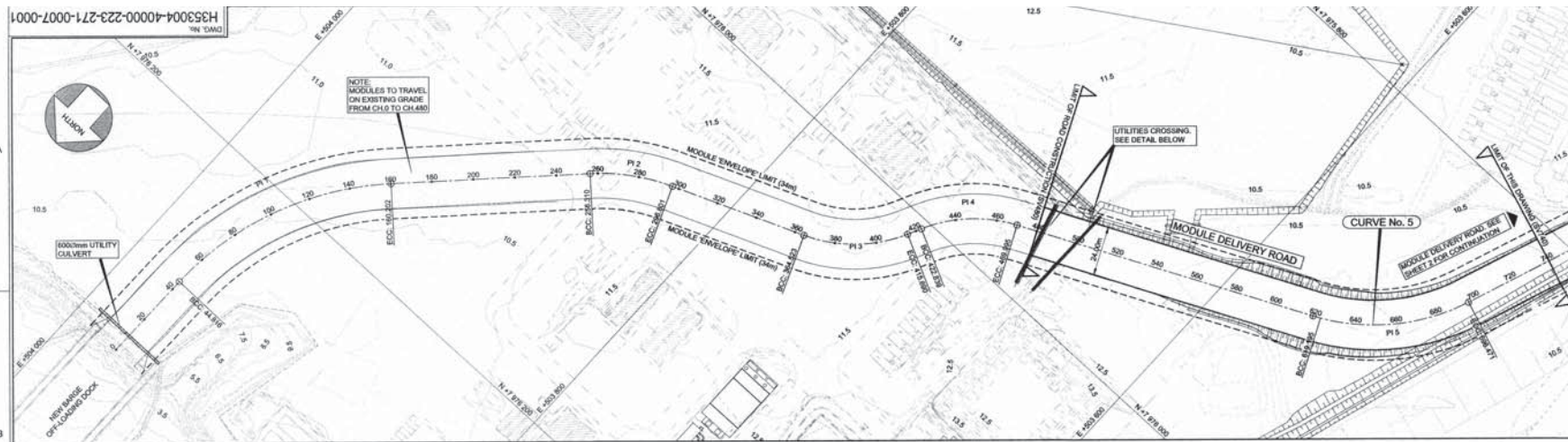
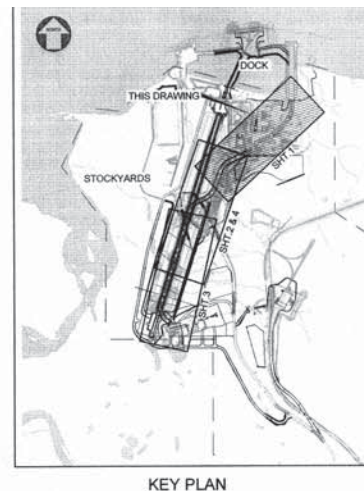




SETTING OUT DATA MODULE DELIVERY ROUTE				
NAME	CH	E	N	DETAILS
START	0.000	50972.759	7 978 310.086	L 44.816m
BCC1	44.816	50972.299	7 978 265.272	R 150.000m
P1	50972.299	50971.875	7 978 264.556	DA 44°04'30"
ECC1	160.202	50969.966	7 978 181.373	TL 60.717m
				AL 115.386m
BCC2	256.310	50961.439	7 978 093.015	R 100.000m
P2	50961.439	50947.230	7 978 078.416	DA 23°12'00"
ECC2	296.801	50927.966	7 978 070.681	TL 38.787m
				AL 46.461m
BCC3	364.523	50916.267	7 978 045.100	R 70.000m
P3	50916.267	50904.455	7 978 035.066	DA 41°52'00"
ECC3	415.690	50878.720	7 978 010.986	TL 24.513m
				AL 51.167m
BCC4	422.839	50875.588	7 978 004.559	R 70.000m
P4	50875.588	50871.850	7 978 982.525	DA 41°52'00"
ECC4	489.995	50862.712	7 978 972.003	TL 24.513m
				AL 47.155m
BCC5	519.195	50857.958	7 978 907.954	R 100.000m
P5	50857.958	50852.214	7 978 880.490	DA 44°18'30"
ECC5	606.471	50837.086	7 978 862.334	TL 40.683m
				AL 72.277m
BCC7	626.304	50841.981	7 978 730.380	R 100.000m
P7	50841.981	50844.175	7 978 680.061	DA 38°35'00"
ECC7	902.244	50812.503	7 978 675.430	TL 38.797m
				AL 75.741m
BCC8	966.729	50804.894	7 978 646.896	R 100.000m
P8	50804.894	50801.308	7 978 627.883	DA 40°21'40"
ECC8	1047.644	50783.547	7 978 587.009	TL 42.818m
				AL 80.915m
BCC9	1081.096	50781.778	7 974 982.338	R 100.000m
P9	50781.778	50769.412	7 974 905.629	DA 123°14'40"
ECC9	1886.199	50737.643	7 974 856.367	TL 185.120m
				AL 215.103m
END	1902.092	50737.643	7 974 857.362	L 5.893m



