Appendix E

Geosynthetics QA/QC Information

Date: 2021-08-06

Mail To:
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GHD Services
138 East 7th Ave Suite 100
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Bill To:

GHD Services
11222680-7-1

e-mail:
roxanne.hasior@ghd.com david.barbour@ghd.com rosemarie.rocca@ghd.com

Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66011**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66011

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	143	138	149	146	148	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	135	146	145	139	155	**144**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	194	197	188	189	189	**191**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-09

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66061**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66061

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	145	159	136	142	151	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	138	140	136	142	146	**140**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	194	194	197	202	199	**197**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-11

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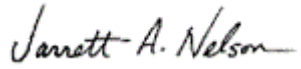
Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66141**
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 54/882 mod.)

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,



Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66141

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	144	139	153	137	**142**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	131	131	131	134	134	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	200	194	191	191	197	**195**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	141	140	133	137	155	**141**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	161	137	158	147	150	**151**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	193	194	190	195	191	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-12

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66171**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66171

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	136	142	141	136	129	**137**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	145	147	149	153	162	**151**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	190	192	183	183	184	**186**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	142	158	137	117	**138**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	130	133	126	120	126	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	185	185	181	179	181	**182**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-17

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66271**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66271

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	151	158	131	133	132	**141**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	152	146	140	143	142	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	196	199	186	194	190	**193**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: DT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	140	148	127	127	114	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	148	135	144	149	153	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	194	186	191	189	187	**189**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-18

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66309**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66309

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	140	140	147	162	140	**146**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	122	120	126	155	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	191	184	185	184	183	**185**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-23

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66389**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66389

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	129	131	135	127	133	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	154	147	152	154	156	**153**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	198	190	196	192	194	**194**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-26

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Dear Ms. Hasior,

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

Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66469**
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 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
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FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

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Sincerely,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66469

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	142	138	148	137	119	**137**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	154	153	153	154	150	**153**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	176	169	167	167	166	**169**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2021-08-27

Mail To:
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Project:	**Upland LF - Northwin LF Phase 1 East**
TRI Job Reference Number:	**66509**
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 54/882 mod.)

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,

Jarrett A. Nelson

Jarret Nelson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: GHD Services
Project: Upland LF - Northwin LF Phase 1 East

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 66509

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: DT-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	159	133	154	158	158	**152**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	126	145	122	143	150	**137**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	193	186	186	187	193	**189**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

C.J. Cassidy
Consulting Inc.

NORTHWIN LANDFILL
CAMPBELL RIVER, B.C. – 2021
EFFLUENT POND AND LANDFILL CELL#1

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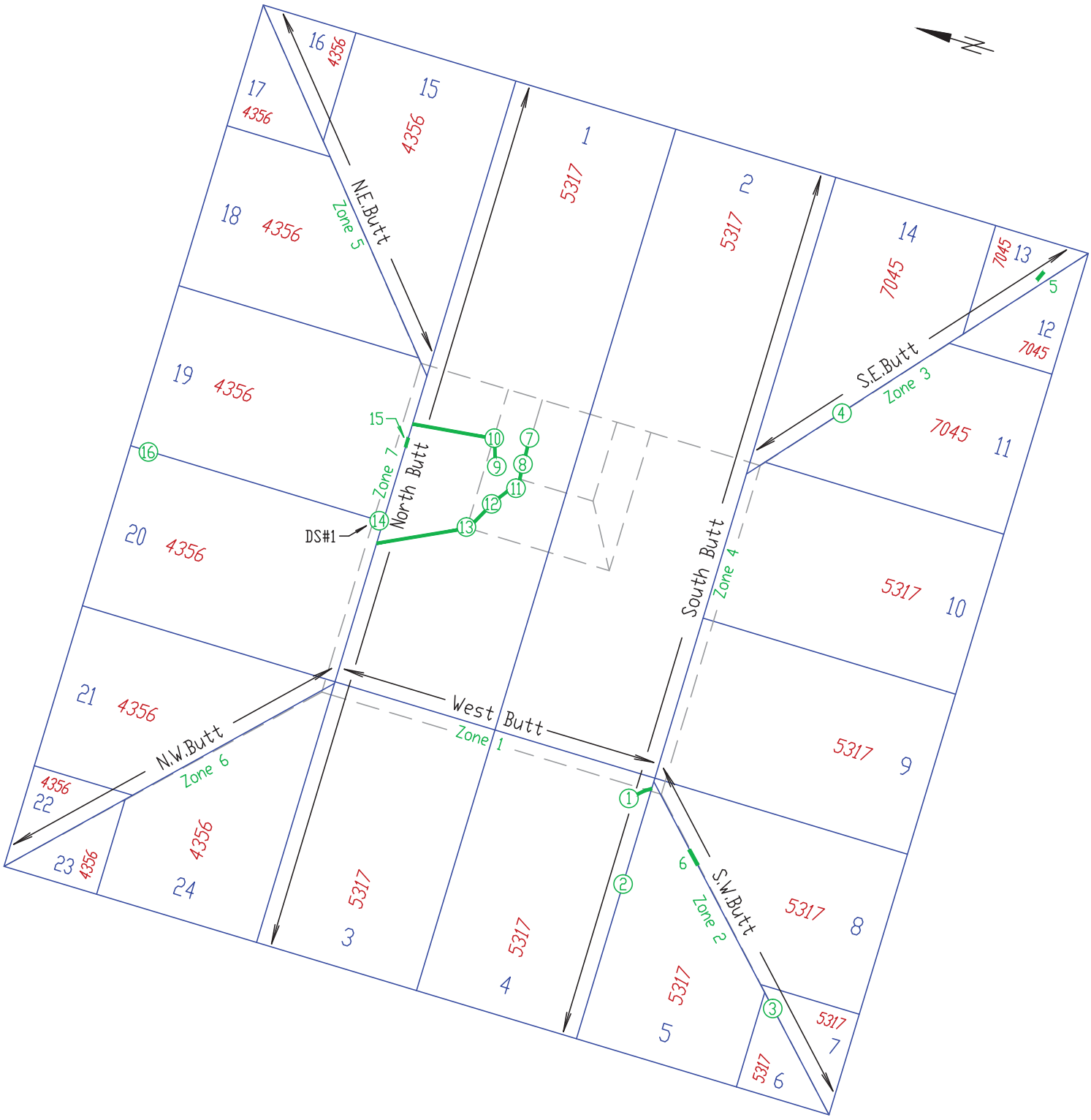
EFFLUENT STORAGE POND

SECONDARY LINER



DATE: August 30 2021	Cassidy Consulting Inc.	NORTHWIN LANDFILL CAMPBELL RIVER, B.C. - 2021
SCALE: NTS		EFFLUENT STORAGE POND
FILE NAME: EffluentStoragePond-Secondary		Secondary Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, August 03, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:30	9	JC			860ºF		430	1	115	1	134	1	196	CC	
6:30	9	JC			860ºF		430	2	100	2	146	2	198	CC	
6:30	9	JC			860ºF		430	3	124	3	151	3	198	CC	
6:30	9	JC			860ºF		430	4	112	4	139	4	197	CC	
6:30	9	JC			860ºF		430	5	113	5	146	5	198	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, August 04, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:33	9	JC			860ºF		430ºF	1	118	1	123	1	187	CC	
6:33	9	JC			860ºF		430ºF	2	114	2	118	2	184	CC	
6:33	9	JC			860ºF		430ºF	3	135	3	132	3	184	CC	
6:33	9	JC			860ºF		430ºF	4	135	4	122	4	185	CC	
6:33	9	JC			860ºF		430ºF	5	110	5	128	5	186	CC	
8:00	X2	JC	500ºC	500ºC				1	96	1		1	154	CC	
8:00	X2	JC	500ºC	500ºC				2	92	2		2	154	CC	
8:00	X2	JC	500ºC	500ºC				3	87	3		3	159	CC	
8:00	X2	JC	500ºC	500ºC				4	87	4		4	166	CC	
8:00	X2	JC	500ºC	500ºC				5	111	5		5	167	CC	
12:30	9	JC			860ºF		600ºF	1	123	1	129	1	154	CC	
12:30	9	JC			860ºF		600ºF	2	121	2	134	2	143	CC	
12:30	9	JC			860ºF		600ºF	3	111	3	139	3	158	CC	
12:30	9	JC			860ºF		600ºF	4	117	4	147	4	159	CC	
12:30	9	JC			860ºF		600ºF	5	127	5	142	5	158	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, August 05, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:42	9	JC			860ºF		430ºF	1	128	1	150	1	189	CC	
7:42	9	JC			860ºF		430ºF	2	150	2	138	2	188	CC	
7:42	9	JC			860ºF		430ºF	3	128	3	136	3	193	CC	
7:42	9	JC			860ºF		430ºF	4	148	4	142	4	186	CC	
7:42	9	JC			860ºF		430ºF	5	136	5	152	5	181	CC	
1:37	X2	MC	500ºC	500ºC				1	109	1		1	162	CC	
1:37	X2	MC	500ºC	500ºC				2	137	2		2	164	CC	
1:37	X2	MC	500ºC	500ºC				3	129	3		3	161	CC	
1:37	X2	MC	500ºC	500ºC				4	124	4		4	162	CC	
1:37	X2	MC	500ºC	500ºC				5	133	5		5	162	CC	
8:18	9	JC			860ºF		430ºF	1	113	1	131	1	174	CC	
8:18	9	JC			860ºF		430ºF	2	120	2	132	2	168	CC	
8:18	9	JC			860ºF		430ºF	3	127	3	144	3	170	CC	
8:18	9	JC			860ºF		430ºF	4	133	4	134	4	171	CC	
8:18	9	JC			860ºF		430ºF	5	128	5	133	5	158	CC	

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE August 3 to August 5, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	5317	E.Slope & Floor	29.00	7.30	211.70	Layout - August 3
2	5317	E.Slope & Floor	29.00	7.30	211.70	Layout - August 3
3	5317	West Slope	15.00	7.30	109.50	Layout - August 3
4	5317	West Slope	15.00	7.30	109.50	Layout - August 3
5	5317	S.W.Corner	15.00	7.30	109.50	Layout - August 4
6	5317	S.W.Corner	3.00	3.00	9.00	Layout - August 4
7	5317	S.W.Corner	4.00	4.00	16.00	Layout - August 4
8	5317	S.W.Corner	12.00	7.30	87.60	Layout - August 4
9	5317	South Slope	12.00	7.30	87.60	Layout - August 4
10	5317	South Slope	13.00	7.30	94.90	Layout - August 4
11	7045	S.E.Corner	13.00	7.30	94.90	Layout - August 4
12	7045	S.E.Corner	3.00	4.00	12.00	Layout - August 4
13	7054	S.E.Corner	4.00	3.00	12.00	Layout - August 4
14	7045	S.E.Corner	15.00	7.30	109.50	Layout - August 4
15	4356	N.E.Corner	15.00	7.30	109.50	Layout - August 5
16	4356	N.E.Corner	5.60	3.00	16.80	Layout - August 5
17	4356	N.E.Corner	4.00	4.00	16.00	Layout - August 5
18	4356	N.E.Corner	14.00	7.30	102.20	Layout - August 5
19	4356	North Slope	14.00	7.30	102.20	Layout - August 5
20	4356	North Slope	14.00	7.30	102.20	Layout - August 5
21	4356	N.W.Corner	14.00	7.30	102.20	Layout - August 5
22	4356	N.W.Corner	6.00	4.00	24.00	Layout - August 5
23	4356	N.W.Corner	6.00	3.00	18.00	Layout - August 5
24	4356	N.W.Corner	15.00	7.30	109.50	Layout - August 5

1978.00 **sq m**

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: August 3 to August 5, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
Welded August 3rd													
1/2	29.0	9:17	JC	9	1:53	1:58	32	31	Pass	Pass	N/A	CC	
3/4	15.0	10:15	JC	9	12:10	12:15	30	30	Pass	Pass	N/A	CC	
West Butt	14.5	11:10	JC	9	2:25	2:30	30	29	Pass	Pass	N/A	CC	Panels 1,2 to 3,4.
Welded August 4th													
5/6	3.0	10:30	JC	9	12:18	12:23	30	30	Pass	Pass	N/A	CC	
7/8	4.0	11:07	JC	9	12:21	12:26	40	39	Pass	Pass	N/A	CC	
8/9	12.0	11:15	JC	9	12:29	12:34	32	32	Pass	Pass	N/A	CC	
9/10	12.0	11:45	JC	9	12:43	12:48	43	41	Pass	Pass	N/A	CC	
10/11	13.0	12:00	JC	9	12:48	12:53	41	40	Pass	Pass	N/A	CC	
11/12	3.0	12:10	JC	9	1:15	1:21	39	38	Pass	Pass	N/A	CC	
13/14	4.0	12:25	JC	9	1:32	1:37	41	40	Pass	Pass	N/A	CC	
S.W.Butt	16.0	12:40	JC	9	1:25	1:30	30	30	Pass	Pass	N/A	CC	Panels 5 - 8.
S.E.Butt	16.0	12:09	JC	9	1:35	1:40	31	31	Pass	Pass	N/A	CC	Panels 11 - 14.
South Butt	44.5	1:15	JC	9	1:41	1:46	42	41	Pass	Pass	N/A	CC	Panels 2, 4 to 5, 9, 10, 14.
Welded August 5th													
15/16	5.6	8:07	JC	9	1:59	2:04	36	36	Pass	Pass	N/A	CC	
17/18	4.0	8:15	JC	9	9:36	9:40	30	30	Pass	Pass	N/A	CC	
18/19	14.0	8:25	JC	9	9:37	9:42	30	30	Pass	Pass	N/A	CC	
19/20	14.0	8:47	JC	9	1:51	1:56	38	38	Pass	Pass	N/A	CC	
20/21	14.0	9:03	JC	9	2:10	2:15	30	29	Pass	Pass	N/A	CC	
21/22	6.0	9:15	JC	9	2:18	2:23	31	31	Pass	Pass	N/A	CC	
23/24	6	9:22	JC	9	9:44	9:49	30	30	Pass	Pass	N/A	CC	
N.E.Butt	16	9:57	JC	9	2:30	2:35	30	30	Pass	Pass	N/A	CC	Panels 15 - 18.
N.W..Butt	16	10:44	JC	9	2:45	2:50	30	30	Pass	Pass	N/A	CC	Panels 21 - 24.
North Butt	44.5	11:32	JC	9	2:57	3:02	31	29	Pass	Pass	N/A	CC	Panels 1, 3 to 15, 19, 20, 24.

Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE August 4th and 5th, 2021

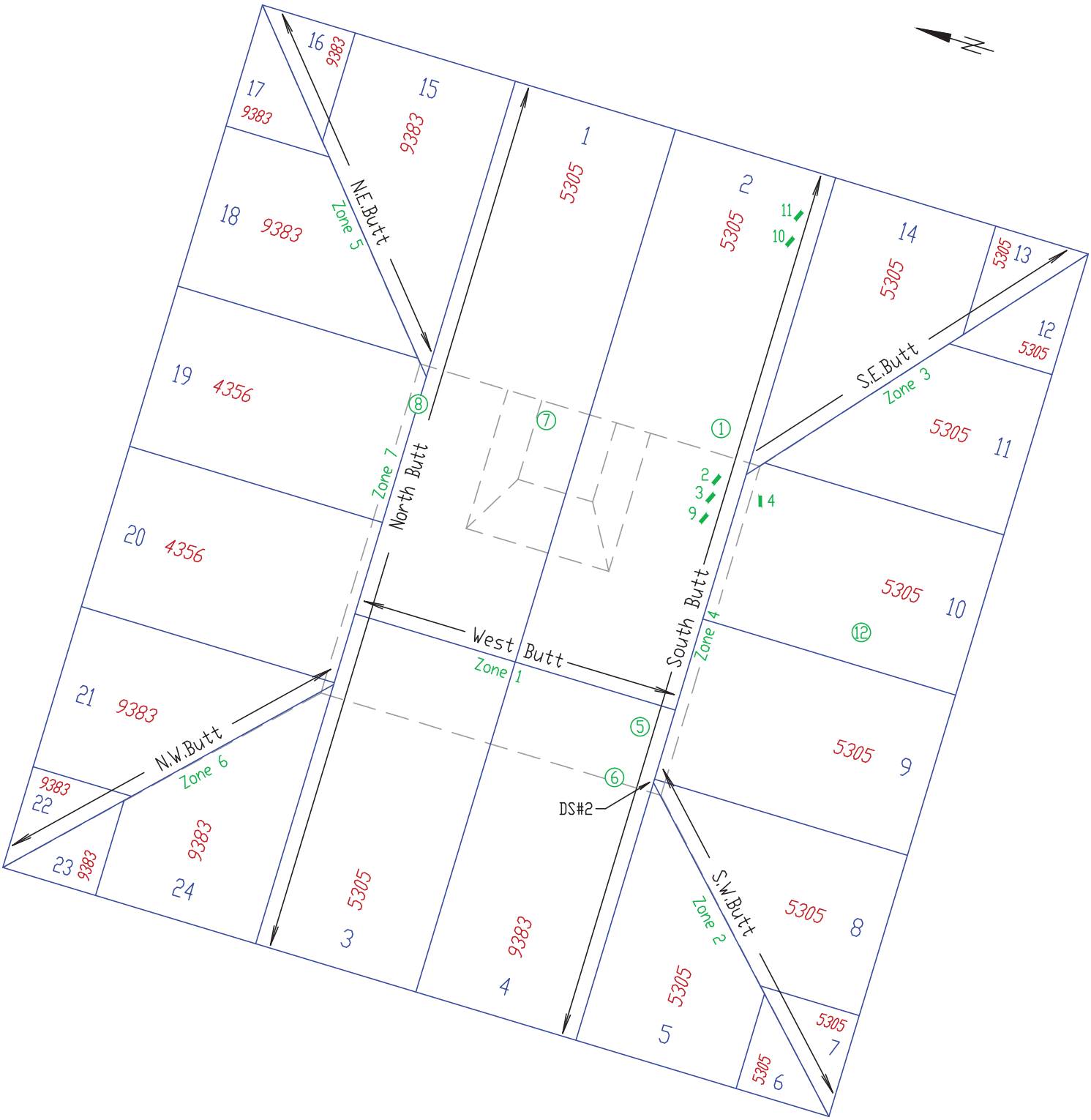
PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
	Extruded August 4th							
1	Patch/Bead	4	Aug 4, 2021	JC	X2	CC	Pass	Near S.W.Toe.
2	Patch	South Butt	Aug 4, 2021	JC	X2	CC	Pass	On West Slope.
3	Patch	S.W.Butt	Aug 4, 2021	JC	X2	CC	Pass	Near top of Slope.
4	Patch	S.E.Butt	Aug 4, 2021	JC	X2	CC	Pass	On Corner Slope.
5	Bead	13	Aug 4, 2021	JC	X2	CC	Pass	Roll damage near top of slope.
6	Bead	S.W.Butt	Aug 4, 2021	JC	X2	CC	Pass	Near top of slope.
7	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
8	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
9	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
10	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Bead in Sump to remove Slack.
11	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
12	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
13	Patch/Bead	1	Aug 4, 2021	JC	X2	CC	Pass	Patch and Bead in Sump to remove Slack.
Zone 1	Beads	West Butt	Aug 4, 2021	JC	X2	CC	Pass	All "T" Intersections along West Butt Seam.
Zone 2	Beads	S.W.Butt	Aug 4, 2021	JC	X2	CC	Pass	All "T" Intersections along South West Butt Seam.
Zone 3	Beads	S.E.Butt	Aug 4, 2021	JC	X2	CC	Pass	All "T" Intersections along South East Butt Seam.
Zone 4	Beads	South Butt	Aug 4, 2021	JC	X2	CC	Pass	All "T" Intersections along South Butt Seam.
	Extruded August 5th							
14	Patch	North Butt	Aug 5, 2021	MC	X2	CC	Pass	Patch over Destruct #1.
15	Bead	North Butt	Aug 5, 2021	MC	X2	CC	Pass	At panel 19.
16	Patch	19/20	Aug 5, 2021	MC	X2	CC	Pass	At top of slope.
Zone 5	Beads	N.E.Butt	Aug 5, 2021	MC	X2	CC	Pass	All "T" Intersections along North East Butt Seam.
Zone 6	Beads	N.W.Butt	Aug 5, 2021	MC	X2	CC	Pass	All "T" Intersections along North West Butt Seam.
Zone 7	Beads	North Butt	Aug 5, 2021	MC	X2	CC	Pass	All "T" Intersections along North Butt Seam.

EFFLUENT STORAGE POND

PRIMARY LINER



DATE: August 30 2021	Cassidy Consulting Inc.	NORTHWIN LANDFILL CAMPBELL RIVER, B.C. - 2021
SCALE: NTS		EFFLUENT STORAGE POND
FILE NAME: EffluentStoragePond-Primary		Primary Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, August 05, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:42	9	JC			860ºF		430ºF	1	128	1	150	1	189	CC	
7:42	9	JC			860ºF		430ºF	2	150	2	138	2	188	CC	
7:42	9	JC			860ºF		430ºF	3	128	3	136	3	193	CC	
7:42	9	JC			860ºF		430ºF	4	148	4	142	4	186	CC	
7:42	9	JC			860ºF		430ºF	5	136	5	152	5	181	CC	
1:37	X2	MC	500ºC	500ºC				1	109	1		1	162	CC	
1:37	X2	MC	500ºC	500ºC				2	137	2		2	164	CC	
1:37	X2	MC	500ºC	500ºC				3	129	3		3	161	CC	
1:37	X2	MC	500ºC	500ºC				4	124	4		4	162	CC	
1:37	X2	MC	500ºC	500ºC				5	133	5		5	162	CC	
8:18	9	JC			860ºF		430ºF	1	113	1	131	1	174	CC	
8:18	9	JC			860ºF		430ºF	2	120	2	132	2	168	CC	
8:18	9	JC			860ºF		430ºF	3	127	3	144	3	170	CC	
8:18	9	JC			860ºF		430ºF	4	133	4	134	4	171	CC	
8:18	9	JC			860ºF		430ºF	5	128	5	133	5	158	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Friday, August 06, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:30	9	JC			860ºF		430	1	122	1	148	1	206	CC	
6:30	9	JC			860ºF		430	2	137	2	120	2	200	CC	
6:30	9	JC			860ºF		430	3	142	3	111	3	203	CC	
6:30	9	JC			860ºF		430	4	135	4	138	4	203	CC	
6:30	9	JC			860ºF		430	5	128	5	154	5	199	CC	
8:45	X2	MC	500ºC	500ºC				1	92	1		1	178	CC	
8:45	X2	MC	500ºC	500ºC				2	99	2		2	184	CC	
8:45	X2	MC	500ºC	500ºC				3	91	3		3	177	CC	
8:45	X2	MC	500ºC	500ºC				4	101	4		4	178	CC	
8:45	X2	MC	500ºC	500ºC				5	112	5		5	190	CC	

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE August 5 to August 6, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021

MATERIAL 60mil HDPE DTEX - **Primary Liner**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	5305	E.Slope & Floor	24.00	7.30	175.20	Layout - August 5
2	5305	E.Slope & Floor	24.00	7.30	175.20	Layout - August 5
3	5305	E.Slope & Floor	20.00	7.30	146.00	Layout - August 5
4	9383	E.Slope & Floor	20.00	7.30	146.00	Layout - August 5
5	5305	S.W.Corner	15.00	7.30	109.50	Layout - August 6
6	5305	S.W.Corner	5.00	3.00	15.00	Layout - August 6
7	5305	S.W.Corner	7.00	4.00	28.00	Layout - August 6
8	5305	S.W.Corner	12.00	7.30	87.60	Layout - August 6
9	5305	South Slope	12.00	7.30	87.60	Layout - August 6
10	5305	South Slope	12.00	7.30	87.60	Layout - August 6
11	5305	S.E.Corner	12.00	7.30	87.60	Layout - August 6
12	5305	S.E.Corner	4.00	4.00	16.00	Layout - August 6
13	5305	S.E.Corner	4.00	3.00	12.00	Layout - August 6
14	5305	S.E.Corner	15.00	7.30	109.50	Layout - August 6
15	9383	N.E.Corner	15.00	7.30	109.50	Layout - August 6
16	9383	N.E.Corner	4.00	4.00	16.00	Layout - August 6
17	9383	N.E.Corner	4.00	4.00	16.00	Layout - August 6
18	9383	N.E.Corner	15.00	7.30	109.50	Layout - August 6
19	4356	North Slope	15.00	7.30	109.50	Layout - August 6
20	4356	North Slope	15.00	7.30	109.50	Layout - August 6
21	9383	N.W.Corner	15.00	7.30	109.50	Layout - August 6
22	9383	N.W.Corner	4.00	4.00	16.00	Layout - August 6
23	9383	N.W.Corner	4.00	4.00	16.00	Layout - August 6
24	9383	N.W.Corner	12.00	7.30	87.60	Layout - August 6

1981.90 **sq m**

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING SEAM LOG

DATE: August 5 to August 6, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
Welded August 5th													
1/2	24.0	8:55	JC	9	2:13	2:18	40	40	Pass	Pass	N/A	CC	
3/4	20.0	9:35	JC	9	2:46	2:51	30	30	Pass	Pass	N/A	CC	
West Butt	14.5	10:22	JC	9	2:19	2:26	30	29	Pass	Pass	N/A	CC	Panels 1,2 to 3,4.
Welded August 6th													
5/6	5.0	9:47	JC	9	10:09	10:14	30	30	Pass	Pass	N/A	CC	
7/8	7.0	9:02	JC	9	11:21	11:17	40	40	Pass	Pass	N/A	CC	
8/9	12.0	9:14	JC	9	11:41	11:46	40	39	Pass	Pass	N/A	CC	
9/10	12.0	9:33	JC	9	12:31	12:37	31	31	Pass	Pass	N/A	CC	
10/11	12.0	11:21	JC	9	6:50	6:55	40	40	Pass	Pass	N/A	CC	
11/12	4.0	11:30	JC	9	1:28	1:37	40	40	Pass	Pass	N/A	CC	
13/14	4.0	11:39	JC	9	1:41	1:46	30	30	Pass	Pass	N/A	CC	
S.E.Butt	17.0	11:49	JC	9	1:31	1:36	40	40	Pass	Pass	N/A	CC	Panels 11 - 14.
S.W.Butt	17.0	10:28	JC	9	10:00	10:15	30	29	Pass	Pass	N/A	CC	Panels 5 - 8.
South Butt	44.0	1:36	JC	9	2:05	2:10	38	37	Pass	Pass	N/A	CC	Panels 2, 4 to 5, 9, 10, 14.
16/15	4.0	11:58	JC	9	6:35	6:40	40	40	Pass	Pass	N/A	CC	
17/18	4.0	12:36	JC	9	6:30	6:35	40	40	Pass	Pass	N/A	CC	
18/19	15.0	1:05	JC	9	6:30	6:35	40	40	Pass	Pass	N/A	CC	
19/20	15.0	12:29	JC	9	13:05	13:10	35	35	Pass	Pass	N/A	CC	
20/21	15.0	11:05	JC	9	11:15	11:20	30	29	Pass	Pass	N/A	CC	
21/22	4.0	10:50	JC	9	2:39	2:44	31	31	Pass	Pass	N/A	CC	
24/23	4.0	10:36	JC	9	2:24	2:29	31	30	Pass	Pass	N/A	CC	
N.E.Butt	16.5	12:45	JC	9	6:35	6:40	40	40	Pass	Pass	N/A	CC	Panels 15 - 18.
N.W..Butt	17.0	10:47	JC	9	2:31	2:36	40	38	Pass	Pass	N/A	CC	Panels 21 - 24.
North Butt	44.0	1:55	JC	9	2:47	2:52	30	30	Pass	Pass	N/A	CC	Panels 1, 3 to 15, 19, 20, 24.

Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE Friday, August 06, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
1	Patch	2	Aug 6, 2021	MC	X2	CC	Pass	Near bottom of slope.
2	Bead	2	Aug 6, 2021	MC	X2	CC	Pass	On floor.
3	Bead	2	Aug 6, 2021	MC	X2	CC	Pass	On floor.
4	Bead	10	Aug 6, 2021	MC	X2	CC	Pass	At Toe.
5	Patch	4	Aug 6, 2021	MC	X2	CC	Pass	On floor.
6	Patch	4	Aug 6, 2021	MC	X2	CC	Pass	At Toe.
7	Patch	1	Aug 6, 2021	MC	X2	CC	Pass	In The Sump.
8	Patch	North Butt	Aug 6, 2021	MC	X2	CC	Pass	At panel 19.
9	Bead	2	Aug 6, 2021	MC	X2	CC	Pass	On floor.
10	Bead	2	Aug 6, 2021	MC	X2	CC	Pass	Upper slope.
11	Bead	2	Aug 6, 2021	MC	X2	CC	Pass	Upper slope.
12	Patch	10	Aug 6, 2021	MC	X2	CC	Pass	On Slope.
Zone 1	Beads	West Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along West Butt Seam.
Zone 2	Beads	S.W.Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along South West Butt Seam.
Zone 3	Beads	S.E.Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along South East Butt Seam.
Zone 4	Beads	South Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along South Butt Seam.
Zone 5	Beads	N.E. Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along North East Butt Seam.
Zone 6	Beads	N.W.Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along North West Butt Seam.
Zone 7	Beads	North Butt	Aug 6, 2021	MC	X2	CC	Pass	All "T" Intersections along North West Butt Seam.

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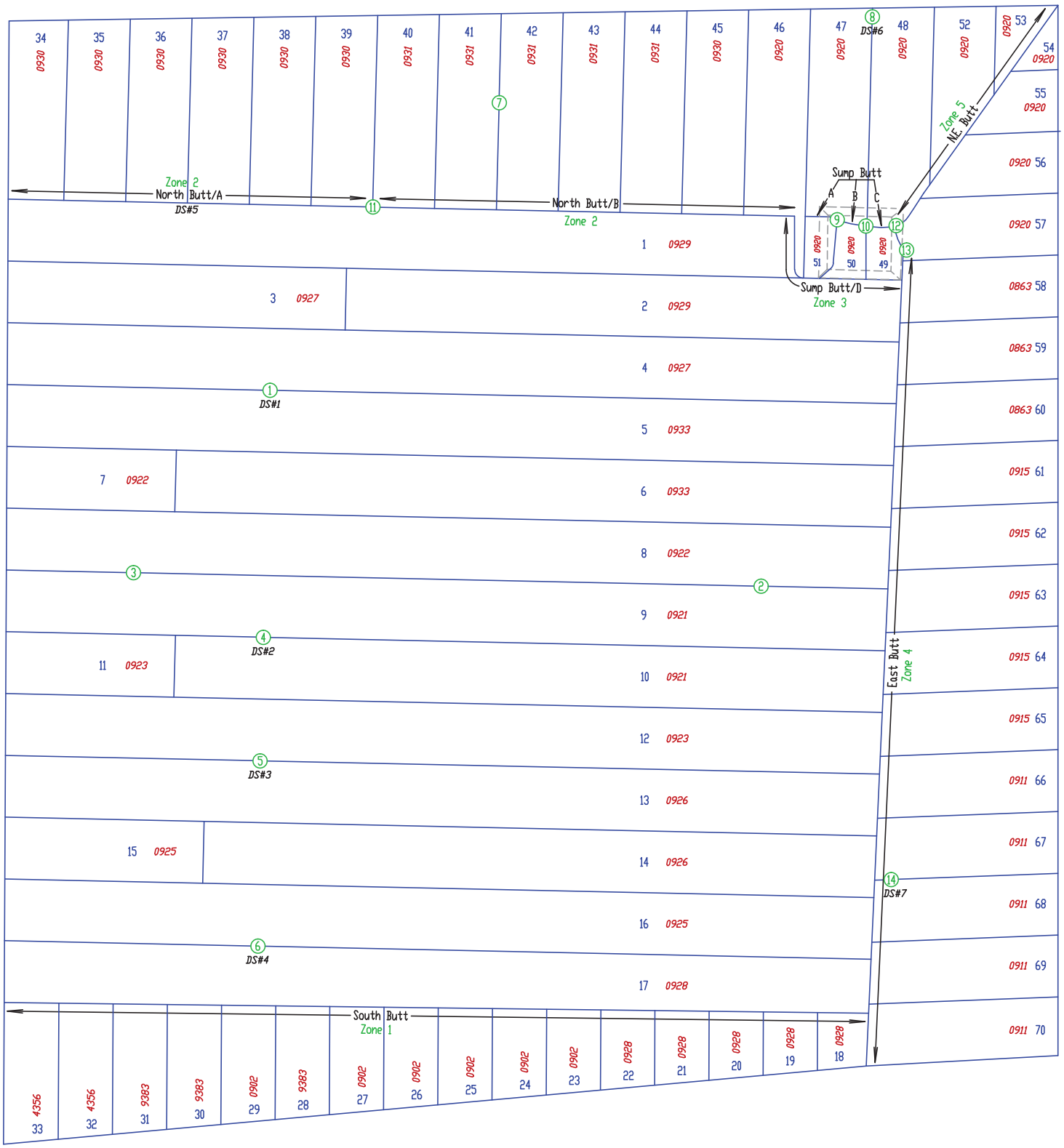
Consulting Inc.

DESTRUCTIVE TESTING REPORT

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - EFFLUENT POND - 2021** MATERIAL 60mil HDPE DTEX - Secondary & Primary Liners

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
Aug 5/21	1	19/20	JC	9	129	135	186	136	114	183	132	115	187	121	124	180	121	111	185	CC	Seam 19/20 at Toe - Secondary.
Aug 6/21	2	8/9	JC	9	124	124	208	142	118	210	135	119	208	121	119	208	150	133	201	CC	Seam 8/9 at Toe - Primary.

