H349000-3000-10-088-0031

DWG. NO.

Culvert ID	KP Chainage	Hatch Chainage	Distance	Fish Bearing Status	Number of Pipes	Existing Diameter	Proposed Diameter	Existing Length	Proposed Length	E	W	Culvert C/L At Upstream		U/S INV. ELV.	Rip Rap Required	Culvert C/L At Downstream		D/S INV. ELV.	Rip Rap Required	C	Rip Rap Apron Length	Slope	Skew Degree	What To Do	Comments
	(m)	(m)	(km)	(Y/N/P)	(n)	(m)	(m)	(m)	(m)	(mm)	(mm)	Northing	Easting	(m)	(Y/N)	Northing	Easting	(m)	(Y/N)	(mm)	(m)	(%)			
CV123G		28+291	21+195	NO	1		0.5		11.5		500				N				N	300				New	
CV123H	A22+900	28+509	21+413	NO	1	0.5		9	17.5		500			91.824	N			91.377	Y	300	2	4.97		Extend	Extend 8.5m right
CV120A	A23+002	28+619	21+523	POTENTIAL	1	0.5		18	21		500			86.756	N			86.721	N	300		0.19		Extend	Extend 3m right
CV120B	A23+012	28+621	21+525	POTENTIAL	3	0.5		18	22	50	2800			86.803	N			86.793	N	300		0.06		Extend	Extend 4m right
CV120C	A23+013	28+622	21+526	POTENTIAL	3	0.5		18	21.5	50	2800			86.728	N			86.686	N	300		0.23		Extend	Extend 3.5m right
CV120D	A23+018	28+627	21+531	POTENTIAL	3	1		18	22.5	100	2800			86.547	N			86.505	N	500		0.23		Extend	Extend 4.5m right
CV119A	A23+756	29+348	22+252	POTENTIAL	1	1		15	17		1000			97.055	N			96.345	Y	500	4	4.73		Extend	Extend 0.5m left & 1.5m right
CV119B	A24+470	30+072	22+976	POTENTIAL	1	0.1		7.6						104.389	N			104.070	N			4.20		Abandon	
CV119C	A25+060	30+663	23+567	POTENTIAL	1	0.5		9	12		500			105.052	N			104.740	N	300		3.47		Extend	Extend 3m right
CV197A	A25+133	30+738	23+642	NO	1	0.15	0.5	7.5	9.5		500			105.959	N			105.830	N	300		1.72		Replace	Replace with new length of 9.5m
CV197B	A25+257	30+859	23+764	NO	1	0.15	0.5	7.4	9.5		500			106.198	N			105.926	N	300		3.68		Replace	Replace with new length of 9.5m
CV197C	A25+258	30+860	23+763	NO	1	0.15		7.3						106.239	N			105.812	N			5.85		Remove	
CV197D	A25+737	31+341	24+245	NO	1	0.15	0.5	10.4	10		500			105.125	N			104.756	N	300		3.55		Replace	Replace with new length of 10m
CV198A	A25+939	31+543	24+447	NO	1	0.15	0.5	9.3	10		500			105.597	N			105.525	N	300		0.77		Replace	Replace with new length of 10m
CV198B	A26+248	31+852	24+756	NO	1	0.15	0.5	10.3	9.5		500			107.397	N			107.074	N	300		3.14		Replace	Abandon and replace with new length of 9.5m
CV198C	A26+248	31+852	24+756	NO	1	0.15		10.4						107.335	N			107.067	N			2.58		Abandon	
CV117A	A26+584	32+186	25+090	NO	2	1		12	15		2000			104.178	N			103.921	Y	500	4	2.14		Extend	Extend 3m left
CV117B	A26+581	32+184	25+088	NO	2	0.5		12	15.5		2000			104.161	N			103.781	N	300		3.17		Extend	Extend 3m left & 0.5m right
CV116	A26+890	32+494	25+398	NO	1	0.5		12	13.5		500			102.865	N			102.834	N	300		0.26		Extend	Extend 1.5m right
CV115A	A27+193	32+803	25+707	POTENTIAL	2	0.5		15	17.5		1800			104.408	N			104.380	N	300		0.19		Extend	Extend 2.5m left
CV115B	A27+200	32+804	25+708	POTENTIAL	2	1		15	17	100	1800			104.004	N			103.973	N	500		0.21		Extend	Extend 2m left
CV115C	A28+244	40+240	33+144	POTENTIAL	1	0.5		12	15.5		500			108.049	N			107.639	N	300		3.42		Extend	Extend 3.5m right
CV115D	A28+573	40+570	33+474	POTENTIAL	1	0.5		9	17		500			110.846	N			110.412	Y	300	2	4.82		Extend	Extend 8m left
CV114A	A29+151	41+143	34+047	YES	1	1		15	15.5		1000			106.904	N			106.247	Y	500	4	4.38		Extend	Extend 0.5m right
CV114B	A29+223	41+221	34+125	YES	1	0.5		9	14		500			109.075	N			108.752	N	300		3.59		Extend	Extend 5m left
CV114C	A29+447	41+447	34+351	YES	1	0.15	0.5	10.4	11		500			111.172	N			110.546	Y	300	2	6.02		Replace	Replace with new length of 11m
CV114D	A29+632	41+631	34+535	YES	1	0.5		9	11.5		500			112.058	N			111.648	Y	300	2	4.56		Extend	Extend 2m left & 0.5m right
CV201	A29+982	41+981	34+885	NO	1	0.5		9	12		500			112.606	N			112.265	N	300		3.79		Extend	Extend 1.5m left & 1.5m right
CV113A	A30+157	42+155	35+059	POTENTIAL	1	0.5		15	18		500			113.243	N			112.746	N	300		3.31		Extend	Extend 3m left
CV113B	A30+153	42+151	35+055	POTENTIAL	3	0.5		15	16	50	2100			113.573	N			112.878	Y	300	2	4.63		Extend	Extend 1m left
CV113C	A30+154	42+153	35+057	POTENTIAL	3	0.5		12	14	50	2100			113.713	N			112.950	Y	300	2	6.36		Extend	Extend 2m left
CV113D	A30+155	42+154	35+058	POTENTIAL	3	0.5		15	17.5	50	2100			113.765	N			112.911	Y	300	2	5.69		Extend	Extend 2.5m left
CV113E	A30+587	42+585	35+489	POTENTIAL	1	0.15	1	10.3	12.5		1000			110.397	N			109.926	Y	500	4	4.57		Replace	Replace with new length of 12.5m
CV112A	A30+947	42+941	35+845	POTENTIAL	2	1.2		15	17.5		2200			112.797	N			112.427	Y	500	4.8	2.47		Extend	Extend 2.5m right
CV112B	A30+951	42+942	35+846	POTENTIAL	2	0.5		15	24	50	500			113.029	N			112.580	N	300		2.99		Extend	Extend 9m right
CV112C	A31+410	43+400	36+304	POTENTIAL	1	0.5		12	21		500			118.084	N			117.551	Y	300	2	4.44		Extend	Extend 9m left
CV111	A31+489	43+492	36+396	YES	1	1		18	24		1000			115.851	N			115.017	Y	500	4	4.63		Extend	Extend 4.5m left & 1.5m right
CV110A	A31+726	43+715	36+619	NO	1	0.5		12	22.5		500			117.920	N			117.546	N	300		3.12		Extend	Extend 8.5m left & 2m right
CV110B	A31+855	43+843	36+747	NO	1	0.5		9	16.5		500			117.084	N			116.540	Y	300	2	6.04		Extend	Extend 7.5m left
CV108A	A31+994	43+982	36+886	NO	1	0.5		9						115.167	N			114.964	N			2.26		Abandon	
CV108B		43+929	36+833	NO	1		0.5		10.5		500				N				N	300				New	
CV108C		44+018	36+922	NO	1		0.5		11.5		500				N				N	300				New	
CV108D	A32+266	44+250	37+154	NO	1	0.5		12	20		500			110.478	N			110.351	N	300		1.06		Extend	Extend 8m right
CV202	A32+336	44+315	37+219	POTENTIAL	1	1		15	17		1000			109.116	N			108.708	Y	500	4	2.72		Extend	Extend 2m left
CV107	A32+601	44+584	37+488	NO	1	0.5		9	15		500			111.293	N			111.198	N	300		1.06		Extend	Extend 6m right
CV106	A32+681	44+667	37+571	POTENTIAL	1	1		15	19		1000			112.791	N			112.460	Y	500	4	2.21		Extend	Extend 4m left
CV105	A32+818	44+801	37+705	NO	1	0.15	0.5	12.4	13		500			113.481	N			113.198	N	300		2.28		Replace	Replace with new length of 13m
CV104A	A33+301	45+289	38+193	POTENTIAL	2	1.2		15	19		2900			112.917	N			112.325	Y	500	4.8	3.95		Extend	Extend 4m left
CV104B	A33+307	45+290	38+194	POTENTIAL	2	1.2		15	19	120	2900			112.713	N			112.152	Y	500	4.8	3.74		Extend	Extend 4m left
CV203A	A33+665	45+646	38+550	POTENTIAL	1	1		12	17		1000			115.344	N			114.653	Y	500	4	5.76		Extend	Extend 2m left & 3m right
CV203B	A33+781	45+763	38+667	POTENTIAL	2	0.5		12	13	50	1300			109.860	N			109.599	N	300		2.17		Extend	Extend 0.5m left & 0.5m right
CV203C	A33+782	45+764	38+668	POTENTIAL	2	0.5		12	13	50	1300			109.800	N			109.604	N	300		1.63		Extend	Extend 0.5m left & 0.5m right
CV203D	A34+039	46+020	38+924	POTENTIAL	1	0.15		13.2						110.704	N			110.650	N			0.41		Abandon	
CV203E	A34+040	46+021	38+925	POTENTIAL	1	0.15		13.6						110.746	N			110.668	N			0.57		Abandon	
CV203F		46+104	39+008	POTENTIAL	1		0.5		17		500				N				N	300				New	
CV203G	A34+277	46+258	39+162	POTENTIAL	1	0.15		14						112.677	N			112.192	N			3.46		Abandon	
CV204A	A34+650	46+632	39+536	NO	1	0.15		12.5						113.952	N			113.656	N			2.37		Abandon	
CV204B	A35+217	47+198	40+102	NO	1	0.5		9	13.5		500			111.556	N			111.394	N	300		1.80		Extend	Extend 3.5m left & 1m right
CV204C	A35+286	47+268	40+172	NO	1	0.15		10.5						111.971	N			111.722	N			2.37		Abandon	
CV103	A35+383	47+364	40+268	NO	1	0.5		8.2	21.2		500			110.650	N			110.301	N	300		4.26		Extend	Extend 13m right
CV102A	A35+540	47+521	40+425	POTENTIAL	4	1		15	22.5		3600			113.063	N			112.454	Y	500	4	4.06		Extend	Extend 7.5m left
CV102B	A35+543	47+525	40+429	POTENTIAL	4	0.5		15	21.5	50	3600			113.065	N			112.759	N	300		2.04		Extend	Extend 6.5m left
CV102C	A35+544	47+526	40+430	POTENTIAL	4	0.5		15	21.5	50	3600			113.036	N			112.771	N	300		1.77		Extend	Extend 6.5m left
CV102D	A35+545	47+528	40+432	POTENTIAL	4	0.5		15	20.5	50	3600			113.026	N			112.734	N	300		1.95		Extend	Extend 5.5m left
CV101	A36+469	48+449	41+353	NO	1	0.5		9	19		500			114.755	N			114.590	N	300		1.83		Extend	Extend 10m left
CV099A	A37+351	49+321	42+225	YES	1	1.2		18						119.76	N			119.31	N			2.50		Remove	
CV099B	A37+343	49+312	42+216	YES	2	1.2	1.2	21	17	120	3700			120.12	N			119.61	Y	500	4.8	2.43		Replace	Replace with new length of 17m
CV099C	A37+346	49+319	42+223	YES	2	1.2	2	21	18.5	200	3700			120.14	N			119.77	Y	500	8	1.76		Replace	Replace with new length of 18.5m
CV099D	A37+354	49+329	42+233	YES	1	0.5		12						121.09	N			121.12	N			0.25		Remove	
CV099E	A37+355	49+330	42+234	YES	1	0.5		12						121.11	N			121.06	N			0.42		Remove	
CV099F	A37+987	49+962	42+866	YES	1	0.5		12	14		500			138.993	N			138.879	N	300		0.95		Extend	Extend 2m right
CV098A	A38+034	50+029	42+933	NO	1	1		15	17.5		1000			139.122	N			139.115	N	500		0.05		Extend	Extend 2.5m left
CV098B	A38+188	50+163	43+067	NO	1	0.5		9	10		500			140.867	N			140.783	N	300		0.93		Extend	Extend 1m left
CV097A	A38+542	50+516	43+420	NO	1	0.5		12	15		500			146.456	N			146.402	N	300		0.45		Extend	Extend 1.5m left & 1.5m right
CV097B	A40+008	51+971	44+875	NO	1	0.15		11.7						161.623	N			161.061	N			4.80		Abandon	
CV097C		51+480	44+384	NO	1		0.5		14		500				N				N	300				New	
CV097D	A40+522	52+484	45+388	NO	2	0.15		11.1						146.216	N			145.394	N			7.41		Abandon	
CV097E	A40+522	52+484	45+388	NO	2	0.15		11						146.129	N			145.393	N			6.69		Abandon	
CV097F	A40+675	52+637	45+541	NO	1	0.15	0.5	12.4	25		500			142.555	N			141.634	Y	300	2	7.43		Replace	Replace with new length of 25m
CV094	A41+112	53+067	45+971	YES	1	1.2		18	23		1200			140.464	N			139.437	Y	500	4.8	5.71		Extend	Extend 5m right
CV093A	A41+711	53+669	46+573	NO	1	1		12	15		1000			148.080	N			147.998	N	500		0.68		Extend	Extend 3m right
CV093B	A41+698	53+652	46+556	NO	1	0.5		12	15.5		500			148.644	N			148.311	N	300		2.77		Extend	Extend 3.5m right
CV093C	A42+274	54+232	47+136	NO	1	0.15		11.2						150.008	N			149.429	N			5.17		Abandon	
V092 & CV091	A42+445	54+400	47+304	NO	3	1		12	19.5		4000			147.337	N			147.048	Y	500	4	2.41		Extend	Extend 4.5m left & 3m right

