

# ROADS & EMPLOYMENT PROJECT

CONSULTANCY SERVICES FOR THE PREPARATION OF DETAILED DESIGN, STANDARD BIDDING  
DOCUMENTS AND E&S SAFEGUARD DOCUMENTS FOR ROADS ROUTINE MAINTENANCE AND  
REHABILITATION OF REMAINING ROADS

## LOT 3

(Nabatieh, Marjayoun, West Bekaa, Rachaya, Hasbaya, Jezzine & Saida Cazas)

### STAGE 2.2.c

## FINAL TENDER DOCUMENTS REHABILITATION OF REMAINING ROADS

### JEZZINE ENTRANCE

APRIL 2024

# INDEX OF DRAWINGS (LOT 3: JEZZINE)

CAZA OF JEZZINE - GENERAL		
DWG. N°	TITLE	SHEET
JE-G-10002	INDEX OF DRAWINGS	1 OF 1
JE-R-10006	LOCATION PLAN	1 OF 1

GENERAL DRAWINGS		
GE-R-10010	ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES	1 OF 1
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GE-R-10022	TRAFFIC SIGNS DETAILS	1 OF 1
GE-R-10023	DIRECTION SIGNS DIMENSIONING DETAILS	1 OF 1
GE-R-10024	SIGN LETTERING DETAILS	1 OF 1
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ROAD SETTING OUT INCREMENTAL COORDINATES		
JE-R-10033	ROAD: L3-JE-CL	1 OF 1

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JE-R-10013	ROAD: L3-JE-CL	1 OF 1

ROAD: L3-JE-CL (0.27 Km)		
JE-R-10501	ROAD LINE DIAGRAM - FROM STA. 0+000 TO STA. 0+270	1 OF 1

ROAD: L3-JE-CL		
JE-R-11501	TRAFFIC SIGNING AND ROAD MARKING PLAN	1 OF 1

STRUCTURE DRAWINGS		
GE-S-40000	STRUCTURAL GENERAL NOTES	1 OF 1
GE-S-40001	WALL STRUCTURAL DETAILS	1 OF 1
GE-S-40002	BARRIER STRUCTURAL DETAILS	1 OF 1
GE-S-40003	SINGLE CELL BOX CULVERT STRUCTURAL DETAILS	1 OF 1
GE-S-40004	DOUBLE CELLS BOX CULVERT STRUCTURAL DETAILS	1 OF 1
GE-S-40005	TRIPLE CELLS BOX CULVERT STRUCTURAL DETAILS	1 OF 1
GE-S-40006	COREWALL TYPICAL DETAILS - SINGLE FACE STONE MASONRY	1 OF 2
GE-S-40007	END TERMINAL COREWALL TYPICAL DETAILS SINGLE FACE STONE MASONRY GUARDWALL	2 OF 2
GE-S-40008	PILE AND CAPPING BEAM REINFORCING- DETAILS AND SECTIONS	1 OF 1

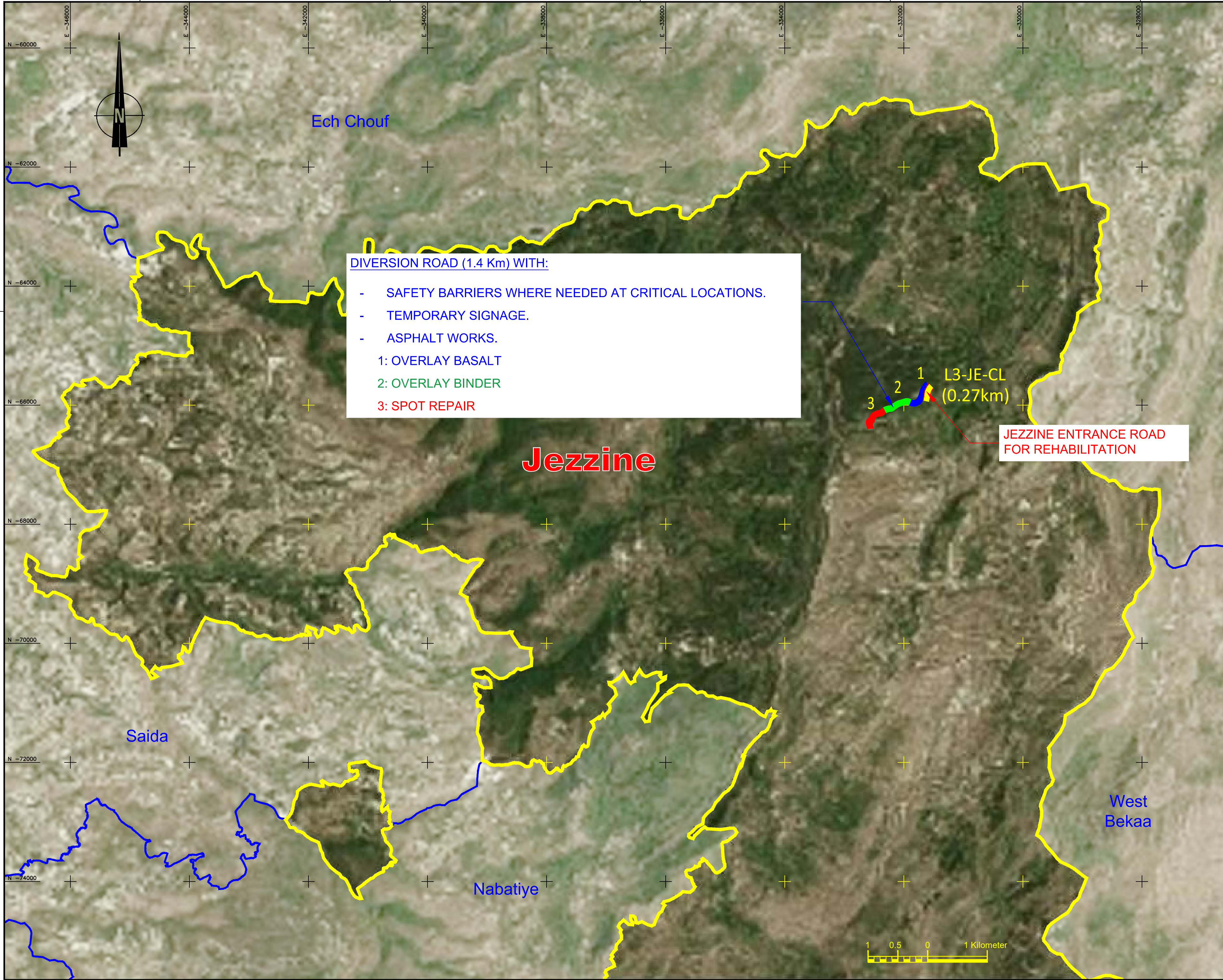
WATER DRAWINGS		
DWG. N°	TITLE	SHEET
GE-W-20001	STORMWATER DRAINAGE STANDARD DETAILS	1 OF 2
GE-W-20002	STORMWATER DRAINAGE STANDARD DETAILS	2 OF 2

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°	DATE	BY	DESCRIPTION	CHK'D	APP'D
R E V I S I O N S					
CLIENT REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKAA, RAGHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE ROAD LINE DIAGRAM CAZA OF JEZZINE					
INDEX OF DRAWINGS					
DESIGNED M.K.	CHECKED H.K.	PROJECT N° L2102	SHEET 1 OF 1	FORMING N° JE-G-10002	TOTAL 0
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE N.T.S.		



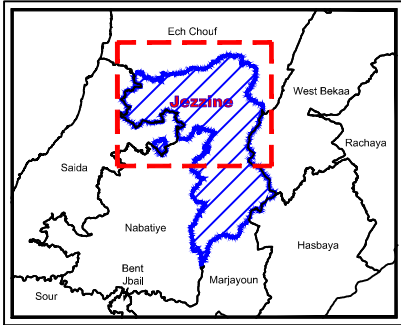


DIVERSION ROAD (1.4 Km) WITH:

- SAFETY BARRIERS WHERE NEEDED AT CRITICAL LOCATIONS.
- TEMPORARY SIGNAGE.
- ASPHALT WORKS.

1: OVERLAY BASALT  
2: OVERLAY BINDER  
3: SPOT REPAIR

JEZZINE ENTRANCE ROAD  
FOR REHABILITATION



FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°	DATE	BY	DESCRIPTION	CHKD	APPD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
الـمـكـتـبـ الـهـنـدـسـيـ الـاسـتـشـاـرـيـ - اـيـسـ فيـ بـيـرـوت					
ACE ASSOCIATED CONSULTING ENGINEERS BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(NABATIYE, WEST BEKAA, RACHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE					
ROAD REHABILITATION					
JEZZINE CAZA					
LOCATION PLAN					
DESIGNED	CHECKED	PROJECT N°	SHEET	FORMED N°	REV
M.K.	H.K.	L2102	1 OF 1	JE-R-10006	0
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	1/20,000		



SYMBOLS

PROPOSED CONSTRUCTION

	PAVED ROAD WITH SHOULDERS
	ROAD STATIONING
	CYCLOPEAN WALL
	SIDEWALK
	BRIDGE
	EARTHWORK LIMITS
	CHAIN-LINK FENCE
	DRAINAGE CULVERT
	SINGLE FACE NEW JERSEY BARRIER

GRADING:

	PROPOSED SPOT ELEVATION (TOP OF FINISHED SURFACE)
	ROAD CROSSFALL OR TRANSVERSE SLOPE
	VERTICAL TO HORIZONTAL EMBANKMENT SLOPE

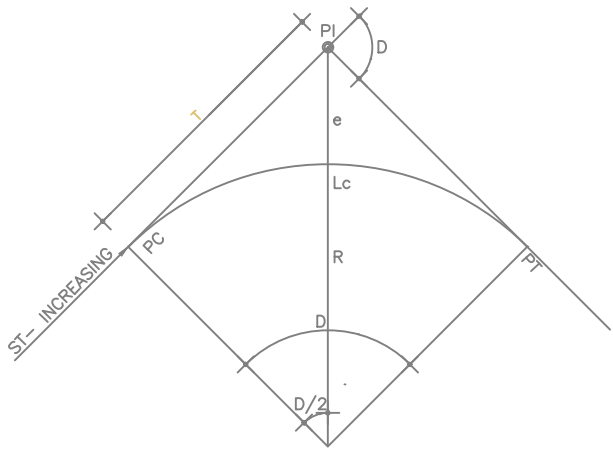
TRAFFIC:

	PAVEMENT MARKING
	TRAFFIC SIGN
	POLE WITH TWO TRAFFIC SIGNS
	PAVEMENT ARROW MARKING
	DIRECTIONAL SIGN

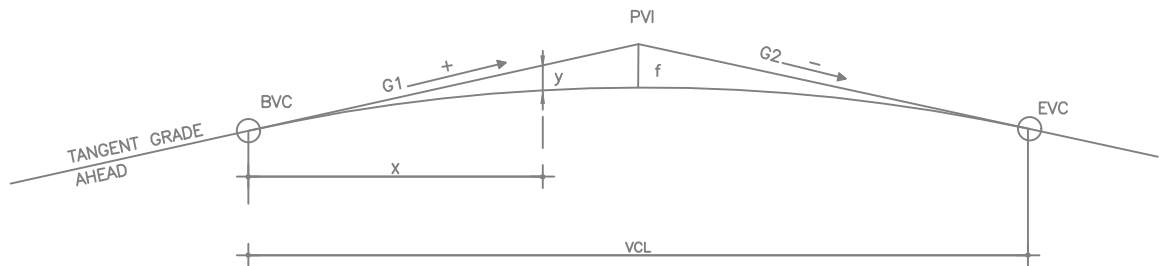
ABBREVIATIONS

ROADS

AZ.	AZIMUTH
A.D.	ALGEBRAIC DIFFERENCE IN GRADIENTS
BVC.	BEGINNING OF VERTICAL CURVE
BVCE	BEGINNING ELEVATION OF VERTICAL CURVE
BVCS	BEGINNING STATION OF VERTICAL CURVE
C	CENTER LINE
Δ	DEFLECTION ANGLE IN HORIZONTAL ALIGNMENT
DWG.	DRAWING
e	DISTANCE FROM PI TO MIDDLE OF CIRCULAR CURVE IN HORIZONTAL ALIGNMENT
E	EASTING COORDINATES
ELEV.	ELEVATION
EVC.	END OF VERTICAL CURVE
EVCE	END ELEVATION OF VERTICAL CURVE
EVCS	END STATION OF VERTICAL CURVE
f	DISTANCE FROM PVI TO MIDDLE OF PARABOLIC CURVE IN VERTICAL ALIGNMENT
G	GRADIENT (POSITIVE FOR UPHILL, NEGATIVE FOR DOWNHILL.)
K	RATIO OF VERTICAL CURVE LENGTH OVER A.D.
Lc	LENGTH OF CIRCULAR HORIZONTAL CURVE
L	LENGTH
L.P.	LOW POINT
L.O.C.	LIMIT OF CONTRACT
N	NORTHING COORDINATES
N.A.	NOT APPLICABLE
N.G.	NATURAL GROUND
N.T.S.	NOT TO SCALE
PI	POINT OF INTERSECTION OF TANGENTS IN HORIZONTAL ALIGNMENT
PC	POINT OF CURVATURE IN HORIZONTAL ALIGNMENT
PRC	POINT OF REVERSE CURVE IN HORIZONTAL ALIGNMENT
PT	POINT OF TANGENCY IN HORIZONTAL ALIGNMENT
PVI	INTERSECTION POINT OF TANGENTS IN VERTICAL ALIGNMENT
PGL	PROPOSED GROUND LEVEL
R	RADIUS OF CIRCULAR HORIZONTAL CURVE
RD.	ROAD
S.E.	SUPERELEVATION RATE
SHLD	SHOULDER
STA.	STATION
SW	SIDEWALK
T.	LENGTH OF TANGENT OF CIRCULAR HORIZONTAL CURVE
TYP.	TYPICAL
VCL	VERTICAL CURVE LENGTH
U/C	UNDER CONSTRUCTION
VAR.	VARIABLE
3F	BUILDING WITH 3 FLOOR
x	HORIZONTAL DISTANCE FROM BVC TO A CERTAIN POINT ON VERTICAL CURVE
y	ORDINATE DISTANCE ON VERTICAL CURVE AT DISTANCE x FROM BVC
BWC	BITUMINOUS WEARING COURSE
BBC	BITUMINOUS BASE COURSE
ABC	CRUSHED AGGREGATE BASE COURSE
GSB	GRANULAR SUBBASE



CIRCULAR HORIZONTAL CURVE  
NOT TO SCALE



PARABOLIC VERTICAL CURVE  
NOT TO SCALE

GENERAL NOTES:

- ALL DIMENSIONS, DISTANCES, COORDINATES AND LEVELS ARE IN METERS, UNLESS OTHERWISE INDICATED.
- ALL ANGLES ARE IN GRAD.
- ALL COORDINATES ARE CONNECTED TO THE NATIONAL GRID SYSTEM OF LEBANON.
- ALL LEVELS ARE CONNECTED TO THE NATIONAL DATUM LEVEL OF LEBANON.
- CONTRACTOR TO COORDINATE WITH THE ENGINEER, PLANS AND LEVELS AT CONNECTION WITH EXISTING ROADS AND DRIVEWAYS.
- SUPERELEVATION ON HORIZONTAL CURVES SHOULD BE CHECKED ON SITE. IN CASE WHERE OUTER EDGE OF THE ASPHALT IS LOWER THAN THE INNER EDGE ASPHALT LAYER SHOULD BE ADJUSTED AS DIRECTED BY THE ENGINEER TO ATTAIN ACCEPTABLE CROSSFALL.
- WHERE ASPHALT WIDTH IS LOWER THAN 5m, WIDENING OF ASPHALT SHALL BE PROVIDED WHERE POSSIBLE WITHOUT IMPLICATING ANY EXPROPRIATION. PROPOSED WIDENED SECTIONS ARE SHOWN ON PLANS.
- FOR LOCATION PLAN, REFER TO DRAWING No. GE-R-10005.
- FOR ROAD STANDARD DETAILS, REFER TO DRAWING No. GE-R-10011 TO 10012.
- FOR STRUCTURAL DETAILS, REFER TO DRAWING No. GE-S-40000 TO 40004.

TOPOGRAPHIC SURVEY SYMBOLS

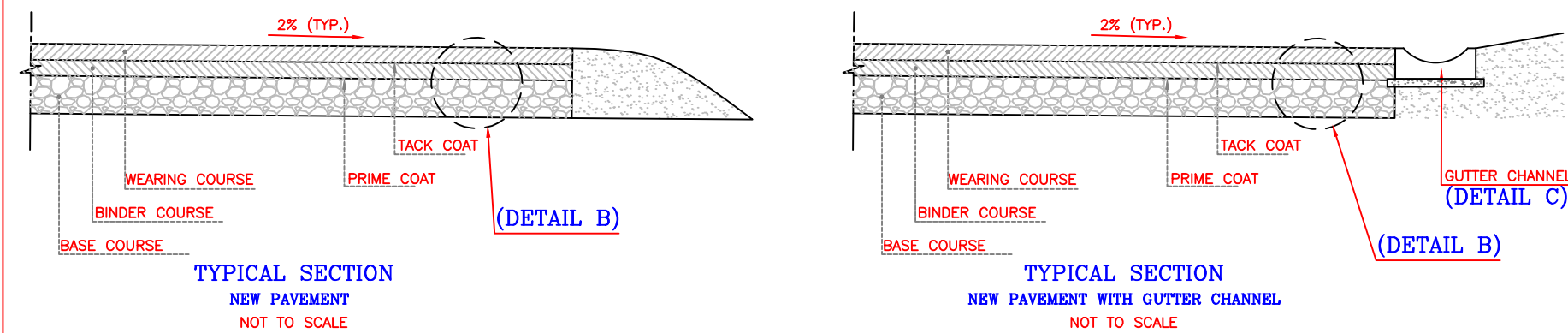
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	BENCH MARK		PALM TREE
	BRIDGE		PETROL PUMP
	BUILDING		ELECTRICAL PYLON
	CEMETERY		ROCKS
	CONCRETE DITCH		SPOT LEVEL
	CULVERT		STORM WATER MANHOLE
	ELECTRIC POLE		STORM WATER GRILL
	TELEPHONE POLE		SEWERAGE MANHOLE
	EMBANKMENT		TRAFFIC LIGHT
	EXISTING ROAD		TRAFFIC SIGN
	FENCE		TREE
	FOOT PATH		WATER-LINE
	LIGHT POLE		WATER VALVE MANHOLE
	MONUMENT		
	TELEPHONE MANHOLE		
	BUILDING		
	CONTOUR AT 10m INTERVAL		

FINAL TENDER DOCUMENTS

REDUCTION 1/2

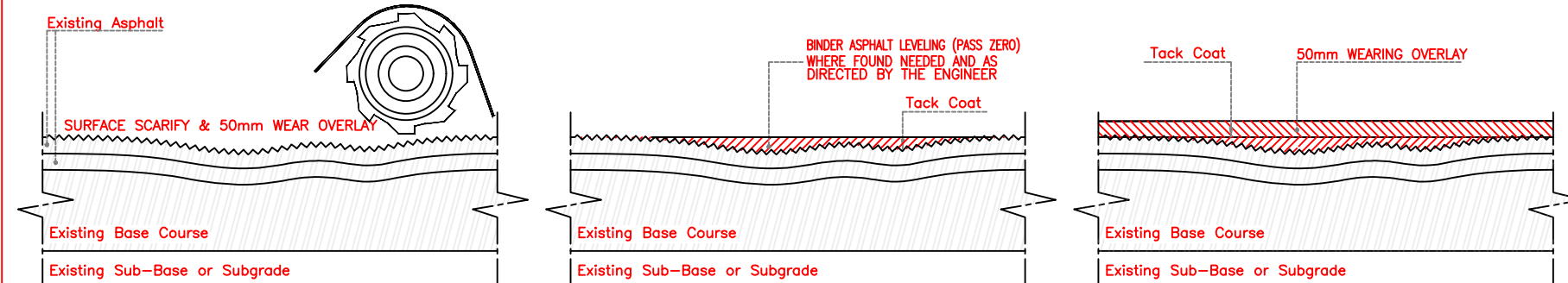
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CLIENT					
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE QAZAS)					
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ROAD LINE DIAGRAM CAZA OF JEZZINE					
ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES					
DESIGNED M.K.	CHECKED H.K.	PROJECT NO. L2102	SHEET 1 OF 1	FORMED BY M.K.	REV. 0
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE N.T.S.	GE-R-10010	





NEW PAVEMENT TYPICAL DETAIL

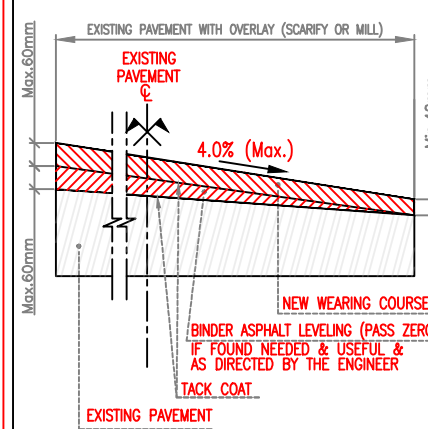
**NOTE:**  
After Scarifying, check for any considerable cracks and seal them and/or locate any damage in the existing asphalt and/or base course and appropriately repair it, prior to overlay.



**NOTE:**  
When we have overlay spot repair could be used prior to installation of final wearing layer where & as directed by the engineer

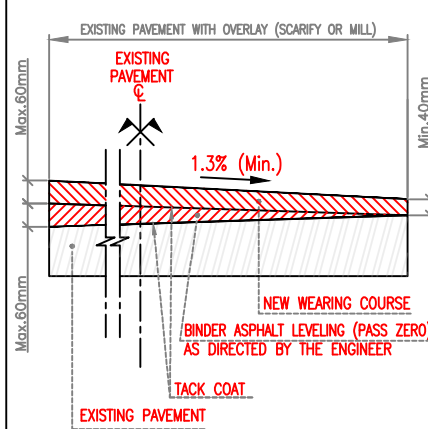
SCARIFYING AND WEARING OVERLAY TYPICAL DETAIL

**NOTE:**  
Complete action with speed reduce sign if desired super elevation not reached



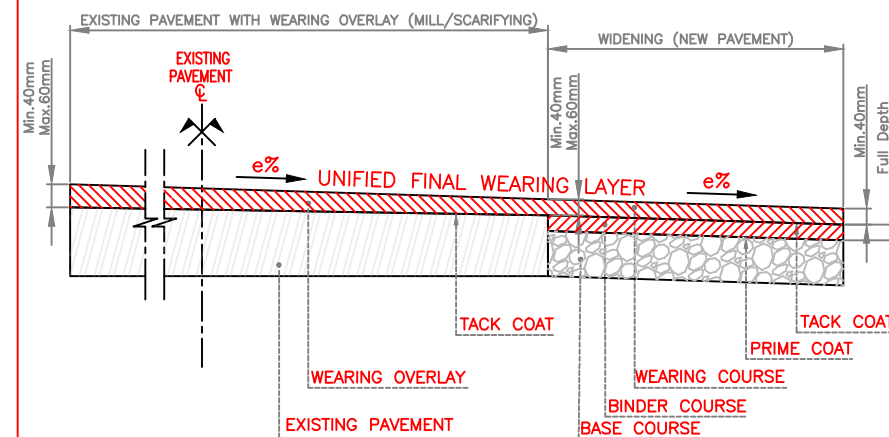
TYPICAL DETAIL (TYPE 1A)  
WHERE EXISTING SUPER-ELEVATION IS IN THE APPROPRIATE DIRECTION

**NOTE:**  
Complete action with suitable speed reduce warning sign



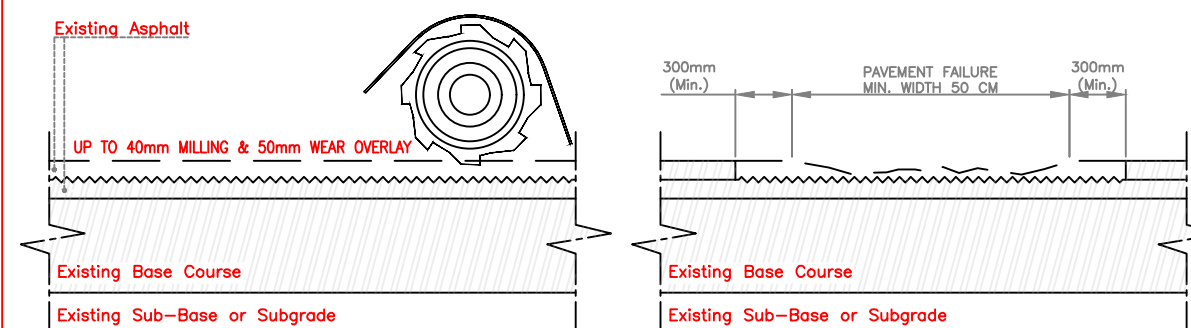
TYPICAL DETAIL (TYPE 1B)  
WHERE EXISTING SUPER-ELEVATION IS IN THE UNSUITABLE DIRECTION

TYPICAL WEARING OVERLAY SECTION AT CURVES  
(SUPER ELEVATION IMPROVEMENT WHERE POSSIBLE )



TYPICAL PAVEMENT SECTION WIDENING  
( TYPE 1D )

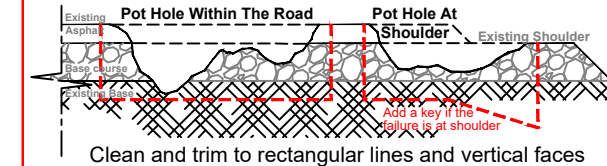
**NOTE:**  
After milling, check for any considerable cracks and seal them and/or check for any remaining damage in the underneath asphalt and/or base course and appropriately repair it, prior to overlay. if found need a leveling (pass zero) could be used as per above detail & as directed by the engineer



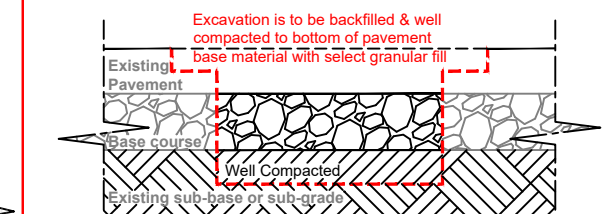
TYPICAL LONGITUDINAL SECTION  
NOT TO SCALE

TYPICAL TRENCH SECTION  
NOT TO SCALE

MILL AND WEARING OVERLAY TYPICAL DETAIL



**REMARK:**  
IT'S NOT UNCOMMON TO HAVE MULTIPLE FAILURES OVERLAPPING, ESPECIALLY ALLIGATOR CRACKING & SURFACE DEFORMATIONS.



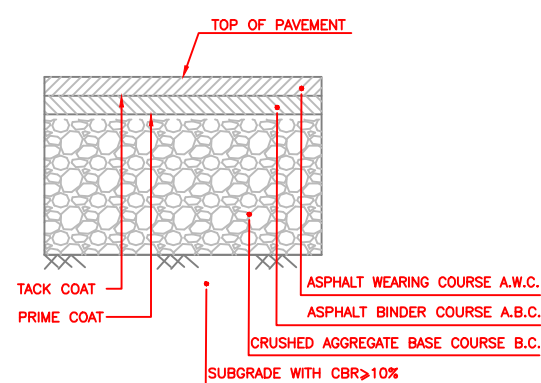
**Note:**  
In case of small potholes (30x30cm for example) caused by surface damage to asphalt and where the base course is still intact with no corrugation or damages to the surrounding asphalt, repair works must be limited to full hole refill with asphalt followed by a good compaction.

**NOTE:** AREA TO BE REPAIRED IS TO BE EXCAVATED TO DEPTH THAT IS SUFFICIENT TO REMOVE EXISTING FAILED BASE MATERIALS & ANY UNDERLYING UNSUITABLE MATERIALS. AS FOR PAVEMENT SUB-BASE REPAIR, ANY DEPTH OF REPAIR AREA MUST TO BE INCLUDED IN THE GLOBAL PRICE.

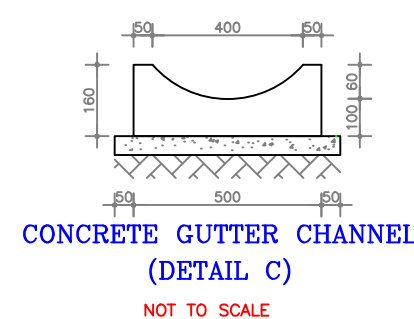
SPOT REPAIR (TYPICAL)

NEW PAVEMENT STRUCTURE TABLE

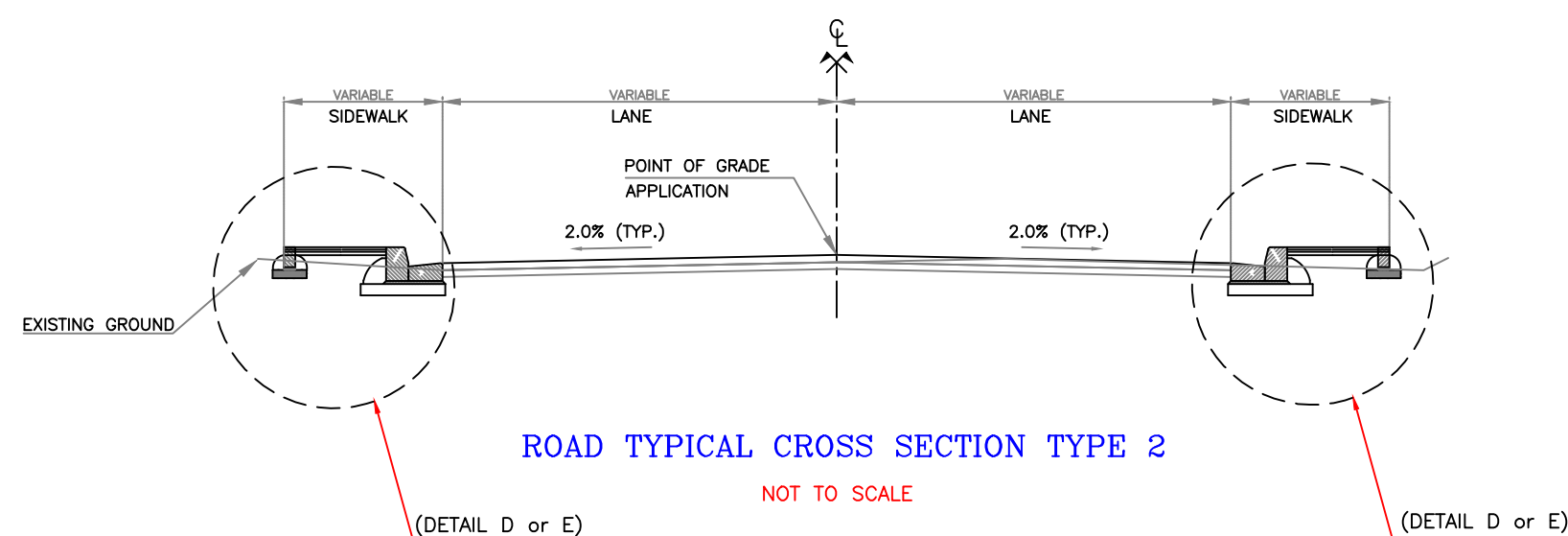
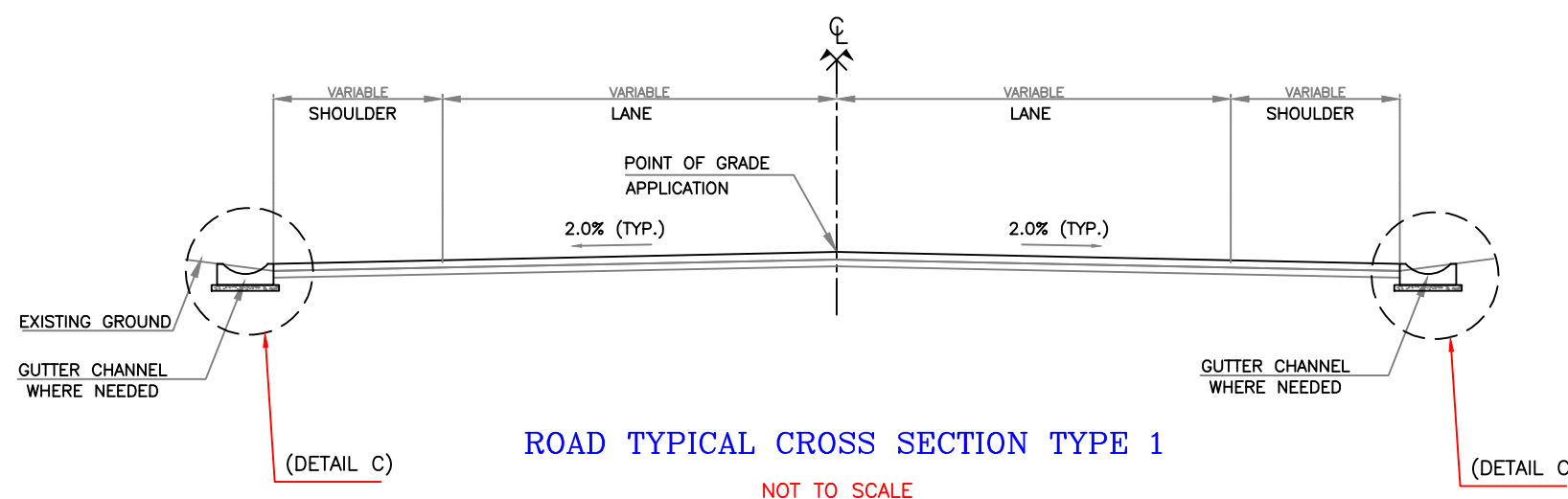
ROAD Nb.	A.W.C. (mm)	A.B.C. (mm)	B.C. (mm)
L3-JE-CL	50	50	250



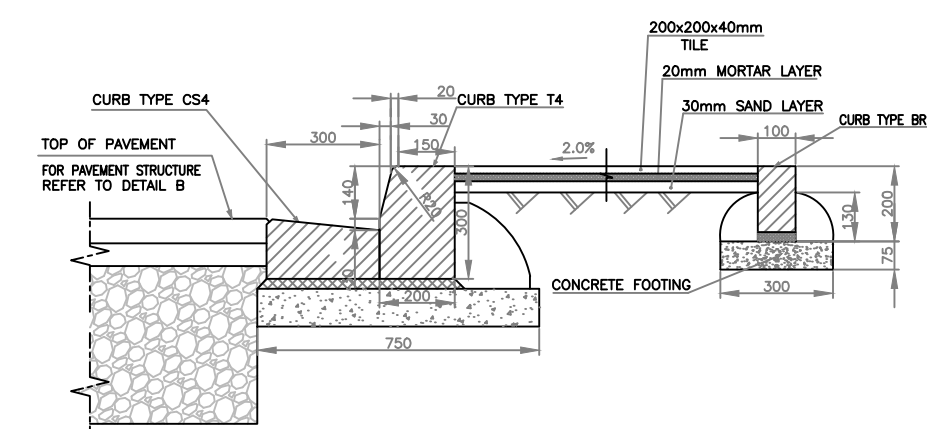
NEW PAVEMENT STRUCTURE (DETAIL B)  
(NOT TO SCALE)



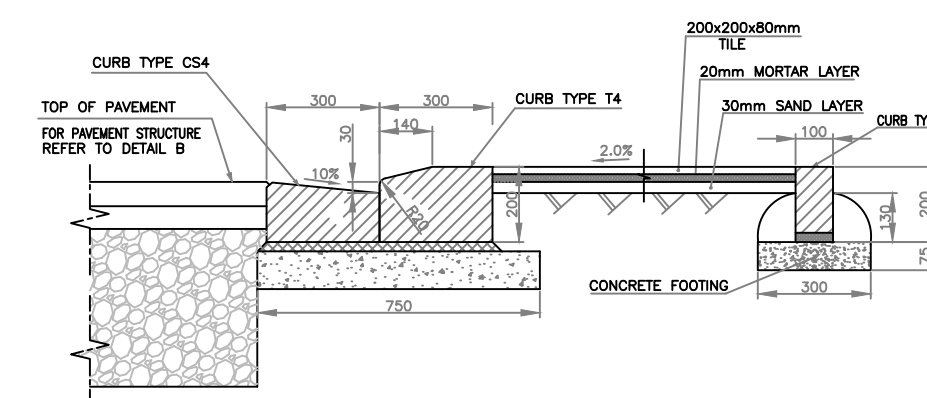
CONCRETE GUTTER CHANNEL  
(DETAIL C)  
NOT TO SCALE



