

APPENDIX K – THIRD PARTY 80MIL LLDPE GEOMEMBRANE CONFORMANCE TESTING RESULTS



> TRI CONTROL NUMBER 145806 145807 145808 145809

December 26, 2019

Nikoliya Boyanich *NewFields* 9400 Station Street, Suite 300 Lone Tree, CO, 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the *final* laboratory report for the Conformance testing of number of four (4) 80mil LLDPE Microspike geomembrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

REFERENCE TRI JOB NO .: G192048

DATE RECEIVED: December 11, 2019

SAMPLED BY: TRI-CA at AGRU, NV

SAMPLE IDENTIFICATIONS:							
SAMPLE ID							
R# FNB0047810003	L#DKJ810770						
R# FNB0047810018	L#DKJ810770						
R# FNB0047810033	L#DKJ810770						
R# FNB0047810048	L#DKJ810770						

TESTS REQUIRED / PERFORMED:	
TEST METHOD	DESCRIPTION
1. ASTM D5994	Thickness
2. ASTM D6693	Tensile Properties
3. ASTM D792	Specific Gravity
4. ASTM D4218	Carbon Content Muffle

TEST RESULTS: The test results are summarized in the attached Tables 1 to 4.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully, TRI Environmental, Inc. - California

Maria Espetia

Maria Espitia Quality Assurance

an. Cora Queja

TRI-CA Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Retained conformance samples are disposed of after one (1) month.* On the other hand, should you need us to keep them at a longer period, please advise us in writing.

5 Pages Total (including this sheet)

DATE REPORTED: December 26, 2019



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TABLE 1. <u>MATERIAL PROPERTIES</u> CLIENT: Newfields PROJECT: CC&V VLF2 Phase 2B

Date Received: **12/11/2019** Date Reported: **12/26/2019** Client Sample ID: **R#FNB0047810003** L**#DKJ810770**

Material Description: 80mil LLDPE Microspike Geomembrane

QC'd By: Maria Expitia TRI Job No.: **G192048**

TRI Control No.: 145806

					:	SPECIMEN	5								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTI	ON													
ASTM D5994	Thickness (mil	ls)													
	Apparatus: D	Dead-weight dia	l micrometer w	ith gauge p	oints tapered a	at an angle of	$60^{\circ} + / - 2^{\circ} t$	o the horizonta	al with the tip						
	rounded to a	a radius of 0.8+/	/-0.1 mm(0.031	+/-0.004 in), with a specifi	ied force of 0.	56+/-0.05 N (2+/-0.2 oz)							68 min.
	Loading Time	e:5 sec Spec	imen Size: 4" >	× 4"											76 MARV
	80	80	81	82	84	82	81	80	80	81	81	1	80	84	80 nominal
ASTM D792	Specific Gravity	(23/ 23°C)													
Method A	0.9365	0.9364									0.9365	0.0000	0.9364	0.9365	0.939 max.
ASTM D6693	Tensile Propertie	es:													
Type IV	Test Specime	ens: Type IV, V	Vidth of narrow	section:0.2	25in, Length of	narrow sectio	n:1.3in, Widt	h Overall:0.75	in,						
	Length Overa	all: 4.5in Cond	ditioning: Cond	ucted test i	n standard labo	oratory atmosp	here of 23+/	-2 ⁰ C (73.4+/-	3.6 ⁰ F), and						
	50+/-5% rela	tive humidity. F	Rate of Separat	tion: 2"/min											
	Tensile Strength	n at Break (lbs/ in widt	h)											
	MD 244	267	243	264	237						251	14	237	267	120 min.
	TD 268	290	263	274	289						277	13	263	290	
	Elongation at Br	eak (perce	nt, %)		Gauge Le	ngth = 2.0 i	n.								
	MD 482	495	493	521	475						493	18	475	521	250 min.
	TD 574	613	566	596	617						593	23	566	617	
ASTM D4218	Carbon Content														
	Apparatus: I	Muffle Furnace													
	2.46	2.39									2.42	0.05	2.39	2.46	2 - 3
											-	-	-	-	
	(End of Ta	ble 1)							(Sheet 1 of	1)					



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 TABLE 2.

 <u>MATERIAL PROPERTIES</u>

 CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/11/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810018 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: TRI Job No.: **G192048** TRI Control No.: **145807**

						S	SPECIMEN	S								Proj.
	1		2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRI	ΡΤΙΟ	N													1
ASTM D5994	Thickness	(mils)													
	Appara	tus: De	ad-weight dial	micrometer w	vith gauge po	ints tapered a	t an angle of 6	60° +/-2° to	the horizontal	with the tip						
	roundee	d to a r	adius of 0.8+/-	0.1 mm(0.031	1+/-0.004 in),	with a specifie	ed force of 0.5	6+/-0.05 N (2	?+/-0.2 oz)							68 min.
	Loading	, Time:	5 sec Speci	men Size: 4" :	x 4"											76 MARV
	82		82	84	82	83	80	82	80	81	81	82	1	80	84	80 nominal
ASTM D792	Specific Gra	avity	(23/ 23°C)]
Method A	0.93	51	0.9352									0.9352	0.0000	0.9351	0.9352	0.939 max.
ASTM D6693	Tensile Prop	erties	<u>::</u>													
Type IV	Test Sp	ecimer	ns: Type IV, W	idth of narrow	section:0.25	5in, Length of I	narrow sectior	n:1.3in, Width	Overall:0.75in	l,						
	Length	Overal	l: 4.5in Condi	tioning: Cond	lucted test in	standard labo	ratory atmosp	here of 23+/-	2 ⁰ C (73.4+/-3.	.6 ⁰ F), and						
	50+/-5%	6 relativ	ve humidity. Ra	ate of Separa	tion: 2"/min											
	Tensile Stre	ength a	at Break (lt	os/ in widt	:h)											
	MD 257	7	243	242	276	277						259	17	242	277	120 min.
	TD 27	5	293	263	285	277						279	11	263	293	
	Elongation a	at Bre	ak (percen	t, %)		Gauge Lei	ngth = 2.0 i	n.								
	MD 498	3	501	466	531	530						505	27	466	531	250 min.
	TD 594	1	616	585	618	621						607	16	585	621	
ASTM D4218	Carbon Con	tent														
	Appara	tus: M	uffle Furnace													
	2.4	8	2.53									2.50	0.04	2.48	2.53	2 - 3
	(End c	of Tab	le 2)						(Sheet 1 of	1)					



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 TABLE 3.

