REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REGION XI

DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE

TAGUM CITY

C.Y. 2025 PROJECT

DETAILED ENGINEERING DESIGN PLAN FOR

CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SECTION : B.E. DUJALI - STO. TOMAS, DAVAO DEL NORTE

LOCATION : B.E. DUJALI - STO. TOMAS, DAVAO DEL NORTE

STATION LIMITS: 21+389.91 - 22+520.26

NET LENGTH: 1130.35 Ln.m.

SUBMITTED:

JEZABEL E. TULING, MPA

CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY E. VERANO

OFFICER-IN-CHARGE

OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON

DISTRICT ENGINEER

DATE:

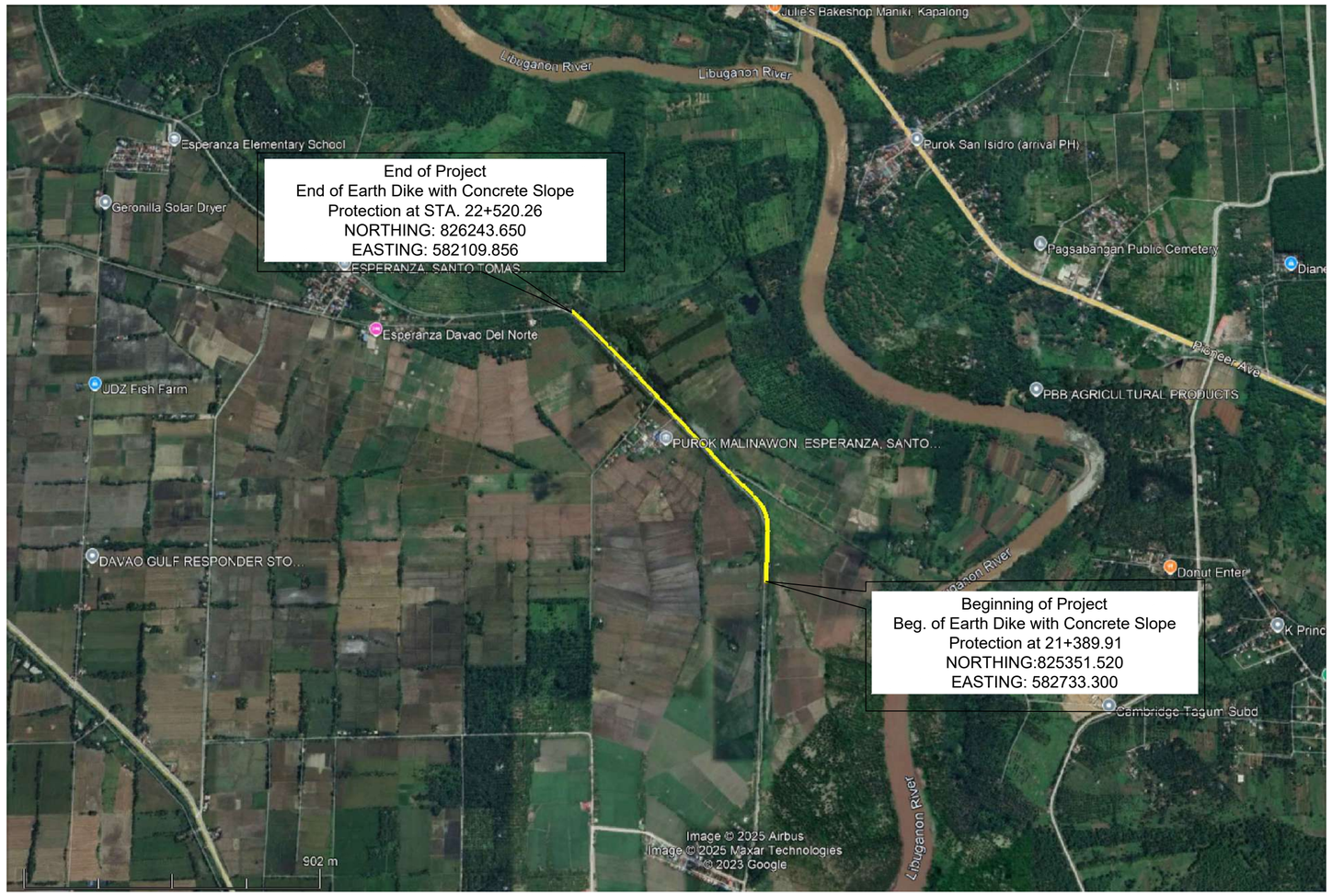
PROJECT LIMITS :

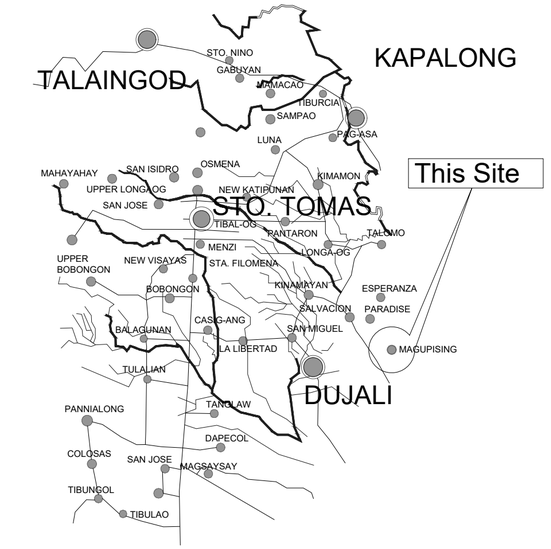
RIGHT BANK

21+389.91 - 22+520.26 = 1130.35 Ln.m. Earth dike with Concrete Slope Protection

1130.35 Ln.m. Earth dike with Concrete Slope Protection

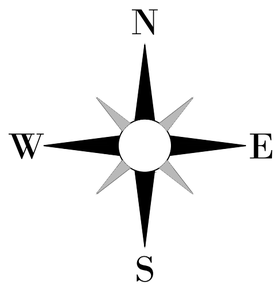
INDEX OF SHEETS





VICINITY MAP

NOT TO SCALE



LOCATION PLAN

SCALE 1 : 10000 m

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE	**INDEX OF SHEETS** **LOCATION PLAN** **VICINITY MAP**	**HERWIN EVAN J. HABABAG** ENGINEER II PREPARED: **BENILDA S. PACQUIAO** ENGINEER III	**WARREN S. PIÑEZ** ENGINEER II	**JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION DATE:	**GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	**ARTURO P. LONGYAPON** DISTRICT ENGINEER DATE:	A 1 | 1	1 26

GENERAL NOTES

SPECIFICATION

1. HEIGHT OF THE STRUCTURE
   THE DESIGNED HEIGHT OF THE STRUCTURE IS BASED ON THE DESIGN FLOOD LEVEL PLUS 1.2 M FREEBOARD.
2. DISCHARGE VOLUME
   THE DISCHARGE VOLUME OF FLOOD WATER WAS BASED ON 100 YEARS RETURN PERIOD.

CONSTRUCTION REQUIREMENTS

3. STRUCTURAL CONCRETE
   THIS ITEM SHALL CONSIST OF FURNISHING, PLACING AND FINISHING CONCRETE IN ALL STRUCTURES EXCEPT PAVEMENTS IN ACCORDANCE WITH THIS SPECIFICATION AND CONFORMING TO THE LINES, GRADES, AND DIMENSIONS SHOWN ON THE PLANS. CONCRETE SHALL CONSIST OF A MIXTURE OF PORTLAND CEMENT, FINE AGGREGATE, COARSE AGGREGATE, ADMIXTURE WHEN SPECIFIED, AND WATER MIXED IN THE PROPORTIONS SPECIFIED OR APPROVED BY THE ENGINEER.
4. ALL ELEVATION SHALL BASE ON PHILIPPINE REFERENCE SYSTEM OF 1992(PRS92).

5. PRE-CONSTRUCTION SURVEY SHALL BE CONDUCTED BY THE REPRESENTATIVE OF THE IMPLEMENTING OFFICE AND THE CONTRACTOR. CORRESPONDING "AS STAKED PLAN" SHALL BE PREPARED AND SUBJECT FOR APPROVAL BY THE DISTRICT ENGINEER.

6. OTHER ITEMS OF WORK SHALL CONFORM WITH THE DPWH STANDARD SPECIFICATIONS FOR PUBLIC WORKS AND HIGHWAYS, 2004 EDITION, VOLUME II AND DESIGN GUIDELINES CRITERIA AND STANDARD 2015 EDITION.

FACILITIES FOR THE ENGINEER

7. THE CONTRACTOR SHALL AT ALL TIMES DURING THE DURATION OF THE CONTRACT PROVIDE FOR THE USE OF THE ENGINEER ALL EQUIPMENT, INSTRUMENTS AND APPARATUS, ALL INFORMATION AND RECORDS AND QUALIFIED CHAINMEN AND LABOURERS REQUIRED BY THE ENGINEER FOR INSPECTING AND ASURING THE WORKS. SUCH EQUIPMENT, INSTRUMENTS AND APPARATUS SHALL INCLUDE THOSE LISTED IN THE SPECIAL PROVISIONS.

8. THE CONTRACTOR SHALL PROVIDE WITHIN THIRTY (30) CALENDAR DAYS AFTER NOTICE TO COMMENCE WORK, THE VEHICLE LISTED IN THE SPECIAL PROVISIONS FOR THE EXCLUSIVE USE OF THE ENGINEER. THE VEHICLES ON DELIVERY SHALL BE NEW AND SHALL BE DRIVEN BY A COMPETENT QUALIFIED AND EXPERIENCED DRIVER WHO SHALL BE UNDER THE DIRECT ORDER OF THE ENGINEER.

OTHER GENERAL REQUIREMENTS

9. ALIGNMENT AND GRADES ARE SUBJECT TO ADJUSTMENTS TO SUIT ACTUAL FIELD CONDITIONS.
10. DISTANCES AND ELEVATIONS ARE IN METER UNLESS OTHERWISE INDICATED.
11. BEFORE THE START OF ACTUAL CONSTRUCTION, THE AS-STAKED PLAN SHOULD BE SUBMITTED TO THE REGIONAL OFFICE IN ORDER THAT IMMEDIATE STEPS MAY BE TAKEN TO CORRECT OR ADJUST WHATEVER APPRECIABLE DEVIATION THERE MAY BE FROM THE ORIGINAL PLAN.
12. QUARRY SITE FOR AGGREGATES IS LOCATED AT BRGY. MABUHAY, CARMEN, 34.30 KM AWAY FROM PROJECT SITE.

HYDRAULIC ANALYSIS		
RETURN PERIOD (RP)	50 YRS.	100 YRS.
DRAINAGE AREA (DA)	2,417.73 sq.km	2,417.73 sq.km
DISCHARGE (Q)	2,737.62 cu.m/sec	3,041.80 cu.m/sec

13. DESIGN WAS BASED ON SURVEY DATA SUBMITTED BY THE SURVEY INVESTIGATION SECTION OF THE PLANNING AND DESIGN DIVISION OF THE DPWH-DISTRICT ENGINEERING OFFICE.