NOTES:

1. Abandoned culverts should have the ends backfilled and left in place
2. Remove indicates that culverts should be dug out and a ditch left in its place
3. New culverts are to be installed as per H349000-1000-10-041-0003
4. Replace indicates that culvert existing at the same chainage is to be removed and replaced as per H349000-1000-10-041-0003
5. No Change indicates that the culvert should be left as is
6. For fish bearing culverts, refer to drawing H349000-4138-10-035-0002
7. Invert elevations are approximate. Culverts should be placed to match field conditions
8. CSP culverts to be used throughout
9. Erosion Control Measures will be installed as directed by the site environmental engineer or designate
10. Before beginning any construction for installation works adjacent to a fish bearing culvert stream or other adjacent water body, the site environmental engineer or designate will be consulted as to what erosion mitigation measures are to be installed to protect the water from contamination by soil

LEGEND

D	CULVERT DIAMETER
E	EMBEDMENT DEPTH
C	CULVERT SPACING AND BEDDING CLEARANCE C=500 WHILE D>900mm C=300 WHILE D<=900mm
W	CULVERT BACKFILL TOP WIDTH W=n•D+(n-1)•C
TYPE	CULVERT MATERIAL
U/S INV. ELV.	CULVERT UPSTREAM INVERT ELEVATION
D/S INV. ELV.	CULVERT DOWNSTREAM INVERT ELEVATION
L	RIPRAP APRON LENGTH L=4•D (APPROX.)
S	CULVERT SLOPE
LENGTH	CULVERT LENGTH

FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 27 Jan 2014
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
1	REVISION TO FISH BEARING STATUS	KM	JT	JT	2014-01-23

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
J. TOLOVSKI
LICENSEE
NT/NU

REV.	ISSUE FOR	AUTH.	BY	DATE
1	CONSTRUCTION	RN	JT	2014-01-23
0	CONSTRUCTION	RN	DW	2013-08-30

ISSUE AUTHORIZATION

HATCH

DESIGNED BY E. YU DATE 31/05/13	DRAWN BY D. WIGMORE DATE 31/05/13
CHECKED BY J. TOLOVSKI DATE 31/05/13	DISCIP. ENGR. R. NUSINK DATE 31/05/13
PROJ. DES. COORD. T. THERTELL DATE 31/05/13	PROJ. ENGR. J. CLELAND DATE 31/05/13
PROJ. MGR. S. PERRY DATE 31/05/13	

Baffinland

MARY RIVER PROJECT

TOTE ROAD
CULVERT DATA
SHEET 2 OF 5

SCALE NTS OR AS NOTED

DWG. NO. H349000-3000-10-088-0031

REV. 1

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

idc_pwservice
24-JAN-2014 17:36

H349000-3000-10-088-0032
DWG. NO.

Culvert ID	KP Chainage	Hatch Chainage	Distance	Fish Bearing Status	Number of Pipes	Existing Diameter	Proposed Diameter	Existing Length	Proposed Length	E	W	Culvert C/L At Upstream		U/S INV. ELV.	Rip Rap Required	Culvert C/L At Downstream		D/S INV. ELV.	Rip Rap Required	C	Rip Rap Apron Leng	Slope	Skew Degree	What To Do	Comments
	(m)	(m)	(km)	(Y/N/P)	(n)	(m)	(m)	(m)	(m)	(mm)	(mm)	Northing	Easting	(m)	(Y/N)	Northing	Easting	(m)	(Y/N)	(mm)	(m)	(%)			
V092 & CV091	A42+445	54+400	47+304	NO	3	1		12	19.5		4000			147.720	N			147.578	N	500		1.18		Extend	Extend 4.5m left & 3m right
V092 & CV091	A42+445	54+400	47+304	NO	3	1		12	19.5		4000			147.728	N			147.631	N	500		0.81		Extend	Extend 4.5m left & 3m right
CV090A	A44+351	56+296	49+200	NO	1	1		12						168.190	N			167.940	N			2.08		Remove	
CV090B	A44+366	56+312	49+216	NO	1	0.5	1	12	11		1000			168.500	N			168.314	N	500		1.55		Replace	Replace with new length of 11m
CV088	A45+506	57+434	50+338	NO	1	1		9	13		1000			169.559	N			169.266	Y	500	4	3.26		Extend	Extend 3m left & 1m right
CV087A	A45+741	57+668	50+572	POTENTIAL	2	1.2		12	18.5		2900			168.080	N			167.836	Y	500	4.8	2.03		Extend	Extend 6m left & 0.5m right
CV087B	A45+737	57+664	50+568	POTENTIAL	2	1.2		12	19		2900			168.085	N			167.832	Y	500	4.8	2.11		Extend	Extend 6.5m left & 0.5m right
CV087C	A45+752	57+678	50+582	POTENTIAL	1	0.5		12	18		500			168.773	N			168.306	N	300		3.89		Extend	Extend 6m right
CV086	A45+814	57+738	50+642	POTENTIAL	1	1		18	24.5		1000				N				Y	500	4			Extend	Extend 6.5m right
CV085	A45+933	57+858	50+762	NO	1	1		15	25		1000			165.472	N			164.747	Y	500	4	4.83		Extend	Extend 4m left & 6m right
CV084	A46+563	58+478	51+382	NO	1	0.5		12	12.5		500			169.910	N			169.569	N	300		2.84		Extend	Extend 0.5m left
CV083A	A47+169	59+091	51+995	NO	1	1		12	17.5		1000			175.054	N			174.776	Y	500	4	2.32		Extend	Extend 3m left & 2.5m right
CV083B	A49+014	60+926	53+830	NO	1	0.15		11.2						174.820	N			174.817	N			0.03		Abandon	
CV082A	A49+167	61+083	53+987	POTENTIAL	3	1.2		12	14.5		3000			173.216	N			173.026	Y	500	4.8	1.58		Extend	Extend 1.5m left & 1m right
CV082B	A49+173	61+086	53+990	POTENTIAL	3	0.5		12	14	50	3000			173.120	N			173.068	N	300		0.43		Extend	Extend 1m left & 1m right
CV082C	A49+175	61+088	53+992	POTENTIAL	3	0.5		12	13.5	50	3000			173.141	N			173.092	N	300		0.41		Extend	Extend 1m left & 0.5m right
CV079A	A50+109	62+015	54+919	YES	1	1.2		15	16.5		1200			166.296	N			166.196	N	500		0.67		Extend	Extend 1.5m left
CV079B	A50+066	61+973	54+877	YES	1	1.2		15	16.5	120	1200			165.893	N			165.857	N	500		0.24		Extend	Extend 1.5m left
CV079C	A50+225	62+132	55+036	YES	1	0.15		14.7						165.903	N			165.783	N			0.82		Remove	
CV079D	A50+226	62+133	55+037	YES	1	0.15		14.8						166.760	N			165.937	N			5.56		Remove	
CV078A	A50+680	62+577	55+481	YES	2	1.2		15	16.5		2700			165.786	N			165.702	N	500		0.56		Extend	Extend 1.5m left
CV078B		62+579	55+483	YES	2	1		18	19.5	100	2700			165.786	N			165.702	N	500		0.47		Extend	Extend 1.5m left
CV078C		62+599	55+503	YES	1	1		18	19.5	100	1000			165.786	N			165.702	N	500		0.47		Extend	Extend 1.5m left
CV078D	51+126	63+011	55+915	YES	1	2		20	22		2000			165.79	N			165.70	N	500		0.42		Extend	Extend 2m right
CV077	A51+602	63+489	56+393	NO	1	1		15	26.5		1000			165.55	N			165.23	Y	500	4	2.13		Extend	Extend 11.5m left
CV076	A52+536	64+430	57+334	POTENTIAL	1	1	1	15	11.5		1000			159.361	N			159.335	N	500		0.17		Replace	Replace with new length of 11.5m
CV075A	A52+842	64+712	57+616	NO	1	0.5		12	13		500			160.575	N			160.301	N	300		2.28		Extend	Extend 1m left
CV075B	A52+829	64+707	57+611	NO	4	0.5		12	12.5		2900			160.664	N			160.502	N	300		1.35		Extend	Extend 0.5m left
CV075C	A52+830	64+709	57+613	NO	4	0.5		12	12.5		2900			160.698	N			160.542	N	300		1.30		Extend	Extend 0.5m left
CV075D	A52+831	64+710	57+614	NO	4	0.5		12	13		2900			160.526	N			160.273	N	300		2.11		Extend	Extend 1m left
CV075E	A52+832	64+711	57+615	NO	4	0.5		12	13		2900			160.806	N			160.670	N	300		1.13		Extend	Extend 1m left
CV075F	A52+937	64+812	57+716	NO	1	0.15		11.2						159.873	N			159.334	N			4.81		Abandon	
CV072A	A53+830	65+696	58+600	YES	1	1.2		15			1200			161.710	N			161.280	Y	500	4.8	2.87		Replace	Replace with new length of 17.5m
CV072B	A53+345	65+213	58+117	YES	1	1.2		15			1200			161.690	N			161.450	Y	500	4.8	1.60		Replace	Replace with new length of 17.5m
CV072C	A53+379	65+246	58+150	YES	1	1.2		15			1200			161.140	N			160.600	Y	500	4.8	3.60		Replace	Replace with new length of 17.5m
CV071A	A53+646	65+515	58+419	NO	1	0.15		10.9						165.856	N			165.193	N			6.08		Abandon	
CV071B		65+110	58+014	YES	1		0.5		13.5		500				N				N	300				New	
CV064A	A54+956	66+818	59+722	NO	1	0.15		11.1						175.192	N			175.014	N			1.60		Abandon	
CV064B	A55+222	80+174	53+588	NO	1	0.15		11.1						174.395	N			174.017	N			3.41		Abandon	
CV064C	A55+307	80+258	53+672	NO	1	0.15		13.1						172.376	N			172.001	N			2.86		Abandon	
CV064D		80+355	53+769	NO	1		0.5		14		500				N				N	300				New	
CV064E		81+160	54+574	NO	1		0.5		12.5		500				N				N	300				New	
CV064F	A56+280	81+209	54+623	NO	1	0.5		15.4						168.452	N			168.127	N			2.11		Abandon	
CV064G	A56+997	81+915	55+329	NO	1	0.5		12.3	15.8		500			164.511	N			164.271	N	300		1.95		Extend	Extend 3.5m right
CV064H	A57+773	82+688	56+102	NO	1	0.15	0.5	11.3	13		500			158.890	N			158.549	N	300		3.02		Replace	Abandon and replace with new length of 13m
CV064I	A57+774	82+689	56+103	NO	1	0.15		11.1						158.887	N			158.526	N			3.25		Abandon	
CV064J	A57+995	82+911	56+325	NO	1	0.15		11						159.491	N			159.332	N			1.45		Abandon	
CV060A	A58+114	83+030	56+444	YES	2	1		15	16.5		2500			158.533	N			158.478	N	500		0.37		Extend	Extend 1.5m left
CV060B	A58+114	83+030	56+444	YES	2	1		15	16.5	100	2500			158.669	N			158.739	N	500		0.47		Extend	Extend 1.5m left
CV059A	A59+217	84+128	57+542	POTENTIAL	4	0.5		12	16		2900			160.749	N			160.456	N	300		2.44		Extend	Extend 3m left & 1m right
CV059B	A59+216	84+127	57+541	POTENTIAL	4	0.5		12	16.5	50	2900			160.688	N			160.301	N	300		3.23		Extend	Extend 3.5m left & 1m right
CV059C	A59+217	84+128	57+542	POTENTIAL	4	0.5		12	16.5	50	2900			160.615	N			160.393	N	300		1.85		Extend	Extend 4m left & 0.5m right
CV059D	A59+218	84+129	57+543	POTENTIAL	4	0.5		12	16.5	50	2900			160.763	N			160.485	N	300		2.32		Extend	Extend 4m left & 0.5m right
CV058A	A59+779	84+684	58+098	POTENTIAL	2	0.5		18			2000			161.044	N			160.434	N	300		3.39		No Change	
CV058B	A59+773	84+683	58+097	POTENTIAL	2	1.2		18		120	2000			160.840	N			160.335	Y	500	4.8	2.81		No Change	
CV057A	A59+970	84+878	58+292	POTENTIAL	1	0.5		15	16.5	50	500			161.854	N			161.682	N	300		1.15		Extend	Extend 1.5m left
CV057B	A59+966	84+875	58+289	POTENTIAL	2	0.5		15	16.5	50	1300			161.975	N			161.884	N	300		0.61		Extend	Extend 1.5m left
CV057C	A59+967	84+876	58+290	POTENTIAL	2	0.5		15	16.5	50	1300			162.011	N			161.871	N	300		0.93		Extend	Extend 1.5m left
CV057D	A61+052	85+953	59+367	POTENTIAL	1	0.15		11						165.415	N			165.075	N			3.09		Abandon	
CV057E	A61+929	86+829	60+243	POTENTIAL	1	0.15		11						148.329	N			148.194	N			1.23		Abandon	
BG50A	A62+054	86+955	60+369	YES	1	1.2		18	33.5		1200			142.436	N			141.949	Y	500	4.8	2.71		Extend	Extend 15.5m left
BG50B	A62+081	86+981	60+395	YES	1	1.2		18	32	120	1200			142.365	N			141.757	Y	500	4.8	3.38		Extend	Extend 14m left
CV049A	A62+550	87+409	60+823	YES	2	1.2		15	24.5		2900			147.410	N			147.044	Y	500	4.8	2.44		Extend	Extend 5.5m left & 4m right
CV049B	A62+536	87+422	60+836	YES	2	1.2		15	24.5	120	2900			147.680	N			147.388	Y	500	4.8	1.95		Extend	Extend 4.5m left & 5m right
CV048A	A63+560	88+432	61+846	YES	1	1.2		15	17.5		1200			185.224	N			185.177	N	500		0.31		Extend	Extend 2.5m right
CV048B	A63+554	88+426	61+840	YES	1	1.2		15	18	120	1200			185.533	N			185.365	N	500		1.12		Extend	Extend 3m right
CV048C	A65+378	90+221	63+635	YES	1	0.15		10.8						229.495	N			229.119	N			3.48		Abandon	
CV048D		90+170	63+584	YES	1		0.5		16		500				N				N	300				New	
CV047A	A65+681	90+523	63+937	NO	2	1.2		15			2900			231.882	N			230.989	Y	500	4.8	5.95		No Change	
CV047B	A65+682	90+525	63+939	NO	2	1.2		15			2900			232.153	N			231.293	Y	500	4.8	5.73		No Change	
CV046A	A65+747	90+583	63+997	POTENTIAL	1	0.5		15	23.5		500			233.200	N			232.542	N	300		4.39		Extend	Extend 6.5m left & 2m right
CV046B	A65+738	90+578	63+992	POTENTIAL	4	0.5		15	23.5	50	3400			232.968	N			232.170	Y	300	2	5.32		Extend	Extend 8.5m left
CV046C	A65+739	90+579	63+993	POTENTIAL	4	1		15	23	100	3400			233.052	N			232.057	Y	500	4	6.63		Extend	Extend 8m left
CV046D	A65+740	90+580	63+994	POTENTIAL	4	0.5		15	19	50	3400			233.066	N			232.277	Y	300	2	5.26		Extend	Extend 4m left
CV046E	A65+741	90+582	63+996	POTENTIAL	4	0.5		15	19.5	50	3400			233.187	N			232.442	Y	300	2	4.97		Extend	Extend 3.5m left & 1m right
CV043A	A66+729	91+570	64+984	NO	1	1		15	17.5		1000			290.256	N			289.760	Y	500	4	3.31		Extend	Extend 2.5m right
CV043B	A66+736	91+577	64+991	NO	2	0.5		15	16.5		1300			290.437	N			289.793	N	300		4.29		Extend	Extend 1.5m right
CV043C	A66+737	91+578	64+992	NO	2	0.5		15	16		1300			290.541	N			289.849	Y	300	2	4.61		Extend	Extend 1m right
CV043D		93+565	66+979	NO	1		0.5		21		500				N				N	300				New	
CV041A	A68+796	93+633	67+047	NO	1	0.15		11.1						325.612	N			325.414	N			1.78		Abandon	
CV041B	A70+613	95+448	68+862	NO	1	0.15		9.5						289.327	N			289.096	N			2.43		Abandon	
CV041C	A71+271	96+106	69+520	NO	1	0.15		11.1						272.037	N			271.758	N			2.51		Abandon	
CV210A	A71+718	96+555	69+969	NO	1	0.15		9.1						254.154	N			254.030	N			1.36		Abandon	
CV210B	A71+926	96+763	70+177	NO	1	0.15		15.8						247.623	N			246.682	N			5.96		Abandon	