NORTHWIN LANDFILL CELL 1
SECONDARY LINER



DATE: September 7, 2021	Cassidy Consulting Inc.	NORTHWIN LANDFILL - CELL 1 - 2021
SCALE: NTS		CAMPBELL RIVER, B.C.
FILE NAME: CampbellRiverCell-Secondary		60mil Dtex Secondary Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, August 09, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:54	9	RC			860ºF		600	1	137	1	140	1	175	CC	
8:54	9	RC			860ºF		600	2	131	2	134	2	182	CC	
8:54	9	RC			860ºF		600	3	104	3	140	3	172	CC	
8:54	9	RC			860ºF		600	4	127	4	141	4	165	CC	
8:54	9	RC			860ºF		600	5	130	5	143	5	170	CC	
11:28	9	RC			860ºF		430	1	124	1	125	1	173	CC	
11:28	9	RC			860ºF		430	2	128	2	133	2	168	CC	
11:28	9	RC			860ºF		430	3	130	3	135	3	168	CC	
11:28	9	RC			860ºF		430	4	130	4	129	4	173	CC	
11:28	9	RC			860ºF		430	5	131	5	137	5	169	CC	
12:19	X2	JC	520ºF	530ºF				1	96	1		1	158	CC	
12:19	X2	JC	520ºF	530ºF				2	99	2		2	158	CC	
12:19	X2	JC	520ºF	530ºF				3	92	3		3	152	CC	
12:19	X2	JC	520ºF	530ºF				4	103	4		4	154	CC	
12:19	X2	JC	520ºF	530ºF				5	108	5		5	154	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, August 10, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:13	9	RC			860ºF		600ºF	1	141	1	137	1	188	CC	
7:13	9	RC			860ºF		600ºF	2	148	2	147	2	186	CC	
7:13	9	RC			860ºF		600ºF	3	143	3	147	3	188	CC	
7:13	9	RC			860ºF		600ºF	4	142	4	143	4	188	CC	
7:13	9	RC			860ºF		600ºF	5	144	5	141	5	185	CC	
9:28	X2	JC	520ºF	530ºF				1	115	1		1	146	CC	
9:28	X2	JC	520ºF	530ºF				2	107	2		2	141	CC	
9:28	X2	JC	520ºF	530ºF				3	109	3		3	146	CC	
9:28	X2	JC	520ºF	530ºF				4	106	4		4	164	CC	
9:28	X2	JC	520ºF	530ºF				5	105	5		5	156	CC	
11:22	9	RC			860ºF		600ºF	1	134	1	129	1	178	CC	
11:22	9	RC			860ºF		600ºF	2	136	2	133	2	178	CC	
11:22	9	RC			860ºF		600ºF	3	141	3	146	3	181	CC	
11:22	9	RC			860ºF		600ºF	4	143	4	156	4	184	CC	
11:22	9	RC			860ºF		600ºF	5	149	5	159	5	177	CC	
12:21	9	RC			860ºF		750ºF	1	123	1	119	1	154	CC	
12:21	9	RC			860ºF		750ºF	2	135	2	121	2	155	CC	
12:21	9	RC			860ºF		750ºF	3	127	3	122	3	155	CC	
12:21	9	RC			860ºF		750ºF	4	140	4	134	4	160	CC	
12:21	9	RC			860ºF		750ºF	5	141	5	137	5	161	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, August 11, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:13	9	RC			860ºF		600ºF	1	143	1	144	1	186	CC	
6:13	9	RC			860ºF		600ºF	2	120	2	141	2	183	CC	
6:13	9	RC			860ºF		600ºF	3	140	3	144	3	183	CC	
6:13	9	RC			860ºF		600ºF	4	135	4	151	4	180	CC	
6:13	9	RC			860ºF		600ºF	5	135	5	137	5	183	CC	
8:48	X2	JC	520ºF	530ºF				1	91	1		1	153	CC	
8:48	X2	JC	520ºF	530ºF				2	92	2		2	156	CC	
8:48	X2	JC	520ºF	530ºF				3	97	3		3	150	CC	
8:48	X2	JC	520ºF	530ºF				4	98	4		4	153	CC	
8:48	X2	JC	520ºF	530ºF				5	94	5		5	150	CC	

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WELDER QUALIFICATIONS

DATE Saturday, August 14, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:23	9	RC			860ºF		600ºF	1	137	1	1125	1	172	CC	
6:23	9	RC			860ºF		600ºF	2	129	2	123	2	168	CC	
6:23	9	RC			860ºF		600ºF	3	99	3	126	3	168	CC	
6:23	9	RC			860ºF		600ºF	4	94	4	126	4	167	CC	
6:23	9	RC			860ºF		600ºF	5	142	5	125	5	170	CC	
8:40	17	RC			860ºF		620ºF	1	142	1	138	1	173	CC	
8:40	17	RC			860ºF		620ºF	2	129	2	137	2	174	CC	
8:40	17	RC			860ºF		620ºF	3	123	3	125	3	169	CC	
8:40	17	RC			860ºF		620ºF	4	131	4	138	4	166	CC	
8:40	17	RC			860ºF		620ºF	5	136	5	131	5	164	CC	
11:19	X2	MC	520ºF	530ºF				1	109	1		1	147	CC	
11:19	X2	MC	520ºF	530ºF				2	106	2		2	146	CC	
11:19	X2	MC	520ºF	530ºF				3	112	3		3	145	CC	
11:19	X2	MC	520ºF	530ºF				4	113	4		4	146	CC	
11:19	X2	MC	520ºF	530ºF				5	121	5		5	148	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, August 16, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Secondary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:31	9	RC			860ºF		600ºF	1	123	1	145	1	193	CC	
7:31	9	RC			860ºF		600ºF	2	116	2	141	2	194	CC	
7:31	9	RC			860ºF		600ºF	3	130	3	138	3	193	CC	
7:31	9	RC			860ºF		600ºF	4	122	4	130	4	190	CC	
7:31	9	RC			860ºF		600ºF	5	120	5	139	5	194	CC	
11:01	17	JC			860ºF		620ºF	1	116	1	122	1	166	CC	
11:01	17	JC			860ºF		620ºF	2	118	2	115	2	163	CC	
11:01	17	JC			860ºF		620ºF	3	117	3	121	3	169	CC	
11:01	17	JC			860ºF		620ºF	4	120	4	125	4	164	CC	
11:01	17	JC			860ºF		620ºF	5	139	5	121	5	165	CC	
11:06	X2	MC	520ºF	530ºF				1	124	1		1	182	CC	
11:06	X2	MC	520ºF	530ºF				2	128	2		2	181	CC	
11:06	X2	MC	520ºF	530ºF				3	112	3		3	179	CC	
11:06	X2	MC	520ºF	530ºF				4	109	4		4	176	CC	
11:06	X2	MC	520ºF	530ºF				5	130	5		5	178	CC	

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Monday, August 09, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	0929	Floor	90.00	7.30	657.00	
2	0929	Floor	60.00	7.30	438.00	
3	0927	Floor	40.00	7.30	292.00	
4	0927	Floor	100.00	7.30	730.00	
5	0933	Floor	100.00	7.30	730.00	
6	0933	Floor	80.00	7.30	584.00	
7	0922	Floor	20.00	7.30	146.00	
8	0922	Floor	102.00	7.30	744.60	

4321.60 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Tuesday, August 10, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
9	0921	Floor	100.00	7.30	730.00	
10	0921	Floor	80.00	7.30	584.00	
11	0923	Floor	20.00	7.30	146.00	
12	0923	Floor	99.00	7.30	722.70	
13	0926	Floor	97.00	7.30	708.10	
14	0926	Floor	80.00	7.30	584.00	
15	0925	Floor	20.00	7.30	146.00	
16	0925	Floor	94.00	7.30	686.20	
17	0928	Floor	92.00	7.30	671.60	

4978.60 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Wednesday, August 11, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
18	0928	South Slope	5.00	7.30	36.50	
19	0928	South Slope	5.00	7.30	36.50	
20	0928	South Slope	6.00	7.30	43.80	
21	0928	South Slope	7.00	7.30	51.10	
22	0928	South Slope	7.00	7.30	51.10	
23	0902	South Slope	8.00	7.30	58.40	
24	0902	South Slope	9.00	7.30	65.70	
25	0902	South Slope	11.00	7.30	80.30	
26	0902	South Slope	12.00	7.30	87.60	
27	0902	South Slope	13.00	7.30	94.90	
28	9383	South Slope	13.00	7.30	94.90	
29	0902	South Slope	14.00	7.30	102.20	
30	9383	South Slope	16.00	7.30	116.80	
31	9383	South Slope	17.00	7.30	124.10	
32	4356	South Slope	18.00	7.30	131.40	
33	4356	South Slope	18.00	7.30	131.40	

1306.70 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Saturday, August 14, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
34	0930	North Slope	17.00	7.30	124.10	
35	0930	North Slope	19.00	7.30	138.70	
36	0930	North Slope	20.00	7.30	146.00	
37	0930	North Slope	20.00	7.30	146.00	
38	0930	North Slope	21.00	7.30	153.30	
39	0930	North Slope	21.00	7.30	153.30	
40	0931	North Slope	23.00	7.30	167.90	
41	0931	North Slope	23.00	7.30	167.90	
42	0931	North Slope	23.00	7.30	167.90	
43	0931	North Slope	23.00	7.30	167.90	
44	0931	North Slope	24.00	7.30	175.20	
45	0930	North Slope	25.00	7.30	182.50	
46	0920	North Slope	34.00	7.30	248.20	
47	0920	North Slope	28.00	7.30	204.40	
48	0920	North Slope	26.00	7.30	189.80	
49	0920	North Slope	8.00	3.60	28.80	
50	0920	North Slope	8.00	3.60	28.80	
51	0920	North Slope	6.00	3.60	21.60	

2612.30 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Monday, August 16, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Secondary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
52	0920	NE Corner	18.00	7.30	131.40	
53	0920	NE Corner	12.00	7.30	87.60	
54	0920	NE Corner	4.00	7.30	29.20	
55	0920	NE Corner	8.00	7.30	58.40	
56	0920	East Slope	12.00	7.30	87.60	
57	0920	East Slope	18.00	7.30	131.40	
58	0863	East Slope	22.00	7.30	160.60	
59	0863	East Slope	23.00	7.30	167.90	
60	0863	East Slope	23.00	7.30	167.90	
61	0915	East Slope	23.00	7.30	167.90	
62	0915	East Slope	23.00	7.30	167.90	
63	0915	East Slope	24.00	7.30	175.20	
64	0915	East Slope	24.00	7.30	175.20	
65	0915	East Slope	24.00	7.30	175.20	
66	0911	East Slope	24.00	7.30	175.20	
67	0911	East Slope	24.00	7.30	175.20	
68	0911	East Slope	24.00	7.30	175.20	
69	0911	East Slope	24.00	7.30	175.20	
70	0911	East Slope	25.00	7.30	182.50	

2766.70 **sq m**

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Monday, August 09, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
2/3	7.3	9:03	RC	9	12:36	12:41	35	35	Pass	Pass	N/A	CC	Cross Seam
1/2/3	90.0	9:10	RC	9	10:09	10:14	30	30	Pass	Pass	N/A	CC	
2/3/4	100.0	10:30	RC	9	11:17	11:23	35	35	Pass	Pass	N/A	CC	
4/5	100.0	11:26	RC	9	1:18	1:23	30	29	Pass	Pass	N/A	CC	
6/7	7.3	12:32	RC	9	2:01	2:06	30	30	Pass	Pass	N/A	CC	Cross Seam
5/6/7	100.0	12:43	RC	9	1:33	1:38	40	39	Pass	Pass	N/A	CC	
6/7/8	100.0	1:37	RC	9	2:45	2:50	30	30	Pass	Pass	N/A	CC	

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Tuesday, August 10, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
8/9/A	15.0	7:36	RC	9	10:24	10:29	30	30	Pass	Pass	N/A	CC	
8/9/B	75.0	7;36	RC	9	10:25	10:30	30	30	Pass	Pass	N/A	CC	
8/9/C	15.0	7:36	RC	9	10:36	10:41	30	30	Pass	Pass	N/A	CC	
10/11	7.3	8:31	RC	9	10:27	10:32	30	29	Pass	Pass	N/A	CC	Cross Seam
9/10/11	100.0	9:23	RC	9	11:00	11:05	30	30	Pass	Pass	N/A	CC	
10/11/12	99.0	9:40	RC	9	11:12	11:17	30	28	Pass	Pass	N/A	CC	
12/13	97.0	10:22	RC	9	12:15	12:20	32	31	Pass	Pass	N/A	CC	
14/15	7.3	11:47	RC	9	12:23	12:28	40	39	Pass	Pass	N/A	CC	Cross Seam
13/14/15	97.0	11:55	RC	9	12:30	12:35	32	30	Pass	Pass	N/A	CC	
14/15/16	94.0	12:37	RC	9	1:58	2:03	30	29	Pass	Pass	N/A	CC	
16/17	92.0	2:28	RC	9	3:00	3:05	30	30	Pass	Pass	N/A	CC	

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Wednesday, August 11, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
18/19	5.0	8:06	RC	9	9:14	9:19	38	38	Pass	Pass	N/A	CC	
19/20	5.0	8:12	RC	9	9:18	9:23	30	30	Pass	Pass	N/A	CC	
20/21	5.0	8:17	RC	9	9:20	9:25	30	30	Pass	Pass	N/A	CC	
21/22	7.0	8:31	RC	9	9:26	9:31	40	40	Pass	Pass	N/A	CC	
22/23	7.0	8:37	RC	9	9:27	9:32	30	29	Pass	Pass	N/A	CC	
23/24	8.0	9:15	RC	9	10:50	10:55	32	31	Pass	Pass	N/A	CC	
24/25	9.0	9:22	RC	9	11:30	11:35	40	39	Pass	Pass	N/A	CC	
25/26	11.0	9:30	RC	9	11:35	11:40	32	30	Pass	Pass	N/A	CC	
26/27	12.0	9:38	RC	9	11:40	11:45	30	29	Pass	Pass	N/A	CC	
27/28	13.0	9:52	RC	9	11:45	11:50	30	30	Pass	Pass	N/A	CC	
28/29	13.0	9:57	RC	9	11:50	11:55	30	30	Pass	Pass	N/A	CC	
29/30	14.0	10:05	RC	9	11:55	12:00	30	30	Pass	Pass	N/A	CC	
30/31	16.0	10:15	RC	9	12:00	12:05	30	30	Pass	Pass	N/A	CC	
31/32	17.0	10:24	RC	9	12:04	12:09	30	30	Pass	Pass	N/A	CC	
32/33	18.0	10:32	RC	9	12:09	12:13	30	29	Pass	Pass	N/A	CC	
S.Butt	92.0	11:02	RC	9	12:15	12:20	36	35	Pass	Pass	N/A	CC	Panels 18 - 33.

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Saturday, August 14, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
34/35	17.0	6:49	RC	9	11:36	11:41	30	30	Pass	Pass	N/A	CC	
35/36	19.0	7:00	RC	9	12:34	12:39	40	40	Pass	Pass	N/A	CC	
36/37	20.0	7:11	RC	9	11:45	11:50	30	30	Pass	Pass	N/A	CC	
37/38	20.0	7:23	RC	9	11:37	11:42	30	30	Pass	Pass	N/A	CC	
38/39	21.0	7:36	RC	9	11:29	11:34	30	30	Pass	Pass	N/A	CC	
39/40	21.0	7:48	RC	9	11:20	11:25	30	30	Pass	Pass	N/A	CC	
40/41	23.0	8:03	RC	9	11:14	11:19	30	29	Pass	Pass	N/A	CC	
41/42A	13.0	8:15	RC	9	11:55	12:00	32	30	Pass	Pass	N/A	CC	
41/42B	10.0	8:22	RC	9	11:54	12:00	30	30	Pass	Pass	N/A	CC	
42/43	23.0	8:58	RC	9	12:55	1:00	30	30	Pass	Pass	N/A	CC	
43/44	23.0	9:10	RC	9	1:01	1:06	30	30	Pass	Pass	N/A	CC	
44/45	24.0	9:21	RC	9	10:12	10:17	30	30	Pass	Pass	N/A	CC	
45/46	25.0	10:07	RC	9	10:20	10:25	31	30	Pass	Pass	N/A	CC	
46/47	28.0	9;37	RC	9	10:45	10:50	30	30	Pass	Pass	N/A	CC	
47/48	26.0	10:21	RC	9	10:53	10:58	31	31	Pass	Pass	N/A	CC	
49/50	8.0	10:03	RC	9	11:00	11:05	30	29	Pass	Pass	N/A	CC	
50/51	8.0	10:33	RC	9	11:06	11:11	30	30	Pass	Pass	N/A	CC	
N.Butt/A	43.0	11:35	RC	9	12:20	12:25	31	28	Pass	Pass	N/A	CC	Panels 34 - 39.
N.Butt/B	50.0	11:35	RC	9	12:33	12:38	30	29	Pass	Pass	N/A	CC	Panels 40 - 46.
Sump/A	3.5	12:10	RC	9	1:13	1:18	30	30	Pass	Pass	N/A	CC	North side of Sump, Panels 47/51.
Sump/B	3.5	12:10	RC	9	1:20	1:25	30	30	Pass	Pass	N/A	CC	North side of Sump, Panels 47/50.
Sump/C	3.5	12:10	RC	9	1:29	1:34	30	30	Pass	Pass	N/A	CC	North side of Sump, Panels 48/49.
Sump/D	20.0	12:35	RC	9	1:45	1:50	30	28	Pass	Pass	N/A	CC	South side of Sump, Panels 49 - 51.