MATERIALS

1. CONCRETE
   a. CONCRETE STRENGTH BY CLASS

STRUCTURAL MEMBER	CLASS	28-DAY CYLINDER STRENGTH		MAX SIZE OF COARSE AGGREGATE, mm(in.)
		MPa	PSI	
CAST -IN-PLACE SLABS, DIAPHRAGMS, BACKWALLS, COPINGS,COLUMNS,SIDEWALK	A	27.59	4000	20

   b. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL THE PLACING SEQUENCES FOR ALL TYPES OF CONCRETING WORK.
   c. DESIGN OF CONCRETE SHALL BE AS SET FORTH UNDER ITEM NO. 1 OF MATERIALS.
   d. CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE GENERAL SPECIFICATIONS.
   e. FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE SHALL BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF THE CONCRETE SECTION.

2. REINFORCING STEEL
   a. REINFORCING STEEL NON WELDABLE SHALL CONFORM TO ASTM615/A615M & WELDABLE STEELBARS SHALL CONFORM TO ASTM A706/A706M. MINIMUM YIELD STRENGTH AS LISTED BELOW UNLESS OTHERWISE SPECIFIED IN THE DRAWING:
   Fy=414 MPa (Gr. 60) FOR 16mm Ø AND LARGER
   Fy=276 MPa (Gr. 40) FOR 12mm Ø AND SMALLER
   b. REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. RUBBER WATER STOPS
   a. RUBBER WATER STOPS MAY BE MOLDED OR EXTRUDED AND HAVE A UNIFORM CROSS-SECTION, FREE FROM POROSITY OR OTHER DEFECTS, CONFORMING TO THE NOMINAL DIMENSIONS SHOWN ON THE PLANS. AN EQUIVALENT STANDARD SHAPE MAY BE FURNISHED, IF APPROVED BY THE ENGINEER.
   b. THE WATER STOP MAY BE COMPOUNDED FROM NATURAL RUBBER, SYNTHETIC RUBBER OR BLEND OF THE TWO, TOGETHER WITH OTHER COMPATIBLE MATERIALS WHICH WILL PRODUCE A FINISHED WATER STOP MEETING THE REQUIREMENTS OF TABLE 705.I. NO RECLAIMED MATERIAL SHALL BE USED. THE CONTRACTOR SHALL FURNISH A CERTIFICATE FROM THE PRODUCER TO SHOW THE GENERAL COMPOSITIONS OF THE MATERIAL AND VALUES FOR THE DESIGNATED PROPERTIES. THE CONTRACTORS SHALL ALSO FURNISH SAMPLES, IN LENGTH ADEQUATE FOR MAKING DESIGNATED TESTS, AS ORDERED BY THE ENGINEER.

TABLE 705.1
Required Properties and Test Methods-Finished Rubber Water Stop

Property	Federal Test Method Standard No. 601	Requirement
Hardness (by shore durometer)	3021	60-70
Compression set	3311	Maximum 30 percent
Tensile Strength	4111	Minimum 17.23 MPa (2,500 psi)
Elongation at Breaking	ASTM D 412	Minimum 450 percent
Tensile stress at 300 percent elongation	4131	Minimum 6.20 MPa (900 psi)
Water absorption by mass	6631	Minimum 5 percent
Tensile strength after aging	7111	Minimum 80 percent original

4. JOINT FILLERS
   a. POURED FILLER FOR JOINTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 173.
   b. PERFORMED FILLERS FOR JOINTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 33 (ASTM D 994), AASHTO M 153, AASHTO M 213, AASHTO M 220, AS SPECIFIED, AND SHALL BE PUNCHED TO ADMIT THE DOWELS WHERE CALLED FOR ON THE PLANS.THE FILLER FOR EACH JOINT SHALL BE FURNISHED IN A SINGLE PIECE FOR THE DEPTH AND WIDTH REQUIRED FOR THE JOINT UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER. WHEN THE USE OF MORE THAN ONE PIECE IS AUTHORIZED FOR A JOINT, THE ABUTTING ENDS SHALL BE FASTENED SECURELY AND HELD ACCURATELY TO SHAPE, BY STAPLING OR OTHER POSITIVE FASTENING SATISFACTORY TO THE ENGINEER.

SURVEY SPECIFICATIONS

1. ALL PROJECT CONTROL POINTS ARE PROJECTED IN PRS'92 GRID COORDINATE SYSTEM (ZONE 5).
2. SURVEY INSTRUMENT USED. COMNAV MARS & N3
3. DATE SURVEYED: SEPTEMBER 5, 2024
4. PROJECT CONTROL POINTS, REFER TO 'PLAN AND PROFILE'

REFERENCES :

1. LABOR CODE OF THE PHILIPPINES AND ITS IMPLEMENTING RULES AND REGULATIONS DOLE DO NO. 13, s.1998, OCCUPATIONAL SAFETY AND HEALTH STANDARDS AND ITS PROCEDURAL GUIDELINES.
   - FOR MONITORING, ENFORCEMENT AND IMPLEMENTATION OF CONSTRUCTION SAFETY AND HEALTH
   - DO. 56, s.2005
2. DPWH DESIGN GUIDELINES, CRITERIA & STANDARDS (DGCS), 2015 EDITION
   - FOR THE DESIGN OF HIGHWAYS, BRIDGES, BUILDINGS AND FLOOD CONTROL PROJECTS COVERING THE MINIMUM REQUIREMENTS, SPECIFICATIONS AND PROCEDURES.
   - DO. 179, s.2015
3. DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS VOL II, 2013 EDITION.
4. DPWH STANDARD SPECIFICATIONS FOR PUBLIC WORKS STRUCTURES (BUILDING, PORTS AND HARBORS, FLOOD CONTROL & DRAINAGE STRUCTURES & WATER SUPPLY SYSTEMS) - VOL. III, 2019 EDITION

LEGEND

SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
CH	CONCRETE HOUSE		BENCH MARK
P	PUROK		NATURAL GROUND
WH	WOODEN HOUSE	CEP	CONCRETE ELECTRIC POST
	EXISTING RCC PIPE	WEP	WOODEN ELECTRIC POST
	BRIDGE		EASEMENT
	SIDE SHOT REMARK		CONTOUR LINES
	JUNCTION RIVER		CYLINDRICAL MONUMENT
	VARIOUS TREES	PI	POINT OF INTERSECTION
RP-1 RP-2	REFERENCE POINTS		BARBWIRE FENCE
	WATER FLOW DIRECTION	T-0	TURNING POINTS
	WATERWAY		WATER LEVEL
	RCC PIPE PROFILE		
	FENCE		

This is to certify that the detailed engineering surveys and designs have been conducted according to the prescribed agency standards and specifications in conformance with the provisions of Annex "A" of the Revised Implementing Rules and Regulations of RA 9184, and that the detailed engineering outputs are adequate for the procurement at hand.

WARREN S. PIÑEZ
ENGINEER II

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
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2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
GENERAL NOTES
LEGEND
HYDRAULIC ANALYSIS

DRAFTED: **HERWIN EVAN J. HABABAG** ENGINEER II
PREPARED: **BENILDA S. PACQUIAO** ENGINEER III

REVIEWED: **WARREN S. PIÑEZ** ENGINEER II

SUBMITTED: **JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION DATE:

RECOMMENDED: **GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:

APPROVED: **ARTURO P. LONGYAPON** DISTRICT ENGINEER DATE:

SET NO. B 1 1

SHEET NO. 2 26

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QTY	UNIT	REMARKS
PART A	**FACILITIES FOR THE ENGINEER**			
A.1.2 (2)	Provision of 4x4 Pick Up Types Service Vehicle for the Engineer on Bare Rental Basis	9.36	Vehicle - month	
A.1.1 (3)	Construction of Field Office for the Engineer	1.00	ls	
A.1.2 (5)	Operation and Maintenance of 4x4 Pickup Type Service Vehicle for the Engineer	9.36	Vehicle - month	
	TOTAL OF PART A			
PART B	**OTHER GENERAL REQUIREMENTS**			
B.3 (1)	Permits and Clearances	1.00	ls	
B.4 (1)	Construction survey and staking	1.130	km	
B.5 (1)	Project Billboard / Signboard	4.00	ea	
B.7 (1)	Occupational Safety and Health	1.00	ls	
B.9 (1)	Mobilization/Demobilization	1.00	ls	
	TOTAL OF PART B			
PART L-A	**EARTHWORKS**			
801 (1)	Removal of Structures and Obstruction	1.00	ls	
1700 (3)a1	Individual Removal of Trees (150 - 300 mm dia.)	368.00	ea	
1700 (3)a2	Individual Removal of Trees (301 - 500 mm dia.)	302.00	ea	
1701 (1)	Unsuitable Excavation	7,165.49	cu.m.	
1704 (1)a	Embankment (From roadway/ structure excavation)	4,052.27	cu.m.	
1704 (1)b	Embankment (From borrow)	49,105.60	cu.m.	
1707 (1)	Aggregate Subbase Course	1,868.35	cu.m.	
	TOTAL OF PART L-A			
PART D	**REINFORCED CONCRETE**			
900 (1)d	Structural Concrete, 4000 psi, Class A, 28 days	1,898.84	cu.m.	
902 (1)a1	Reinforcing Steel (Deformed), Grade 40	62,118.00	kg	
902 (1)a2	Reinforcing Steel (Deformed), Grade 60	28,932.00	kg	
	TOTAL OF PART D			
PART L-B	**BANK AND SLOPE PROTECTION WORKS**			
1712 (1)	Concrete Slope Protection	2,209.70	cu.m.	
	TOTAL OF PART L-B			
PART G	**DRAINAGE AND SLOPE PROTECTION STRUCTURES**			
510 (1)	Bed Course Granular Material Concrete	1,434.83	cu.m.	
	TOTAL OF PART G			
PART H	**MISCELLANEOUS STRUCTURES**			
611 (3)	Seedlings/Saplings for Other Programs/Initiatives	5,500.00	ea.	

NOTE: THE QUANTITIES OF ALL WORK ITEMS INVOLVED ARE SUBJECT TO INCREASE/DECREASE AS PER ACTUAL FIELD REQUIREMENTS.

