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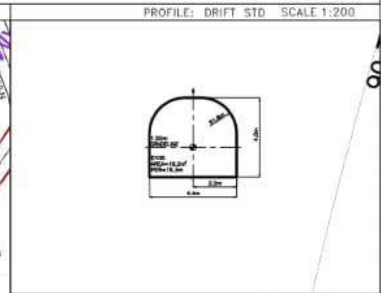
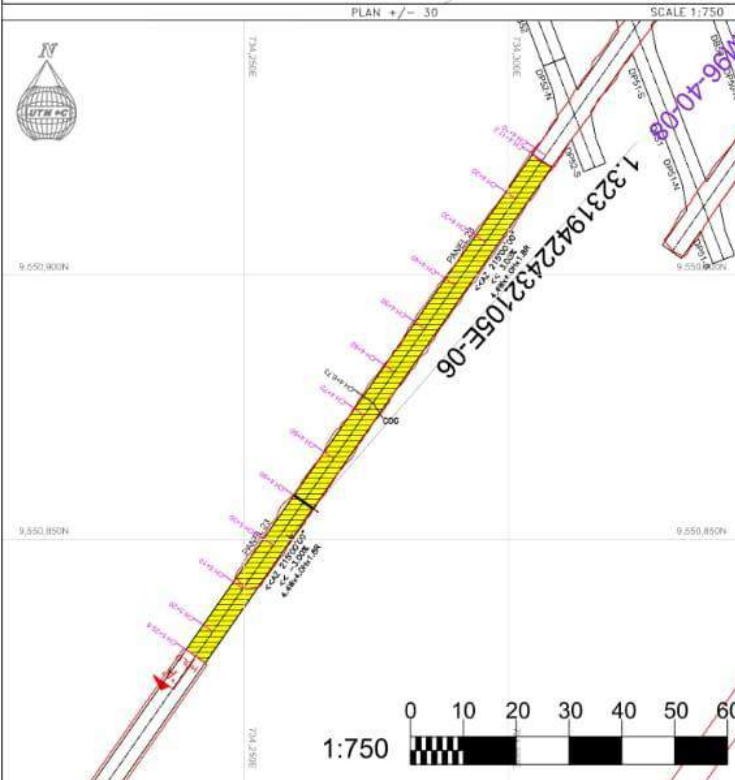
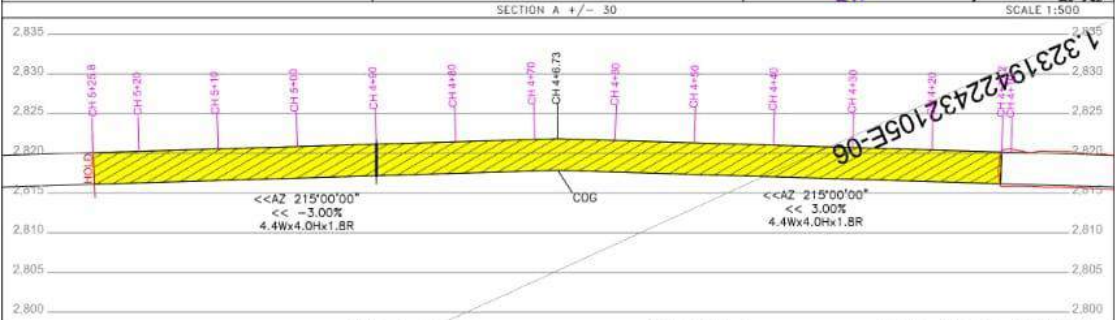
ISSUED

GC-2830-11467D6-A APPROVAL TO EXCAVATE (ATE)

Panel 23 from EXTN Middle Acc. to West

GEOLOGY psialah1 : 01-Aug-19 1. 1 DDH 2. Rock is Tgdd 3. Local faults, NS38, NE29 & NE87 faults 4. Failure potential from faults, joints, alteration contact, GTS-MDV & HDV, degradation & swelling clay 5. ARD 6. Ore 7. Wet Please see attached file.	GEOTECH rinting : 19-Dec-19 1. Fair (Act) 2. 75mmFRS 3. 8mmWM, 2.25m Resin bar@1.2x1.2m back to 0.3m from fir. 4. 6mCB@1mx1m back prior to open turnout 6. Probe hole required 9. PDT of resin bar	VENTILATION isefiawa2 : 02-Aug-19 1. No gas issue from Geology 2. Use 100hp fan at P23/24 DB49 and join with 36 twin duct until 30m from face 3. Escape way to Amole 4. Use 500person Refuge Chamber for this area
---	--	--

ENGINEERING dsiallag1 : 06-Aug-19 1. No control blasting 2. No blast monitor 3. 4.4Wx4.0H 4. No middling pillar 5. Azimuth 215.00.00 6. Gradient +3% and -3% 7. No BIT warning 8. 1 DDH closed 9. Standard panel blasting pattern	DEV. OPERATION awabes : 11-Aug-19 1. Please follow worksheet and all recommendation is completed. 2. follow survey marking point 3. Follow SOP drill and Blast	KEY PLAN SCALE 1:15000 WORK AREA
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$\frac{4.4}{W} \times \frac{4.0}{H}$ m MAX. DEV. From CH 4+10 To CH 5+25.6m	SURVEY CONTROL GRADIENT +3.00% GRADIENT -3.00%
REFERENCES POI: GC-2830-P23W-PPD-700 FILENAME: GC2830_11467D6-A.vdel ID CALC./NON-CALC.: - DRAWN BY: zsulisty	
LEGEND SURVEY-LEVEL ABOVE SURVEY-HORIZONTAL SURVEY-LEVEL BELOW POI LEVEL OF ATE SURVEY MARKUP LASER LINE ATE FOR APPROVAL DDH (BHID/DEPTH)	
PT FREEPORT INDONESIA Affiliate of Freeport-McMoRan GBC LEVEL 2830 05 Dec 2019	
REV. 01	

