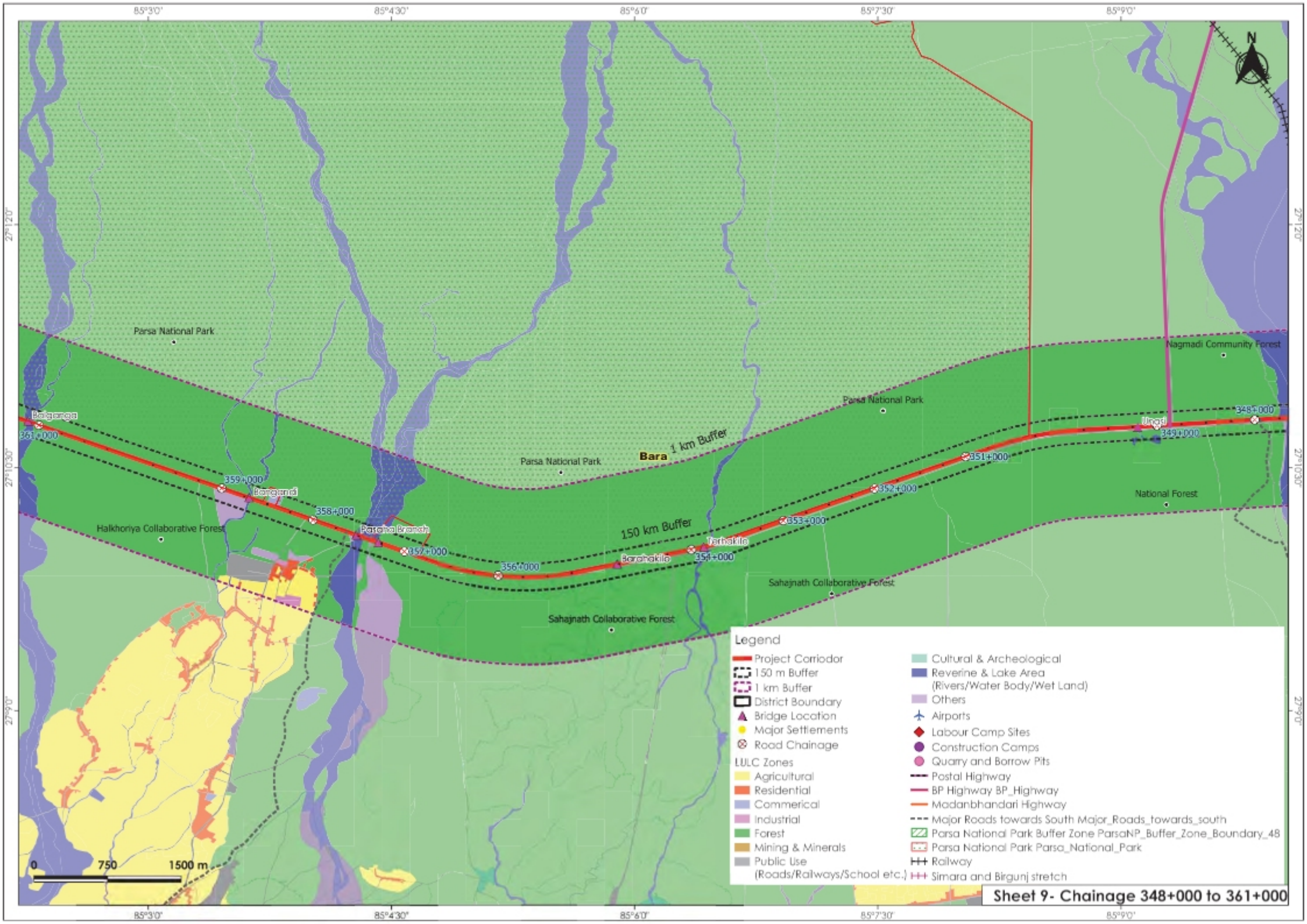
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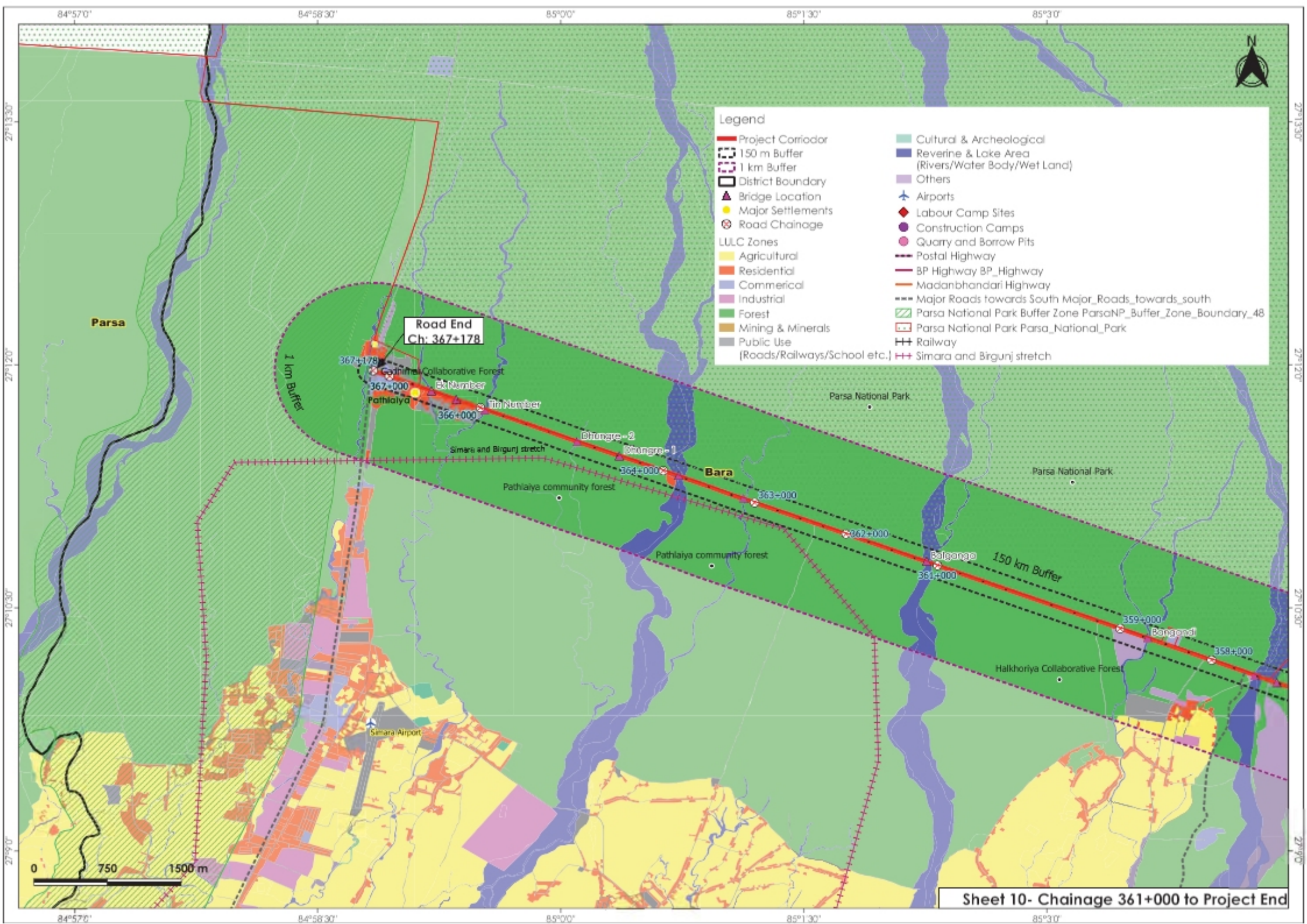
N
Parsa National Park
Nagmadi Community Forest
Parsa National Park
Parsa National Park
Bara
1 km Buffer
150 km Buffer
Halkhoriya Collaborative Forest
National Forest
Sahajnath Collaborative Forest
Sahajnath Collaborative Forest
Bargania
361+000
359+000
Bargania
358+000
Parsha Branch
357+000
356+000
Barahakila
Tarbakila
354+000
353+000
352+000
351+000
Jingdi
349+000
348+000
0
750
1500 m
Legend
Project Corriodor
150 m Buffer
1 km Buffer
District Boundary
Bridge Location
Major Settlements
Road Chainage
LULC Zones
Agricultural
Residential
Commerical
Industrial
Forest
Mining & Minerals
Public Use
(Roads/Railways/School etc.)
Cultural & Archeological
Reverine & Lake Area
(Rivers/Water Body/Wet Land)
Others
Airports
Labour Camp Sites
Construction Camps
Quarry and Borrow Pits
Postal Highway
BP Highway BP_Highway
Madanbhandari Highway
Major Roads towards South Major_Roads_towards_south
Parsa National Park Buffer Zone ParsaNP_Buffer_Zone_Boundary_48
Parsa National Park Parsa_National_Park
Railway
Simara and Birgunj stretch
Sheet 9- Chainage 348+000 to 361+000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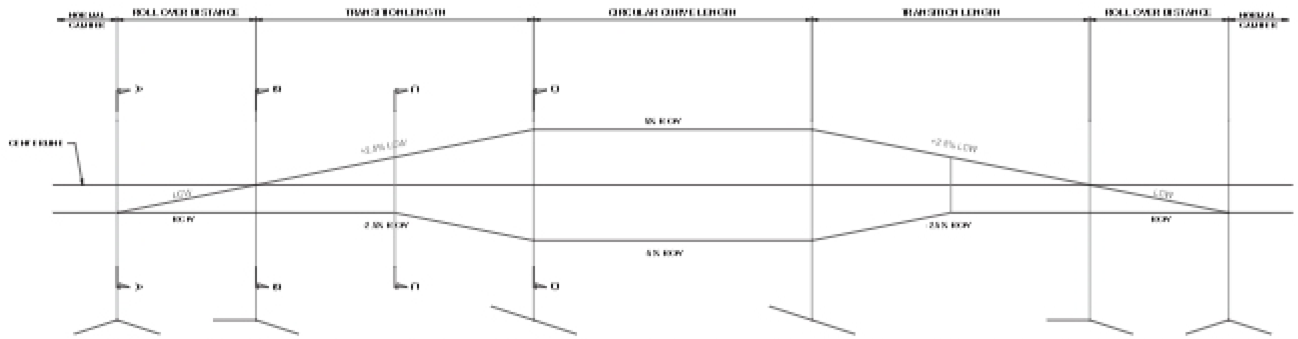
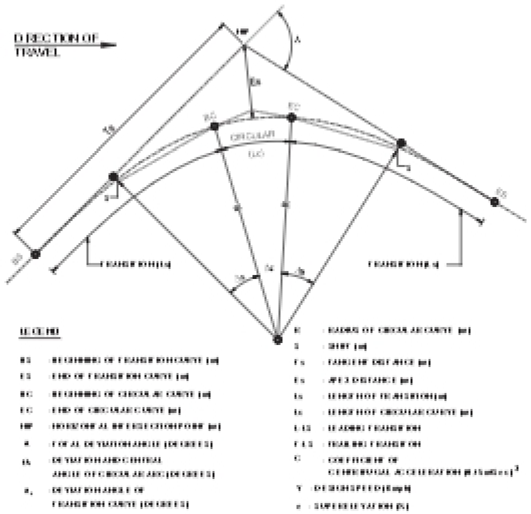
N
Legend
Project Corriodor
150 m Buffer
1 km Buffer
District Boundary
Bridge Location
Major Settlements
Road Chainage
LULC Zones
Agricultural
Residential
Commerical
Industrial
Forest
Mining & Minerals
Public Use
(Roads/Railways/School etc.)
Cultural & Archeological
Reverine & Lake Area
(Rivers/Water Body/Wet Land)
Others
Airports
Labour Camp Sites
Construction Camps
Quarry and Borrow Pits
Postal Highway
BP Highway BP_Highway
Madanbhandari Highway
Major Roads towards South Major_Roads_towards_south
Parsa National Park Buffer Zone ParsaNP_Buffer_Zone_Boundary_48
Parsa National Park Parsa_National_Park
Railway
Simara and Birgunj stretch
Parsa
Road End
Ch: 367+178
367+178
Gadhimai Collaborative Forest
367+000
Pathlaiya
Ek Number
Tin Number
366+000
1 km Buffer
Simara and Birgunj stretch
Dhungre - 2
Dhungre - 1
364+000
Bara
Pathlaiya community forest
363+000
362+000
Parsa National Park
Pathlaiya community forest
Balgonga
361+000
150 km Buffer
359+000
Bangondi
358+000
Halkhoriya Collaborative Forest
Simara Airport
0
750
1500 m
Sheet 10- Chainage 361+000 to Project End

