GOVERNMENT OF KHYBER PAKHTUNKHWA
PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA)

CONSTRUCTION OF ROAD FROM MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TENDER DRAWINGS

JUNE, 2022

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LIMITED.
NESPAK HOUSE 2nd Floor Attaturk Avenue, Sector G-5/2 Islamabad- Pakistan.

LIST OF DRAWINGS

Sr.No.	TITLE OF DRAWING	DRAWING No.	TOTAL NO OF SHEETS
1	LIST OF DRAWINGS AND GENERAL NOTES	4402/102/TD/KM001	01
2	KEY MAP	4402/102/TD/KM002	01
3	SYMBOLS AND ABBREVIATIONS	4402/102/TD/SA002A	01
4	ROUTE LOCATION PLAN	4402/102/TD/RLP 01~04	04
5	TYPICAL CROSS SECTIONS	4402/102/TD/TC003A~TC003B	02
6	SCHEDULE OF STRUCTURES	4402/102/TD/SS004	01
7	TRAVERSE STATION DATA	4402/102/TD/TS004B	01
8	GENERAL ARRANGEMENT PLAN,ELEVATION AND SECTION BRIDGE	4402/102/TD/BG005A	01
9	PRESTRESSED GIRDER DETAILS	4402/102/TD/PG005B~005C	02
10	BOX CULVERT GENERAL ARRANGEMENT	4402/102/TD/BCG005	01
11	BOX CULVERT GENERAL ARRANGEMENT REINFORCEMENT DETAIL	4402/102/TD/BCR006	01
12	DESIGN PARAMETERS WITH REINFORCEMENT DETAIL	4402/102/TD/BCR007	01
13	TYPICAL R.C.C PIPE CULVERT GENERAL ARRANGEMENT DETAIL	4402/102/TD/PC-007	01
14	RCC WING WALL REINFORCEMENT DETAIL	4402/102/TD/WWR008	01
15	BOX CULVERT WING WALL REINFORCEMENT DETAIL	4402/102/TD/WWR009	01
16	BOX CULVERT WING WALL REINFORCEMENT DETAIL	4402/102/TD/WWR010	01
17	TYPICAL PLUM CONCRETE RETAINING WALL DETAILS	4402/102/TD/PIRWP011	01
18	GENERAL NOTES FOR STRUCTURES	4402/102/TD/GNS012	01
19	REBAR SHAPE CODE	4402/102/TD/RS013	01
20	MISCELLANEOUS PROTECTION DETAIL	4402/102/TD/014	01
21	TYPICAL SUPERELEVATION DETAILS	4402/102/TD/TS015	01
22	TYPICAL ROAD SIGN DETAILS	4402/102/TD/RS016~25	10
23	PAVEMENT MARKING AND ROAD STUDS	4402/102/TD/PMS026	01
25	DETAIL PLAN & PROFILE DRAWINGS	4402/102/TD/P&P	14

GENERAL NOTES

1. ALL DIMENSIONS SHOWN ON PLAN AND PROFILE DRAWINGS ARE IN METERS WHEREAS ANGULAR MEASUREMENTS ARE IN DEGREES, MINUTES AND SECONDS (360° TO A CIRCLE).
2. EACH DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER DRAWINGS.
3. GRID CO-ORDINATES AND ELEVATIONS ARE BASED ON UTM ZONE 43-N.
4. MINOR CHANGES IN HORIZONTAL/VERTICAL ALIGNMENT MAY BE CARRIED OUT AT SITE WITH PRIOR APPROVAL OF THE ENGINEER.
5. STRUCTURES SHOWN ON PLAN/PROFILE ARE SYMBOLIC. FOR DETAIL OF STRUCTURES AND PROTECTION WORKS SEE RELEVANT DRAWING. HOWEVER DETAILED INVENTORY OF STRUCTURES SHALL BE PREPARED AS PER SITE CONDITION/REQUIREMENTS AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRACTION ACTIVITES AT SITE.
6. FOR PAVEMENT MARKING AND ROAD SIGNS, CONTRACTOR SHALL SUBMIT DETAILED PLANS DRAWINGS FOR APPROVAL OF THE ENGINEER.
7. LOCATION OF UNDER GROUND CABLES/UTILITIES SHOWN ON PLANS ARE APPROXIMATE. EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR AT HIS OWN COST.
8. ANY DAMAGE DONE TO THE UTILITIES DURING EXCAVATION/EXECUTION OF WORKS SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR AT HIS OWN COST TO THE SATISFACTION OF CONCERNED DEPARTMENTS.
9. THE SUBGRADE MATERIAL SHALL HAVE A MINIMUM SOAKED C.B.R. OF 08% AT 95% M.D.D. AASHTO T-180 FOR BOTH FILL AND CUT SECTIONS.
10. THE LENGTHS, SIZES, SLOPES, INVERT LEVELS AND OTHERS GIVEN DETAILS REGARDING CULVERTS, AS SHOWN IN SCHEDULE OF STRUCTURES ARE TENTATIVE. THE CONTRACTOR SHALL PREPARE SHOP DRAWINGS OF EACH CULVERT LOCATIONS WITH THE REQUIRED SKEW ANGLE AS PER SITE REQUIREMENTS AND SHALL SUBMIT THE SAME TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION EXECUTION.
11. THE CONTRACTOR SHALL BE RESPONSIBLE TO CATER FOR ALL TEMPORARY TRAFFIC DIVERSIONS BEFORE START OF CONSTRUCTION OF THE ROAD TO THE CNTIRE SATISFACTION OF THE ENGINEER INCLUDING DETOUR ROAD AND ITS MAINTENANCE, SPRINKLING OF WATER, GRADING AND COMPACTION WHEN AND WHERE REQUIRED AT HIS OWN COST.
12. RETAINING/BREAST/TOE WALL, GUARD RAIL, CONCRETE CURB STONES, FOOTPATH, ROAD SIGNS, GANTRY SIGNS, PAVEMENT STUDS AND OTHER ANCILLARY ITEMS SHALL BE PROVIDED AS PER THE BOQ ITEMS , AS PER SITE REQUIREMENT OR AS DIRECTED BY THE ENGINEER. CONTRACTOR SHALL PREPARE THE SHOP DRAWINGS FOR EACH ACTIVITY/ LOCATION ALONG WITH METHODOLOGY AND SHALL SUBMIT FOR APPROVAL TO THE ENGINEER PRIOR TO START OF CONSTRUCTION.
13. TWO COATS OF BITUMEN PAINT SHALL BE APPLIED ON CONCRETE FACES IN CONTACT WITH THE SOIL. COST OF THIS ITEM IS DEEMED TO BE INCLUDED IN THE RELEVENT BOQ ITEM RATES AND NO SEPRATE PAYMENT SHALL BE MADE FOR THIS ITEM OF WORK.
14. RETAINING/DRAINAGE STRUCTURES FOUNDATION SHALL BE PLACED ON FIRM,HARD AND ROCKY STRATA, OR AS DIRECTED BY ENGINEER.
15. ROADWAY EXCAVATION MATERIAL SHELL BE UTILIZED IN MOST EFFECTIVE MANNER IN THE EMBANKMENT EVEN WITH BLENDING /MIXING WITH THE SUPERIOR MATERIALS (IF REQUIRED, WIHTOUT AT ANY EXTRA COST). ROADWAY EXCAVATION SHALL NOT BE DISPOSED OFF OUTSIDE RIGHT OF WAY, IT IS MANDATORY TO UTILIZE IN THE PROJECT.
16. DURING EXECUTION, JOINT CROSS SECTION AND ACTUAL NSL OF CENTER LINE WILL BE PROVIDED TO FINALIZE THE ROAD PROFILE PRIOR TO COMMONS CONSTRUCTION ACTIVELY AT SITE.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED

DRAWN	
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

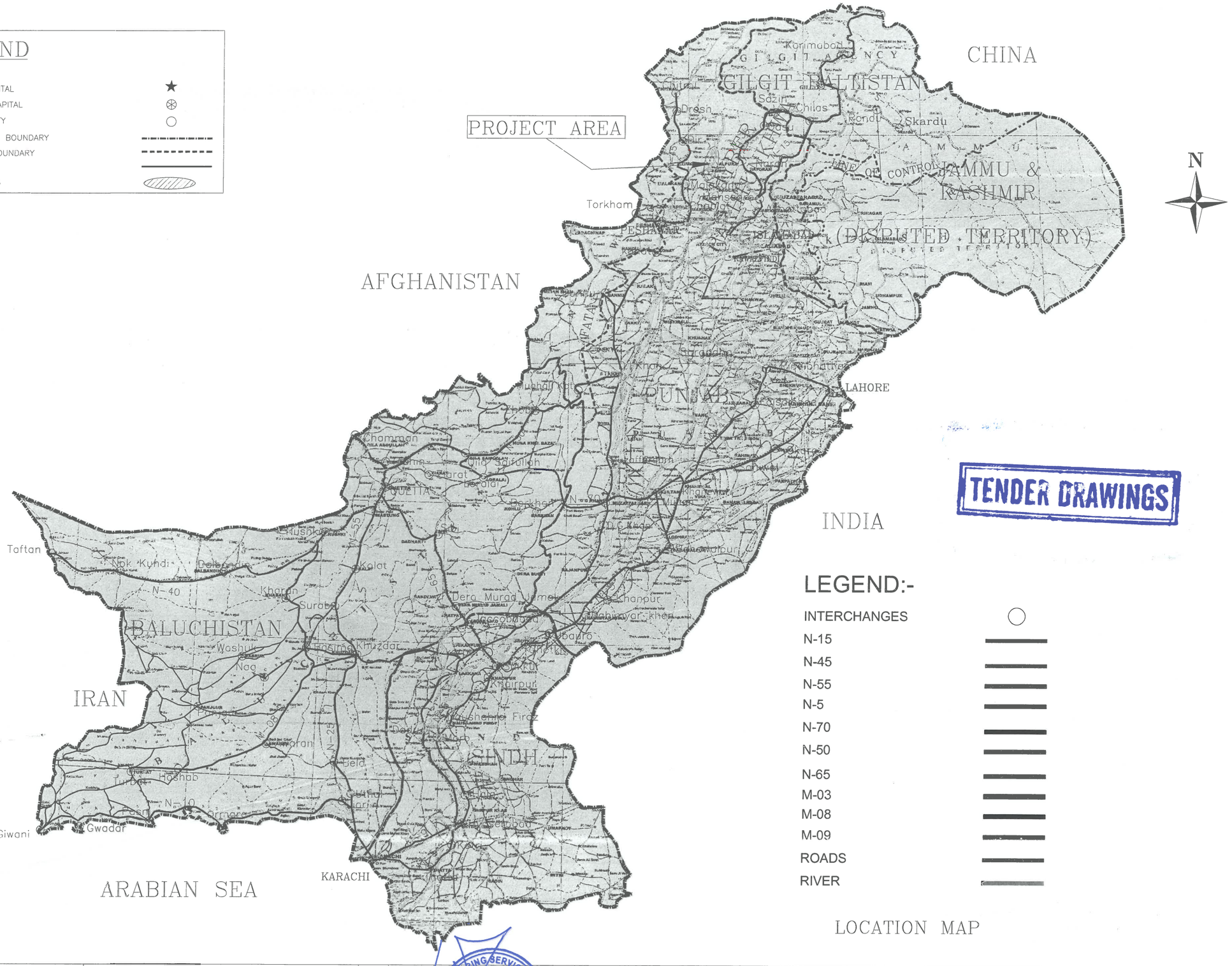
TITLE: LIST OF DRAWINGS & GENERAL NOTES

DATE: JUNE, 2022

DWG NO.: 4402/102/TD/ LDG001

LEGEND

- NATIONAL CAPITAL
- PROVINCIAL CAPITAL
- IMPORTANT CITY
- INTERNATIONAL BOUNDARY
- PROVINCIAL BOUNDARY
- ROADS
- PROJECT AREA



TENDER DRAWINGS

N

LEGEND:-

- INTERCHANGES
- N-15
- N-45
- N-55
- N-5
- N-70
- N-50
- N-65
- M-03
- M-08
- M-09
- ROADS
- RIVER

LOCATION MAP

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION		
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.
			APPROVED	APPROVED

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: KEY MAP

DATE: JUNE, 2022

DWG NO.: 4402/102/TD/ KM002

SYMBOLS

DESIGN CENTER LINE

AGRICULTURE LAND

LAND ACQUISITION

TREES

BUSHES

MOSQUE

PERMANENT HOUSE / TEMPORARY

GRAVES / GRAVE YARD

TELEPHONE POLE

ELECTRIC & T&T LINE

DIRT TRACK — D.TRACK

METALLED ROAD

ELECTRIC POLE

HIGH TENSION LINE PYLON

HORIZONTAL CURVE DATA — CH= R= L= Δ = E= N=

GRID NORTH — N N

TRAVERSE /BM POINTS — TP

FENCE

SUI GAS & WATER PIPE LINE

TUBE WELL

BOUNDARY LINE

MANHOLE

NULLAH

CULVERT / BRIDGE

T&T BOX — T&T

HAND PUMP — HP

CANAL / DRAIN

LINED WATER COURSE

UNLINED WATER COURSE

SPUR STRUCTURE

GRID LINE — N= E=

SPOT LEVEL (TYP.) — 100.00

ROAD SIGN (IN PLAN) — ROAD SIGN NUMBER (101)

EXISTING GROUND LEVEL (PROFILE)

FINISHED GRADE LINE

C/WAYS IN PROFILE

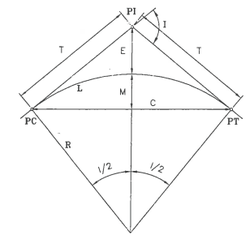
CULVERT IN PROFILE

C/WAYS IN PLAN

ABBREVIATIONS

A	AREA
ALIG.	ALIGNMENT
B	BREADTH
BC	BOX CULVERT
B.M	BENCH MARK
BOP	BEGINNING OF PROJECT
C	CHORD LENGTH
C.B.R	CALIFORNIA BEARING RATIO
C/C	CENTER TO CENTER
CHD.	CHECKED
C/L, ℄	CENTER LINE
CM/cm	CENTIMETER
CONC.	CONCRETE
CONST/JT	CONSTRUCTION JOINT
CS	CURVE TO SPIRAL
CUL	CULVERT
Cu.m	CUBIC METER
CURVE LEN	VERTICAL CURVE LENGTH
DC	DEPTH OF CUT
Da	DEGREE OF CURVE (BY ARC)
Dc	DEGREE OF CURVE (BY CHORD)
DEG	DEGREE
DIA.	DIAMETER
DIM.	DIMENSION
D/S	DOWNSTREAM
D.S.T	DOUBLE SURFACE TREATMENT
DRG.	DRAWING
E	EASTING , EAST , EXTERNAL DISTANCE (SHIFT)
ELEV./EL	ELEVATION
EOP	END OF PROJECT
EXP/JT	EXPANSION JOINT
G.I	GALVANIZED IRON
H/HOR.	HORIZONTAL
H.T/L.T	HIGH TENSION/LOW TENSION
HF	HEIGHT OF FILL
HFL	HIGH FLOOD LEVEL
HWY.	HIGHWAY
I	DEFLECTION ANGLE (HORIZONTAL CURVE)
Ic	CIRCULAR DEFLECTION ANGLE
I.L	INVERT LEVEL
K	SMOOTHNESS FACTOR (IN CASE OF VERTICAL CURVE)
Kg.	KILOGRAM
KM/Km	KILOMETER
L	LENGTH OF HORIZONTAL CURVE/SPIRAL
L.M	LINEAR METER
LHS.	LEFT HAND SIDE
LT.	LEFT
LT	LONG TANGENT
M/m	METER
M	MIDDLE ORDINATE
MAX.	MAXIMUM
M.H	MAN HOLE
MIN.	MINIMUM
mm	MILLIMETER
N.S.L	NATURAL SURFACE LEVEL (E.G.L)
N	NORTHING, NORTH
NO.	NUMBER
N.T.S	NOT TO SCALE

P	OFFSET OF TANGENT LINE TO PC OF SHIFTED CIRCLE CURVE
PC	POINT OF HORIZONTAL CURVATURE (START OF HORIZONTAL CURVE)
P.C.	REINFORCED CONCRETE PIPE CULVERT
PGL	PROFILE GRADE LINE
P.I.	PLASTICITY INDEX
PI	POINT OF HORIZONTAL INTERSECTION
PR	POINT OF ROTATION
PT	POINT OF HORIZONTAL TANGENCY (END OF HORIZONTAL CURVE)
R	RADIUS OF HORIZONTAL CURVE
R.C	REINFORCED CONCRETE
REINF.	REINFORCEMENT
REV.	REVISION
RHS.	RIGHT HAND SIDE
R.O.W.	RIGHT OF WAY
RT.	RIGHT
R/W	RETAINING WALL
RWC	RELOCATED WATER COURSE
S	SLOPE GRADIENT (PERCENT)
SE	SUPERELEVATION
S.B.P	SHOULDER BREAK POINT
S.C.	SLAB CULVERT
SC	SPIRAL TO CURVE, SLAB CULVERT
SHLD	SHOULDER
Sq.m	SQUARE METER
S.T.	SHORT TANGENT
ST	SPIRAL TO TANGENT
STA./STA	STATION (CHAINAGE)
STRUCT	STRUCTURE
SUPEREL.	SUPERELEVATION
S'WALK	SIDE WALK
T	TANGENT LENGTH OF HORIZONTAL CURVE
TS	TANGENT TO SPIRAL
T.S.T	TRIPPLE SURFACE TREATMENT
TAN.	TANGENT
TH	THICKNESS
TR	TRANSITION
TYP.	TYPICAL
U/S	UPSTREAM
V	VERTICAL
VAR.	VARIABLE
VER.	VERIFIED
VPC	VERTICAL POINT OF CURVATURE (START OF VERTICAL CURVE)
VPI	VERTICAL POINT OF INTERSECTION OF PROFILE GRADE.
VPT	VERTICAL POINT OF TANGENCY (END OF VERTICAL CURVE)
W.	WEST, WIDTH OF ROADWAY
W.B.M	WATER BOUND MACADAM
WC	WATER COURSE
X	DISTANCE, PERPENDICULAR TO THE TANGENT, FROM BEGINNING TO THE END OF SPIRAL
Y	DISTANCE, PERPENDICULAR TO THE TANGENT, FROM BEGINNING TO THE END OF SPIRAL
θ	SKEW ANGLE



CIRCULAR CURVE PARAMETERS

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: SYMBOLS AND ABBREVIATIONS

DATE: JUNE, 2022

DWG NO. 4402/102/TD/ SA002A

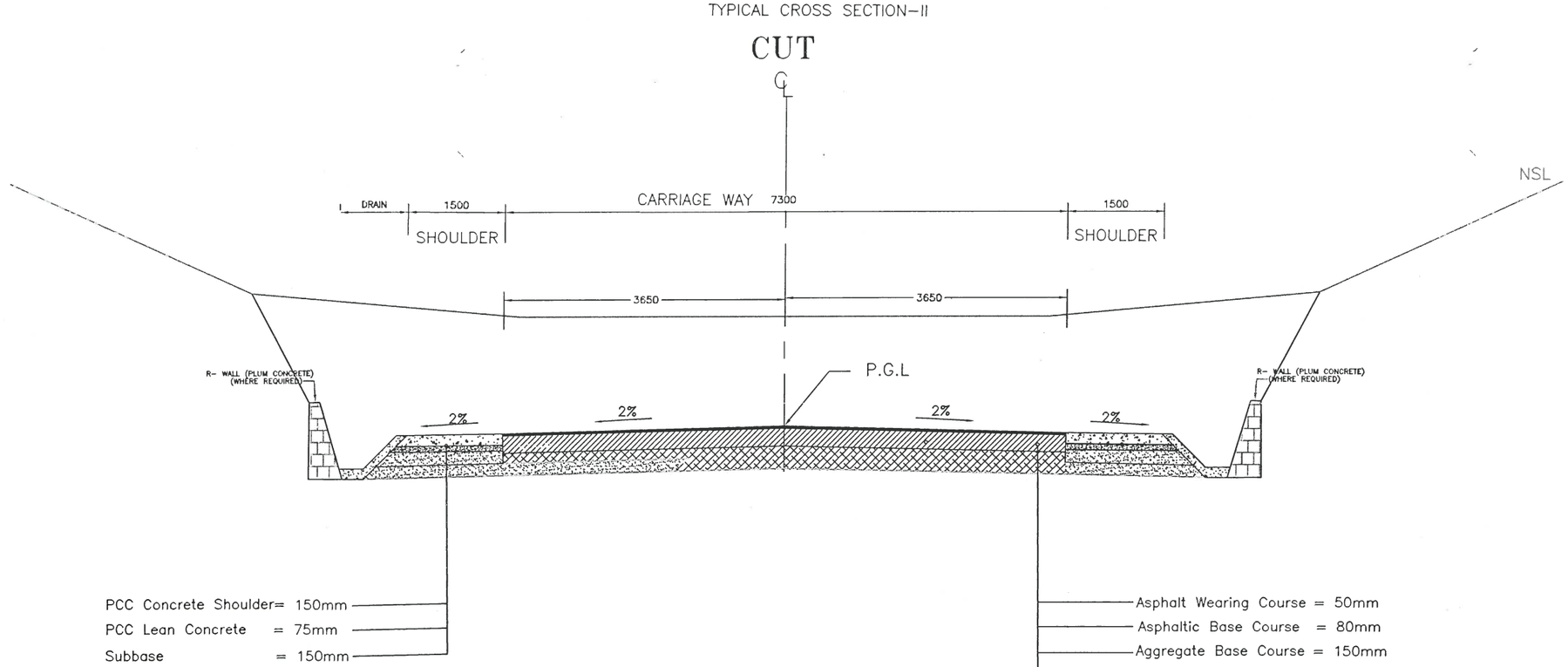


PAKHTUNKHWA HIGHWAY AUTHORITY	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.		DRAWN		CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)
			SUBMITTED		TITLE: ROUTE LOCATION MAP BAHRAIN
			RECOMMENDED		
			CHD./VER.		DATE: JUNE, 2021
		APPROVED	APPROVED		DWG NO.: 4402/102/TD/

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

TYPICAL CROSS SECTION–II

CUT



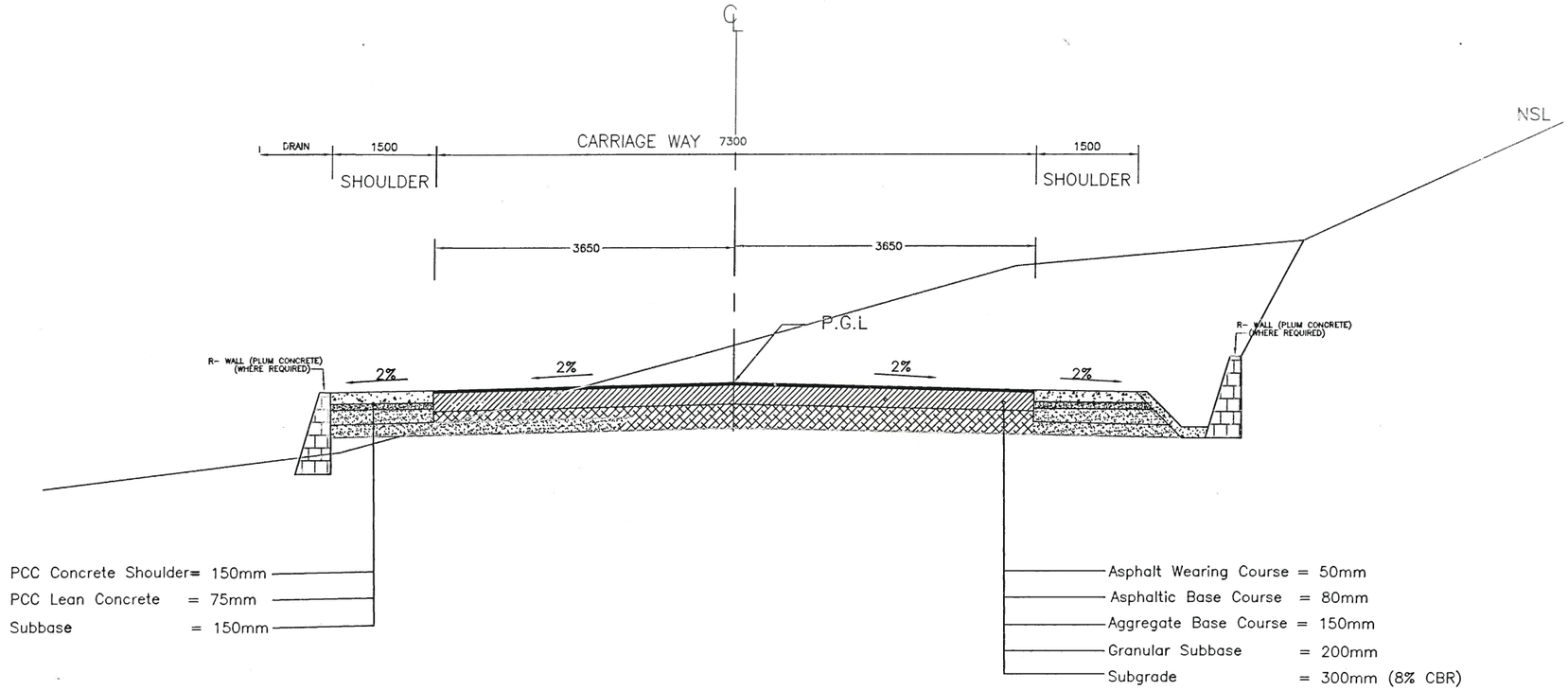
TENDER DRAWINGS

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE–1(BEHRAIN BYPASS)	TYPICAL CROSS SECTION
			SCALE NTS
			DATE JUNE 2022
			DWG NO. 4402/102/TD/CS01

DESCRIPTION			
		DRAWN	
		SUBMITTED	
		RECOMMENDED	
		CHD./VER.	
	APPROVED	APPROVED	

TYPICAL CROSS SECTION–III

CUT /FILL



TENDER DRAWINGS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

			DRAWN	
			SUBMITTED	
			RECOMMENDED	
			CHD./VER.	
	DESCRIPTION	APPROVED	APPROVED	

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE–1(BEHRAIN BYPASS)

TYPICAL CROSS SECTION

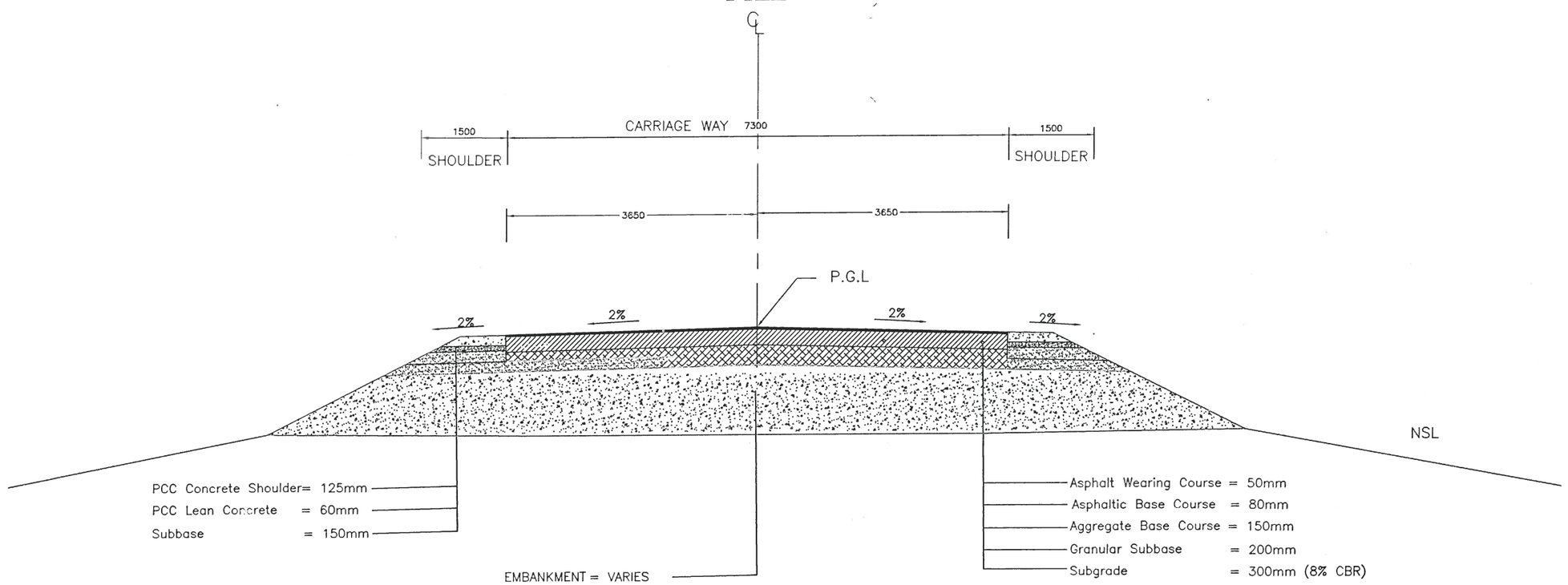
SCALE NTS

DATE JUNE 2022

DWG NO. 4402/102/iD/CS02

TYPICAL CROSS SECTION–II

FILL



TENDER DRAWINGS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

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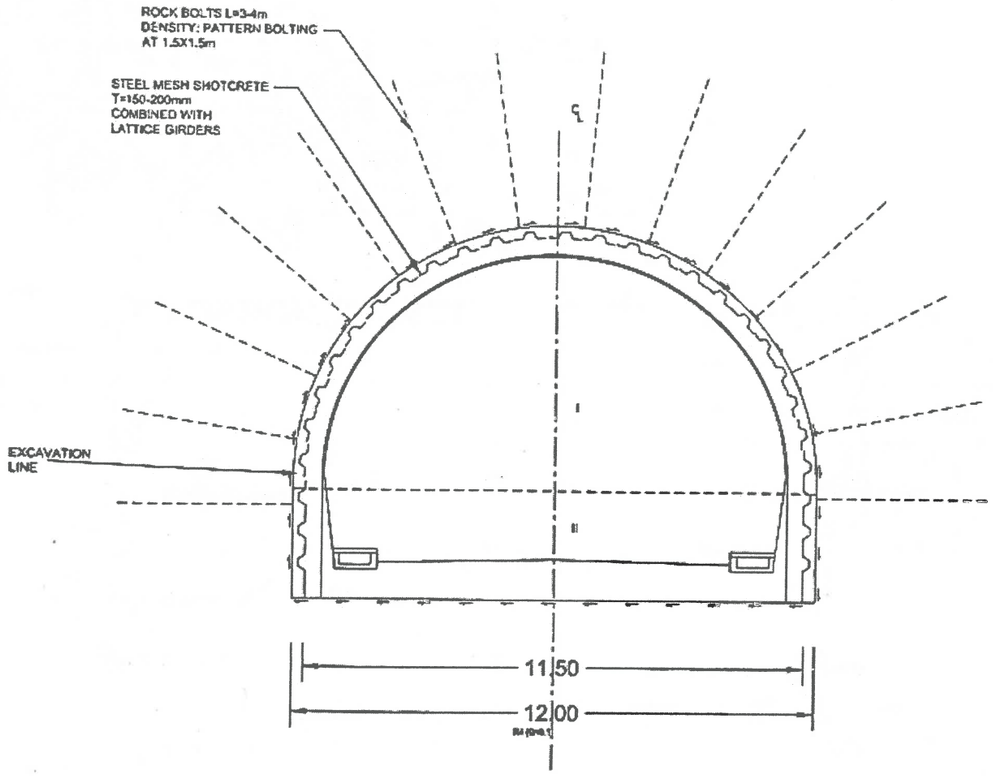
CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE–1(BEHRAIN BYPASS)

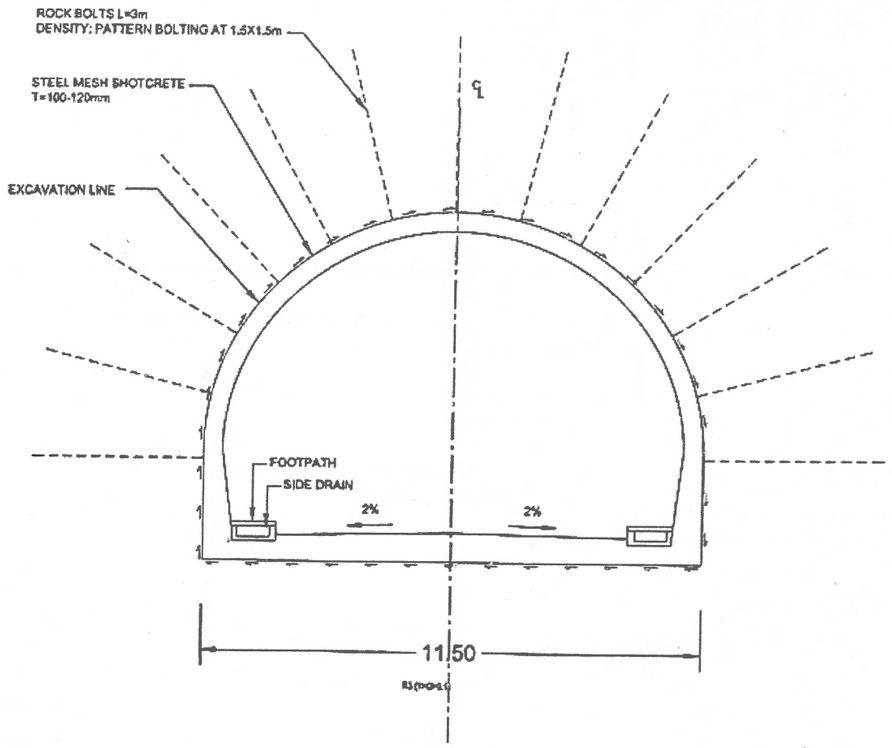
TYPICAL CROSS SECTION

SCALE NTS

DATE JUNE 2022

DWG NO. 4402/102/TD/CS03





TYPICAL SECTION

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PrHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

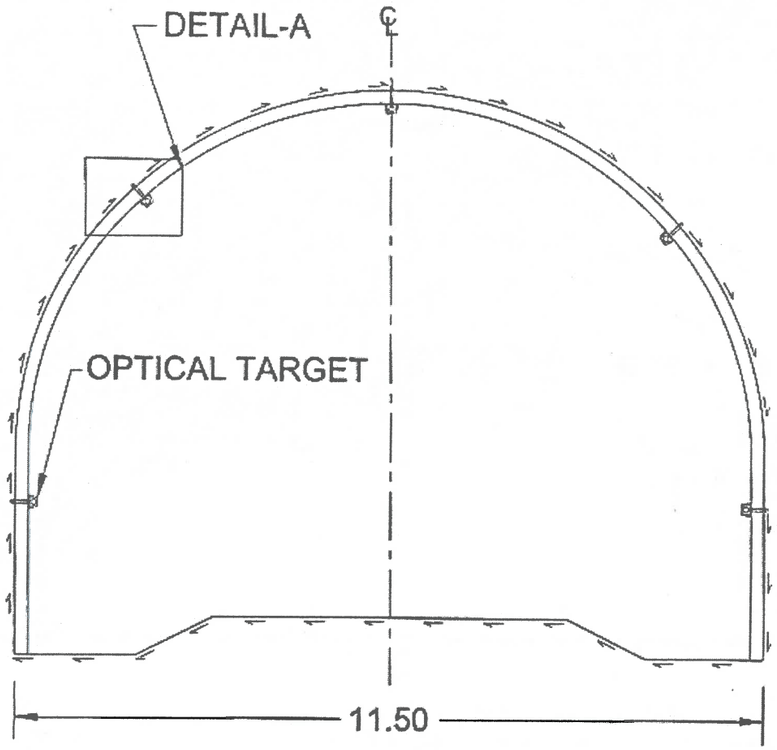
DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD
MADYAN TO KALAM INCLUDING
BRIDGES DISTRICT SWAT PHASE-1
BEHRAIN BYPASS

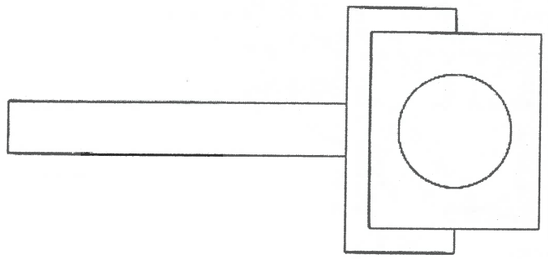
TYPICAL SECTION

DATE	DWG NO.	REV.
MARCH , 2022		0

SCALE
AS SHOWN



DETAIL-A



DETAIL 'A'
OPTICAL TARGET

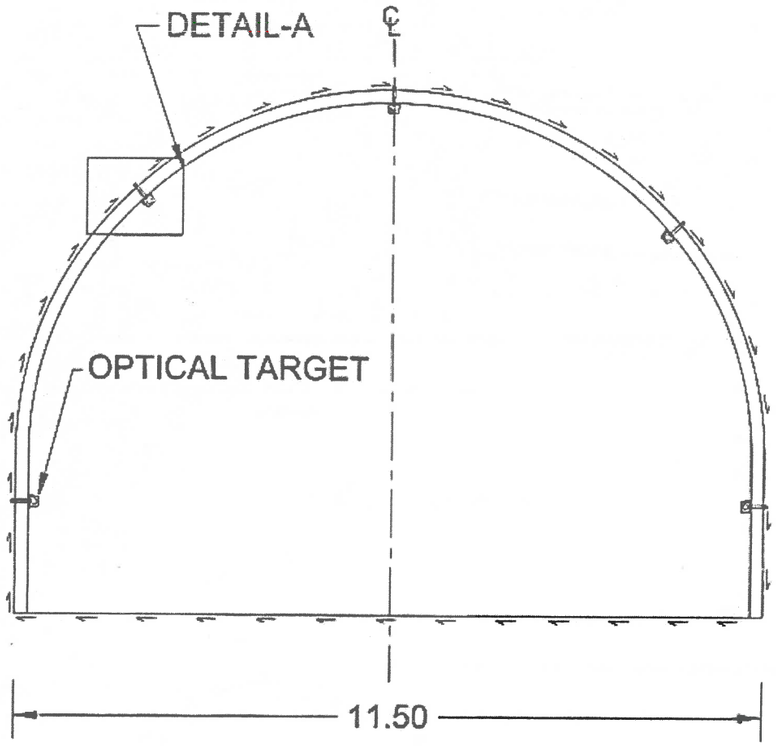
TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)	NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	04			DRAWN	ASIF SAMI
		03			SUBMITTED	
		02			RECOMMENDED	
		01			CHD./VER.	
	HEAD OFFICE NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN	REV.	DATE	DESCRIPTION	APPROVED	APPROVED

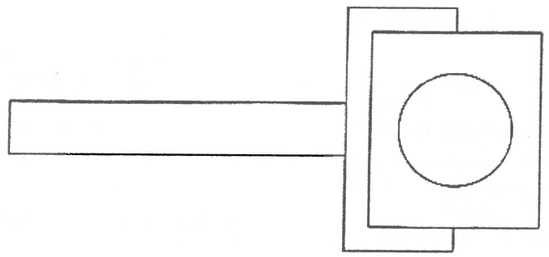
CONSTRUCTION OF ROAD MADYAN TO KÁLAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

CONVERGENCE MEASUREMENT POINTS

SCALE	DATE	DWG NO.	REV.
AS SHOWN	MARCH , 2022		0



DETAIL-A

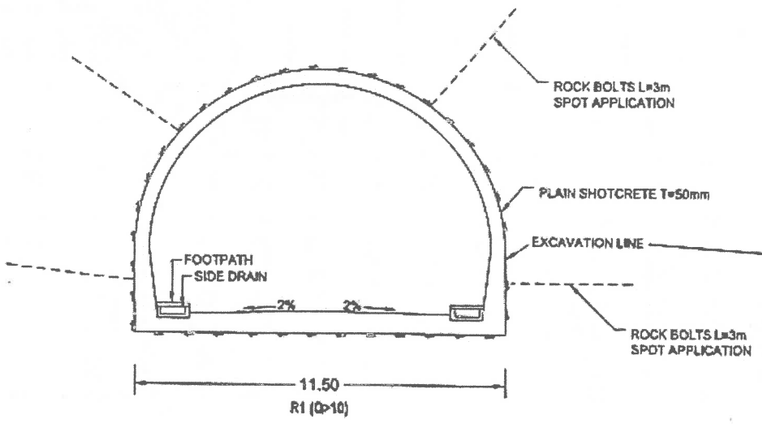


DETAIL 'A'
OPTICAL TARGET

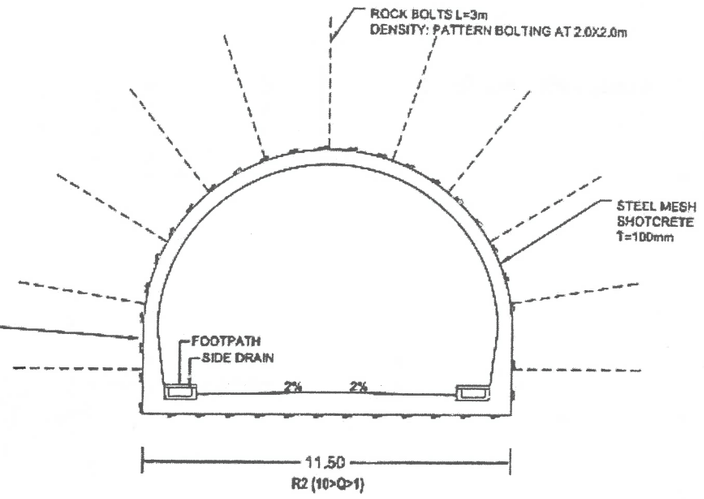
TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)	NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	04			DRAWN	ASIF SAMI	CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS	CONVERGENCE MEASUREMENT POINTS (BT-1)	SCALE AS SHOWN
	HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN	03			SUBMITTED			DATE MARCH , 2022	DWG NO.
		02			RECOMMENDED				REV. 0
		01			CHD/MGR.				
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			

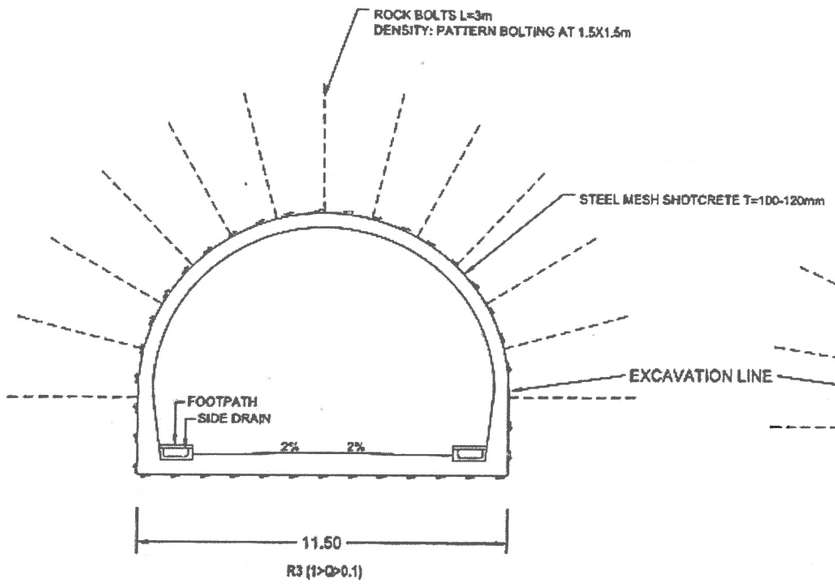
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.



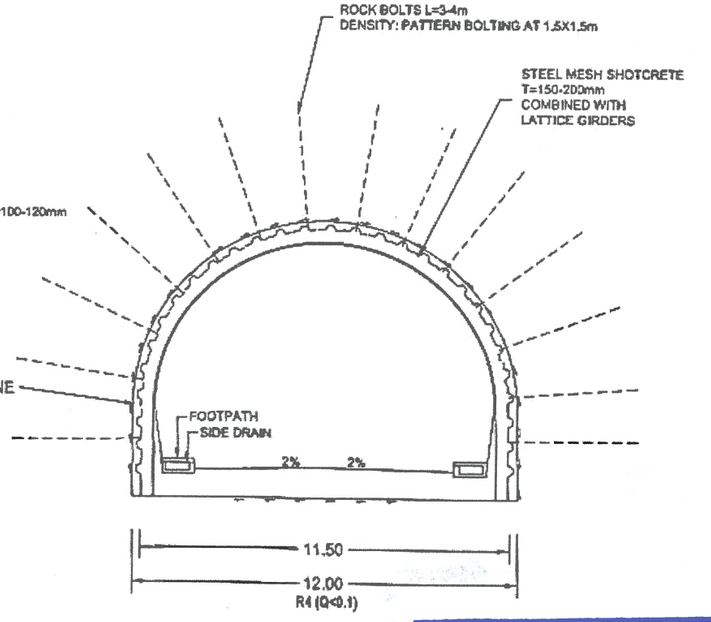
R1 (Q>10)



R2 (10>Q>1)



R3 (1>Q>0.1)



R4 (Q<0.1)

SECTION APPLICABILITY OF ROCK SUPPORT

SUPPORT CLASS	% TUNNEL LENGTH
R1	5
R2	10
R3	70
R4	15

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). NO ROCK SHALL PROTRUDE INSIDE THE EXCAVATION LINE.

3). ALL SHOTCRETE IS STEEL MESH REINFORCED UNLESS OTHERWISE STATED.

4). SHOTCRETE CHARACTERISTIC STRENGTH (28 DAYS) 30MPA.

5). EXCAVATED PROFILE VARIES BETWEEN ROCK SUPPORT CLASSES.

6). CONCRETE PLACED FOR TEMPORARY ROADWAYS MUST BE PLACED ON UNDISTURBED GROUND WITH ALL LOOSE MATERIAL REMOVED AND MUST BE OUTSIDE THE NOMINAL MINIMUM LINER PROFILE.

7). UNAVOIDABLE EXCAVATION OUTSIDE THIS LINE CAUSED BY GEOLOGICAL FEATURES WILL NOT BE PAID.

8). CONCRETE LINING DETAILS ARE FURNISHED ON SEPARATE DRAWING.

9). THE TUNNEL CROSS SECTION FOR CLASS R4 MAY BE VARIED BEHIND THE CONCRETE LINER THAN SHOWN DEPENDING ON THE LATTICE GIRDERS DIMENSIONS AND REQUIRED EMBEDMENT IN SHOTCRETE.

10). THICKNESS OF SHOTCRETE; LENGTH, TYPE AND INCLINATION OF ROCK BOLTS SHALL BE ADJUSTED TO LOCAL ROCKMASS CONDITIONS.

