve; Rose, Gretchen; 'Wineman, David K'
Subject: FW: Terminal 5 Seam Report

Attachments: 789-Rotschy-Terminal5-60HDSeam.pdf; Jennifer Tenney.vcf; Submittal form 2009.xls

789-Rotschy-Terminal5-60HDSeam... Jennifer Tenney.vcf (198 B) Submittal form 2009.xls (79 KB...

Passing liner samples (taken yesterday) test results attached. Thanks!

Hans Schmeusser
Project Manager

O: 360.334.3128
F: 360. 334.3101
C: 360.608.5056

-----Original Message-----
From: Jennifer Tenney [mailto:JTenney@tri-env.com]
Sent: Wednesday, February 17, 2010 11:27 AM
To: hanss@rotschyinc.com
Subject: Terminal 5 Seam Report

Attached are your seam results.

Thanks
Jen

Jennifer Tenney
Project Manager
TRI Environmental Inc.
9063 Bee Caves Rd
Austin, TX 78733
ph: 800-880-8378
fax: 512-263-2558
email: jtenney@tri-env.com
www.geosynthetictesting.com

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rolschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE 2/18/2009

Resubmittal ☐
Previous Submittal No

This section to be completed by COV:

Submittal No. 101

TO CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144
This section to be completed by contractor

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	Vaneco	F-84	Vanexco liner sample #4 and 5 test results	H	N/A	N/A		

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert. of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 2/18/2010

Contractor certifies compliance with Contract Documents.

By Hans Schmeusser / TRI Enviromental

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☐
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR		SA	2/22/10
Reviewed by:			
Reviewed by: Consi		SL	2/22/10
COV, Construction		JMR	2/23/10
Returned to contractor			

Contractor ✓ Project File ____ Project Inspector ____ Materials Lab ____ Port of Vancouver ____ HDR Inc ____

Updated Jan 2009

TRI / Environmental, Inc.
A Texas Research International Company

February 18, 2010

Mail To:

Attn: Hans Schmeusser
Rotschy, Inc.
9210 N E 62nd Avenue
Vancouver, WA 98665

E-mail hanss@rotschyinc com
cc e-mail david wineman@hdrinc com

Bill To:

<= Same
Project # : 9103

Dear Mr Schmeusser

Thank you for consulting TRI/Environmental, Inc (TRI) for your geosynthetics testing needs
TRI is pleased to submit this final report for laboratory testing

Project	**Terminal 5 Rail Loop**
TRI Job Reference Number	E2339-80-08
Material(s) Tested	2 Heat Fusion Weld Seam(s)
Test(s) Requested	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at
1-800-880-8378

Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
www GeosyntheticTesting com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin TX 78733 / 512 263 2101 / fax 512 263 2558

TRI / Environmental, Inc.
A Texas Research International Company

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-80-08

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJ. SPEC.
	Sample ID:	DT-4		Panel:					
	Weld:	Heat Fusion		P22/P20					
								Peel A	
Side A	Peel Strength (ppi)		156	151	151	160	146	153	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Peel B	
Side B	Peel Strength (ppi)		145	108	152	120	155	136	91 min
Side B	Peel Incursion (%)		<10	50	<10	50	<10		
Side B	Peel Locus of Failure Code		SE	AD-BRK	SE	AD-BRK	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Shear	
	Shear Strength (ppi)		187	188	186	188	188	187	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		
	Sample ID:	DT-5		Panel:					
	Weld:	Heat Fusion		P27/P25					
								Peel A	
Side A	Peel Strength (ppi)		154	153	151	153	153	153	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Peel B	
Side B	Peel Strength (ppi)		147	148	152	149	152	150	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Shear	
	Shear Strength (ppi)		188	190	187	186	187	188	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

Rose, Gretchen

From: Hans Schmeusser [hanss@rotschyinc.com]
Sent: Thursday, February 18, 2010 2:09 PM
To: Rose, Gretchen
Subject: FW: Terminal 5 Rail Loop Seam Report

Attachments: 808-Rotschy-Terminal5-60HDSeam.pdf, Jennifer Tenney.vcf; Submittal form 2009.xls


808-Rotschy-Termi nal5-60HDSeam...


Jennifer Tenney.vcf (198 B)


Submittal form 2009.xls (79 KB...

Hans Schmeusser
Project Manager

O: 360.334.3128
F: 360. 334.3101
C: 360.608.5056

-----Original Message-----
From: Jennifer Tenney [mailto:JTenney@tri-env.com]
Sent: Thursday, February 18, 2010 9:52 AM
To: hanss@rotschyinc.com
Cc: david.wineman@hdrinc.com
Subject: Terminal 5 Rail Loop Seam Report

Attached are your seam results.

Thanks
Jen

Jennifer Tenney
Project Manager
TRI Environmental Inc.
9063 Bee Caves Rd
Austin, TX 78733
ph: 800-880-8378
fax: 512-263-2558
email: jtenney@tri-env.com
www.geosynthetictesting.com

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE 2/19/2009

Resubmittal ☐
Previous Submittal No.

This section to be completed by COV:

Submittal No. **104**

TO: CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144
This section to be completed by contractor

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	Vanexco	F-84	Sample # 6, 7, 8 - 60 mil HDPE	H	N/A	N/A	1	

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 2/19/2010

Contractor certifies compliance with Contract Documents.

By Hans Schmeusser / TRI

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☒
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR		SA	2/23/10
Reviewed by:			
Reviewed by: Corps		[illegible]	2/24/10
COV, Construction		GMR	2/25/10
Returned to contractor			

Contractor ✓ Project File ____ Project Inspector ____ Materials Lab ____ Port of Vancouver ____ HDR Inc ____

TRI / Environmental, Inc.
A Texas Research International Company

February 19, 2010

Mail To:

Attn: Hans Schmeusser
Rotschy, Inc.
9210 N.E. 62nd Avenue
Vancouver, WA 98665

E-mail: hanss@rotschyinc.com
cc e-mail: david.wineman@hdrinc.com

Bill To:

<= Same
Project # : 9103

Dear Mr. Schmeusser:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleesed to submit this final report for laboratory testing.