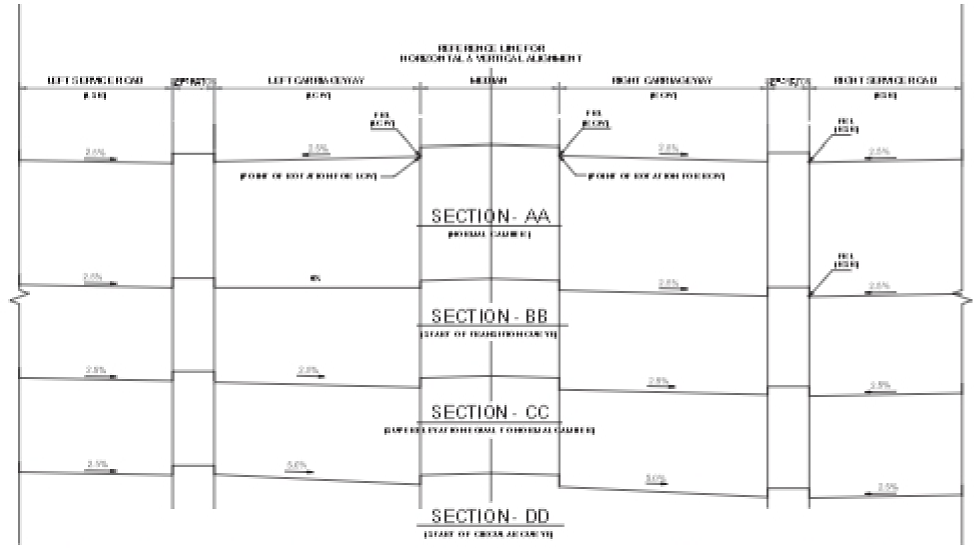
Annexure 1.2: Typical Cross-section of proposed road



(SCHEMATIC DIAGRAM OF ATTAINMENT OF SUPERELEVATION PAVEMENT ROTATED ABOUT MEDIAN KERB EDGES RIGHT HAND CURVE)



ELEMENTS OF COMBINED CIRCULAR AND TRANSITION CURVE



ATTAINMENT OF SUPERELEVATION - MAIN CARRIAGEWAY PAVEMENT ROTATED ABOUT MEDIAN KERB EDGES)

(RIGHT HAND CURVE)

NOTES:

1. DESIGN OF TRANSITION CURVES AND HORIZONTAL CURVES ARE BASED ON NEPAL ROAD STANDARD 2070 AND IRC:38-1988

EMPLOYER	PROJECT	DESIGN CONSULTANTS			
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingenieria Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Roys Consultant Private Limited	Designed By / Checked By / Approved By	Drawing Name: TYPICAL HORIZONTAL CURVE & ATTAINMENT OF SUPERELEVATION DETAILS Reference Drawings	Scale: NONE Date: NOVEMBER 2022 Drawing No. Sheet No.

GENERAL NOTES

1. MATERIAL SPECIFICATIONS AND WORK SPECIFICATIONS FOR COMPLETE PROJECT ROAD CONSTRUCTION SHALL BE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGES" 2073 UNLESS OTHERWISE SPECIFIED.