NOTES:

1. Abandoned culverts should have the ends backfilled and left in place
2. Remove indicates that culverts should be dug out and a ditch left in its place
3. New culverts are to be installed as per H349000-1000-10-041-0003
4. Replace indicates that culvert existing at the same chainage is to be removed and replaced as per H349000-1000-10-041-0003
5. No Change indicates that the culvert should be left as is
6. For fish bearing culverts, refer to drawing H349000-4138-10-035-0002
7. Invert elevations are approximate. Culverts should be placed to match field conditions
8. CSP culverts to be used throughout
9. Erosion Control Measures will be installed as directed by the site environmental engineer or designate
10. Before beginning any construction for installation works adjacent to a fish bearing culvert stream or other adjacent water body, the site environmental engineer or designate will be consulted as to what erosion mitigation measures are to be installed to protect the water from contamination by soil

LEGEND

D	CULVERT DIAMETER
E	EMBEDMENT DEPTH
C	CULVERT SPACING AND BEDDING CLEARANCE C=500 WHILE D>900mm C=300 WHILE D<=900mm
W	CULVERT BACKFILL TOP WIDTH W=n•D+(n-1)•C
TYPE	CULVERT MATERIAL
U/S INV. ELV.	CULVERT UPSTREAM INVERT ELEVATION
D/S INV. ELV.	CULVERT DOWNSTREAM INVERT ELEVATION
L	RIPRAP APRON LENGTH L=4•D (APPROX.)
S	CULVERT SLOPE
LENGTH	CULVERT LENGTH

FOR CONSTRUCTION

PERMIT TO PRACTICE
HATCH LTD.
Signature [signature]
Date 27 Jan 2014
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REGISTERED PROFESSIONAL ENGINEER
J. TOLOVSKI
LICENSEE
24/01/14
NT/NU

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
1	REVISION FISH BEARING STATUS	KM	JT	JT	2014-01-23

REVISIONS

REV.	ISSUE FOR	AUTH.	BY	DATE
1	CONSTRUCTION	RN	JT	2014-10-23
0	CONSTRUCTION	RN	DW	2013-07-19

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY E. YU DATE 31/05/13	DRAWN BY D. WIGMORE DATE 31/05/13
CHECKED BY J. TOLOVSKI DATE 31/05/13	DISCIP. ENGR. R. NUSINK DATE 31/05/13
PROJ. DES. COORD. T. THERTELL DATE 31/05/13	PROJ. ENGR. J. CLELAND DATE 31/05/13
PROJ. MGR. S. PERRY DATE 31/05/13	

Baffinland

MARY RIVER PROJECT

TOTE ROAD
CULVERT DATA
SHEET 3 OF 5

SCALE	DWG. NO.	REV.
NTS OR AS NOTED	H349000-3000-10-088-0032	1

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

idc_pwservice
24-JAN-2014 17:42

H349000-3000-10-088-0033
DWG. NO.