Project:	**Terminal 5 Rail Loop**
TRI Job Reference Number:	E2339-82-06
Material(s) Tested:	3 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Melissa Hunter

Melissa Hunter
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-82-06

	PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJ. SPEC.
Sample ID:	**DT-6**		**Panel:**					
Weld:	**Heat Fusion**		**P22/P20**					
Side A	Peel Strength (ppi)	157	147	157	150	149	Peel A 152	91 min
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side B	Peel Strength (ppi)	146	144	144	147	150	Peel B 146	91 min
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
	Shear Strength (ppi)	176	175	176	178	179	Shear 177	120 min
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		
Sample ID:	**DT-7**		**Panel:**					
Weld:	**Heat Fusion**		**P27/P25**					
Side A	Peel Strength (ppi)	151	154	152	150	151	Peel A 152	91 min
Side A	Peel Incursion (%)	<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code	SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
Side B	Peel Strength (ppi)	149	150	146	150	152	Peel B 149	91 min
Side B	Peel Incursion (%)	<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code	SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB		
	Shear Strength (ppi)	182	180	181	183	183	Shear 182	120 min
	Shear Elongation @ Break (%)	>50	>50	>50	>50	>50		

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-82-06

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJ. SPEC.
Sample ID:		DT-8		Panel:					
Weld:		Heat Fusion		P22/P20					
								Peel A	
Side A	Peel Strength (ppi)		151	149	148	150	154	150	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Peel B	
Side B	Peel Strength (ppi)		150	143	146	147	147	147	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Shear	
	Shear Strength (ppi)		185	184	185	185	184	185	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

Rose, Gretchen

From: Hans Schmeusser [hanss@rotschyinc.com]
Sent: Friday, February 19, 2010 11:33 AM
To: Rose, Gretchen; 'Wineman, David K'; bennettshoop@yahoo.com
Subject: FW: Terminal 5 Rail Loop seam results

Attachments: 826-Rotschy-Terminal5-60HDSeam.pdf; Melissa Hunter.vcf; Submittal form 2009.xls


826-Rotschy-Termi nal5-60HDSeam...


Melissa Hunter.vcf (268 B)


Submittal form 2009.xls (79 KB...

Liner sample #6, 7 & 8 test results; thanks!

Hans Schmeusser
Project Manager

O: 360.334.3128
F: 360. 334.3101
C: 360.608.5056

-----Original Message-----
From: Melissa Hunter [mailto:MHunter@tri-env.com]
Sent: Friday, February 19, 2010 11:25 AM
To: hanss@rotschyinc.com
Subject: Terminal 5 Rail Loop seam results

Melissa C. Hunter
Project Manager
TRI/Environmental, Inc.
9063 Bee Caves Rd.
Austin, TX 78733
ph: 800-880-8378 ext. 140
fax: 512-263-2558
e-mail: mhunter@tri-env.com
www.geosynthetictesting.com

SUBMITTAL TRANSMITTAL / SOURCE APPROVAL

Port of Vancouver USA

FROM: Rotschy, Inc
9210 NE 62nd Ave
Vancouver, Washington 98665

DATE 2/22/2009

Resubmittal ☐
Previous Submittal No

This section to be completed by COV:

Submittal No **105**

TO: CONSTRUCTION MANAGER
3103 NW Lower River Road
Vancouver, Washington 98660

PROJECT: Terminal 5 Unit Train Improvements
CP0144

This section to be completed by contractor:

Bid Item Number(s)	Drawing Sheet No.	Specification	Description - Manufacturer's Specific Product*	Type** Code	Local Supplier	Manufacturer / Brand / WSDOT Pit #	Review Action	Notes
77	Vanexco	F-84	Sample # 9 & 10 -- 60 mil HDPE	H	N/A	N/A	1	

Contractor shall submit 6 copies of each attachment, and shall write bid item number(s)) on each attached page.

* one component per line

** Type Codes: A - Source approval only; B - Catalog Cut/Data Sheet; C - Mix Design; D - QPL; E - Cert. of Compliance; F - Sample; G - Shop Drawings; H - Other

Received: 2/22/2010

Contractor certifies compliance with Contract Documents.

By: Hans Schmeusser / TRI

COV Review Comments:

Legend: Review Action

1 No exceptions taken ☐
2 Note markings ☐
3 Comments attached-Resubmit ☐
4 Rejected ☐
5 Submit WSDOT Pit # ☐

Distribution	Review Target Date	Initial	Date
Reviewed by: HDR		SA	2/24/10
Reviewed by:			
Reviewed by: Lench		GA	2/24/10
COV, Construction		SMM	2/25/10
Returned to contractor			

Contractor ✓ Project File ____ Project Inspector ____ Materials Lab ____ Port of Vancouver ____ HDR Inc ____

TRI / Environmental, Inc.
A Texas Research International Company

February 22, 2010

Mail To:

Attn: Hans Schmeusser
Rotschy, Inc.
9210 N.E. 62nd Avenue
Vancouver, WA 98665

E-mail: hanss@rotschyinc.com
cc e-mail: david wineman@hdrinc.com

Bill To:

<= Same
Project # : 9103

Dear Mr. Schmeusser:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Terminal 5 Rail Loop**
TRI Job Reference Number:	E2339-83-03
Material(s) Tested:	2 Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)

Codes	
AD	Adhesion failure (100% Peel)
BRK	Break in sheeting away from Seam edge
SE	Break in sheeting at edge of seam
AD-BRK	Break in sheeting after some adhesion failure - partial peel
SIP	Separation in the plane of the sheet (leaving the bond intact)
FTB	Film tearing bond (all non "AD" failures)
NON-FTB	100% peel