11). DEFORMATION ALLOWANCE FOR ROCKS OF CLASS R4 MAY CHANGED BY THE ENGINEER BASE ON THE GEOLOGICAL CONDITIONS ENCOUNTERED DURING THE EXCAVATION.

12). INDIVIDUAL SUPPORT CLASSES ARE FOR INFORMATION ONLY. CHANGES IN SUPPORT DESIGN MAY BE ADJUSTED WITH THE ACTUAL GROUND CONDITIONS.

13). ALL ROCK SUPPORT SHALL BE INSTALLED AS PER SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

14). CONSOLIDATION AND CONTACT GROUTING HOLES ARE NOT SHOWN BUT THEY SHALL BE PROVIDED.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NESPAK PAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD/VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

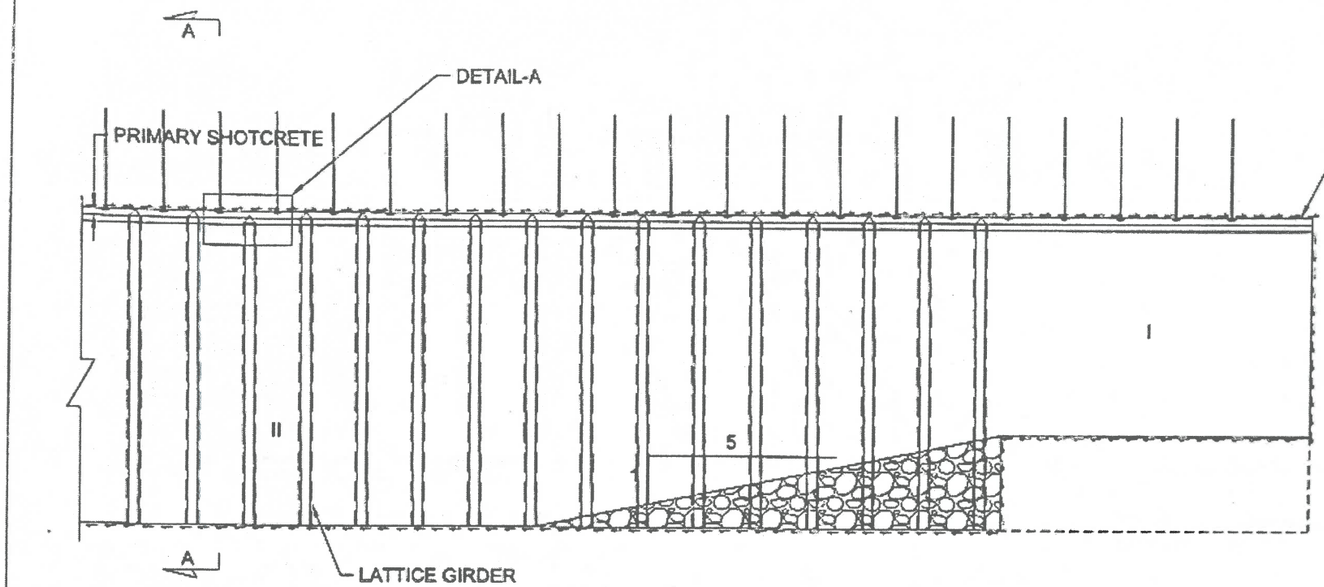
INITIAL ROCK SUPPORT (BT-1)

SCALE: AS SHOWN

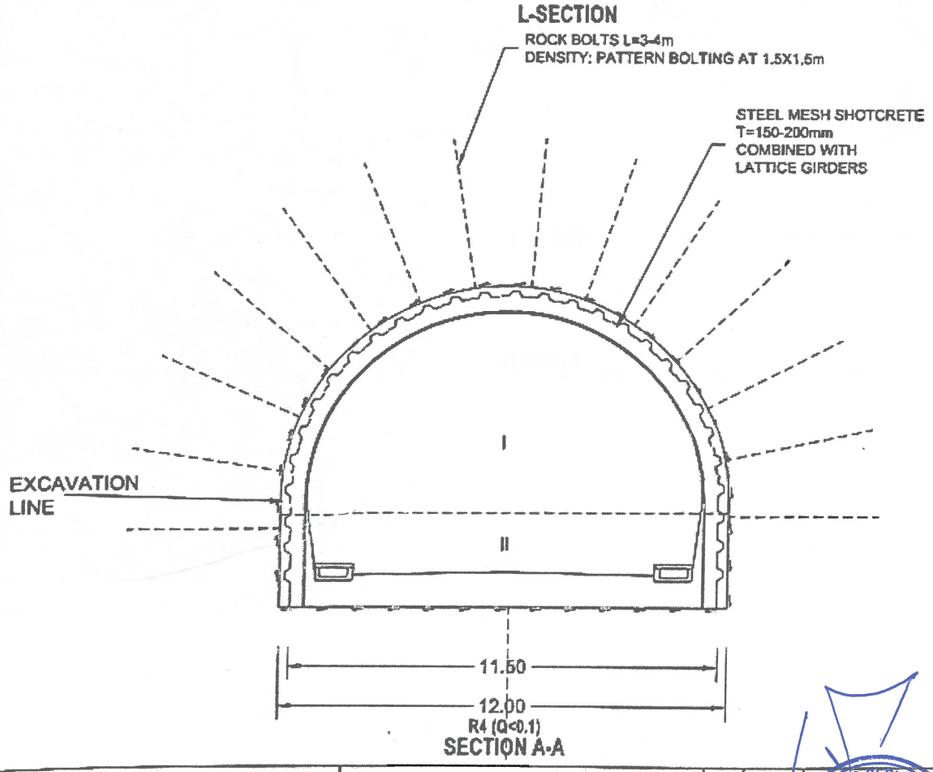
DATE: MARCH , 2022

DWG NO.

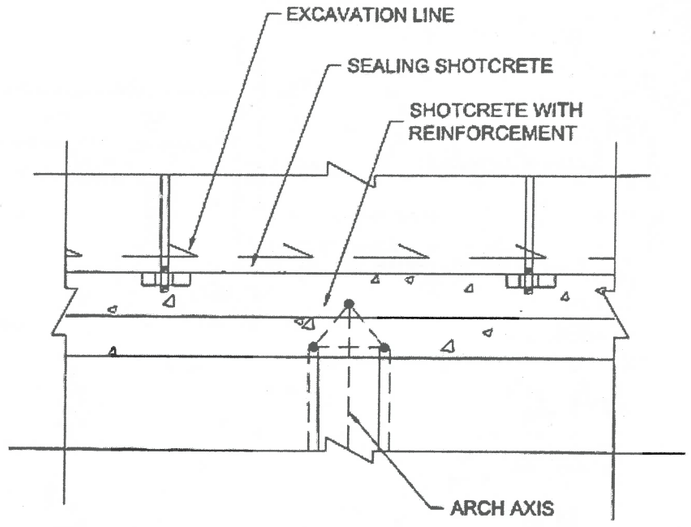
REV. 0



L-SECTION



SECTION A-A



DETAIL-A

TENDER DRAWINGS

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). THE EXCAVATION IN CLASS R4 ROCKMASS MAY FOLLOW HEADING AND BANCHING EXCAVATION SEQUENCE. THE BENCH HEIGHT SHALL BE DECIDED ON THE BASIS OF ENCOUNTERED ROCKMASS CONDITIONS.

3). THE THICKNESS OF CONCRETE LINING SHALL BASE ON THE DIMENSIONS OF THE LATTICE GIRDERS.

4) THE EXCAVATED PROFILE OF THE TUNNEL SHALL BE DECIDED ON THE BASIS OF INITIAL SUPPORT BEHIND THE CONCRETE LINNER.

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD/VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1
BEHRAIN BYPASS

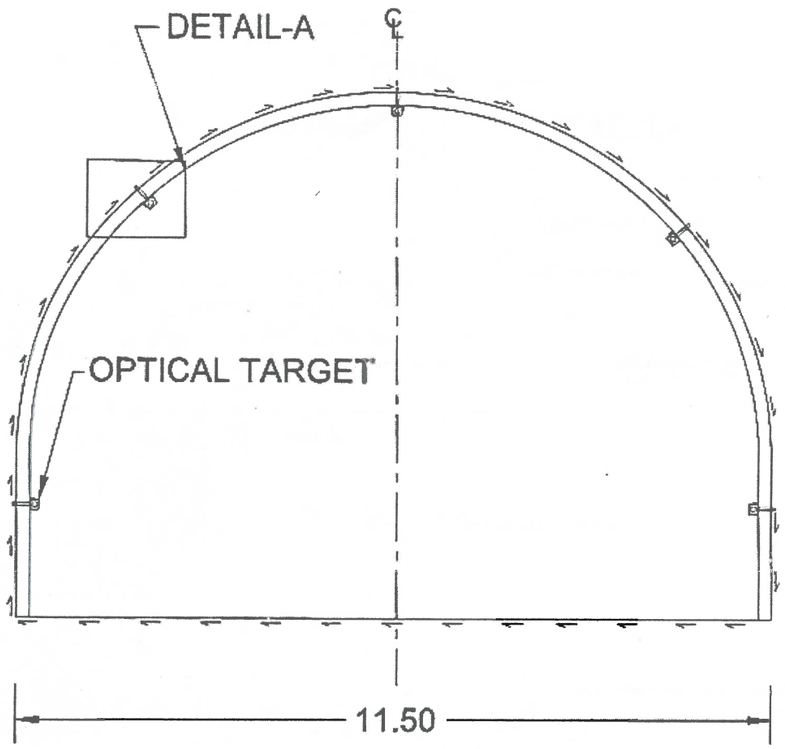
INITIAL SUPPORT IN ADVERSE ROCKMASS CONDITIONS (BT-1)

SCALE: AS SHOWN

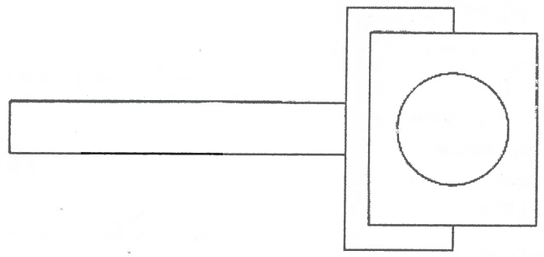
DATE: MARCH , 2022

DWG NO.

REV. 0



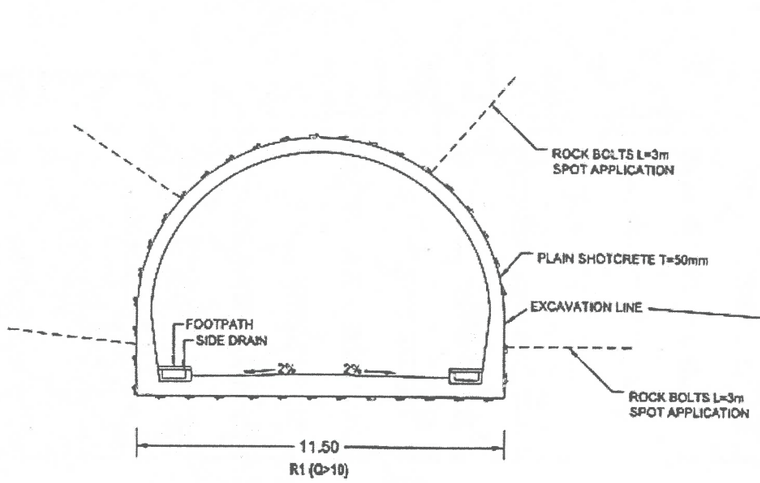
DETAIL-A



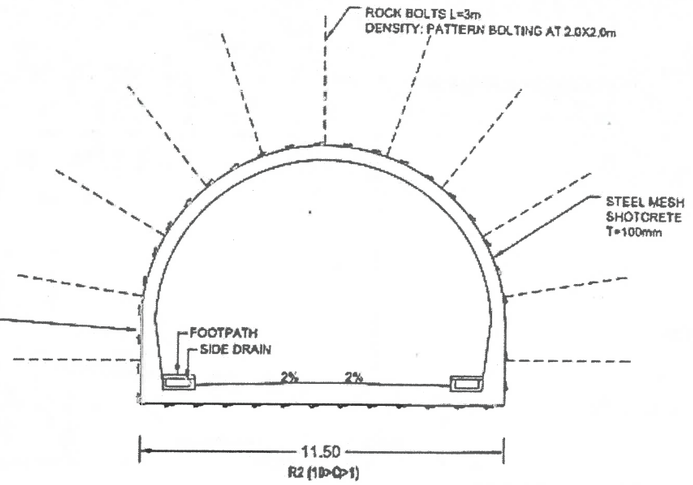
DETAIL 'A'
OPTICAL TARGET

TENDER DRAWINGS

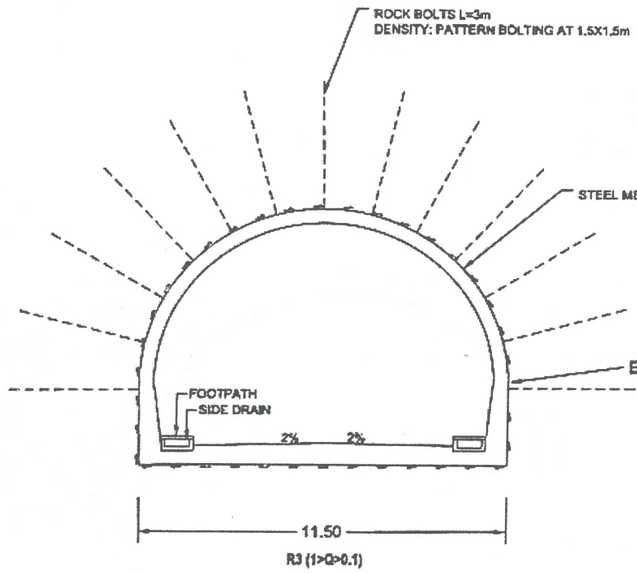
PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	04			DRAWN	ASIF SAJID	CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS	CONVERGENCE MEASUREMENT POINTS (BT-2)	SCALE AS SHOWN
		03			SUBMITTED				
		02			RECOMMENDED				
	HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	01			CHD./VER.			DATE MARCH , 2022 / DWG NO.	REV. 0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			



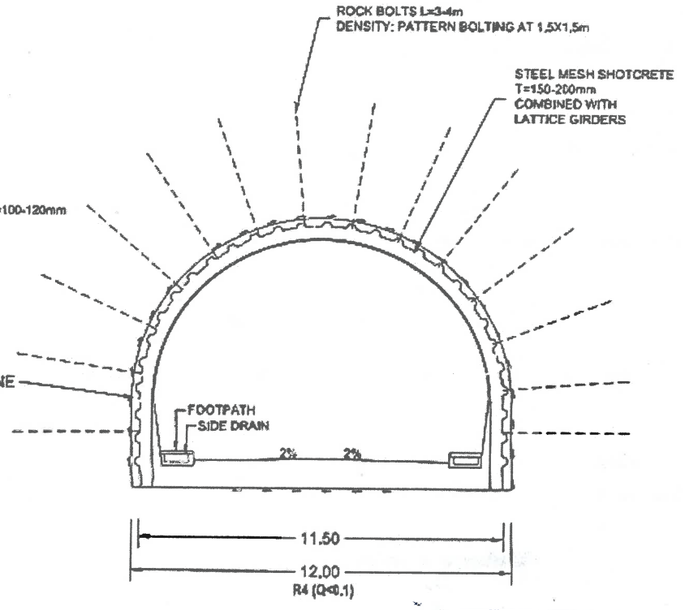
R1 (Q>10)



R2 (10>Q>1)



R3 (1>Q>0.1)



R4 (Q<0.1)

SECTION APPLICABLITY OF ROCK SUPPORT

SUPPORT CLASS	% TUNNEL LENGTH
R1	5
R2	10
R3	70
R4	15

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). NO ROCK SHALL PROTRUDE INSIDE THE EXCAVATION LINE.

3). ALL SHOTCRETE IS STEEL MESH REINFORCED UNLESS OTHERWISE STATED.

4). SHOTCRETE CHARACTERISTIC STRENGTH (28 DAYS) 30MPA.

5). EXCAVATED PROFILE VARIES BETWEEN ROCK SUPPORT CLASSES.

6). CONCRETE PLACED FOR TEMPORARY ROADWAYS MUST BE PLACED ON UNDISTURBED GROUND WITH ALL LOOSE MATERIAL REMOVED AND MUST BE OUTSIDE THE NOMINAL MINIMUM LINER PROFILE.

7). UNAVOIDABLE EXCAVATION OUTSIDE THIS LINE CAUSED BY GEOLOGICAL FEATURES WILL NOT BE PAID.

8). CONCRETE LINING DETAILS ARE FURNISHED ON SEPARATE DRAWING.

9). THE TUNNEL CROSS SECTION FOR CLASS R4 MAY BE VARIED BEHIND THE CONCRETE LINER THAN SHOWN DEPENDING ON THE LATTICE GIRDERS DIMENSIONS AND REQUIRED EMBEDMENT IN SHOTCRETE.

10). THICKNESS OF SHOTCRETE, LENGTH, TYPE AND INCLINATION OF ROCK BOLTS SHALL BE ADJUSTED TO LOCAL ROCKMASS CONDITIONS.

11). DEFORMATION ALLOWANCE FOR ROCKS OF CLASS R4 MAY CHANGED BY THE ENGINEER BASE ON THE GEOLOGICAL CONDITIONS ENCOUNTERED DURING THE EXCAVATION.

12). INDIVIDUAL SUPPORT CLASSES ARE FOR INFORMATION ONLY. CHANGES IN SUPPORT DESIGN MAY BE ADJUSTED WITH THE ACTUAL GROUND CONDITIONS.

13). ALL ROCK SUPPORT SHALL BE INSTALLED AS PER SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

14). CONSOLIDATION AND CONTACT GROUTING HOLES ARE NOT SHOWN BUT THEY SHALL BE PROVIDED.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C BLOCK N, MODEL TOWN EXTENSION, LAHORE PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

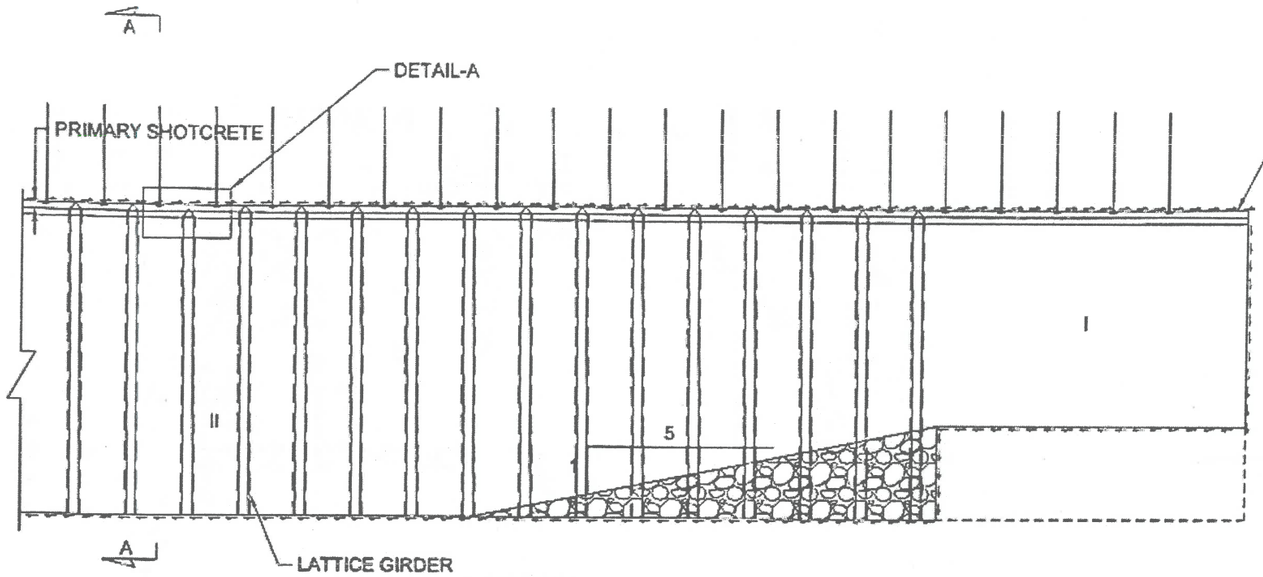
INITIAL ROCK SUPPORT (BT-2)

SCALE: AS SHOWN

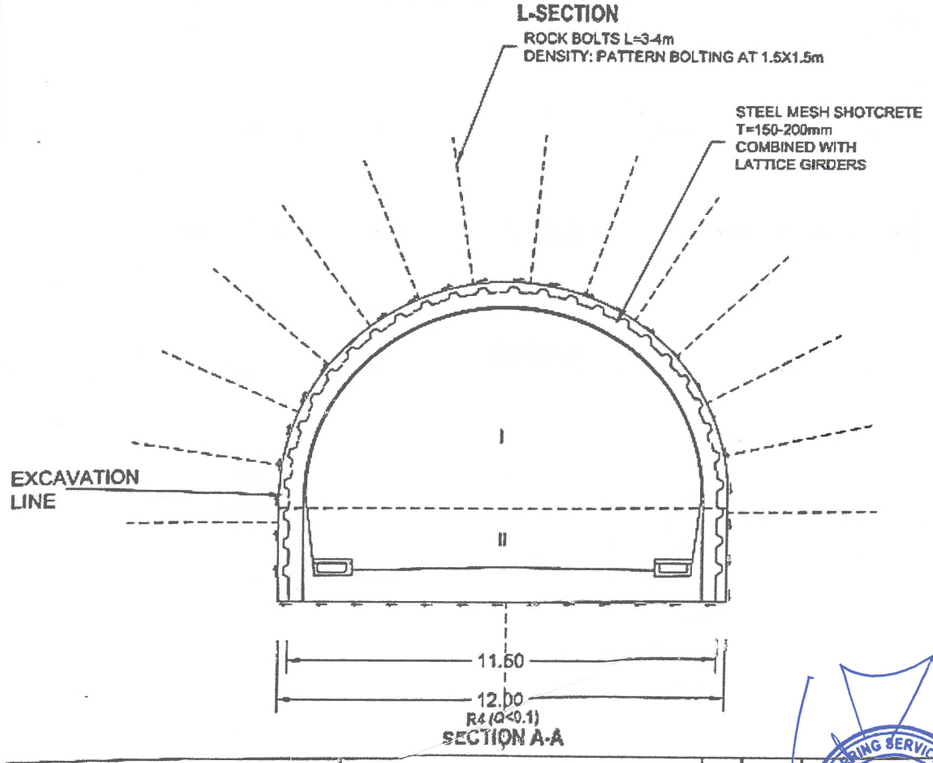
DATE: MARCH , 2022

DWG NO.

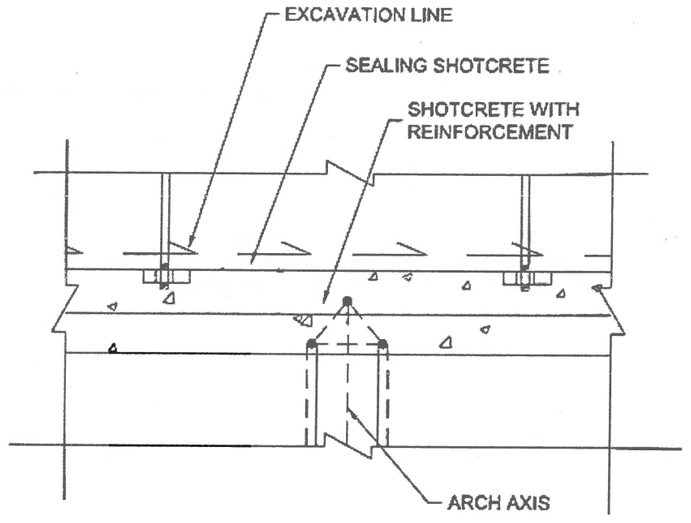
REV. 0



L-SECTION



SECTION A-A



DETAIL-A

TENDER DRAWINGS

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). THE EXCAVATION IN CLASS R4 ROCKMASS MAY FOLLOW HEADING AND BANCHING EXCAVATION SEQUENCE. THE BENCH HEIGHT SHALL BE DECIDED ON THE BASIS OF ENCOUNTERED ROCKMASS CONDITIONS.

3). THE THICKNESS OF CONCRETE LINING SHALL BASE ON THE DIMENSIONS OF THE LATTICE GIRDERS.

4). THE EXCAVATED PROFILE OF THE TUNNEL SHALL BE DECIDED ON THE BASIS OF INITIAL SUPPORT BEHIND THE CONCRETE LINNER.

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
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DRAWN	ASIF SANI
SUBMITTED	
RECOMMENDED	
DIR/AVER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

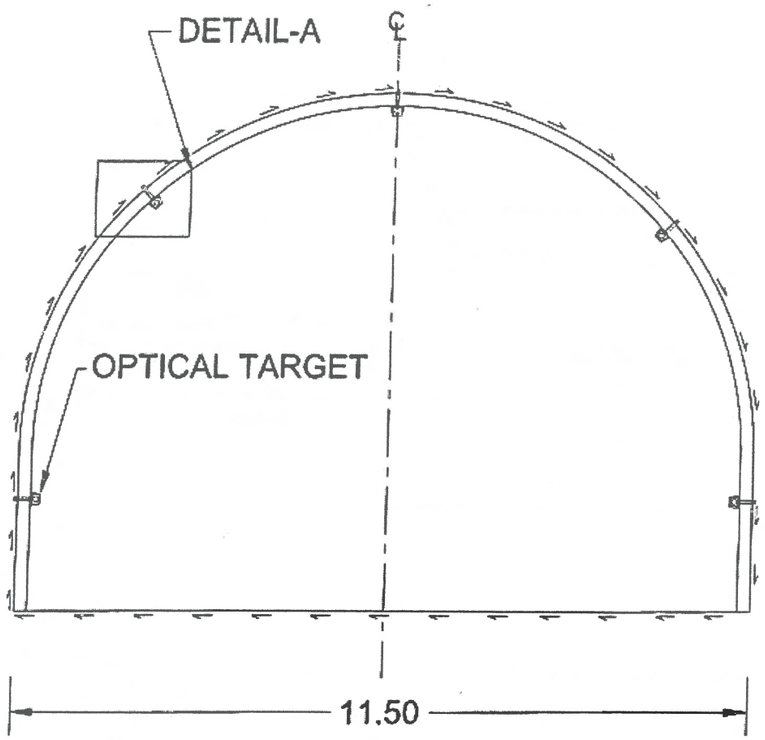
INITIAL SUPPORT IN ADVERSE ROCKMASS CONDITIONS (BT-2)

SCALE: AS SHOWN

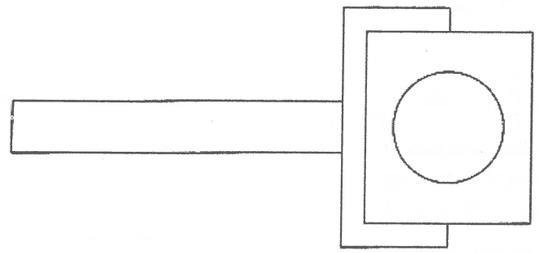
DATE: MARCH , 2022

DWG NO.

REV. 0



DETAIL-A



DETAIL 'A'
OPTICAL TARGET

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
D4			
D3			
D2			
D1			

DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD.VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

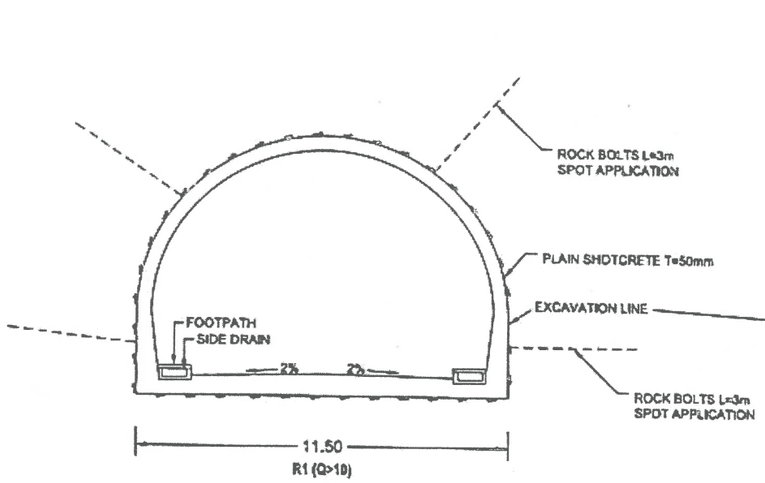
CONVERGENCE MEASUREMENT POINTS (BT-3)

DATE: MARCH , 2022

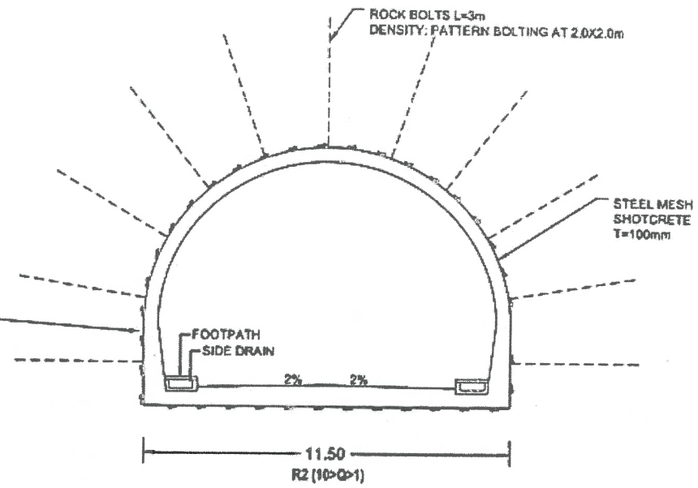
DWG NO.

SCALE: AS SHOWN

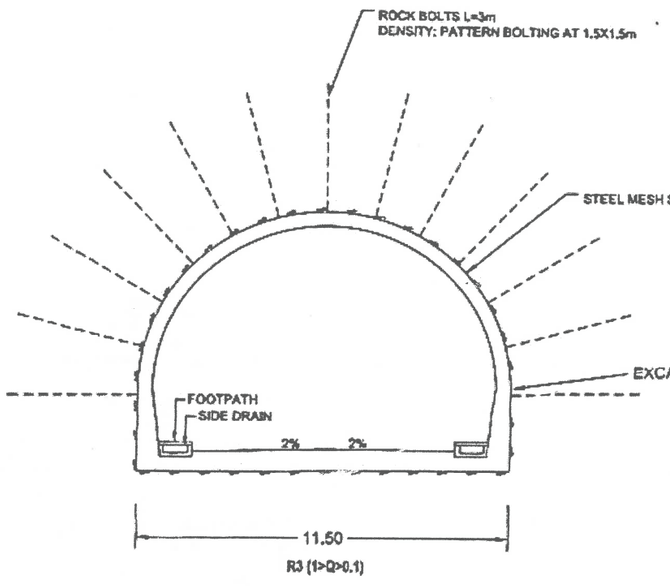
REV. D



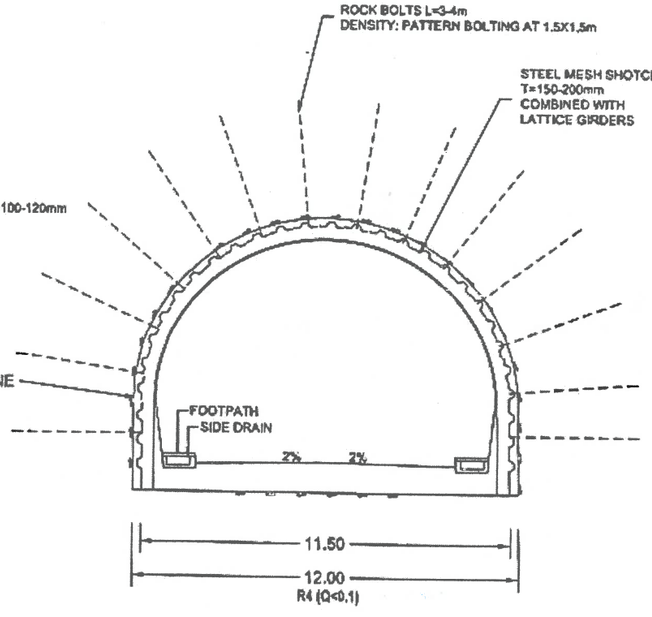
R1 (Q>10)



R2 (10>Q>1)



R3 (1>Q>0.1)



R4 (Q<0.1)

SECTION APPLICABILITY OF ROCK SUPPORT

SUPPORT CLASS	% TUNNEL LENGTH
R1	5
R2	10
R3	70
R4	15

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). NO ROCK SHALL PROTRUDE INSIDE THE EXCAVATION LINE.

3). ALL SHOTCRETE IS STEEL MESH REINFORCED UNLESS OTHERWISE STATED.

4). SHOTCRETE CHARACTERISTIC STRENGTH (28 DAYS) 30MPA.

5). EXCAVATED PROFILE VARIES BETWEEN ROCK SUPPORT CLASSES.

6). CONCRETE PLACED FOR TEMPORARY ROADWAYS MUST BE PLACED ON UNDISTURBED GROUND WITH ALL LOOSE MATERIAL REMOVED AND MUST BE OUTSIDE THE NOMINAL MINIMUM LINER PROFILE.

7). UNAVOIDABLE EXCAVATION OUTSIDE THIS LINE CAUSED BY GEOLOGICAL FEATURES WILL NOT BE PAID.

8). CONCRETE LINING DETAILS ARE FURNISHED ON SEPARATE DRAWING.

9). THE TUNNEL CROSS SECTION FOR CLASS R4 MAY BE VARIED BEHIND THE CONCRETE LINER THAN SHOWN DEPENDING ON THE LATTICE GIRDERS DIMENSIONS AND REQUIRED EMBEDMENT IN SHOTCRETE.

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13). ALL ROCK SUPPORT SHALL BE INSTALLED AS PER SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

14). CONSOLIDATION AND CONTACT GROUTING HOLES ARE NOT SHOWN BUT THEY SHALL BE PROVIDED.

TENDER DRAWINGS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
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DRAWN	ASIF BAMI
SUBMITTED	
RECOMMENDED	
CHECKED	
APPROVED	

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NESPAK HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

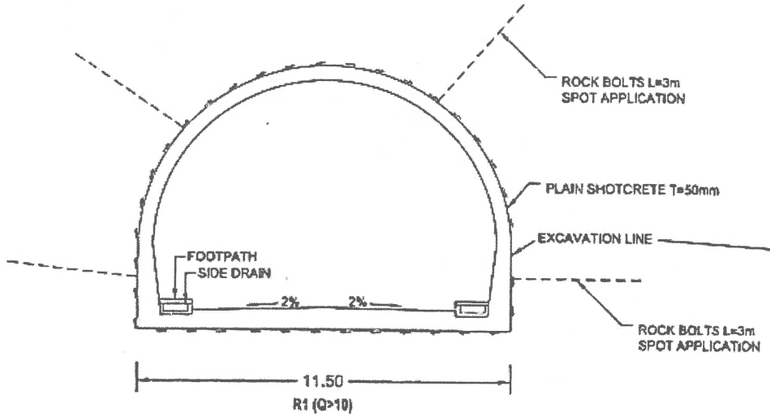
INITIAL ROCK SUPPORT (BT-3)

SCALE: AS SHOWN

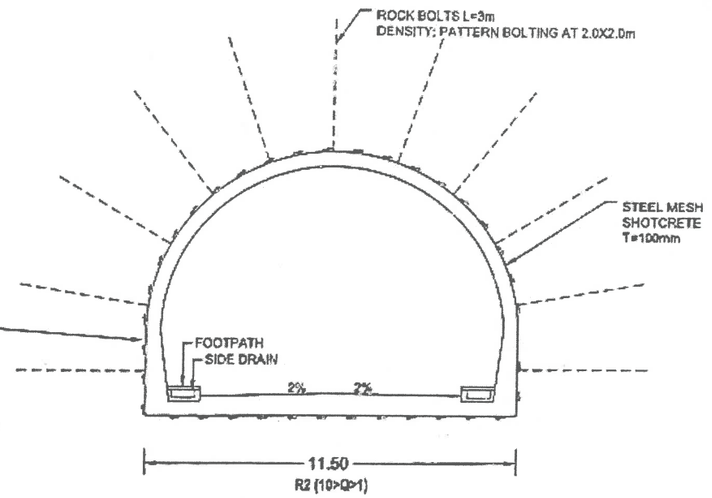
DATE: MARCH , 2022

DWG NO.

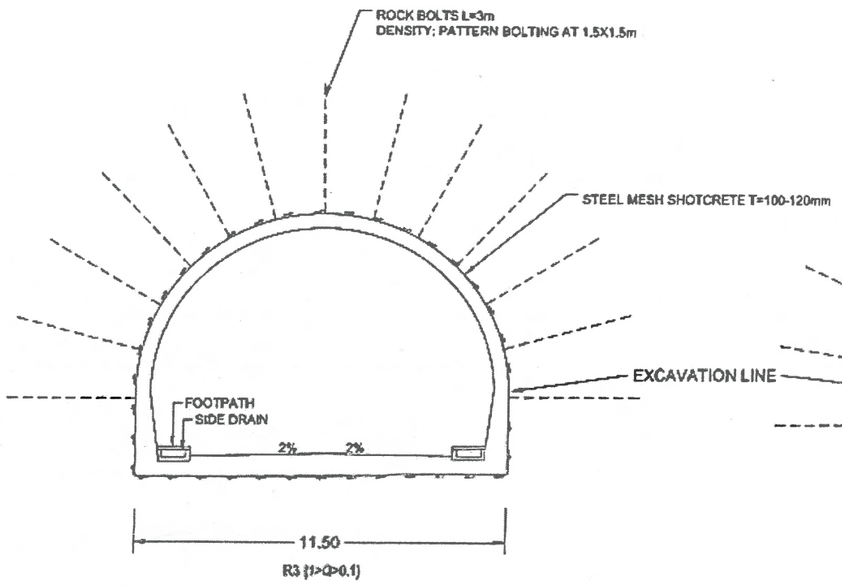
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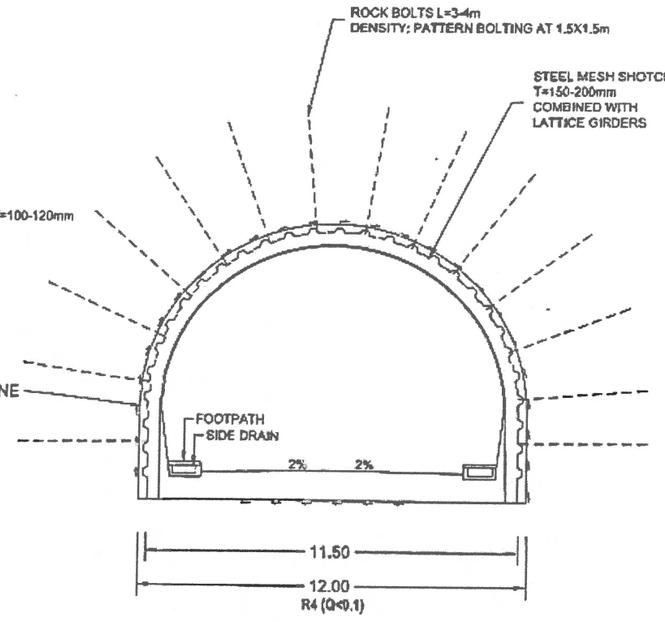
R1 (Q>10)



R2 (10>Q>1)



R3 (1>Q>0.1)



R4 (Q<0.1)

SECTION APPLICABLITY OF ROCK SUPPORT

SUPPORT CLASS	% TUNNEL LENGTH
R1	5
R2	10
R3	70
R4	15

NOTES:

1). ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.

2). NO ROCK SHALL PROTRUDE INSIDE THE EXCAVATION LINE.

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14). CONSOLIDATION AND CONTACT GROUTING HOLES ARE NOT SHOWN BUT THEY SHALL BE PROVIDED.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY (PKHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE: NESPAK HOUSE, 1-C, BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	ASIF SAMI
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 BEHRAIN BYPASS

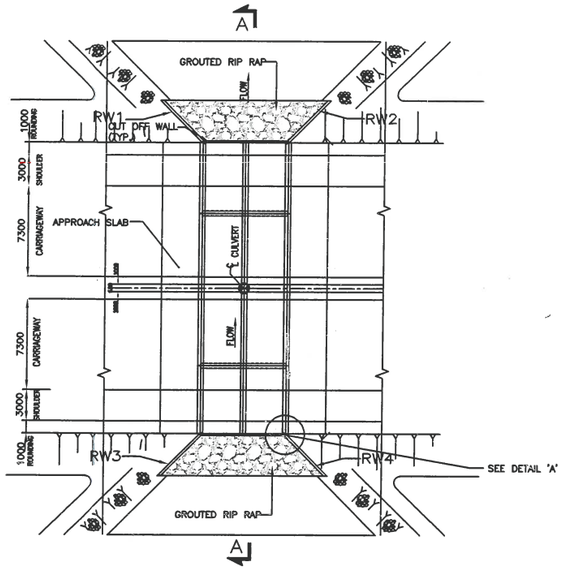
INITIAL ROCK SUPPORT (BT-3)

SCALE: AS SHOWN

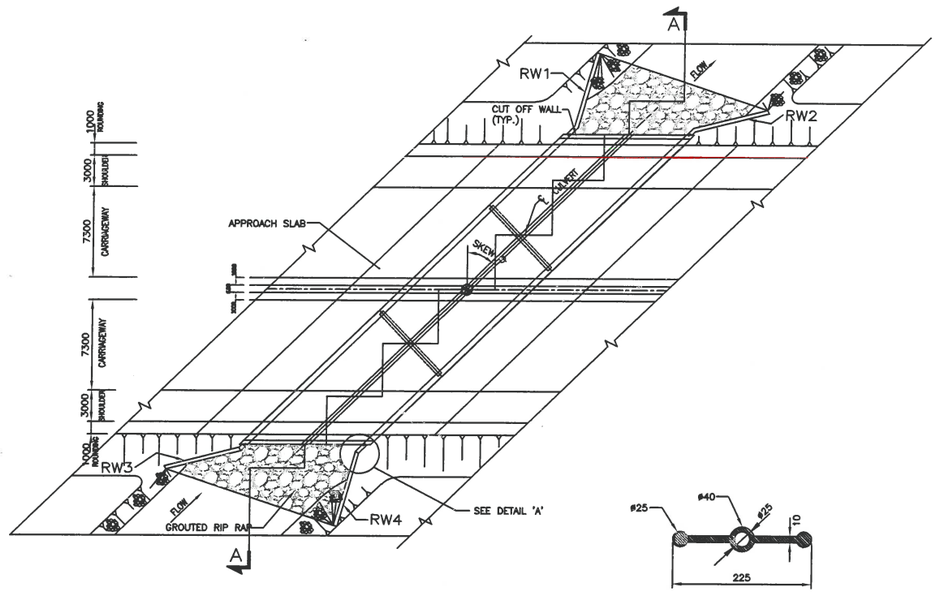
DATE: MARCH , 2022

DWG NO.

REV. 0

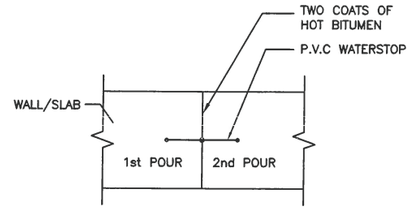


(TYP.) PLAN FOR CULVERT
0 DEG SKEW

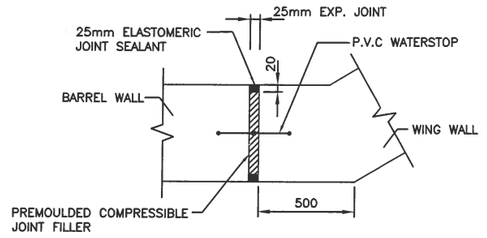


(TYP.) PLAN FOR CULVERT
WITH SKEW

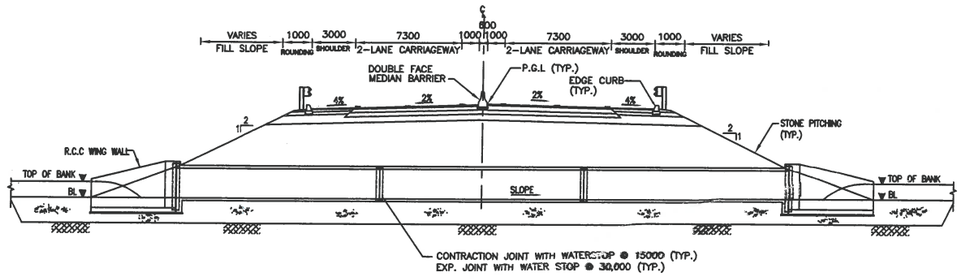
DETAIL OF WATERSTOP



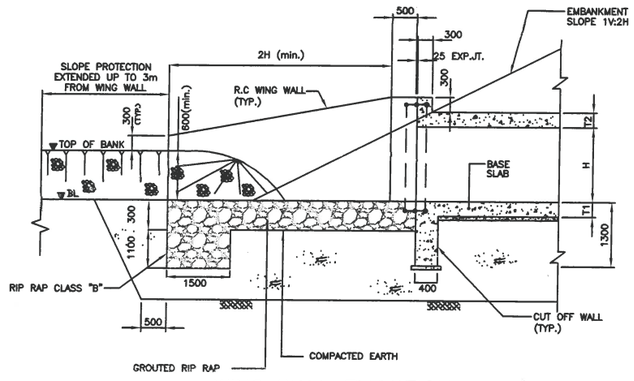
CONTARCTION JOINT DETAIL
SCALE 1:10



DETAIL 'A'
SCALE 1:10



SECTION A–A



WING WALL ELEVATION

NOTES:–

1–ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

2–ALL CONCRETE SHALL BE REINFORCED CONCRETE.HOWEVER CONCRETE STRENGTH SHALL BE STRENGTH SHALL BE AS PER DRAWING NO 3737/102/TD/GNS0012.

3–REINFORCEMENT FOR REINFORCED CONCRETE SHALL BE DEFORMED ROUND BARS OF GRADE 60 CONFORMING TO AASHTO M–31(ASTM A615) WITH MINIMUM YIELD STRENGTH OF 4200 Kg/Sq.cm (60,000 Psi).

4–ALL FACES OF CONCRETE IN CONTACT WITH SOIL SHALL BE DAMP PROOFED WITH 2 LAYERS OF BITUMINOUS MATERIAL.

5–WING WALLS SHALL BE AT 45 DEG FOR SKEW 0, HOWEVER AT SKEW, IT SHALL BE FINALIZED AS PER SITE REQUIREMENT.