2. FOLLOWING SPECIFICATIONS OF "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGES" SHALL BE FOLLOWED FOR MATERIAL SELECTION AND CONSTRUCTION:
   - EARTHWORK IN CUTTING : CLAUSE 905 & 906
   - EARTHWORK IN EMBANKMENT : CLAUSE 909 & 910
   - SUBGRADE : CLAUSE 1000
   - GRANULAR SHOULDER & MEDIAN : CLAUSE 1205
   - GRANULAR SUB-BASE : CLAUSE 1201, TABLE 12.1
   - WET MIX MACADAM : CLAUSE 1208, TABLE 12.12
   - DENSE BITUMINOUS MACADAM : CLAUSE 1308, TABLE 13.28
   - BITUMINOUS CONCRETE (POLYMER MODIFIED : CLAUSE 1309, TABLE 13.31
   - DRY LEAN CONCRETE : CLAUSE
   - PAVEMENT QUALITY CONCRETE : CLAUSE

3. COMPACTION REQUIREMENTS (% OF DRY DENSITY), MODIFIED PROCTOR SHALL BE AS FOLLOWS:
   a. EMBANKMENT : 95%
   b. CUT SECTIONS SUPPORTING PAVEMENT : 95%
   c. SUBGRADE : 95%
   d. SHOULDER AND MEDIAN FILL : 95%

4. COMPACTED SURFACE OF ROAD SUPPORTING VARIOUS LAYERS SHALL HAVE THE FOLLOWING CBR VALUE (4 DAYS SOAKED) AS MINIMUM:
   a. EMBANKMENT : 5%
   b. SUBGRADE : 10% (EFFECTIVE)
   c. CUT SURFACE SUPPORTING PAVEMENT : 10% (EFFECTIVE)
   d. CUT SURFACE SUPPORTING SUBGRADE : 5%

5. IF THE LEVEL DIFFERENCE BETWEEN NATURAL GROUND LEVEL AND ROAD TOP LEVEL IS LESS THAN THE PAVEMENT THCIKNESS, THEN THE GROUND SUPPORTING THE PAVEMENT SHALL BE COMPACTED TO REQUIRED DENSITY AND WITH REQUIRED CBR.

6. AT ALL CUT SECTIONS, THE NATURAL GROUND SUPPORTING THE GROUND SHALL BE PROVIDED WITH SELECT / BORROW SOIL FOR SUBGRADE IF EFFECTIVE CBR OF THE SOIL AT NATURAL GROUND IS LESS THAN THE REQUIRED CBR.

7. UNSUITABLE MATERIAL / SOIL ENCOUNTERED DURING FORMATION, EMBANKMENT AND PAVEMENT CONSTRUCTION SHALL BE REMOVED AND REFILLED WITH SELECT FILL (EMBANKMENT / SUBGRADE) AND COMPACTED IN LAYERS.

* MORT&H SPECIFICATION FOR ROAD AND BRIDGE WORKS - V REVISION.

8. THE EXISTING PAVEMENT THROUGH OUT THE PROJECT IS PROPSOED TO BE DISMANTLED AND NEW PAVEMENT AS PER PAVEMENT COMPOSTION GIVEN IN TABLE-1 SHALL BE CONSTRUCTED.

9. FINISHED ROAD LEVELS FOR MAIN ROAD IS MEASURED WITH RESPECT TO MEDIAN KERB EDGES. SERVICE ROAD LEVELS WILL BE AN EXTENDED CROSS FALL OF MAIN ROAD EXCEPT AT UNDERPASS AND FLYOVER LOCATIONS.

10. MEDIAN TOP SLOPE INDICATED IN THE TYPICAL CROSS SECTION IS INDICATIVE. THE SLOPE SHALL VARY DEPENDING ON KERB EDGE LEVES OF LEFT AND RIGHT CARRAIGEWAYS.

11. THE SIDES SLOPES OF ROAD IN FILL / CUT SECTIONS SHALL BE IN ACCORDANCE WITH CLAUSE 11.7 OF NRS 2070.

12. PAVEMENT COMPOSTION FOR MAIN ROAD AND SERVICE ROAD ARE GIVEN IN BELOW.

PAVEMENT LAYERS, THICKNESS IN MM	SECTION I, CH 236.470 TO CH 268.300	SECTION II, CH 268.300 TO CH 347.100	SECTION III, CH 347.100 TO CH 366.878	SERVICE ROAD (ALL SECTIONS)
BITUMINOUS CONCRETE	40	40	40	40
DENSE BITUMINOUS MACADAM	100	85	110	50
WET MIX MACADAM	250	250	250	150
GRANULAR SUBBASE	200	200	200	150
TOTAL	590	575	600	390

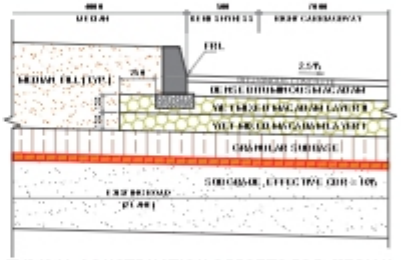
13. PAVEMENT COMPOSITION FOR CYCLE TRACK AND SEPARATOR SHALL BE AS FOLLOWS,

a) CYCLE TRACK: * INTERLOCKING PAVER BLOCK IN M30 CONCRETE, 60mm
* SAND BED, 30mm
* GRANULAR SUBBASE, 200mm
LAID OVER SUBGRADE, EFFECTIVE CBR≥ 10%

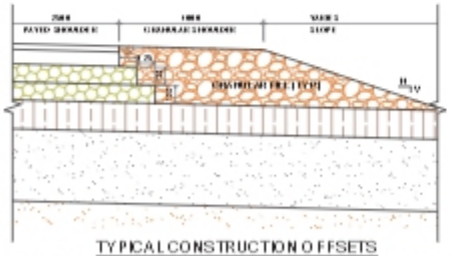
b) SEPARATOR: * INTERLOCKING PAVER BLOCK IN M40 CONCRETE, 80mm
* SAND BED, 30mm
* WET MIX MACADAM, 250mm
* GRANULAR SUBBASE, 200mm
LAID OVER SUBGRADE, EFFECTIVE CBR≥ 10%

PRE CAST KERB AT LONGITUDINAL INTERVAL OF 10m SHALL BE PLACED TO ACHIEVE PROPER COMPACTION OF PAVEMENT LAYERS. THE TOP OF PRE CAST KERB SHALL BE FLUSH WITH TOP SURFACE OF CYCLE TRACK / SEPARATOR.

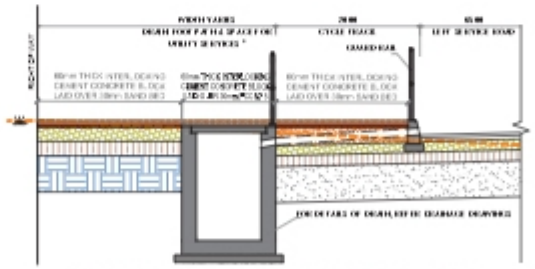
TYPICAL DETAILS OF KERB



TYPICAL CONSTRUCTION OFFSETS FOR MEDIAN



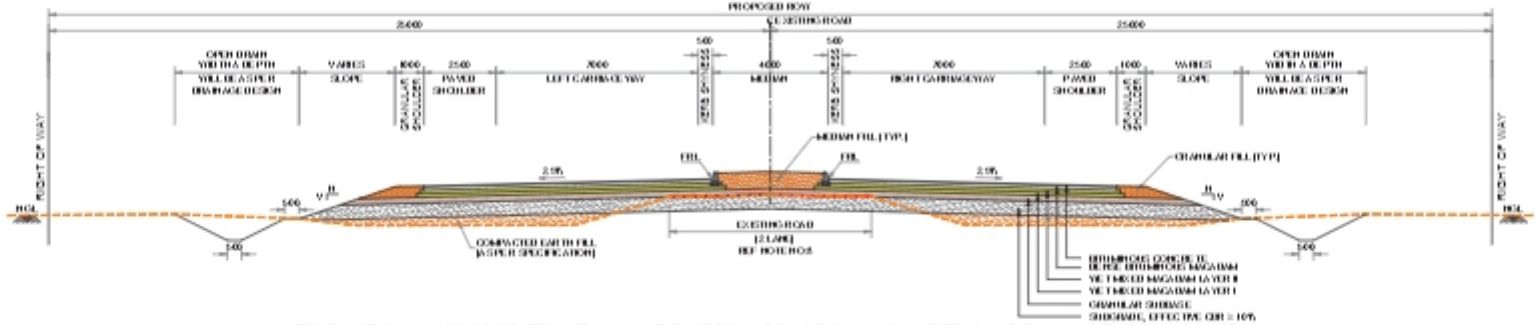
TYPICAL CONSTRUCTION OFFSETS
BETWEEN PAVED SHOULDER AND GRANULAR SHOULDER



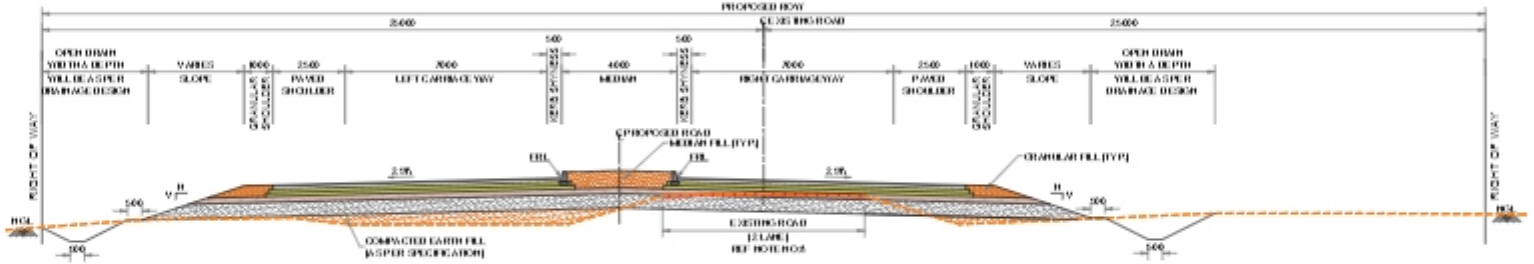
TYPICAL DETAILS OF CYCLE TRACK AND FOOTPATH