ROAD DATA LEGEND:

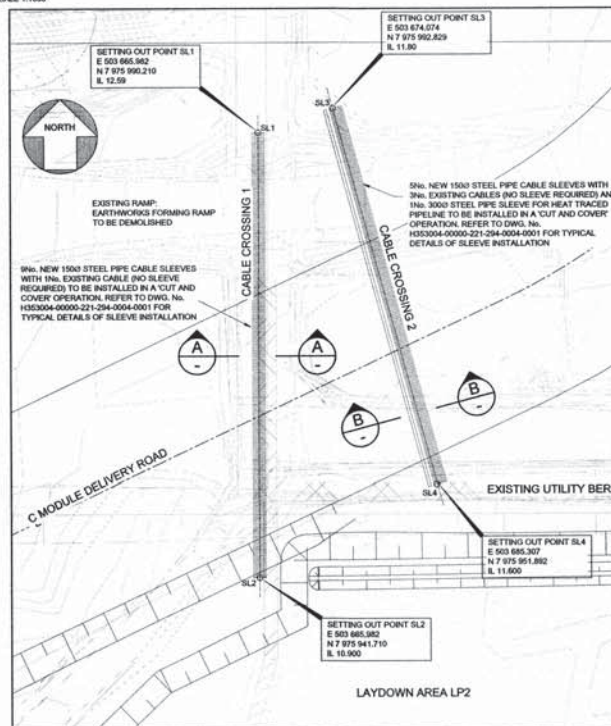
BVC BEGINNING VERTICAL CURVE
EVC END VERTICAL CURVE
BCC BEGINNING CIRCULAR CURVE
ECC END CIRCULAR CURVE
R RADIUS (CURVE)
DA DEFLECTION ANGLE (CURVE)
TL TANGENT LENGTH (CURVE)
AL ARC LENGTH (CURVE)

SCALES:
Horizontal 1:1000
Vertical 1:200
DATUM 0.000

CHAINAGE (CH)		480.000	500.000	520.000	540.000	560.000	580.000	600.000	620.000	640.000	660.000	680.000	700.000	720.000	740.000
GROUND LEVELS ON CL		11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680
	CENTRE LINE (CL)	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680
	RIGHT EDGE (HR)	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680	11.680
VERTICAL PROFILE GRADES		0.00% 1.33% 0.00% 1.33% 0.00% 1.33% 0.00% 1.33% 0.00% 1.33% 0.00% 1.33% 0.00% 1.33% 0.00% 1.33%													
HORIZONTAL ALIGNMENT		DIRECT 14° 34' 47" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20" 142° 28' 20"													

MODULE DELIVERY ROUTE
FROM CH.480.000 TO CH.740.000

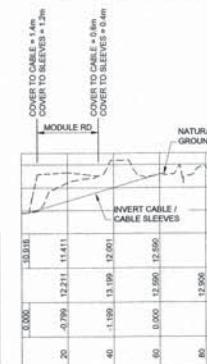
PLAN
SCALE 1:1000



DETAIL - UTILITY SLEEVE CROSSING
SCALE 1:250

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:100
DATUM 10.000

CENTRE LINE (CL)
GROUND LEVELS ON CL
CUT / FILL
DISTANCE (m)