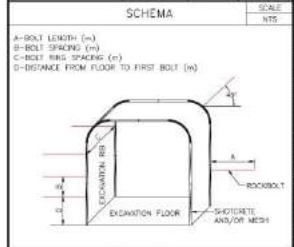
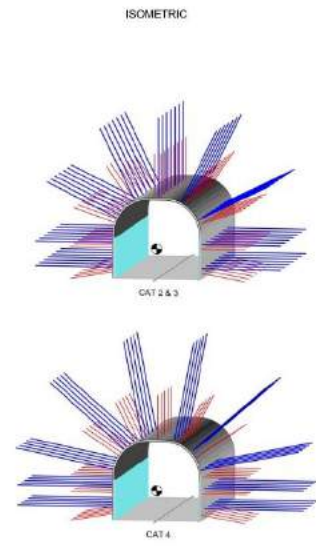
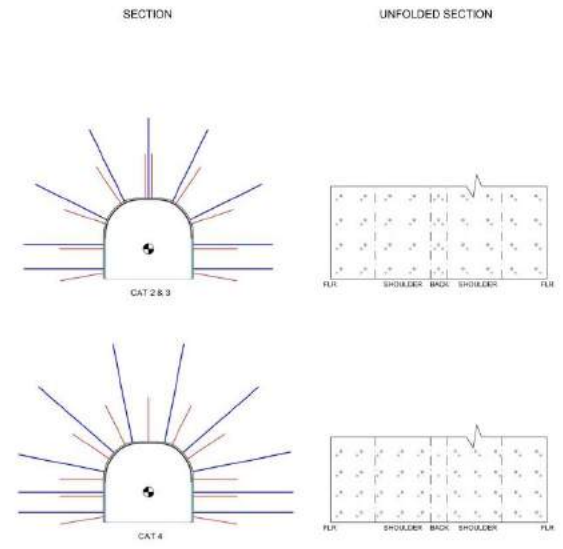
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STANDARDS

SCALE
1:100

APPROVED — AUTHORIZED PERSONS			
DEPARTMENT	SIGNATURE	DATE	EMPLOYEE ID
DRAFTSPERSON		02/08/2018	
ENG. GRP. PLANNING — PRK		02/08/2018	
CHIEF GEOTECH — PRK		02/08/2018	
VP PLANNING — PRK		02/08/2018	
MANAGER GEOTECH — PPF		02/08/2018	
GEN SUPT OPS — GBC		02/08/2018	
MANAGER ENG — GBC		02/08/2018	
MANAGER MHE — GBC		02/08/2018	
GEN SUPT GEOTECH — GBC		02/08/2018	
VP ENG		02/08/2018	
EMP. LE		02/08/2018	



REFERENCES		
No.	DESCRIPTION	VERSION
1	US-2000-PROF-DEV-GAD	1E 2018/01/09

REVISIONS			
No.	DATE	BY	DESCRIPTION
B	14/02/16	ET	REVISED GROUND SUPPORT
C	03/04/18	ET	UPDATED NOTES AND BOLT ARRAY

GT-2000-GRS-D100			
GROUND SUPPORT			
BAND, DETAIL			
GROUND CATEGORY	CAT 2 OR 3	CAT 4	
SPRT	#/IN (")	4.4	
EMBEDDING	IN/FT (m)	4.0	
SPRT NET	A		
	B		
	C		
	D		
NET W/ BAR	A	3.25	3.25
	B	1.2	1.0
	C	1.2	1.0
	D	0.5	0.5(0)
CABLE BOLT	A	4.0	3.0
	B	1.2	1.0
	C	1.2	1.0
	D	0.5	0.5
MESH	1 (mm)	0.9	0.9
MESH	2 (mm)		
SHOTCRETE	1 (mm)	75 (kg)	75.0 (kg)
SHOTCRETE	2 (mm)	60 (kg)	60.0 (kg)
* GROUND CATEGORY = TYPES 2, 3, 4			

NOTES:
 (1) IN GOOD OR VERY POOR ENGINE CONDITIONS, IT IS ADVISABLE TO USE ONE OF THE FOLLOWING:
 1) HIGH STRENGTH WITH TENSILE CAPACITY FROM PULL OUT TESTING 2) BOLTS WITH EQUIVALENT CAPACITY (E.G. SELF-DRILLING RESIN BOLTS OR 3) MULTIPLE CABLE BOLTS.
 (2) IN-PLACE TESTS RECOMMENDED.
 (3) AN ADDITIONAL 30 mm OF SHOTCRETE SHOULD BE APPLIED TO THE WALL UP TO A HEIGHT OF 2 m TO PROTECT THE GROUND SUPPORT SYSTEM FROM DOWNHILL DAMAGE.

SPECIFICATIONS — GROUND SUPPORT ELEMENTS	
<p>BOLTS — STANDARD</p> <p>PS-47 GALVANIZED SPURT SET — LENGTHS AVAILABLE (2.1m, 2.4m, AND 3.0m)</p> <p>PS-39 GALVANIZED SPURT SET — LENGTHS AVAILABLE (3.0m)</p> <p>RESIN BAR / FIBER BAR (24mm) (RESIN ENCAPSULATED) — LENGTHS AVAILABLE (2.25m, 3.0m, AND 4.0m)</p> <p>THREADED BAR (26mm) (CEMENT GROUTED) — LENGTHS AVAILABLE (3.0m AND 4.0m)</p> <p>CABLE BOLT (19.0mm) (CEMENT GROUTED) — LENGTHS AVAILABLE (3.0m)</p> <p>CABLE WRAP WITH DGS BOND</p> <p>D-BOLT (20mm) — RESIN ENCAPSULATED — LENGTHS AVAILABLE (2.25m)</p>	<p>SURFACE SUPPORT: MESH / STRAP</p> <p>3.0mm WELD WIRE MESH — GALVANIZED, APERTURE 100mm X 100mm</p> <p>3.0mm WELD WIRE MESH — GALVANIZED, APERTURE 150mm X 100mm</p> <p>SHOTCRETE-ARCH REINFORCING MATS, MADE FROM GALVANIZED 10mm WELD MESH, CUSTOM UNITS</p>
<p>BOLTS — CORROSION RESISTANT</p> <p>SUBURA COATED (24mm) (RESIN ENCAPSULATED) — LENGTHS AVAILABLE (3.0m)</p> <p>BOLTS — SPECIAL</p> <p>SS-190 (32mm) (CEMENT GROUTED) — LENGTHS AVAILABLE (1.5m AND 3.0m)</p>	<p>SHOTCRETE</p> <p>PLAIN SHOTCRETE; 40MPa UNIAXIAL COMPRESSION STRENGTH</p> <p>FIBER SHOTCRETE (5kg/m³ FIBER DOSAGE) 300 JOULES SPEC.</p>