Culvert ID	KP Chainage	Hatch Chainage	Distance	Fish Bearing Status	Number of Pipes	Existing Diameter	Proposed Diameter	Existing Length	Proposed Length	E	W	Culvert C/L At Upstream		U/S INV. ELV.	Rip Rap Required	Culvert C/L At Downstream		D/S INV. ELV.	Rip Rap Required	C	Rip Rap Apron Leng	Slope	Skew Degree	What To Do	Comments
	(m)	(m)	(km)	(Y/N/P)	(n)	(m)	(m)	(m)	(m)	(mm)	(mm)	Northing	Easting	(m)	(Y/N)	Northing	Easting	(m)	(Y/N)	(mm)	(m)	(%)			
CV040A	A72+062	96+899	70+313	YES	1	1.2		15	16.5		1200			235.43	N			235.24	N	500		1.27		Extend	Extend 1.5m right
CV040B	A72+051	96+887	70+301	YES	2	1.2		15	23	120	2900			235.45	N			235.03	Y	500	4.8	2.80		Extend	Extend 6m left & 2m right
CV040C		96+885	70+299	YES	2	1.2		12	19	120	2900				N				Y	500	4.8			Extend	Extend 5m left & 2m right
CV040D	A72+083	96+919	70+333	YES	1	0.15	1	11	15.5		1000			235.69	N			236.12	Y	500	4	3.91		Replace	Abandon and replace with new length of 15.5m
CV040E	A72+084	96+920	70+334	YES	1	0.15		11.1						236.14	N			235.71	N			3.87		Abandon	
CV039	A72+637	97+473	70+887	NO	1	0.15		11.1						244.400	N			244.263	N			1.23		Abandon	
CV038A	A72+734	97+569	70+983	NO	1	0.15		11						243.210	N			243.111	N			0.90		Abandon	
CV038B	A72+815	97+649	71+063	NO	1	0.15		11						243.409	N			243.113	N			2.69		Abandon	
CV038C	A72+858	97+693	71+107	NO	1	0.15	0.5	11.8	13		500			243.301	N			243.102	N	300		1.69		Replace	Replace with new length of 13m
CV037A	A72+896	97+730	71+144	NO	1	0.15		10.9						243.789	N			243.457	N			3.05		Abandon	
CV037B	A73+414	98+248	71+662	NO	1	0.15	0.5	15.14	16.5		500			223.873	N			223.726	N	300		0.97		Replace	Replace with new length of 16.5m
CV212A	A74+249	99+083	72+497	NO	1	0.15		11.1						209.924	N			209.598	N			2.94		Abandon	
CV212B	A74+251	99+085	72+499	NO	1	0.15		11.1						209.986	N			209.465	N			4.69		Abandon	
CV212C	A74+468	99+302	72+716	NO	1	0.15		11.1						198.526	N			198.026	N			4.50		Abandon	
CV212D	A74+469	99+302	72+716	NO	1	0.15		11.2						198.535	N			197.951	N			5.21		Abandon	
CV212E	A74+481	99+314	72+728	NO	1	0.15	1	12.9	13.5		1000			198.876	N			198.493	Y	500	4	2.97		Replace	Abandon and replace with new length of 13.5m
CV212F	A74+484	99+317	72+731	NO	1	0.15		12.4						198.689	N			198.106	N			4.70		Abandon	
CV212G	A74+485	99+317	72+731	NO	1	0.15		12.5						198.695	N			198.105	N			4.72		Abandon	
CV033A	A75+637	100+471	73+885	NO	1	0.15	0.5	14.1	15.5		500			212.488	N			212.218	N	300		1.91		Replace	Replace with new length of 15.5m
CV033B	A76+360	101+173	74+587	NO	1	0.15		11.2						168.469	N			168.064	N			3.62		Abandon	
CV033C	A76+361	101+176	74+590	NO	1	0.15		11.1						168.437	N			167.864	N			5.16		Abandon	
CV033D	A76+508	101+320	74+734	NO	1	0.5		12	24		500			156.076	N			155.671	N	300		3.38		Extend	Extend 2.5m left & 9.5m right
BG33	A76+996	101+810	75+224	NO	1	0.5		15	23.5		500			147.771	N			147.399	N	300		2.48		Extend	Extend 4.5m left & 4m right
CV030A	A77+495	102+249	75+663	POTENTIAL	1	1		15	16		1000			143.855	N			143.698	N	500		1.05		Extend	Extend 1m left
CV030B	A77+435	102+308	75+722	POTENTIAL	1	0.5		15	16	50	500			144.052	N			143.825	N	300		1.51		Extend	Extend 1m left
BG32A	A78+130	102+942	76+356	YES	2	2		17.5	21.5		4500			140.983	N			140.918	N	500		0.37		Extend	Extend 0.5m left & 3.5m right
BG32B	A78+130	102+944	76+358	YES	2	2		17.5	21		4500			141.134	N			141.023	N	500		0.63		Extend	Extend 0.5m left & 3m right
BG32C	A78+408	103+221	76+635	YES	1	0.25	0.5	15	14		500			144.209	N			143.955	N	300		1.69		Replace	Replace with new length of 14m
CV214A	78+837	103+638	77+052	NO	1	1.2		18	25.5		1200			142.954	N			142.410	Y	500	4.8	3.02		Extend	Extend 7.5m right
CV214B	A79+073	103+874	77+288	NO	1	0.25	0.5	12	14.5		500			144.147	N			144.016	N	300		1.09		Replace	Replace with new length of 14.5m
CV215A	A79+523	104+323	77+737	NO	1	0.5		12	17.5		500			142.714	N			142.590	N	300		1.03		Extend	Extend 2.5m left & 3m right
CV215B	A79+534	104+335	77+749	NO	3	0.5		12	17.5		2100			142.799	N			142.612	N	300		1.56		Extend	Extend 2.5m left & 3m right
CV215C	A79+535	104+336	77+750	NO	3	0.5		12	18		2100			142.725	N			142.587	N	300		1.15		Extend	Extend 3m left & 3m right
CV215D	A79+536	104+337	77+751	NO	3	0.5		12	18.5		2100			142.716	N			142.436	N	300		2.33		Extend	Extend 3m left & 3.5m right
CV217A	A79+854	104+652	78+066	YES	1	1.2		15	16		1200			141.549	N			141.270	Y	500	4.8	1.86		Extend	Extend 1m right
CV217B	A79+831	104+631	78+045	YES	2	1.2		15	16	120	2900			141.452	N			141.147	Y	500	4.8	2.03		Extend	Extend 1m right
CV217C	A79+833	104+633	78+047	YES	2	1.2		15	16	120	2900			141.554	N			141.218	Y	500	4.8	2.24		Extend	Extend 1m right
CV217D	A80+460	105+263	78+677	YES	1	0.15		11.2						145.785	N			145.570	N			1.92		Abandon	
CV216A	A80+951	105+753	79+167	YES	1	1.2		15	18.5		1200			142.710	N			142.656	N	500		0.36		Extend	Extend 1.5m left & 2m right
CV216B	A80+580	105+382	78+796	YES	2	1.2		15	17.5	120	2900			143.048	N			142.947	N	500		0.67		Extend	Extend 1.5m left & 1m right
CV216C	A80+582	105+384	78+798	YES	2	1.2		15	16.5	120	2900			143.057	N			142.922	N	500		0.90		Extend	Extend 1.5m left
CV216D	A80+988	105+791	79+205	YES	1	0.15	0.5	10.4	14.5		500			146.303	N			146.236	N	300		0.64		Replace	Replace with new length of 14.5m
CV216E	A81+375	106+179	79+593	YES	1	0.25	0.5	9	14		500			147.018	N			146.809	N	300		2.32		Replace	Abandon and replace with new length of 14m
CV216F	A81+513	106+317	79+731	YES	1	0.25	0.5	9	12		500			148.032	N			147.833	N	300		2.21		Replace	Replace with new length of 12m
BG31A	82+014	150+119	80+233	POTENTIAL	1	1.2		16	19.5		1200				N				Y	500	4.8			Extend	Extend 1m left & 2.5m right
BG31B	A82+472	150+567	80+681	POTENTIAL	1	0.25		9						164.332	N			163.868	N			5.16		Abandon	
CV023A	A83+094	151+188	81+302	NO	1	1	1	12	12		1000			181.980	N			181.779	N	500		1.67		Replace	Abandon and replace with new length of 12m
CV023B	A84+005	152+116	82+230	NO	1	0.15		8.4						163.422	N			163.311	N			1.32		Abandon	
CV023C	A84+128	152+238	82+352	NO	1	0.15	0.5	9	11		500			161.884	N			161.739	N	300		1.61		Replace	Replace with new length of 11m
CV023D	A84+166	152+276	82+390	NO	1	0.15		9.1						161.681	N			161.458	N			2.45		Abandon	
BG30	A84+537	152+650	82+764	YES	1	1		15	22		1000			155.219	N			154.188	Y	500	4	6.87		Extend	Extend 7m right
BG29	A84+706	152+817	82+931	POTENTIAL	1	1		15	31		1000			151.334	N			151.288	N	500		0.31		Extend	Extend 7.5m left & 8.5m right
CV021	A84+982	153+095	83+209	NO	1	0.25	0.5	12	15		500			152.630	N			152.520	N	300		0.92		Replace	Replace with new length of 15m
CV020	A85+513	153+625	83+739	NO	1	0.25	1	9	14		1000			163.246	N			163.183	N	500		0.70		Replace	Abandon and replace with new length of 14m
CV017	A85+778	153+900	84+014	NO	1	0.25		9						169.872	N			169.735	N			1.52		Abandon	
BG28	A86+135	154+237	84+351	NO	1	0.25	0.5	9	23		500			159.345	N			158.928	Y	300	2	4.63		Replace	Replace with new length of 23m
CV016	A86+327	154+443	84+557	NO	1	0.25	0.5	9	12.5		500			160.468	N			159.993	Y	300	2	5.28		Replace	Replace with new length of 12.5m
BG27A	A86+499	154+603	84+717	POTENTIAL	1	0.5		18	31		500			159.311	N			158.534	N	300		4.32		Extend	Extend 4.5m left & 8.5m right
BG27B	A86+493	154+596	84+710	POTENTIAL	2	0.5		18	31	50	1300			159.304	N			158.444	Y	300	2	4.78		Extend	Extend 5m left & 8m right
BG27C	A86+494	154+597	84+711	POTENTIAL	2	0.5		18	31	50	1300			159.159	N			158.411	N	300		4.16		Extend	Extend 5m left & 8m right
CV015	A86+652	154+766	84+880	NO	1	0.15		11.1						164.217	N			163.884	N			3.00		Abandon	
BG25A	A86+945	155+045	85+159	NO	1	0.15	0.5	10	19.5		500			157.714	N			157.705	N	300		0.09		Replace	Replace with new length of 19.5m
BG25B	A86+945	155+046	85+160	NO	1	0.15		10.1						157.621	N			157.075	N			5.41		Remove	
BG24A	A87+588	155+687	85+801	YES	1	1.2		15			1200			157.422	N			157.033	Y	500	4.8	2.59		No Change	
BG24B	A87+610	155+709	85+823	YES	3	1.2		15		120	4600			157.384	N			156.742	Y	500	4.8	4.28		No Change	
BG24C	A87+612	155+711	85+825	YES	3	1.2		15		120	4600			157.591	N			156.999	Y	500	4.8	3.95		No Change	
BG24D		155+712	85+826	YES	3	1.2		18		120	4600				N				Y	500	4.8			No Change	
BG24E	A87+955	156+066	86+180	YES	1	0.15		9.4						160.996	N			160.699	N			3.16		Abandon	
CV010A	A88+189	156+300	86+414	NO	1	0.25	0.5	9	13		500			162.231	N			161.935	N	300		3.29		Replace	Replace with new length of 13m
CV010B	A88+475	156+585	86+699	NO	1	0.15		14.3						160.480	N			160.294	N			1.30		Abandon	
CV010C	A88+475	156+585	86+699	NO	1	0.15		13.6						160.630	N			160.269	N			2.65		Abandon	
CV010D	A88+570	156+678	86+792	NO	1	0.25	0.5	9	11		500			160.605	N			160.473	N	300		1.47		Replace	Replace with new length of 11m
BG22	A89+151	157+257	87+371	NO	1	0.25	0.5	9	14		500			170.397	N			169.674	Y	300	2	8.03		Replace	Replace with new length of 14m
BG21	A89+307	157+412	87+526	NO	1	0.25		9						163.162	N			163.108	N			0.60		Abandon	
BG20	A89+389	157+497	87+611	NO	1	0.25	0.5	9	13		500			163.023	N			162.460	Y	300	2	6.26		Replace	Replace with new length of 13m
CV008	A89+557	157+662	87+776	NO	1	0.25		9						161.934	N			161.764	N			1.89		Abandon	
BG19	A89+671	157+777	87+891	NO	1	0.25	0.5	12	14		500			162.338	N			162.162	N	300		1.47		Replace	Replace with new length of 14m
BG18		158+038	88+152	NO	1	0.25	0.5	12	20		500				N				N	300				Replace	Replace with new length of 20m
BG17A	A90+016	158+122	88+236	YES	2	1.2		15	36.5		2900			158.11	N			157.80	Y	500	4.8	2.07		Extend	Extend 8m left & 13.5m right
BG17B	A90+019	158+124	88+238	YES	2	1.2		15	37.5	120	2900			158.00	N			157.73	Y	500	4.8	1.80		Extend	Extend 15.5m left & 7m right
BG15	A90+185	158+275	88+389	NO	1	0.25	0.5	12	13		500			161.533	N			160.772	Y	300	2	6.34		Replace	Replace with new length of 13m
BG14A	A90+246	158+336	88+450	NO	1	0.25	0.5	12	25.5		500			161.336	N			160.850	N	300		4.05		Replace	Replace with new length of 25.5m
BG14B	A90+338	158+428	88+542	NO	1	0.25		12						162.939	N			162.458	N			4.01		Abandon	
BG14C		158+495	88+609	NO	1		0.5		11.5		500				N				N	300				New	

NOTES:

1. Abandoned culverts should have the ends backfilled and left in place
2. Remove indicates that culverts should be dug out and a ditch left in its place
3. New culverts are to be installed as per H349000-1000-10-041-0003
4. Replace indicates that culvert existing at the same chainage is to be removed and replaced as per H349000-1000-10-041-0003
5. No Change indicates that the culvert should be left as is
6. For fish bearing culverts, refer to drawing H349000-4138-10-035-0002
7. Invert elevations are approximate. Culverts should be placed to match field conditions
8. CSP culverts to be used throughout
9. Erosion Control Measures will be installed as directed by the site environmental engineer or designate
10. Before beginning any construction for installation works adjacent to a fish bearing culvert stream or other adjacent water body, the site environmental engineer or designate will be consulted as to what erosion mitigation measures are to be installed to protect the water from contamination by soil

LEGEND

D	CULVERT DIAMETER
E	EMBEDMENT DEPTH
C	CULVERT SPACING AND BEDDING CLEARANCE C=500 WHILE D>900mm C=300 WHILE D<=900mm
W	CULVERT BACKFILL TOP WIDTH W=n•D+(n-1)•C
TYPE	CULVERT MATERIAL
U/S INV. ELV.	CULVERT UPSTREAM INVERT ELEVATION
D/S INV. ELV.	CULVERT DOWNSTREAM INVERT ELEVATION
L	RIPRAP APRON LENGTH L=4•D (APPROX.)
S	CULVERT SLOPE
LENGTH	CULVERT LENGTH

FOR CONSTRUCTION

DRAWING NO. | DRAWING TITLE

REFERENCE DRAWINGS

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 27 Jan 2014
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
1	REVISION FISH BEARING STATUS	KM	JT	JT	2014-01-23

REVISIONS

REV.	ISSUE FOR	AUTH.	BY	DATE
1	CONSTRUCTION	RN	JT	2014-01-23
0	CONSTRUCTION	RN	DW	2013-08-30

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY E. YU DATE 31/05/13
DRAWN BY D. WIGMORE DATE 31/05/13
CHECKED BY J. TOLOVSKI DATE 31/05/13
DISCIP. ENGR. R. NUSINK DATE 31/05/13
PROJ. DES. COORD. T. THERTELL DATE 31/05/13
PROJ. ENGR. J. CLELAND DATE 31/05/13
PROJ. MGR. S. PERRY DATE 31/05/13