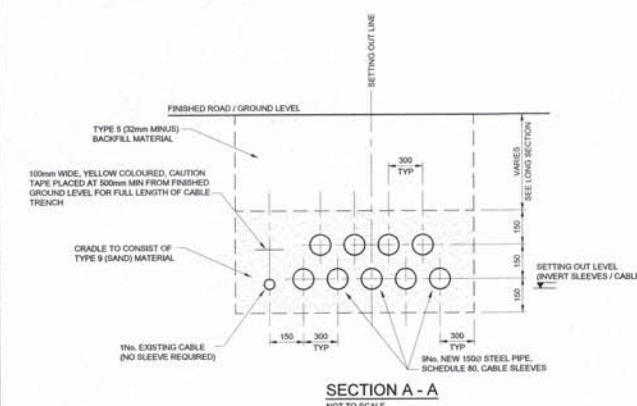
CABLE CROSSING 1 - LONGITUDINAL SECTION

SCALES:
HORIZONTAL 1:1000
VERTICAL 1:100
DATUM 10.000

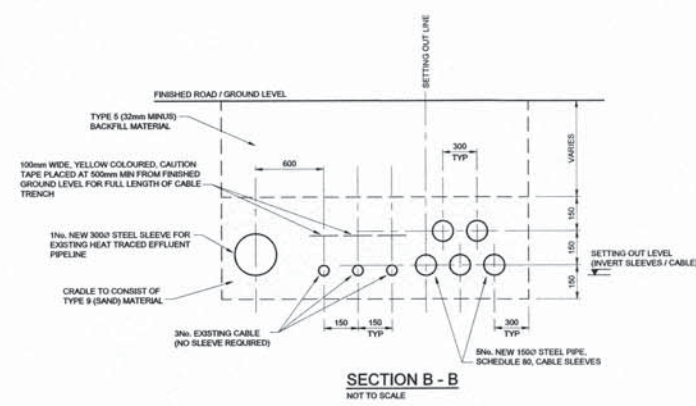
CENTRE LINE (CL)
GROUND LEVELS ON CL
CUT / FILL
DISTANCE (m)