EMPLOYER	PROJECT	DESIGN CONSULTANTS			
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingeniera Madrid, Spain STUP Consultants Private Limited Kolkatta, India In Association With Udaya Consultancy, Geocom International, Sundar Kirti Consultant and Raya Consultant Private Limited	Designed By Checked By Approved By	Des. No. Des. No. Des. No.	Signature Signature Signature

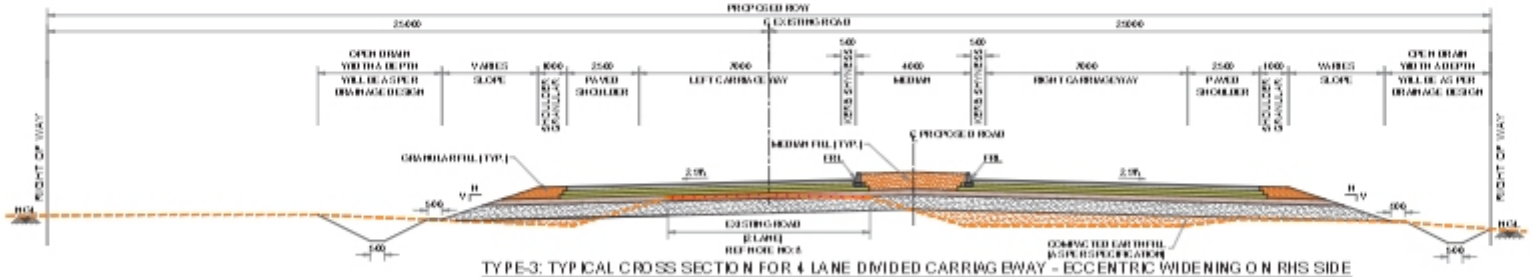
Drawing Name:	Scale:	Date:
GENERAL NOTES AND TYPICAL DETAILS	Scale 1:100	NOVEMBER 2022
Reference Drawings: 1.TYPICAL CROSS SECTIONS -KDHDBHIGHWAYTCS 001 TO 005 2.PLAN AND PROFILE -KDHDBHIGHWAYPP-01 TO 24	Challenge :	Drawing No. KDHDBHIGHWAYTCS 001 REVR[0] Sheet No.



TYPE-1: TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY - CONCENTRIC WIDENING OF EXISTING 2 LANE



TYPE-2: TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY - ECCENTRIC WIDENING ON LHS SIDE

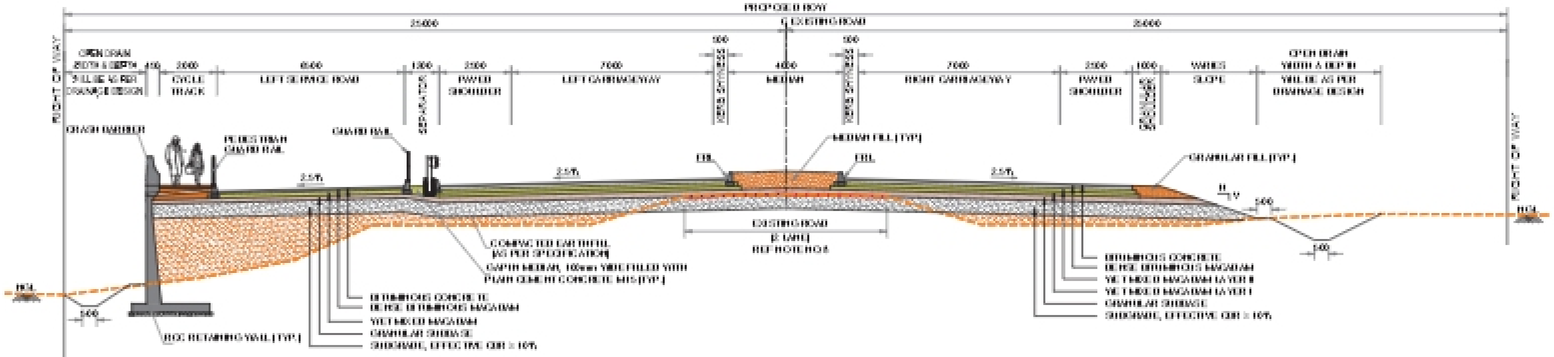


TYPE-3: TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY - ECCENTRIC WIDENING ON RHS SIDE

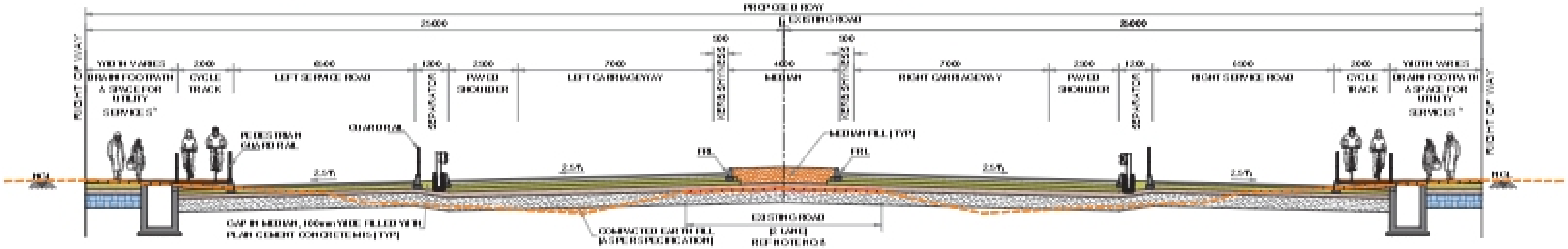
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE INDICATED.
2. THE WIDTH OF FOOTPATH SPACE INCLUDING CYCLE TRACK WHERE WHOLE RIGHT OF WAY IS CONSTRAINED

EMPLOYER	PROJECT	DESIGN CONSULTANTS			
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 Km) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingeniera Madrid, Spain STUP Consultants Private Limited Kolkata, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited	Designed By Checked By Approved By	Rev. No. Rev. No. Rev. No.	Signature Signature Signature

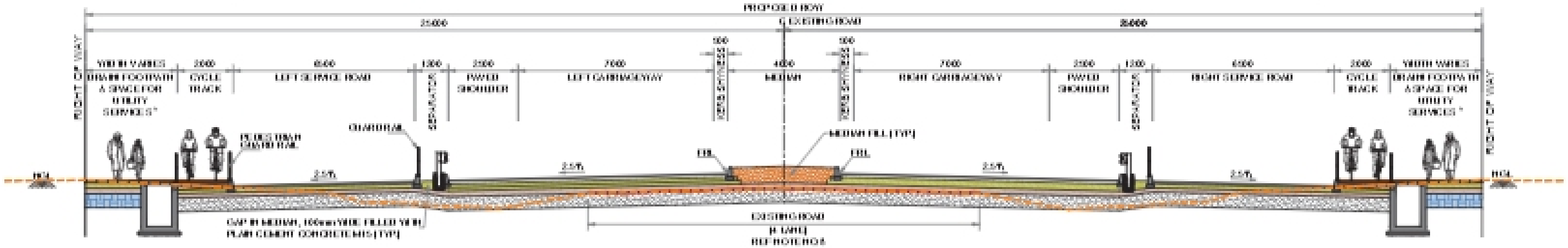
Drawing Name:	Scale:	Date:
TYPICAL CROSS SECTION TYPE-1 TO TYPE-3	Scale: 1:100	NOVEMBER 2022
Reference Drawings: 1.TYPICAL HORIZONTAL CURVE ATTACHMENT OF SUPERELEVATION DETAILS 2.PLAN AND PROFILE	Challenge :	Drawing No. Sheet No.