Baffinland

MARY RIVER PROJECT

TOTE ROAD
CULVERT DATA
SHEET 4 OF 5

SCALE NTS OR AS NOTED
DWG. NO. H349000-3000-10-088-0033
REV. 1
ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

idc_pwservice
24-JAN-2014 17:42

Culvert ID	KP Chainage	Hatch Chainage	Distance	Fish Bearing Status	Number of Pipes	Existing Diameter	Proposed Diameter	Existing Length	Proposed Length	E	W	Culvert C/L At Upstream		U/S INV. ELV.	Rip Rap Required	Culvert C/L At Downstream		D/S INV. ELV.	Rip Rap Required	C	Rip Rap Apron Leng	Slope	Skew Degree	What To Do	Comments
	(m)	(m)	(km)	(Y/N/P)	(n)	(m)	(m)	(m)	(m)	(mm)	(mm)	Northing	Easting	(m)	(Y/N)	Northing	Easting	(m)	(Y/N)	(mm)	(m)	(%)			
CV007	A90+510	158+599	88+713	NO	1	0.25	0.5	12	11		500			161.368	N			161.260	N	300		0.90		Replace	Replace with new length of 11m
BG13	A90+846	158+948	89+062	NO	1	0.25	0.5	12	17.5		500			161.993	N			161.598	N	300		3.29		Replace	Replace with new length of 17.5m
BG11A	A91+430	159+528	89+642	NO	1	0.25	0.5	12	32.5		500			172.201	N			171.593	Y	300	2	5.07		Replace	Abandon and replace with new length of 32.5m
BG11B		159+895	90+009	NO	1		0.5		15.5		500				N				N	300				New	
CV219	A91+949	160+046	90+160	NO	1	0.15	0.5	9.9	10.5		500			162.986	N			162.832	N	300		1.56		Replace	Replace with new length of 10.5m
CV004	A92+477	160+561	90+675	NO	1	0.15	0.5	9.9	14.5		500			162.725	N			162.425	N	300		3.03		Replace	Replace with new length of 14.5m
BG07	A92+956	161+039	91+153	NO	1	0.15	0.5	9.4	20.5		500			163.340	N			163.113	N	300		2.41		Replace	Replace with new length of 20.5m
CV002A	A93+022	161+117	91+231	NO	1	0.15		9.6						165.485	N			165.298	N			1.95		Abandon	
CV002B	A93+492	161+585	91+699	NO	1	0.15		11.2						164.790	N			164.714	N			0.68		Abandon	
CV002C	A93+782	161+862	91+976	NO	1	0.15		9.7						167.495	N			164.429	N			31.61		Abandon	
BG04A	A93+992	162+086	92+200	YES	2	1.2		15	24		2900			163.785	N			163.648	N	500		0.91		Extend	Extend 5.5m left & 3.5m right
BG04B	A93+993	162+087	92+201	YES	2	1.2		15	24	120	2900			163.570	N			163.463	N	500		0.71		Extend	Extend 5m left & 4m right
CV001A	A94+606	162+690	92+804	POTENTIAL	1	0.5		15			500			166.546	N			166.299	N	300		1.65		No Change	
CV001B	A94+351	162+434	92+548	POTENTIAL	2	1		15		100	2000			166.333	N			166.159	N	500		1.16		No Change	
CV001C	A94+353	162+437	92+551	POTENTIAL	2	0.5		15		50	2000			166.547	N			166.305	N	300		1.61		No Change	
BG03A	A95+585	163+673	93+787	NO	1	0.25	0.5	18	30.5		500			164.307	N			163.840	N	300		2.59		Replace	Replace with new length of 30.5m
BG03B	A96+817	164+930	95+044	NO	1	0.15		13.9						153.743	N			153.309	N			3.12		Abandon	
CV223A	A97+007	165+117	95+231	YES	1	2		10	24		2000				N				Y	500	8			Extend	Extend 14m left
CV223B	A96+981	165+088	95+202	YES	3	1.2		15	28	120	4600			151.827	N			151.314	Y	500	4.8	3.42		Extend	Extend 13m left
CV223C	A96+983	165+090	95+204	YES	3	1.2		15	28	120	4600			151.792	N			151.337	Y	500	4.8	3.03		Extend	Extend 13m left
CV223D	A96+985	165+092	95+206	YES	3	1.2		15	29	120	4600			151.859	N			151.313	Y	500	4.8	3.64		Extend	Extend 14m left
CV223E	A97+072	165+181	95+295	YES	2	1.2		15	19.5	120	2900			152.629	N			152.615	N	500		0.09		Extend	Extend 4.5m left
CV223F	A97+074	165+183	95+297	YES	2	1.2		15	19	120	2900			152.784	N			152.669	N	500		0.77		Extend	Extend 4m left
CV224A	A97+576	165+695	95+809	YES	1	1		15	26		1000			153.289	N			153.131	N	500		1.05		Extend	Extend 6m left & 5m right
CV224B	A98+568	166+685	96+799	YES	1	1		15	26.5		1000			153.466	N			153.317	N	500		0.99		Extend	Extend 6.5m left & 5m right
CV225A	A98+845	166+950	97+064	YES	1	1	1	15	18.5		1000				N				Y	500	4			Replace	Replace with new length of 18.5m
CV225B	A98+804	166+915	97+029	YES	1	1.2	1.2	18	18	120	1200			151.682	N			151.505	N	500		0.98		Replace	Replace with new length of 18m
BG01A	A99+483	167+610	97+724	YES	3	1.2		18	36.5		4600				N				Y	500	4.8			Extend	Extend 11.5m left & 7m right
BG01B	A99+483	167+610	97+724	YES	3	1.2		18	37	120	4600			159.688	N			159.016	Y	500	4.8	3.73		Extend	Extend 12m left & 7m right
BG01C		167+596	97+710	YES	3	1.2		18	37	120	4600				N				Y	500	4.8			Extend	Extend 11m left & 8m right
BG01H		168+760	98+874	YES	1		0.5		18		500				N				N	300				New	
BG01G		169+026	99+140	YES	1		0.5		12.5		500				N				N	300				New	
BG01D		169+158	99+272	YES	1		0.5		10		500				N				N	300				New	
BG01E		169+281	99+395	YES	1		1		10		1000				N				Y	500	4			New	
BG01F		169+535	99+649	YES	1		0.5		18		500				N				N	300				New	
CV186		170+745	100+859	POTENTIAL	1	1		21	27		1000				N				Y	500	4			Extend	Extend 6m left
CV187A		170+956	101+070	POTENTIAL	1	0.5		10	36		500				N				N	300				Extend	Extend 6m left & 20m right
CV187B		171+221	101+335	POTENTIAL	1		0.5		16		500				N				N	300				New	
CV187D		171+426	101+540	NO	1		0.5		13.5		500				N				N	300				New	
CV187C		171+458	101+572	NO	1		0.5		19		500				N				N	300				New	
CV187E		171+562	101+676	NO	1		0.5		24.5		500				N				N	300				New	
CV187F		171+562	101+676	NO	1		0.5		11.5		500				N				N	300				New	

NOTES:

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2. Remove indicates that culverts should be dug out and a ditch left in its place
3. New culverts are to be installed as per H349000-1000-10-041-0003
4. Replace indicates that culvert existing at the same chainage is to be removed and replaced as per H349000-1000-10-041-0003
5. No Change indicates that the culvert should be left as is
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7. Invert elevations are approximate. Culverts should be placed to match field conditions
8. CSP culverts to be used throughout
9. Erosion Control Measures will be installed as directed by the site environmental engineer or designate
10. Before beginning any construction for installation works adjacent to a fish bearing culvert stream or other adjacent water body, the site environmental engineer or designate will be consulted as to what erosion mitigation measures are to be installed to protect the water from contamination by soil

LEGEND

D	CULVERT DIAMETER
E	EMBEDMENT DEPTH
C	CULVERT SPACING AND BEDDING CLEARANCE C=500 WHILE D>900mm C=300 WHILE D<=900mm
W	CULVERT BACKFILL TOP WIDTH W=n•D+(n-1)•C
TYPE	CULVERT MATERIAL
U/S INV. ELV.	CULVERT UPSTREAM INVERT ELEVATION
D/S INV. ELV.	CULVERT DOWNSTREAM INVERT ELEVATION
L	RIPRAP APRON LENGTH L=4•D (APPROX.)
S	CULVERT SLOPE
LENGTH	CULVERT LENGTH

FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

PERMIT TO PRACTICE
HATCH LTD.
Signature
Date 27 Jan 2014
PERMIT NUMBER: P 512
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

NO.	DESCRIPTION	BY	CHK'D	APP'D	DATE
4	REVISION FISH BEARING STATUS	KM	JT	RN	2014-01-23
3	CULVERT BG01H ADDED	DW	JT	RN	2013-10-29
2	CULVERT CV187F ADDED	DW	JT	RN	2013-10-04
2	CULVERT CV187C LENGTH MODIFIED	DW	JT	RN	2013-10-04
2	CULVERT CV187E ADDED	DW	JT	RN	2013-10-04
1	CULVERT CV187A LENGTH MODIFIED	DW	JT	RN	2013-09-26
1	CULVERT CV187D ADDED	DW	JT	RN	2013-09-26

REVISIONS

REGISTERED PROFESSIONAL ENGINEER J. TOLOVSKI LICENSEE NT/NU

REV.	ISSUE FOR	AUTH.	BY	DATE
4	CONSTRUCTION	RN	JT	2014-01-23
3	CONSTRUCTION	RN	DW	2013-10-29
2	CONSTRUCTION	RN	DW	2013-10-04
1	CONSTRUCTION	RN	DW	2013-09-26
0	CONSTRUCTION	RN	DW	2013-08-30

ISSUE AUTHORIZATION

HATCH

DESIGNED BY E. YU DATE 31/05/13	DRAWN BY D. WIGMORE DATE 31/05/13
CHECKED BY J. TOLOVSKI DATE 31/05/13	DISCIP. ENGR. R. NUSINK DATE 31/05/13
PROJ. DES. COORD. T. THERTELL DATE	PROJ. ENGR. J. CLELAND DATE 31/05/13
PROJ. MGR. S. PERRY DATE 31/05/13	

Baffinland

MARY RIVER PROJECT

TOTE ROAD
CULVERT DATA
SHEET 5 OF 5

SCALE NTS OR AS NOTED | DWG. NO. H349000-3000-10-088-0034 | REV. 4

ORIGINAL SHEET SIZE: ISO A1 (841 x 594)

Appendix C.6:
Piping

Summary of Work – MPEI Installation (H349000-CE001-011100, Rev. 1)

Summary of Work

MPEI Installation

2013-11-06	1	Approved for Award	FOR J. Cleland	S. Perry	S. Perry	for D. Matthews
2013-06-24	0	Approved for Enquiry	B. Perkins	J. Cleland	S. Perry	D. Matthews
DATE	**REV.**	**STATUS**	**PREPARED BY**	**CHECKED BY**	**APPROVED BY**	**APPROVED BY**

Table of Contents

1. Introduction

1.1 Baffinland Iron Mines (BIM) is planning to develop an iron ore mine at their Mary River site located on Baffin Island, Nunavut, Canada. The mine development requires construction of facilities at Milne Port and the Mine Site, and upgrade of the Tote Road connecting Milne Port to the Mine Site. The main construction period is one (1) year and the intended life of the permanent facilities is six (6) years.

1.2 This package defines the scope and requirements to provide mechanical, piping, electrical, instrumentation and structural installation services including: 1

a) Installation of the mechanical components of the power generation system.

b) Installation of building fit out for HVAC and utilities.

c) Installation of equipment for: utilities, shops, truck scales etc.

d) Installation of the mobile crushing units.

e) Preparation of mobile equipment for use at site.

f) Building electrical services in modular trailer and fold-away buildings.

g) Electrical and control interconnections for modular generators, E-houses and site power distribution system.

h) Electrical and control connections for modular raw water pump house, modular sewage treatment plants, mobile crushing equipment, and truck wash and truck weigh scale systems.

i) Installation of pipe heat tracing systems.

j) Installation of aerodrome lighting systems.

k) Installation of electrical grounding systems.

l) Transport and placement of modular skidded buildings on gravel pads prepared by others. 1

m) Installation of airfield lighting structures. 1

1.3 Contractor's scope generally includes all labour, consumables, tools, small equipment and general materials for construction.

1.4 Contractors scope generally excludes:

a) Supply of all equipment, facilities and listed bulk materials.

b) Transport and placement of large buildings, modules and structures.

c) Excavation and backfill.

d) Electrical, Instrumentation, Communications and IT installation.

e) Supply of all equipment, facilities and major bulk materials.

f) Transport and placement of large buildings, modules and structures.

g) Excavation and backfill.

h) Communications and IT installation.

1.5 The Site generally consists of:

- Milne Port Project Development Area.
- Tote Road right-of-way.
- Mine Site Project Development Area.

1.6 All exceptions to this specification shall be clearly informed in the proposal.

2. Work Included – Mechanical/Piping

2.1 Buildings

2.1.1 Construct mechanical fit-out for modular trailer and fold-away buildings listed in Table 2-1. Refer to Building Matrix for details.

Table 2-1: Building Installation Scope

Site	Facility	Building Number	Building Name
Milne Port	2223.1	2223-BLD-001	Dock Office
Milne Port	2513.1	2513-BLD-001	Emergency Response Office
Milne Port	2513.2	2513-BLD-002	Emergency Response Garage
Milne Port	2521.1	2521-BLD-001	Maintenance Building
Milne Port	2521.2	2521-BLD-002	Welding Shop Building
Milne Port	2521.0	2521-BLD-003	Workshop Office Building
		2521-BLD-004	Workshop Office Washcar
Milne Port	2540.1	2540-BLD-001	Waste Management Building
Milne Port	2720.1	2720-BLD-001	Water Building
Milne Port	2732.1	2732-BLD-001	Sewage Truck Building
Milne Port	7232.0	7232-BLD-003	Batch Plant Office-Lunchroom-W/C
		7232-BLD-009	Site Services Wash car #1
		7232-BLD-010	Site Services Wash car #2

Site	Facility	Building Number	Building Name
Mine Site	4281.0	4281-BLD-002	Pit Office Wash Car
Mine Site	4282.1	4382-BLD-001	Truck Weigh Building
Mine Site	4431.1	4431-BLD-001	Aerodrome Office
Mine Site	4513.1	4513-BLD-001	Emergency Response Office
Mine Site	4513.2	4513-BLD-002	Emergency Response Garage
Mine Site	4521.1	4521-BLD-001	Maintenance Building
Mine Site	4521.2	4521-BLD-002	Warehouse
Mine Site	4521.3	4521-BLD-003	Welding Shop Building
Mine Site	4521.4	4521-BLD-005	Workshop Office Wash car
		4523-BLD-001	Truck Wash Building
Mine Site	4523.1	4540-BLD-001	Waste Management Building
Mine Site	4540.1	4720-BLD-001	Water Building
Mine Site	4720.1	4732-BLD-001	Sewage Truck Building
Mine Site	4732.1	7432-BLD-001	Batch Plant Office-Lunchroom-W/C
Mine Site	7432.0	7432-BLD-004	Fuel Systems Washcar
		7432-BLD-007	Site Services Washcar #1

2.1.2 Install external plumbing systems as specified in the modular buildings, including:

a) External sewage tank directly on gravel pad adjacent to building.

b) Insulated sewage drain and vent from building to sewage tank.