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Monday, August 16, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Secondary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
48/52	18.0	8:17	RC	9	9:58	10:03	30	30	Pass	Pass	N/A	CC	
52/53	12.0	8:31	RC	9	9:50	9:55	32	32	Pass	Pass	N/A	CC	
54/55	4.0	9:27	RC	9	10:22	10:27	30	30	Pass	Pass	N/A	CC	
55/56	8.0	9:00	RC	9	10:35	10:40	30	30	Pass	Pass	N/A	CC	
56/57	12.0	9:12	RC	9	10:50	10:55	30	30	Pass	Pass	N/A	CC	
57/58	18.0	9:47	RC	9	11:11	11:16	33	33	Pass	Pass	N/A	CC	
58/59	22.0	10:03	RC	9	11:20	11:25	30	30	Pass	Pass	N/A	CC	
59/60	23.0	10:15	RC	9	11:29	11:34	30	30	Pass	Pass	N/A	CC	
60/61	23.0	10:45	RC	9	11:43	11:48	30	30	Pass	Pass	N/A	CC	
61/62	23.0	10:59	RC	9	11:55	12:00	30	30	Pass	Pass	N/A	CC	
62/63	23.0	11:43	RC	9	12:20	12:25	30	30	Pass	Pass	N/A	CC	
63/64	24.0	11:26	RC	9	12:33	12:38	31	30	Pass	Pass	N/A	CC	
64/65	24.0	11:34	RC	9	12:41	12:46	30	30	Pass	Pass	N/A	CC	
65/66	24.0	12:50	RC	9	1:47	1:51	30	30	Pass	Pass	N/A	CC	
66/67	24.0	1:02	RC	9	1:57	2:02	30	30	Pass	Pass	N/A	CC	
67/68	24.0	1:19	RC	9	2:06	2:11	30	30	Pass	Pass	N/A	CC	
68/69	24.0	1:41	RC	9	2:22	2:27	32	31	Pass	Pass	N/A	CC	
69/70	24.0	2:03	RC	9	2:26	2:31	40	38	Pass	Pass	N/A	CC	
East Butt	93.0	3:22	RC	9	7:06	7:11	34	33	Pass	Pass	N/A	CC	Panels 70 - 57.
N.E.Butt	35.0	12:11	JC	17	2:45	2:50	30	29	Pass	Pass	N/A	CC	Panels 57 - 52.

Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE August 9 to 16, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021** MATERIAL 60mil HDPE DTEX - Secondary Liner

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
	Extruded August 9th							
1	Patch	4/5	Aug 9, 2021	JC	X2	RC	Pass	Destruct #1.
	Extruded August 10th							
2	Patch	8/9	Aug 10, 2021	JC	X2	RC	Pass	GCL caught in welder.
3	Patch	8/9	Aug 10, 2021	JC	X2	RC	Pass	GCL caught in welder.
4	Patch	9/10	Aug 10, 2021	JC	X2	RC	Pass	Destruct #2.
5	Patch	12/13	Aug 10, 2021	JC	X2	RC	Pass	Destruct #3.
6	Patch	16/17	Aug 10, 2021	JC	X2	RC	Pass	Destruct #4.
	Extruded August 11th							
Zone 1	Beads	S.Butt	Aug 11, 2021	JC	X2	MC	Pass	All "T" Intersections along South Butt.
	Extruded August 14th							
7	Patch	41/42	Aug 14, 2021	MC	X2	CC	Pass	Welder stalled midway up slope.
8	Patch	47/48	Aug 14, 2021	MC	X2	CC	Pass	Destruct #6.
9	Patch	50/51	Aug 14, 2021	MC	X2	CC	Pass	In Sump.
10	Patch	49/50	Aug 14, 2021	MC	X2	CC	Pass	In Sump.
11	Patch	N.Butt	Aug 14, 2021	MC	X2	CC	Pass	At Seam 39/40.
Zone 2	Beads	N.Butt	Aug 14, 2021	MC	X2	CC	Pass	All "T" Intersections along South Butt/A and B.
Zone 3	Beads	Sump Butt	Aug 14, 2021	MC	X2	CC	Pass	All "T" Intersections along Sump Butt/D.
	Extruded August 16th							
12	Patch	49/57	Aug 16, 2021	MC	X2	CC	Pass	At Sump.
13	Patch	E.Butt	Aug 16, 2021	MC	X2	CC	Pass	End of East Butt at Panel 57.
14	Patch	67/68	Aug 16, 2021	MC	X2	CC	Pass	Destruct #7.
Zone 4	Beads	E.Butt	Aug 16, 2021	MC	X2	CC	Pass	All "T" Intersections along East Butt.
Zone 5	Beads	N.E.Butt	Aug 16, 2021	MC	X2	CC	Pass	All "T" Intersections along North East Butt.

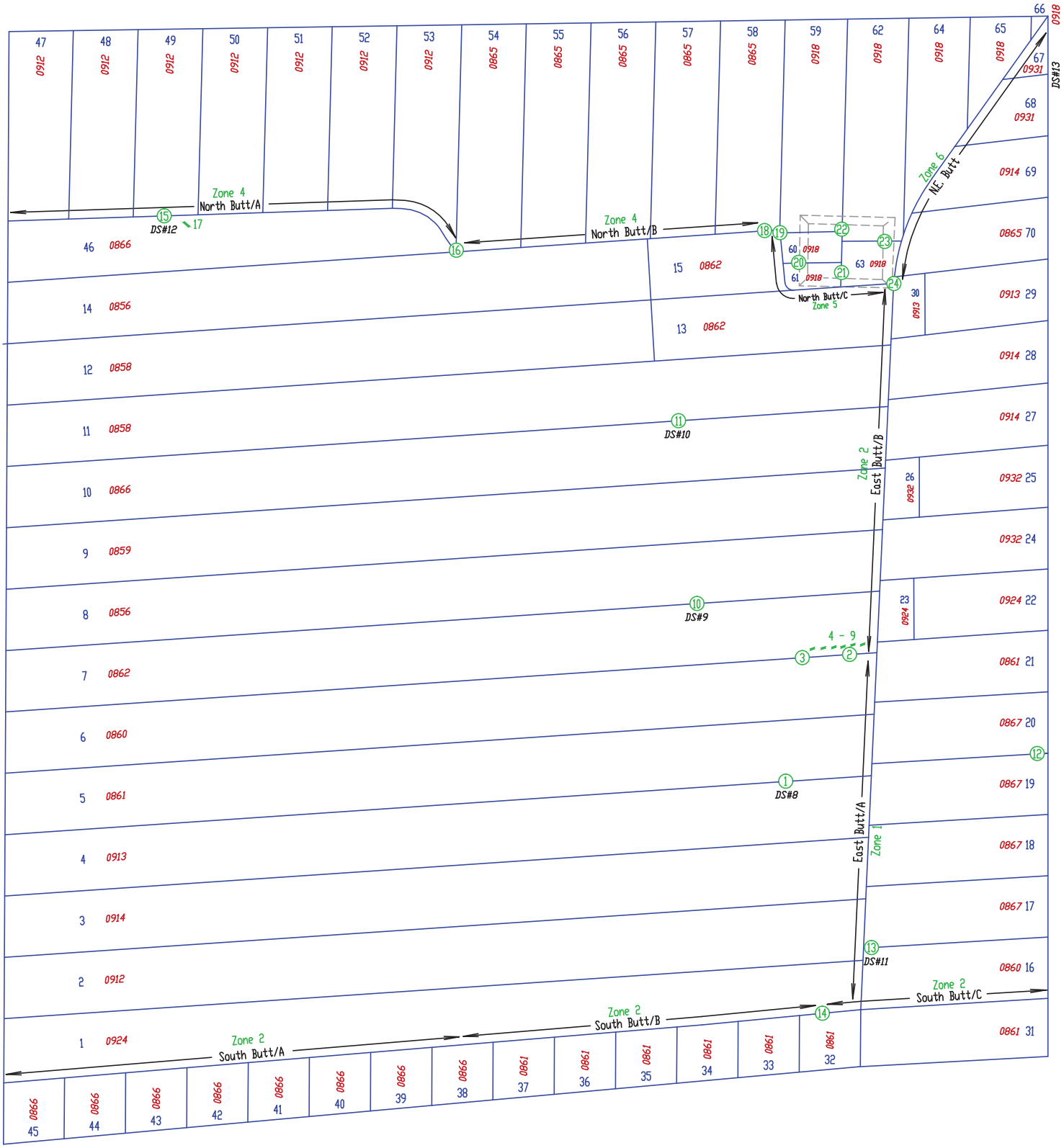
Cassidy
Consulting Inc.

DESTRUCTIVE TESTING REPORT

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021** MATERIAL 60mil HDPE DTEX - Secondary Liner

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
8-09-21	1	4/5	RC	9	121	128	193	117	138	194	128	113	194	108	143	192	133	143	190	CC	On Floor.
8-10-21	2	9/10	RC	9	130	150	190	121	142	189	124	148	193	119	145	191	122	141	190	CC	On Floor.
8-10-21	3	12/13	RC	9	105	121	151	113	118	155	106	116	158	118	121	156	138	129	159	CC	On Floor.
8-10-21	4	16/17	RC	9	112	123	151	110	120	151	114	109	152	115	117	150	112	107	158	CC	On Floor.
8-14-21	5	36/37	RC	9	105	116	181	113	126	182	115	127	184	137	131	179	119	120	180	CC	Run out on floor.
8-14-21	6	47/48	RC	9	134	244	187	130	125	192	136	132	191	127	133	192	129	136	189	CC	Crest of slope.
8-16-21	7	67/68	RC	9	130	120	180	118	116	179	134	129	178	128	132	177	149	128	177	CC	Toe of slope.

NORTHWIN LANDFILL CELL 1
PRIMARY LINER



DATE: September 13, 2021	Cassidy Consulting Inc.	NORTHWIN LANDFILL - CELL 1 - 2021
SCALE: NTS		CAMPBELL RIVER, B.C.
FILE NAME: CampbellRiverCell-Primary		60mil Dtex Primary Liner Representative Drawing
DRAWN BY: SSC		
CHECKED BY: CJC		

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, August 18, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
8:31	9	RC			860ºF		600	1	140	1	128	1	190	CC	
8:31	9	RC			860ºF		600	2	131	2	124	2	193	CC	
8:31	9	RC			860ºF		600	3	132	3	143	3	191	CC	
8:31	9	RC			860ºF		600	4	131	4	140	4	191	CC	
8:31	9	RC			860ºF		600	5	136	5	137	5	188	CC	
11:01	9	RC			860ºF		620	1	125	1	145	1	182	CC	
11:01	9	RC			860ºF		620	2	130	2	134	2	183	CC	
11:01	9	RC			860ºF		620	3	133	3	142	3	177	CC	
11:01	9	RC			860ºF		620	4	137	4	139	4	182	CC	
11:01	9	RC			860ºF		620	5	132		139	5	179	CC	
1:30	X2	MC	520ºF	530ºF				1	125	1		1	176	CC	
1:30	X2	MC	520ºF	530ºF				2	128	2		2	178	CC	
1:30	X2	MC	520ºF	530ºF				3	136	3		3	171	CC	
1:30	X2	MC	520ºF	530ºF				4	137	4		4	176	CC	
1:30	X2	MC	520ºF	530ºF				5	133	5		5	174	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Thursday, August 19, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:22	9	RC			860ºF		600	1	135	1	147	1	195	CC	
7:22	9	RC			860ºF		600	2	138	2	132	2	193	CC	
7:22	9	RC			860ºF		600	3	145	3	137	3	194	CC	
7:22	9	RC			860ºF		600	4	127	4	120	4	191	CC	
7:22	9	RC			860ºF		600	5	115	5	131	5	193	CC	

Cassidy
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WELDER QUALIFICATIONS

DATE Friday, August 20, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:44	9	RC			860ºF		600	1	113	1	112	1	176	CC	
6:44	9	RC			860ºF		600	2	109	2	116	2	177	CC	
6:44	9	RC			860ºF		600	3	114	3	113	3	174	CC	
6:44	9	RC			860ºF		600	4	116	4	119	4	174	CC	
6:44	9	RC			860ºF		600	5	127		123	5	176	CC	
9:35	X2	MC	520ºF	530ºF				1	139	1		1	170	CC	
9:35	X2	MC	520ºF	530ºF				2	126	2		2	172	CC	
9:35	X2	MC	520ºF	530ºF				3	133	3		3	169	CC	
9:35	X2	MC	520ºF	530ºF				4	130	4		4	164	CC	
9:35	X2	MC	520ºF	530ºF				5	135	5		5	167	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Saturday, August 21, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
6:24	9	RC			860ºF		600	1	132	1	126	1	200	CC	
6:24	9	RC			860ºF		600	2	134	2	132	2	199	CC	
6:24	9	RC			860ºF		600	3	137	3	129	3	199	CC	
6:24	9	RC			860ºF		600	4	136	4	134	4	197	CC	
6:24	9	RC			860ºF		600	5	135		138	5	195	CC	
2:15	X2	JC	520ºF	530ºF				1	131	1		1	178	CC	
2:15	X2	JC	520ºF	530ºF				2	141	2		2	174	CC	
2:15	X2	JC	520ºF	530ºF				3	143	3		3	171	CC	
2:15	X2	JC	520ºF	530ºF				4	132	4		4	174	CC	
2:15	X2	JC	520ºF	530ºF				5	117			5	178	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Monday, August 23, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
12:00	9	RC			860ºF		600	1	115	1	134	1	168	CC	
12:00	9	RC			860ºF		600	2	116	2	129	2	169	CC	
12:00	9	RC			860ºF		600	3	139	3	133	3	164	CC	
12:00	9	RC			860ºF		600	4	122	4	129	4	173	CC	
12:00	9	RC			860ºF		600	5	119		128	5	172	CC	
2:00	X2	JC	520ºF	530ºF				1	121	1		1	171	CC	
2:00	X2	JC	520ºF	530ºF				2	132	2		2	173	CC	
2:00	X2	JC	520ºF	530ºF				3	135	3		3	169	CC	
2:00	X2	JC	520ºF	530ºF				4	112	4		4	169	CC	
2:00	X2	JC	520ºF	530ºF				5	113			5	166	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Tuesday, August 24, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
12:00	9	RC			860ºF		600	1	134	1	133	1	168	CC	
12:00	9	RC			860ºF		600	2	123	2	146	2	167	CC	
12:00	9	RC			860ºF		600	3	124	3	145	3	169	CC	
12:00	9	RC			860ºF		600	4	111	4	145	4	168	CC	
12:00	9	RC			860ºF		600	5	124		136	5	170	CC	
2:00	X2	JC	520ºF	530ºF				1	111	1		1	155	CC	
2:00	X2	JC	520ºF	530ºF				2	109	2		2	156	CC	
2:00	X2	JC	520ºF	530ºF				3	108	3		3	164	CC	
2:00	X2	JC	520ºF	530ºF				4	121	4		4	164	CC	
2:00	X2	JC	520ºF	530ºF				5	107			5	159	CC	

Cassidy
Consulting Inc.

WELDER QUALIFICATIONS

DATE Wednesday, August 25, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL 60mil HDPE DTEX - Primary Liner

			EXTRUDER		FUSION WELDER			TENSIONMETER VALUES LBs/INCH								
QUALIFY TIME	WELDER NUMBER	TECH INITIALS	BARREL TEMP ºC/ºF	PREHEAT TEMP ºC/ºF	SET TEMP ºC/ºF	MEASURED SPEED	SPEED SETTINGS		PEEL INSIDE		PEEL OUTSIDE		SHEAR VALUE	QC INITIAL	WEATHER / COMMENTS:
7:08	9	RC			860ºF		600	1	135	1	112	1	169	CC	
7:08	9	RC			860ºF		600	2	114	2	117	2	172	CC	
7:08	9	RC			860ºF		600	3	133	3	107	3	168	CC	
7:08	9	RC			860ºF		600	4	142	4	106	4	169	CC	
7:08	9	RC			860ºF		600	5	133		115	5	160	CC	
11:00	9	RC			860ºF		680	1	107	1	112	1	167	CC	
11:00	9	RC			860ºF		680	2	113	2	112	2	165	CC	
11:00	9	RC			860ºF		680	3	109	3	112	3	166	CC	
11:00	9	RC			860ºF		680	4	110	4	111	4	170	CC	
11:00	9	RC			860ºF		680	5	118	5	113	5	178	CC	
11:54	X2	JC	520ºF	530ºF				1	111	1		1	155	CC	
11:54	X2	JC	520ºF	530ºF				2	109	2		2	156	CC	
11:54	X2	JC	520ºF	530ºF				3	109	3		3	160	CC	
11:54	X2	JC	520ºF	530ºF				4	105	4		4	161	CC	
11:54	X2	JC	520ºF	530ºF				5	106			5	160	CC	

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Wednesday, August 18, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
1	0924	Floor	84.00	7.30	613.20	South side laying North - West to East.
2	0912	Floor	84.00	7.30	613.20	
3	0914	Floor	87.00	7.30	635.10	
4	0913	Floor	90.00	7.30	657.00	
5	0861	Floor	90.00	7.30	657.00	
6	0860	Floor	90.00	7.30	657.00	
7	0862	Floor	90.00	7.30	657.00	
8	0856	Floor	90.00	7.30	657.00	

5146.50 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Thursday, August 19, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
9	0859	Floor	90.00	7.30	657.00	
10	0866	Floor	90.00	7.30	657.00	
11	0858	Floor	87.00	7.30	635.10	
12	0858	Floor	60.00	7.30	438.00	
13	0862	Floor	30.00	7.30	219.00	
14	0856	Floor	60.00	7.30	438.00	
15	0862	Floor	20.00	7.30	146.00	

3190.10 **sq m**

PANEL PLACEMENT LOG

Cassidy

Consulting Inc.