6–FOR FURTHER DETAIL, REFER TO DRAWING NO 3737/102/TD/GNS0012.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

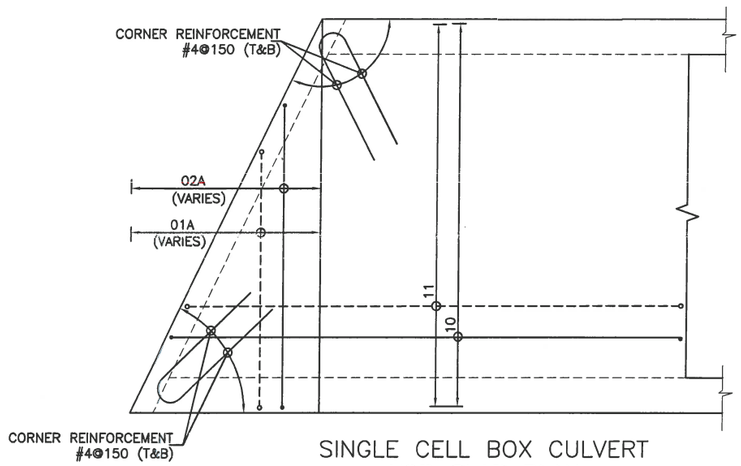
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
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03			
02			
01			

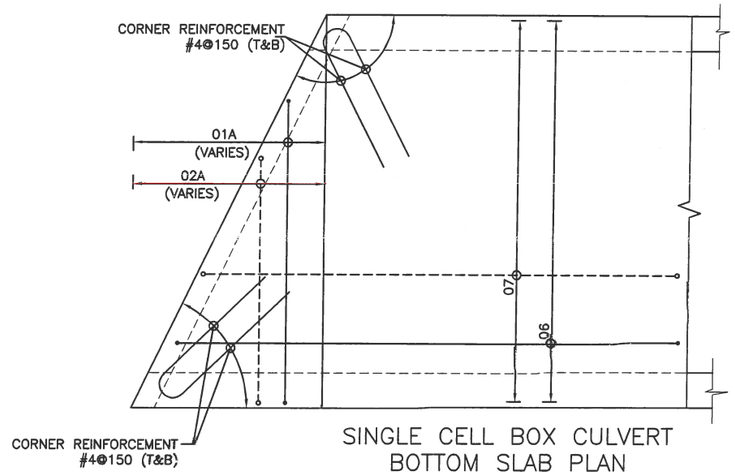
DRAWN BY	
SUBMITTED BY	
RECOMMENDED BY	
CHD./VER. BY	
APPROVED BY	

CONSTRUCTION OF ROAD MADYAN TO KALM INCULUDING BRIDGES DISTRICT SWAT PHASE–1 (BEHRAIN BYPASS)

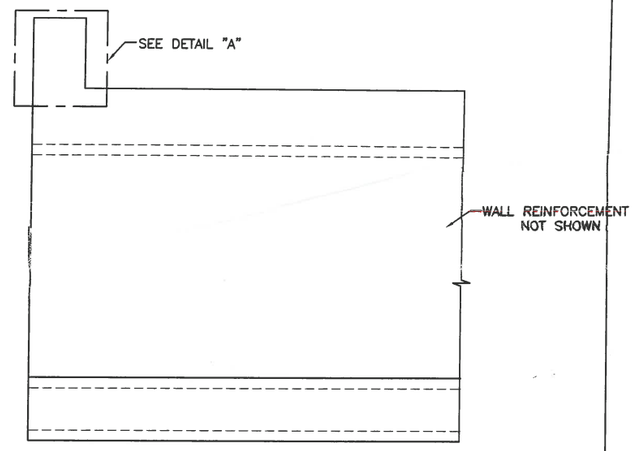
TITLE	SCALE
BOX CULVERT GENERAL ARRANGEMENT	
DATE: JUNE, 2022	DRAWING NO.: 3737/102/CD/BCG005
	REV.



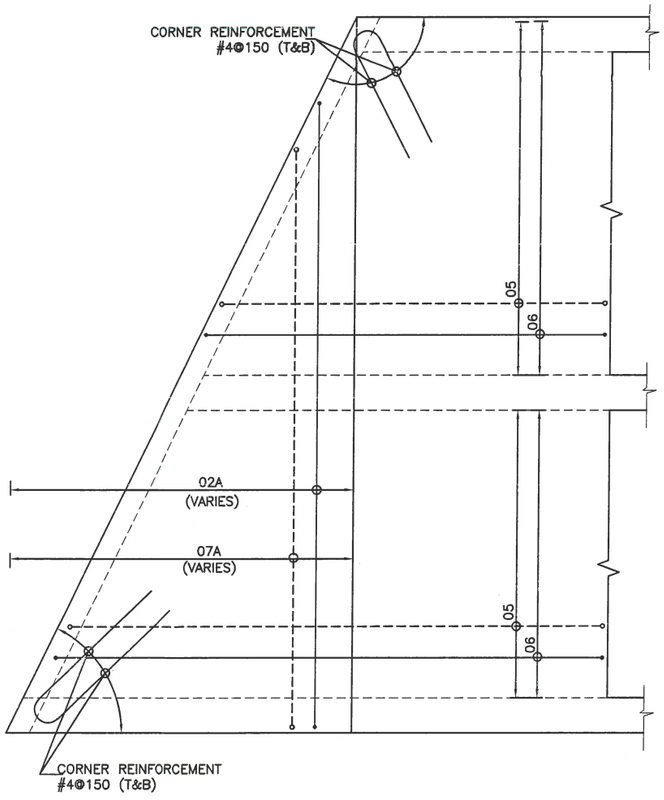
SINGLE CELL BOX CULVERT
TOP SLAB PLAN
ONLY FOR Θ° SKEW UNDERPASS



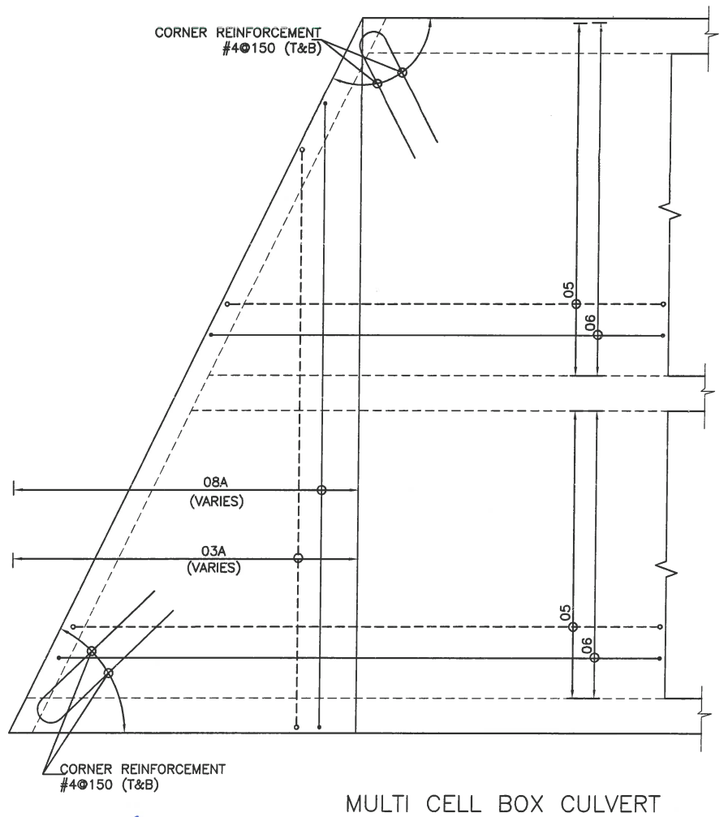
SINGLE CELL BOX CULVERT
BOTTOM SLAB PLAN
FOR SKEW Θ° BOX CULVERTS



EXTERNAL WALL ELEVATION

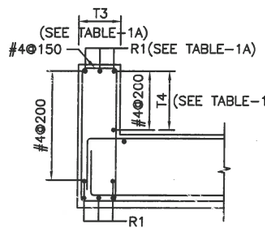


MULTI CELL BOX CULVERT
TOP SLAB PLAN
ONLY FOR Θ° SKEW UNDERPASS

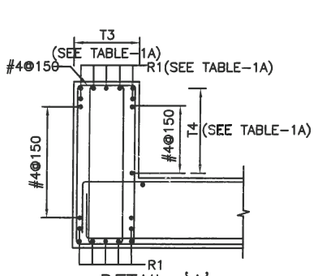


MULTI CELL BOX CULVERT
BOTTOM SLAB PLAN
FOR SKEW Θ° BOX CULVERTS

TENDER DRAWINGS



DETAIL-'A'
FOR SKEW ANGLE 0° TO 25°



DETAIL-'A'
FOR SKEW ANGLE 25° TO 50°

TABLE-1A

CULVERT SIZE (mm)	FOR SKEW ANGLE 0° TO 25°			FOR SKEW ANGLE 25° TO 50°		
	T3 (mm)	T4 (mm)	R1	T3 (mm)	T4 (mm)	R1
2000X2000	300	300	3-#6	350	350	4-#6
3000X3000	350	350	4-#6	400	400	5-#6
4000X4000	400	400	5-#6	450	450	6-#6

NOTE:-

1- WORK THIS DRAWING IN CONJUCTION WITH OTHER RELEVANT DRAWINGS

PAKHTUNKHWA
HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD.

DATE	DESCRIPTION	APPROVED
		DRAWN
		SUBMITTED
		RECOMMENDED
		CHD./VER.
		APPROVED

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: **SINGLE & MULTI CELL BOX CULVERT SLAB & WALLS REINFORCEMENT DETAIL**

DATE: JUNE, 2022

DWG NO.: 4402/102/TD/BCR007

WING WALL DESIGN DETAILS ALONG WITH REINFORCEMENT

Sr. No.	Height (m)			DIMENSIONS						
NEW				B	BH	BT	D1	D2	T1	T2
1	1.00	~	1.50	1500	500	400	300	300	250	300
2	2.00	~	3.00	2200	1400	500	300	300	250	300
3	3.00	~	4.00	3000	1950	700	350	350	250	350
4	4.00	~	5.00	3600	2200	1000	400	400	250	400
5	5.00	~	6.00	4400	2700	1200	500	500	250	500
6	6.00	~	7.00	5000	3000	1400	600	600	250	600
7	7.00	~	8.00	5800	3500	1600	700	700	250	700

REINFORCEMENT DETAILS

REINFORCEMENT

Sr. No.	Height (m)	R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11
NEW												
1	1~1.50	#3@125	#3@125	#3@100	#3@125	#3@125	#3@225	#3@225	#3@250	#3@150	#5@200	#4@150
2	2~3	#4@225	#4@225	#4@175	#4@125	#3@125	#3@225	#3@225	#3@250	#3@150	#6@200	#4@150
3	3~4	#4@125	#4@125	#4@150	#6@200	#4@200	#3@200	#3@200	#3@225	#3@125	#6@200	#4@150
4	4~5	#5@200	#6@200	#4@150	#6@125	#4@125	#3@175	#3@175	#3@200	#3@125	#6@200	#4@150
5	5~6	#5@175	#6@175	#4@125	#6@100	#4@100	#4@275	#3@275	#3@175	#4@175	#6@200	#4@150
6	6~7	#5@100	#6@100	#5@200	#8@150	#6@150	#4@225	#3@225	#4@275	#4@175	#6@200	#4@150
7	7~8	#6@200	#8@200	#5@175	#8@125	#6@125	#4@200	#3@200	#4@250	#4@150	#6@200	#4@150

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN BY	
SUBMITTED BY	
RECOMMENDED BY	
CHD./VER. BY	
APPROVED BY	

CONSTRUCTION OF ROAD MADYAN TO KALM INCULUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

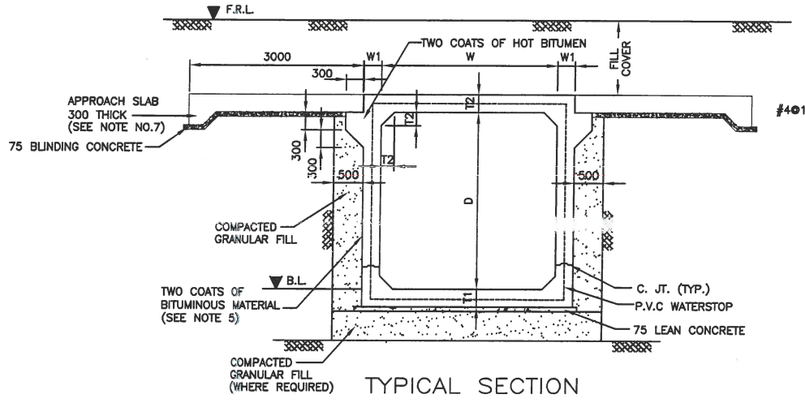
TITLE: BOX CULVERT WING WALL REINFORCEMENT DETAILS

SCALE:

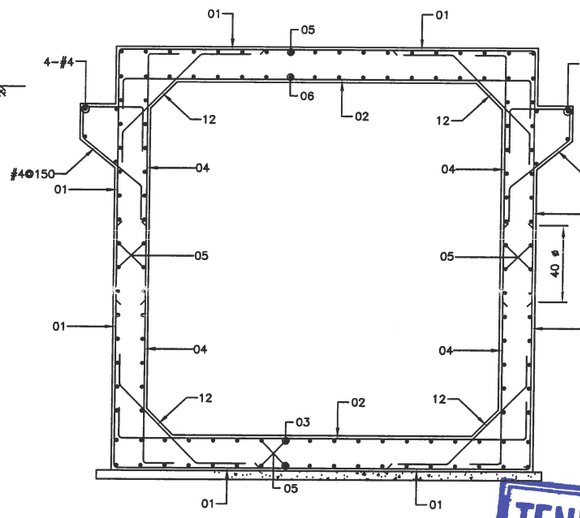
DATE: JUNE, 2022

DRAWING NO.: 3737/102/CD/WWR008A

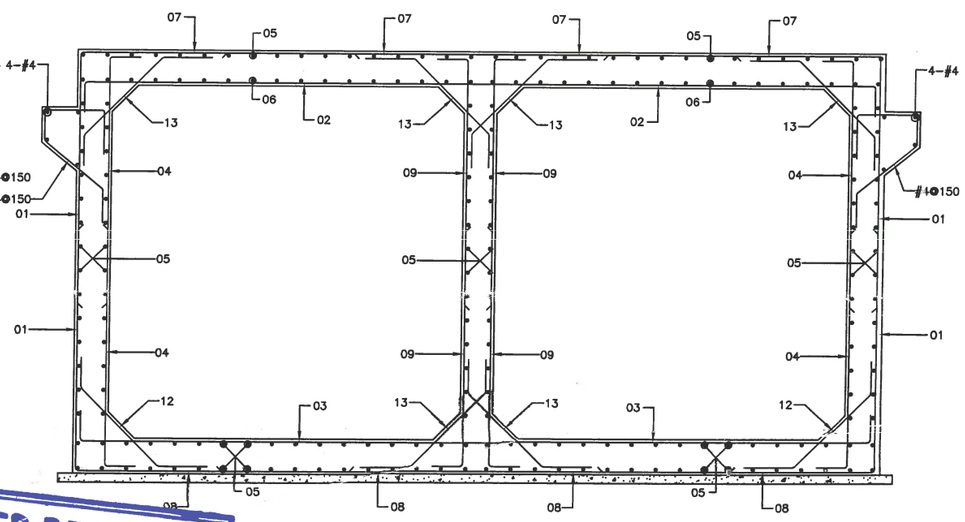
REV.:



TYPICAL SECTION
(FOR SINGLE CELL)

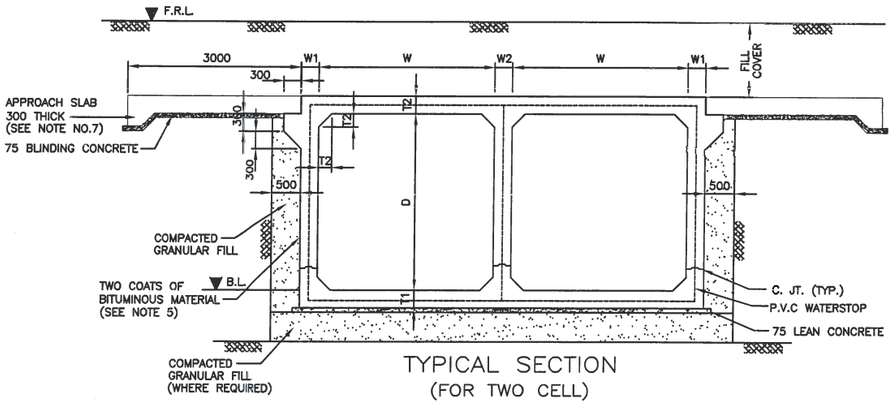


REINFORCEMENT DETAIL
(FOR SINGLE CELL)

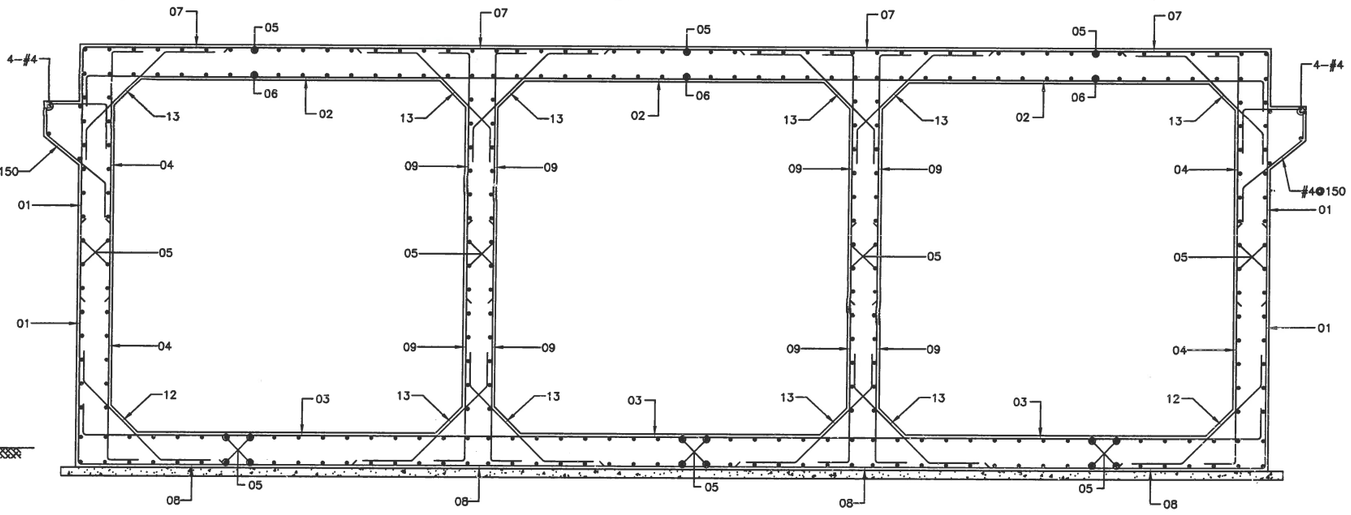


REINFORCEMENT DETAIL
(FOR TWO CELL)

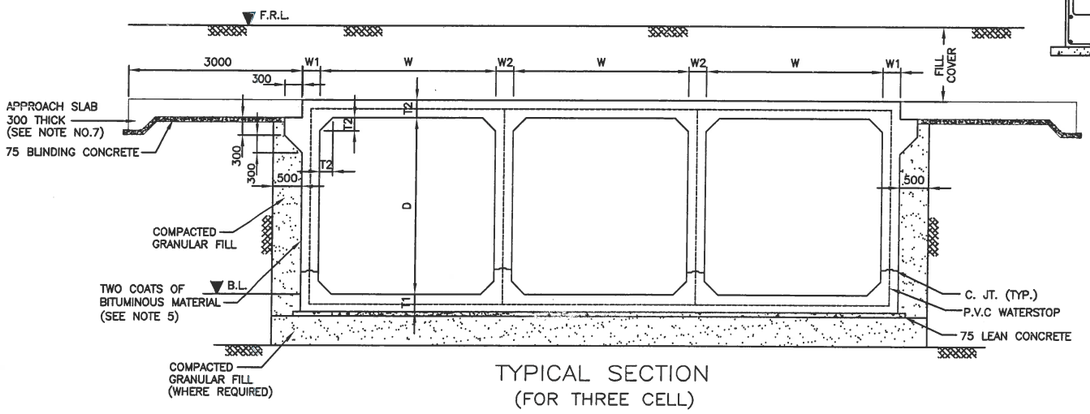
TENDER DRAWINGS



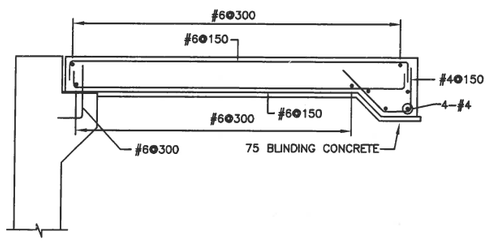
TYPICAL SECTION
(FOR TWO CELL)



REINFORCEMENT DETAIL
(FOR THREE CELL)



TYPICAL SECTION
(FOR THREE CELL)



APPROACH SLAB REINFORCEMENT DETAILS

NOTES:—

1—ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

2—READ THIS DRAWING IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS.

3—ALL CONCRETE SHALL BE REINFORCED CONCRETE. HOWEVER CONCRETE STRENGTH SHALL BE AS PER DRAWING NO 39293/102/TD/GNS0012.

4—REINFORCEMENT FOR REINFORCED CONCRETE SHALL BE DEFORMED ROUND BARS OF (GRADE 60) CONFORMING TO AASHTO M-31(ASTM A615) WITH MINIMUM YIELD STRENGTH OF 4200 kg/sq.cm (60,000psi).

5—ALL FACES OF CONCRETE IN CONTACT WITH SOIL SHALL BE DAMP PROOFED WITH 2 LAYERS OF BITUMINOUS MATERIAL WITH NO ADDITIONAL COST TO CONTRACTOR.

6—GRANULAR FILL MATERIAL (450 Max) SHALL BE PROVIDED IN LAYERS TO ACHIEVE REQUIRED BEARING CAPACITY AND COMPACTION 95% MDD IN CASE EXISTING SOIL AT FOOTING NOT QUALIFYING AFORESAID REQUIREMENT.

7—THE APPROACH SLAB ALONG WITH SUPPORT KEY IN WALL WILL BE PROVIDED ONLY IF THE FILL ABOVE THE CULVERT IS LESS THAN 1500.

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: **SINGLE & MULTI CELL BOX CULVERTS GENERAL ARRANGEMENT & REINFORCEMENT DETAILS**

DATE: SEPTEMBER, 2021

DWG NO. 39293/102/TD/**BCR006**

TABLE "1" FILL COVER 0.30 TO 0.60m

RCBC CELL DIMENSIONS						REINFORCEMENT																	
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																	
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "12"					
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.				
2000	2000	350	350	300	...	#5	150	#8	150	#6	150	#4	150	#4	200	#5	200	#5	150				
3000	2000	450	450	350	...	#6	150	#8	150	#6	150	#4	150	#4	200	#5	200	#5	150				
	3000	450	450	350	...	#6	150	#8	150	#6	150	#4	150	#4	200	#5	200	#5	150				
4000	4000	500	500	400	...	#6	150	#8	150	#8	150	#5	150	#4	200	#5	200	#5	150				

TABLE "2" FILL COVER 0.60 TO 1.50m

RCBC CELL DIMENSIONS						REINFORCEMENT																	
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																	
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "12"					
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.				
2000	2000	350	350	300	...	#5	150	#6	150	#5	150	#4	150	#4	200	#5	200	#4	150				
3000	2000	350	350	300	...	#8	150	#8	150	#6	150	#4	150	#4	200	#5	200	#5	150				
	3000	350	350	300	...	#6	150	#8	150	#6	150	#4	150	#4	200	#5	200	#5	150				
4000	4000	450	450	400	...	#6	150	#8	150	#6	150	#5	150	#4	200	#5	200	#5	150				

TABLE "3" FILL COVER 1.50 TO 3.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																	
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																	
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "12"					
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.				
2000	2000	250	250	250	...	#4	150	#5	150	#5	150	#4	150	#3	200	#3	200	#4	150				
3000	2000	350	350	300	...	#5	150	#5	150	#5	150	#4	150	#4	200	#4	200	#4	150				
	3000	350	350	300	...	#5	150	#5	150	#5	150	#4	150	#4	200	#4	200	#4	150				
4000	4000	450	450	400	...	#6	150	#6	150	#6	150	#5	150	#4	200	#4	200	#4	150				

TABLE "4" FILL COVER 3.0 TO 5.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																	
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																	
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "12"					
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.				
2000	2000	300	300	200	..	#4	150	#5	150	#5	150	#4	150	#3	200	#3	200	#4	150				
3000	2000	350	350	300	...	#5	150	#6	150	#6	150	#4	150	#4	200	#4	200	#5	150				
	3000	350	350	300	...	#6	150	#6	150	#6	150	#5	150	#4	200	#4	200	#5	150				
4000	4000	450	450	400	...	#8	150	#8	150	#8	150	#5	150	#4	200	#4	200	#5	150				

TENDER DRAWINGS

ONE CELL BOX CULVERTS

TABLE "1" FILL COVER 0.30 TO 0.60m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	325	325	300	250	#6	150	#6	150	#6	150	#5	150	#4	200	#5	200	#6	150	#6	150	#5	150	#5	150	#5	150
3000	2000	425	425	375	250	#6	150	#8	150	#6	150	#5	150	#4	200	#5	200	#8	150	#6	150	#5	150	#5	150	#5	150
	3000	425	425	375	250	#6	150	#8	150	#6	150	#5	150	#4	200	#5	200	#8	150	#6	150	#5	150	#5	150	#5	150
4000	4000	500	500	450	250	#8	150	#6	150	#8	150	#5	150	#5	200	#6	200	#8	150	#8	150	#5	150	#6	150	#6	150

TABLE "2" FILL COVER 0.60 TO 1.50m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	350	350	300	250	#5	150	#5	150	#5	150	#4	150	#4	200	#5	200	#5	150	#5	150	#5	150	#4	150	#4	150
3000	2000	350	350	300	250	#6	150	#6	150	#6	150	#4	150	#3	200	#5	200	#6	150	#6	150	#5	150	#5	150	#5	150
	3000	350	350	300	250	#6	150	#6	150	#6	150	#4	150	#3	200	#5	200	#6	150	#6	150	#5	150	#5	150	#5	150
4000	4000	450	450	400	250	#6	150	#8	150	#6	150	#5	150	#4	200	#5	200	#8	150	#6	150	#5	150	#5	150	#5	150

TABLE "3" FILL COVER 1.50 TO 3.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	250	250	250	250	#4	150	#5	150	#5	150	#4	150	#3	200	#3	200	#5	150	#5	150	#4	150	#4	150	#4	150
3000	2000	300	300	300	250	#5	150	#5	150	#5	150	#4	150	#3	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150
	3000	300	300	300	250	#5	150	#5	150	#5	150	#4	150	#3	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150
4000	4000	400	400	350	250	#5	150	#5	150	#5	150	#5	150	#4	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150

TABLE "4" FILL COVER 3.0 TO 5.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	250	250	250	250	#5	150	#5	150	#5	150	#4	150	#3	200	#3	200	#5	150	#5	150	#4	150	#4	150	#4	150
3000	2000	350	350	300	250	#6	150	#6	150	#6	150	#4	150	#4	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150
	3000	350	350	300	250	#6	150	#6	150	#6	150	#4	150	#4	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150
4000	4000	450	450	400	250	#6	150	#6	150	#6	150	#5	150	#4	200	#4	200	#6	150	#6	150	#4	150	#4	150	#4	150

TWO CELL BOX CULVERTS

TABLE "1" FILL COVER 0.30 TO 0.60m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "10"		BARS "11"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	350	350	300	300	#6	150	#6	150	#6	150	#5	150	#4	200	#5	200	#6	150	#6	150	#5	150	#6	150	#6	150	#5	150	#5	150
3000	3000	400	400	350	300	#8	150	#8	150	#8	150	#5	150	#4	200	#6	200	#8	150	#8	150	#5	150	#8	150	#8	150	#6	150	#6	150
4000	4000	500	500	450	300	#8	150	#8	150	#8	150	#5	150	#5	200	#6	200	#8	150	#8	150	#6	150	#8	150	#8	150	#6	150	#6	150

TABLE "2" FILL COVER 0.60 TO 1.50m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "10"		BARS "11"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	350	350	300	250	#5	150	#5	150	#5	150	#4	150	#4	200	#5	200	#5	150	#5	150	#5	150	#5	150	#5	150	#4	150	#4	150
3000	3000	350	350	300	250	#8	150	#6	150	#6	150	#4	150	#4	200	#5	200	#6	150	#6	150	#5	150	#6	150	#6	150	#5	150	#5	150
4000	4000	450	450	400	250	#6	150	#8	150	#6	150	#5	150	#4	200	#6	200	#8	150	#6	150	#5	150	#8	150	#6	150	#5	150	#5	150

TABLE "3" FILL COVER 1.50 TO 3.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "10"		BARS "11"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	250	250	250	250	#4	150	#5	150	#5	150	#4	150	#3	200	#3	200	#5	150	#5	150	#4	150	#5	150	#5	150	#4	150	#4	150
3000	3000	300	300	300	250	#5	150	#5	150	#5	150	#4	150	#3	200	#3	200	#5	150	#5	150	#4	150	#5	150	#5	150	#4	150	#4	150
4000	4000	400	400	350	250	#6	150	#6	150	#6	150	#4	150	#4	200	#4	200	#6	150	#6	150	#4	150	#5	150	#5	150	#4	150	#4	150

TABLE "4" FILL COVER 3.0 TO 5.0m

RCBC CELL DIMENSIONS						REINFORCEMENT																					
SPAN	HEIGHT	SLAB		WALL		SIZE, SPACING & LENGTH OF REINFORCEMENT																					
		BOT.	TOP	EXT.	ENT.	BARS "01"		BARS "02"		BARS "03"		BARS "04"		BARS "05"		BARS "06"		BARS "07"		BARS "08"		BARS "09"		BARS "10"		BARS "11"		BARS "12"		BARS "13"	
W	D	T1	T2	W1	W2	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.	SIZE	SPCG.
2000	2000	250	250	250	250	#5	150	#5	150	#5	150	#4	150	#3	200	#3	200	#5	150	#5	150	#4	150	#5	150	#5	150	#4	150	#4	150
3000	3000	350	350	300	250	#6	150	#6	150	#6	150	#4	150	#4	200	#4	200	#6	150	#6	150	#4	150	#5	150	#5	150	#4	150	#4	150
4000	4000	450	450	400	250	#6	150	#6	150	#6	150	#4	150	#4	200	#4	200	#6	150	#6	150	#4	150	#5	150	#5	150	#4	150	#4	150

THREE CELL BOX CULVERTS

NOTE:-
1- WORK THIS DRAWING IN CONJUNCTION WITH OTHER RELEVANT DRAWINGS.

PAKHTUNKHWA HIGHWAY AUTHORITY	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	04				DRAWN BY	
		03				SUBMITTED BY	
		02	10/1/17	3		RECOMMENDED BY	
		01				CHD./VER. BY	
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED BY	

CONSTRUCTION OF ROAD MADYAN TO KALM INCULUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE	SCALE
DESIGN PARAMETERS WITH REINFORCEMENT DETAILS FOR BOX CULVERT	
DATE: JUNE, 2022	DRAWING NO.: 3737/102/CD/BCR007
	REV.: 01

GENERAL NOTES

1. DESIGN SPECIFICATIONS:

1.1 AASHTO LRFD 6th EDITION 2012: AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIAL FOR STRUCTURAL DESIGN.
1.2 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES – 2002
1.3 WEST PAKISTAN CODE OF PRACTICE FOR HIGHWAY BRIDGES – 1967 (WHERE APPLICABLE)

2. LIVE LOADS:

2.1 VEHICULAR LIVE LOADING ON ROADWAY BRIDGES ACCORDING TO AASHTO – LRFD CONSISTS OF HL–93 WITH COMBINATION OF
* DESIGN TRUCK OR DESIGN TENDEM
* DESIGN LANE LOAD

2.2 SINGLE LANE OF CLASS 'AA' (MILITARY 70 TON TANK) LOADING OR TWO LANES OF CLASS 'A' LOADING OF WEST PAKISTAN CODE OF PRACTICE FOR HIGHWAY BRIDGES– 1967 WHICH EVER GOVERNS.
2.3 A SINGLE LOAD OF 95 KN (21 Klp) ON 300x600 mm AREA, FOR THE DESIGN OF DECK SLAB ONLY.

3. GENERAL:

3.1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. ELEVATIONS ARE IN METERS.
3.2 ALL ELEVATIONS SHOWN ON DRAWINGS ARE FINISHED SURFACE LEVELS UNLESS OTHERWISE NOTED.
3.3 ALL EXPOSED CONCRETE CORNERS, EDGES AND ANGLES SHALL BE CHAMFERED OR FILLETED 20 x 20mm UNLESS OTHERWISE SPECIFIED.
3.4 GIRDER TOP SHALL BE ROUGHENED TO A FULL AMPLITUDE OF 6mm.
3.5 THE FINISHES OF EXPOSED CONCRETE FACES SHALL BE AS PER DRAWING OR AS SPECIFIED IN THE GENERAL SPECIFICATIONS.
3.6 THE SURFACE IN CONTACT WITH EARTH SHALL BE TREATED WITH WATER PROOFING SYSTEM AS PER SPECIFICATIONS AND DRAWINGS.

4. MATERIALS:

4.1 ALL THE MATERIALS AND WORKMANSHIP SHALL BE ACCORDING TO THE AASHTO SPECIFICATIONS AND ASTM STANDARDS EXCEPT WHERE MODIFIED BELOW, OR IN "PARTICULAR SPECIFICATIONS AND SPECIAL PROVISIONS" OF THE TENDER DOCUMENTS.

4.2 CONCRETE
UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASSIFIED AS FOLLOWS:

CONCRETE	28 DAYS (15 X 30 CM) CYLINDER STRENGTH KG/Sq.cm^2	
REINFORCED	210 (3000 psi)	APPROACH SLAB & BARRIER
REINFORCED	280 (4000 psi)	PIERS, PILECAP, TRANSOM, ABUTMENT WALLS, WING WALLS, DECK SLAB, DIAPHRAGM, R.C BEAMS & RETAINING WALL
REINFORCED	280 (4000 psi)	PILES.
PRE STRESSED	330 (4800 psi)	PRECAST PRESTRESSED GIRDERS.
LEAN	100 (1500 psi)	

4.3 STEEL REINFORCEMENT
REINFORCING STEEL SHALL BE GRADE 60 STEEL CONFORMING TO AASHTO M–31 (ASTM A–615) WITH MINIMUM YIELD STRENGTH OF 414 N/mm^2 (60,000 psi).

4.4 STRUCTURAL STEEL
ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A–36 HAVING MINIMUM YIELD STRENGTH OF 248 N/mm^2 (36,000 psi). BOLTS AND NUTS SHALL CONFORM TO ASTM A–307 OR EQUIVALENT. ALL WELDS SHALL CONFORM TO A.W.S (AMERICAN WELDING SOCIETY).

4.5 PRESTRESSING CABLES.
PRESTRESSING STEEL SHALL BE LOW RELAXATION STRAND CONFORMING TO AASHTO M203 (ASTM A–416), GRADE 270 HAVING MINIMUM ULTIMATE TENSILE STRENGTH OF 1862 N/mm^2 (270 ksi).

4.6 BEARING PADS.
BEARING PADS SHALL CONFORM TO SECTION 14, "ELASTOMERIC BEARINGS" OF AASHTO SPECIFICATIONS FOR HIGHWAY BRIDGES, 1992.

4.7 DUCTS FOR PRESTRESSING
– ID SHALL BE > or = 63 mm OR AS INDICATED IN THE DRAWINGS.
– FULLY GALVANIZED SHEATH TH > or = 0.5mm SHALL BE USED

4.8 STEEL TUBES.
ALL STEEL TUBES SHALL CONFORM TO ASTM A–501 HAVING MINIMUM YIELD STRENGTH OF 248 N/mm^2 (36,000 psi).

5. CONCRETE COVER:

THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED TO REINFORCING STEEL UNLESS OTHERWISE NOTED IN CASE OF BEAMS, PRESTRESSED GIRDERS & PILES ETC, THE COVER WILL BE MEASURED FROM THE OUTER EDGE OF STIRRUPS, TIES OR SPIRAL.

– DECK SLAB
TOP OF DECK SLAB ..... 40 mm
BOTTOM OF DECK SLAB ..... 25 mm

– PRESTRESSED GIRDER/REINFORCED GIRDER
TOP ..... 25 mm
BOTTOM ..... 40 mm
STIRRUPS AND TIES ..... 40 mm

– BARRIER
TOP, BOTTOM & SIDES ..... 30 mm
– PILES ..... 75 mm
– PILE CAP
BOTTOM AND SIDES ..... 75 mm
TOP ..... 50 mm
– DIAPHRAGM STIRRUPS ..... 40 mm
– PIER AND COLUMN TIES, BEAM STIRRUP ..... 50 mm
– APPROACH SLAB,
BOTTOM ..... 50 mm
TOP ..... 30 mm
– RETAINING WALLS
– FACE EXPOSED TO WEATHER OR EARTH ... 50mm
– FACE NOT EXPOSED TO WEATHER OR EARTH ... 40mm
– FOUNDATION
– TOP BARS ..... 50 mm
– BOTTOM BARS ..... 50 mm

6. CONSTRUCTION & ERECTION:

6.1 C.Jts. SHALL BE PROVIDED AT JUNCTIONS OF WEBS WITH TOP & BOTTOM FILLETS.
6.2 CONCRETE IN BOX GIRDER TOP SLAB SHALL BE PLACED IN FULL WIDTH, NO CONSTRUCTION JOINT SHALL BE PERMITTED. DIAPHRAMS AND DECK SLAB SHALL BE CAST MONOLITHICALLY.
6.3 CONCRETE FOR THE BARRIERS AND SIDEWALKS SHALL BE PLACED NO SOONER THAN 20 DAYS AFTER PLACING OF CONCRETE IN THE DECK SLAB.
6.4 GIRDERS SHALL BE INSTALLED IN THEIR CORRECT POSITION ON BEARINGS BY LIFTING OR LAUNCHING AND SHALL BE TEMPORARILY BRACED UNTIL CASTING OF DIAPHRAGMS.
6.5 IF LIFTING METHOD IS USED, GIRDERS SHALL BE LIFTED FROM BOTH ENDS USING LIFTING HOLES / SLEEVES BY MEANS APPROVED BY THE ENGINEER.
6.6 IF LAUNCHING IS USED THE MAXIMUM CANTILEVER OVERHANG SHALL NOT EXCEED 3 m.
6.7 ALL EXPOSED SURFACES SHALL HAVE FAIR FACED FINISH UNLESS OTHERWISE SPECIFIED.
6.8 ALL REINFORCING STEEL SHALL BE ACCURATELY LOCATED IN THE FORM WORK AND HELD FIRMLY IN PLACE BEFORE AND DURING PLACING OF CONCRETE BY MEANS OF 16 GAUGE BLACK ANNEALED WIRE AND ADEQUATELY DESIGNED SPACERS. CONCRETING SHALL NOT TAKE PLACE UNTIL ALL EMBEDDED ITEMS HAVE BEEN FULLY SECURED IN PLACE.
6.9 BEHIND THE ABUTMENT AND WING WALLS A SELECTED GRANULAR FILL SHALL BE PROVIDED, AS SHOWN IN THE DRAWINGS.
6.10 FOR PIER HEIGHT 'H' > 7900mm, LAPS OF MAIN REINFORCEMENT SHALL BE PROVIDED AT MID HEIGHT OF PIER AND FOR PIER HEIGHT 'H' ≤ 7900mm, NO LAPS OF MAIN REINFORCEMENT SHALL BE PROVIDED IN PIER.

7. POST–TENSIONING:

7.1 A MULTI–STRAND POST TENSIONING SYSTEM SHALL BE USED.
7.2 ALL CABLES SHALL BE STRESSED, SIMULTANEOUSLY FROM BOTH ENDS AND FROM ONE END ONLY IN THE ORDER SPECIFIED ON THE DRAWINGS.
7.3 CABLE EXTENSION INCLUDES A PULL–IN MARGIN OF 5 mm AT EACH STRESSING END. CONE PULL–IN AT BOTH ENDS, DURING TENSIONING AND AFTER ANCHORAGE SHALL BE RECORDED AND COMMUNICATED TO THE ENGINEER FOR ANY DEVIATION.
7.4 THE JACKING FORCE, CABLE ELONGATION AND LOCKING SLIPPAGE SHALL BE IN ACCORDANCE WITH THE DRAWINGS. ANY DEVIATION OR VARIATION MUST BE REPORTED TO THE ENGINEER BEFORE CONTINUING STRESSING WORK.
7.5 THE CABLE AXIS MUST COINCIDE WITH THE ANCHORAGE AXIS BEHIND THE ANCHORAGE FOR A LENGTH OF AT LEAST 400mm OR TRUMPET LENGTH, WHICHEVER IS GREATER.
7.6 SUITABLE STEEL CHAIRS/FRAMES, TO HOLD THE PRESTRESSING TENDON DUCTS AND REINFORCEMENT IN TRUE POSITION, AT ADEQUATE INTERVALS (RANGING FROM 0.8 TO 1.2 METER) SHALL BE PROVIDED. TENDON DUCTS SHALL BE RIGIDLY SUPPORTED BY TIES TO REINFORCING STEEL AT EVERY 1.2 METER.
7.7 PROVISIONS SHALL BE MADE IN THE END ANCHORAGES FOR GROUTING THE CABLE DUCTS IMMEDIATELY AFTER TENSIONING. AFTER SECURING GROUTED AFTER STRESSING WITH FEB–FLOWCABLE/FLOWCABLE–50 OR THE END ANCHORAGES, ALL CABLES SHALL BE PRESSURE GROUTED IN THEIR DUCTS IN ACCORDANCE WITH THE SPECIFICATIONS. SHALL BE FILLED WITH 210 KG/Sq.cm (3000 psi) USING USING 10mm
7.8 INTERMEDIATE GROUT VENTS SHALL BE PROVIDED NEAR THE LOWEST/UPPER PARTS OF THE CABLE PROFILE. CABLES SHALL BE EQUIVALENT AS APPROVED BY THE ENGINEER. ANCHORAGE POCKETS DOWN AGGREGATE, AFTER GROUTING AND TRIMMING CABLES.
7.9 UNLESS OTHERWISE NOTED THE CYLINDER STRENGTH OF CONCRETE IN PRESTRESSED CONCRETE POST TENSIONED GIRDER AT TRANSFER SHALL BE NOT LESS THAN 33 N/mm^2 (4800 psi).
7.10 COMPLETE PRESTRESSING TENDONS OR CABLES SHALL CONSIST OF HIGH TENSILE WIRES OR CABLES AS SPECIFIED IN DRAWINGS, ALONG WITH CORE HELIX, METAL SHEATHS, COUPLINGS AT ADEQUATE INTERVALS, PRE STRESSING ANCHORAGES, BINDING TAPE, METAL SPACERS AND OTHER ACCESSORIES.
7.11 THE FOLLOWING SHALL BE USED IN THE CALCULATION OF THEORETICAL ELONGATION, Ao:
– MODULUS OF ELASTICITY, E = 200,000 MPa. (29000 ksi)
– COEFFICIENT OF FRICTION = 0.25 / radian.
– WOBBLE COEFFICIENT = 0.0033 /meter.
– DRAW–IN OF WEDGES FOR, 0.5" (12.7mm) STRAND = 6 mm.
ANY DEVIATION IN PARAMETERS MAY RESULT IN REVISION OF THE TENDON SIZE. IF THE COST INCREASES THEN IT WILL BE CONTRACTORS RESPONSIBILITY.
7.12 ANCHORAGES, FOR BONDED POST–TENSIONED REINFORCEMENT SHALL DEVELOPE AT LEAST 95% OF MINIMUM SPECIFIED ULTIMATE STRENGTH OF THE PRESTRESSING STEEL TESTED IN AN UNBONDED STATE WITHOUT EXCEEDING ANTICIPATED SET.
7.13 ANCHORAGES, END FITTINGS SHALL BE PERMANENTLY PROTECTED AGAINST CORROSION.

8. FOUNDATIONS:

8.1 ALL THE EXCAVATION FOR OPEN FOUNDATIONS SHALL BE SUBJECTED TO INSPECTION BY THE ENGINEER PRIOR TO POURING OF CONCRETE.
8.2 SELECTED GRANULAR BACKFILL SHOULD BE PLACED IN LAYERS OF THICKNESS APPROPRIATE TO THE COMPACTION EQUIPMENT ENSURING A MINIMUM INSITU COMPACTION OF 95% MODIFIED PROCTOR.
8.3 WHERE SHOWN ON THE DRAWINGS, SELECT FILL SHOULD BE PROVIDED UNDER THE FOUNDATIONS, AS PER SPECIFICATIONS. THE DEPTH OF SELECT FILL MATERIAL SHOWN ON THE DRAWINGS, IS THE REQUIRED MINIMUM; THE EXACT DEPTH WILL BE DETERMINED BY THE GEOTECHNICAL ENGINEER AT SITE.
8.4 PILES
(I) PILE LOAD TEST
PILE FOR LOAD TEST SHOULD BE CAST AS SHOWN ON THE DRAWING AND AT LOCATION DIRECTED BY THE ENGINEER. FOR PILE LOAD TEST PILE SHOULD BE TESTED TO 2.5 TIMES THE DESIGN LOAD.
PILE LOAD TEST SHALL BE CARRIED OUT AS PER ASTM DESIGNATION D1143–87 AND TEST RESULTS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL. CONSTRUCTION OF WORKING PILES SHALL COMMENCE AFTER COMPLETION AND INTERPRETATION OF TEST RESULTS.
(II) PILE PROOF LOAD TEST
THE WORKING PILES SHALL BE CONSTRUCTED AS PER FINAL DESIGN. AT LEAST ONE OF THE WORKING PILES SHALL BE SUBJECTED TO PROOF LOAD TEST WITH LOAD 1.5 TIMES THE DESIGN LOAD.
(III) PLANNING FOR LOAD TESTS, SUPERVISION, INTERPRETATION OF RESULTS AND LOAD CARRYING CAPACITY SHALL BE CARRIED OUT BY THE ENGINEER.

9. METAL WORK:

9.1 MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
9.2 ALL WELDED CONSTRUCTION UNLESS OTHERWISE NOTED.
9.3 ALL STEEL TO BE PAINTED OR GALVANIZED AS DIRECTED BY THE ENGINEER.
9.4 ALL SHEAR EDGES TO BE GROUND SMOOTH.
9.5 ALL WELDS SHALL BE 5mm CONTINUOUS FILLET WELD, E70XX ELECTRODE UNLESS OTHERWISE NOTED ON THE DRAWING.