TYPE-4 : TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY - CONCENTRIC WIDENING OF EXISTING 2 LANE AND SERVICE ROAD ON LHS ONLY



TYPE-5 : TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - CONCENTRIC WIDENING OF EXISTING 2 LANE



TYPE-6 : TYPICAL CROSS SECTION FOR 4 LANE DIVIDED CARRIAGEWAY WITH SERVICE ROAD - CONCENTRIC WIDENING OF EXISTING 4 LANE

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THE WIDTH OF FOOTPATH SPACE INCLUDING CYCLE TRACK VARIES WHERE RIGHT OF WAY IS CONSTRAINED

EMPLOYER	PROJECT	DESIGN CONSULTANTS
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	EPTISA Servicios De Ingeniera Madrid, Spain STUP Consultants Private Limited Kolkata, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Rays Consultant Private Limited

Designed By	Mr. Nec No.	Signature	Drawing Name: TYPICAL CROSS SECTION TYPE-4 TO TYPE-6
Checked By	Mr. Nec No.	Signature	Reference Drawings: 1. TYPICAL HORIZONTAL CURVE & ATTAINMENT OF SUPERELEVATION DETAILS -KDP/DOR/HIGHWAY/STD/01 2. PLAN AND PROFILE
Approved By	Mr. Nec No.	Signature	

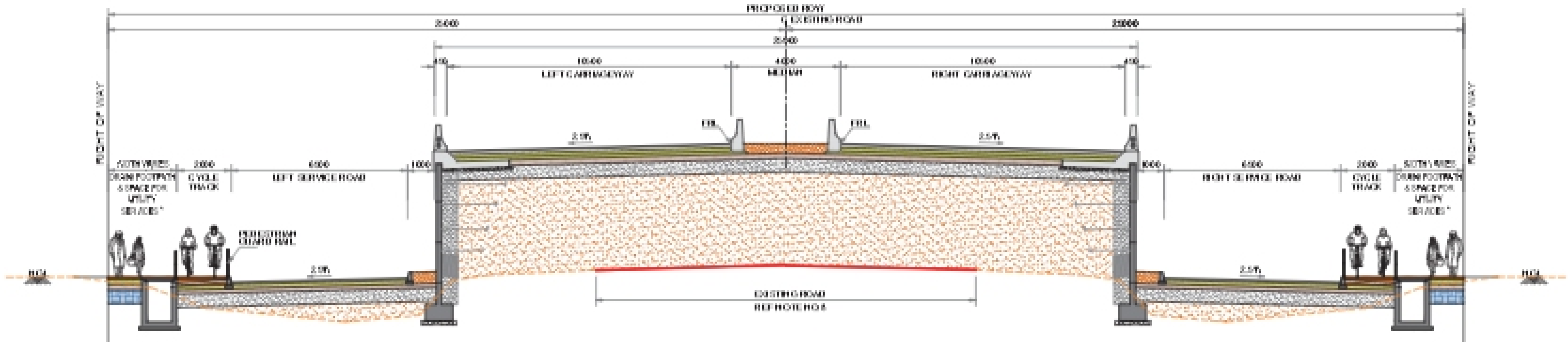
Scale: Scale: 1:100

Chainage:

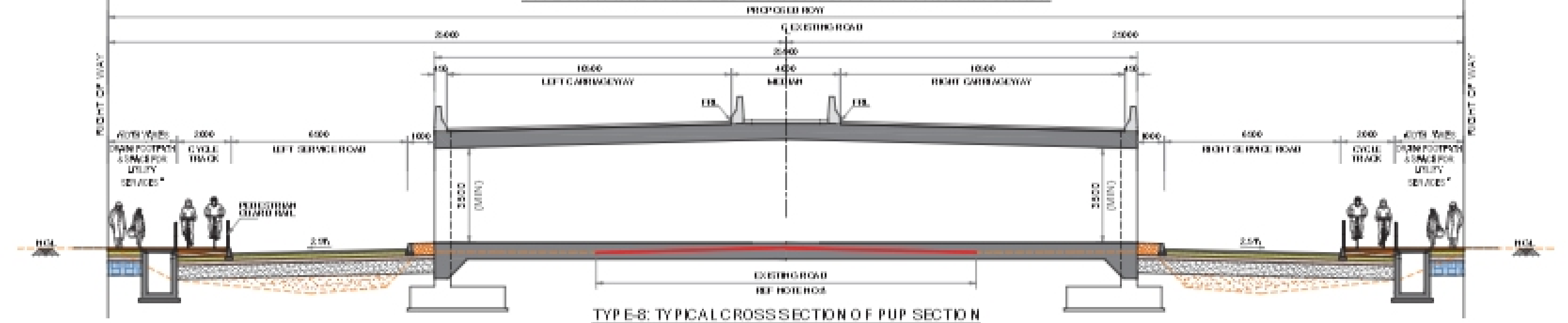
Date: NOVEMBER 2022

Drawing No.

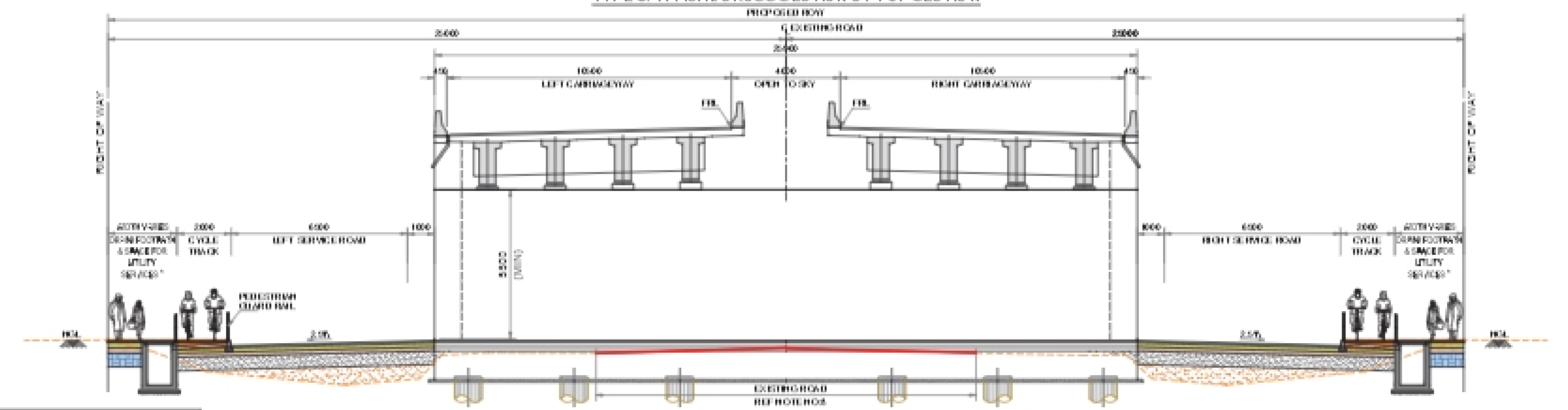
Sheet No.