ROAD TYPICAL CROSS SECTION TYPE 2  
NOT TO SCALE



DETAIL OF SIDEWALK (DETAIL D)  
(WHERE APPLICABLE AND AS INDICATED ON DRAWINGS)  
(DIMENSIONS ARE IN MILLIMETERS)  
SCALE : 1/10



DETAIL OF SIDEWALK AT BUILDING ENTRANCE (DETAIL E)  
(WHERE APPLICABLE AND AS INDICATED ON DRAWINGS)  
(DIMENSIONS ARE IN MILLIMETERS)  
SCALE : 1/10

NOTES:

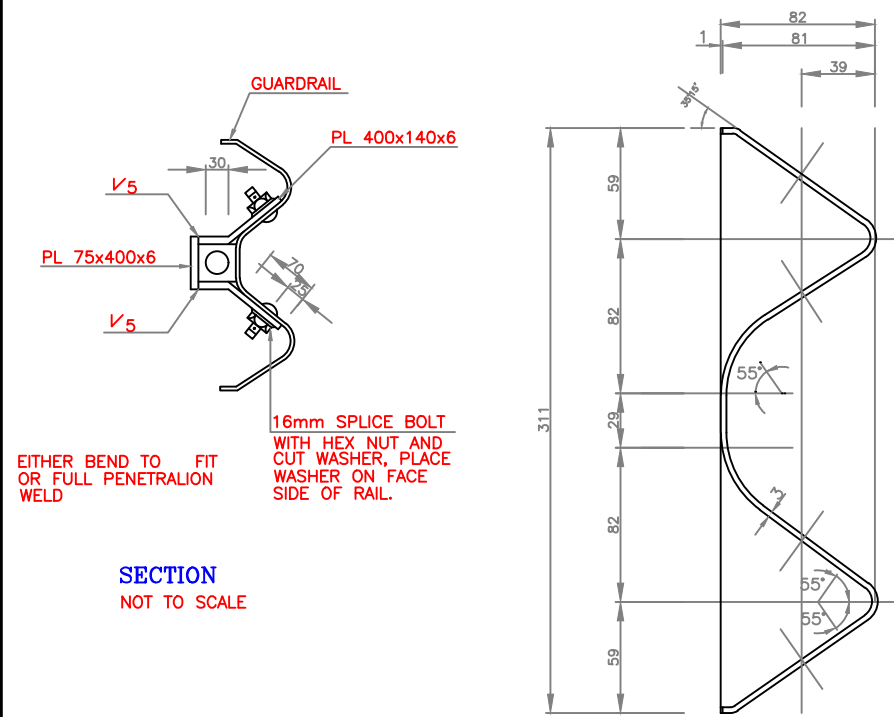
- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- FOR "STABLE" SUNKEN UTILITY TRENCHES AND PAVEMENT "SPOT" REPAIR REFER TO DRAWING No. GE-R-10015

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°	DATE	BY	DESCRIPTION	CHKD	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(WABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE					
ROAD LINE DIAGRAM					
CAZA OF JEZZINE					
ROAD TYPICAL DETAILS & CROSS SECTIONS					
DESIGNED	CHECKED	PROJECT N°	SHEET	FORMED N°	REV.
M.K.	H.K.	L2102	1 OF 2	GE-R-10011-a	0
DRAWN	APPROVED	DATE	SCALE	AS SHOWN	
M.K.	N.F.	JULY 2023			

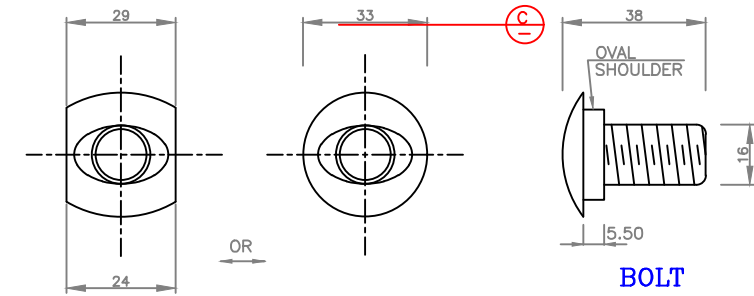




SECTION  
NOT TO SCALE

SECTION THROUGH  
RAIL ELEMENT  
NOT TO SCALE

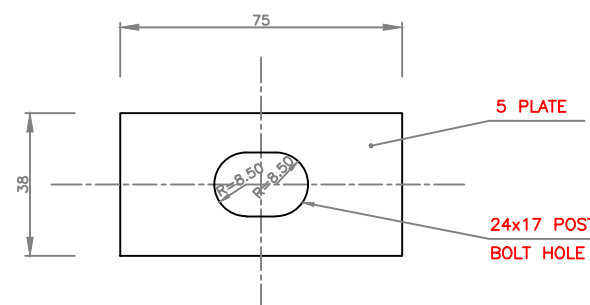
BEAM OR SHEET THICKNESS				WEIGHT OF ZINC COATING	
CLASS A		CLASS B		MIN.CHECK LIMIT SINGLE - SPOT TEST.	MIN.CHECK LIMIT TRIPLE - SPOT TEST.
TYPE	THICKNESS	TOLERANCE UNDER SPECIFIED THICKNESS. NO LIMIT FOR OVER THICKNESS	THICKNESS	TOLERANCE UNDER SPECIFIED THICKNESS. NO LIMIT FOR OVER THICKNESS	
1	2.74	0.23	3.51	0.25	550
2	2.82	0.23	3.58	0.25	1100



NOTE:  
POST BOLT SIMILAR  
EXCEPT LENGTH.

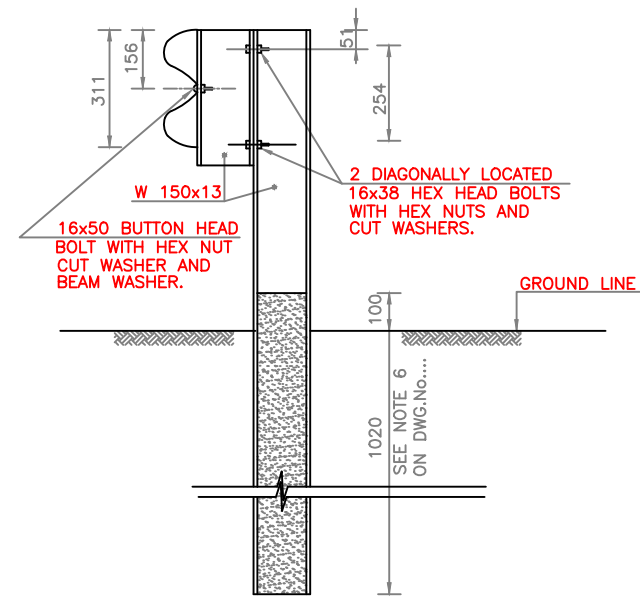
SPLICE BOLT  
NOT TO SCALE

BOLT

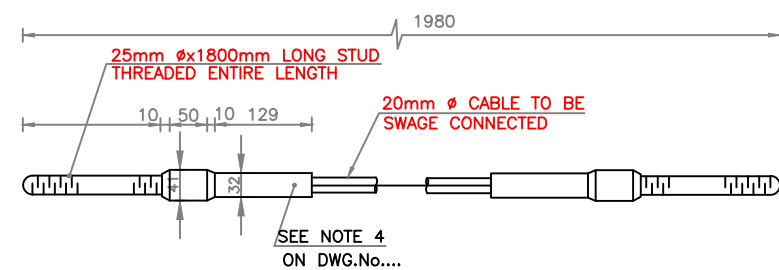


BEAM WASHER  
(FOR POST BOLT ONLY)  
NOT TO SCALE

NOTE:  
POST BOLT SIMILAR  
EXCEPT LENGTH

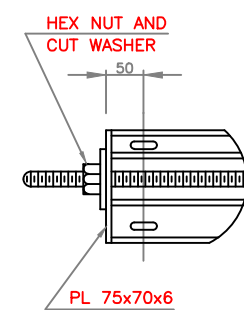


LINE POST  
NOT TO SCALE

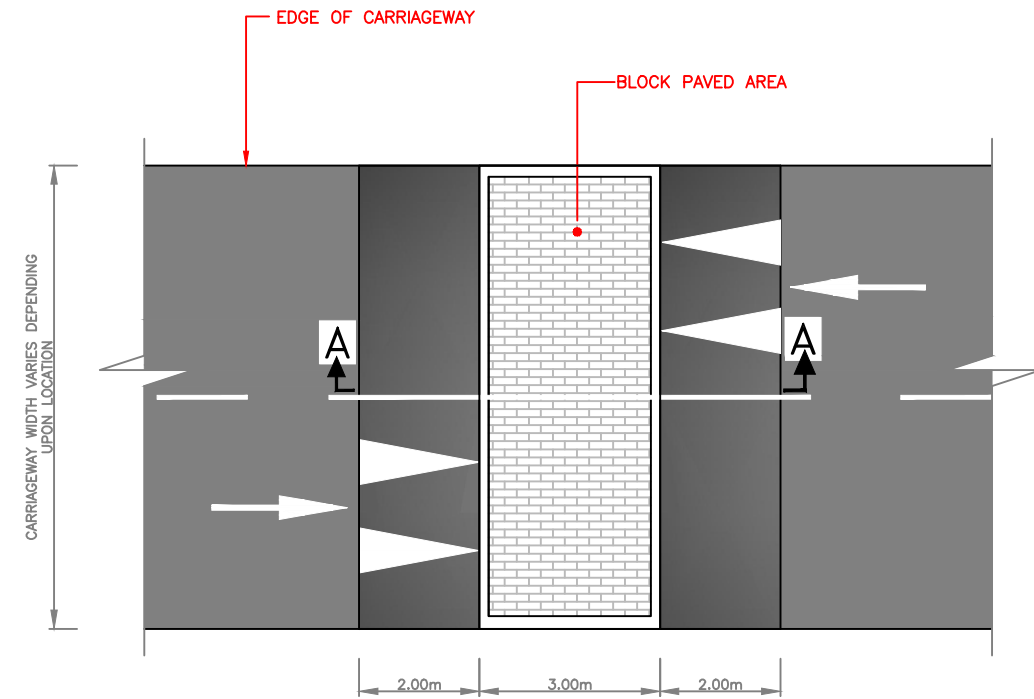
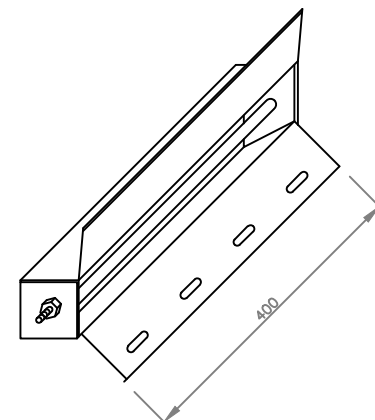


SWAGED FITTING AND STUD  
NOT TO SCALE

GUARDRAIL DETAILS

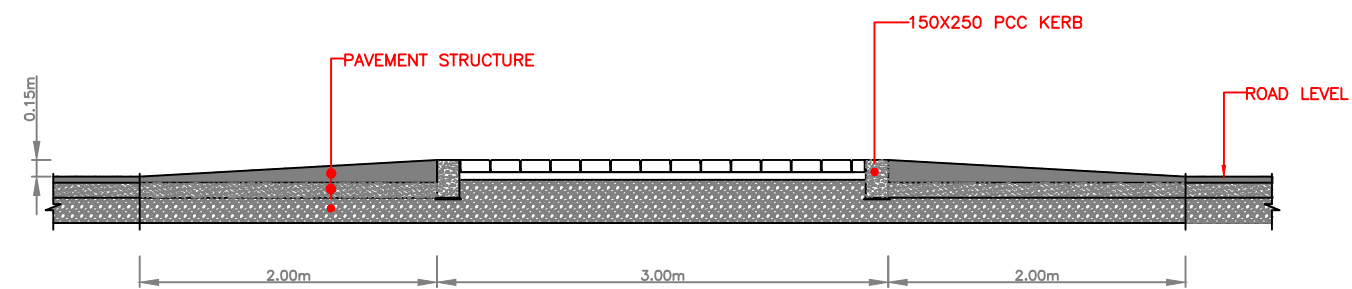


ANCHOR PLATE  
NOT TO SCALE



TYPICAL SPEED TABLE DETAIL

FOR DUAL SINGLE LANE  
NOT TO SCALE



CROSS-SECTION A-A

NOT TO SCALE

NOTES:

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL  
NOTES REFER TO DRAWING No. GE-R-10010.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

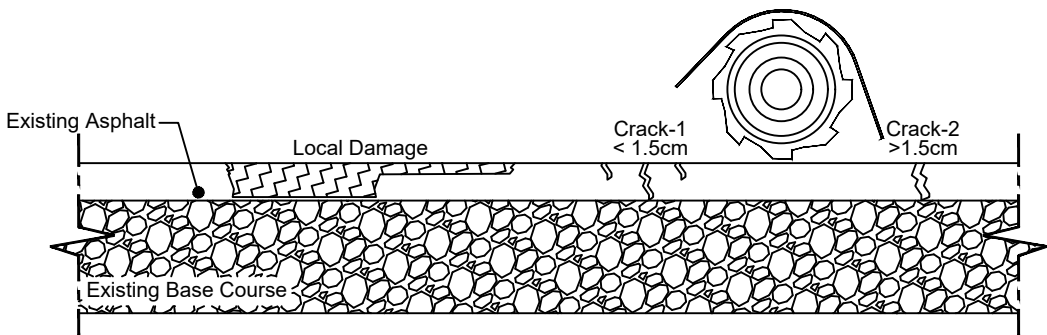
REV. NO.	DATE	BY	DESCRIPTION	CHKD	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
الكتبة الهندسية الاستشارية - ايس في بيروت					
ACE ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
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DESIGNED	CHECKED	PROJECT NO.	SHEET	DRAWING NO.	REV.
M.K.	H.K.	L2102	2 OF 2	GE-R-10012	0
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	N.T.S.		



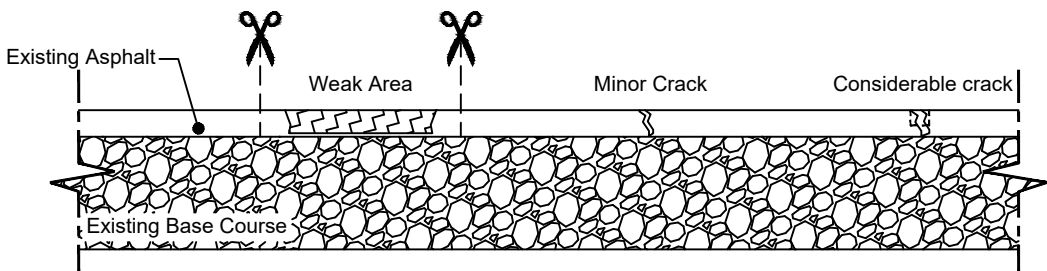
PAVEMENT SPOT REPAIR WORKS:

including the necessary actions as found needed:  
Local excavation, local base course repair, prime coat apply on new base course, asphalt binder course and / or wide cracks sealing.

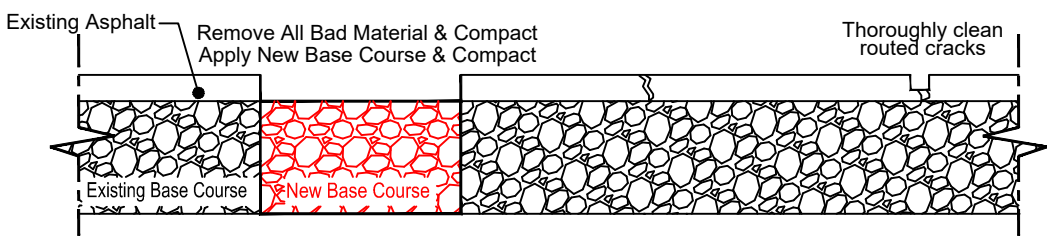
Step -1  
Scarify the existing asphalt surface or mill by the required depth (4cm max) the whole area as directed by the engineer.



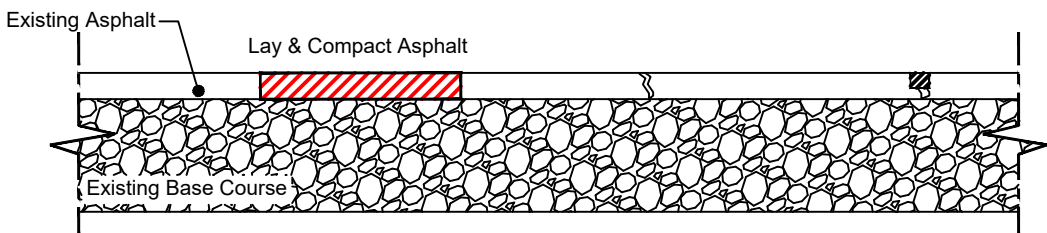
Step -3  
If any found, locate & saw cut to full asphalt depth the remaining weak areas and / or route to 2cm deep any considerable crack prior to seal.



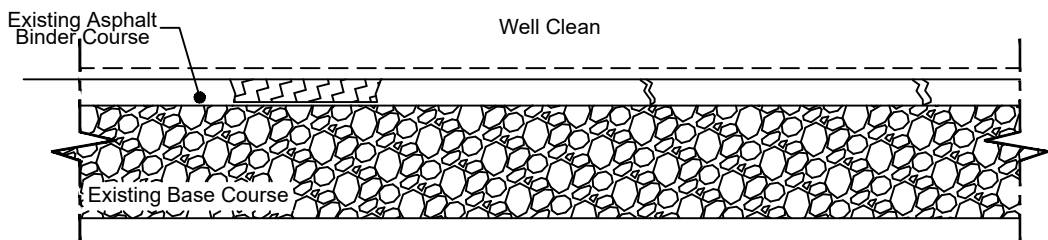
Step -5  
If weakness detected in the existing base course, proceed with base course removal with care to not undermine adjacent asphalt. Remove bad material to the satisfaction of the engineer and compact sub-surface. Apply and well compact base course using new approved material



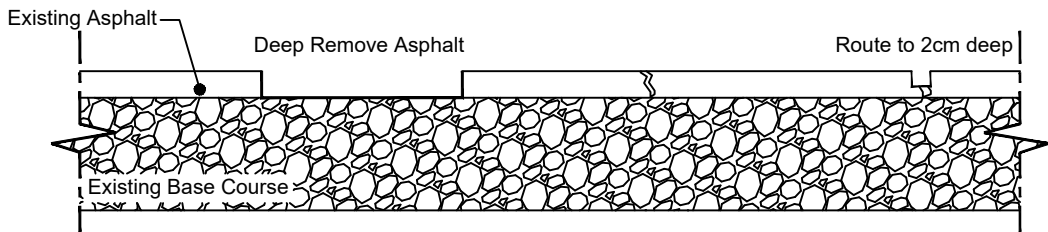
Step -7  
Lay and compact binder course asphalt



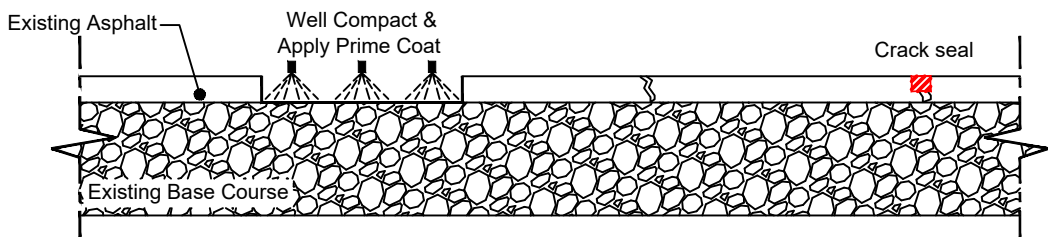
Step -2  
Well clean and check the whole area for any remaining damage and / or any considerable cracks in the remaining asphalt layers. if found sound, proceed with wearing overlay process (Step 8).



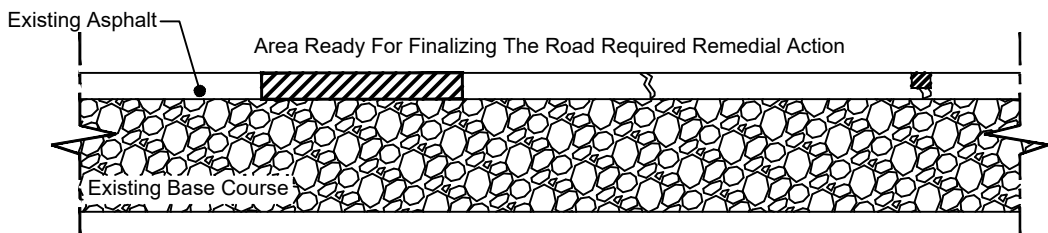
Step -4  
Scrap-off all existing asphalt layers within the cut limits with care to not damage the existing base course layer and / or the adjacent good asphalt. Check the existing base course condition, if found good move to re-paving and crack sealing (Step 6)



Step -6  
Well compact and apply prime coat to spot repair area and its edges



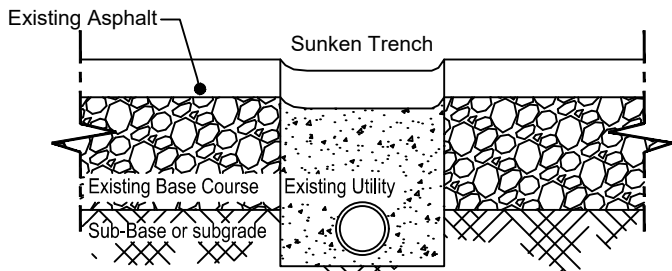
Step -8  
Finalizing the general overlay or mill/overlay remedial process.



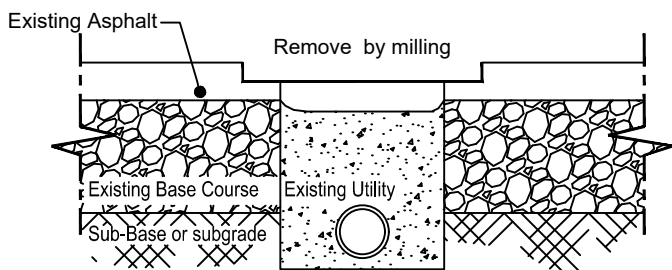
UTILITY TRENCH SPOT REPAIR WORKS:

Milling & overlay for existing sunken stable utility trenches including milling 20cm wider on each side, tack coat apply and asphalt binder course (one layer)

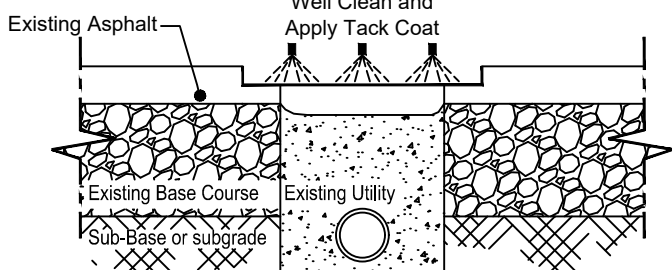
Step -1  
Locate the damaged parts



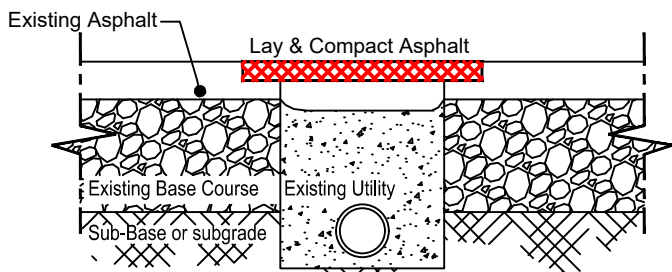
Step -2  
Mill slightly larger (20cm on each side) along the trench



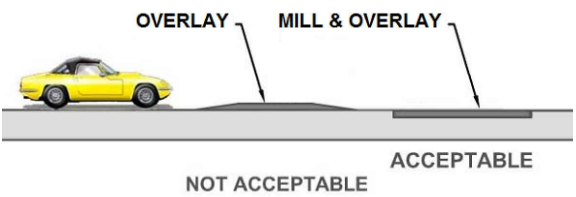
Step -3  
Well clean and apply tack coat to surface & edges.



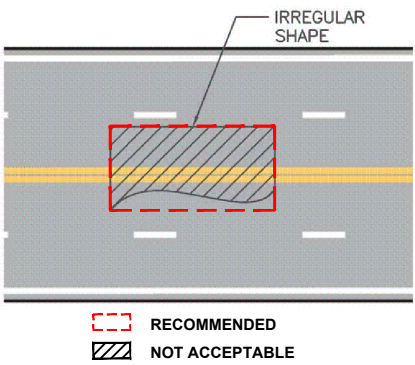
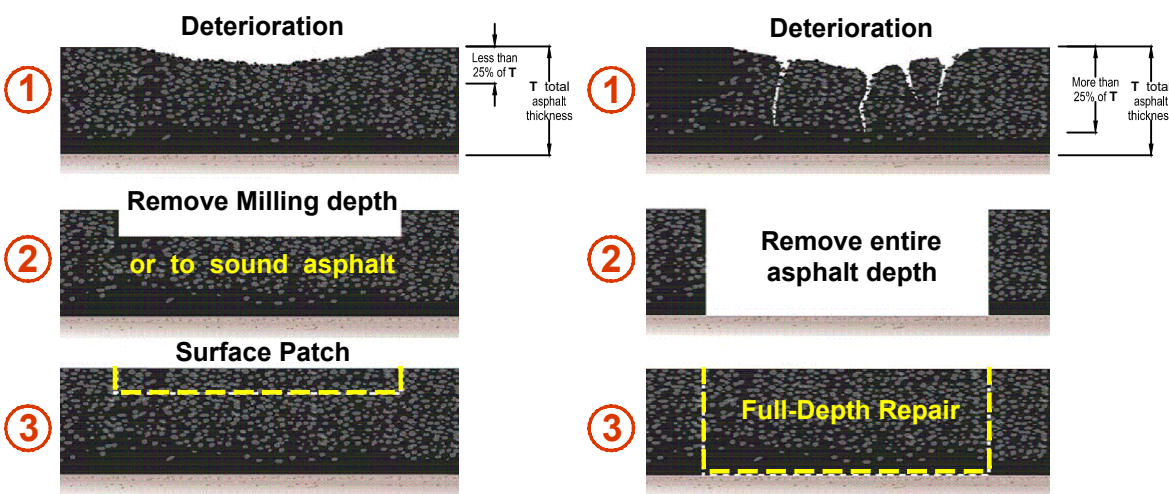
Step -4  
Lay and compact binder course asphalt.



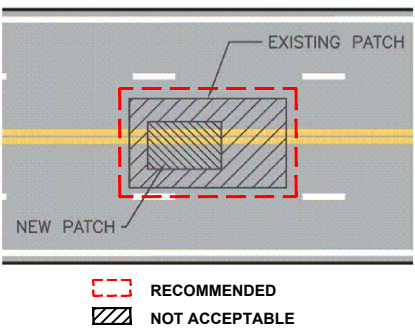
- Notes:
- Local deeper repair may be needed in some place rather than a patching .
  - Instable or severely damaged trenches to be remedied as new pavement.



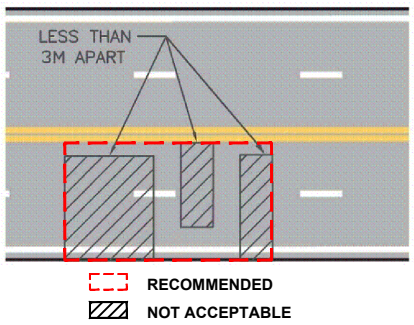
Completed street repairs should have rideability at least as good as, if not better than, the pavement prior to the repairs. An overlay to be avoided in located areas.



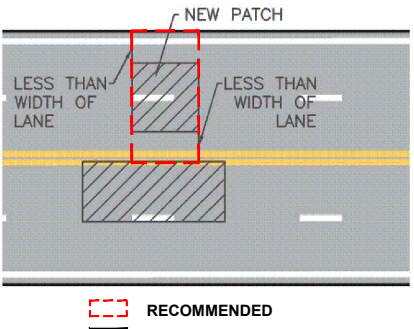
Existing pavements should be removed to clean, straight lines parallel and perpendicular to the flow of traffic. Do not construct patches with angled sides and irregular shapes. Asphalt and concrete pavements should be removed by saw cutting or grinding. Avoid breaking away the edges of the existing pavement or damaging the remaining pavement with heavy construction equipment.



In case of repairing damaged or inadequate previous patches, avoid patches within existing patches. consider repairing the entire patch with extra minimum of 0.5m from each side.



In the case of a series of patches, repair the pavement over the patches by grinding and overlay when the spacing between the patches is less than 3 meters.



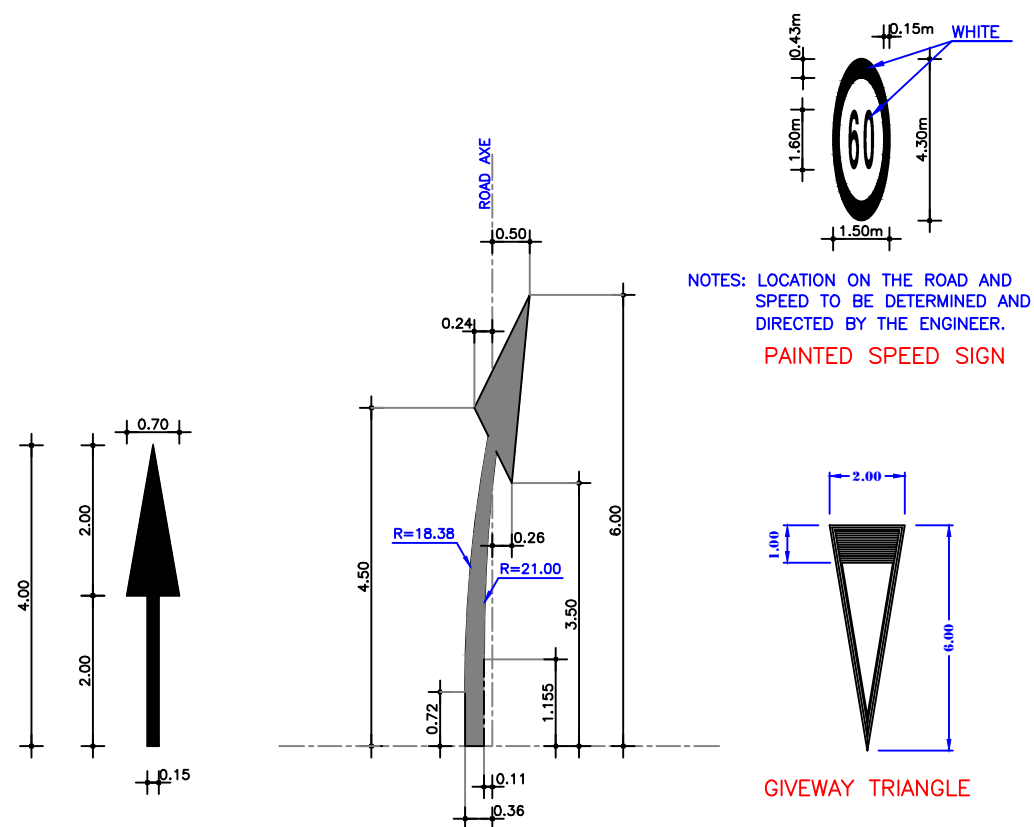
Do not leave strips of pavement less than one-half lane in width from the edge of the new patch to the edge of an existing patch or the lip of the gutter. complete the patch with mill-repaves as shown in red.

FINAL TENDER DOCUMENTS

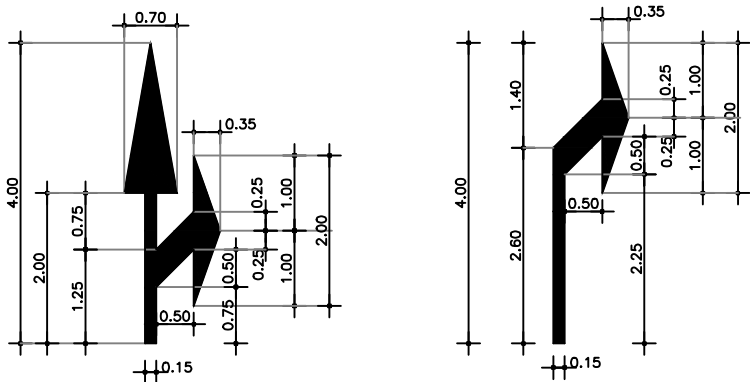
REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHKD	APPD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
الـكـتـبـ الـهـنـدـسـيـ الـاسـتـشـاـرـيـ - ايس في بيروت					
ACE ASSOCIATED CONSULTING ENGINEERS BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(WABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE					
ROAD LINE DIAGRAM					
CAZA OF JEZZINE					
SUNKEN UTILITY TRENCHES & PAVEMENT SPOT REPAIR					
DESIGNED	CHECKED	PROJECT NO.	SHEET	FORMED BY	REV.
M.K.	H.K.	L2102	1 OF 1	GE-R-10015	0
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	N.T.S.		