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS

TRI Client: Rotschy, Inc.
Project: Terminal 5 Rail Loop

Material: 60 mil HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54)
TRI Log #: E2339-83-03

	PARAMETER		TEST REPLICATE NUMBER 1	2	3	4	5	MEAN	PROJ. SPEC.
Sample ID:		DT-9		Panel:					
Weld:		Heat Fusion		P46/P48					
								Peel A	
Side A	Peel Strength (ppi)		149	150	149	152	152	150	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Peel B	
Side B	Peel Strength (ppi)		144	140	144	140	148	143	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Shear	
	Shear Strength (ppi)		177	175	178	178	175	177	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		
Sample ID:		DT-10		Panel:					
Weld:		Heat Fusion		P53/P52					
								Peel A	
Side A	Peel Strength (ppi)		147	147	147	157	144	148	91 min
Side A	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side A	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side A	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Peel B	
Side B	Peel Strength (ppi)		146	141	145	143	146	144	91 min
Side B	Peel Incursion (%)		<10	<10	<10	<10	<10		
Side B	Peel Locus of Failure Code		SE	SE	SE	SE	SE		
Side B	Peel NSF Failure Code		FTB	FTB	FTB	FTB	FTB		
								Shear	
	Shear Strength (ppi)		173	172	169	174	171	172	120 min
	Shear Elongation @ Break (%)		>50	>50	>50	>50	>50		

GeosyntheticTesting.com
9063 Bee Caves Road / Austin, TX 78733 / 512 263 2101 / fax 512 263 2558

Rose, Gretchen

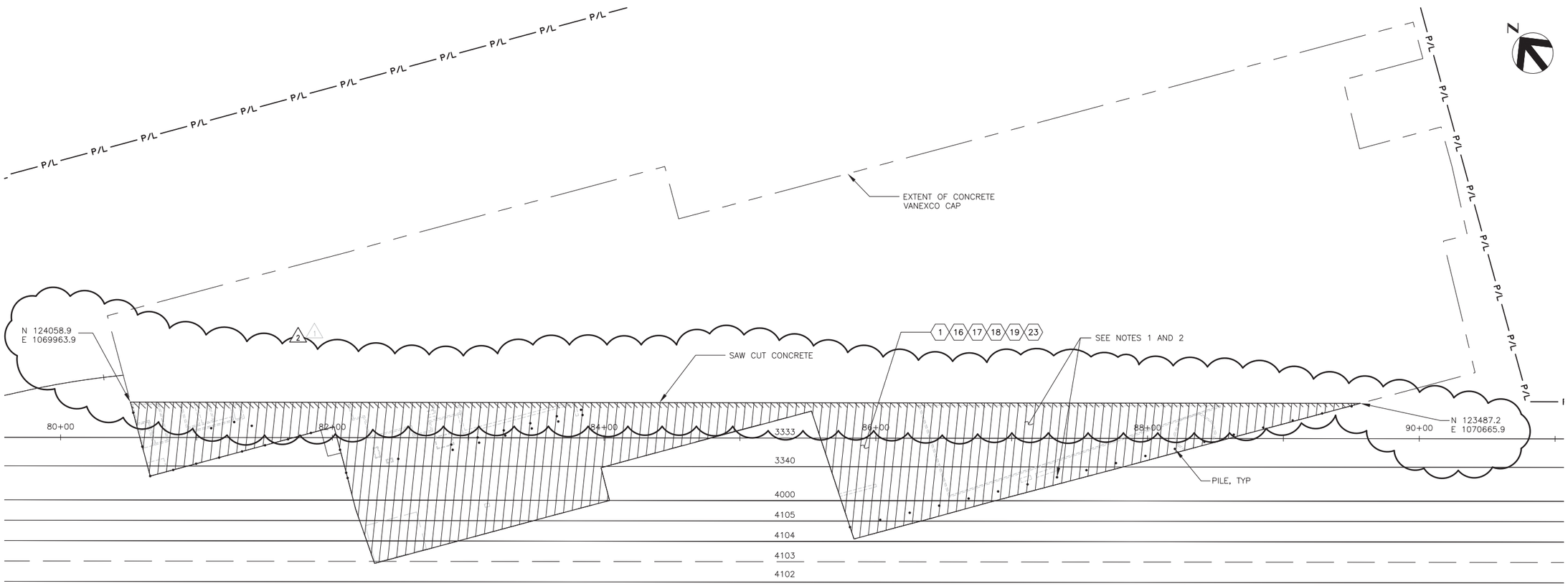
From: Hans Schmeusser [hanss@rotschyinc.com]
Sent: Monday, February 22, 2010 9:34 AM
To: 'Wineman, David K'; bennettshoop@yahoo.com; Rose, Gretchen
Subject: FW: Terminal 5 Rail Loop
Attachments: 833-Rotschy-Terminal5-60HDSeam.pdf; Jennifer Tenney.vcf; Submittal form 2009.xls

APPENDIX C

As-Built Drawings

KEY NOTES:

1. REMOVING CEMENT CONC. PAVEMENT
16. TSCA WASTE CONCRETE REMOVAL AND MANAGEMENT
17. INDUSTRIAL WASTE CONCRETE REMOVAL AND MANAGEMENT
18. TSCA WASTE SOILS REMOVAL AND MANAGEMENT
19. INDUSTRIAL WASTE SOILS REMOVAL AND MANAGEMENT
23. ROADWAY EXCAVATION INCL. HAUL



VANEXCO CAP REMOVAL PLAN

0 40' 80'

NOTES:

1. APPROXIMATE THICKNESS OF EXISTING VANEXCO CAP VARIES FROM 4 TO 8 INCHES BUT INCLUDES PILES AND FOOTINGS OF GREATER THICKNESS. CONTRACTOR TO REMOVE CONCRETE TO DEPTH REQUIRED FOR PROPER INSTALLATION OF HDPE GEOMEMBRANE.
2. POTENTIAL HAZARDOUS WASTE MATERIALS SHALL BE HANDLED IN ACCORDANCE WITH THE SPECIFICATIONS.