 <u>MATERIAL PROPERTIES</u>

 CLIENT: Newfields

 PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/11/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810033 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: TRI Job No.: **G192048** TRI Control No.: **145808**

					S	PECIMEN	5								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTI	ON													
ASTM D5994	Thickness (mil	s)													
	Apparatus: D	ead-weight dial	l micrometer	with gauge p	oints tapered a	t an angle of	$60^{\circ} + - 2^{\circ} tc$	the horizonta	al with the tip						
	rounded to a	radius of 0.8+/-	-0.1 mm(0.03	31+/-0.004 in,), with a specifie	ed force of 0.8	56+/-0.05 N (2	2+/-0.2 oz)							68 min.
	Loading Time	e: 5 sec Spec	imen Size: 4	" x 4"											76 MARV
	83	82	82	81	81	82	81	80	83	82	82	1	80	83	80 nomina
ASTM D792	Specific Gravity	(23/ 23°C)													
Method A	0.9352	0.9349									0.9350	0.0002	0.9349	0.9352	0.939 max
ASTM D6693	Tensile Propertie	s:													
Type IV	Test Specime	ens: Type IV, W	idth of narro	w section:0.2	5in, Length of	narrow sectio	n:1.3in, Widtl	o Overall:0.75	iin,						
	Length Over	all: 4.5in Cond	litioning: Cor	nducted test in	n standard labo	ratory atmosp	here of 23+/	2 ° C (73.4+/-	3.6 [°] F), and						
	50+/-5% rela	tive humidity. R	ate of Separ	ration: 2"/min											
	I ensile Strength	at Break (I	bs/ in wi	dth)											
	MD 262	253	281	263	238						260	15	238	281	120 min.
	ID 280	285	287	266	296						283	11	266	296	
	Elongation at Br	eak (percer	it, %)	F40	Gauge Lei	ngth = 2.0 i	n.				547				
	MD 501	530	552	510	492						517	24	492	552	250 min.
	1D 599	608	627	606	654						619	22	599	654	
ASTM D4218	Carbon Content														
	Apparatus: I	Muttle Furnace									0.40	0.05			
	2.47	2.39									2.43	0.05	2.39	2.47	2-3

(End of Table 3)

(Sheet 1 of 1)



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 TABLE 4.

 MATERIAL PROPERTIES

 CLIENT:
 Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/11/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810048 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: Maria Cypitia TRI Job No.: **G192048**

TRI Control No.: 145809

					ę	SPECIMEN	S								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTIO	ON													
ASTM D5994	Thickness (mil	s)													
	Apparatus: D	ead-weight dia	l micrometer w	vith gauge p	oints tapered a	t an angle of 6	60° +/-2° to	the horizonta	al with the tip						
	rounded to a	radius of 0.8+/	/-0.1 mm(0.031	+/-0.004 in), with a specifi	ed force of 0.5	56+/-0.05 N (2	?+/-0.2 oz)							68 min.
	Loading Time	e:5 sec Spec	cimen Size: 4" x	x 4"											76 MARV
	82	82	83	82	83	80	82	80	81	81	81	1	80	83	80 nominal
ASTM D792	Specific Gravity	(23/ 23°C)													
Method A	0.9374	0.9374									0.9374	0.0000	0.9374	0.9374	0.939 max.
ASTM D6693	Tensile Propertie	es:													
Type IV	Test Specime	ens: Type IV, V	Vidth of narrow	section:0.2	25in, Length of	narrow sectior	n:1.3in, Width	o Overall:0.75i	in,						
	Length Overa	all: 4.5in Conc	ditioning: Cond	ucted test i	n standard labo	oratory atmosp	here of 23+/-	2 ⁰ C (73.4+/-3	3.6 ⁰ F), and						
	50+/-5% rela	tive humidity. R	Rate of Separat	tion: 2"/min											
	Tensile Strength	nat Break (lbs/ in widt	:h)											
	MD 237	237	266	291	243						255	23	237	291	120 min.
	TD 280	271	286	285	276						280	6	271	286	
	Elongation at Br	eak (percer	nt, %)		Gauge Le	ngth = 2.0 i	n.								
	MD 453	454	517	540	482						489	38	453	540	250 min.
	TD 617	580	616	600	603						603	15	580	617	
ASTM D4218	Carbon Content														
	Apparatus: N	Muffle Furnace													
	2.43	2.41									2.42	0.01	2.41	2.43	2 - 3
	(End of Tal	ble 4)							(Sheet 1 of	1)					



December 26, 2019

Nikoliya Boyanich **NewFields** 9400 Station Street, Suite 300 Lone Tree, CO, 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the final laboratory report for the Conformance testing of number of two (2) 80 mil LLDPE Microspike Geomambrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

REFERENCE TRI JOB NO .: G192062

DATE RECEIVED: December 12, 2019

SAMPLED BY: TRI-CA at AGRU, NV

SAMPLE IDENTIFICATIONS:

SAMPLE ID R# FNB0047810063 L#DKJ810770 R# FNB0047810078 L#DKJ810770

TESTS REQUIRED / PERFORMED:

TEST METHOD	DESCRIPTION
1. ASTM D5994	Thickness
2. ASTM D6693	Tensile Properties
3. ASTM D792	Specific Gravity
4. ASTM D4218	Carbon Content Muffle

TEST RESULTS: The test results are summarized in the attached Tables 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully, TRI Environmental, Inc. - California

Maria Espetia

Maria Espitia **Quality Assurance**

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Cora Queja **TRI-CA** Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. Retained conformance samples are disposed of after one (1) month. On the other hand, should you need us to keep them at a longer period, please advise us in writing.

3 Pages Total (including this sheet)



DATE REPORTED: December 26, 2019

TRI CONTROL NUMBER 145869 145870



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TABLE 1.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/11/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810063 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: TRI Job No.: **G192062**

TRI Control No.: 145869

						3	PECIMEN	5								j Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DES	CRIPTIO	N													
ASTM D5994	Thickr	ness (mils	s)													
	A	Apparatus: De	ead-weight dial	micrometer w	ith gauge po	oints tapered at a	n angle of 60	$^{\circ}$ +/- 2 $^{\circ}$ to the	horizontal wit	th the tip						
	ro	ounded to a r	radius of 0.8+/-0).1 mm(0.031-	+/-0.004 in),	with a specified	force of 0.56+	-/-0.05 N (2+/-0).2 oz)							68 min.
	L	oading Time.	:5 sec Specin	nen Size: 4" x	4"											76 MAR V
		80	81	81	81	83	80	82	81	81	81	81	1	80	83	80 nomina
ASTM D792	Specif	ic Gravity	(23/ 23°C)													1
Method A		0.9350	0.9344									0.9347	0.0004	0.9344	0.9350	0.939 max
ASTM D6693	Tensile	Propertie	<u>S:</u>													
Type IV	7	est Specime	ns: Type IV, Wie	dth of narrow	section:0.25	5in, Length of nai	row section:1	.3in, Width Ov	ərall:0.75in,							1
	L	ength Overa	ll: 4.5in Condit	ioning: Condu	icted test in	standard laborat	ory atmosphe	re of 23+/-2 ⁰	C (73.4+/-3.6 [°])	F), and						1
	5	50+/-5% relati	ive humidity. Ra	ate of Separati	ion: 2"/min											
	Tensil	e Strength	at Break (I	bs/ in wid	lth)											1
	MD	272	264	254	234	250						255	14	234	272	120 min.
	TD	315	307	301	276	318						303	17	276	318	
	Elonga	ation at Br	eak (percer	nt, %)		Gauge Lei	ngth = 2.0 i	'n.								1
	MD	539	506	502	482	511						508	20	482	539	250 min.
	TD	670	647	649	595	674						647	32	595	674	1
ASTM D4218	Carbor	n Content														1
	A	Apparatus: M	luffle Furnace													1
		2.41	2.44									2.43	0.02	2 4 1	2 4 4	2-3

(End of Table 1)

(Sheet 1 of 1)



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TABLE 2. **MATERIAL PROPERTIES CLIENT: Newfields**

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/11/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810078 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane

Maria Espetie QC'd By: TRI Job No.: G192062

TRI Control No.: 145870

						S	SPECIMEN	S								Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESC	CRIPTIO	N													1
ASTM D5994	Thickn	ess (mils	5)													
	A	pparatus: De	ad-weight dial	micrometer wit	th gauge po	oints tapered at a	n angle of 60	$^{\circ}$ +/- 2 $^{\circ}$ to the	e horizontal wi	ith the tip						
	rc	ounded to a ra	adius of 0.8+/-0).1 mm(0.031+,	/-0.004 in),	with a specified	force of 0.56+	/-0.05 N (2+/-0).2 oz)							68 min.
	L	oading Time:	5 sec Specin	nen Size: 4" x -	4"											76 MAR V
		82	81	80	80	83	82	80	81	81	81	81	1	80	83	80 nomina
ASTM D792	Specifi	ic Gravity	(23/ 23°C)													
Method A		0.9375	0.9376									0.9376	0.0000	0.9375	0.9376	0.939 max
ASTM D6693	<u>Tensile</u>	Properties	<u>s:</u>													
Type IV	T	est Specimer	ns: Type IV, Wie	dth of narrow s	ection:0.25	iin, Length of nar	row section:1.	3in, Width Ov	erall:0.75in,							
	L	ength Overal	I: 4.5in Condit	ioning: Conduc	cted test in	standard laborat	ory atmosphe	re of 23+/-2 ⁰	C (73.4+/-3.6 [°]	F), and						
	5	0+/-5% relati	ve humidity. Ra	te of Separatio	on: 2"/min											
	Tensile	e Strength	at Break (I	bs/ in widt	th)								_			
	MD	252	258	255	257	264						257	5	252	264	120 min.
	TD	273	288	283	289	291						285	7	273	291	
	Elonga	ation at Bre	eak (percer	nt, %)		Gauge Le	ngth = 2.0	in.								
	MD	496	510	519	521	543						518	17	496	543	250 min.
	TD	589	620	621	636	629						619	18	589	636	
ASTM D4218	Carbon	Content														
	A	pparatus: Mi	uffle Furnace													
		2.41	2.45									2.43	0.03	2.41	2.45	2 - 3
	/1	Ind of Tob								(Chaot 1 a	f 1)					
	([JE Z)													



December 26, 2019

Nikoliya Boyanich **NewFields** 9400 Station Street, Suite 300 Lone Tree, CO, 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the final laboratory report for the Conformance testing of number of two (2) 80mil LLDPE Microspike Geomembrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

REFERENCE TRI JOB NO .: G192072

DATE RECEIVED: December 16, 2019

SAMPLED BY: TRI-CA at AGRU, NV

SAMPLE IDENTIFICATIONS:

SAMPLE ID R# FNB0047810085 L#DKJ810770 R# FNB0047810100 L#DKK810700

<u>TESTS</u>	REQUIRED	<u>) / PERFORMED</u> :

TEST METHOD	DESCRIPTION
1. ASTM D5994	Thickness
2. ASTM D6693	Tensile Properties
3. ASTM D792	Specific Gravity
4. ASTM D4218	Carbon Content Muffle

TEST RESULTS: The test results are summarized in the attached Tables 1 to 2.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

TRI Environmental, Inc. - California

Maria Espetia

Maria Espitia Quality Assurance

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Cora Queja **TRI-CA** Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. Retained conformance samples are disposed of after one (1) month. On the other hand, should you need us to keep them at a longer period, please advise us in writing.

3 Pages Total (including this sheet)



DATE REPORTED: December 26, 2019

TRI CONTROL NUMBER 145955 145956





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TABLE 1.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/16/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810085 L#DKJ810770 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: Maria Cypitia TRI Job No.: **G192072**

TRI Control No.: 145955

					3	PECIMEN	5								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	. Min	Max	Specs.
METHOD	DESCRIPT	ON													
ASTM D5994	Thickness (m	nils)													
	Apparatus:	Dead-weight dia	l micrometer w	rith gauge po	oints tapered at a	an angle of 60	$^{\circ}$ +/- 2 $^{\circ}$ to th	e horizontal witl	h the tip						
	rounded to	a radius of 0.8+/	0.1 mm(0.031-	+/-0.004 in),	with a specified	force of 0.56+	-/-0.05 N (2+/·	0.2 oz)							68 min.
	Loading Ti	me: 5 sec Spec	imen Size: 4" x	: 4"											76 MARV
	84	82	82	84	84	81	82	82	80	83	82	1	80	84	80 nomina
ASTM D792	Specific Gravi	ty (23/ 23°C)												
Method A	0.9345	0.9344									0.9344	0.0001	0.9344	0.9345	0.939 max
ASTM D6693	<u>Tensile Proper</u>	ties:													
Type IV	Test Speci	mens: Type IV, W	idth of narrow	section:0.25	in, Length of na	rrow section:1	.3in, Width O	verall:0.75in,							
	Length Ove	erall: 4.5in Cond	itioning: Condu	ucted test in	standard labora	tory atmosphe	re of 23+/-2 ⁰	C (73.4+/-3.6 [°])	F), and						
	50+/-5% re	lative humidity. F	ate of Separat	ion: 2"/min											
	Tensile Streng	th at Break	(lbs/ in wic	tth)											
	MD 251	260	244	250	234						248	10	234	260	120 min.
	TD 254	253	254	264	254						256	5	253	264	
	Elongation at	Break (perce	ent, %)		Gauge Lei	ngth = 2.0 i	n.								
	MD 488	535	492	533	491						508	24	488	535	250 min.
	TD 593	576	595	624	631						604	23	576	631	
ASTM D4218	Carbon Conter	nt													
	Apparatus:	Muffle Furnace													
	2.36	2.44									2.40	0.06	2.36	2.44	2 - 3

(End of Table 1)

(Sheet 1 of 1)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

Precision Geosynthetic Laboratories International dba TRI Environmental, Inc.



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TABLE 2. **MATERIAL PROPERTIES**

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/16/2019

Date Reported: 12/26/2019

Client Sample ID: R#FNB0047810100 L#DKK810700 Material Description: 80mil LLDPE Microspike Geomembrane

Maria Espetio QC'd By: TRI Job No.: G192072

TRI Control No.: 145956

					S	PECIMEN	S								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTIC)N													
ASTM D5994	Thickness (mil	s)													
	Apparatus: D	ead-weight dial	l micrometer w	ith gauge po	ints tapered at	an angle of 60	$0^{\circ} + / - 2^{\circ}$ to a	he horizontal v	with the tip						
	rounded to a	radius of 0.8+/-	0.1 mm(0.031	+/-0.004 in), I	with a specified	force of 0.56	+/-0.05 N (2+	/-0.2 oz)							68 min.
	Loading Time	e:5 sec Speci	men Size: 4" :	x 4"											76 MARV
	81	80	81	82	82	81	84	82	80	82	81	1	80	84	80 nomina
ASTM D792	Specific Gravity	(23/ 23°C))												
Method A	0.9378	0.9378									0.9378	0.0000	0.9378	0.9378	0.939 max
ASTM D6693	Tensile Propertie	es:													
Type IV	Test Specime	ens: Type IV, W	idth of narrow	section:0.25i	n, Length of na	rrow section:	1.3in, Width (overall:0.75in,							
	Length Overa	all: 4.5in Cond	itioning: Cond	ucted test in s	standard labora	tory atmosph	ere of 23+/-2	[°] C (73.4+/-3.6	5°F), and						
	50+/-5% rela	tive humidity. R	ate of Separa	tion: 2"/min											
	Tensile Strength	n at Break	(lbs/ in wi	dth)											
	MD 273	264	231	244	232						249	19	231	273	120 min.
	ID 269	272	251	250	253						259	11	250	272	
	Elongation at Bi	reak (perce	ent, %)		Gauge Ler	ngth = 2.0 i	n.				5.0-				
	MD 519	524	494	502	498						507	13	494	524	250 min.
	ID 628	615	586	592	615						607	18	586	628	
ASTM D4218	Carbon Content														
	Apparatus: N	Auffle Furnace													
	2.43	2.46									2.44	0.02	2.43	2.46	2 - 3

(End of Table 2)

(Sheet 1 of 1)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

Precision Geosynthetic Laboratories International dba TRI Environmental, Inc.