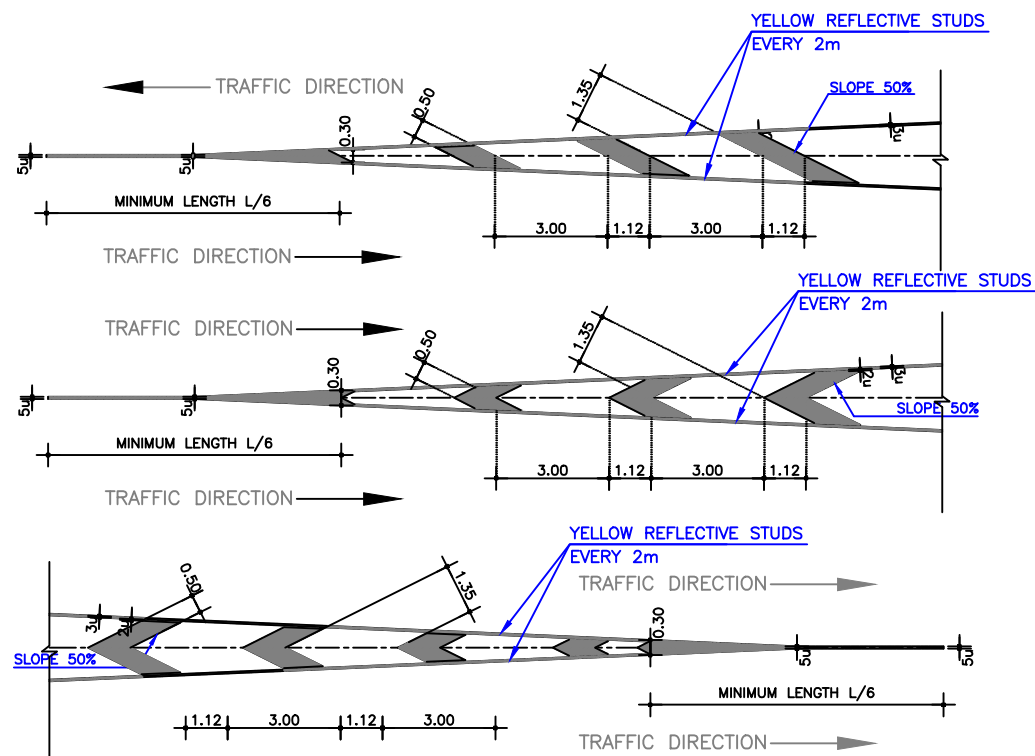




MERGE ARROW

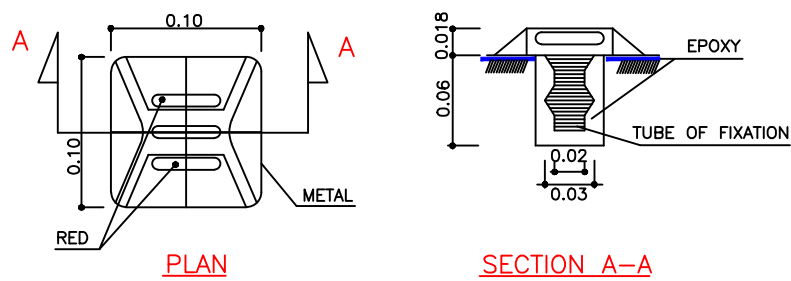


DIRECTIONAL ARROW MARKINGS

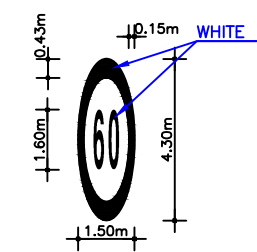


NOTES:  
u=7.5cm FOR MOTORWAYS, HIGHWAYS WITH 4 LANES AND ROADS WITH SEPARATED CARRIAGE WAYS.  
u=6.0cm FOR MAIN ROAD AND ROADS WITH HIGH TRAFFIC.  
u=5.0cm FOR OTHER ROADS

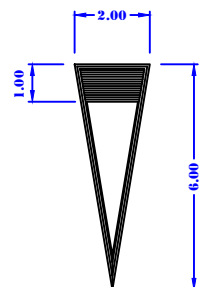
CHEVRON MARKINGS



REFLECTIVE STUDS  
SCALE 1/2.5

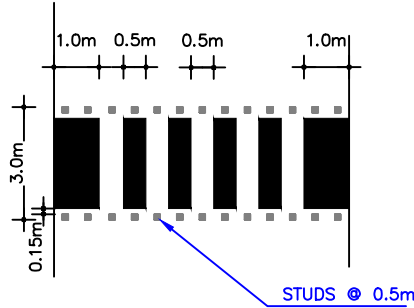
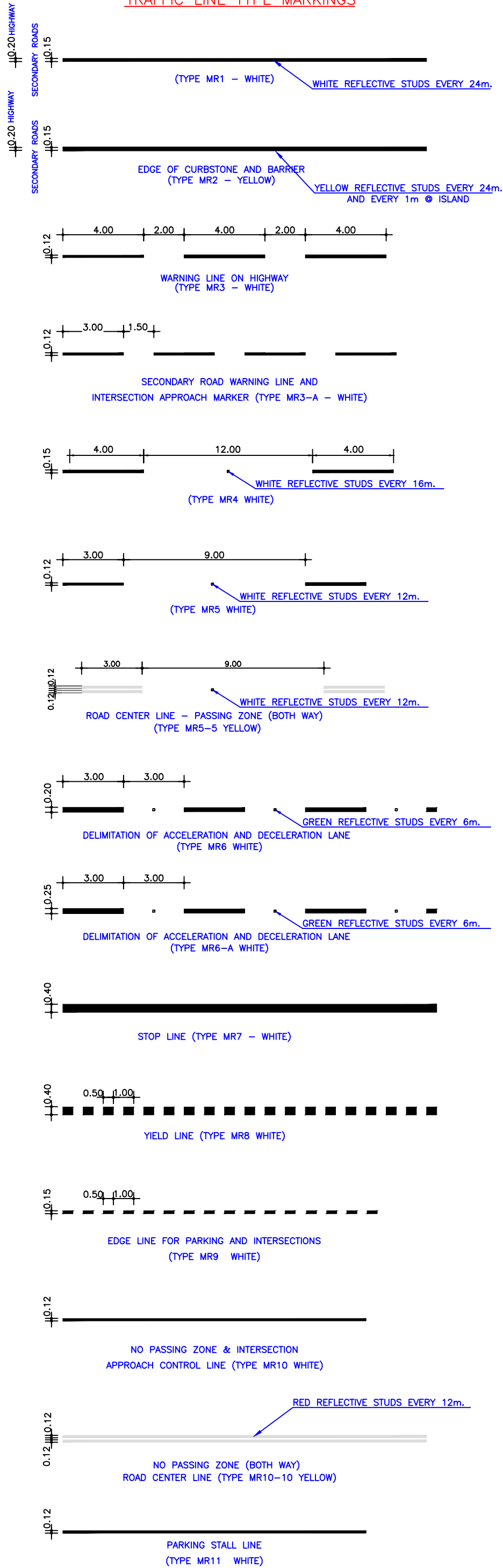


NOTES: LOCATION ON THE ROAD AND SPEED TO BE DETERMINED AND DIRECTED BY THE ENGINEER.  
PAINTED SPEED SIGN



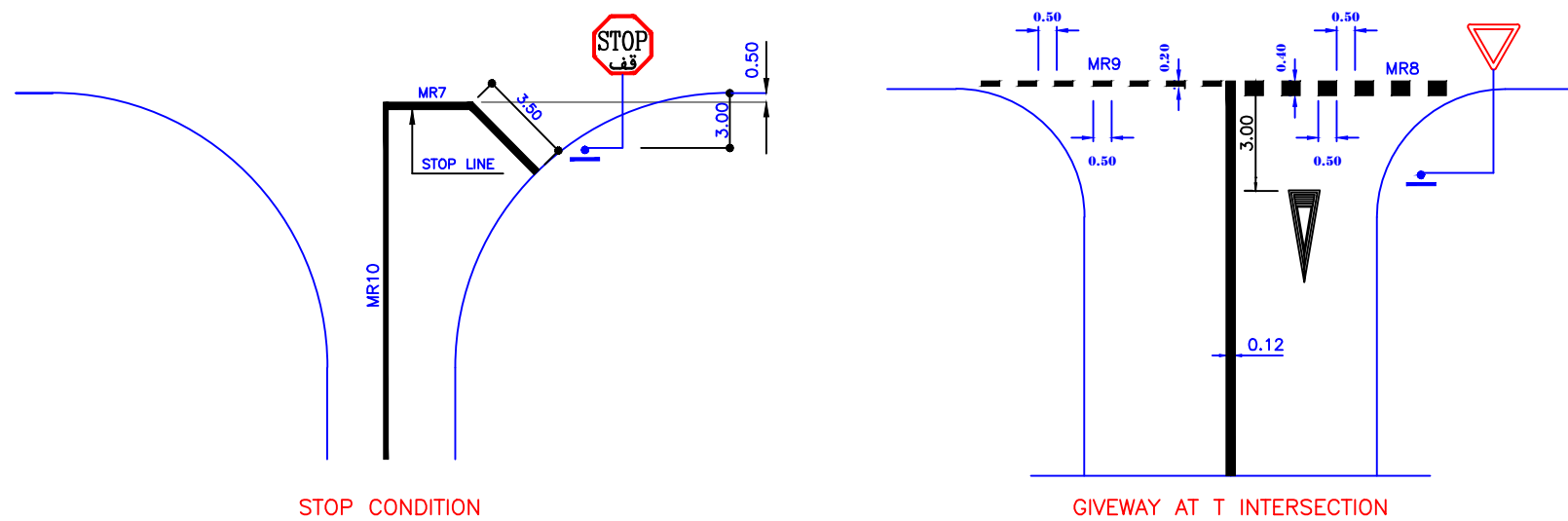
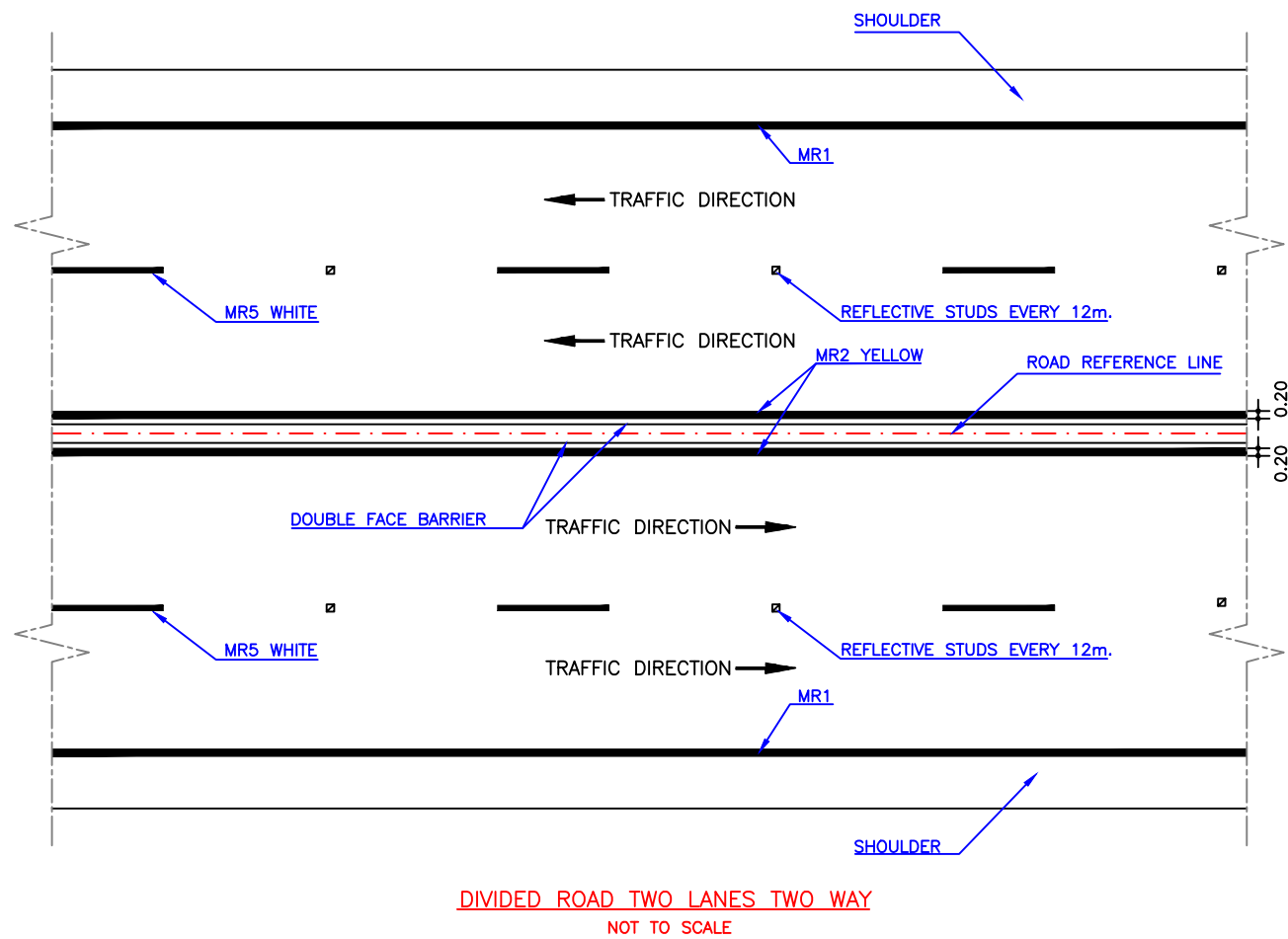
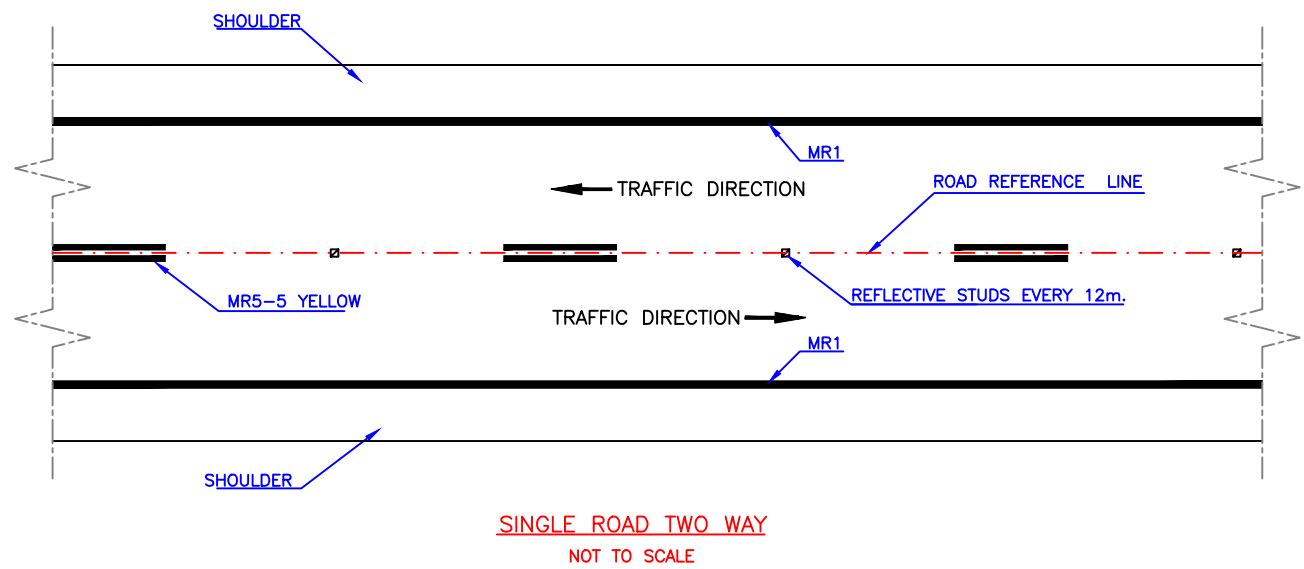
GIVEWAY TRIANGLE

TRAFFIC LINE TYPE MARKINGS



PEDESTRIAN MARKING DETAIL

TYPICAL ROAD MARKING SCHEMES



TYPICAL INTERSECTION MARKING DETAILS

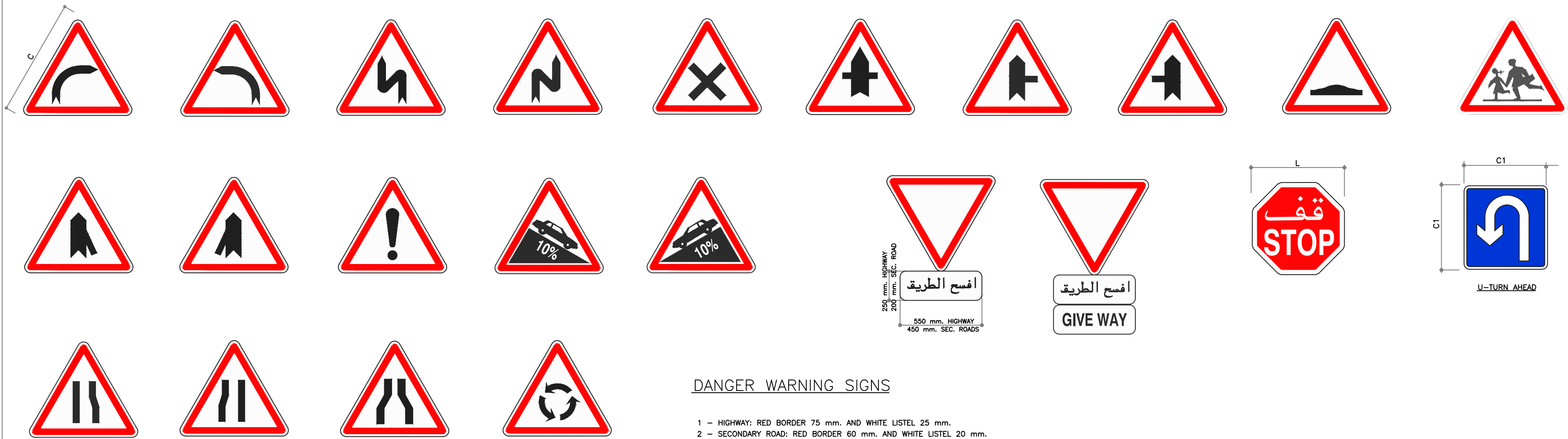
NOTES:

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- UNLESS OTHERWISE INDICATED ALL DIMENSIONS ARE IN METERS.
- TRAFFIC MARKINGS SHALL CONFORM TO THE LEBANESE STANDARDS "INSTITUT DE NORMES LIBANAISE-LIBNOR".
- REFLECTIVE STUDS SHALL BE PROVIDED AS SHOWN ON ROAD MARKING LINE TYPE AND AS DIRECTED BY THE SITE ENGINEER.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHKD	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
الكتبة الهندسية الاستشارية - ايس في بيروت					
ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(WABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE QAZAS)					
TITLE					
ROAD REHABILITATION					
LOT 3					
TRAFFIC MARKING DETAILS					
DESIGNED	CHECKED	PROJECT NO.	SHEET	FORMED BY	REV.
M.K.	H.K.	L2102	1 OF 1		
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	AS SHOWN		
GE-R-10021					0



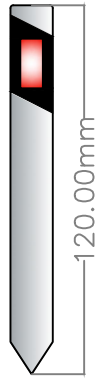
DANGER WARNING SIGNS

- 1 - HIGHWAY: RED BORDER 75 mm. AND WHITE LISTEL 25 mm.  
2 - SECONDARY ROAD: RED BORDER 60 mm. AND WHITE LISTEL 20 mm.

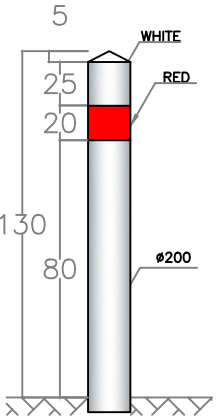
SIGNS DIMENSION TABLE

SIGN RANGE	SIGN DIMENSION			
	TRIANGULAR C (mm)	CIRCULAR D (mm)	OCTOGONAL L (mm)	SQUARE C1 (mm)
LARGE (SPEED $V > 60\text{km/h}$ )	1250	1050	1200	900
MEDIUM (SPEED $V \leq 60\text{km/h}$ )	900	900	900	600
SMALL	600	600	600	500

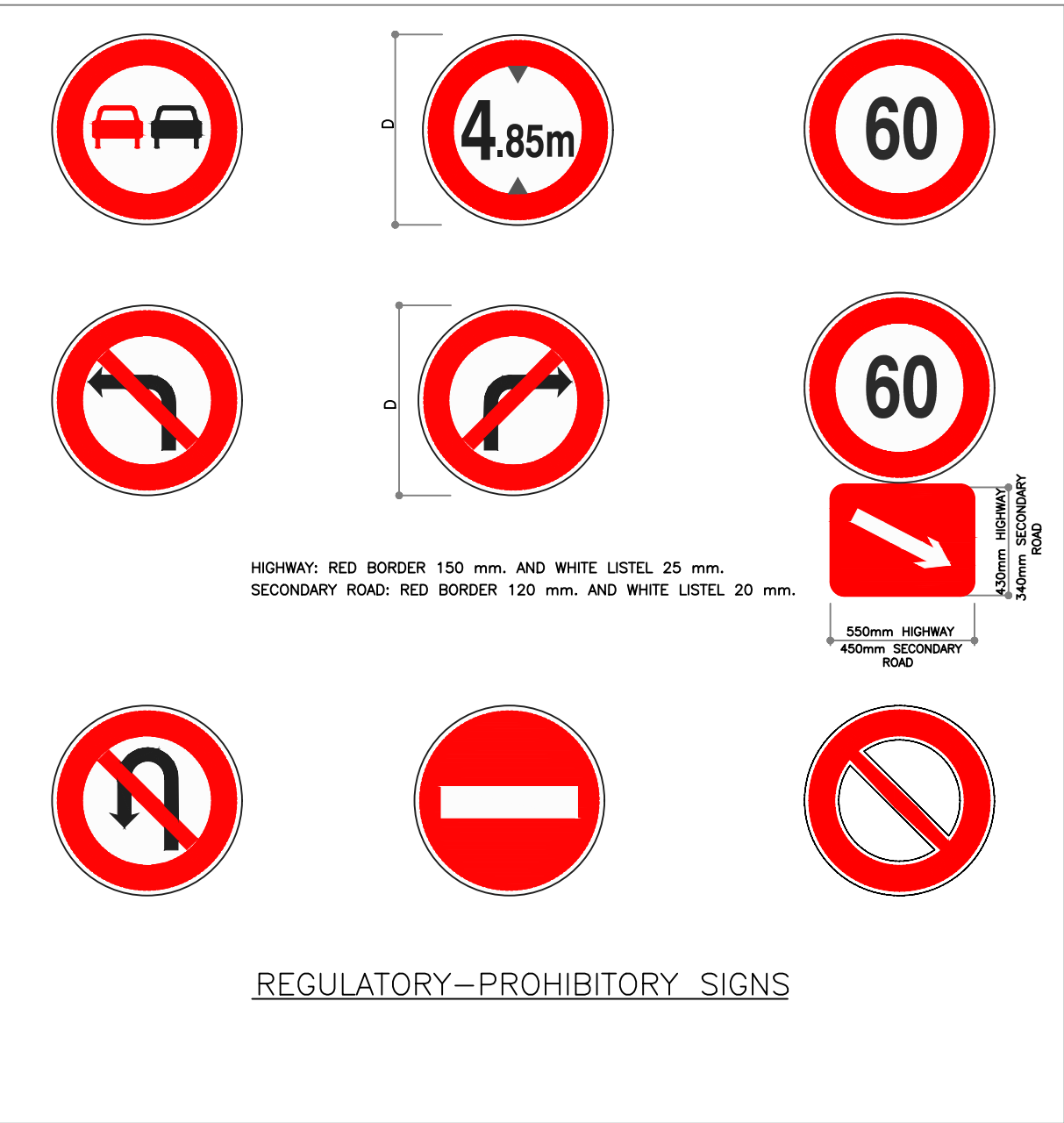
FLEXIBLE DELINEATORS TYPE J6



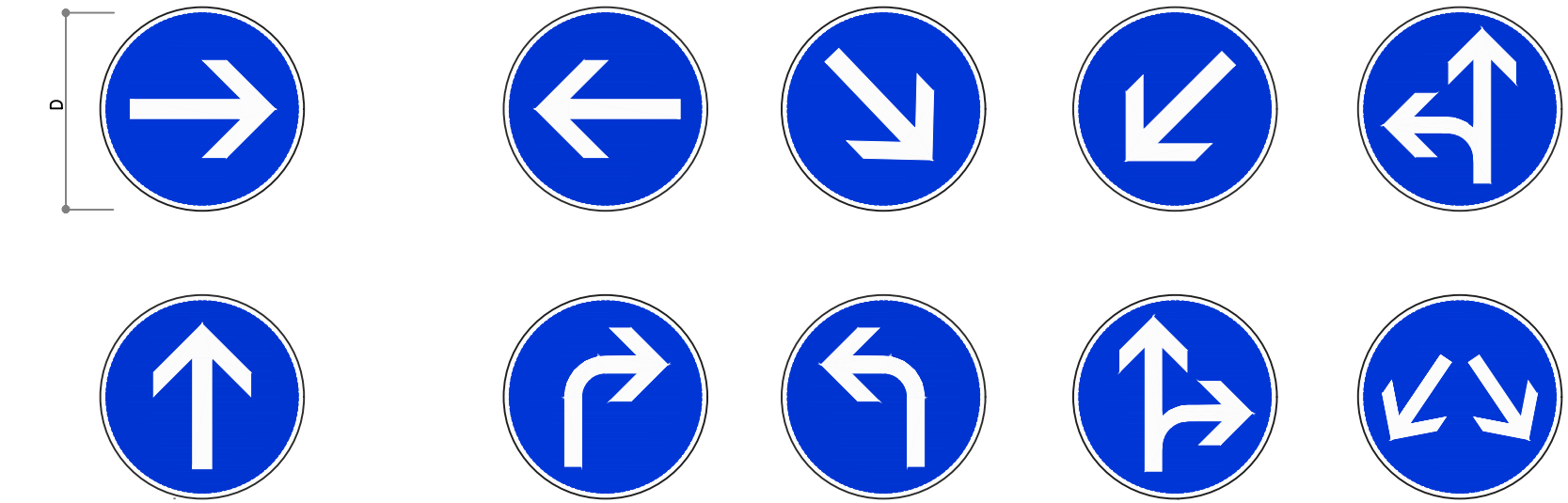
DELINEATORS TYPE J3



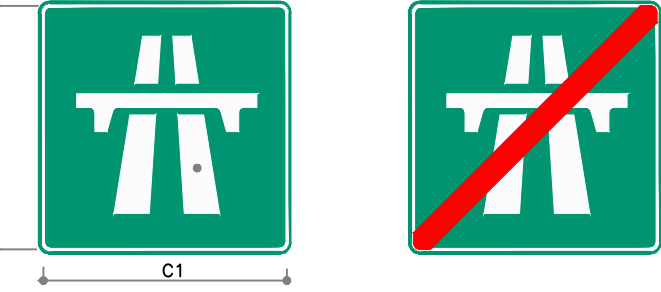
TYPE J3 - ON INTERSECTIONS AND ISLANDS  
(WITH RED REFLECTIVE SHEETING CLASS 2)



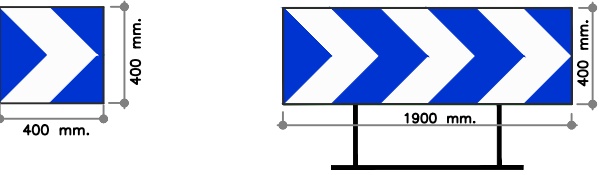
REGULATORY-PROHIBITORY SIGNS



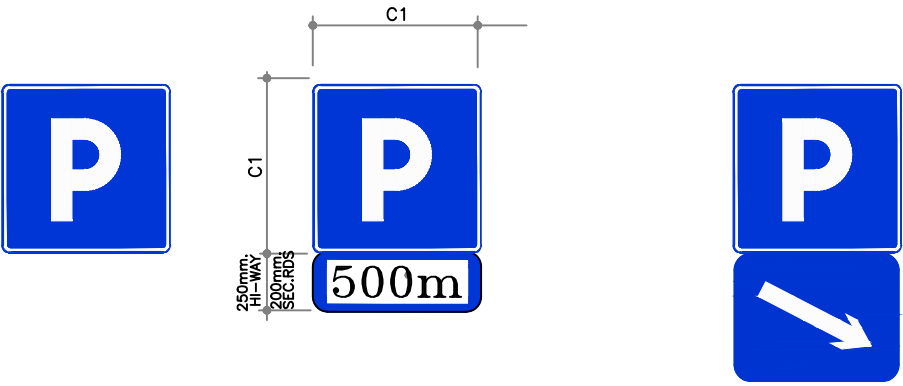
- 1 - HIGHWAY:LISTEL WHITE 40 mm.  
2 - SEC. ROADS: LISTEL WHITE 40 mm.



REGULATORY-MANDATORY SIGNS



SHARP DEVIATION REFLECTORIZED SIGN  
TYPE J4



INFORMATORY SIGN

NOTES:

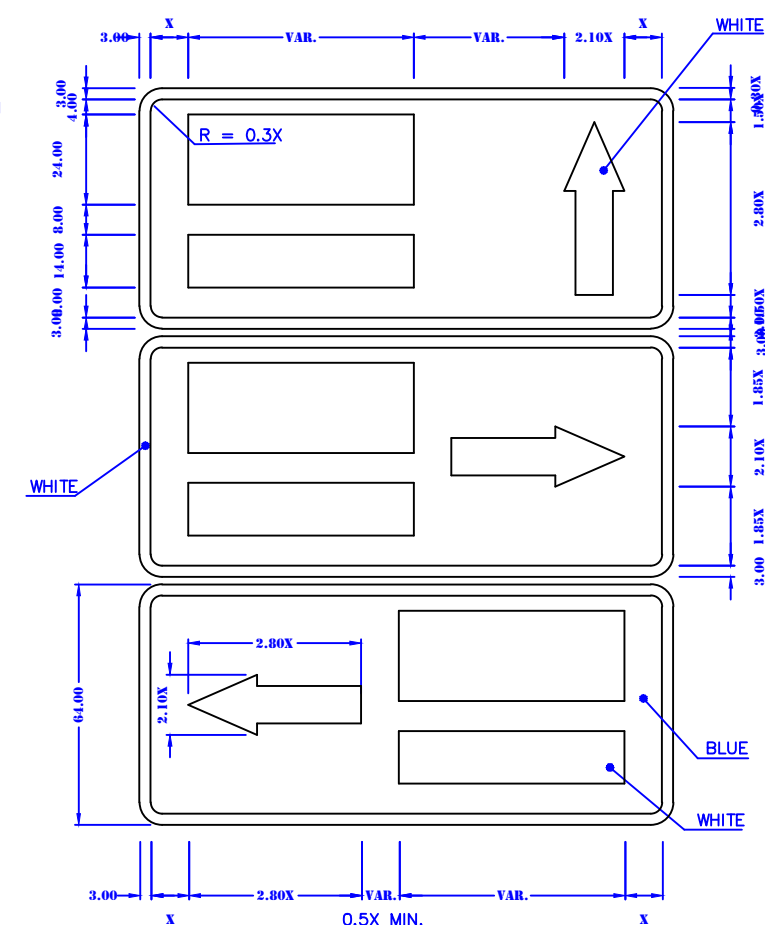
- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- ALL DIMENSIONS ARE IN MILLIMETERS.
- ALL TRAFFIC SIGNS SHALL BE MOUNTED WITH ONE POST EXCEPT SHARP DEVIATION REFLECTORIZED SIGN MOUNTED WITH TWO POSTS.
- TRAFFIC SIGNS SHALL CONFORM TO THE LEBANESE STANDARDS "INSTITUT DE NORMES LIBANAISE-LIBNOR".

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°	DATE	BY	DESCRIPTION	CHKD	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
الكاتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKKA, RAHAYIA, HASBAYA & JEZZINE QAZAS)					
TITLE					
ROAD REHABILITATION LOT 3 TRAFFIC SIGNS DETAILS					
DESIGNED M.K.	CHECKED H.K.	PROJECT N° L2102	SHEET 1 OF 1	DRAWING N° GE-R-10022	REV 0
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE AS SHOWN		





- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- ALL DIMENSIONS, DISTANCES AND LEVELS ARE IN METERS.
- FOR SIGN LETTERING DETAILS REFER TO DWG.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°.	DATE	BY	DESCRIPTION	CH'KD	AP'D
REVISIONS					

CLIENT REPUBLIC OF LEBANON  
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

مكتب الهندسي الاستشاري - ايس ش بيروت  
ASSOCIATED CONSULTING ENGINEERS S<sup>ARL</sup> BEIRUT

PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE  
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3  
(NABATIEH, WEST BEKAA, RACHAYA, HASBAYA & JEZZINE CAZAS)

TITLE	ROAD REHABILITATION LOT 3
-------	------------------------------

DIRECTION SIGNS DIMENSIONING DETAILS

DESIGNED M.K.	CHECKED H.K.	PROJECT N° L2102	SHEET 1 OF 1	DRAWING N° GE-R-10023	REV (
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE AS SHOWN		



## LETTERING HEIGHT

UPPER CASE				LOWER CASE				NUMERALS			
LETTER	TILE WIDTH	H1	H2	LETTER	TILE WIDTH	H1	H2	LETTER	TILE WIDTH	H1	H2
A	136	08	08	a	111(104)	07	12	1	79	11	23
B	147	25	15	b	117	13	12	2	120	10	16
C	148	14	14	c	103	06	08	3	127	11	18
D	154	25	15	d	119	08	18	4	132	06	10
E	132	25	20	e	109(102)	08	12	5	122	12	12
F	119	25	12	f	75	06	06	6	126	15	15
G	155	14	20	g	114(107)	08	18	7	104	05	05
H	160	25	25	h	112	13	18	8	130	16	16
I	73	25	25	i	54	15	21	9	128	14	14
J	93	02	25	j	58	02	18	0	133	13	13
K	138	25	06	k	108	13	06				
L	107	25	04	l	62	15	29				
M	184	25	25	m	164	13	18				
N	168	25	25	n	112	13	18				
O	156	15	15	o	118(111)	08	15				
P	130	25	10	p	118	13	15				
Q	158	15	15	q	118	08	18				
R	141	25	15	r	73(59)	13	07				
S	137	13	15	s	97(95)	05	12				
T	109(105)	04	04	t	81	07	07				
U	154	25	25	u	115(101)	13	18				
V	130(120)	10	10	v	98	06	06				
W	183(189)	12	12	w	147(145)	06	06				
X	128	12	12	x	104	04	04				
Y	123(118)	05	06	y	98(96)	04	04				
Z	119	12	12	z	97	08	08				

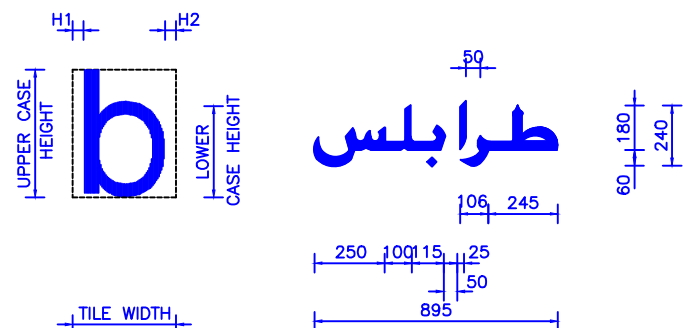
The diagram illustrates the layout of the tile grid. It shows a grid of tiles with dimensions and labels. The grid is divided into three main sections: UPPER CASE, LOWER CASE, and NUMERALS. The dimensions are given in centimeters (cm). The grid is composed of 26 tiles for the alphabet and 10 tiles for the numerals. The dimensions for each tile are provided in the table above. The diagram also shows the relative positions of the tiles and the overall dimensions of the grid.

Diagram illustrating the layout of the tile grid with dimensions and labels:

- UPPER CASE HEIGHT: 100 cm
- LOWER CASE HEIGHT: 100 cm
- TILE WIDTH: 100 cm
- NUMERALS: 100 cm
- Overall dimensions: 250 cm (width) x 100 cm (height)

EXAMPLE OF TILE

X=100



# Beyrouth

LENGTH OF LEGEND






1. LENGTH OF LEGEND FOR 100 mm. L.C.H.  
 $147+109+98+73+118+115+81+112=853$
2. LENGTH OF LEGEND FOR 150 mm. L.C.H.  
 $\frac{150}{100} (147+109+98+73+118+115+81+112)=1280$

ا ا ب ج د ه ز ح ط ظ ث ش

ش خ ف غ ق ك ل

ل م ن ه و ي

ع ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩ ٠

SPACING BETWEEN SEPARATED LETTERS AND OTHER RELATED LETTERS		
LETTER	REQUIRED SPACING	EXAMPLE
ا	0.50X FROM ALL LETTERS.	الزيتون 
ذ	0X FROM SAG LETTERS 0.4X FROM ALL OTHER LETTERS.	العبد 
ز	0.50X FROM PERPENDICULAR LETTERS, EXCEPT ُ WHICH SHALL BE 0.82X  0.50X FROM HIGH LETTERS, EXCEPT ُ OR ُ OR ُ ECT. WHICH SHALL BE 0.73X  0.82X FROM ALL CREST LETTERS.  0.82X FROM SAG LETTERS, WITH SAG LETTERS BEING LOWERED 0.17X FROM USUAL POSITION.  THE ABOVE DISTANCES ARE FROM THE UPPER POINT OF ُ OR ُ TO THE NEAREST POINT OF THE FOLLOWING LETTERS.	طرابلس 
لا	0.40X FROM PERPENDICULAR LETTERS.  0.32X FROM HIGH LETTERS & CREST LETTERS.  0X FROM SAG LETTERS.	الاعمار 
و	0X FROM SAG LETTERS, WITH SAG LETTERS, BEING LOWERED 0.17X FROM USUAL POSITION.  0.25X FROM ALL OTHER LETTERS.	القلمون 

DESIGN SPEED km/h	HEIGHT OF LETTER		ARABIC LETTER		LETTER THICKNESS	
	LOWER CASE * (X) mm	UPPER CASE (1.4 X) mm	HEIGHT ** (1.8 X) mm	FRAME HEIGHT (2.4 X) mm	ENGLISH (0.25 X) mm	ARABIC (0.33 X) mm
40	100	140	180	240	25	33
60	150	210	270	360	37.5	49
80-100	200	280	360	480	50	66
100-120	250	350	450	600	62.5	82

\* THE HEIGHT X CORRESPONDS TO THE HEIGHT OF THE SMALL LETTER "a"  
 \*\* THE HEIGHT OF THE ARABIC LETTER CORRESPONDS TO THE HEIGHT OF THE LETTER "i"

DEFINITION OF LETTER CATEGORIES	
CATEGORY	ARABIC LETTER
PERPENDICULAR LETTERS	لا ل ك ا
HIGH LETTERS	ف ق ط خ ض ذ
CREST LETTERS	ي و ن ق ز
SAG LETTERS	غ خ

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
- TILE WIDTHS OF FRENCH LETTERING ARE EXPRESSED AS A PERCENTAGE OF LOWER CASE LETTERING HEIGHT (L. C. H.).
- THE ALPHABETS USED IS THE ENGLISH TRANSPORT MEDIUM ALPHABET.
- WHEN T.V OR Y IS FOLLOWED BY a, e, g, o, r, s, u, w OR y, SPECIAL TILES OF LETTER WIDTH ARE USED FOR BOTH THE UPPER CASE AND LOWER CASE LETTERS SEE FIGURES IN BRACKETS.
- MEDIUM ALPHABET SHALL CONSIST OF LIGHT WHITE LETTERS STICKED ON A DARK (BLUE OR GREEN) BACKGROUND.
- ARABIC LETTERING TO BE "NASKH" SCRIPT.
- ALL ARABIC LETTER SIZES ARE EXPRESSED AS A PROPORTION OF "X" (ARABIC STROKE WIDTH).
- WHEN ARABIC LEGEND IS ABOVE FRENCH LEGEND, MINIMUM LENGTH OF ARABIC LEGEND SHALL BE EQUIVALENT TO FRENCH LEGEND LENGTH.