LEGEND	
	SPURT SET
	REINBAR (FRASILE BOLT)
	CABLE BOLT
	THREADED BAR
	ADDITIONAL TIE-IN (SHOTCRETE)

PT FREESTOP INDONESIA
 Affiliate of Freestop-McMoRan

GBC GROUND SUPPORT PROFILES
 D100 EXTRACTION - SHEET 5 OF 22

04/04/2018 DRAWING NUMBER
 GC-2000-GRSUP-DEV-GAD REV C



LAMPIRAN C

HARGA MATERIAL *ROCKBOLT*

Tabel C1. Kombinasi *Cable Bolt*

No	<i>Cable Bolt</i>	Satuan	Harga (\$)	Harga per Satuan (\$)
1	<i>Cable coil 700MTR</i>	ROLL	2,824.20	6.28
2	<i>Barrel and 3 piece wedge anchor dome</i>	EA	7.12	7.12
3	<i>Plate dome, for Cable bolt 150 X 150 X 12 36H</i>	EA	6.46	6.46
4	<i>Flowcable, powder admixturemeyco (rheomac gf320),15 kg</i>	BG	25.77	1.72
5	<i>Cement, portland type 1-pcc, 1000kg</i>	BG	78.54	0.08
Total :				43.88

Tabel C2. Kombinasi *Resin* yang Digunakan Untuk *Resin Bar*

<i>Resin Bar Length</i>	<i>Medium Cartridge</i>	<i>Slow Cartridge</i>
2,25	3	3

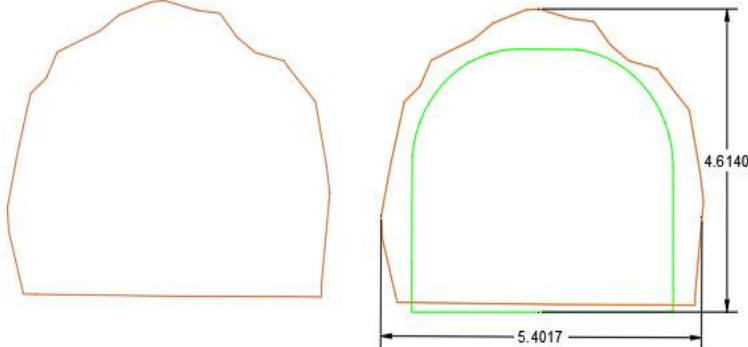
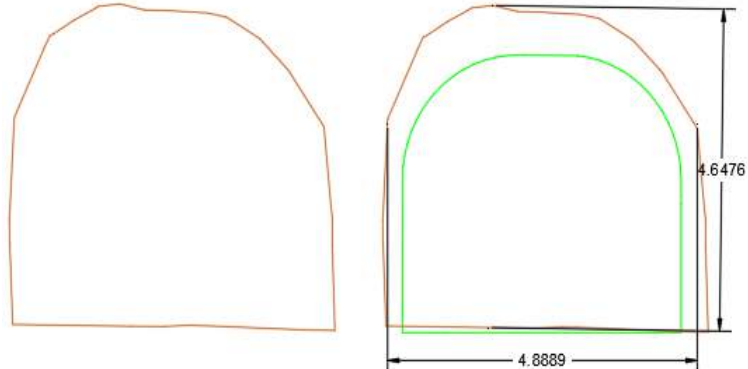
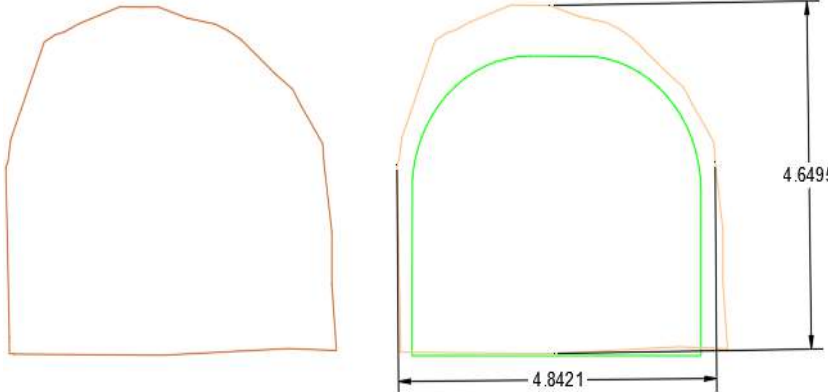
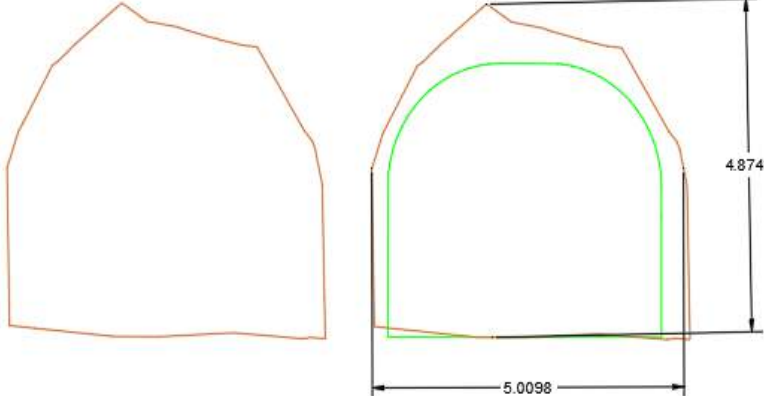
Tabel C3. Kombinasi *Resin Bar*