CABLE CROSSING 2 - LONGITUDINAL SECTION

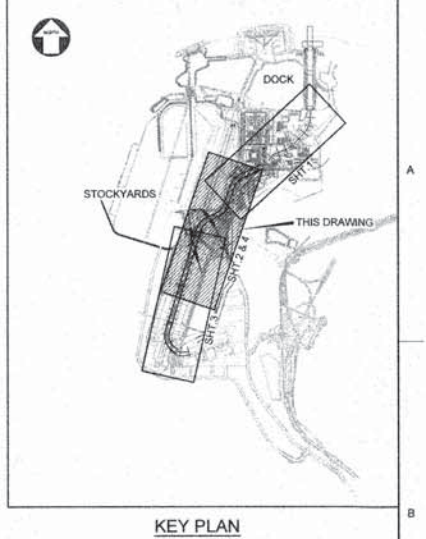


SECTION A - A
NOT TO SCALE



SECTION B - B
NOT TO SCALE

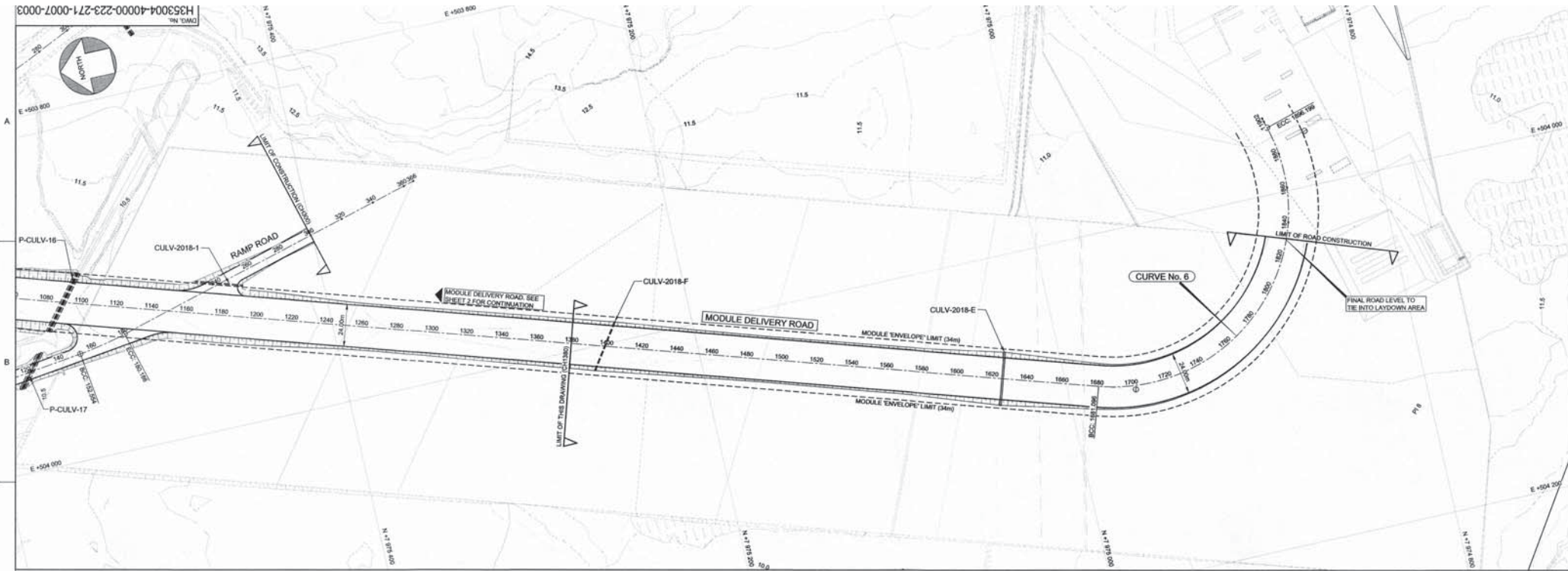
REF ID: A66666	
DRAWING No.	DRAWING TITLE
H353004-40000-223-271-0007-0004	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 4 OF 4
H353004-40000-223-271-0007-0005	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 5 OF 4
H353004-40000-223-271-0007-0005	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 2 OF 4
H353004-40000-223-271-0007-0005	MODULE, PRIMARY, SECONDARY ROAD, TRAFFIC CROSS SECTIONS
DRAWING No.	DRAWING TITLE
REFERENCE DRAWINGS	



1. LIDAR SURVEY PROVIDED BY PHOTOSAT (2016)
2. CO-ORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS NOTED OTHERWISE.
5. FOR TYPICAL CROSS SECTION OF MODULE ROAD REFER TO DRAWING No H333004-40500-323-273-0001-0001
6. FOR TYPICAL CROSS SECTION FROM CH W80 REFER TO DRAWING No H333004-40500-221-272-0004-0001

D	CULVERT DIAMETER
E	EMBEDMENT DEPTH
C	CULVERT SPACING AND BEDDING CLEARANCE
	C = 500 WHILE D = 900mm
	C = 300 WHILE D = 300mm
W	CULVERT BACKFILL TOP WIDTH
	W = (n'D) + (n-1)'C
	n = No. OF PIPE/CULVERT
TYPE	CULVERT MATERIAL
DIS INV.	CULVERT UPSTREAM INVERT ELEVATION
DIS INV.	CULVERT DOWNSTREAM INVERT ELEVATION
L	RIPRAP APPROX LENGTH
	L = 4xD (APPROX)
S	CULVERT SLOPE
LENGTH	CULVERT LENGTH
CSP	CORRUGATED STEEL PIPE

PORTER FILES



PLAN
SCALE 1:1000

CULVERT SCHEDULE																			
(THIS SCHEDULE TO BE READ IN CONJUNCTION WITH DRG. No. H353004-0000-221-294-0001-TYPICAL CULVERT DETAILS)																			
							CULVERT AT UPSTREAM				CULVERT AT DOWNSTREAM		NOTE: FINAL US INVERT AND DS INVERT LEVELS ARE TO BE CONFIRMED ON SITE						
CULVERT ID	FISH BEARING	NUMBER OF PIPES	D (mm)	LENGTH (m)	E (mm)	W (mm)	TYPE	NORTHING	EASTING	US INV. ELEV (m)	RIP RAP REQ	NORTHING	EASTING	DS INV. ELEV (m)	RIP RAP REQ	C (mm)	L (m)	S (%)	SKEW (DEGREE)
CULV-2018-F	N	1	600	29.980	0	600	CSP	7975243.040	503211.000	10.852	N	7975260.091	503186.431	10.790	N	300	2.4	0.2	17
CULV-2018-E	N	1	600	30.685	0	600	CSP	7975030.090	503145.690	10.121	Y	7975039.236	503116.401	10.059	Y	300	2.4	0.2	90