L.C.H. LOWER CASE HEIGHT

FINAL TENDER DOCUMENTS

REDUCTION  $1/2$

REV. N°.	DATE	BY	DESCRIPTION	CH'KD	APP'D

## REVISIONS

CLIENT

REPUBLIC OF LEBANON  
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION


**لمكتب الهندسي الاستشاري - ايس في بيروت**  
**ASSOCIATED CONSULTING ENGINEERS - BEIRUT**

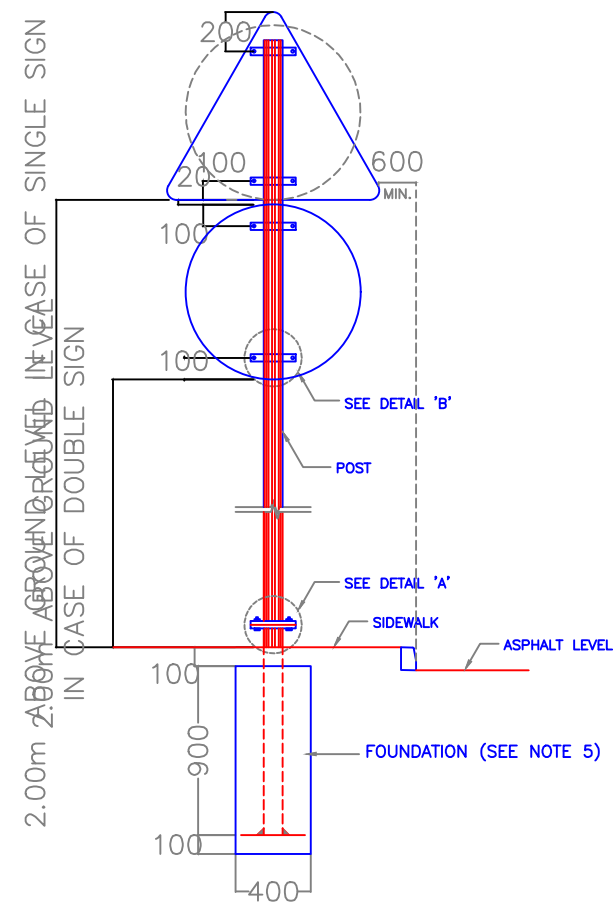
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE  
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3  
(NABATIEH, WEST BEKAA, RACHAYA, HASBAYA & JEZZINE CAZAS)

TITLE	ROAD REHABILITATION LOT 3
-------	------------------------------

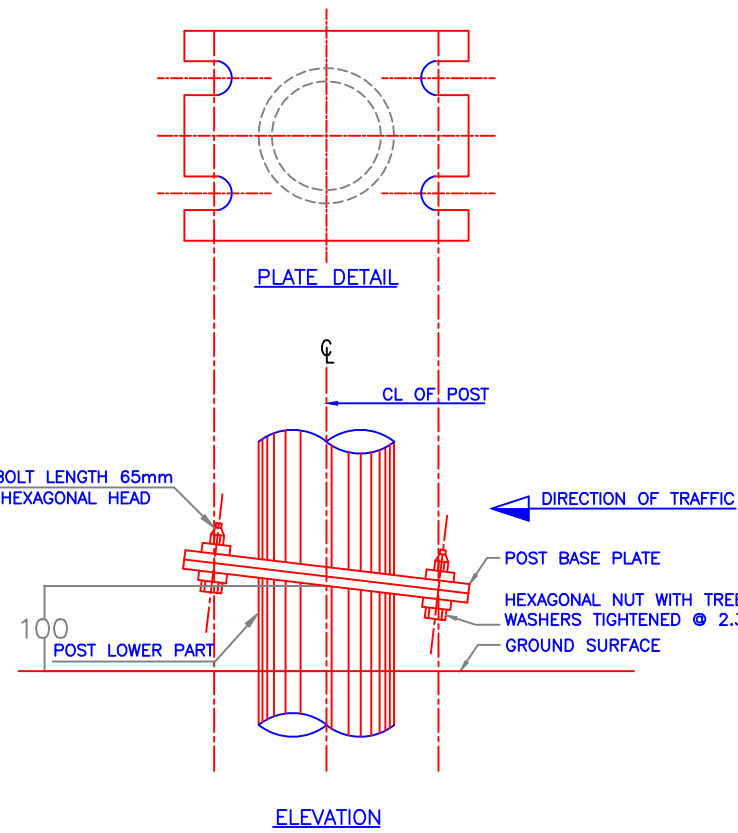
## SIGN LETTERING DETAILS

DESIGNED M.K.	CHECKED H.K.	PROJECT N°. L2102	SHEET 1 OF 1	DRAWING N°. GE-R-10024	REV. 0
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE AS SHOWN		

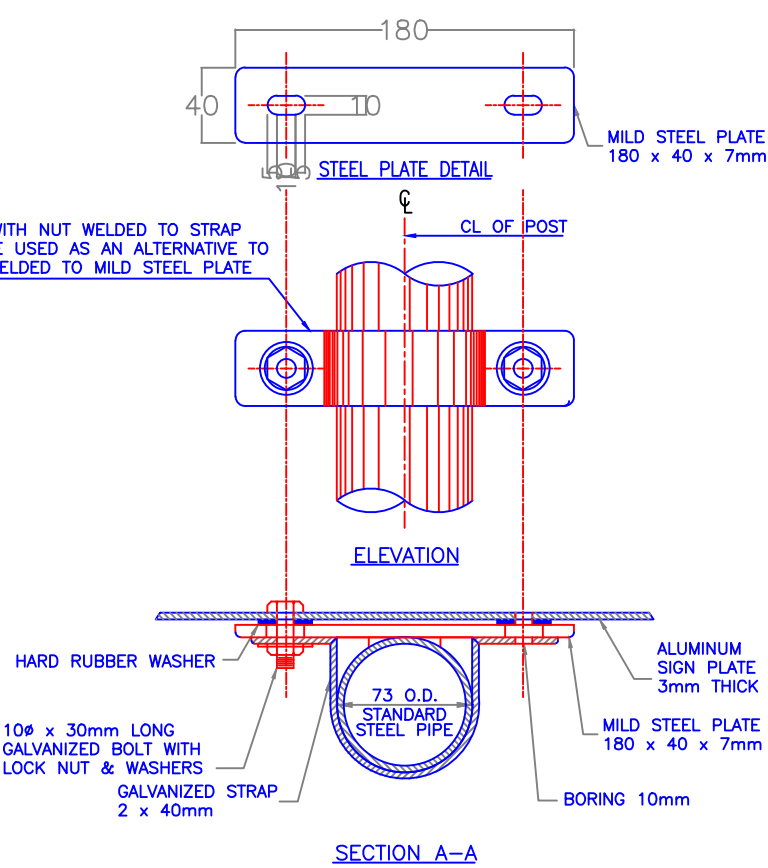




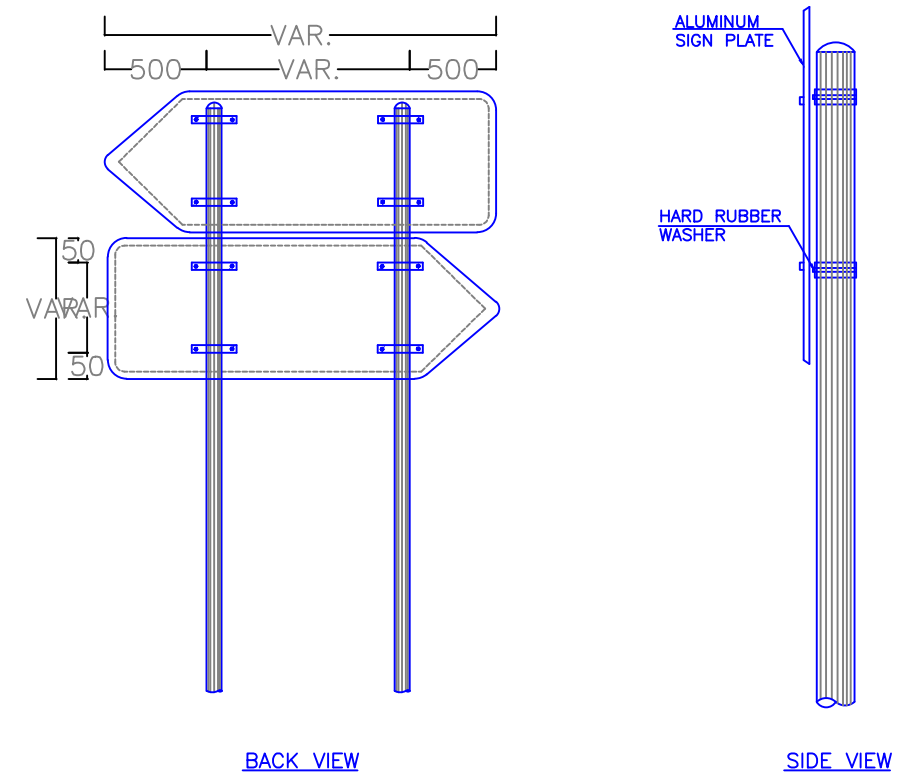
DANGER, WARNING AND REGULATORY SIGN  
(SINGLE AND DOUBLE SIGN POST)



BREAKAWAY CONNECTION  
DETAIL "A"



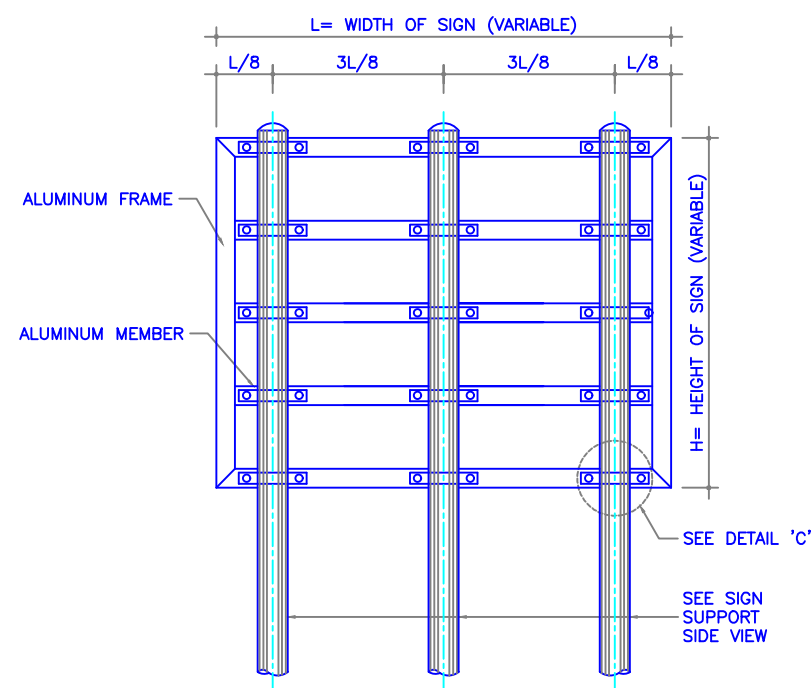
BRACKET ASSEMBLY  
DETAIL "B"



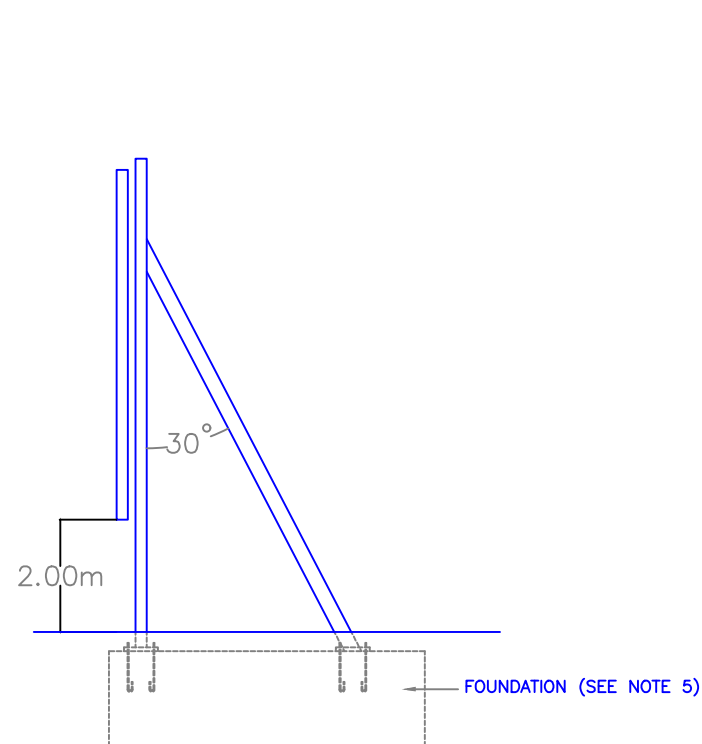
DIRECTIONAL SIGN

# NOTES:

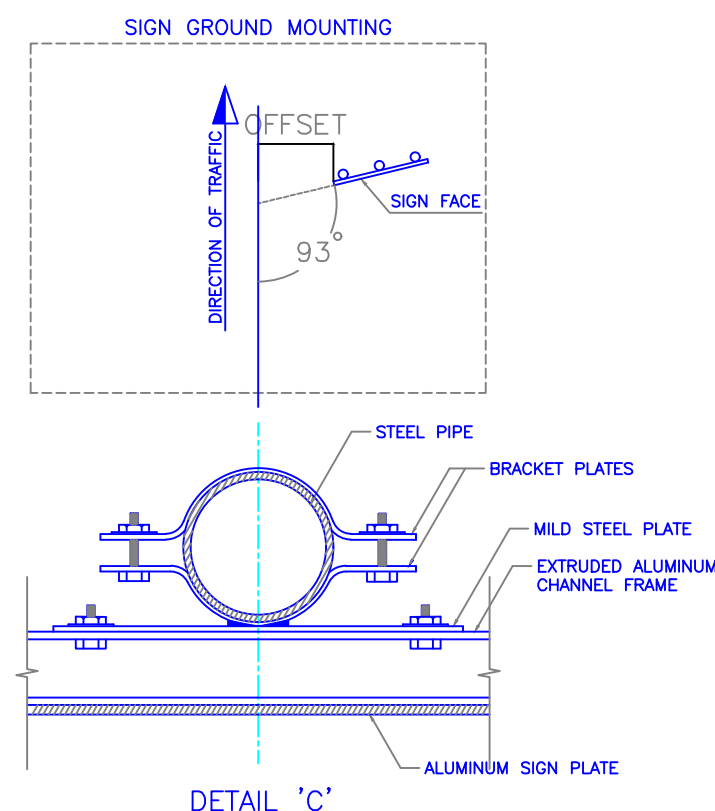
- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
- SIGNBOARD, SIGNBOARD STIFFENERS AND ALL ATTACHMENTS TO SIGN POSTS SHALL BE DESIGNED BY THE CONTRACTOR TO THE APPROVAL OF THE ENGINEER IN ACCORDANCE WITH THE REQUIREMENTS OF THE UNIFORM BUILDING CODE (LATEST EDITION) FOR A WIND LOAD BASED ON A BASIC WIND SPEED (FASTEST-MILE) OF 150 KPH.
- TOP OF STEEL HOLLOW SECTION POST SHALL BE PROVIDED WITH PLASTIC CAPS.
- THE FOUNDATIONS OF THE SIGN POSTS, GANTRY, ETC... SHALL BE PREPARED BY THE CONTRACTOR WHO SHALL DESIGN, DETAIL AND PREPARE RELATED DRAWINGS IN ACCORDANCE WITH GROUND CONDITIONS AND SUBMIT ALL TO THE ENGINEER FOR REVIEW AND APPROVAL.
- CONTRACTOR SHALL SUBMIT DETAILS OF BREAKAWAY CONNECTION TO THE ENGINEER FOR APPROVAL.



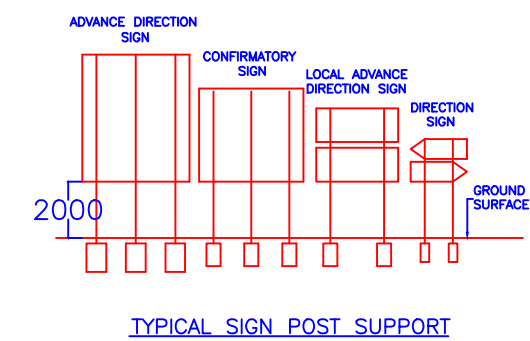
BACK VIEW  
ADVANCE DIRECTION AND CONFIRMATORY SIGNS



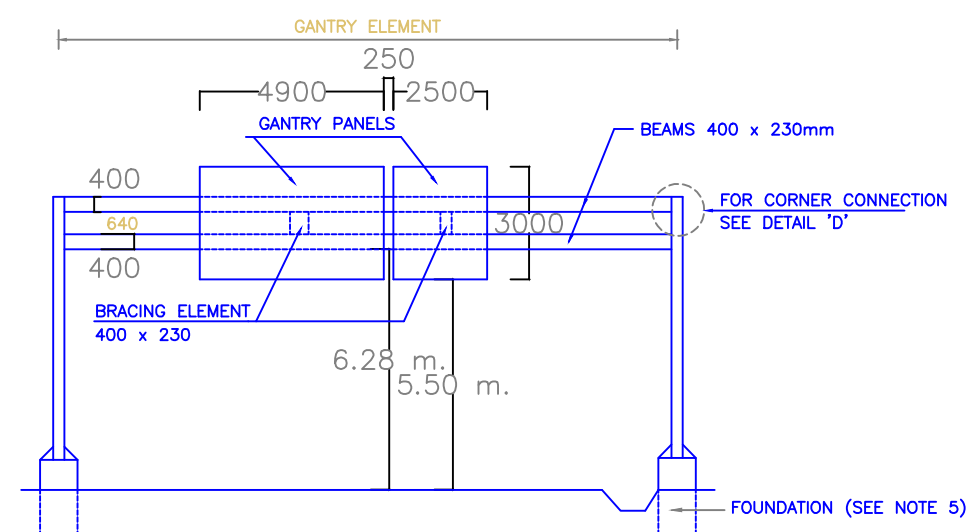
SIGN SUPPORT SIDE VIEW



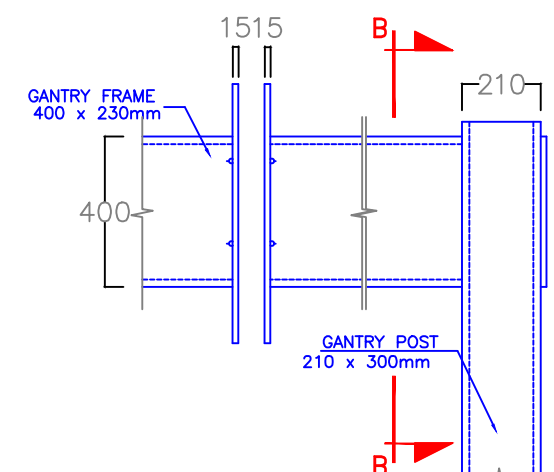
DETAIL "C"



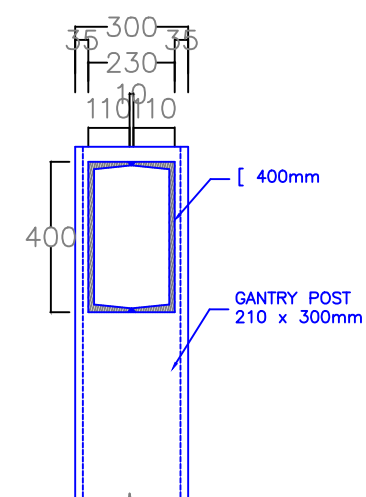
TYPICAL SIGN POST SUPPORT



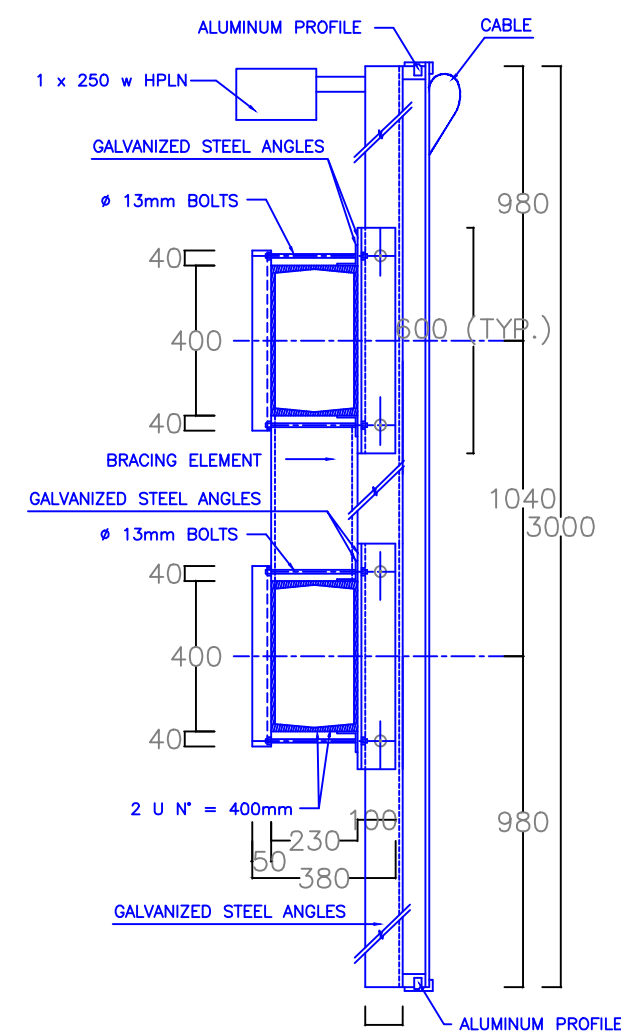
ELEVATION  
SCALE:1/100



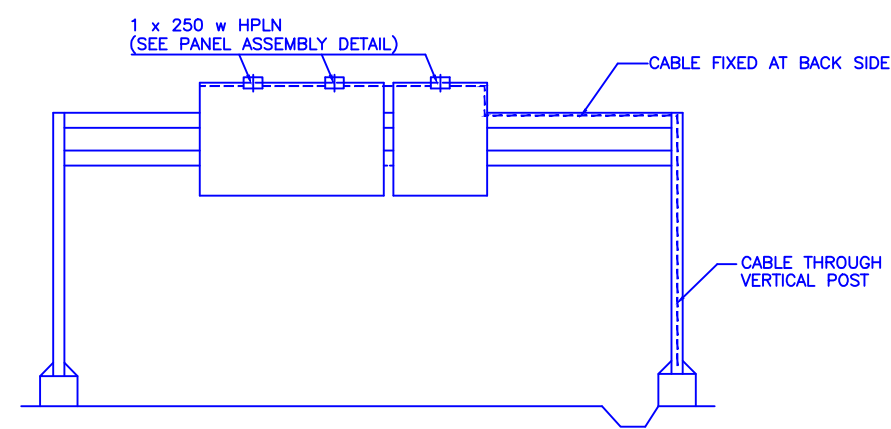
CORNER CONNECTION  
DETAIL "D"



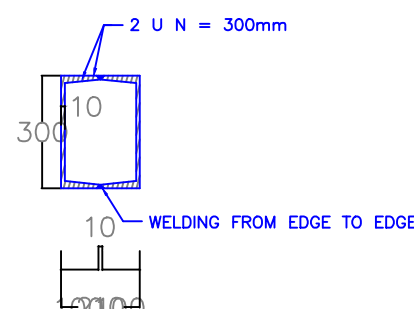
SECTION B-B  
SCALE:1/10



PANEL ASSEMBLY  
DETAIL "E"



LIGHTING & CABLE MOUNTING  
SCALE:1/100



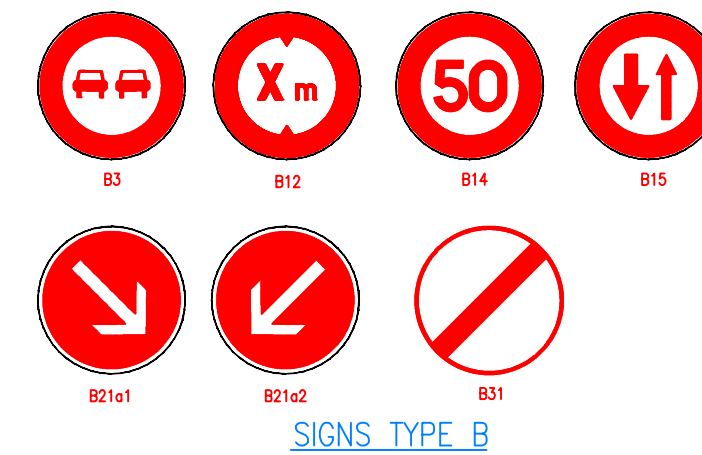
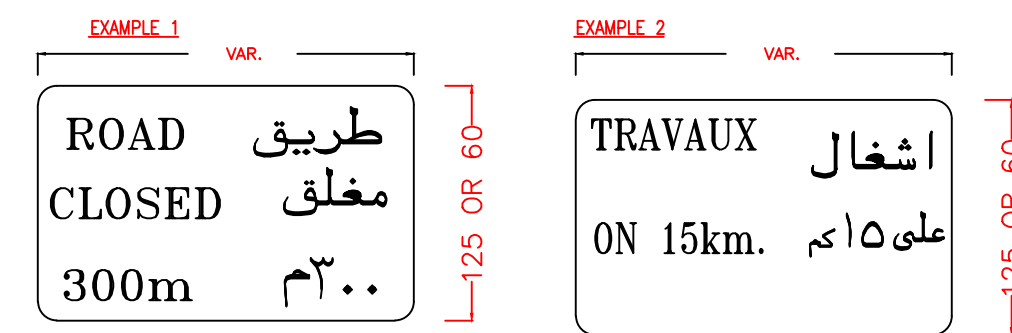
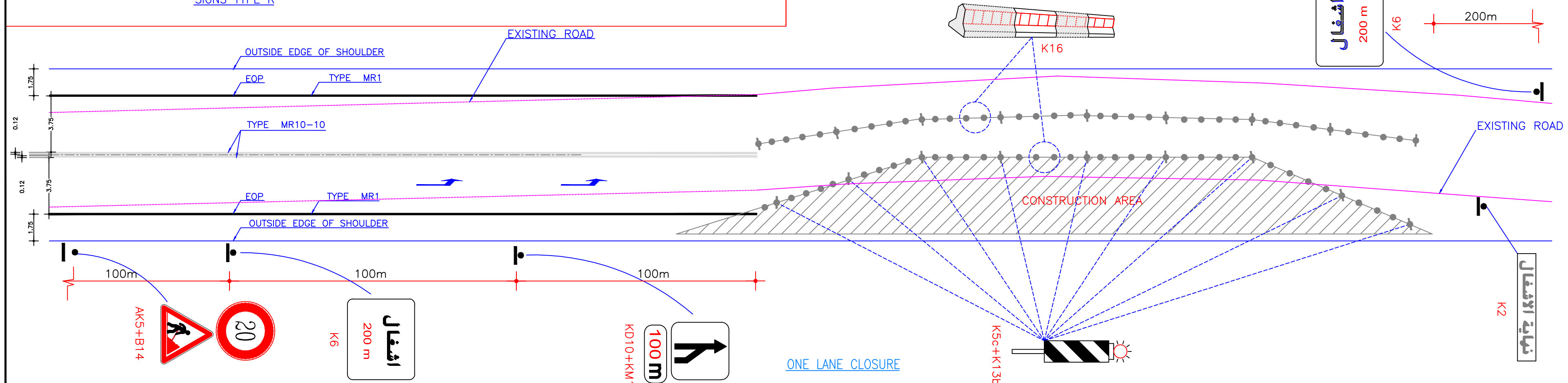
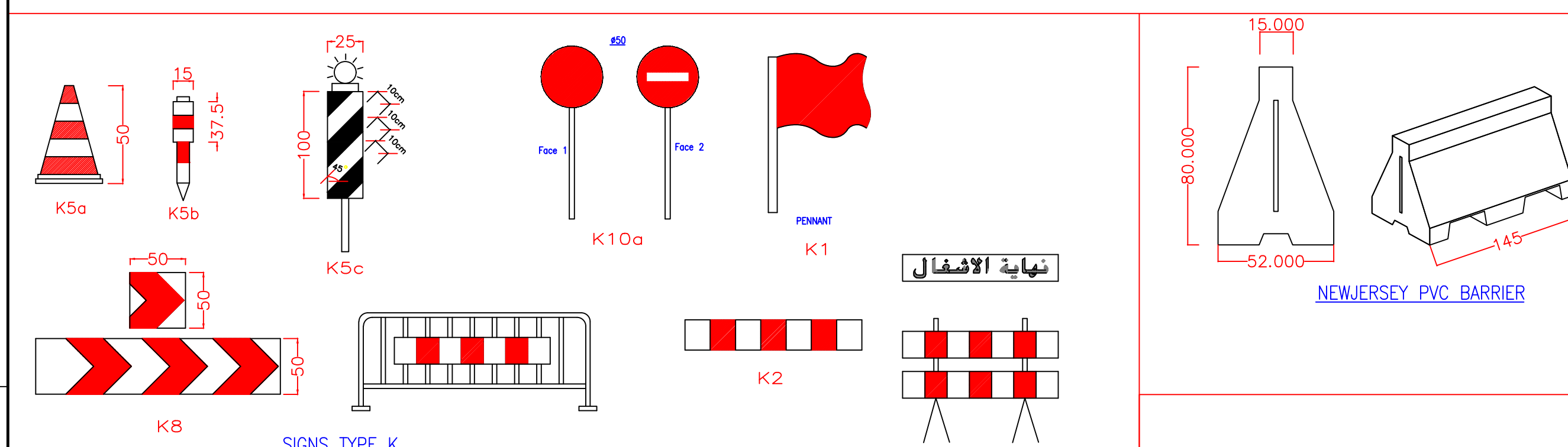
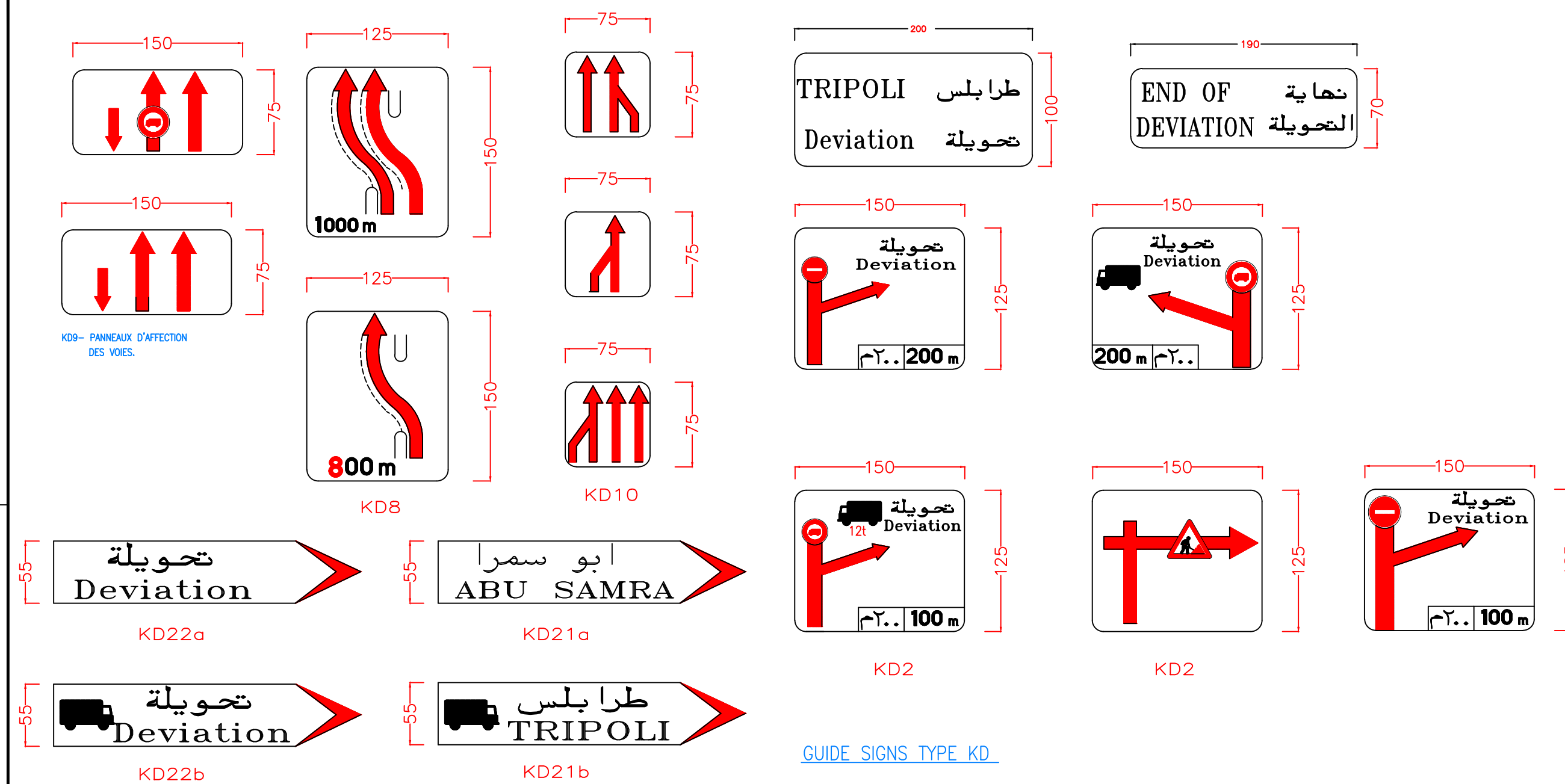
DETAIL OF GANTRY POST  
SCALE:1/10

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHKD	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت					
ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(WABATEH, WEST BEKA, RACHAYA, HASBAYA & JEZZINE QAZAS)					
TITLE					
ROAD REHABILITATION					
LOT 3					
SIGN MOUNTING DETAILS					
DESIGNED	CHECKED	PROJECT NO.	SHEET	FORMED BY	REV.
M.K.	H.K.	L2102	1 OF 1		
DRAWN	APPROVED	DATE	SCALE	AS SHOWN	
M.K.	N.F.	JULY 2023			
GE-R-10025					0





SIGNS TYPE AK  
YELLOW SIGN PLATE,RED LISTED AND BLACK SYMBOL

**NOTES:**

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- ALL DIMENSIONS, DISTANCES AND LEVELS ARE IN CENTIMETERS.
- TEMPORARY SIGNS SHALL HAVE THE SAME CHARACTERISTICS AS PERMANENT SIGNS.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

[illegible]