10. EXPANSION JOINTS

EXPANSION JOINT SYSTEM SHALL BE APPROVED BY THE ENGINEER. ALLOWABLE MOVEMENT BETWEEN MAXIMUM AND MINIMUM GAP IN THE DIRECTION OF TRAFFIC SHALL BE AS INDICATED ON DRAWINGS. EXPANSION JOINT SYSTEM SHALL BE INSTALLED AT LEAST ONE MONTH AFTER COMPLETING THE DECK, BY SAW CUTTING IN THE CONTINUOUS WEARING COURSE. CONTRACTOR SHALL SUBMIT NECESSARY INSTALLATION DETAILS FOR ENGINEER'S APPROVAL BEFORE STARTING THIS WORK.

11. DETAILED BAR BENDING SCHEDULE:

DETAILED BAR BENDING SCHEDULE SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED FOR ENGINEER'S APPROVAL.

12. EMBEDDED ITEMS:

ALL EMBEDDED ITEMS SHALL BE SECURED IN POSITION ACCORDING TO THE DRAWINGS BEFORE PROCEEDING WITH THE CONCRETING.

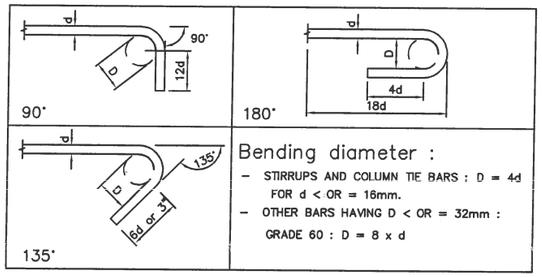
13. PROTECTION WORKS:

THE LIMITS OF PROTECTION WORKS SHALL BE AS SHOWN IN THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.

14. LIST OF SYMBOLS AND ABBREVIATIONS:

Ao	=	THEORETICAL ELONGATION OF PRESTRESSING TENDON
B	=	BOTTOM
BOS	=	BOTTOM OF SLAB
○B.H	=	BORE HOLE
C.JT.	=	CONSTRUCTION JOINT
℄	=	CENTERLINE
C/C	=	CENTER TO CENTER
DIA.	=	DIAMETER
EXP. JT.	=	EXPANSION JOINT
E.F	=	EACH FACE
EL.	=	ELEVATION
F.F	=	FAR FACE
GI	=	GALVANIZED IRON
GUTS	=	GUARANTEED ULTIMATE STRENGTH (OF PRE STRESSING CABLES)
ID	=	INTERNAL DIAMETER
I.F	=	INNER FACE
m	=	METER
mm	=	MILLIMETER
N.F	=	NEAR FACE
NSL.	=	NATURAL SURFACE LEVEL
PGL.	=	PROFILE GRADE LEVEL
RD.	=	REDUCED DISTANCE.
SYMM.	=	SYMMETRICAL
T	=	TOP
TH.	=	THICK
TYP.	=	TYPICAL
ϴ	=	SKEW ANGLE IN DEGREE
TOS	=	TOP OF SLAB
TOW	=	TOP OF WALL

15. STANDARD HOOKS



Bending diameter :
– STIRRUPS AND COLUMN TIE BARS : D = 4d FOR d < OR = 16mm.
– OTHER BARS HAVING D < OR = 32mm : GRADE 60 : D = 8 x d

16. LAPPED SPLICES:

16.1 ALL LAPPED SPLICES SHALL BE TENSION SPLICES, AS PER TABLE NO.1, CONFORMING TO ACI 318, UNLESS OTHERWISE NOTED.
16.2 FOR SMALLER HEIGHTS OF WALLS UPTO, 3 METRES, LAPPING OF RE BARS IS NOT ALLOWED, UNLESS OTHERWISE NOTED.
16.3 NOT MORE THAN 50% OF THE BARS SHALL BE SPLICED AT ONE LOCATION, UNLESS OTHERWISE SHOWN ON DRAWINGS.
16.4 FOR EMBEDMENT LENGTH REFER TO TABLE NO.2

TABLE NO. 1

(i) SPLICE LENGTH IN TENSION

(a) TOP BARS

fc' N/mm^2 \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
21	710	945	1180	1410	2060	2355	2645	2940	3240
28	610	820	1020	1225	1780	2040	2295	2550	2805
33	550	730	915	1095	1580	1805	2035	2290	2545

(b) OTHER BARS

fc' N/mm^2 \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
21	550	730	905	1085	1590	1815	2035	2285	2490
28	475	630	790	945	1375	1570	1765	1960	2160
33	425	565	705	845	1215	1390	1565	1765	1980

(ii) SPLICE LENGTH IN COMPRESSION

SPLICE LENGTH (mm) IN COMPRESSION (Fy=4220Kg/cm^2)									
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Splice Length	300	380	480	575	670	765	860	955	1050

TABLE NO. 2

DEVELOPMENT LENGTH IN TENSION

(a) TOP BARS

fc' N/mm^2 \ Bar Size	DEVELOPMENT LENGTH ℓd (mm)								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
21	545	730	910	1090	1590	1820	2050	2310	2565
28	475	630	785	945	1380	1555	1755	1975	2190
33	435	560	715	840	1220	1400	1575	1755	1930

(b) OTHER BARS

fc' N/mm^2 \ Bar Size	DEVELOPMENT LENGTH ℓd (mm)								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
21	420	560	700	840	1225	1400	1580	1775	1970
28	365	485	605	725	1045	1195	1350	1520	1685
33	330	435	535	635	940	1070	1220	1350	1475

TABLE NO. 3

VALUES OF ℓdh (mm)			
GRADE 60 REINFORCEMENT: fy=420 MPa			
BAR SIZE	fc'=21MPa	fc'=28 MPa	fc'=33 MPa
#3	210	180	160
#4	280	240	215
#5	350	300	270
#6	420	360	320
#7	490	420	375
#8	550	480	430
#9	630	540	485
#10	710	610	550
#11	785	680	600

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
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02			
01			

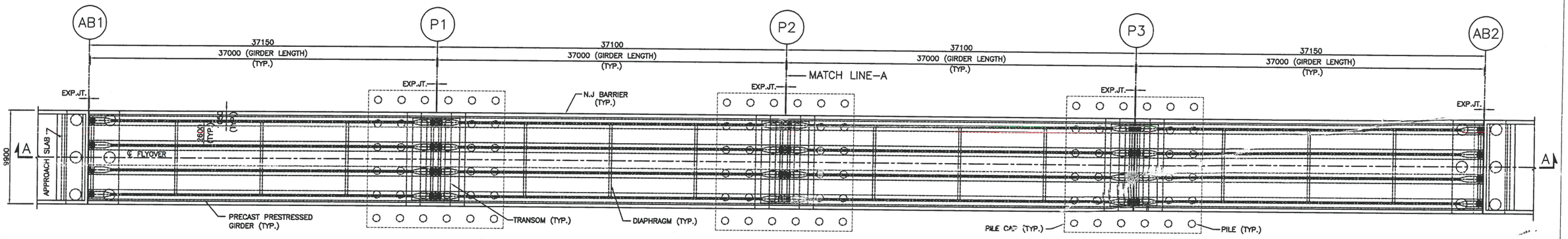
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

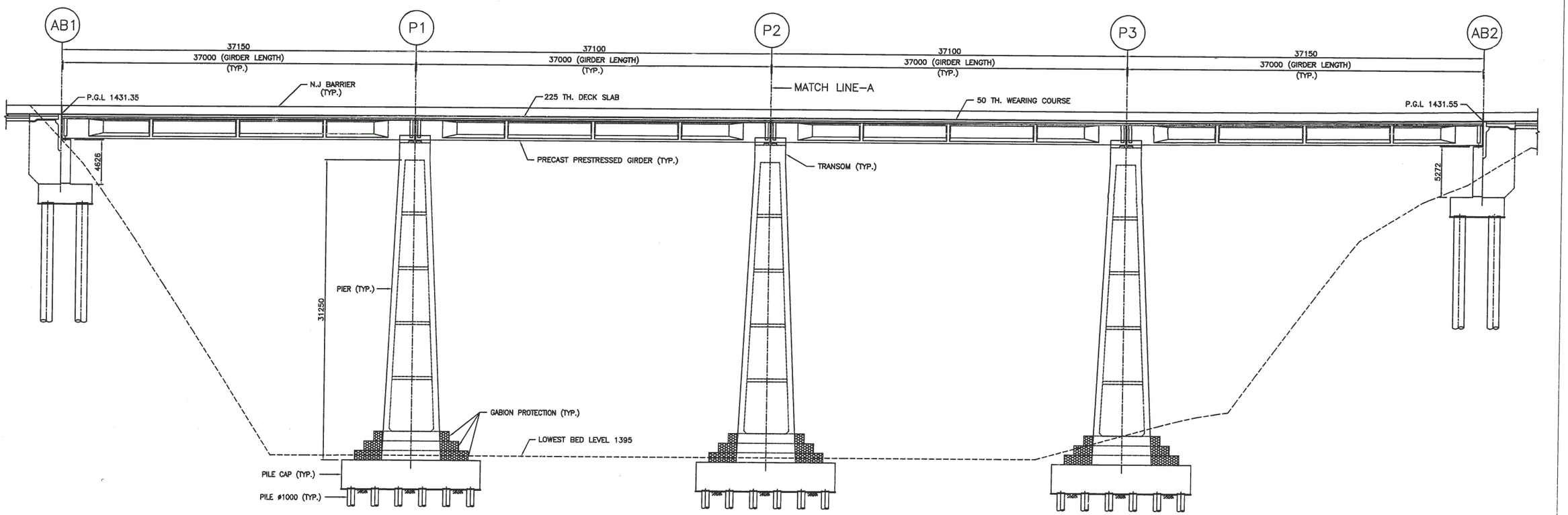
CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

MARDAN SAWABI BRIDGE
GENERAL NOTES

SCALE 1/8" = 1'-0"
DATE MAY, 2022
DRAWING No. 4402/033/PC/G001
REV. 0



PLAN



SECTION A–A

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

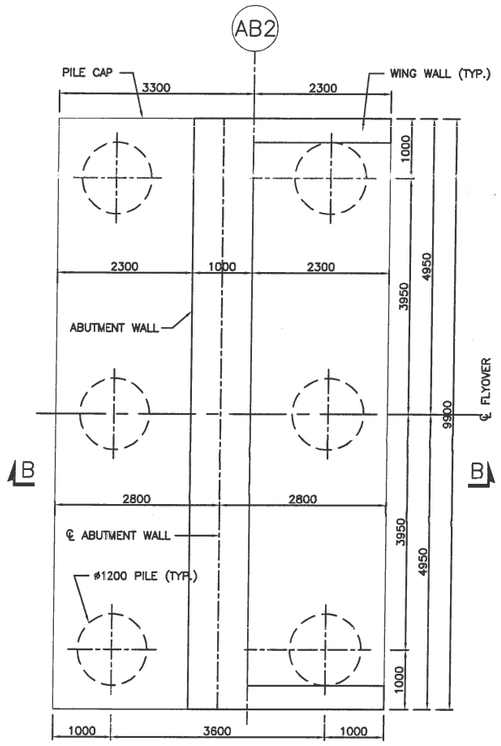
REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

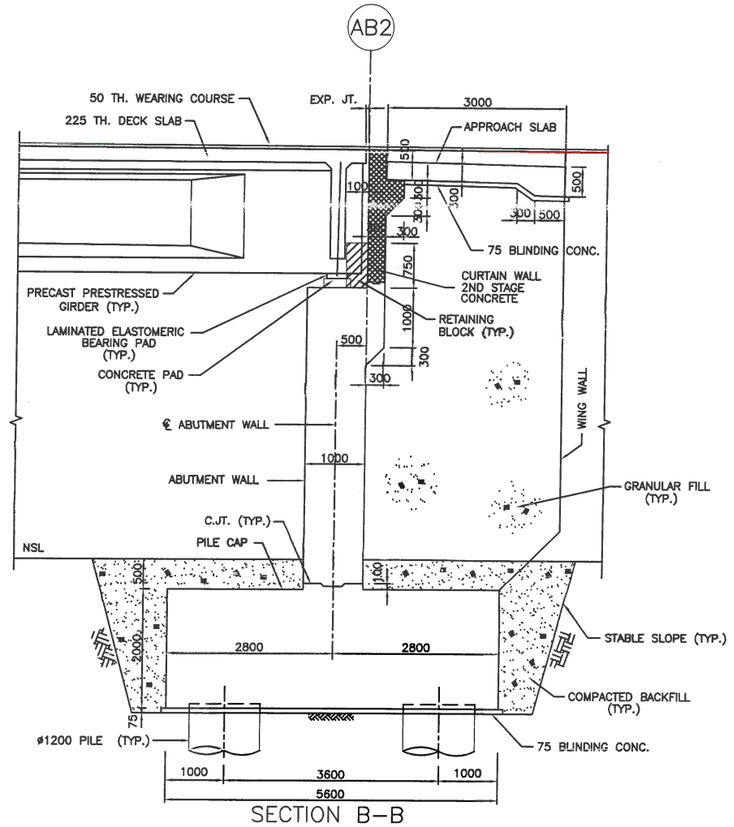
CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

BRIDGE NO. 4
GENERAL ARRANGEMENT PLAN & LONGITUDINAL SECTION

SCALE: 1/8" = 1'-0"
DATE: JUNE, 2022
DRAWING No.: 4402/033/PC/4G01
REV.: 0



ABUTMENT PLAN
SCALE 1:50



SECTION B–B

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

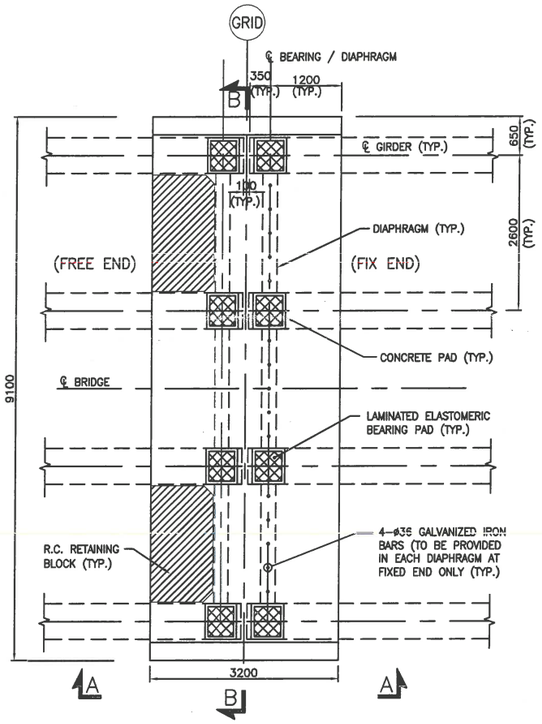
BRIDGE NO. 4
ABUTMENT DETAIL

SCALE 1/8" = 1'-0"

DATE JUNE, 2022

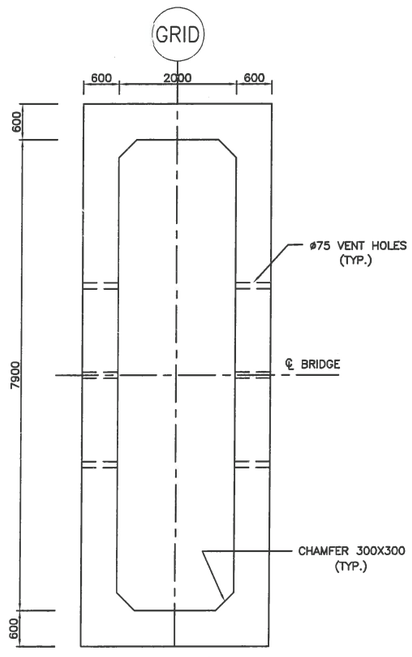
DRAWING No. 4402/033/PC/4G02

REV. 0



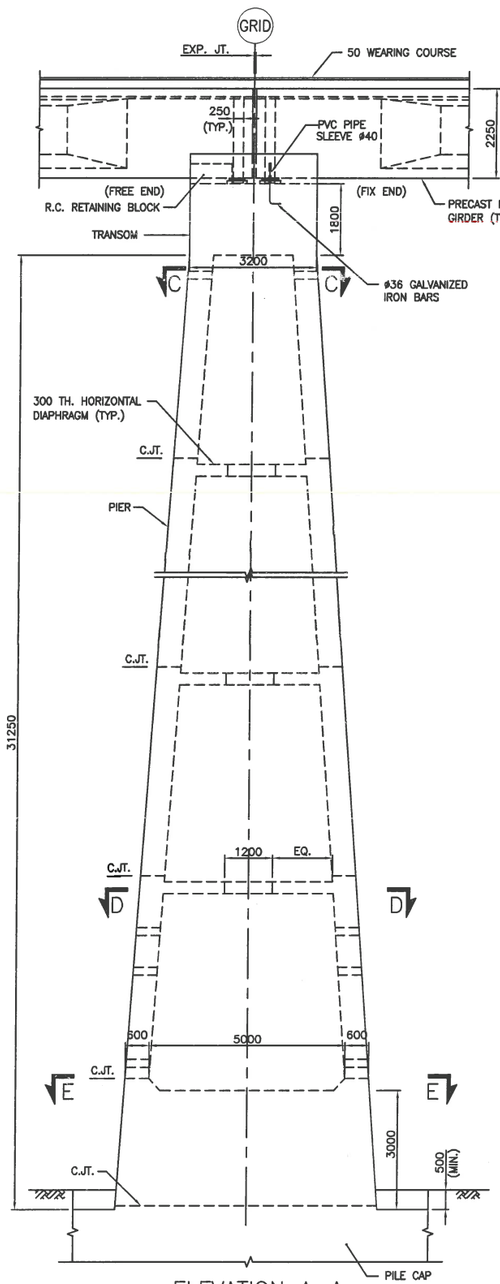
TRANSOM PLAN

SCALE 1:50

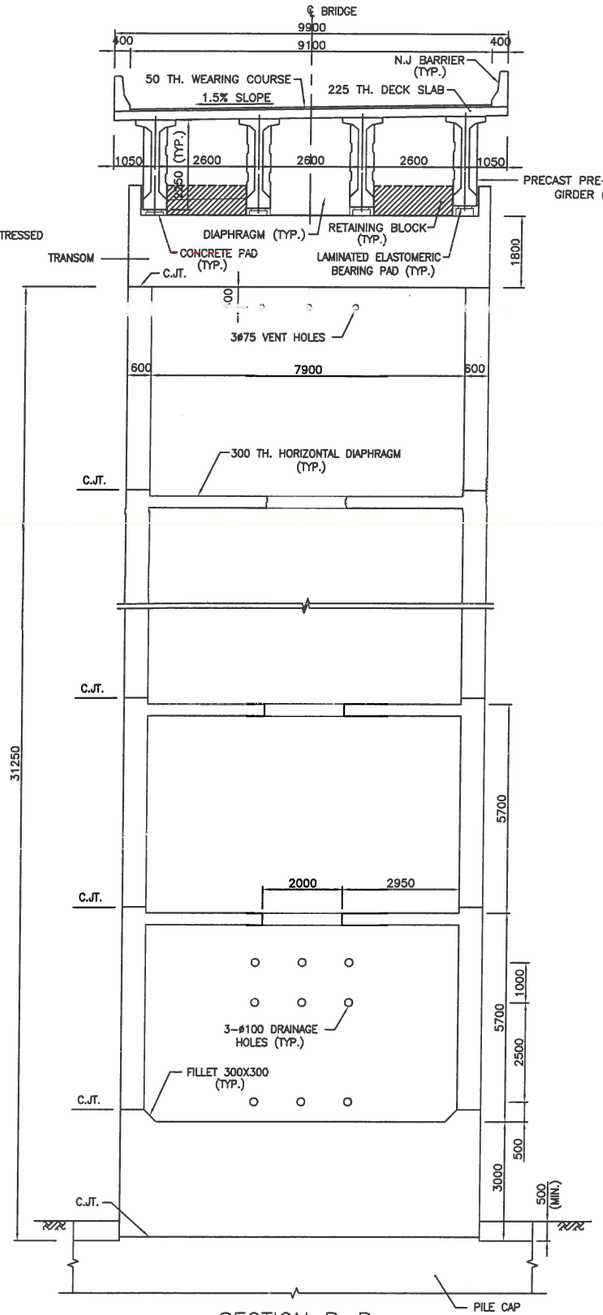


SECTION C–C

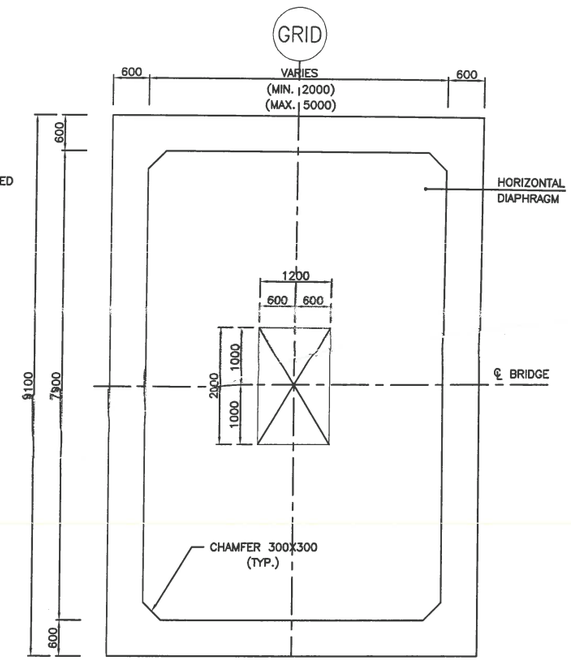
SCALE 1:50



ELEVATION A–A

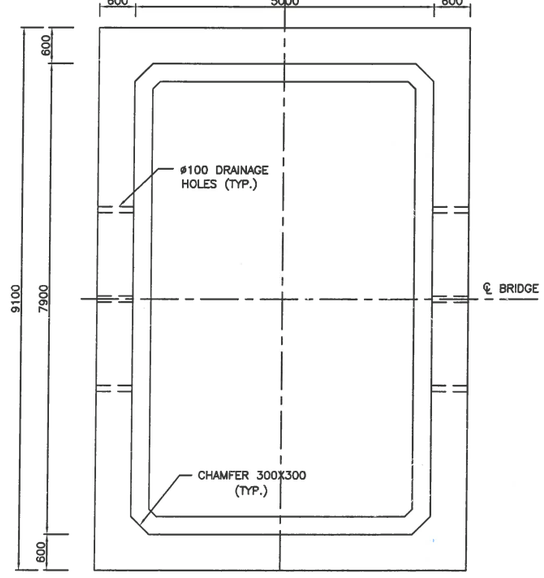


SECTION B–B



SECTION D–D

SCALE 1:50



SECTION E–E

SCALE 1:50

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

TENDER DRAWINGS

NOTES

1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT

PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

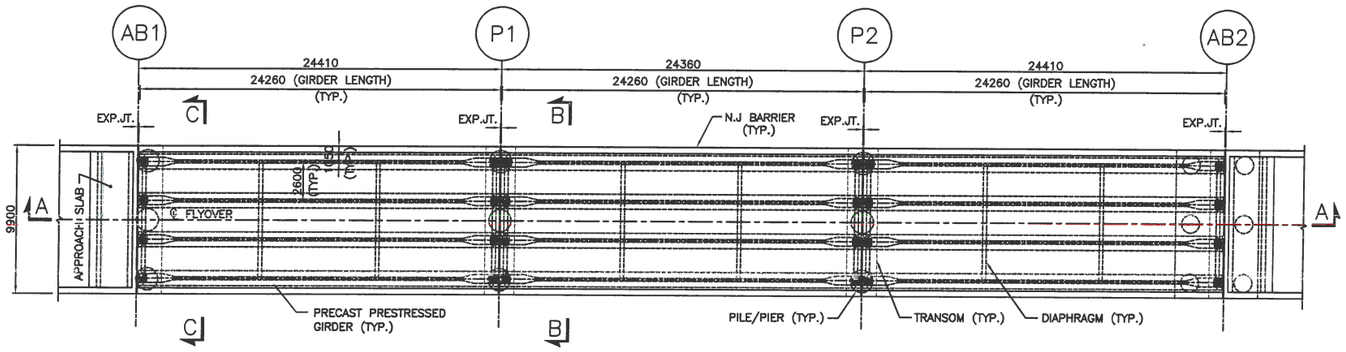
BRIDGE NO. 4
PIER AND TRANSOM PLAN & SECTIONS CONCRETE OUTLINE

SCALE: 1/8" = 1'-0"

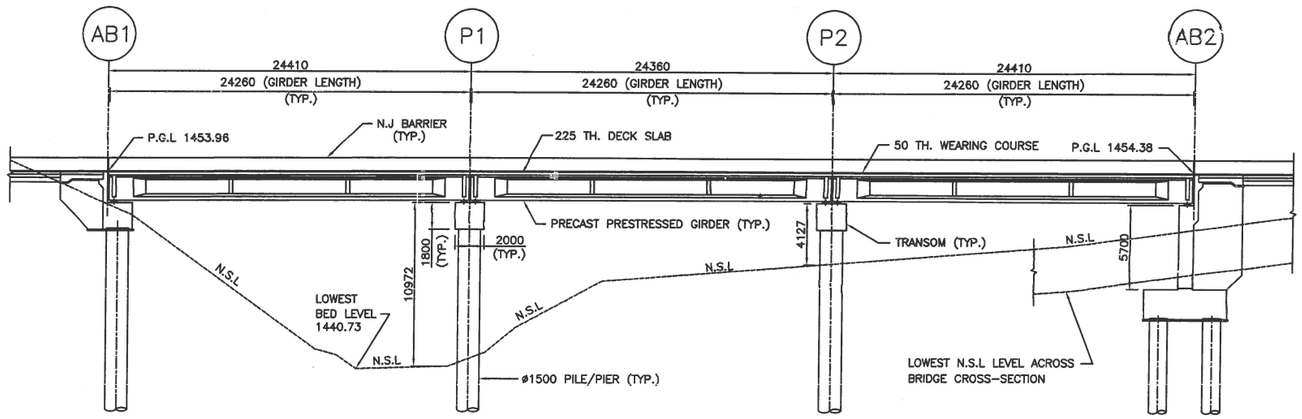
DATE: JUNE, 2022

DRAWING No.: 4402/033/PC/4G03

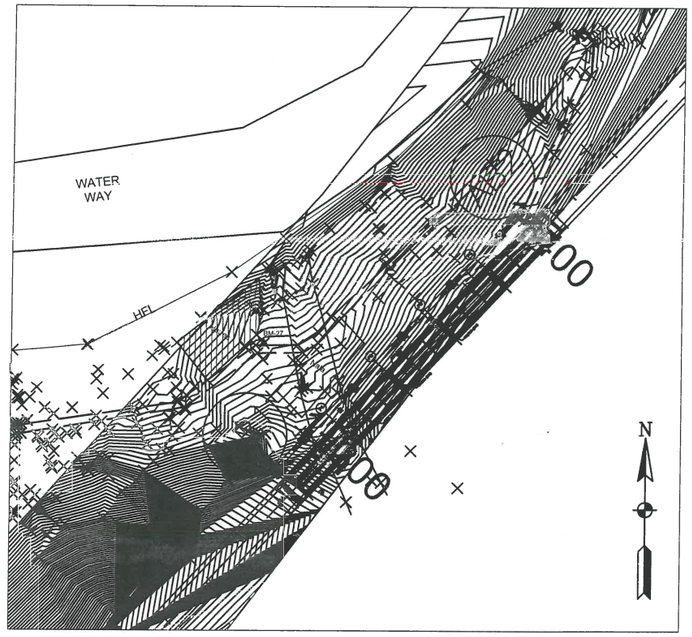
REV.: 0



PLAN



SECTION A–A



KEY PLAN

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
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CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

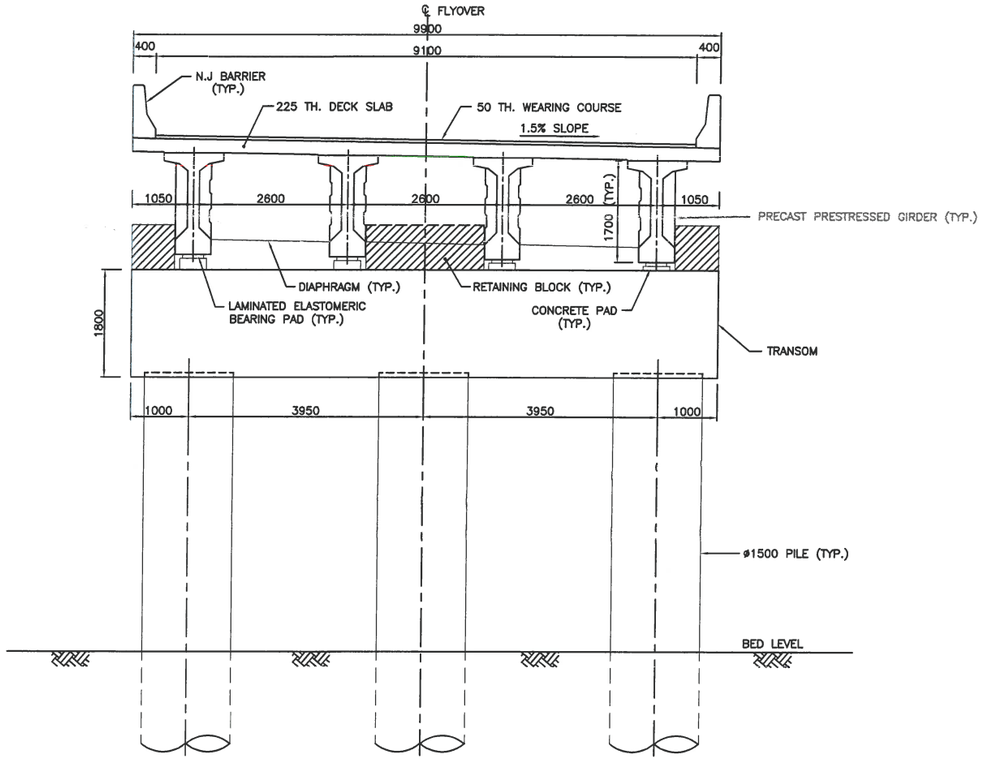
BRIDGE NO. 5
GENERAL ARRANGEMENT PLAN & LONGITUDINAL SECTION

SCALE 1/8" = 1'-0"

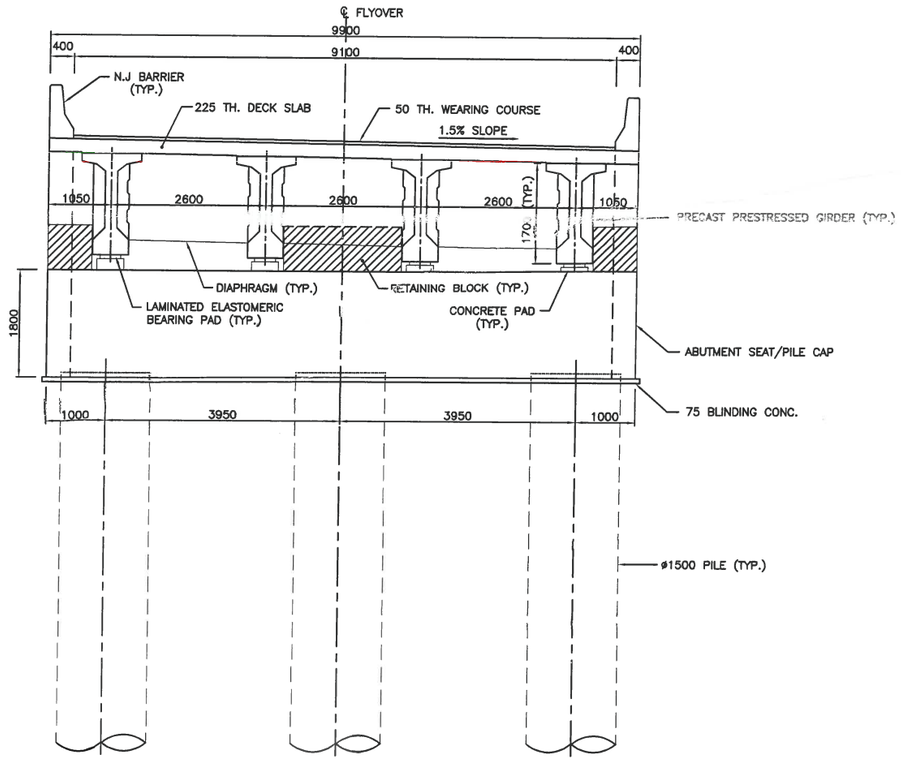
DATE JUNE, 2022

DRAWING No. 4402/033/PC/5G01

REV. 0



SECTION B–B



SECTION C–C

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
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DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

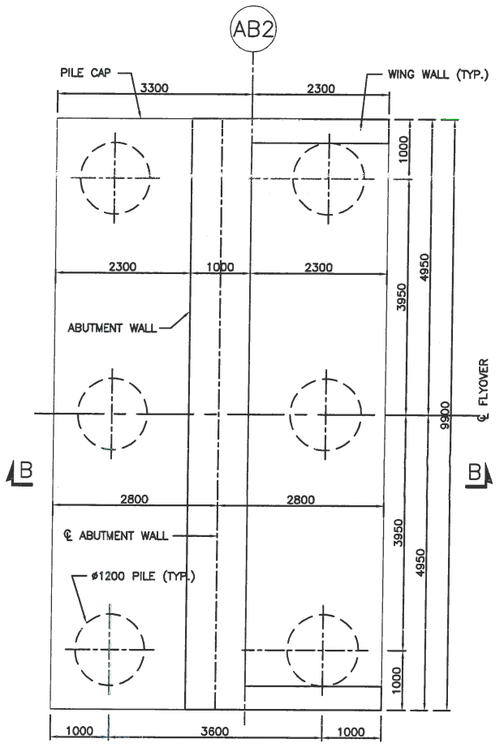
BRIDGE NO. 5
CROSS SECTION

SCALE: 1/8" = 1'-0"

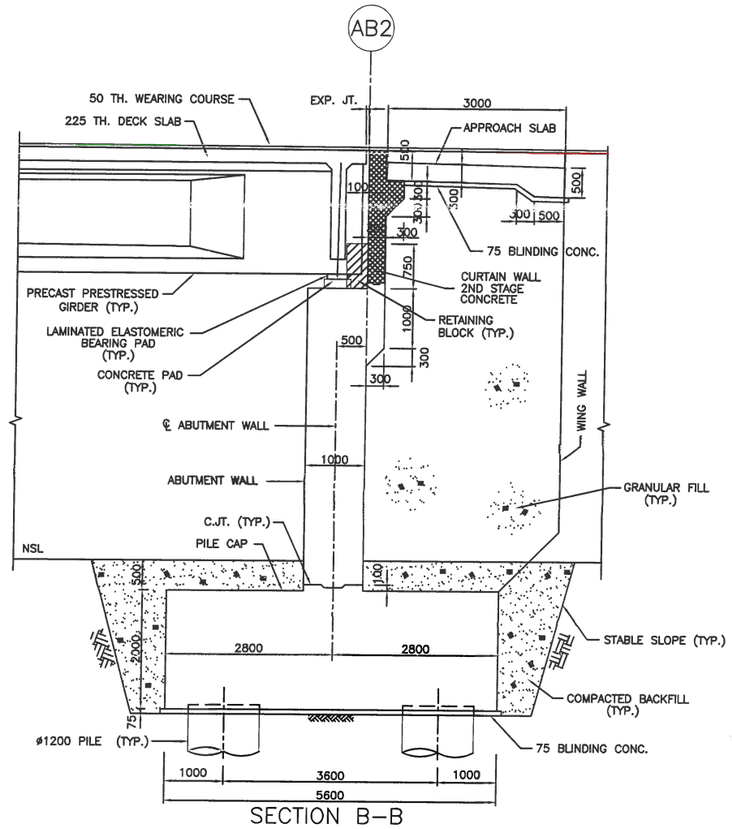
DATE: JUNE, 2022

DRAWING No.: 4402/033/PC/5G02

REV.: 0



ABUTMENT PLAN
SCALE 1:50



SECTION B–B

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

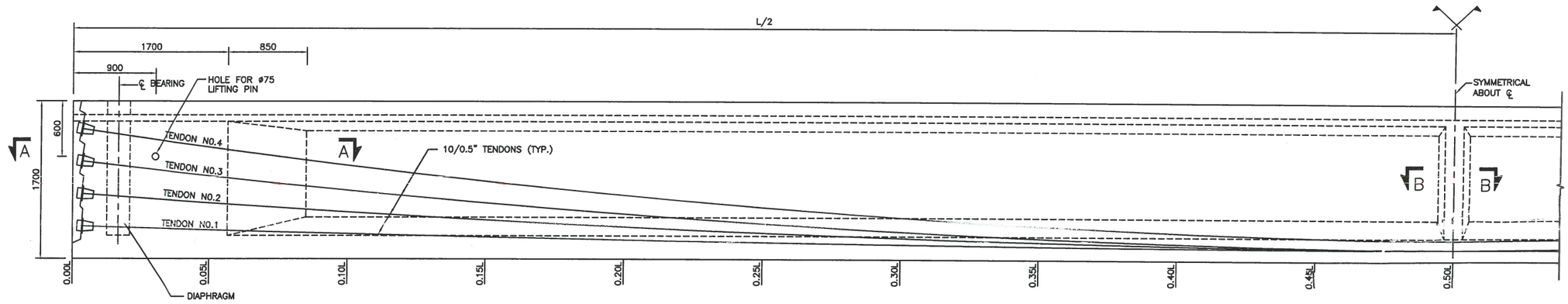
BRIDGE NO. 5
ABUTMENT DETAIL

SCALE 1/8" = 1'-0"

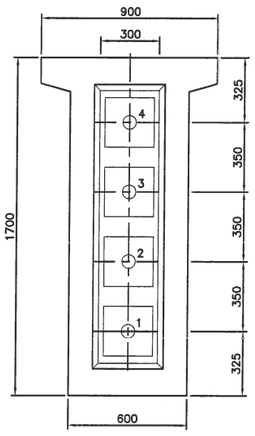
DATE JUNE, 2022

DRAWING No. 4402/033/PC/5G03

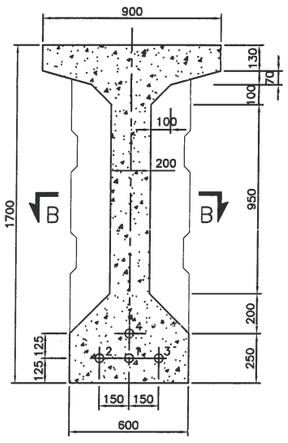
REV. 0



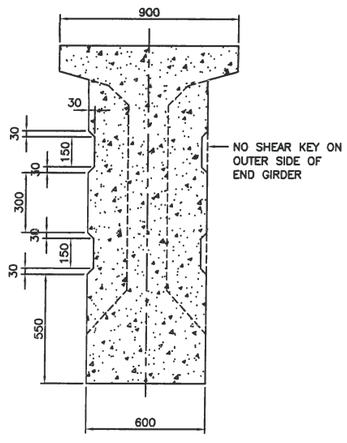
ELEVATION (TENDON PROFILE)



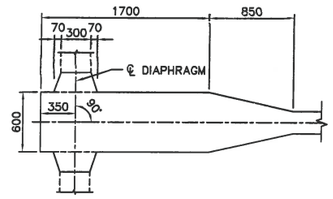
END VIEW OF GIRDER
SCALE 1:15



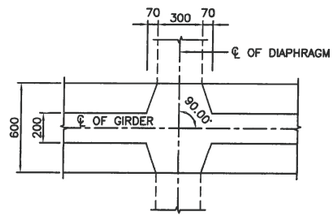
SECTION AT MIDSPAN
SCALE 1:15



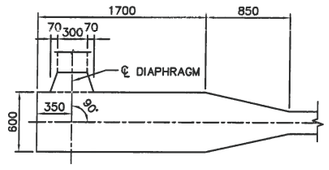
SECTION AT DIAPHRAGM
SCALE 1:15



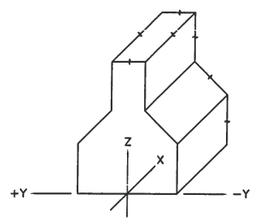
SECTIONAL PLAN A–A
(FOR INTERIOR GIRDER)
SCALE 1:30



SECTIONAL PLAN B–B
SCALE 1:20



SECTIONAL PLAN A–A
(FOR EXTERIOR GIRDER)
SCALE 1:30



REFERENCE CO–ORDINATES

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

TENDER DRAWINGS

NOTES

1. FOR GENERAL NOTES REFER DRAWING No. G001.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED
3. GIRDERS SHALL BE INSTALLED IN THEIR CORRECT POSITIONS ON BEARING BY LIFTING FROM BOTH ENDS AND SHALL BE TEMPORARILY BRACED UNTIL CASTING OF THE DIAPHRAGM.
4. ALL PRESTRESSED CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH OF 33.00MPa (4800 Psi.) AT 28 DAYS.
5. GIRDER LIFTING DETAILS SHALL BE PROVIDED BY CONTRACTOR FOR ENGINEER'S APPROVAL.
6. THE FOLLOWING VALUES HAVE BEEN ASSUMED IN THE CALCULATION OF THEORETICAL ELONGATION/EXTENSION (Ao) OF TENDONS:
   MODULUS OF ELASTICITY, E = 193,000 MPa (28,000) ksi)
   COEFFICIENT OF CURVATURE FRICTION = 0.25 PER RADIAN
   WOBBLE FRICTION COEFFICIENT = 0.0033 PER METER
   ANY DEVIATION FROM THE ABOVE VALUES SHALL BE REPORTED TO THE ENGINEER.
7. STRESSING SHALL BE STOPPED AS SOON AS ONE OF THE FOLLOWING CONDITIONS IS FULFILLED:
   – STRESS REACHES 0.77 TIMES GUARANTEED ULTIMATE TENSILE STRENGTH (GUTS) OR ACTUAL ELONGATION/EXTENSION REACHES 1.10 Ao. (IN NO CASE JACKING FORCE SHOULD BE LESS THAN AS GIVEN IN TABLE).
   – IF AT 0.75 GUTS ACTUAL ELONGATION IS STILL BELOW 0.95 Ao STRESSING SHALL BE PROCEEDED UPTO MAXIMUM OF 0.80 GUTS.
   – IN THE EVENT OF NON–CONFORMANCE OF ABOVE, THE CABLE MAY BE REPLACED.
8. TENDON EXTENSION GIVEN IN TABLE IS FOR THE JACKING END.
9. STRESSING OF GIRDERS SHOULD BE DONE FROM BOTH ENDS.
10. CABLE DUCTS SHALL BE GROUTED IMMEDIATELY AFTER STRESSING.
11. ANCHORAGE SLIP SHOULD BE LESS THAN 5mm.
12. DETAILS SHOWN ARE BASED ON THE STRONGHOLD MULTI–STRAND SYSTEM OF POST TENSIONING. ALTERNATIVE MULTI–STRAND POST–TENSIONING SYSTEM MAY BE USED SUBJECT TO APPROVAL BY THE ENGINEER.
13. PRESTRESSING OPERATIONS ARE NOT TO BE STARTED UNTILL THE CONCRETE GAINS ITS FULL STRENGTH OF 33.00MPa (4800 Psi).
14. IN CASE OF CHANGE IN PRESTRESSING PARAMETERS, THE MATTER SHALL BE REFER TO DESIGN OFFICE BEFORE PROCEEDING THE CONSTRUCTION OF GIRDERS.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION
04		
03		
02		
01		

DRAWN	M.A	
SUBMITTED		
RECOMMENDED		
CHD./VER.		
APPROVED	APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

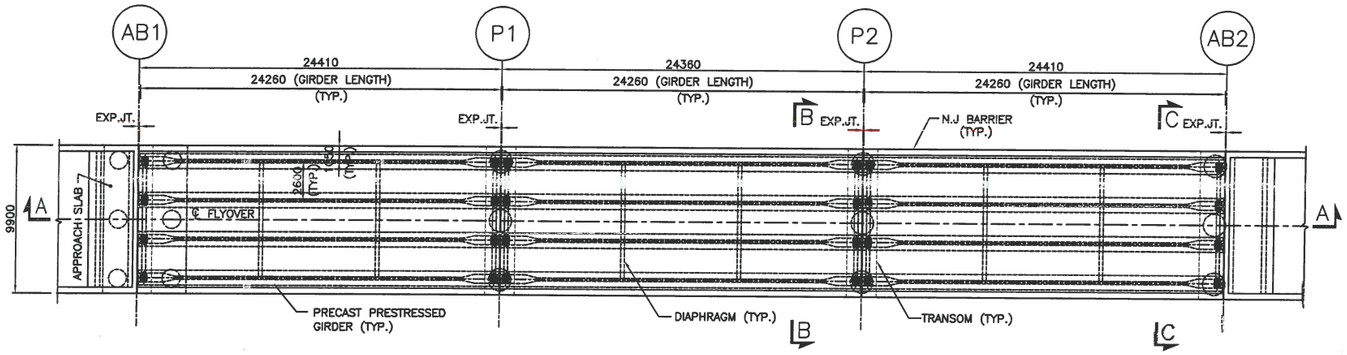
BRIDGE NO. 5
PRECAST PRESTRESSED GIRDERS
CONCRETE OUTLINE

SCALE 1/8" = 1'-0"