DATE Friday, August 20, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - **Primary Liner**

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
16	0860	East Slope	34.00	7.30	248.20	
17	0867	East Slope	35.00	7.30	255.50	
18	0867	East Slope	35.00	7.30	255.50	
19	0867	East Slope	35.00	7.30	255.50	
20	0867	East Slope	34.00	7.30	248.20	
21	0861	East Slope	32.00	7.30	233.60	

1496.50 **sq m**

PANEL PLACEMENT LOG

Cassidy

Consulting Inc.

DATE Saturday, August 21, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
22	0924	East Slope	30.00	7.30	219.00	
23	0924	Floor	3.00	7.30	21.90	
24	0932	East Slope	34.00	7.30	248.20	
25	0932	East Slope	28.00	7.30	204.40	
26	0932	Floor	4.00	7.30	29.20	
27	0914	East Slope	32.00	7.30	233.60	
28	0914	East Slope	32.00	7.30	233.60	
29	0913	East Slope	29.00	7.30	211.70	
30	0913	Floor	3.00	7.30	21.90	

1423.50 **sq m**

PANEL PLACEMENT LOG

Cassidy

Consulting Inc.

DATE Monday, August 23, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
31	0861	S.E.Corner	33.00	7.30	240.90	
32	0861	South Slope	5.00	7.30	36.50	
33	0861	South Slope	5.00	7.30	36.50	
34	0861	South Slope	6.00	7.30	43.80	
35	0861	South Slope	7.00	7.30	51.10	
36	0861	South Slope	7.00	7.30	51.10	
37	0861	South Slope	7.00	7.30	51.10	
38	0866	South Slope	8.00	7.30	58.40	
39	0866	South Slope	8.00	7.30	58.40	
40	0866	South Slope	9.00	7.30	65.70	
41	0866	South Slope	9.00	7.30	65.70	
42	0866	South Slope	9.00	7.30	65.70	
43	0866	South Slope	8.00	7.30	58.40	
44	0866	South Slope	7.00	7.30	51.10	
45	0866	S.W.Corner	7.00	7.30	51.10	

985.50 **sq m**

PANEL PLACEMENT LOG

Cassidy
Consulting Inc.

DATE Tuesday, August 24, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021 MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
46	0866	Floor	50.00	7.30	365.00	
47	0912	N.W.Corner	23.00	7.30	167.90	
48	0912	North Slope	24.00	7.30	175.20	
49	0912	North Slope	24.00	7.30	175.20	
50	0912	North Slope	24.00	7.30	175.20	
51	0912	North Slope	24.00	7.30	175.20	
52	0912	North Slope	24.00	7.30	175.20	
53	0912	North Slope	31.00	7.30	226.30	
54	0865	North Slope	31.00	7.30	226.30	
55	0865	North Slope	31.00	7.30	226.30	
56	0865	North Slope	31.00	7.30	226.30	
57	0865	North Slope	31.00	7.30	226.30	
58	0865	North Slope	31.00	7.30	226.30	

2766.70 **sq m**

PANEL PLACEMENT LOG

Cassidy

Consulting Inc.

DATE Wednesday, August 25, 2021

PROJECT NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021

MATERIAL 60mil HDPE DTEX - Primary Liner

PANEL NUMBER	ROLL NUMBER	WORK AREA	PANEL LENGTH	PANEL WIDTH	PANEL AREA	COMMENTS:
59	0918	North Slope	32.00	7.30	233.60	
60	0918	Sump	4.00	7.30	29.20	
61	0918	Sump	3.00	7.30	21.90	
62	0918	North Slope	33.00	7.30	240.90	
63	0918	Sump	7.00	7.30	51.10	
64	0918	N.E.Corner	25.00	7.30	182.50	
65	0918	N.E.Corner	9.00	7.30	65.70	
66	0918	N.E.Corner	3.00	7.30	21.90	
67	0931	N.E.Corner	7.00	7.30	51.10	
68	0931	N.E.Corner	18.00	7.30	131.40	
69	0914	N.E.Corner	26.00	7.30	189.80	
70	0865	East Slope	29.00	7.30	211.70	

1430.80 **sq m**

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Wednesday, August 18, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
1/2	84.0	9:06	RC	9	9:45	9:50	35	35	Pass	Pass	N/A	CC	
2/3	84.0	9:45	RC	9	10:30	10:35	30	30	Pass	Pass	N/A	CC	
3/4	87.0	10:57	RC	9	12:02	12:07	40	39	Pass	Pass	N/A	CC	
4/5	90.0	11:27	RC	9	12:11	12:16	30	30	Pass	Pass	N/A	CC	
5/6	90.0	12:58	RC	9	1:33	1:38	30	30	Pass	Pass	N/A	CC	
6/7/A	75.0	1:47	RC	9	3:06	3:11	30	30	Pass	Pass	N/A	CC	
6/7/B	15.0	1:47	RC	9	3:01	3:06	30	30	Pass	Pass	N/A	CC	
7/8	90.0	2:55	RC	9	3:40	3:45	30	30	Pass	Pass	N/A	CC	

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Thursday, August 19, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
8/9	90.0	8:06	RC	9	8:46	8:51	30	30	Pass	Pass	N/A	CC	
9/10	90.0	8:45	RC	9	9:25	9:30	30	30	Pass	Pass	N/A	CC	
10/11	87.0	7:18	RC	9	8:06	8:11	40	39	Pass	Pass	N/A	CC	
12/13	7.3	8:08	RC	9	9:15	9:20	30	30	Pass	Pass	N/A	CC	Cross Seam
11/12/13	87.0	8:12	RC	9	9:30	9:35	30	30	Pass	Pass	N/A	CC	
14/15	7.3	8:45	RC	9	8:40	8:45	30	30	Pass	Pass	N/A	CC	Cross Seam
12/13/14/15	80.0	8:52	RC	9	9:36	9:41	30	30	Pass	Pass	N/A	CC	

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Friday, August 20, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
16/17	34.0	12:06	RC	9	12:38	12:43	30	30	Pass	Pass	N/A	CC	
17/18	35.0	12:32	RC	9	12::42	12:47	30	30	Pass	Pass	N/A	CC	
18/19	35.0	12:37	RC	9	1:25	1:30	30	30	Pass	Pass	N/A	CC	
19/20	34.0	12:54	RC	9	1:20	1:25	30	30	Pass	Pass	N/A	CC	
20/21	32.0	1:08	RC	9	1:30	1:35	30	30	Pass	Pass	N/A	CC	
E.Butt/A	42.0	1:53	RC	9	3:11	3:16	30	30	Pass	Pass	N/A	CC	Panels 16 - 21.

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Saturday, August 21, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
22/23	7.3	6:54	RC	9	9:06	9:11	30	30	Pass	Pass	N/A	CC	Cross Seam
21/22/23	32.0	8:54	RC	9	10:35	10:40	30	30	Pass	Pass	N/A	CC	
22/23/24	33.0	6:59	RC	9	10:18	10:23	40	39	Pass	Pass	N/A	CC	
25/26	7.3	7:29	RC	9	9:10	9:15	30	30	Pass	Pass	N/A	CC	Cross Seam
24/25/26	32.0	7:46	RC	9	10:13	10:18	30	30	Pass	Pass	N/A	CC	
25/26/27	32.0	8:05	RC	9	10:43	10:48	30	30	Pass	Pass	N/A	CC	
27/28	32.0	8:26	RC	9	10:52	10:57	33	31	Pass	Pass	N/A	CC	
29/30	7.3	9:09	RC	9	9:30	9:40	30	30	Pass	Pass	N/A	CC	Cross Seam
28/29/30	32.0	9:27	RC	9	9:22	9:27	30	30	Pass	Pass	N/A	CC	
E.Butt/B	42.0	9:46	RC	9	11:25	11:30	30	30	Pass	Pass	N/A	CC	Panels 21 - 30.

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Monday, August 23, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
31/32	5.0	12:01	RC	9	12:10	12:15	30	30	Pass	Pass	N/A	CC	
32/33	5.0	12:10	RC	9	12:15	12:20	30	30	Pass	Pass	N/A	CC	
33/34	5.0	12:14	RC	9	12:20	12:25	40	39	Pass	Pass	N/A	CC	
34/35	6.0	12:18	RC	9	12:30	12:35	30	30	Pass	Pass	N/A	CC	
35/36	7.0	12:20	RC	9	12:37	12:42	30	30	Pass	Pass	N/A	CC	
36/37	7.0	12:25	RC	9	12:45	12:50	30	30	Pass	Pass	N/A	CC	
37/38	7.0	12:29	RC	9	12:50	12:55	30	30	Pass	Pass	N/A	CC	
38/39	8.0	12:34	RC	9	12:55	1:00	33	31	Pass	Pass	N/A	CC	
39/40	8.0	12:41	RC	9	1:01	1:06	30	30	Pass	Pass	N/A	CC	
40/41	9.0	12:45	RC	9	1:07	1:12	30	30	Pass	Pass	N/A	CC	
41/42	9.0	12:50	RC	9	1:15	1:20	30	30	Pass	Pass	N/A	CC	
42/43	8.0	1:01	RC	9	1:20	1:25	30	30	Pass	Pass	N/A	CC	
43/44	8.0	1:07	RC	9	1:30	1:35	30	30	Pass	Pass	N/A	CC	
44/45	7.0	1:11	RC	9	1:36	1:41	31	30	Pass	Pass	N/A	CC	
S.Butt/A	47.0	1:33	RC	9	2.57	3:02	35	33	Pass	Pass	N/A	CC	Panels 45 - 39.
S.Butt/B	47.0	1:33	RC	9	3:11	3:16	30	28	Pass	Pass	N/A	CC	Panels 39 - 32.
S.Butt/C	38.0	1:33	RC	9	3:25	3:30	30	29	Pass	Pass	N/A	CC	Panels 32 - 31.

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Tuesday, August 24, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
47/48	23.0	9:04	RC	9	11:10	11:15	30	30	Pass	Pass	N/A	CC	
48/49	24.0	9:14	RC	9	11:15	11:20	30	30	Pass	Pass	N/A	CC	
49/50	24.0	9:43	RC	9	11:21	11:26	40	39	Pass	Pass	N/A	CC	
50/51	24.0	9:54	RC	9	11:27	11:32	30	30	Pass	Pass	N/A	CC	
51/52	24.0	10:03	RC	9	11:38	11:43	30	30	Pass	Pass	N/A	CC	
52/53	24.0	11:39	RC	9	12:06	12:11	30	30	Pass	Pass	N/A	CC	
53/54	31.0	11:51	RC	9	12:12	12:17	30	30	Pass	Pass	N/A	CC	
54/55	31.0	12:50	RC	9	1:05	1:10	33	31	Pass	Pass	N/A	CC	
55/56	31.0	12:07	RC	9	12:18	12:23	30	30	Pass	Pass	N/A	CC	
56/57	31.0	12:21	RC	9	12:24	12:29	30	30	Pass	Pass	N/A	CC	
57/58	31.0	12:32	RC	9	12:40	12:45	30	30	Pass	Pass	N/A	CC	
14/46	50.0	1:15	RC	9	2:46	2:51	30	30	Pass	Pass	N/A	CC	
N.Butt/A	50.0	10:28	RC	9	11:47	11:52	35	33	Pass	Pass	N/A	CC	Panels 46 - 53.
N.Butt/B	35.0	1:15	RC	9	2:46	2:51	32	30	Pass	Pass	N/A	CC	Panels 54 - 58

Cassidy
Consulting Inc.

NON-DESTRUCTIVE TESTING
SEAM LOG

DATE: Wednesday, August 25, 2021

PROJECT: **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021**

MATERIAL: 60mil HDPE DTEX - Primary Liner

					AIR PRESSURE TESTING				PEELS				
SEAM NUMBER	SEAM LENGTH	WELD TIME	TECH INITIAL	WELDER NUMBER	TIME START	TIME FINISH	PSI START	PSI FINISH	PEEL INSIDE	PEEL OUTSIDE	VAC-TEST Pass/FAIL	QC INITIAL	COMMENTS:
58/59	31.0	11:41	RC	9	12:26	12:31	30	30	Pass	Pass	N/A	CC	
59/60	7.3	10:25	RC	9	10:45	10:50	30	30	Pass	Pass	N/A	CC	Cross Seam
60/61	7.3	10:38	RC	9	11:10	11:15	40	39	Pass	Pass	N/A	CC	Cross Seam
62/63	7.3	10:34	RC	9	11:01	11:06	30	30	Pass	Pass	N/A	CC	Cross Seam
59-62/60-63	39.0	11:10	RC	9	11:56	12:01	30	30	Pass	Pass	N/A	CC	Slope to Sump Panels 59/60/61/62/63.
62/64	25.0	9:56	RC	9	10:44	10:49	30	30	Pass	Pass	N/A	CC	
64/65	9.0	9:46	RC	9	10:31	10:36	30	30	Pass	Pass	N/A	CC	
65/66	3.0	10:07	RC	9	10:36	10:41	33	31	Pass	Pass	N/A	CC	
67/68	7.0	11:27	RC	9	12:11	12:16	30	30	Pass	Pass	N/A	CC	
68/69	18.0	9:29	RC	9	9:40	9:45	30	30	Pass	Pass	N/A	CC	
69/70	26.0	9:20	RC	9	9:10	9:15	30	30	Pass	Pass	N/A	CC	
70/29	29.0	8:44	RC	9	8:50	8:55	32	31	Pass	Pass	N/A	CC	
N.Butt/C	20.0	12:09	RC	9	12:47	12:52	30	28	Pass	Pass	N/A	CC	Sump Panels 60 - 63.
N.E.Butt	51.0	1:27	RC	9	2:11	2:16	40	38	Pass	Pass	N/A	CC	Panels 63 - 70.

Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE August 18 to 23, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021** MATERIAL 60mil HDPE DTEX - Primary Liner

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
	Extruded August 18th							
1	Patch	4/5	Aug 18, 2021	MC	X2	CC	Pass	Destruct #8.
2	Patch	6/7	Aug 18, 2021	MC	X2	CC	Pass	Burn Out.
3	Patch	6/7	Aug 18, 2021	MC	X2	CC	Pass	Burn Out.
4	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
5	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
6	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
7	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
8	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
9	Bead	7	Aug 18, 2021	MC	X2	CC	Pass	Roll Damage.
	Extruded August 20th							
10	Patch	7/8	Aug 20, 2021	MC	X2	CC	Pass	Destruct #9.
11	Patch	10/11	Aug 20, 2021	MC	X2	CC	Pass	Destruct #10.
12	Patch	19/20	Aug 20, 2021	MC	X2	CC	Pass	Burn out Crest of slope.
Zone 1	Beads	E.Butt/A	Aug 20, 2021	MC	X2	CC	Pass	All "T" Intersections along E.Butt/A.
	Extruded August 21st							
13	Patch	16/17	Aug 21, 2021	JC	X2	RC	Pass	Destruct #11.
Zone 2	Beads	E.Butt/B	Aug 21, 2021	JC	X2	RC	Pass	All "T" Intersections along E.Butt/B.
	Extruded August 23rd							
14	Patch	32/1	Aug 23, 2021	JC	X2	RC	Pass	Start/Stop at Panel 32.

Cassidy
Consulting Inc.