No	<i>Resin Bar</i>	Satuan	Harga (\$)
1	<i>Nut, plain, round m20, l/h, domed, 25/poly liner</i>	EA	2.22
2	<i>Plate, butterfly, galvanized 300 x 280 1.9mm, 900/plt</i>	EA	3.09
3	<i>Plate</i>	EA	2.20
4	<i>Resin medium</i>	EA	2.08
5	<i>Resin slow</i>	EA	2.11
6	<i>Pd. Bolt 2.25m</i>	EA	24.16



Tabel D1 Sayatan *Drift* Aktual

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
1	4,95	3,87	11,03	
2	4,89	3,72	10,82	
3	4,94	3,87	11,42	
4	5,11	4,08	11,7	
5	5,29	4,25	11,64	

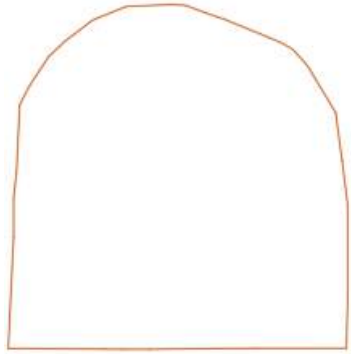
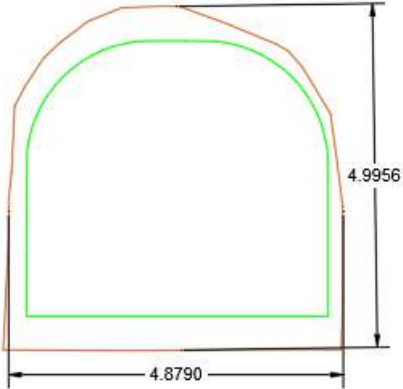
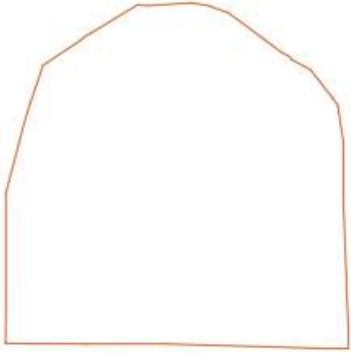
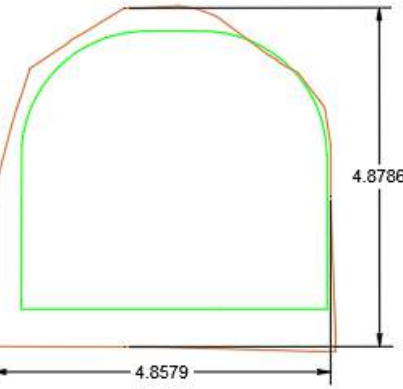
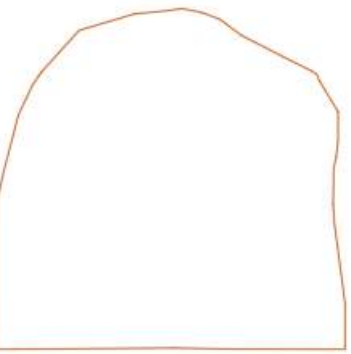
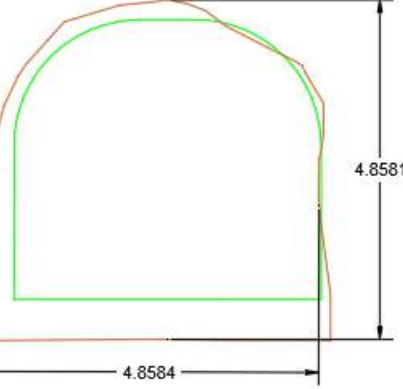
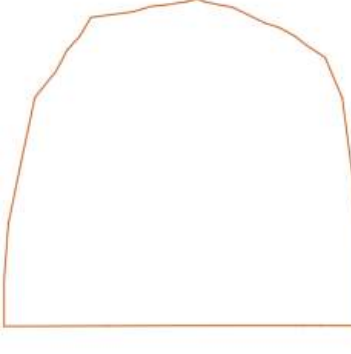
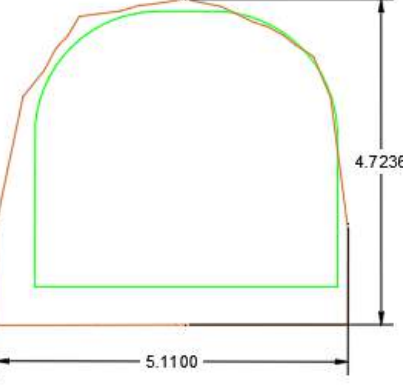
No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
6	5,4	4,61	12,08	
7	4,88	4,64	12,4	
8	4,84	4,64	12,15	
9	5	4,87	12,26	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
10	5,15	4,72	12,95	
11	4,99	4,59	12,12	
12	4,84	4,45	11,77	
13	5,14	4,59	12,07	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
14	5,26	4,45	11,94	
15	5,02	4,33	11,91	
16	5,17	4,53	11,98	
17	5,05	4,46	11,83	