December 26, 2019

Nikoliya Boyanich *NewFields* 9400 Station Street, Suite 300 Lone Tree, CO, 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the *final* laboratory report for the Conformance testing of number of three (3) 80mil LLDPE Microspike Geomembrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

REFERENCE TRI JOB NO .: G192083

DATE RECEIVED: December 17, 2019

SAMPLED BY: TRI-CA at AGRU

SAMPLE IDENTIFICATIONS:

 SAMPLE ID

 R# FNB0047810115
 L#DKK810700

 R# FNB0047810130
 L#DKK810700

 R# FND0047820005
 L#DKK810710

TESTS REQUIRED / PERFORMED:

TEST METHOD 1. ASTM D5994 2. ASTM D6693 3. ASTM D792 4. ASTM D4218

DATE REPORTED: December 26, 2019

TRI CONTROL NUMBER 146015 146016 146017

DESCRIPTION

Thickness Tensile Properties Specific Gravity Carbon Content Muffle

TEST RESULTS: The test results are summarized in the attached Tables 1 to 3.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully, TRI Environmental, Inc. - California

Maria Espetia

Maria Espitia Quality Assurance

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Cora	Queia

TRI-CA Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Retained conformance samples are disposed of after one (1) month.* On the other hand, should you need us to keep them at a longer period, please advise us in writing.

4 Pages Total (including this sheet)





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TABLE 1. **MATERIAL PROPERTIES CLIENT: Newfields**

PROJECT: CC&V VLF2 Phase 2B

ODEONAENIO

Date Received: 12/17/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810115 L#DKK810700 Material Description: 80mil LLDPE Microspike Geomembrane

Jorea Espeti QC'd By: TRI Job No.: G192083 TRI Control No.: 146015

							SPECIMENS									Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DES	CRIPTIC	DN													
ASTM D5994	Thickr	ness (mil	s)													
	A	Apparatus: D	ead-weight dial	micrometer w	vith gauge po	oints tapered at	an angle of 60 [°]	° +/- 2° to th	e horizontal w	vith the tip						
	r	rounded to a	radius of 0.8+/-	0.1 mm(0.031	+/-0.004 in),	with a specified	l force of 0.56+/	-0.05 N (2+/	-0.2 oz)							68 min.
	L	Loading Time	e: 5 sec Speci	men Size: 4" >	‹ 4"											76 MARV
		83	80	81	80	82	81	82	80	82	80	81	1	80	83	80 nomina
ASTM D792	Specit	fic Gravity	(23/ 23°C))												
Method A		0.9348	0.9348									0.9348	0.0000	0.9348	0.9348	0.939 max
ASTM D6693	Tensile	e Propertie	es:													
Type IV	7	Test Specime	ens: Type IV, W	idth of narrow	section:0.25	5in, Length of na	rrow section:1.	3in, Width O	verall:0.75in,							
	L	Length Overa	all: 4.5in Condi	itioning: Cond	ucted test in	standard labora	tory atmospher	e of 23+/-2	C (73.4+/-3.6	⁰ F), and						
	5	50+/-5% rela	tive humidity. R	ate of Separat	tion: 2"/min											
	Tensil	le Strength	n at Break ([lbs/ in wid	dth)											
	MD	263	263	250	242	242						252	11	242	263	120 min.
	TD	280	286	280	292	275						283	7	275	292	
	Elong	ation at B	reak (perce	nt, %)		Gauge Le	ngth = 2.0 in	•								
	MD	494	539	501	552	486						514	29	486	552	250 min.
	TD	630	627	618	641	619						627	9	618	641	
ASTM D4218	Carbor	n Content														
	A	Apparatus: N	<i>Auffle Furnace</i>													
													••••••••••••••••••••••••••••••••••••			

(End of Table 1)

(Sheet 1 of 1)



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TABLE 2. **MATERIAL PROPERTIES**

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/17/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810130 L#DKK810700

Material Description: 80mil LLDPE Microspike Geomembrane

Jorea Cipet QC'd By: TRI Job No.: G192083

TRI Control No.: 146016

						S	SPECIMEN:	S								Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DES	CRIPTIC	N													
ASTM D5994	Thickr	ness (mil	s)													
	A	Apparatus: D	ead-weight dial	l micrometer w	ith gauge po	oints tapered at a	an angle of 60	° +/- 2° to th	e horizontal w	vith the tip						
	r	ounded to a	radius of 0.8+/-	0.1 mm(0.031	+/-0.004 in),	with a specified	force of 0.56-	-/-0.05 N (2+/·	0.2 oz)							68 min.
	L	oading Time.	e: 5 sec Speci	imen Size: 4" >	x 4"											76 MARV
		83	80	84	80	80	82	80	82	81	82	81	1	80	84	80 nomina
ASTM D792	Specif	ic Gravity	(23/ 23°C))												
Method A		0.9348	0.9346									0.9347	0.0002	0.9346	0.9348	0.939 max.
ASTM D6693	<u>Tensile</u>	e Propertie	es:													
Type IV	7	Fest Specime	ens: Type IV, W	idth of narrow	section:0.25	iin, Length of na	rrow section:1	.3in, Width O	/erall:0.75in,							
	L	ength Overa	all: 4.5in Cond	itioning: Condi	ucted test in	standard labora	tory atmosphe	ere of 23+/-2 ⁰	C (73.4+/-3.6	[°] F), and						
	_ 5	50+/-5% relat	tive humidity. R	ate of Separat	tion: 2"/min											
	Tensil	e Strength	n at Break	(lbs/ in wid	dth)											
	MD	256	239	254	238	251						248	8	238	256	120 min.
	TD	285	288	280	281	284						284	3	280	288	
	Elong	ation at Br	eak (perce	ent, %)		Gauge Lei	ngth = 2.0 i	n.								
	MD	500	504	498	503	528						507	12	498	528	250 min.
	TD	603	605	610	605	605						606	3	603	610	
ASTM D4218	Carbor	n Content														
	A	Apparatus: N	<i>Iuffle Furnace</i>													
		2.30	2.31									2.31	0.01	2.30	2.31	2 - 3

(End of Table 2)

(Sheet 1 of 1)



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TABLE 3. **MATERIAL PROPERTIES**

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

ODEOUVENIO

Date Received: 12/17/2019 Date Reported: 12/26/2019 Client Sample ID: R#FND0047820005 L#DKK810710 Material Description: 80mil LLDPE Microspike Geomembrane