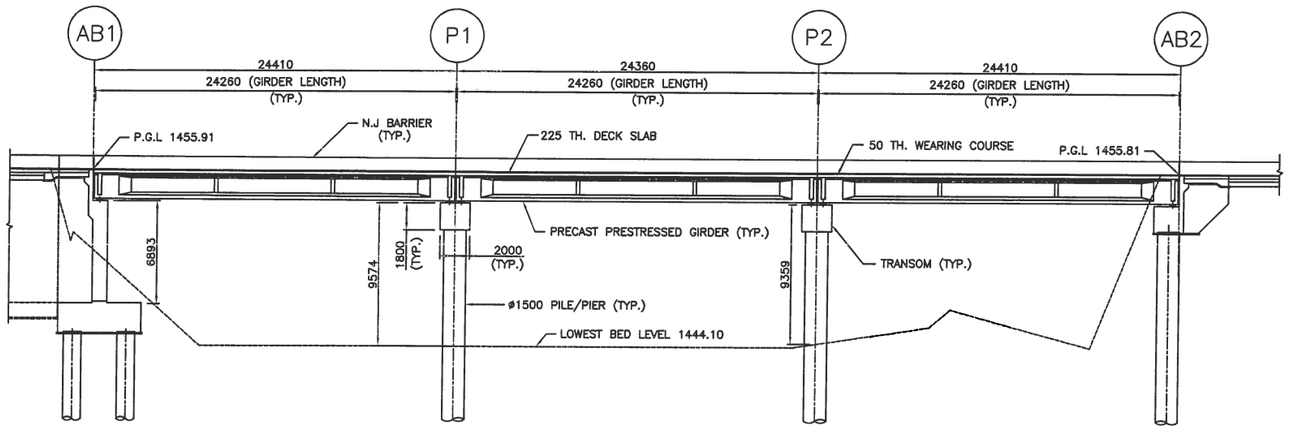
DATE JUNE, 2022

DRAWING No. 4402/033/PC/5G04

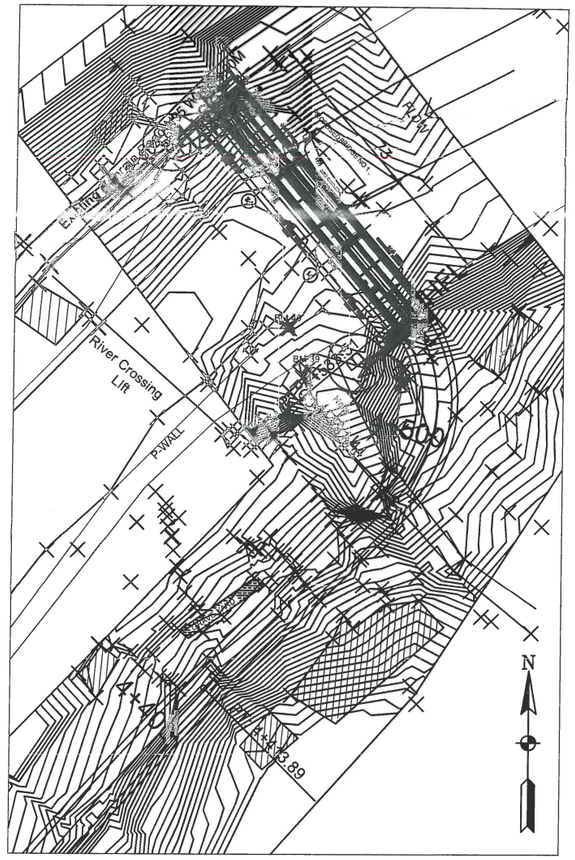
REV. 0



PLAN



SECTION A–A



KEY PLAN

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N,
MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

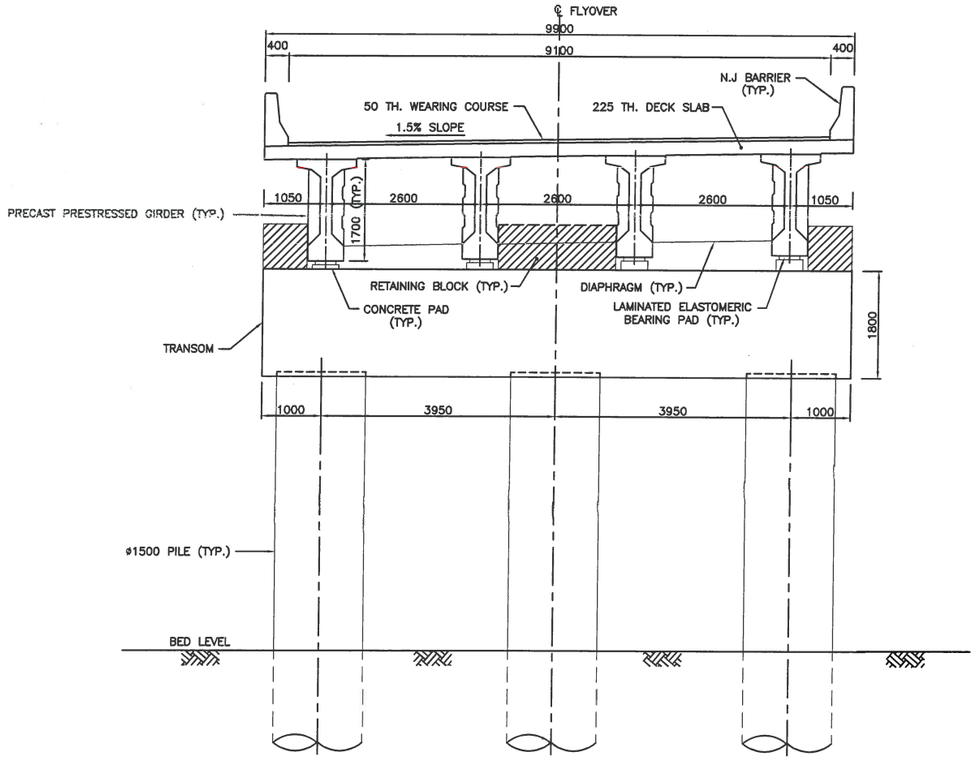
BRIDGE NO. 6
GENERAL ARRANGEMENT PLAN & LONGITUDINAL SECTION

SCALE 1/8" = 1'-0"

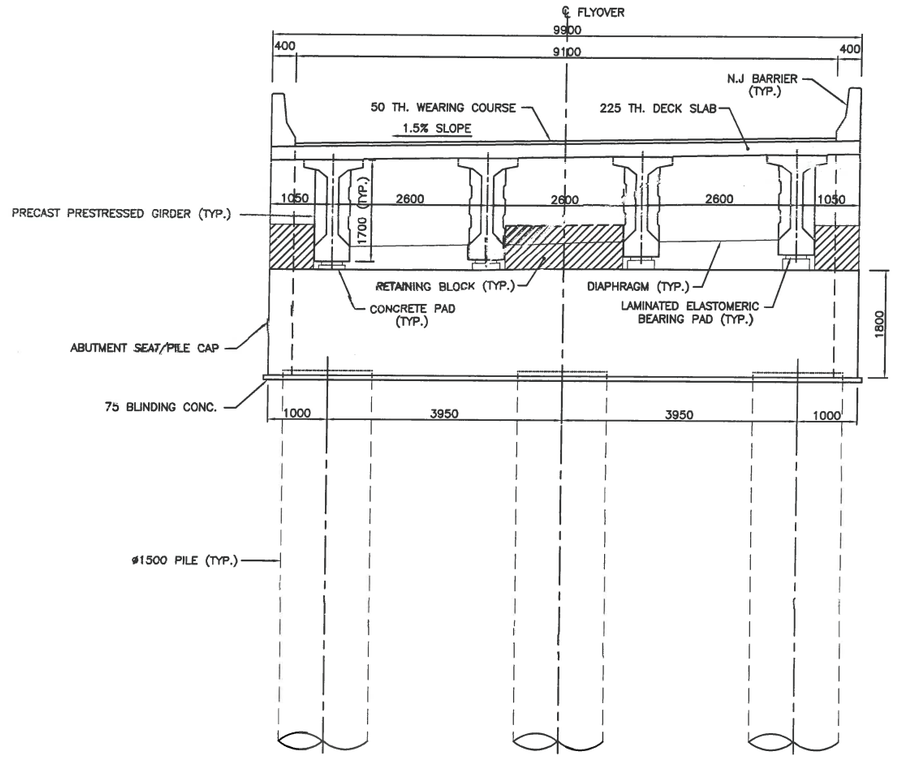
DATE JUNE, 2022

DRAWING No. 4402/033/PC/6G01

REV. 0



SECTION B–B



SECTION C–C

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
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2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N,
MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

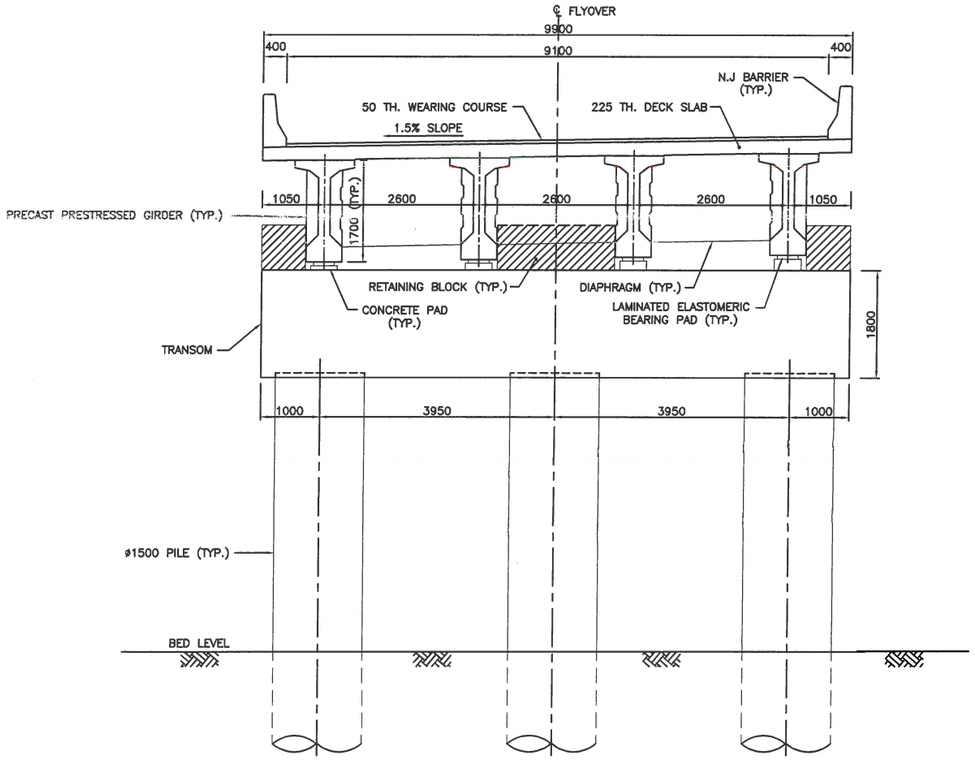
BRIDGE NO. 6
CROSS SECTION

SCALE 1/8" = 1'-0"

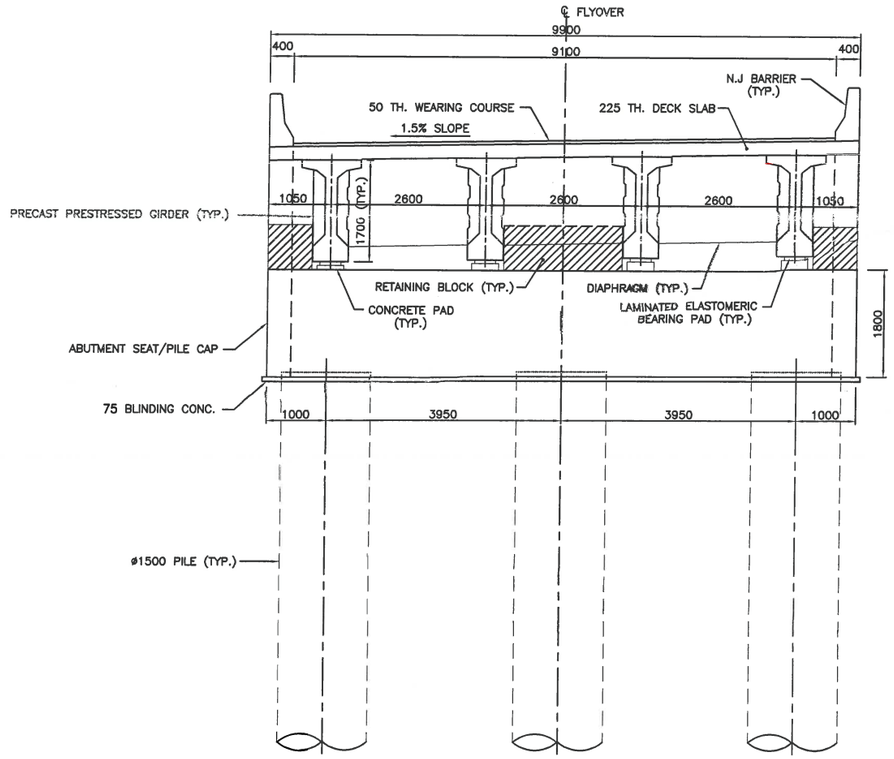
DATE JUNE, 2022

DRAWING No. 4402/033/PC/6G02

REV. 0



SECTION B–B



SECTION C–C

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N,
MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

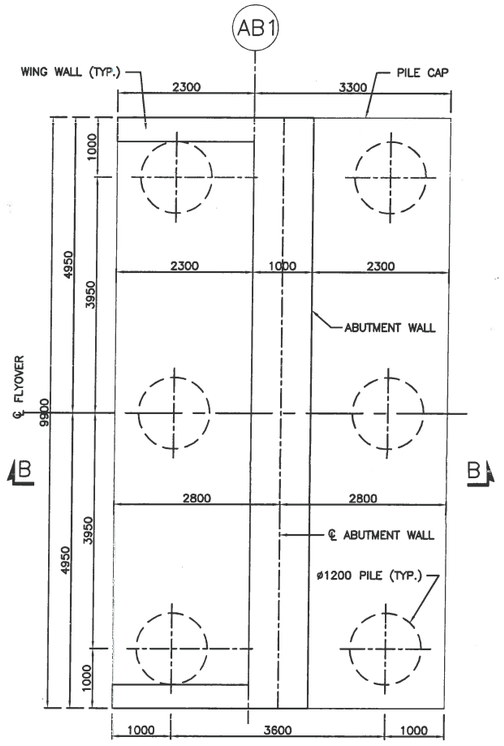
BRIDGE NO. 6
CROSS SECTION

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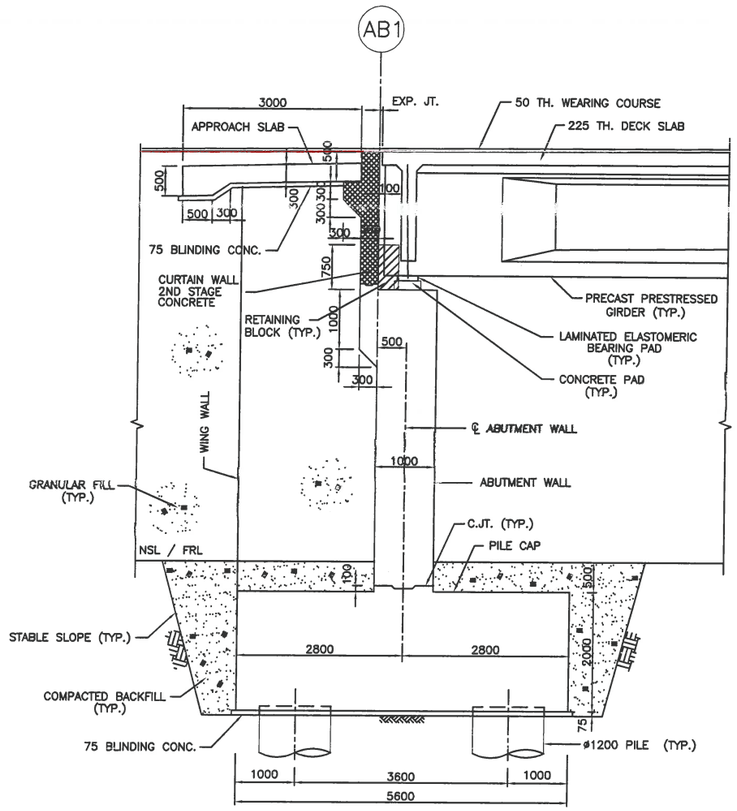
DATE JUNE, 2022

DRAWING No. 4402/033/PC/6G02

REV. 0



ABUTMENT PLAN
SCALE 1:50



SECTION B–B

TENDER DRAWINGS

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES
1. FOR GENERAL NOTES REFER DWG. NO. G001.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

CLIENT
PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

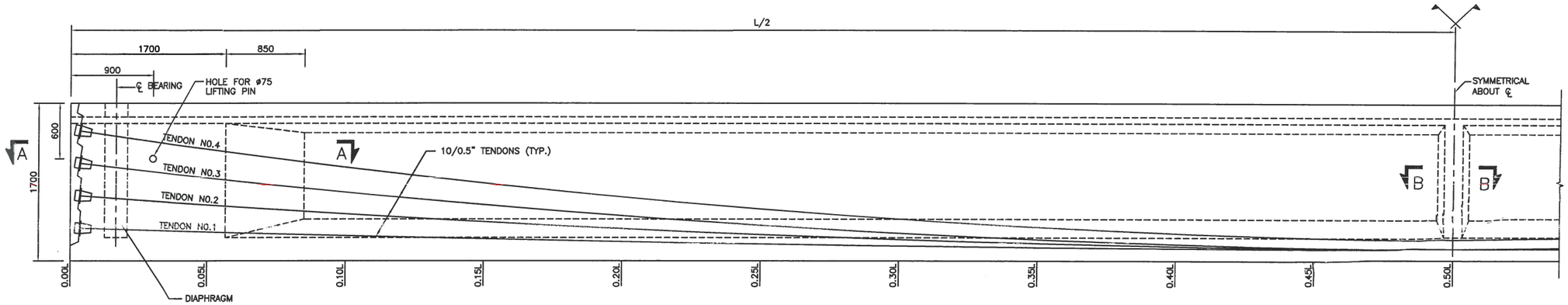
BRIDGE NO. 6
ABUTMENT DETAIL

SCALE 1/8" = 1'-0"

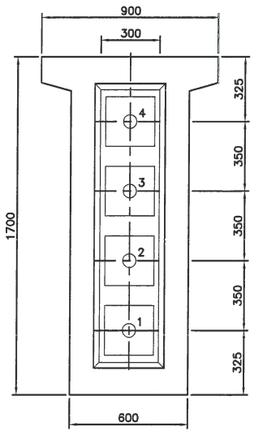
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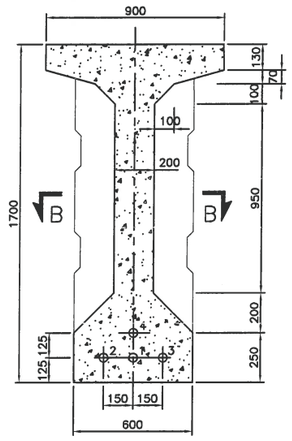
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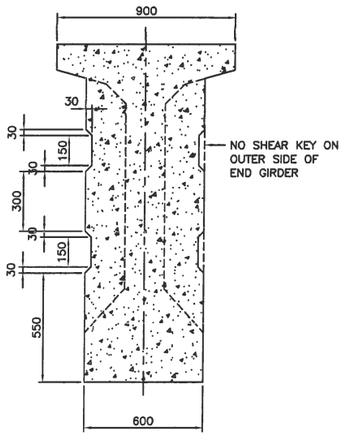
ELEVATION (TENDON PROFILE)



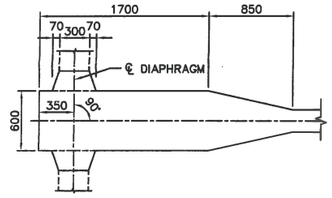
END VIEW OF GIRDER
SCALE 1:15



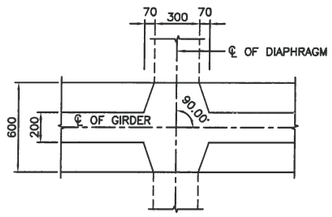
SECTION AT MIDSPAN
SCALE 1:15



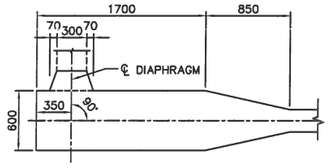
SECTION AT DIAPHRAGM
SCALE 1:15



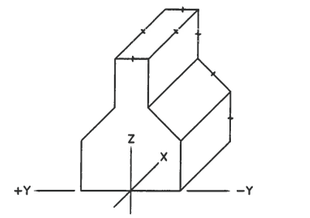
SECTIONAL PLAN A–A
(FOR INTERIOR GIRDER)
SCALE 1:30



SECTIONAL PLAN B–B
SCALE 1:20



SECTIONAL PLAN A–A
(FOR EXTERIOR GIRDER)
SCALE 1:30



REFERENCE CO–ORDINATES

NOT TO BE USED FOR CONSTRUCTION
FOR PC–I ONLY

NOTES

1. FOR GENERAL NOTES REFER DRAWING No. G001.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED
3. GIRDERS SHALL BE INSTALLED IN THEIR CORRECT POSITIONS ON BEARING BY LIFTING FROM BOTH ENDS AND SHALL BE TEMPORARILY BRACED UNTIL CASTING OF THE DIAPHRAGM.
4. ALL PRESTRESSED CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE CYLINDER STRENGTH OF 33.00MPa (4800 Psi.) AT 28 DAYS.
5. GIRDER LIFTING DETAILS SHALL BE PROVIDED BY CONTRACTOR FOR ENGINEER'S APPROVAL.
6. THE FOLLOWING VALUES HAVE BEEN ASSUMED IN THE CALCULATION OF THEORETICAL ELONGATION/EXTENSION (Ao) OF TENDONS:
   MODULUS OF ELASTICITY, E = 193,000 MPa (28,000) ksi)
   COEFFICIENT OF CURVATURE FRICTION = 0.25 PER RADIAN
   WOBBLE FRICTION COEFFICIENT = 0.0033 PER METER
   ANY DEVIATION FROM THE ABOVE VALUES SHALL BE REPORTED TO THE ENGINEER.
7. STRESSING SHALL BE STOPPED AS SOON AS ONE OF THE FOLLOWING CONDITIONS IS FULFILLED:
   – STRESS REACHES 0.77 TIMES GUARANTEED ULTIMATE TENSILE STRENGTH (GUTS) OR ACTUAL ELONGATION/EXTENSION REACHES 1.10 Ao. (IN NO CASE JACKING FORCE SHOULD BE LESS THAN AS GIVEN IN TABLE).
   – IF AT 0.75 GUTS ACTUAL ELONGATION IS STILL BELOW 0.95 Ao STRESSING SHALL BE PROCEEDED UPTO MAXIMUM OF 0.80 GUTS.
   – IN THE EVENT OF NON–CONFORMANCE OF ABOVE, THE CABLE MAY BE REPLACED.
8. TENDON EXTENSION GIVEN IN TABLE IS FOR THE JACKING END.
9. STRESSING OF GIRDERS SHOULD BE DONE FROM BOTH ENDS.
10. CABLE DUCTS SHALL BE GROUTED IMMEDIATELY AFTER STRESSING.
11. ANCHORAGE SLIP SHOULD BE LESS THAN 5mm.
12. DETAILS SHOWN ARE BASED ON THE STRONGHOLD MULTI–STRAND SYSTEM OF POST TENSIONING. ALTERNATIVE MULTI–STRAND POST–TENSIONING SYSTEM MAY BE USED SUBJECT TO APPROVAL BY THE ENGINEER.
13. PRESTRESSING OPERATIONS ARE NOT TO BE STARTED UNTILL THE CONCRETE GAINS ITS FULL STRENGTH OF 33.00MPa (4800 Psi).
14. IN CASE OF CHANGE IN PRESTRESSING PARAMETERS, THE MATTER SHALL BE REFER TO DESIGN OFFICE BEFORE PROCEEDING THE CONSTRUCTION OF GIRDERS.

TENDER DRAWINGS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CLIENT
PAKHTUNKHWA HIGHWAY AUTHORITY

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

REV.	DATE	DESCRIPTION	APPROVED
04			
03			
02			
01			

DRAWN	M.A
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

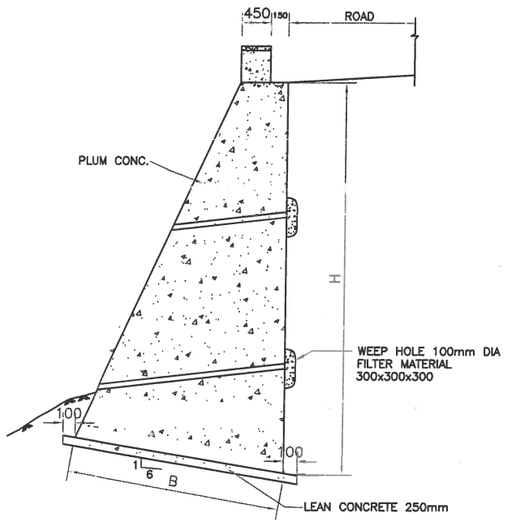
BRIDGE NO. 6
PRECAST PRESTRESSED GIRDERS
CONCRETE OUTLINE

SCALE: 1/8" = 1'-0"

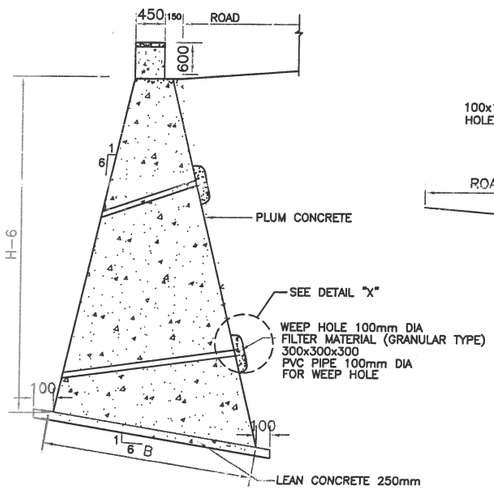
DATE: JUNE, 2022

DRAWING No.: 4402/033/PC/6G05

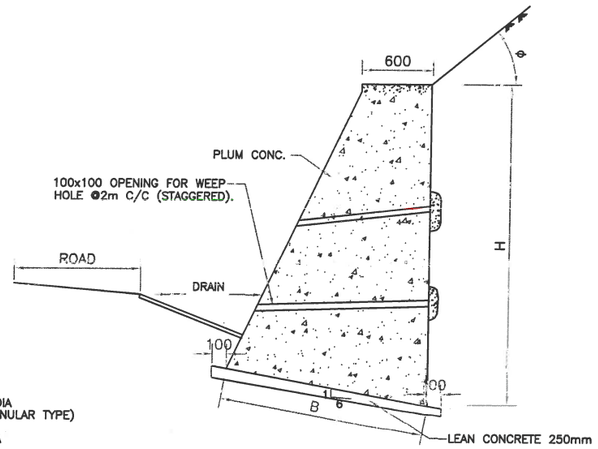
REV.: 0



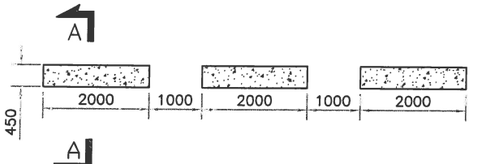
TYPICAL SECTION OF PLUM CONCRETE
RETAINING WALL TYPE 1



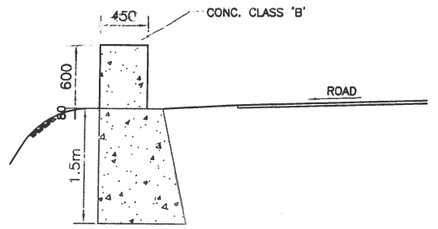
TYPICAL SECTION OF PLUM CONCRETE
RETAINING WALL TYPE 2



TYPICAL SECTION OF PLUM CONCRETE
RETAINING/BREAST WALL TYPE 3



TYPICAL PLAN OF PARAPET WALL



APPLICABLE WHERE NO RETAINAING WALL EXISTS
SECTION A–A

TABLE:-

TYPE–1

H (m)	B (m)
1.50	0.60
2.00	0.80
2.50	1.00
3.00	1.20
3.50	1.50
4.00	1.80
4.50	2.00
5.00	2.30
5.50	2.60
6.00	2.90
7.00	3.40
8.00	3.90

TYPE–2

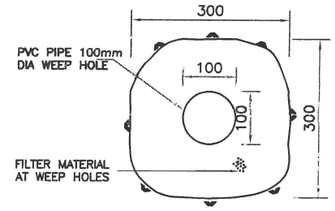
H (m)	B (m)
1.50	0.80
2.00	1.05
2.50	1.40
3.00	1.70
3.50	2.10
4.00	2.40
4.50	2.70
5.00	3.00
5.50	3.30
6.00	4.00
7.00	4.70
8.00	5.50
9.00	6.00
10.00	6.60
11.00	7.20
12.00	7.80

TYPE–3
$\theta < 40^{\circ}$

H (m)	B (m)
1.50	0.80
2.00	1.00
2.50	1.40
3.00	1.70
3.50	2.00
4.00	2.40
4.50	2.70
5.00	3.00
5.50	3.30
6.00	3.70
6.50	4.00
7.00	4.40
7.50	4.70
8.00	5.00

TYPE–3
$\theta \geq 40^{\circ}$

H (m)	B (m)
1.50	1.10
2.00	1.40
2.50	1.70
3.00	2.00
3.50	2.30
4.00	2.70
4.50	3.00
5.00	3.60
5.50	3.90
6.00	4.30
6.50	4.70
7.00	5.00



DETAIL "X"

NOTES

1– ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2– WEEP HOLES PVC PIPE 100mm DIA SHALL BE STAGGERED AT AN INTERVAL OF 2m VERTICAL AND HORIZONTAL AND AS ADDITIONALLY DIRECTED BY THE ENGINEER.
3– THE SLOPE OF WEEP HOLE SHALL BE 1 IN 8 FROM BACK OF THE WALL TO THE OUTER FACE OR AS DIRECTED BY THE ENGINEER.
4– TYPE OF RETAINING WALL SHALL BE DECIDED BY THE ENGINEER AS PER SITE CONDITIONS KEEPING FOLLOWING IN VIEW.
5– PLUM CONCRETE (70% CONCRETE CLASS 'B' & 30% ROCK FILL MATERIAL HAVING STONE SIZE RANGING BETWEEN 200~300) BE UTILIZED.
6– TYPE 1 RETAINING WALL SHALL BE PROVIDED WHERE THE ROAD IS WELL AWAY FROM THE NALLAH, RIVER/RIVINE.
7– TYPE 2 RETAINING WALL SHALL BE PROVIDED WHERE THE ROAD IS IN CLOSE VICINITY OF THE RIVER/RIVINE OR CLIFF FACE.
8– TYPE 3 RETAINING WALL SHALL BE PROVIDED TO RETAIN THE SCREED MATERIAL (BREAST WALL).
9– PCC PARAPET SHALL BE PROVIDED AT TOP OF RETAINING WALL AND AT OTHER HAZARDOUS LOCATIONS. GUARD RAIL SHALL BE PROVIDED OVER 4m HIGH FILL OR AS DIRECTED BY THE ENGINEER.
10– VERTICAL SLOPE TO THE OUTER FACE OF THE RETAINING WALL TYPE 2 CAN BE CHANGE UP TO 1 IN 10.
11– PAYMENT FOR WEEP HOLES AND FILTER MATERIAL IS INCLUDED IN THE COST OF OTHER ITEMS AND SHALL NOT BE PAID SEPARATELY.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED	
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.
				APPROVED

CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE
TYPICAL PLUM CONC.
RETAINING WALL DETAILS

DATE
JUNE, 2021

DWG NO.
4402/102/TD/ P1RWP011

1. GENERAL:

1.1 SPECIFIC TO PROJECT ONLY AND SHOULD BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS, STRUCTURAL ENGINEERING DRAWINGS, RELEVANT CONTRACT CONDITINS AND ENGINEER'S INSTRUCTIONS.

1.2 ALL DRAWINGS SHALL BE CO-ORDINATED WITH OTHER SPECIALTY DRAWINGS / DETAILS. ANY DISCREPANCY, ERROR OR RECTIFICATION IF REQUIRED, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR NECESSARY APPROVAL.

1.3 ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES. UNLESS SPECIFIED OTHERWISE.

1.4 ALL ELEVATIONS SHOWN ON DRAWINGS ARE FINISHED SURFACE LEVELS UNLESS NOTED OTHERWISE.

1.5 ALL EXPOSED CONCRETE CORNERS, EDGES AND ANGLES SHALL BE CHAMFERED OR FILLETED 20mm x 20 mm UNLESS SPECIFIED OTHERWISE.

1.6 THE CONTRACTOR SHALL SUBMIT, COMPLETE METHODOLOGY FOR DIFFERENT WORK ITEMS LIKE EXCAVATION/BACKFILLING, DEWATERING/DRAINAGE, CONCRETING, JOINTS ETC FOR APPROVAL OF ENGINEER.

1.9 ALL EXPOSED SURFACES SHALL HAVE CLASS 1 SURFACE FORM FINISH UNLESS SPECIFIED OTHERWISE.

2. DESIGN SPECIFICATIONS:

3. LIVE LOADS:

3.2 A SINGLE LOAD OF 95 kN (21 Kip) ON 300mmx600 mm AREA, FOR THE DESIGN OF DECK SLAB ONLY.

4. MATERIALS:

4.1 ALL THE MATERIALS AND WORKMANSHIP SHALL BE ACCORDING TO THE AASHTO SPECIFICATIONS AND ASTM STANDARDS EXCEPT WHERE MODIFIED BELOW, OR IN "PARTICULAR SPECIFICATIONS AND SPECIAL PROVISIONS" OF TENDER DOCUMENTS.

4.2 CONCRETE

CONCRETE CLASSIFICATION AND STRENGTHS SHALL BE AS PER TABLE GIVEN BELOW:

CONCRETE	CLASS	28 DAYS CYLINDER STRENGTH (psi)
CULVERT (TOP SLAB), BOTTOM SLAB, WALLS, WINGWALL	A3	4000
APPROACH SLAB, CUTOFF WALL	A2	3500
GIRDER	d1	5000
PCC SHOULDER	1:2:4	3000
LEAN CONCRETE	1:4:8	1500

4.3 REINFORCEMENT

REINFORCING STEEL SHALL BE DEFORMED ROUND BARS OF INTERMEDIATE GRADE (GRADE 60) CONFORMING TO AASHTO M-31 (ASTM A-615) WITH MINIMUM YIELD STRENGTH OF 4,200 Kg/Sq.Cm (60,000 Psi).

4.4 STRUCTURAL STEEL

MAIN STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36 HAVING MINIMUM YIELD STRENGTH OF 2,500 Kg/Sq.Cm (36,000 psi). BOLTS AND NUTS SHALL CONFORM TO ASTM A-307 OR EQUIVALENT. WELDS SHALL CONFORM TO A.W.S (AMERICAN WELDING STANDARDS).

4.8 STEEL TUBES

ALL STEEL TUBES SHALL CONFORM TO ASTM A-501 HAVING MINIMUM YIELD STRENGTH OF 2,500 Kg/Sq.Cm (36,000 psi).

5. CONCRETE COVER:

THE MINIMUM COVER TO REINFORCEMENT SHALL BE AS UNDER UNLESS SPECIFIED OTHERWISE.

- DECK SLAB
  - TOP ..... 40 mm
  - BOTTOM ..... 25 mm
- APPROACH SLAB
  - BOTTOM ..... 50 mm
  - TOP ..... 75 mm
- WALLS
  - EARTH SIDE ..... 50 mm
  - OTHER SIDE ..... 40 mm
- MATERIAL FOR CONCRETE COVER

BAR SUPPORTS SHALL BE PRECAST MORTAR BLOCK, PLASTIC OR METAL SUPPORTS. MORTAR BLOCKS SHALL BE CONSTRUCTED AND CURED. THE MINIMUM COMPRESSIVE STRENGTH OF MORTAR USED FOR BLOCKS SHALL EQUAL THE MINIMUM COMPRESSIVE STRENGTH OF CONCRETE FOR THE STRUCTURE THEY ARE USED IN. MORTAR BLOCK SUPPORTS SHALL BE ATTACHED TO THE SUPPORTED BAR BY MEANS OF 16-GAUGE WIRE CAST IN THE CENTER OF EACH BLOCK.

8. FOUNDATIONS:

8.1 ALL THE EXCAVATION FOR OPEN FOUNDATIONS / BOX CULVERTS SHALL BE SUBJECTED TO INSPECTION BY THE ENGINEER PRIOR TO POURING OF CONCRETE.

8.6 PLANNING FOR LOAD TESTS, SUPERVISION, INTERPRETATION OF RESULTS AND LOAD CARRYING CAPACITY ANALYSIS SHALL BE CARRIED OUT BY THE ENGINEER.

8.7 BEHIND THE ABUTMENT AND WING WALLS, COMPACTED GRANULAR BACKFILL SHALL BE PLACED IN LAYERS OF THICKNESS APPROPRIATE TO THE COMPACTION EQUIPMENT ENSURING A MINIMUM IN SITU COMPACTION OF 95% MODIFIED PROCTOR.

9. JOINTS:

9.1 THE CONTRACTOR SHALL SUBMIT COMPLETE LAYOUT AND DETAILS OF ALL CONSTRUCTION JOINTS FOR APPROVAL OF THE ENGINEER.

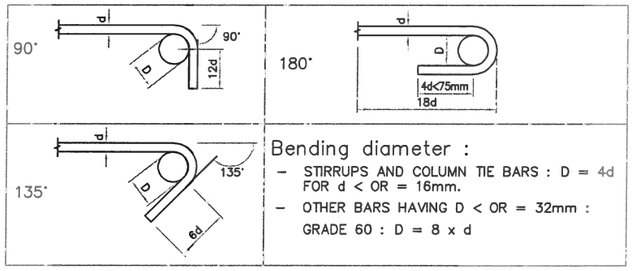
9.2 CONCRETE IN DECK SLAB SHALL BE PLACED IN FULL WIDTH. NO CONSTRUCTION JOINT SHALL BE PERMITTED. DIAPHRAGMS AND DECK SLAB SHALL BE CAST MONOLITHICALLY. EXCEPT AS SHOWN ON DRAWING AT LOCATION FOR INSTALLATION OF EXPANSION JOINTS.

9.3 CONCRETE FOR THE BARRIERS AND SIDEWALKS SHALL BE PLACED NO SOONER THAN 20 DAYS AFTER PLACING OF CONCRETE IN THE DECK SLAB.

9.4 UNLESS SPECIFIED OTHERWISE ON DRG. ALLOWABLE MOVEMENT BETWEEN MAXIMUM AND MINIMUM GAP ARE 30mm IN THE DIRECTION OF TRAFFIC. EXPANSION JOINT SYSTEM SHALL BE INSTALLED AT LEAST ONE MONTH AFTER COMPLETING THE DECK OR ACHIEVING REQUIRED COMPRESSIVESTRENGTH OF DECK SLAB WHICHEVER IS EARLIER IN BLOCK OUT PROVIDED AT TIME OF POURING DECK SLAB. CONTRACTOR SHALL SUBMIT NECESSARY INSTALLATION DETAILS FOR ENGINEER'S APPROVAL BEFORE STARTING THIS ACTIVITY.

10. BAR BENDING SCHEDULE

DETAILED BAR BENDING SCHEDULE SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED FOR ENGINEER'S APPROVAL. LAP LENGTHS AND STANDARD HOOKS SHALL BE AS GIVEN BELOW:



12. TENDER DOCUMENTS, DRAWINGS & CONSTRUCTION DRAWINGS:

12.1 TENDER DRAWINGS ISSUED WITH TENDER DOCUMENTS ARE TO APPRAISE THE BIDDERS OF THE GENERAL NATURE & FAIR IDEA OF THE WORK TO PREPARE BOQ & TENDER DOCUMENTS.EHGINEER SHALL ISSUE THE DETAILED CONSTRUCTION DRAWINGS & SUCH FIELD SKETCHES FROM TIME TO TIME AS NECESSARY FOR THE EASE OF CONSTRUCTION.

12.2 THE CONTRACTOR SHALL CHECK ALL CONSTRUCTION DRAWINGS AND CONTRACT DOCUMENTS CAREFULLY AS SOON AS PRACTICABLE AFTER RECEIPT THERE OF, AND SHALL PROMPTLY ADVICE THE ENGINEER'S REP OF ANY ERRORS OR OMISSIONS THERE IN PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES.

TENDER DRAWINGS

14. SCAFFOLDING:

ALL SCAFFOLDING SHALL BE DESIGNED BY THE CONTRACTOR & THE TRAFFIC MOVEMENT UNDERNEATH SUCH SCAFFOLDING MAY REMAIN UNOBSTRUCTED.

16. METAL WORK:

15.1 MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
15.2 ALL WELDED CONSTRUCTION UNLESS OTHERWISE NOTED.
15.3 ALL STEEL TO BE PAINTED OR GALVANIZED AS DIRECTED BY THE ENGINEER.
15.4 ALL SHEAR EDGES TO BE GROUND SMOOTH.
15.5 ALL WELDS SHALL BE 6mm CONTINOUS FILLET WELD, E70XX ELECTRODE UNLESS OTHERWISE NOTED ON DRAWING.

17. LIST OF SYMBOLS AND ABBREVIATIONS:

B	=	BOTTOM
◯B.H	=	BORE HOLE
C. JT.	=	CONSTRUCTION JOINT
℄	=	CENTRELINE
C/C	=	CENTER TO CENTER
DIA.	=	DIAMETER
EXP. JT.	=	EXPANSION JOINT
E.F	=	EACH FACE
ELE.	=	ELEVATION
F.F	=	FAR FACE
G.I	=	GALVANIZED IRON
ID	=	INTERNAL DIAMETER
I.F	=	INNER FACE
m	=	METER
mm	=	MILLIMETER
N.F	=	NEAR FACE
N.S.L	=	NATURAL SURFACE LEVEL
P.G.L	=	PROFILE GRADE LEVEL
SYM.	=	SYMMETRICAL
T	=	TOP
TH.	=	THICK
TYP.	=	TYPICAL
Θ	=	SKEW ANGLE IN DEGREES

TABLE NO.1

(i) SPLICE LENGTH IN TENSION

(a) TOP BARS

fc' Kg/cm² \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
210	710	945	1180	1410	2060	2355	2645	2940	3240
280	610	820	1020	1225	1780	2040	2995	2550	2805
350	425	565	705	845	1215	1390	1565	1765	1960

(b) OTHER BARS

fc' Kg/cm² \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
210	550	730	905	1085	1590	1815	2035	2265	2490
280	475	630	790	945	1375	1570	1765	1960	2160
350	325	435	540	650	935	1070	1205	1360	1505

(ii) SPLICE LENGTH IN COMPRESSION

SPLICE LENGTH (mm) IN COMPRESSION (Fy=4220Kg/cm²)									
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Splice Length	300	380	480	575	670	765	860	955	1050

(iii) EMBEDMENT LENGTH IN TENSION

(a) TOP BARS

fc' Kg/cm² \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
210	545	730	910	1090	1590	1820	2050	2310	2565
280	475	630	785	945	1360	1555	1755	1975	2190
350	425	565	705	845	1215	1390	1565	1765	1960

(b) OTHER BARS

fc' Kg/cm² \ Bar Size	SPLICE LENGTH mm								
	#3	#4	#5	#6	#7	#8	#9	#10	#11
210	420	560	700	840	1225	1400	1580	1775	1970
280	365	485	605	725	1045	1195	1350	1520	1685
350	325	435	540	650	935	1070	1205	1360	1505

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED	
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				CHD./VER.
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: GENERAL NOTES FOR STRUCTURES (BRIDGE)

DATE: JUNE, 2021

DWG NO. 4402/102/TD/ GNS012

1. GENERAL:

1.1 SPECIFIC TO PROJECT ONLY AND SHOULD BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS, STRUCTURAL ENGINEERING DRAWINGS, RELEVANT CONTRACT CONDITINS AND ENGINEER'S INSTRUCTIONS.

1.2 ALL DRAWINGS SHALL BE CO-ORDINATED WITH OTHER SPECIALTY DRAWINGS / DETAILS. ANY DISCREPANCY, ERROR OR RECTIFICATION IF REQUIRED, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR NECESSARY APPROVAL.

1.3 ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES. UNLESS SPECIFIED OTHERWISE.

1.4 ALL ELEVATIONS SHOWN ON DRAWINGS ARE FINISHED SURFACE LEVELS UNLESS NOTED OTHERWISE.

1.5 ALL EXPOSED CONCRETE CORNERS, EDGES AND ANGLES SHALL BE CHAMFERED OR FILLETED 20mm x 20 mm UNLESS SPECIFIED OTHERWISE.

1.6 THE CONTRACTOR SHALL SUBMIT, COMPLETE METHODOLOGY FOR DIFFERENT WORK ITEMS LIKE EXCAVATION/BACKFILLING, DEWATERING/DRAINAGE, CONCRETING, JOINTS ETC FOR APPROVAL OF ENGINEER.

1.9 ALL EXPOSED SURFACES SHALL HAVE CLASS 1 SURFACE FORM FINISH UNLESS SPECIFIED OTHERWISE.

2. DESIGN SPECIFICATIONS:

3. LIVE LOADS:

3.2 A SINGLE LOAD OF 95 kN (21 Kip) ON 300mmx600 mm AREA, FOR THE DESIGN OF DECK SLAB ONLY.

4. MATERIALS:

4.1 ALL THE MATERIALS AND WORKMANSHIP SHALL BE ACCORDING TO THE AASHTO SPECIFICATIONS AND ASTM STANDARDS EXCEPT WHERE MODIFIED BELOW, OR IN "PARTICULAR SPECIFICATIONS AND SPECIAL PROVISIONS" OF TENDER DOCUMENTS.

4.2 CONCRETE

CONCRETE CLASSIFICATION AND STRENGTHS SHALL BE AS PER TABLE GIVEN BELOW:

CONCRETE	CLASS	28 DAYS CYLINDER STRENGTH (psi)
CULVERT (TOP SLAB), BOTTOM SLAB, WALLS, WINGWALL	A3	4000
APPROACH SLAB, CUTOFF WALL	A2	3500
GIRDER	d1	5000
PCC SHOULDER	1:2:4	3000
LEAN CONCRETE	1:4:8	1500

4.3 REINFORCEMENT

REINFORCING STEEL SHALL BE DEFORMED ROUND BARS OF INTERMEDIATE GRADE (GRADE 60) CONFORMING TO AASHTO M-31 (ASTM A-615) WITH MINIMUM YIELD STRENGTH OF 4,200 Kg/Sq.Cm (60,000 Psi).

4.4 STRUCTURAL STEEL

MAIN STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36 HAVING MINIMUM YIELD STRENGTH OF 2,500 Kg/Sq.Cm (36,000 psi). BOLTS AND NUTS SHALL CONFORM TO ASTM A-307 OR EQUIVALENT. WELDS SHALL CONFORM TO A.W.S (AMERICAN WELDING STANDARDS).

4.8 STEEL TUBES

ALL STEEL TUBES SHALL CONFORM TO ASTM A-501 HAVING MINIMUM YIELD STRENGTH OF 2,500 Kg/Sq.Cm (36,000 psi).

5. CONCRETE COVER:

THE MINIMUM COVER TO REINFORCEMENT SHALL BE AS UNDER UNLESS SPECIFIED OTHERWISE.