DCN #3

Jun 04, 2010 – 9:42am

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KEITH W. RAY CHUBEY
STATE OF WASHINGTON
35550
REGISTERED
PROFESSIONAL ENGINEER
DATE

HDR Engineering, Inc.

A/E PROJECT NUMBER: 131272

DRAWING SCALE: AS SHOWN
DRAWN BY: SJF
APPROVED BY: KWR
DATE: 08/18/2009

REVISION NO. DATE.
1 10/09/2009
2 12/02/2009

WEST VANCOUVER FREIGHT ACCESS PROJECT

Terminal 5 Unit Train Improvements

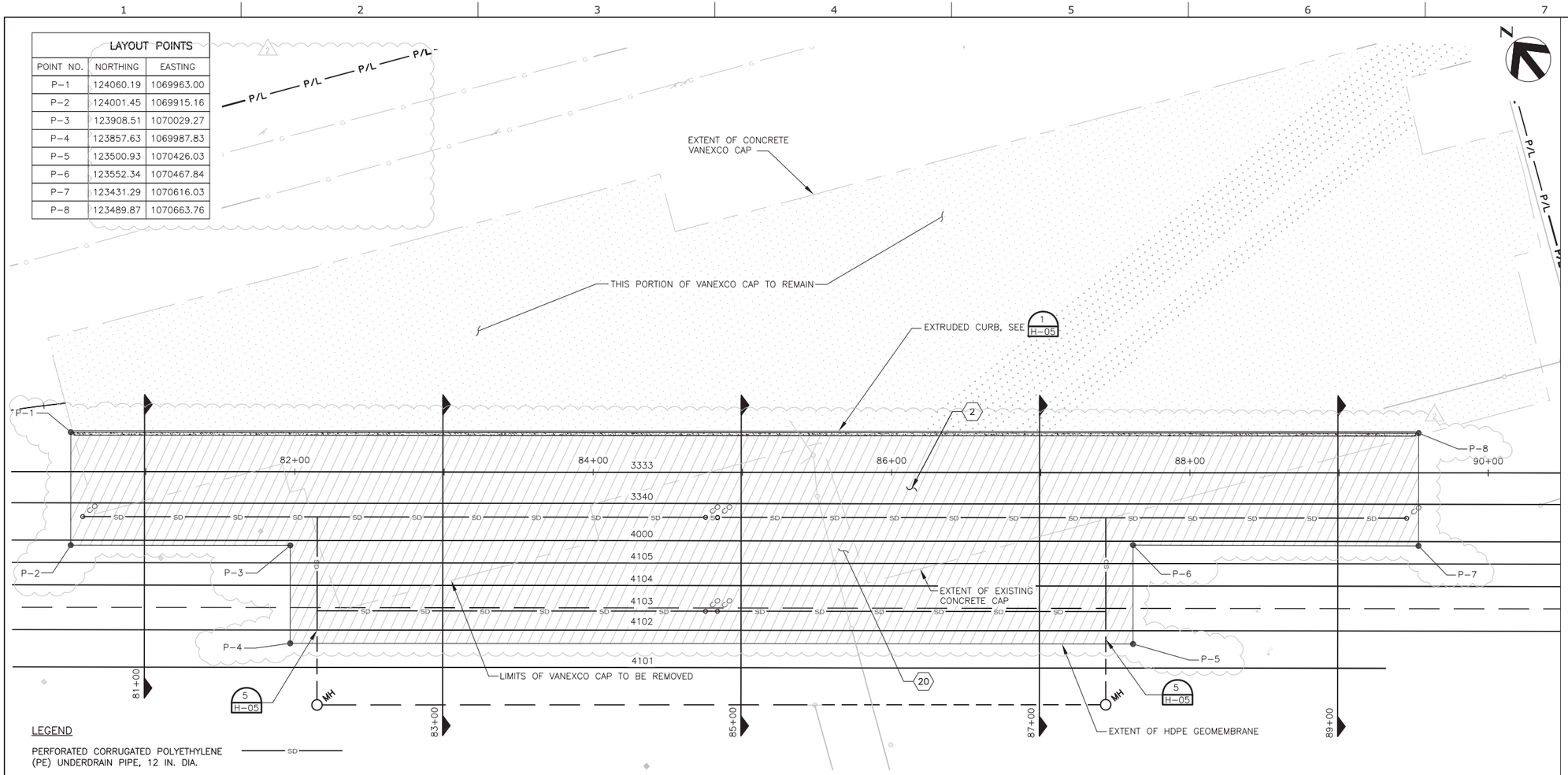
Port of Vancouver USA
3103 N.W. LOWER RIVER ROAD
VANCOUVER, WA 98660-1027
(360) 693-3611 FAX (360) 735-1565

SHEET CONTENTS
Vanexco Cap - **Removal Plan & Section**

DRAWING NUMBER
H-01
SHEET NUMBER 23 OF 151

POV PROJECT NO:
CP0144

LAYOUT POINTS		
POINT NO.	NORTHING	EASTING
P–1	124060.19	1069963.00
P–2	124001.45	1069915.16
P–3	123908.51	1070029.27
P–4	123857.63	1069987.83
P–5	123500.93	1070426.03
P–6	123552.34	1070467.84
P–7	123431.29	1070616.03
P–8	123489.87	1070663.76