ROAD DATA LEGEND:

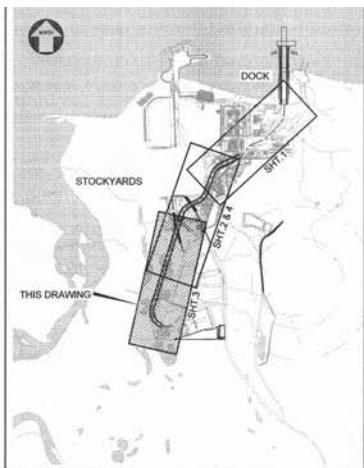
BVC BEGINNING VERTICAL CURVE
EVC END VERTICAL CURVE
BOC BEGINNING CIRCULAR CURVE
EOC END CIRCULAR CURVE
R RADIUS (CURVE)
DA DEFLECTION ANGLE (CURVE)
TL TANGENT LENGTH (CURVE)
AL ARC LENGTH (CURVE)

SCALES:
Horizontal 1:1000
Vertical 1:200

DATUM 0.000

CHAINAGE (CH)			
GROUND LEVELS ON CL			
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	11.673	11.673
	CENTRE LINE (CL)	11.670	11.670
	RIGHT EDGE (HR)	11.667	11.667
VERTICAL PROFILE GRADES		0.00%	
HORIZONTAL ALIGNMENT		DIRECT 17° 20' 20"	

MODULE DELIVERY ROUTE
FROM CH.1380.000 TO CH.1860.000



KEY PLAN

NOTES:

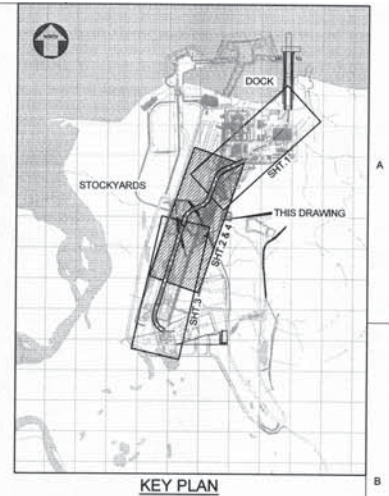
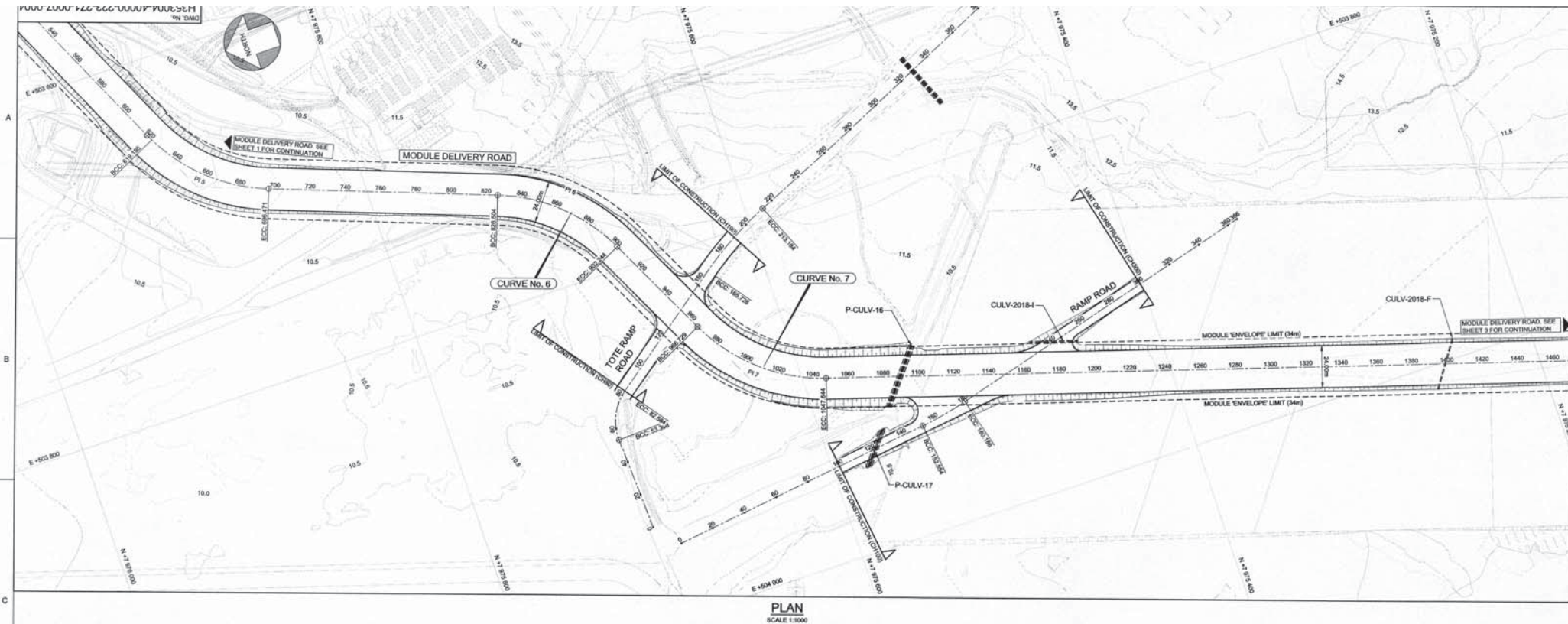
1. LIDAR SURVEY PROVIDED BY PHOTOSAT (2016)
2. CO-ORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS NOTED OTHERWISE.
5. FOR TYPICAL CROSS SECTION OF MODULE ROAD REFER TO DRAWING No.H353004-40000-221-273-0001-0001