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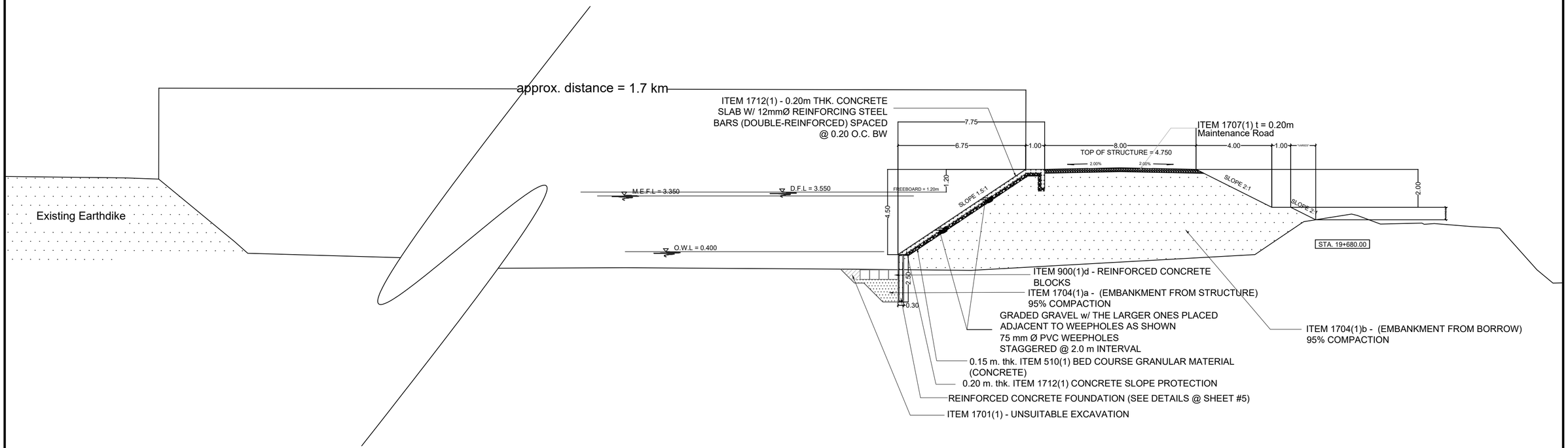

TYPICAL SECTION OF REINFORCED CONCRETE SLOPE PROTECTION (RIGHT BANK)

SCALE 1:150

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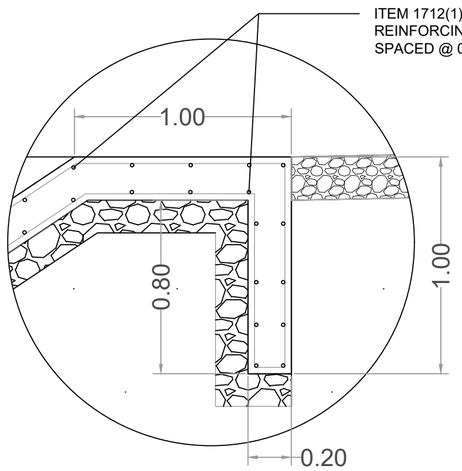

CREST PROTECTION

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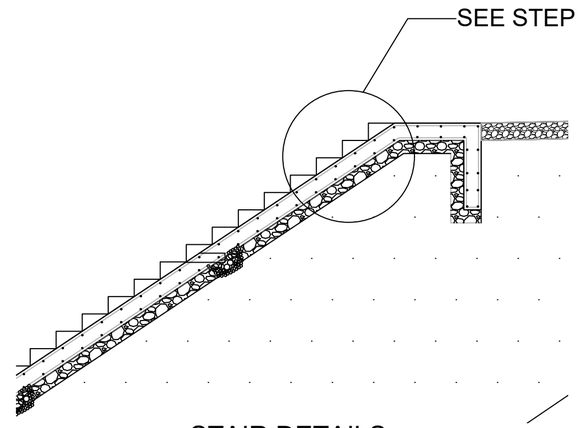


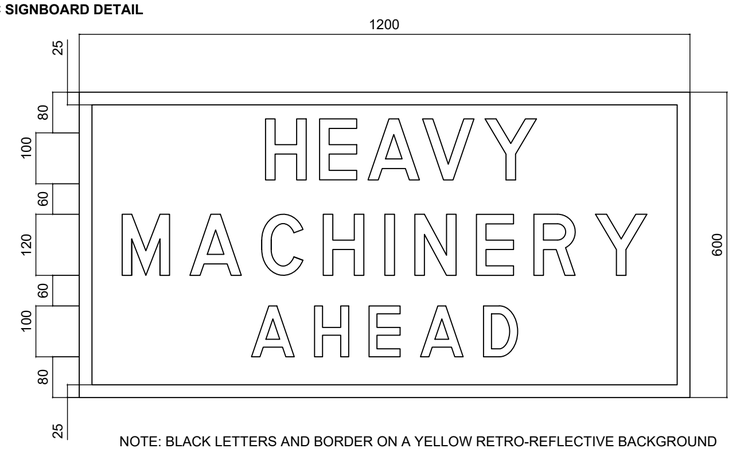
STAIR DETAILS

SCALE 1:50 mts.

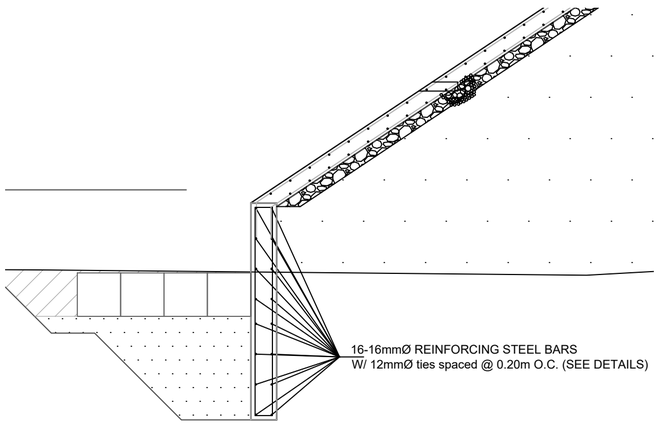
MINIMUM REQUIRED FREEBOARD	
DESIGN FLOOD DISCHARGE (m3/sec)	FREEBOARD (m)
LESS THAN 200	0.60
200 AND UP TO 500	0.80
500 AND UP TO 2000	1.00
2000 AND UP TO 5000	1.20
5000 AND UP TO 10000	1.50

SCHEDULE OF STAIRS	
21+440	R/S
21+500	R/S
21+560	R/S
21+620	R/S
21+680	R/S
21+740	R/S
21+800	R/S
21+860	R/S
21+920	R/S
21+980	R/S
22+040	R/S
22+100	R/S
22+160	R/S
22+220	R/S
22+280	R/S
22+340	R/S
22+400	R/S
22+460	R/S

TRAFFIC SIGNBOARD DETAIL



NOTE: BLACK LETTERS AND BORDER ON A YELLOW RETRO-REFLECTIVE BACKGROUND



REINFORCED CONCRETE FOUNDATION DETAIL

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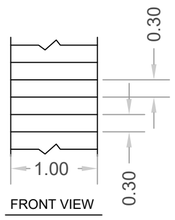
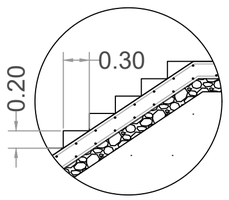


FRONT VIEW

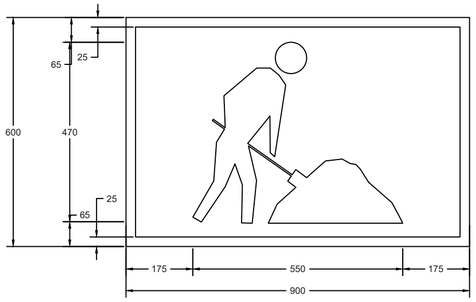
STEP DETAILS

SCALE NTS

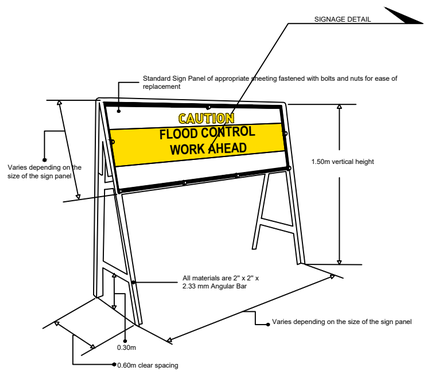


SECTION VIEW

SCALE 1:50



NOTE:
BLACK SYMBOLS AND BORDER
- RED/ORANGE FLOURESCENT BACKGROUND FOR DAYTIME USE
- ORANGE RETRO-REFLECTIVE BACKGROUND FOR NIGHTTIME USE



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SHEET CONTENTS:
CREST PROTECTION
REINFORCED CONCRETE DETAIL
STAIR DETAILS
STEP DETAILS
SCHEDULE OF STAIRS
FLOOD CONTROL WORKS SITE TEMPORARY SIGNAGE
MIN. REQUIRED FREEBOARD

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
ENGINEER III

REVIEWED:
WARREN S. PIÑEZ
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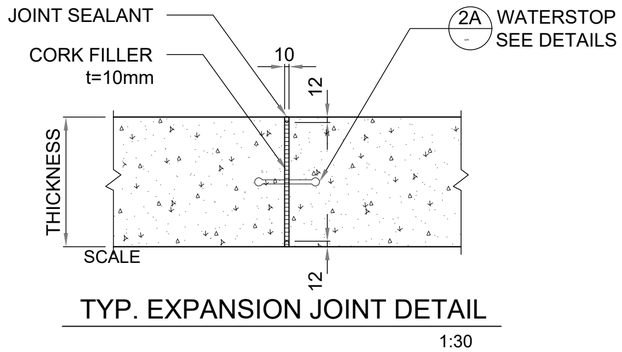
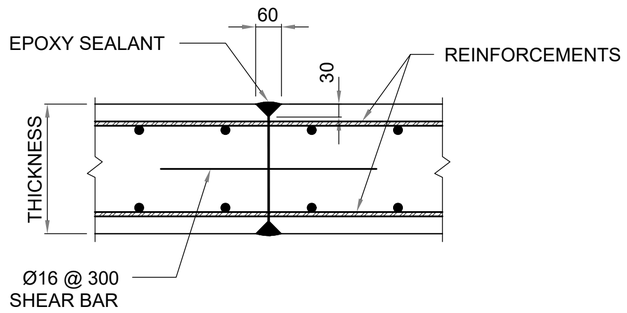
SHEET NO. 5 26



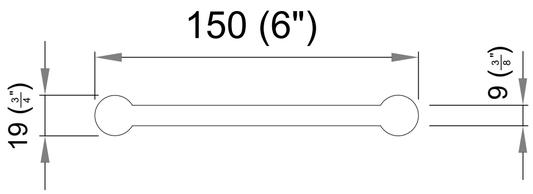
TYP. EXPANSION JOINT DETAIL

1:30



TYP. CONSTRUCTION JOINT DETAILS

SCALE 1:30

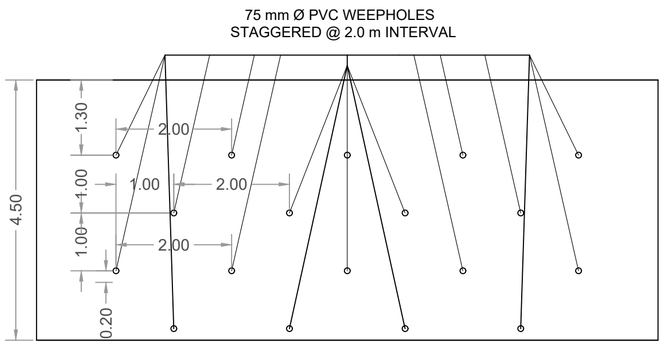


RUBBER WATERSTOP DETAILS

SCALE 1:30 mts.