TYPE-7: TYPICAL CROSS SECTION FOR PUP/VUP APPROACH PORTION



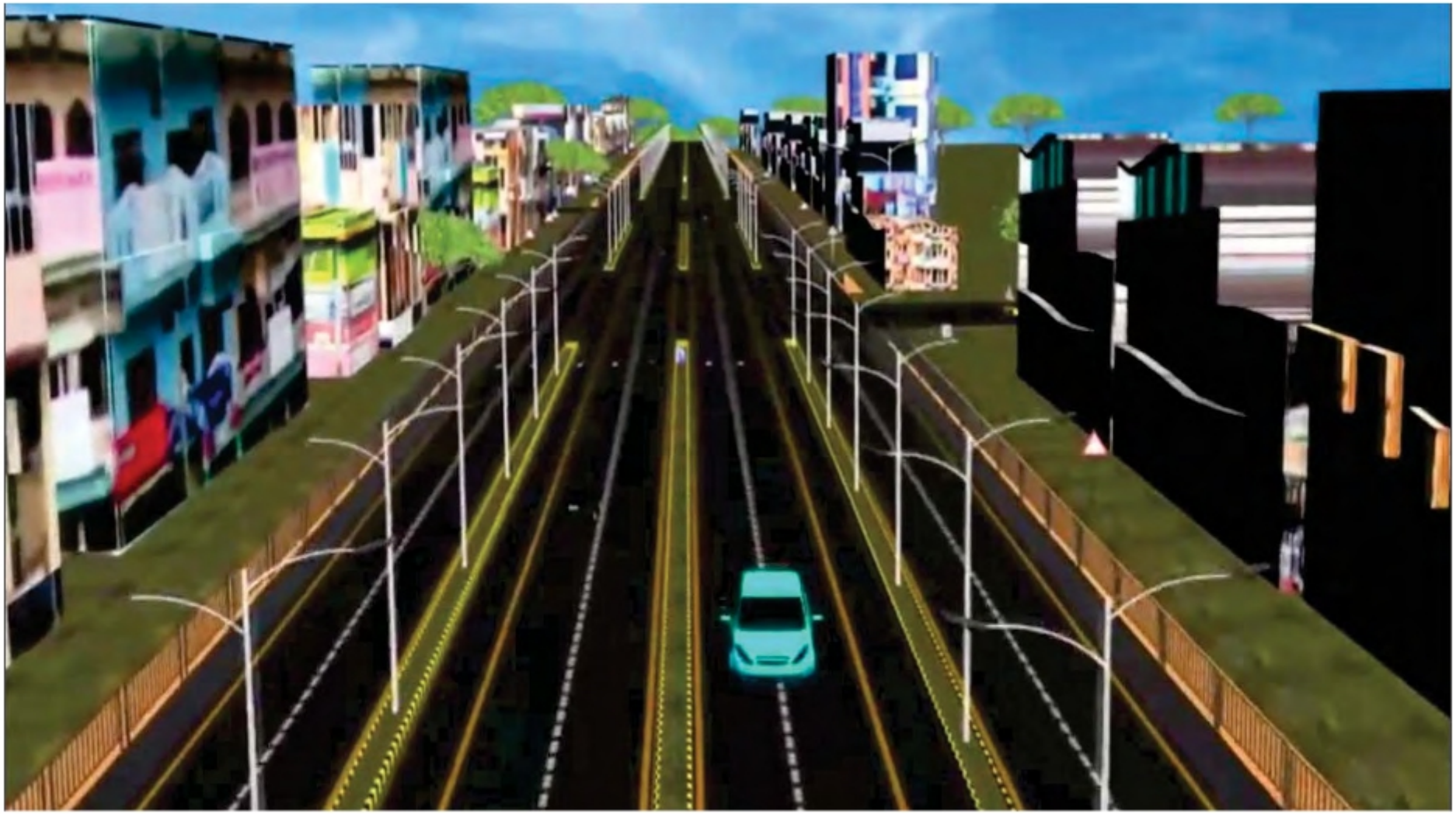
TYPE-8: TYPICAL CROSS SECTION OF PUP SECTION



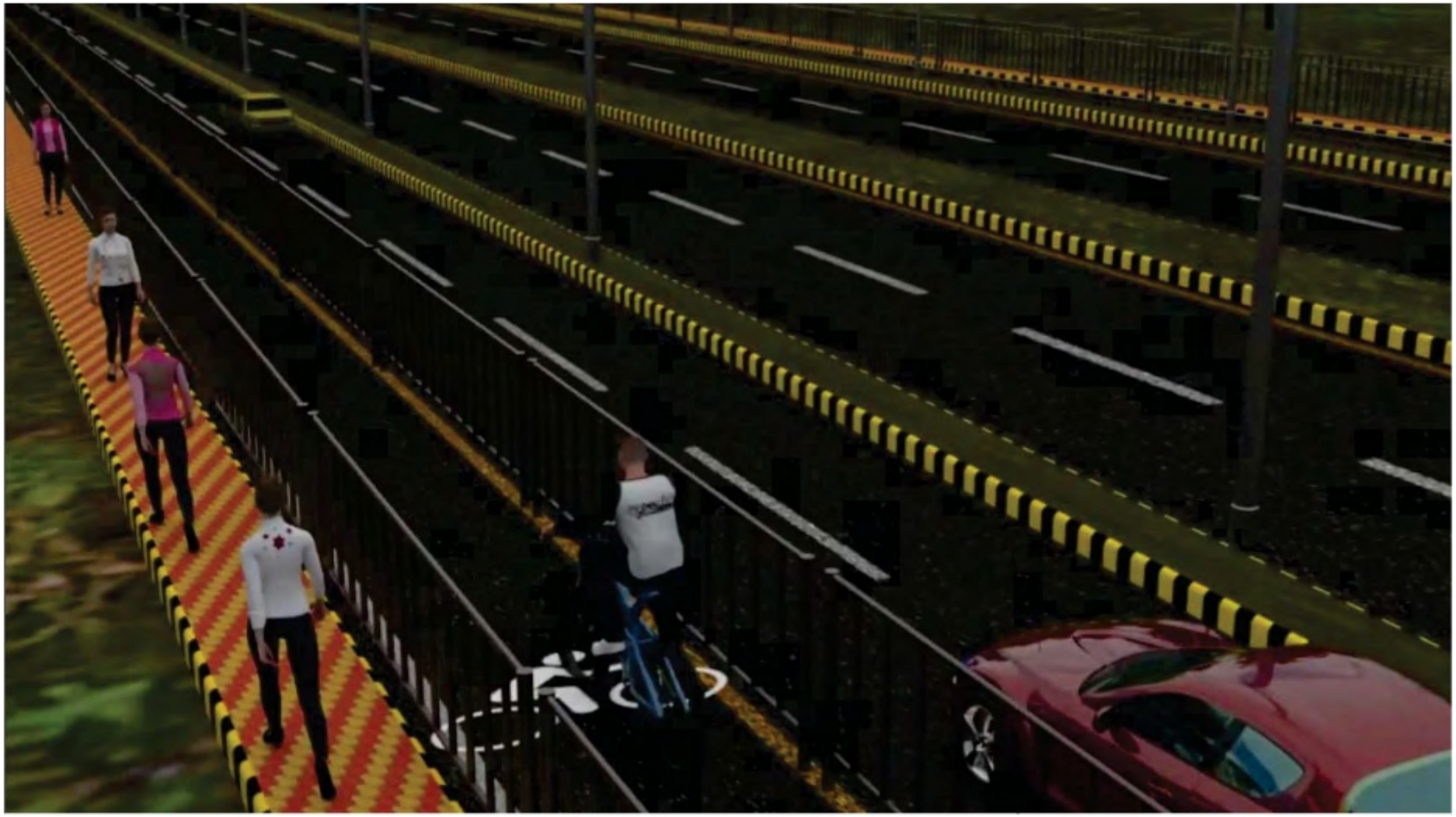
TYPE-9: TYPICAL CROSS SECTION FOR VUP STRUCTURE PORTION

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THE WIDTH OF FOOTPATH SPACE INCLUDING CYCLE TRACK VARIES WHERE RIGHT OF WAY IS CONSTRAINED