EXTRUSION WELD REPORT

DATE August 24 to 25, 2021

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021** MATERIAL 60mil HDPE DTEX - Primary Liner

EXTRUSION NUMBER	EXTRUSION TYPE	PANEL/SEAM NUMBER	TEST DATE	TECH INITIAL	MACHINE NUMBER	QC INITIAL	PASS/ FAIL	COMMENTS:
	Extruded August 24th							
15	Patch	46/49	Aug 24, 2021	JC	X2	RC	Pass	Destruct #12.
16	Patch	N.Butt	Aug 24, 2021	JC	X2	RC	Pass	Start/Stop at Seam 53/54.
17	Bead	46	Aug 24, 2021	JC	X2	RC	Pass	Near Panel 49.
Zone 4	Beads	N.Butt/A&B	Aug 24, 2021	JC	X2	RC	Pass	All "T" Intersections along N.Butt/A and B.
	Extruded August 25th							
18	Patch	N.Butt/B	Aug 25, 2021	JC	X2	RC	Pass	Start/Stop at Panel 58.
19	Patch	58/59	Aug 25, 2021	JC	X2	RC	Pass	At N.W. Corner of Sump.
20	Patch	60/61	Aug 25, 2021	JC	X2	RC	Pass	Fit Liner in Sump area.
21	Patch	61/63	Aug 25, 2021	JC	X2	RC	Pass	Fit Liner in Sump area.
22	Patch	59/62	Aug 25, 2021	JC	X2	RC	Pass	Fit Liner in Sump area.
23	Patch	62/63	Aug 25, 2021	JC	X2	RC	Pass	Fit Liner in Sump area.
24	Patch	E.Butt/B	Aug 25, 2021	JC	X2	RC	Pass	Start/Stop between E.Butt/B and N.E.Butt.
Zone 5	Beads	N.Butt/C	Aug 25, 2021	JC	X2	RC	Pass	All "T" Intersections along N.Butt/C.
Zone 6	Beads	N.E.Butt	Aug 25, 2021	JC	X2	RC	Pass	All "T" Intersections along N.E.Butt.

Cassidy
Consulting Inc.

DESTRUCTIVE TESTING REPORT

PROJECT **NORTHWIN ENVIRONMENTAL LANDFILL - CELL1 - 2021** MATERIAL 60mil HDPE DTEX - Primary Liner

WELD DATE	D.S. #	SEAM #	TECH INITIAL	WELDER NUMBER	PEEL 1		SHEAR	PEEL 2		SHEAR	PEEL 3		SHEAR	PEEL 4		SHEAR	PEEL 5		SHEAR	QC INITIAL	COMMENTS / LOCATION
					IN	OUT		IN	OUT		IN	OUT		IN	OUT		IN	OUT			
8-18-21	8	4/5	RC	9	107	122	183	129	128	183	127	113	181	127	111	182	117	122	182	CC	First Destruct on Primary liner - Floor.
8-19-21	9	7/8	RC	9	119	117	156	102	104	158	119	106	159	120	116	160	113	115	169	CC	On Floor.
8-19-21	10	10/11	RC	9	124	120	170	122	108	168	123	111	164	127	112	167	129	140	165	CC	On Floor.
8-20-21	11	16/17	RC	9	132	119	172	119	107	173	121	106	171	118	122	170	120	120	165	CC	At Toe of Slope.
8-24-21	12	46/49	RC	9	135	145	151	131	135	153	112	134	152	113	135	150	131	122	150	CC	On Floor.
8-25-21	13	67/68	RC	9	143	130	175	117	120	174	118	128	174	119	134	180	136	121	175	CC	In Anchor Trench.

Appendix F

Field Inspections

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	3/19/2021 13:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil, Brad Maxwell		
WEATHER CONDITIONS:	Raining 7 ^{o}C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe sub-base conditions of pit particularly where East Berm construction will begin next week

SITE NOTES / PROGRESS:
-Fill stakes have been placed by surveyor
-No excavation required before filling activities begin for East Berm
-Floor of pit generally compact and free of debris
-Small amounts of ponding scattered around pit floor due to recent rain
-Observed proof roll, soil compaction appeared adequate
-One large rock observed near toe of east slope (photo attached). Instructed Joe to remove before placing fill

Next Steps
-Begin fill activities on Monday, March 22
-Compaction testing tentatively set for 13:00 on March 22

OUTSTANDING INFORMATION / NEW ISSUES:
-Brad has question regarding centre line of East Berm on drawing. Email sent to Roxy.

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	3/22/2021 13:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil, Brad Maxwell Johnny Csondes (McElhanney)		
WEATHER CONDITIONS:	Mixed sun, cloud, rain 10 ^{o}C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe fill activites and compaction testing

SITE NOTES / PROGRESS:
-One lift had been placed on North and East Berm
-Trucks were hauling material being excavated from slope South of Landfill routing over East Berm to North Berm to increase compaction
-McElhanney tested compaction on several places on East Berm. It was unknown how many passes were made with the vibrator packer.
-No packing had yet taken place on the North Berm. Material had been placed in approximiately 0.3 m lift.
-Vibrator packer made 6 passes, compaction was tested, 4 more passes, compaction tested, 4 more passes, compaction tested on North Berm.
-Compaction test results averaged 93.5% based on Proctor on file. Did not improve noticable with subsequent passes of packer McElhanney grabbed a sample of material from where it was being excavated to send to lab
-Confirmed with Brad that Proctor results that were given to GHD did not represent the material that was being placed

Next Steps
-Lab results expected tomorrow (March 23) evening
-McElhanney to confirm compaction based on lab results
-GHD to determine appropriate inspection schedule for remainder of berm construction

OUTSTANDING INFORMATION / NEW ISSUES:
-Proctor test given to GHD from Upland not representative of material being placed

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	3/23/2021 14:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil		
WEATHER CONDITIONS:	Overcast 9 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe fill activites on North and East Berms

SITE NOTES / PROGRESS:
-Three lifts placed on North and East Berms, begining to work on 4th lift on south end of East Berm
-Trucks continuing one way haul, dumping and then driving the length of the two berms to increase compaction
-D8 pushing material and vibrator packer working continously
-Height of 3 compacted lifts approximately 1m
-Height of 4th lift approximately 0.3m
-Material being hauled from same location as yesterday from slope south of landfill footpring

OUTSTANDING INFORMATION / NEW ISSUES:
-Results Proctor test given to GHD from Upland not representative of material being placed
-Results of Proctor of material being placed expected by end of day today

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	3/29/2021 12:10	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Doug Wynd		
WEATHER CONDITIONS:	Sunny 8 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe fill activites on North and East Berms

SITE NOTES / PROGRESS:
-North Berm and majority of East Berm filled to design grade.
-Small fill remaining on south end of East Berm
-crushing plant being removed from landfill footprint
-lock blocks placed at west end of North Berm
-trucks hauling material to remaining fill by driving over North Berm full and dumping on East Berm
-vibratory compactor working continously, when operator takes break different operator fills in
-location of infiltration pond berms marked out with paint, some aggregate currently in way of fill

Next Steps

-complete fill on East Berm
-cut back berms slopes to design
-complete moving crushing plant
-move pile of aggregate that is in base of infiltration pond
-cut base of landfill to grade

OUTSTANDING INFORMATION / NEW ISSUES:
-Results of Proctor still not available from lab - Brad followed up again today

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	3/31/2021 9:10	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Brad Maxwell Tyler(surveyor)		
WEATHER CONDITIONS:	Mixed Sun and Cloud 8 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe fill activites and base of infiltration pond

SITE NOTES / PROGRESS:
-Fill on North and East Berm almost complete. Small fill required on south end of East Berm
-Shaping of inside slopes of North Berm beginig
-Base of lock-block wall on north-east corner of Infiltration Pond being prepped
-Crew moving stockpiled material out of way that is currently setting in of infiltration pond
-Observed loaded trucks travelling over base of berms. Sub-base is competent with no deflection observed..
-Varying depth of round-rock, from previous stockpiled material up to 30 mm depth sitting where in footprint of Infiltraion Pond including where berms will be constructed.
-Instructed Tyler and followed up with Brad, to make sure round-rock is removed before berms are placed

Next Steps

-Remove round-rock from base of infiltration pond berms before constructing berms
-Complete removing stock-pile of material that is in infiltration pond footprint
-Cut base of landfill to design contours (up to 2m cut close to North Berm) This will take most of next week.

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	4/7/2021 14:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil		
WEATHER CONDITIONS:	Mixed Sun and Cloud 7 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe / excavation activites

SITE NOTES / PROGRESS:
-Excavation of base of landfill underway
-Gravel removed from base of infiltration pond
-Infiltration pond berms nearly complete
-Grubbing activities have begun for leachate treatment pond

Next Steps

-Remove round-rock from base of infiltration pond berms before constructing berms
-Complete removing stock-pile of material that is in infiltration pond footprint
-Cut base of landfill to design contours (up to 2m cut close to North Berm) This will take most of next week.

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	4/16/2021 14:30 AM	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil		
WEATHER CONDITIONS:	Mixed Sun and Cloud 7 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe / excavation activites

SITE NOTES / PROGRESS:
-Excavation of base of landfill underway
-Gravel removed from base of infiltration pond
-Infiltration pond berms nearly complete
-Grubbing activities have begun for leachate treatment pond

Next Steps

-Remove round-rock from base of infiltration pond berms before constructing berms
-Complete removing stock-pile of material that is in infiltration pond footprint
-Cut base of landfill to design contours (up to 2m cut close to North Berm) This will take most of next week.

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	4/30/2021 8:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil, Brad Maxwell		
WEATHER CONDITIONS:	Mixed Sun and Cloud 7 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe sand to be used for GCL protection layers

SITE NOTES / PROGRESS:
-Excavation to new contours rearly complete
-Material in base of pit was sandy Joe Vandereil asked if it would be acceptable for GCL protection layer. Sand was observed to be clean free of fines but contained oversized up to approximately 25 mm. (see attached photolog)
-Disccussed with Brad and Joe if protection layer would be required on slopes given that rocks are on side slope.

Next Steps

-Complete excavation to new contours

OUTSTANDING INFORMATION / NEW ISSUES:
-sand present in landfill excavation not acceptable for placement as GCL protection Layer

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	5/7/2021 11:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil,		
WEATHER CONDITIONS:	Mixed Sun and Cloud 9 °C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe subbase excavation and potential sand to be placed for GCL protection layer

SITE NOTES / PROGRESS:
-Excavation to base contours complete. Floor of pit is clean and free of lumps and debris, slopes visually appear to match design.
-some triming of berms still required
-observed potential sand source to be used for GCL protection layer. Material was clean but conatined signifant rocks greater than max spec (4.75mm). Reviewed sand specification with Joe and conclued that that sand would have to be screened

Next Steps

-Complete shaping of berms where required
-Perform as-built survey of pit
-Screen and place sand

OUTSTANDING INFORMATION / NEW ISSUES:
-GHD to determine if GCL protection layer required on landfill slopes

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	5/12/2021 10:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Vanderweil,		
WEATHER CONDITIONS:	Sunny 12 ^{o}C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Inspect sand and observe sand placement on floor of Landfill

SITE NOTES / PROGRESS:
-observed stockpiled sand being used for GCL protection layer. Sand washed, screened and acceptable for use as the GCL protection layer
-Sand was being place to depth of 150 mm starting on south end of landfill.
-Dozer placing sand is equipped with laser level to ensure correct depth of is placed
-Vibrator packer will be used to compact sand layer

Next Steps

-Complete placing sand
- minimal futher activities unitl lining

OUTSTANDING INFORMATION / NEW ISSUES:
-GHD to determine if GCL protection layer required on landfill slopes
-GHD to complete review of moisture sensor

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/3/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner crew		
WEATHER CONDITIONS:	Sunny, 16 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness test seams
- Obersrve panel placement and welds
- Observe Geosynthetic deployement

SITE NOTES / PROGRESS:
-Geomembrane placed on Leachate Pond except North Slope.
-1 roll of geomembrane used, second roll started
-Witnessed sheer and peel of test weld
-Oberved liner welds and panel placement
-Liner placement and welds appeared acceptable. No wrinkles observed in geomembrane
-Observed HDPE pipe for leachate leak detection being fused on site

Next Steps

- Continue placing geosythetics
- Place geotextile protection layer leak detection pipe
- Pressure test seams
- Vaccuum test repairs
- Backfill leack detection sump with sand

OUTSTANDING INFORMATION / NEW ISSUES:
-Vaccuum box is not working, New device is expected to arrive tomorrow. Cannot place sand in Leachate pond sump until repairs are tested

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/4/2021 6:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner crew		
WEATHER CONDITIONS:	Sunny, 20 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness test seams
- Obersrve panel placement and welds
- Observe Geosynthetic deployement

SITE NOTES / PROGRESS:
-1st layer of geomembrane placement complete. Panels 17-24 placed yesterday
-Geocomposite installation began yesterday two panels placed on south and two placed on west slope
-Leak detection pipe placed with geotextile covering perforated section
-Witnessed test weld and destructive tests.
-Observed extrusiion test weld and destructive test
-Cut first destructive test sample
-Observed geocomposite connections
-Observed vaccum test of repairs

Next Steps

-Continue placing geosythetics
-Place sand in leak detection sump
-Pressure test seams
-Backfill leack detection sump with sand

OUTSTANDING INFORMATION / NEW ISSUES:
-Temperature got too high in the afternoon so geomembrane installation shut down early

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/5/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner crew		
WEATHER CONDITIONS:	Scattered cloud 18 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness test seams
- Obersrve geo-synthetic installation

SITE NOTES / PROGRESS:
-Geocomposite installation complete
-Second GCL layer installation complete except corners
-Two panels of Geomembrane placed
-Witnessed test weld destructive tests, all results acceptable
-Observed GCL placement and checked overlap
-Observed geomembrane placement
-Leak detection sump backfilled with sand

Next Steps

- Complete placement of final layer of Geomembrane on Leachate pond
- Perform pressure tests on seams
- Backfill anchor trench

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/6/2021 7:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Terry Stuart, Liner crew		
WEATHER CONDITIONS:	Scattered cloud 18 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Observe Leachate pond geomembrane installation

SITE NOTES / PROGRESS:
-All geomembrane installed fused and repairs / patches made
-Observed all welds and repairs, all repairs marked after vaccuum test
-Walked each panel with Joe Cassidy, and Terry Stuart inspecting for defects. No issues observed
-Observed field sheer and peel test on destructive test 2 (DT-2), sent sample to lab

Next Steps

- Complete sealing geomembrane to HDPE leak detection pipe.
- Backfill anchor trench
- Begin geosythetic installation on landfill cell

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/9/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner crew		
WEATHER CONDITIONS:	Sun and cloud, 14 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness lining activities in Landfill area
- Observe conditions after Saturday's rain

SITE NOTES / PROGRESS:
-First day of geosythetic installation in landfill area.
-Rolls of Geotextile placed around landfill perimeter
-Bedding sand placed and compacted where it was previously missing on sub-base on north-west corner
-All sub-base now acceptable, some trimming still required on toe of slopes
-Sump dimensions are acceptable but edges need to be trimmed before liner placed
-Observed deployement of geotextile and geomembrane
-No ponding of water after rainfall in area where GCL rolls placed. No GCL was deployed before rainfall on Saturday

Next Steps

- Continue placing first layer of GCL and geomembrane on base of landfill

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):
-See attached photolog

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/10/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner crew		
WEATHER CONDITIONS:	Mostly sunny, 18 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness lining activities in Landfill area

SITE NOTES / PROGRESS:
- Eight Geomembrane panels laid yesterday
- Observed field peel and sheer test for first destructive test, DT - 1, Seam 4/5, Welder # 9, field results acceptable
- Obersvered peel and sheer on test seem, results acceptable
- Marked out location of DT-2, Seam 8/9, Welder # 9, observed field peel and sheer tests, field results acceptable
- Sent DT-1 and DT-2 to lab
- Observed GCL and Geomembrane placement and seam welding

Next Steps

- Continue placing first layer of GCL and geomembrane on base of landfill

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/11/2021 14:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:			
WEATHER CONDITIONS:	Sunny, 30 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness lining activities in Landfill area

SITE NOTES / PROGRESS:
-Geosythetic placement had stopped for the day due to the heat and high winds
- Panels 9 - 17 placed and seamed yesterday completing floor of landfill to south toe
- Panels 18-33 placed and seamed today on south slope
- Sent DT-3, Panel 12/13 and and DT-4, panel 16/17 to lab
- Crew attempted to place geocomposite with skid steer, weather was too hot and windy so shut down for the day
- Inspected new panels placed, no deficiencies found

Next Steps

- Place geo-composite on geomembrane
- Place geotextile on slopes

OUTSTANDING INFORMATION / NEW ISSUES:
-Need to review procedure for operating equipment on liner to ensure damage is avoided

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/12/2021 8:45	**SITE:**	Upland landfill
PERSONNEL ON SITE:			
WEATHER CONDITIONS:	Sunny, 18 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:
- Witness lining activities in Landfill area

SITE NOTES / PROGRESS:

-Spoke to Terry Stuart and Joe Cassidy about leak detection pipe locations and requirements. Confirmed that PVC is not acceptable for pipe material.
-Observed placement of Geomembrane, no damage was be observed from skid-steer on liner
-Practices being followed were acceptable including: leaf blower used to remove sand and gravel before placing material, equipment entering liner at 90 degree angle to edge and not turning on geombrane, crew members observing geomembrane as liner is placed, placing in morning when there are fewer wrinkles in the liner.

Next Steps

- Continue placing geo-composite on geomembrane
- Place geotextile on slopes
- Shape area for leak detection ports.