Alignment Name: JE-CL

Chainage Range: Start: 0+000.00, End: 0+270.00

Chainage Increment: 20.00

Chainage	Northing	Easting	Straight Direction
0+000.00	-66,884.9139m	-331,642.7839m	N67° 53' 52"E
0+020.00	-66,877.3888m	-331,624.2536m	N67° 53' 52"E
0+040.00	-66,869.8453m	-331,605.7308m	N67° 14' 26"E
0+060.00	-66,861.4992m	-331,587.5595m	N63° 25' 15"E
0+080.00	-66,852.3520m	-331,569.7740m	N62° 43' 06"E
0+100.00	-66,843.1847m	-331,551.9987m	N62° 43' 06"E
0+120.00	-66,834.0175m	-331,534.2234m	N62° 43' 06"E
0+140.00	-66,825.2934m	-331,516.2319m	N66° 33' 18"E
0+160.00	-66,818.1804m	-331,497.5469m	N71° 45' 49"E
0+180.00	-66,812.7931m	-331,478.2933m	N76° 58' 20"E
0+200.00	-66,809.1760m	-331,458.6301m	N82° 10' 52"E
0+220.00	-66,807.3471m	-331,438.7204m	N86° 47' 52"E
0+240.00	-66,806.2934m	-331,418.7487m	N88° 27' 55"E
0+260.00	-66,807.0903m	-331,398.7794m	S83° 53' 43"E
0+270.00	-66,808.4654m	-331,388.8760m	S80° 59' 22"E

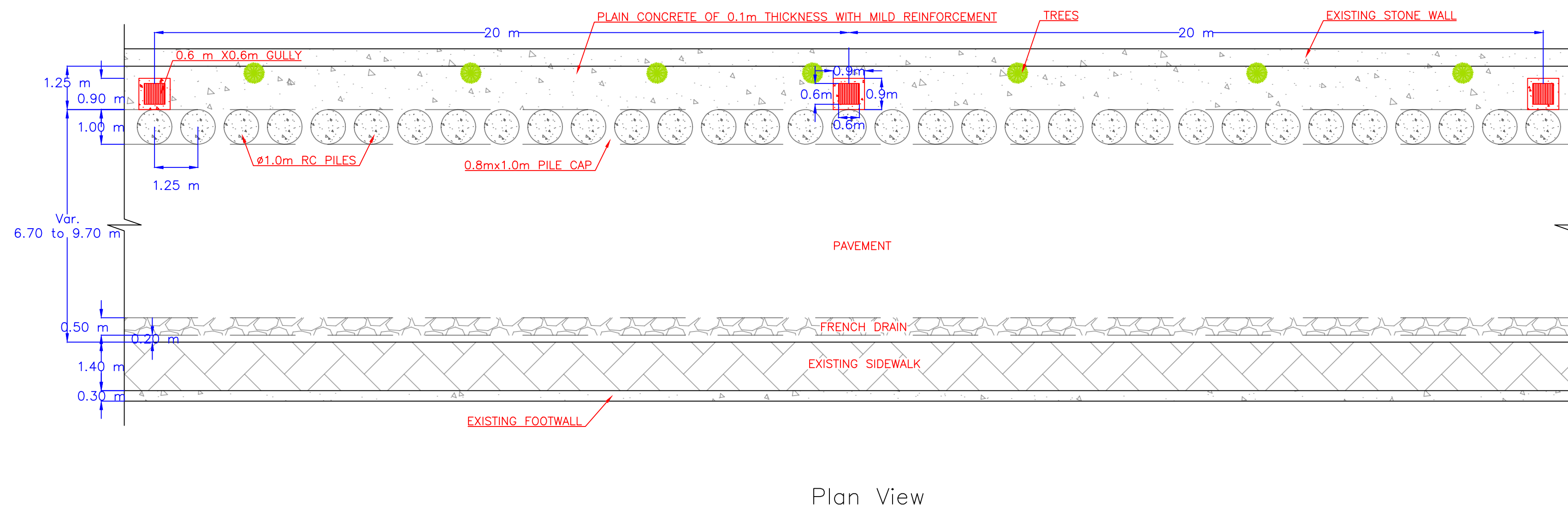
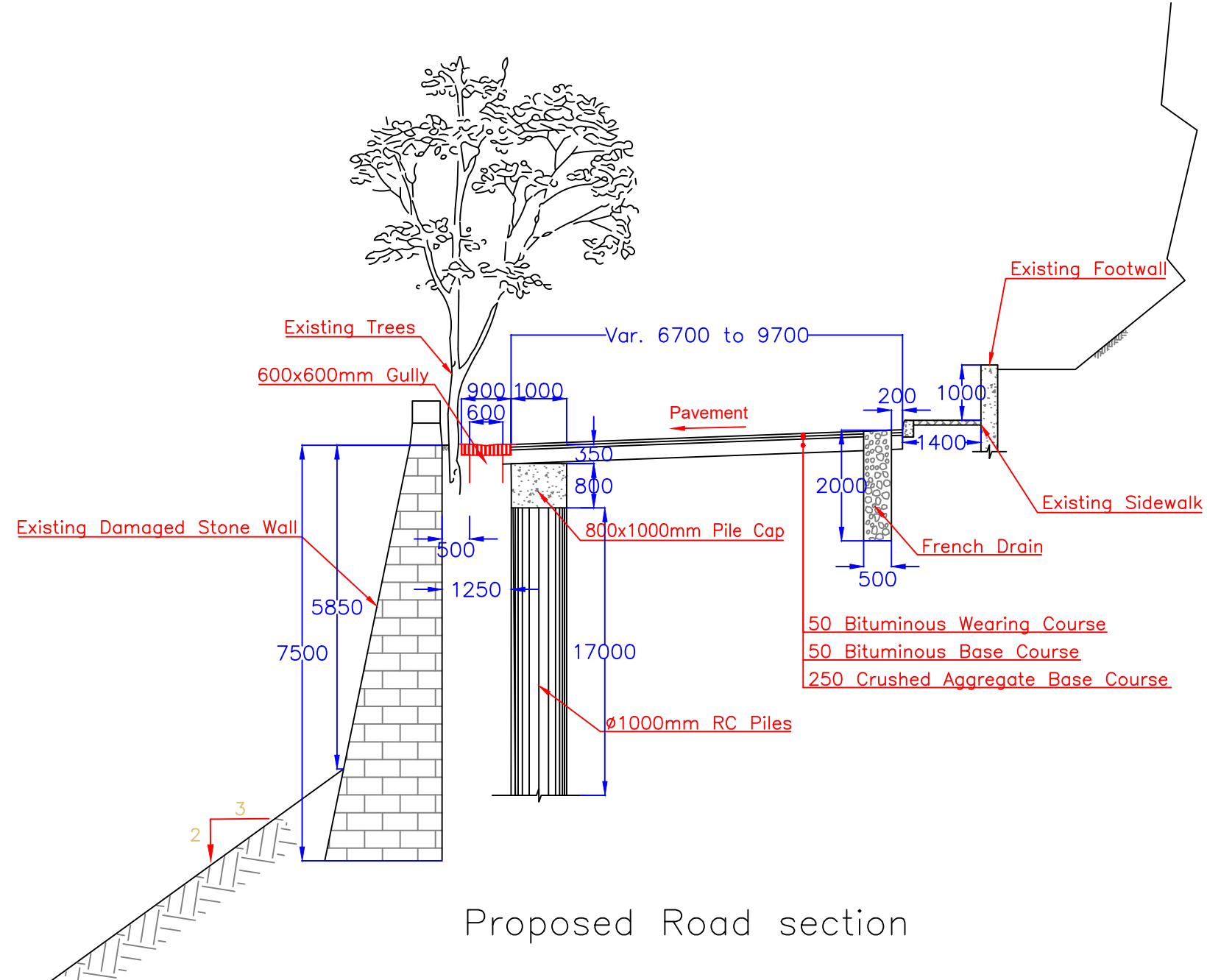
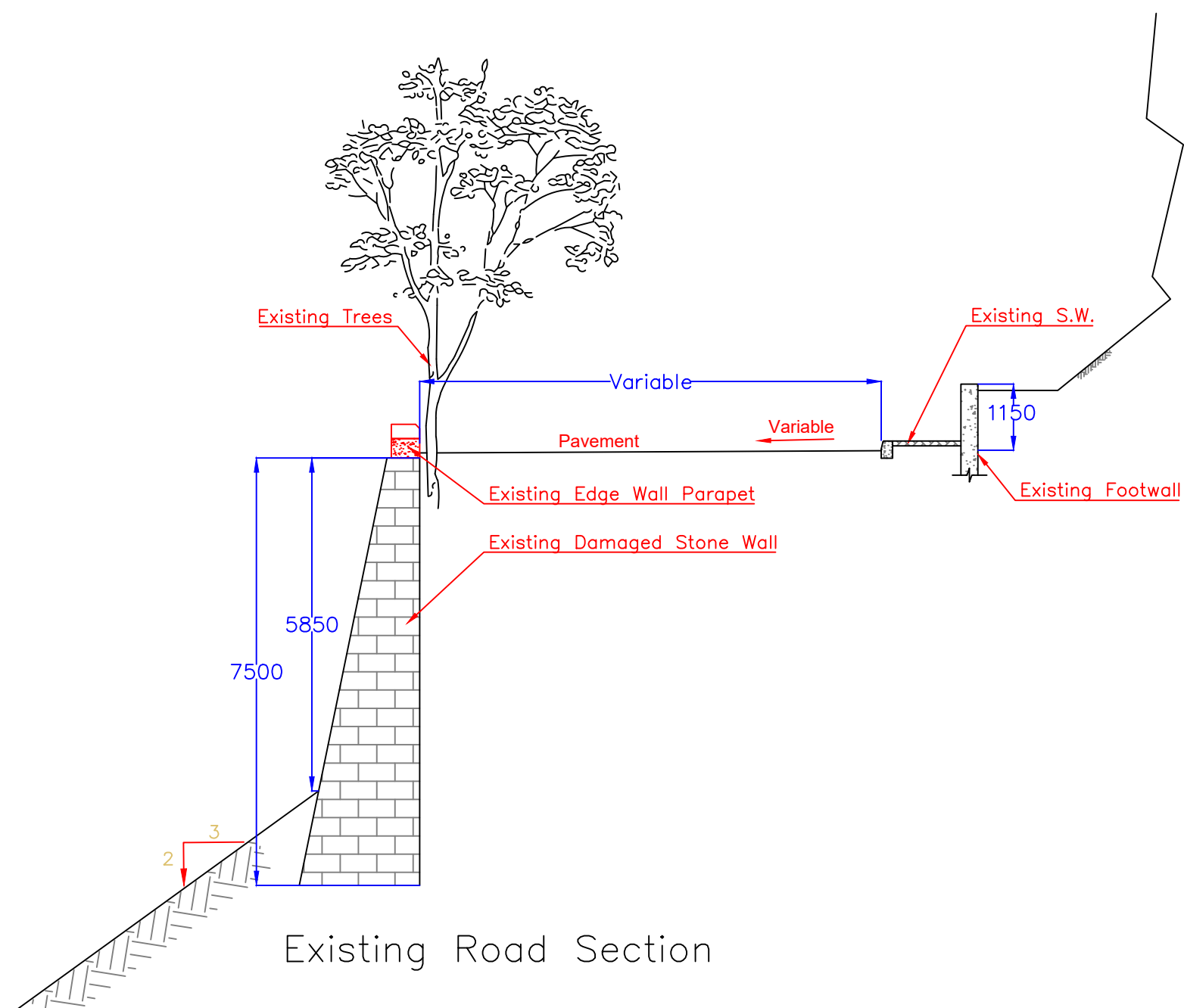
FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. N°	DATE	BY	DESCRIPTION	CHK'D	APP'D
R E V I S I O N S					
CLIENT					
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
<div><div>المكتب الهندسي الاستشاري - ايس في بيروت</div><div>ASSOCIATED CONSULTING ENGINEERS &amp; BEIRUT</div></div>					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKKA, RAGHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE					
ROAD REHABILITATION JEZZINE CAZA ROAD SETTING OUT INCREMENTAL COORDINATES ROAD: L3-JE-CL					
DESIGNED	CHECKED	PROJECT NO.	SHEET	DRAWING NO.	NO.
M.K.	H.K.	L2102	1/1	JE-G-10033	0
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	N.T.S.		



- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.



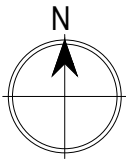
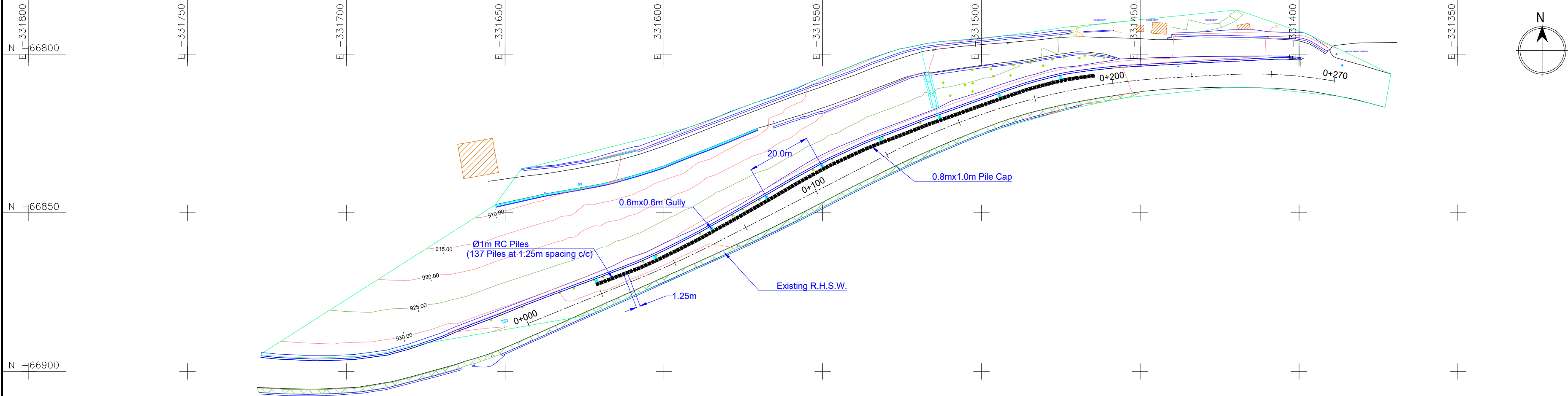
REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CH'KD	APP'D
REVISIONS					

CLIENT	REPUBLIC OF LEBANON
	COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION
PROJECT	المكتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS' BEIRUT
	CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATICH, WEST BEKAA, RACHAYA, HASBAYA & JEZZINE CAZAS)

TITLE	ROAD LINE DIAGRAM CAZA OF JEZZINE
	PROPOSED REHABILITATED WORKS

DESIGNED M.K.	CHECKED H.K.	PROJECT N°. L2102	SHEET 1 OF 1	DRAWING N°.	REV.
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE N.T.S.	JE-R-10013	0



NOTES:

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- FOR TYPICAL OVERLAY DETAILS REFER TO TYPICAL OVERLAY SECTION TYPE 1A TO 1D ON DWG. No GE-R-10011.
- FOR NEW PAVEMENT DETAILS REFER TO DWG. No GE-R-10011.
- FOR MILL AND OVERLAY DETAILS REFER TO DWG. No GE-R-10011.

LEGEND :

CROSS SECTION

- CW = CARRIAGEWAY
- SH = SHOULDER
- P = PARKING
- SW = SIDEWALK
- EC = EDGE CURB

PAVEMENT STRUCTURE

- BWC = BITUMINOUS WEARING COURSE
- BBC = BITUMINOUS BASE COURSE
- ABC = CRUSHED AGGREGATE BASE COURSE
- GSB = GRANULAR SUBBASE
- M & O = 4cm MILL & 4cm OVERLAY
- N.P = NEW PAVEMENT FOR DEEP PATCHING

PAVEMENT RATING

- G = GOOD ( SR > 3.1 )
- F = FAIR ( 2.6 < SR ≤ 3.1 )
- PR = POOR ( 2.0 ≤ SR ≤ 2.6 )
- FLD = FAILED ( SR < 2.0 )

CROSS DRAINAGE

- RCBC = REINFORCED CONCRETE BOX CULVERT
- RPCP = REINFORCED CONCRETE PIPE CULVERT
- ARCH = ARCH CULVERT
- ARMCO = ARMCO TYPE CULVERT
- IWG = INTERCEPTOR WITH GRILL
- IC = INLET CHAMBER

SIDE DRAINAGE

- ED = EARTH DITCH
- CCC = COVERED CONCRETE CHANNEL
- COC = OPEN CONCRETE CHANNEL
- U = U-SHAPE
- V = V-SHAPE

STRUCTURES

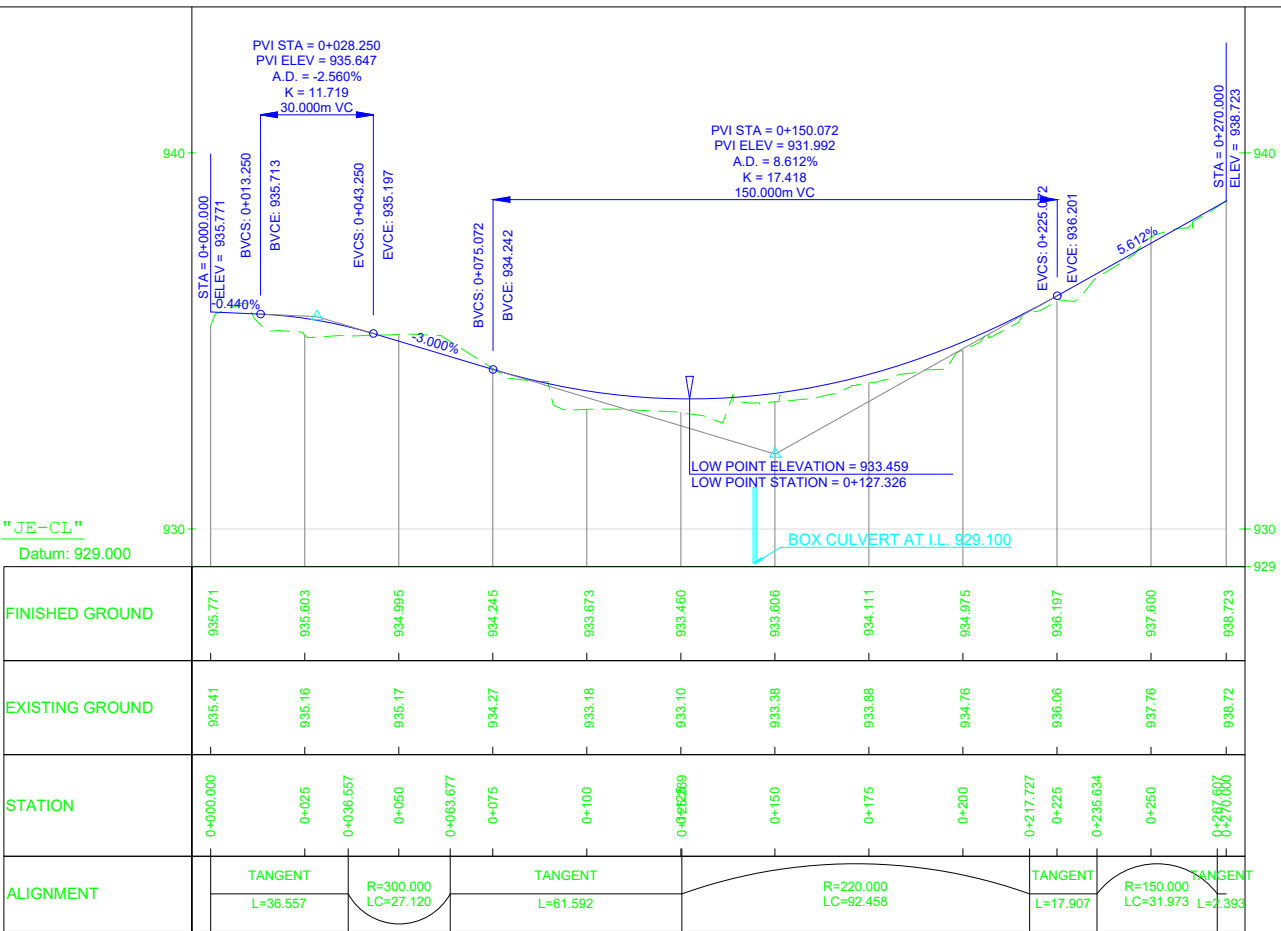
- FW = FENCE/FOOT WALL
- RW = RETAINING WALL
- BR = BRIDGE

SAFETY BARRIERS

- GR = GUARD RAIL
- NJB = NEW JERSEY BARRIER
- CB = CONCRETE BARRIER
- SMG = STONE MASONRY GUARDWALL

MISCELLANEOUS

- LHS = LEFT HAND SIDE
- RHS = RIGHT HAND SIDE
- DM = DAMAGED
- N = NEEDED
- OP = OPERATIONAL
- G = GOOD
- BD = BLOCKED
- ST = STONE
- CY = CYCLOPEAN
- RC = REINFORCED CONCRETE



		0	25	100	189	195	200	207.50	259			
EXISTING CONDITION	CROSS SECTION		6.75 S.W.=100			7.40 S.W.=107.5			6.70			
	PAVEMENT RATING / STRUCTURE		F			F			F			
	CROSS DRAINAGE											
	SIDE DRAINAGE	LHS										
		RHS										
	RETAINING WALLS	LHS	RW-ST-F			RW-ST-F			RW-ST-F			
		RHS										
	SAFETY BARRIERS	LHS	EDGE WALL PARAPET									
		RHS	FW									
	STREET LIGHTING	LHS										
RHS												

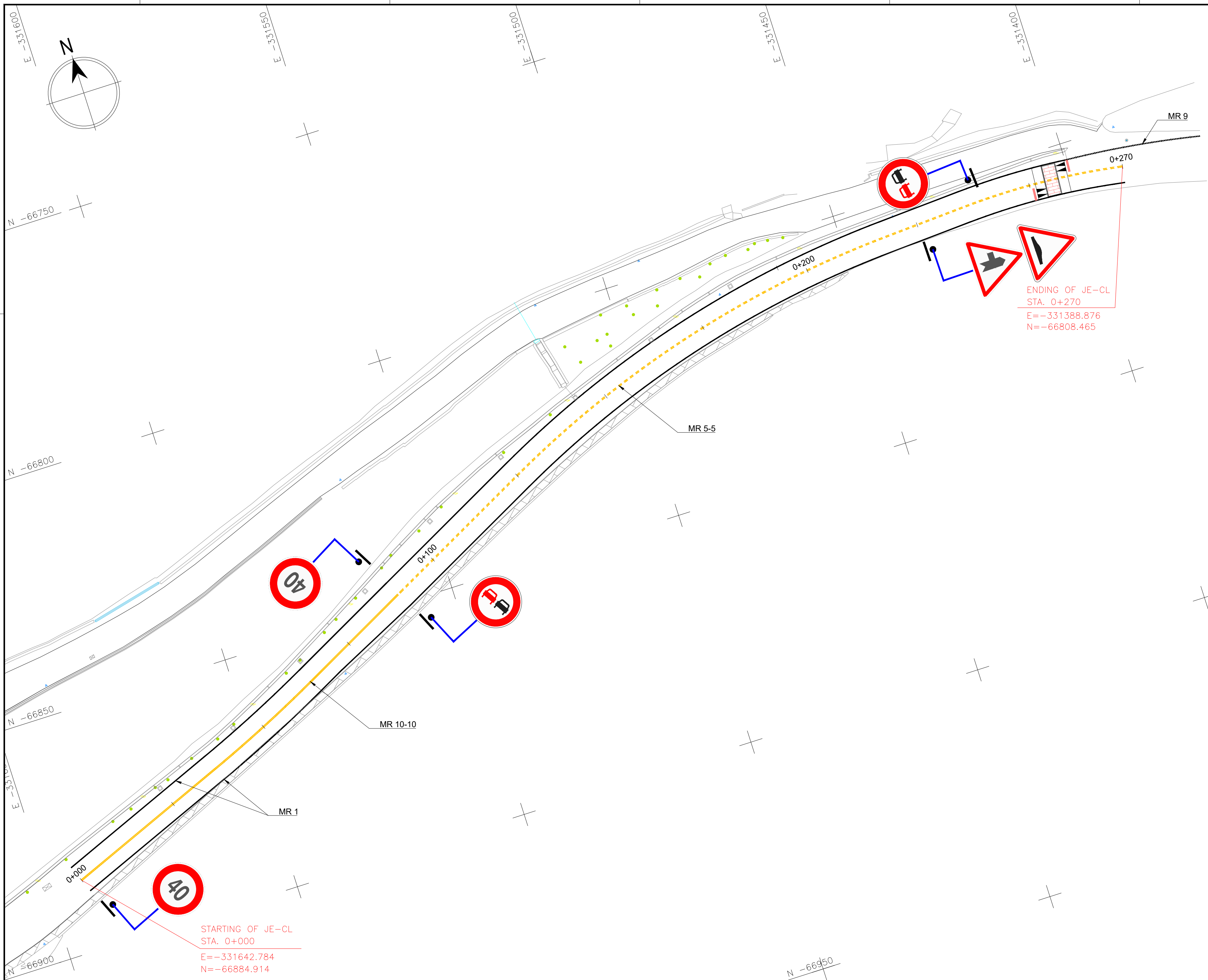
REHABILITATION WORKS	PAVEMENT STRUCTURE		NEW PAVEMENT (AAWC=0.05 + BWC=0.05 + BC=0.25)								
	CROSS DRAINAGE										
	SIDE DRAINAGE	LHS	9 GULLIES OF 0.6mX0.6m (20m spacing c/c) TO BE ADDED IN FRONT OF WALL								
		RHS									
	RETAINING WALLS	LHS	EXISTING WALL TO BE REHABILITATED								
		RHS	137 PILES OF Ø1m (1.25m spacing c/c) TO BE ADDED IN FRONT OF WALL FOR SOIL SUPPORT								
	SAFETY BARRIERS	LHS									
		RHS									
	STREET LIGHTING	LHS									
		RHS									

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHK'D	APP'D
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKKA, RAGHAYA, HASBAYA & JEZZINE CAZAS)					
TITLE					
ROAD REHABILITATION CAZA OF JEZZINE ROAD: L3-JE-CL ROAD LINE DIAGRAM (0+000 TO 0+270)					
DESIGNED	CHECKED	PROJECT NO.	SHEET	FORMING NO.	NO.
M.K.	H.K.	L2102	1 OF 1		
DRAWN	APPROVED	DATE	SCALE		
M.K.	N.F.	JULY 2023	1:1000		
JE-R-10501					0





**NOTES:**

- FOR ROAD SYMBOLS, ABBREVIATIONS & GENERAL NOTES REFER TO DRAWING No. GE-R-10010.
- FOR SPEED TABLE DETAILS REFER TO ROAD TYPICAL DETAIL DRAWING No. GE-R-10012
- FOR ROAD HORIZONTAL AND VERTICAL MARKING REFER TO TRAFFIC MARKING DETAILS DRAWINGS No. GE-R-10021 TO GE-R-10025

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHK'D	APP'D

CLIENT

REPUBLIC OF LEBANON  
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION

المكتب الهندسي الاستشاري - ايس في بيروت

ASSOCIATED CONSULTING ENGINEERS & BEIRUT

PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE  
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3  
(NABATEH, WEST BEKKA, RAHAYAH, HASBAYA & JEZZINE CAZAS)

TITLE  
ROAD REHABILITATION  
CAZA OF JEZZINE  
ROAD: JE-CL  
TRAFFIC SIGNING AND ROAD MARKING PLAN

DESIGNED M.K.	CHECKED H.K.	PROJECT NO. L2102	SHEET 1 OF 1	FORM NO. JE-G-11501	REV. 0
DRAWN M.K.	APPROVED N.F.	DATE JULY 2023	SCALE 1/250		

# GENERAL NOTES

## I. GENERAL

- EACH OF THE STRUCTURAL DWGS. SHALL BE READ IN CONJUNCTION WITH THE PERTINENT HIGHWAY, DRAINAGE AND ELECTRICAL DRAWINGS.
- UNLESS NOTED OTHERWISE, ALL DIMENSIONS SHOWN ARE IN MILLIMETERS, LEVELS ARE IN METERS. DO NOT SCALE FROM DRAWINGS.
- ALL CONSTRUCTION MATERIALS TO WHICH REFERENCE IS MADE IN THE DRAWINGS AND IN THE TYPICAL DETAILS SHALL CONFORM TO THE APPLICABLE CODES AND STANDARDS FOR CONSTRUCTION, AND TO THE SPECIFICATIONS.
- SETTING OUT OF ALL STRUCTURES SHALL BE VERIFIED BY THE CONTRACTOR ON SITE BEFORE EXECUTION OF THE WORKS, AND ANY DISCREPANCIES FROM THE DRAWINGS SHALL BE REPORTED TO THE ENGINEER FOR REVIEW.

## II. CONCRETE

- DESIGN CYLINDER COMPRESSIVE STRENGTHS OF CONCRETE  $f'_c$  SHALL BE AS FOLLOWS:
  - CAST-IN-SITU REINFORCED CONCRETE FOR ALL CONCRETE  $f'_c=28$  N/mm<sup>2</sup>.
  - BLINDING CONCRETE  $f'_c=10$  N/mm<sup>2</sup>.
- STRENGTH TESTS FOR CONCRETE SHALL BE MADE IN ACCORDANCE WITH "METHOD OF TEST FOR COMPRESSIVE STRENGTH OF MOLDED CONCRETE CYLINDERS", ASTM C39.
- ORDINARY PORTLAND CEMENT (OPC) SHALL BE USED IN ALL REINFORCED CONCRETE INCLUDING WALLS, BARRIERS, CULVERTS, APPROACH SLAB AND GUARD WALLS.

## III. REINFORCING

ALL REINFORCING STEEL BARS USED SHALL BE DEFORMED, GRADE 60 WITH A MIN. YIELD POINT STRENGTH OF 420 N/mm<sup>2</sup>, AND SHALL CONFORM TO ASTM A615.

## IV. CONCRETE COVER TO REINFORCEMENT

- UNLESS OTHERWISE INDICATED ON DRAWINGS , CONCRETE CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.

## V. DETAILS OF REINFORCEMENT

- SPLICES :
  - UNLESS OTHERWISE APPROVED BY THE ENGINEER, BARS MAY BE SPICED ONLY WHERE SHOWN ON THE DRAWINGS, EXCEPT FOR BARS LABELLED CONTINUOUS, PROVIDED NOT MORE THAN 50% OF THE BARS ARE SPICED WITHIN THE SPlice LENGTH. AT APPROVED SPLICES NO MORE THAN HALF THE BARS MAY BE SPICED AT A GIVEN SECTION.
  - UNLESS OTHERWISE INDICATED ON DRAWINGS, AT APPROVED SPLICES BARS SHALL BE LAPPED A MINIMUM OF 50 BAR DIAMETERS.
  - WHERE SPICED BARS ARE OF DIFFERENT DIAMETERS, SPlice LENGTH SHALL BE DETERMINED FOR THE SMALLER BARS. d- ALL REINFORCING BARS SHALL BE CONSIDERED AS BOTTOM BARS EXCEPT HORIZONTAL BARS IN SLABS AND BEAMS WITH MORE THAN 300 mm OF CONCRETE BELOW THEM.
- BARS BENDS:
  - THE MINIMUM INSIDE DIAMETERS OF BEND ARE AS FOLLOWS ( ACI 318-05 ):  
6 BARS DIAMETERS FOR T 10 TO T 20 8 BARS DIAMETERS FOR T 25 TO T 32 4 BARS DIAMETERS FOR STIRRUPS AND TIES b- ALL BARS SHALL BE BENT COLD. NO BARS PARTIALLY EMBEDDED IN CONCRETE SHALL BE FIELD BENT.
- BAR SUPPORTS :  
PROVIDE BAR SUPPORTS IN ACCORDANCE WITH ACI 315 DETAILING MANUAL AND AS SPECIFIED.
- HOOKS FOR STIRRUPS SHALL BE BENT AT 135° WITH THE LENGTH OF STRAIGHT BAR BEYOND THE END OF THE CURVE SHOULD BE AT LEAST TEN TIMES THE DIAMETERS OF THE BAR.

## VI. CONSTRUCTION JOINTS

- UNLESS OTHERWISE INDICATED ON DRAWINGS NO HORIZONTAL CONSTRUCTION JOINTS SHALL BE MADE IN SLABS, BEAMS OR FOUNDATIONS.
- NO HORIZONTAL CONSTRUCTION JOINTS SHALL BE MADE IN WALLS AND SLAB AND BARRIER, SIDEWALK AND BARRIER. NO VERTICAL CONSTRUCTION JOINTS IN WALLS AND SLABS AT PLACES NOT INDICATED ON DRAWINGS WITHOUT THE APPROVAL OF THE ENGINEER.
- AT APPROVED LOCATIONS, HORIZONTAL CONSTRUCTION JOINTS IN WALLS AND VERTICAL JOINTS IN WALLS SHALL BE CLEAN, FREE OF LAITANCE, AND SHALL HAVE AN APPROVED BULK HEAD AT MIDDLE OF SECTION EQUAL TO 1/3 THE THICKNESS AND 50mm IN DEPTH.

## VII. OPENINGS, PIPE SLEEVES AND FITTINGS EMBEDDED IN CONCRETE

- THE CONTRACTOR SHALL REFER TO DRAINAGE AND ELECTRICAL DRAWINGS FOR VERIFICATION AND COORDINATION OF OPENINGS,PIPES, SLEEVES AND FITTINGS .
- OPENINGS NOT INDICATED ON STRUCTURAL DRAWINGS UP TO A MAXIMUM OF 200mm MAY BE PLACED OR DRILLED IN SOLID SLABS EXCEPT FOR PUDDLE FLANGES WHICH

## VIII. CONCRETE PROTECTION

ALL CONCRETE SURFACES IN CONTACT WITH GROUND SHALL BE PAINTED WITH TWO COATS OF BITUMINOUS PAINT AS SPECIFIED. UNLESS OTHERWISE NOTED.

## IX. DESIGN SPECIFICATION

THE FOLLOWING STANDARDS SHALL BE ADOPTED:  
1. AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SEVENTEENTH EDITION AND THE AASHTO STANDARD SPECIFICATIONS FOR SEISMIC DESIGN OF HIGHWAY BRIDGES AND THE LATEST REVISIONS TO THE ABOVE SPECIFICATIONS.

## X. CHAMFERS

UNLESS OTHERWISE INDICATED ON DRAWINGS, ALL EXPOSED CONCRETE EDGES OF THE VIADUCT SHALL BE CHAMFERED TO 20mm x 20mm.

## XI. BACKFILL BEHIND WALLS

- BACKFILL BEHIND ALL RETAINING WALLS SHALL BE SELECT GRANULAR ENGINEERING FILL MATERIAL (AS PER SPECIFICATIONS) AND SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 200mm TO 95% OF MAXIMUM DRY DENSITY AS OBTAINED PER ASTM D 1557 METHOD D.

## XII. DESIGN LOADS FOR RETAINING STRUCTURAL SYSTEM

- THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE RETAINING STRUCTURAL SYSTEM TO RETAINING WALLS TO THE ENGINEER FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL PREPARE ALL RELATED CALCULATIONS, DRAWINGS AND DETAILS FOR THE APPROVED ALTERNATIVE AND SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL.
- RETAINING STRUCTURE SYSTEMS SHALL BE DESIGNED TO RESIST LATERAL EARTH PRESSURES, HIGHWAY SURCHARGE, SURCHARGE FROM ADJACENT BUILDINGS, AND EARTH SEISMIC LOADING BASED ON A GROUND ACCELERATION OF 0.2g IN ACCORDANCE WITH RECENT INTERNATIONAL (AMERICAN, EUROPEAN) CODES AND STANDARDS. THE MAXIMUM ANGLE OF INTERNAL FRICTION FOR THE DESIGN OF THE APPROVED ALTERNATIVE SHALL NOT BE TAKEN GREATER THAN 32° SUBJECT TO THE APPROVAL OF THE ENGINEER.

## XIII. CONCRETE FINISH

ALL EXPOSED CONCRETE SURFACES BE FAIRFACED.