LEGEND

PERFORATED CORRUGATED POLYETHYLENE (PE) UNDERDRAIN PIPE, 12 IN. DIA. — SD —

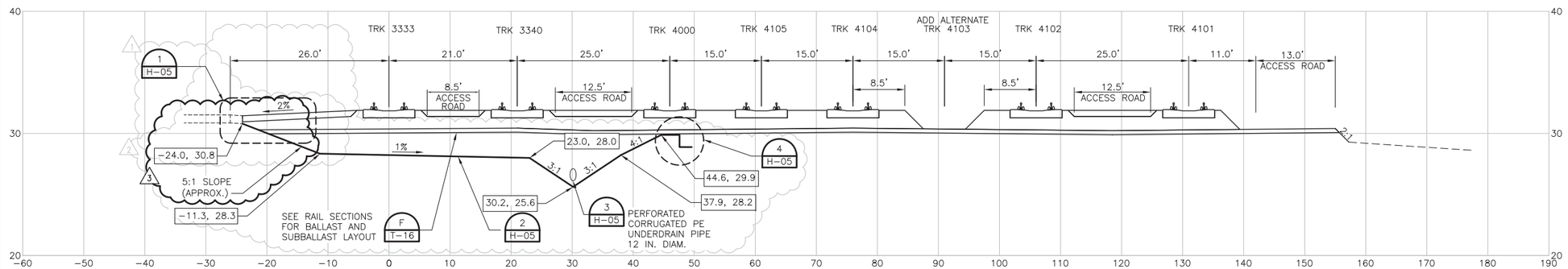
DUCTILE IRON SEWER PIPE 15 IN. DIA. — — —

DUCTILE IRON SEWER PIPE 12 IN. DIA. — — —

EXTENT OF 60–MIL HDPE GEOMEMBRANE

VANEXCO CAP PLAN

0 40' 80'



LEGEND

FIRST NUMBER INDICATES OFFSET FROM TRACK 3333 CENTERLINE (NEGATIVE NUMBER INDICATES LEFT OFFSET, POSITIVE NUMBER INDICATES RIGHT OFFSET). SECOND NUMBER INDICATES LINER ELEVATION.

XX.X, XX.X

VANEXCO CAP SECTION, TRACK 3333 STA: 81+00

SCALE: 1" = 10'–0" HORIZ
1" = 5'–0" VERT

DCN #9

KEY NOTES:

2 60–MIL HDPE GEOMEMBRANE

20 SUBBALLAST FILL BELOW TRACK SECTION

NOTES:

1. SEE SHEET SW–01 FOR STORMWATER INFORMATION.
2. CROSS SECTION STATIONING REFERENCES TRACK 3333.

ALLEN W. REYCRAFT STATE OF WASHINGTON 35550 REGISTERED PROFESSIONAL ENGINEER

DATE

HDR HDR Engineering, Inc.

A/E PROJECT NUMBER: 131272

DRAWING SCALE: AS SHOWN

DRAWN BY: SJF

APPROVED BY: KWR

DATE: 08/18/2009

REVISION NO.	DATE.
1	10/09/2009
2	12/02/2009
3	02/02/2010

WEST VANCOUVER FREIGHT ACCESS PROJECT

Terminal 5 Unit Train Improvements

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SHEET CONTENTS
Vanexco Cap - Plan & Sections I

DRAWING NUMBER
H-02
SHEET NUMBER 24 OF 151

POV PROJECT NO: CP0144

Jun 04, 2010 – 9:43am

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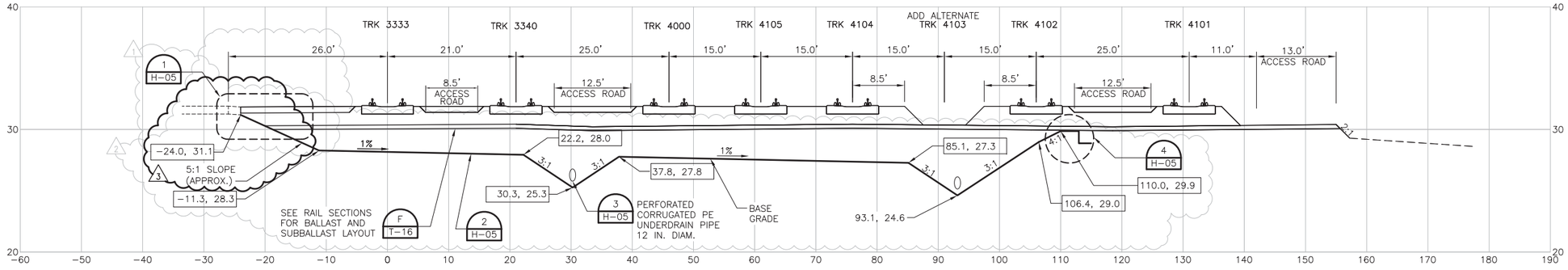
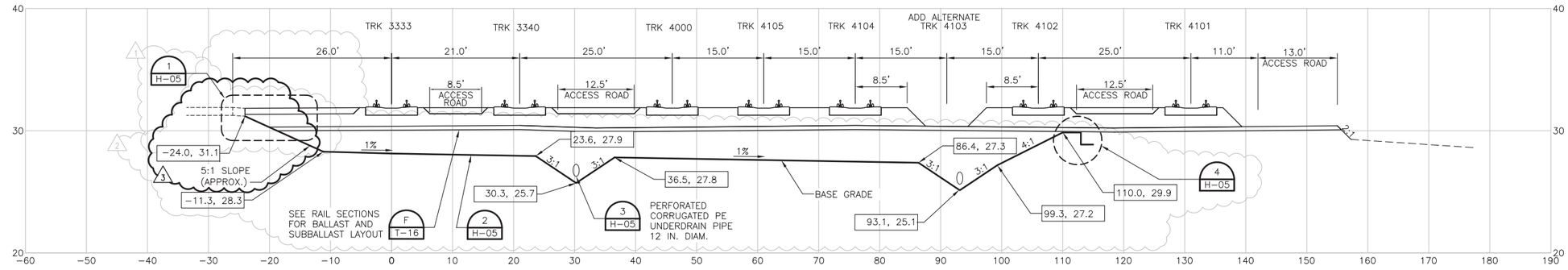


VANEXCO CAP SECTION, TRACK 3333 STA: 83+00

SCALE: 1" = 10'-0" HORIZ
1" = 5'-0" VERT

NOTES:

1. SEE SHEET SW-01 FOR STORMWATER INFORMATION.



VANEXCO CAP SECTION, TRACK 3333 STA: 85+00

SCALE: 1" = 10'-0" HORIZ
1" = 5'-0" VERT

LEGEND

FIRST NUMBER INDICATES OFFSET FROM TRACK 3333 CENTERLINE (NEGATIVE NUMBER INDICATES LEFT OFFSET, POSITIVE NUMBER INDICATES RIGHT OFFSET). SECOND NUMBER INDICATES LINER ELEVATION.