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/13/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Terry Stuart, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 17 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Anchor trench on North and East Slopes excavated, excavation dimensions acceptable
-Observed Geotextile installed on North Slope
-Observed location marking for Leak Detection Ports, locations acceptable
-Observed crew was continuing to place geomembrane on west side of base of landfill

Next Steps

- Continue placing geocomposite on base of landfill
- Place geotextile on East Slope
- Place first layer of GCL and Geomembrane on North and East Slopes
- Hand dig leak detection port depression

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/14/2021 7:20	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy,, Brian Fagan, Liner Crew, Terry Stuart		
WEATHER CONDITIONS:	Sunny, 18 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geotextile placement on East Slope complete
-Observed Geomebrane being placed on North Slope, Panels 34-44 placed from West to edge of sump
-Marked location of destructive test (DT-5), witnessed field sheer and peel tests
-Witnessed sheer and peel tests on trail seem, welder # 17
-Spoke to Brian and Terry about need for depression below gemembrane for leak detection Ports
- Observed placement of GCL in sump

Next Steps

- Finish placing and seaming geomembrane on North Slope and sump
- Place GCL and Geomembrane on East Slope
- Establish depression for leak detection ports

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/16/2021 6:45	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew, Terry Stuart		
WEATHER CONDITIONS:	Overcast, 15 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geomembrane installed on North Slope, up to and including Sump.
-All GCL placed was covered with geomembrane before Sunday's rain.
-Water drained to sump after rain yesterday, no pooling observed on geomembrane on base of landfill.
-Observed crew placing GCL and Geomembrane in North-East corner.
-Observed test weld peel and sheer test.
-Marked location of destructive test DT-6, Panel 47/48, observed field peer and sheer test.
-Sent DT-5 and DT-6 to lab.

Next Steps

- Place GCL and Geomembrane on East Slope.

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/17/2021 5:55	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Clear sky, 14 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

- First layer geomembrane installation complete
- Checked yesterday's geomembrane installation for defects
- Collected destructive test DT-7 seam, 67/68 and sent to lab

Next Steps

-Install leak detetion ports
-Install leachate leak detection sump riser pipe
-Complete installing geocomposite on geomembrane

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/18/2021 7:15	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Overcast, 16 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

- Geocomposite installation complete except for North Slope and area around sump
- Checked yesterday's geocomposite installation for defects
- Observed crew placing GCL and Geomembrane working from South end to North
- 50 mm HDPE pipe for leak detection port on site and perforations drilled

Next Steps

- Continue placing GCL and Geomembrane
- Install leak detection ports
- Install leachate leak detection sump riser pipe

OUTSTANDING INFORMATION / NEW ISSUES:

-No depression established for leak detection ports. Installation will require a field fit.

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/19/2021 7:15	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 17 C, strong wind from North-West		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

- 8 geomembrane panels installed and welded yesterday along with underlying GCL
- Observed crew placing GCL and geomembrane panels 9 & 10
- Inspected yesterday's geomembrane installation
- Collected destructive test DT-8, Panel 4/5 and sent to lab

Next Steps

- Continue placing GCL and Geomembrane to toe of North slope
- Install leak detection ports
- Install leachate leak detection sump riser pipe

OUTSTANDING INFORMATION / NEW ISSUES:

- HDPE pipe fusion machine under repair, leachate leak detection pipe installation delayed until tomorrow or Monday

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/20/2021 7:15	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	mixed sun and cloud, 14 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

- Operation shut down early yesterday due to high winds
- 2 geomembrane panels (9&10) installed and welded yesterday along with underlying GCL
- Observed crew placinng geomembrane panels 11 - 14 up to close to toe of North slope
- Observed crew placing geomembrane on South end of East slope
- Inspected yesterday's geomembrane installation
- Marked location for destructive test DT-10, witnessed field sheer and peel test, sent DT-9 and DT-10 to lab

Next Steps

- Continue placing GCL and Geomembrane on East Slope
- Install leak detection ports
- Install leachate leak detection sump riser pipe

OUTSTANDING INFORMATION / NEW ISSUES:

- HDPE pipe fusion machine still under repair

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/21/2021 7:15	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 14 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

- Geomembrane panels 12 -21 and underlying GCL installed on East slope yesterday
- Obersrved crew placing geomembrane panels 22 - 29, completeing East slope
- HDPE pipe fusion welder onsite welding 300 mm leachate leak detection pipe
-Two leak detection ports were installed on East slope yesterday and GCL placed on top.

Construction notes on leak detection ports

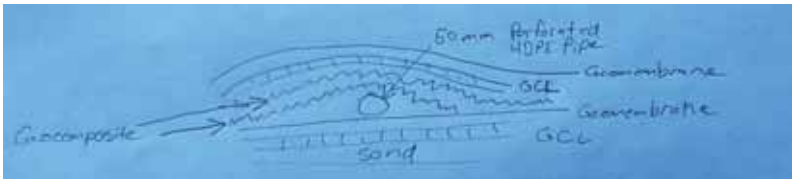
-Leak detection monitoring ports were field fit by the Contractor (without the presence of the Engineer)
-3 m section of perforated pipe was placed on top of geomembrane, two layers of geocomposite were placed on top of pipe, see sketch below
-The two layers of gemeombrane on top of perforated pipe will prevent the upper GCL from deforming around the perforated pipe and ensure hydraulic connectivity in the inter-membrane will be acceptable.
-Without depression below leak detection port, small volumes flowing past the detection port will be difficult to detect
-Port will function acceptably for detecting larger flow volumes and leachate pooled on the geomembrane in the area of the ports

Next Steps

-Place geocomposite on North slope
-Install two leak detection ports on North slope
- Install Leachate leak detection pipe
- Install GCL and geomembrane on South Transition Berm

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):



NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/23/2021 6:45	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 12 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Observed crew placing geocomposite on North Slope and North-East Corner
-Witnessed destructive test, DT-11, field sheer and peel and sent sample to lab
-Observed Field fit of leak detection port on North Slope nearest to the sump

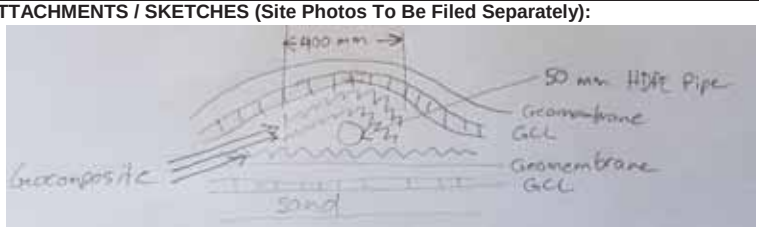
Construction notes on leak detection port:
-Leak detection port was field fit with Engineer present
-50 mm HDPE pipe was run along geomembrane, 3 m perforated section was placed on Geocomposite (see sketch below)
- Two 40 cm wide strips of geocomposite were placed on top of perforated section and heat seamed to layer below
- Installation achieves hydraulic connectivity with the inter-membrane space and will prevent the upper GCL from deforming around perforated pipe
- Lack of depression where perforated pipe sits will make it difficult to detect small volumes of leachate flowing past leak detection port
-Port will function acceptably for detecting large volumes or leachate pooled on the geomembrane in the area

Next Steps

-Complete installation of geocomposite on North slope
-Install second leak detection port on North Slope
-Insalll leachate leak detection pipe in sump
-Place GCL and Geomembrane on South Transition Berm
-Weld 600 mm leachate collection pipe, fusion machine expected to arrive today

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):



NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/24/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 12 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geomembrane installation on South Transition Berm completed yesterday, panels 31 - 45
-Second leak detection port on North Berm installed yesterday, see Aug 23 Field Inspection notes for installation details
-Observed crew placing geotextile on west side of landfill
-Observed crew placing leak detection pipe in sump
-Observed crew placing geomembrane by toe of west slope
-Spoke to Briand and Joe about need for additional geocomposite at transition to sump
-Witnessed test seem field peel and sheer tests

Next Steps

-Complete installation of GCL and geomeombrane on North Slope
-Place sand in sump
-Place additional geocomposite where needed to ensure hydraulic connectivity between geocomposite layer and leak detection pipe in sump

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/25/2021 6:15	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Clear sky, 10 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geomembrane panels 46 - 58 and underlying GCL installed on North Berm yesterday
-Observed crew installing geomembrane on North-East corner
-Witnessed test weld peel and sheer test
-Collected destructive test DT-12 and sent to lab
-Observed 600mm HDPE pipe welding
-Observed placement of 300 mm leak detection pipe
-Observed crew backfilling leak detection pipe

Leak detection pipe details:

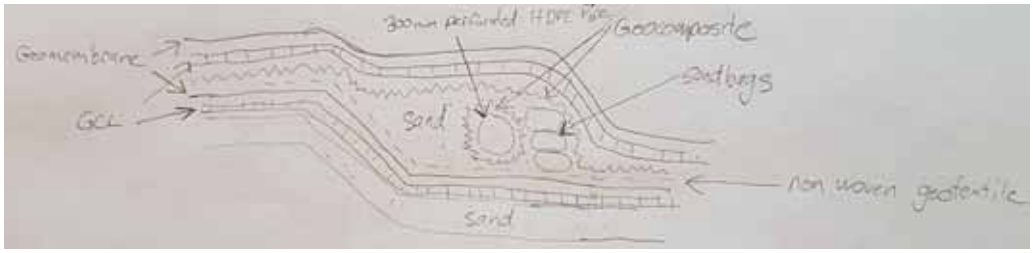
-The following modifications from design were observed and approved in the field by the Engineer:
-Sandbags were placed on east side of perforated pipe to secure pipe in place
-300mm perforated HDPE pipe was wrapped in geocomposite to maintain hydraulic connectivity between pipe and sandbags
-Non-woven geotextile was installed above lower geomembrane layer
-See sketch of installation below

Next Steps

-Complete installation of GCL and geomeombrane on North-East Corner
-Install Geocomposite on slopes
-Install non-woven geotextiile on remainder of landfill floor

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):



NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/26/2021 6:45	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Overcast, light rain 16 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geomembrane panels 59 - 70 installed yesterday, geomembrane installation is now complete
-600 mm leachate collection pipe section welded yesterday and ready to be installed in sump
-Observed crew placing geocomposite on north slope
-Collected destructive test DT-13, panel 67/68, and sent to lab

Next Steps

- Complete installation of geocomposite on landfill slopes
- Install 600 mm HDPE leachate pipe in sump
- Install non-woven geotextile on remainder of landfill floor (East side)

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/27/2021 7:00	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Joe Cassidy, Brian Fagan, Liner Crew		
WEATHER CONDITIONS:	Sunny, 14 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Witness geosythetic installation activities in Landfill area

SITE NOTES / PROGRESS:

-Geocomposite installation complete on slopes
-Observed crew placing non-woven geotextile on floor of landfill

Next Steps

- Complete installation of geotextile on landfill floor
- Weld / place 200 mm HDPE leachate collection system
- Place stone drainage layer on landfill floor

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	8/28/2021 7:45	**SITE:**	Upland landfill
PERSONNEL ON SITE:			
WEATHER CONDITIONS:	Sunny, 12 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Inspect geotextile and geocomposite installation

SITE NOTES / PROGRESS:

-Geotextile installation on landfill complete
-Installation of geotextile and geocomposite is acceptable for placement of leachate collection pipe and stone drainage layer

Next Steps

- Seal geomembrane penetrations Landfill: 4 x 50 mm HDPE leak detection conduit, 1 x 300 mm HDPE leachate leak detection pipe
- Seal geomembrane penetration Leachate Treatment Pond: 1 x 300 mm leak detection pipe
- Weld / place 200 mm HDPE leachate collection pipe
- Place stone drainage layer on landfill floor

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	Dave Engstrom	**PROJECT NUMBER:**	11222680
DATE/TIME:	8/30/2021 9:00	**SITE:**	Upland Landfill
PERSONNEL ON SITE:	Brian Fagain; Liner Installation Contractor; Terry Stuart		
WEATHER CONDITIONS:	Sunny; 13-15 deg C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

Observe cell preparation for placement of drain rock and install of pipe boots for the cell and leachate pond underliners.

SITE NOTES / PROGRESS:

Discussed with Brian Fagan regarding schedule for producing drain rock. Tentative plan is to begin producing tomorrow when Brad Maxwell is on-site (8/31 follow-up - Brad provided an update that drain rock production would begin on Wednesday, 9/1).

Observed pipe boots with extrusion seams vacuum box tested at the leachate pond and the cell. Geocomposite was to be placed over the pipe boot at the cell.

Walked the cell for any new damage or concerns prior to drain rock install. No concerns or issues observed.

Next Steps

Coordinate with Brad Maxwell regarding schedule for production and placement of drain rock in the cell for next site visit.

OUTSTANDING INFORMATION / NEW ISSUES:

No issues observed during site visit.

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	Dave Engstrom	**PROJECT NUMBER:**	11222680
DATE/TIME:	9/1/2021 7:30	**SITE:**	Upland Landfill
PERSONNEL ON SITE:	Brad Maxwell; Kris Goodridge		
WEATHER CONDITIONS:	Sunny; 10-15 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

Observe cell preparation for placement of drain rock.

SITE NOTES / PROGRESS:

Met Brad Maxwell and Kris Goodridge on-site to discuss approach installing drain rock. Upland plans to mark locations of leachate pipes (to avoid placing drain rock until pipe is in place), construct a 1 m high road at the center of the cell for dumping with drain rock, placing the drain rock using a low-ground pressure excavator (CAT 315F) and placing the drain rock close to the surface (not dropping from high up). General approach will be to construct three roads from the west side future tie-in, place along the east toe and work back to the west tie in to push out any wrinkles.

Drain rock visually appeared to be in substantial conformance with the project specifications.

Leachate collection piping was inspected and found to be in conformance with the specifications. Confirmed with pipe fitter that thermal butt fusion of piping was in accordance with manufacturer's recommendations. Inspected fusion welds and found no issues.

Observed placement of drain rock at west end of cell by large mining rock truck (outside of cell). Excavator operator excavated from pile and placed in cell to start 1 m high road. Discussed with Kris and Upland plans to continue this approach until 1 m high road is started and CAT 370 rock truck will place on the road for placement by the excavator.

Next Steps

Coordinate with Upland for progress and visit site for progress check-in of the 1 m high drain rock road.

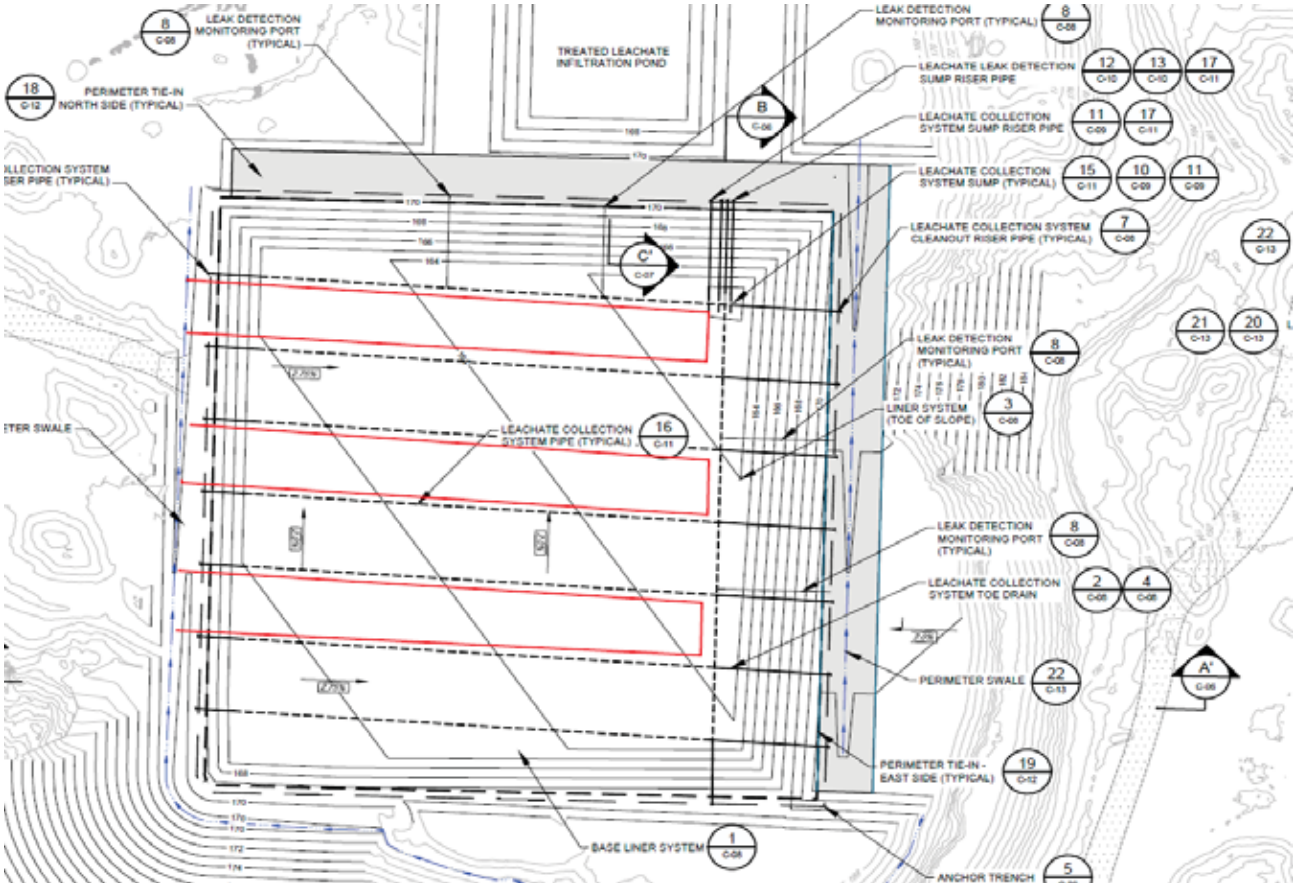
OUTSTANDING INFORMATION / NEW ISSUES:

No issues observed during site visit.