CULVERT SCHEDULE LEGEND:

D CULVERT DIAMETER
E EMBEDMENT DEPTH
C CULVERT SPACING AND BEDDING CLEARANCE
C = 500 WHILE D > 800mm
C = 300 WHILE D < 800mm
W CULVERT BACKFILL TOP WIDTH
W = (W1) + (W2) * S
a = No. OF PIPES/CULVERT
TYPE CULVERT MATERIAL
US INV. CULVERT UPSTREAM INVERT ELEVATION
DS INV. CULVERT DOWNSTREAM INVERT ELEVATION
L REPAIR APICAL LENGTH
S CULVERT SLOPE
L CULVERT LENGTH
CSP CORRUGATED STEEL PIPE

SETTING OUT DATA
MODULE DELIVERY ROUTE

NAME	CH	E	N	DETAILS
START	0.000	503672.758	7 976 310.096	L 44.816m
BCC1	44.816	503672.299	7 976 285.272	R 150.000m
PH1	503671.875	7 976 284.558	TL 60.717m	AL 115.366m
ECC1	160.202	503628.998	7 976 181.373	R 100.000m
BCC2	256.310	503681.439	7 976 093.015	R 100.000m
PH2	503680.010	7 976 078.418	TL 20.527m	AL 45.851m
ECC2	296.801	503627.998	7 976 070.881	R 100.000m
BCC3	364.023	503765.287	7 976 045.180	R 70.000m
PH3	503740.458	7 976 035.086	TL 28.787m	AL 51.167m
ECC3	415.890	503728.720	7 976 038.068	R 100.000m
BCC4	422.839	503725.588	7 976 044.558	R 70.000m
PH4	503714.860	7 976 029.528	TL 25.615m	AL 46.723m
ECC4	469.995	503662.712	7 975 927.003	R 100.000m
BCC5	518.195	503587.965	7 975 907.564	R 100.000m
PH5	503586.975	7 975 896.603	TL 20.527m	AL 44°18'30"
ECC5	696.471	503527.998	7 975 824.334	R 100.000m
BCC6	728.504	503481.981	7 975 730.308	R 100.000m
PH6	503480.175	7 975 693.051	TL 24.773m	AL 44°23'50"
ECC6	902.244	503424.150	7 975 680.491	R 100.000m
BCC7	968.728	503384.654	7 975 546.468	R 100.000m
PH7	503382.848	7 975 516.468	TL 24.773m	AL 44°21'10"
ECC7	1047.844	503344.544	7 975 507.089	R 100.000m
BCC8	1088.196	503314.778	7 975 462.628	R 100.000m
PH8	503309.812	7 975 430.628	TL 20.527m	AL 42°17'40"
ECC8	1896.199	503267.563	7 974 856.367	AL 2°15.102m
END	1902.092	503227.643	7 974 857.362	L 5.830m