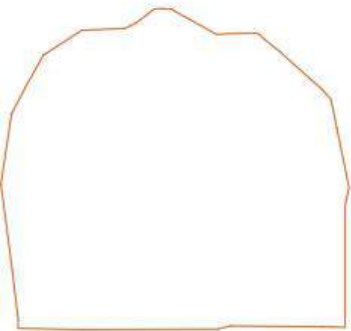
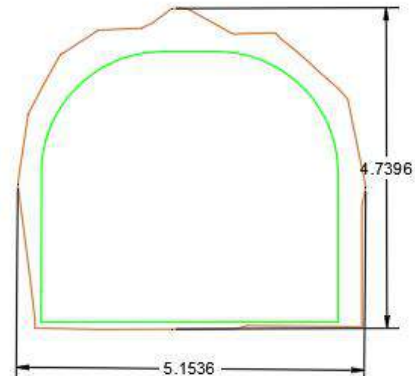
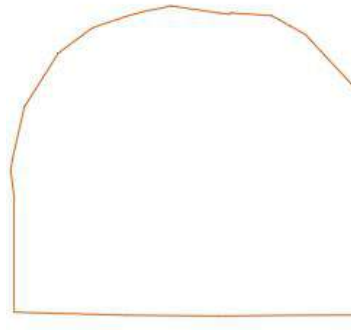
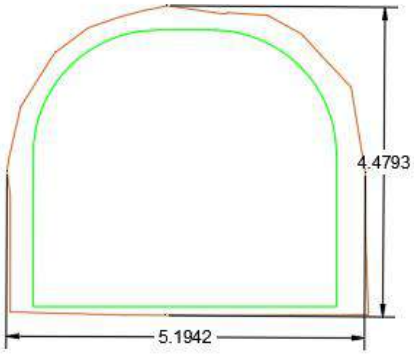
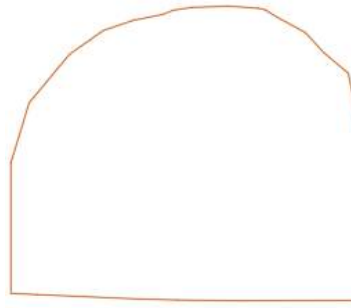
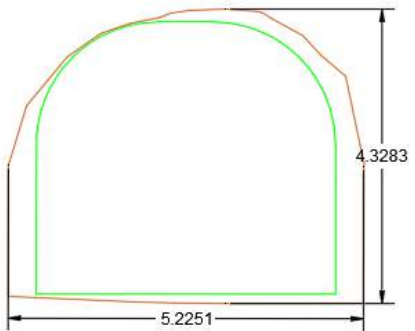
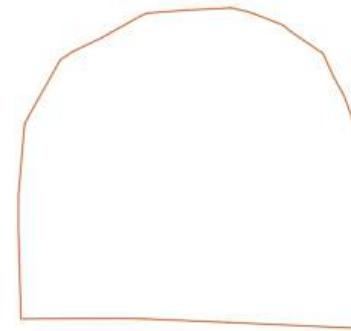
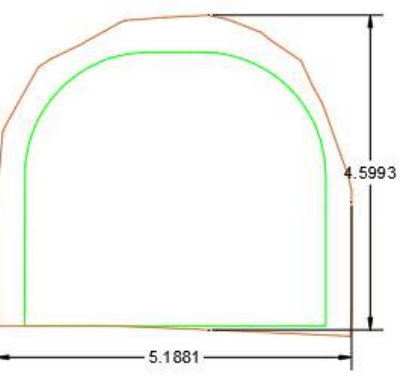
No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
18	4,93	4,31	11,38	
19	4,91	4,32	11,65	
20	4,95	4,27	11,68	
21	5,23	4,42	11,95	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
22	5,56	4,9	12,88	
23	5,45	5,15	13,37	
24	5,38	4,98	12,99	
25	5,43	4,93	12,93	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar	
27	4,87	4,99	12,83		
28	4,85	4,87	12,62		
29	4,85	4,85	12,6		
30	5,11	4,72	12,39		

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
32	4,9	4,91	12,83	
33	4,91	4,79	12,86	
34	4,88	4,75	12,73	
35	4,94	4,82	12,65	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
37	4,75	4,55	11,7	
38	4,61	4,46	11,55	
39	4,88	4,43	11,83	
40	4,89	4,34	11,62	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar	
42	5,15	4,73	12,52		
43	5,19	4,47	12,1		
44	5,22	4,32	11,72		
45	5,18	4,59	12,28		