XX.X, XX.X

DCN #9

Jun 04, 2010 - 9:43am

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ALLEN W. REYCRAFT
STATE OF WASHINGTON
35550
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PROFESSIONAL ENGINEER
DATE

HDR Engineering, Inc.

A/E PROJECT NUMBER: 131272

DRAWING SCALE: AS SHOWN
DRAWN BY: SJF
APPROVED BY: KWR
DATE: 08/18/2009

REVISION NO.	DATE.
1	10/09/2009
2	12/02/2009
3	02/02/2010

WEST VANCOUVER FREIGHT ACCESS PROJECT

Terminal 5 Unit Train Improvements

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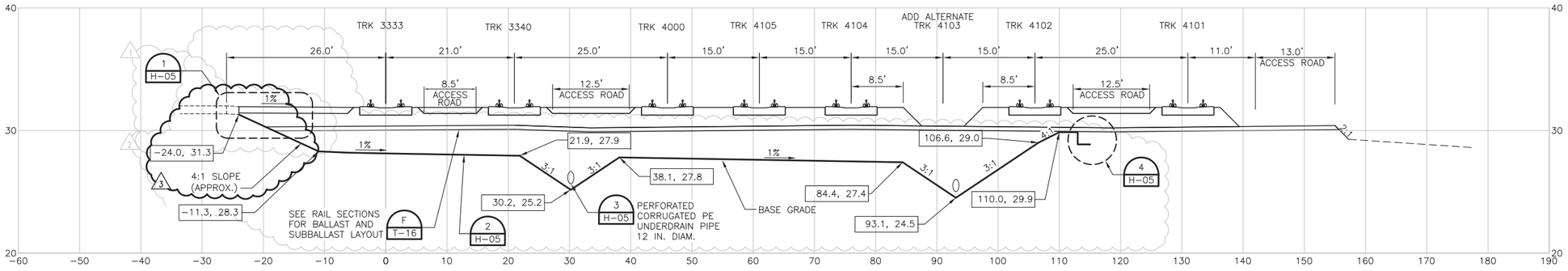
SHEET CONTENTS
Vanexco Cap - Sections II

DRAWING NUMBER
H-03
SHEET NUMBER 25 OF 151

POV PROJECT NO:
CP0144

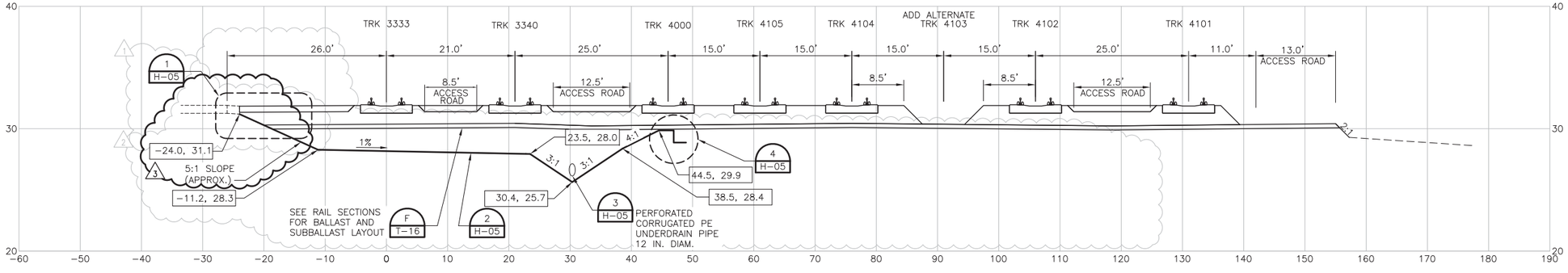


VANEXCO CAP SECTION, TRACK 3333 STA: 87+00

SCALE: 1" = 10'−0" HORIZ
1" = 5'−0" VERT

NOTES:

1. SEE SHEET SW−01 FOR STORMWATER INFORMATION.



VANEXCO CAP SECTION, TRACK 3333 STA: 89+00

SCALE: 1" = 10'−0" HORIZ
1" = 5'−0" VERT

LEGEND

FIRST NUMBER INDICATES OFFSET FROM TRACK 3333 CENTERLINE (NEGATIVE NUMBER INDICATES LEFT OFFSET, POSITIVE NUMBER INDICATES RIGHT OFFSET). SECOND NUMBER INDICATES LINER ELEVATION.

XX.X, XX.X

DCN #9

Jun 04, 2010 − 9:43am

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KEITH W. REYCRAFT
STATE OF WASHINGTON
35550
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PROFESSIONAL ENGINEER
DATE

HDR Engineering, Inc.
A/E PROJECT NUMBER: 131272

DRAWING SCALE: AS SHOWN
DRAWN BY: SJF
APPROVED BY: KWR
DATE: 08/18/2009

REVISION NO. DATE.