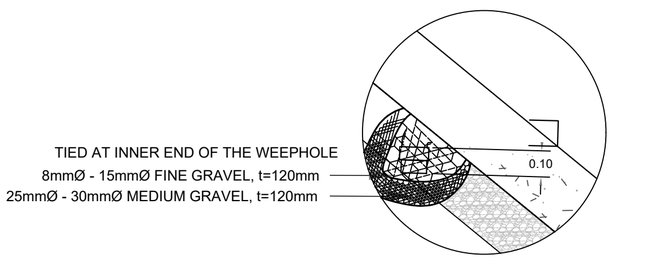
SCHEDULE OF WATER STOP	
21+430	R/S
21+480	R/S
21+530	R/S
21+580	R/S
21+630	R/S
21+680	R/S
21+730	R/S
21+780	R/S
21+830	R/S
21+880	R/S
21+930	R/S
21+980	R/S
22+030	R/S
22+080	R/S
22+130	R/S
22+180	R/S
22+230	R/S
22+280	R/S
22+330	R/S
22+380	R/S
22+430	R/S
22+480	R/S

REMOVAL OF STRUCTURES		
STA.	TYP. OF STRUCTURE	SQM
21+420	AHOUSE X2	54
21+480	ASTORE	42
21+780	AHOUSE X3	72
21+800	WHOUSE	4
21+840	AHOUSE X2	35
21+860	AHOUSE X2	35
21+900	AHOUSE	12
21+920	AHOUSE X2	52
21+960	AHOUSE & WHOUSE	60
21+980	AHOUSE	24
22+020	AHOUSE & WHOUSE	48.49
22+080	AHOUSE	20
22+100	AHOUSE	24
22+140	AHOUSE X3	64
22+200	AHOUSE X2 & WHOUSE	60
22+220	AHOUSE X4	77
22+240	AHOUSE X3 & WHOUSE	102
22+260	AHOUSE X3 & WHOUSE	106
22+300	WHOUSE X2	64



WEEPHOLE SPACING

SCALE 1:75



WEEPHOLE DETAIL

SCALE 1:25

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
RUBBER WATERSTOP DETAILS
TYP. EXPANSION JOINT DETAIL
TYP. CONSTRUCTION JOINT DETAILS
WEEPHOLE DETAIL
WEEPHOLE SPACING
SCHEDULE OF WATER STOP
REMOVAL OF STRUCTURE

DRAFTED: **HERWIN EVAN J. HABABAG** ENGINEER II
PREPARED: **BENILDA S. PACQUIAO** ENGINEER III

REVIEWED: **WARREN S. PIÑEZ** ENGINEER II

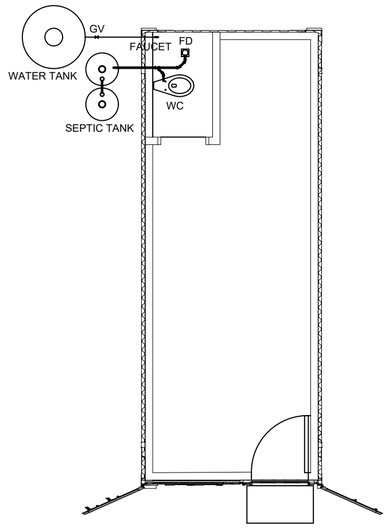
SUBMITTED: **JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION DATE:

RECOMMENDED: **GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:

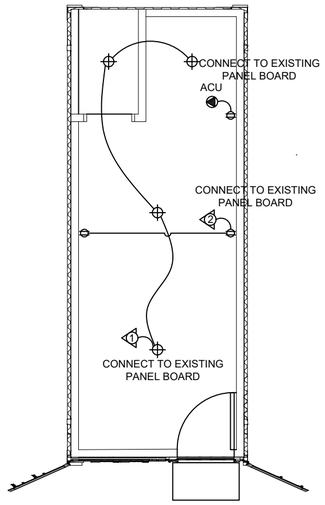
APPROVED: **ARTURO P. LONGYAPON** DISTRICT ENGINEER DATE:

SET NO. D 3 4

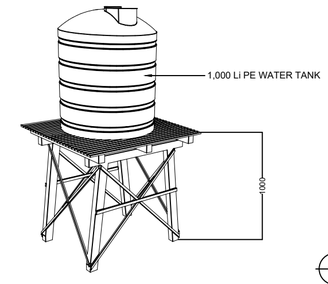
SHEET NO. 6 26



PLUMBING PLAN

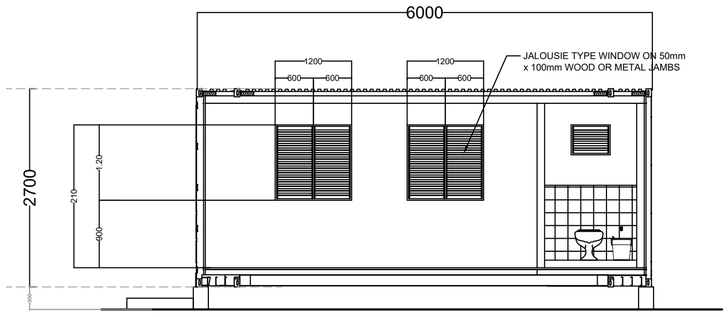


ELECTRICAL PLAN

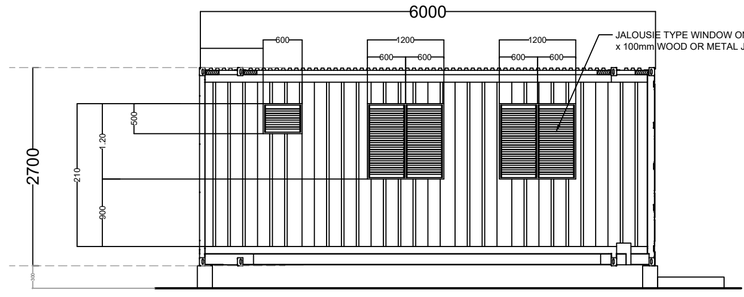


WATER TANK

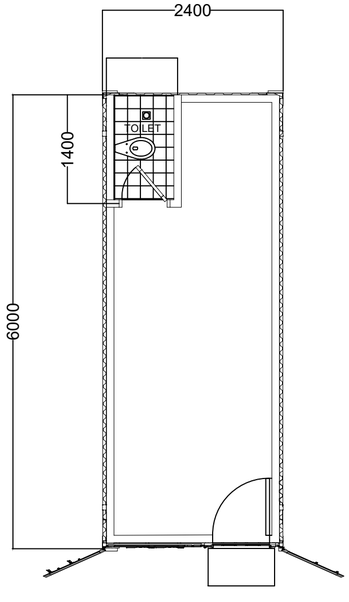
SEPTIC TANK



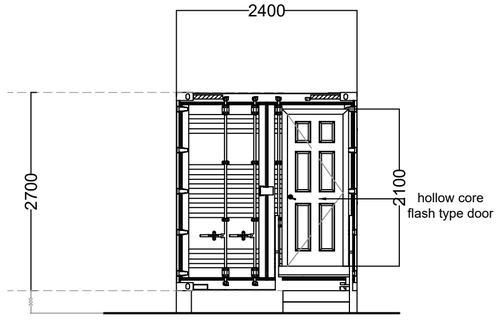
LONGITUDINAL SECTION



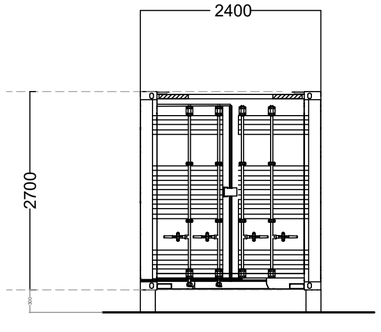
LEFT SIDE ELEVATION



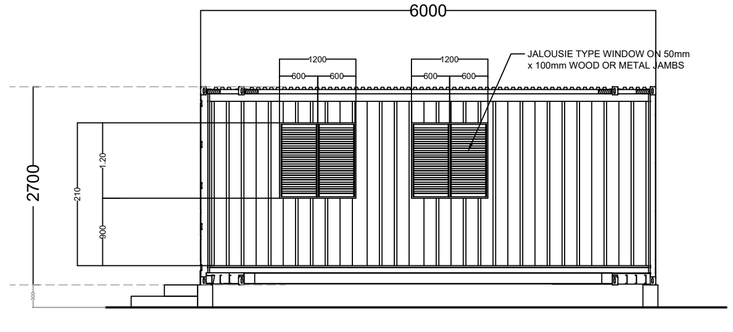
FLOOR PLAN



FRONT ELEVATION



REAR ELEVATION



RIGHT SIDE ELEVATION

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
OFFICE OF THE FIELD ENGINEER

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
ENGINEER III

REVIEWED:
WARREN S. PIÑEZ
ENGINEER II

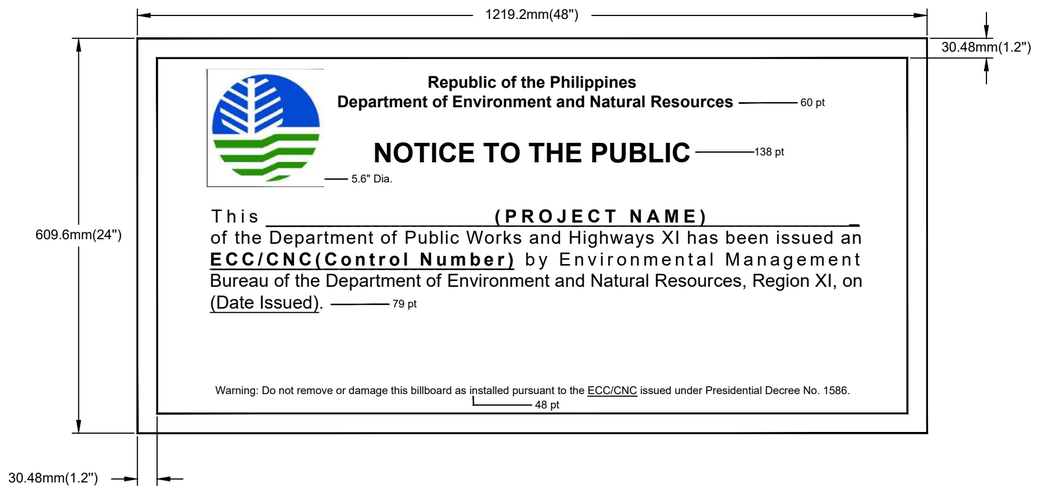
SUBMITTED:
JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION
DATE:

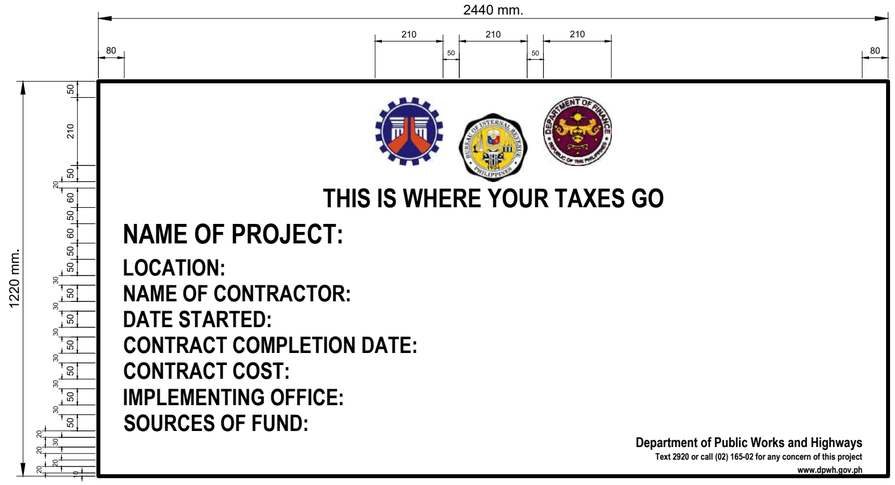
RECOMMENDED:
GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:
ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