Maria Espeti QC'd By: TRI Job No.: G192083

TRI Control No.: 146017

							SPECIMENS)								proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCR		Ν													
ASTM D5994	Thicknes	s (mils)													
	Арра	aratus: De	ad-weight dial	micrometer w	ith gauge po	ints tapered at	an angle of 60 °	+/-2° to th	e horizontal w	rith the tip						
	roun	ded to a ra	adius of 0.8+/-0	0.1 mm(0.031-	+/-0.004 in),	with a specified	force of 0.56+/	-0.05 N (2+/-	0.2 oz)							68 min.
	Load	ling Time:	5 sec Specii	men Size: 4" x	4"											76 MARV
		82	81	81	81	82	81	80	84	81	80	81	1	80	84	80 nomina
ASTM D792	Specific (Gravity	(23/ 23°C)													
Method A	0.9	9356	0.9355									0.9355	0.0001	0.9355	0.9356	0.939 max
ASTM D6693	Tensile Pr	roperties	<u>;;</u>													
Type IV	Test	Specimen	is: Type IV, Wi	dth of narrow	section:0.25	in, Length of na	rrow section:1.3	Bin, Width O	verall:0.75in,							
	Leng	th Overall	: 4.5in Condi	tioning: Condu	icted test in s	standard labora	tory atmospher	e of 23+/-2 "	C (73.4+/-3.6	^o F), and						
	50+/-	-5% relativ	/e humidity. Ra	ate of Separati	ion: 2"/min											
	Tensile S	strength	at Break (lbs/ in wid	lth)								_			
	MD 2	261	257	268	258	243						258	9	243	268	120 min.
		250	291	270	275	283						274	15	250	291	
	Elongatio	on at Bre	eak (perce	nt, %)		Gauge Le	ngth = 2.0 in									
	MD 4	196	484	522	4/2	517						498	21	472	522	250 min.
		566	620	619	602	597						601	22	566	620	
ASTM D4218	Carbon C	ontent														
	Appa	aratus: Mu	Iffle Furnace													
	2	.42	2.38									2.40	0.03	2.38	2.42	2-3

(End of Table 3)

(Sheet 1 of 1)



December 26, 2019

Nikoliya Boyanich *NewFields* 9400 Station Street, Suite 300 Lone Tree, CO 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the *final* laboratory report for the Conformance testing of six (6) 80 mil LLDPE Microspike Geomembrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

DATE REPORTED: December 26, 2019

REFERENCE TRI JOB NO .: G192088

DATE RECEIVED: December 18, 2019

SAMPLED BY: TRI-CA at AGRU,NV

SAMPLE IDENTIFICATIONS:

SAMPLE ID	TR	RI CONTROL NUMBER
R# FNB0047810145	L#DKK810700	146047
R# FNB0047810160	L#DKK810700	146048
R# FNB0047810175	L#DKK810700	146049
R# FND0047820022	L#DKK810710	146050
R# FND0047820037	L#DKK810710	146051
R# FND0047820052	L#DKK810710	146052

TESTS REQUIRED / PERFORMED:

TEST METHOD	DESCRIPTION
1. ASTM D5994	Thickness
2. ASTM D6693	Tensile Properties
3. ASTM D792	Specific Gravity
4. ASTM D4218	Carbon Content Muffle

TEST RESULTS: The test results are summarized in the attached Tables 1 to 6.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

TRI Environmental, Inc. - California

Maries Expetia

Maria Espitia Quality Assurance

Cora Queja TRI-CA Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Retained conformance samples are disposed of after one (1) month.* On the other hand, should you need us to keep them at a longer period, please advise us in writing.

7 Pages Total (including this sheet)





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TABLE 1.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/18/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810145 L#DKK810700 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: Maria Cypitis TRI Job No.: **G192088**

TRI Control No.: 146047

						SPECIMEN	S								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	. Min	Max	Specs.
METHOD	DESCRIPT	ION													
ASTM D5994	Thickness (mils)													
	Apparatus	: Dead-weight d	lial micrometer v	vith gauge po	oints tapered at	an angle of 60	° +/- 2° to th	e horizontal wi	th the tip						
	rounded t	o a radius of 0.8-	+/-0.1 mm(0.031	+/-0.004 in),	with a specified	force of 0.56+	-/-0.05 N (2+/·	0.2 oz)							68 min.
	Loading T	ïme: 5 sec Spe	ecimen Size: 4" :	x 4"											76 MARV
	82	83	84	82	80	81	80	82	80	81	82	1	80	84	80 nomina
ASTM D792	Specific Grav	ity (23/ 23°	C)												
Method A	0.9343	3 0.9342									0.9342	0.0000	0.9342	0.9343	0.939 max
ASTM D6693	Tensile Prope	<u>rties:</u>													
Type IV	Test Spec	imens: Type IV,	Width of narrow	section:0.25	ōin, Length of na	rrow section:1	.3in, Width O	erall:0.75in,							
	Length O	verall: 4.5in Cor	nditioning: Cond	lucted test in	standard labora	tory atmosphe	ere of 23+/-2	C (73.4+/-3.6 [°]	F), and						
	50+/-5% r	elative humidity.	Rate of Separa	tion: 2"/min											
	Tensile Stren	gth at Break	(lbs/ in wi	dth)											
	MD 262	276	217	255	234						249	23	217	276	120 min.
	TD 285	281	283	292	276						283	6	276	292	
	Elongation at	Break (per	cent, %)		Gauge Le	ngth = 2.0 i	n.								
	MD 511	528	442	489	518						498	34	442	528	250 min.
	TD 636	629	639	659	601						633	21	601	659	
ASTM D4218	Carbon Conte	nt													
	Apparatus	: Muffle Furnac	e												
	2.33	2.37									2.35	0.03	2.33	2.37	2 - 3

(End of Table 1)

(Sheet 1 of 1)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

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TABLE 2. MATERIAL PROPERTIES CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/18/2019 Date Reported: 12/26/2019 Client Sample ID: R#FNB0047810160 L#DKK810700 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: Maria Expiti TRI Job No.: **G192088**

TRI Control No.: 146048

						SPECIMENS									Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTI	ON													
ASTM D5994	Thickness (m	ils)													
	Apparatus: I	Dead-weight dia	micrometer w	ith gauge p	oints tapered at	an angle of 60 $^{\circ}$	+/- 2 $^{\circ}$ to th	e horizontal w	ith the tip						
	rounded to a	a radius of 0.8+/-	0.1 mm(0.031-	+/-0.004 in),	, with a specified	d force of 0.56+/-	0.05 N (2+/-	0.2 oz)							68 min.
	Loading Tim	ne: 5 sec Speci	men Size: 4" x	: 4"											76 MARV
	80	82	81	82	81	82	81	80	80	85	81	1	80	85	80 nomina
ASTM D792	Specific Gravit	y (23/ 23°C))												
Method A	0.9383	0.9383									0.9383	0.0000	0.9383	0.9383	0.939 max
ASTM D6693	Tensile Properti	ies:													
Type IV	Test Specim	nens: Type IV, W	idth of narrow	section:0.25	5in, Length of na	arrow section:1.3	in, Width Ov	rerall:0.75in,							
	Length Over	rall: 4.5in Cond	itioning: Condu	ucted test in	standard labora	atory atmosphere	of 23+/-2 ⁰	C (73.4+/-3.6	°F), and						
	50+/-5% rela	ative humidity. R	ate of Separat	ion: 2"/min											
	Tensile Strengt	th at Break	(lbs/ in wic	lth)											
	MD 263	235	210	216	245						234	22	210	263	120 min.
	TD 282	304	276	127	290						256	73	127	304	
	Elongation at E	Break (perce	ent, %)		Gauge Le	ength = 2.0 in.									
	MD 507	473	438	482	517						483	31	438	517	250 min.
	TD 672	647	616	595	644						635	30	595	672	
ASTM D4218	Carbon Content	t													
	Apparatus:	Muffle Furnace													
	2.36	2.41									2.38	0.03	2.36	2.41	2 - 3