2.1.3 Install diesel fired heating systems in fold-away buildings as specified, including:

a) Install heater units on base frames.

b) Install intake hoods, ductwork and distribution hoods and grills.

c) Install diesel tank(s) with distribution pumps and piping.

d) Install ventilation fans and air makeup exchangers.

e) Ceiling fans.

f) Louvers.

2.1.4 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) H349000-1000-00-144-0001 Master Building Matrix.

b) E349000-PX001-35-042-0009 525 GAL Horizontal Tank.

c) E349000-PX001-50-042-0001 12' x 60' Aerodrome Office – Mechanical Plan/Plumbing.

d) E349000-PX001-50-042-0002 12' x 60' Aerodrome Office – Mechanical Plan/Plumbing.

e) E349000-PX001-50-042-0003 12' x 60' Aerodrome Office – Mechanical Plan/Plumbing.

f) E349000-PX001-50-042-0004 12' x 60' Lunchroom/Washcar - Mechanical Plan/Plumbing.

g) E349000-PX001-50-042-0005 12' x 60' Lunchroom/Washcar - Mechanical Plan/Plumbing.

h) E349000-PX001-50-042-0006 12' x 32' Washcar - Mechanical Plan/Plumbing.

i) E349000-PX001-50-042-0007 12' x 32' Washcar - Mechanical Plan/Plumbing.

j) E349000-PX001-50-042-0008 12' x 32' Washcar - Mechanical Plan/Plumbing.

k) Other building drawings to follow as they become available.

2.2 Power Generation Systems - 2013

- Milne Port Power Generation: Facility 2530.1
- Mine Site Power Generation: Facility 4530.1

2.2.1 Provide mechanical installation of four (4) skidded Power Generation Modules (containerized high-speed gensets) at the Milne Port.

2.2.2 Provide mechanical installation of five (5) skidded Power Generation Modules (containerized high-speed gensets) at the Mine Site.

2.2.3 Installation includes:

- The removal of all packaging and shipping protection, draining of shipping fluids and first fill of fluids for all generators.
- Installation of vibration isolators.
- Connecting the fuelling piping for truck fill and for automatic fill from fuel farm. Installing the fuel vent lines. Install fuel filters.
- Radiator connections and fan alignment and belting.
- Installation and connection of oil and fuel heaters.
- Connecting inlet and outlet hoods, silencers, stacks.

2.2.4 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) E349000-PE-001-00-118-0001 Installation Manual – Generator Set.

b) E349000-PE-001-70-042-0005 Genset Enclosure Package.

2.3 Power Generation Systems - 2014

- Milne Port Power Generation: Facility 2530.2
- Mine Site Power Generation: Facility 4530.2.

2.3.1 Provide mechanical installation of three (3) additional skidded Power Generation Modules (containerized high-speed gensets) at Milne Port.

2.3.2 Provide mechanical installation of one (1) additional skidded Power Generation Modules (containerized high-speed gensets) at Mine Site.

2.3.3 Installation includes:

- The removal of all packaging and shipping protection, draining of shipping fluids and first fill of fluids for all generators.
- Connecting the fuelling piping for truck fill and for automatic fill from fuel farm. Installing the fuel vent lines.
- Connecting inlet and outlet hoods, silencers, stacks.

2.3.4 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) E349000-PE-001-00-118-0001 Installation Manual – Generator Set.

b) E349000-PE-001-70-042-0005 Genset Enclosure Package.

2.4 Raw Water Pumphouse

- Mine Site Raw Water Pumphouse: Facility 4712.1

2.4.1 Drain shipping fluids, remove packaging and install first fill.

2.4.2 Install manual hoist on upper crawl beam.

2.4.3 Install two (2) vertical turbine pumps.

2.4.4 Install interconnecting carbon steel pipe spools and supports.

2.4.5 Check vertical turbine pump column heat tracing for prevention of wet well freezing.

2.4.6 Check electric heat tracing and insulation for piping exposed to freezing conditions.

2.4.7 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) E349000-PM003-50-042-0001 Plant/Equipment General Arrangement Drawing.

2.5 Utility Systems Piping

2.5.1 Install the pre-insulated HDPE pipe systems as listed in Table 2-2.

2.5.2 Install the following carbon steel pipe systems as listed in Table 2-3.

2.5.3 Installation of piping shall be as per routing on attached drawing, or field routing for non-insulated pipe less than 2".

2.5.4 Installation includes:

a) Fuse piping connections.

b) Install insulation kits at all piping connections and around all valves and other fittings (after installation of heat tracing system by others).

c) Fabricate and install minor pipe supports.

d) Install bolted flanged connections.

e) Install bolted valves.

f) Fabricate, Install and insulate valve boxes.

g) Install any connection required for instrumentation tie-ins, including nipple and isolation valves upstream of the actual instrumentation.

h) Supply and install of line identification labels.

2.5.5 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) H349000-2000-00-014-0005 Milne Port Utility Services Site Layout.

b) H349000-2000-00-014-0006 Milne Port Utility Services Sections.

c) H349000-2000-00-014-0007 Milne Port Utility Services Site Layout.

d) H349000-2000-00-014-0008 Milne Port Utility Services Detail Sheet 1 of 2.

e) H349000-2000-00-014-0009 Milne Port Utility Services Detail Sheet 2 of 2.

f) H349000-4000-00-014-0004 Mine Site Utility Services Layout.

g) H349000-4000-00-014-0005 Mine Site Utility Services Site Layout.

h) H349000-4000-00-014-0006 Mine Site Utility Services Site Layout.

i) H349000-4000-00-014-0007 Mine Site Utility Services Sections.

j) H349000-4000-00-014-0008 Mine Site Utility Services Sections.

k) H349000-4000-00-014-0009 Mine Site Utility Services Details.

l) H349000-4000-00-014-0010 Mine Site Utility Services Details.

m) H349000-4000-00-014-0011 Mine Site Utility Services Details.

Table 2-2: HDPE Piping Systems Summary

Facility	Facility Title	From	To	Nominal Size (inch)	Nominal Length (m)
2731.2	Milne Port Sewage Treatment Piping	Sewage Truck Building	Sewage Treatment Plant	3	10
		Water Building	Sewage Treatment Plant	2	120
4731.2	Mine Site Sewage Treatment Piping	Sewage Truck Building	Sewage Treatment Plant	3	10
		Water Building	Sewage Treatment Plant	2	109
2734.1	Milne Port Treated Effluent Piping	Sewage Treatment Plant	Ocean Discharge	2	1,265
4734.1	Mine Site Treated Effluent Piping	Sewage Treatment Plant	Mary River[1]	2	75, Note[1]
4712.2	Mine Site Raw Water Piping	Raw Water Pumphouse	Water Systems Building	4	4,258
4385.1	Mine Ore Stockpile Drain Piping	Ore Stockpile	Mary River	3	2,610

Note[1]: The Mine Site Treated Effluent Discharge “T” joins with the Mine Ore Stockpile Drain for discharge to Mary River.

Table 2-3: Carbon Steel Piping Systems Summary

Facility	System	From	To	Nominal Size (inch)	Nominal Length (m)
2521.5	Milne Port Maintenance Building Piping	Water Tank	Service Points in Building	2	85
		Air Compressor	Service Points in Building	1, 2	85
		Lube Oil Tank	Service Points in Building	2	85
4521.5	Mine Site Maintenance Building Piping	Water Tank	Service Points in Building	2	135
		Air Compressor	Service Points in Building	1, 2	135
		Lube Oil Tank	Service Points in Building	2	135

2.6 Mine Site Crushing and Screening

Scope deleted. 1

2.7 Mine Site Truck Weigh System

- Truck Weigh System: Facility 4382.2

2.7.1 The truck weigh scale consists of a 30 m weigh scale deck. The scale shall measure the ore haul trucks bringing product to the Milne Port site. The scale is enclosed in a metal foldaway building (building 4382-BLD-001).

2.7.2 Remove shipping packaging.

2.7.3 Install truck weigh scale deck on foundation and structure of the weigh scale is by others.

2.7.4 Install and calibrate load cells.

2.7.5 Install RFID tags for trucks and mount the reader.

2.8 Mine Site Truck Wash

- Truck Wash Facility: Facility 4523.2

2.8.1 The truck wash system consists of a wash pan mounted system to be installed on a gravel pad, and connected to a containerized water recycle and treatment system. The entire system is enclosed in a heated metal foldaway building (4523-BLD-001).

2.8.2 Remove shipping packaging and drain shipping fluids.

2.8.3 Install truck wash pan and touch-less spray bar system module directly on a gravel pad.

2.8.4 Install water recycle and treatment module(s).

2.8.5 Install interconnecting pipe work between module and wash pan system.

2.8.6 Install first fills of surfactants and media.

2.9 Milne Port Stacking Equipment

Scope deleted. 1

2.10 Mobile Equipment

Scope deleted. 1

2.11 Services Equipment

Scope deleted. 1

2.12 Contractor Supply

2.12.1 Supply all required HDPE pipe cutting, fusing and associated equipment. Equipment shall be suitable for piping up to and including 14" diameter. Equipment shall be maintained in a serviceable condition throughout the contract period and shall be issued to the Company at the end of the contract.

2.12.1.1 Supply all required equipment, tools, consumables and minor construction materials unless specified otherwise in section 3. Work Excluded.

3. Work Included – Electrical/Instrumentation

3.1 Buildings

3.1.1 Construct building electrical systems for modular trailer (MT) and fold-away (FO) buildings listed in Table 2–1.

Table 3-1: Building Installation Scope

Site	Facility	Building Number	Building Name	Type
Milne Port	2223.1	2223-BLD-001	Dock Office	MT
Milne Port	2513.1	2513-BLD-001	Emergency Response Office	MT
Milne Port	2513.2	2513-BLD-002	Emergency Response Garage	FO
Milne Port	2521.1	2521-BLD-001	Maintenance Building	FO
Milne Port	2521.2	2521-BLD-002	Welding Shop Building	FO
Milne Port	2521.0	2521-BLD-003	Workshop Office Building	MT
		2521-BLD-004	Workshop Office Washcar	MT
Milne Port	2540.1	2540-BLD-001	Waste Management Building	FO
Milne Port	2720.1	2720-BLD-001	Water Building	FO
Milne Port	2732.1	2732-BLD-001	Sewage Truck Building	FO
Milne Port	7231.1	7231-BLD-001	Construction Office	MT
Milne Port	7232.0	7231-BLD-002	Aerodrome Office	MT
		7232-BLD-003	Batch Plant Office-Lunchroom-W/C	MT
Milne Port	7235.1	7235-BLD-002	Site Services Heated Warehouse	FO
Milne Port	7235.2	7235-BLD-003	Site Services Unheated Warehouse	FO
Milne Port	7251.1	7251-BLD-001	Concrete Batch Plant Building	FO
3Mine Site	4281.0	4281-BLD-001	Pit Office Building	MT
		4281-BLD-002	Pit Office Wash Car	MT
Mine Site	4282.1	4382-BLD-001	Truck Weigh Building	FO
Mine Site	4431.1	4431-BLD-001	Aerodrome Office	MT
Mine Site	4513.1	4513-BLD-001	Emergency Response Office	MT
Mine Site	4513.2	4513-BLD-002	Emergency Response Garage	FO
Mine Site	4521.1	4521-BLD-001	Maintenance Building	FO
Mine Site	4521.2	4521-BLD-002	Warehouse	FO

Site	Facility	Building Number	Building Name	Type
Mine Site	4521.3	4521-BLD-003	Welding Shop Building	FO
Mine Site	4521.4	4521-BLD-004	Workshop Office Building	MT
		4521-BLD-005	Workshop Office Wash car	MT
Mine Site	4523.1	4523-BLD-001	Truck Wash Building	FO
Mine Site	4540.1	4540-BLD-001	Waste Management Building	FO
Mine Site	4720.1	4720-BLD-001	Water Building	FO
Mine Site	4732.1	4732-BLD-001	Sewage Truck Building	FO
Mine Site	7432.0	7432-BLD-001	Batch Plant Office-Lunchroom-W/C	MT
		7432-BLD-006	Site Services Lunchroom #2	MT
Mine Site	7451.1	7451-BLD-001	Concrete Batch Plant Building	FO

3.1.2 For all fold-away (Type FO) buildings:

a) Install main building power service entrance. Note: Feed to main building service entrance is included in Power Distribution.

b) Install distribution system including sub-panels and transformers.

c) Install lighting and auxiliary power systems including luminaries and receptacles.

d) Install emergency systems including exit and emergency lighting.

e) Install communication systems including telephone and data raceway and wiring.

f) Install fire detection and alarm systems.