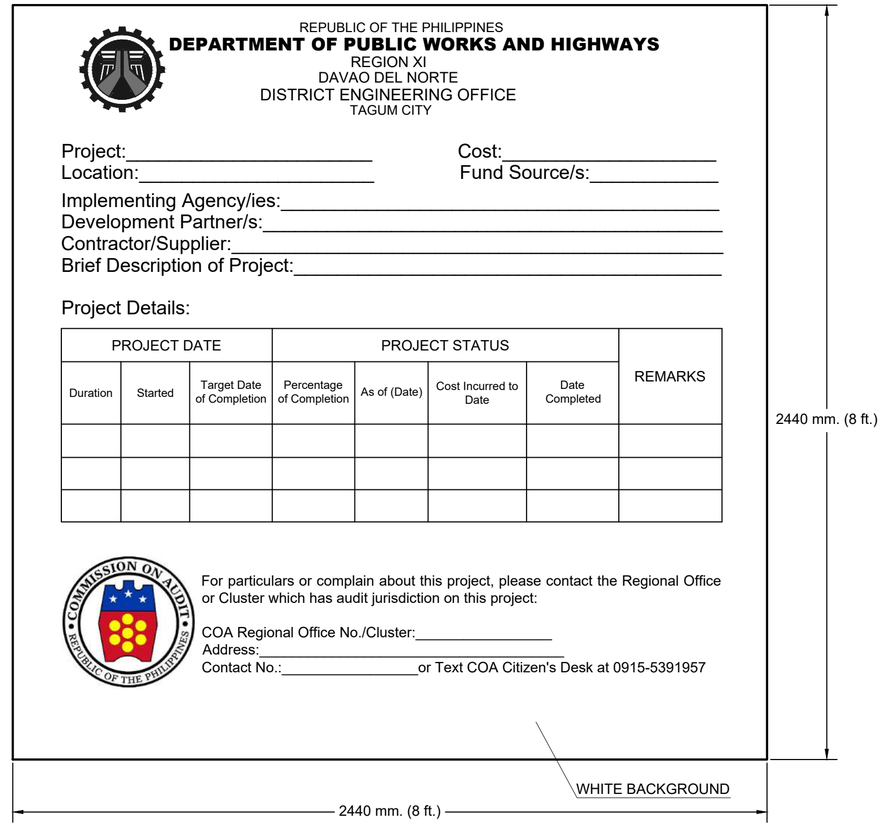
SET NO.: D 4 4

SHEET NO.: 7 / 26





DPWH STANDARD PROJECT BILLBOARD



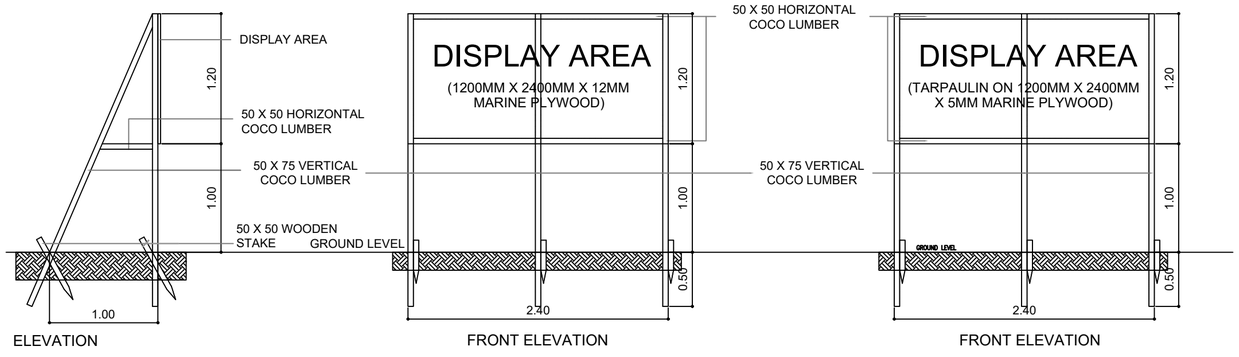
NOTE :

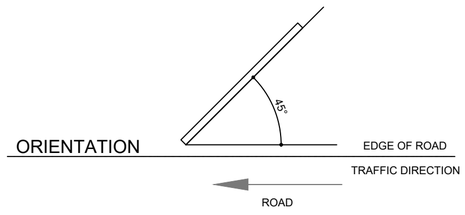
* INSTALLATION OF BILLBOARD SHALL BE ONE(1) AT THE BEGINNING & ONE(1) AT THE END OF THE PROJECT.

* NAMES OR PICTURES OF ANY PERSONAGES SHOULD NOT APPEAR IN THE BILLBOARD.

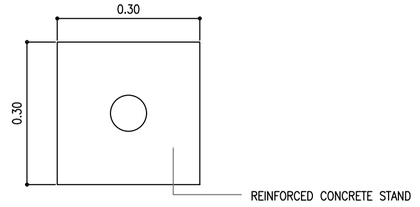
* NO POLITICAL BILLBOARD SHALL BE ALLOWED TO BE INSTALLED 100m BEFORE & 100m AFTER ALL DPWH PROJECTS & IN BETWEEN THE PROJECT LIMITS OR WITHIN THE ROAD-RIGHT-OF-WAY.

* DPWH CONTRACTORS SHALL NOT BE ALLOWED TO PLACE NAMES OF POLITICIANS ON THEIR EQUIPMENT OR CARRY POLITICAL BILLBOARD ON THEIR EQUIPMENT.





BILLBOARD FRAME DETAIL



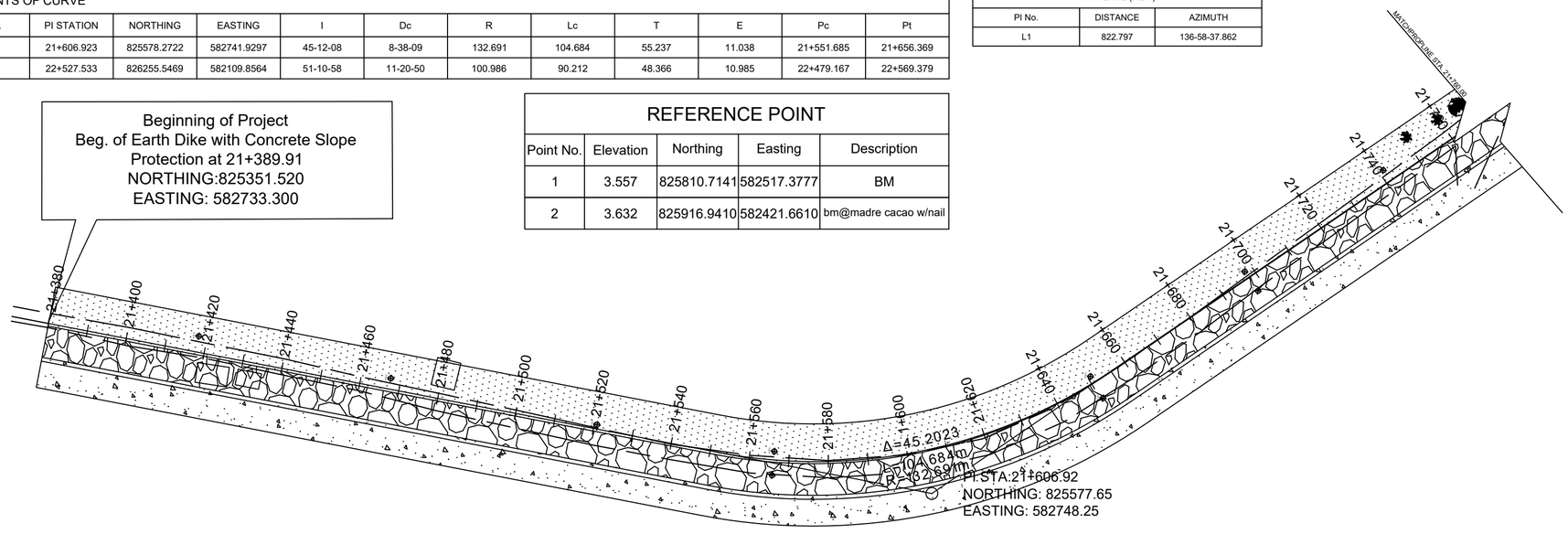
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION XI DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE TAGUM CITY	PROJECT NAME AND LOCATION: CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE	SHEET CONTENTS: STANDARD BILLBOARD DETAIL BOLLARD DETAIL	DRAFTED: HERWIN EVAN J. HABABAG ENGINEER II PREPARED: BENILDA S. PACQUIAO ENGINEER III	REVIEWED: WARREN S. PIÑEZ ENGINEER II	SUBMITTED: JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION DATE:	RECOMMENDED: GARRY E. VERANO OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	APPROVED: ARTURO P. LONGYAPON DISTRICT ENGINEER DATE:	SET NO. E 1 1	SHEET NO. 8 26

ELEMENTS OF CURVE											
PI No.	PI STATION	NORTHING	EASTING	I	Dc	R	Lc	T	E	Pc	Pt
PI - 1	21+606.923	825578.2722	582741.9297	45-12-08	8-38-09	132.691	104.684	55.237	11.038	21+551.685	21+656.369
PI - 2	22+527.533	826255.5469	582109.8564	51-10-58	11-20-50	100.986	90.212	48.366	10.985	22+479.167	22+569.379

TRAVERSE (NEW)		
PI No.	DISTANCE	AZIMUTH
L1	822.797	136-58-37.862

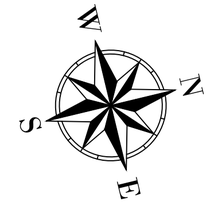
Beginning of Project
Beg. of Earth Dike with Concrete Slope Protection at 21+389.91
NORTHING:825351.520
EASTING: 582733.300

REFERENCE POINT				
Point No.	Elevation	Northing	Easting	Description
1	3.557	825810.7141	582517.3777	BM
2	3.632	825916.9410	582421.6610	bm@madre cacao w/nail



LEGEND:

- ROAD EDGE
- EXISTING PCCP
- WATER FLOW — WATER FLOW DIRECTION
- D.F.L. — DESIGN FLOOD LEVEL
- M.E.F.L. — MAXIMUM EXPERIENCED FLOOD LEVEL
- O.W.L. — ORIGINAL WATER LEVEL
- T-0 — OLD POINT OF INTERSECTION
- VARIOUS TREES
- CONTOUR LINES
- RIVER EDGE
- SOIL EXPLORATION BOREHOLE