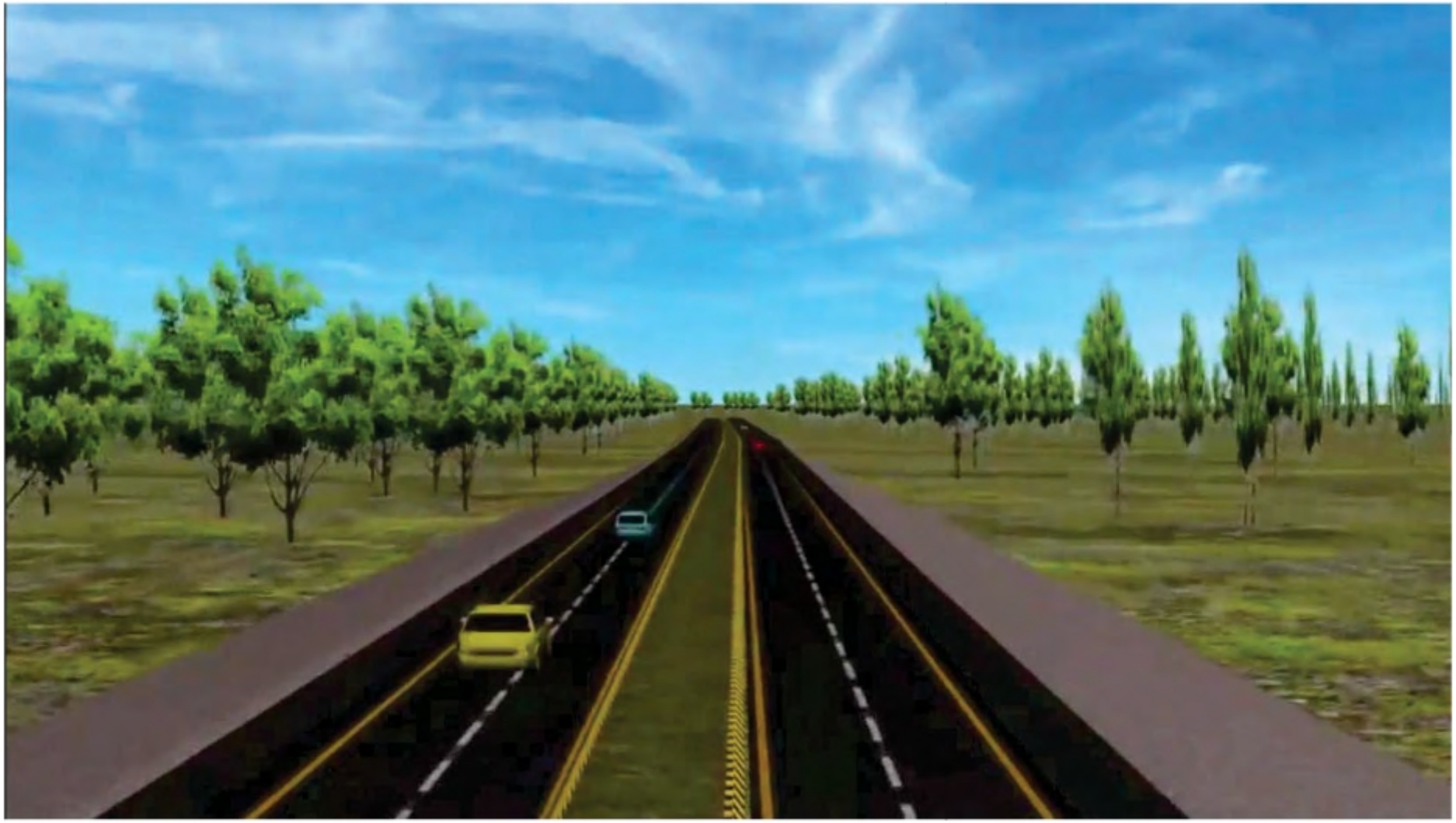
EMPLOYER	PROJECT	DESIGN CONSULTANTS			Drawing Name	Scale:	Date:
Government of Nepal Ministry of Physical Infrastructure and Transport Department of Roads Development Cooperation Implementation Division	Strategic Road Connectivity & Trade Improvement Project (SRCTIP) Detailed Design of Upgradation of Kamala-Dhalkebar-Pathlaiya Road Section (130 KM) of Mahendra Highway and Bridges	Joint Venture of EPTISA Servicios De Ingenieria Madrid, Spain STUP Consultants Private Limited Kolkata, India In Association With Udaya Consultancy, Geocom International, Sundar Kriti Consultant and Roys Consultant Private Limited	Designed By / Checked By / Approved By	Signature	TYPICAL CROSS SECTION TYPE-7 TO TYPE-9 Reference Drawings: 1. TYPICAL HORIZONTAL CURVE & ATTAINMENT OF SUPERELEVATION DETAILS 2. PLAN AND PROFILE	Scale 1:100 Chainage:	NOVEMBER 2022 Drawing No. Sheet No.