- DECK SLAB
  - TOP ..... 40 mm
  - BOTTOM ..... 25 mm
- APPROACH SLAB
  - BOTTOM ..... 50 mm
  - TOP ..... 75 mm
- WALLS
  - EARTH SIDE ..... 50 mm
  - OTHER SIDE ..... 40 mm
- MATERIAL FOR CONCRETE COVER

BAR SUPPORTS SHALL BE PRECAST MORTAR BLOCK, PLASTIC OR METAL SUPPORTS. MORTAR BLOCKS SHALL BE CONSTRUCTED AND CURED. THE MINIMUM COMPRESSIVE STRENGTH OF MORTAR USED FOR BLOCKS SHALL EQUAL THE MINIMUM COMPRESSIVE STRENGTH OF CONCRETE FOR THE STRUCTURE THEY ARE USED IN. MORTAR BLOCK SUPPORTS SHALL BE ATTACHED TO THE SUPPORTED BAR BY MEANS OF 16-GAUGE WIRE CAST IN THE CENTER OF EACH BLOCK.

8. FOUNDATIONS:

8.1 ALL THE EXCAVATION FOR OPEN FOUNDATIONS / BOX CULVERTS SHALL BE SUBJECTED TO INSPECTION BY THE ENGINEER PRIOR TO POURING OF CONCRETE.

8.6 PLANNING FOR LOAD TESTS, SUPERVISION, INTERPRETATION OF RESULTS AND LOAD CARRYING CAPACITY ANALYSIS SHALL BE CARRIED OUT BY THE ENGINEER.

8.7 BEHIND THE ABUTMENT AND WING WALLS, COMPACTED GRANULAR BACKFILL SHALL BE PLACED IN LAYERS OF THICKNESS APPROPRIATE TO THE COMPACTION EQUIPMENT ENSURING A MINIMUM IN SITU COMPACTION OF 95% MODIFIED PROCTOR.

9. JOINTS:

9.1 THE CONTRACTOR SHALL SUBMIT COMPLETE LAYOUT AND DETAILS OF ALL CONSTRUCTION JOINTS FOR APPROVAL OF THE ENGINEER.

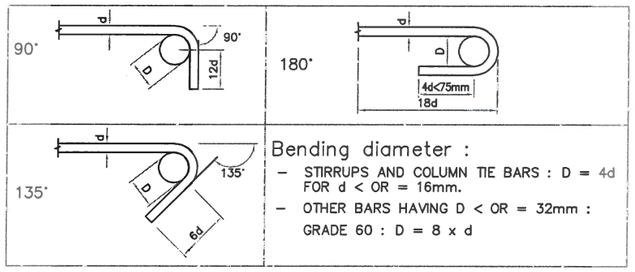
9.2 CONCRETE IN DECK SLAB SHALL BE PLACED IN FULL WIDTH. NO CONSTRUCTION JOINT SHALL BE PERMITTED. DIAPHRAGMS AND DECK SLAB SHALL BE CAST MONOLITHICALLY. EXCEPT AS SHOWN ON DRAWING AT LOCATION FOR INSTALLATION OF EXPANSION JOINTS.

9.3 CONCRETE FOR THE BARRIERS AND SIDEWALKS SHALL BE PLACED NO SOONER THAN 20 DAYS AFTER PLACING OF CONCRETE IN THE DECK SLAB.

9.4 UNLESS SPECIFIED OTHERWISE ON DRG. ALLOWABLE MOVEMENT BETWEEN MAXIMUM AND MINIMUM GAP ARE 30mm IN THE DIRECTION OF TRAFFIC. EXPANSION JOINT SYSTEM SHALL BE INSTALLED AT LEAST ONE MONTH AFTER COMPLETING THE DECK OR ACHIEVING REQUIRED COMPRESSIVESTRENGTH OF DECK SLAB WHICHEVER IS EARLIER IN BLOCK OUT PROVIDED AT TIME OF POURING DECK SLAB. CONTRACTOR SHALL SUBMIT NECESSARY INSTALLATION DETAILS FOR ENGINEER'S APPROVAL BEFORE STARTING THIS ACTIVITY.

10. BAR BENDING SCHEDULE

DETAILED BAR BENDING SCHEDULE SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED FOR ENGINEER'S APPROVAL. LAP LENGTHS AND STANDARD HOOKS SHALL BE AS GIVEN BELOW:



12. TENDER DOCUMENTS, DRAWINGS & CONSTRUCTION DRAWINGS:

12.1 TENDER DRAWINGS ISSUED WITH TENDER DOCUMENTS ARE TO APPRAISE THE BIDDERS OF THE GENERAL NATURE & FAIR IDEA OF THE WORK TO PREPARE BOQ & TENDER DOCUMENTS.ENGINEER SHALL ISSUE THE DETAILED CONSTRUCTION DRAWINGS & SUCH FIELD SKETCHES FROM TIME TO TIME AS NECESSARY FOR THE EASE OF CONSTRUCTION.

12.2 THE CONTRACTOR SHALL CHECK ALL CONSTRUCTION DRAWINGS AND CONTRACT DOCUMENTS CAREFULLY AS SOON AS PRACTICABLE AFTER RECEIPT THERE OF, AND SHALL PROMPTLY ADVICE THE ENGINEER'S REP OF ANY ERRORS OR OMISSIONS THERE IN PRIOR TO START OF ANY CONSTRUCTION ACTIVITIES.

TENDER DRAWINGS

14. SCAFFOLDING:

ALL SCAFFOLDING SHALL BE DESIGNED BY THE CONTRACTOR & THE TRAFFIC MOVEMENT UNDERNEATH SUCH SCAFFOLDING MAY REMAIN UNOBSTRUCTED.

16. METAL WORK:

15.1 MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
15.2 ALL WELDED CONSTRUCTION UNLESS OTHERWISE NOTED.
15.3 ALL STEEL TO BE PAINTED OR GALVANIZED AS DIRECTED BY THE ENGINEER.
15.4 ALL SHEAR EDGES TO BE GROUND SMOOTH.
15.5 ALL WELDS SHALL BE 6mm CONTINOUS FILLET WELD, E70XX ELECTRODE UNLESS OTHERWISE NOTED ON DRAWING.

17. LIST OF SYMBOLS AND ABBREVIATIONS:

B	=	BOTTOM
◯B.H	=	BORE HOLE
C. JT.	=	CONSTRUCTION JOINT
℄	=	CENTRELINE
C/C	=	CENTER TO CENTER
DIA.	=	DIAMETER
EXP. JT.	=	EXPANSION JOINT
E.F	=	EACH FACE
ELE.	=	ELEVATION
F.F	=	FAR FACE
G.I	=	GALVANIZED IRON
ID	=	INTERNAL DIAMETER
I.F	=	INNER FACE
m	=	METER
mm	=	MILLIMETER
N.F	=	NEAR FACE
N.S.L	=	NATURAL SURFACE LEVEL
P.G.L	=	PROFILE GRADE LEVEL
SYM.	=	SYMMETRICAL
T	=	TOP
TH.	=	THICK
TYP.	=	TYPICAL
Θ	=	SKEW ANGLE IN DEGREES

TABLE NO.1

(i) SPLICE LENGTH IN TENSION

(a) TOP BARS

fc' Kg/cm² \ Bar Size	SPLICE LENGTH mm								
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SPLICE LENGTH (mm) IN COMPRESSION (Fy=4220Kg/cm²)									
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(iii) EMBEDMENT LENGTH IN TENSION

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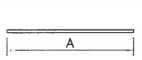
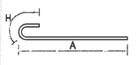
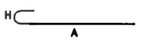
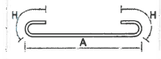
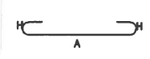
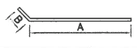
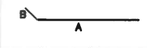
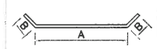
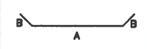
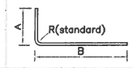
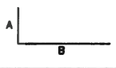
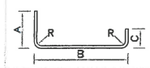
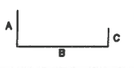
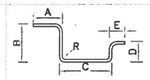
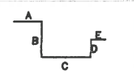
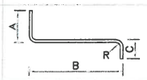
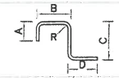
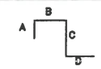
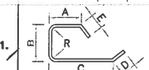
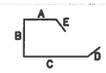
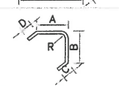
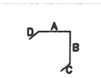
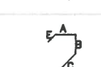
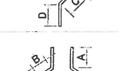
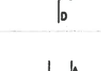
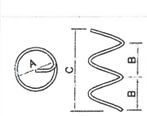
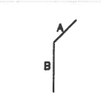
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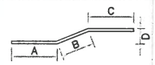
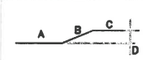
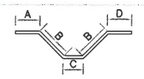
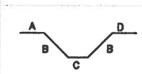
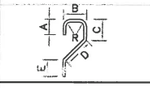
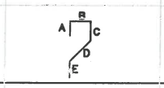
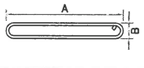
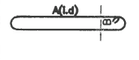
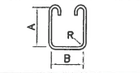
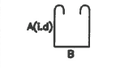
CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: GENERAL NOTES FOR STRUCTURES (BRIDGE)

DATE: JUNE, 2021

DWG NO. 4402/102/TD/ GNS012

SHAPE CODE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	TOTAL LENGTH OF BAR (L) MEASURED ALONG CENTERLINE	SKETCH AND DIMENSIONS TO BE GIVEN IN SCHEDULE
1.		A	Straight
2.		A+H	
3.		A+2H	
4.		A+B	
5.		A+2B	
6.		A+B−½R−d	
7.		A+B+C−R−2d	
8.		A+B+C+D+E−2R−4d	
9.		A+B+C−R−2d	
10.		A+B+C+D−1½R−3d	
11.		A+B+C+D+E−R−2d	
12.		A+B+C+D−½R−d	
13.		A+B+C+D+E−½R−d	
14.		2(A+B+C)+D−R−2d	
15.		(C/B)*3.14*(A+d)+8d Where, B is not greater than A/5. d = dia of bar.	HELIX A = internal dia.(mm) B = pitch of helix(mm) C = overall height(mm)
16.		A+B	

SHAPE CODE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	TOTAL LENGTH OF BAR (L) MEASURED ALONG CENTERLINE	SKETCH AND DIMENSIONS TO BE GIVEN IN SCHEDULE
17.		A+B+C Where D is at least 2 diameters	
18.		A+2B+C+E If angle with horizontal is 45° or less	
19.		A+B+C+D+E−R−2d	
20.		2A+1.14B	
21.		2A+B+20d	
22.		A+B+C+D+E−2R−4d	
23.		A+2B+C+10ø	
24.		A+lap	
25.		2A+2B+22ø	
26.		A+B+0.57C+D−½R−2.57d	
27.		2A+B+20ø	
28.		2A+2B+C+20ø	
29.		A+B+C+10ø	
30.		πA+20ø	
31.		A+B+C+D−½R−d	
32.		2(A+B+C)+D−R−2d	

SHAPE CODE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	TOTAL LENGTH OF BAR (L) MEASURED ALONG CENTERLINE	SKETCH AND DIMENSIONS TO BE GIVEN IN SCHEDULE
33.		A+0.57B+C	
34.		A+B+C+D If angle with horizontal is 45° or less	
35.		A+B+C−½R−d	
36.		A+B+C If angle with horizontal is 45° or less	
37.		A+B+C+D−1½R−3d	
38.		A+B+C+D+3E If angle with horizontal is 45° or less	
39.		A	
40.		A+B+C+D+E+F−½R−d	
41.		A+B+C	
42.		A+2B+2C−2R−4d	
43.		A+2B+2C−2R−4d	
44.		A+2B+2C−R−2d	
45.		A+2(B+C+D)−R−2d	
46.		2(A+B+C)+D−R−2d	
47.		A+B+C+D+E−2R−4d	
48.		A+B+C−½R−d	

SHAPE CODE	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	TOTAL LENGTH OF BAR (L) MEASURED ALONG CENTERLINE	SKETCH AND DIMENSIONS TO BE GIVEN IN SCHEDULE
49		2A+2B+C+2D−R−2d	
50.		A+B	
51.		A+2B+2C−2R−4d	
52.		A+2B−R−2d	
53.		A+B+C	
54.		A+B+C+D−1½R−3d	
55.		A+B+C+D+E	
56.		A+B+C+D−½R−d	
57.		A+B+C+D+E−2½R−3d	
58.		A+B+C+D−R+32d	
59.		A+B+C−½R−d	
60.		2(A+B)+C−R−2d	
61.		A+2B+C+D−R−2d	

NOTES:

1- "ø" AND "d" ARE THE DIAMETER OF REINFORCEMENTS.
2- "R" IS THE RADIUS OF BEND IN RADIANS.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

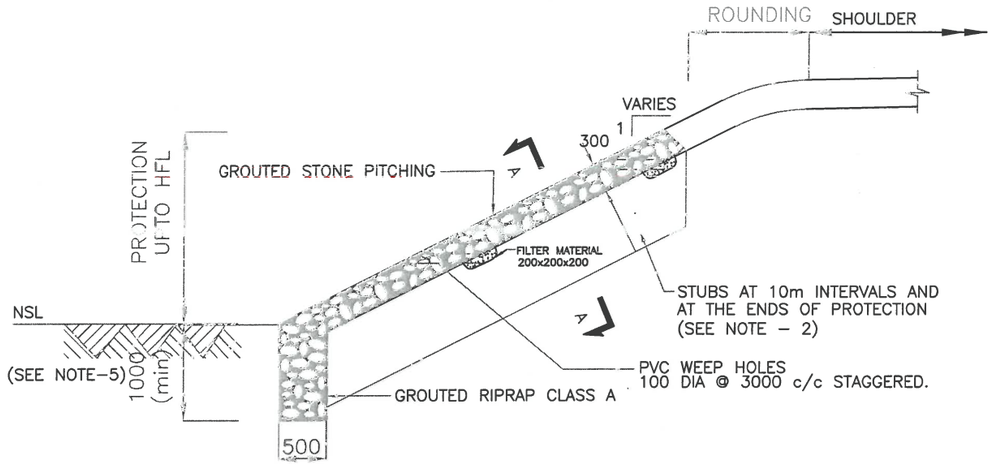
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

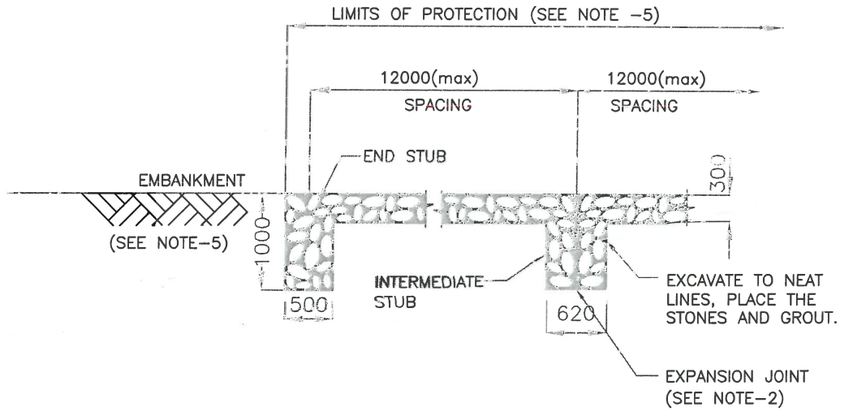
TITLE: REBAR SHAPE CODE

DATE: JUNE, 2021

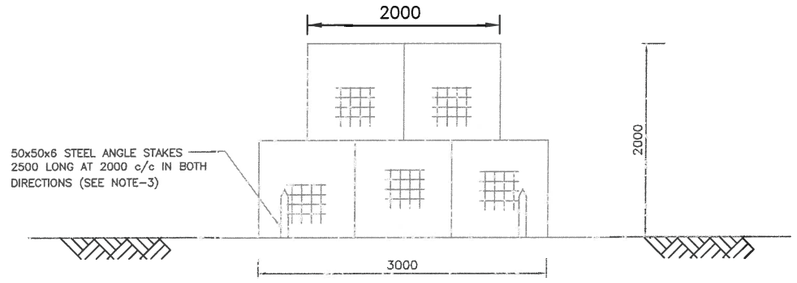
DWG NO. 4402/102/TD/ RS013



EMBANKMENT PROTECTION



SECTION A – A



TYPICAL GABION WALL DETAIL

(FOR GUIDANCE OF STORM WATER TO PASS THROUGH STUCTURES)

TENDER DRAWINGS

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. EXPANSION JOINT IN MORTARED RIPRAP SHALL BE PROVIDED AT AN MAXIMUM INTERVAL OF 10m. TYPE OF MATERIAL TO BE USED SHALL BE AS APPROVED BY THE ENGINEER. NO SEPRATE PAYMENT SHALL BE MADE FOR PROVISION AND FIXATION OF EXPANSION JOINTS AND WEEP HOLES.
3. SUPPLY AND ERECTION OF STEEL ANGLE STAKES SHALL BE PROVIDED AS SHOWN ON DRAWINGS AT NO EXTRA COST TO THE EMPLOYER.
4. IN CASE ROCK IS ENCOUNTERED DEPTH OF PROTECTION WORKS SHALL BE ADJUSTED AS DIRECTED BY THE ENGINEER (MINIMUM DEPTH IN ROCK SHALL BE KEPT 300MM)
5. LOCATION & HEIGHT OF PROTECTION WORKS SHALL BE DECIDED BY THE ENGINEER ON COMPLETION OF EMBANKMENT WORKS.

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			APPROVED

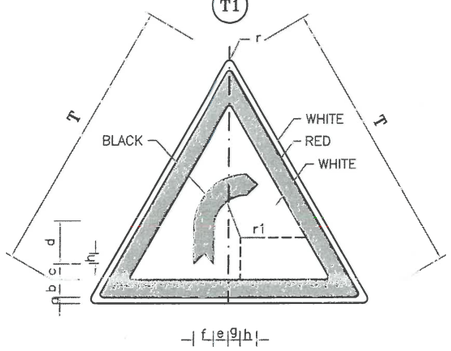
CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: MISCELLANEOUS PROTECTION DETAILS

DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ 014

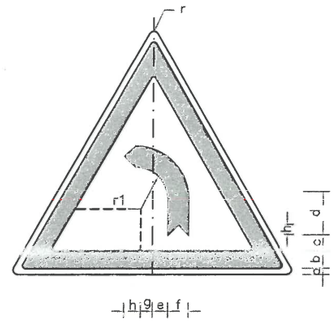
T1



RIGHT BEND
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	4.0	5.3
d	11.5	15.3
e	8.5	11.3
f	7.0	9.3
g	6.0	8.0
h	3.5	4.7
r1	12.5	16.7

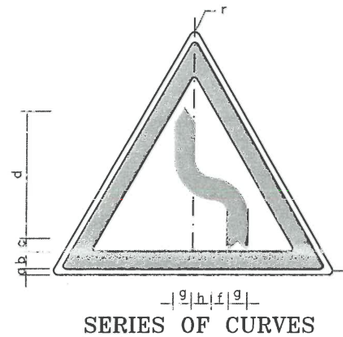
T2



LEFT BEND
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	4.0	5.3
d	11.5	15.3
e	8.5	11.3
f	7.0	9.3
g	6.0	8.0
h	3.5	4.7
r1	12.5	16.7

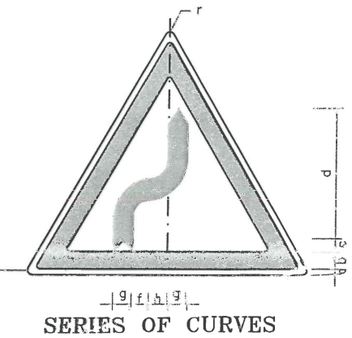
T3



SERIES OF CURVES
(FIRST TO LEFT)
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	33.0	44.0
e	14.0	18.7
f	8.0	10.7
g	7.0	9.3
h	2.0	2.7
i	3.5	4.7
r1	4.5	6.0

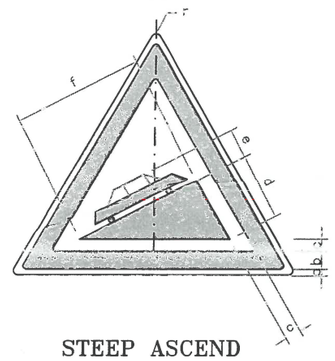
T4



SERIES OF CURVES
(FIRST TO RIGHT)
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	33.0	44.0
e	14.0	18.7
f	8.0	10.7
g	7.0	9.3
h	2.0	2.7
i	3.5	4.7
r1	4.5	6.0

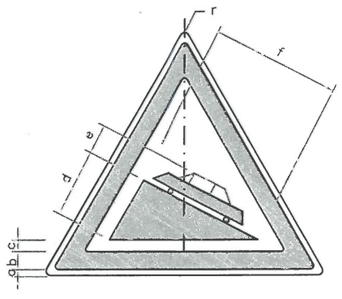
T5



STEEP ASCEND
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	23.5	31.3
e	11.5	15.3
f	33.0	44.0

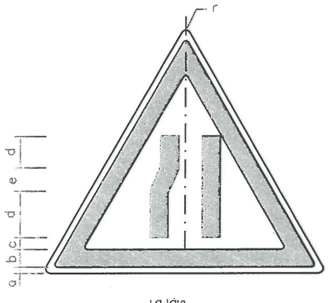
T6



STEEP DESCEND
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	23.5	31.3
e	11.5	15.3
f	33.0	44.0

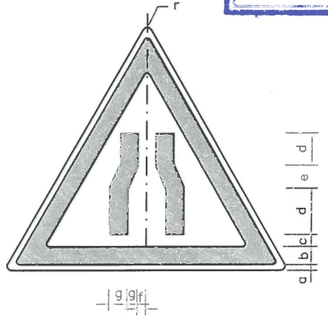
T7



ROADWAY NARROWS
(FROM LEFT)
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	10.0	13.3
e	14.0	18.7
f	2.5	3.3
g	5.0	6.7

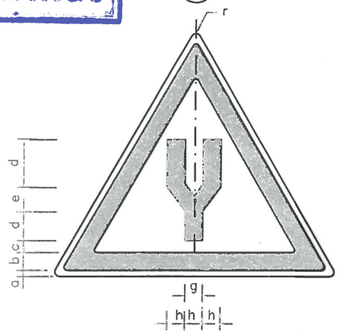
T8



ROADWAY NARROWS
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	10.0	13.3
e	14.0	18.7
f	2.3	3.3
g	5.0	6.7

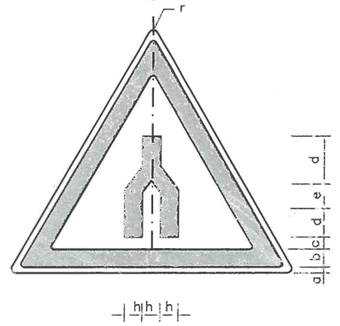
T9



DUAL CARRIAGEWAY STARTS
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	4.5	6.0
d	15.0	20.0
e	9.0	12.0
f	12.0	16.0
g	9.0	12.0
h	7.0	9.3

T10



DUAL CARRIAGEWAY ENDS
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	4.0	5.30
d	15.0	20.0
e	9.0	12.0
f	12.0	16.0
g	9.0	12.0
h	7.0	9.3

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED	APPROVED
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

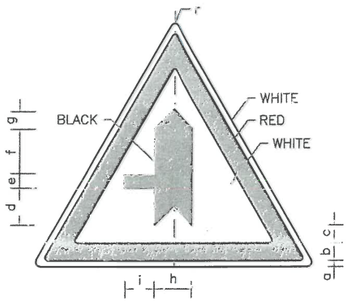
CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS (1) (INFORMATORY SIGN)

DATE: JUNE, 2021

DWG NO. 4402/102/TD/ RS016

T11

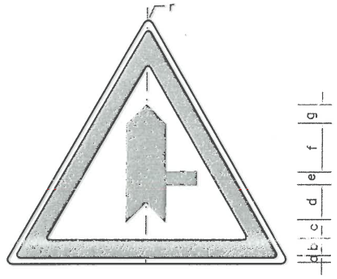


MINOR ROAD FROM LEFT

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	13.5	18.0
e	5.5	7.3
f	15.0	20.0
g	7.0	9.3
h	14.0	18.7
i	10.5	14.0

T12

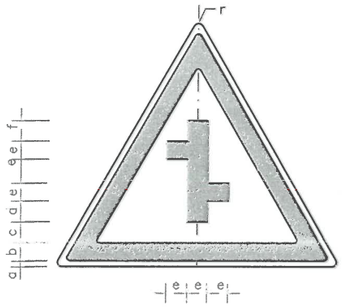


MINOR ROAD FROM RIGHT

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	13.5	18.0
e	5.5	7.3
f	15.0	20.0
g	7.0	9.3
h	14.0	18.7
i	10.5	14.0

T13

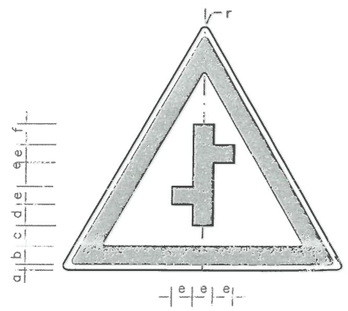


MINOR ROAD CROSSING WITH AN OFFSET

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	2.5	3.3
d	8.0	10.7
e	7.5	10.0
f	9.0	12.0

T14

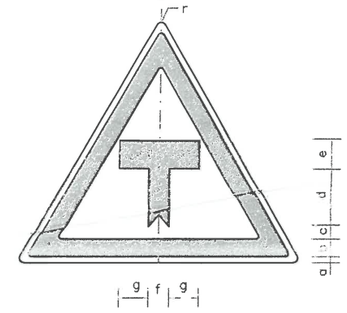


MINOR ROAD CROSSING WITH AN OFFSET

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	2.5	3.3
d	8.0	10.7
e	7.5	10.0
f	9.0	12.0

T15



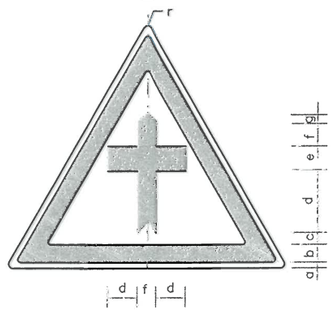
T- JUNCTION AHEAD

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	15.5	20.7
e	7.0	9.3
f	5.0	6.7
g	11.0	14.7
h	2.5	3.3

TENDER DRAWINGS

T16

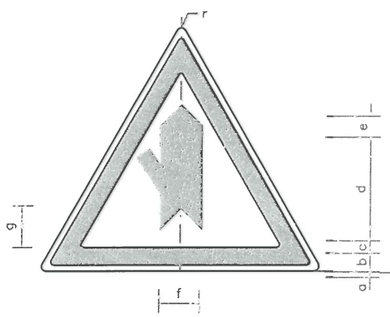


CROSS ROAD AHEAD

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	13.0	17.3
e	7.0	9.3
f	10.0	13.3
g	2.5	3.3
i	5.0	6.7

T17

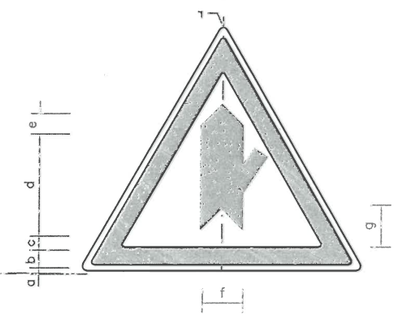


MINOR ROAD FROM LEFT

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	33.0	44.0
e	7.0	9.3
f	14.0	18.7
g	15.0	20.0
h	3.0	4.0
i	5.5	7.3

T18

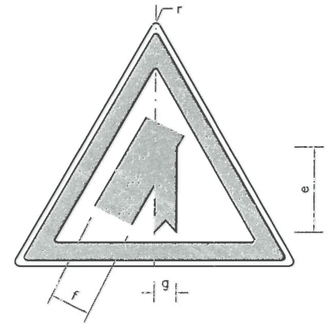


MINOR ROAD FROM RIGHT

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.5	4.7
d	33.0	44.0
e	7.0	9.3
f	14.0	18.7
g	15.0	20.0
h	3.0	4.0
i	5.5	7.3

T19

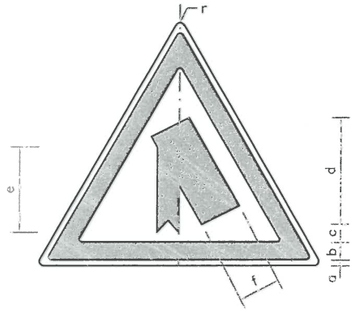


MAIN ROAD (ON LEFT)

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	2.5	3.3
d	39.0	52.0
e	27.0	36.0
f	13.0	17.3
g	5.0	6.7

T20



MAIN ROAD (ON RIGHT)

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	2.5	3.3
d	39.0	52.0
e	27.0	36.0
f	13.0	17.3
g	5.0	6.7

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

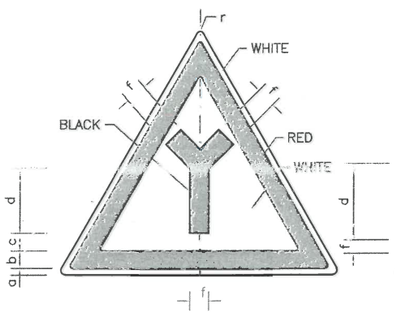
CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS (2) (INFORMATORY SIGN)

DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ RS017

T21

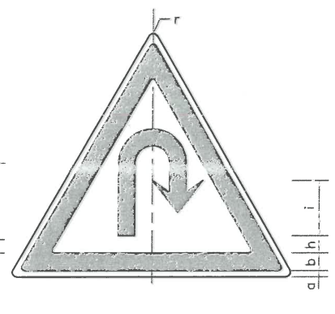


Y-JUNCTION

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	17.0	22.7
e	13.0	17.3
f	7.0	9.3

T22

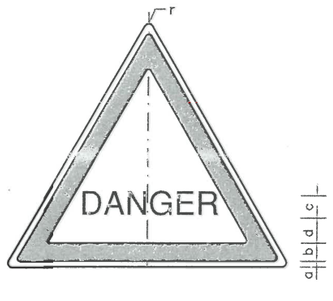


U-TURN

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	5.5	7.3
d	7.0	9.3
e	5.0	6.7
f	2.5	3.3
g	23.0	30.7
h	7.5	10.0
i	12.0	16.0

T23

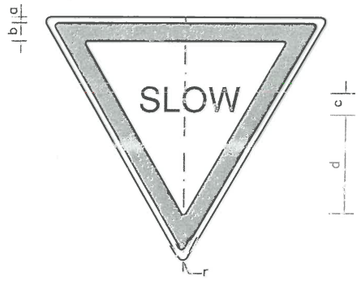


DANGER WARNING

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	6.5	8.7
d	7.0	9.5

T24

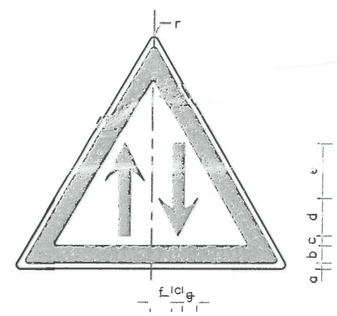


SLOW

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	6.5	8.7
d	16.0	21.3

T25

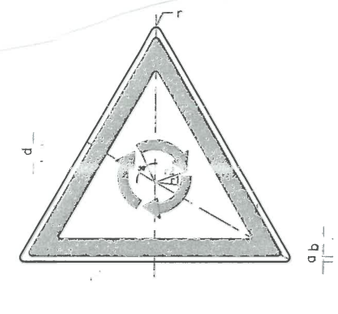


TWO WAY TRAFFIC

DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
r	3.5	4.7
a	1.0	1.3
b	6.5	8.7
c	4.0	8.7
d	9.0	21.3
e	19.0	21.3
f	5.0	21.3
g	3.5	21.3

T26



ROUNDABOUT

DIMENSION(cm)

PARTS	Sign Size	
	90cm	
r	3.5	120
a	1.0	–
b	6.5	–
c	3.0	–
d	9.0	–
r1	12.0	–
r2	16.0	–

T27



Entry to 30KM/h zone



END OF SPEED LIMIT IMPOSED



END OF PROHIBITION OF OVFERTAKING

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED	
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.
				APPROVED

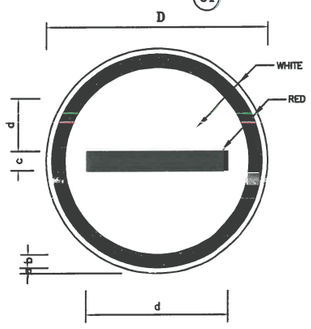
CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS (3) (WARNING SIGN)

DATE: JUNE, 2021

DWG NO. 4402/102/TD/ RS018

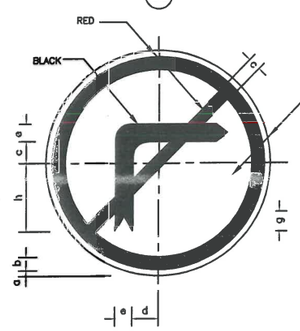
C1



NO ENTRY
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	4.0	5.3
c	8.0	10.7
d	64.0	85.3

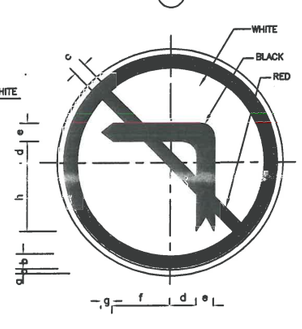
C2



NO RIGHT TURN
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	6.5	8.7
c	5.5	7.3
d	6.0	8.0
e	10.0	13.3
f	25.0	33.3
g	5.0	6.7
h	30.0	40.0

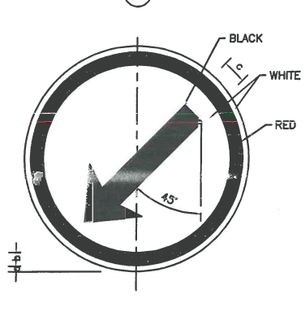
C3



NO LEFT TURN
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C13)	120cm(C7)
a	1.0	1.3
b	6.5	8.7
c	5.5	7.3
d	6.0	8.0
e	10.0	13.3
f	25.0	33.3
g	5.0	6.7
h	30.0	40.0

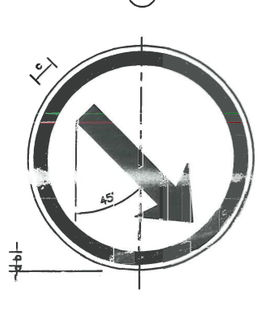
C4



KEEP LEFT
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C4)	120cm(C3)
a	1.0	1.3
b	4.0	5.3
c	8.0	10.7
d	9.0	12.0
e	32.0	42.7
f	23.0	30.7
g	4.5	6.0

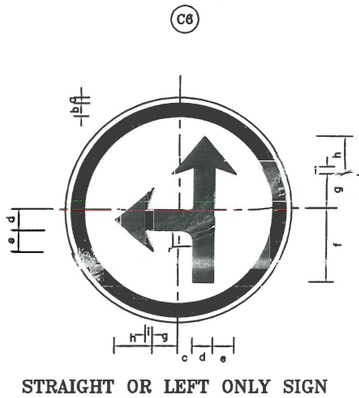
C5



KEEP RIGHT
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C4)	120cm(C3)
a	1.0	1.3
b	4.0	5.3
c	8.0	10.7
d	9.0	12.0
e	32.0	42.7
f	23.0	30.7
g	4.5	6.0

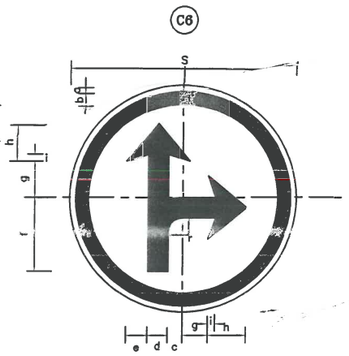
C6



STRAIGHT OR LEFT ONLY SIGN
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C4)	120cm(C3)
a	1.0	1.3
b	6.5	8.7
c	10.0	13.3
d	8.0	10.7
e	9.0	12.0
f	34.0	45.3
g	10.5	14.0
h	23.5	31.3
l	4.5	6.0
r	8.0	10.7

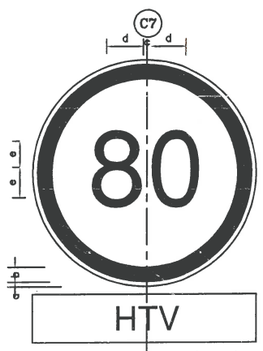
C6



STRAIGHT OR RIGHT ONLY SIGN
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C4)	120cm(C3)
a	1.0	1.3
b	6.5	8.7
c	10.0	13.3
d	8.0	10.7
e	9.0	12.0
f	34.0	45.3
g	10.5	14.0
h	23.5	31.3
l	4.5	6.0
r	8.0	10.7

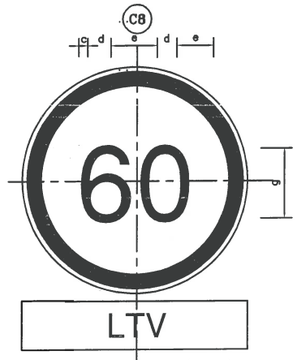
C7



SPEED LIMIT (100)
DIMENSION(cm)

PARTS	SIGN SIZE	
	90cm(C4)	120cm(C3)
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	23.0	30.7
e	20.0	26.7

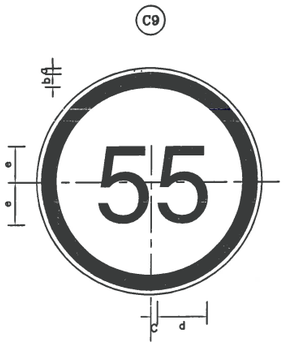
C8



SPEED LIMIT (120)
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	6.5	8.7
c	2.5	3.25
d	5.0	6.5
e	11.25	15.38
f	35.0	47.0
g	40.0	53.5

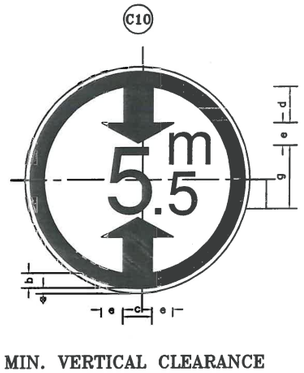
C9



SPEED LIMIT (55)
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	6.5	8.7
c	3.0	4.0
d	23.0	30.7
e	20.0	26.7

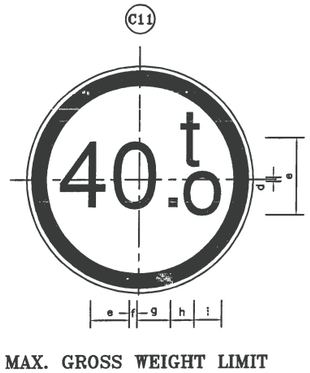
C10



MIN. VERTICAL CLEARANCE
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	6.5	8.7
c	13.5	18.0
d	12.5	17.0
e	8.5	11.5
f	31.0	41.0
g	24.5	32.5
h	12.5	16.5

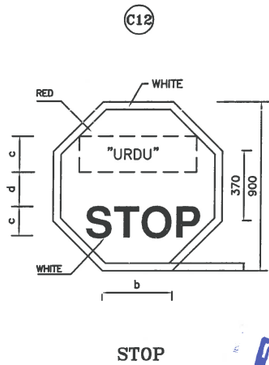
C11



MAX. GROSS WEIGHT LIMIT
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.3
b	6.5	8.67
c	32.0	42.50
d	2.5	3.50
e	17.0	22.50
f	1.5	2.0
g	17.0	22.50
h	3.5	4.50
i	10.0	13.50

C12



STOP
DIMENSION(cm)

PARTS	Sign Size	
	90cm	120cm
a	1.0	1.30
b	37.0	49.5
c	20.0	25.0
d	15.0	20.0
e	36.0	43.0
f	90.0	120.0

TENDER DRAWINGS

PAKHTUNKHWA
HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

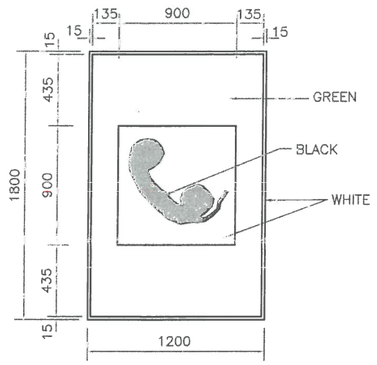
CONSTRUCTION OF ROAD MADYAN
TO KALAM INCLUDING BRIDGES
DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

TITLE
ROAD SIGNS (4)
(REGULATORY SIGN)

DATE
JUNE, 2021

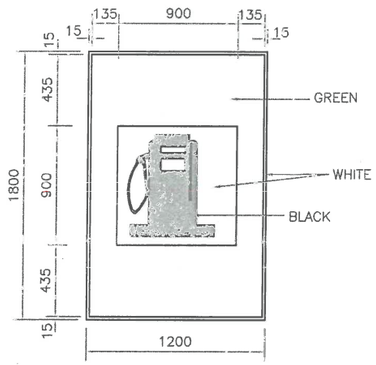
DWG NO.
4402/102/TD/ RS019

R1



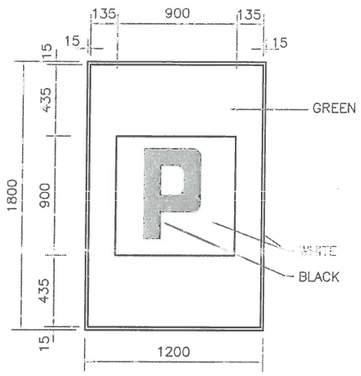
TELEPHONE

R2



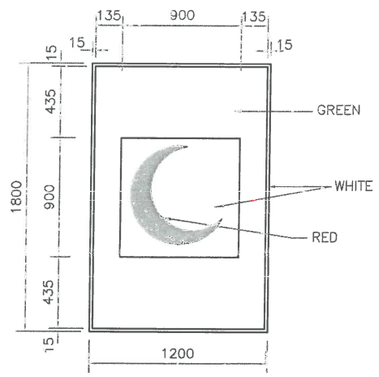
FILLING STATION

R3



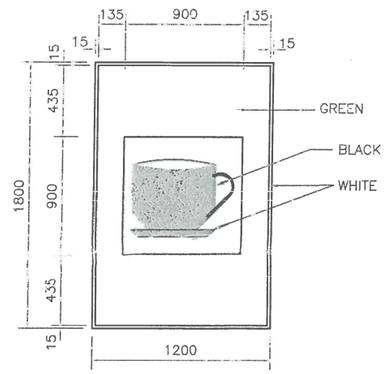
PARKING

R4



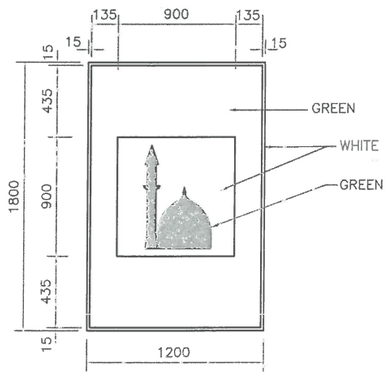
FIRST AID STATION

R5



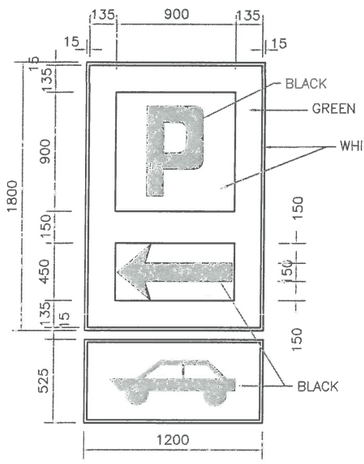
REFRESHMENT/CAFETERIA

R6



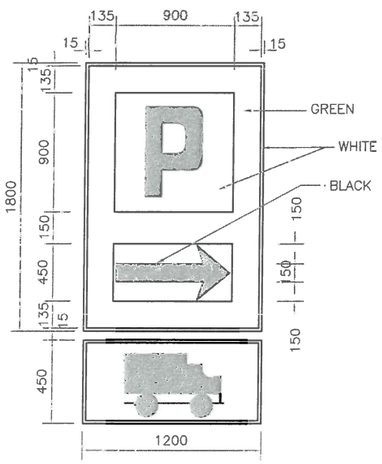
MOSQUE

R7



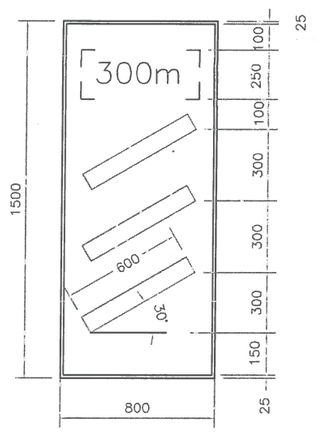
PARKING ON LEFT
(FOR CARS)

R8

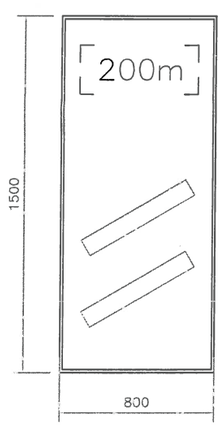


PARKING ON RIGHT
(FOR BUS/TRUCK)