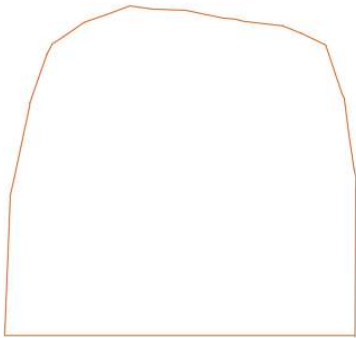
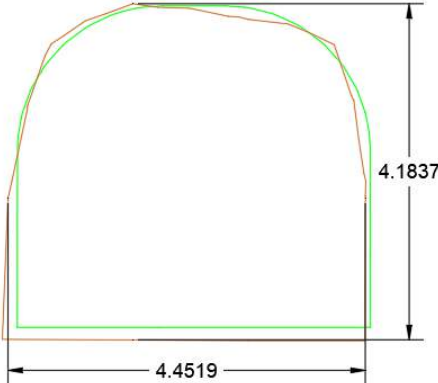
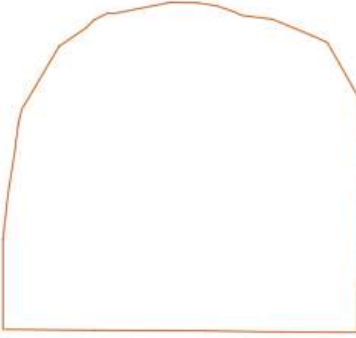
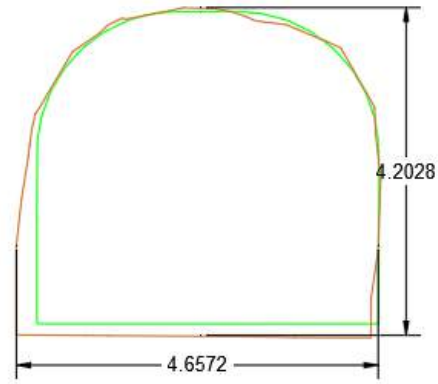
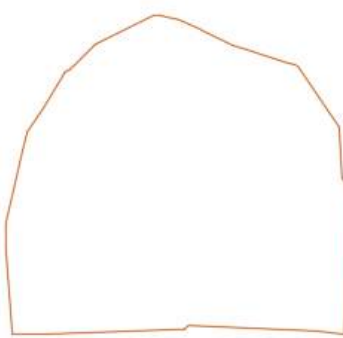
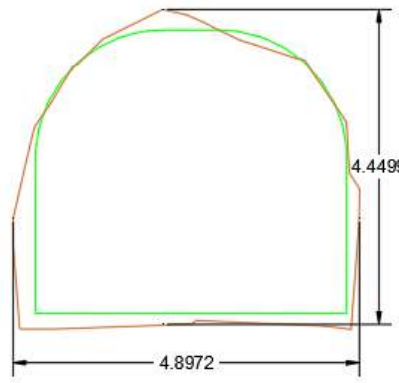
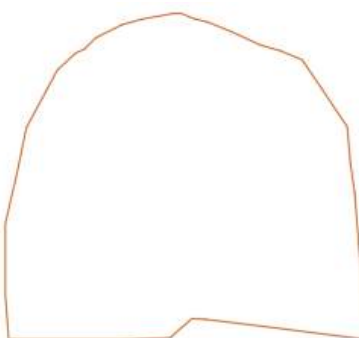
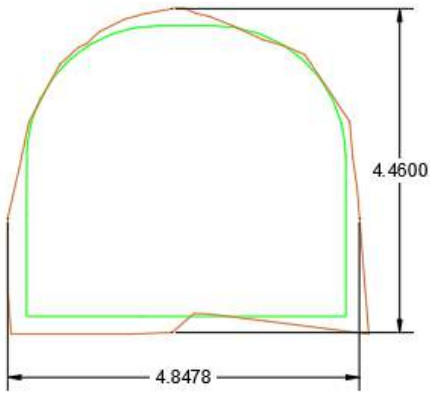
No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
47	5,17	4,45	11,73	
48	5,2	4,42	11,95	
49	4,84	4,2	11,61	
50	4,78	4,21	11,37	

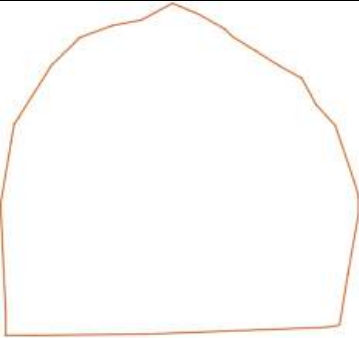
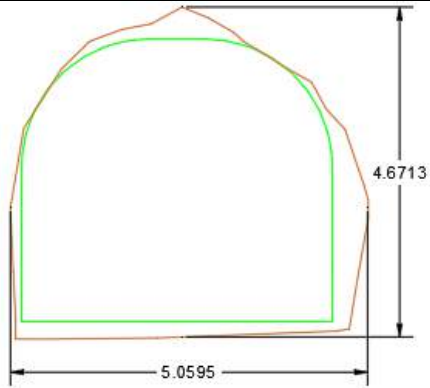
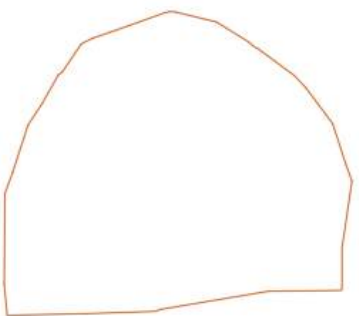
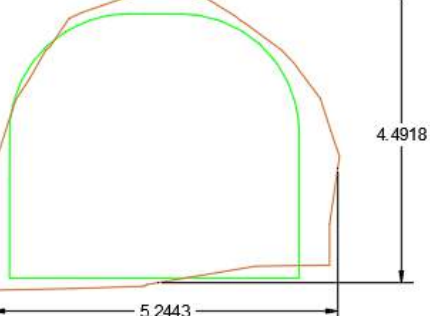
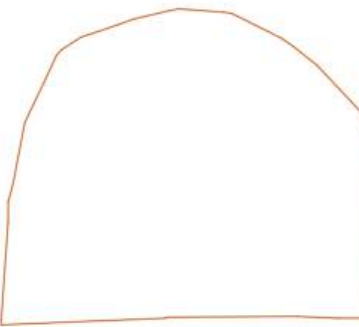
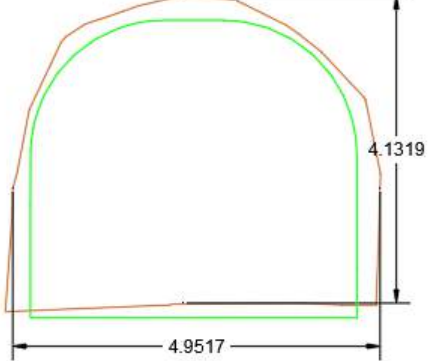
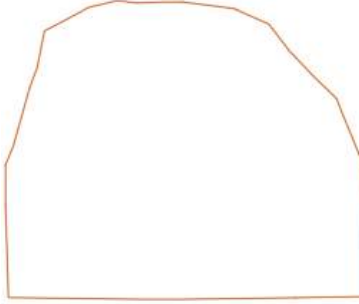
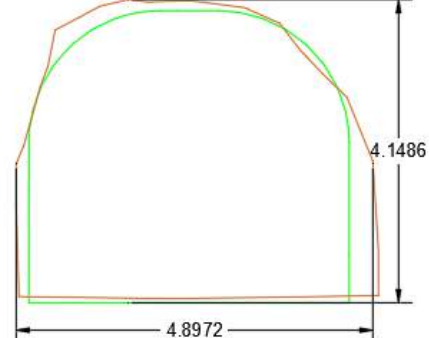
No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
52	4,91	4,34	11,69	
53	5,13	4,57	11,87	
54	4,78	4,55	11,65	
55	4,77	4,46	11,8	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
57	4,59	4,3	11,48	
58	4,59	4,27	11,57	
59	5,13	4,67	12,45	
60	5,1	4,69	12,44	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
62	4,67	4,21	11,64	
63	4,7	4,18	11,37	
64	4,77	4,14	11,14	
65	4,59	4,26	11,27	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar
67	4,42	4,27	11,37	
68	4,81	4,23	11,63	
69	4,82	4,24	11,61	
70	4,72	4,16	11,42	