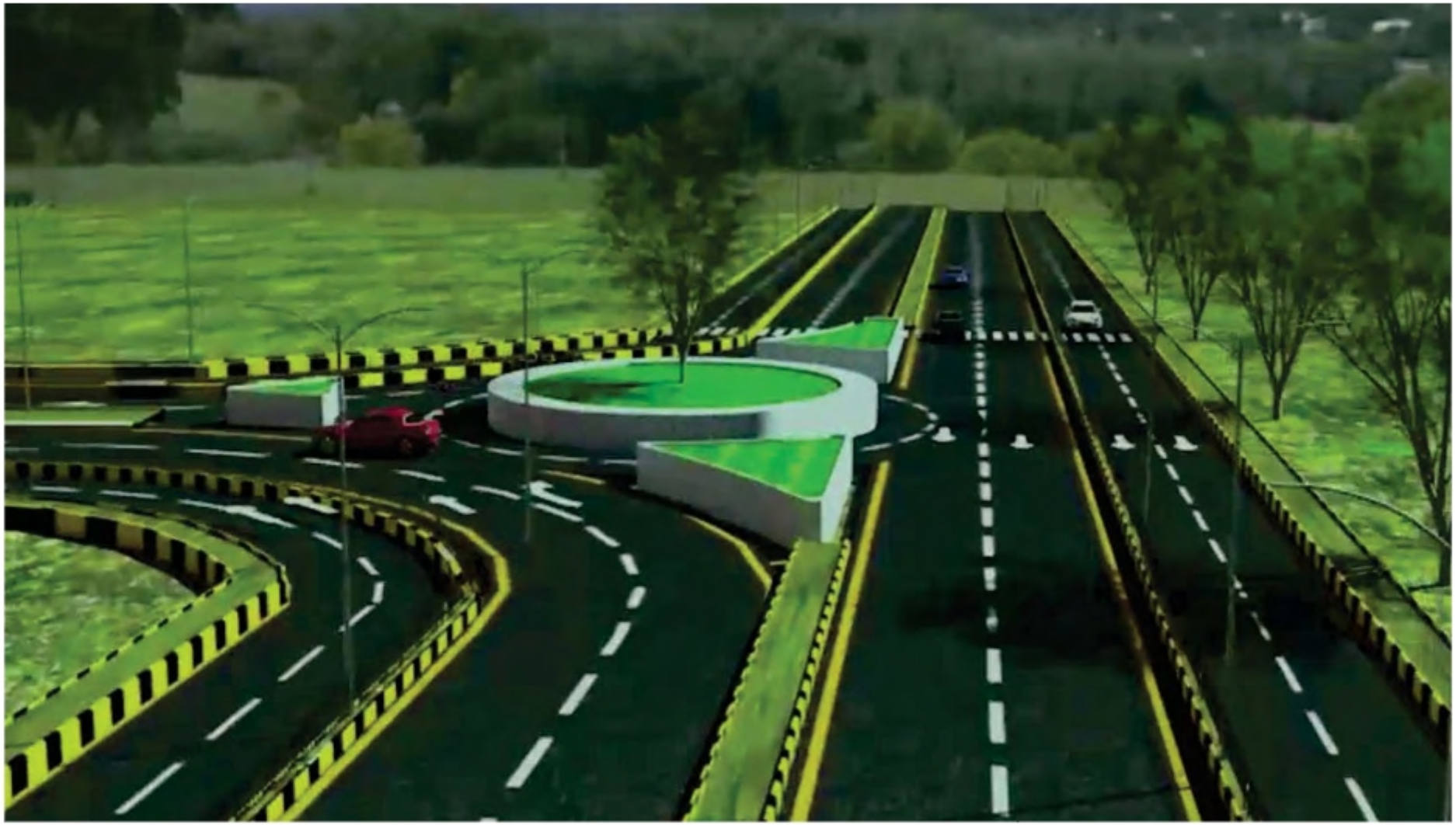
Road in Urban Section



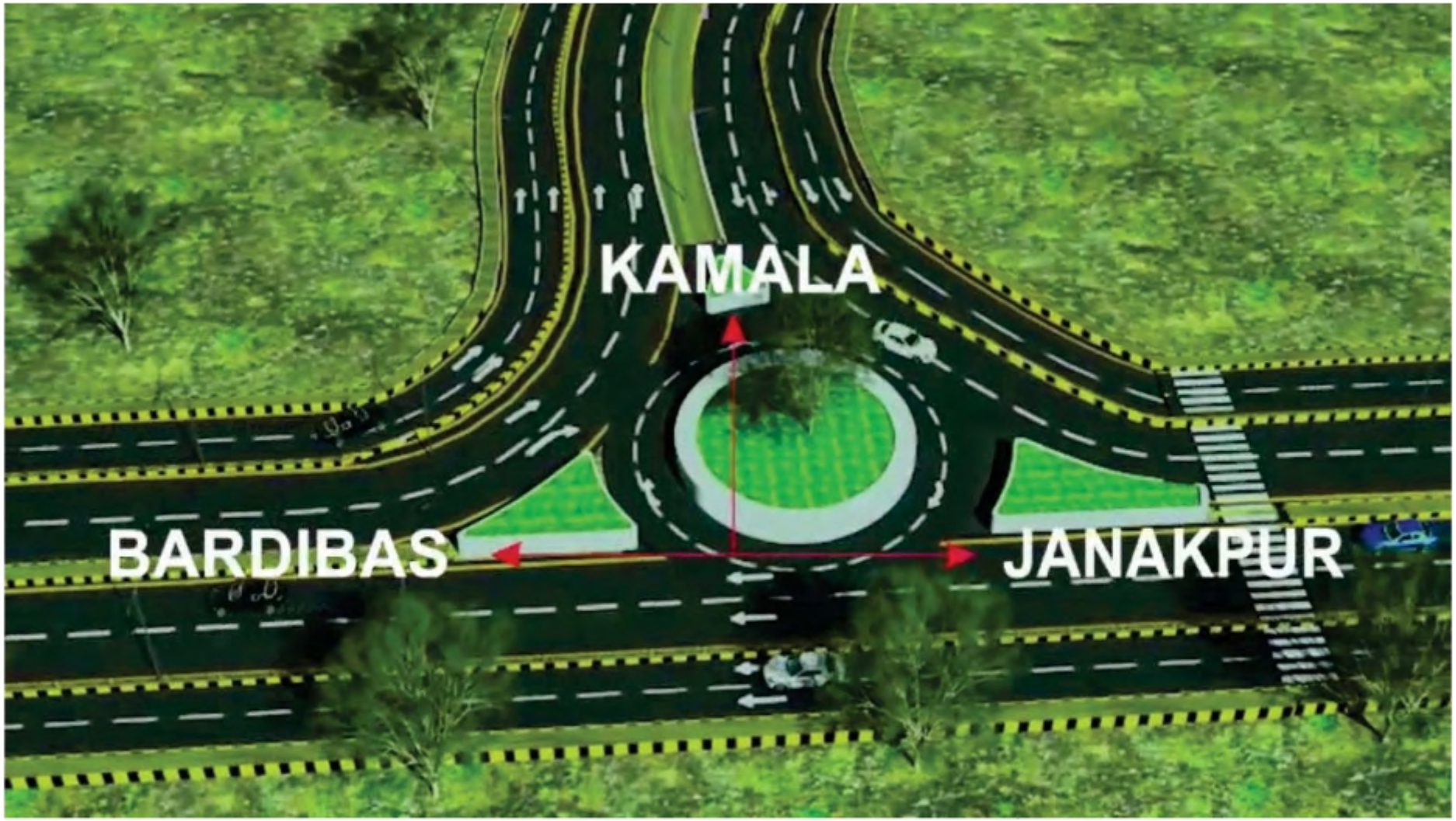
Road in Urban section with footpath, cycle lane, service road, main highway and medain



Road in Rural/Forest section



Dhalkebar Junction



Dhalkaber Junction

Vehicle Under Pass and People Under Pass

Vehicle Under Pass

Annexure 1.3: Traffic Data

Table: Traffic Count Result along KDP Road Alignment

S/N	Vehicle Type	ADT, VPD					
		Kamala-Dhalkebar	Dhalkebar-Bardibas	Bardibas-Nawalpur	Nawalpur-Chapur	Chapur-Nijgadh	Nijgadh-Pathlaiya
1	Multi-axle Truck	1277	1244	851	866	865	796
2	Heavy Truck	731	795	576	682	731	741
3	Mini-truck	133	146	213	229	312	461
4	Large-bus	560	680	716	663	661	791
5	Mini-bus	100	104	134	163	188	138
6	Micro-bus	659	562	371	335	283	180
7	Car	707	719	696	722	722	882
8	Motorcycle	6694	7365	5994	8779	9481	3188
9	Utility vehicle	676	813	670	622	531	449
10	Four-wheel drive	927	1061	754	736	652	711
11	Tractor	165	160	139	284	402	133

Source: Detailed Design Report 2023

On the basis of this data, past trend, and seasonal variation factor the design has estimated Annual Average Daily Traffic (AADT) for each homogeneous road sections. Estimated AADT for base year (i.e. Jan 2022) is given in **Table 1-5**.

Table: Traffic Estimation for Base Year

S/N	Vehicle Type	Traffic Jan 2022, VPD					
		Kamala-Dhalkebar	Dhalkebar-Bardibas	Bardibas-Nawalpur	Nawalpur-Chapur	Chapur-Nijgadh	Nijgadh-Pathlaiya
1	Multi-axle Truck	1200	1169	800	814	813	748
2	Heavy Truck	687	747	542	641	687	697
3	Mini-truck	125	137	201	216	294	434
4	Large-bus	526	639	673	623	621	744
5	Mini-bus	94	97	126	153	176	129
6	Micro-bus	620	529	348	315	266	170
7	Car	665	676	655	679	679	829
8	Motorcycle	6293	6923	5634	8252	8912	2996
9	Utility vehicle	635	764	630	585	499	422
10	Four-wheel drive	872	997	708	692	613	668
11	Tractor	155	150	131	267	378	125

Source: Detailed Design Report 2023

Further, traffic forecast was performed based on the predetermined growth rates. The Pathlaiya – Nijgadh section of the Project Road was also analyzed for the diverted traffic because the Project Road will have significant influence on diverted traffic after the construction of Kathmandu-Terai Fast Track Expressway originating from Kathmandu and merging the KDP at the Nijgadh. Final Traffic Forecast as for each homogeneous road section is given in **Table** below.

Table: Traffic Forecast for the Year 2046

S/N	Vehicle Type	AADT Jan 2046, VPD					
		Kamala-Dhalkebar	Dhalkebar-Bardibas	Bardibas-Nawalpur	Nawalpur-Chapur	Chapur-Nijgadh	Nijgadh-Pathlaiya
1	Multi-axle Truck	2656	2588	1769	1801	1800	2660
2	Heavy Truck	1521	1654	1199	1419	1521	2294
3	Mini-truck	277	304	444	477	650	1213
4	Large-bus	1043	1266	1333	1235	1231	1874
5	Mini-bus	186	193	250	303	350	402
6	Micro-bus	1228	1048	691	624	528	455
7	Car	2372	2411	2335	2421	2422	4548
8	Motorcycle	40892	44990	36614	53624	57912	19445
9	Utility vehicle	1173	1411	1162	1079	921	891
10	Four-wheel drive	3354	3837	2726	2661	2359	2711
11	Tractor	369	357	310	634	897	297

Source: Detailed Design Report 2023

Annexure 1.4: Construction Schedule

Construction Schedule for the Proposed Road Upgradation

S.N	Description	Months																																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1.	General (insurance of works, equipment, third party insurance etc.)																																				
2.	Additional tests for material and work																																				
3.	Property acquisition (buildings, land and other structures)																																				
4.	Provide and maintain traffic safety, control measures and temporary diversions where necessary																																				
5.	Relocation of services																																				
6.	Provision and maintenance of labor camps																																				
7.	Clearing of grass and vegetation, leveling the surface																																				
8.	Earth work (excavation for road widening and foundation of structures in all types of soil including disposal of excavated material at approved environmentally safe tipping sites																																				
9.	In filling and back filling, construction of embankments, shoulders and other miscellaneous filling and backfilling																																				

10.	Construction of road embankment and side drains
11.	Construction of bridges and cross drainage structures
12.	Sub-base, Base and Shoulders (preparation of subgrade to designed grade and chamber including watering and compaction, supply, place and compact quarry sieved sub-base materials and crusher run improved sub base course materials
13.	Bituminous course
14.	Turfing along road embankment and Plantation: supply and planting rooted grass slips, shrubs and tree samplings.
15.	Miscellaneous Works (supply and place permanent traffic sign, standard size sign boards, one kilometer and five-kilometer stone (RCC), edging, gabion parapet-safety barriers for vehicle safety on the edge of road, delineator post etc.
16.	Project Completion and DLP Period Start