R9

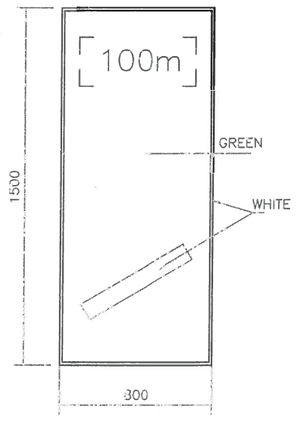


R10



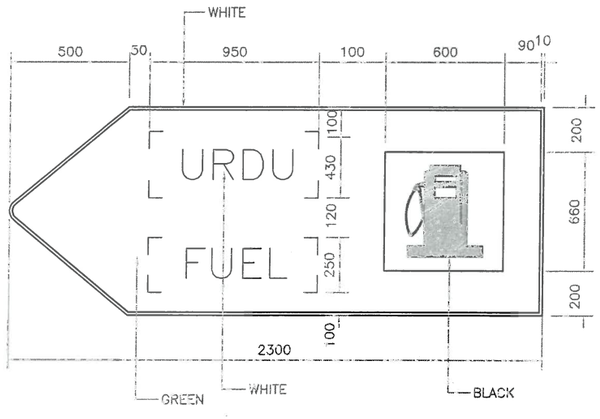
COUNT DOWN MARKERS

R11



COUNT DOWN MARKER

M1



FILLING STATION ON LEFT

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

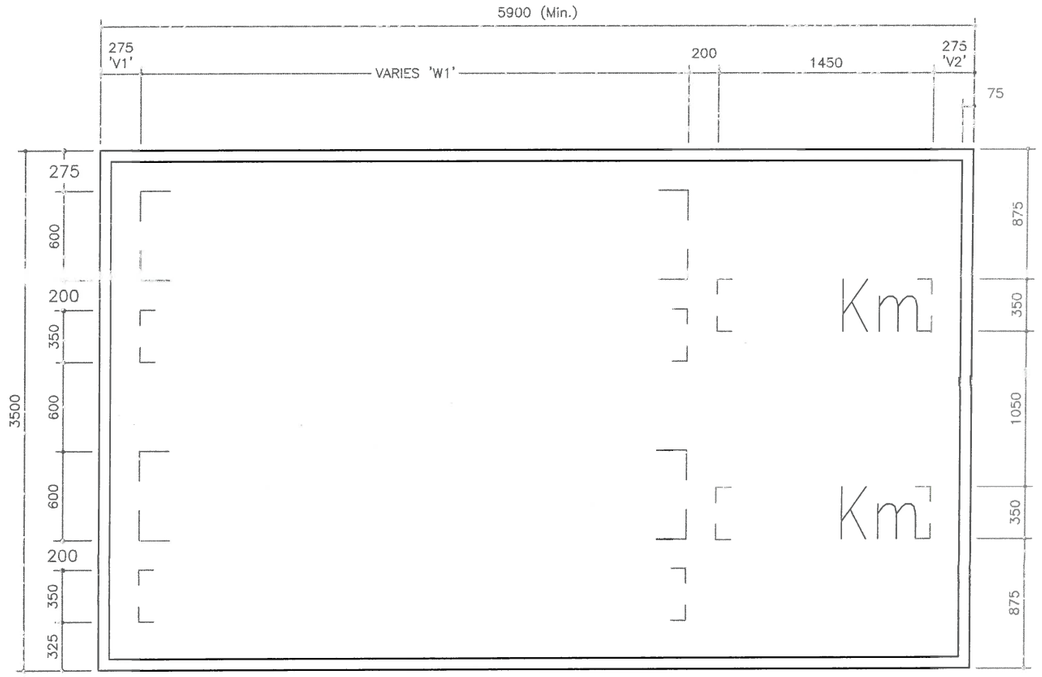
REV.	DATE	DESCRIPTION		APPROVED
			DRAWN	
			SUBMITTED	
			RECOMMENDED	
			CHD./ASE.	
			APPROVED	

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS (5) (INFORMATORY SIGN)

DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ RS020



R21

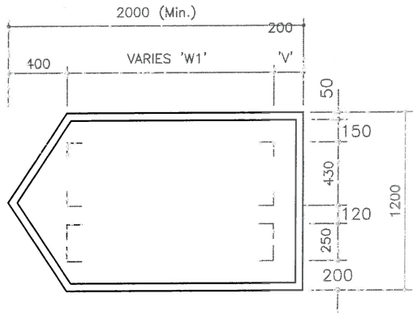
DISTANCE SIGN

(After the junction)

(Beginning of Project)



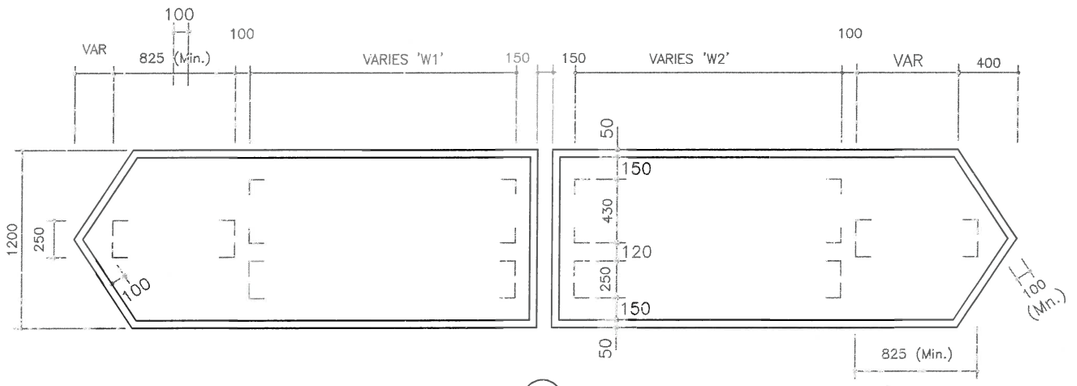
(End of Project)



R20

EXIT SIGN

(At exit ramp nose)



R19

DISTANCE & DESTINATION SIGN

(At T– Junction)

TENDER DRAWINGS

				DRAWN	
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
REV.	DATE	DESCRIPTION		APPROVED	APPROVED

PAKHTUNKHWA HIGHWAY AUTHORITY

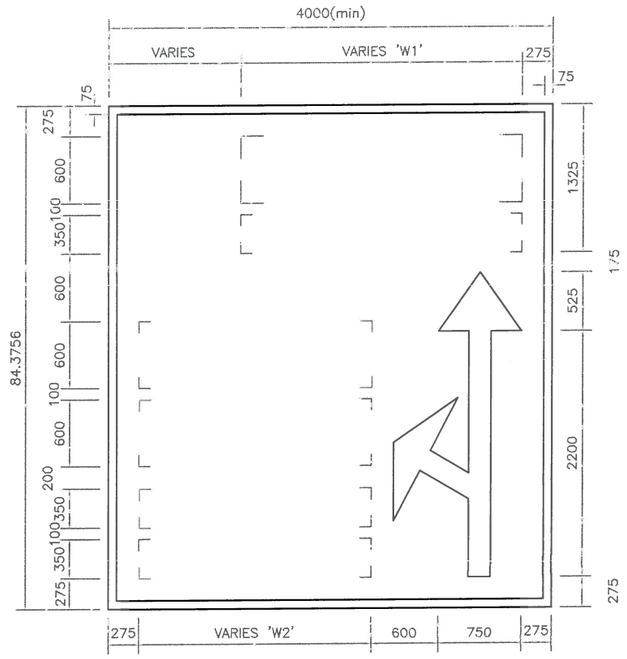
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS (3) (REGULATORY SIGN)

DATE: JUNE, 2021

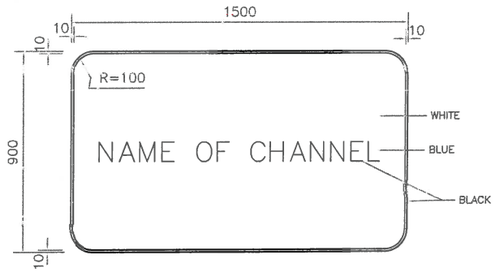
DWG NO.: 4402/102/TD/ RS021



R22

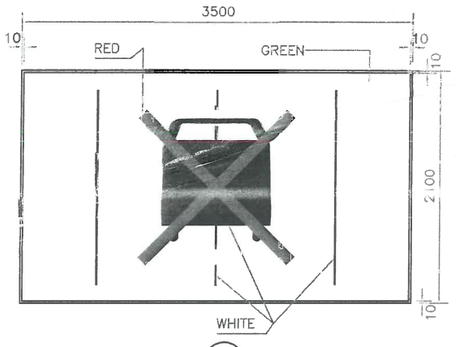
DESTINATION SIGN

(500m SHORT OF EXIT RAMP)



R32

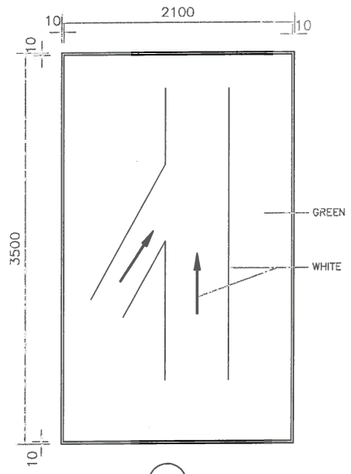
CHANNEL NAME



R33

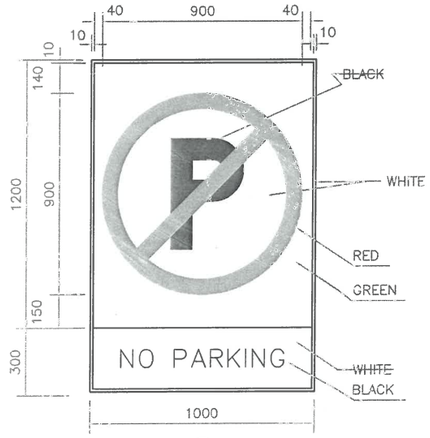
DO NOT DRIVE
ON LANE MARKING

W A R N I N G S I G N



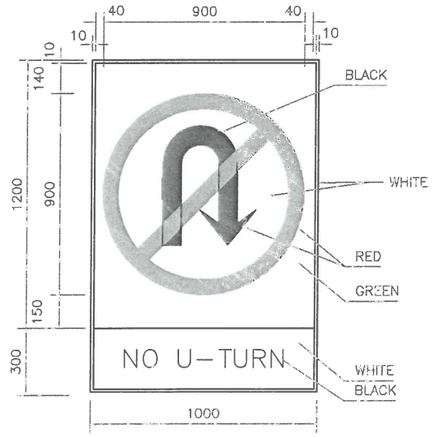
R31

ENTRY LANE AHEAD



R27

NO PARKING



R28

NO U-TURN

R E G U L A T O R Y S I G N

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

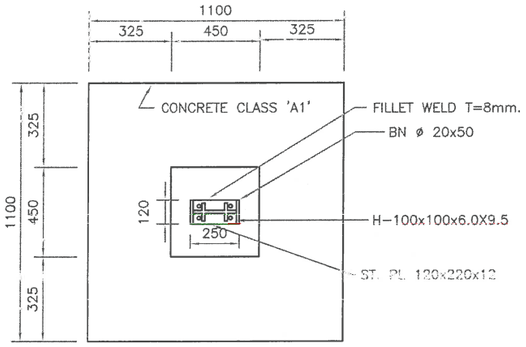
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			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./ NER.
			APPROVED

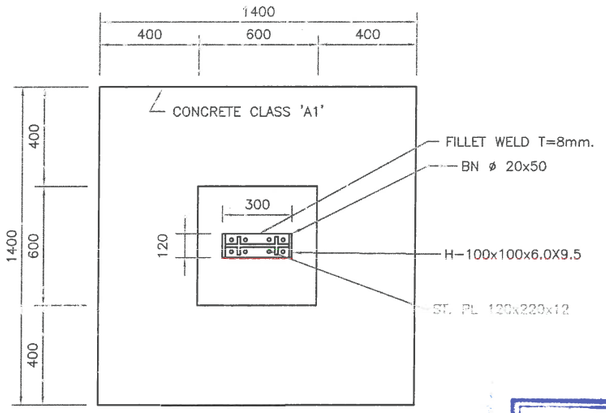
CONSTRUCTION OF ROAD
MADYAN TO KALAM INCLUDING
BRIDGES DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

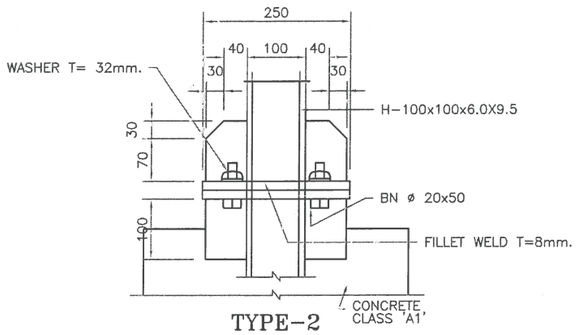
TITLE
ROAD SIGNS (7)

DATE
JUNE, 2021

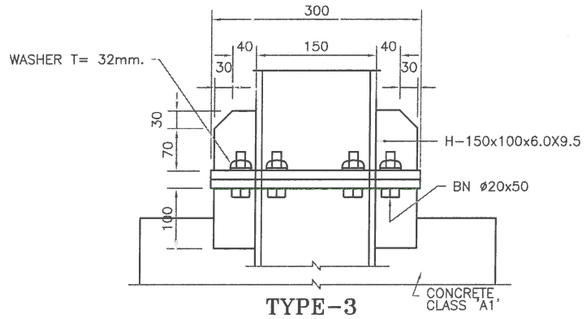
DWG NO.
4402/102/TD/ RS022



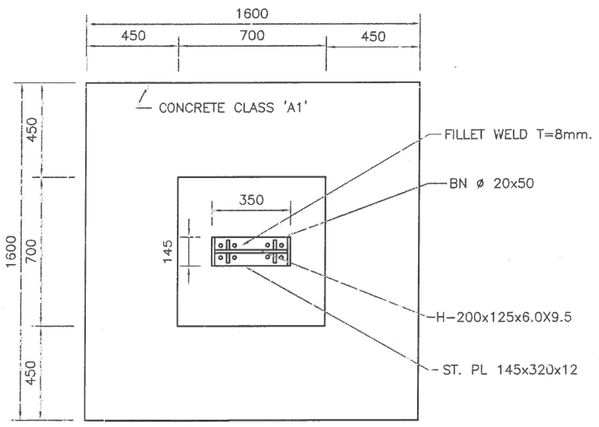


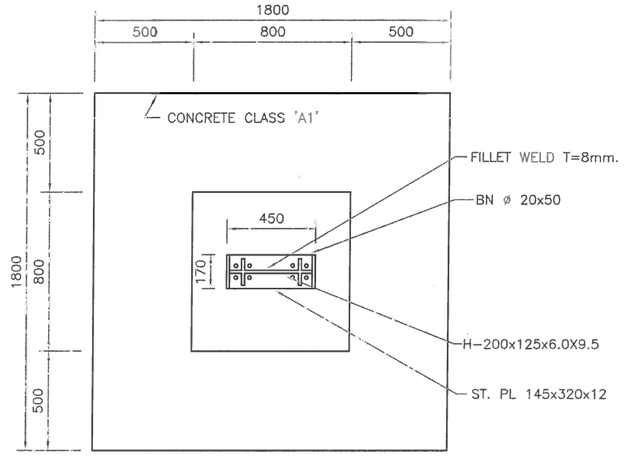


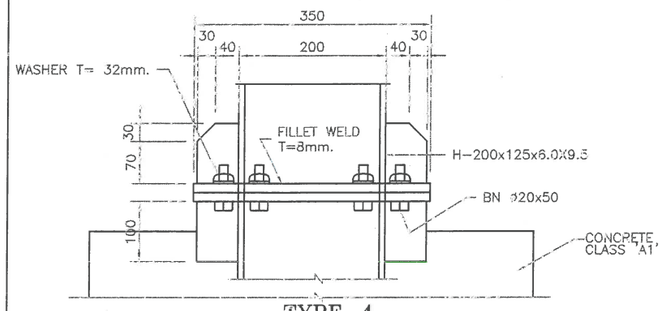
TYPE-2



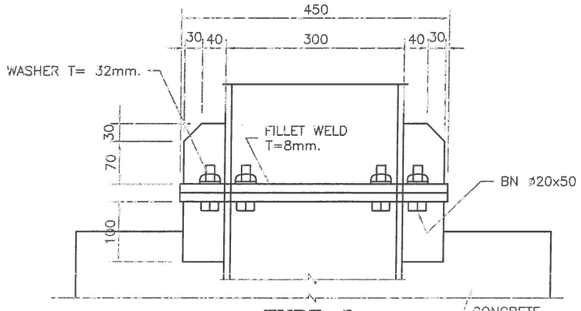
TYPE-3







TYPE-4



TYPE-5

TENDER DRAWINGS

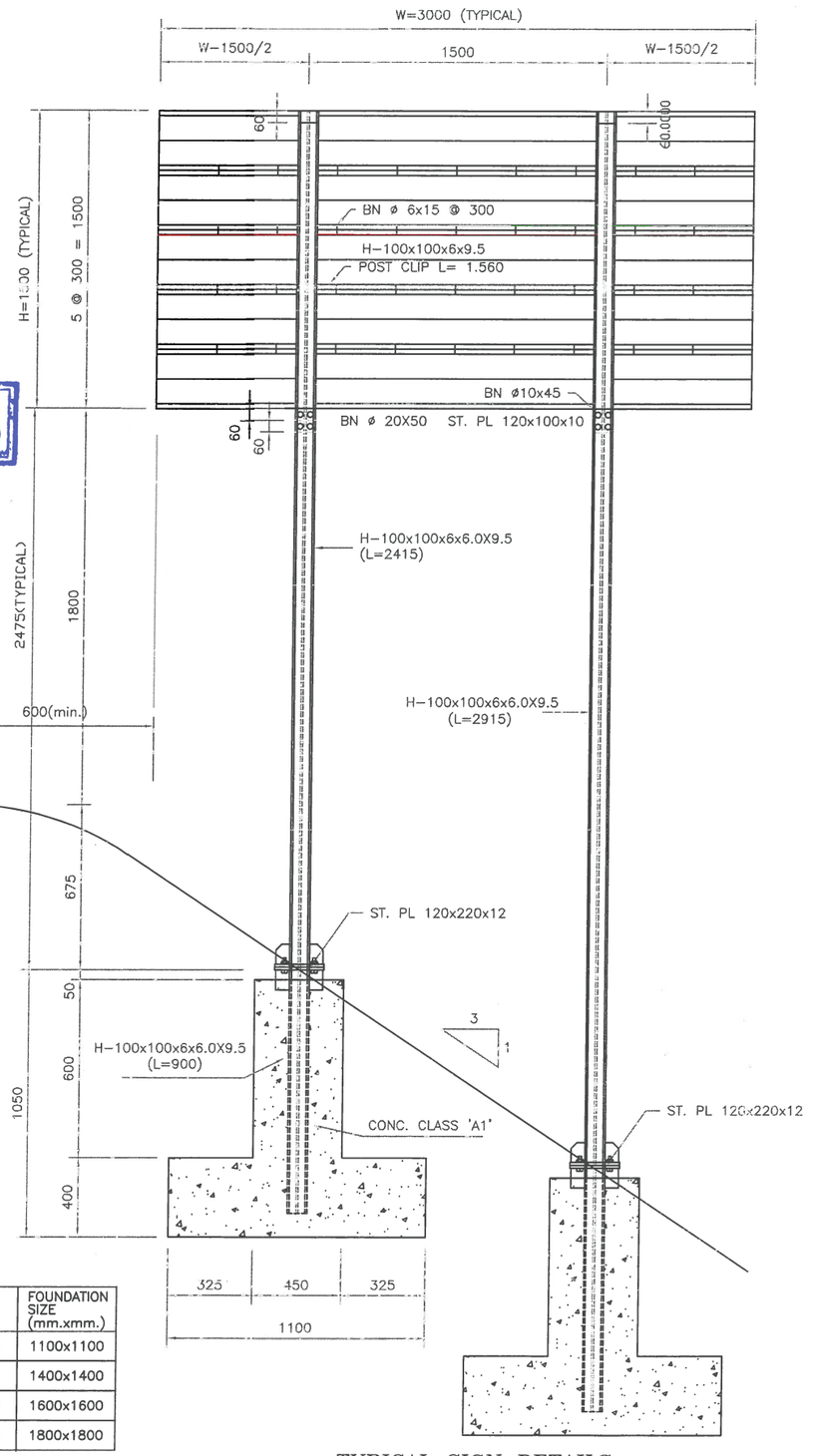


TABLE-1

SIGN FACE AREA 'A'	COLUMN SIZE (2 Nos. EACH)	FOUNDATION SIZE (mm.xmm.)
3 < A<5	H-100x100x6X9.5	1100x1100
5 < A<10	H-150x100x6X9.5	1400x1400
10< A<15	H-200x125x6X9.5	1600x1600
15< A<20	H-300x150x6X9.5	1800x1800

TYPICAL SIGN DETAILS
(FACE AREA <5m^2)

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED	
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.
				APPROVED

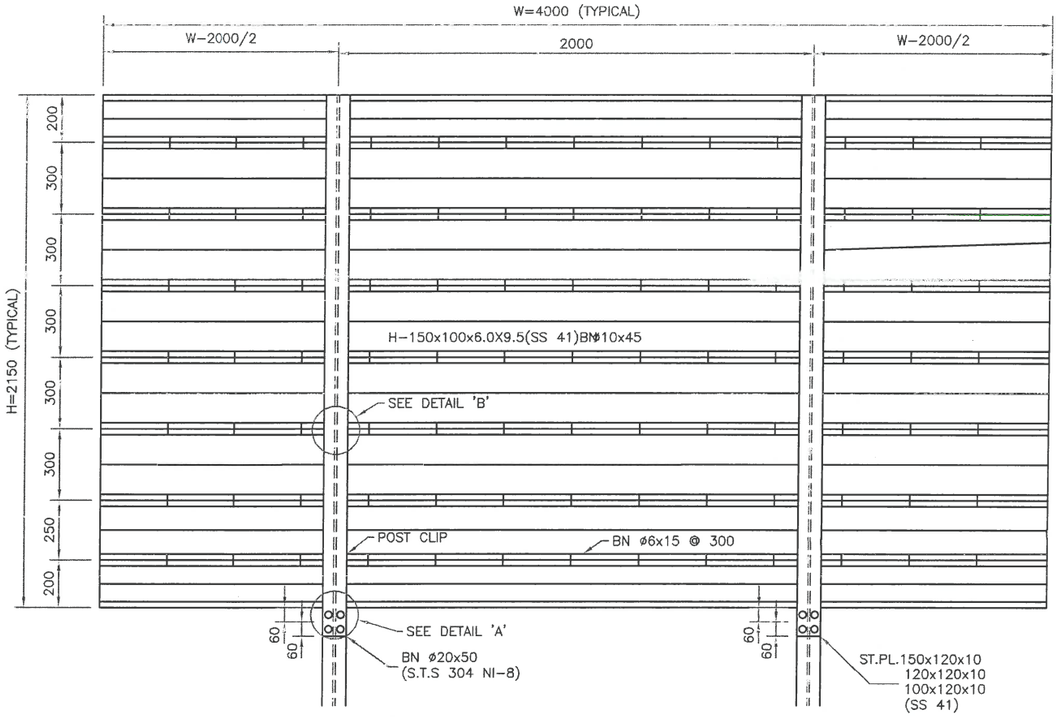
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

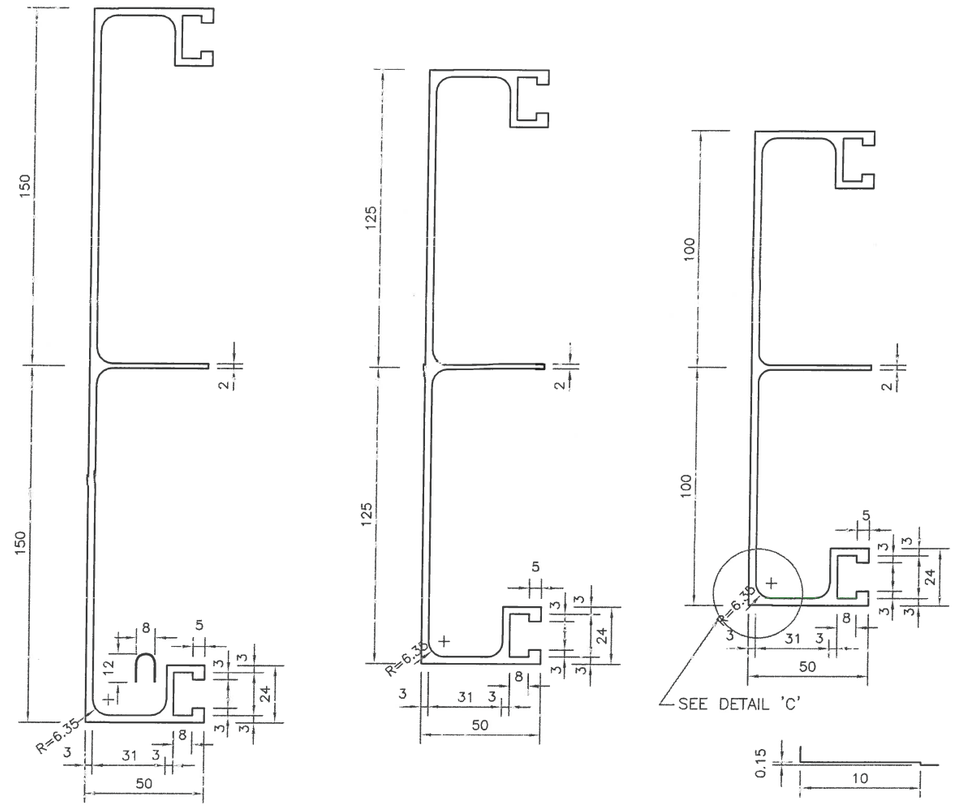
CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS FIXATION DETAILS (2)

DATE: JUNE, 2021

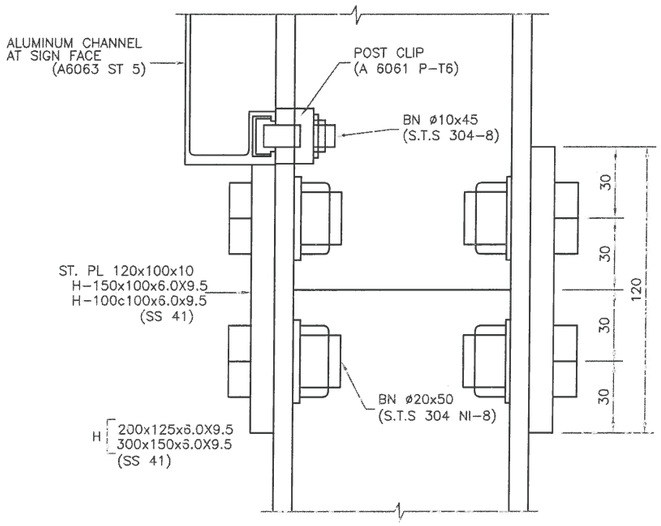
DWG NO.: 4402/102/TD/ RS024



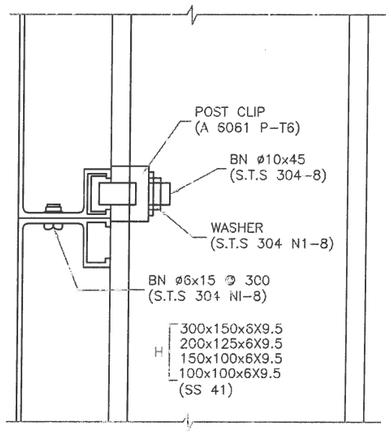


ALUMINUM CHANNEL DETAILS

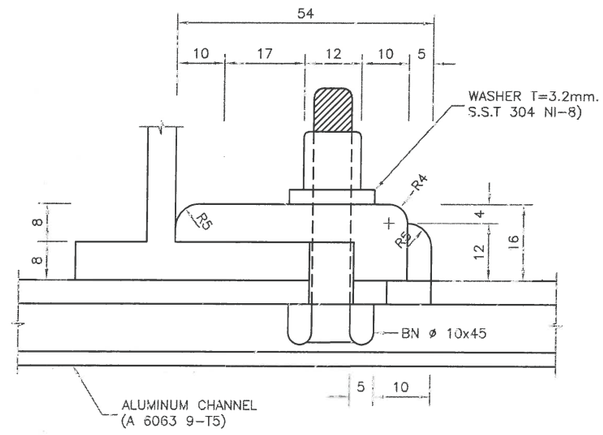
DETAIL 'C'

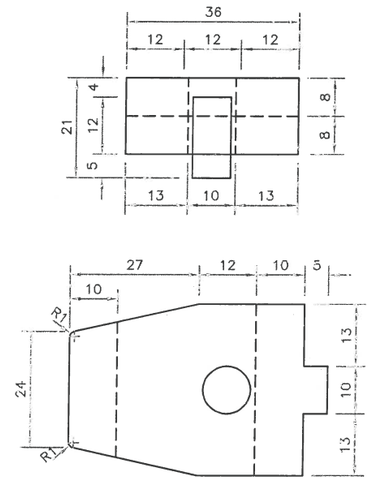


DETAIL 'A'



DETAIL 'B'





ALUMINUM POST CLIP DETAIL

TENDER DRAWINGS

NOTES:-

1 - ALL DIMENSIONS ARE IN MILLIMETERS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: ROAD SIGNS FIXATION DETAILS (3)

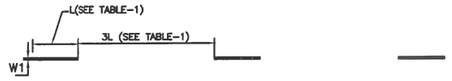
DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ RS025

PAVEMENT MARKING LINES

SCALE 1:200

FOR DIMENSIONS L & W1 TO W5 (SEE TABLE–1)



L1 – BROKEN GUIDE LINE–WHITE

AT CENTERLINE OF DIVIDED (SINGLE) 2–LANE HWYS AND LANE SEPARATION OF DIVIDED (DUAL) HWYS



L2 –BROKEN WARNING LINE –WHITE

AT APPROACHES TO DANGER (e.g roundabouts, median openings and junctions)



L3 – CONTINUOUS LINE – WHITE

AT CENTERLINE NEAR INTERSECTIONS AND AT NO PASSING ZONES



L4 – CONTINUOUS EDGE LINE –YELLOW

AT EDGE OF PAVEMENT OF ALL HWYS



L5 – DASHED LINE – WHITE

AT SEPERATION OF THROUGH LANES FROM ACCELERATION/DECELERATION LANE



L6 – DOTTED LINE – WHITE

FOR DEFINING VEHICLE PATHS WITHIN INTERSECTIONS



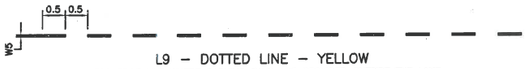
L7 – STOP LINE – WHITE

AT INTERSECTIONS ACROSS PAVEMENT



L8 – TRANSVERSE YIELD LINE – WHITE

AT INTERSECTIONS ACROSS PAVEMENT IN THE SAME POSITION AS L7 LINE TO INDICATE GIVE WAY



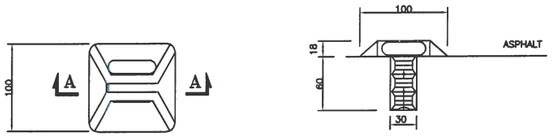
L9 – DOTTED LINE – YELLOW

FOR EDGE LINE WHERE PARKING BAYS ARE PROVIDED OUTSIDE THE LANE



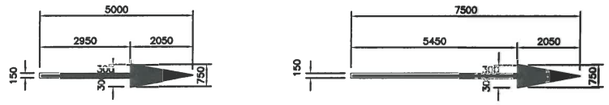
L10 – CONTINUOUS LINE – WHITE

FOR DELINEATION OF LIMITS OF PARKING BAYS

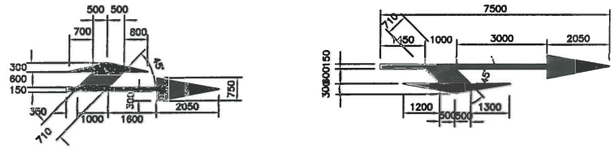


PLAN SECTION A–A

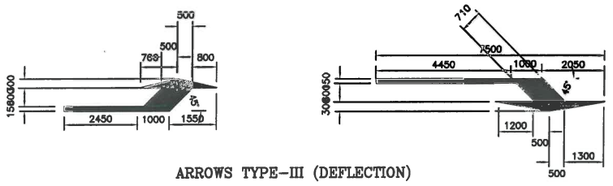
REFLECTORISED PAVEMENT STUD
(RAISED PROFILE TYPE)



ARROWS TYPE–I (STRAIGHT)



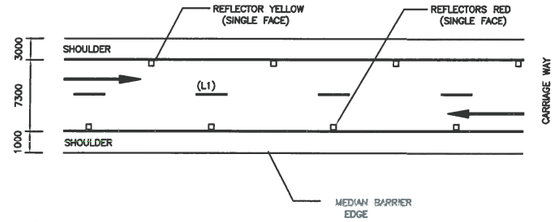
ARROWS TYPE–II (COMBINED)



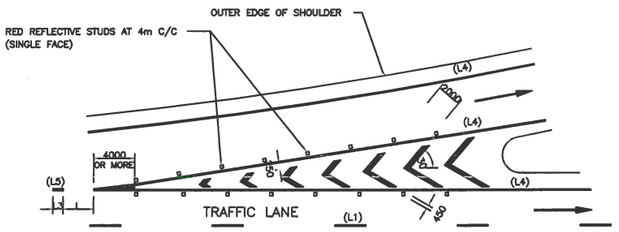
ARROWS TYPE–III (DEFLECTION)

(FOR <60 Km/hr) (FOR >60 Km/hr)

LANE SELECTION ARROWS – WHITE

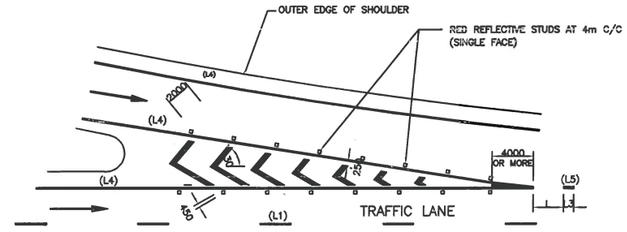


ADDITIONAL DETAIL FOR MEDIAN
AND CARRIAGE WAY



ENTRANCE NOSE DETAIL

SCALE 1:300



EXIT NOSE DETAIL

SCALE 1:300

PAVEMENT MARKING & ROAD STUDS DETAILS

TABLE – 1

ROADWAY SPEED	L (mm)	W1	W2	W3	W4	W5
>120 Km/hr	4000	200	200	200	400	100

NOTES :–

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. AT APPROACHES TO INTERSECTIONS/ROUNDABOUTS, CENTER LINE OR LANE SEPARATION LINE (L1) BECOMES (L2) FOR A LENGTH = 150m AND CONTINUOUS LINE (L3) FOR LAST 50m.
3. LENGTH OF STORKE IN (L2) = LENGTH OF GAP IN MATCHING (L1).
4. LOCATION OF DIRECTIONAL ARROWS, NOSES AND STOP SIGN SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED
			DRAWN
			SUBMITTED
			RECOMMENDED
			CHD./VER.
			APPROVED

CONSTRUCTION OF ROAD
MADYAN TO KALAM INCLUDING
BRIDGES DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

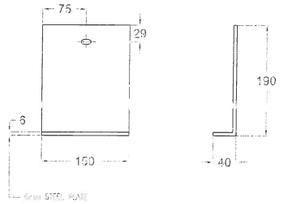
TITLE
PAVEMENT MARKING AND ROAD STUDS

DATE
JUNE, 2021

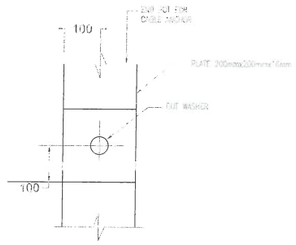
DWG NO.
4402/102/TD/ PMS026



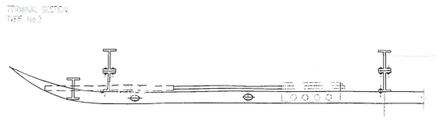
PLAN



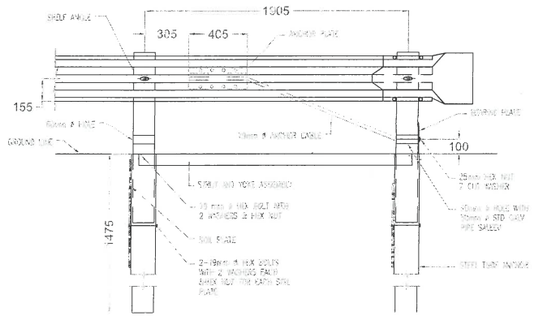
SHELF ANGLE



BEARING PLATE DETAIL

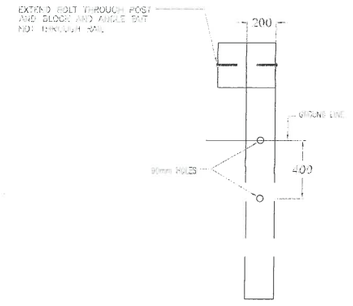


PLAN

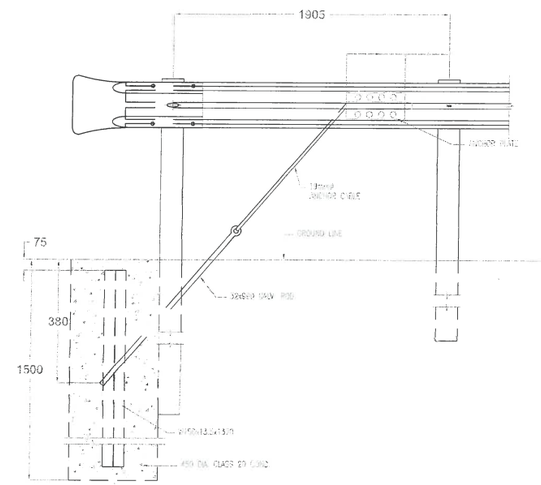


ELEVATION

ANCHORS ASSEMBLY
TYPE NO.1 (BREAKAWAY)

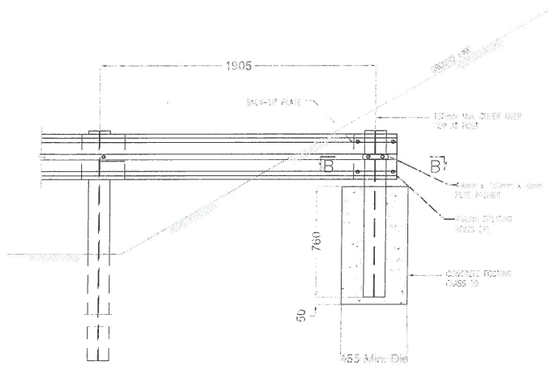


BREAKAWAY POST
(POST NO. 2, 3<, 4, 5, AND 6)



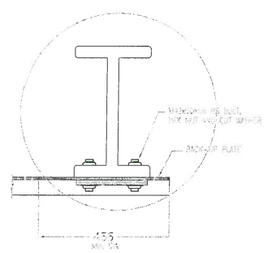
ELEVATION

ANCHORS ASSEMBLY
TYPE NO.2



ELEVATION

BURIED POST ANCHOR



SECTION B – B

TENDER DRAWINGS

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS. UNLESS NOTED OTHERWISE.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DWG. NO. 38164/102/TD/GR0030.)
3. THE LAYOUT AND DETAILS SHOWN ON THIS PLAN ARE INDICATIVE ONLY OF THE VARIOUS POSSIBILITIES AVAILABLE FOR THE APPROACH AND TAIL ENDS FOR GUARD RAIL INSTALLATION.
4. IN CASE SOLID ROCK IS ENCOUNTERED, THE POST MAY BE SHORTENED, PROVIDED IT EXTENDS INTO THE SOLID ROCK A MIN. OF 900mm.

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

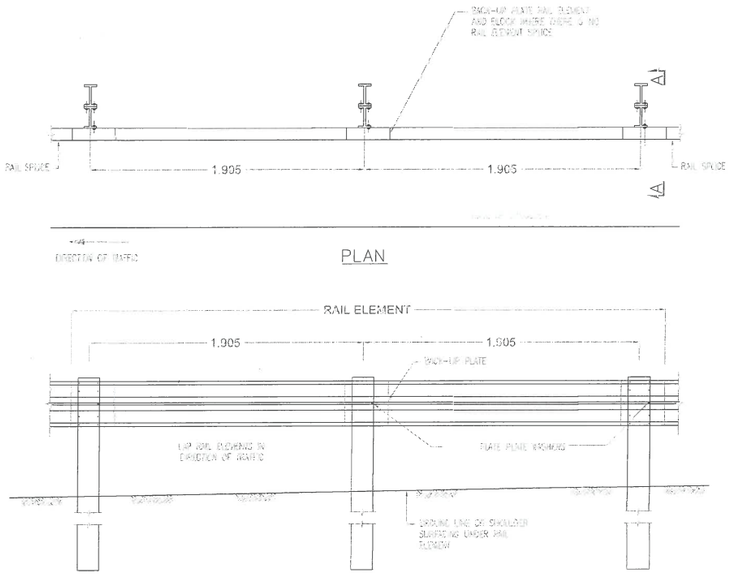
REV.	DATE	DESCRIPTION		APPROVED
				DRAWN
				SUBMITTED
				RECOMMENDED
				CHD./VER.
				APPROVED

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: TYPICAL GUARD RAIL DETAILS (2)

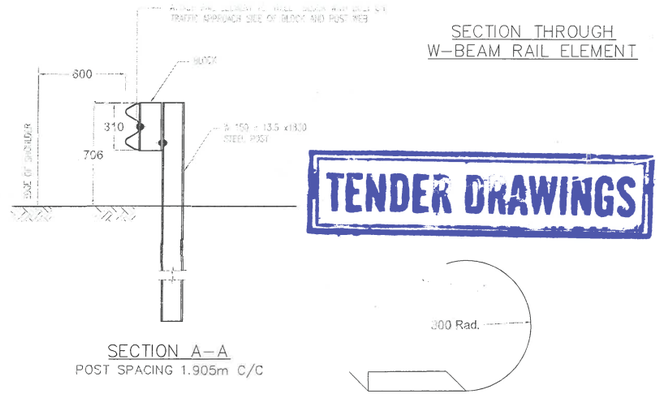
DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ GR028

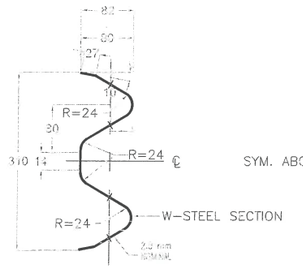


PLAN

METAL W-BEAM GUARD RAILING WITH W150x13.5
STEEL POSTS AND BLOCKS

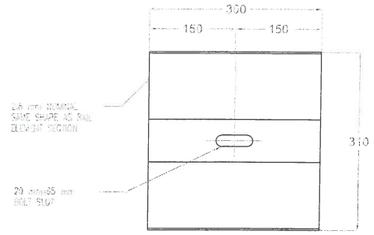


SECTION A-A
POST SPACING 1.905m C/C

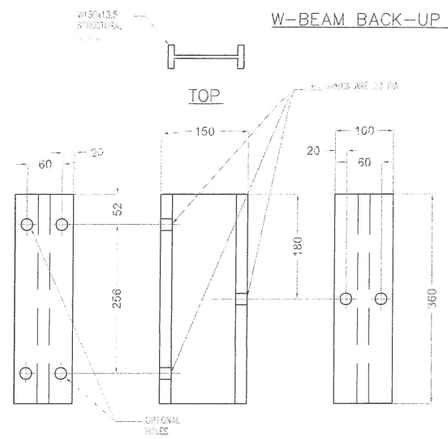


SYM. ABOUT

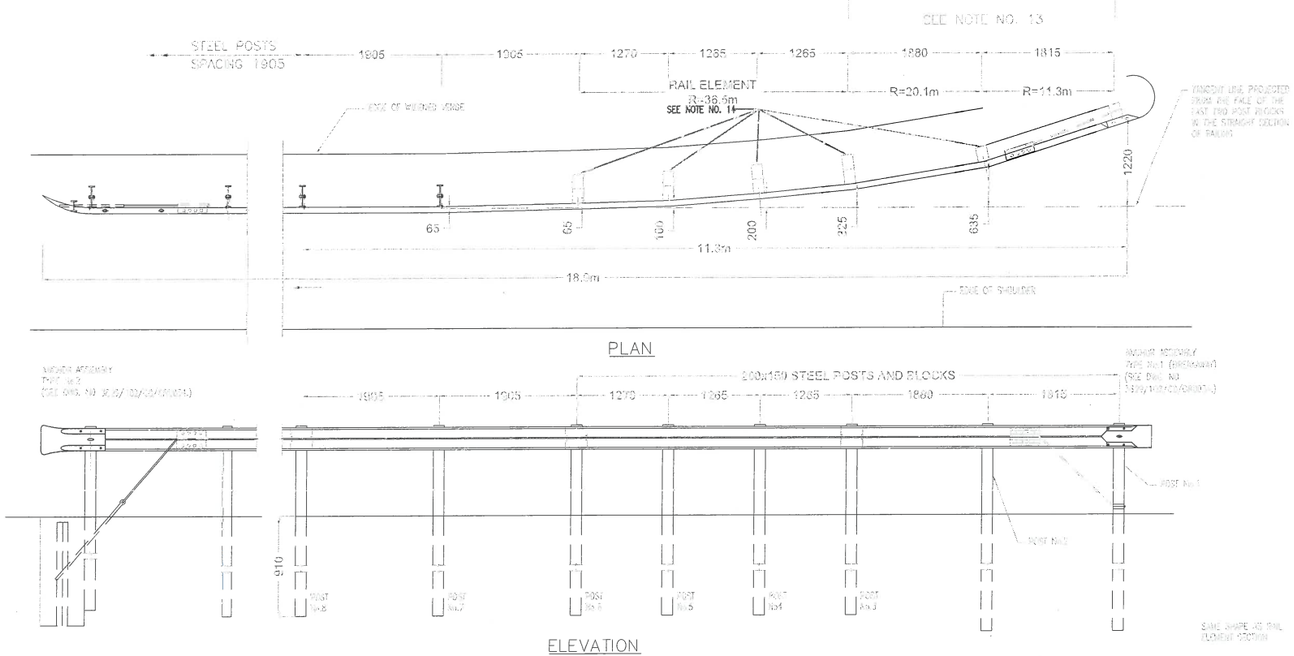
SECTION THROUGH
W-BEAM RAIL ELEMENT



W-BEAM BACK-UP PLATE

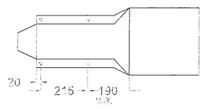


W-BEAM GUARD RAIL BLOCK

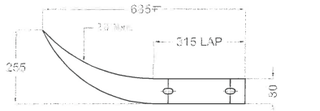


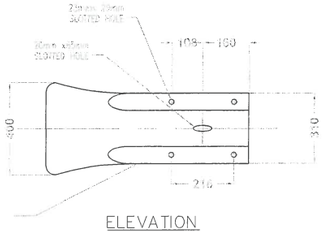
PLAN

ELEVATION
APPROACH FLARE AND END ANCHORS



ELEVATION
TERMINAL SECTION TYPE No. 1
W-BEAM





ELEVATION
TERMINAL SECTION TYPE No.2
W-BEAM

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
2. ALL LAPS SHALL BE IN THE DIRECTION OF TRAFFIC.
3. W-BEAM TERMINAL SECTIONS SHALL BE USED IN PLACE OF END ANCHORAGE RAIL AT THE DEPARTURE END ONLY OR AT OTHER RESTRICTED LOCATIONS AS APPROVED BY THE ENGINEER.
4. W-BEAM RAIL SECTION SHALL CONFORM TO AASHTO M-180 AND SHALL BE TYPE-II, CLASS 'B'.
5. WHERE THE GUARD RAIL HAS TO FOLLOW A CURVE OF LESS THAN 45m RADIUS, THE BEAM SHALL BE CURVED TO SUIT, BY THE BEAM MANUFACTURER.
6. THE HOLES FOR ANCHORAGE POSTS SHALL BE BACKFILLED WITH WELL COMPACTED GRANULAR MATERIAL. THE SPACE INSIDE THE TERMINAL NOSE SHALL BE FILLED WITH CONCRETE, CLASS 20
7. THE CONTRACTOR SHALL PREPARE DRAWINGS SHOWING LOCATIONS, ELEVATIONS AND SPACING OF POSTS AT EACH CULVERT/HIGH FILL LOCATION AND SHALL OBTAIN APPROVAL OF THE ENGINEER
8. BACKFILLING OF THE POST HOLES SHALL BE CARRIED OUT AS FOLLOWS:
   - IN CASE OF ROCK, CORED HOLES-250 DIA (AS MADE) WILL BE BACKFILLED WITH LEAN CONCRETE CLASS 15
   - IN CASE OF STRATA OTHER THAN ROCK, HOLES-300 DIA (AS MADE) WILL BE BACKFILLED WITH LEAN CONCRETE CLASS 15 OR THE POSTS MAY BE HAMMERED IN PLACE AS APPROVED BY THE ENGINEER.