## XIV. ABBREVIATIONS

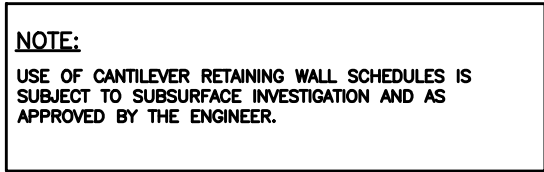
ADD.	ADDITIONAL
BOT.	BOTTOM
C.L.	CONCRETE LEVEL
CONT.	CONTINUOUS BAR LAPPED 50db, U.N.O.
E.F.	EACH FACE
E.W.	EACH WAY
EQ. SP.	EQUALLY SPACED
EL	ELEVATION
F.G.L.	FINISHED GRADE LEVEL
N.G.L.	NATURAL GROUND LEVEL
MIN.	MINIMUM
MAX.	MAXIMUM
N.T.S.	NOT TO SCALE
R.C.	REINFORCED CONCRETE
REINF.	REINFORCEMENT
STIR.	STIRRUPS
THICK.	THICKNESS
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
T, db	DEFORMED HIGH YIELD BAR NOMINAL DIAMETER IN mm
EXP. JT.	EXPANSION JOINT
CONST. JT.	CONSTRUCTION JOINT

FINAL TENDER DOCUMENTS

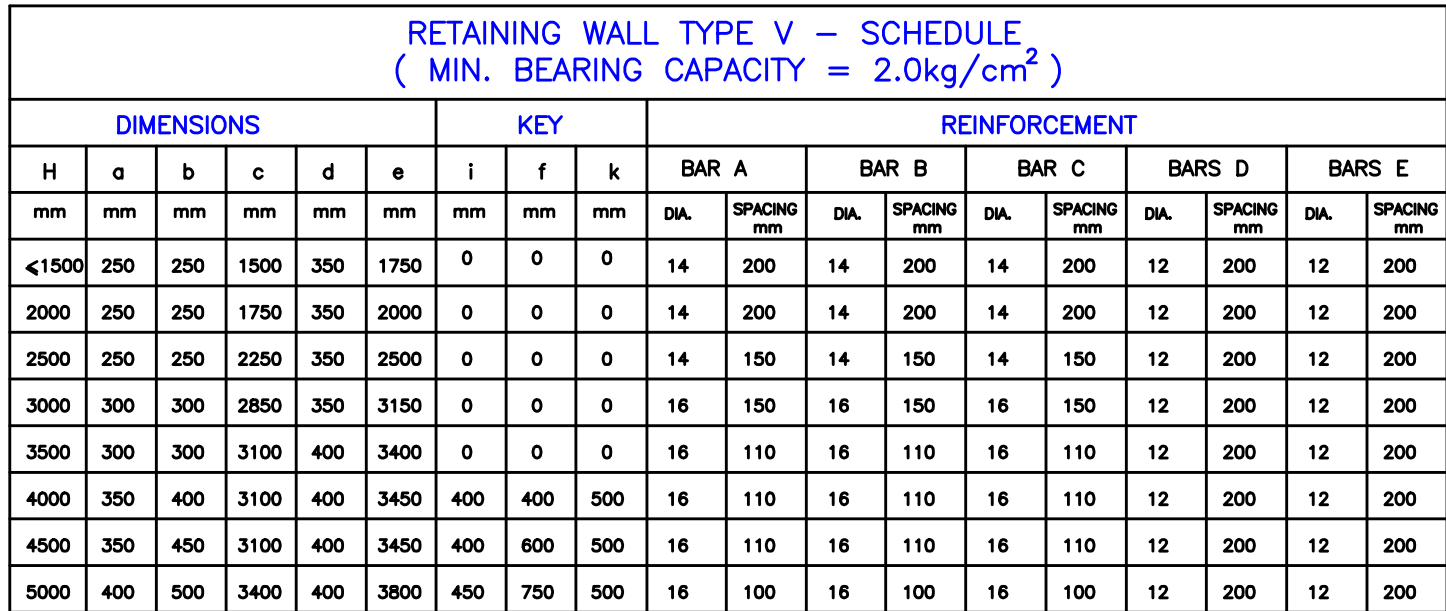
REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHNG	APPRD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيوت ASSOCIATED CONSULTING ENGINEERS & BEBOUT					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (MARTIN, WEST BEWA, RACHVA, HASBAYA & JEZZINE QIZAS)					
TITLE					
ROAD REHABILITATION STRUCTURAL GENERAL NOTES					
DRAWN J.L.	CHECKED C.K.	PROJECT NO. L2102	SHEET 1 OF 1	ISSUED BY GE-S-40000	REV 0
DATE O.A.L.	APPROVED N.F.	DATE JULY 2023	SCALE AS SHOWN		

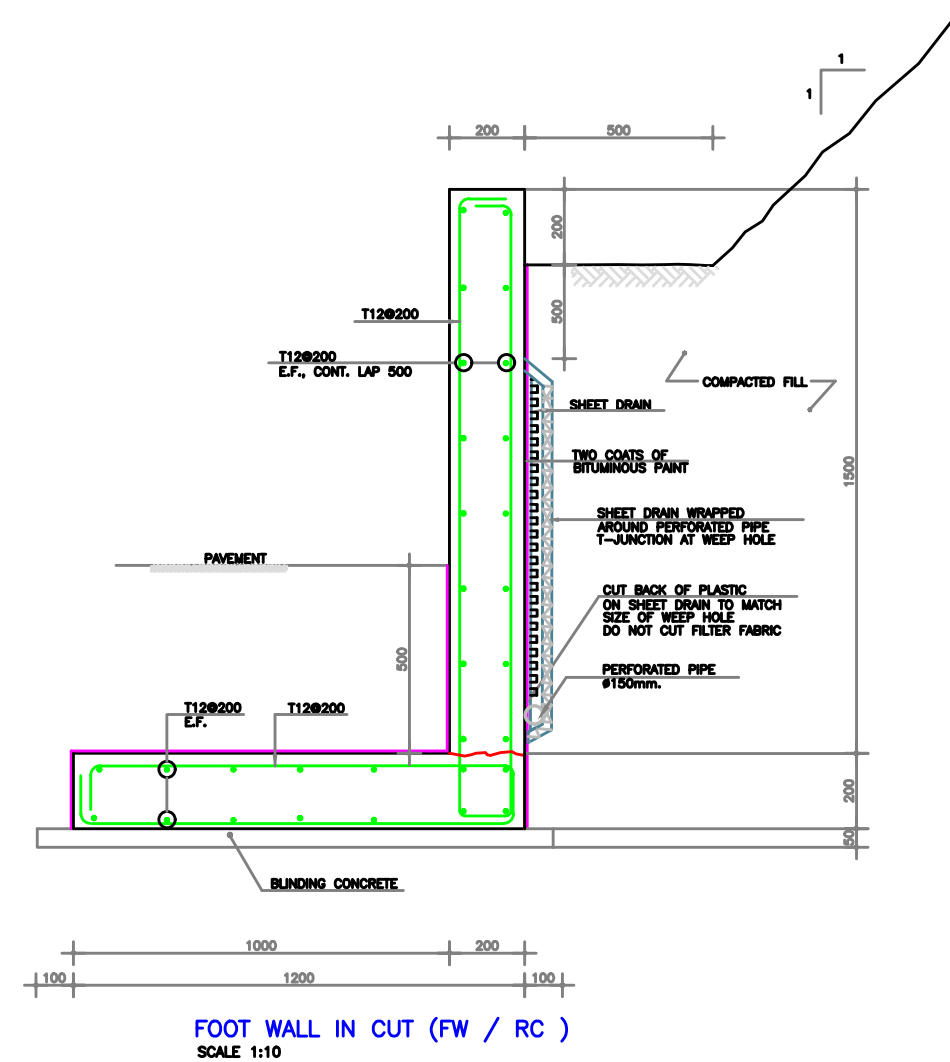




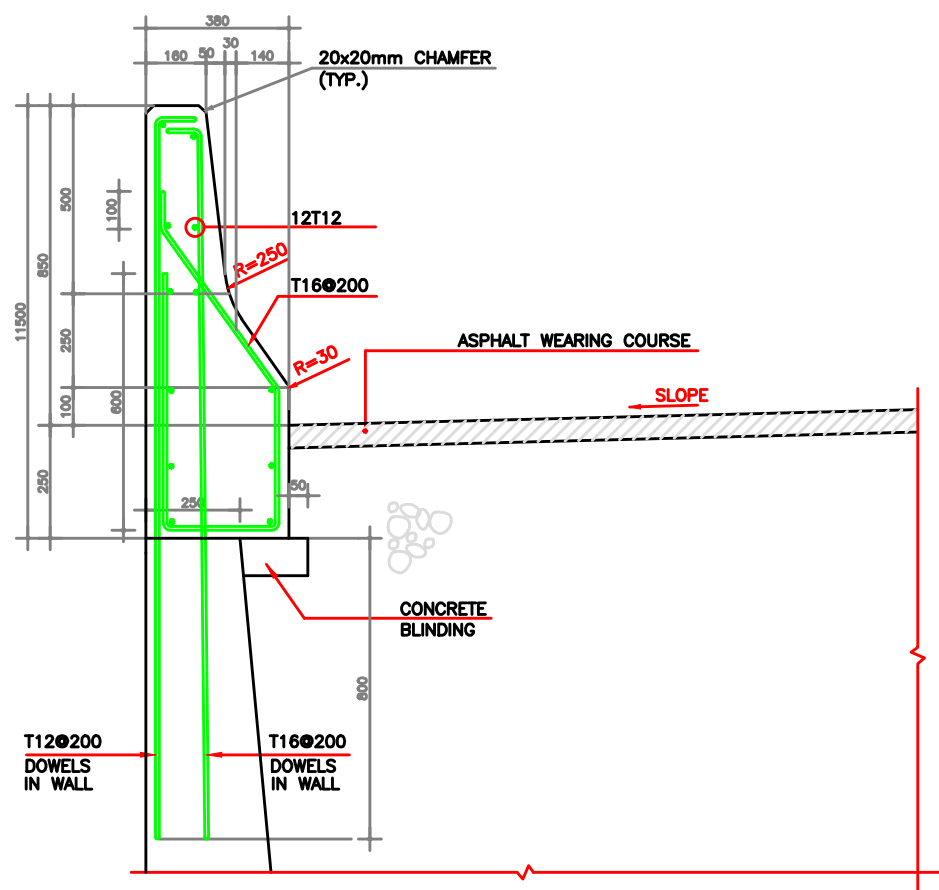
RETAINING WALL TYPE IV – SCHEDULE ( MIN. BEARING CAPACITY = 2.0kg/cm <sup>2</sup> )												
DIMENSIONS					REINFORCEMENT							
h mm	a mm	b mm	c mm	d mm	BAR A		BAR B		BAR C		BARS D	
					DIA.	SPACING mm	DIA.	SPACING mm	DIA.	SPACING mm	DIA.	SPACING mm
≤1500	250	250	2000	100	16	100	16	100	12	200	12	200
2000	250	300	2250	100	16	100	16	100	12	200	12	200



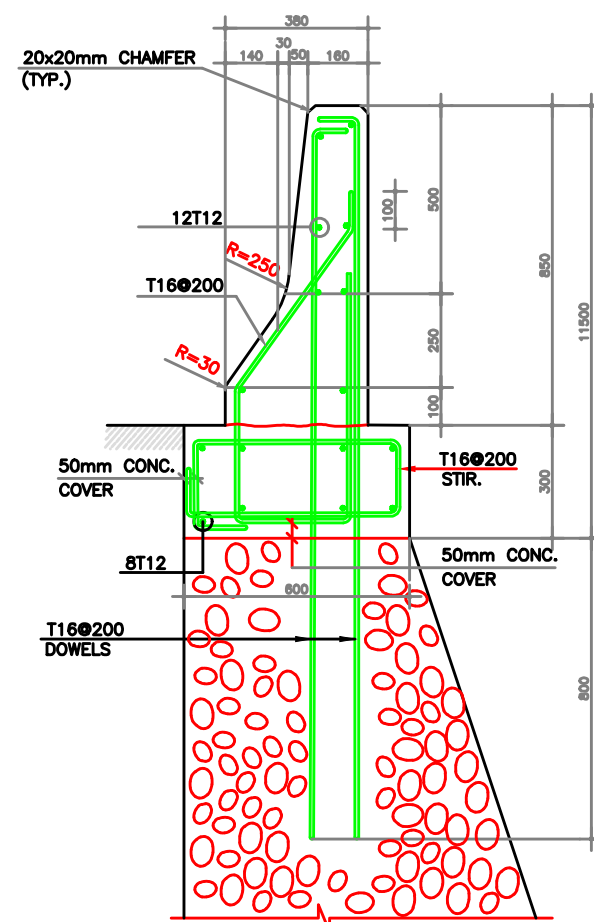
TYPICAL FOOTBALL SCHEDULE ( MIN. BEARING CAPACITY = 25T/m <sup>2</sup> )																
DIMENSIONS					REINFORCEMENT											
H mm	a mm	b mm	c mm	d mm	BAR A		BAR B		BAR C		BAR D		BARS E		BARS F	
					DIA.	Spacing mm	DIA.	Spacing mm	DIA.	Spacing mm	DIA.	Spacing mm	DIA.	Spacing mm	DIA.	Spacing mm
2000	200	200	500	1400	10	150	10	200	10	150	10	150	10	200	10	200
2500	250	250	650	1800	12	150	10	200	12	150	12	150	10	200	10	200
3000	300	300	800	1800	14	150	10	200	14	150	14	150	10	200	10	200
3500	350	350	950	2000	14	150	10	200	14	150	14	150	10	200	10	200
4000	400	400	1100	2200	14	150	12	200	14	150	14	150	12	200	12	200
4500	450	450	1250	2400	16	150	12	200	16	150	16	150	12	200	12	200
5000	500	500	1800	3000	16	130	12	200	16	130	16	130	12	200	12	200
6000	600	600	2400	3700	20	140	12	180	20	140	20	140	12	180	12	180



REV.	N°	DATE	BY	DESCRIPTION	DWG	APPD			
<b>R E V I S I O N S</b>									
<b>CUSTOMER</b>									
REPUBLIC OF LEBANON COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION									
المكتب الهندسي الاستشاري - ايس س جيه									
<b>ASSOCIATED CONSULTING ENGINEERS' BUREAU</b>									
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATHIN, WEST BEHA, RACHAYA, HSYRYIA & JEZZINE CADS)									
<b>ROAD REHABILITATION WALL STRUCTURAL DETAILS</b>									
<b>TITLE</b>									
DESIGNED BY	CHECKED BY	PROJECT NO.	SHEET						
J.J.I.	M.F.	L21012	1 OF 1						
Q.A.L.	C.N.C.	JULY 2023	AS SHOWN						
DRAWING NO.				GE-S-40001					
REV.				0					

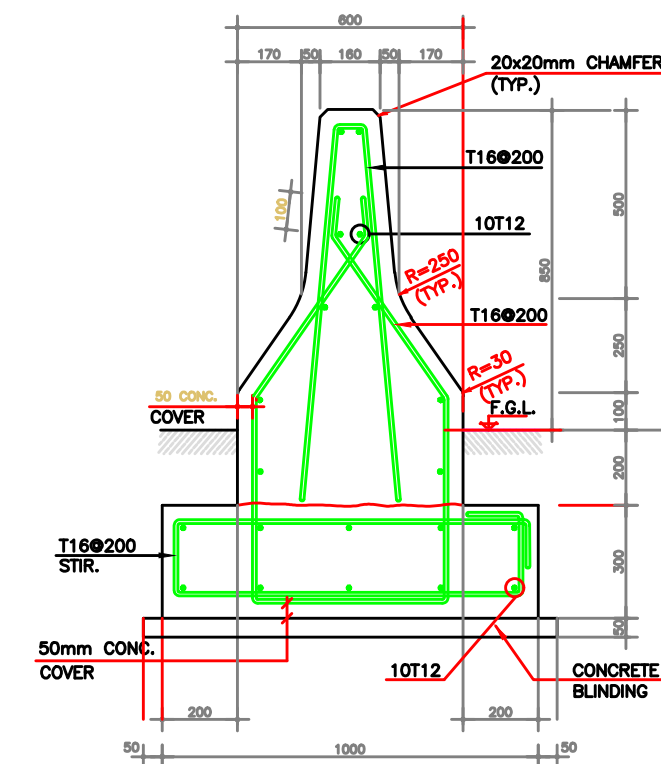


HALF NEW JERSEY BARRIER ON RETAINING WALL SECTION  
SCALE : 1/10

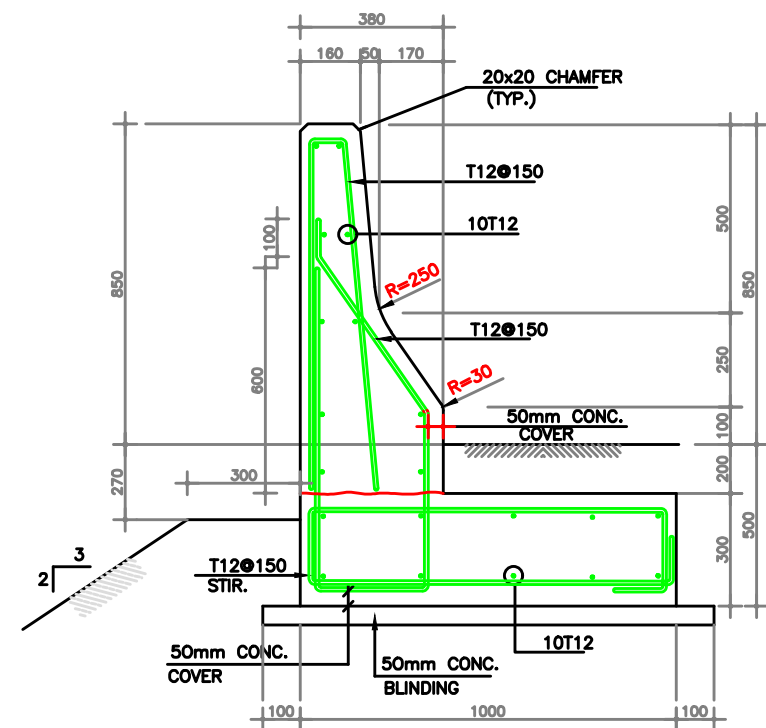


HALF NEW JERSEY BARRIER ON CYCLOPEAN WALL SECTION  
SCALE : 1/10

NOTE : SPACING OF EXPANSION JOINTS = 20m MIN. AND 30m MAX.

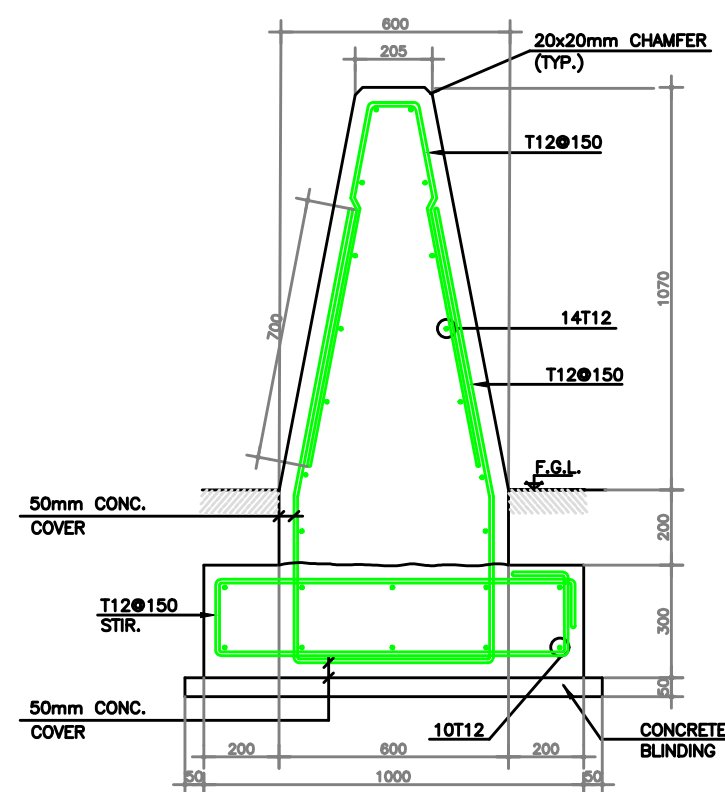


CENTRAL NEW JERSEY BARRIER DETAIL IN MEDIAN  
SCALE : 1/10  
NOTE : SPACING OF EXPANSION JOINTS = 20m MIN. AND 30m MAX.  
MAX. SPACING OF CONSTRUCTION JOINTS = 10m MAX.



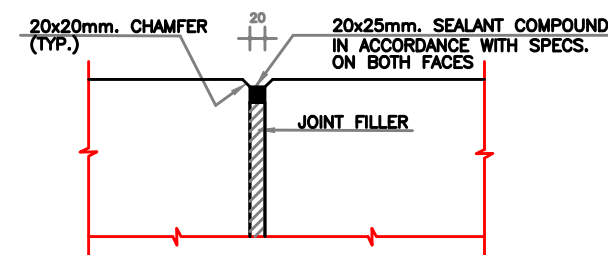
SINGLE FACE NEW JERSEY BARRIER AGAINST A SLOPE  
SCALE : 1/10

NOTE : SPACING OF EXPANSION JOINTS = 20m MIN./30m MAX.  
MAX. SPACING OF CONSTRUCTION JOINTS = 7.5m



SINGLE SLOPE BARRIER DETAIL IN MEDIAN  
SCALE : 1/10

NOTE : SPACING OF EXPANSION JOINTS = 20m MIN. AND 30m MAX.  
MAX. SPACING OF CONSTRUCTION JOINTS = 7.5m MAX.



TYPICAL JOINT DETAIL  
SCALE : 1/10

#### NOTES :

- FOR GENERAL NOTES REFER TO DWG. No. GE-S-40000
- THE ALUMINUM HANDRAIL SHALL BE DESIGNED TO WITHSTAND A 1 KN/m FORCE APPLIED IN ANY DIRECTION. THE CONTRACTOR SHALL SUBMIT ALL DETAILS TO THE ENGINEER FOR REVIEW AND APPROVAL.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHD	APPD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيوت					
ASSOCIATED CONSULTING ENGINEERS & SURVEY					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(MARTIN, WEST BEKA, RACHA, HASBAYA & JEZZINE QIZAS)					
TITLE					
NEW JERSEY BARRIER STRUCTURAL DETAILS					
( NJB )					
DESIGNED	CHECKED	PROJECT BY	SHEET	ISSUED BY	REV.
J.L.	C.K.	L2102	1 OF 1	GE-S-40002	0
DATE	OFFICE	DATE	SCALE	AS SHOWN	
O.A.L.	N.F.	JULY 2023			



BOX CULVERTS DIMENSIONS AND QUANTITIES																
DIMENSIONS				TABLE 1S – 0.90m FILL COVER OR LESS												
SPAN	HEIGHT	SLAB	WALL	REINFORCEMENT										SPACER BARS		
				Bar Diameter, Spacing and Length in Millimeters												
				BARS – A			BARS – B			BARS – C				SIZE	NUMBER	
S	H	T	W	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	TOP SLAB	BOTTOM SLAB	EACH WALL
1000	1000	180	180	#16	140	1240	#12	190	1400	#12	400	1680	#12	10	7	5
1500	1000	180	180	#20	190	1780	#14	180	1615	#12	400	1700	#12	13	7	5
1500	1250	180	180	#20	180	1780	#14	180	1740	#12	400	1950	#12	13	7	7
1500	1500	190	180	#20	180	1780	#14	220	1875	#12	400	2220	#12	13	7	7
2000	1000	200	200	#20	170	2320	#16	180	1830	#12	400	1740	#12	17	9	5
2000	1250	200	200	#20	170	2320	#16	180	1955	#12	400	1990	#12	17	9	7
2000	1500	200	200	#20	160	2320	#14	150	2080	#12	400	2240	#12	18	9	7
2000	2000	210	200	#20	150	2320	#14	180	2340	#12	350	2780	#12	18	9	9
2500	1000	230	230	#20	170	2880	#16	140	2085	#12	350	1800	#12	21	12	5
2500	1250	230	230	#20	170	2880	#16	180	2190	#12	400	2050	#12	21	12	7
2500	1500	230	230	#20	160	2880	#16	170	2315	#12	400	2300	#12	21	12	7
2500	2000	230	230	#20	150	2880	#16	190	2585	#12	400	2800	#12	23	12	9
2500	2500	230	230	#20	140	2880	#14	150	2815	#12	240	3300	#12	23	12	13
3000	1000	260	260	#20	180	3440	#16	130	2300	#12	400	1880	#12	27	16	5
3000	1250	260	260	#20	170	3440	#16	140	2425	#12	400	2110	#12	27	16	7
3000	1500	260	260	#20	160	3440	#16	150	2550	#12	400	2360	#12	27	16	7
3000	2000	260	260	#20	150	3440	#16	170	2800	#12	400	2860	#12	27	16	9
3000	2500	260	260	#20	140	3440	#16	180	3050	#12	280	3360	#12	29	16	13
3000	3000	260	260	#20	140	3440	#16	180	3300	#12	220	3860	#12	30	16	15

BOX CULVERTS DIMENSIONS AND QUANTITIES																
DIMENSIONS				TABLE 3S - FILL COVER OVER TO 4.0m TO 5.1m												
SPAN	HEIGHT	SLAB	WALL	REINFORCEMENT												
				Bar Diameter, Spacing and Length in Millimeters										SPACER BARS		
				BARS - A			BARS - B			BARS - C						
S	H	T	W	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH	SIZE	NUMBER		
1000	1000	180	180	#12	170	1240	#12	300	1400	#12	400	1680	#10	7	7	5
1500	1000	180	180	#14	140	1780	#12	200	1615	#12	400	1700	#10	9	9	5
1500	1250	180	180	#14	140	1780	#12	200	1740	#12	400	1950	#10	9	9	7
1500	1500	180	180	#14	135	1780	#12	200	1865	#12	400	2200	#10	9	9	9
2000	1000	220	220	#16	140	2360	#14	170	1870	#12	400	1780	#12	10	10	5
2000	1250	220	220	#16	140	2360	#14	180	1975	#12	400	2030	#12	10	10	7
2000	1500	220	220	#16	135	2360	#14	180	2120	#12	400	2280	#12	10	10	7
2000	2000	220	220	#16	130	2360	#14	180	2370	#12	400	2780	#12	10	10	9
2500	1000	260	230	#20	160	2880	#16	150	2095	#12	400	1880	#12	14	14	5
2500	1250	260	230	#20	150	2880	#16	170	2220	#12	400	2110	#12	14	14	7
2500	1500	260	230	#20	150	2880	#16	180	2345	#12	400	2380	#12	14	14	7
2500	2000	260	240	#20	140	2900	#16	180	2605	#12	400	2880	#12	14	14	9
2500	2500	260	260	#20	140	2940	#16	180	2875	#12	280	3360	#12	14	14	13
3000	1000	300	260	#20	140	3440	#16	125	2340	#12	280	1940	#12	19	19	5
3000	1250	300	260	#20	135	3440	#16	135	2485	#12	280	2190	#12	19	19	7
3000	1500	300	260	#20	130	3440	#16	140	2590	#12	280	2440	#12	19	19	9
3000	2000	300	260	#20	125	3440	#16	150	2840	#12	280	2940	#12	19	19	11
3000	2500	300	260	#20	125	3480	#16	150	3110	#12	280	3440	#12	19	19	13
3000	3000	300	300	#20	125	3520	#16	150	3380	#12	200	3940	#12	19	19	13

# NOTE:

FOR LOCATION OF BOX CULVERTS, REFER TO DRAINAGE DRAWINGS.

BOX CULVERTS DIMENSIONS AND QUANTITIES																
DIMENSIONS				TABLE 2S – FILL COVER OVER 0.9m TO 4.00m												
SPAN	HEIGHT	SLAB	WALL	REINFORCEMENT												
				Bar Diameter, Spacing and Length in Millimeters										SPACER BARS		
				BARS – A		BARS – B		BARS – C		SIZE	NUMBER					
S	H	T	W	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH			SIZE	SPGC	LENGTH	SIZE	TOP SLAB
1000	1000	180	180	#12	170	1240	#12	300	1400	#12	400	1680	#10	7	7	5
1500	1000	180	180	#14	160	1780	#12	230	1615	#12	400	1700	#10	9	9	5
1500	1250	180	180	#14	160	1780	#12	230	1740	#12	400	1950	#10	9	9	7
1500	1500	180	180	#14	160	1780	#12	230	1865	#12	400	2200	#10	9	9	9
2000	1000	200	200	#16	150	2320	#14	180	1830	#12	400	1740	#12	9	9	5
2000	1250	200	200	#16	150	2320	#14	190	1955	#12	400	1990	#12	9	9	7
2000	1500	200	200	#16	140	2320	#14	190	2080	#12	400	2240	#12	9	9	7
2000	2000	200	200	#16	135	2320	#14	180	2330	#12	350	2740	#12	9	9	9
2500	1000	230	230	#20	180	2880	#16	160	2065	#12	400	1800	#12	12	12	5
2500	1250	230	230	#20	170	2880	#16	170	2190	#12	400	2050	#12	12	12	7
2500	1500	230	230	#20	170	2880	#16	180	2315	#12	400	2300	#12	12	12	7
2500	2000	230	230	#20	160	2880	#16	180	2565	#12	400	2800	#12	12	12	9
2500	2500	230	230	#20	150	2880	#16	170	2815	#12	240	3300	#12	12	12	13
3000	1000	260	260	#20	160	3440	#16	130	2300	#12	400	1880	#12	16	16	5
3000	1250	260	260	#20	150	3440	#16	135	2425	#12	400	2110	#12	16	16	7
3000	1500	260	260	#20	150	3440	#16	140	2550	#12	400	2360	#12	16	16	9
3000	2000	260	260	#20	140	3440	#16	150	2800	#12	400	2860	#12	16	16	11
3000	2500	260	260	#20	130	3440	#16	150	3050	#12	400	3360	#12	16	16	13
3000	3000	260	260	#20	130	3440	#16	140	3300	#12	200	3680	#12	16	16	15

BOX CULVERTS DIMENSIONS AND QUANTITIES																
DIMENSIONS				TABLE 4S - FILL COVER OVER 5.10m TO 6.50m												
SPAN	HEIGHT	SLAB	WALL	REINFORCEMENT												
				Bar Diameter, Spacing and Length in Millimeters										SPACER BARS		
				BARS - A		BARS - B		BARS - C		SIZE	NUMBER					
S	H	T	W	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH			SIZE	SPGC	LENGTH	SIZE	TOP SLAB
1000	1000	180	160	#12	150	1240	#12	300	1400	#12	400	1680	#10	7	7	5
1500	1000	200	200	#14	135	1820	#12	200	1655	#12	400	1740	#10	10	10	7
1500	1250	200	200	#14	130	1820	#12	200	1780	#12	400	1990	#10	10	10	9
1500	1500	200	200	#14	130	1820	#12	200	1905	#12	400	2240	#10	10	10	9
2000	1000	240	220	#20	170	2380	#14	180	1890	#12	400	1820	#12	11	11	5
2000	1250	240	220	#20	170	2380	#14	180	1995	#12	400	2070	#12	11	11	7
2000	1500	240	220	#20	160	2380	#14	180	2140	#12	400	2320	#12	11	11	7
2000	2000	240	240	#20	160	2400	#14	180	2410	#12	400	2820	#12	11	11	9
2500	1000	280	260	#20	150	2940	#16	150	2155	#12	400	1920	#14	12	12	5
2500	1250	280	260	#20	140	2940	#16	160	2280	#12	400	2170	#14	12	12	7
2500	1500	280	260	#20	140	2940	#16	180	2405	#12	400	2420	#14	12	12	7
2500	2000	280	270	#20	140	2980	#16	180	2665	#12	400	2920	#14	12	12	9
3000	2500	290	290	#20	140	3000	#16	180	2935	#12	400	3420	#14	12	12	13
3000	1000	340	300	#20	135	3520	#16	120	2420	#12	400	2020	#14	16	16	5
3000	1250	340	300	#20	130	3520	#16	130	2545	#12	400	2270	#14	16	16	7
3000	1500	340	300	#20	125	3520	#16	140	2670	#12	400	2520	#14	16	16	7
3000	2000	340	300	#20	120	3520	#16	150	2920	#12	400	3020	#14	16	16	9
3000	2500	340	320	#20	120	3580	#16	150	3180	#12	400	3520	#14	16	16	13
3000	3000	340	340	#20	120	3600	#16	150	3460	#12	280	4020	#14	16	16	13



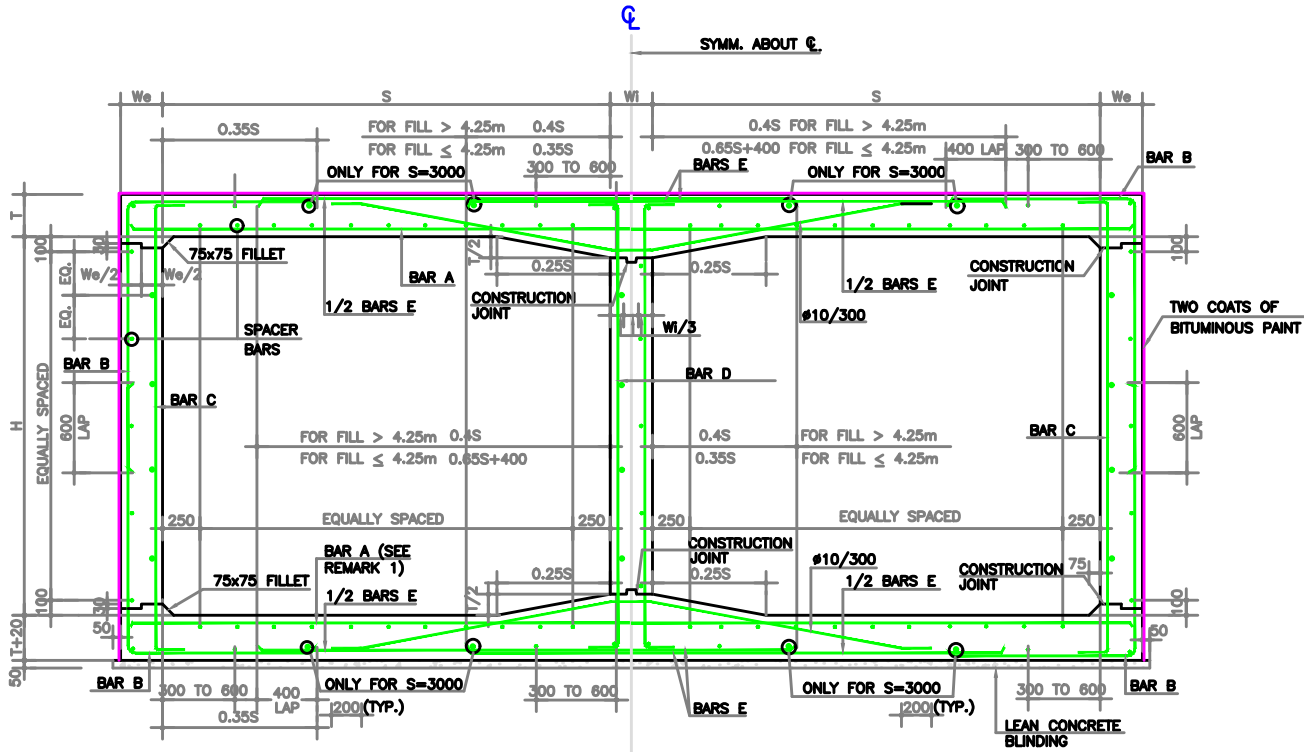
BOX CULVERTS DIMENSIONS AND QUANTITIES																			
DIMENSIONS				TABLE 1D - 0.90m FILL COVER OR LESS															
				REINFORCEMENT															
				Bar Diameter, Spacing and Length in Millimeters												SPACER BARS			
				BARS-A			BARS-B			BARS-C			BARS-D			BARS-E			SIZE
SPAN	HEIGHT	SLAB	EXT. WALL	INT. WALL	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
S	H	T	We	Wi	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
1500	1500	200	200	200	#20	200	3520	#14	220	1905	#12	180	2240	#12	300	2240	#16	140	2100
2000	1000	200	200	200	#20	200	4520	#14	180	1830	#12	220	1740	#12	300	1740	#16	150	2800
2000	1250	200	200	200	#20	200	4520	#14	180	1955	#12	220	1990	#12	300	1990	#16	140	2800
2000	1500	200	200	200	#20	200	4520	#14	200	2080	#12	200	2240	#12	300	2240	#16	140	2800
2000	2000	200	200	200	#20	200	4520	#14	220	2330	#12	180	2740	#12	300	2740	#16	140	2800
2500	1000	230	230	200	#20	200	5580	#14	140	2065	#12	220	1800	#12	300	1800	#16	140	3100
2500	1250	230	230	200	#20	200	5580	#14	150	2190	#12	220	2050	#12	300	2050	#16	140	3100
2500	1500	230	230	200	#20	190	5580	#14	170	2315	#12	200	2300	#12	300	2300	#16	130	3100
2500	2000	230	230	200	#20	190	5580	#14	180	2585	#12	180	2800	#12	300	2800	#16	130	3100
2500	2500	230	230	200	#20	190	5580	#14	180	2815	#12	180	3300	#14	250	3300	#16	130	3100
3000	1000	260	260	200	#20	200	6640	#16	170	2300	#12	220	1880	#12	300	1880	#16	140	3600
3000	1250	260	260	200	#20	190	6640	#16	180	2425	#12	220	2110	#12	300	2110	#16	130	3600
3000	1500	260	260	200	#20	190	6640	#16	200	2550	#12	220	2360	#12	300	2360	#16	130	3600
3000	2000	260	260	200	#20	190	6640	#16	220	2800	#12	180	2880	#12	300	2880	#16	130	3600
3000	2500	260	260	200	#20	190	6640	#16	220	3050	#12	160	3360	#14	250	3360	#16	125	3600
3000	3000	260	260	250	#20	180	6690	#14	150	3300	#12	140	3860	#14	200	3860	#16	120	3650