PLAN

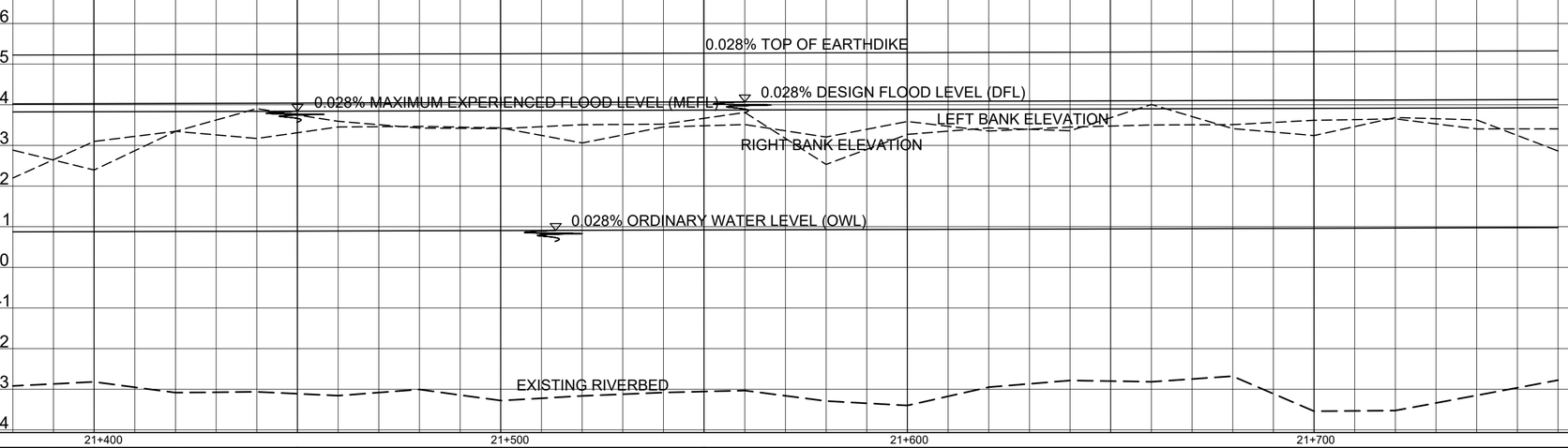
SCALE 1 : 1000 mts

PROFILE

SCALE 1 : 1000 mts (HOR.)
SCALE 1 : 100 mts (VERT.)

LEGEND:

- TOP OF EARTH DIKE
- DESIGN FLOOD LEVEL (DFL) — DFL
- MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL) — MEFL
- ORDINARY WATER LEVEL (OWL) — OWL
- LEFT/RIGHT BANK ELEVATION
- EXISTING RIVERBED



STATION	21+400				21+500																	
TOP OF EARTHDIKE	5.224	5.228	5.233	5.239	5.244	5.250	5.256	5.261	5.267	5.272	5.278	5.283	5.289	5.294	5.300	5.306	5.311	5.317	5.322	5.328		
DESIGN FLOOD LEVEL	4.024	4.028	4.033	4.039	4.044	4.050	4.056	4.061	4.067	4.072	4.078	4.083	4.089	4.094	4.100	4.106	4.111	4.117	4.122	4.128		
MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL)	3.824	3.828	3.833	3.839	3.844	3.850	3.856	3.861	3.867	3.872	3.878	3.883	3.889	3.894	3.900	3.906	3.911	3.917	3.922	3.928		
RIGHT BANK ELEVATION	2.198	3.099	3.347	3.171	3.454	3.468	3.432	3.060	3.454	3.513	3.206	3.589	3.354	3.451	3.503	3.512	3.618	3.653	3.406	3.407		
LEFT BANK ELEVATION	2.884	2.395	3.345	3.905	3.593	3.428	3.413	3.510	3.523	3.811	2.533	3.271	3.431	3.36	4.007	3.414	3.242	3.686	3.628	2.863		
ORDINARY WATER LEVEL	0.874	0.878	0.883	0.889	0.894	0.900	0.906	0.911	0.917	0.922	0.928	0.933	0.939	0.944	0.950	0.956	0.961	0.967	0.972	0.978		
EXISTING RIVERBED	-2.918	-2.818	-3.083	-3.063	-3.157	-3.005	-3.278	-3.164	-3.080	-3.031	-3.290	-3.399	-2.948	-2.784	-2.815	-2.679	-3.54	-3.524	-3.150	-2.776		

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
PLAN AND PROFILE

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
ENGINEER III

REVIEWED:
WARREN S. PIÑEZ
ENGINEER II

SUBMITTED:
JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION
DATE:

RECOMMENDED:
GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:
ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

SET NO. F 1 3

SHEET NO. 9 26

ELEMENTS OF CURVE											
PI No.	PI STATION	NORTHING	EASTING	I	Dc	R	Lc	T	E	Pc	Pt
PI - 1	21+606.923	825578.2722	582741.9297	45-12-08	8-38-09	132.691	104.684	55.237	11.038	21+551.685	21+656.369
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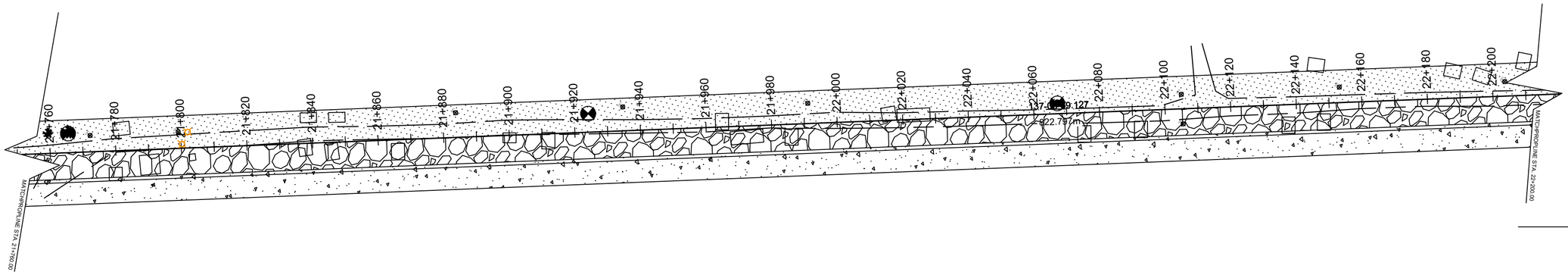
TRAVERSE (NEW)		
PI No.	DISTANCE	AZIMUTH
L1	822.797	136-58-37.862

REFERENCE POINT				
Point No.	Elevation	Northing	Easting	Description
1	3.557	825810.7141	582517.3777	BM
2	3.632	825916.9410	582421.6610	bm@madre cacao w/nail

LEGEND:

- ROAD EDGE
- EXISTING PCCP
- WATER FLOW — WATER FLOW DIRECTION
- D.F.L. — DESIGN FLOOD LEVEL
- M.E.F.L. — MAXIMUM EXPERIENCED FLOOD LEVEL
- O.W.L. — ORIGINAL WATER LEVEL
- T-0 — OLD POINT OF INTERSECTION
- VARIOUS TREES
- CONTOUR LINES
- RIVER EDGE
- SOIL EXPLORATION BOREHOLE

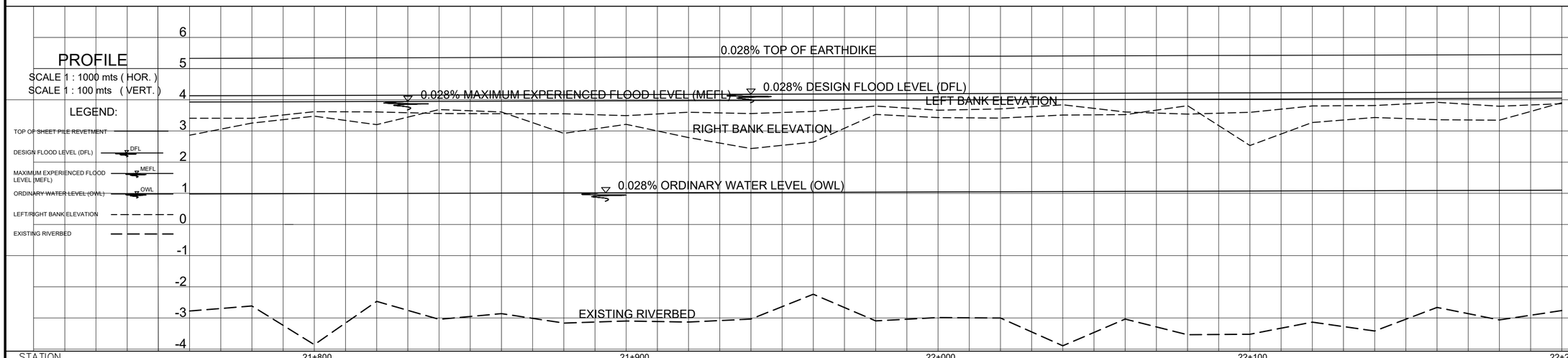


PLAN

SCALE 1 : 1000 mts

PROFILE

SCALE 1 : 1000 mts (HOR.)
SCALE 1 : 100 mts (VERT.)



STATION	21+800							21+900							22+000							22+100							22+200
TOP OF EARTHDIKE	5.328	5.333	5.339	5.344	5.350	5.356	5.361	5.367	5.372	5.378	5.383	5.389	5.394	5.400	5.406	5.411	5.417	5.422	5.428	5.433	5.439	5.444	5.450						
DESIGN FLOOD LEVEL	4.128	4.133	4.139	4.144	4.150	4.156	4.161	4.167	4.172	4.178	4.183	4.189	4.194	4.200	4.206	4.211	4.217	4.222	4.228	4.233	4.239	4.244	4.250						
MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL)	3.928	3.933	3.939	3.944	3.950	3.956	3.961	3.967	3.972	3.978	3.983	3.989	3.994	4.000	4.006	4.011	4.017	4.022	4.028	4.033	4.039	4.044	4.050						
RIGHT BANK ELEVATION	3.407	3.406	3.618	3.610	3.560	3.552	3.551	3.491	3.600	3.558	3.627	3.799	3.666	3.707	3.839	3.609	3.540	3.598	3.802	3.816	3.919	3.793	3.874						
LEFT BANK ELEVATION	2.863	3.252	3.474	3.202	3.686	3.608	2.923	3.212	2.788	2.435	2.642	3.530	3.428	3.413	3.510	3.523	3.811	2.533	3.271	3.431	3.360	3.345	3.905						
ORDINARY WATER LEVEL	0.978	0.983	0.989	0.994	1.000	1.006	1.011	1.017	1.022	1.028	1.033	1.039	1.044	1.05	1.056	1.061	1.067	1.072	1.078	1.083	1.089	1.094	1.100						
EXISTING RIVERBED	-2.776	-2.615	-3.856	-2.467	-3.043	-2.86	-3.163	-3.097	-3.130	-3.035	-2.238	-3.093	-2.986	-3.001	-3.892	-3.035	-3.537	-3.522	-3.133	-3.418	-2.661	-3.062	-2.762						

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
PLAN AND PROFILE

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
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DATE:

APPROVED:
ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

SET NO. F 2 3

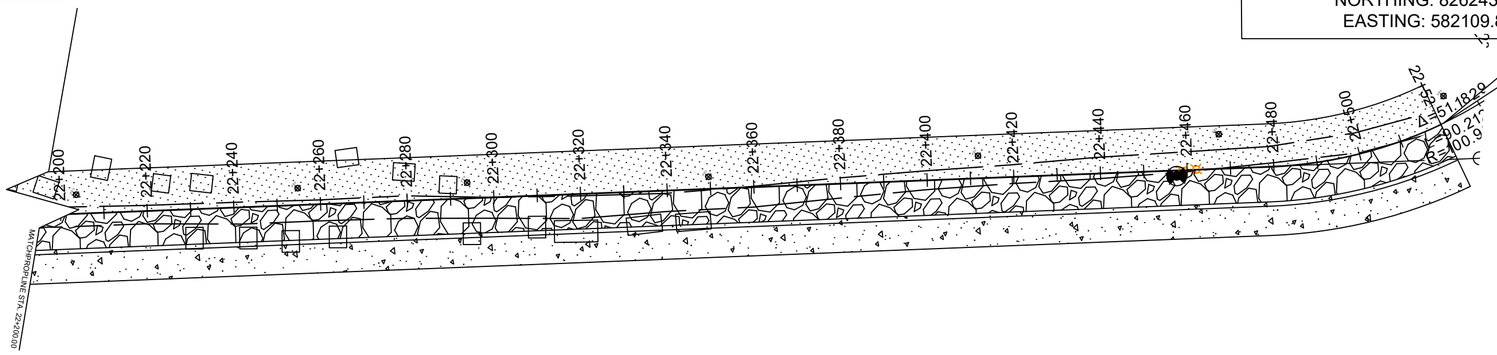
SHEET NO. 10 26

ELEMENTS OF CURVE											
PI No.	PI STATION	NORTHING	EASTING	I	Dc	R	Lc	T	E	Pc	Pt
PI - 1	21+606.923	825578.2722	582741.9297	45-12-08	8-38-09	132.691	104.684	55.237	11.038	21+551.685	21+656.369
PI - 2	22+527.533	826255.5469	582109.8564	51-10-58	11-20-50	100.986	90.212	48.366	10.985	22+479.167	22+569.379

TRAVERSE (NEW)		
PI No.	DISTANCE	AZIMUTH
L1	822.797	136-58-37.862

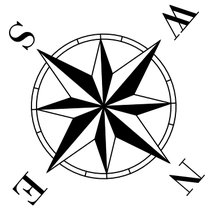
REFERENCE POINT				
Point No.	Elevation	Northing	Easting	Description
1	3.557	825810.7141	582517.3777	BM
2	3.632	825916.9410	582421.6610	bm@madre cacao w/nail

End of Project
End of Earth Dike with Concrete Slope
Protection at STA. 22+520.26
NORTHING: 826243.650
EASTING: 582109.856



LEGEND:

- ROAD EDGE
- EXISTING PCCP
- WATER FLOW — WATER FLOW DIRECTION
- D.F.L. — DESIGN FLOOD LEVEL
- M.E.F.L. — MAXIMUM EXPERIENCED FLOOD LEVEL
- O.W.L. — ORIGINAL WATER LEVEL
- T-0 — OLD POINT OF INTERSECTION
- VARIOUS TREES
- CONTOUR LINES
- RIVER EDGE
- SOIL EXPLORATION BOREHOLE



PLAN

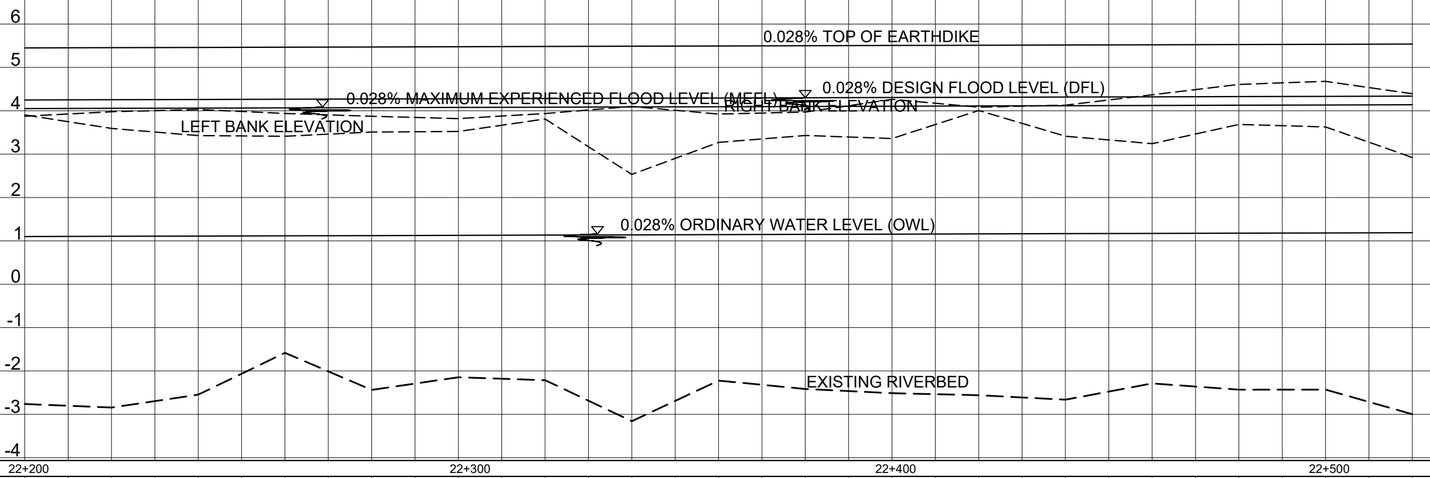
SCALE 1 : 1000 mts

PROFILE

SCALE 1 : 1000 mts (HOR.)
SCALE 1 : 100 mts (VERT.)

LEGEND:

- TOP OF SHEET PILE REVETMENT
- DESIGN FLOOD LEVEL (DFL)
- MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL)
- ORDINARY WATER LEVEL (OWL)
- LEFT/RIGHT BANK ELEVATION
- EXISTING RIVERBED



STATION	22+200																	
TOP OF EARTHDIKE	5.450	5.456	5.461	5.467	5.472	5.478	5.483	5.489	5.494	5.500	5.506	5.511	5.517	5.522	5.528	5.533	5.539	
DESIGN FLOOD LEVEL	4.250	4.256	4.261	4.267	4.272	4.278	4.283	4.289	4.294	4.300	4.306	4.311	4.317	4.322	4.328	4.333	4.339	
MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL)	4.050	4.056	4.061	4.067	4.072	4.078	4.083	4.089	4.094	4.100	4.106	4.111	4.117	4.122	4.128	4.133	4.139	
RIGHT BANK ELEVATION	3.874	3.978	4.030	3.939	3.874	3.820	3.937	4.100	3.925	3.971	4.264	4.084	4.130	4.368	4.609	4.679	4.393	
LEFT BANK ELEVATION	3.905	3.593	3.428	3.413	3.510	3.523	3.811	2.533	3.271	3.431	3.360	4.007	3.414	3.242	3.686	3.628	2.923	
ORDINARY WATER LEVEL	1.100	1.106	1.111	1.117	1.122	1.128	1.133	1.139	1.144	1.150	1.156	1.161	1.167	1.172	1.178	1.183	1.189	
EXISTING RIVERBED	-2.762	-2.843	-2.546	-1.581	-2.437	-2.145	-2.212	-3.158	-2.222	-2.415	-2.512	-2.559	-2.662	-2.287	-2.431	-2.430	-2.997	

STATION	22+300																	
TOP OF EARTHDIKE	5.450	5.456	5.461	5.467	5.472	5.478	5.483	5.489	5.494	5.500	5.506	5.511	5.517	5.522	5.528	5.533	5.539	
DESIGN FLOOD LEVEL	4.250	4.256	4.261	4.267	4.272	4.278	4.283	4.289	4.294	4.300	4.306	4.311	4.317	4.322	4.328	4.333	4.339	
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LEFT BANK ELEVATION	3.905	3.593	3.428	3.413	3.510	3.523	3.811	2.533	3.271	3.431	3.360	4.007	3.414	3.242	3.686	3.628	2.923	
ORDINARY WATER LEVEL	1.100	1.106	1.111	1.117	1.122	1.128	1.133	1.139	1.144	1.150	1.156	1.161	1.167	1.172	1.178	1.183	1.189	
EXISTING RIVERBED	-2.762	-2.843	-2.546	-1.581	-2.437	-2.145	-2.212	-3.158	-2.222	-2.415	-2.512	-2.559	-2.662	-2.287	-2.431	-2.430	-2.997	

STATION	22+400																	
TOP OF EARTHDIKE	5.450	5.456	5.461	5.467	5.472	5.478	5.483	5.489	5.494	5.500	5.506	5.511	5.517	5.522	5.528	5.533	5.539	
DESIGN FLOOD LEVEL	4.250	4.256	4.261	4.267	4.272	4.278	4.283	4.289	4.294	4.300	4.306	4.311	4.317	4.322	4.328	4.333	4.339	
MAXIMUM EXPERIENCED FLOOD LEVEL (MEFL)	4.050	4.056	4.061	4.067	4.072	4.078	4.083	4.089	4.094	4.100	4.106	4.111	4.117	4.122	4.128	4.133	4.139	
RIGHT BANK ELEVATION	3.874	3.978	4.030	3.939	3.874	3.820	3.937	4.100	3.925	3.971	4.264	4.084	4.130	4.368	4.609	4.679	4.393	
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ORDINARY WATER LEVEL	1.100	1.106	1.111	1.117	1.122	1.128	1.133	1.139	1.144	1.150	1.156	1.161	1.167	1.172	1.178	1.183	1.189	
EXISTING RIVERBED	-2.762	-2.843	-2.546	-1.581	-2.437	-2.145	-2.212	-3.158	-2.222	-2.415	-2.512	-2.559	-2.662	-2.287	-2.431	-2.430	-2.997	

STATION	22+500																	
TOP OF EARTHDIKE	5.450	5.456	5.461	5.467	5.472	5.478	5.483	5.489	5.494	5.500	5.506	5.511	5.517	5.522	5.528	5.533	5.539	
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REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF FLOOD CONTROL MITIGATION STRUCTURE ALONG TAGUM-LIBUGANON RIVER, PROTECTING TALOMO TO MAGUPISING, STO. TOMAS SECTION, DAVAO DEL NORTE

SHEET CONTENTS:
PLAN AND PROFILE

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
BENILDA S. PACQUIAO
ENGINEER III