   NO EXTRA PAYMENT SHALL BE MADE TO THE CONTRACTOR FOR CORING AND OR CONCRETING FOR POST FIXATION.
9. EXISTING EMBANKMENT MAY BE WIDENED WHERE NECESSARY TO ACCOMMODATE GUARD RAIL FLARE AT APPROACH END.
10. BACK-UP PLATE TO BE USED BETWEEN GUARD RAIL ELEMENT AND STEEL BLOCK ON STEEL POST WHERE THERE IS NO RAIL ELEMENT SPLICE.
11. DIRECTION OF TRAFFIC INDICATED BY ARROW (→).
12. POST SPACING AND HEIGHT IS AS PER TYPE OF RAIL SPECIFIED IN HIGHWAY DESIGN STANDARDS SECTION 16.
13. THE RAIL ELEMENT CONNECTING POST NOS. 1, 2, AND AND 3 HAS A COMPOUND BEND WITH A RADIUS OF 11.3m BETWEEN POST NOS. 1 AND 2, AND A RADIUS OF 20.1m BETWEEN POST NOS. 2 AND 3. THE RADIUS CHANGES AT POST NO. 2.
14. SHELF ANGLES TO SUPPORT THE RAIL ELEMENT SHALL BE INSTALLED ON POST NOS. 2, 3, 4, 5 AND 6 OF THE FLARE. SEE DWG. NO. 3829/102/CD/GR0034
15. FOR GUARD RAIL EXTENDED INTO CUT BANK, THE THE POSTS INSTALLED ON SLOPES GREATER THAN 10:1, SHOULD BE 2400 LONG.
16. THE FLARE RATE FOR THE GUARD RAIL EXTENDED INTO CUT BANKS MAY BE INCREASED AFTER CROSSING THE DITCH BOTTOM (AT THE ANGLE POINT), TO SHORTEN THE LENGTH OF TERMINAL (UPTO 8:1).
17. TYPE NO.2 WOULD BE USED ON THE TRAIL END OF A 1WAY SINGLE CARRIAGEWAY, AND ON THE TRAIL END FOR A DUAL CARRIAGEWAY.
18. MINOR ADJUSTMENTS TO POST SPACING AND OFFSETS MAY BE REQUIRED TO FIT SITE CONDITIONS.

TENDER DRAWINGS

PAKHTUNKHWA HIGHWAY AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

REV.	DATE	DESCRIPTION	APPROVED

DRAWN	
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	

CONSTRUCTION O FROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: TYPICAL GUARD RAIL DETAILS (1)

DATE: JUNE, 2021

DWG NO.: 4402/102/TD/ GR027

PLAN AND PROFILE



TENDER DRAWINGS

BAHRAIN NEW.dwg

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PLAN SHEET	SCALE
DATE: JUNE 2022	DWG NO.: 4402/102/TD/P&P

PVI STA: 0+019.95
PVI ELEV: 1436.06
K: 2.52
LVC: 19.33
BVCS: 0+010.28
BVCE: 1436.227
EVCS: 0+029.61
EVCE: 1435.15

PVI STA: 0+069.97
PVI ELEV: 1431.35
K: 2.57
LVC: 24.18
BVCS: 0+057.88
BVCE: 1432.491
EVCS: 0+082.06
EVCE: 1431.35

PVI STA: 0+312.94
PVI ELEV: 1431.35
K: 28.82
LVC: 150.00
BVCS: 0+237.94
BVCE: 1431.35
EVCS: 0+387.94
EVCE: 435.26

PVI STA: 0+550.00
PVI ELEV: 1445.25
K: 21.25
LVC: 65.00
BVCS: 0+547.50
BVCE: 1445.56
EVCS: 0+612.50
EVCE: 1445.95

1.74%
-9.40%
-0.00%
5.20%
2.14%

DOUBLE CELL BOX CULVERT
Km: 0+490
SIZE: (3*3)

SINGLE CELL BOX CULVERT
Km: 0+310
SIZE: (3*3)

KM: 0+135
BRIDGE: (4*37)

TENDER DRAWINGS

Horizontal Geometry	TANGENT 0.48	R=35.00 L = 59.41	TANGENT 3.48	R=26.79 L = 39.80	TANGENT 141.07	R=26.55 L = 41.33	TANGENT 243.39	R=600.00 L = 176.43
Vertical Geometry	G=1.74%	G=-9.40% K=2.527	G=-9.40% K=2.572	G=-0.00%	K=28.820	G=5.20%	L=159.56	K=21.247 L=130.34
Superelevation								

Chainage	Design Levels	Ground Levels
0+000	1436.405	1436.405
0+025	1435.869	1439.397
0+050	1434.172	1442.144
0+075	1432.301	1433.177
0+100	1431.363	1434.867
0+125	1431.354	1426.100
0+150	1431.354	1399.528
0+175	1431.354	1395.454
0+200	1431.354	1395.210
0+225	1431.354	1395.890
0+250	1431.354	1395.567
0+275	1431.353	1405.534
0+300	1431.354	1422.237
0+325	1431.438	1431.883
0+350	1431.660	1432.713
0+375	1432.021	1431.003
0+400	1432.521	1430.341
0+425	1433.160	1433.526
0+450	1433.937	1433.297
0+475	1434.854	1433.573
0+500	1435.884	1436.137
0+525	1436.924	1436.195
0+550	1437.965	1436.253
0+575	1439.006	1436.311
0+600	1440.047	1436.247
0+625	1441.088	1435.893
0+650	1442.128	1440.794
0+675	1443.169	1444.800
0+700	1444.173	1442.818
0+725	1445.002	1446.086
0+750	1445.643	1447.150
0+775	1446.109	1449.481
0+800	1446.538	1451.440
0+825	1446.967	1453.025
0+850	1447.396	1454.059
0+875	1447.825	1454.798

BAHRAIN NEW.dwg

CLIENT
PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT
NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD.

RE.	DATE		APPROVED
		DRAWN	
		SUBMITTED	
		RECOMMENDED	
		CHD./VER.	
		APPROVED	

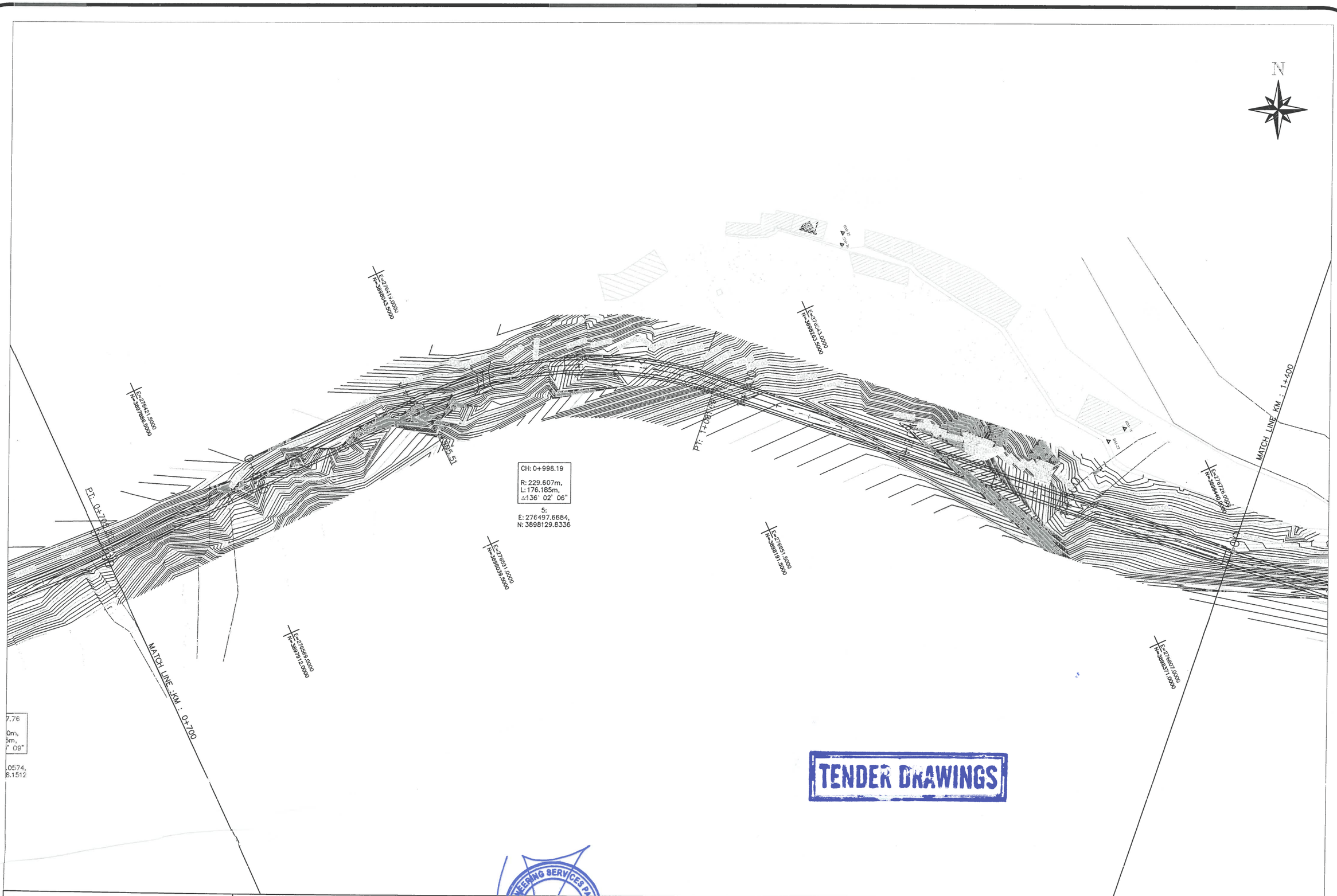
PROJECT TITLE
CONSTRUCTION OF ROAD MADYAN
TO KALAM INCLUDING BRIDGES
DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

TITLE
PROFILE SHEETS
FROM Km. 0+000 TO Km 0+700

SCALE
NTS

DATE
JUNE 2022

DRAWING NO.
4402/102/TD/P&P 1



BAHRAIN NEW.dwg

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PROJECT TITLE

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

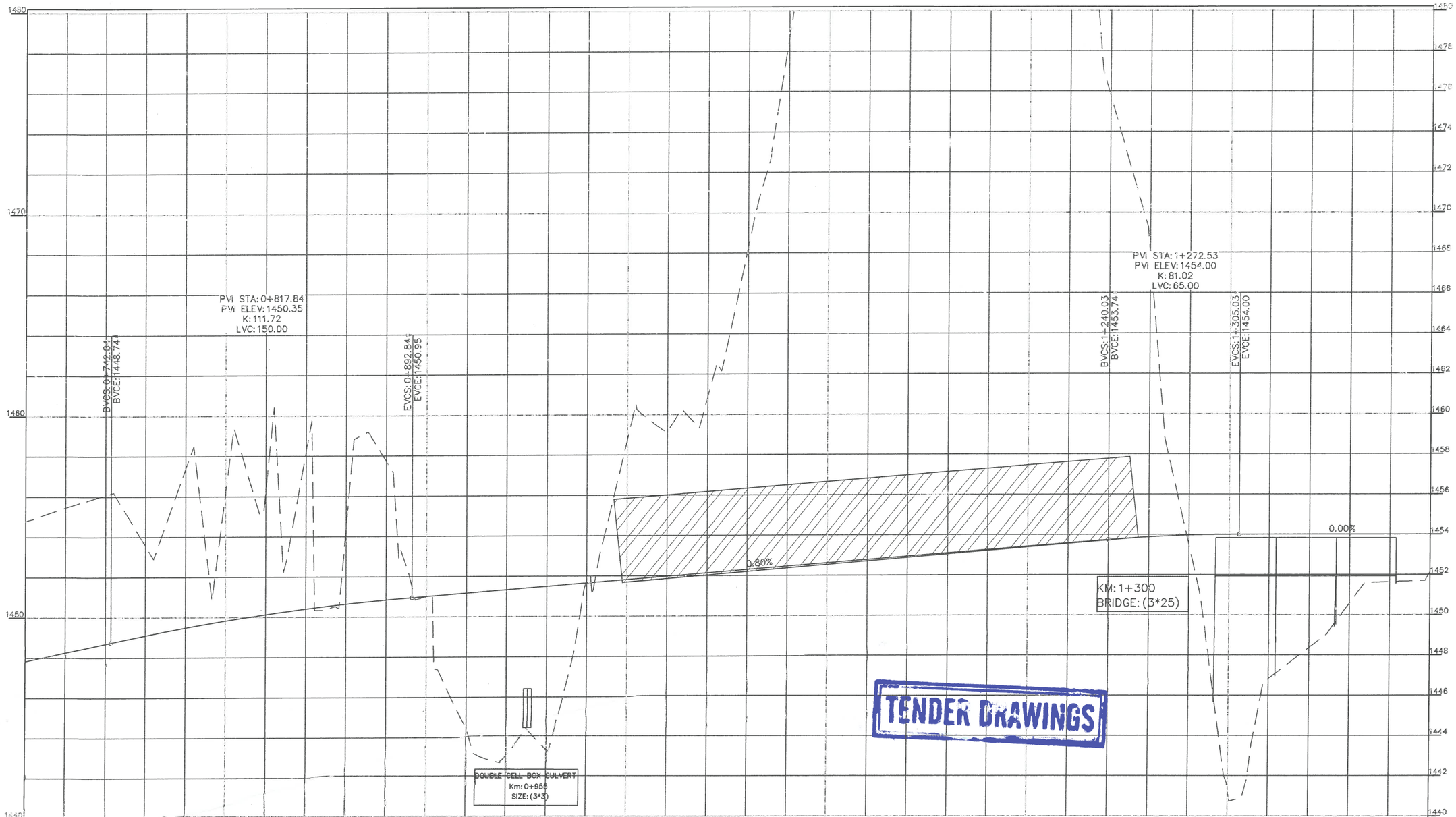
PLAN SHEET

SCALE

DATE: JUNE 2022

DWG NO.: 4402/102/TD/P&P

Bahrain Profile



Horizontal Geom.	R=500.00 L = 176.19	TANGENT 200.18	R=229.61 L = 176.19	TANGENT 685.53	
	G= 2.14% L=100.00 R=111.72		G=0.80%	L=65.00 R=81.02	G=0.00%
Superelevation					
Design Levels	1447.825	1448.254	1448.683	1449.099	1449.479	1449.823	1450.132	1450.405	1450.642	1450.844	1451.011	1451.172	1451.332	1451.493	1451.653	1451.814	1451.974	1452.135	1452.295	1452.455	1452.616	1452.776	1452.937	1453.097	1453.258	1453.418	1453.579	1453.739	1453.875	1453.961	1453.998	1454.000	1454.000	1454.000	1454.000	1454.000	1454.000
Ground Levels	1447.825	1448.254	1448.683	1449.099	1449.479	1449.823	1450.132	1450.405	1450.642	1450.844	1451.011	1451.172	1451.332	1451.493	1451.653	1451.814	1451.974	1452.135	1452.295	1452.455	1452.616	1452.776	1452.937	1453.097	1453.258	1453.418	1453.579	1453.739	1453.875	1453.961	1453.998	1454.000	1454.000	1454.000	1454.000	1454.000	1454.000
	0+700		0+800		0+900		1+000		1+100		1+200		1+300		1+400																								

CLIENT

PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

CONSULTANT

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD.

RE.	DATE	DESCRIPTION		
			DRAWN	
			SUBMITTED	
			RECOMMENDED	
			CHD./VER.	
			APPROVED	APPROVED

PROJECT TITLE

CONSTRUCTION OF ROAD MADYAN
TO KALAM INCLUDING BRIDGES
DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

TITLE	SCALE
PROFILE SHEET From Km 0 +700 To Km 1+400	NTS
DATE: JUNE 2022	DRAWING NO.: 4402/102/TD/P&P2

BAHRAIN NEW.dwg

N

MATCH LINE KM : 2+100

MATCH LINE : KM : 1+400

E=278026.6000
N=3898440.6000

E=278051.0000
N=3898615.5000

E=278932.0000
N=3898788.0000

E=277082.5000
N=3898920.5000

E=276907.0000
N=3898971.0000

E=276857.5000
N=3898835.5000

E=277202.5000
N=3898900.5000

E=277128.5000
N=3898797.5000

P.T. 2+000.18

P.C. 1+787.22

CH: 1+888.84

R: 346.733m,
L: 233.941m,
Δ141° 20' 33"

6:
E: 277113.1448,
N: 3698786.2559

TENDER DRAWINGS

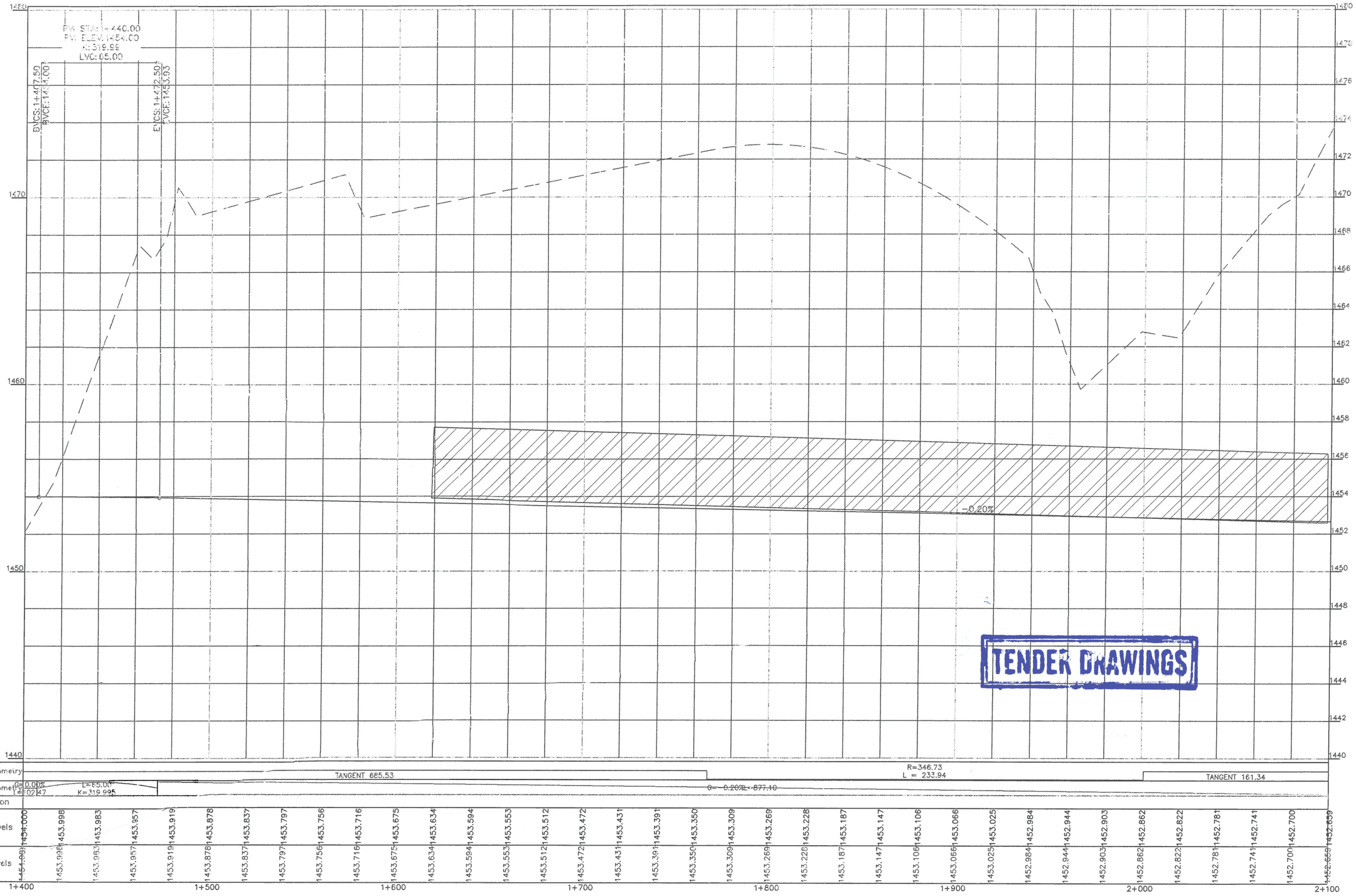
BAHRAIN NEW.c:wg

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PLAN SHEET | SCALE

DATE: JUNE 2022 | DWG NO.: 4402/102/TD/P&P

Bahrain Profile



BAHRN NEW.dwg

CLIENT: PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	RE.	DATE	DESCRIPTION	APPROVED	DRAWN / SUBMITTED / RECOMMENDED / CHD./VER. / APPROVED

PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: PROFILE SHEETS FROM Km 1+400 TO Km 2+100

SCALE: NTS

DATE: JUNE 2022

DRAWING NO.: 4402/102/TD/P&P 3

CH: 2+325.80

R: 236.476m,
L: 265.825m,
Δ110° 44' 31"

7:
E: 277148.1472,
N: 3899231.1361

N

MATCH LINE KM : 2+800

MATCH LINE :KM : 2+100

CH: 2+655.52

R: 250.000m,
L: 167.464m,
Δ141° 37' 12"

8:
E: 277503.8282,
N: 3899334.7994

TENDER DRAWINGS

BAHRAIN NEW.dwg

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PROJECT TITLE

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

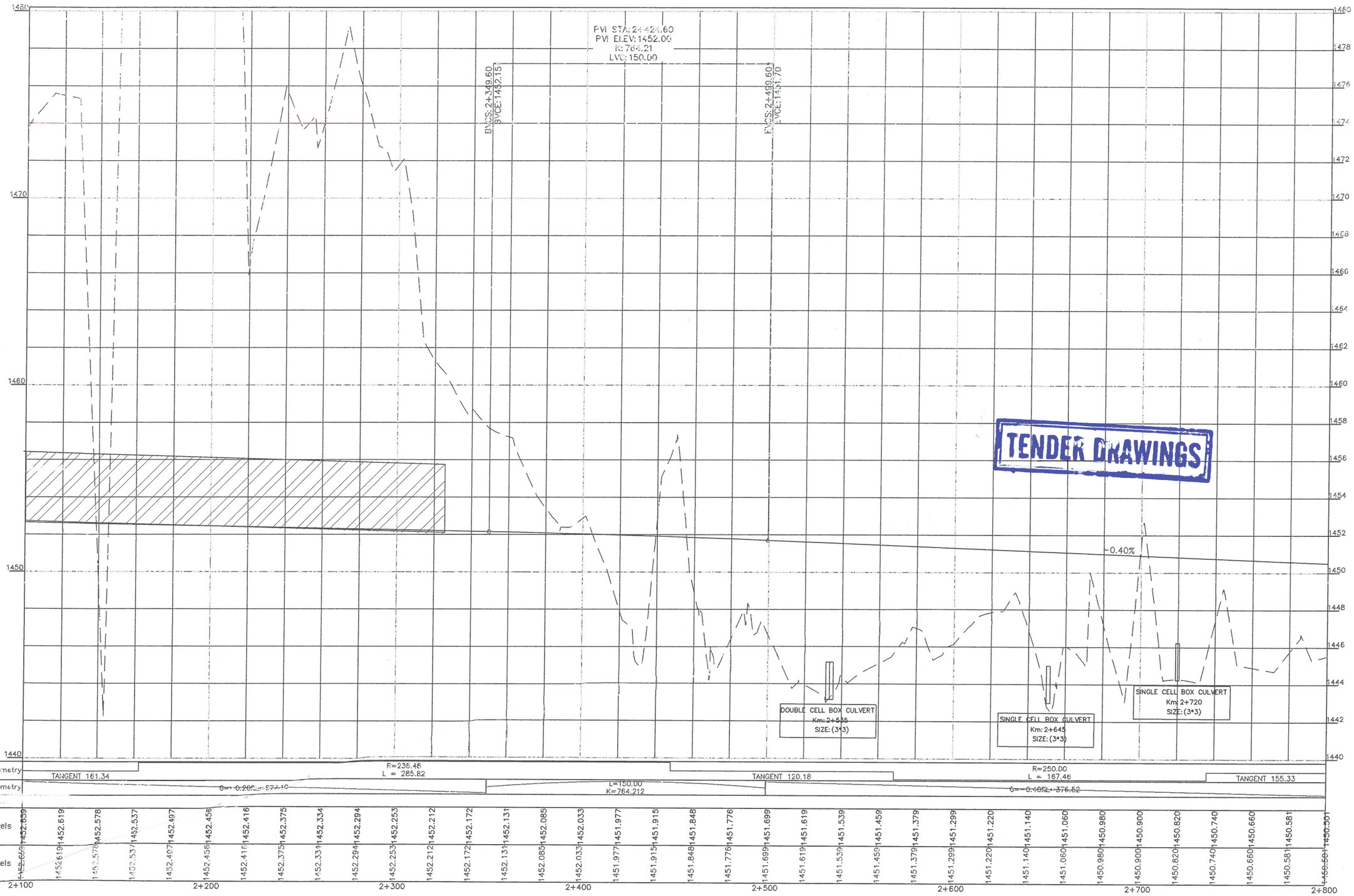
PLAN SHEET

SCALE

DATE: JUNE 2022

DWG NO.: 4402/102/TD/P&P

Bahrain Profile



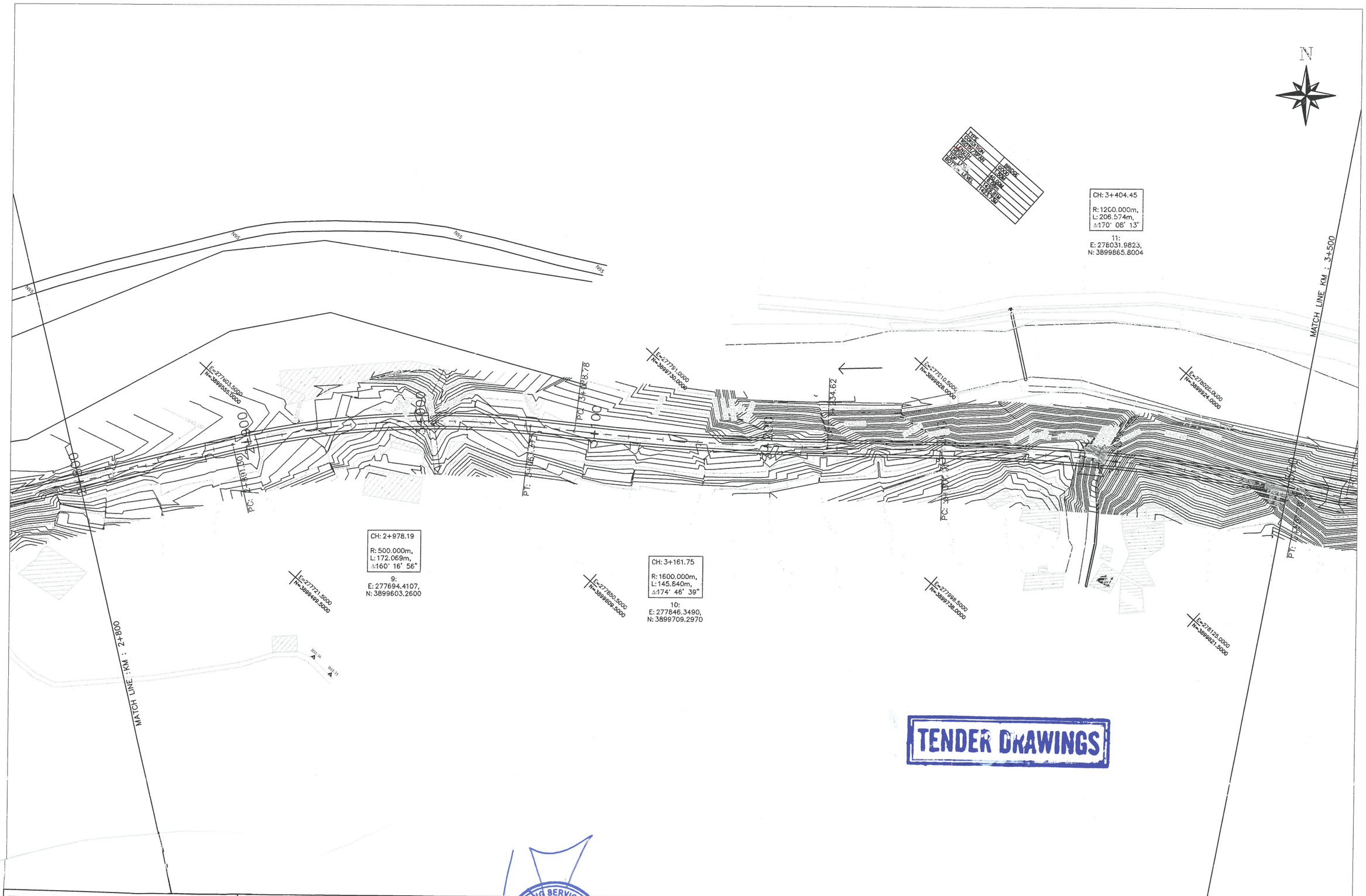
TENDER DRAWINGS

BAHRAIN NEW.dwg

CLIENT	PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	
CONSULTANT	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	
PROJECT TITLE	CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)	
TITLE	PROFILE SHEETS FROM Km 2+100 TO Km 2+800	SCALE: NTS
DATE	JUNE 2022	DRAWING NO.: 4402/102/TD/P&P 4

RE.	DATE	DESCRIPTION		
			DRAWN	
			SUBMITTED	
			RECOMMENDED	
			CHD./VER.	
			APPROVED	APPROVED

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.



TENDER DRAWINGS

BAHRAIN NEW.c*wg

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	JUNAID
				SUBMITTED	SAAD TAYYAB
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PROJECT TITLE

CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

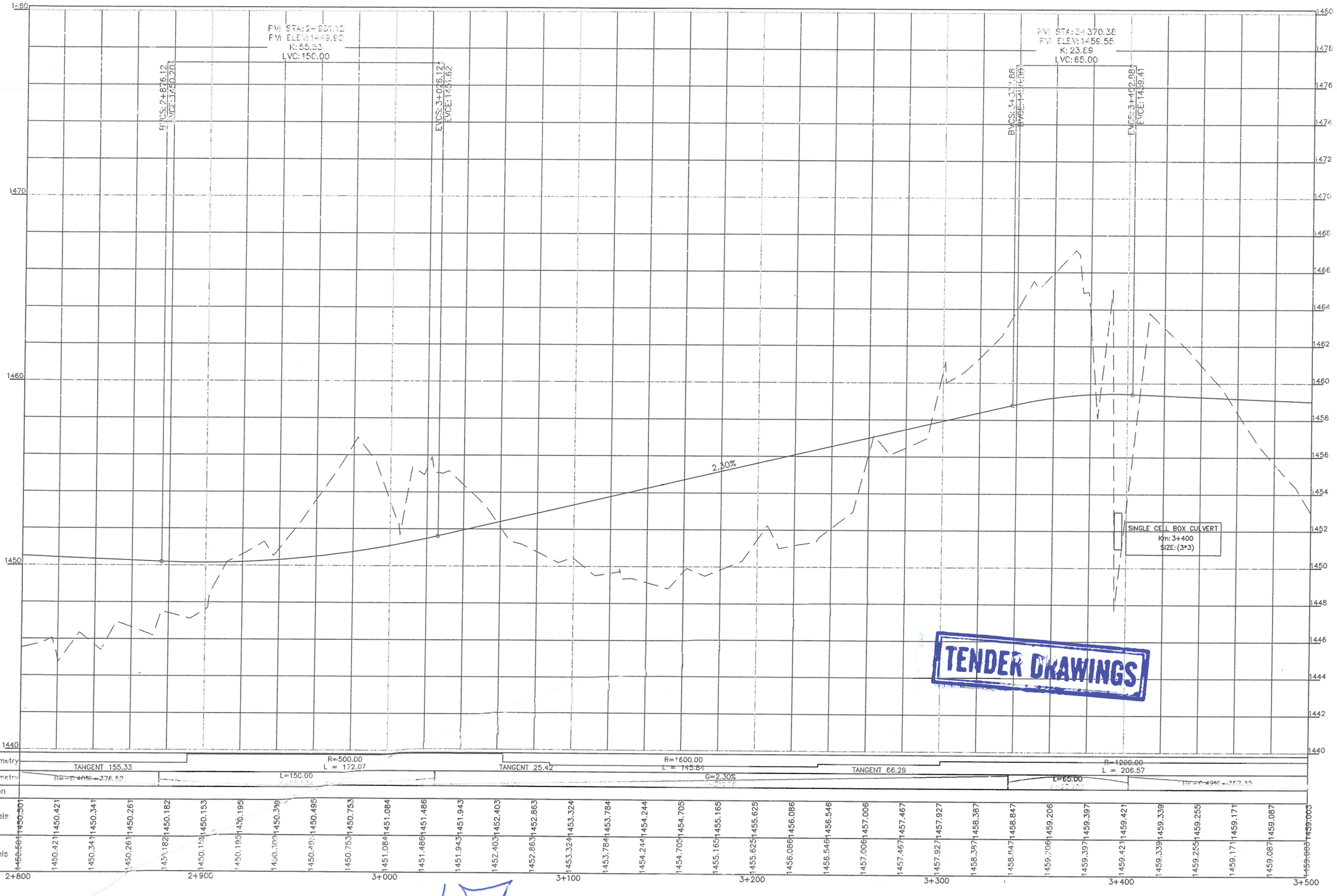
PLAN SHEET

SCALE

DATE: JUNE 2022

DWG NO.: 4402/102/TD/P&P

Bahrain Profile



CLIENT: PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	RE.	DATE / DESCRIPTION	APPROVED	DRAWN / SUBMITTED / RECOMMENDED / CHD./VER. / APPROVED

PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: PROFILE SHEETS FROM KM 2+800 TO Km 3+500

SCALE: NTS

DATE: JUNE 2022

DRAWING NO.: 4402/102/TD/P&P 5

BAHRAIN NEW.dwg

N

MATCH LINE KM : 4+200

MATCH LINE :KM : 3+500

E=278173.5000
N=3900016.5000

E=276306.0000
N=3900129.5000

E=276398.4000
N=3900218.9500

E=276525.0000
N=3900394.9000

E=278648.0000
N=3900330.0000

CH: 3+624.42
R: 700.000m,
L: 179.957m,
Δ165° 16' 13"

12:
E: 278222.3968,
N: 3899976.9374

CH: 4+028.20
R: 700.000m,
L: 151.456m,
Δ167° 36' 11"

13:
E: 278508.6187,
N: 3900263.1593

E=278216.5000
N=3900030.0000

E=278531.0000
N=3900140.0000

TENDER DRAWINGS

BAHRAIN NEW.dwg

PAKHTUNKHWA
HIGHWAYS AUTHORITY (PKHA)
GOVERNMENT OF KPK

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.

DESCRIPTION			
		DRAWN	
		SUBMITTED	
		RECOMMENDED	
		CHD./VER.	
	APPROVED	APPROVED	

PROJECT TITLE

CONSTRUCTION OF ROAD MADYAN
TO KALAM INCLUDING BRIDGES
DISTRICT SWAT PHASE-1
(BEHRAIN BYPASS)

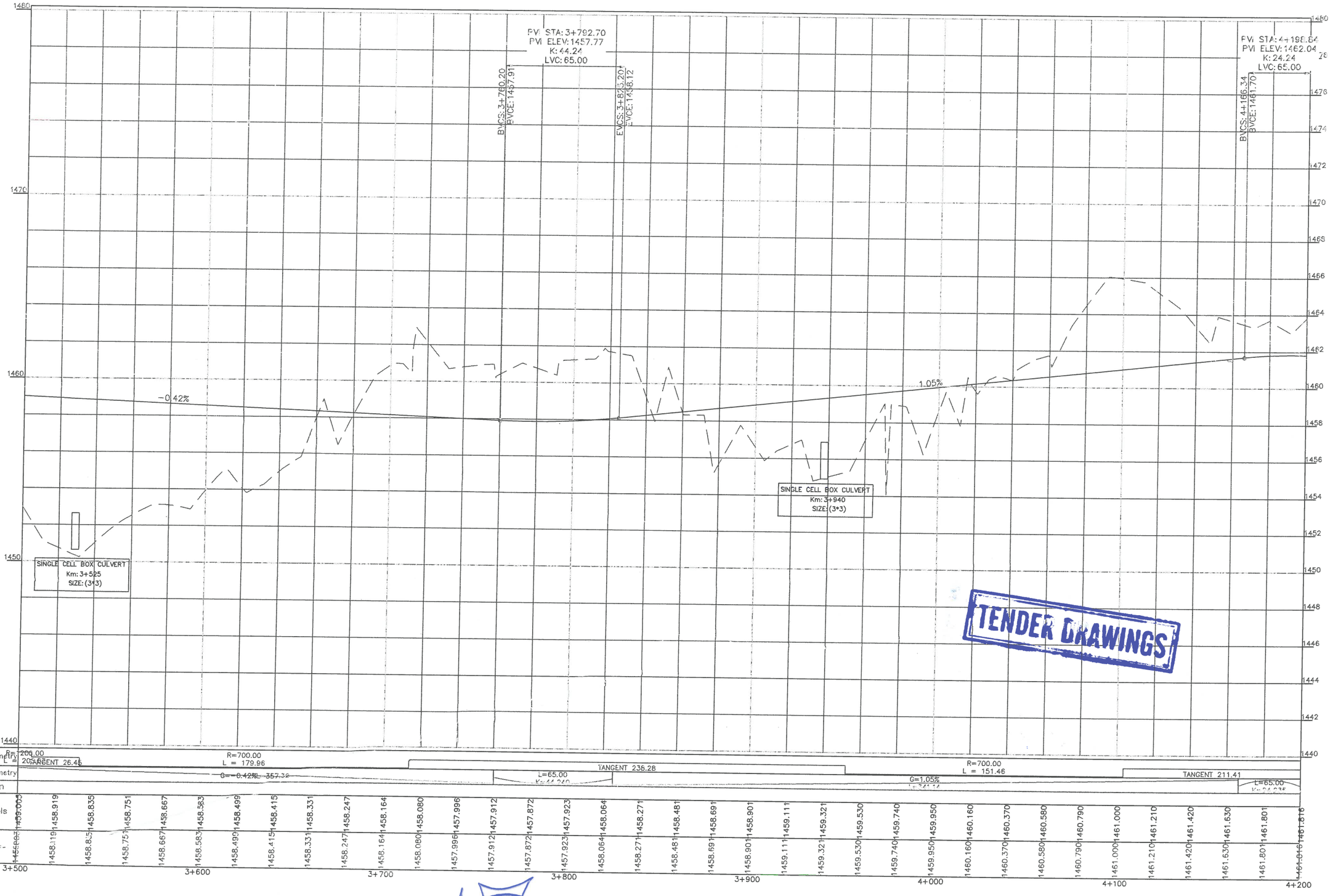
PLAN SHEET

SCALE

DATE
JUNE 2022

DWG NO.
4402/102/TD/P&P

Bahrain Profile



CLIENT: PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	RE.	DATE	DESCRIPTION	APPROVED
				DRAWN	
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
				APPROVED	

PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)

TITLE: PROFILE SHEETS FROM Km 3+500 TO Km4+200

SCALE: NTS

DATE: JUNE 2022

DRAWING NO.: 4402/102/TD/P&P 6

BHAAN NEW.dwg

BRIDGE NO 1

N

+028.20

0.000m,
.456m,
36' 11"

13:
508.6187,
0263.1593

E=278653.0000
N=3900394.0000

E=278649.0000
N=3900355.0000

E=278688.0000
N=3900548.0000

E=278749.0000
N=3900483.0000

E=278776.5000
N=3900686.0000

CH: 4+390.64

R: 700.000m,
L: 150.617m,
Δ:167° 40' 19"

14:
E: 278704.2264,
N: 3900568.9853

CH: 4+565.41

R: 35.000m,
L: 52.077m,
Δ:94° 44' 55"

15:
E: 278628.0773,
N: 3900693.1333

E=278811.5000
N=3900778.8000

E=278681.5000
N=3900587.2000

MATCH LINE : KM : 4+200

BAHRAIN NEW.dwg

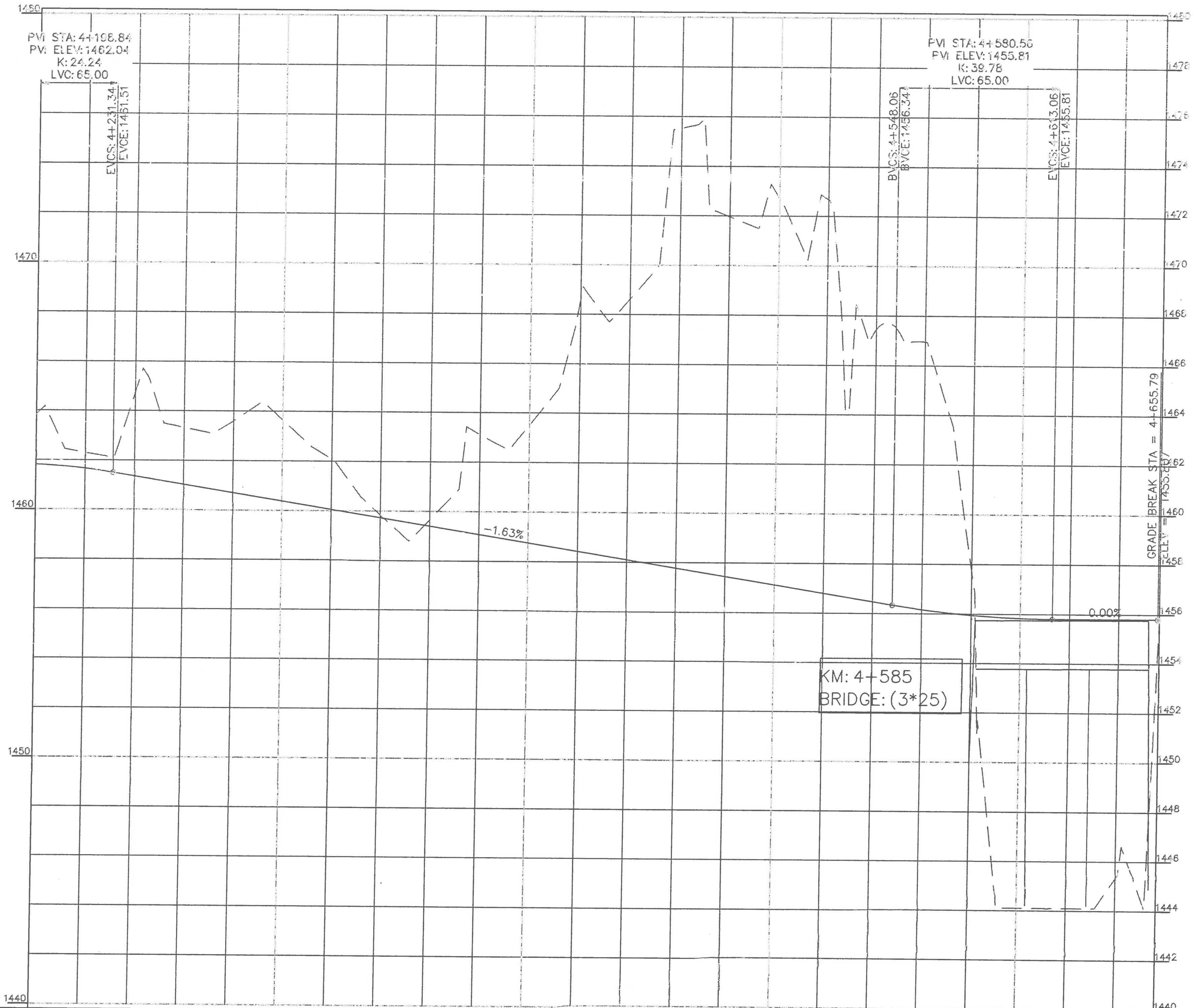
TENDER DRAWINGS

PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.			DRAWN	PROJECT TITLE: CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)
				SUBMITTED	
				RECOMMENDED	
				CHD./VER.	
		DESCRIPTION	APPROVED	APPROVED	

PLAN SHEET | SCALE

DATE: JUNE 2022 | DWG NO.: 4402/102/TD/P&P

Bahrain Profile



Horizontal Geometry: TANGENT 211.41 | R=700.00 L = 150.62 | TANGENT 67.55 | R=35.00 L = 52.08 | TANGENT 71.16

Vertical Geometry: L=65.00 K=24.235 | g=-1.63% L=316.21 | L=65.00 K=39.777 | G=0.00% L=42.73

Superelevation

Station	Design Levels	Ground Levels
4+200	1461.816	1463.839
	1461.665	1462.306
	1461.365	1464.739
	1461.039	1463.335
	1460.712	1463.603
4+300	1460.386	1463.654
	1460.059	1462.108
	1459.733	1459.848
	1459.406	1459.661
	1459.080	1463.119
4+400	1458.753	1463.512
	1458.427	1468.604
	1458.100	1468.623
	1457.774	1475.524
	1457.447	1471.969
4+500	1457.121	1472.727
	1456.794	1472.677
	1456.468	1467.442
	1456.159	1466.951
	1455.943	1457.735
4+600	1455.828	1444.100
	1455.807	1444.099
	1455.807	1445.331
4+656.44		1455.992

BAHRAIN NEW.dwg

CLIENT	CONSULTANT			PROJECT TITLE	TITLE	SCALE
PAKHTUNKHWA HIGHWAYS AUTHORITY (PKHA) GOVERNMENT OF KPK	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.	RE. / DATE / DESCRIPTION / APPROVED	DRAWN / SUBMITTED / RECOMMENDED / CHD./VER. / APPROVED	CONSTRUCTION OF ROAD MADYAN TO KALAM INCLUDING BRIDGES DISTRICT SWAT PHASE-1 (BEHRAIN BYPASS)	PROFILE SHEETS FROM Km 4+200 TO Km 4+656.44	NTS
					DATE: JUNE 2022	DRAWING NO. 4402/102/TD/P&P 7

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. NESPAK

TENDER DRAWINGS