BOX CULVERTS DIMENSIONS AND QUANTITIES																			
DIMENSIONS				TABLE 3D - FILL COVER OVER TO 4.00m TO 5.10m															
				REINFORCEMENT															
				Bar Diameter, Spacing and Length in Millimeters												SPACER BARS			
				BARS-A			BARS-B			BARS-C			BARS-D			BARS-E			SIZE
SPAN	HEIGHT	SLAB	EXT. WALL	INT. WALL	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
S	H	T	We	Wi	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
1500	1500	220	220	200	#14	160	3560	#12	180	1945	#12	400	2280	#12	300	2280	#16	130	1400
2000	1000	220	220	200	#14	160	4560	#12	230	1870	#12	400	1780	#12	300	1780	#16	130	1800
2000	1250	220	220	200	#14	160	4560	#12	230	1975	#12	400	2030	#12	300	2030	#16	130	1800
2000	1500	220	220	200	#14	160	4560	#12	230	2120	#12	400	2280	#12	300	2280	#16	130	1800
2000	2000	220	220	200	#14	160	4560	#12	180	2370	#12	400	2780	#12	300	2780	#16	130	1800
2500	1000	260	230	200	#16	160	5580	#12	170	2095	#12	400	1860	#12	300	1860	#20	150	2200
2500	1250	260	230	200	#16	160	5580	#12	180	2220	#12	400	2110	#12	300	2110	#20	150	2200
2500	1500	260	230	200	#16	160	5580	#12	180	2345	#12	400	2360	#12	300	2360	#20	150	2200
2500	2000	260	240	200	#16	160	5600	#12	170	2605	#12	400	2860	#12	300	2860	#20	150	2200
2500	2500	260	260	200	#16	160	5640	#12	140	2875	#12	280	3360	#14	250	3360	#20	150	2200
3000	1000	300	260	200	#16	140	6640	#14	170	2340	#12	300	1940	#20	130	2600	#14	29	29
3000	1250	300	260	200	#16	135	6640	#14	190	2465	#12	280	2190	#12	300	2190	#20	125	2600
3000	1500	300	260	200	#16	135	6640	#14	190	2590	#12	300	2440	#20	125	2600	#14	29	29
3000	2000	300	260	200	#16	135	6640	#14	190	2840	#12	280	2940	#12	300	2940	#20	125	2600
3000	2500	300	280	200	#16	135	6680	#14	160	3110	#12	280	3440	#14	250	3340	#20	125	2600
3000	3000	300	300	250	#16	135	6770	#14	150	3380	#12	200	3940	#14	200	3940	#20	125	2650

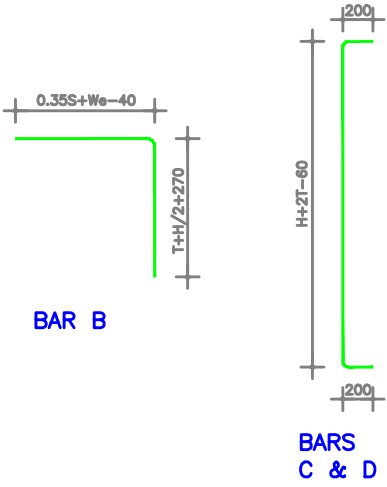
SPECIAL BOX CULVERT DIMENSIONS AND QUANTITIES																			
DIMENSIONS				TABLE 5D - FILL COVER OVER 6.50m TO 8.00m															
				REINFORCEMENT															
				Bar Diameter, Spacing and Length in Millimeters												SPACER BARS			
				BARS-A			BARS-B			BARS-C			BARS-D			BARS-E			SIZE
SPAN	HEIGHT	SLAB	EXT. WALL	INT. WALL	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
S	H	T	We	Wi	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH
1500	1500	270	240	200	#14	150	3600	#16	190	2015	#10	200	2380	#10	200	2380	#16	120	1400

NOTE

FOR LOCATION OF BOX CULVERTS, REFER TO DRAINAGE DRAWINGS.



TYPICAL SECTION

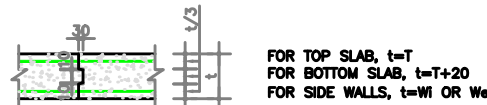


LENGTH OF STRAIGHT BARS:

BAR A:  $2S+2We+Wi-80$   
BAR E:  $0.8S+Wi$  FOR FILL > 4.25m.  
 $S+Wi+400$  FOR FILL ≤ 4.25m.

REMARK 1:

BAR A IN BOTTOM SLAB OF TABLE 1D ONLY, FOR S=2000 ONLY SHALL HAVE SAME SIZE, SPACING & LENGTH AS BARS A OF TABLE 2D.



CONSTRUCTION JOINT DETAIL (SPACED AT 8M INTERVALS)

FOR TOP SLAB,  $t=T$   
FOR BOTTOM SLAB,  $t=T+20$   
FOR SIDE WALLS,  $t=Wi$  OR  $We$

LENGTH OF STRAIGHT BARS:

BAR A:  $2S+2We+Wi-80$   
BAR E:  $0.8S+Wi$  FOR FILL > 4.25m.  
 $S+Wi+400$  FOR FILL ≤ 4.25m.

REMARK 1:

BAR A IN BOTTOM SLAB OF TABLE 1D ONLY, FOR S=2000 ONLY SHALL HAVE SAME SIZE, SPACING & LENGTH AS BARS A OF TABLE 2D.

BOX CULVERTS DIMENSIONS AND QUANTITIES																								
DIMENSIONS				TABLE 2D - FILL COVER OVER 0.9m TO 4.00m																				
				REINFORCEMENT																				
				Bar Diameter, Spacing and Length in Millimeters												SPACER BARS								
SPAN	HEIGHT	SLAB	EXT. WALL	INT. WALL	BARS-A			BARS-B			BARS-C			BARS-D			BARS-E			NUMBER				
					SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	TOP SLAB	BOTTOM SLAB	EACH EXT. INT.	
S	H	T	We	Wi	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	TOP SLAB	BOTTOM SLAB	EACH EXT. INT.	
1500	1500	200	200	200	#14	150	3520	#12	180	1905	#12	260	2240	#12	300	2240	#16	140	2100	#12	17	17	9	9
2000	1000	200	200	200	#14	160	4520	#12	230	1830	#12	300	1740	#12	300	1740	#16	140	2600	#12	17	17	5	5
2000	1250	200	200	200	#14	160	4520	#12	230	1955	#12	300	1990	#12	300	1990	#16	140	2600	#12	17	17	7	7
2000	1500	200	200	200	#14	160	4520	#12	230	2080	#12	280	2240	#12	300	2240	#16	140	2600	#12	17	17	7	7
2000	2000	200	200	200	#14	150	4520	#12	180	2330	#12	260	2740	#12	300	2740	#16	140	2600	#12	17	17	9	9
2500	1000	230	230	230	#14	140	5580	#12	160	2065	#12	300	1800	#12	300	1800	#20	160	3100	#12	25	25	5	5
2500	1250	230	230	230	#14	140	5580	#12	180	2190	#12	300	2050	#12	300	2050	#20	160	3100	#12	25	25	7	7
2500	1500	230	230	230	#14	135	5580	#12	180	2315	#12	280	2300	#12	300	2300	#20	160	3100	#12	25	25	7	7
2500	2000	230	230	230	#14	135	5580	#12	160	2565	#12	250	2800	#12	300	2800	#20	150	3100	#12	25	25	9	9
2500	2500	230	230	230	#14	135	5580	#12	140	2815	#12	240	3300	#14	250	3300	#20	150	3100	#12	25	25	12	13
3000	1000	260	260	260	#16	140	6640	#14	160	2300	#12	300	1860	#12	300	1860	#20	130	3600	#12	31	31	5	5
3000	1250	260	260	260	#16	140	6640	#14	170	2425	#12	300	2110	#12	300	2110	#20	130	3600	#12	31	31	7	7
3000	1500	260	260	260	#16	140	6640	#14	180	2550	#12	300	2360	#12	300	2360	#20	130	3600	#12	31	31	9	9
3000	2000	260	260	260	#16	140	6640	#14	180	2800	#12	260	2860	#12	300	2860	#20	130	3600	#12	31	31	11	9
3000	2500	260	260	260	#16	135	6640	#14	170	3050	#12	220	3360	#14	250	3360	#20	130	3600	#12	31	31	13	13
3000	3000	260	260	250	#16	135	6690	#14	140	3300	#12	180	3860	#14	200	3860	#20	130	3650	#12	31	31	15	15



		S		H		T		BARS-A				BARS-B				BARS-C				BARS-D				BARS-E				BARS-F				BARS-G				SIZE	NUMBER		
								SIZE	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG		LENGTH	TOP SLAB	BOTTOM SLAB
1500	1500	230	230	230	200	#20	170	1990	#16	180	1985	#12	200	2300	#12	300	2300	#16	300	2100	#16	300	2100	#16	300	2950	#20	210	3100	#12	61	37	25	7	7				
2500	1000	230	230	200	#20	180	2990	#16	150	2065	#12	220	1800	#12	300	1800	#16	300	3100	#16	300	3100	#16	300	4650	#20	210	3100	#12	61	37	5	5						
2500	1250	230	230	200	#20	180	2990	#16	160	2190	#12	220	2050	#12	300	2050	#16	300	3100	#16	300	3100	#16	300	4650	#20	210	3100	#12	61	37	7	5						
2500	1500	230	230	200	#20	170	2990	#16	180	2315	#12	200	2300	#12	300	2300	#16	300	3100	#16	300	3100	#16	300	4650	#20	210	3100	#12	61	37	7	7						
2500	2000	230	230	200	#20	160	2990	#16	200	2565	#12	180	2800	#12	300	2800	#16	300	3100	#16	300	3100	#16	300	4650	#20	210	3100	#12	61	37	9	9						
2500	2500	230	230	200	#20	160	2990	#16	200	2815	#12	160	3300	#14	250	3300	#16	280	3100	#16	280	3100	#16	280	4650	#20	210	3100	#12	61	37	13	13						
3000	1000	260	260	200	#20	180	3520	#16	140	2300	#12	220	1860	#12	300	1860	#16	280	3600	#16	280	3600	#16	280	5500	#20	210	3600	#12	79	49	5	5						
3000	1250	260	260	200	#20	180	3520	#16	150	2425	#12	220	2110	#12	300	2110	#16	280	3600	#16	280	3600	#16	280	5500	#20	210	3600	#12	79	49	7	7						
3000	1500	260	260	200	#20	170	3520	#16	160	2550	#12	220	2360	#12	300	2360	#16	280	3600	#16	280	3600	#16	280	5500	#20	210	3600	#12	79	49	7	7						
3000	2000	260	260	200	#20	160	3520	#16	180	2800	#12	180	2860	#12	300	2860	#16	280	3600	#16	280	3600	#16	280	5500	#20	210	3600	#12	79	49	11	11						
3000	2500	260	260	200	#20	160	3520	#16	190	3050	#12	160	3360	#14	250	3360	#16	280	3600	#16	280	3600	#16	280	5500	#20	210	3600	#12	79	49	13	13						
3000	3000	260	260	250	#20	160	3545	#16	190	3300	#12	140	3860	#14	200	3860	#16	280	3650	#16	280	3650	#16	280	5600	#20	200	3650	#12	79	49	15	15						
4000	2000	340	300	200	#20	170	4580	#16	170	3270	#14	260	3020	#12	300	3020	#16	280	4600	#16	280	4600	#16	280	7200	#20	210	4600	#14	73	61	9	9						
4000	2500	340	300	200	#20	170	4580	#16	180	3520	#14	260	3520	#14	250	3520	#16	280	4600	#16	280	4600	#16	280	7200	#20	210	4600	#14	70	61	13	13						
4000	3000	340	310	250	#20	160	4955	#16	180	3780	#14	220	4020	#14	200	4020	#16	280	4650	#16	280	4650	#16	280	7300	#20	210	4650	#14	70	61	15	15						
4000	4000	340	340	250	#20	160	4925	#16	160	4310	#14	140	5020	#16	220	5020	#16	260	4650	#16	260	4650	#16	260	7300	#20	210	4650	#14	70	61	19	19						

		BARS-A		BARS-B		BARS-C		BARS-D		BARS-E		BARS-F		BARS-G		SIZE	NUMBER												
		W	H	T	We	Wi	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH	SIZE	SPGC	LENGTH		SIZE	SPGC	LENGTH	TOP SLAB	BOTTOM SLAB	EACH WALL EXT.	INT.						
1500	1500	280	230	200	#16	140	1990	#14	190	1995	#12	280	2360	#12	300	2360	#16	260	1400	#16	260	3100	#12	200	2100	#12	25	7	7
2500	1000	280	230	200	#16	140	2990	#14	180	2095	#12	280	1860	#12	300	1860	#16	260	2200	#16	260	4900	#12	200	3100	#12	40	5	5
2500	1250	260	230	200	#16	140	2990	#14	190	2220	#12	280	2110	#12	300	2110	#16	260	2200	#16	260	4900	#12	200	3100	#12	40	7	7
2500	1500	280	230	200	#16	140	2990	#14	190	2345	#12	280	2360	#12	300	2360	#16	260	2200	#16	260	4900	#12	200	3100	#12	40	7	7
2500	2000	280	240	200	#16	140	3000	#14	190	2605	#12	280	2860	#12	300	2860	#16	260	2200	#16	260	4900	#12	200	3100	#12	40	9	9
2500	2500	280	260	200	#16	140	3020	#14	170	2875	#12	280	3360	#14	250	3360	#16	260	2200	#16	260	4900	#12	200	3100	#12	40	13	13
3000	1000	300	260	200	#20	170	3520	#16	170	2340	#12	280	1940	#12	300	1940	#20	300	2600	#20	300	5800	#12	170	3600	#14	40	5	5
3000	1250	300	260	200	#20	170	3520	#16	190	2465	#12	280	2190	#12	300	2190	#20	300	2600	#20	300	5800	#12	170	3600	#14	40	7	7
3000	1500	300	260	200	#20	160	3520	#16	190	2590	#12	280	2440	#12	300	2440	#20	300	2600	#20	300	5800	#12	170	3600	#14	40	7	7
3000	2000	300	260	200	#20	160	3520	#16	190	2840	#12	280	2940	#12	300	2940	#20	300	2600	#20	300	5800	#12	170	3600	#14	40	9	9
3000	2500	300	280	200	#20	160	3540	#16	190	3110	#12	280	3440	#14	250	3440	#20	300	2600	#20	300	5800	#12	170	3600	#14	40	13	13
3000	3000	300	300	250	#20	180	3985	#16	170	3380	#12	200	3940	#14	200	3940	#20	300	2650	#20	300	5900	#12	170	3650	#14	40	15	15
4000	2000	400	360	200	#20	135	4620	#16	160	3390	#12	200	3140	#12	300	3140	#20	250	3400	#20	250	7600	#14	190	4600	#14	70	11	9
4000	2500	400	360	200	#20	135	4620	#16	160	3640	#12	200	3640	#14	250	3640	#20	240	3400	#20	240	7600	#14	190	4600	#14	70	13	13
4000	3000	400	360	250	#20	130	4645	#16	160	3890	#12	200	4140	#14	200	4140	#20	240	3450	#20	240	7700	#14	190	4650	#14	70	15	15
4000	4000	400	400	250	#20	130	4645	#16	135	4430	#14	200	5140	#16	220	5140	#20	240	3450	#20	240	7700	#14	190	4650	#14	70	21	19

FOR LOCATION OF BOX CULVERTS, REFER TO DRAINAGE DRAWINGS

S		H		T		BARS-A		BARS-B		BARS-C		BARS-D		BARS-E		BARS-F		BARS-G		SIZE	NUMBER										
						SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG		LENGTH	SIZE	SPCG	LENGTH	TOP SLAB	BOTTOM SLAB	EACH EXT. INT.				
1500	1500	230	230	230	200	#16	150	1990	#14	190	1965	#12	280	2300	#12	300	2300	#16	280	2100	#16	280	2950	#12	160	2100	#12	24	24	7	7
2500	1000	230	230	230	200	#16	160	2990	#14	180	2065	#12	300	1800	#12	300	1800	#16	280	3100	#16	280	4650	#12	160	3100	#12	37	37	5	5
2500	1250	230	230	230	200	#16	150	2990	#14	190	2190	#12	300	2050	#12	300	2050	#16	280	3100	#16	280	4650	#12	160	3100	#12	37	37	5	5
2500	1500	230	230	230	200	#16	150	2990	#14	190	2315	#12	280	2300	#12	300	2300	#16	280	3100	#16	280	4650	#12	160	3100	#12	37	37	7	7
2500	2000	230	230	230	200	#16	140	2990	#14	190	2565	#12	250	2800	#12	300	2800	#16	280	3100	#16	280	4650	#12	160	3100	#12	37	37	9	9
2500	2500	230	230	230	200	#16	140	2990	#14	160	2815	#12	240	3300	#14	250	3300	#16	280	3100	#16	280	4650	#12	160	3100	#12	37	37	13	13
3000	1000	260	260	260	200	#20	180	3520	#16	160	2300	#12	300	1860	#12	300	1860	#20	320	3600	#20	320	5500	#12	150	3600	#12	49	49	5	5
3000	1250	260	260	260	200	#20	180	3520	#16	180	2425	#12	300	2110	#12	300	2110	#20	320	3600	#20	320	5500	#12	150	3600	#12	49	49	7	7
3000	1500	260	260	260	200	#20	180	3520	#16	190	2550	#12	300	2360	#12	300	2360	#20	320	3600	#20	320	5500	#12	150	3600	#12	49	49	7	7
3000	2000	260	260	260	200	#20	170	3520	#16	180	2800	#12	280	2860	#12	300	2860	#20	320	3600	#20	320	5500	#12	150	3600	#12	49	49	11	11
3000	2500	260	260	260	200	#20	160	3520	#16	180	3050	#12	220	3360	#14	250	3360	#20	300	3600	#20	300	5500	#12	150	3600	#12	49	49	13	13
3000	3000	260	260	260	250	#20	160	3545	#16	160	3300	#12	180	3860	#14	200	3860	#20	300	3650	#20	300	5600	#12	150	3650	#12	49	49	15	15
4000	2000	340	300	200	#20	135	4580	#16	160	3270	#12	300	3020	#12	300	3020	#20	250	4600	#20	250	7200	#14	160	4600	#14	61	61	9	9	
4000	2500	340	300	200	#20	135	4580	#16	160	3520	#12	280	3520	#14	250	3520	#20	250	4600	#20	250	7200	#14	160	4600	#14	61	61	13	13	
4000	3000	340	310	250	#20	135	4595	#16	150	3780	#12	220	4020	#14	200	4020	#20	240	4650	#20	240	7300	#14	160	4650	#14	61	61	15	15	
4000	4000	340	340	250	#20	130	4625	#16	130	4310	#12	150	5020	#16	220	5020	#20	240	4650	#20	240	7300	#14	160	4650	#14	61	61	19	19	

		BARS-A		BARS-B		BARS-C		BARS-D		BARS-E		BARS-F		BARS-G		SIZE	NUMBER												
S	H	T	We	Wi	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG	LENGTH	SIZE	SPCG		LENGTH	SIZE	TOP SLAB	BTM SLAB	EACH WALL EXT.	INT.	7						
1500	1500	290	260	200	#20	180	3020	#14	190	2055	#12	400	2420	#12	300	2420	#16	240	1400	#16	240	3100	#12	200	2100	#14	21	21	7
2500	1000	290	260	200	#20	170	3020	#14	170	2155	#12	400	1920	#12	300	1920	#16	240	2200	#16	240	4900	#12	200	3100	#14	34	34	5
2500	1250	290	260	200	#20	180	3020	#14	190	2280	#12	400	2170	#12	300	2170	#16	240	2200	#16	240	4900	#12	200	3100	#14	34	34	7
2500	1500	290	260	200	#20	180	3020	#14	190	2405	#12	400	2420	#12	300	2420	#16	240	2200	#16	240	4900	#12	200	3100	#14	34	34	7
2500	2000	290	270	200	#20	180	3030	#14	190	2685	#12	400	2920	#12	300	2920	#16	240	2200	#16	240	4900	#12	200	3100	#14	34	34	9
2500	2500	290	290	200	#20	180	3050	#14	170	2935	#12	400	3420	#14	250	3420	#16	240	2200	#16	240	4900	#12	200	3100	#14	34	34	13
3000	1000	340	300	200	#20	170	3560	#16	170	2420	#12	400	2020	#12	300	2020	#20	280	2600	#20	280	5800	#14	220	3600	#14	46	46	5
3000	1250	340	300	200	#20	160	3560	#16	190	2545	#12	400	2270	#12	300	2270	#20	280	2600	#20	280	5800	#14	220	3600	#14	46	46	7
3000	1500	340	300	200	#20	160	3560	#16	200	2670	#12	400	2520	#12	300	2520	#20	280	2600	#20	280	5800	#14	220	3600	#14	46	46	7
3000	2000	340	300	200	#20	160	3560	#16	200	2920	#12	400	3020	#12	300	3020	#20	280	2600	#20	280	5800	#14	220	3600	#14	46	46	9
3000	2500	340	320	200	#20	160	3590	#16	190	3190	#12	400	3520	#14	250	3520	#20	280	2600	#20	280	5800	#14	220	3600	#14	46	46	13
3000	3000	340	340	250	#20	160	3625	#16	170	3460	#12	280	4020	#14	200	4020	#20	280	2650	#20	280	5900	#14	220	3650	#14	46	46	15
4000	2000	450	400	200	#20	130	4680	#16	160	3480	#12	280	3240	#12	300	3240	#20	230	3400	#20	230	7600	#16	240	4600	#14	79	79	11
4000	2500	450	400	200	#20	125	4680	#16	160	3730	#12	280	3740	#14	250	3740	#20	230	3400	#20	230	7600	#16	240	4600	#14	79	79	15
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4000	4000	450	450	250	#20	125	4735	#16	135	4350	#12	200	5240	#16	220	5240	#20	230	3450	#20	230	7700	#16	240	4650	#14	79	79	25

1. FOR GENERAL NOTES REFER TO DWG. GE-S-40000.
2. MINIMUM BEARING CAPACITY OF SOIL SHALL NOT BE LESS THAN 1.7 Kg/cm<sup>2</sup>.
3. CONCRETE CURE COVER TO REINFORCEMENT SHALL BE 40mm.
4. AT BENDS, REINFORCING BARS SHALL HAVE A RADIUS OF 4 BAR DIAMETERS.
5. FOR CURVLET LENGTH EXCEEDING 10 METERS, TRANSVERSE JOINTS SHALL BE PLACED AT MAXIMUM SPACING OF 8 METERS. FOR CURVLET LENGTH EXCEEDING 50 METERS, A 10mm EXPANSION JOINT SHALL BE PLACED AT A MAXIMUM SPACING OF 50 METERS.
6. PROTECTIVE COATING FOR CONCRETE SURFACES SHALL BE 10mm GREY SPORE. DRAIN PIPE SPACING SHALL BE AS SHOWN IN LONGITUDINAL SECTION.
7. FILL COVER IS CRITICAL HEIGHT FROM TOP OF CURVLET SLAB TO FINISHED ROAD LEVEL. THE CRITICAL HEIGHT IS DEFINED AS THE MAXIMUM HEIGHT FOR FILL IN EXCESS OF ROAD SURFACE HEIGHT TO FILL LESS THAN 0.9m. FOR FILL COVER THAT VARIES FROM LESS THAN 0.9m TO ROAD SURFACE 0.9m, DIFFERENT DESIGN SHALL BE AS GIVEN IN TABLE 1T.
8. ALL DIMENSIONS ARE IN MILLIMETERS.
9. BWS C & D MAY BE SLOPED AT TOP OF BOTTOM CONSTRUCTION JOINT AND LAPPED 500mm.
10. BOTTOM SPACER BARS IN TOP SLAB IN TABLE 1T ONLY MAY BE INCREASED TO  $\phi 14mm$  DIAMETER OF EQUIVALENT STRENGTH OR NO OTHER SUBSTITUTION OF LARGER DIAMETER BARS SHALL BE PERMITTED.

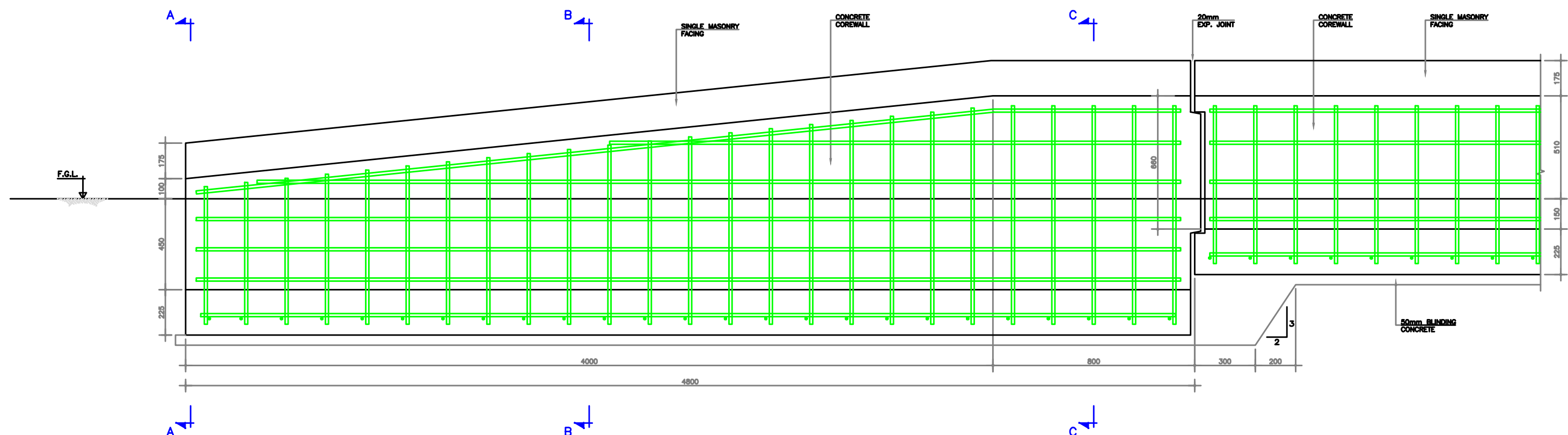


REDUCTION 1/2

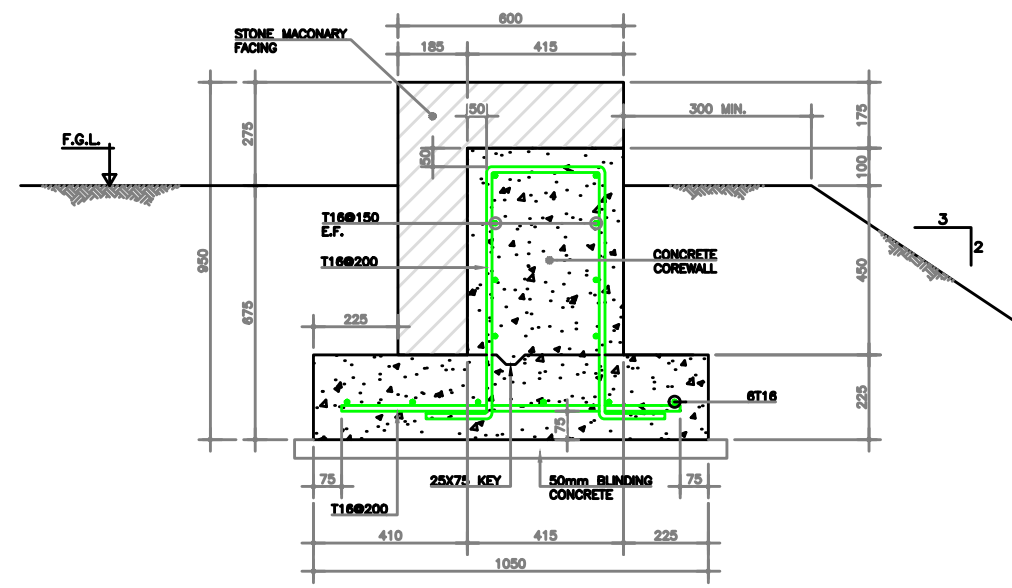
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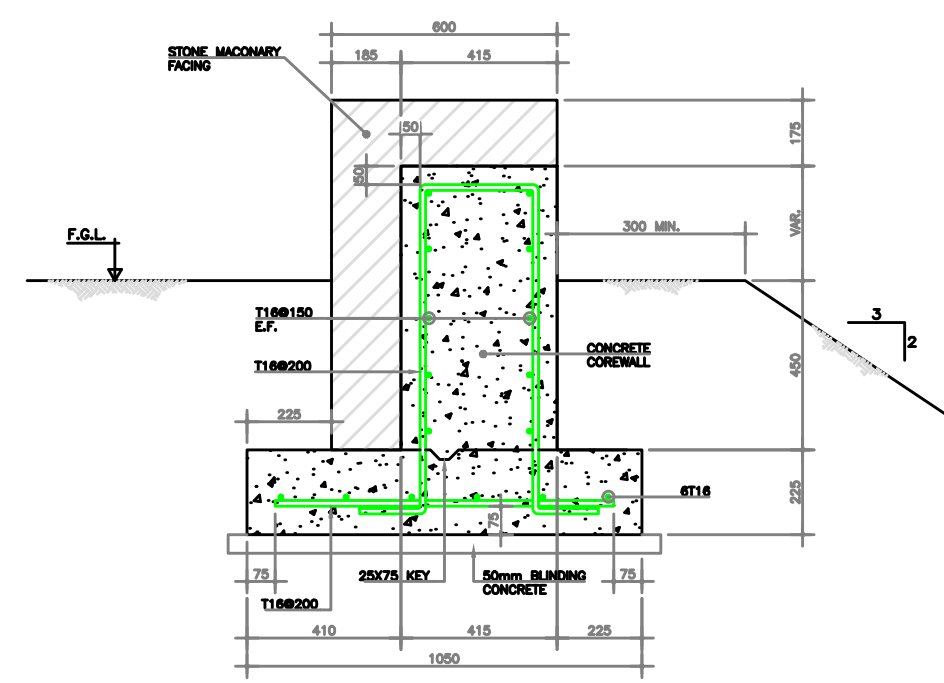




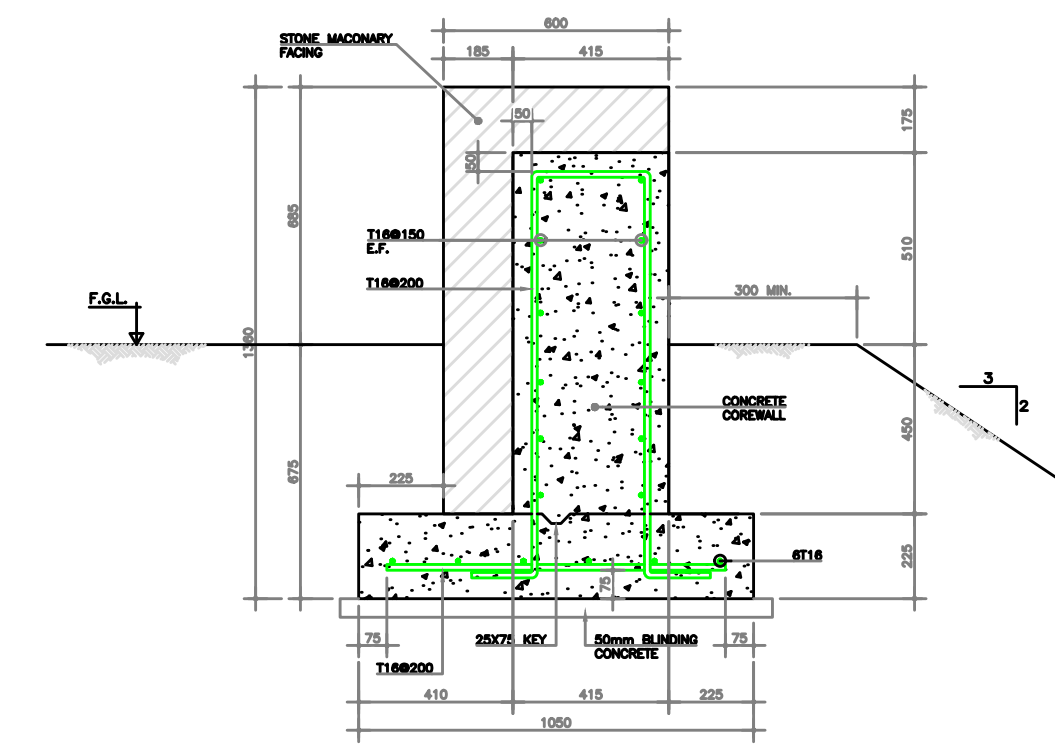
END TERMINAL CONCRETE COREWALL  
(SINGLE FACE ADJACENT TO CUT SLOPE)  
SCALE: 1/100



SECTION A-A  
SCALE: 1/10



SECTION B-B  
SCALE: 1/10



SECTION C-C  
SCALE: 1/10

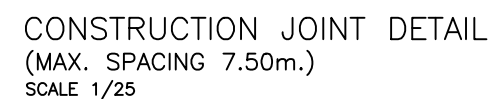
- NOTES:
1. SET GALVANIZED METAL SLOTS WITH ANCHORS FOR THE STONE WORK OR OTHER APPROVED TYPE OF METAL ANCHORS IN THE CONCRETE. EQUIVALENT ATTACHMENT SYSTEMS ARE ALLOWED WITH THE APPROVAL OF THE ENGINEER.
  2. CONCRETE:
    - a. CAST-IN-SITU REINFORCED CONCRETE  $f_c=28\text{MPa}$ .
    - b. BLINDING CONCRETE  $f_c=10\text{MPa}$ .
  3. REINFORCING STEEL:

ALL REINFORCING STEEL BARS USED SHALL BE DEFORMED, GRADE 60 WITH A MIN. YIELD POINT STRENGTH OF 420MPa AND SHALL CONFORM TO ASTM A615.
  4. DIMENSIONS WITHOUT UNITS ARE MILLIMETERS.