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar	
72	4,45	4,18	11,23		
73	4,65	4,2	11,31		
74	4,89	4,44	11,59		
75	4,84	4,46	11,63		

No	Lebar (m)	Tinggi (m)	Perimeter (m)	Gambar	
77	5,05	4,67	11,82		
78	5,24	4,49	11,53		
79	4,95	4,13	11,25		
80	4,89	4,14	11,11		

Keterangan :

■ = Desain

■ = Aktual

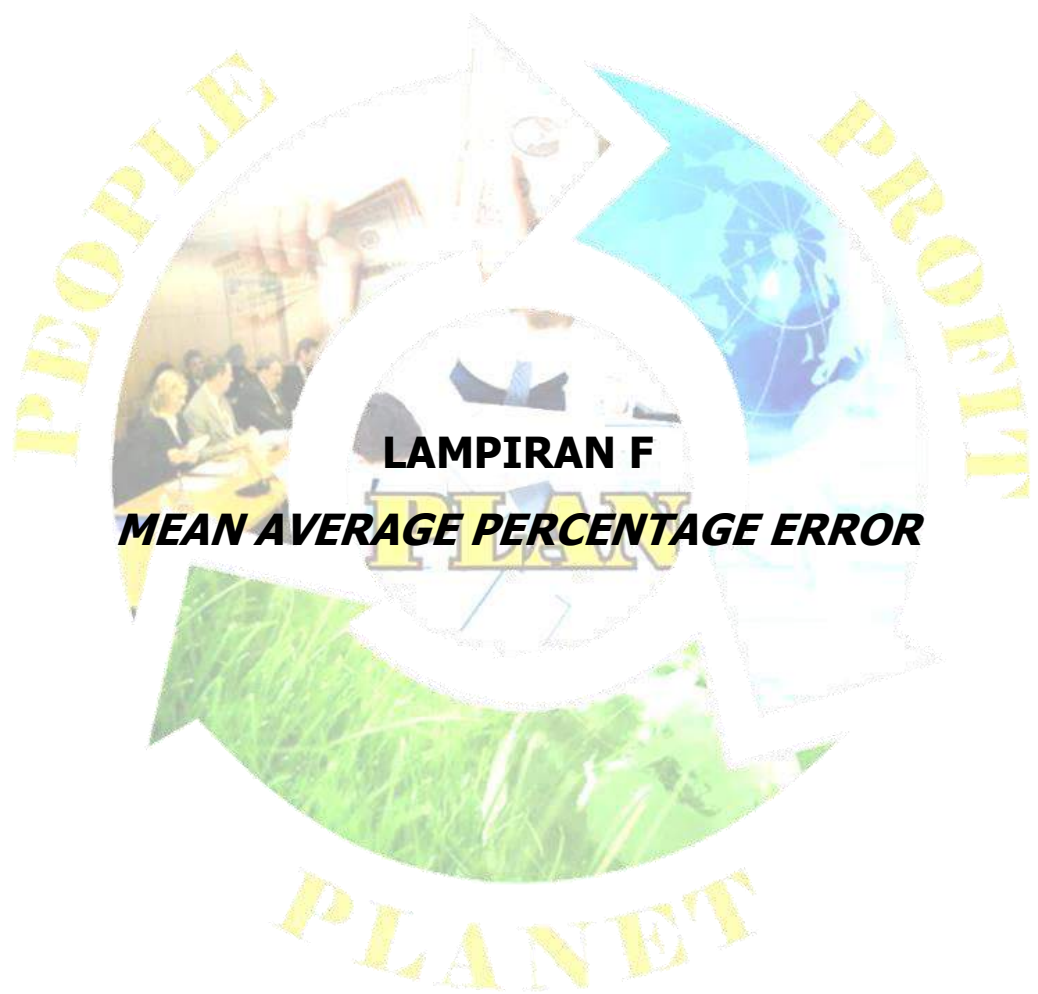


LAMPIRAN E
DISTRIBUSI FREKUENSI
REGRESI LINEAR SEDERHANA

Tabel E. Distribusi Frekuensi Analisis Regresi Linear Sederhana

No	X (m)	Y (n)	XY	X ²	Y ²
1	10,81	10	108,09	116,84	100
2	10,60	10	106,04	112,44	100
3	11,19	10	111,92	125,25	100
4	11,47	11	126,13	131,47	121
5	11,41	11	125,48	130,12	121
6	11,84	11	130,22	140,15	121
7	12,15	11	133,67	147,67	121
8	11,91	11	130,98	141,78	121
9	12,01	11	132,16	144,36	121
10	12,69	12	152,29	161,06	144
11	11,88	11	130,65	141,08	121
12	11,53	11	126,88	133,05	121
13	11,83	11	130,11	139,92	121
14	11,70	11	128,71	136,92	121
15	11,67	11	128,39	136,23	121
16	11,74	11	129,14	137,84	121
17	11,59	11	127,53	134,41	121
18	11,15	10	111,52	124,38	100
19	11,42	11	125,59	130,35	121
20	11,45	11	125,91	131,02	121
21	11,71	11	128,82	137,15	121
22	12,62	12	151,47	159,32	144
23	13,10	12	157,23	171,68	144
24	12,73	12	152,76	162,06	144
25	12,67	12	152,06	160,56	144
26	12,81	12	153,70	164,06	144
27	12,57	11	138,31	158,09	121
28	12,37	11	136,04	152,96	121
29	12,35	11	135,83	152,47	121
30	12,14	11	133,56	147,43	121
31	12,64	12	151,70	159,82	144
32	12,57	11	138,31	158,09	121
33	12,60	12	151,23	158,83	144
34	12,48	11	137,23	155,64	121
35	12,40	11	136,37	153,69	121
36	11,54	11	126,99	133,27	121
37	11,47	11	126,13	131,47	121
38	11,32	11	124,51	128,12	121
39	11,59	11	127,53	134,41	121
40	11,39	11	125,26	129,68	121
41	11,69	11	128,61	136,69	121
42	12,27	11	134,97	150,54	121
43	11,86	11	130,44	140,61	121

No	X (m)	Y (n)	XY	X ²	Y ²
44	11,49	10	114,86	131,92	100
45	12,03	10	120,34	144,83	100
46	11,76	10	117,60	138,30	100
47	11,50	10	114,95	132,14	100
48	11,71	10	117,11	137,15	100
49	11,38	10	113,78	129,45	100
50	11,14	10	111,43	124,16	100
51	11,23	10	112,31	126,13	100
52	11,46	10	114,56	131,24	100
53	11,63	11	127,96	135,32	121
54	11,42	10	114,17	130,35	100
55	11,56	10	115,64	133,73	100
56	11,51	11	126,56	132,37	121