NO.	DATE.
1	10/09/2009
2	12/02/2009
3	02/02/2010

WEST VANCOUVER FREIGHT ACCESS PROJECT

Terminal 5 Unit Train Improvements

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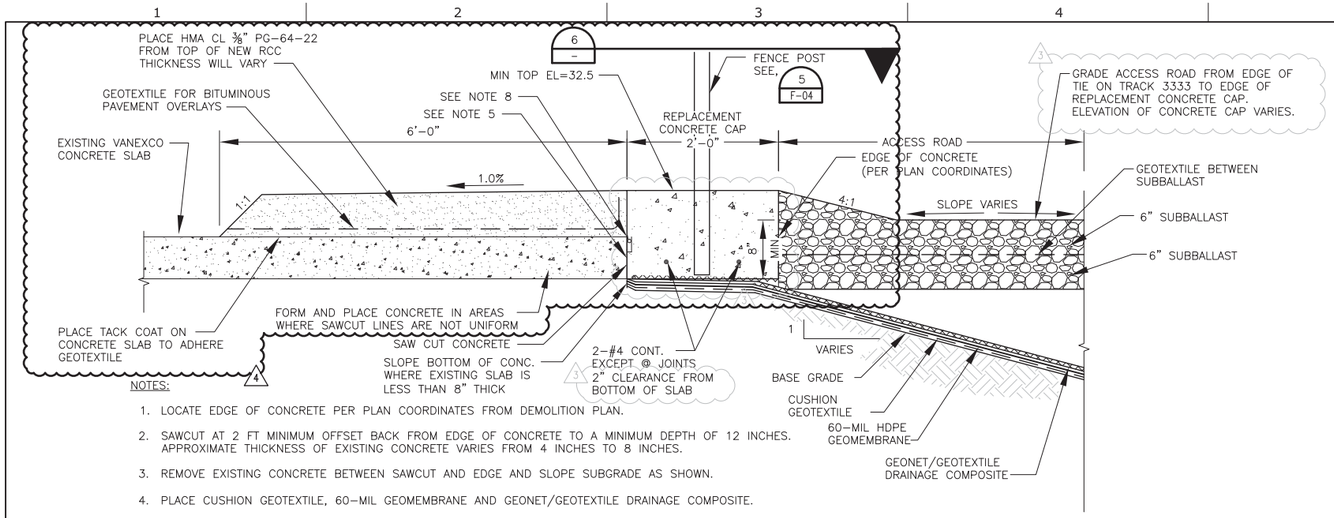
SHEET CONTENTS
Vanexco Cap - Sections III

DRAWING NUMBER
H-04
SHEET NUMBER 26 OF 151

POV PROJECT NO: CP0144

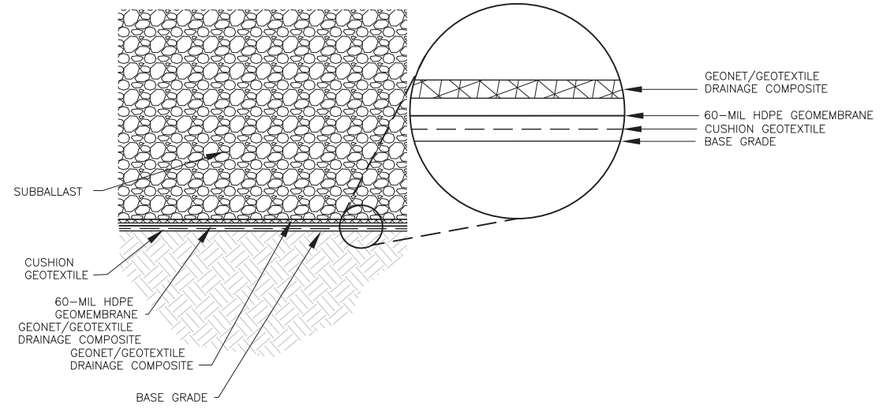


NOTES:

1. LOCATE EDGE OF CONCRETE PER PLAN COORDINATES FROM DEMOLITION PLAN.
2. SAWCUT AT 2 FT MINIMUM OFFSET BACK FROM EDGE OF CONCRETE TO A MINIMUM DEPTH OF 12 INCHES. APPROXIMATE THICKNESS OF EXISTING CONCRETE VARIES FROM 4 INCHES TO 8 INCHES.
3. REMOVE EXISTING CONCRETE BETWEEN SAWCUT AND EDGE AND SLOPE SUBGRADE AS SHOWN.
4. PLACE CUSHION GEOTEXTILE, 60-MIL GEOMEMBRANE AND GEONET/GEOTEXTILE DRAINAGE COMPOSITE.
5. COAT CONSTRUCTION JOINT WITH BONDING AGENT PRIOR TO POURING SLAB. (USE ASTM C1059 TYPE II BONDING AGENT)
7. SEE DETAIL 6 FOR PLAN VIEW OF CONTROL AND EXPANSION JOINTS.
8. EXISTING VANEXCO CAP VARIES IN THICKNESS. PRELEVEL WITH NEW HMA BEFORE PLACING FINAL LIFT.