NOTES:

1. LIDAR SURVEY PROVIDED BY PHOTOSAT (2016)
2. CO-ORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METERS.
3. CONTOURS ARE IN METERS. CONTOUR INTERVAL IS 0.5m.
4. ALL DIMENSIONS SHOWN ARE IN METERS, UNLESS NOTED OTHERWISE.
5. FOR TYPICAL CROSS SECTION OF MODULE ROAD REFER TO DRAWING No.H353004-40000-221-275-0001-0001

CULVERT SCHEDULE LEGEND:

D CULVERT DIAMETER
E EMBEDEDMENT DEPTH
C CULVERT SPACING AND BEDDING CLEARANCE
C = 500 WHILE D > 900mm
C = 300 WHILE D < 900mm
W CULVERT BACKFILL TOP WIDTH
W = 600 (in 1:1)
A = NO. OF PIPES/CULVERT
TYPE CULVERT MATERIAL
US INV. CULVERT UPSTREAM INVERT ELEVATION
DIS INV. CULVERT DOWNSTREAM INVERT ELEVATION
L RIPRAP APRON LENGTH
L = 40 (APPROX)
S CULVERT SLOPE
LENGTH CULVERT LENGTH
CSP CORRUGATED STEEL PIPE

CULVERT SCHEDULE (THIS SCHEDULE TO BE READ IN CONJUNCTION WITH DRG. No. H353004-00000-221-294-0001-0001-TYPICAL CULVERT DETAILS)															
CULVERT ID	FISH BEARING	NUMBER OF PIPES	D (mm)	LENGTH (m)	E (mm)	W (mm)	TYPE	CULVERT AT UPSTREAM		CULVERT AT DOWNSTREAM		NOTE: FINAL US INVERT AND DS INVERT LEVELS ARE TO BE CONFIRMED ON SITE			
								NORTHING	EASTING	US INV. ELEV (m)	RIP RAP REQ'D	NORTHING	EASTING	DS INV. ELEV (m)	RIP RAP REQ'D
P-CULV-16	N	1	1200	38.900	0	1200	CSP	7975535.240	503305.45	9.754	Y	7975558.404	503276.731	9.616	Y
P-CULV-17	N	1	1200	22.245	0	1200	CSP	7975566.310	503265.48	9.564	Y	7975580.078	503248.004	9.481	Y
CULV-2018-I	N	1	600	27.300	0	600	CSP	7975444.929	503278.010	11.178	N	7975470.989	503296.143	11.120	N

ROAD DATA LEGEND:

BVC BEGINNING VERTICAL CURVE
EVC END VERTICAL CURVE
BCC BEGINNING CIRCULAR CURVE
ECC END CIRCULAR CURVE
R RADIUS (CURVE)
DA DEFLECTION ANGLE (CURVE)
TL TANGENT LENGTH (CURVE)
AL ARC LENGTH (CURVE)

SCALES:
Horizontal 1:1000
Vertical 1:200

DATUM 0.000

CHAINAGE (CH)		86.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034	11.044
	CENTRE LINE (CL)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034	11.044
	RIGHT EDGE (HR)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034	11.044
	VERTICAL PROFILE GRADES	0.04%	4.00%	0.00%	1.04%	4.00%	0.77%					
HORIZONTAL ALIGNMENT		DIRECT 302° 30' 40"										

TOTE ROAD RAMP
FROM 86.000 TO 190.000

SCALES:
Horizontal 1:1000
Vertical 1:200

DATUM 0.000

CHAINAGE (CH)		100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034
	CENTRE LINE (CL)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034
	RIGHT EDGE (HR)	10.947	10.954	10.964	10.974	10.984	10.994	11.004	11.014	11.024	11.034
	VERTICAL PROFILE GRADES	2.94%	2.08%	0.87%	-0.13%	-0.04%	-1.82%	7.71%			
HORIZONTAL ALIGNMENT		DIRECT 344° 47' 40"									