3.1.3 For all modular (type MT) buildings:

a) Install loose shipped items such as exterior luminaries.

b) Install external heat tracing systems on sewage tank, water tank and associated piping connections as specified.

3.1.4 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

a) H349000-1000-00-144-0001 Master Building Matrix

3.2 Power Generation Systems - 2013

- Milne Port Power Generation: Facility 2530.1
- Mine Site Power Generation: Facility 4530.1

3.2.1 Install electrical grounding system (excavation and backfill by others).

3.2.2 Install interconnecting cable with raceways connecting five (5) Power Generation Modules to two (2) Switchgear and Control Buildings at each site.

3.2.3 Install cabled bus-tie and other interconnections between the two (2) Switchgear and Control Buildings.

3.2.4 Terminate cable as required including install connectors, terminations and lugs.

3.2.5 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-2530-70-082-0001 Milne Port Power Generation 4160V Single Line Diagram.
- H349000-2530-70-082-0002 Milne Port Power Generation 600V Single Line Diagram.
- H349000-4530-70-082-0001 Mine Site Power Generation 4160V Single Line Diagram.
- H349000-4530-70-082-0002 Mine Site Power Generation 600V Single Line Diagram.
- E349000-PE001-70-093-0001 Power Generation Milne Port Electrical Layout.
- E349000-PE001-70-093-0002 Power Generation Mine Site Electrical Layout
- E349000-PE001-70-085-0002 Power Generation Genset Interconnection Diagram.

3.3 Power Generation Systems - 2014

- Milne Port Power Generation: Facility 2530.2
- Mine Site Power Generation: Facility 4530.2

3.3.1 Install interconnecting cable with raceways connecting three (3) additional Power Generation Modules to the Switchgear and Control Buildings at Milne Port.

3.3.2 Install interconnecting cable with raceways connecting one (1) additional Power Generation Module to the Switchgear and Control Buildings at Mine Site.

3.3.3 Terminate cable as required including install connectors, terminations and lugs.

3.3.4 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-2530-70-082-0001 Milne Port Power Generation 4160VSingle Line Diagram
- H349000-2530-70-082-0002 Milne Port Power Generation 600V Single Line Diagram
- H349000-4530-70-082-0001 Mine Site Power Generation 4160V Single Line Diagram
- H349000-4530-70-082-0002 Mine Site Power Generation 600V Single Line Diagram

- E349000-PE001-70-093-0001 Power Generation Milne Port Electrical Layout
- E349000-PE001-70-093-0002 Power Generation Mine Site Electrical Layout
- E349000-PE001-70-085-0002 Power Generation Genset Interconnection Diagram.

3.4 Power Distribution

- Milne Port Power Distribution System: Facility 2750.0
- Mine Site Power Distribution System: Facility 4750.0

3.4.1 Install primary distribution 4160 V (5 kV) feeders from the Power Generation Switchgear Buildings to the Unit Substation Buildings including installation of cable directly on raised berms, on grade, through pipe under road crossings and on raceway at end termination locations.

3.4.2 Install secondary distribution 600 V (1 kV) feeders from Unit Substation Buildings to associated building Service Entrances including cable, raceways and associated pre-cast concrete supports and grounding system.

3.4.3 Install tertiary distribution 600 V (1 kV) feeders from large building panels to modular building service entrance panels including cable (generally direct buried).

3.4.4 Terminate cable as required including install connectors, terminations and lugs.

3.4.5 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

General

- H349000-1000-70-041-2001 Power Cable on Utility Berm
- H349000-1000-70-041-2002 Power Cable Road Crossing – Cable Only
- H349000-1000-70-041-2003 Power Cable Road Crossing – Cable and Piping
- H349000-2000-70-007-0002 Milne Port Primary Distribution Grounding Ground Conductor Schedule
- H349000-1000-70-041-2001 Power Distribution E-House Building Grounding

Milne Port

- H349000-2000-00-014-0001 Milne Port Early Revenue Phase Site Layout
- H349000-2000-00-014-0004 Milne Port Infrastructure Site Layout
- H349000-2000-70-082-0001 Milne Port Overall Key Drawing Single Line Diagram
- H349000-2000-70-007-0002 Milne Port Primary Distribution Grounding Ground Conductor Schedule
- H349000-2750-70-007-0001 Milne Port Power Distribution 5kV 3/C Cable Schedule

- H349000-2750-70-007-0002-001 Milne Port Power Distribution 1kV 3/C Cable Schedule (Sht. 1 of 2)
- H349000-2750-70-007-0002-002 Milne Port Power Distribution 1kV 3/C Cable Schedule (Sht. 2 of 2)
- H349000-2750-70-007-0003 Milne Port Power Distribution 1kV 4/C Cable Schedule

Mine Site

- H349000-4000-00-014-0001 Mine Site Early Revenue Phase Site Layout
- H349000-4000-00-014-0003 Mine Site Infrastructure Layout
- H349000-4000-70-082-0001 Mine Site Overall Key Drawing Single Line Diagram
- H349000-4000-70-007-0002 Mine Site Primary Distribution Grounding Ground Conductor Schedule
- H349000-4750-70-007-0001 Mine Site Power Distribution 5kV 3/C Cable Schedule
- H349000-4750-70-007-0002-001 Mine Site Power Distribution 1kV 3/C Cable Schedule (Sht. 1 of 2)
- H349000-4750-70-007-0002-002 Mine Site Distribution 1kV 3/C Cable Schedule (Sht. 2 of 2)
- H349000-4750-70-007-0003 Mine Site Power Distribution 1kV 4/C Cable Schedule

3.5 Construction Power Supply Systems

- Milne Port Construction Power Supply: Facility 7244.1
- Mine Site Construction Power Supply: Facility 7444.1

3.5.1 Install grounding mat and interconnect mobile gensets for construction power supply listed in Table 2–2.

3.5.2 Note that the two Cummins CPG 1600 kW units (7244-GEN-001 and 7444-GEN-001) will be relocated to serve early operations of FBS 4380 Crushing and Screening once the Accommodation Areas are grid connected.

Table 3-2: Construction Power Supply Scope

Generator Tag No.	Generator Make/Model	Generator Rating	Connect Load(s)
7244-GEN-001	Cummins CPG 1600kW	2 x 800 kW, 600 V	MI Accommodation Area
7244-GEN-002	Cummins C150D6R	150 kW, 600/347 V	MI Concrete Batch Plant
7244-GEN-003	Cummins C150D6R	150 kW, 600/347 V	MI Concrete Batch Plant
7244-GEN-004	Cummins C80D6R	80 kW, 600/347 V	Spare/General Use
7244-GEN-005	Cummins C60D6R	60 kW, 208/120 V	MI Constr Office/Lunchroom/WC

Generator Tag No.	Generator Make/Model	Generator Rating	Connect Load(s)
7244-GEN-006	Cummins DSFAA	35 kW, 208/120 V	MI Site Services Lunchroom/WC
7244-GEN-007	Cummins DSFAA	35 kW, 208/120 V	MI Logistics Trailer
7244-GEN-008	Cummins DSKBA	20 kW, 240/120 V	MI Aerodrome Lighting
7244-GEN-009	Cummins DSKBA	20 kW, 240/120 V	MI Workface Tools
7244-GEN-010	Cummins DSKBA	20 kW, 240/120 V	MI Workface Tools
7444-GEN-001	Cummins CPG 1600kW	2 x 800 kW, 600 V	MR Accommodation Area
7444-GEN-002	Cummins C150D6R	150 kW, 600/347 V	MR Concrete Batch Plant
7444-GEN-003	Cummins C150D6R	150 kW, 600/347 V	MR Concrete Batch Plant
7444-GEN-004	Cummins C80D6R	80 kW, 600/347 V	Spare/General Use
7444-GEN-005	Cummins C60D6R	60 kW, 600/347 V	MR Aerodrome Lighting FEC
7444-GEN-006	Cummins C60D6R	60 kW, 600/347 V	MR Raw Water Pumphouse
7444-GEN-007	Cummins C60D6R	60 kW, 600/347 V	MR Raw Water Pumphouse
7444-GEN-008	Cummins C60D6R	60 kW, 208/120 V	MR Constr Office/Lunchroom/WC
7444-GEN-009	Cummins DSFAA	35 kW, 208/120 V	MR Site Services Lunchroom/WC
7444-GEN-010	Cummins DSFAA	35 kW, 208/120 V	MR Site Services Lunchroom/WC
7444-GEN-011	Cummins DSFAA	35 kW, 208/120 V	MR Fuel Lunchroom/Washcar
7444-GEN-012	Cummins DSKBA	20 kW, 240/120 V	MR Workface Tools
7444-GEN-013	Cummins DSKBA	20 kW, 240/120 V	MR Workface Tools

3.5.3 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-7244-70-007-0001 Milne Port Construction Power Supply Generator Schedule
- H349000-7444-70-007-0001 Mine Site Construction Power Supply Generator Schedule
- E349000-PE001-70-042-0008 Power Generation 1600kW Twin-Pack Genset GA
- E349000-PE001-70-042-0015 Power Generation 60 kW Portable Genset GA

3.6 Raw Water Pumphouse

- Mine Site Raw Water Pumphouse: Facility 4712.1

3.6.1 Connect electrical power to pump system and associated equipment.

3.6.2 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- E349000-PM003-70-083-0001 Electrical Schematics

3.7 Utility Systems Piping

3.7.1 Install pipe heat tracing systems as listed in Table 2–3 including distribution panel, controllers, cable and accessories (terminations and splices).

3.7.2 Heat trace cable is generally installed in channels on pre-insulated HDPE pipe.

3.7.3 Multiple – i.e. a minimum of two (2) - heat trace cables per are anticipated per pipe.

3.7.4 Long lines will be heat traced with series resistance cable whereas the short lines will use self-regulated cable.

3.7.5 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-2000-70-007-0003 Milne Port Outdoor Pipelines Electric Heat Tracing Schedule
- H349000-4000-70-007-0003 Mine Site Outdoor Pipelines Electric Heat Tracing Schedule

Table 3-3: Heat Traced Pipelines

Facility	Facility Description	From	To	Nom. Size (inch)	Line Length (m)
2731.2	Milne Port Sewage Treatment Piping	Sewage Truck Building	Sewage Treatment Plant	3	8
		Water Building	Sewage Treatment Plant	2	120
4731.2	Mine Site Sewage Treatment Piping	Sewage Truck Building	Sewage Treatment Plant	3	8
		Water Building	Sewage Treatment Plant	2	120
2734.1	Milne Port Treated Effluent Piping	Sewage Treatment Plant	Ocean Discharge	2	1,330
4734.1	Mine Site Treated Effluent Piping	Sewage Treatment Plant	Mary River	3	2,050
4712.2	Mine Site Raw Water Piping	Raw Water Pumphouse	Water Systems Building	4	4,260
4385.1	Mine Ore Stockpile Drain Piping	Ore Stockpile	Mary River	3	2,610

3.8 Milne Port Airfield Lighting and Visual Aids

- Milne Port Airfield Lighting and Visual Aids: Facility 2436.0

3.8.1 Install new APAPI (Abbreviated Precision Approach Path Indicators/2 light box PAPI) on approach 17T. Connect power supply to APAPI

3.8.2 Connect power supply to new lighted windsock (windsock installation by others).

3.8.3 Install new aerodrome beacon. Connect power supply to beacon.

3.8.4 Install and connect power genset/power supply for new and existing aerodrome lighting systems. Commission power supply and aerodrome electrical systems.

3.8.5 Aim and commission APAPI.

3.8.6 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-1000-70-041-9126 Aerodrome Lighting Standard Drawing- Voltage Fed Illuminated Windcone
- H349000-1000-70-041-9128 Aerodrome Lighting Standard Drawing – Voltage Fed APAPI Unit
- H349000-1000-70-041-9129 Aerodrome Lighting Standard Drawing – Voltage Fed APAPI Power Supply

3.9 Mine Site Field Electrical Centre

- Field Electrical Centre: Facility 4435.0

3.9.1 Install electrical grounding system (excavation and backfill by others).

3.9.2 Install Field Electrical Center vendor equipment removed for shipping.

3.9.3 Terminate airfield lighting circuits onto Field Electrical Center constant current regulators.

3.9.4 Install communications cable and conduit between FEC and Aerodrome Office (building 4431-BLD-001).

3.9.5 Install Airfield Lighting Control and Monitoring (ALCMS) in Aerodrome Office (building 4431-BLD-001).

3.9.6 Decommissioning existing wooden shed FEC. Remove, clean and store components as spares.

3.9.7 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-4750-70-082-0006 Mine Site Power Distribution Aerodrome Area Type III Unit Substation SLD
- E349000-PE004-70-103-0001 Pre-Engineered Airfield Lighting Field Electrical Centre

3.10 Mine Site Airfield Lighting and Visual Aids

- Mine Site Airfield Lighting and Visual Aids: Facility 4436.0

3.10.1 Install new Precision Approach Path Indicators (PAPIs), four (4) unit assembly for each runway approach, bolted to base plates installed by others.