REVIEWED:
WARREN S. PIÑEZ
ENGINEER II

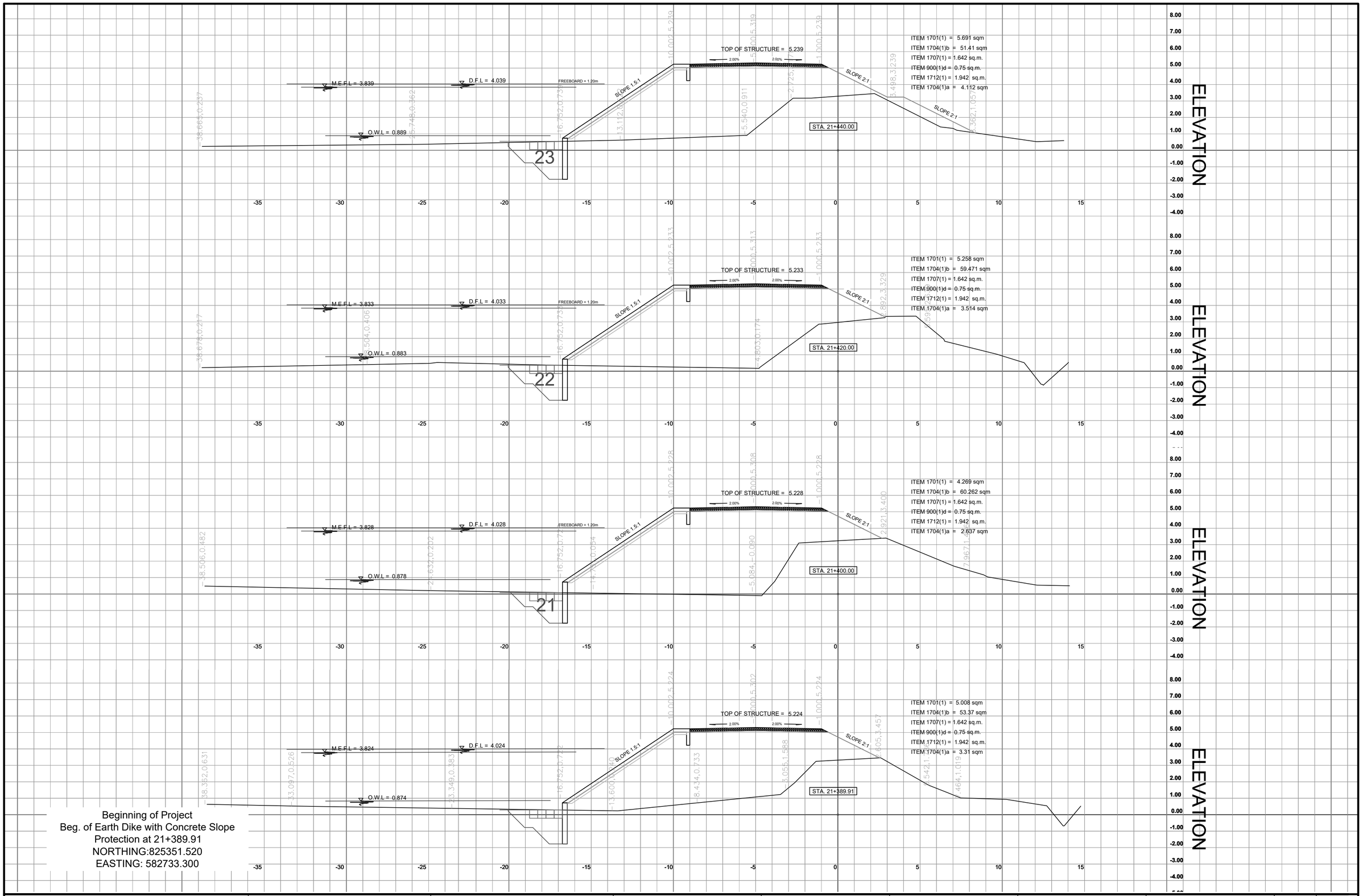
SUBMITTED:
JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION
DATE:

RECOMMENDED:
GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:
ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

SET NO. F 3 3

SHEET NO. 11 26



Beginning of Project
Beg. of Earth Dike with Concrete Slope Protection at 21+389.91
NORTHING:825351.520
EASTING: 582733.300

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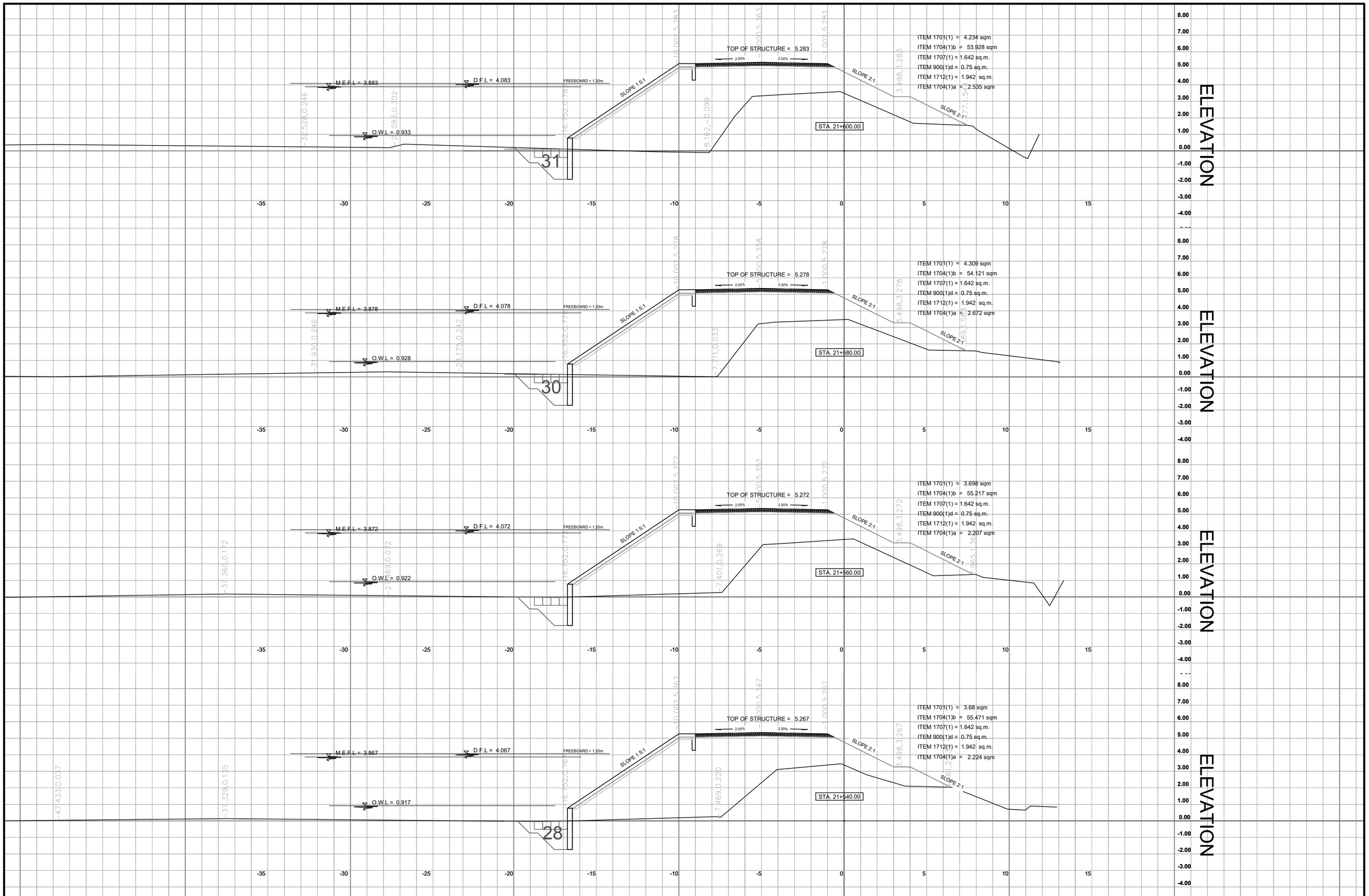

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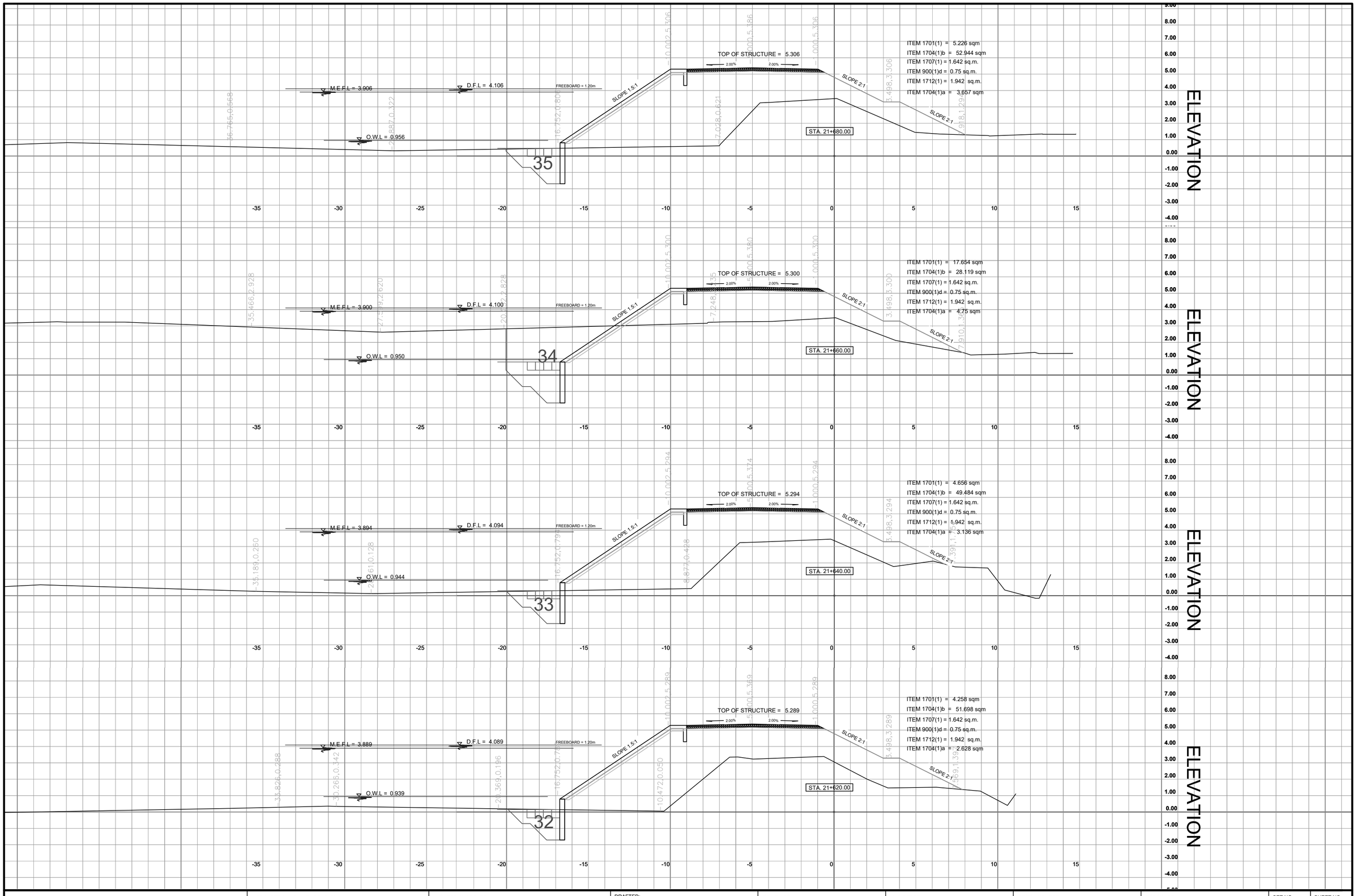

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