57	11,25	11	123,75	126,57	121
58	11,34	10	113,39	128,56	100
59	12,20	11	134,21	148,86	121
60	12,19	10	121,91	148,63	100
61	11,56	11	127,20	133,73	121
62	11,41	11	125,48	130,12	121
63	11,14	11	122,57	124,16	121
64	10,92	11	120,09	119,19	121
65	11,04	11	121,49	121,98	121
66	11,20	11	123,22	125,47	121
67	11,14	11	122,57	124,16	121
68	11,40	11	125,37	129,90	121
69	11,38	10	113,78	129,45	100
70	11,19	10	111,92	125,25	100
71	10,94	10	109,37	119,61	100
72	11,01	11	121,06	121,12	121
73	11,08	11	121,92	122,85	121
74	11,36	11	124,94	129,01	121
75	11,40	11	125,37	129,90	121
76	11,30	11	124,29	127,68	121
77	11,58	11	127,42	134,18	121
78	11,30	10	112,99	127,68	100
79	11,03	10	110,25	121,55	100
80	10,89	10	108,88	118,54	100
Total	934,00	865,00	10.115,18	10.928,19	9.381,00



Tabel F. Nilai *Mean Average Percentage Error*

Nilai Aktual	Nilai Prediksi	(Nilai Aktual - Nilai Prediksi)/Nilai Aktual	MAPE
10	10,14	-0,01	0,59
10	10,00	0,00	
10	10,40	-0,04	
11	10,59	0,04	
11	10,55	0,04	
11	10,84	0,01	
11	11,05	0,00	
11	10,89	0,01	
11	10,96	0,00	
12	11,42	0,05	
11	10,87	0,01	
11	10,63	0,03	
11	10,83	0,02	
11	10,75	0,02	
11	10,73	0,02	
11	10,77	0,02	
11	10,67	0,03	
10	10,37	-0,04	
11	10,56	0,04	
11	10,58	0,04	
11	10,75	0,02	
12	11,37	0,05	
12	11,70	0,03	
12	11,45	0,05	
12	11,41	0,05	
12	11,50	0,04	
11	11,34	-0,03	
11	11,20	-0,02	
11	11,19	-0,02	
11	11,05	0,00	
12	11,39	0,05	
11	11,34	-0,03	
12	11,36	0,05	
11	11,28	-0,03	
11	11,22	-0,02	
11	10,64	0,03	
11	10,59	0,04	
11	10,49	0,05	
11	10,67	0,03	
11	10,54	0,04	
11	10,74	0,02	

Nilai Aktual	Nilai Prediksi	(Nilai Aktual - Nilai Prediksi)/Nilai Aktual	MAPE
11	11,13	-0,01	
11	10,85	0,01	
10	10,60	-0,06	
10	10,97	-0,10	
10	10,79	-0,08	
10	10,61	-0,06	
10	10,75	-0,08	
10	10,53	-0,05	
10	10,37	-0,04	
10	10,43	-0,04	
10	10,58	-0,06	
11	10,70	0,03	
10	10,56	-0,06	
10	10,65	-0,07	
11	10,62	0,03	
11	10,44	0,05	
10	10,50	-0,05	
11	11,09	-0,01	
10	11,08	-0,11	
11	10,65	0,03	
11	10,55	0,04	
11	10,37	0,06	
11	10,22	0,07	
11	10,30	0,06	
11	10,41	0,05	
11	10,37	0,06	
11	10,54	0,04	
10	10,53	-0,05	
10	10,40	-0,04	
10	10,23	-0,02	
11	10,28	0,07	
11	10,32	0,06	
11	10,51	0,04	
11	10,54	0,04	
11	10,47	0,05	
11	10,66	0,03	
10	10,47	-0,05	
10	10,29	-0,03	
10	10,20	-0,02	