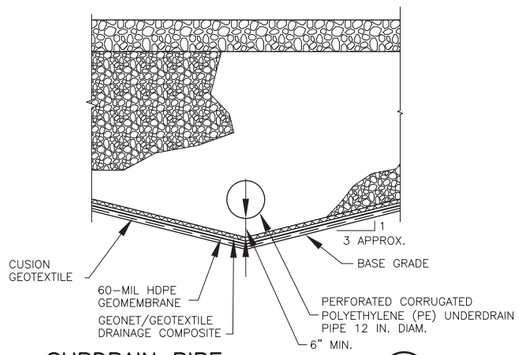
CAP CONNECTION DETAIL 1

NTS



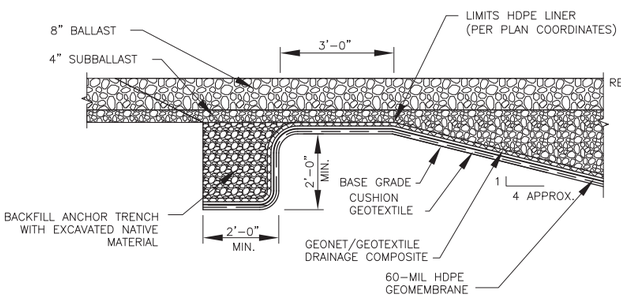
TYPICAL MEMBRANE DETAIL 2

NTS



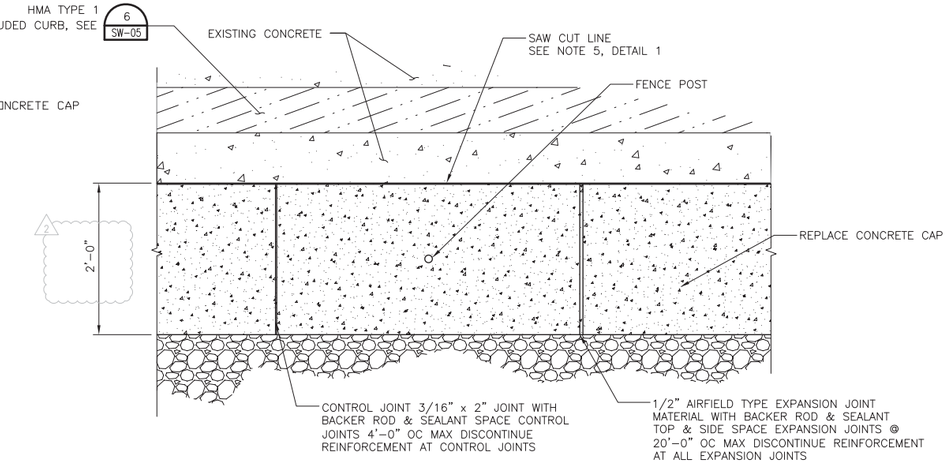
SUBDRAIN PIPE 3

NTS



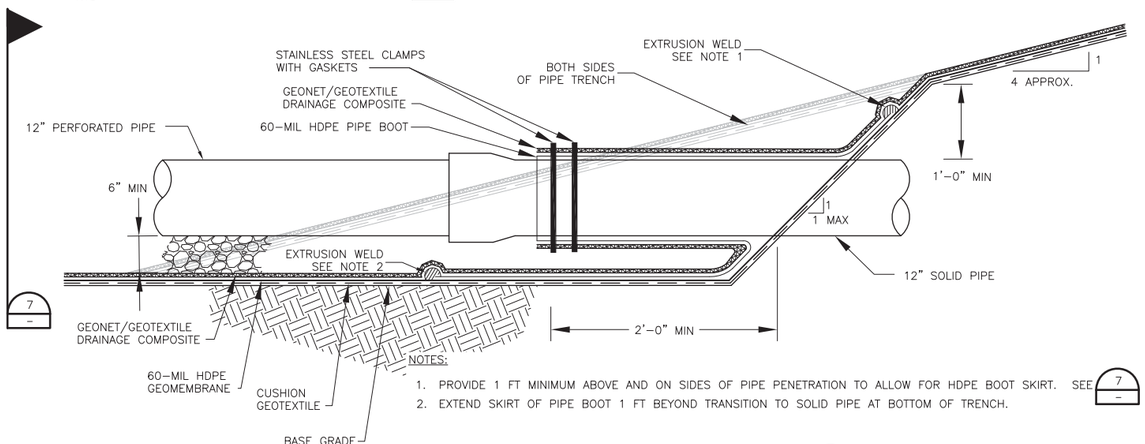
DETAIL FOR GEOMEMBRANE SIDESLOPE 4

NTS



REPLACEMENT CONCRETE CAP PLAN 6

NTS

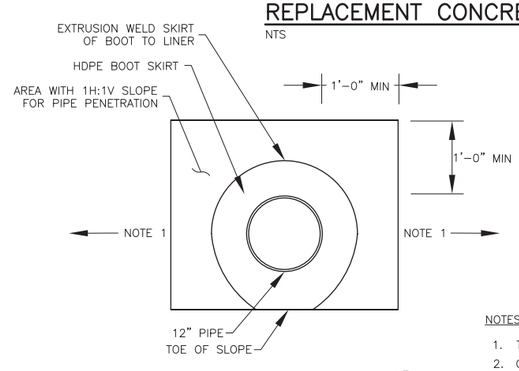


NOTES:

1. PROVIDE 1 FT MINIMUM ABOVE AND ON SIDES OF PIPE PENETRATION TO ALLOW FOR HDPE BOOT SKIRT. SEE 7
2. EXTEND SKIRT OF PIPE BOOT 1 FT BEYOND TRANSITION TO SOLID PIPE AT BOTTOM OF TRENCH.

PIPE PENETRATION BOOT DETAIL 5

NTS



NOTES:

1. TRANSITION TO 4H:1V SLOPE
2. ONLY SHOWS HDPE GEOMEMBRANE, GEONET/GEOTEXTILE COMPOSITE NOT SHOWN FOR CLARITY

GEOMEMBRANE SKIRT DETAIL 7

NTS

DCN #10

Jun 04, 2010 - 9:43am

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KURT W. REICHERT
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DATE

HDR Engineering, Inc.

A/E PROJECT NUMBER: 131272

DRAWING SCALE: AS SHOWN

DRAWN BY: SJF

APPROVED BY: KWR

DATE: 08/18/2009

REVISION

NO.	DATE.
1	10/09/2009
2	12/02/2009
3	02/02/2010
4	03/12/2010

WEST VANCOUVER FREIGHT ACCESS PROJECT

Terminal 5 Unit Train Improvements

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SHEET CONTENTS

Vanexco Cap - Details I

DRAWING NUMBER

H-05

SHEET NUMBER 27 OF 151

POV PROJECT NO: CP0144