(End of Table 2)

(Sheet 1 of 1)



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TABLE 3.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: **12/18/2019** Date Reported: **12/26/2019**

Client Sample ID: R#FNB0047810175 L#DKK810700

Material Description: 80mil LLDPE Microspike Geomembrane

					S	PECIMENS	S								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTION	N													
ASTM D5994	Thickness (mils))													
	Apparatus: Dea	ad-weight dial n	nicrometer with	h gauge poir	nts tapered at an	angle of 60 $^{\circ}$	+/- 2 $^{\circ}$ to the	horizontal with	the tip						
	rounded to a ra	adius of 0.8+/-0.	1 mm(0.031+/-	-0.004 in), w	ith a specified fo	orce of 0.56+/-0	0.05 N (2+/-0	.2 oz)							68 min.
	Loading Time:	5 sec Specim	en Size: 4" x 4	!"											76 MARV
	81	80	80	82	83	81	80	81	82	81	81	1	80	83	80 nominal
ASTM D792	Specific Gravity	(23/ 23°C)													
Method A	0.9371	0.9371									0.9371	0.0000	0.9371	0.9371	0.939 max.
ASTM D6693	Tensile Properties	<u>):</u>													
Type IV	Test Specimen	s: Type IV, Wid	th of narrow se	ection:0.25in	, Length of narro	ow section:1.3	in, Width Ove	erall:0.75in,							
	Length Overall.	: 4.5in Conditie	oning: Conduc	ted test in st	andard laborato	ry atmosphere	of 23+/-2 ° C	C (73.4+/-3.6 [°] F)	, and						
	50+/-5% relativ	e humidity. Rat	e of Separatio	n: 2"/min											
	Tensile Strength	at Break (It	os/ in widtl	h)											
	MD 241	300	262	278	242						264	25	241	300	120 min.
	TD 269	279	274	268	281						274	6	268	281	
	Elongation at Bre	eak (percen	t, %)		Gauge Lei	ngth = 2.0 ir	า.								
	MD 492	551	513	510	503						514	22	492	551	250 min.
	TD 606	627	641	612	674						632	27	606	674	
ASTM D4218	Carbon Content														
	Apparatus: Mu	Iffle Furnace													
	2.36	2.32									2.34	0.03	2.32	2.36	2 - 3

(End of Table 3)

(Sheet 1 of 1)

Maria Espeti

QC'd By:

TRI Control No.: 146049

TRI Job No.: G192088



Austin, TX - USA Anaheim, CA - USA Anderson, SC - USA Gold Coast - Australia Suzhou - China

TABLE 4.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/18/2019 Date Reported: 12/26/2019 Client Sample ID: R#FND0047820022 L#DKK810710

Material Description: 80mil LLDPE Microspike Geomembrane

QC'd By: <u>Maria Cypitic</u> TRI Job No.: **G192088** TRI Control No.: **146050**

Proj.

Specs.

68 min.

76 MARV

80 nominal

0.939 max.

120 min.

250 min.

2 - 3

SPECIMENS 1 2 3 4 5 6 8 9 10 Avg. Std. Dev. Min Max **METHOD** DESCRIPTION ASTM D5994 Thickness (mils) Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2° to the horizontal with the tip rounded to a radius of 0.8+/-0.1 mm(0.031+/-0.004 in), with a specified force of 0.56+/-0.05 N (2+/-0.2 oz) Loading Time: 5 sec Specimen Size: 4" x 4" 81 80 81 81 80 81 83 82 1 83 84 83 80 84 Specific Gravity (23/23°C) ASTM D792 0.9371 0.0000 Method A 0.9372 0.9371 0.9371 0.9372 **ASTM D6693 Tensile Properties:** Type IV Test Specimens: Type IV, Width of narrow section:0.25in, Length of narrow section:1.3in, Width Overall:0.75in, Length Overall: 4.5in Conditioning: Conducted test in standard laboratory atmosphere of 23+/-2 °C (73.4+/-3.6°F), and 50+/-5% relative humidity. Rate of Separation: 2"/min Tensile Strength at Break (lbs/ in.- width) 256 MD 208 240 222 232 232 18 208 256 TD 279 263 280 300 264 277 15 263 300 Elongation at Break (percent, %) Gauge Length = 2.0 in. MD 537 473 512 485 483 498 26 473 537 TD 650 613 619 666 608 631 25 608 666 ASTM D4218 Carbon Content Apparatus: Muffle Furnace 2.48 2.49 2.48 0.01 2.48 2.49

(End of Table 4)

(Sheet 1 of 1)



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China

TABLE 5. **MATERIAL PROPERTIES CLIENT: Newfields**

PROJECT: CC&V VLF2 Phase 2B

ODEONAENIO

Date Received: 12/18/2019 Date Reported: 12/26/2019 Client Sample ID: R#FND0047820037 L#DKK810710 Material Description: 80mil LLDPE Microspike Geomembrane

Maria Espeti QC'd By: TRI Job No.: G192088 TRI Control No.: 146051

							SPECIMENS	5								Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESC	RIPTIO	N													1
ASTM D5994	Thickne	ss (mils	3)													
	Ap	paratus: De	ad-weight dial	micrometer v	vith gauge po	oints tapered at	an angle of 60	° +/-2° to th	e horizontal wi	ith the tip						
	rou	inded to a r	adius of 0.8+/-0	0.1 mm(0.03	1+/-0.004 in),	with a specified	force of 0.56+	/-0.05 N (2+/-	0.2 oz)							68 min.
	Loa	ading Time.	: 5 sec Specii	men Size: 4"	x 4"											76 MARV
		85	80	82	81	81	81	82	80	80	82	82	2	80	85	80 nomina
ASTM D792	Specific	Gravity	(23/ 23°C)													
Method A	0).9348	0.9350									0.9349	0.0002	0.9348	0.9350	0.939 max
ASTM D6693	Tensile I	Propertie	<u>s:</u>													
Type IV	Tes	st Specime	ns: Type IV, Wi	dth of narrow	section:0.25	iin, Length of na	rrow section:1.	3in, Width Ov	erall:0.75in,							
	Ler	ngth Overal	ll: 4.5in Condi	tioning: Conc	lucted test in	standard labora	tory atmospher	e of 23+/-2 ⁰	C (73.4+/-3.6 ⁰	°F), and						
	50-	+/-5% relati	ive humidity. Ra	ate of Separa	tion: 2"/min											
	Tensile	Strength	at Break (lbs/ in wi	dth)											
	MD	235	241	229	264	236						241	14	229	264	120 min.
	TD	259	270	271	277	259						267	8	259	277	
	Elongat	ion at Br	eak (perce	nt, %)		Gauge Le	ngth = 2.0 ii	า.								
	MD	493	519	496	528	503						508	15	493	528	250 min.
	TD	596	627	619	635	611						618	15	596	635	
ASTM D4218	Carbon (Content														
	Apj	paratus: M	uffle Furnace													
		2.33	2.30									2.32	0.02	2.30	2.33	2 - 3

(End of Table 5)

(Sheet 1 of 1)



Austin, TX - USA | Anaheim, CA - USA | Anderson, SC - USA | Gold Coast - Australia | Suzhou - China