3.10.2 Connect power, aim and commission PAPIs.

3.10.3 Connect power to and commission two new wind socks (installed by others).

3.10.4 Connect power to and commission four (4) new Runway End Identification lights for Runway 30 (north) approach.

3.10.5 Install runway edge, end and threshold lights. Excavation and backfill by others.

3.10.6 Install taxiway and apron edge lights. Excavation and backfill by others

3.10.7 Install series circuit airfield lighting cable, counterpoise, transformers and primary connector kits. Underground duct bank installation by others.

3.10.8 Megger test airfield lighting cable.

3.10.9 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-4435-70-095-0001 Mine Site Aerodrome Lighting Electrical Plan
- H349000-1000-70-041-9103 Aerodrome Lighting Standard Drawing – Direct Buried Cables
- H349000-1000-70-041-9110 Aerodrome Lighting Standard Drawing – Current FED PAPI Unit
- H349000-1000-70-041-9113 Aerodrome Lighting Standard Drawing – Ground Mounted Runway ODALS
- H349000-1000-70-041-9114 Aerodrome Lighting Standard Drawing – Tower Mounted Runway ODALS
- H349000-1000-70-041-9117 Aerodrome Lighting Standard Drawing – Elevated Runway/Taxiway Edge Light
- H349000-1000-70-041-9118 Aerodrome Lighting Standard Drawing – Current Fed Illuminated Wind Cone

- H349000-1000-70-041-9127 Aerodrome Lighting Standard Drawing – Runway End Identification Light (REIL)

3.11 Mine Site Crushing and Screening

Scope deleted. 1

3.12 Mine Site Truck Weigh System

- Truck Weigh System: Facility 4382.2

3.12.1 Install truck weigh scale load cells, instruments, control systems and associated interconnections.

3.12.2 Calibrate weigh scale using Company supplied test weights.

3.12.3 Install traffic light wiring and cabling, sensor proximity switches, local control panel to activate the rubber rolled up doors to open/close from PLC.

3.12.4 Install RFID station, weigh display to drivers.

3.13 Mine Site Truck Wash

- Truck Wash Facility: Facility 4523.2

3.13.1 Install electrical power interconnections.

3.13.2 Install instruments, control systems and associated interconnections.

3.14 Communication and IT Infrastructure

- Milne Port Communications Facilities: Facility 2110.4
- Tote Road Communications Facilities: Facility 3110.0
- Mine Site Communications Facilities: Facility 4110.4

3.14.1 Install grounding system at thirteen (13) communications tower locations comprising one (1) at Milne Port, ten (10) along the Tote Road and two (2) at the Mine Site, install electrical grounding system.

3.14.2 Primary scope reference documents (refer to Section 01 10 00 Technical Specification Index and Section 00 01 15 Drawing and Document Index for a list of all applicable engineering documents):

- H349000-1000-70-041-1230 Building Grounding Communication Tower Bldg. Grounding

3.15 Contractor Supply

3.15.1 Supply all field fabricated labels and name plates.

3.15.2 Supply all required equipment, tools, consumables, test equipment and minor construction materials unless specified otherwise in Section 3 Work Excluded.

4. Work Included – Structural

4.1 Module Installation

4.1.1 Transport and install modules listed in Table 4-1, including:

a) Receive module at local laydown yard, either Milne Port or Mine Site.

b) Load module onto transport truck.

c) Transport module to final installation location.

d) Offload module.

e) Install module on gravel pad in specified location and orientation.

4.1.2 Install vendor supplied access stairs and awnings - bolted assemblies only.

4.1.3 Supply all required labour and tools excluding crane operators.

Table 4-1: Modules for Installation by Contractor

Facility	Building Number	Name/Description
Milne Port Power Generation 2013		
2530.1	2530-BLD-003	Power Generation Module #3
	2530-BLD-004	Power Generation Module #4
	2530-BLD-005	Power Generation Module #5
	2530-BLD-006	Power Generation Module #6
	2530-BLD-009	Power Generation E-House #1
	2530-BLD-010	Power Generation E-House #2
Mine Site Power Generation 2013		
4530.1	4530-BLD-001	Power Generation Module #1
	4530-BLD-002	Power Generation Module #2
	4530-BLD-003	Power Generation Module #3
	4530-BLD-004	Power Generation Module #4
	4530-BLD-005	Power Generation Module #5
	4530-BLD-007	Power Generation E-House #1
	4530-BLD-008	Power Generation E-House #2
Milne Port Power Generation 2014		
2530.2	2530-BLD-001	Power Generation Module #1
	2530-BLD-002	Power Generation Module #2
	2530-BLD-007	Power Generation Module #7

Facility	Building Number	Name/Description
Mine Site Power Generation 2014		
4530.2	4530-BLD-006	Power Generation Module #6
Milne Port Power Distribution System		
2750.0	2750-BLD-001	Accommodation Area E-House #1
	2750-BLD-002	Accommodation Area E-House #2
	2750-BLD-003	Services Area E-House #1
	2750-BLD-004	Services Area E-House #2
	2750-BLD-005	Fuel Tank Farm E-House
Mine Site Power Distribution System		
4750.0	4750-BLD-001	Accommodation Area E-House #1
	4750-BLD-002	Accommodation Area E-House #2
	4750-BLD-003	Services Area E-House #1
	4750-BLD-004	Services Area E-House #2
	4750-BLD-005	Fuel Tank Farm E-House
	4750-BLD-006	Aerodrome Area E-House
	4750-BLD-007	Raw Water Supply E-House
	4750-BLD-008	Mineral Processing E-House
Mine Site Raw Water Pumphouse		
4712.1	4710-BLD-001	Raw Water Pumphouse building
Field Electrical Centre		
4435.0	4435-BLD-001	Field Electrical Center building
Milne Port Communications Facilities		
2110.4	2110-BLD-001	Communication Shed Milne Port
Tote Road Communications Facilities		
3110.0	3111-BLD-001	Communication Shed No. 01
	3111-BLD-002	Communication Shed No. 02
	3111-BLD-003	Communication Shed No. 03
	3112-BLD-001	Communication Shed No. 04
	3112-BLD-002	Communication Shed No. 05
	3112-BLD-003	Communication Shed No. 06
	3112-BLD-004	Communication Shed No. 07
	3113-BLD-001	Communication Shed No. 08
	3113-BLD-002	Communication Shed No. 09
	3113-BLD-003	Communication Shed No. 10
Mine Site Communications Facilities		
4110.4	4110-BLD-001	Communication Shed Mine Site No 1
	4110-BLD-002	Communication Shed Mine Site No 2

Facility	Building Number	Name/Description
Tote Road Emergency Shelters		
3160.0	3160-BLD-001	Emergency Shelter No. 1
	3160-BLD-002	Emergency Shelter No. 2
	3160-BLD-003	Emergency Shelter No. 3
	3160-BLD-004	Emergency Shelter No. 4

4.2 Airfield Lighting Installation

4.2.1 Install Milne Port Airfield Lighting and Visual Aids (Facility 2436.0), including:

a) Lighted windsock.

b) Two-light APAPI unit for Runway 17 approach.

c) Ceilometer.

4.2.2 Install Mine Site Airfield Lighting and Visual Aids (Facility 4436.0), including:

a) Two (2) new four-light PAPI.

b) Two (2) temporary two-light APAPI.

c) Two (2) new windsocks, one at each runway end, bolted to steel base plate

d) Two (2) new Runway End Identification Light.

e) Seven (7) Omni-Directional Approach Light towers, bolted to steel base plates.

4.2.3 Supply all required labour and tools excluding crane operators.

5. Work Excluded

5.1 Company Supplied Materials, Facilities and Equipment

5.1.1 Supply of building diesel heaters, heater frames, tanks, pumps and associated piping and fittings.

5.1.2 Supply of pre-insulated sewage and water tanks, piping and pipe insulation.

5.1.3 Supply Raw Water Pumphouse including Vertical Turbine Pumps, Hoist and Carbon steel piping.

5.1.4 Supply of bulk pre-insulated HDPE pipe and associated flanges, fittings and valves.

5.1.5 Supply of insulation kits for pipe joins, valves etc.

5.1.6 Supply of carbon steel pipe for building utility systems.

5.1.7 Supply Mine Site Truck Weigh System including all equipment and materials to complete installation.

5.1.8 Supply Mine Site Truck Wash including all equipment and materials to complete installation.

5.1.9 Supply of first fill fluids and lubricants.

5.1.10 Supply Genset modules, E-Houses, Airfield Lighting Field Electrical Centre and Airfield Lighting Equipment.

5.1.11 Bulk equipment and materials.

5.1.12 Construction of gravel pad for module installation. Verification of gravel pad suitability, including compaction and level, prior to module installation. 1

5.1.13 Construction of foundations and base plates for airfield lighting systems. 1

5.2 Company Supplied Equipment and Services

5.2.1 Vendor representation as required (at the Company's discretion) to support construction and commissioning.

5.2.2 Mobile equipment to support the Contractor's work as specified in section 01 64 05 Company Contractor Supply Table, including:

a) Pickup trucks for limited Contractor use.

b) Booms lifts, scissor lifts etc.

c) Truck transport of equipment and materials from lay down to work site.

d) Crane support (within limits specified).

e) Rigging – including slings, chokers and spreader beams 1

5.2.3 On-site accommodation, meals and transport as specified in this contract.

5.2.4 Drilling, trenching and backfilling for installation of grounding systems.

6. General Requirements

6.1 Transport

6.1.1 Deliver all facilities and equipment to the Company's consolidation hub (port location).

6.1.2 Company shall arrange shipping, loading and unloading to transport the facilities and equipment from the consolidation hub to the construction site. Delivery and handover at the construction site shall be in accordance with the included construction specification documents.

6.1.3 Company shall arrange air transport of equipment from the specified air transport location in accordance with this Contract.

6.1.4 Company shall arrange transport of personnel from the specified air transport location to the construction site and return.

6.2 General Construction

6.2.1 Provide suitably qualified personnel to complete on-site installation and commissioning for all specified facilities and equipment.

6.2.2 Train all Contractor's personnel as required by WHMIS legislation prior to arriving at site. Make available at site available a record of that training.

6.2.3 Provide a comprehensive list of WHMIS regulated products and MSDS for all products prior to mobilizing a controlled product from transport to site. Use Company provided templates.

6.2.4 Provide all required construction equipment, facilities and materials to complete the Contractors scope of work unless specified otherwise.

6.2.5 Provide all required spare parts and consumables for Contractors equipment, facilities and materials. Provide sufficient spare parts and consumables at the time of mobilizing the equipment to minimize the risk of air transport being required.

6.2.6 Install and commission Company supplied facilities and equipment in accordance with Manufacturers/Vendors drawings and documentation (as provided by Company).

6.3 Quality Control

6.3.1 Maintain a Quality System compliant with ISO 9001:2008 or equivalent. Quality system shall be suitable for the scope of services, size of the organization and commensurate with the complexity of the services and products to be provided.

6.3.2 Develop a Project specific Quality Plan which details the Quality Management processes used to assure final product quality. Plan shall include, but is not limited to, Management Responsibility, Control of Inspections and inspection/testing equipment, and management of non-conformities and corrective actions.

6.3.3 Submit information required by the Company as noted in the contract documents for review and approval prior to beginning any work. Review and approval of the Quality Plan or any submitted documents, or inspection and testing performed by the Company does not relieve the Vendor of responsibility for compliance of the finished work with the purchase order/contract documents.

6.3.4 Contractor is solely responsible for the quality of the work included in their scope, including the work of all sub-contractors/sub-vendors.

6.4 Commissioning and Acceptance Tests

6.4.1 Install first fills for all equipment including lubricants, cooling media, fuels etc.

6.4.2 Complete Stage 1 commissioning (pre-operational testing) of all facilities and equipment installed by the Contractor.

6.4.3 Provide labor and support for Company to complete commissioning and start-up (stages 2 to 4 as applicable).

6.4.4 Complete inspections, acceptance tests, punch list works and other general requirements prior to handover of facilities to the Company.

END OF SECTION

Appendix C.7:
Cable

Milne Port Power Distribution 5kV 3/C Cable Schedule (H349000-2750-70-007-0001, Rev. 0)

Milne Port Power Distribution 1kV 3/C Cable Schedule (SHT. 1 of 2) (H349000-2750-70-007-0002-001, Rev. 1)

Milne Port Power Distribution 1kV 3/C Cable Schedule (SHT. 2 of 2) (H349000-2750-70-007-0002-002, Rev. 0)

Milne Port Power Distribution 1kV 4/C Cable Schedule (H349000-2750-70-007-0003, Rev. 0)

Mine Site Power Distribution 5kV 3/C Cable Schedule (H349000-4750-70-007-0001, Rev. 0)

Mine Site Power Distribution 1kV 3/C Cable Schedule (SHT. 1 of 3) (H349000-4750-70-007-0002-001, Rev. 1)

Mine Site Power Distribution 1kV 3/C Cable Schedule (SHT. 2 of 3) (H349000-4750-70-007-0002-002, Rev. 0)

Mine Site Power Distribution 1kV 4/C Cable Schedule (H349000-4750-70-007-0003, Rev. C)