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHD	APPD
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيوت					
ASSOCIATED CONSULTING ENGINEERS & SERVICES					
PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(MARTIN, WEST BEKAA, RACHAYA, HASBAYA & JEZZINE QIZAS)					
TITLE					
END TERMINAL COREWALL ( CB ) TYPICAL DETAILS					
SINGLE FACE STONE MASONRY GUARDWALL( SMG )					
DESIGNED	CHECKED	PROJECT BY	SHEET	PROJECT NO.	REV.
J.L.	C.K.	L2102	2 OF 2	GE-S-40007	0
DRAWN	OFFICE	DATE	SCALE		
O.A.L.	N.F.	JULY 2023	1/10		



- |        |   |
|--------|---|
| BOT.   | BOTTOM  |
| CONT.  | CONTINUOUS                                      |
| E.F.   | EACH FACE                                       |
| EL.    | ELEVATION                                       |
| E.W.   | EACH WAY  |
| F.G.L. | FINISHED GRADE LEVEL                            |
| LONG.  | LONGITUDINAL                                    |
| REINF. | REINFORCEMENT                                   |
| TYP.   | TYPICAL   |
| U.N.O. | UNLESS NOTED OTHERWISE                          |
| Ø,T,db | DEFORMED HIGH-YIELD BAR NOMINAL DIAMETER in mm. |
| N.T.S. | NOT TO SCALE                                    |

REDUCTION 1/2


REV. K.

R E V I S I O N S

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CUSTOMER

## REPUBLIC OF LEBANON

### COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION



الهندسي الاستشاري - ايس في بيروت  
**ASSOCIATED CONSULTING ENGINEERS BEIRUT**

**PROJECT CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING RODS FOR LOT 3 (NABATIEH, WEST BEKAA, RACHAYA, HASBATYA & JEZZINE CAZAS)**

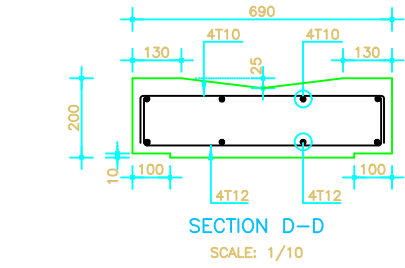
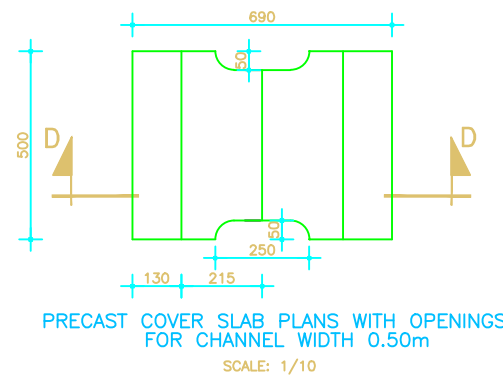
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TITLE

## ROAD LINE DIAGRAM CAZA OF JEZJINE PILE AND CAPPING BEAM REINFORCING DETAILS AND SECTIONS

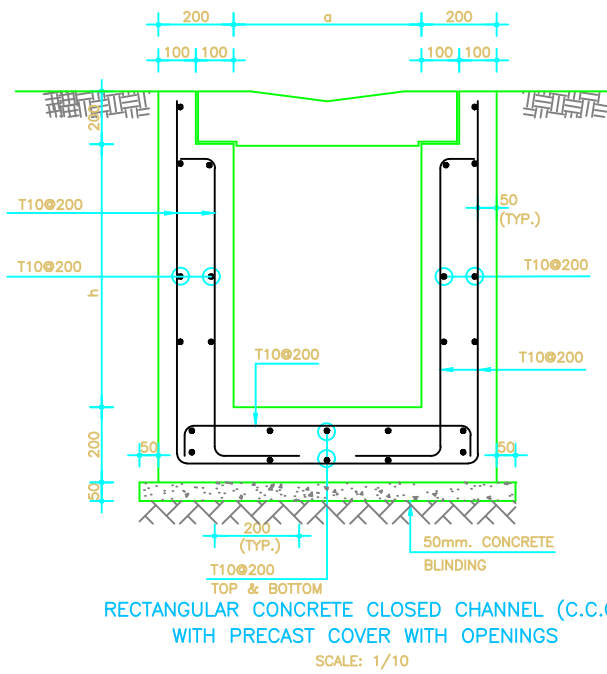
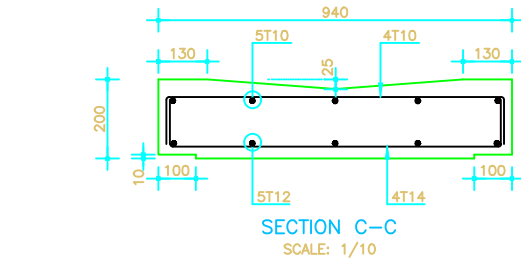
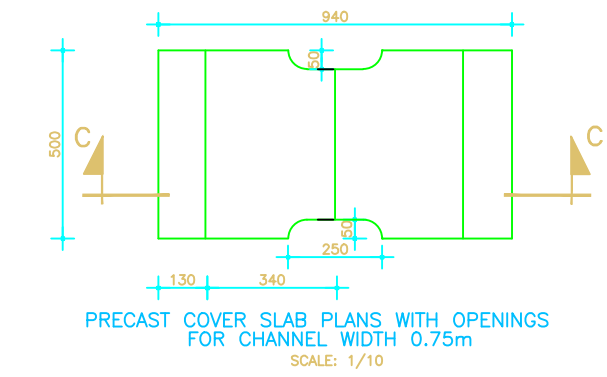
DESIGNED BY	CHECKED BY	PROJECT NO.	SHEET	DRAWING NO.	REV.
J.J.L.	C.J.K.	L2102			
DRAWN BY	APPROVED BY	DATE	SCALE		
G.A.I.	M.F.	AUG 24, 2003		GE-S-40008	0





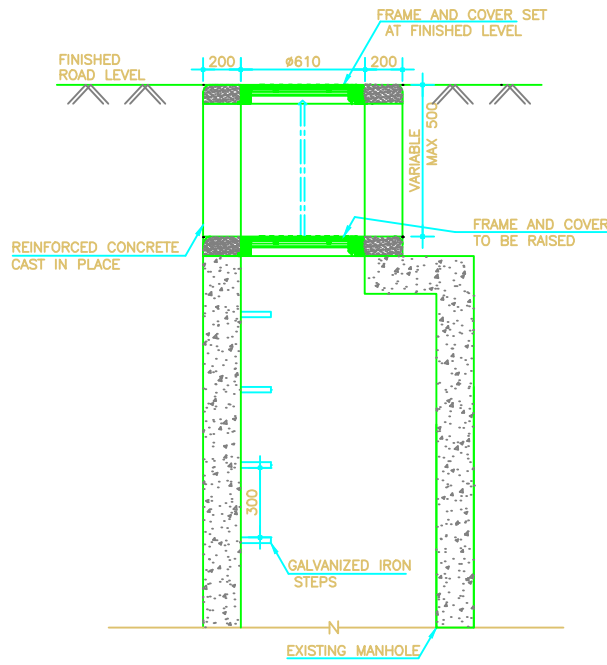
a (min)	a (max)	h (min)	h (max)
500	750	500	1000

RECTANGULAR CONCRETE CHANNEL DIMENSIONS



RECTANGULAR CONCRETE CLOSED CHANNEL (C.C.C) WITH PRECAST COVER WITH OPENINGS

SCALE: 1/10



RAISING OF MANHOLE FRAME AND COVER

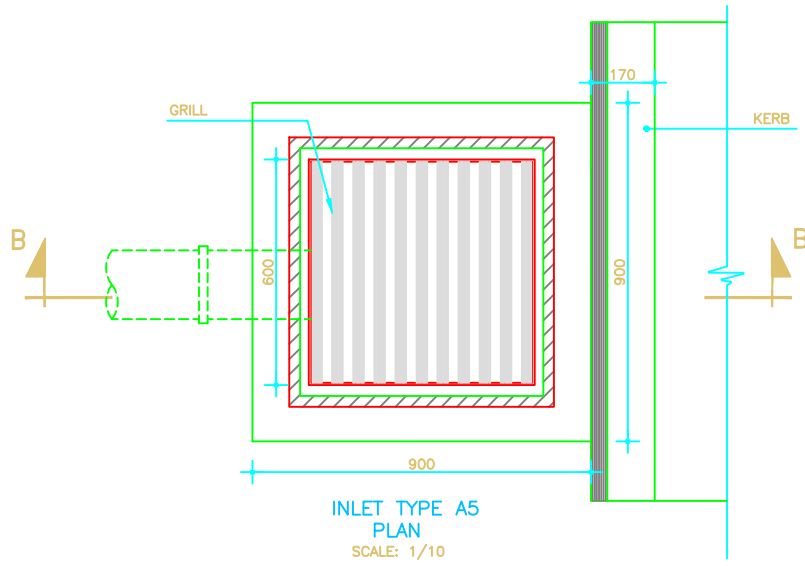
SCALE: 1/20

#### NOTES:

- 1-REFER TO THE SPECIFICATIONS SECTION: "PIPE BEDDING REQUIREMENTS" TABLE APPLICABLE TO EACH PIPE MATERIAL.
- 2-THE MINIMUM THICKNESS "T" FOR CONCRETE ENCASEMENT TO PIPES SHALL BE AS FOLLOWS:
  - T = 150 for  $D \leq 600$
  - T = 250 for  $700 \leq D \leq 1000$
  - T = 300 for  $1000 < D \leq 1200$
- 3-ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
- 4-THE TRENCH WIDTHS INDICATED IN THE TABLE ARE THE MAXIMUM VALUES. THE TRENCH WIDTHS OF PIPES MUST BE ADOPTED ACCORDING TO THE SITE ENGINEER (DECIDED ACCORDING TO THE NATURE OF THE SOIL.).
- 5-THE GRANULAR MATERIAL AND SAND FILL IN PIPE TRENCHES MUST BE COMPACTED ACCORDING TO THE TECHNICAL SPECIFICATIONS.
- 6-THE CONTRACTOR SHALL IDENTIFY ALL THE EXISTING UTILITIES AND MANHOLES WITH THEIR LOCATION AND LEVELS, IN ORDER TO AVOID DAMAGE TO EXISTING WORKS.
- 7-EXPANSION JOINTS WITH FIBER BOARD FILLER SHALL BE PROVIDED IN CONCRETE ENCASEMENT FOR ALL PIPE MATERIAL.MENTIONED JOINTS SHALL BE ALL AT PIPE JOINTS IN THE VICINITY AND WITHIN 500mm OR 10. FROM MANHOLES AND AT MAXIMUM INTERVALS OF 12m FOR REMAINING LENGTH OF ENCASEMENT BUT ALWAYS AT PIPE JOINTS.
- 8-ALL PIPES SHALL BE LAID ON THE APPROPRIATE TYPE OF BEDDING AS INDICATED IN THE TABLE OF PIPE BEDDING REQUIREMENTS AND SHALL RECEIVE SELECTED FILL COMPACTED TO AT LEAST 300mm. ABOVE CROWN OF PIPE AND REST.
- 9-MINIMUM THICKNESS T1 OF COMPACTED MATERIAL UNDER BARREL BOTTOM:
  - T1=150 FOR  $D \leq 300$ mm.
  - T1=200 FOR  $300 < D \leq 800$ mm
  - T1=  $\frac{D}{4}$  FOR  $D > 800$
- 10-FOR REINFORCED CONCRETE PIPES, THE LENGTH OF THE SHORT PIECES WILL BE DETERMINED ON SITE (ACCORDING TO MANUFACTURER'S STANDARDS).
- 11-FOR STRUCTURAL NOTES REFER TO DWG. No. RBM-S-4000.
- 12-THE CONTRACTOR SHALL CHECK THE EXISTING OPEN/CLOSED. CONCRETE CHANNEL FOR OPERATION AND CONDITION, ELSE NEW CONCRETE CLOSED CHANNEL SHALL BE INSTALLED DEMOLITION THE FAILED EXISTING CHANNELS. IF EXISTING OPEN CHANNEL IS IN GOOD CONDITION CONCRETE COVERS MUST BE PROVIDED.

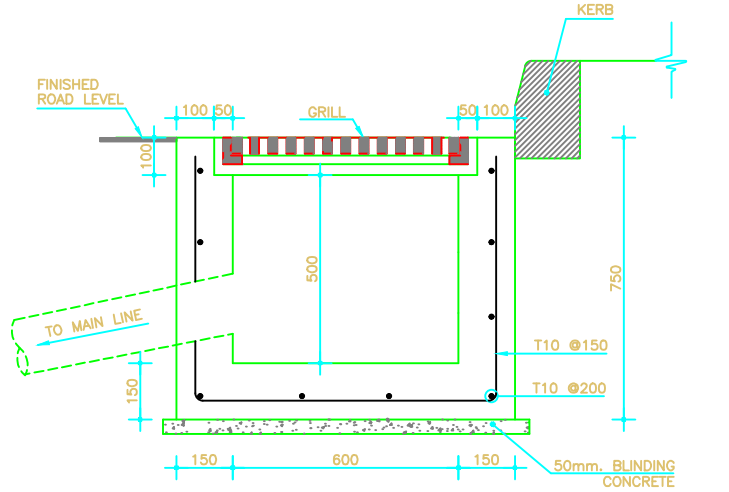
#### LEGEND:

G.E.L.	GROUND ELEVATION
CONT.	CONTINUOUS LAP 50db AT SPICES
db	DEFORMED BAR DIAMETER IN mm.
DIA.	DIAMETER.
D	PIPE DIAMETER
MIN	MINIMUM
EXT	EXTERNAL



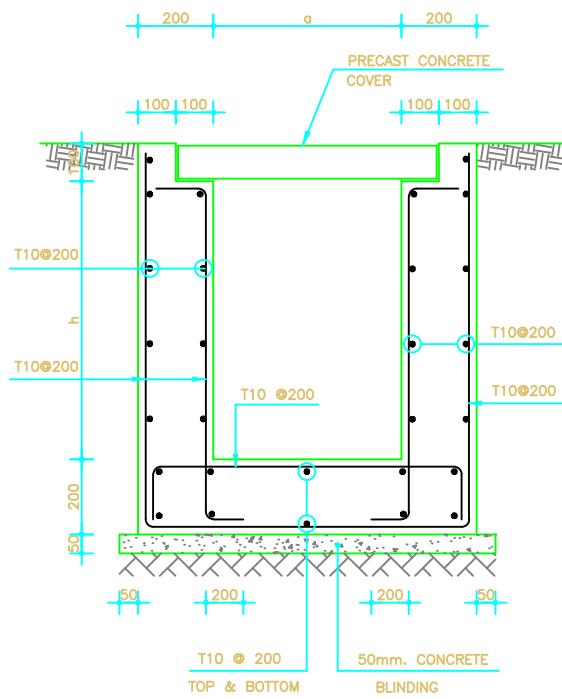
INLET TYPE A5 PLAN

SCALE: 1/10



INLET TYPE A5 B-B  
INLET CHAMBER (IC)

SCALE: 1/10



RECTANGULAR CONCRETE OPEN CHANNEL WITH PRECAST CONCRETE COVER

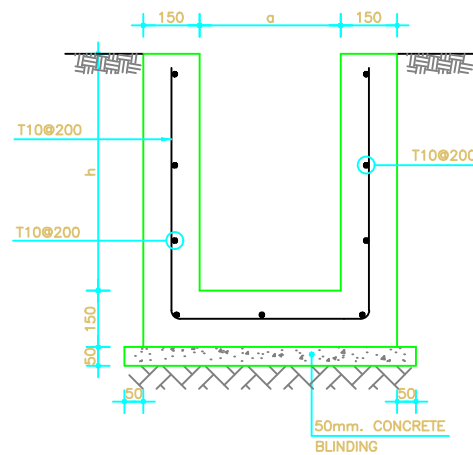
SCALE: 1/10

a	h (min)	h (max)
500	500	750

RECTANGULAR CONCRETE CHANNEL DIMENSIONS

RECTANGULAR CONCRETE OPEN CHANNEL (C.O.C)

SCALE: 1/10

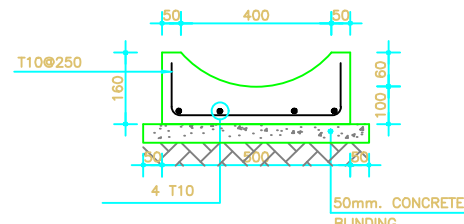


RECTANGULAR CONCRETE OPEN CHANNEL

SCALE: 1/10

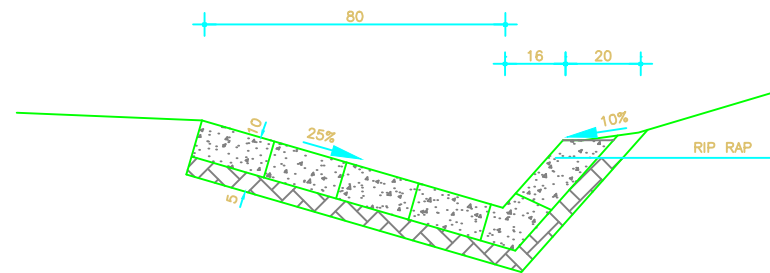
a	h (min)	h (max)
500	500	750

RECTANGULAR CONCRETE CHANNEL DIMENSIONS



U-SHAPE CONCRETE GUTTER

N.T.S.

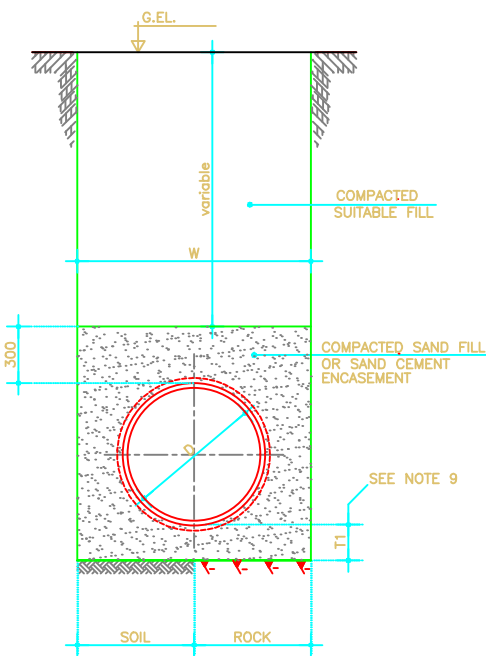


V-SHAPE GUTTER CHANNEL

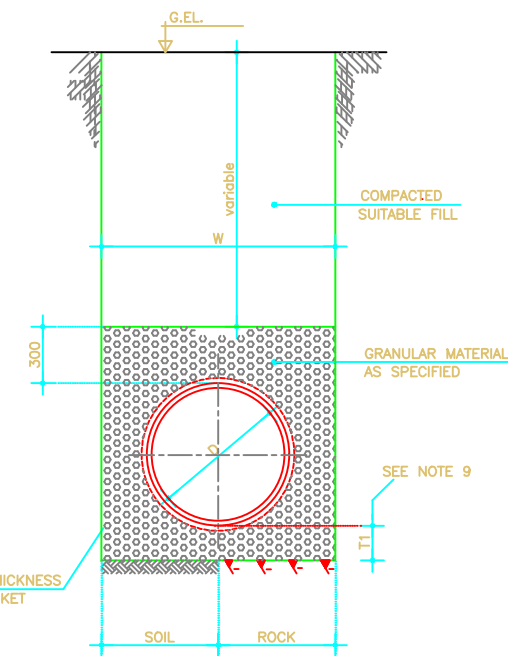
FINAL TENDER DOCUMENTS

REDUCTION 1/2

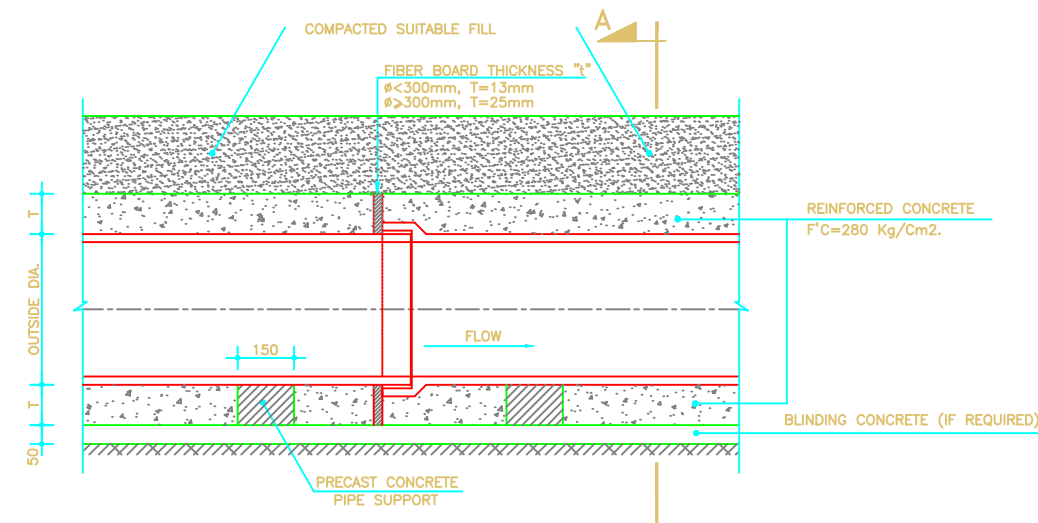
REV. NO.	DATE	BY	DESCRIPTION	CHKD	APP'D
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت ASSOCIATED CONSULTING ENGINEERS - BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3 (NABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE QAZAS)					
TITLE					
STORMWATER DRAINAGE STANDARD DETAILS					
DESIGNED	CHECKED	PROJECT NO.	SHEET	DRAWING NO.	REV.
S.K.	N.F.	L2102	1 OF 2	GE-W-20001	0
DATE	DATE	DATE	SCALE		
JULY 2023	N.T.S				



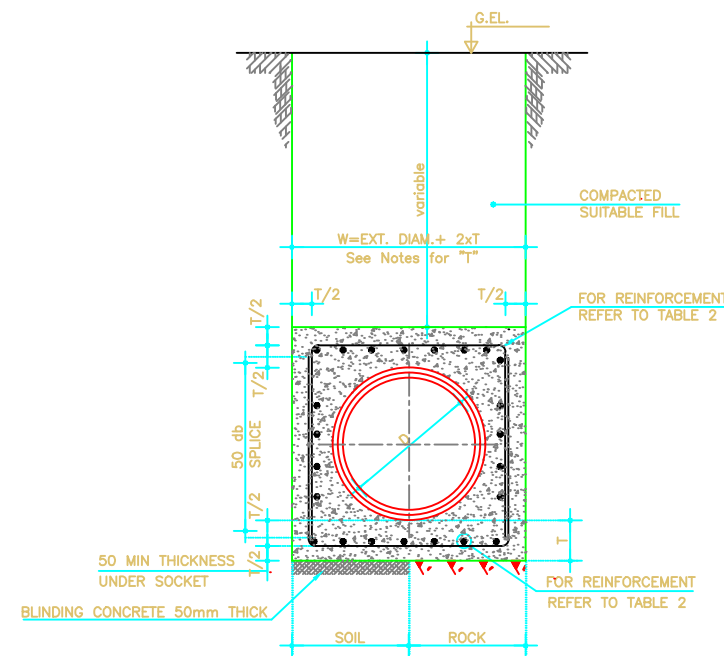
SAND OR CEMENT STABILIZED  
SAND BEDDING AND SURROUND  
SCALE: 1/20



GRANULAR BEDDING AND SURROUND  
SCALE: 1/20

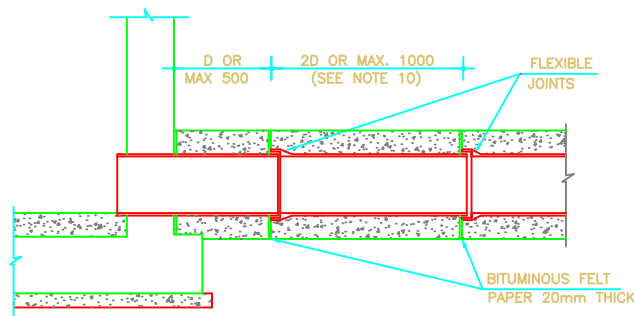


DETAIL OF CONCRETE PIPE ENCASEMENT  
SCALE: 1/10

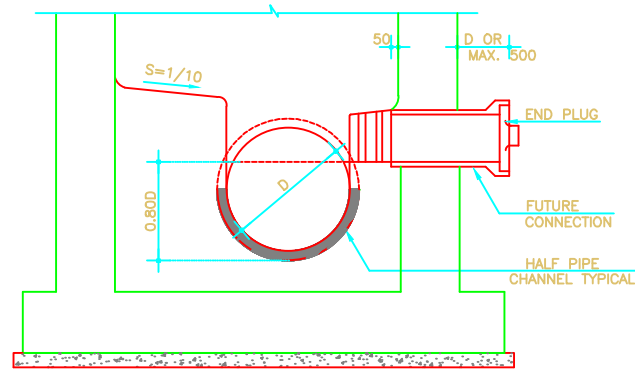


SECTION A-A CONCRETE ENCASEMENT  
SCALE: 1/20

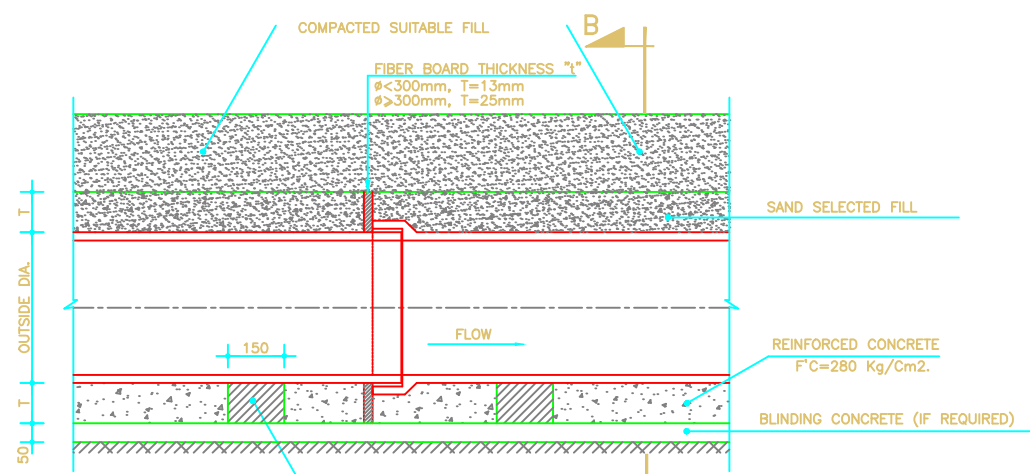
TABLE FOR TRENCH WIDTH (W)	
PIPE DIAMETER m.m.	MAX TRENCH WIDTH
200	700
250	750
300	800
350	950
400	1000
500	1100
600	1300



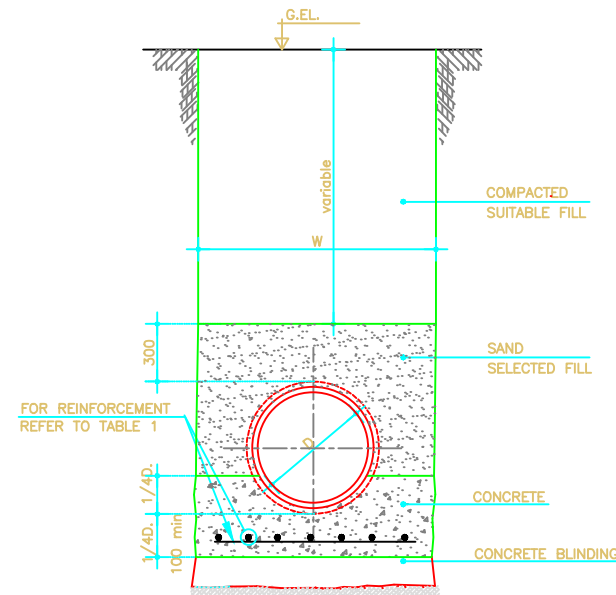
A -FOR PIPES IN  
CONCRETE SURROUND  
N.T.S.



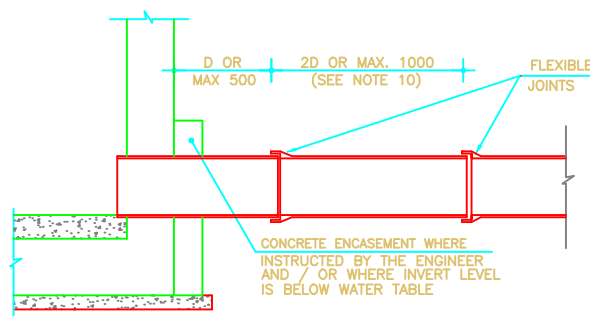
TYPICAL FUTURE CONNECTION  
N.T.S.



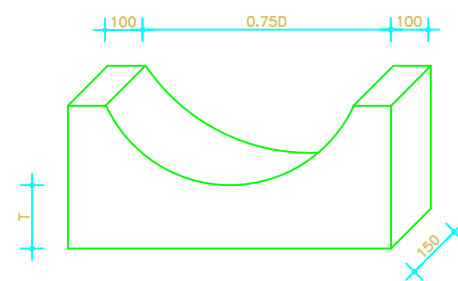
DETAIL OF CONCRETE PIPE BEDDING  
SCALE: 1/10



SECTION B-B CONCRETE BEDDING  
SCALE: 1/20



B -FOR PIPES IN  
ORDINARY BACKFILL  
N.T.S.

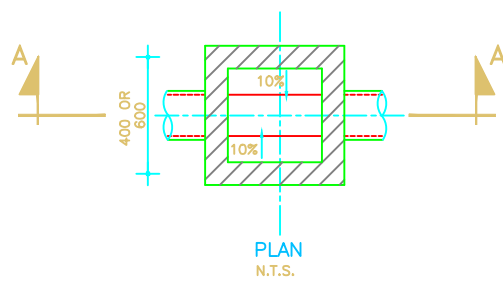


PRECAST CONCRETE  
PIPE SUPPORT  
SCALE: 1/10

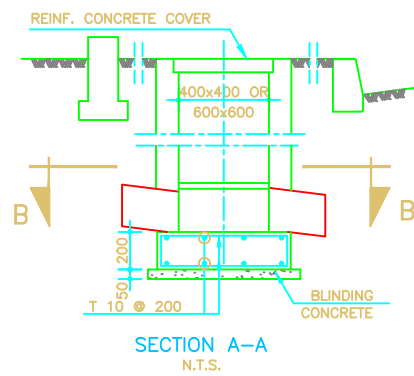
TABLE 1 REINFORCEMENT FOR CONCRETE BEDDING	
PIPE SIZE	STEEL BARS
UP TO #600	T10 # 150 (EACH LAYER)
#700 TO #1000	T12 # 140 (EACH LAYER)

TABLE 2 REINFORCEMENT FOR CONCRETE ENCASEMENT	
PIPE SIZE	STEEL BARS
UP TO #600	T10 # 150
#700 TO #1000	T12 # 140

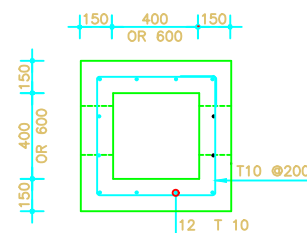
SQUARE HOUSE CONNECTION CHAMBER  
SECTION 0.40mx0.40m OR SECTION 0.60mx0.60m



PLAN  
N.T.S.



SECTION A-A  
N.T.S.



SECTION B-B  
N.T.S.

PIPE BEDDING REQUIREMENTS  
LAYING OF DIFFERENT TYPES OF PIPES MUST BE ACCORDING TO THE TABLE BELOW  
UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER

PIPE MATERIAL	HEIGHT OF FILLING OVER THE PIPE FROM GROUND ELEV. TO CROWN OF PIPE	TYPE OF INSTALLATION
FOR ALL PIPE MATERIALS	LESS THAN 1.00m	CONCRETE ENCASEMENT
GRP	1-3m	GRANULAR BEDDING AND SURROUND
	3-4.50m	CEMENT STABILIZED SAND BEDDING AND SURROUND
	GREATER THAN 4.50m	CONCRETE ENCASEMENT
UPVC, CLASS 4 "DIAM 315mm"	1-4m	GRANULAR BEDDING AND SURROUND
	GREATER THAN 4.00m	CONCRETE ENCASEMENT

## NOTES:

- 1-REFER TO THE SPECIFICATIONS SECTION: "PIPE BEDDING REQUIREMENTS" TABLE APPLICABLE TO EACH PIPE MATERIAL.
- 2-THE MINIMUM THICKNESS "T" FOR CONCRETE ENCASEMENT OF PIPES SHALL BE AS FOLLOWS:
  - T = 150 for D < 600
  - T = 250 for 700 < D < 1000
  - T = 300 for 1000 < D < 1200
- 3-ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- 4-THE TRENCH WIDTHS INDICATED IN THE TABLE ARE THE MAXIMUM VALUES. THE TRENCH WIDTHS OF PIPES MUST BE ADOPTED ACCORDING TO THE SITE ENGINEER (DECIDED ACCORDING TO THE NATURE OF THE SOIL).
- 5-THE GRANULAR MATERIAL AND SAND FILL IN PIPE TRENCHES MUST BE COMPACTED ACCORDING TO THE TECHNICAL SPECIFICATIONS.
- 6-THE CONTRACTOR SHALL IDENTIFY ALL THE EXISTING UTILITIES AND MANHOLES WITH THEIR LOCATION AND LEVELS, IN ORDER TO AVOID DAMAGE TO EXISTING WORKS.
- 7-EXPANSION JOINTS WITH FIBER BOARD FILLER SHALL BE PROVIDED IN CONCRETE ENCASEMENT FOR ALL PIPE MATERIAL-MENTIONED JOINTS SHALL BE ALL AT PIPE JOINTS IN THE VICINITY AND WITHIN 500mm OR 10. FROM MANHOLES AND AT MAXIMUM INTERVALS OF 12m FOR REMAINING LENGTH OF ENCASEMENT BUT ALWAYS AT PIPE JOINTS.
- 8-ALL PIPES SHALL BE LAID ON THE APPROPRIATE TYPE OF BEDDING AS INDICATED IN THE TABLE OF PIPE BEDDING REQUIREMENTS AND SHALL RECEIVE SELECTED FILL COMPACTED TO AT LEAST 300mm. ABOVE CROWN OF PIPE AND REST.
- 9-MINIMUM THICKNESS T1 OF COMPACTED MATERIAL UNDER BARREL BOTTOM:
  - T1=150 FOR D < 300mm.
  - T1=200 FOR 300 < D < 800mm
  - T1= D FOR D > 800
- 10-FOR REINFORCED CONCRETE PIPES, THE LENGTH OF THE SHORT PIECES WILL BE DETERMINED ON SITE (ACCORDING TO MANUFACTURER'S STANDARDS).
- 11-FOR STRUCTURAL NOTES REFER TO DWG. No. RBM-S-4000.

## LEGEND:

G.E.L.	GROUND ELEVATION
CONT.	CONTINUOUS LAP 50db AT SPLICES
db	DEFORMED BAR DIAMETER IN mm.
DIA.	DIAMETER.
D	PIPE DIAMETER
MIN	MINIMUM
EXT	EXTERNAL

FINAL TENDER DOCUMENTS

REDUCTION 1/2

REV. NO.	DATE	BY	DESCRIPTION	CHKD	APP'D
REVISIONS					
CLIENT					
REPUBLIC OF LEBANON					
COUNCIL FOR DEVELOPMENT AND RECONSTRUCTION					
المكتب الهندسي الاستشاري - ايس في بيروت					
ASSOCIATED CONSULTING ENGINEERS & BEIRUT					
PROJECT					
CONSULTANCY SERVICES FOR ROADS ROUTINE					
MAINTENANCE & REHABILITATION OF REMAINING ROADS FOR LOT 3					
(WABATEH, WEST BEKKA, RACHAYA, HASBAYA & JEZZINE QAZAS)					
TITLE					
STORMWATER DRAINAGE					
STANDARD DETAILS					
DESIGNED	CHECKED	PROJECT NO.	SHEET	DRAWING NO.	REV.
S.K.	N.F.	L2102	2 OF 2	GE-W-20002	0