ROAD RAMP
FROM CH.100.000 TO CH.300.000

SETTING OUT DATA MODULE DELIVERY ROUTE

NAME	CH	E	N	DETAILS
START	0.000	503972.759	7 976 310.086	L 44.818m
BCC1	44.816	503972.299	7 976 265.272	R 150.000m
P1	50.000	503971.475	7 976 254.658	DA 44°54'30"
ECC1	100.202	503928.996	7 976 161.373	TL 60.717m AL 115.386m
BCC2	256.310	503861.439	7 976 083.015	R 100.000m
P2	300.000	503847.010	7 976 078.416	DA 23°12'00"
ECC2	346.801	503827.996	7 976 070.881	TL 20.527m AL 40.491m
BCC3	344.523	503765.267	7 976 045.180	R 70.000m
P3	415.600	503740.455	7 976 035.066	DA 41°52'30"
ECC3	415.600	503726.720	7 976 010.386	TL 26.787m AL 51.167m
BCC4	422.839	503725.568	7 976 004.509	R 70.000m
P4	469.995	503714.880	7 975 982.525	DA 38°30'00"
ECC4	469.995	503692.712	7 975 972.003	TL 24.512m AL 47.155m
BCC5	619.195	503657.958	7 975 907.864	R 100.000m
P5	696.471	503621.214	7 975 890.490	DA 44°16'30"
ECC5	696.471	503607.268	7 975 882.334	TL 40.883m AL 77.277m
BCC7	826.504	503481.381	7 975 730.380	R 100.000m
P7	902.244	503412.903	7 975 683.061	DA 43°23'30"
ECC7	902.244	503412.903	7 975 675.430	TL 38.719m AL 75.741m
BCC8	966.729	503354.684	7 975 646.856	R 100.000m
P8	1047.644	503316.308	7 975 627.883	DA 40°21'40"
ECC8	1047.644	503303.347	7 975 606.367	TL 42.819m AL 80.915m
BCC9	1681.096	503114.778	7 974 862.338	R 100.000m
P9	1896.199	503099.812	7 974 850.829	DA 127°14'40"
ECC9	1896.199	503087.843	7 974 838.307	TL 185.120m AL 215.103m
END	1902.062	503237.843	7 974 857.962	L 5.893m

PERMIT TO PRACTICE
NOTARY LTD.
Signature: [Signature]
Date: 2016-04-28
PERMIT NUMBER P-012
The Association of Professional Engineers,
Geologists and Geographers of Namibia (APEGG)

DRAWING No.	REFERENCE DRAWINGS
H353004-40000-221-271-0007-0003	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 3 OF 4
H353004-40000-221-271-0007-0002	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 2 OF 4
H353004-40000-221-271-0007-0001	MODULE DELIVERY ROAD PLAN & PROFILE SHEET 1 OF 4
H353004-40000-221-271-0001-0001	MODULE PRIMARY, SECONDARY ROADS TYPICAL CROSS SECTIONS
H353004-40000-221-294-0001-0001	TYPICAL CULVERT DETAILS

DRAWING TITLE	REVISIONS
FOR CONSTRUCTION	
0 FOR CONSTRUCTION	
1	
2	
3	
4	
5	
6	
7	
8	
9	

REG. PROFESSIONAL
[Signature]
[Stamp]

FOR CONSTRUCTION
[Signature]
[Stamp]

HATCH
DRAFTSPERSON: K VAN DER MERWE
DESIGNER: E BALGAMBE
CHECKER: F HADJO
DESIGN COORD.: R GOODEN
RESP. ENG.: R HALL
LEAD ENG.: A GROENELAND
AREA LEAD: V LAMIC
ENG. MANAGER: D STANGER
[Signature]
[Stamp]

Baffinland
BAFFINLAND IRON MINES LP
MARY RIVER EXPANSION PROJECT
PORT SITE
MODULE DELIVERY ROAD
PLAN & PROFILE SHEET 4 OF 4
DWG. No. H353004-40000-221-271-0007-0004
REV 0
SHEET SIZE: E