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

See attached sketch for haul road locations.

NOTE: All site photos to be filed in the Project Folder on the Project Portal.



Planned location of three 1 m high drain rock roads.

Field Notes

NAME:	Dave Engstrom	**PROJECT NUMBER:**	11222680
DATE/TIME:	9/2/2021 11:30	**SITE:**	Upland Landfill
PERSONNEL ON SITE:	Kris Goodridge		
WEATHER CONDITIONS:	Sunny; 15-17 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

Observe cell preparation for placement of drain rock.

SITE NOTES / PROGRESS:

Met Kris Goodridge on-site to discuss progress of drain rock and planned date for leachate collection piping installation (ETA Weds. 9/8).

Observed hauling, stockpiling and placement of drain rock on center minimum 1 m high drain rock road by the CAT 370 rock truck and CAT 315 low ground pressure dozer. Haul truck dumped drain rock on the 1 m high access road as a temporary stockpile. Excavator placed material in the cell by dropping from approximately less than 1 m from geosynthetics. Upland plans to continue this approach tomorrow and next Tuesday.

Collected a 5 gallon bucket sample of drain rock placed in the cell for quality assurance testing (sieve analysis).

Next Steps

Coordinate with Upland for progress and visit site for progress check-in of the 1 m high drain rock roads, placement of the leachate collection piping, and backfill over the leachate collection piping.

OUTSTANDING INFORMATION / NEW ISSUES:

No issues observed during site visit.

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	9/9/2021 14:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Kris Goodrich		
WEATHER CONDITIONS:	21 C		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Inspect drainage layer installation

SITE NOTES / PROGRESS:

-2 900 mm high roadway of drainrock installed from west to east toe
-3rd drainrock roadway being installed, rock trucks hauling and placing on top of lift and excavator being used to push material
-traffic cones being used to mark elevation of lift
-Two leachate riser pipes installed in sump,braced to temporary lock block
-4 perforated lengths of leachate collection pipe welded and ready to be placed in drainage layer.

Next Steps

- Finish placing 3rd 900 mm high drainrock road
- place perforated leachate collection pipes
- place 300 mm lift of drainrock on base of landfill

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	9/14/2021 7:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	Kris Goodrich, HDPE Welding Crew, Equipment Operators		
WEATHER CONDITIONS:	13 C raining		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Inspect drainage layer installation

SITE NOTES / PROGRESS:

-3 900 mm high roadway of drainrock installed from west to east toe complete. Traffic pilons with ribbons being used to indicate required heigh of lift
-Observed HDPE welding crew setting up to weld non- perforated leachate riser pipes. Party tent being used to shield welding area from rain
-Perforated leachate pipes placed on landfill floor ready for backfill

Next Steps

- Finish welding leachate riser pipes
- place 300 mm of drain rock on floor of landfill

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

Field Notes

NAME:	David Barbour	**PROJECT NUMBER:**	88877
DATE/TIME:	9/22/2021 14:30	**SITE:**	Upland landfill
PERSONNEL ON SITE:	HDPE Welding Crew, Equipment Operators		
WEATHER CONDITIONS:	14 C Sunny		

HASP for this project can be found on project portal

SITE VISIT OBJECTIVE:

- Inspect drainage layer installation

SITE NOTES / PROGRESS:

-HDPE Leachate collection pipe installation complete on base of landfill
-Obseved crew placing placing 300 mm lift of drain rock with Caterpillar D5 dozer, using traffic pilons to indicate required depth. Dozer was pushing material from 900m lift onto geotextile to required depth

Next Steps

- Fuse solid HDPE leachate collection risers and install on east berm
- Continue placing drain rock on remainder of landfill footprint
- Install HDPE leachate risers

OUTSTANDING INFORMATION / NEW ISSUES:

ATTACHMENTS / SKETCHES (Site Photos To Be Filed Separately):

NOTE: All site photos to be filed in the Project Folder on the Project Portal.

ghd.com

The Power of Commitment

Cell 1 West Construction Report

Cell 1 West Construction Report

Northwin Landfill

Upland Excavating Ltd.

19 March 2024

The Power of Commitment

GHD Limited 735
138 East 7th Avenue, Suite 100
Vancouver, BC V5T 1M6, Canada

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	00	David Barbour	Roxy Hasior		Rose Marie Rocca		March 19, 2024
[Status code]							

Contents

Appendices

1. Introduction

The Northwin Landfill (Landfill or Site) is owned by Upland Excavating Ltd. (Upland) and operated by Northwin Environmental (Northwin). The Site has an area of approximately 48 hectares (ha) and is located at civic address 7295 and 7311 Gold River Highway, Campbell River, BC, approximately 7 kilometres (km) southwest of Campbell River city centre. The Site operates as a sand, gravel and rock quarry and a waste management facility.

This Construction Report (Report) documents the construction of Cell 1 West carried out by Upland Contracting Ltd. (Contractor), Northwin and other contractors hired by Upland.

The Report has been prepared by GHD for Upland for submission to the Ministry of Environment and Climate Change Strategy (ENV) as required by Section 2.11 of the Landfill's OC and also satisfies the requirements of Section 10.2 of the Landfill Criteria for Municipal Solid Waste (Second Edition), BC Ministry of Environment, June 2016 (the Criteria).

Upland, as the OC holder retained GHD to act as the Qualified Professional (QP) for this project scope. In this capacity, GHD designed the civil work for Cell 1 West, carried out inspections during construction, and completed this construction report.

1.1 Project Scope

Cell 1 West is the second cell constructed in the Landfill. In accordance with the 2022 Design Operations and Closure Plan (DOCP) for the Landfill and the detailed design, the Cell 1 West base consists of a double liner system and includes a leak detection layer. Leachate generated from the Landfill will be collected within the cell and conveyed to the existing Cell 1 East sump, and then to the leachate treatment system. The leachate treatment system is a batch treatment system and includes the leachate collection system, aerated equalization pond, a treated leachate holding pond and an infiltration pond, which were initially designed and constructed in 2021.

The composite double liner system for Cell 1 West is comprised of a primary and secondary base liner. The primary base liner refers to the composite liner system that consists of an HDPE geomembrane liner and geosynthetic clay liner (GCL) which underlies the leachate collection system, and the secondary base liner refers to the composite liner system comprised from of an HDPE geomembrane liner and GCL which underlies the leak detection system.

The leachate collection system includes perforated leachate collection pipes within a stone drainage blanket sloped towards the leachate sump, with the following components:

- 300 mm thick, 50 mm diameter, clear, round stone drainage blanket, with minimal fines
- Perforated leachate collection pipes (LCP) with minimum diameter of 200 mm
- Maximum 15 m lateral spacing between leachate collection pipes (LCP) running south to north
- Maximum 50 m drainage path for leachate to travel before it is intercepted by the LCPs
- Clean-outs at each end of the LCPs
- Leachate collection header pipe at the east end of the Landfill running towards the leachate collection sump at a minimum slope of 2 percent
- Leachate sump at elevation 164 m AMSL with two leachate sump riser pipes with diameters of 450 mm
- Leak detection system with four 50 mm leak detection monitoring riser pipes

2. Construction Narrative

The following sections provide the construction narrative for Cell 1 West. Record drawings are provided in Appendix A.

Construction activities began on October 12, 2022, and were completed on September 22, 2023

In general, construction generally progressed as follows:

- Site preparation and excavation

– Cell 1 West double liner installation
– Cell 1 West leachate collection and leak detection system installation

2.1 Site Preparation & Excavation

Site preparation activities including excavation of the Cell 1 West base, preparation of subgrade contours, and construction of berms around the Cell 1 West perimeter began in September 2022 and continued through October 12, 2022. Site preparation works were completed prior to GHD arriving on site.

2.2 Cell 1 West - Composite Double Liner

Joe Cassidy (Liner Installer) was hired as an independent contractor to oversee the geosynthetic installation. Mr. Cassidy is an experienced liner installer with over thirty years of experience in the industry. Several experienced liner technicians were also hired for the installation and worked alongside Upland (the Contractor) employees with Mr. Cassidy overseeing the work. The geosynthetic installation crew mobilized to site on October 12, 2022 and the installers met with GHD to confirm QA/QC requirements.

Installation of geosynthetics in the Cell 1 West began on October 14, 2022. The QA/QC program for the construction of the base liner systems included non-destructive testing of each seam. Details of the QA/QC program are described in Section 3.

The geosynthetic deployment began with the placement of a non-woven geotextile on the slopes and floor of the landfill cell, starting at the Cell 1 East tie in berm. Geosynthetic rolls were deployed using a telehandler forklift. An excavator was used to deploy geosynthetics for the rest of the Landfill cell.

GCL was placed over top of the non-woven geotextile. Rolls in the east section of the cell were installed in a north-south direction working from the east end of the landfill to the west. For the west section of the cell, rolls were installed in a west-east direction working from the north end of the landfill to the south. The seams of the GCL were overlapped, with the crew using factory provided indicating lines that marked the minimum overlap. The seams were heat seamed shortly after the GCL deployment. In general, the geomembrane was installed on top of the GCL as soon as the width of GCL panels would allow. This process continued until the primary GCL and geomembrane layer was installed across the landfill floor.

Geocomposite installation began after the primary geomembrane installation on the landfill floor. The geocomposite was installed with panels in the same direction starting near the north toe working south. A skid-steer with smooth rubber tracks was used to deploy the geocomposite on the liner while an excavator held the rolls. GHD observed the procedures being followed by the operators and determined they were acceptable to avoid damage to the liner. The deployment procedure involved using a leaf blower to remove any debris from the area being driven on, having a spotter observe the geomembrane between the skid-steer tracks and the geo-composite, and skid steer operator never turning the equipment on the exposed geomembrane. Nylon cable ties were applied at 1.5 m intervals at the edge netting and the overlapping geotextile was heat seamed.

As the geocomposite was being placed on the base of the landfill, the crew began deploying non-woven geotextile on the slopes of the landfill. The geotextile rolls were held with an excavator while the crew placed the material manually on the slopes. The geotextile was heat seamed shortly after deployment.

The GCL was placed on the slopes after the geotextile using the same method. GCL was heat seamed shortly after it was placed and covered with the second layer of Geomembrane. The primary layer of GCL and geomembrane was completed and tied into the geosynthetics on the floor of the landfill before the secondary containment layers were installed. The same procedures were followed to install the secondary geomembrane. The smooth tracked skid steer was used to pull the geosynthetics on the base of the landfill and while the excavator held the rolls and materials were pulled by hand down the slopes. Installation of geosynthetics was completed on November 20, 2022, with the final placement of non-woven geotextile on the floor of the landfill.

Some damage to the liner was observed and repaired on November 18, 2022. Photos of the repairs are provided in the Appendix B (photo log).

2.3 Leachate Collection System

The Contractor began installing the leachate collection pipes and the stone drainage layer in November of 2022 after completion of the geosynthetics work, however construction was postponed for the winter and resumed on June 7, 2023.

The leachate collection system was installed per the drawings with one 300 mm HDPE leachate collection header pipe running south to north, and seven 300 mm HDPE leachate collection pipes running west to east. To facilitate installation of the leachate collection system over the liner, the Contractor initially placed the stone drainage layer in 3 rows of 900 mm high lifts to form roadways from the south to the north side of the landfill cell. The material was hauled with rock trucks and placed with an excavator. Traffic cones were used for visual aids to ensure the minimum 900 mm depth of material was placed. After the drain rock roads were built the Contractor fused and placed perforated leachate collection pipe on the base of the landfill. A Caterpillar mini excavator was then used to spread the drain rock in 300 mm lifts across the floor of the landfill. The Contractor placed woven geotextile on top of the drain rock, completing the leachate collection system installation.

2.4 Close-Out

GHD performed an inspection of the Cell 1 West Works on July 7, 2023, and created a deficiency list which was provided to the Contractor. All deficiencies were addressed to the satisfaction of GHD and Upland by September 22, 2023.

3. Construction Quality Assurance & Quality Control

GHD carried out regular inspections throughout the duration of the construction to assure construction quality and quality control (QA/QC). The QA/QC program included product data review and geosynthetics installation QA/QC according to the design specifications.

A photo log with select photographs from throughout the construction is provided in Appendix B. Appendix C provides the material test results. Product data sheets and reviewed submittals are provided in Appendix D. Appendix E provides geosynthetics QA/QC information including the results of destructive and non-destructive quality testing. GHD's inspection notes from select field inspections during liner installation are included in Appendix F.

3.1 Earthworks

Site preparation and excavation activities were completed by the contractor prior to GHD's first inspection. Based on GHD's earthworks inspection was conducted prior to geosynthetics placement, the materials installed were in conformance with design specifications and drawings (refer to Section 4.1).

3.2 Leachate Collection System & Leak Detection Piping

QA/QC activities carried out during leachate collection system installation include the following:

– Inspection to witness placement of materials
– Review of submittals for pipe materials
– Review of results of sieve analysis performed on a sample of drain rock material collected by Contractor. A total of 1 sample was collected and analysed (results are presented in Appendix C).

3.3 Geosynthetics QA/QC

The Liner Installer performed QA/QC according to the design specifications on all geomembrane installed. QC included performing field sheer and peel on a test weld before welding began and whenever conditions changed, pressure testing each welded seam, recording roll number and location of each panel placed, location of each repair. After each repair was made the weld was tested with a vacuum box.

GHD collected samples of welds at intervals less than 300 m of seams. The samples were sent to TRI Environmental Inc. for peel and sheer testing and the results were reviewed by GHD. Laboratory results are presented in Appendix E.

Geotextile material met the specifications and was installed both on the side slopes per the design and the landfill base. The geotextile on the landfill based was installed in place of the bedding sand in the design and was approved by GHD.

Geocomposite material met the specifications and was installed both on the side slopes per the design, and on a portion of the west berm of the cell base, a design change that was approved by GHD. The affected area is shown on the record drawings and notes are provided in the June 13 inspection report.

4. Conformance with Design

In general, the construction of the Cell 1 West landfill cell was carried out according to the design and specifications prepared by GHD. The below documents conformance with the original design.

4.1 Earthworks

A berm was constructed on the north end of Cell 1 West, along the road from approximately the middle of Cell 1 West to the western edge. This berm was not included in the design or inspected by GHD.

Material was left on a portion of the cell base along the western edge of Cell 1 West to cover a bedrock outcrop. This was completed to protect the liner and achieve minimum depth to groundwater. The remainder of the earthworks were carried out in accordance with the design.

4.2 Leachate Collection System & Leak Detection Piping

The 300 mm HDPE leak detection system riser was constructed as shown on Detail 15 of Drawing CI-0104.The perforated portion of the pipe was wrapped in geo-composite and sandbags were placed on the east side of the pipe to secure the pipe in place. Wrapping the pipe in geo-composite ensured there was hydraulic connectivity around the pipe.

A sample of the drain rock was collected to carry out sieve analysis and confirm whether gradation met design specifications. The results of the sieve analysis showed gravel larger than 50 mm and fines content above the design specification. The fines content was less than or equal to 1% and the material was accepted by GHD.

The stone drainage layer was placed on the non-woven geotextile layer. The Contractor exposed the top of leachate pipe by hand to confirm pipe location prior to mounding drainage rock overtop to a depth of greater than 300 mm. The area was visually inspected and large rocks were identified and removed from the cell.

During an inspection, GHD noted that 20% of loads placed within a 20 x 30 m area on the southeast section of the cell had silty sand mixed into the drainage rock. Upland discussed with the loading operator to avoid material sitting directly on the pit floor, which resulted in the material meeting specifications and resolving the material issue.

The remaining components of the leachate collection system and leak detection piping were installed in conformance with the design drawings and specifications.

4.3 Geosynthetics

Non-woven geotextile was placed on the subgrade in place of bedding sand, on the landfill base as well as the side slopes. The geotextile placed on the landfill base was a deviation from design, which was approved by GHD.

Geocomposite material was placed on an area of the west side of the cell where a grade break was present due to the bedrock outcropping mentioned in Section 4.1. =

All other geosynthetics were installed in conformance with the design.

5. Certification

This construction report dated MONTH X, 2024, demonstrates that the Cell 1 West has been constructed in accordance with OC and the most recent DOCP, with the changes noted below and approved by the undersigned during construction. Qualified Professionals completed inspections before and during construction of Cell 1 West.

This construction report includes the information described in Section 10.2 Construction Report(s) of the Landfill Criteria and Section 2.11 of the OC, specifically:

- Changes from the original design that were approved during construction
- As-built record drawings of Cell 1 West
- All inspection and testing reports
- Quality control and quality testing results
- Soil test data including field and laboratory testing

All of Which is Respectfully Certified and Submitted by:

GHD

Deacon Liddy

David Barbour

Roxy Hasior