TABLE 6. **MATERIAL PROPERTIES CLIENT: Newfields**

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/18/2019 Date Reported: 12/26/2019 Client Sample ID: R#FND0047820052 L#DKK810710 Material Description: 80mil LLDPE Microspike Geomembrane

Maria Espeti QC'd By: TRI Job No.: G192088

TRI Control No.: 146052

							SPECIMENS	5								Proj.
		1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DES	CRIPTIC	DN													1
ASTM D5994	Thickr	ness (mil	ls)													
	A	Apparatus: D	ead-weight dial	micrometer wi	ith gauge po	oints tapered at a	an angle of 60 [°]	$^{\circ}$ +/- 2 $^{\circ}$ to the	e horizontal w	ith the tip						
	n	ounded to a	radius of 0.8+/-0	0.1 mm(0.031+	-/-0.004 in),	with a specified	force of 0.56+/	-0.05 N (2+/-).2 oz)							68 min.
	L	oading Time.	e: 5 sec Specii	men Size: 4" x	4"											76 MARV
		81	81	83	81	81	84	82	80	82	80	82	1	80	84	80 nomina
ASTM D792	Specif	ic Gravity	′ (23/ 23°C)													
Method A		0.9345	0.9351									0.9348	0.0004	0.9345	0.9351	0.939 max
ASTM D6693	<u>Tensile</u>	e Propertie	es:													
Type IV	7	Fest Specime	ens: Type IV, Wi	dth of narrow s	section:0.25	ōin, Length of na	rrow section:1.3	3in, Width Ov	erall:0.75in,							
	L	ength Overa	all: 4.5in Condi	tioning: Condu	icted test in	standard labora	tory atmospher	e of 23+/-2 ⁰	C (73.4+/-3.6 [°]	F), and						
	_ 5	50+/-5% relat	tive humidity. Ra	ate of Separati	on: 2"/min											
	lensil	e Strength	n at Break (lbs/ in wid	th)											
	MD	228	276	229	264	302						260	32	228	302	120 min.
		285	264	2/1	286	309						283	1/	264	309	1
	Elonga	ation at Bi	reak (perce	nt, %)		Gauge Le	ngth = 2.0 ir).				504				
	MD	491	526	478	540	569						521	37	478	569	250 min.
	ID	646	591	587	623	676						625	38	587	676	1
ASTM D4218	Carbor	n Content														
	A	Apparatus: N	Auffle Furnace													
		2.49	2.45									2.47	0.03	2.45	2.49	2-3

(End of Table 6)

(Sheet 1 of 1)



January 10, 2020

Nikoliya Boyanich *NewFields* 9400 Station Street, Suite 300 Lone Tree, CO 80124

Re: FINAL LABORATORY TEST REPORT

Dear Ms. Boyanich:

Thank you for consulting TRI California for your material testing needs.

Enclosed is the *final* laboratory report for the Conformance testing of three (3) 80 mil LLDPE Microspike Geomembrane samples.

PROJECT NAME: CC&V VLF2 Phase 2B

REFERENCE TRI JOB NO .: G192093

DATE RECEIVED: December 19, 2019

SAMPLED BY: TRI-CA at AGRU, NV

SAMPLE IDENTIFICATIONS:

SAMPLE ID R# FNB0047810190 Lot DKJ810710 R# FND0047820067 Lot DKJ810710 R# FND0047820082 Lot DKJ810710

TESTS REQUIRED / PERFORMED:

TEST METHOD 1. ASTM D5994 2. ASTM D6693 3. ASTM D792

4. ASTM D4218

DATE REPORTED: January 10, 2020

DESCRIPTION Thickness Tensile Properties Specific Gravity Carbon Content Muffle

TRI CONTROL NUMBER

146076

146078

146079

TEST RESULTS: The test results are summarized in the attached Tables 1 to 3.

Note: The general conditioning and testing of the material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e., 20-24°C and 45-65% RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.

Respectfully,

TRI Environmental, Inc. - California

Maria Espetia

Maria Espitia Quality Assurance

Cora Queja TRI-CA Director

Signatures are on file

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is our policy to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Retained conformance samples are disposed of after one (1) month.* On the other hand, should you need us to keep them at a longer period, please advise us in writing.

4 Pages Total (including this sheet)





 TABLE 1.

 MATERIAL PROPERTIES

 CLIENT: Newfields

 PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/20/2019 Date Reported: 1/10/2019 Client Sample ID: R# FNB0047810190 L# DKJ810710 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: <u>Maria Expitia</u> TRI Job No.: **G192093** TRI Control No.: **146076**

					5	SPECIMEN	S								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTION														
ASTM D5994	Thickness (mils)														
	Apparatus: Dead	d-weight dial r	micrometer with	n gauge poin	ts tapered at	an angle of 60	° +/- 2° to th	e horizontal wi	th the tip						
	rounded to a rad	lius of 0.8+/-0).1 mm(0.031+/-	-0.004 in), w	ith a specified	d force of 0.56	+/-0.05 N (2+/	-0.2 oz)							68 min.
	Loading Time: 5	sec Specin	nen Size: 4" x 4	!"		<u> </u>			<u> </u>	<u> </u>		_			76 MARV
	83 Occuritie Occuritie (80	80	80	84	84	80	83	80	81	82	2	80	84	80 nominal
ASTM D792	Specific Gravity (23/23 ()									0.0265	0.0001	0.0005	0.0000	0.000
	U.9303	0.9300									0.9305	0.0001	0.9365	0.9366	0.939 max.
Type IV	Tensile Fluperlies.	. Type IV - Wi	dth of parrow of	oction:0 25ir	l ongth of p	arrow contine	1 2in Width C	worall:0 75in							
Type Tv	Length Overall:	4 5in Conditi	ionina: Conduct	ted test in st	andard labora	anow section.	2.511, which $0are of 23+/-2^0$	C (73 4+/-3 6 ⁰	F) and						
	50+/-5% relative	humidity. Ra	te of Separation	n: 2"/min		actif aanoopne		0 (701777 010	, y and			-			
	Tensile Strength a	t Break (I	bs/ in width	n)											
	MD 247	250 `	232	237	237						241	8	232	250	120 min.
	TD 280	272	269	261	294						275	12	261	294	
	Elongation at Brea	ık (percer	nt, %)		Gauge Le	ngth = 2.0 i	n.								
	MD 518	521	486	509	500						507	14	486	521	250 min.
	TD 636	625	626	601	665						630	23	601	665	
ASTM D4218	Carbon Content														
	Apparatus: Muti	ne Furnace									2 20	0.06	0.05	0.44	0 0
	2.44	2.30									2.39	0.00	2.35	2.44	2-3

(End of Table 1)

(Sheet 1 of 1)

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI Environmental, Inc. from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless TRI Environmental, Inc. from and against all liabilities in excess of the aforementioned limit.

1160 North Gilbert Street, Anaheim, CA 92801, www.precisionlabs.net Precision Geosynthetic Laboratories International dba TRI Environmental, Inc.



TABLE 2.MATERIAL PROPERTIES

CLIENT: Newfields

PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/20/2019 Date Reported: 1/10/2019 Client Sample ID: R# FND0047820067 L# DKJ810710 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: <u>Maria Cypitia</u> TRI Job No.: **G192093** TRI Control No.: **146078**

					ę	SPECIMENS	5								Proj.
	1	2	3	4	5	6	7	8	9	10	Avg.	Std. Dev.	Min	Max	Specs.
METHOD	DESCRIPTION														
ASTM D5994	Thickness (mils)														
	Apparatus: Dea	d-weight dial	micrometer with gau	uge points	tapered at a	an angle of 60 $^{\circ}$	+/- 2° to the	horizontal wit	h the tip						
	rounded to a rac	dius of 0.8+/-0	0.1 mm(0.031+/-0.00	04 in), witl	h a specified	force of 0.56+/	-0.05 N (2+/-	0.2 oz)							68 min.
	Loading Time: 5	sec Speci	men Size: 4" x 4"												76 MARV
	81	80	82	80	80	81	82	80	81	80	81	1	80	82	80 nominal
ASTM D792	Specific Gravity	(23/ 23°C)													
Method A	0.9354	0.9355									0.9355	0.0001	0.9354	0.9355	0.939 max.
ASTM D6693	Tensile Properties	<u>:</u>													
Type IV	Test Specimens	s: Type IV, W	idth of narrow sectio	on:0.25in,	Length of na	rrow section:1.	3in, Width Ov	verall:0.75in,							
	Length Overall:	4.5in Condi	tioning: Conducted t	test in star	ndard labora	tory atmospher	e of 23+/-2° (C (73.4+/-3.6°	F), and						
	50+/-5% relative	e humidity. Ra	ate of Separation: 2'	"/min							-				
	I ensile Strength a	at Break (lbs/ in width)	~~~	<u> </u>						050				
	MD 248	228	250	269	255						250	15	228	269	120 min.
	ID 294	270 ali (naraa	320 , at 9()	312	280	nath 20i	-				290	19	276	320	
		ak (perce	FOC	E00	Gauge Le	ngin = 2.0 ii	1.				E10	10	400	500	050 min
	MD 514	490	712	522 607	523 640						513	30	498	523 710	250 mm.
ASTM D/218	Carbon Content	017	114	031	UTU						007	59	017	112	
	Annaratus: Mut	ffla Furnaca													
	2.29	2.40									2.34	0.07	2 29	2 40	2-3
	v										1	1 0.07	1	1	1 - V
	(End of Table	e 2)							(Sheet 1 of	1)					



 TABLE 3.

 <u>MATERIAL PROPERTIES</u>

 CLIENT: Newfields

 PROJECT: CC&V VLF2 Phase 2B

Date Received: 12/20/2019 Date Reported: 1/10/2019 Client Sample ID: R# FND0047820082 L# DKJ810710 Material Description: 80mil LLDPE Microspike Geomembrane QC'd By: <u>Maries Expitis</u> TRI Job No.: **G192093** TRI Control No.: **146079**

					SPECIMEN	S								Proj.
	1 2	3	4	5	6	7	8	9	10	Avg.	Std. Dev	. Min	Max	Specs.
METHOD	DESCRIPTION													
ASTM D5994	Thickness (mils)													
	Apparatus: Dead-weight d	ial micrometer w	ith gauge poir	nts tapered a	t an angle of 60	0° +/- 2° to th	e horizontal wi	ith the tip						
	rounded to a radius of 0.8-	+/-0.1 mm(0.031	+/-0.004 in), v	vith a specifie	ed force of 0.56	+/-0.05 N (2+/	/-0.2 oz)							68 min.
	Loading Time: 5 sec Spe	ecimen Size: 4" x	<i>«</i> 4"											76 MARV
	80 81	81	82	80	81	80	80	81	80	81	1	80	82	80 nominal
ASTM D792	Specific Gravity (23/23°C	C)												
Method A	0.9382 0.9383									0.9382	0.0001	0.9382	0.9383	0.939 max.
ASTM D6693	Tensile Properties:													
Type IV	Test Specimens: Type IV,	Width of narrow	section:0.25i	n, Length of i	narrow section:	1.3in, Width C	overall:0.75in,							
	Length Overall: 4.5in Cor	nditioning: Condu	ucted test in s	tandard laboi	ratory atmosphe	ere of 23+/-2°	C (73.4+/-3.6°	°F), and						
	50+/-5% relative humidity.	Rate of Separat	tion: 2"/min											
	Tensile Strength at Break	(lbs/ in wic	dth)											
	MD 265 272	217	242	232						246	23	217	272	120 min.
	TD 296 284	286	270	272						282	11	270	296	
	Elongation at Break (per	cent, %)		Gauge Le	ength = 2.0 i	in.								
	MD 544 541	475	499	485						509	32	475	544	250 min.
	TD 668 673	668	622	636						653	23	622	673	
ASTM D4218	Carbon Content													
	Apparatus: Muffle Furnac	е												
	2.37 2.34									2.35	0.02	2.34	2.37	2 - 3
	(End of Table 3)							(Sheet 1 of	F 1)					



APPENDIX L – TENSIOMETER CERTIFICATIONS

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

	And a state of the formation of the state of		
Tensiometer Model:	Pro-Tester T-0100		
Device Calibrated	S-Type load cell	Calibrati	on Apparatus
Range	0 - 750 lbs Tension	Guildia	
Model No:	M2405-750#	Pro-Cal	init model TC-0100/A
Serial No:	686331		
		Dead Weight:	Reference Cell:
A/D Module Model No:	T-029	W1 2	R1 2
A/D Module Serial No:	3912686331	W2 152	R2 152
Channel No:	N/A	W3 302	R3 302
Indicator reading with no load	0		
	Offset 1.966512	Scale: 3.146753	
Applied Force lbs.	Cell Response:	Deviation Error:	
2	2	0.00	
52	52	0.00	
102	102	0.00	
152	152	0.00	
202	202	0.00	
252	252	0.00	
302	302	0.00	
		F	
	Total Deviation	Error (%): 0.00%	
Temperature at time of calibra	ation: 73 degrees F		
Exitation Voltage:	5 V DC		
This calibration conforms to t	he standards set by ASTM E4 a	nd is traceable to NIST standa	ds

matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician:

MH

Date: 05/13/20

Signature:

Matthanison

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

			-
Tensiometer Model:	Pro-Tester T-0100		
Device Calibrated:	S-Type load cell	Calibration	n Apparatus:
Range:	0 - 750 lbs Tension		
Model No:	M2405-750#	Pro-Cal u	nit model TC-0100/A
Woder No.	112400-100#		
Serial No:	688139	Dood Woldht	Poloronoo Call
	T 000		
AVD Module Model No:	1-029		
A/D Module Serial No:	4612688139	W2 152	R2 152
Channel No:	N/A	W3 302	R3 302
Indicator reading with no load:	0		
(Offset 1.960214	Scale: 3.183084]
Applied Force lbs.	Cell Response:	Deviation Error:	
2	2	0.00	
52	52	0.00	
102	102	0.00	
152	152	0.00	
152	202	0.00	
202	202	0.00	
252	252	0.00	
302	302	0.00	
	Total Deviation Er	rror (%): 0.00%	
Temperature at time of calibrat	tion: 73 degrees F		
Exitation Voltage:	5 V DC		
	L		
This calibration conforms to th	e standards set by ASTM E4 and	d is traceable to NIST standard	s
The calibration comorns to th	e etallouro eeta y norm er une		887
	- 11 - 1	ibrotod and are saveidered -	
Note: A/D Module and load co	ell apove nave been systems cal	iprated and are considered a	
matched pair. In gener	al, calibrated A/D Modules and lo	oad cells are not interchangea	ble.

Calibration Technician:

MH Mattagrison

Date: 05/13/20

Signature: