

A. FICHAS GEODESICAS



INSTITUTO GEOGRÁFICO NACIONAL
SUBDIRECCIÓN DE CARTOGRAFÍA
DEPARTAMENTO DE PROCESAMIENTO GEODÉSICO



FORMULARIO DE INFORMACIÓN DE LA ESTACIÓN GNSS DE RASTREO
PERMANENTE

0. DATOS GENERALES:

Preparado por: Departamento de Procesamiento Geodésico
Realizado: 1 de julio de 2019
Versión: 3.0.0

1. INFORMACIÓN DE LA ESTACIÓN GNSS:

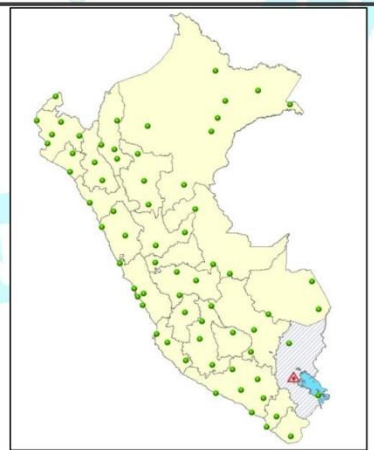
Nombre: Juliaca
Código Nacional: PU02
Código Internacional: 42228M001
Inscripción: Placa de bronce
Orden de la estación: "0"
Fecha de monumentación: 3 de abril de 2010



2. INFORMACIÓN SOBRE LA LOCALIZACIÓN:

Departamento: Puno
Provincia: San Román
Distrito: Juliaca
Ubicación de la estación: Universidad Peruana la Unión

CROQUIS DE UBICACIÓN



FECHA: 5/08/2019 13:50 / COMPROBANTE DE PAGO ELECTRÓNICO: F001-004669

PU02 1 | 4



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3. COORDENADAS DE LA ESTACIÓN:

Sistema de referencia: GRS80 / WGS84	Marco de referencia: ITRF2000
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3.1. GEODÉSICAS:

Latitud (S)	Longitud (O)
15° 30' 51.75393 "	70° 10' 45.77093 "
Altura Elipsoidal (m)	Factor de escala combinado
3880.6146	0.999797846658

3.2. CARTESIANAS

X (m)	Y (m)	Z (m)
2085642.8051	-5786561.0252	1696048.2278

3.3. UTM

Este (m)	Norte (m)
373508.2250	8284432.1757
Zona: 19 Sur	

4. INFORMACIÓN SOBRE EL EQUIPO GNSS

4.1. RECEPTOR:

Modelo: NET R9 TRIMBLE, Doble frecuencia
N° de serie: 5742R51312
Versión del firmware: 5.22
Fecha de instalación: 10 de mayo de 2018
Ubicación del receptor: El receptor se encuentra dentro de una caja metálica de color blanco humo empotrada a la pared, ubicada en el Laboratorio del Colegio Adventista del Titicaca de la mencionada universidad.

4.2. ANTENA:

Modelo: Zephyr Geodetic Model 3 (L1,L2) Trimble
N° de serie: 1551129465
Cubierta protectora: con domo
Medición de la antena: ARP
Altura de la antena: 0.0750 m
Fecha de instalación: 10 de mayo de 2018
Ubicación de la antena: La antena se encuentra sobre un monumento de concreto de 2.00 m de alto y 40 cm x 40 cm de ancho de color azul, ubicada en el techo de la oficina de informática de la mencionada universidad.

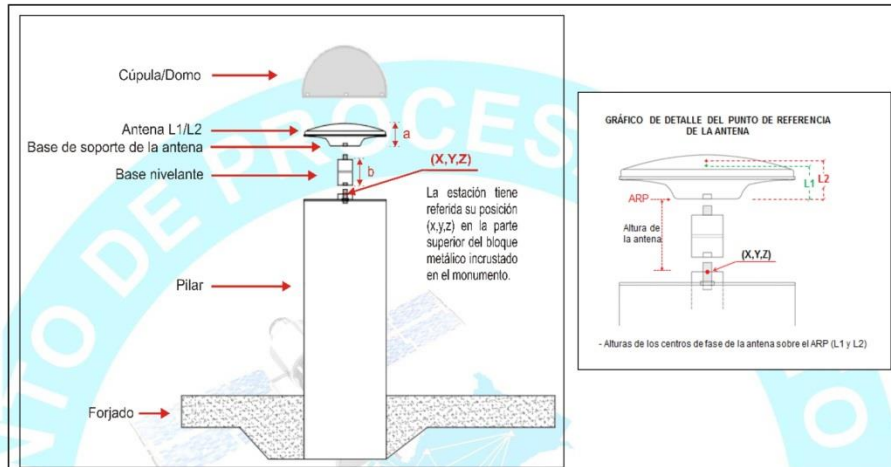


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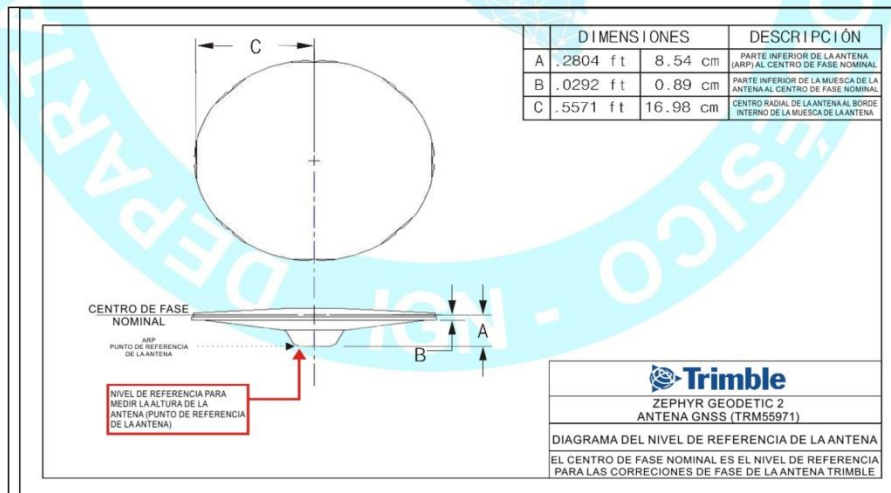
5. ESQUEMA DE LA ESTACIÓN

5.1.ESQUEMA DE ALTURA DE LA ANTENA



a = 8.54 cm	Distancia de compensación del centro de fase. (Phase Center Offset)
b = 7.50 cm	Distancia entre la base de soporte de la antena y el límite superior del bloque metálico incrustado en el monumento.

5.2.DIMENSIONES DE LA ANTENA





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6. INFORMACIÓN SOBRE EL PROCESAMIENTO

Área de mantenimiento: DPG
Área de control: DPG
Área de procesamiento: DPG
Observables: L1, L2, C1, P2
Intervalo de registro: 5 seg
Máscara de elevación: 5°
Archivo diario: 24 HRS
Formato de archivo nativo: *T01
Datos para el procesamiento: 27 de mayo al 9 de junio de 2019
Tipo de órbita: Efemérides precisas finales
Archivo procesado: Rinex 2.11
Software de procesamiento: Gamit / Globk V 10.7
Procesador y analista GNSS: Mario César Mendoza Del Aguila
Revisado por: CAP. EP. Rogger Montoya Monroy

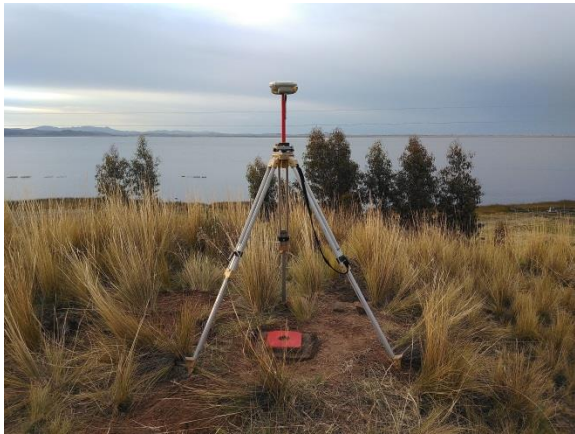

7. CONTACTOS

Oficina: Departamento de Procesamiento Geodésico
Dirección: Av. Andrés Aramburú 1184, Surquillo, Lima 34, Perú
Teléfono: 4759960 / 4753030 Anexo 120
Correo: cpg@ign.gob.pe / cpg.ign@hotmail.com
Web site: http://209.45.65.186/rastreo_permanente





DESCRIPCION MONOGRAFICA

NOMBRE DEL PUNTO: PCG-1183		LOCALIDAD:	ESTABLECIDA POR:
UBICACIÓN: DISTRITO : JULI PROVINCIA : CHUCUITO DEPARTAMENTO : PUNO		ZONA UTM 19K	
LATITUD(S) WGS84: S16°11'35.91061"		LONGITUD(S) WGS84: W69°26'55.60195"	
NORTE WGS84: 8209629.330		ESTE WGS84: 452030.522	
ALT. ORTOMETRICA (m): EGM2008: 3848.483	ALT. ELIPSOIDAL: 3893.401	FACTOR DE ESCALA (COMBINADO): 0.9990187832	
FOTOGRAFIA 		FOTOGRAFIA 	
DESCRIPCION: Se aprecia el receptor GPS TRIMBLE, R8, estacionado sobre el punto PCG-1183			
MARCA DE LA ESTACION: Se trata de una placa grabada de bronce, empotrada sobre un hito de concreto, con la inscripción PCG-1183			
REFERENCIA:			
DESCRITA POR: Bach. Javier Rolando Maquera Ccalle		FECHA: 2020	




DESCRIPCION MONOGRAFICA

NOMBRE DEL PUNTO: PCG-1184		LOCALIDAD:	ESTABLECIDA POR:
UBICACIÓN: DISTRITO : JULI PROVINCIA : CHUCUITO DEPARTAMENTO : PUNO		ZONA UTM 19K	
LATITUD(S) WGS84: S16°11'20.30926"		LONGITUD(S) WGS84: W69°26'37.36739"	
NORTE WGS84: 8210109.898		ESTE WGS84: 452570.905	
ALT. ORTOMETRICA (m): EGM2008: 3859.938	ALT. ELIPSOIDAL: 3904.862	FACTOR DE ESCALA (COMBINADO): 0.9990163525	
FOTOGRAFIA 		FOTOGRAFIA 	
DESCRIPCION: Se aprecia el receptor GPS TRIMBLE, R8, estacionado sobre el punto PCG-1184			
MARCA DE LA ESTACION: Se trata de una placa grabada de bronce, empotrada sobre un hito de concreto, con la inscripción PCG-1184			
REFERENCIA:			
DESCRITA POR: Bach. Javier Rolando Maquera Ccalle		FECHA: 2020	



DESCRIPCION MONOGRAFICA

NOMBRE DEL PUNTO: PCG-1185		LOCALIDAD:	ESTABLECIDA POR:
UBICACIÓN: DISTRITO : JULI PROVINCIA : CHUCUITO DEPARTAMENTO : PUNO		ZONA UTM 19K	
LATITUD(S) WGS84: S16°11'25.25545"		LONGITUD(S) WGS84: W69°24'27.04377"	
NORTE WGS84: 8209965.928		ESTE WGS84: 456440.839	
ALT. ORTOMETRICA (m): EGM2008: 3827.051	ALT. ELIPSOIDAL: 3871.950	FACTOR DE ESCALA (COMBINADO): 0.9990171515	
FOTOGRAFIA 		FOTOGRAFIA 	
DESCRIPCION: Se aprecia el receptor GPS TRIMBLE, R8, estacionado sobre el punto PCG-1185			
MARCA DE LA ESTACION: Se trata de una placa grabada de bronce, empotrada sobre un hito de concreto, con la inscripción PCG-1185			
REFERENCIA:			
DESCRITA POR: Bach. Javier Rolando Maquera Ccalle		FECHA: 2020	



DESCRIPCION MONOGRAFICA

NOMBRE DEL PUNTO: PCG-1186		LOCALIDAD:	ESTABLECIDA POR:
UBICACIÓN: DISTRITO : JULI PROVINCIA : CHUCUITO DEPARTAMENTO : PUNO		ZONA UTM 19K	
LATITUD(S) WGS84: S16°11'27.81530"		LONGITUD(S) WGS84: W69°24'05.63985"	
NORTE WGS84: 8209888.522		ESTE WGS84: 457076.522	
ALT. ORTOMETRICA (m): EGM2008: 3832.338	ALT. ELIPSOIDAL: 3877.231	FACTOR DE ESCALA (COMBINADO): 0.9990156456	
FOTOGRAFIA 		FOTOGRAFIA 	
DESCRIPCION: Se aprecia el receptor GPS TRIMBLE, R8, estacionado sobre el punto PCG-1186			
MARCA DE LA ESTACION: Se trata de una placa grabada de bronce, empotrada sobre un hito de concreto, con la inscripción PCG-1186			
REFERENCIA:			
DESCRITA POR: Bach. Javier Rolando Maquera Ccalle		FECHA: 2020	

B. RESUMEN DE METRADOS



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

TESIS: : COMPARACIÓN DE VOLÚMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL MÉTODO TRADICIONAL Y BIM EN EL DISEÑO GEOMÉTRICO DE LA CARRETERA HUAQUINA – CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO

UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO 10 METROS MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE	TERRAPLEN
			(m3)	(m3)
1	5+000.00	5+500.00	5,093.60	335.90
2	5+500.00	6+000.00	3,182.30	1,026.50
3	6+000.00	6+500.00	3,083.25	354.90
4	6+500.00	7+000.00	1,223.10	806.90
5	7+000.00	7+500.00	1,554.80	1,105.65
6	7+500.00	8+000.00	4,915.10	472.65
7	8+000.00	8+500.00	3,773.50	547.20
8	8+500.00	9+000.00	2,016.55	1,325.15
9	9+000.00	9+500.00	3,920.40	964.45
10	9+500.00	10+000.00	3,593.75	466.35
11	10+000.00	10+500.00	882.35	2,625.50
12	10+500.00	11+000.00	524.50	1,932.25
13	11+000.00	11+500.00	349.30	2,363.10
14	11+500.00	12+000.00	2,313.25	1,110.35
15	12+000.00	12+500.00	137.45	2,927.75
TOTAL			36,563.20	18,364.60



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

TESIS: : COMPARACIÓN DE VOLÚMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL MÉTODO TRADICIONAL Y BIM EN EL DISEÑO GEOMÉTRICO DE LA CARRETERA HUAQUINA – CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO

UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO 5 METROS MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE	TERRAPLEN
			(m3)	(m3)
1	5+000.00	5+500.00	5,123.95	328.10
2	5+500.00	6+000.00	3,178.15	1,024.65
3	6+000.00	6+500.00	3,056.38	371.55
4	6+500.00	7+000.00	1,214.45	781.35
5	7+000.00	7+500.00	1,560.05	1,097.38
6	7+500.00	8+000.00	4,883.20	486.08
7	8+000.00	8+500.00	3,780.45	543.70
8	8+500.00	9+000.00	1,994.68	1,312.98
9	9+000.00	9+500.00	3,879.10	905.73
10	9+500.00	10+000.00	3,600.18	476.98
11	10+000.00	10+500.00	875.08	2,645.35
12	10+500.00	11+000.00	525.30	1,917.73
13	11+000.00	11+500.00	349.65	2,316.05
14	11+500.00	12+000.00	2,313.13	1,106.98
15	12+000.00	12+500.00	140.28	2,915.08
TOTAL			36,474.00	18,229.65



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

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UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO 1 METRO MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE (m3)	TERRAPLEN (m3)
1	5+000.00	5+500.00	5,114.62	329.11
2	5+500.00	6+000.00	3,184.14	1,027.65
3	6+000.00	6+500.00	3,082.47	366.23
4	6+500.00	7+000.00	1,222.09	800.26
5	7+000.00	7+500.00	1,574.53	1,093.75
6	7+500.00	8+000.00	4,866.16	493.76
7	8+000.00	8+500.00	3,795.03	547.96
8	8+500.00	9+000.00	1,987.17	1,325.69
9	9+000.00	9+500.00	3,883.35	934.79
10	9+500.00	10+000.00	3,585.50	477.63
11	10+000.00	10+500.00	879.95	2,626.41
12	10+500.00	11+000.00	529.80	1,937.42
13	11+000.00	11+500.00	351.45	2,318.34
14	11+500.00	12+000.00	2,314.18	1,104.58
15	12+000.00	12+500.00	141.13	2,916.77
TOTAL			36,511.56	18,300.32



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

TESIS: : COMPARACIÓN DE VOLÚMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL MÉTODO TRADICIONAL Y BIM EN EL DISEÑO GEOMÉTRICO DE LA CARRETERA HUAQUINA – CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO

UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO 0.5 METROS MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE	TERRAPLEN
			(m3)	(m3)
1	5+000.00	5+500.00	5,114.87	329.18
2	5+500.00	6+000.00	3,184.18	1,028.53
3	6+000.00	6+500.00	3,082.32	366.21
4	6+500.00	7+000.00	1,221.72	800.50
5	7+000.00	7+500.00	1,574.41	1,093.76
6	7+500.00	8+000.00	4,866.36	494.31
7	8+000.00	8+500.00	3,794.37	548.18
8	8+500.00	9+000.00	1,986.57	1,325.53
9	9+000.00	9+500.00	3,883.41	935.89
10	9+500.00	10+000.00	3,584.95	477.62
11	10+000.00	10+500.00	879.80	2,625.98
12	10+500.00	11+000.00	529.97	1,937.20
13	11+000.00	11+500.00	351.41	2,318.06
14	11+500.00	12+000.00	2,314.88	1,103.43
15	12+000.00	12+500.00	141.17	2,916.31
TOTAL			36,510.37	18,300.67



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

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UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO 0.25 METROS MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE	TERRAPLEN
			(m3)	(m3)
1	5+000.00	5+500.00	5,114.54	329.18
2	5+500.00	6+000.00	3,183.99	1,028.25
3	6+000.00	6+500.00	3,082.12	366.18
4	6+500.00	7+000.00	1,221.86	800.55
5	7+000.00	7+500.00	1,574.41	1,093.74
6	7+500.00	8+000.00	4,866.09	494.67
7	8+000.00	8+500.00	3,794.51	548.19
8	8+500.00	9+000.00	1,986.69	1,325.51
9	9+000.00	9+500.00	3,882.88	936.32
10	9+500.00	10+000.00	3,584.88	477.65
11	10+000.00	10+500.00	879.82	2,625.17
12	10+500.00	11+000.00	529.92	1,937.30
13	11+000.00	11+500.00	351.41	2,318.22
14	11+500.00	12+000.00	2,315.09	1,103.53
15	12+000.00	12+500.00	141.11	2,916.05
TOTAL			36,509.32	18,300.51



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE

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UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO

CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA



RESUMEN DE METRADO BIM MOVIMIENTO DE TIERRAS KM 5+000 AL KM 12+500

UM	PROGRESIVA		REPLANTEADO	
	INICIO	FINAL	VOLUMEN TOTAL	VOL. TOTAL
			CORTE	TERRAPLEN
			(m3)	(m3)
1	5+000.00	5+500.00	5,114.50	326.70
2	5+500.00	6+000.00	3,182.72	1,026.44
3	6+000.00	6+500.00	3,081.90	366.50
4	6+500.00	7+000.00	1,221.53	799.85
5	7+000.00	7+500.00	1,573.20	1,092.22
6	7+500.00	8+000.00	4,865.54	494.60
7	8+000.00	8+500.00	3,792.20	548.05
8	8+500.00	9+000.00	1,986.91	1,325.42
9	9+000.00	9+500.00	3,884.13	934.89
10	9+500.00	10+000.00	3,584.27	477.87
11	10+000.00	10+500.00	879.20	2,626.40
12	10+500.00	11+000.00	531.45	1,937.41
13	11+000.00	11+500.00	352.50	2,316.80
14	11+500.00	12+000.00	2,314.56	1,103.44
15	12+000.00	12+500.00	141.92	2,916.20
TOTAL			36,506.53	18,292.79

C. PLANILLA DE METRADOS



TESISTA: : JAVIER ROLANDO MAQUERA CCALLE
 TESIS: : COMPARACIÓN DE VOLÚMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL MÉTODO TRADICIONAL Y BIM EN EL DISEÑO GEOMÉTRICO DE LA CARRETERA HUAQUINA - CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO
 UNIVERSIDAD : UNIVERSIDAD NACIONAL DEL ALTIPLANO
 CARRERA : INGENIERIA TOPOGRAFICA Y AGRIMENSURA

PLANILLA DE MOVIMIENTO DE TIERRAS KM 5+000 - KM 12+500

PROGRESIVAS (km)	DISTANCIA m	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS		
		ÁREA CAPA DESBROSE m ²	ÁREA TOTAL m ²	VOLUMEN Ha	ÁREA CORTE m ²	ÁREA TOTAL m ²	VOLUMEN m ³		EXCAVACIÓN ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN		ÁREA RELLENO TERRAPLEN m ²	RELLENO CAPA DESBROSE m ²	VOLUMEN m ³	ÁREA BANQ. PARA RELLENO m ²	RELLENO m ³	VOLUMEN m ³
									RF %	VOLUMEN m ³	RS %	VOLUMEN m ³	MS %	VOLUMEN m ³						
5+000					11.86	11.86		-	0%	-	0%	-	0%	-	-	-	-	-	-	
5+010	10.00				10.48	10.48	111.70	111.70	0%	-	0%	-	0%	0.48	-	-	2.40	-	-	
5+020	10.00				9.10	9.10	97.90	97.90	0%	-	0%	-	0%	1.07	-	-	7.75	-	-	
5+030	10.00				3.04	3.04	60.70	60.70	0%	-	0%	-	0%	2.51	-	-	17.90	-	-	
5+040	10.00				4.10	4.10	35.70	35.70	0%	-	0%	-	0%	1.37	-	-	19.40	-	-	
5+050	10.00				4.84	4.84	44.70	44.70	0%	-	0%	-	0%	1.44	-	-	14.05	-	-	
5+060	10.00				6.25	6.25	55.45	55.45	0%	-	0%	-	0%	0.85	-	-	11.45	-	-	
5+070	10.00				5.23	5.23	57.40	57.40	0%	-	0%	-	0%	0.15	-	-	5.00	-	-	
5+080	10.00				2.64	2.64	39.35	39.35	0%	-	0%	-	0%	0.33	-	-	2.40	-	-	
5+090	10.00				1.07	1.07	18.55	18.55	0%	-	0%	-	0%	0.29	-	-	3.10	-	-	
5+100	10.00				0.97	0.97	10.20	10.20	0%	-	0%	-	0%	0.44	-	-	3.65	-	-	
5+110	10.00				1.22	1.22	10.95	10.95	0%	-	0%	-	0%	1.01	-	-	7.25	-	-	
5+120	10.00				1.48	1.48	13.50	13.50	0%	-	0%	-	0%	2.01	-	-	15.10	-	-	
5+130	10.00				1.47	1.47	14.75	14.75	0%	-	0%	-	0%	2.42	-	-	22.15	-	-	
5+140	10.00				1.74	1.74	16.05	16.05	0%	-	0%	-	0%	1.97	-	-	21.95	-	-	
5+150	10.00				1.44	1.44	15.90	15.90	0%	-	0%	-	0%	1.62	-	-	17.95	-	-	
5+160	10.00				1.57	1.57	15.05	15.05	0%	-	0%	-	0%	1.97	-	-	17.95	-	-	
5+170	10.00				2.53	2.53	20.50	20.50	0%	-	0%	-	0%	1.37	-	-	16.70	-	-	
5+180	10.00				2.86	2.86	26.95	26.95	0%	-	0%	-	0%	1.52	-	-	14.45	-	-	
5+190	10.00				4.12	4.12	34.90	34.90	0%	-	0%	-	0%	2.28	-	-	19.00	-	-	
5+200	10.00				4.38	4.38	42.50	42.50	0%	-	0%	-	0%	0.88	-	-	15.80	-	-	
5+210	10.00				4.83	4.83	46.05	46.05	0%	-	0%	-	0%	1.05	-	-	9.65	-	-	
5+220	10.00				5.40	5.40	51.15	51.15	0%	-	0%	-	0%	0.53	-	-	7.90	-	-	
5+230	10.00				4.92	4.92	51.60	51.60	0%	-	0%	-	0%	0.08	-	-	3.05	-	-	
5+240	10.00				18.63	18.63	117.75	117.75	0%	-	0%	-	0%	0.03	-	-	0.55	-	-	
5+250	10.00				19.84	19.84	192.35	192.35	0%	-	0%	-	0%	0.29	-	-	1.60	-	-	
5+260	10.00				22.84	22.84	213.40	213.40	0%	-	0%	-	0%	0.53	-	-	4.10	-	-	
5+270	10.00				28.02	28.02	254.30	254.30	0%	-	0%	-	0%	0.60	-	-	5.65	-	-	
5+280	10.00				31.14	31.14	295.80	295.80	0%	-	0%	-	0%	0.80	-	-	7.00	-	-	
5+290	10.00				15.63	15.63	233.85	233.85	0%	-	0%	-	0%	1.88	-	-	13.40	-	-	
5+300	10.00				9.10	9.10	123.65	123.65	0%	-	0%	-	0%	1.36	-	-	16.20	-	-	
5+310	10.00				11.45	11.45	102.75	102.75	0%	-	0%	-	0%	0.13	-	-	7.45	-	-	
5+320	10.00				8.77	8.77	101.10	101.10	0%	-	0%	-	0%	-	-	-	0.65	-	-	
5+330	10.00				6.43	6.43	76.00	76.00	0%	-	0%	-	0%	-	-	-	-	-	-	
5+340	10.00				5.20	5.20	58.15	58.15	0%	-	0%	-	0%	-	-	-	-	-	-	
5+350	10.00				3.30	3.30	42.50	42.50	0%	-	0%	-	0%	-	-	-	-	-	-	
5+360	10.00				3.82	3.82	35.60	35.60	0%	-	0%	-	0%	-	-	-	-	-	-	
5+370	10.00				7.87	7.87	58.45	58.45	0%	-	0%	-	0%	-	-	-	-	-	-	
5+380	10.00				10.47	10.47	91.70	91.70	0%	-	0%	-	0%	-	-	-	-	-	-	
5+390	10.00				11.52	11.52	109.95	109.95	0%	-	0%	-	0%	-	-	-	-	-	-	
5+400	10.00				13.50	13.50	125.10	125.10	0%	-	0%	-	0%	-	-	-	-	-	-	
5+410	10.00				18.02	18.02	157.60	157.60	0%	-	0%	-	0%	-	-	-	-	-	-	
5+420	10.00				21.63	21.63	198.25	198.25	0%	-	0%	-	0%	-	-	-	-	-	-	
5+430	10.00				23.60	23.60	226.15	226.15	0%	-	0%	-	0%	-	-	-	-	-	-	
5+440	10.00				17.64	17.64	206.20	206.20	0%	-	0%	-	0%	-	-	-	-	-	-	
5+450	10.00				22.64	22.64	201.40	201.40	0%	-	0%	-	0%	-	-	-	-	-	-	
5+460	10.00				26.64	26.64	246.40	246.40	0%	-	0%	-	0%	-	-	-	-	-	-	
5+470	10.00				33.95	33.95	302.95	302.95	0%	-	0%	-	0%	-	-	-	-	-	-	
5+480	10.00				18.31	18.31	261.30	261.30	0%	-	0%	-	0%	-	-	-	-	-	-	
5+490	10.00				5.96	5.96	121.35	121.35	0%	-	0%	-	0%	0.02	-	-	0.10	-	-	
5+500	10.00				3.66	3.66	48.10	48.10	0%	-	0%	-	0%	0.62	-	-	3.20	-	-	
							5,093.60	5,093.60									335.90			
5+510	10.00				5.50	5.50	45.80	45.80	0%	-	0%	-	0%	0.58	-	-	6.00	-	-	
5+520	10.00				4.36	4.36	49.30	49.30	0%	-	0%	-	0%	0.51	-	-	5.45	-	-	
5+530	10.00				5.79	5.79	50.75	50.75	0%	-	0%	-	0%	0.07	-	-	2.90	-	-	
5+540	10.00				6.00	6.00	58.95	58.95	0%	-	0%	-	0%	-	-	-	0.35	-	-	
5+550	10.00				5.22	5.22	56.10	56.10	0%	-	0%	-	0%	-	-	-	-	-	-	
5+560	10.00				5.08	5.08	51.50	51.50	0%	-	0%	-	0%	-	-	-	-	-	-	
5+570	10.00				3.28	3.28	41.80	41.80	0%	-	0%	-	0%	-	-	-	-	-	-	
5+580	10.00				4.24	4.24	37.60	37.60	0%	-	0%	-	0%	-	-	-	-	-	-	
5+590	10.00				4.10	4.10	41.70	41.70	0%	-	0%	-	0%	-	-	-	-	-	-	
5+600	10.00				3.30	3.30	37.00	37.00	0%	-	0%	-	0%	-	-	-	-	-	-	
5+610	10.00				7.14	7.14	52.20	52.20	0%	-	0%	-	0%	0.71	-	-	3.55	-	-	
5+620	10.00				6.57	6.57	68.55	68.55	0%	-	0%	-	0%	1.29	-	-	10.00	-	-	
5+630	10.00				2.00	2.00	42.85	42.85	0%	-	0%	-	0%	3.23	-	-	22.60	-	-	
5+640	10.00				-	-	10.00	10.00	0%	-	0%	-	0%	7.70	-	-	54.65	-	-	
5+650	10.00				-	-	-	-	0%	-	0%	-	0%	12.46	-	-	100.80	-	-	
5+660	10.00				-	-	-	-	0%	-	0%	-	0%	16.95	-	-	147.05	-	-	
5+670	10.00				-	-	-	-	0%	-	0%	-	0%	16.48	-	-	167.15	-	-	
5+680	10.00				-	-	-	-	0%	-	0%	-	0%	13.11	-	-	147.95	-	-	
5+690	10.00				0.16	0.16	0.80	0.80	0%	-	0%	-	0%	6.37	-	-	97.40	-	-	
5+700	10.00				1.16	1.16	6.60	6.60	0%	-	0%	-	0%	3.63	-	-	50.00	-	-	
5+710	10.00				2.27	2.27	17.15	17.15	0%	-	0%	-	0%	1.92	-	-	27.75	-	-	
5+720	10.00				1.40	1.40	18.35	18.35	0%	-	0%	-	0%	0.91	-	-	14.15	-	-	
5+730	10.00				2.02	2.02	17.10	17.10	0%	-	0%	-	0%	0.81	-	-	8.60	-	-	
5+740	10.00				3.56	3.56	27.90	27.90	0%	-	0%	-	0%	0.59	-	-	7.00	-	-	
5+750	10.00				2.29	2.29	29.25	29.25	0%	-	0%	-	0%	0.73	-	-	6.60	-	-	
5+760	10.00				-	-	11.45	11.45	0%	-	0%	-	0%	2.48	-	-	16.05	-	-	
5+770	10.00				-	-	-	-	0%	-	0%	-	0%	5.23	-	-	38.55	-	-	
5+780	10.00				-	-	-	-	0%	-	0%	-	0%	3.39	-	-	43.10	-	-	
5+790	10.00				0.01	0.01	0.05	0.05	0%	-	0%	-	0%	1.67	-	-	25.30	-	-	

PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS	
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN						
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	ÁREA RELLENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	VOLUMEN
(km)	m	m ²	m ²	Ha	m ²	m ²	m ³									m ²	m ³		
5+800	10.00				0.19	0.19	1.00	1.00	0%		0%					1.11		13.90	
5+810	10.00				1.85	1.85	10.20	10.20	0%		0%					0.32		7.15	
5+820	10.00				4.25	4.25	30.50	30.50	0%		0%					0.07		1.95	
5+830	10.00				6.66	6.66	54.55	54.55	0%		0%					0.02		0.45	
5+840	10.00				9.21	9.21	79.35	79.35	0%		0%							0.10	
5+850	10.00				13.54	13.54	113.75	113.75	0%		0%								
5+860	10.00				19.91	19.91	167.25	167.25	0%		0%								
5+870	10.00				22.99	22.99	214.50	214.50	0%		0%								
5+880	10.00				24.01	24.01	235.00	235.00	0%		0%								
5+890	10.00				21.32	21.32	226.65	226.65	0%		0%								
5+900	10.00				15.05	15.05	181.85	181.85	0%		0%								
5+910	10.00				11.29	11.29	131.70	131.70	0%		0%								
5+920	10.00				8.28	8.28	97.85	97.85	0%		0%								
5+930	10.00				8.21	8.21	82.45	82.45	0%		0%								
5+940	10.00				9.81	9.81	90.10	90.10	0%		0%								
5+950	10.00				9.36	9.36	95.85	95.85	0%		0%								
5+960	10.00				10.22	10.22	97.90	97.90	0%		0%								
5+970	10.00				11.46	11.46	108.40	108.40	0%		0%								
5+980	10.00				12.95	12.95	122.05	122.05	0%		0%								
5+990	10.00				14.00	14.00	134.75	134.75	0%		0%								
6+000	10.00				12.78	12.78	133.90	133.90	0%		0%								
							3,182.30										1,026.50		
6+010	10.00				10.42	10.42	116.00	116.00	0%		0%								
6+020	10.00				6.57	6.57	84.95	84.95	0%		0%								
6+030	10.00				3.74	3.74	51.55	51.55	0%		0%								
6+040	10.00				2.24	2.24	29.90	29.90	0%		0%				0.15		0.75		
6+050	10.00						11.20	11.20	0%		0%				4.74		24.45		
6+060	10.00								0%		0%				12.25		84.95		
6+070	10.00								0%		0%				7.74		99.95		
6+080	10.00				0.28	0.28	1.40	1.40	0%		0%				1.92		48.30		
6+090	10.00				2.18	2.18	12.30	12.30	0%		0%				1.04		14.80		
6+100	10.00				1.96	1.96	20.70	20.70	0%		0%				0.56		8.00		
6+110	10.00				3.50	3.50	27.30	27.30	0%		0%				0.25		4.05		
6+120	10.00				4.02	4.02	37.60	37.60	0%		0%				0.07		1.60		
6+130	10.00				3.83	3.83	39.25	39.25	0%		0%						0.35		
6+140	10.00				5.37	5.37	46.00	46.00	0%		0%								
6+150	10.00				9.16	9.16	72.65	72.65	0%		0%								
6+160	10.00				13.42	13.42	112.90	112.90	0%		0%								
6+170	10.00				15.98	15.98	147.00	147.00	0%		0%								
6+180	10.00				16.74	16.74	163.60	163.60	0%		0%								
6+190	10.00				10.37	10.37	135.55	135.55	0%		0%								
6+200	10.00				11.11	11.11	107.40	107.40	0%		0%								
6+210	10.00				8.40	8.40	97.55	97.55	0%		0%								
6+220	10.00				7.18	7.18	77.90	77.90	0%		0%								
6+230	10.00				7.32	7.32	72.50	72.50	0%		0%								
6+240	10.00				4.71	4.71	60.15	60.15	0%		0%								
6+250	10.00				2.75	2.75	37.30	37.30	0%		0%								
6+260	10.00				3.66	3.66	32.05	32.05	0%		0%				0.07		0.35		
6+270	10.00				3.74	3.74	37.00	37.00	0%		0%				0.01		0.40		
6+280	10.00				5.45	5.45	45.95	45.95	0%		0%						0.05		
6+290	10.00				5.43	5.43	54.40	54.40	0%		0%								
6+300	10.00				5.72	5.72	55.75	55.75	0%		0%								
6+310	10.00				5.67	5.67	56.95	56.95	0%		0%								
6+320	10.00				5.64	5.64	56.55	56.55	0%		0%								
6+330	10.00				6.85	6.85	62.45	62.45	0%		0%								
6+340	10.00				7.61	7.61	72.30	72.30	0%		0%								
6+350	10.00				7.67	7.67	76.40	76.40	0%		0%								
6+360	10.00				6.66	6.66	71.65	71.65	0%		0%								
6+370	10.00				5.29	5.29	59.75	59.75	0%		0%								
6+380	10.00				3.41	3.41	43.50	43.50	0%		0%				3.08		15.40		
6+390	10.00				3.55	3.55	34.80	34.80	0%		0%				0.09		15.85		
6+400	10.00				9.39	9.39	64.70	64.70	0%		0%						0.45		
6+410	10.00				9.85	9.85	96.20	96.20	0%		0%								
6+420	10.00				19.24	19.24	145.45	145.45	0%		0%								
6+430	10.00				6.52	6.52	128.80	128.80	0%		0%								
6+440	10.00				7.79	7.79	71.55	71.55	0%		0%								
6+450	10.00				6.04	6.04	69.15	69.15	0%		0%								
6+460	10.00				4.52	4.52	52.80	52.80	0%		0%				0.06		0.30		
6+470	10.00				4.68	4.68	46.00	46.00	0%		0%				0.37		2.15		
6+480	10.00				5.35	5.35	50.15	50.15	0%		0%				0.66		5.15		
6+490	10.00				0.56	0.56	29.55	29.55	0%		0%				1.20		9.30		
6+500	10.00				0.79	0.79	6.75	6.75	0%		0%				2.46		18.30		
							3,083.25										354.90		
6+510	10.00				1.41	1.41	11.00	11.00	0%		0%				2.33		23.95		
6+520	10.00				0.83	0.83	11.20	11.20	0%		0%				2.85		25.90		
6+530	10.00				0.32	0.32	5.75	5.75	0%		0%				4.11		34.80		
6+540	10.00				0.81	0.81	5.65	5.65	0%		0%				2.65		33.80		
6+550	10.00				0.07	0.07	4.40	4.40	0%		0%				4.88		37.65		
6+560	10.00				0.25	0.25	1.60	1.60	0%		0%				4.15		45.15		
6+570	10.00				1.21	1.21	7.30	7.30	0%		0%				1.00		25.75		
6+580	10.00				3.68	3.68	24.45	24.45	0%		0%				2.40		17.00		
6+590	10.00				0.27	0.27	19.75	19.75	0%		0%				3.82		31.10		
6+600	10.00				0.74	0.74	5.05	5.05	0%		0%				1.70		27.60		
6+610	10.00				0.40	0.40	5.70	5.70	0%		0%				3.13		24.15		
6+620	10.00				0.06	0.06	2.30	2.30	0%		0%				12.76		79.45		
6+630	10.00				0.02	0.02	0.40	0.40	0%		0%				14.16		134.60		
6+640	10.00				0.80	0.80	4.10	4.10	0%		0%				9.30		117.30		
6+650	10.00				1.38	1.38	10.90	10.90	0%		0%				0.02		46.60		
6+660	10.00				1.94	1.94	16.60	16.60	0%		0%				0.37		1.95		
6+670	10.00				2.70	2.70	23.20	23.20	0%		0%						1.85		
6+680	10.00				5.51	5.51	41.05	41.05	0%		0%								
6+690	10.00				6.10	6.10	58.05	58.05	0%		0%								
6+700	10.00				6.59	6.59	63.45	63.45	0%		0%								
6+710	10.00				6.78	6.78	66.85	66.85	0%		0%								
6+720	10.00				6.56	6.56	66.70	66.70	0%		0%								
6+730	10.00				5.43	5.43	59.95	59.95	0%										

PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS	
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN						
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	ÁREA RELLENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	VOLUMEN
		m ²	m ²	Ha	m ²	m ²	m ³			m ³		m ³		m ³	m ²	m ²	m ³	m ²	m ³
6+790	10.00				7.81	7.81	70.30	70.30	0%		0%		0%		0.33			4.30	
6+800	10.00				6.22	6.22	70.15	70.15	0%		0%		0%		0.19			2.60	
6+810	10.00				0.54	0.54	33.80	33.80	0%		0%		0%		0.71			4.50	
6+820	10.00				0.49	0.49	5.15	5.15	0%		0%		0%		1.22			9.65	
6+830	10.00				0.04	0.04	2.65	2.65	0%		0%		0%		1.90			15.60	
6+840	10.00				1.56	1.56	8.00	8.00	0%		0%		0%		0.89			13.95	
6+850	10.00				3.00	3.00	22.80	22.80	0%		0%		0%		0.40			6.45	
6+860	10.00				4.13	4.13	35.65	35.65	0%		0%		0%		0.37			3.85	
6+870	10.00				2.17	2.17	31.50	31.50	0%		0%		0%		0.07			2.20	
6+880	10.00				2.30	2.30	22.35	22.35	0%		0%		0%					0.35	
6+890	10.00				2.89	2.89	25.95	25.95	0%		0%		0%						
6+900	10.00				3.09	3.09	29.90	29.90	0%		0%		0%						
6+910	10.00				2.89	2.89	29.90	29.90	0%		0%		0%						
6+920	10.00				3.78	3.78	33.35	33.35	0%		0%		0%						
6+930	10.00				2.65	2.65	32.15	32.15	0%		0%		0%						
6+940	10.00				1.42	1.42	20.35	20.35	0%		0%		0%						
6+950	10.00				1.20	1.20	13.10	13.10	0%		0%		0%						
6+960	10.00				0.42	0.42	8.10	8.10	0%		0%		0%	0.54			2.70		
6+970	10.00				1.15	1.15	7.85	7.85	0%		0%		0%	0.21			3.75		
6+980	10.00				0.27	0.27	7.10	7.10	0%		0%		0%	0.24			2.25		
6+990	10.00				0.94	0.94	6.05	6.05	0%		0%		0%	0.06			1.50		
7+000	10.00				1.75	1.75	13.45	13.45	0%		0%		0%	0.04			0.50		
							1,223.10										806.90		
7+010	10.00				3.37	3.37	25.60	25.60	0%		0%		0%	0.01			0.25		
7+020	10.00				4.36	4.36	38.65	38.65	0%		0%		0%				0.05		
7+030	10.00				5.16	5.16	47.60	47.60	0%		0%		0%						
7+040	10.00				4.72	4.72	49.40	49.40	0%		0%		0%						
7+050	10.00				6.18	6.18	54.50	54.50	0%		0%		0%						
7+060	10.00				6.63	6.63	64.05	64.05	0%		0%		0%						
7+070	10.00				7.32	7.32	69.75	69.75	0%		0%		0%						
7+080	10.00				7.58	7.58	74.50	74.50	0%		0%		0%						
7+090	10.00				7.43	7.43	75.05	75.05	0%		0%		0%						
7+100	10.00				8.85	8.85	81.40	81.40	0%		0%		0%						
7+110	10.00				10.41	10.41	96.30	96.30	0%		0%		0%	0.03			0.15		
7+120	10.00				9.96	9.96	101.85	101.85	0%		0%		0%				0.15		
7+130	10.00				5.78	5.78	78.70	78.70	0%		0%		0%	0.14			0.70		
7+140	10.00				1.90	1.90	38.40	38.40	0%		0%		0%	0.64			3.90		
7+150	10.00				1.61	1.61	17.55	17.55	0%		0%		0%	1.38			10.10		
7+160	10.00						8.05	8.05	0%		0%		0%	6.31			38.45		
7+170	10.00								0%		0%		0%	5.82			60.65		
7+180	10.00								0%		0%		0%	3.90			48.60		
7+190	10.00				0.45	0.45	2.25	2.25	0%		0%		0%	0.99			24.45		
7+200	10.00				1.25	1.25	8.50	8.50	0%		0%		0%	0.09			5.40		
7+210	10.00				1.97	1.97	16.10	16.10	0%		0%		0%				0.45		
7+220	10.00				1.86	1.86	19.15	19.15	0%		0%		0%	0.02			0.10		
7+230	10.00				0.85	0.85	13.55	13.55	0%		0%		0%	0.35			1.85		
7+240	10.00				0.74	0.74	7.95	7.95	0%		0%		0%	0.66			5.05		
7+250	10.00				1.42	1.42	10.80	10.80	0%		0%		0%	0.35			5.05		
7+260	10.00				2.10	2.10	17.60	17.60	0%		0%		0%	0.04			1.95		
7+270	10.00				3.55	3.55	28.25	28.25	0%		0%		0%				0.20		
7+280	10.00				4.06	4.06	38.05	38.05	0%		0%		0%						
7+290	10.00				3.31	3.31	36.85	36.85	0%		0%		0%						
7+300	10.00				4.61	4.61	39.60	39.60	0%		0%		0%						
7+310	10.00				6.47	6.47	55.40	55.40	0%		0%		0%						
7+320	10.00				5.90	5.90	61.85	61.85	0%		0%		0%						
7+330	10.00				5.94	5.94	59.20	59.20	0%		0%		0%						
7+340	10.00				5.62	5.62	57.80	57.80	0%		0%		0%						
7+350	10.00				3.09	3.09	43.55	43.55	0%		0%		0%						
7+360	10.00				2.46	2.46	27.75	27.75	0%		0%		0%						
7+370	10.00				3.75	3.75	31.05	31.05	0%		0%		0%						
7+380	10.00				1.95	1.95	28.50	28.50	0%		0%		0%	0.12			0.60		
7+390	10.00				0.89	0.89	14.20	14.20	0%		0%		0%	1.20			6.60		
7+400	10.00				0.84	0.84	8.65	8.65	0%		0%		0%	2.25			17.25		
7+410	10.00				0.03	0.03	4.35	4.35	0%		0%		0%	4.22			32.35		
7+420	10.00						0.15	0.15	0%		0%		0%	6.63			54.25		
7+430	10.00								0%		0%		0%	9.67			81.50		
7+440	10.00								0%		0%		0%	11.51			105.90		
7+450	10.00								0%		0%		0%	11.53			115.20		
7+460	10.00								0%		0%		0%	11.19			113.60		
7+470	10.00								0%		0%		0%	10.41			108.00		
7+480	10.00								0%		0%		0%	9.49			99.50		
7+490	10.00								0%		0%		0%	7.90			86.95		
7+500	10.00				0.47	0.47	2.35	2.35	0%		0%		0%	7.39			76.45		
							1,554.80										1,105.65		
7+510	10.00				0.38	0.38	4.25	4.25	0%		0%		0%	5.91			66.50		
7+520	10.00				1.09	1.09	7.35	7.35	0%		0%		0%	4.92			54.15		
7+530	10.00				2.40	2.40	17.45	17.45	0%		0%		0%	3.44			41.80		
7+540	10.00				2.44	2.44	24.20	24.20	0%		0%		0%	1.45			24.45		
7+550	10.00				3.76	3.76	31.00	31.00	0%		0%		0%				7.25		
7+560	10.00				9.56	9.56	66.60	66.60	0%		0%		0%						
7+570	10.00				12.95	12.95	112.55	112.55	0%		0%		0%						
7+580	10.00				15.71	15.71	143.30	143.30	0%		0%		0%						
7+590	10.00				18.18	18.18	169.45	169.45	0%		0%		0%						
7+600	10.00				20.11	20.11	191.45	191.45	0%		0%		0%						
7+610	10.00				21.38	21.38	207.45	207.45	0%		0%		0%						
7+620	10.00				23.50	23.50	224.40	224.40	0%		0%		0%						
7+630	10.00				23.22	23.22	233.60	233.60	0%		0%		0%						
7+640	10.00				20.62	20.62	219.20	219.20	0%		0%		0%						
7+650	10.00				13.87	13.87	172.45	172.45	0%		0%		0%						
7+660	10.00				6.93	6.93	104.00	104.00	0%		0%		0%						
7+670	10.00				2.21	2.21	45.70	45.70	0%		0%		0%	0.18			0.90		
7+680	10.00						11.05	11.05	0%		0%		0%	5.39			27.85		
7+690	10.00								0%		0%		0%	8.06			67.25		
7+700	10.00				0.12	0.12	0.60	0.60	0%		0%		0%	3.85			59.55		
7+710	10.00				0.34	0.34	2.30	2.30	0%		0%								

PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS	
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN						
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	RELENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	VOLUMEN
		m ²	m ²	Ha	m ²	m ²	m ³			m ³		m ³		m ³	m ²	m ²	m ³	m ²	m ³
8+780	10.00	-	-	-	10.06	10.06	92.70	92.70	0%	-	0%	-	0%	-	1.22	-	10.05	-	-
8+790	10.00	-	-	-	9.77	9.77	99.15	99.15	0%	-	0%	-	0%	-	1.78	-	15.00	-	-
8+800	10.00	-	-	-	5.01	5.01	73.90	73.90	0%	-	0%	-	0%	-	2.25	-	20.15	-	-
8+810	10.00	-	-	-	2.46	2.46	37.35	37.35	0%	-	0%	-	0%	-	3.04	-	26.45	-	-
8+820	10.00	-	-	-	1.06	1.06	17.60	17.60	0%	-	0%	-	0%	-	2.06	-	25.50	-	-
8+830	10.00	-	-	-	1.93	1.93	14.95	14.95	0%	-	0%	-	0%	-	6.02	-	40.40	-	-
8+840	10.00	-	-	-	2.52	2.52	22.25	22.25	0%	-	0%	-	0%	-	2.58	-	43.00	-	-
8+850	10.00	-	-	-	3.31	3.31	29.15	29.15	0%	-	0%	-	0%	-	1.00	-	17.90	-	-
8+860	10.00	-	-	-	4.81	4.81	40.60	40.60	0%	-	0%	-	0%	-	-	-	5.00	-	-
8+870	10.00	-	-	-	4.97	4.97	48.90	48.90	0%	-	0%	-	0%	-	-	-	-	-	-
8+880	10.00	-	-	-	4.91	4.91	49.40	49.40	0%	-	0%	-	0%	-	-	-	-	-	-
8+890	10.00	-	-	-	5.29	5.29	51.00	51.00	0%	-	0%	-	0%	-	-	-	-	-	-
8+900	10.00	-	-	-	5.43	5.43	53.60	53.60	0%	-	0%	-	0%	-	-	-	-	-	-
8+910	10.00	-	-	-	1.89	1.89	36.60	36.60	0%	-	0%	-	0%	-	-	-	-	-	-
8+920	10.00	-	-	-	1.23	1.23	15.60	15.60	0%	-	0%	-	0%	-	0.26	-	1.30	-	-
8+930	10.00	-	-	-	1.82	1.82	15.25	15.25	0%	-	0%	-	0%	-	4.26	-	22.60	-	-
8+940	10.00	-	-	-	2.18	2.18	20.00	20.00	0%	-	0%	-	0%	-	3.73	-	39.95	-	-
8+950	10.00	-	-	-	8.10	8.10	51.40	51.40	0%	-	0%	-	0%	-	1.44	-	25.85	-	-
8+960	10.00	-	-	-	5.83	5.83	69.65	69.65	0%	-	0%	-	0%	-	0.46	-	9.50	-	-
8+970	10.00	-	-	-	6.09	6.09	59.60	59.60	0%	-	0%	-	0%	-	0.18	-	3.20	-	-
8+980	10.00	-	-	-	5.11	5.11	56.00	56.00	0%	-	0%	-	0%	-	0.26	-	2.20	-	-
8+990	10.00	-	-	-	3.80	3.80	44.55	44.55	0%	-	0%	-	0%	-	1.88	-	10.70	-	-
9+000	10.00	-	-	-	2.70	2.70	32.50	32.50	0%	-	0%	-	0%	-	7.87	-	48.75	-	-
							2,016.55										1,325.15		
9+010	10.00	-	-	-	1.71	1.71	22.05	22.05	0%	-	0%	-	0%	-	2.26	-	50.65	-	-
9+020	10.00	-	-	-	1.65	1.65	16.80	16.80	0%	-	0%	-	0%	-	1.17	-	17.15	-	-
9+030	10.00	-	-	-	1.30	1.30	14.75	14.75	0%	-	0%	-	0%	-	13.88	-	75.25	-	-
9+040	10.00	-	-	-	2.01	2.01	16.55	16.55	0%	-	0%	-	0%	-	0.52	-	72.00	-	-
9+050	10.00	-	-	-	1.48	1.48	17.45	17.45	0%	-	0%	-	0%	-	0.12	-	3.20	-	-
9+060	10.00	-	-	-	2.17	2.17	18.25	18.25	0%	-	0%	-	0%	-	0.52	-	3.20	-	-
9+070	10.00	-	-	-	1.58	1.58	18.75	18.75	0%	-	0%	-	0%	-	2.07	-	12.95	-	-
9+080	10.00	-	-	-	2.78	2.78	21.80	21.80	0%	-	0%	-	0%	-	-	-	10.35	-	-
9+090	10.00	-	-	-	4.20	4.20	34.90	34.90	0%	-	0%	-	0%	-	-	-	-	-	-
9+100	10.00	-	-	-	3.44	3.44	38.20	38.20	0%	-	0%	-	0%	-	-	-	-	-	-
9+110	10.00	-	-	-	4.70	4.70	40.70	40.70	0%	-	0%	-	0%	-	-	-	-	-	-
9+120	10.00	-	-	-	5.94	5.94	53.20	53.20	0%	-	0%	-	0%	-	-	-	-	-	-
9+130	10.00	-	-	-	8.12	8.12	70.30	70.30	0%	-	0%	-	0%	-	-	-	-	-	-
9+140	10.00	-	-	-	8.79	8.79	84.55	84.55	0%	-	0%	-	0%	-	-	-	-	-	-
9+150	10.00	-	-	-	11.45	11.45	101.20	101.20	0%	-	0%	-	0%	-	-	-	-	-	-
9+160	10.00	-	-	-	12.92	12.92	121.85	121.85	0%	-	0%	-	0%	-	-	-	-	-	-
9+170	10.00	-	-	-	13.59	13.59	132.55	132.55	0%	-	0%	-	0%	-	-	-	-	-	-
9+180	10.00	-	-	-	15.49	15.49	145.40	145.40	0%	-	0%	-	0%	-	-	-	-	-	-
9+190	10.00	-	-	-	15.53	15.53	155.10	155.10	0%	-	0%	-	0%	-	-	-	-	-	-
9+200	10.00	-	-	-	14.66	14.66	150.95	150.95	0%	-	0%	-	0%	-	-	-	-	-	-
9+210	10.00	-	-	-	7.20	7.20	109.30	109.30	0%	-	0%	-	0%	-	0.02	-	0.10	-	-
9+220	10.00	-	-	-	-	-	36.00	36.00	0%	-	0%	-	0%	-	50.24	-	251.30	-	-
9+230	10.00	-	-	-	9.03	9.03	45.15	45.15	0%	-	0%	-	0%	-	-	-	251.20	-	-
9+240	10.00	-	-	-	20.51	20.51	147.70	147.70	0%	-	0%	-	0%	-	-	-	-	-	-
9+250	10.00	-	-	-	29.90	29.90	252.05	252.05	0%	-	0%	-	0%	-	-	-	-	-	-
9+260	10.00	-	-	-	29.40	29.40	296.50	296.50	0%	-	0%	-	0%	-	-	-	-	-	-
9+270	10.00	-	-	-	28.11	28.11	287.55	287.55	0%	-	0%	-	0%	-	-	-	-	-	-
9+280	10.00	-	-	-	23.71	23.71	259.10	259.10	0%	-	0%	-	0%	-	-	-	-	-	-
9+290	10.00	-	-	-	19.10	19.10	214.05	214.05	0%	-	0%	-	0%	-	-	-	-	-	-
9+300	10.00	-	-	-	15.03	15.03	170.65	170.65	0%	-	0%	-	0%	-	-	-	-	-	-
9+310	10.00	-	-	-	11.85	11.85	134.40	134.40	0%	-	0%	-	0%	-	-	-	-	-	-
9+320	10.00	-	-	-	10.55	10.55	112.00	112.00	0%	-	0%	-	0%	-	-	-	-	-	-
9+330	10.00	-	-	-	8.00	8.00	92.75	92.75	0%	-	0%	-	0%	-	-	-	-	-	-
9+340	10.00	-	-	-	5.86	5.86	69.30	69.30	0%	-	0%	-	0%	-	-	-	-	-	-
9+350	10.00	-	-	-	4.00	4.00	49.30	49.30	0%	-	0%	-	0%	-	0.02	-	0.10	-	-
9+360	10.00	-	-	-	2.70	2.70	33.50	33.50	0%	-	0%	-	0%	-	0.69	-	3.55	-	-
9+370	10.00	-	-	-	1.78	1.78	22.40	22.40	0%	-	0%	-	0%	-	1.10	-	8.95	-	-
9+380	10.00	-	-	-	1.20	1.20	14.90	14.90	0%	-	0%	-	0%	-	2.03	-	15.65	-	-
9+390	10.00	-	-	-	3.48	3.48	23.40	23.40	0%	-	0%	-	0%	-	2.05	-	20.40	-	-
9+400	10.00	-	-	-	4.50	4.50	39.90	39.90	0%	-	0%	-	0%	-	2.04	-	20.45	-	-
9+410	10.00	-	-	-	4.16	4.16	43.30	43.30	0%	-	0%	-	0%	-	1.42	-	17.30	-	-
9+420	10.00	-	-	-	3.51	3.51	38.35	38.35	0%	-	0%	-	0%	-	0.40	-	9.10	-	-
9+430	10.00	-	-	-	0.85	0.85	21.80	21.80	0%	-	0%	-	0%	-	0.25	-	3.25	-	-
9+440	10.00	-	-	-	0.57	0.57	7.10	7.10	0%	-	0%	-	0%	-	0.92	-	5.85	-	-
9+450	10.00	-	-	-	-	-	2.85	2.85	0%	-	0%	-	0%	-	3.23	-	20.75	-	-
9+460	10.00	-	-	-	0.03	0.03	0.15	0.15	0%	-	0%	-	0%	-	3.05	-	31.40	-	-
9+470	10.00	-	-	-	-	-	0.15	0.15	0%	-	0%	-	0%	-	2.60	-	28.25	-	-
9+480	10.00	-	-	-	0.35	0.35	1.75	1.75	0%	-	0%	-	0%	-	1.65	-	21.25	-	-
9+490	10.00	-	-	-	5.52	5.52	29.35	29.35	0%	-	0%	-	0%	-	0.26	-	9.55	-	-
9+500	10.00	-	-	-	12.56	12.56	90.40	90.40	0%	-	0%	-	0%	-	-	-	1.30	-	-
							3,920.40	3,920.40									964.45		
9+510	10.00	-	-	-	8.09	8.09	103.25	103.25	0%	-	0%	-	0%	-	0.17	-	0.85	-	-
9+520	10.00	-	-	-	6.24	6.24	71.65	71.65	0%	-	0%	-	0%	-	1.98	-	10.75	-	-
9+530	10.00	-	-	-	5.31	5.31	57.75	57.75	0%	-	0%	-	0%	-	2.38	-	21.80	-	-
9+540	10.00	-	-	-	1.41	1.41	33.60	33.60	0%	-	0%	-	0%	-	2.45	-	24.15	-	-
9+550	10.00	-	-	-	1.43	1.43	14.20	14.20	0%	-	0%	-	0%	-	1.88	-	21.65	-	-
9+560	10.00	-	-	-	2.60	2.60	20.15	20.15	0%	-	0%	-	0%	-	2.51	-	21.95	-	-
9+570	10.00	-	-	-	2.98	2.98	27.90	27.90	0%	-	0%	-	0%	-	3.04	-	27.75	-	-
9+580	10.00	-	-	-	4.31	4.31	36.45	36.45	0%	-	0%	-	0%	-	2.36	-	27.00	-	-
9+590	10.00	-</																	

PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS	
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN						
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	ÁREA RELLENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	VOLUMEN
		m ²	m ²	Ha	m ²	m ²	m ³			m ³		m ³		m ³	m ²	m ²	m ³	m ²	m ³
9+770	10.00	-	-	-	7.87	7.87	103.55	103.55	0%	-	0%	-	0%	-	1.01	-	7.55	-	-
9+780	10.00	-	-	-	8.61	8.61	82.40	82.40	0%	-	0%	-	0%	-	1.71	-	13.60	-	-
9+790	10.00	-	-	-	7.64	7.64	81.25	81.25	0%	-	0%	-	0%	-	1.79	-	17.50	-	-
9+800	10.00	-	-	-	6.90	6.90	72.70	72.70	0%	-	0%	-	0%	-	1.50	-	16.45	-	-
9+810	10.00	-	-	-	5.25	5.25	60.75	60.75	0%	-	0%	-	0%	-	1.21	-	13.55	-	-
9+820	10.00	-	-	-	5.98	5.98	56.15	56.15	0%	-	0%	-	0%	-	1.73	-	14.70	-	-
9+830	10.00	-	-	-	6.65	6.65	63.15	63.15	0%	-	0%	-	0%	-	1.25	-	14.90	-	-
9+840	10.00	-	-	-	7.04	7.04	68.45	68.45	0%	-	0%	-	0%	-	0.34	-	7.95	-	-
9+850	10.00	-	-	-	8.62	8.62	78.30	78.30	0%	-	0%	-	0%	-	-	-	1.70	-	-
9+860	10.00	-	-	-	9.85	9.85	92.35	92.35	0%	-	0%	-	0%	-	-	-	-	-	-
9+870	10.00	-	-	-	11.10	11.10	104.75	104.75	0%	-	0%	-	0%	-	-	-	-	-	-
9+880	10.00	-	-	-	12.23	12.23	116.65	116.65	0%	-	0%	-	0%	-	-	-	-	-	-
9+890	10.00	-	-	-	11.86	11.86	120.45	120.45	0%	-	0%	-	0%	-	-	-	-	-	-
9+900	10.00	-	-	-	11.70	11.70	117.80	117.80	0%	-	0%	-	0%	-	-	-	-	-	-
9+910	10.00	-	-	-	10.47	10.47	110.85	110.85	0%	-	0%	-	0%	-	-	-	-	-	-
9+920	10.00	-	-	-	10.66	10.66	105.65	105.65	0%	-	0%	-	0%	-	-	-	-	-	-
9+930	10.00	-	-	-	9.19	9.19	99.25	99.25	0%	-	0%	-	0%	-	-	-	-	-	-
9+940	10.00	-	-	-	6.47	6.47	78.30	78.30	0%	-	0%	-	0%	-	-	-	-	-	-
9+950	10.00	-	-	-	4.78	4.78	56.25	56.25	0%	-	0%	-	0%	-	-	-	-	-	-
9+960	10.00	-	-	-	3.38	3.38	40.80	40.80	0%	-	0%	-	0%	-	0.18	-	0.90	-	-
9+970	10.00	-	-	-	1.75	1.75	25.65	25.65	0%	-	0%	-	0%	-	0.65	-	4.15	-	-
9+980	10.00	-	-	-	1.29	1.29	15.20	15.20	0%	-	0%	-	0%	-	1.02	-	8.35	-	-
9+990	10.00	-	-	-	2.88	2.88	20.85	20.85	0%	-	0%	-	0%	-	1.19	-	11.05	-	-
10+000	10.00	-	-	-	3.41	3.41	31.45	31.45	0%	-	0%	-	0%	-	0.73	-	9.60	-	-
							3,593.75	3,593.75									466.35		
10+010	10.00	-	-	-	2.98	2.98	31.95	31.95	0%	-	0%	-	0%	-	1.07	-	9.00	-	-
10+020	10.00	-	-	-	2.24	2.24	26.10	26.10	0%	-	0%	-	0%	-	0.27	-	6.70	-	-
10+030	10.00	-	-	-	3.39	3.39	28.15	28.15	0%	-	0%	-	0%	-	0.02	-	1.45	-	-
10+040	10.00	-	-	-	5.90	5.90	46.45	46.45	0%	-	0%	-	0%	-	-	-	0.10	-	-
10+050	10.00	-	-	-	9.42	9.42	76.60	76.60	0%	-	0%	-	0%	-	-	-	-	-	-
10+060	10.00	-	-	-	10.79	10.79	101.05	101.05	0%	-	0%	-	0%	-	-	-	-	-	-
10+070	10.00	-	-	-	9.88	9.88	103.35	103.35	0%	-	0%	-	0%	-	-	-	-	-	-
10+080	10.00	-	-	-	7.00	7.00	84.40	84.40	0%	-	0%	-	0%	-	-	-	-	-	-
10+090	10.00	-	-	-	4.49	4.49	57.45	57.45	0%	-	0%	-	0%	-	-	-	-	-	-
10+100	10.00	-	-	-	3.85	3.85	41.70	41.70	0%	-	0%	-	0%	-	0.03	-	0.15	-	-
10+110	10.00	-	-	-	2.75	2.75	33.00	33.00	0%	-	0%	-	0%	-	0.16	-	0.95	-	-
10+120	10.00	-	-	-	1.62	1.62	21.85	21.85	0%	-	0%	-	0%	-	0.53	-	3.45	-	-
10+130	10.00	-	-	-	0.13	0.13	8.75	8.75	0%	-	0%	-	0%	-	1.03	-	7.80	-	-
10+140	10.00	-	-	-	0.09	0.09	1.10	1.10	0%	-	0%	-	0%	-	1.62	-	13.25	-	-
10+150	10.00	-	-	-	0.60	0.60	3.45	3.45	0%	-	0%	-	0%	-	0.42	-	10.20	-	-
10+160	10.00	-	-	-	0.15	0.15	3.75	3.75	0%	-	0%	-	0%	-	0.56	-	4.90	-	-
10+170	10.00	-	-	-	-	-	0.75	0.75	0%	-	0%	-	0%	-	1.44	-	10.00	-	-
10+180	10.00	-	-	-	0.12	0.12	0.60	0.60	0%	-	0%	-	0%	-	1.05	-	12.45	-	-
10+190	10.00	-	-	-	1.05	1.05	5.85	5.85	0%	-	0%	-	0%	-	0.36	-	7.05	-	-
10+200	10.00	-	-	-	1.10	1.10	10.75	10.75	0%	-	0%	-	0%	-	0.42	-	3.90	-	-
10+210	10.00	-	-	-	1.19	1.19	11.45	11.45	0%	-	0%	-	0%	-	0.54	-	4.80	-	-
10+220	10.00	-	-	-	1.03	1.03	11.10	11.10	0%	-	0%	-	0%	-	3.69	-	21.15	-	-
10+230	10.00	-	-	-	1.19	1.19	11.10	11.10	0%	-	0%	-	0%	-	3.50	-	35.95	-	-
10+240	10.00	-	-	-	1.08	1.08	11.35	11.35	0%	-	0%	-	0%	-	2.05	-	27.75	-	-
10+250	10.00	-	-	-	0.46	0.46	7.70	7.70	0%	-	0%	-	0%	-	3.68	-	28.65	-	-
10+260	10.00	-	-	-	-	-	2.30	2.30	0%	-	0%	-	0%	-	7.16	-	54.20	-	-
10+270	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.44	-	68.00	-	-
10+280	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.50	-	74.70	-	-
10+290	10.00	-	-	-	0.33	0.33	1.65	1.65	0%	-	0%	-	0%	-	9.47	-	89.85	-	-
10+300	10.00	-	-	-	-	-	1.65	1.65	0%	-	0%	-	0%	-	13.20	-	113.35	-	-
10+310	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	14.25	-	137.25	-	-
10+320	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	17.24	-	157.45	-	-
10+330	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	18.37	-	178.05	-	-
10+340	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	17.91	-	181.40	-	-
10+350	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	20.32	-	191.15	-	-
10+360	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	17.97	-	191.45	-	-
10+370	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	20.47	-	192.20	-	-
10+380	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	19.71	-	200.90	-	-
10+390	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	14.44	-	170.75	-	-
10+400	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	10.32	-	123.80	-	-
10+410	10.00	-	-	-	0.08	0.08	0.40	0.40	0%	-	0%	-	0%	-	3.93	-	71.25	-	-
10+420	10.00	-	-	-	1.79	1.79	9.35	9.35	0%	-	0%	-	0%	-	-	-	19.65	-	-
10+430	10.00	-	-	-	3.15	3.15	24.70	24.70	0%	-	0%	-	0%	-	-	-	-	-	-
10+440	10.00	-	-	-	2.63	2.63	28.90	28.90	0%	-	0%	-	0%	-	0.51	-	2.55	-	-
10+450	10.00	-	-	-	2.01	2.01	23.20	23.20	0%	-	0%	-	0%	-	0.28	-	3.95	-	-
10+460	10.00	-	-	-	2.57	2.57	22.90	22.90	0%	-	0%	-	0%	-	1.60	-	9.40	-	-
10+470	10.00	-	-	-	0.90	0.90	17.35	17.35	0%	-	0%	-	0%	-	1.82	-	17.10	-	-
10+480	10.00	-	-	-	0.57	0.57	7.35	7.35	0%	-	0%	-	0%	-	2.64	-	22.30	-	-
10+490	10.00	-	-	-	-	-	2.85	2.85	0%	-	0%	-	0%	-	6.61	-	46.25	-	-
10+500	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	13.17	-	98.90	-	-
							882.35										2,625.50		
10+510	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	16.49	-	148.30	-	-
10+520	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	14.55	-	155.20	-	-
10+530	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	11.48	-	130.15	-	-
10+540	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.78	-	106.30	-	-
10+550	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.62	-	87.00	-	-
10+560	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.29	-	74.55	-	-
10+570	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	4.82	-	60.55	-	-
10+580	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	3.00	-	39.10	-	-
10+590	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	3.23	-	31.15	-	-

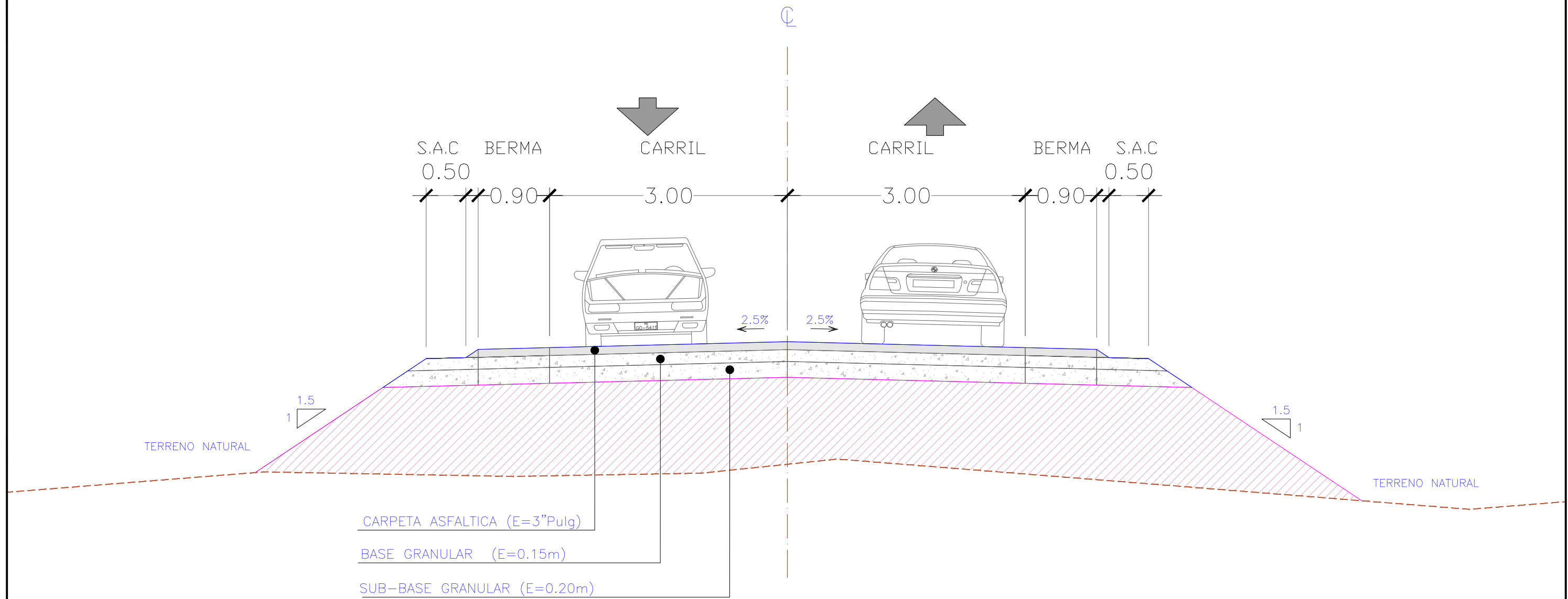
PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS	
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN						
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	ÁREA RELLENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	VOLUMEN
		m ²	m ²	Ha	m ²	m ²	m ³			m ³		m ³		m ³	m ²	m ²	m ³	m ²	m ³
10+760	10.00	-	-	-	6.74	6.74	54.10	54.10	0%	-	0%	-	0%	-	-	-	-	-	
10+770	10.00	-	-	-	7.66	7.66	72.00	72.00	0%	-	0%	-	0%	-	-	-	-	-	
10+780	10.00	-	-	-	7.03	7.03	73.45	73.45	0%	-	0%	-	0%	-	-	-	-	-	
10+790	10.00	-	-	-	5.71	5.71	63.70	63.70	0%	-	0%	-	0%	-	-	-	-	-	
10+800	10.00	-	-	-	3.85	3.85	47.80	47.80	0%	-	0%	-	0%	-	-	-	-	-	
10+810	10.00	-	-	-	2.55	2.55	32.00	32.00	0%	-	0%	-	0%	-	-	-	-	-	
10+820	10.00	-	-	-	0.63	0.63	15.90	15.90	0%	-	0%	-	0%	-	0.03	-	0.15	-	
10+830	10.00	-	-	-	0.08	0.08	3.55	3.55	0%	-	0%	-	0%	-	0.49	-	2.60	-	
10+840	10.00	-	-	-	0.08	0.08	0.80	0.80	0%	-	0%	-	0%	-	3.59	-	20.40	-	
10+850	10.00	-	-	-	0.06	0.06	0.70	0.70	0%	-	0%	-	0%	-	4.77	-	41.80	-	
10+860	10.00	-	-	-	-	-	0.30	0.30	0%	-	0%	-	0%	-	5.63	-	52.00	-	
10+870	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.00	-	53.15	-	
10+880	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	3.90	-	44.50	-	
10+890	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	2.77	-	33.35	-	
10+900	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	1.00	-	18.85	-	
10+910	10.00	-	-	-	0.64	0.64	3.20	3.20	0%	-	0%	-	0%	-	0.13	-	5.65	-	
10+920	10.00	-	-	-	1.77	1.77	12.05	12.05	0%	-	0%	-	0%	-	-	-	0.65	-	
10+930	10.00	-	-	-	3.53	3.53	26.50	26.50	0%	-	0%	-	0%	-	-	-	-	-	
10+940	10.00	-	-	-	3.01	3.01	32.70	32.70	0%	-	0%	-	0%	-	-	-	-	-	
10+950	10.00	-	-	-	1.68	1.68	23.45	23.45	0%	-	0%	-	0%	-	-	-	-	-	
10+960	10.00	-	-	-	0.35	0.35	10.15	10.15	0%	-	0%	-	0%	-	0.14	-	0.70	-	
10+970	10.00	-	-	-	1.23	1.23	7.90	7.90	0%	-	0%	-	0%	-	0.30	-	2.20	-	
10+980	10.00	-	-	-	0.03	0.03	6.30	6.30	0%	-	0%	-	0%	-	1.25	-	7.75	-	
10+990	10.00	-	-	-	-	-	0.15	0.15	0%	-	0%	-	0%	-	4.46	-	28.55	-	
11+000	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.86	-	56.60	-	
							524.50										1,932.25		
11+010	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.99	-	79.25	-	
11+020	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.87	-	94.30	-	
11+030	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.48	-	96.75	-	
11+040	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.88	-	96.80	-	
11+050	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.91	-	93.95	-	
11+060	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.10	-	85.05	-	
11+070	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.35	-	77.25	-	
11+080	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.20	-	72.75	-	
11+090	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.59	-	78.95	-	
11+100	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.47	-	80.30	-	
11+110	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.17	-	68.20	-	
11+120	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	14.82	-	104.95	-	
11+130	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	12.09	-	134.55	-	
11+140	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	3.47	-	77.80	-	
11+150	10.00	-	-	-	0.10	0.10	0.50	0.50	0%	-	0%	-	0%	-	0.36	-	19.15	-	
11+160	10.00	-	-	-	0.88	0.88	4.90	4.90	0%	-	0%	-	0%	-	-	-	1.80	-	
11+170	10.00	-	-	-	2.40	2.40	16.40	16.40	0%	-	0%	-	0%	-	0.17	-	0.85	-	
11+180	10.00	-	-	-	2.99	2.99	26.95	26.95	0%	-	0%	-	0%	-	-	-	0.85	-	
11+190	10.00	-	-	-	3.89	3.89	34.40	34.40	0%	-	0%	-	0%	-	0.12	-	0.60	-	
11+200	10.00	-	-	-	4.53	4.53	42.10	42.10	0%	-	0%	-	0%	-	0.03	-	0.75	-	
11+210	10.00	-	-	-	3.55	3.55	40.40	40.40	0%	-	0%	-	0%	-	-	-	0.15	-	
11+220	10.00	-	-	-	2.23	2.23	28.90	28.90	0%	-	0%	-	0%	-	0.03	-	0.15	-	
11+230	10.00	-	-	-	1.24	1.24	17.35	17.35	0%	-	0%	-	0%	-	0.04	-	0.35	-	
11+240	10.00	-	-	-	0.14	0.14	6.90	6.90	0%	-	0%	-	0%	-	0.71	-	3.75	-	
11+250	10.00	-	-	-	0.06	0.06	1.00	1.00	0%	-	0%	-	0%	-	1.98	-	13.45	-	
11+260	10.00	-	-	-	-	-	0.30	0.30	0%	-	0%	-	0%	-	3.06	-	25.20	-	
11+270	10.00	-	-	-	0.20	0.20	1.00	1.00	0%	-	0%	-	0%	-	2.40	-	27.30	-	
11+280	10.00	-	-	-	-	-	1.00	1.00	0%	-	0%	-	0%	-	4.50	-	34.50	-	
11+290	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.43	-	49.65	-	
11+300	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.01	-	57.20	-	
11+310	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.89	-	64.50	-	
11+320	10.00	-	-	-	0.12	0.12	0.60	0.60	0%	-	0%	-	0%	-	4.08	-	54.85	-	
11+330	10.00	-	-	-	1.09	1.09	6.05	6.05	0%	-	0%	-	0%	-	4.04	-	40.60	-	
11+340	10.00	-	-	-	-	-	5.45	5.45	0%	-	0%	-	0%	-	6.15	-	50.95	-	
11+350	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.99	-	65.70	-	
11+360	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.75	-	73.70	-	
11+370	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.69	-	82.20	-	
11+380	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.34	-	90.15	-	
11+390	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.67	-	95.05	-	
11+400	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.55	-	76.10	-	
11+410	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.13	-	53.40	-	
11+420	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.36	-	52.45	-	
11+430	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	3.60	-	44.80	-	
11+440	10.00	-	-	-	0.99	0.99	4.95	4.95	0%	-	0%	-	0%	-	0.16	-	18.80	-	
11+450	10.00	-	-	-	1.12	1.12	10.55	10.55	0%	-	0%	-	0%	-	-	-	0.80	-	
11+460	10.00	-	-	-	1.11	1.11	11.15	11.15	0%	-	0%	-	0%	-	1.27	-	6.35	-	
11+470	10.00	-	-	-	1.75	1.75	14.30	14.30	0%	-	0%	-	0%	-	-	-	6.35	-	
11+480	10.00	-	-	-	2.42	2.42	20.85	20.85	0%	-	0%	-	0%	-	-	-	-	-	
11+490	10.00	-	-	-	2.42	2.42	24.20	24.20	0%	-	0%	-	0%	-	0.98	-	4.90	-	
11+500	10.00	-	-	-	3.40	3.40	29.10	29.10	0%	-	0%	-	0%	-	-	-	4.90	-	
							349.30										2,363.10		
11+510	10.00	-	-	-	3.83	3.83	36.15	36.15	0%	-	0%	-	0%	-	-	-	-	-	
11+520	10.00	-	-	-	3.35	3.35	35.90	35.90	0%	-	0%	-	0%	-	0.02	-	0.10	-	
11+530	10.00	-	-	-	2.07	2.07	27.10	27.10	0%	-	0%	-	0%	-	0.18	-	1.00	-	
11+540	10.00	-	-	-	0.85	0.85	14.60	14.60	0%	-	0%	-	0%	-	0.67	-	4.25	-	
11+550	10.00	-	-	-	0.46	0.46	6.55	6.55	0%	-	0%	-	0%	-	0.93	-	8.00	-	
11+560	10.00	-	-	-	0.05	0.05	2.55	2.55	0%	-	0%	-	0%	-	2.12	-	15.25	-	
11+570	10.00	-	-	-	0.04	0.04	0.45	0.45	0%	-	0%	-	0%	-	4.20	-	31.60	-	
11+580	10.00	-	-	-	-	-	0.20	0.20	0%	-	0%	-	0%	-	5.51	-	48.55	-	
11+590	10.00	-	-	-	0.15	0.15	0.75	0.75	0%	-	0%	-	0%	-	5.02	-	52.65	-	
11+600	10.00	-	-	-	1.12	1.12	6.35	6.35	0%	-	0%	-	0%	-	3.48	-	42.50	-	
11+610	10.00	-	-	-	3.04	3.04	20.80	20.80	0%	-	0%	-	0%	-	1.20	-	23.40	-	
11+620	10.00	-	-	-	4.29	4.29	36.65	36.65	0%	-	0%	-	0%	-	0.40	-	8.00	-	
11+630	10.00	-	-	-	7.64	7.64	59.65	59.65	0%										

PROGRESIVAS	DISTANCIA	DESBROCE Y LIMPIEZA EN ZONAS NO BOSCOSAS			EXCAVACION EN EXPLANACIONES SIN CLASIFICAR			TOTAL A ELIMINAR	EXCAVACION EN EXPLANACIONES EN:						TERRAPLENES			BANQUETA PARA RELLENOS		
									EXCAVACION ROCA FIJA		EXCAVACION EN ROCA FRACTURADA (SUELTA)		EXCAVACION DE MATERIAL COMUN							
		ÁREA CAPA DESBROSE	ÁREA TOTAL	VOLUMEN	ÁREA CORTE	ÁREA TOTAL	VOLUMEN		RF %	VOLUMEN	RS %	VOLUMEN	MS %	VOLUMEN	ÁREA RELLENO TERRAPLEN	ÁREA RELLENO CAPA DESBROSE	VOLUMEN	ÁREA BANQ. PARA RELLENO	RELLENO	VOLUMEN
		m ²	m ²	Ha	m ²	m ²	m ³			m ³		m ³		m ³	m ²	m ²	m ³	m ²	m ²	m ³
11+750	10.00	-	-	-	2.49	2.49	29.70	29.70	0%	-	0%	-	0%	-	0.80	-	-	9.05	-	-
11+760	10.00	-	-	-	0.49	0.49	14.90	14.90	0%	-	0%	-	0%	-	6.96	-	-	38.80	-	-
11+770	10.00	-	-	-	-	-	2.45	2.45	0%	-	0%	-	0%	-	17.91	-	-	124.35	-	-
11+780	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	20.51	-	-	192.10	-	-
11+790	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	18.85	-	-	196.80	-	-
11+800	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.91	-	-	128.80	-	-
11+810	10.00	-	-	-	0.82	0.82	4.10	4.10	0%	-	0%	-	0%	-	0.70	-	-	38.05	-	-
11+820	10.00	-	-	-	4.76	4.76	27.90	27.90	0%	-	0%	-	0%	-	-	-	-	3.50	-	-
11+830	10.00	-	-	-	7.49	7.49	61.25	61.25	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+840	10.00	-	-	-	12.04	12.04	97.65	97.65	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+850	10.00	-	-	-	9.03	9.03	105.35	105.35	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+860	10.00	-	-	-	9.83	9.83	94.30	94.30	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+870	10.00	-	-	-	9.02	9.02	94.25	94.25	0%	-	0%	-	0%	-	0.07	-	-	0.35	-	-
11+880	10.00	-	-	-	7.18	7.18	81.00	81.00	0%	-	0%	-	0%	-	0.13	-	-	1.00	-	-
11+890	10.00	-	-	-	7.06	7.06	71.20	71.20	0%	-	0%	-	0%	-	-	-	-	0.65	-	-
11+900	10.00	-	-	-	5.65	5.65	63.55	63.55	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+910	10.00	-	-	-	5.38	5.38	55.15	55.15	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+920	10.00	-	-	-	4.88	4.88	51.30	51.30	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+930	10.00	-	-	-	4.54	4.54	47.10	47.10	0%	-	0%	-	0%	-	-	-	-	-	-	-
11+940	10.00	-	-	-	4.15	4.15	43.45	43.45	0%	-	0%	-	0%	-	0.05	-	-	0.25	-	-
11+950	10.00	-	-	-	4.19	4.19	41.70	41.70	0%	-	0%	-	0%	-	0.02	-	-	0.35	-	-
11+960	10.00	-	-	-	4.38	4.38	42.85	42.85	0%	-	0%	-	0%	-	-	-	-	0.10	-	-
11+970	10.00	-	-	-	3.08	3.08	37.30	37.30	0%	-	0%	-	0%	-	0.34	-	-	1.70	-	-
11+980	10.00	-	-	-	0.96	0.96	20.20	20.20	0%	-	0%	-	0%	-	1.35	-	-	8.45	-	-
11+990	10.00	-	-	-	0.82	0.82	8.90	8.90	0%	-	0%	-	0%	-	0.03	-	-	6.90	-	-
12+000	10.00	-	-	-	0.67	0.67	7.45	7.45	0%	-	0%	-	0%	-	0.49	-	-	2.60	-	-
						2,313.25											1,110.35			
12+010	10.00	-	-	-	0.41	0.41	5.40	5.40	0%	-	0%	-	0%	-	1.54	-	-	10.15	-	-
12+020	10.00	-	-	-	0.86	0.86	6.35	6.35	0%	-	0%	-	0%	-	2.78	-	-	21.60	-	-
12+030	10.00	-	-	-	1.03	1.03	9.45	9.45	0%	-	0%	-	0%	-	3.76	-	-	32.70	-	-
12+040	10.00	-	-	-	0.61	0.61	8.20	8.20	0%	-	0%	-	0%	-	4.05	-	-	39.05	-	-
12+050	10.00	-	-	-	0.15	0.15	3.80	3.80	0%	-	0%	-	0%	-	4.67	-	-	43.60	-	-
12+060	10.00	-	-	-	0.03	0.03	0.90	0.90	0%	-	0%	-	0%	-	5.30	-	-	49.85	-	-
12+070	10.00	-	-	-	-	-	0.15	0.15	0%	-	0%	-	0%	-	6.33	-	-	58.15	-	-
12+080	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	7.30	-	-	68.15	-	-
12+090	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.48	-	-	78.90	-	-
12+100	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.40	-	-	89.40	-	-
12+110	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	9.94	-	-	96.70	-	-
12+120	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	11.04	-	-	104.90	-	-
12+130	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	12.33	-	-	116.85	-	-
12+140	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.93	-	-	106.30	-	-
12+150	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.23	-	-	85.80	-	-
12+160	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.02	-	-	81.25	-	-
12+170	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.38	-	-	82.00	-	-
12+180	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.86	-	-	86.20	-	-
12+190	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.68	-	-	87.70	-	-
12+200	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	8.10	-	-	83.90	-	-
12+210	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	6.82	-	-	74.60	-	-
12+220	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	5.62	-	-	62.20	-	-
12+230	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	4.94	-	-	52.80	-	-
12+240	10.00	-	-	-	0.02	0.02	0.10	0.10	0%	-	0%	-	0%	-	4.72	-	-	48.30	-	-
12+250	10.00	-	-	-	-	-	0.10	0.10	0%	-	0%	-	0%	-	5.18	-	-	49.50	-	-
12+260	10.00	-	-	-	0.52	0.52	2.60	2.60	0%	-	0%	-	0%	-	5.29	-	-	52.35	-	-
12+270	10.00	-	-	-	0.23	0.23	3.75	3.75	0%	-	0%	-	0%	-	5.37	-	-	53.30	-	-
12+280	10.00	-	-	-	0.82	0.82	5.25	5.25	0%	-	0%	-	0%	-	5.03	-	-	52.00	-	-
12+290	10.00	-	-	-	0.06	0.06	4.40	4.40	0%	-	0%	-	0%	-	6.20	-	-	56.15	-	-
12+300	10.00	-	-	-	-	-	0.30	0.30	0%	-	0%	-	0%	-	7.42	-	-	68.10	-	-
12+310	10.00	-	-	-	1.12	1.12	5.60	5.60	0%	-	0%	-	0%	-	9.06	-	-	82.40	-	-
12+320	10.00	-	-	-	0.68	0.68	9.00	9.00	0%	-	0%	-	0%	-	9.28	-	-	91.70	-	-
12+330	10.00	-	-	-	0.01	0.01	3.45	3.45	0%	-	0%	-	0%	-	10.14	-	-	97.10	-	-
12+340	10.00	-	-	-	0.51	0.51	2.60	2.60	0%	-	0%	-	0%	-	8.69	-	-	94.15	-	-
12+350	10.00	-	-	-	1.26	1.26	8.85	8.85	0%	-	0%	-	0%	-	8.35	-	-	85.20	-	-
12+360	10.00	-	-	-	0.46	0.46	8.60	8.60	0%	-	0%	-	0%	-	8.52	-	-	84.35	-	-
12+370	10.00	-	-	-	0.02	0.02	2.40	2.40	0%	-	0%	-	0%	-	7.80	-	-	81.60	-	-
12+380	10.00	-	-	-	0.04	0.04	0.30	0.30	0%	-	0%	-	0%	-	5.19	-	-	64.95	-	-
12+390	10.00	-	-	-	0.38	0.38	2.10	2.10	0%	-	0%	-	0%	-	4.35	-	-	47.70	-	-
12+400	10.00	-	-	-	-	-	1.90	1.90	0%	-	0%	-	0%	-	4.14	-	-	42.45	-	-
12+410	10.00	-	-	-	-	-	-	-	0%	-	0%	-	0%	-	2.57	-	-	33.55	-	-
12+420	10.00	-	-	-	0.27	0.27	1.35	1.35	0%	-	0%	-	0%	-	1.70	-	-	21.35	-	-
12+430	10.00	-	-	-	0.60	0.60	4.35	4.35	0%	-	0%	-	0%	-	0.91	-	-	13.05	-	-
12+440	10.00	-	-	-	0.50	0.50	5.50	5.50	0%	-	0%	-	0%	-	0.73	-	-	8.20	-	-
12+450	10.00	-	-	-	0.05	0.05	2.75	2.75	0%	-	0%	-	0%	-	1.37	-	-	10.50	-	-
12+460	10.00	-	-	-	0.15	0.15	1.00	1.00	0%	-	0%	-	0%	-	0.75	-	-	10.60	-	-
12+470	10.00	-	-	-	0.37	0.37	2.60	2.60	0%	-	0%	-	0%	-	0.16	-	-	4.55	-	-
12+480	10.00	-	-	-	1.25	1.25	8.10	8.10	0%	-	0%	-	0%	-	-	-	-	0.80	-	-
12+490	10.00	-	-	-	1.00	1.00	11.25	11.25	0%	-	0%	-	0%	-	3.74	-	-	18.70	-	-
12+500	10.00	-	-	-	-	-	5.00	5.00	0%	-	0%	-	0%	-	4.74	-	-	42.40	-	-
						137.45											2,927.75			

D. PLANOS DE SECCIONES TIPICAS

LEYENDA	
Terreno Natural	- - - - -
Nivel Rasante	—————
Nivel Subrasante	—————

SECCION TIPICA EN RELLENO



S.A.C : SOBREANCHO DE COMPACTACION

— VISTA DE SECCION TIPICA
Esc. 1/25

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



UNIVERSIDAD NACIONAL DEL ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS "ESCUELA PROFECIONAL DE INGENIERIA TOPOGRAFICA Y AGRIMENSURA"



Participantes:
 Presidente de Jurado : D.sc Valeriano Condori Apaza
 Primer Miembro : Ing. Victor Raul Banegas Layme
 Segundo Miembro : Ing. Juan Esteban Araoz Barrios
 Asesor de Tesis : Ing. Arturo Joels Ventura Mamani
 Tesista : Bach. Javier Rolando Maquera Ccalle

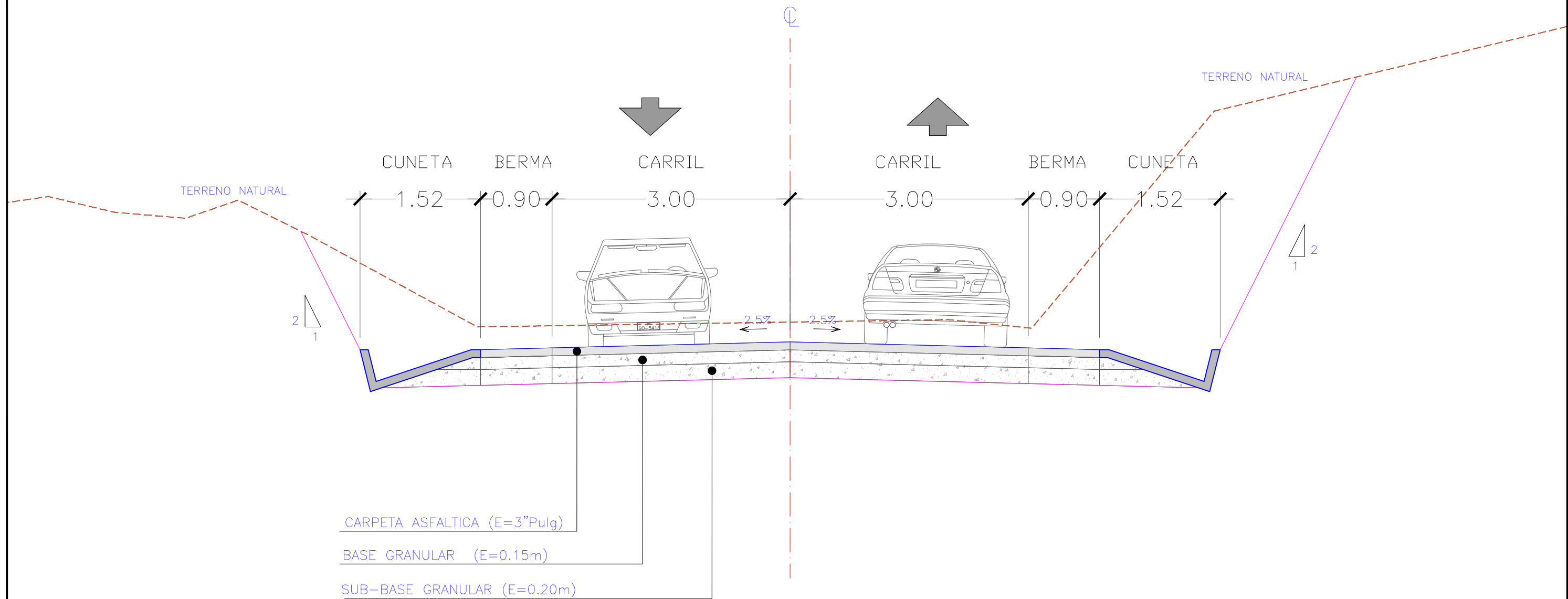
Proyecto de Tesis:
" COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA - CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TIPICA EN RELLENO

Escala:	1/25	Lamina:	01-03
Fecha:	Marzo 2022		
Codigo:	ST-RELL-001		REV-00

LEYENDA	
Terreno Natural	- - - - -
Nivel Rasante	—————
Nivel Subrasante	—————

SECCION TIPICA EN CORTE CERRADO



VISTA DE SECCION TIPICA
Esc. 1/25

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



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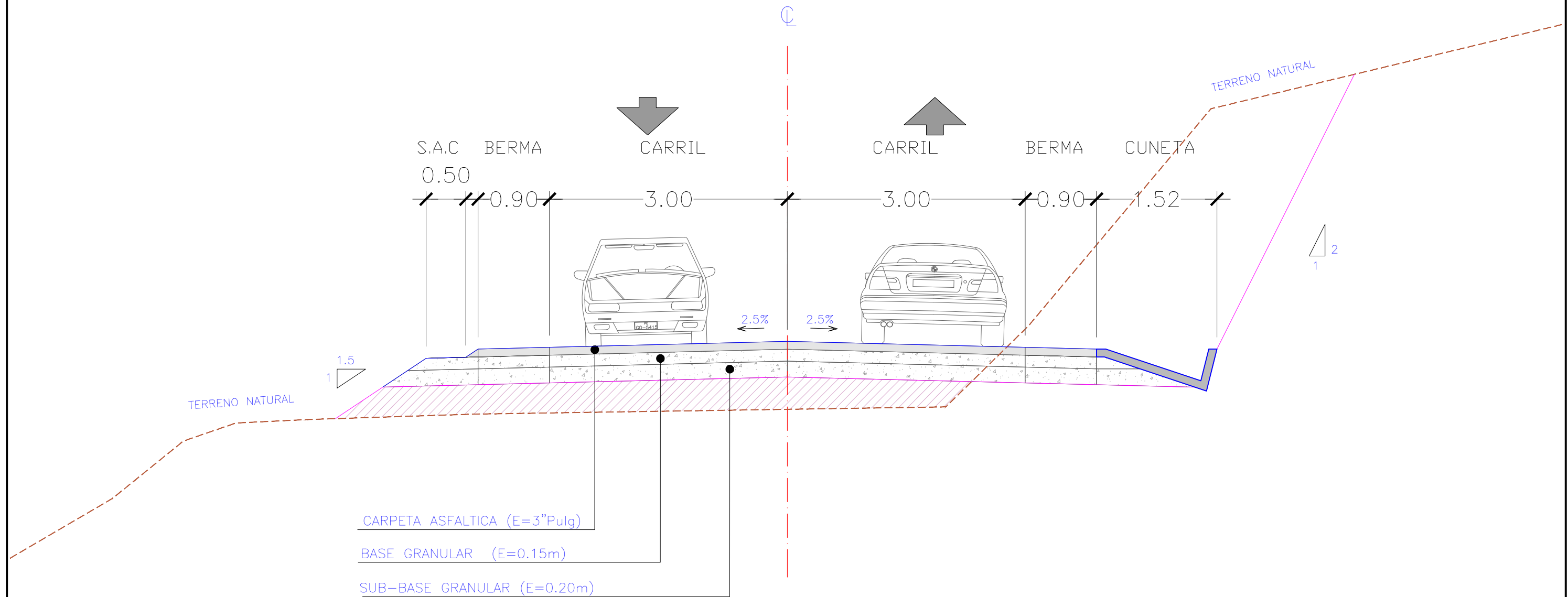
Proyecto de Tesis:
"COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA - CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TIPICA EN CORTE CERRADO

Escala:	1/25	Lamina:	02-03
Fecha:	Marzo 2022		
Codigo:	ST-CC-001		REV-00

LEYENDA	
Terreno Natural	-----
Nivel Rasante	—————
Nivel Subrasante	—————

SECCION TIPICA EN MEDIA LADERA



S.A.C : SOBRECARGO DE COMPACTACION

VISTA DE SECCION TIPICA
Esc. 1/25

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



UNIVERSIDAD NACIONAL DEL ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS
"ESCUELA PROFESIONAL DE INGENIERIA TOPOGRAFICA Y AGRIMENSURA"



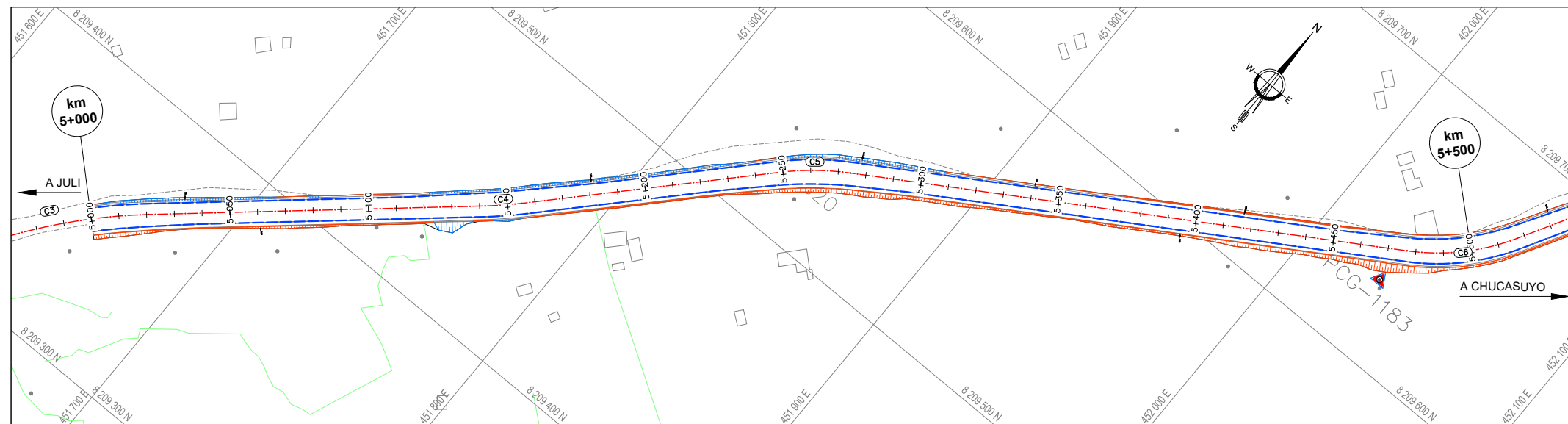
Participantes:
Presidente de Jurado : D.sc Valeriano Condori Apaza
Primer Miembro : Ing. Victor Raul Banegas Layme
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Tesisista : Bach. Javier Rolando Maquera Ccalle

Proyecto de Tesis:
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Plano:
SECCIONES TIPICA EN MEDIA LADERA

Escala:	1/25	Lamina:	03-03
Fecha:	Marzo 2022		
Codigo:	ST-ML-001		REV-00

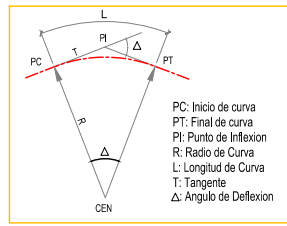
**E. PLANOS DE DISEÑO GEOMETRICO
PLANTA Y PERFIL**



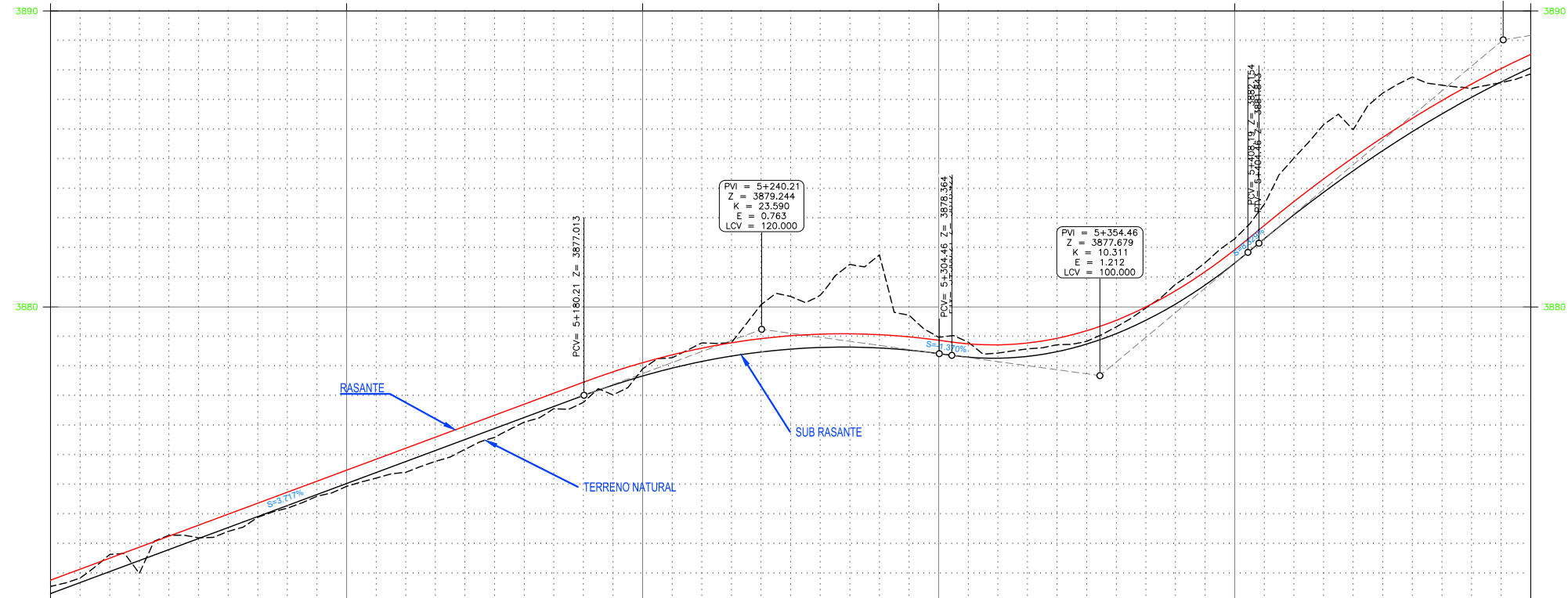
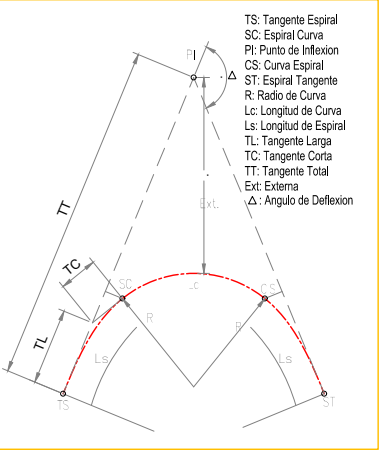
VISTA EN PLANTA
Esc. 1/1,000

CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C3	20°02'33"	35.342	200.000	69.961	3.099	4+950.818	4+986.159	5+020.779	451647.131	8209340.542
C4	5°25'02"	6.623	140.000	13.237	0.157	5+142.099	5+148.722	5+155.336	451770.126	8209447.940
C5	14°49'12"	13.006	100.000	25.866	0.842	5+248.581	5+261.587	5+274.447	451847.760	8209529.876
C6	28°52'32"	20.597	80.000	40.318	2.609	5+476.892	5+497.489	5+517.210	452048.539	8209653.997
C7	31°22'06"	16.847	60.000	32.849	2.320	5+593.749	5+610.596	5+626.598	452104.494	8209753.301
C8	12°13'50"	6.428	60.000	12.808	0.343	5+672.762	5+679.191	5+685.570	452165.091	8209787.212

ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



VISTA EN PERFIL
Esc. 1/1,000

PROGRESIVAS	5+000	5+010	5+020	5+030	5+040	5+050	5+060	5+070	5+080	5+090	5+100	5+110	5+120	5+130	5+140	5+150	5+160	5+170	5+180	5+190	5+200	5+210	5+220	5+230	5+240	5+250	5+260	5+270	5+280	5+290	5+300	5+310	5+320	5+330	5+340	5+350	5+360	5+370	5+380	5+390	5+400	5+410	5+420	5+430	5+440	5+450	5+460	5+470	5+480	5+490	5+500																												
LONG. PENDIENTE	S = 3.7169%																				S = -1.3699%										S = 8.3288%																																																
COTA TERRENO NATURAL	3870.687	3870.638	3871.640	3870.995	3872.288	3872.199	3872.415	3872.890	3873.200	3873.604	3873.935	3874.404	3874.214	3874.412	3874.780	3875.187	3875.890	3875.587	3876.262	3876.108	3876.634	3876.560	3877.006	3876.773	3877.357	3877.028	3877.666	3877.906	3877.933	3878.282	3878.157	3878.784	3878.339	3878.795	3878.478	3880.076	3878.575	3880.355	3878.630	3880.399	3878.303	3878.808	3878.268	3878.441	3878.330	3878.584	3878.489	3878.721	3878.746	3878.837	3879.099	3879.326	3879.549	3879.965	3880.096	3880.764	3880.740	3881.492	3881.481	3882.302	3882.304	3883.466	3883.109	3885.028	3883.874	3886.156	3884.597	3885.988	3885.280	3887.226	3885.922	3887.772	3886.524	3887.492	3887.085	3887.375	3887.605	3887.574	3888.084
COTA SUBRASANTE	3870.687	3870.638	3871.640	3870.995	3872.288	3872.199	3872.415	3872.890	3873.200	3873.604	3873.935	3874.404	3874.214	3874.412	3874.780	3875.187	3875.890	3875.587	3876.262	3876.108	3876.634	3876.560	3877.006	3876.773	3877.357	3877.028	3877.666	3877.906	3877.933	3878.282	3878.157	3878.784	3878.339	3878.795	3878.478	3880.076	3878.575	3880.355	3878.630	3880.399	3878.303	3878.808	3878.268	3878.441	3878.330	3878.584	3878.489	3878.721	3878.746	3878.837	3879.099	3879.326	3879.549	3879.965	3880.096	3880.764	3880.740	3881.492	3881.481	3882.302	3882.304	3883.466	3883.109	3885.028	3883.874	3886.156	3884.597	3885.988	3885.280	3887.226	3885.922	3887.772	3886.524	3887.492	3887.085	3887.375	3887.605	3887.574	3888.084
DIAGRAMA DE PERALTES	[Diagram showing cross-sections with superelevation percentages: 4.80%, 5.80%, 6.80%, 7.80%]																																																																														
ALINEAMIENTO	R=200.00, LC=69.96m, Δ=20°02'33"										R=140.00, LC=13.24m, Δ=6°25'02"										R=100.00, LC=25.87m, Δ=14°49'12"										R=80.00, LC=40.32m, Δ=28°52'32"																																																
CORTE/RELLENO	-0.15	-0.58	0.44	-0.49	-0.03	0.13	0.03	0.09	0.06	0.10	0.19	0.36	0.37	0.33	0.30	0.15	0.07	0.23	0.33	-0.24	-0.35	-0.63	-0.46	-1.60	-1.78	-1.77	-2.80	-3.15	-1.18	-0.55	-0.51	-0.17	-0.25	-0.23	-0.09	-0.23	-0.42	-0.67	-0.75	-0.82	-1.16	-1.92	-2.28	-1.39	-1.95	-1.85	-0.97	-0.29	0.03	0.21																													

LEYENDA

PLANTA :	
CURVA MAESTRA	[Red line symbol]
CURVA SECUNDARIA	[Blue line symbol]
COTA DE CURVAS	[Dashed line symbol]
EJE DE VIA	[Black line symbol]
RIOS	[Blue wavy line symbol]
QUEBRADAS	[Blue dashed wavy line symbol]
BORDE DE VIA	[Blue dashed line symbol]
PIRCA DE PIEDRA	[Black dashed line symbol]
CASA	[Black rectangle symbol]
VEREDAS	[Black hatched rectangle symbol]
PARED DE ADOBE	[Black dashed rectangle symbol]
CANAL PROYECTADO	[Cyan line symbol]
PERFIL TERRENO NATURAL	[Black dashed line symbol]
PERFIL SUBRASANTE	[Red solid line symbol]
PUNTOS DE INTERECCION	[Circle with 'C01' symbol]
ALCANTARILLA	[Black rectangle with lines symbol]
ALCANTARILLA EXISTENTE	[Black rectangle with lines symbol]
LIMITE DE CORTE	[Red solid line symbol]
TERRENO DE CULTIVO	[Green hatched rectangle symbol]
POSTE DE MEDIA TENSION	[Circle with 'PMT' symbol]
POSTE DE ALUMBRADO	[Circle with 'X' symbol]
POSTE DE TELEFONO	[Circle with 'PT' symbol]
CERCO	[Red 'X' symbol]
PERFIL :	
SUBRASANTE	[Red solid line symbol]
TERRENO EXISTENTE	[Black dashed line symbol]

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



UNIVERSIDAD NACIONAL DEL
ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS
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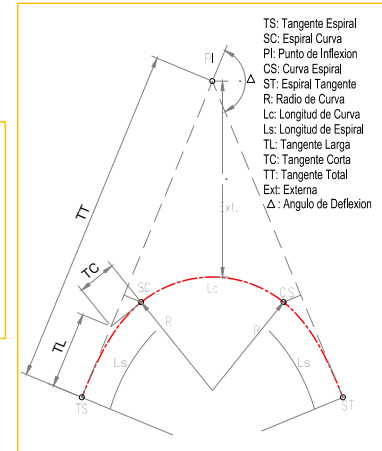
Proyecto de Tesis:
" COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS
OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
PLANTA PERFIL - DISEÑO GEOMETRICO
Km 5+000 - Km 5+500

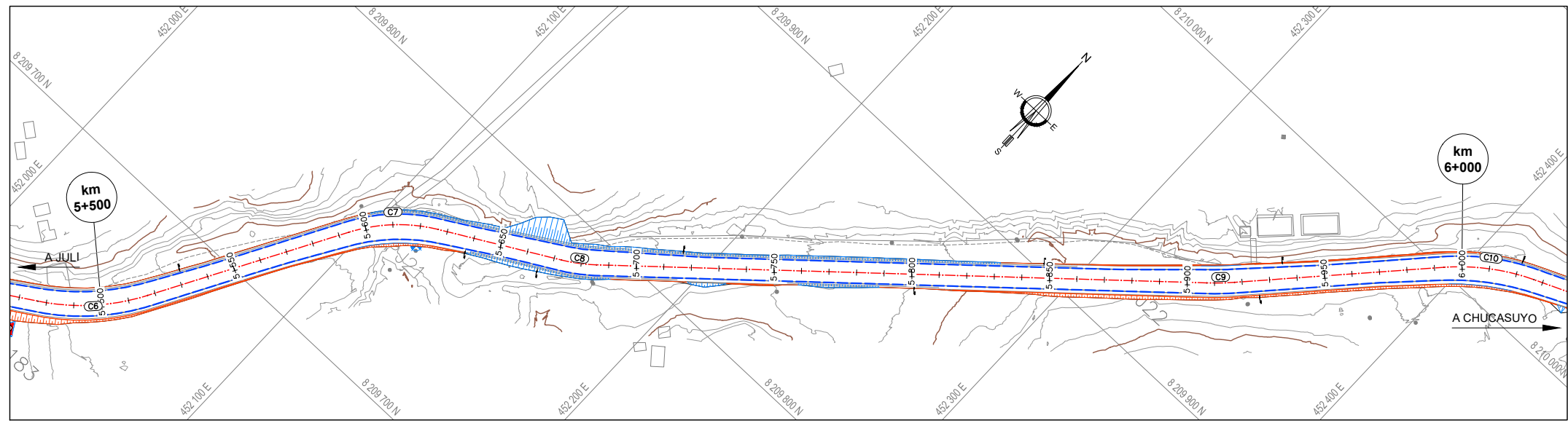
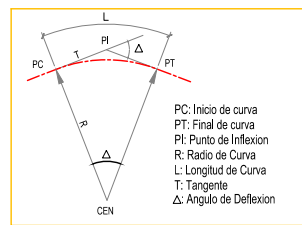
Escala: INDICADA
Fecha: Marzo 2022
Codigo: DG-PPL-001
Lamina: 01-15
REV-00

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C6	28°52'32"	20.597	80.000	40.318	2.609	5+476.892	5+497.489	5+517.210	452048.539	8209653.997
C7	31°22'06"	16.847	60.000	32.849	2.320	5+593.749	5+610.596	5+626.598	452104.494	8209753.301
C8	12°13'50"	6.428	60.000	12.808	0.343	5+672.762	5+679.191	5+685.570	452165.091	8209787.212
C9	5°47'34"	5.060	100.000	10.110	0.128	5+907.188	5+912.248	5+917.299	452339.779	8209941.558
C10	23°48'38"	16.866	80.000	33.246	1.759	5+993.451	6+010.317	6+026.697	452406.347	8210013.585
C11	20°05'57"	14.178	80.000	28.064	1.247	6+070.536	6+084.714	6+098.600	452475.049	8210043.379

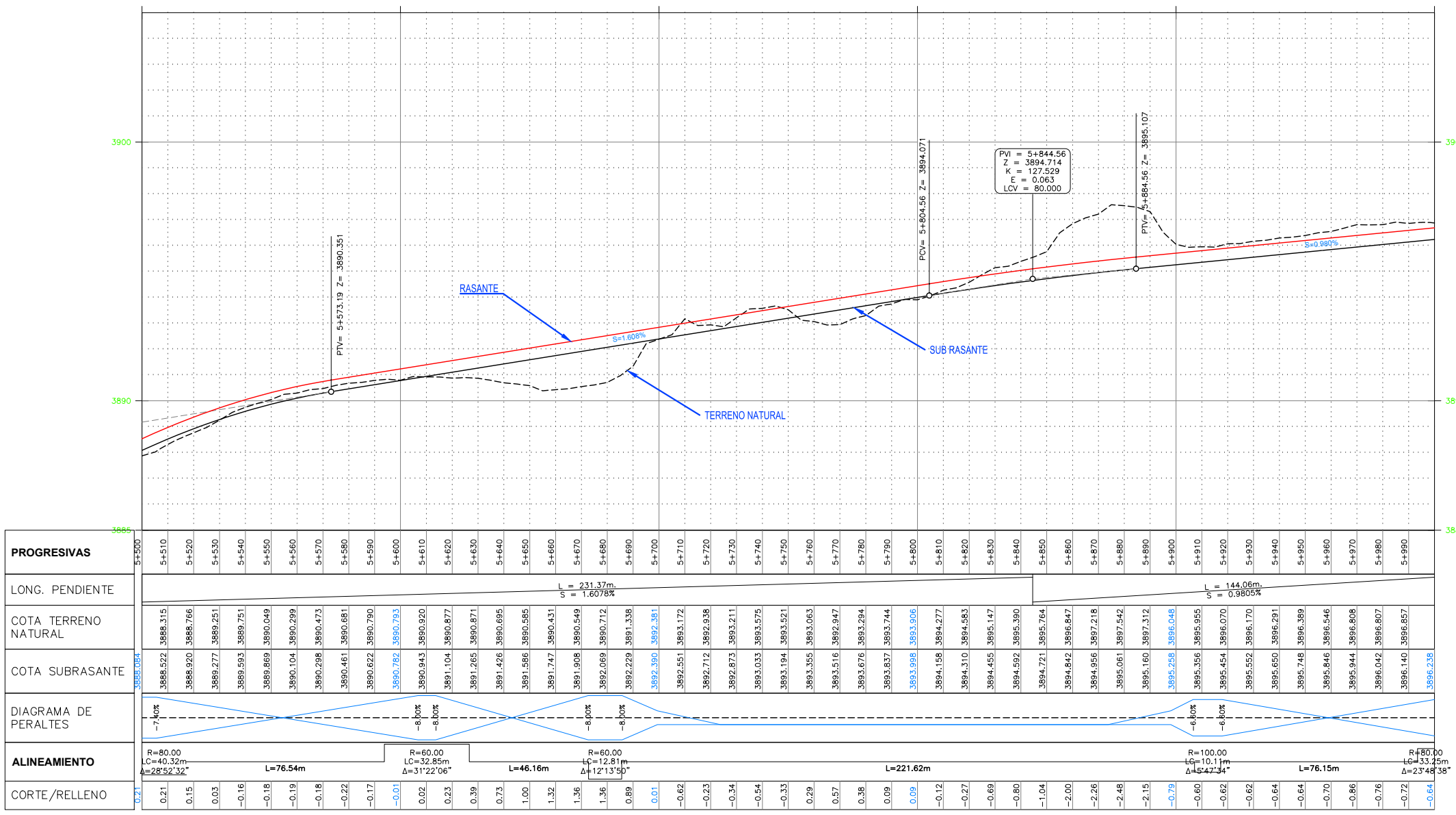
ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



ELEMENTOS DE CURVA CIRCULAR



VISTA EN PLANTA
Esc. 1/1,000

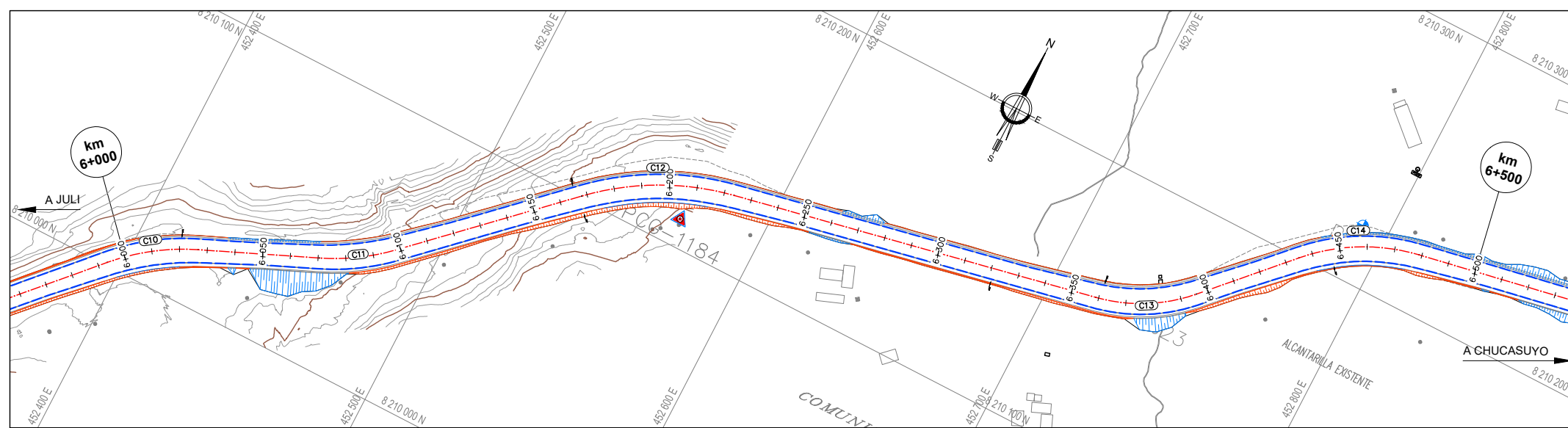


VISTA EN PERFIL
Esc. 1/1,000

LEYENDA

- PLANTA :**
- CURVA MAESTRA
 - CURVA SECUNDARIA
 - COTA DE CURVAS
 - EJE DE VIA
 - RIOS
 - QUEBRADAS
 - BORDE DE VIA
 - PIRCA DE PIEDRA
 - CASA
 - VEREDAS
 - PARED DE ADOBE
 - CANAL PROYECTADO
 - PERFIL TERRENO NATURAL
 - PERFIL SUBRASANTE
 - PUNTOS DE INTERECCION
 - ALCANTARILLA
 - ALCANTARILLA EXISTENTE
 - LIMITE DE CORTE
 - LIMITE DE RELLENO
 - TERRENO DE CULTIVO
 - POSTE DE MEDIA TENSION
 - POSTE DE ALUMBRADO
 - POSTE DE TELEFONO
 - CERCO
- PERFIL :**
- SUB RASANTE
 - TERRENO EXISTENTE

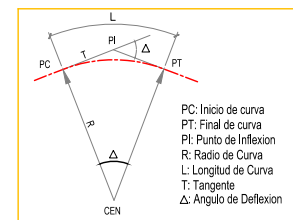
NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



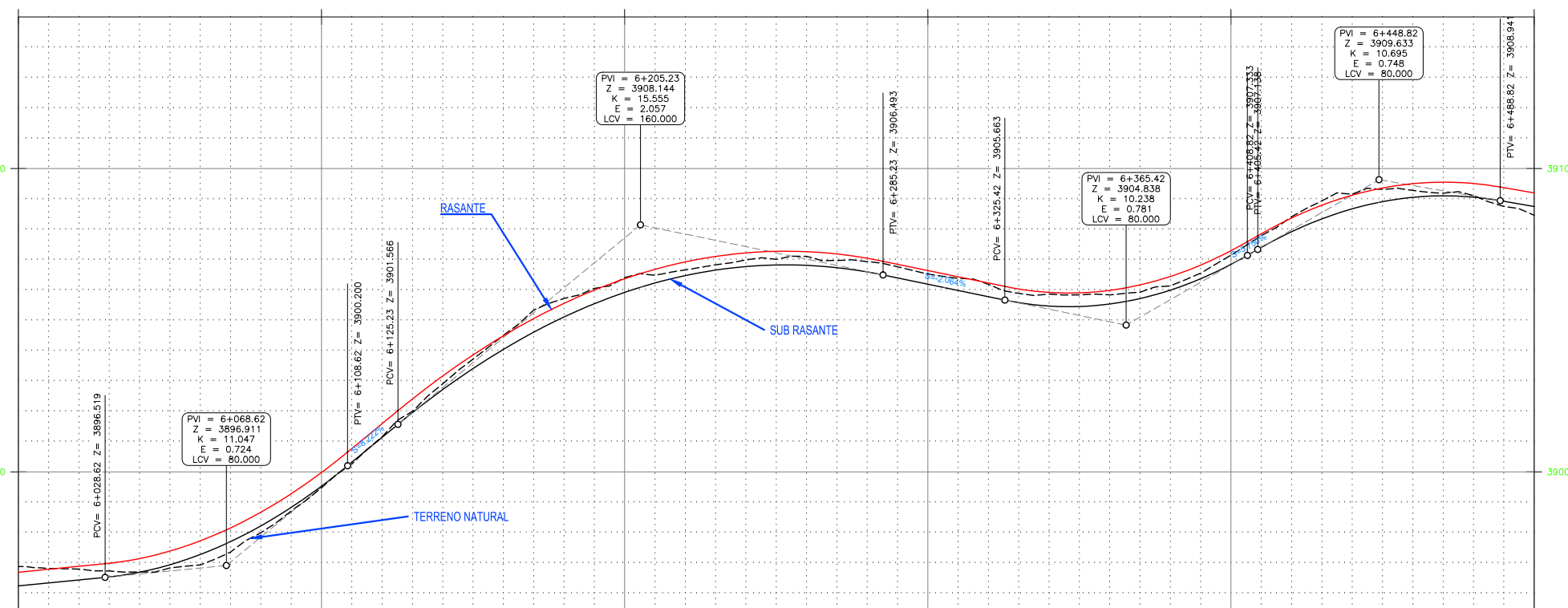
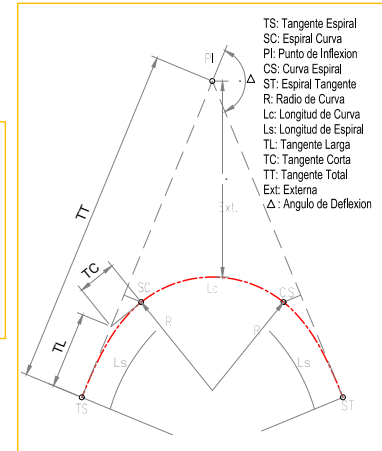
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C10	23°48'38"	16.866	80,000	33.246	1.759	5+993.451	6+010.317	6+026.697	452406.347	8210013.585
C11	20°05'57"	14.178	80,000	28.064	1.247	6+070.536	6+084.714	6+098.600	452475.049	8210043.379
C12	31°54'53"	28.594	100,000	55.702	4.008	6+168.020	6+196.614	6+223.721	452556.370	8210120.668
C13	35°12'25"	19.037	60,000	36.869	2.948	6+358.979	6+378.016	6+395.847	452735.505	8210157.534
C14	36°01'46"	22.764	70,000	44.018	3.608	6+434.955	6+457.719	6+478.973	452790.853	8210216.549
C15	25°52'03"	68.895	300,000	135.442	7.809	6+705.669	6+774.565	6+841.111	453103.563	8210276.241

ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



PROGRESIVAS	LONG. PENDIENTE	COTA TERRENO NATURAL	COTA SUBRASANTE	DIAGRAMA DE PERALTES	ALINEAMIENTO	CORTE/RELLENO
6+000		3896.735	3896.735	-7.00%	R=80.00 LC=33.25m Δ=23°48'38"	-0.34
6+010		3896.814	3896.814	-7.00%		-0.48
6+020		3896.792	3896.792	-7.00%		-0.36
6+030		3896.729	3896.729	-7.00%		-0.20
6+040		3896.698	3896.698	-7.00%		-0.01
6+050		3896.630	3896.630	-7.00%		0.11
6+060		3896.930	3897.272	-7.00%		0.34
6+070		3897.354	3897.700	-7.00%		0.35
6+080		3897.989	3898.218	-7.00%		0.23
6+090		3898.706	3898.826	-7.00%		0.12
6+100		3899.473	3899.525	-6.00%		0.05
6+110		3900.255	3900.314	-6.00%		0.06
6+120		3901.153	3901.136	-6.00%		-0.02
6+130		3901.990	3901.951	-6.00%		-0.04
6+140		3902.900	3902.710	-6.00%		-0.19
6+150		3903.720	3903.405	-6.00%		-0.31
6+160		3904.504	3904.036	-6.00%		-0.47
6+170		3905.332	3904.603	-6.00%		-0.73
6+180		3906.171	3905.105	-6.00%		-0.61
6+190		3907.009	3905.543	-6.00%		-0.51
6+200		3907.826	3905.917	-6.00%		-0.49
6+210		3908.684	3906.226	-6.00%		-0.26
6+220		3909.568	3906.471	-6.00%		-0.19
6+230		3910.468	3906.652	-6.00%		-0.17
6+240		3911.384	3906.769	-6.00%		-0.22
6+250		3912.316	3906.821	-6.00%		-0.19
6+260		3913.264	3906.809	-6.00%		-0.30
6+270		3914.228	3906.732	-6.00%		-0.24
6+280		3915.208	3906.592	-6.00%		-0.34
6+290		3916.204	3906.394	-6.00%		-0.37
6+300		3917.216	3906.188	-6.00%		-0.34
6+310		3918.244	3905.981	-6.00%		-0.40
6+320		3919.288	3905.775	-6.00%		-0.41
6+330		3920.348	3905.579	-6.00%		-0.31
6+340		3921.424	3905.466	-6.00%		-0.39
6+350		3922.516	3905.451	-6.00%		-0.38
6+360		3923.624	3905.533	-6.00%		-0.30
6+370		3924.748	3905.714	-6.00%		-0.21
6+380		3925.888	3905.892	-6.00%		-0.14
6+390		3927.044	3906.067	-6.00%		-0.18
6+400		3928.216	3906.240	-6.00%		-0.30
6+410		3929.404	3906.400	-6.00%		-0.39
6+420		3930.608	3906.549	-6.00%		-0.49
6+430		3931.828	3906.687	-6.00%		-0.59
6+440		3933.064	3906.814	-6.00%		-0.49
6+450		3934.316	3906.929	-6.00%		-0.40
6+460		3935.584	3907.022	-6.00%		-0.23
6+470		3936.868	3907.093	-6.00%		-0.09
6+480		3938.168	3907.143	-6.00%		-0.05
6+490		3939.484	3907.181	-6.00%		0.17
6+500		3940.816	3907.208	-6.00%		0.29

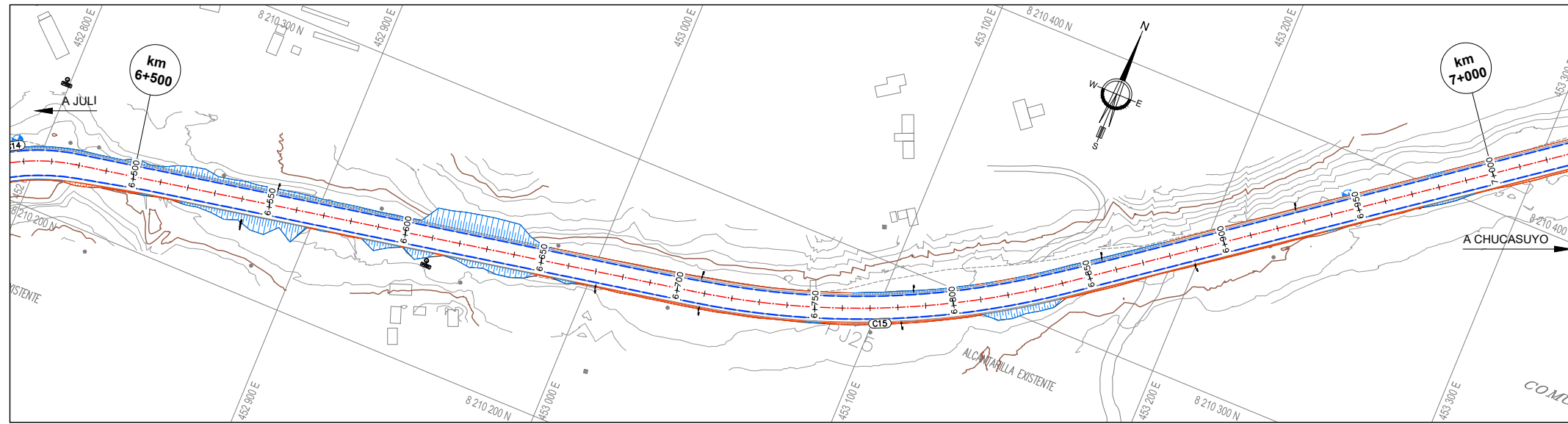
LEYENDA

PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERECCION	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	

PERFIL :	
SUBRASANTE	
TERRENO EXISTENTE	

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.

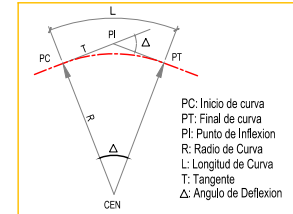
VISTA EN PERFIL
Esc. 1/1,000



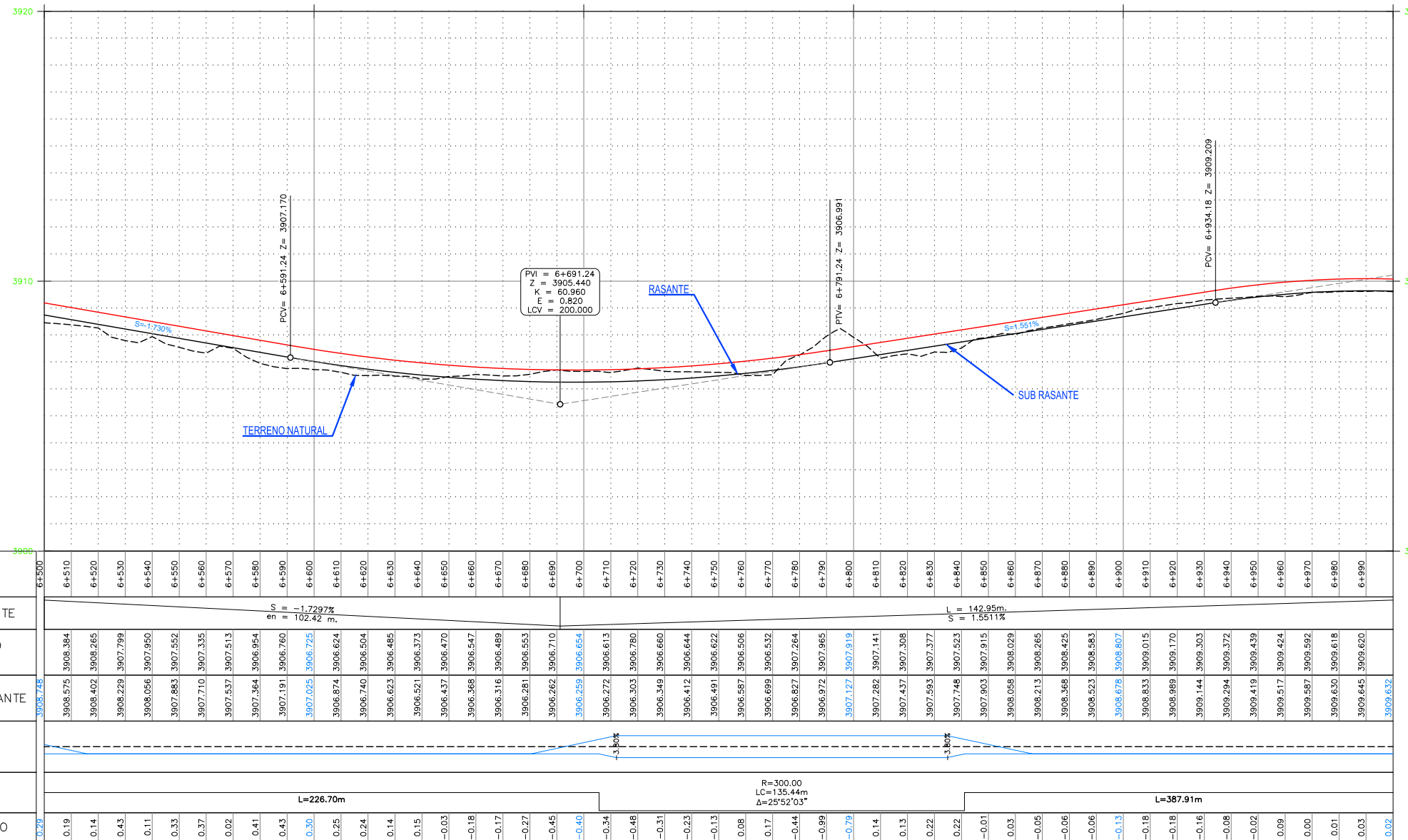
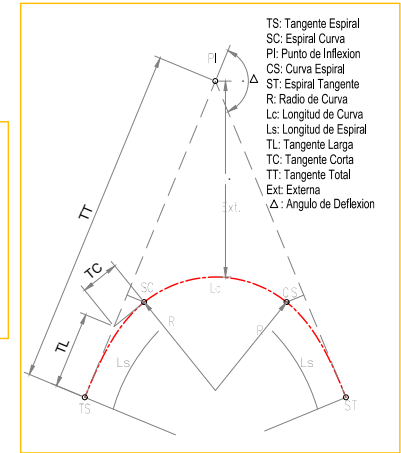
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C13	35°12'25"	19.037	60.000	36.869	2.948	6+358.979	6+378.016	6+395.847	452735.505	8210157.534
C14	36°01'46"	22.764	70.000	44.018	3.608	6+434.955	6+457.719	6+478.973	452790.853	8210216.549
C15	25°52'03"	68.895	300.000	135.442	7.809	6+705.669	6+774.565	6+841.111	453103.563	8210276.241
C16	18°55'21"	19.998	120.000	39.631	1.655	7+229.026	7+249.024	7+268.657	453485.983	8210561.022
C17	30°05'22"	40.318	150.000	78.774	5.324	7+351.054	7+391.372	7+429.828	453621.901	8210604.534

ELEMENTOS DE CURVA CIRCULAR



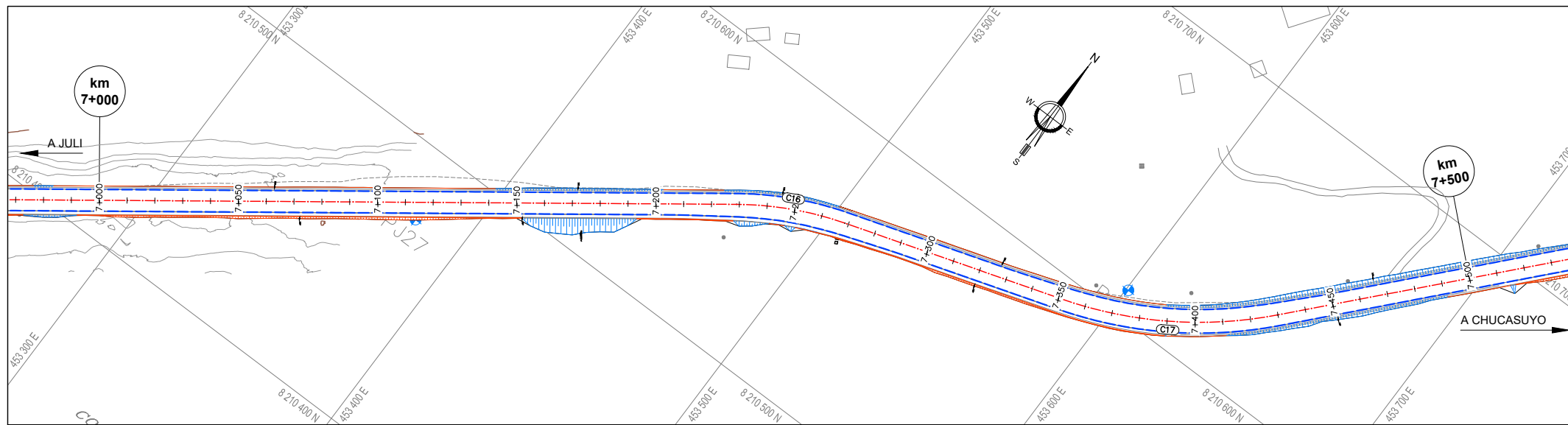
ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



PROGRESIVAS	LONG. PENDIENTE	COTA TERRENO NATURAL	COTA SUBRASANTE	DIAGRAMA DE PERALTES	ALINEAMIENTO	CORTE/RELLENO
6+500		3905.748	3905.748			0.29
6+510		3906.384	3906.575			0.19
6+520		3908.265	3908.402			0.14
6+530		3907.799	3908.229			0.43
6+540		3907.990	3908.056			0.11
6+550		3907.552	3907.883			0.33
6+560		3907.335	3907.710			0.37
6+570		3907.513	3907.537			0.02
6+580		3906.954	3907.364			0.41
6+590		3906.760	3907.191			0.43
6+600		3906.725	3907.025			0.30
6+610		3906.624	3906.874			0.25
6+620		3906.504	3906.740			0.24
6+630		3906.485	3906.623			0.14
6+640		3906.373	3906.521			0.15
6+650		3906.470	3906.437			-0.03
6+660		3906.547	3906.368			-0.18
6+670		3906.489	3906.316			-0.17
6+680		3906.553	3906.281			-0.27
6+690		3906.710	3906.262			-0.45
6+700		3906.654	3906.259			-0.40
6+710		3906.613	3906.272			-0.34
6+720		3906.780	3906.303			-0.48
6+730		3906.660	3906.349			-0.31
6+740		3906.644	3906.412			-0.23
6+750		3906.622	3906.491			-0.13
6+760		3906.506	3906.587			0.08
6+770		3906.532	3906.699			0.17
6+780		3907.264	3906.827			-0.44
6+790		3907.965	3906.972			-0.89
6+800		3907.919	3907.127			-0.79
6+810		3907.141	3907.282			0.14
6+820		3907.308	3907.437			0.13
6+830		3907.377	3907.593			0.22
6+840		3907.523	3907.748			0.22
6+850		3907.915	3907.903			-0.01
6+860		3908.029	3908.058			0.03
6+870		3908.265	3908.213			-0.05
6+880		3908.425	3908.368			-0.06
6+890		3908.583	3908.523			-0.06
6+900		3908.807	3908.678			-0.13
6+910		3909.015	3908.833			-0.18
6+920		3909.170	3908.989			-0.18
6+930		3909.303	3909.144			-0.16
6+940		3909.372	3909.294			-0.08
6+950		3909.439	3909.419			-0.02
6+960		3909.424	3909.517			0.09
6+970		3909.592	3909.587			0.00
6+980		3909.618	3909.630			0.01
6+990		3909.620	3909.645			0.03

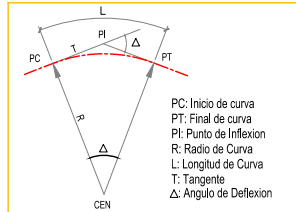
LEYENDA	
PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERSECCIÓN	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	
PERFIL :	
	SUB RASANTE
	TERRENO EXISTENTE

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.

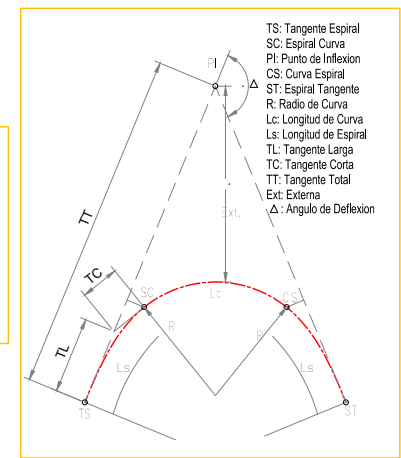


CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C16	18°55'21"	19.998	120,000	39.631	1.655	7+229.026	7+249.024	7+268.657	453485.983	8210561.022
C17	30°05'22"	40.318	150,000	78.774	5.324	7+351.054	7+391.372	7+429.828	453621.901	8210604.534
C18	38°44'48"	28.131	80,000	54.100	4.802	7+608.935	7+637.065	7+663.035	453788.056	8210788.044
C19	36°29'43"	32.970	100,000	63.696	5.295	7+779.878	7+812.848	7+843.574	453963.762	8210816.172
C20	25°52'13"	22.968	100,000	45.152	2.604	7+917.530	7+940.498	7+962.682	454054.660	8210908.962

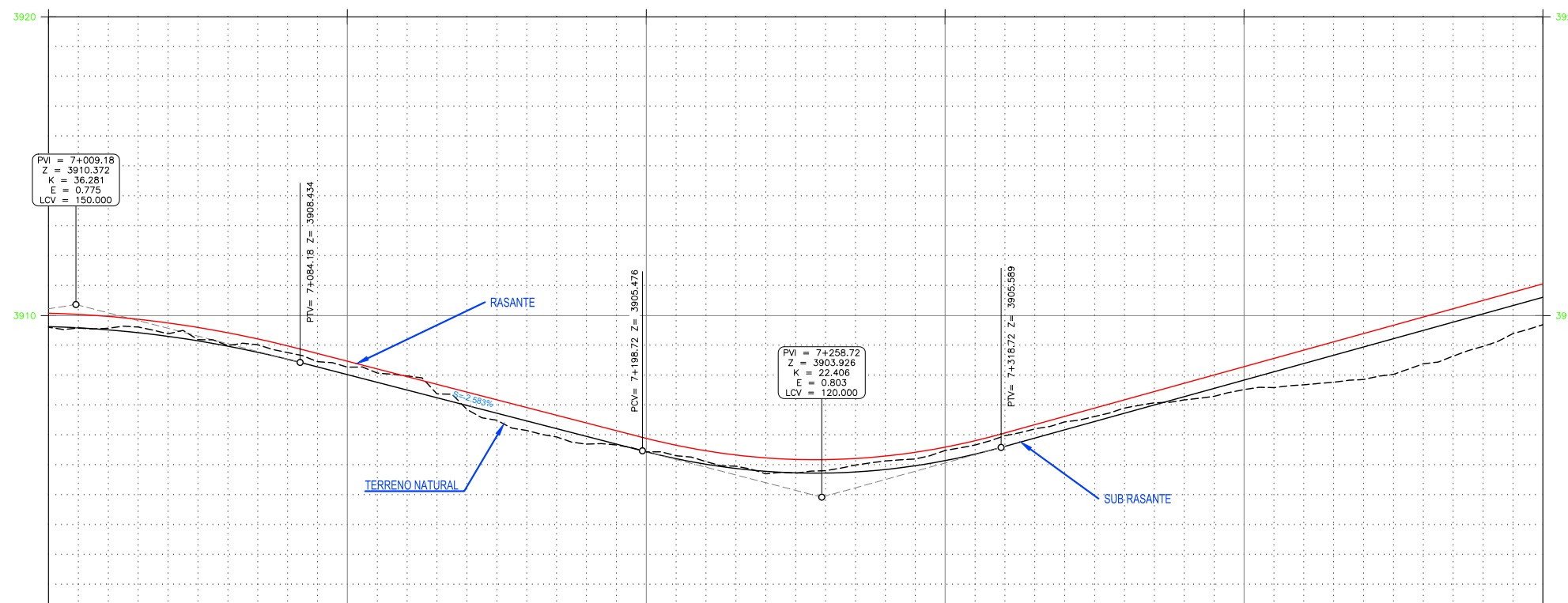
ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



VISTA EN PLANTA
Esc. 1/1,000



LEYENDA

PLANTA :

- CURVA MAESTRA
- CURVA SECUNDARIA
- COTA DE CURVAS
- EJE DE VIA
- RIOS
- QUEBRADAS
- BORDE DE VIA
- PIRCA DE PIEDRA
- CASA
- VEREDAS
- PARED DE ADOBE
- CANAL PROYECTADO
- PERFIL TERRENO NATURAL
- PERFIL SUBRASANTE
- PUNTOS DE INTERECCION
- ALCANTARILLA
- ALCANTARILLA EXISTENTE
- LIMITE DE CORTE
- LIMITE DE RELLENO
- TERRENO DE CULTIVO
- POSTE DE MEDIA TENSION
- POSTE DE ALUMBRADO
- POSTE DE TELEFONO
- CERCO

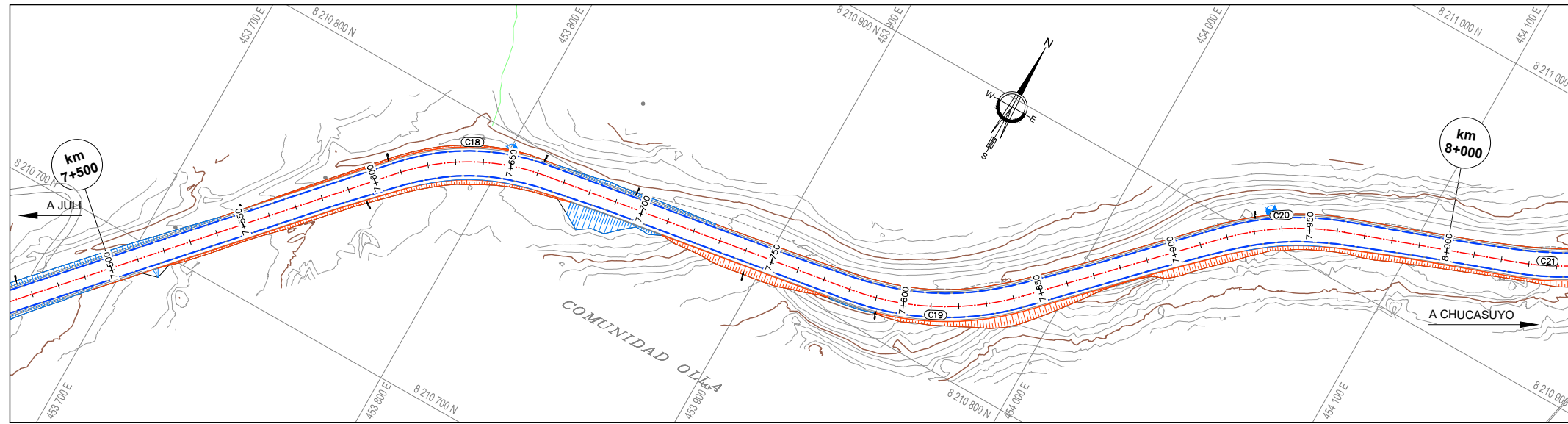
PERFIL :

- SUB RASANTE
- TERRENO EXISTENTE

NOTA:
1- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA
A-3 CONSIDERAR EL DOBLE.

PROGRESIVAS	7+000	7+010	7+020	7+030	7+040	7+050	7+060	7+070	7+080	7+090	7+100	7+110	7+120	7+130	7+140	7+150	7+160	7+170	7+180	7+190	7+200	7+210	7+220	7+230	7+240	7+250	7+260	7+270	7+280	7+290	7+300	7+310	7+320	7+330	7+340	7+350	7+360	7+370	7+380	7+390	7+400	7+410	7+420	7+430	7+440	7+450	7+460	7+470	7+480	7+490	7+500			
COTA TERRENO NATURAL	3909.584	3909.584	3909.579	3909.618	3909.389	3909.198	3909.000	3909.025	3908.765	3908.461	3908.276	3907.768	3907.984	3907.379	3906.861	3906.498	3906.157	3905.941	3905.698	3905.670	3905.440	3905.310	3905.112	3904.961	3904.789	3904.705	3904.727	3904.812	3905.000	3905.137	3905.200	3905.487	3905.670	3905.882	3906.210	3906.443	3906.625	3906.906	3907.081	3907.181	3907.301	3907.527	3907.590	3907.686	3907.770	3907.862	3908.034	3908.389	3908.645	3910.060	3908.970	3910.338	3909.399	3910.615
COTA SUBRASANTE	3909.584	3909.584	3909.579	3909.618	3909.389	3909.198	3909.000	3909.025	3908.765	3908.461	3908.276	3907.768	3907.984	3907.379	3906.861	3906.498	3906.157	3905.941	3905.698	3905.670	3905.440	3905.310	3905.112	3904.961	3904.789	3904.705	3904.727	3904.812	3905.000	3905.137	3905.200	3905.487	3905.670	3905.882	3906.210	3906.443	3906.625	3906.906	3907.081	3907.181	3907.301	3907.527	3907.590	3907.686	3907.770	3907.862	3908.034	3908.389	3908.645	3910.060	3908.970	3910.338	3909.399	3910.615

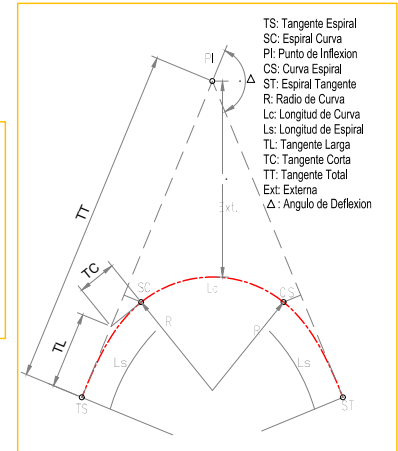
VISTA EN PERFIL
Esc. 1/1,000



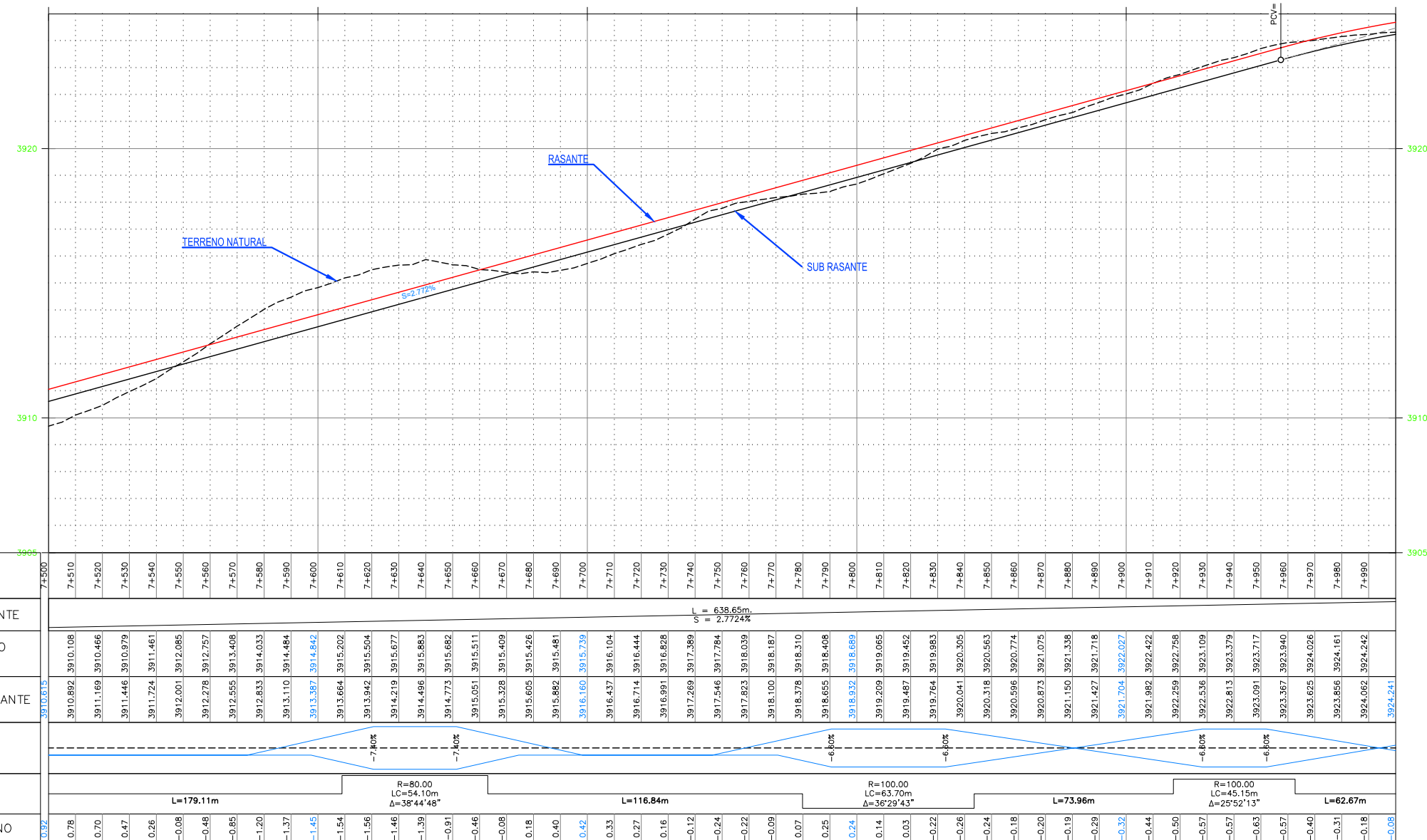
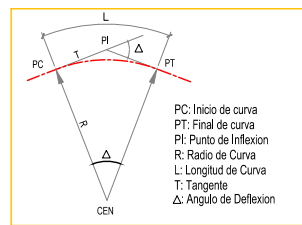
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.L.	P.T.	ESTE	NORTE
C18	38°44'48"	28.131	80.000	54.100	4.802	7+608.935	7+637.065	7+663.035	453786.056	8210788.044
C19	36°29'43"	32.970	100.000	63.696	5.295	7+779.878	7+812.848	7+843.574	453963.762	8210816.172
C20	25°52'13"	22.968	100.000	45.152	2.604	7+917.530	7+940.498	7+962.682	454054.660	8210908.962
C21	12°58'15"	11.368	100.000	22.639	0.644	8+025.352	8+036.720	8+047.991	454145.977	8210941.693
C22	7°34'58"	13.254	200.000	26.468	0.439	8+121.282	8+134.536	8+147.751	454228.380	8210994.577

ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



ELEMENTOS DE CURVA CIRCULAR



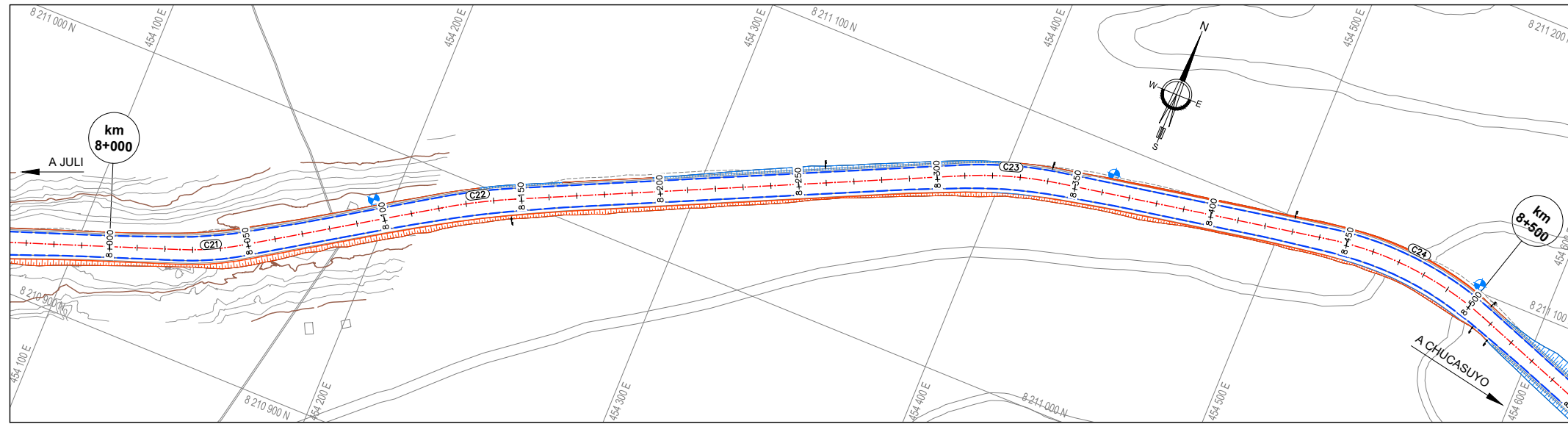
PROGRESIVAS	7+500	7+510	7+520	7+530	7+540	7+550	7+560	7+570	7+580	7+590	7+600	7+610	7+620	7+630	7+640	7+650	7+660	7+670	7+680	7+690	7+700	7+710	7+720	7+730	7+740	7+750	7+760	7+770	7+780	7+790	7+800	7+810	7+820	7+830	7+840	7+850	7+860	7+870	7+880	7+890	7+900	7+910	7+920	7+930	7+940	7+950	7+960	7+970	7+980	7+990																																																	
LONG. PENDIENTE																																		S = 2.7724%																																																																	
COTA TERRENO NATURAL	3910.892	3910.108	3911.169	3910.466	3911.446	3910.979	3911.724	3911.461	3912.001	3912.085	3912.278	3912.757	3912.555	3913.408	3912.833	3914.033	3913.110	3914.484	3913.397	3914.842	3913.664	3915.202	3913.942	3915.504	3914.219	3915.677	3914.496	3915.883	3914.773	3915.682	3915.051	3915.511	3915.328	3915.409	3915.605	3915.426	3915.882	3915.481	3916.160	3915.739	3916.437	3916.104	3916.714	3916.444	3916.991	3916.828	3917.289	3917.389	3917.546	3917.784	3917.823	3918.039	3918.100	3918.187	3918.378	3918.310	3918.655	3918.408	3919.332	3918.689	3919.209	3919.065	3919.487	3919.452	3919.764	3919.983	3920.041	3920.305	3920.318	3920.563	3920.596	3920.774	3920.873	3921.075	3921.150	3921.338	3921.427	3921.718	3921.704	3922.027	3921.982	3922.422	3922.259	3922.758	3922.536	3923.109	3922.813	3923.379	3923.091	3923.717	3923.367	3923.940	3923.625	3924.026	3923.856	3924.151	3924.062	3924.242	3924.241
COTA SUBRASANTE	3910.815	3910.115	3911.169	3910.466	3911.446	3910.979	3911.724	3911.461	3912.001	3912.085	3912.278	3912.757	3912.555	3913.408	3912.833	3914.033	3913.110	3914.484	3913.397	3914.842	3913.664	3915.202	3913.942	3915.504	3914.219	3915.677	3914.496	3915.883	3914.773	3915.682	3915.051	3915.511	3915.328	3915.409	3915.605	3915.426	3915.882	3915.481	3916.160	3915.739	3916.437	3916.104	3916.714	3916.444	3916.991	3916.828	3917.289	3917.389	3917.546	3917.784	3917.823	3918.039	3918.100	3918.187	3918.378	3918.310	3918.655	3918.408	3919.332	3918.689	3919.209	3919.065	3919.487	3919.452	3919.764	3919.983	3920.041	3920.305	3920.318	3920.563	3920.596	3920.774	3920.873	3921.075	3921.150	3921.338	3921.427	3921.718	3921.704	3922.027	3921.982	3922.422	3922.259	3922.758	3922.536	3923.109	3922.813	3923.379	3923.091	3923.717	3923.367	3923.940	3923.625	3924.026	3923.856	3924.151	3924.062	3924.242	3924.241
DIAGRAMA DE PERALTES	-7.40%																																																																																																		
ALINEAMIENTO	L=179.11m												R=80.00 LC=54.10m Δ=38°44'48"												L=116.84m												R=100.00 LC=63.70m Δ=36°29'43"												L=73.96m												R=100.00 LC=45.15m Δ=25°52'13"												L=62.67m																										
CORTE/RELLENO	0.92	0.78	0.70	0.47	0.26	-0.08	-0.48	-0.85	-1.20	-1.37	-1.45	-1.54	-1.56	-1.46	-1.39	-0.91	-0.46	-0.08	0.18	0.40	0.42	0.33	0.27	0.16	-0.12	-0.24	-0.22	-0.09	0.07	0.25	0.24	0.14	0.03	-0.22	-0.26	-0.24	-0.18	-0.20	-0.19	-0.29	-0.32	-0.44	-0.50	-0.57	-0.57	-0.63	-0.57	-0.40	-0.31	-0.18	-0.08																																																

LEYENDA

PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERECCION	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	
PERFIL :	
SUB RASANTE	
TERRENO EXISTENTE	

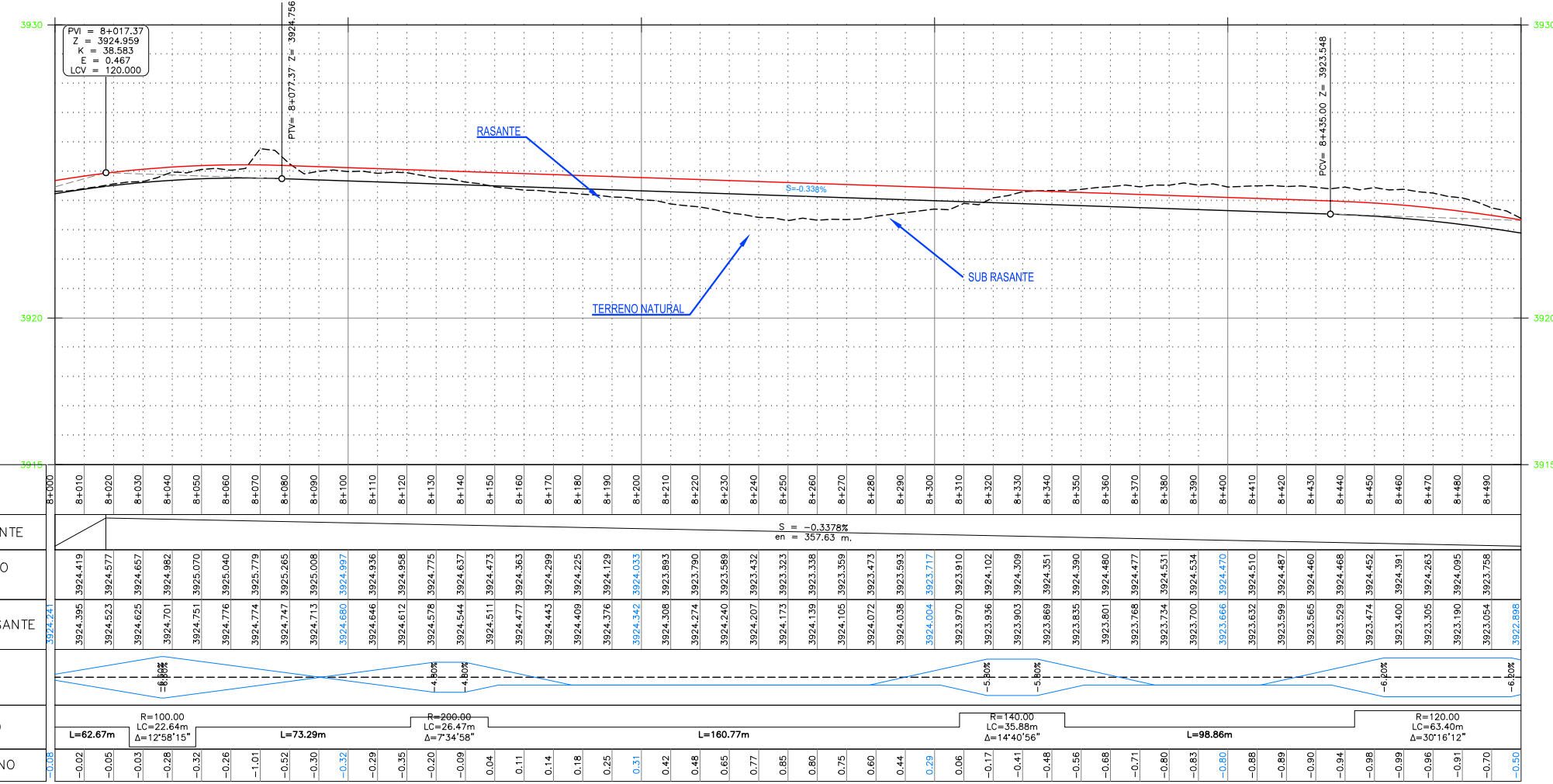
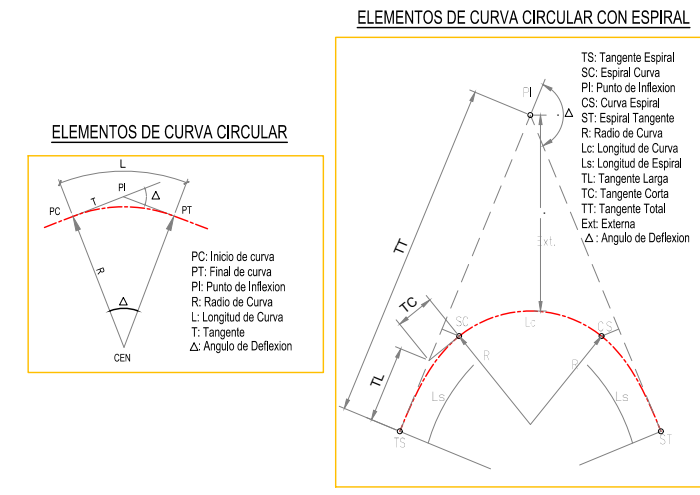
NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.

VISTA EN PERFIL
Esc. 1/1,000



VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.L.	P.T.	ESTE	NORTE
C21	12°58'15"	11.368	100.000	22.639	0.644	8+025.352	8+036.720	8+047.991	454145.977	8210941.693
C22	7°34'58"	13.254	200.000	26.468	0.439	8+121.282	8+134.536	8+147.751	454228.380	8210994.577
C23	14°40'56"	18.037	140.000	35.875	1.157	8+308.521	8+326.557	8+344.396	454402.293	8211076.073
C24	30°16'12"	32.457	120.000	63.397	4.312	8+443.257	8+475.714	8+506.654	454549.181	8211103.101
C25	101°26'28"	116.152	95.000	168.196	55.055	8+647.731	8+763.883	8+815.927	454821.666	8211004.763



VISTA EN PERFIL
Esc. 1/1,000

LEYENDA	
PLANTA :	
CURVA MAESTRA	—
CURVA SECUNDARIA	—
COTA DE CURVAS	1:400
EJE DE VIA	—
RIOS	—
QUEBRADAS	—
BORDE DE VIA	—
PIRCA DE PIEDRA	—
CASA	□
VEREDAS	▨
PARED DE ADOBE	—
CANAL PROYECTADO	—
PERFIL TERRENO NATURAL	—
PERFIL SUBRASANTE	—
PUNTOS DE INTERSECCION	(C01)
ALCANTARILLA	—
ALCANTARILLA EXISTENTE	—
LIMITE DE CORTE	—
LIMITE DE RELLENO	—
TERRENO DE CULTIVO	—
POSTE DE MEDIA TENSION	—
POSTE DE ALUMBRADO	—
POSTE DE TELEFONO	—
CERCO	—
PERFIL :	
SUB RASANTE	—
TERRENO EXISTENTE	—

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



UNIVERSIDAD NACIONAL DEL ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS "ESCUELA PROFECIONAL DE INGENIERIA TOPOGRAFICA Y AGRIMENSURA"

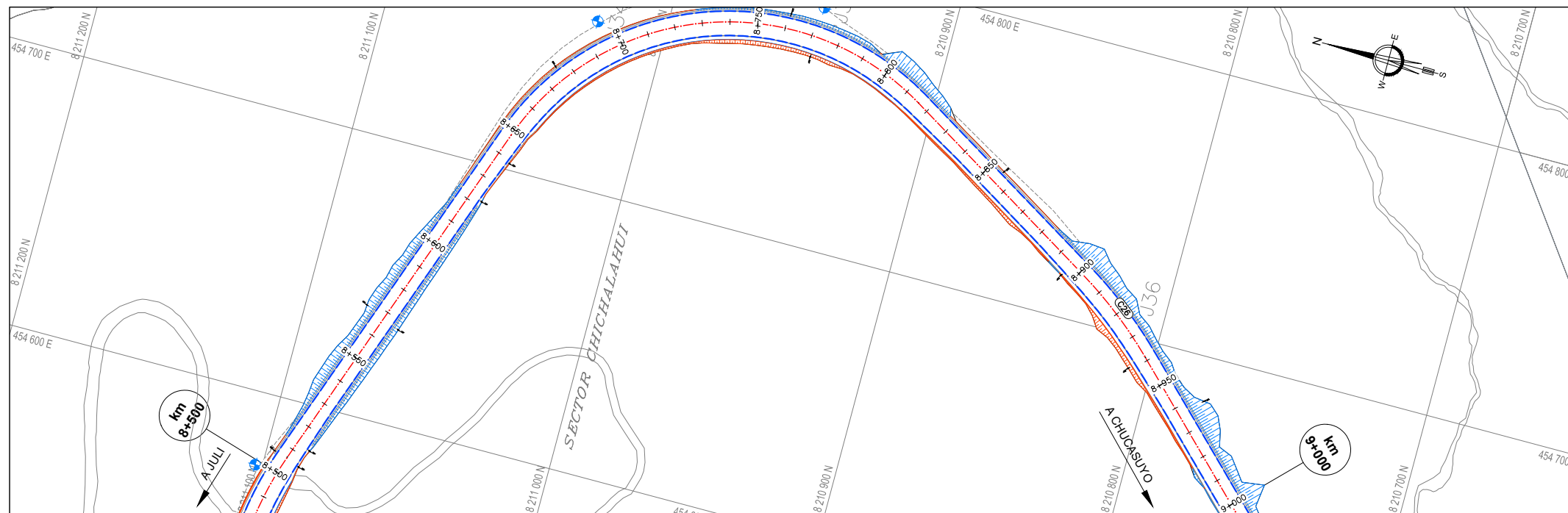


Participantes:
Presidente de Jurado : D.sc Valeriano Condori Apaza
Primer Miembro : Ing. Victor Raul Banegas Layme
Segundo Miembro : Ing. Juan Esteban Araoz Barrios
Asesor de Tesis : Ing. Arturo Joels Ventura Mamani
Testista : Bach. Javier Rolando Maquera Calle

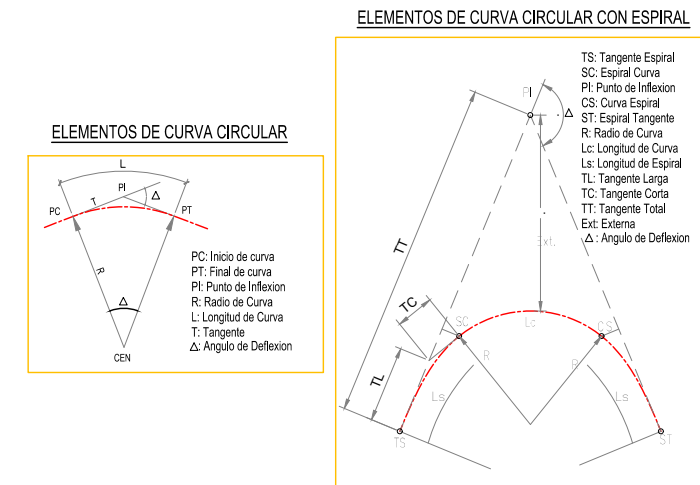
Proyecto de Tesis:
" COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA - CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
PLANTA PERFIL - DISEÑO GEOMÉTRICO
Km 8+000 - Km 8+500

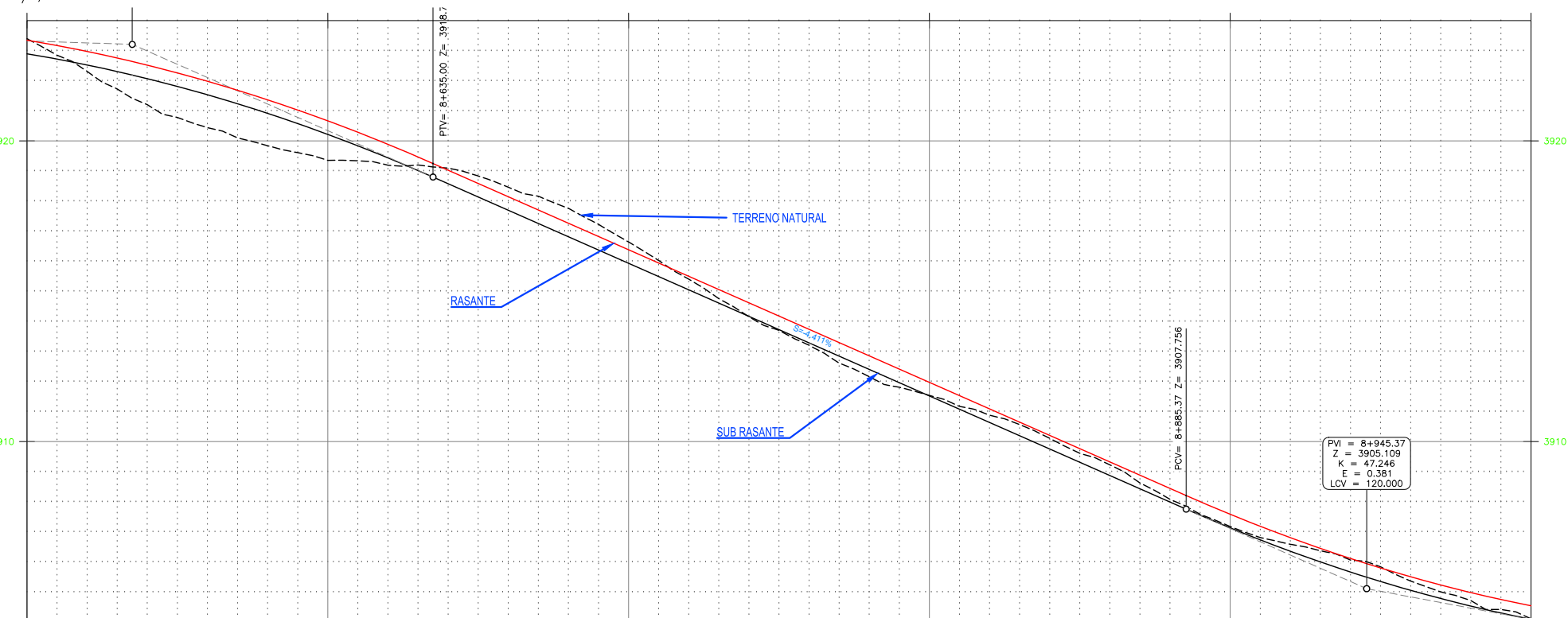
Escala: INDICADA
Fecha: Marzo 2022
Codigo: DG-PPL-007
Lamina: 07-15
REV-00



CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C23	14°40'56"	18.037	140.000	35.875	1.157	8+308.521	8+326.557	8+344.396	454402.293	8211076.073
C24	30°16'12"	32.457	120.000	63.397	4.312	8+443.257	8+475.714	8+506.654	454549.181	8211103.101
C25	101°28'28"	116.152	95.000	168.196	55.055	8+647.731	8+763.883	8+815.927	454821.666	8211004.763
C26	13°30'07"	18.940	160.000	37.704	1.117	8+901.110	8+920.049	8+938.814	454707.277	8210816.518
C27	140°11'39"	82.861	30.000	73.405	58.124	9+154.198	9+237.059	9+227.604	454483.829	8210591.402



VISTA EN PLANTA
Esc. 1/1,000

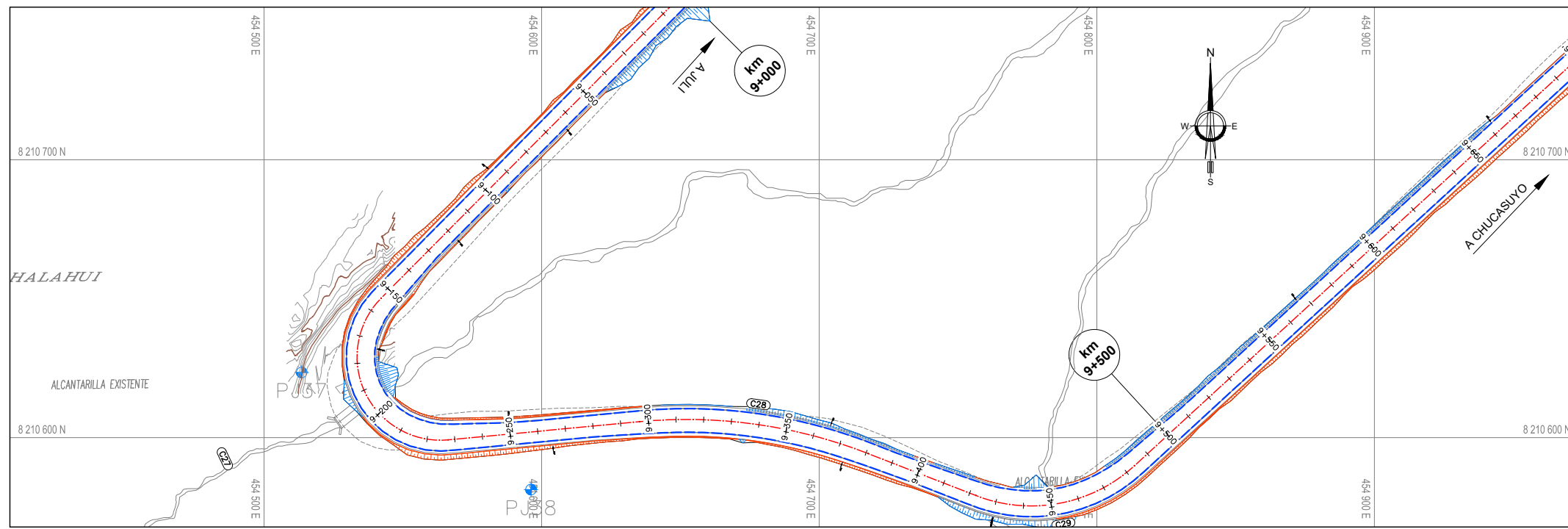


PROGRESIVAS	8+500	8+510	8+520	8+530	8+540	8+550	8+560	8+570	8+580	8+590	8+600	8+610	8+620	8+630	8+640	8+650	8+660	8+670	8+680	8+690	8+700	8+710	8+720	8+730	8+740	8+750	8+760	8+770	8+780	8+790	8+800	8+810	8+820	8+830	8+840	8+850	8+860	8+870	8+880	8+890	8+900	8+910	8+920	8+930	8+940	8+950	8+960	8+970	8+980	8+990																																																
LONG. PENDIENTE	-4.4108%																													250.37 m.																																																																				
COTA TERRENO NATURAL	3922.722	3922.850	3922.525	3922.312	3922.308	3921.729	3921.207	3921.813	3920.760	3921.535	3920.442	3921.236	3920.102	3920.917	3919.840	3920.578	3919.610	3920.218	3919.354	3919.838	3919.338	3919.436	3919.193	3919.017	3919.200	3918.579	3919.098	3918.136	3918.833	3917.697	3918.462	3917.256	3918.159	3916.815	3917.759	3916.373	3917.227	3915.932	3916.640	3915.491	3916.024	3915.050	3915.403	3914.609	3914.756	3914.168	3914.158	3913.727	3913.700	3913.286	3913.206	3912.845	3912.611	3912.404	3912.160	3911.963	3911.807	3911.522	3911.536	3911.080	3911.172	3910.639	3910.879	3910.198	3910.568	3909.737	3910.110	3909.316	3909.612	3908.875	3909.229	3908.434	3908.624	3907.993	3908.080	3907.554	3907.584	3907.133	3907.176	3906.734	3906.810	3906.355	3906.585	3905.998	3906.373	3905.662	3906.061	3905.347	3905.636	3905.054	3905.361	3904.781	3905.001	3904.530	3904.714	3904.300	3904.418	3904.090
COTA SUBRASANTE	3922.858	3922.722	3922.525	3922.312	3922.308	3921.729	3921.207	3921.813	3920.760	3921.535	3920.442	3921.236	3920.102	3920.917	3919.840	3920.578	3919.610	3920.218	3919.354	3919.838	3919.338	3919.436	3919.193	3919.017	3919.200	3918.579	3919.098	3918.136	3918.833	3917.697	3918.462	3917.256	3918.159	3916.815	3917.759	3916.373	3917.227	3915.932	3916.640	3915.491	3916.024	3915.050	3915.403	3914.609	3914.756	3914.168	3914.158	3913.727	3913.700	3913.286	3913.206	3912.845	3912.611	3912.404	3912.160	3911.963	3911.807	3911.522	3911.536	3911.080	3911.172	3910.639	3910.879	3910.198	3910.568	3909.737	3910.110	3909.316	3909.612	3908.875	3909.229	3908.434	3908.624	3907.993	3908.080	3907.554	3907.584	3907.133	3907.176	3906.734	3906.810	3906.355	3906.585	3905.998	3906.373	3905.662	3906.061	3905.347	3905.636	3905.054	3905.361	3904.781	3905.001	3904.530	3904.714	3904.300	3904.418	3904.090
DIAGRAMA DE PERALTES	-7.20%																																																																																																	
ALINEAMIENTO	R=120.00 LC=63.40m Δ=30°16'12"														R=95.00 LC=168.20m Δ=101°26'28"														R=160.00 LC=37.70m Δ=13°30'07"																																																																					
CORTE/RELLENO	-0.13	0.21	0.58	0.86	1.03	1.09	1.13	1.08	0.97	0.66	0.50	0.25	-0.18	-0.52	-0.70	-0.77	-0.90	-0.94	-0.85	-0.71	-0.53	-0.35	-0.15	0.01	0.03	0.08	0.23	0.24	0.16	-0.01	-0.09	-0.24	-0.37	-0.35	-0.30	-0.35	-0.19	-0.09	-0.03	-0.04	-0.08	-0.23	-0.37	-0.40	-0.49	-0.31	-0.22	-0.18	-0.12	-0.02																																																

VISTA EN PERFIL
Esc. 1/1,000

LEYENDA	
PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERECCION	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	
PERFIL :	
	SUB RASANTE
	TERRENO EXISTENTE

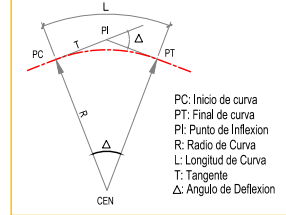
NOTA:
1- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



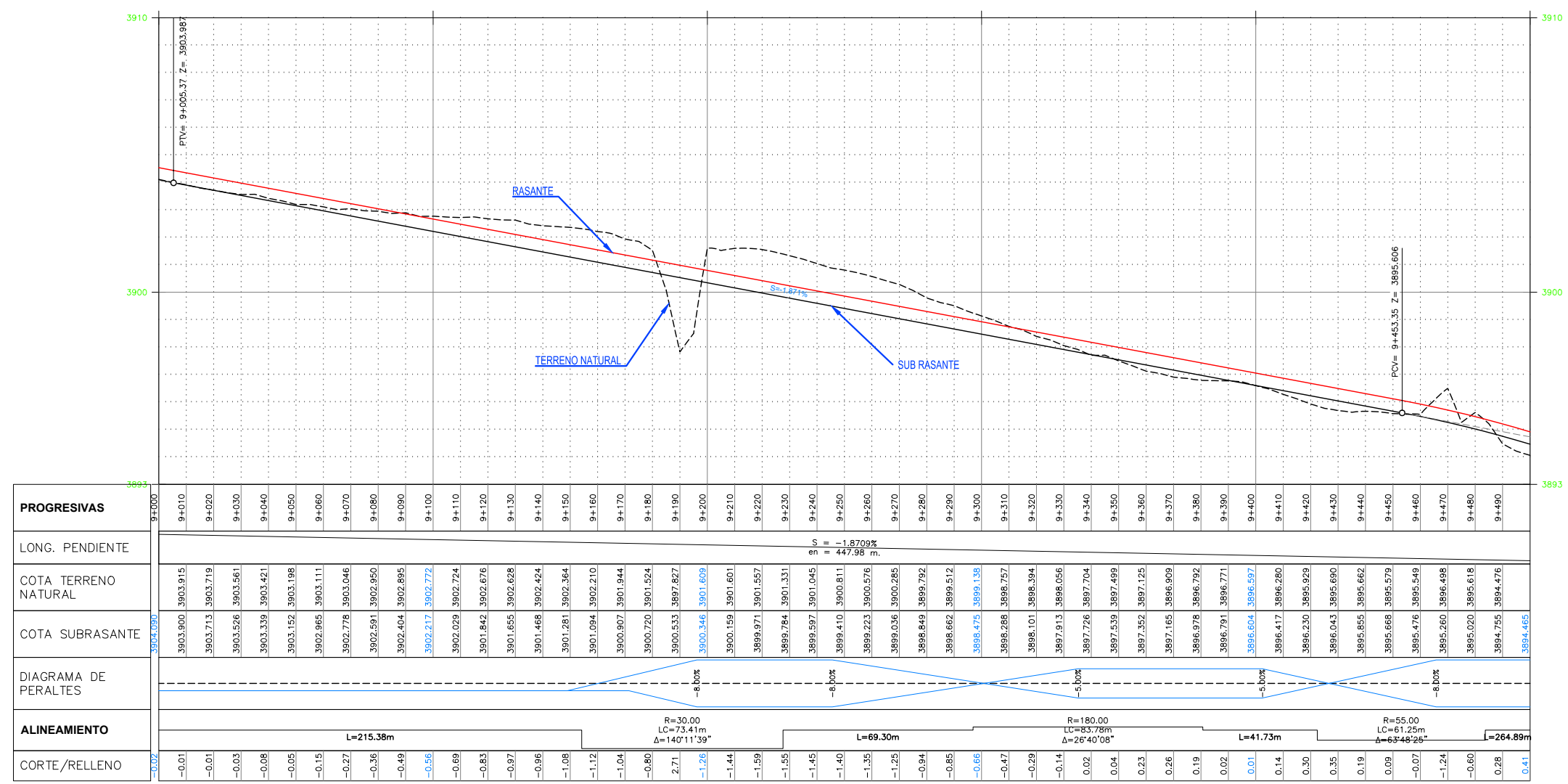
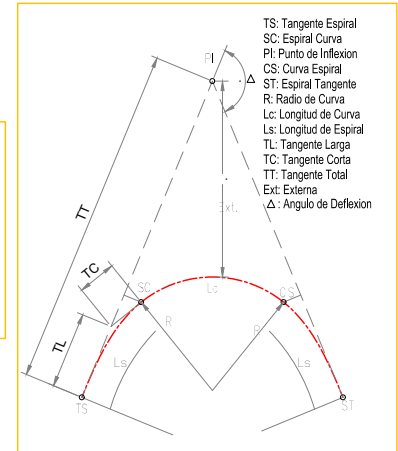
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C25	101°26'28"	116.152	95.000	168.196	55.055	8+647.731	8+763.883	8+815.927	454821.666	8211004.763
C26	13°30'07"	18.940	160.000	37.704	1.117	8+901.110	8+920.049	8+938.814	454707.277	8210816.518
C27	140°11'39"	82.861	30.000	73.405	58.124	9+154.198	9+237.059	9+227.604	454483.829	8210591.402
C28	26°40'08"	42.664	180.000	83.783	4.987	9+296.901	9+339.566	9+380.684	454677.785	8210609.760
C29	63°48'25"	34.239	55.000	61.250	9.787	9+422.418	9+456.657	9+483.668	454788.347	8210566.739

ELEMENTOS DE CURVA CIRCULAR



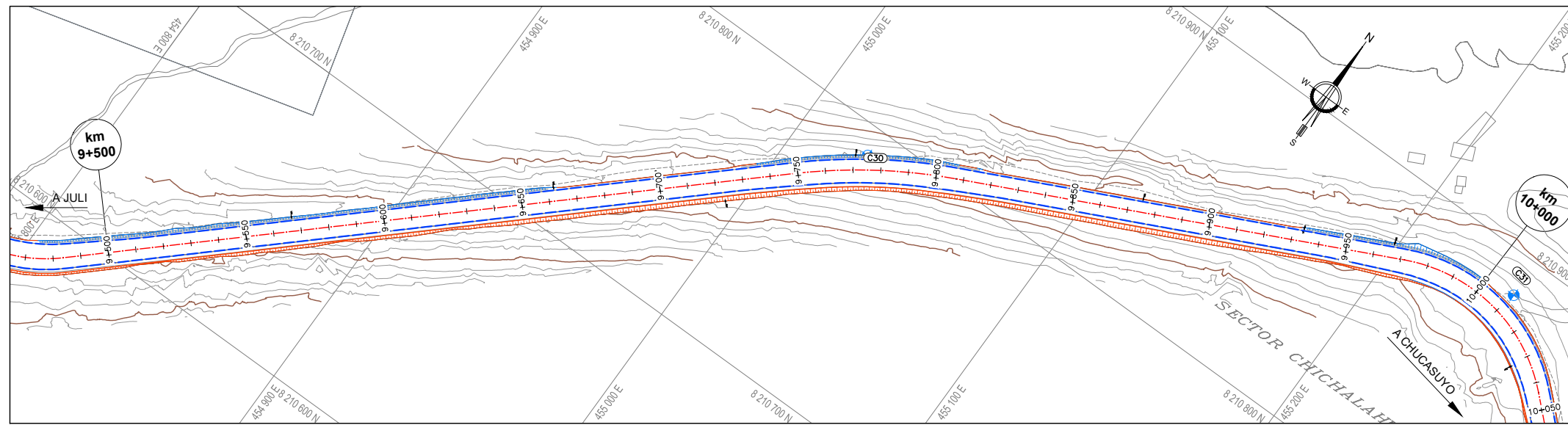
ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



VISTA EN PERFIL
Esc. 1/1,000

LEYENDA	
PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERECCION	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	
PERFIL :	
	SUB RASANTE
	TERRENO EXISTENTE

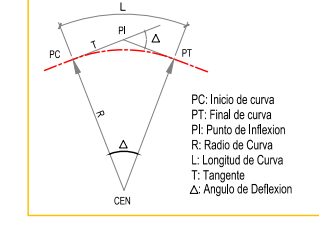
NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



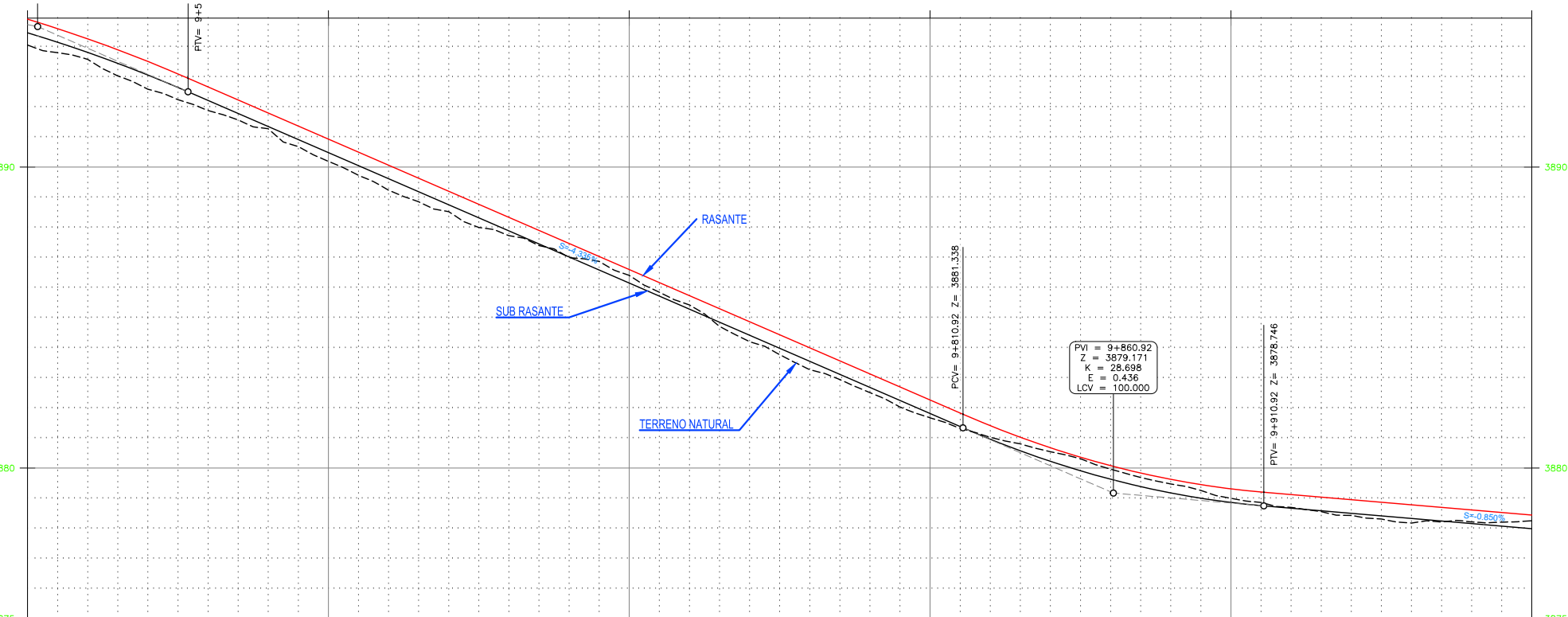
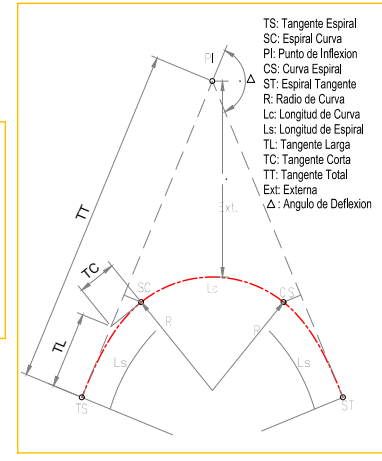
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C29	63°48'25"	34.239	55.000	61.250	9.787	9+422.418	9+456.657	9+483.668	454786.347	8210566.739
C30	16°49'39"	29.582	200.000	58.739	2.176	9+748.553	9+778.135	9+807.292	455030.519	8210789.001
C31	68°55'38"	41.181	60.000	72.180	12.773	9+971.489	10+012.670	10+043.670	455242.205	8210890.960
C32	71°22'38"	64.644	90.000	112.119	20.810	10+275.625	10+340.269	10+387.744	455488.399	8210659.693
C33	60°51'30"	32.306	55.000	58.420	8.786	10+422.497	10+454.803	10+480.917	455433.601	8210539.930
C34	29°00'44"	31.048	120.000	60.763	3.951	10+689.058	10+720.105	10+749.821	455594.220	8210321.046

VISTA EN PLANTA
Esc. 1/1,000

ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



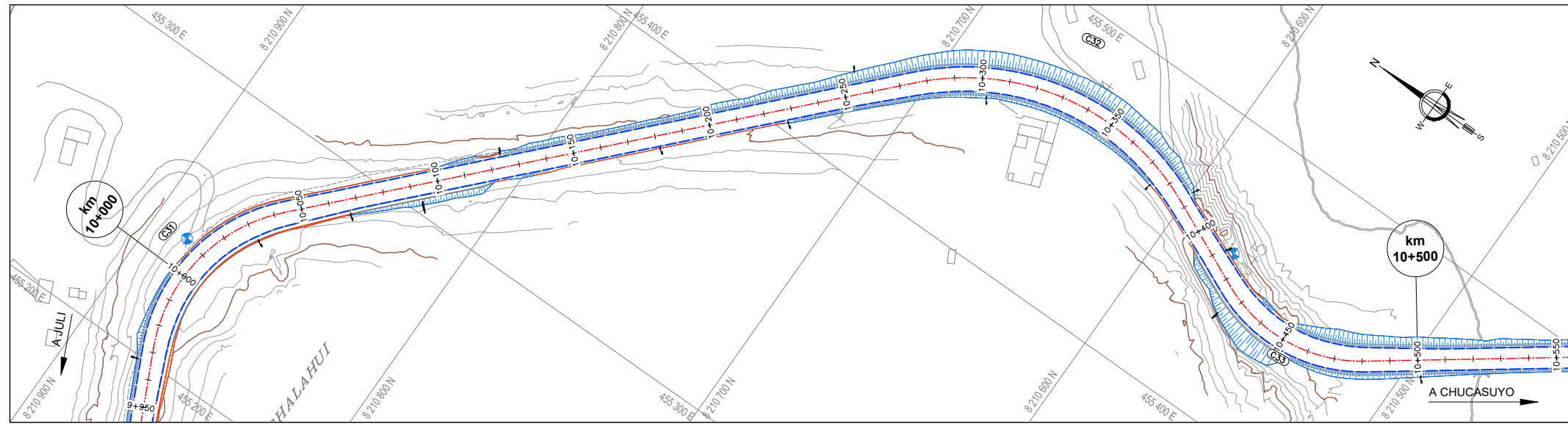
PROGRESIVAS	9+500	9+510	9+520	9+530	9+540	9+550	9+560	9+570	9+580	9+590	9+600	9+610	9+620	9+630	9+640	9+650	9+660	9+670	9+680	9+690	9+700	9+710	9+720	9+730	9+740	9+750	9+760	9+770	9+780	9+790	9+800	9+810	9+820	9+830	9+840	9+850	9+860	9+870	9+880	9+890	9+900	9+910	9+920	9+930	9+940	9+950	9+960	9+970	9+980	9+990						
LONG. PENDIENTE	S ₁ = -4.3346% S ₂ = 0.8500%																																																							
COTA TERRENO NATURAL	3894.150	3893.802	3893.579	3893.030	3892.588	3892.242	3891.880	3891.569	3891.274	3890.683	3890.191	3889.727	3889.233	3888.850	3888.521	3888.195	3887.722	3887.392	3886.995	3886.667	3886.402	3885.844	3885.423	3884.707	3884.202	3883.770	3883.271	3882.943	3882.509	3882.029	3881.672	3881.313	3881.022	3880.804	3880.545	3880.309	3879.967	3879.688	3879.473	3879.258	3878.998	3878.859	3878.695	3878.554	3878.429	3878.310	3878.175	3878.210	3878.211	3878.204	3877.989					
COTA SUBRASANTE	3893.425	3893.150	3892.811	3892.448	3892.060	3891.647	3891.215	3890.781	3890.348	3889.914	3889.481	3889.047	3888.614	3888.180	3887.747	3887.314	3886.880	3886.447	3886.013	3885.580	3885.146	3884.713	3884.279	3883.846	3883.412	3882.979	3882.545	3882.112	3881.678	3881.245	3880.811	3880.378	3879.945	3879.512	3879.079	3878.646	3878.213	3877.780	3877.347	3876.914	3876.481	3876.048	3875.615	3875.182	3874.749	3874.316	3873.883	3873.450	3873.017	3872.584	3872.151	3871.718	3871.285	3870.852	3870.419	3870.986
DIAGRAMA DE PERALTES	[Diagram showing superelevation percentages across the profile]																																																							
ALINEAMIENTO	[Diagram showing horizontal alignment curves with R=200.00, LC=56.74m, Δ=16°49'39" and R=60.00, LC=72.18m, Δ=68°55'38"]																																																							
CORTE/RELLENO	0.35	0.23	0.42	0.47	0.40	0.33	0.21	0.07	0.23	0.29	0.32	0.38	0.33	0.23	0.32	0.16	0.05	0.02	-0.29	-0.26	-0.13	-0.14	0.14	0.21	0.21	0.27	0.17	0.17	0.22	0.14	0.06	-0.06	-0.23	-0.32	-0.40	-0.34	-0.30	-0.30	-0.26	-0.14	-0.11	-0.03	0.03	0.07	0.10	0.15	0.03	-0.05	-0.13	-0.26						

LEYENDA

PLANTA :	
CURVA MAESTRA	[Symbol]
CURVA SECUNDARIA	[Symbol]
COTA DE CURVAS	[Symbol]
EJE DE VIA	[Symbol]
RIOS	[Symbol]
QUEBRADAS	[Symbol]
BORDE DE VIA	[Symbol]
PIRCA DE PIEDRA	[Symbol]
CASA	[Symbol]
VEREDAS	[Symbol]
PARED DE ADOBE	[Symbol]
CANAL PROYECTADO	[Symbol]
PERFIL TERRENO NATURAL	[Symbol]
PERFIL SUBRASANTE	[Symbol]
PUNTOS DE INTERECCION	[Symbol]
ALCANTARILLA	[Symbol]
ALCANTARILLA EXISTENTE	[Symbol]
LIMITE DE CORTE	[Symbol]
LIMITE DE RELLENO	[Symbol]
TERRENO DE CULTIVO	[Symbol]
POSTE DE MEDIA TENSION	[Symbol]
POSTE DE ALUMBRADO	[Symbol]
POSTE DE TELEFONO	[Symbol]
CERCO	[Symbol]
PERFIL :	
SUB RASANTE	[Symbol]
TERRENO EXISTENTE	[Symbol]

NOTA:
1- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.

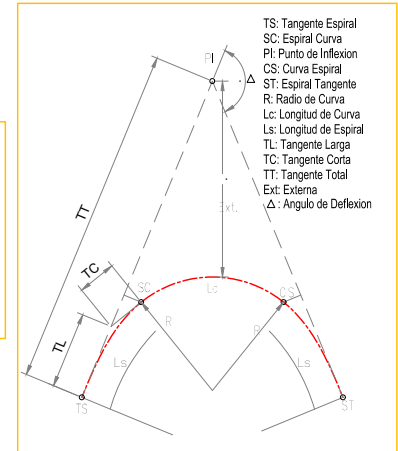
VISTA EN PERFIL
Esc. 1/1,000



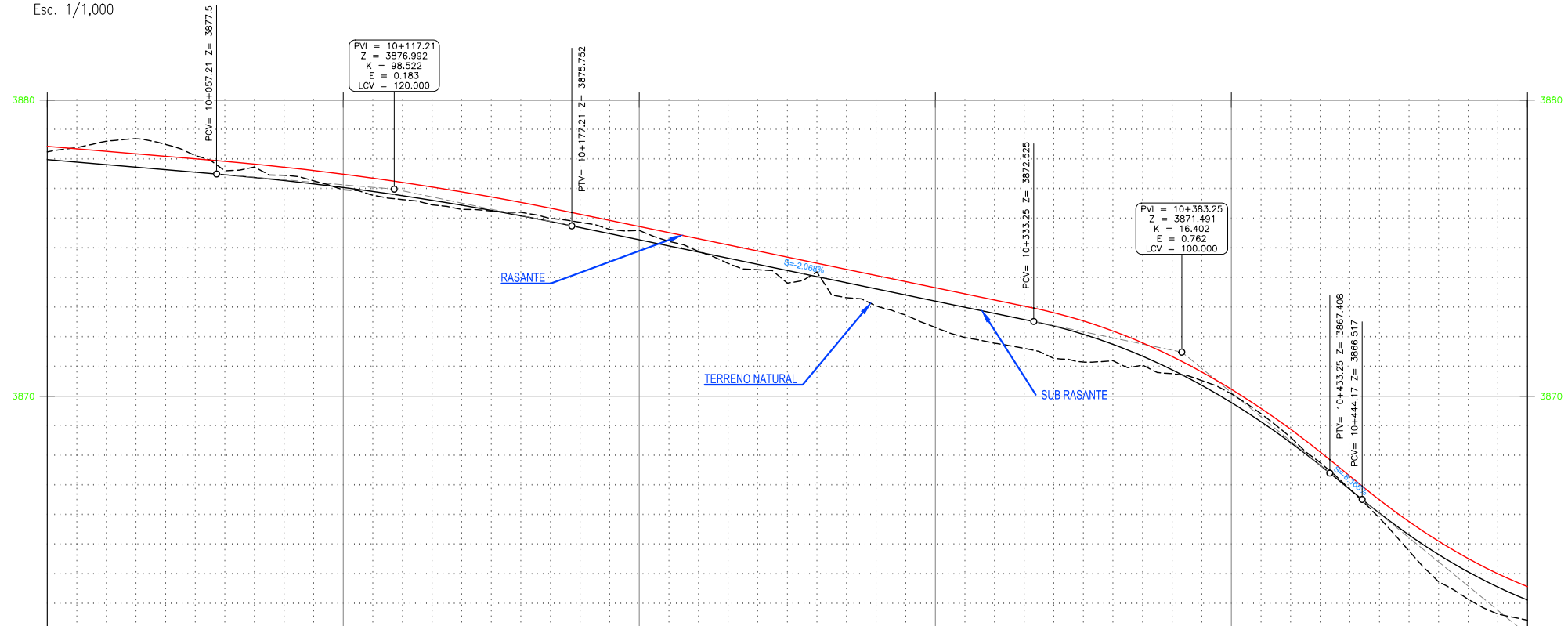
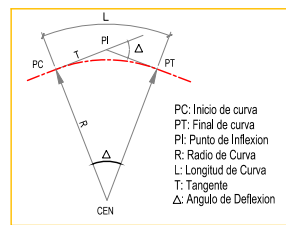
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C31	68°55'38"	41.181	60.000	72.180	12.773	9+971.489	10+012.670	10+043.670	455242.205	8210890.960
C32	71°22'38"	64.844	90.000	112.119	20.810	10+275.625	10+340.269	10+387.744	455488.399	8210659.693
C33	60°51'30"	32.306	55.000	58.420	8.786	10+422.497	10+454.803	10+480.917	455433.601	8210539.930
C34	29°00'44"	31.048	120.000	60.763	3.951	10+689.058	10+720.105	10+749.821	455594.220	8210321.046
C35	4°28'23"	7.811	200.000	15.614	0.152	11+133.230	11+141.041	11+148.843	455977.804	8210144.486

ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



ELEMENTOS DE CURVA CIRCULAR



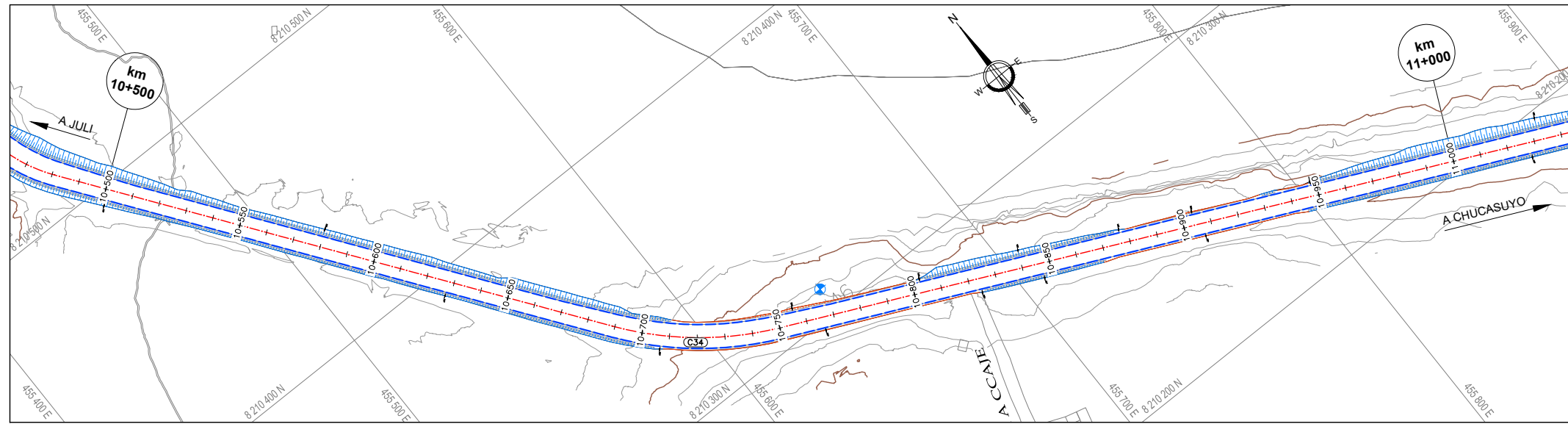
PROGRESIVAS	10+000	10+010	10+020	10+030	10+040	10+050	10+060	10+070	10+080	10+090	10+100	10+110	10+120	10+130	10+140	10+150	10+160	10+170	10+180	10+190	10+200	10+210	10+220	10+230	10+240	10+250	10+260	10+270	10+280	10+290	10+300	10+310	10+320	10+330	10+340	10+350	10+360	10+370	10+380	10+390	10+400	10+410	10+420	10+430	10+440	10+450	10+460	10+470	10+480	10+490																																																	
LONG. PENDIENTE	S = -0.8500% g = 146.29 m.														S = -2.0680% g = 156.04 m.														S = -8.1650% g = 10.92 m.																																																																						
COTA TERRENO NATURAL	3877.904	3878.392	3877.819	3878.610	3877.734	3878.693	3877.649	3878.499	3877.564	3878.125	3877.478	3877.609	3877.585	3877.740	3877.282	3877.499	3877.169	3877.272	3877.046	3876.968	3876.912	3876.784	3876.769	3876.640	3876.615	3876.499	3876.451	3876.308	3876.277	3876.255	3876.093	3876.209	3875.898	3875.003	3875.694	3875.873	3875.487	3875.633	3875.280	3875.598	3875.074	3875.228	3874.867	3874.891	3874.660	3874.485	3874.463	3874.273	3874.246	3873.819	3874.040	3874.194	3873.833	3873.527	3873.626	3873.054	3873.419	3872.741	3873.212	3872.322	3873.006	3871.981	3872.799	3871.789	3872.592	3871.619	3872.371	3871.279	3872.093	3871.155	3871.753	3871.204	3871.353	3871.054	3870.892	3870.765	3870.370	3870.532	3869.786	3870.085	3869.142	3869.413	3868.437	3868.618	3867.671	3867.758	3866.857	3866.859	3866.054	3865.888	3865.318	3864.776	3864.657	3863.739	3864.071	3863.147	3863.560	3862.647	3863.124
DIAGRAMA DE PERALTES	-8.00%														-7.00%												-8.00%																																																																								
ALINEAMIENTO	R=60.00 LC=72.18m Δ=68°55'38"														L=231.96m												R=90.00 LC=112.12m Δ=71°22'38"												L=34.75m												R=55.00 LC=58.42m Δ=60°51'30"												L=208.14m																																				
CORTE/RELLENO	0.26	-0.49	-0.79	-0.96	-0.85	-0.56	-0.13	-0.35	-0.18	-0.10	0.08	0.13	0.13	0.16	0.14	0.02	-0.12	-0.10	-0.18	-0.15	-0.32	-0.15	-0.02	0.18	0.18	0.43	-0.15	0.51	0.57	0.68	0.89	1.03	1.01	0.97	1.09	0.94	0.55	0.30	0.13	-0.16	-0.30	-0.27	-0.18	-0.09	0.00	0.17	0.54	0.92	0.92	0.91	0.68	0.68																																															

VISTA EN PERFIL
Esc. 1/1,000

LEYENDA

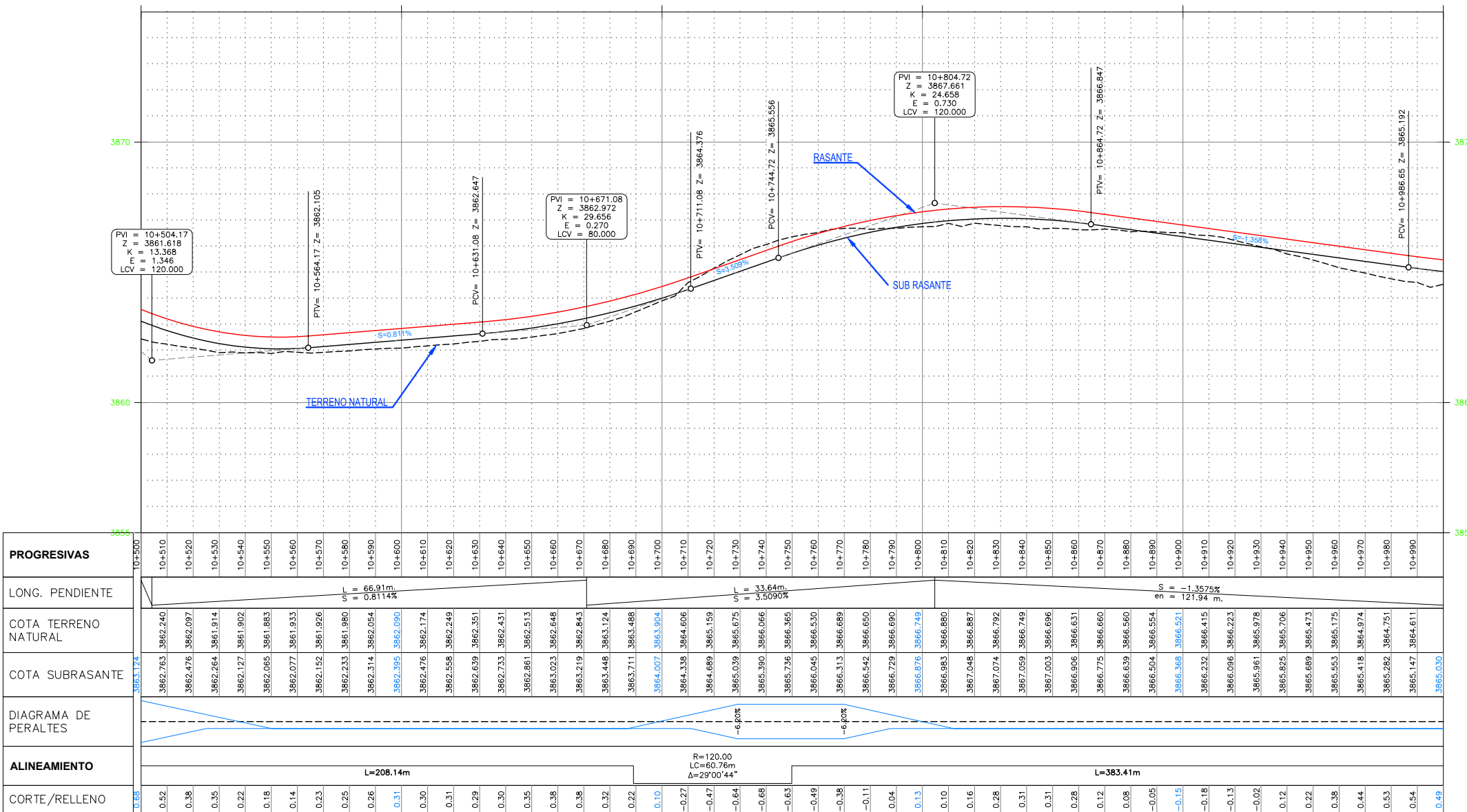
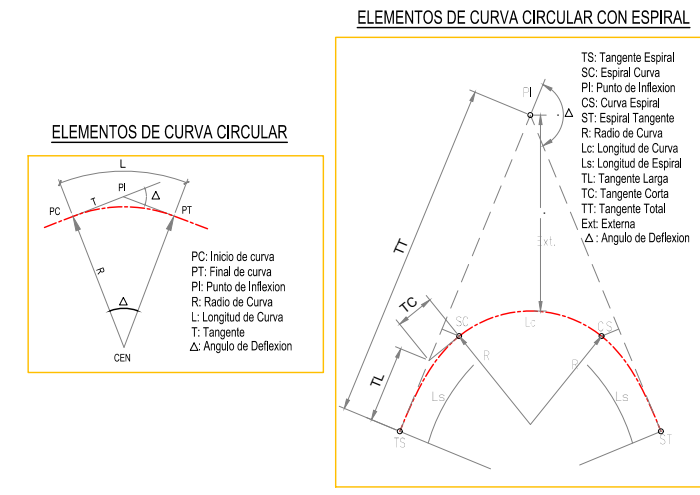
PLANTA :	
CURVA MAESTRA	
CURVA SECUNDARIA	
COTA DE CURVAS	
EJE DE VIA	
RIOS	
QUEBRADAS	
BORDE DE VIA	
PIRCA DE PIEDRA	
CASA	
VEREDAS	
PARED DE ADOBE	
CANAL PROYECTADO	
PERFIL TERRENO NATURAL	
PERFIL SUBRASANTE	
PUNTOS DE INTERECCION	
ALCANTARILLA	
ALCANTARILLA EXISTENTE	
LIMITE DE CORTE	
LIMITE DE RELLENO	
TERRENO DE CULTIVO	
POSTE DE MEDIA TENSION	
POSTE DE ALUMBRADO	
POSTE DE TELEFONO	
CERCO	
PERFIL :	
	SUB RASANTE
	TERRENO EXISTENTE

NOTA:
1- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C31	68°55'38"	41.181	60.000	72.180	12.773	9+971.489	10+012.670	10+043.670	455242.205	8210890.960
C32	71°22'38"	64.844	90.000	112.119	20.810	10+275.625	10+340.269	10+387.744	455488.399	8210659.693
C33	60°51'30"	32.306	55.000	58.420	8.786	10+422.497	10+454.803	10+480.917	455433.601	8210539.930
C34	29°00'44"	31.048	120.000	60.763	3.951	10+689.058	10+720.105	10+749.821	455594.220	8210321.046
C35	4°28'23"	7.811	200.000	15.614	0.152	11+133.230	11+141.041	11+148.843	455977.804	8210144.486

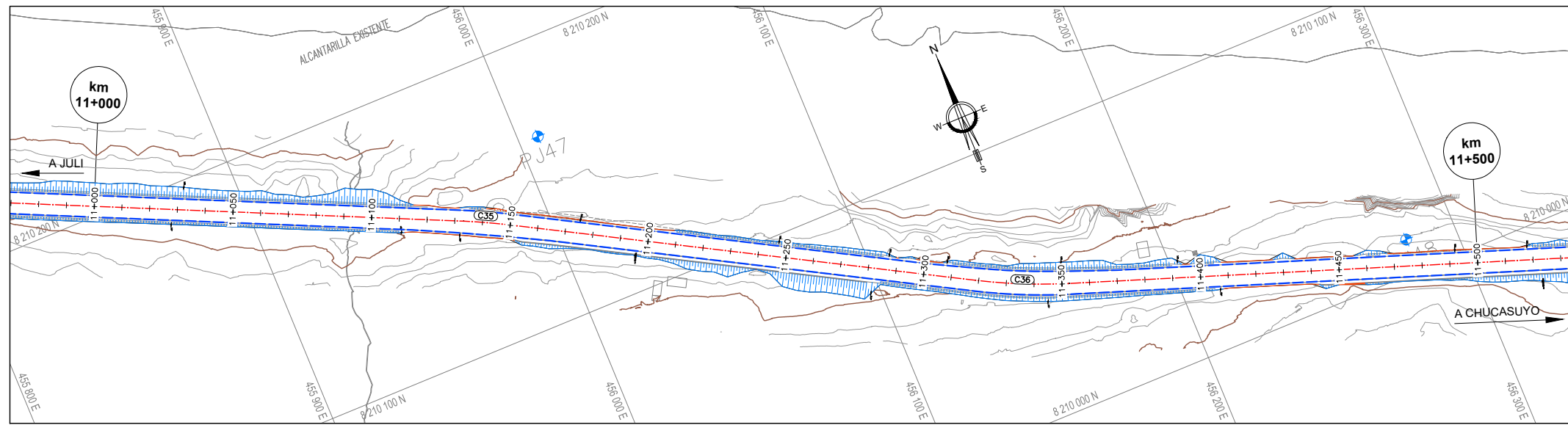
VISTA EN PLANTA
Esc. 1/1,000



VISTA EN PERFIL
Esc. 1/1,000

LEYENDA	
PLANTA :	
CURVA MAESTRA	—
CURVA SECUNDARIA	—
COTA DE CURVAS	100
EJE DE VIA	—
RIOS	—
QUEBRADAS	—
BORDE DE VIA	—
PIRCA DE PIEDRA	—
CASA	□
VEREDAS	▨
PARED DE ADOBE	—
CANAL PROYECTADO	—
PERFIL TERRENO NATURAL	—
PERFIL SUBRASANTE	—
PUNTOS DE INTERSECCIÓN	(C0)
ALCANTARILLA	—
ALCANTARILLA EXISTENTE	—
LIMITE DE CORTE	—
LIMITE DE RELLENO	—
TERRENO DE CULTIVO	—
POSTE DE MEDIA TENSION	—
POSTE DE ALUMBRADO	—
POSTE DE TELEFONO	—
CERCO	—
PERFIL :	
—	SUB RASANTE
- - -	TERRENO EXISTENTE

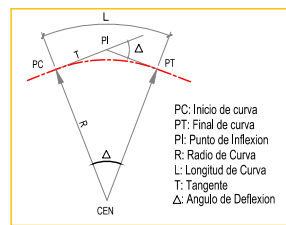
NOTA:
1- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



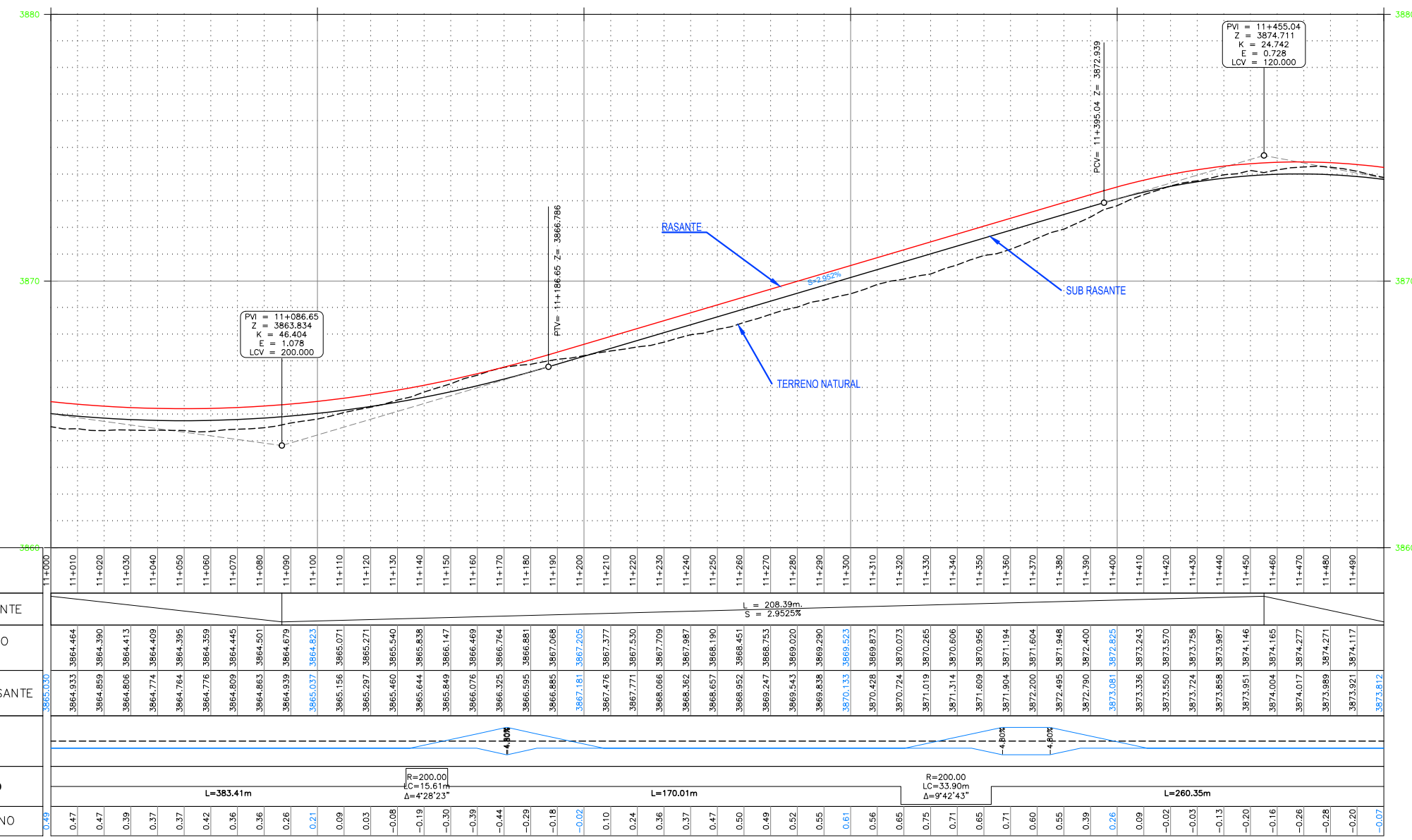
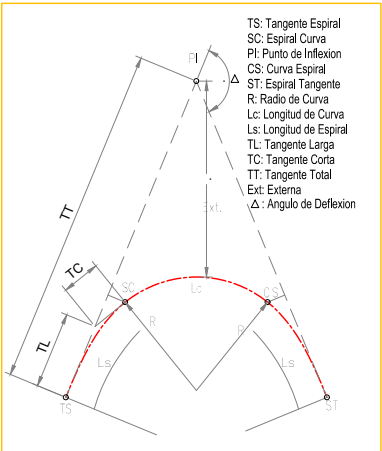
VISTA EN PLANTA
Esc. 1/1,000

CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C34	29°00'44"	31.048	120.000	60.763	3.951	10+689.058	10+720.105	10+749.821	455594.220	8210321.046
C35	4°28'23"	7.811	200.000	15.614	0.152	11+133.230	11+141.041	11+148.843	455977.804	8210144.486
C36	9°42'43"	16.991	200.000	33.901	0.720	11+318.849	11+335.840	11+352.750	456147.874	8210049.479
C37	65°31'20"	51.480	80.000	91.486	15.132	11+613.099	11+664.579	11+704.586	456457.877	8209939.839
C38	86°18'50"	28.129	30.000	45.194	11.125	11+736.468	11+764.598	11+781.662	456467.595	8209828.772

ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



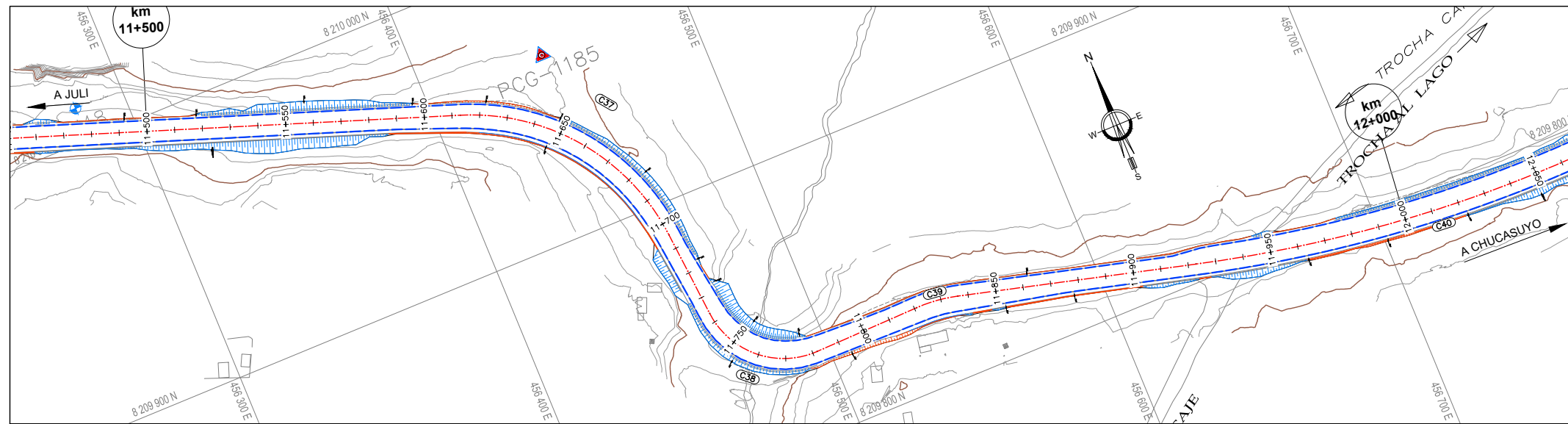
VISTA EN PERFIL
Esc. 1/1,000

LEYENDA

PLANTA :	
CURVA MAESTRA	—
CURVA SECUNDARIA	—
COTA DE CURVAS	1:100
EJE DE VIA	—
RIOS	—
QUEBRADAS	—
BORDE DE VIA	—
PIRCA DE PIEDRA	—
CASA	□
VEREDAS	▨
PARED DE ADOBE	—
CANAL PROYECTADO	—
PERFIL TERRENO NATURAL	—
PERFIL SUBRASANTE	—
PUNTOS DE INTERECCION	(COT)
ALCANTARILLA	—
ALCANTARILLA EXISTENTE	—
LIMITE DE CORTE	—
LIMITE DE RELLENO	—
TERRENO DE CULTIVO	—
POSTE DE MEDIA TENSION	—
POSTE DE ALUMBRADO	—
POSTE DE TELEFONO	—
CERCO	—

PERFIL :	
SUB RASANTE	—
TERRENO EXISTENTE	—

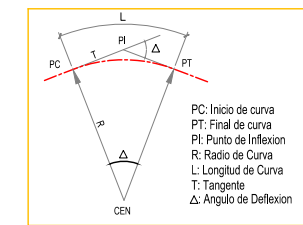
NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



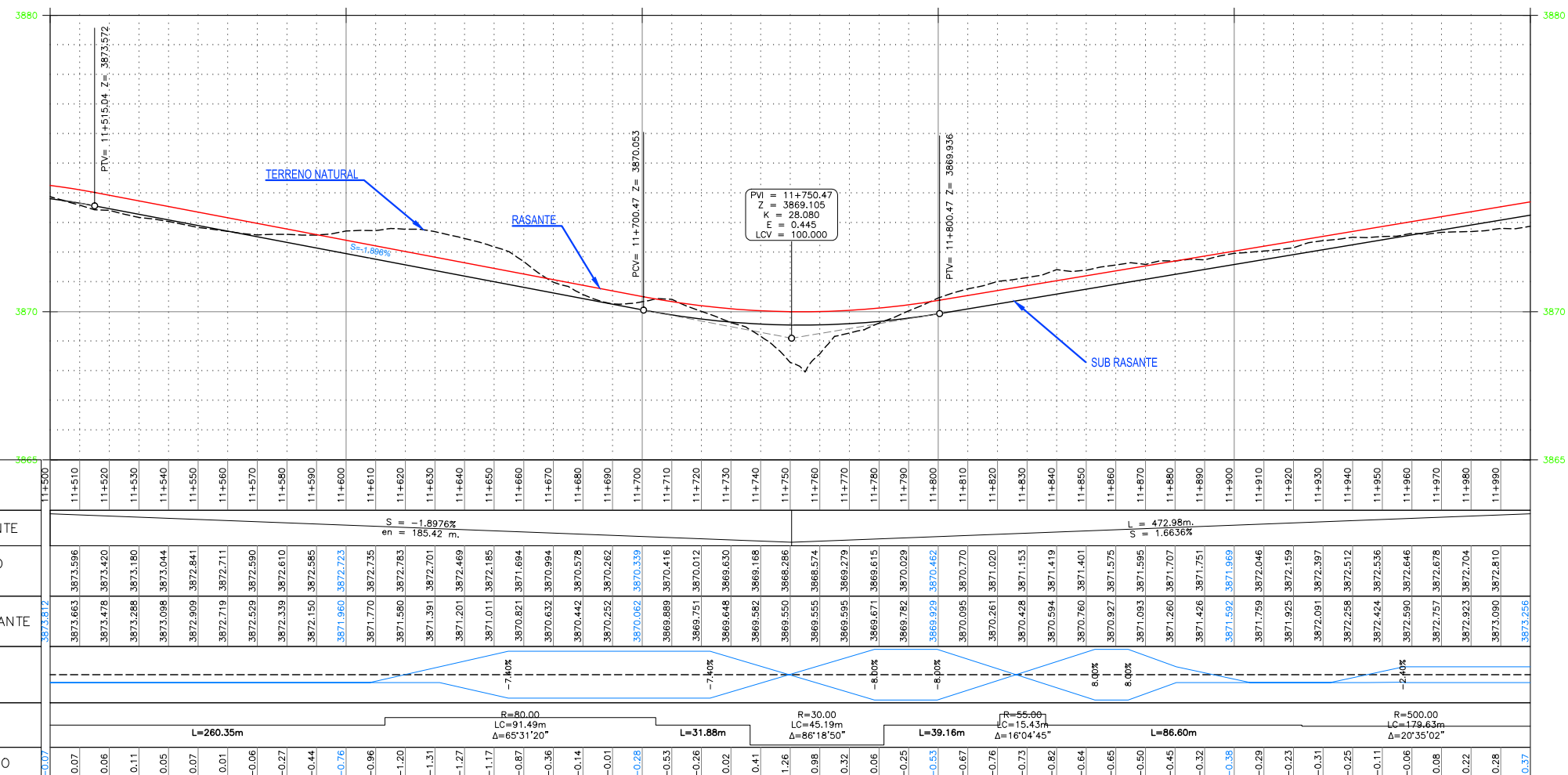
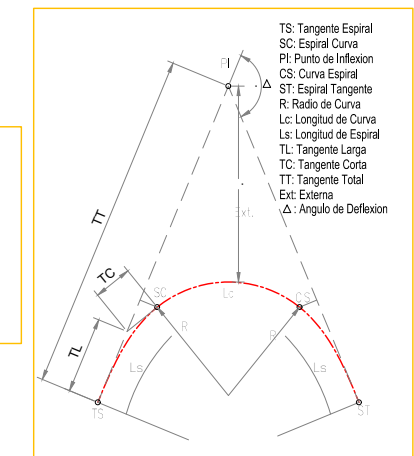
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C36	9°42'43"	16.991	200.000	33.901	0.720	11+318.849	11+335.840	11+352.750	456147.874	8210049.479
C37	65°31'20"	51.480	80.000	91.486	15.132	11+613.099	11+664.579	11+704.586	456457.877	8209939.839
C38	86°18'50"	28.129	30.000	45.194	11.125	11+736.468	11+764.598	11+781.662	456467.595	8209828.772
C39	16°04'45"	7.769	55.000	15.435	0.546	11+820.823	11+828.591	11+836.258	456542.634	8209830.494
C40	20°35'02"	90.792	500.000	179.628	8.176	11+922.859	12+013.651	12+102.486	456721.682	8209783.305

ELEMENTOS DE CURVA CIRCULAR



ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



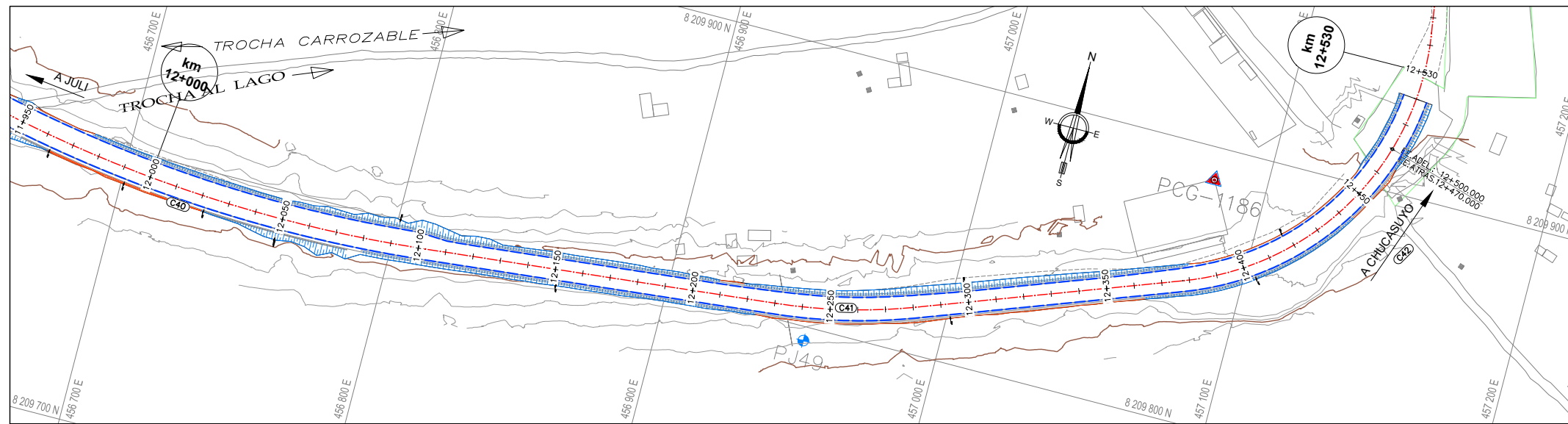
PROGRESIVAS	11+500	11+510	11+520	11+530	11+540	11+550	11+560	11+570	11+580	11+590	11+600	11+610	11+620	11+630	11+640	11+650	11+660	11+670	11+680	11+690	11+700	11+710	11+720	11+730	11+740	11+750	11+760	11+770	11+780	11+790	11+800	11+810	11+820	11+830	11+840	11+850	11+860	11+870	11+880	11+890	11+900	11+910	11+920	11+930	11+940	11+950	11+960	11+970	11+980	11+990																																															
COTA TERRENO NATURAL	3873.663	3873.596	3873.478	3873.420	3873.288	3873.180	3873.098	3873.044	3872.909	3872.841	3872.719	3872.711	3872.529	3872.590	3872.339	3872.610	3872.150	3872.585	3871.960	3872.723	3871.770	3872.735	3871.580	3872.783	3871.391	3872.701	3871.201	3872.469	3871.011	3872.185	3870.821	3871.694	3870.632	3870.994	3870.442	3870.578	3870.252	3870.262	3870.062	3870.339	3869.889	3870.416	3869.751	3870.012	3869.648	3869.630	3869.582	3869.168	3869.550	3868.286	3869.595	3869.574	3869.279	3869.671	3869.615	3869.782	3870.029	3869.929	3870.462	3870.095	3870.770	3870.261	3871.020	3870.428	3871.153	3870.594	3871.419	3870.760	3871.401	3870.927	3871.575	3871.093	3871.595	3871.707	3871.426	3871.751	3871.592	3871.969	3871.759	3872.046	3871.925	3872.159	3872.091	3872.397	3872.258	3872.512	3872.424	3872.536	3872.590	3872.646	3872.757	3872.678	3872.923	3872.704	3873.090	3872.810	3873.256
DIAGRAMA DE PERALTES	[Diagram showing vertical curve shapes with grades: -7.40%, -7.40%, -7.40%, -8.00%, -8.00%, 8.00%, 8.00%, -2.40%]																																																																																																
ALINEAMIENTO	L=260.35m										R=80.00, LC=91.49m, Δ=65°31'20"										L=31.88m										R=30.00, LC=45.19m, Δ=86°18'50"										L=39.16m										R=55.66, LC=15.43m, Δ=16°04'45"										L=86.60m										R=500.00, LC=179.63m, Δ=20°35'02"																										
CORTE/RELLENO	-0.07	0.07	0.06	0.11	0.05	0.07	0.01	-0.06	-0.27	-0.44	-0.76	-0.96	-1.20	-1.31	-1.27	-1.17	-0.87	-0.36	-0.14	-0.01	-0.28	-0.53	-0.26	0.02	0.41	1.26	0.98	0.32	0.06	-0.25	-0.53	-0.87	-0.76	-0.73	-0.82	-0.64	-0.65	-0.50	-0.45	-0.32	-0.38	-0.29	-0.23	-0.31	-0.25	-0.11	-0.06	0.08	0.22	0.28	0.37																																														

VISTA EN PERFIL
Esc. 1/1,000

LEYENDA

- PLANTA :**
- CURVA MAESTRA
 - CURVA SECUNDARIA
 - COTA DE CURVAS
 - EJE DE VIA
 - RIOS
 - QUEBRADAS
 - BORDE DE VIA
 - PIRCA DE PIEDRA
 - CASA
 - VEREDAS
 - PARED DE ADOBE
 - CANAL PROYECTADO
 - PERFIL TERRENO NATURAL
 - PERFIL SUBRASANTE
 - PUNTOS DE INTERECCION
 - ALCANTARILLA
 - ALCANTARILLA EXISTENTE
 - LIMITE DE CORTE
 - LIMITE DE RELLENO
 - TERRENO DE CULTIVO
 - POSTE DE MEDIA TENSION
 - POSTE DE ALUMBRADO
 - POSTE DE TELEFONO
 - CERCO
- PERFIL :**
- SUB RASANTE
 - TERRENO EXISTENTE

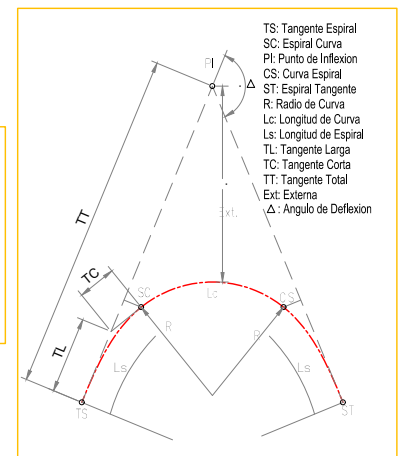
NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



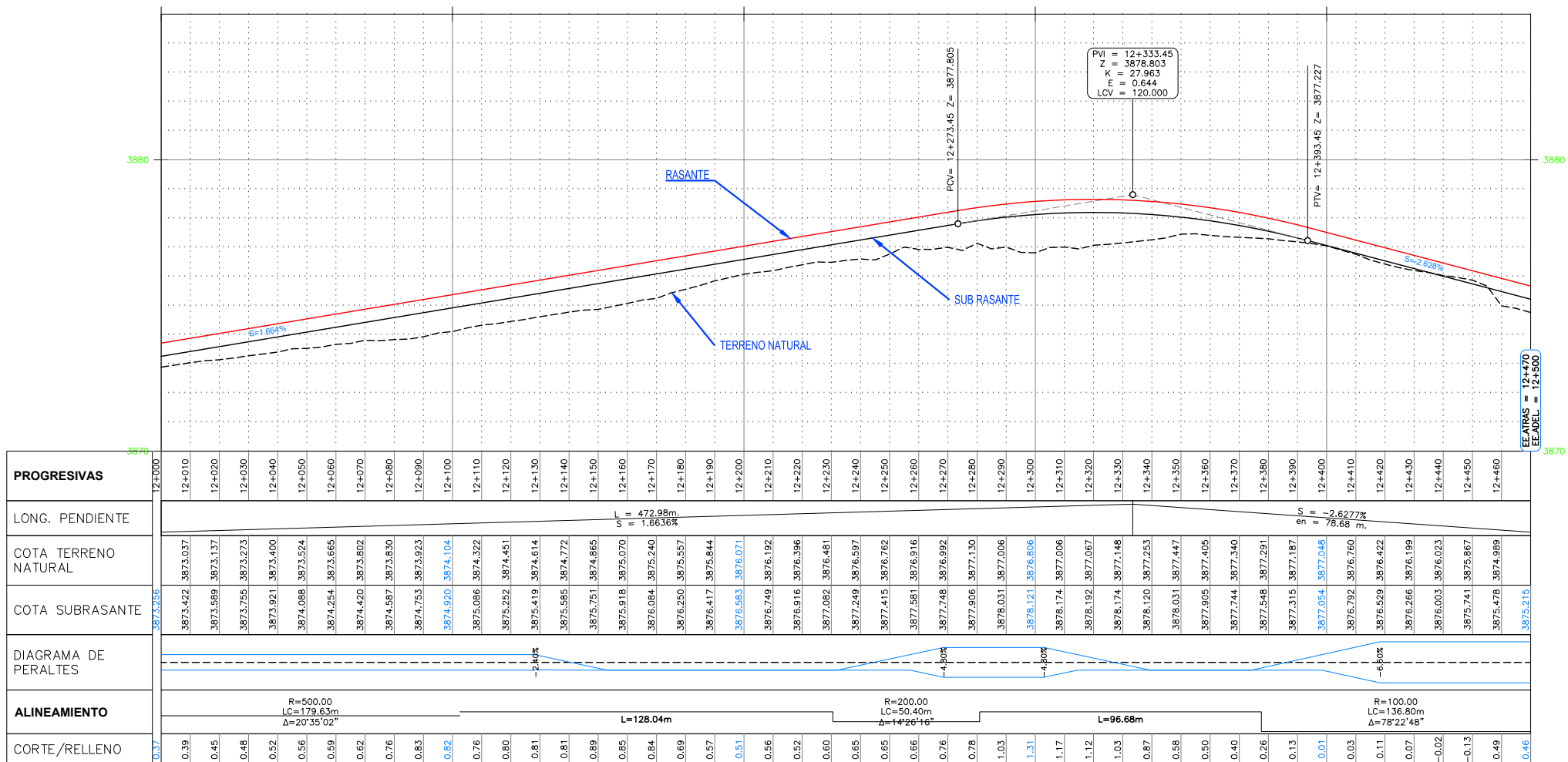
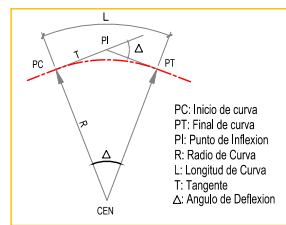
VISTA EN PLANTA
Esc. 1/1,000

CUADRO DE CURVAS HORIZONTALES										
CN°	Deflex.	TANG.	RADIO	L.C.	Ext.	P.C.	P.I.	P.T.	ESTE	NORTE
C38	86°18'50"	28.129	30.000	45.194	11.125	11+736.468	11+764.598	11+781.862	456467.595	8209828.772
C39	16°04'45"	7.769	55.000	15.435	0.546	11+820.823	11+828.591	11+836.258	456542.634	8209830.494
C40	20°35'02"	90.792	500.000	179.628	8.176	11+922.859	12+013.651	12+102.486	456721.682	8209783.305
C41	14°26'16"	25.333	200.000	50.397	1.598	12+230.531	12+255.864	12+280.928	456964.594	8209808.060
C42	78°22'48"	81.529	100.000	136.799	29.023	12+377.604	12+459.133	12+514.403	457155.543	8209878.530

ELEMENTOS DE CURVA CIRCULAR CON ESPIRAL



ELEMENTOS DE CURVA CIRCULAR



VISTA EN PERFIL
Esc. 1/1,000

LEYENDA	
PLANTA :	
CURVA MAESTRA	—
CURVA SECUNDARIA	—
COTA DE CURVAS	100
EJE DE VIA	—
RIOS	—
QUEBRADAS	—
BORDE DE VIA	—
PIRCA DE PIEDRA	—
CASA	□
VEREDAS	▨
PARED DE ADOBE	—
CANAL PROYECTADO	—
PERFIL TERRENO NATURAL	—
PERFIL SUBRASANTE	—
PUNTOS DE INTERECCION	(C0)
ALCANTARILLA	—
ALCANTARILLA EXISTENTE	—
LIMITE DE CORTE	—
LIMITE DE RELLENO	—
TERRENO DE CULTIVO	—
POSTE DE MEDIA TENSION	—
POSTE DE ALUMBRADO	—
POSTE DE TELEFONO	—
CERCO	—
PERFIL :	
—	SUB RASANTE
—	TERRENO EXISTENTE

NOTA:
1.- LA ESCALA INDICADA ES PARA EL FORMATO A-1. PARA A-3 CONSIDERAR EL DOBLE.



UNIVERSIDAD NACIONAL DEL
ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS
"ESCUELA PROFECIONAL DE INGENIERIA
TOPOGRAFICA Y AGRIMENSURA"



Participantes:
Presidente de Jurado : D.sc Valeriano Condori Apaza
Primer Miembro : Ing. Victor Raul Banegas Layme
Segundo Miembro : Ing. Juan Esteban Araoz Barrios
Asesor de Tesis : Ing. Arturo Joels Ventura Mamani
Tesisista : Bach. Javier Rolando Maquera Ccalte

Proyecto de Tesis:
"COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS
OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

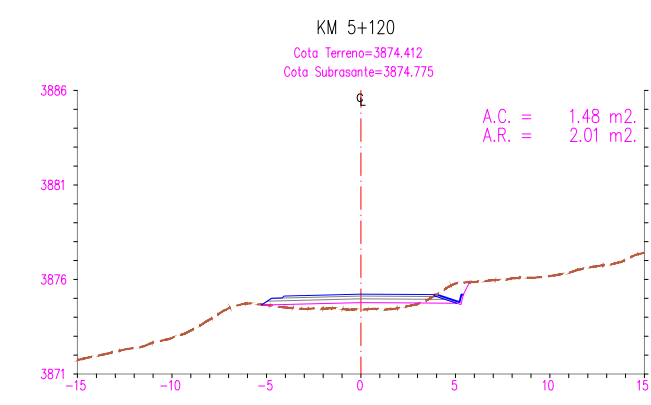
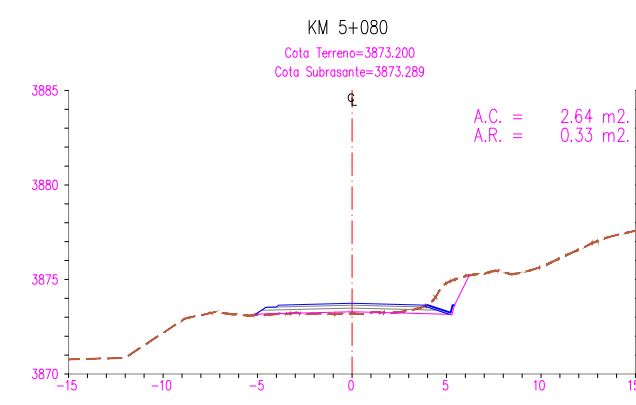
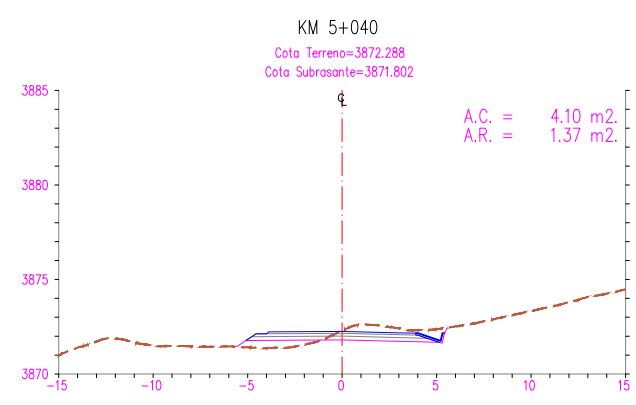
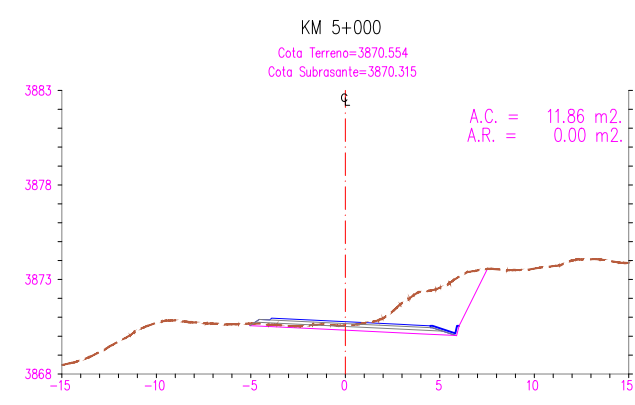
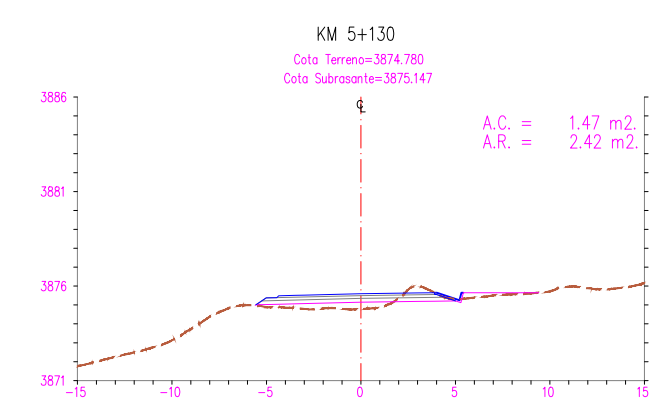
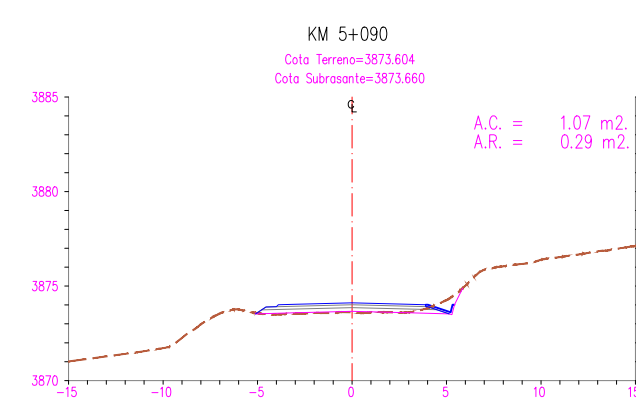
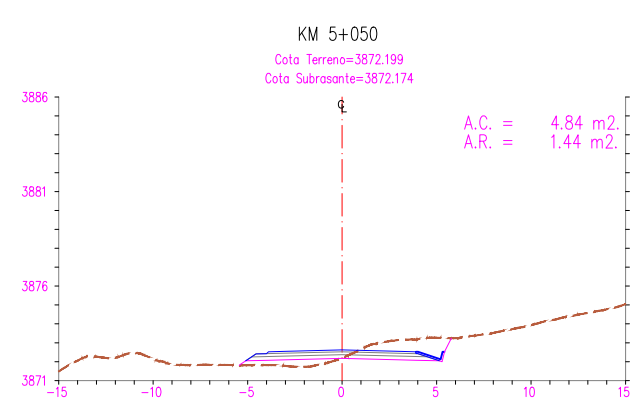
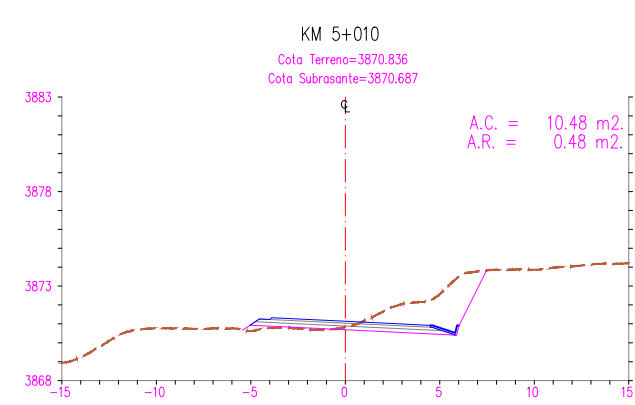
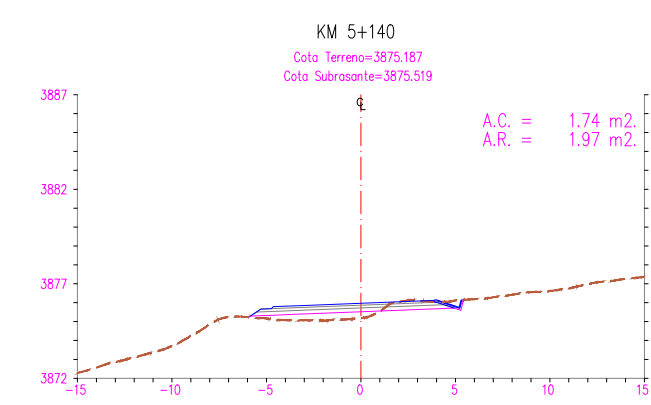
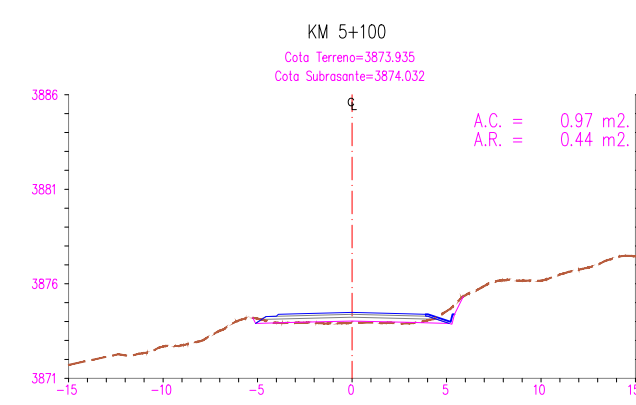
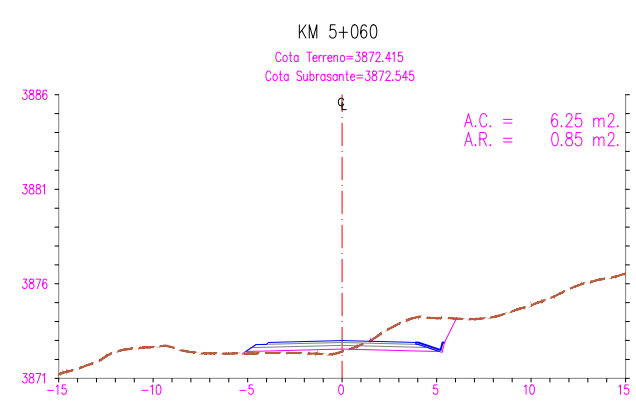
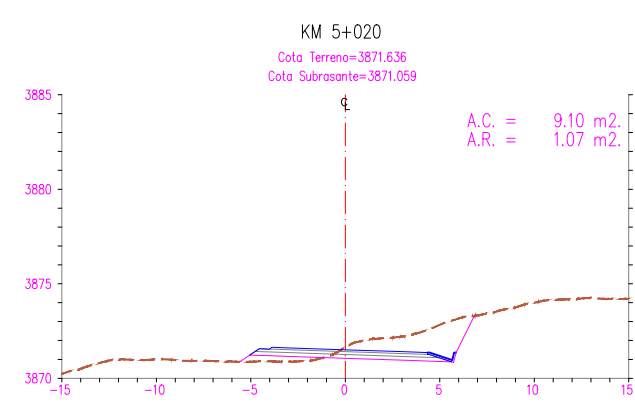
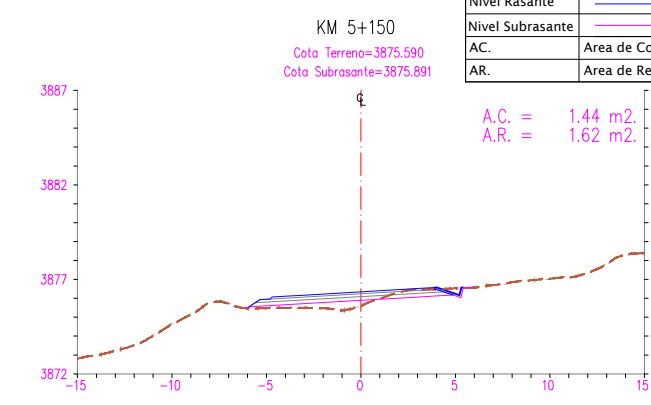
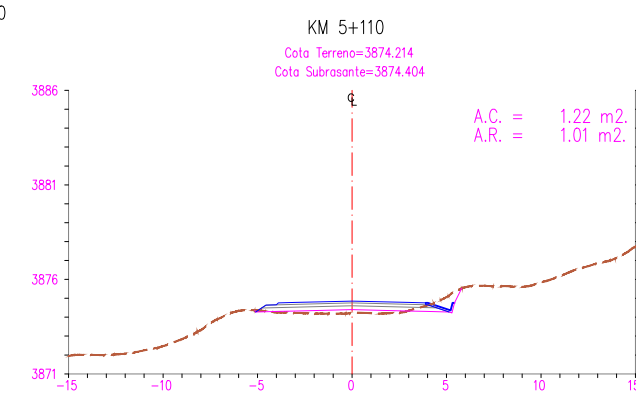
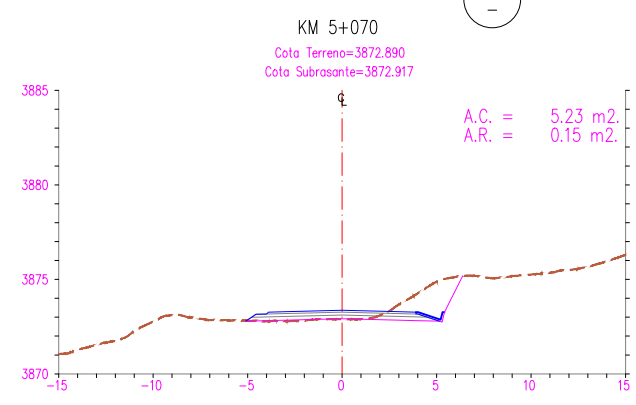
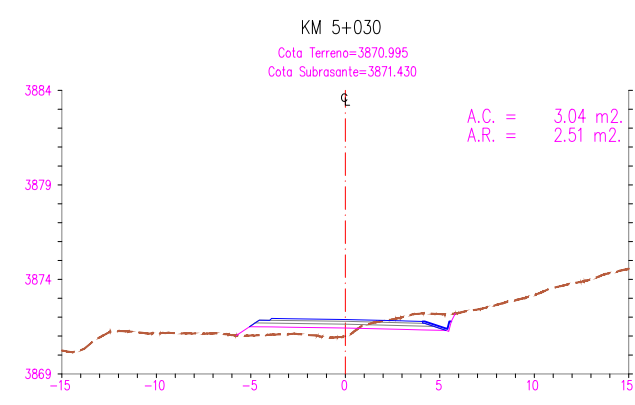
Plano:
PLANTA PERFIL - DISEÑO GEOMÉTRICO
Km 12+000 - Km 12+500

Escala: INDICADA
Fecha: Marzo 2022
Codigo: DG-PPL-015
Lamina: 15-15
REV-00

**F. PLANOS DE DISEÑO GEOMETRICO
SECCIONES TRANSVERSALES**

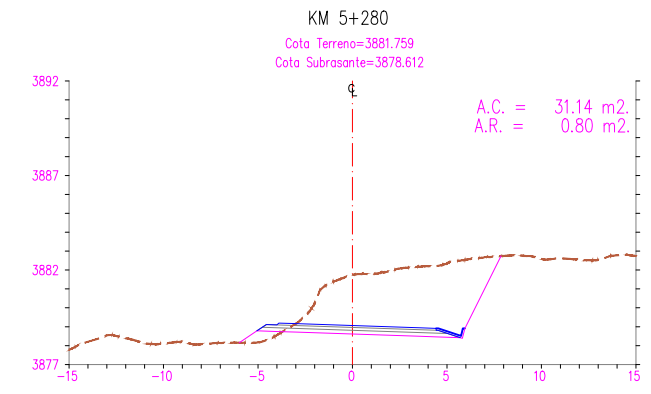
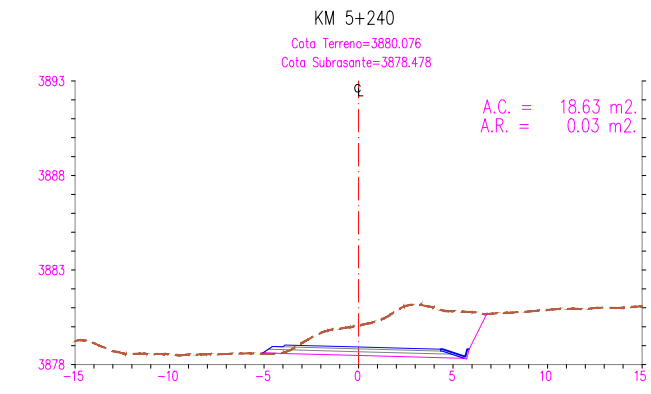
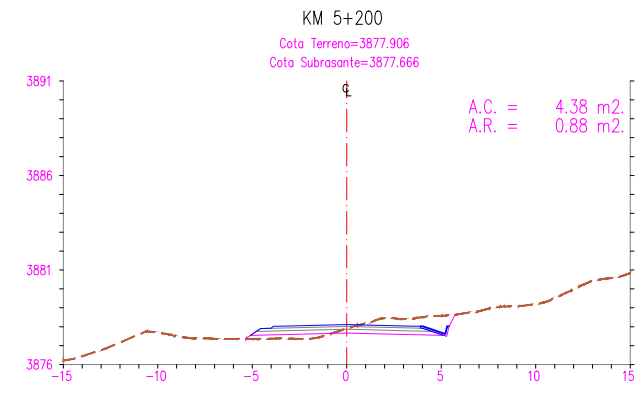
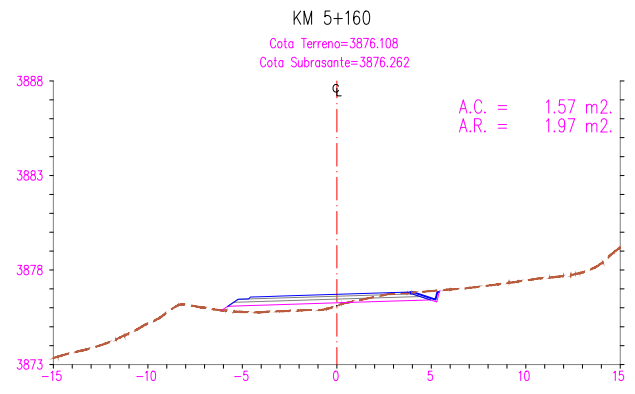
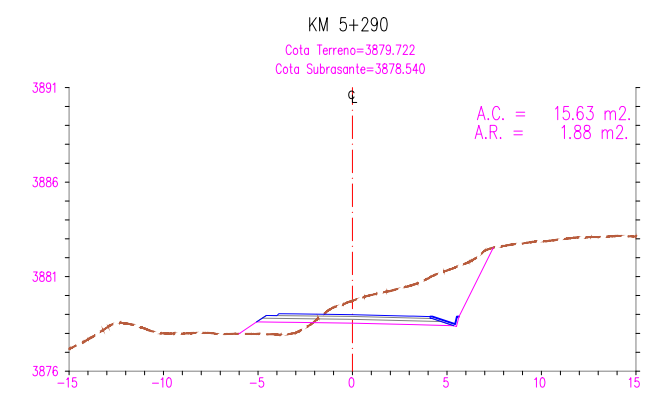
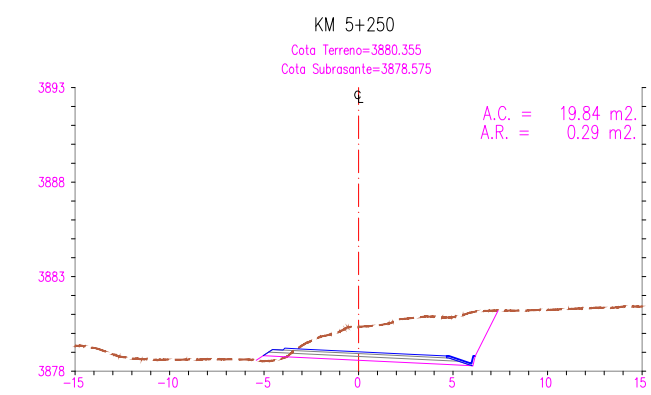
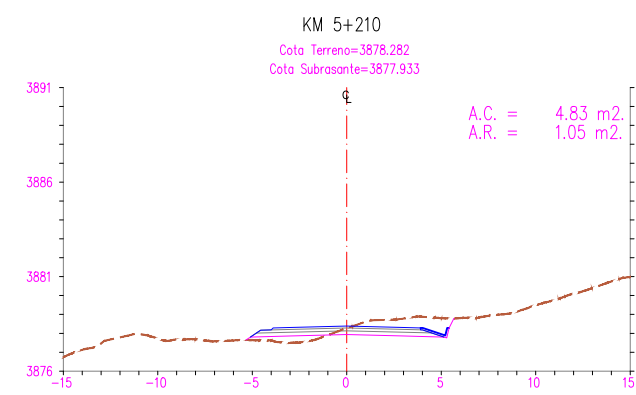
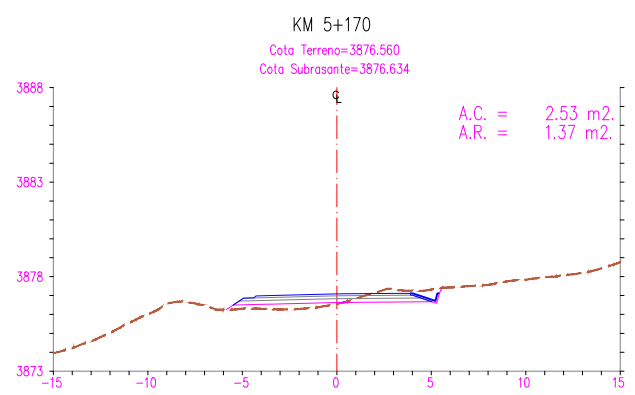
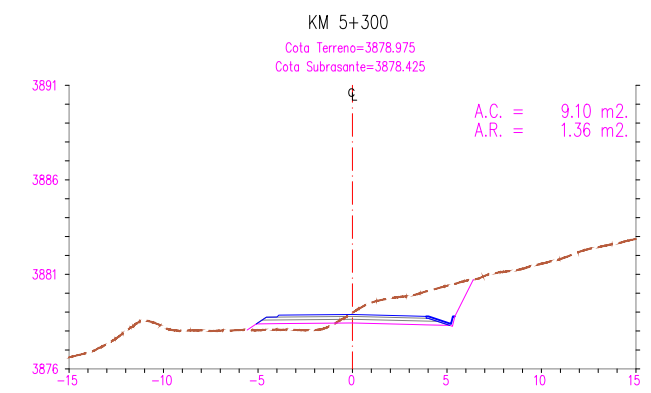
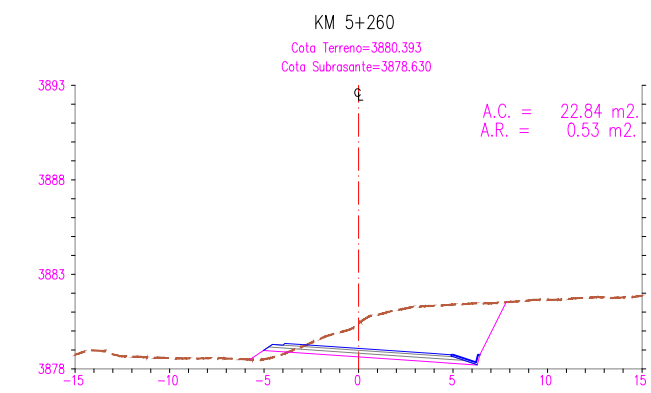
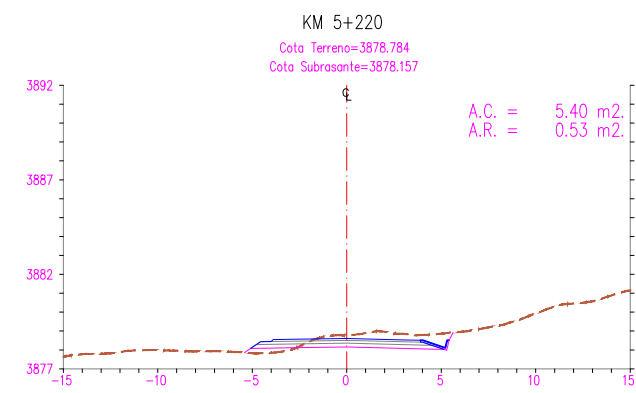
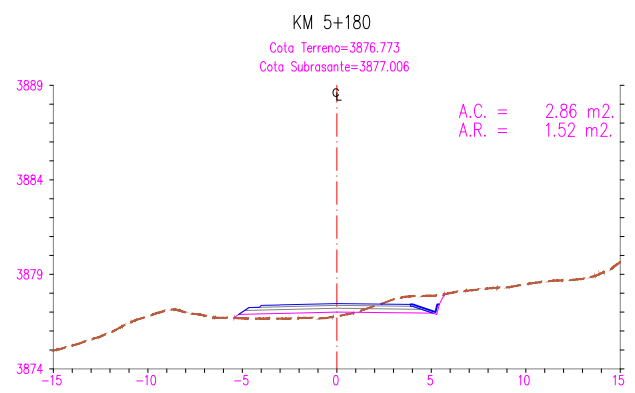
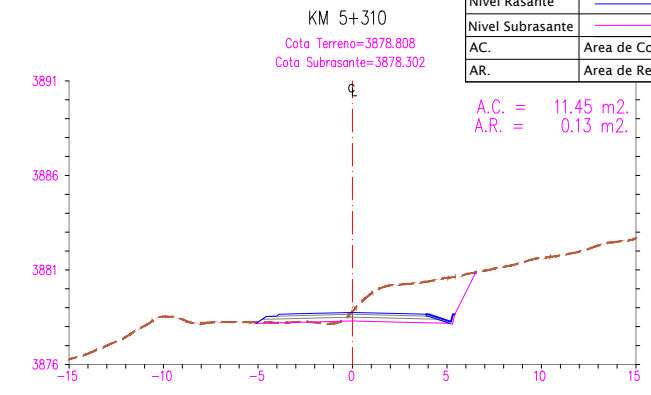
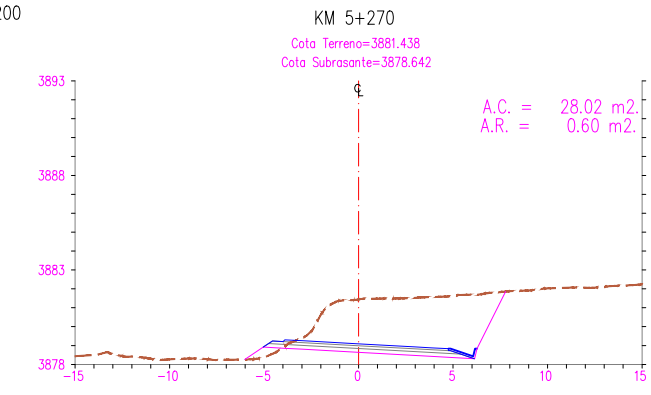
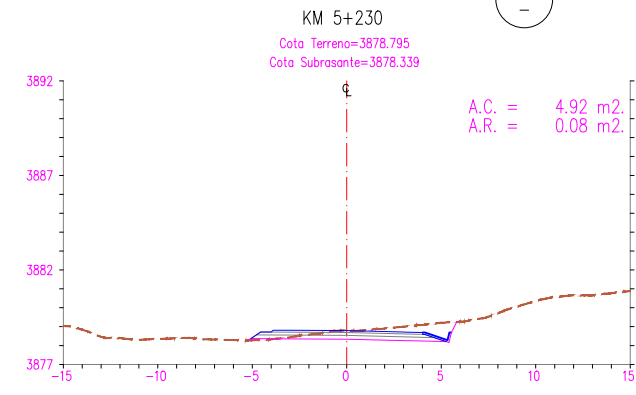
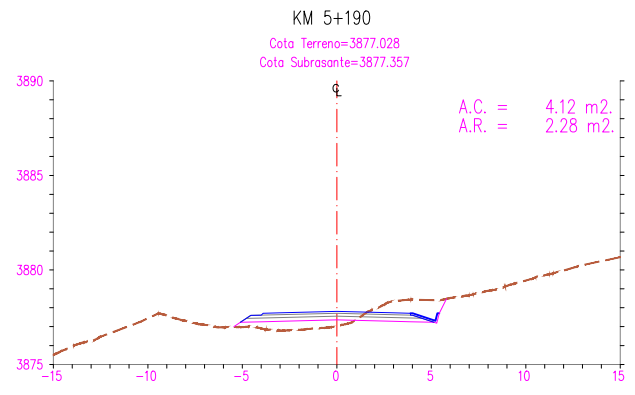
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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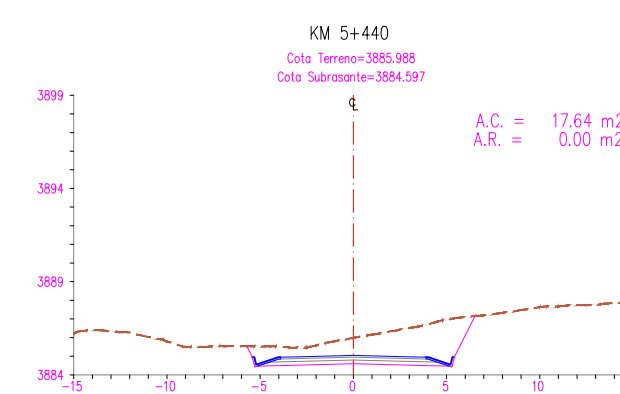
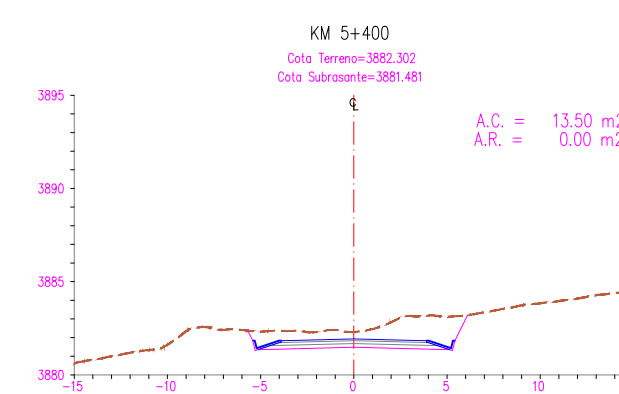
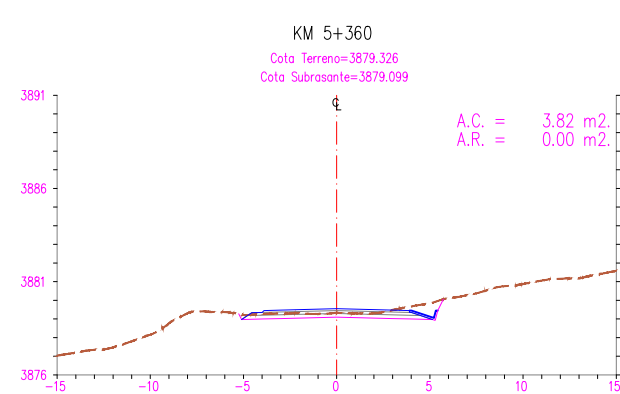
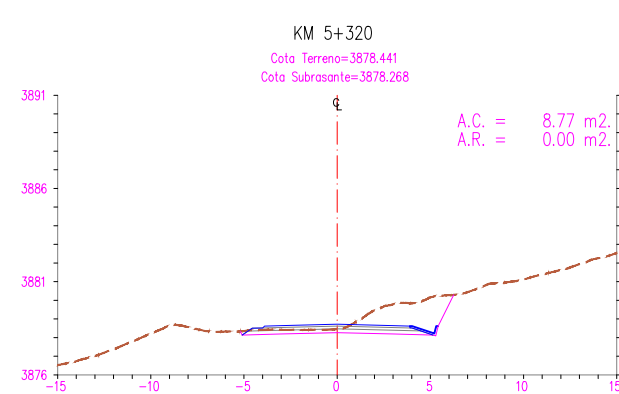
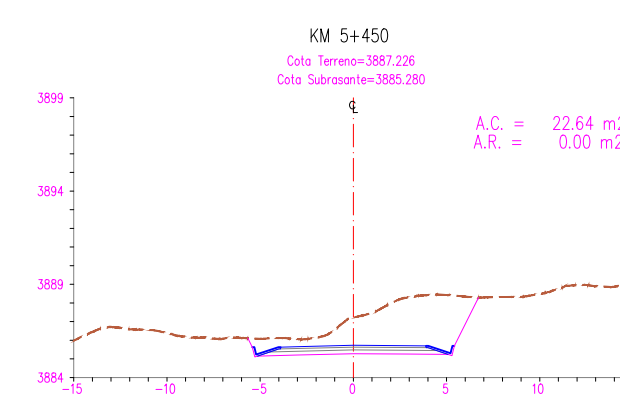
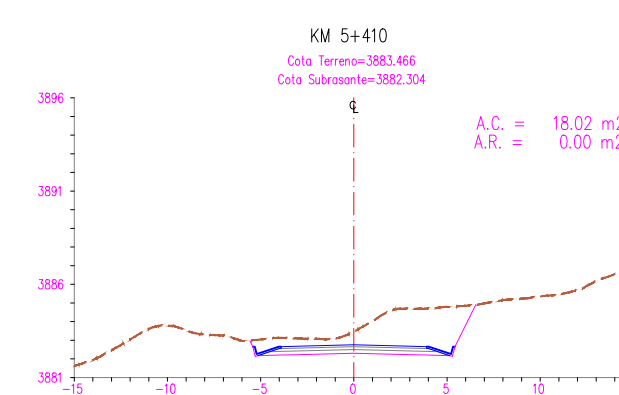
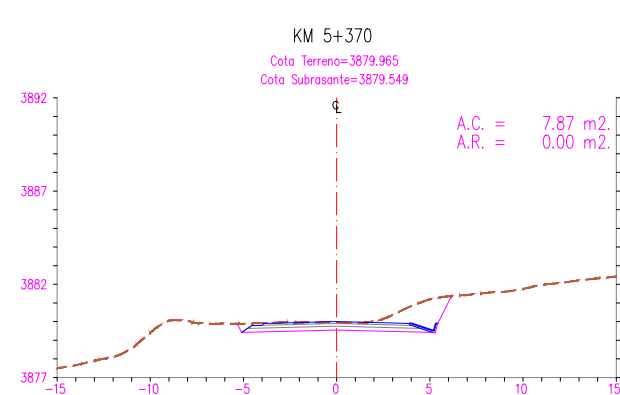
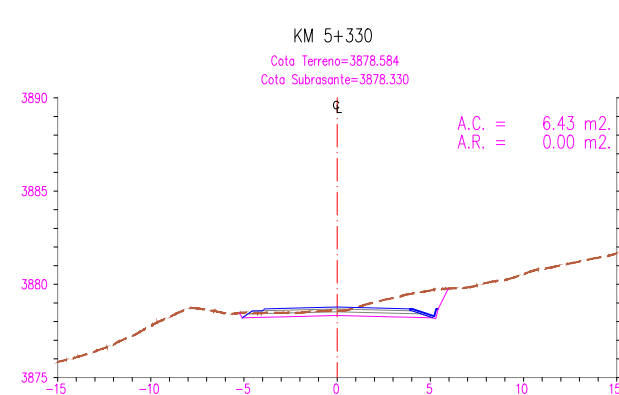
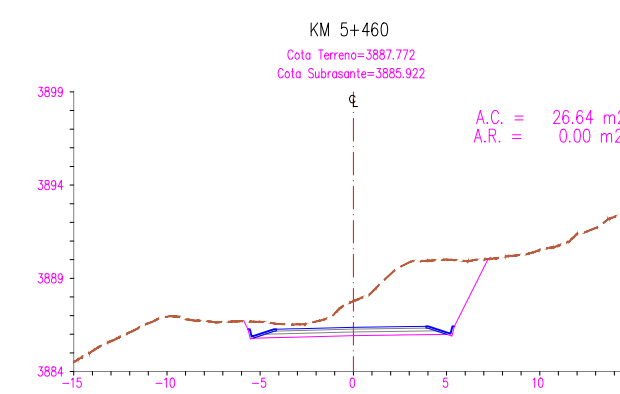
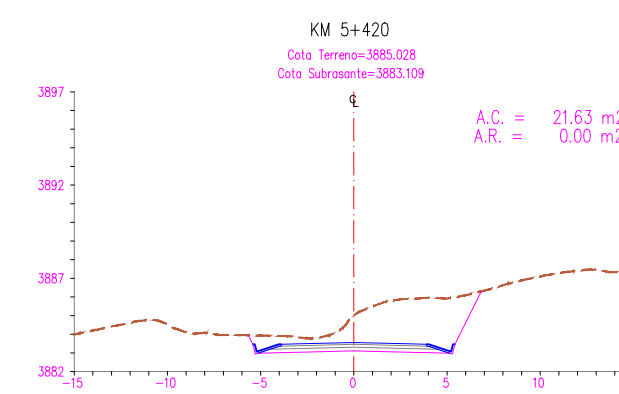
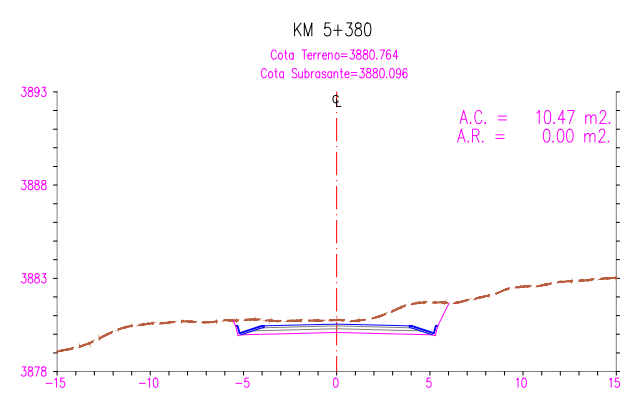
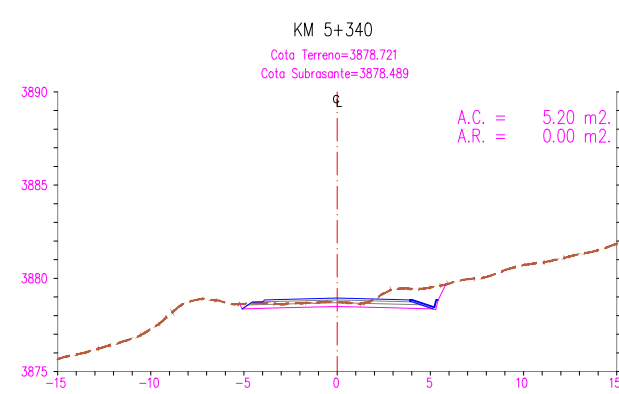
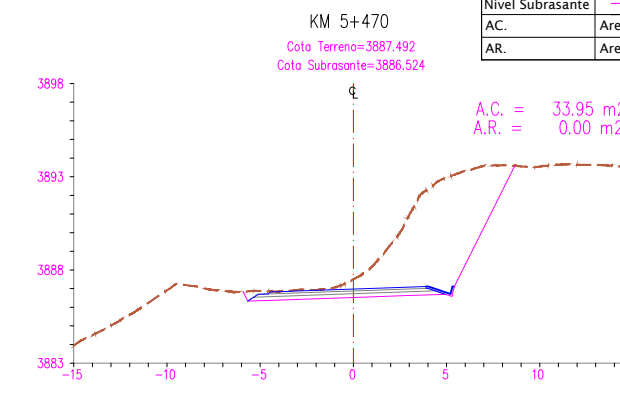
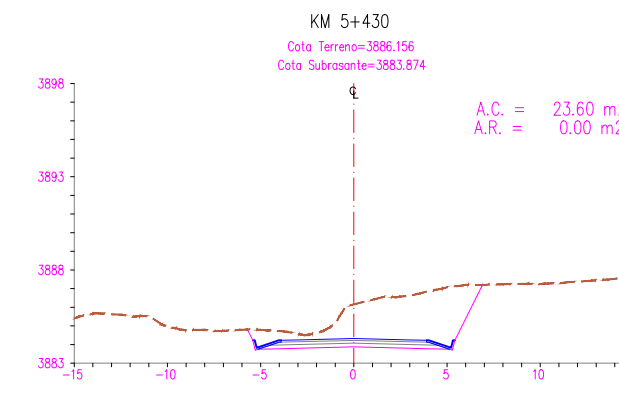
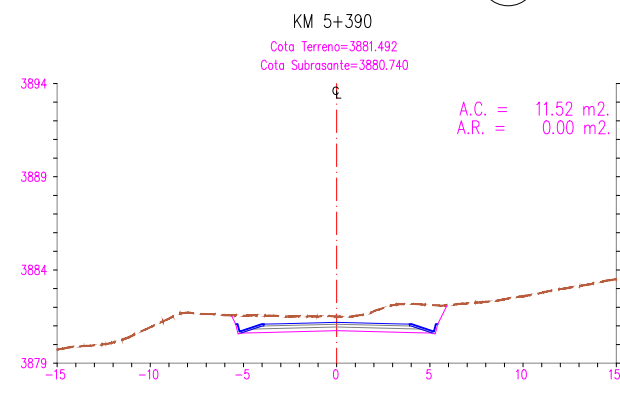
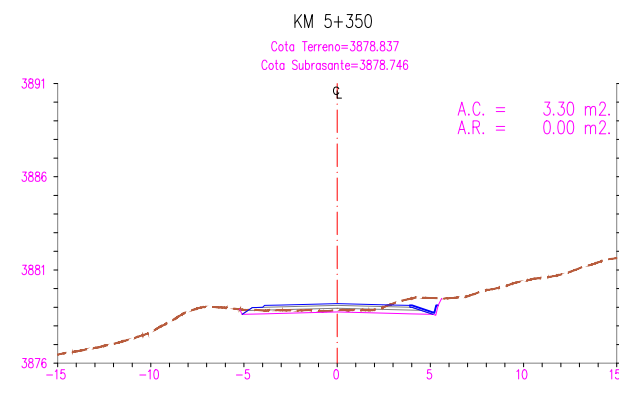
Proyecto de Tesis:
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 5+160 - Km 5+310

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-002
Lamina: 02-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

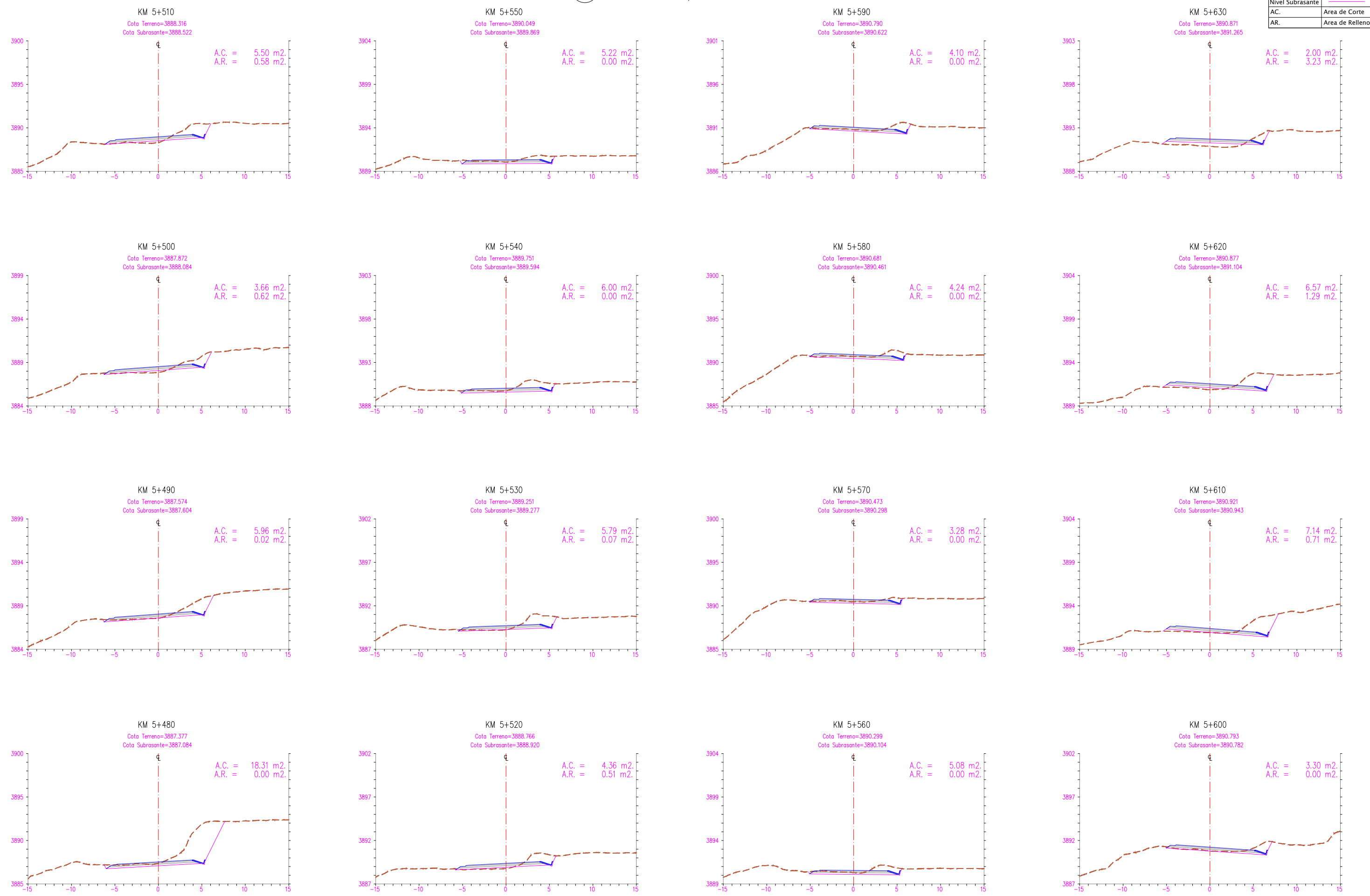
Plano:
SECCIONES TRANSVERSALES
Km 5+320 - Km 5+470

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-003

Lamina:
02-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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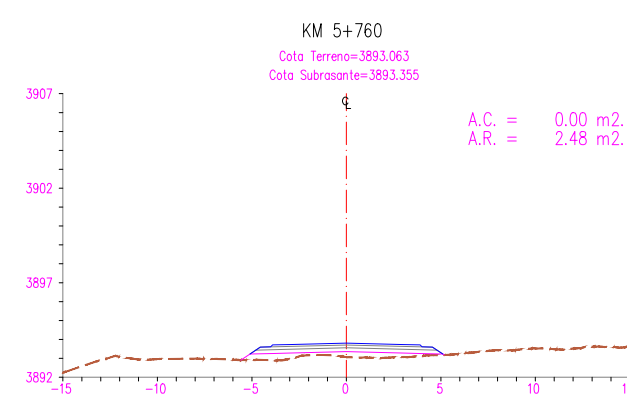
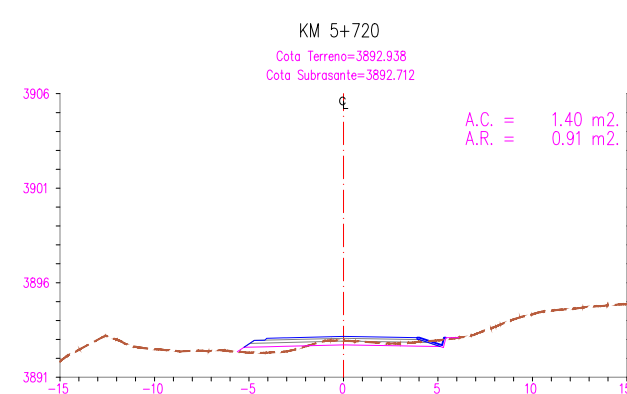
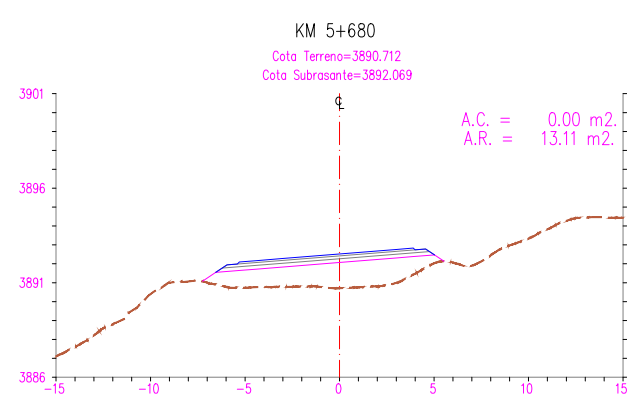
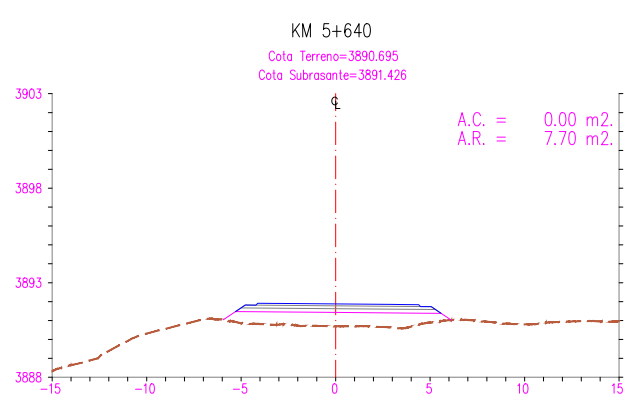
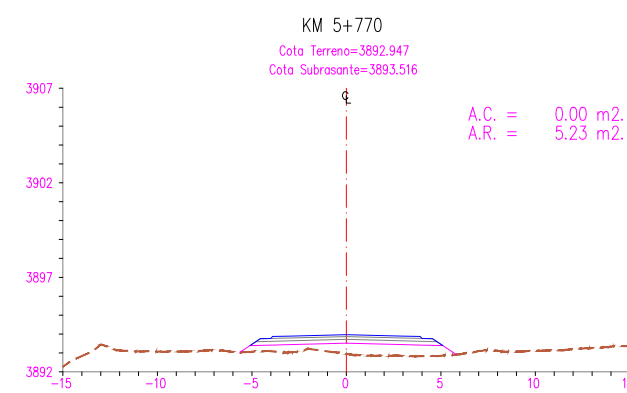
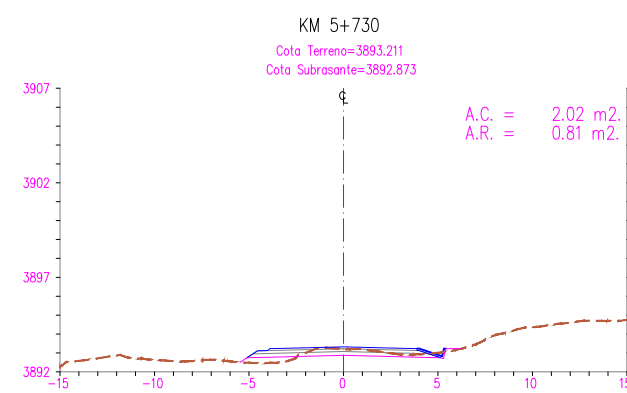
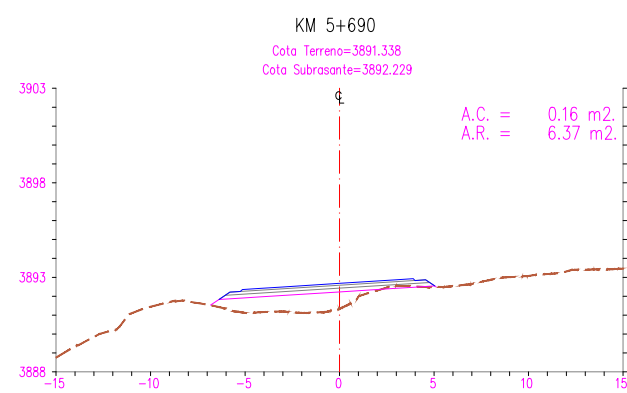
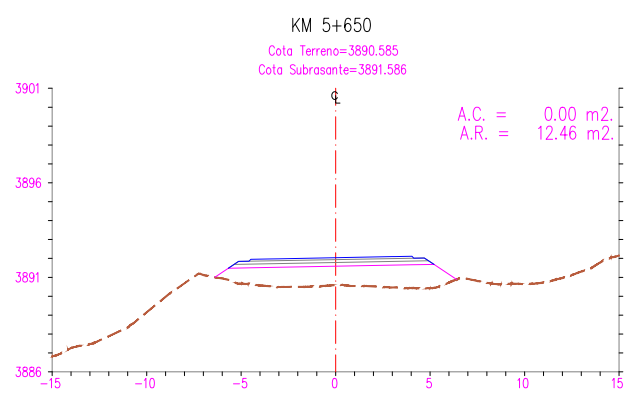
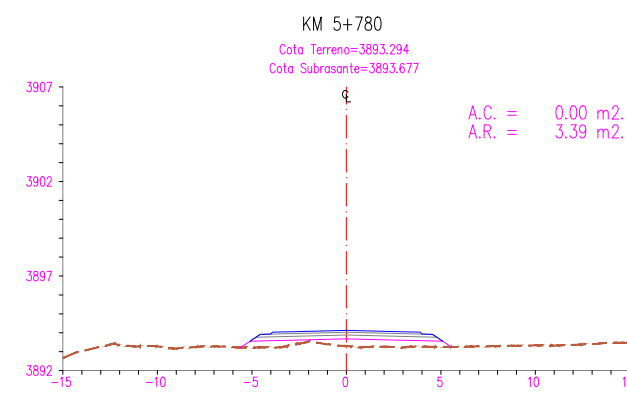
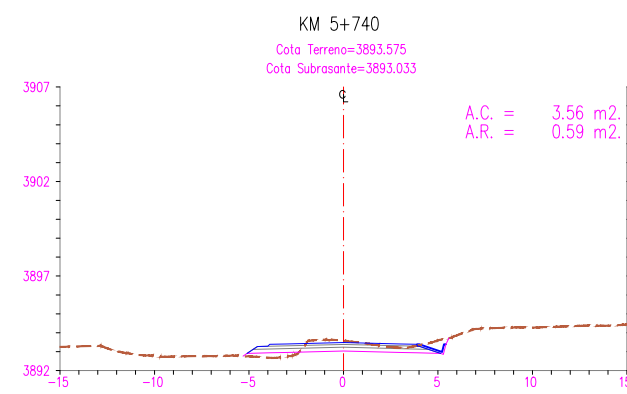
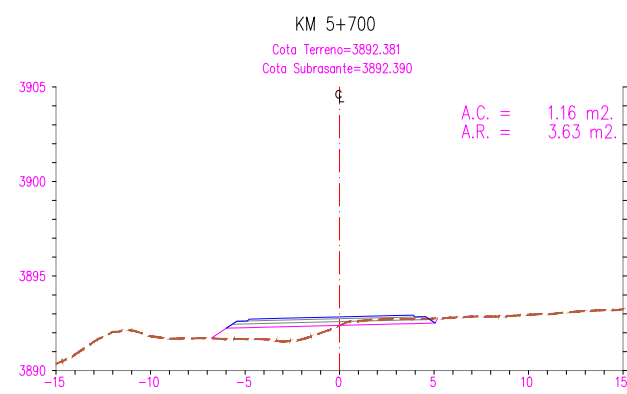
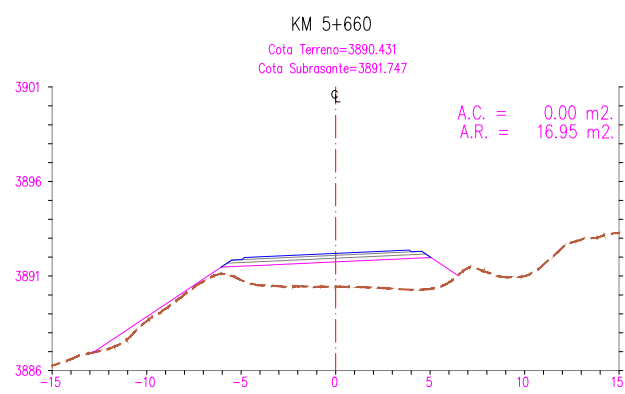
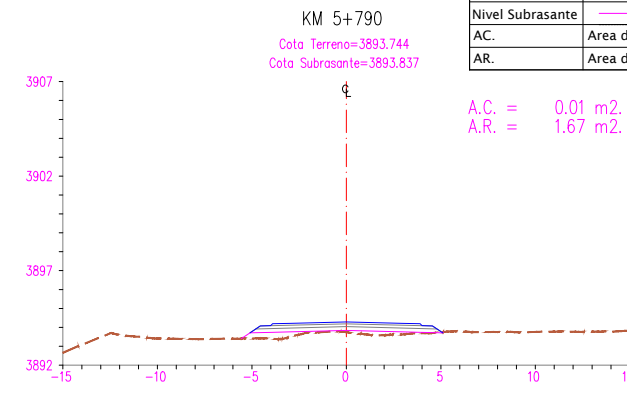
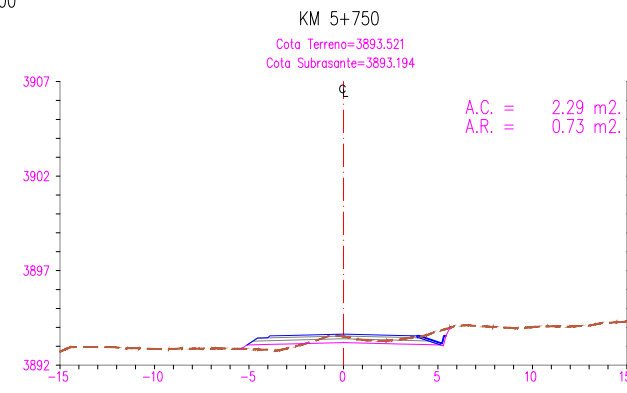
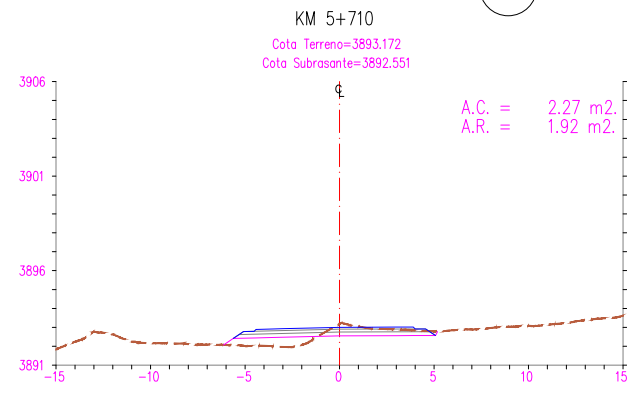
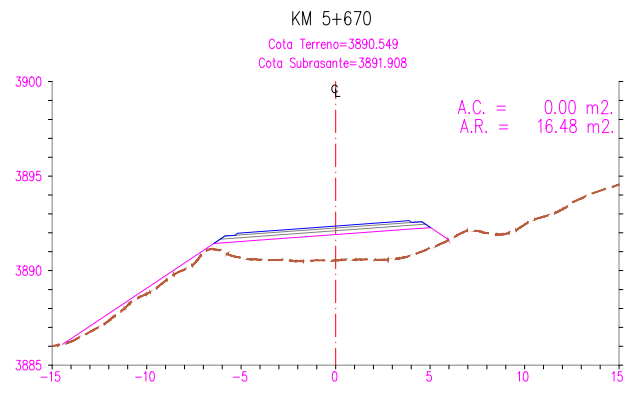
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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 5+480 - Km 5+630

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-004
Lamina: 04-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	---
Nivel Rasante	—
Nivel Subrasante	—
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

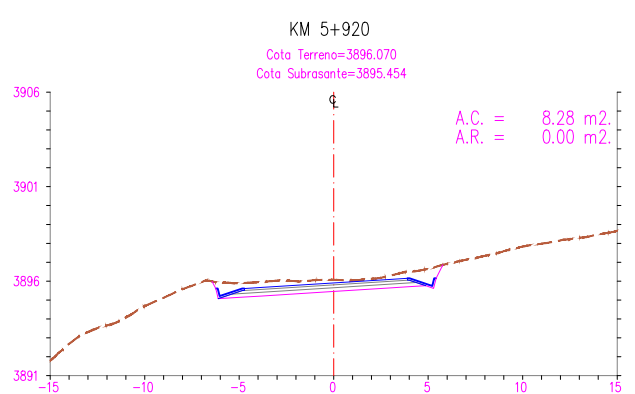
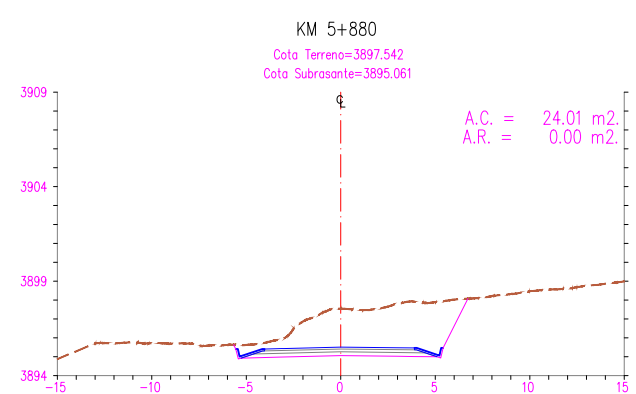
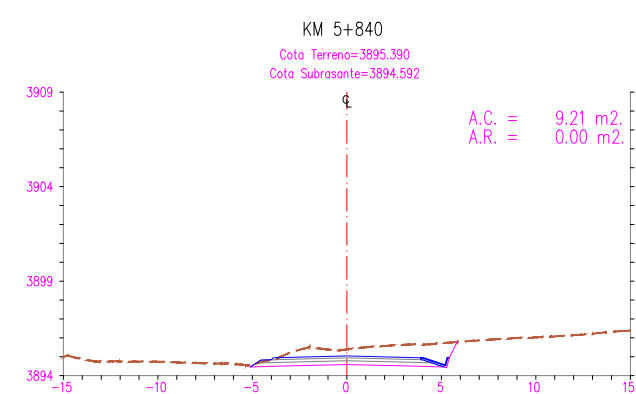
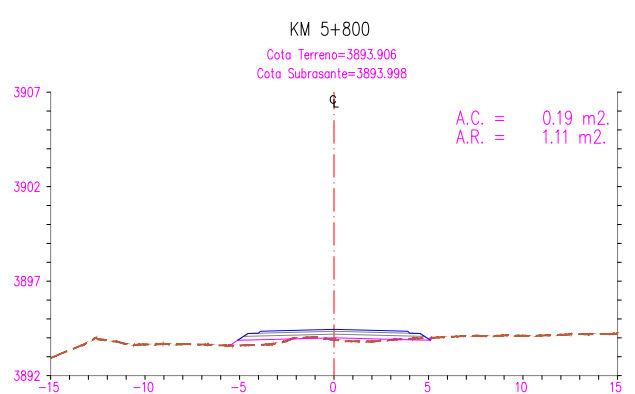
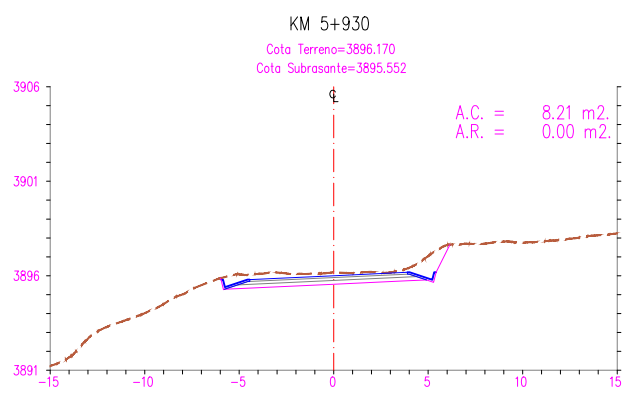
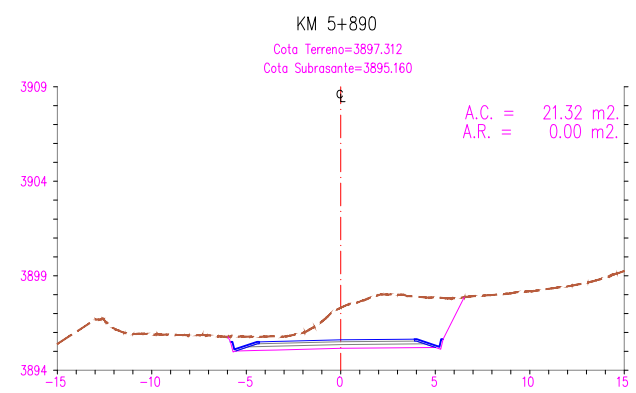
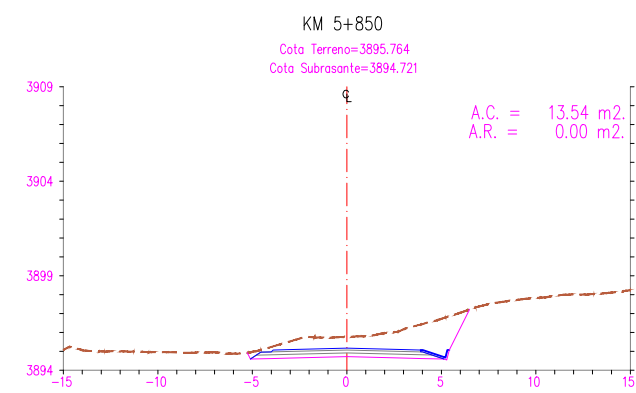
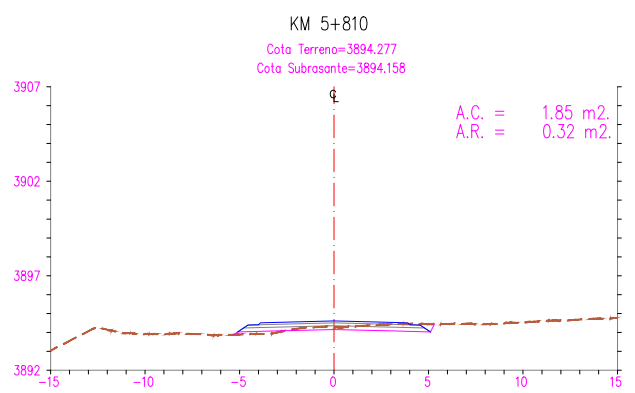
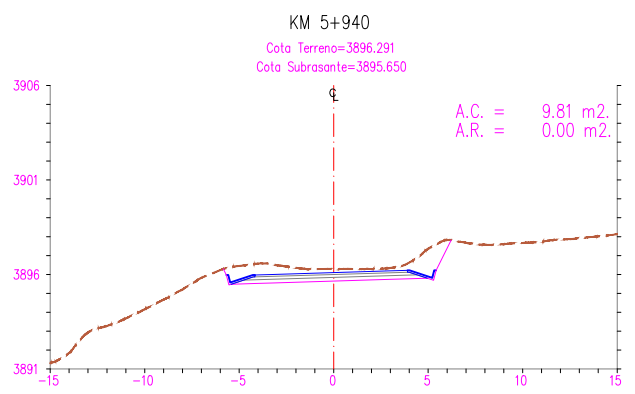
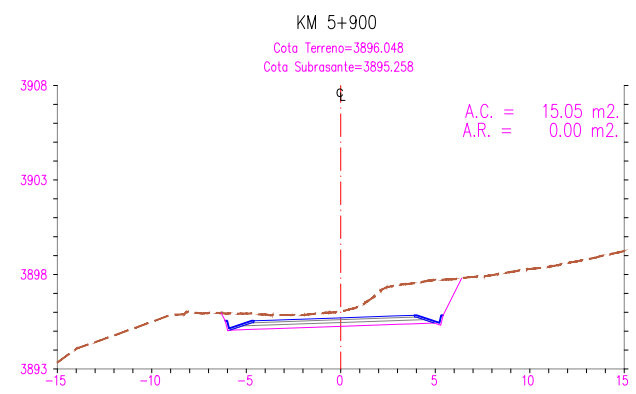
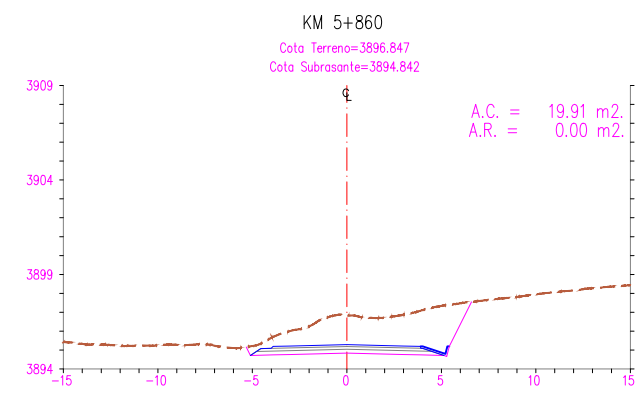
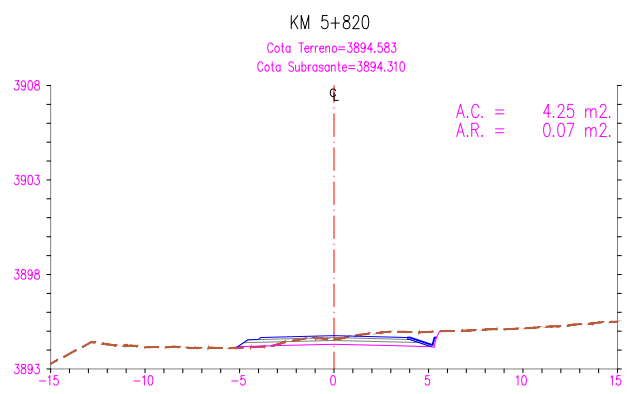
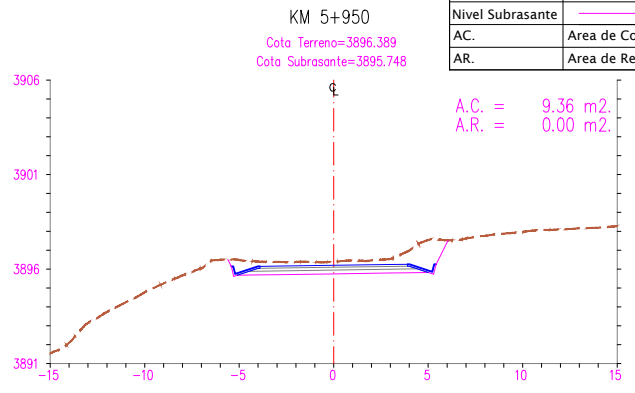
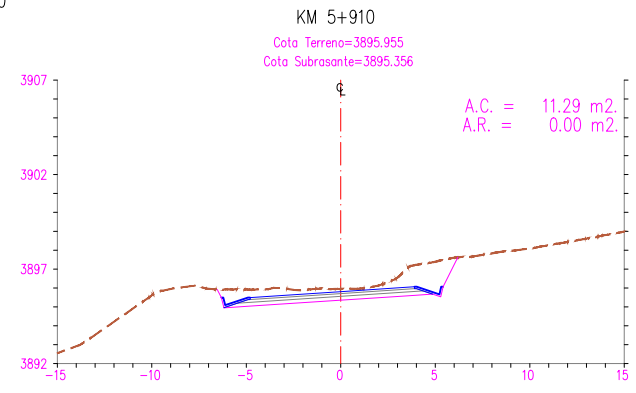
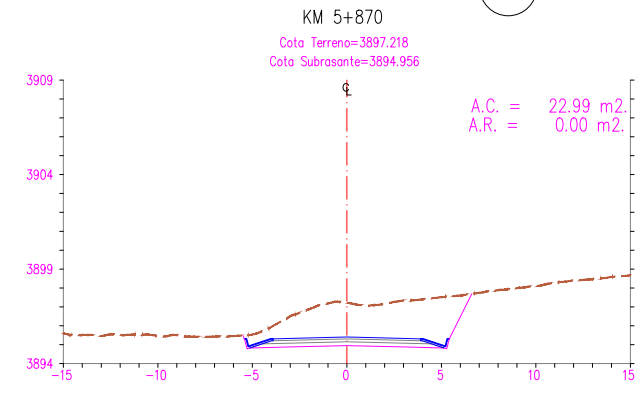
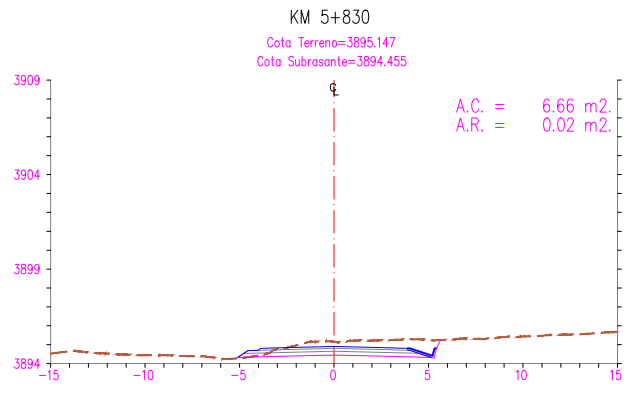
Plano:
SECCIONES TRANSVERSALES
Km 5+630 - Km 5+790

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-005

Lamina:
05-47
REV-00

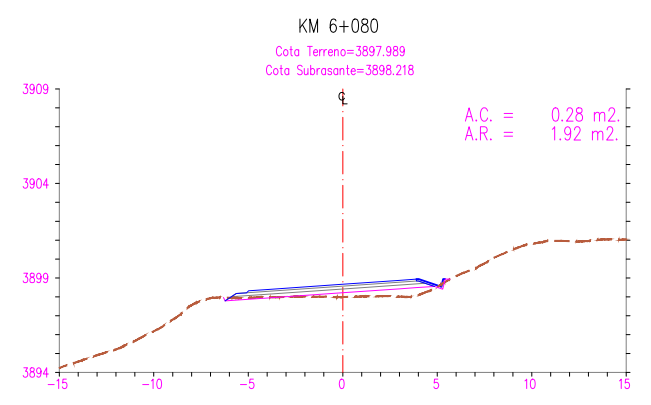
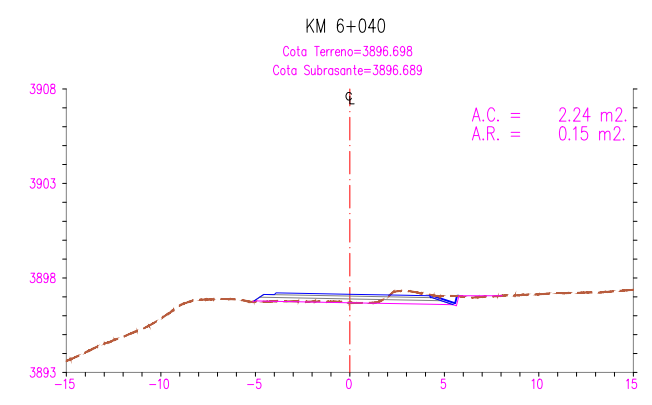
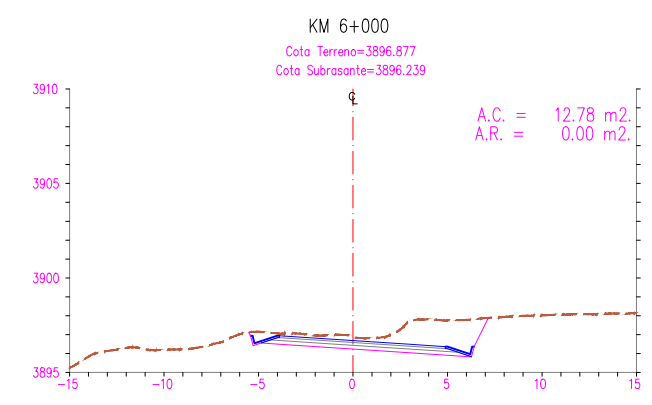
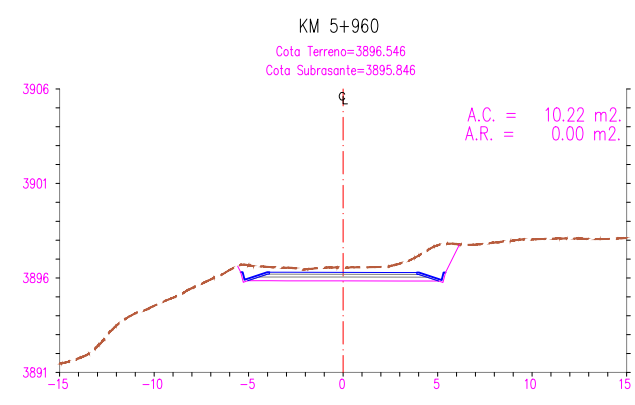
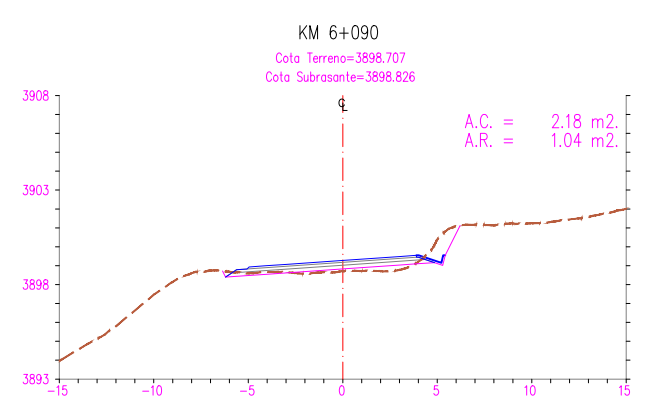
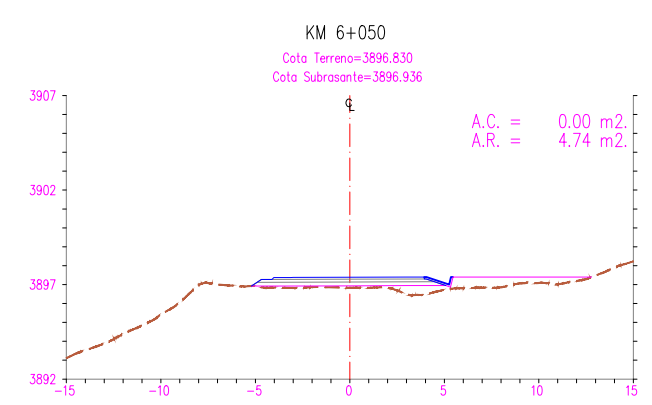
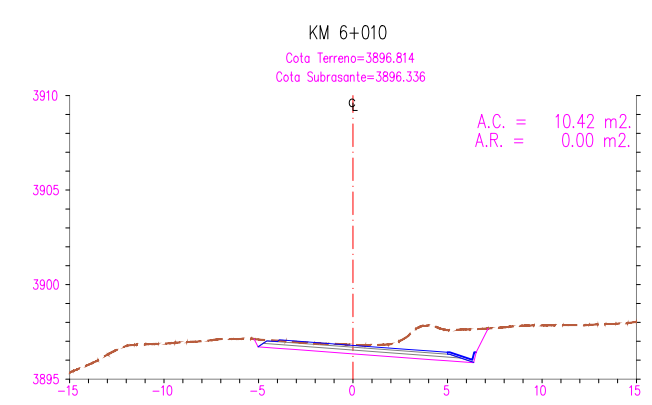
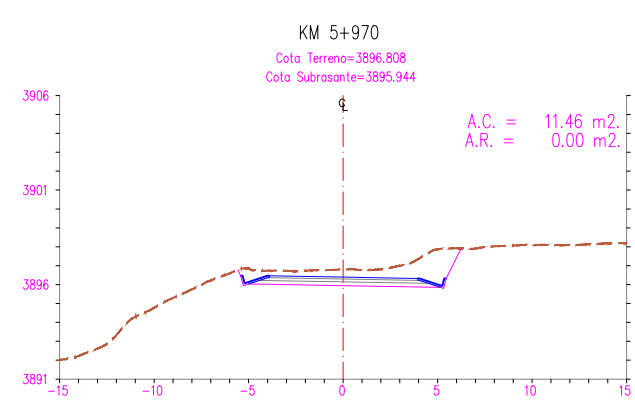
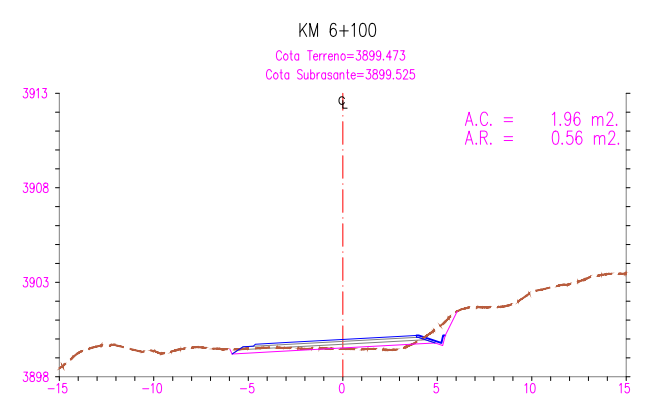
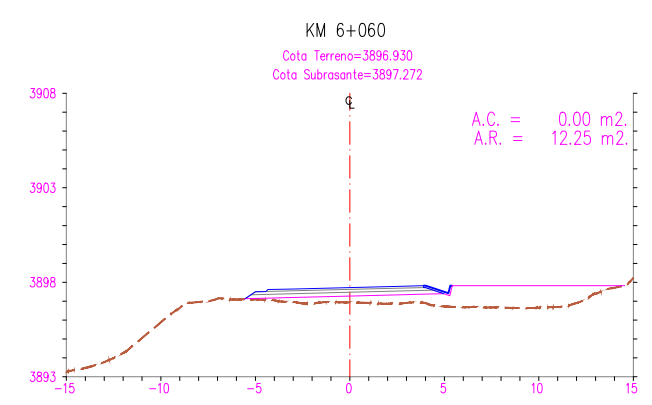
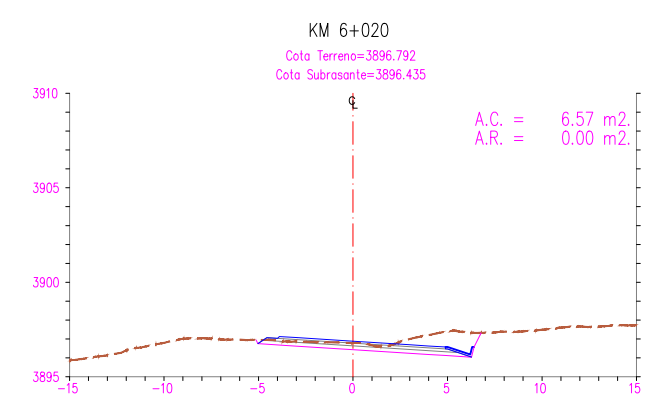
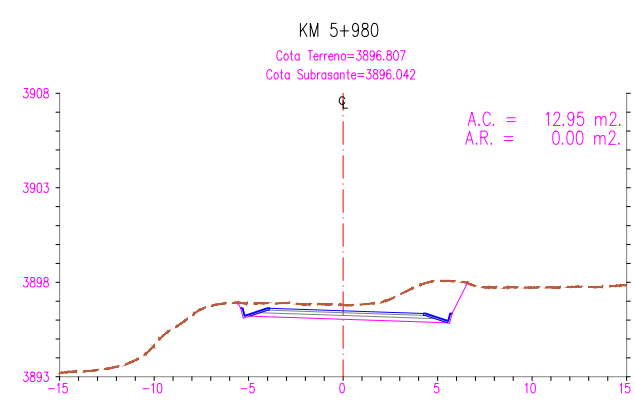
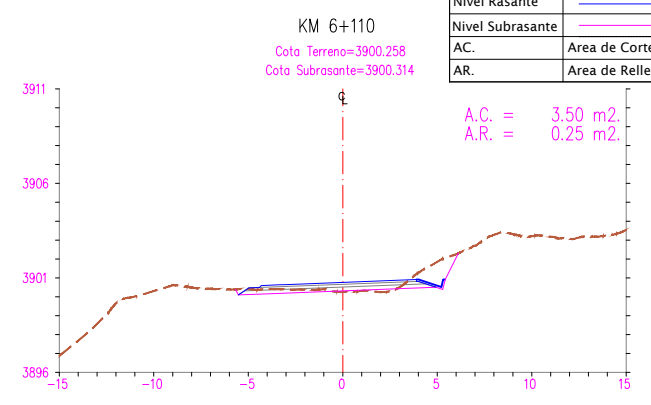
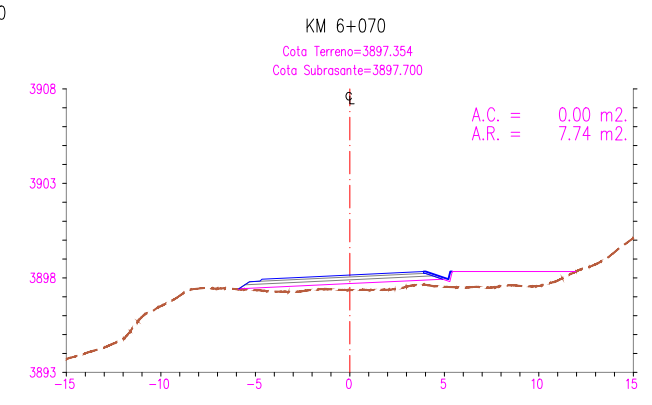
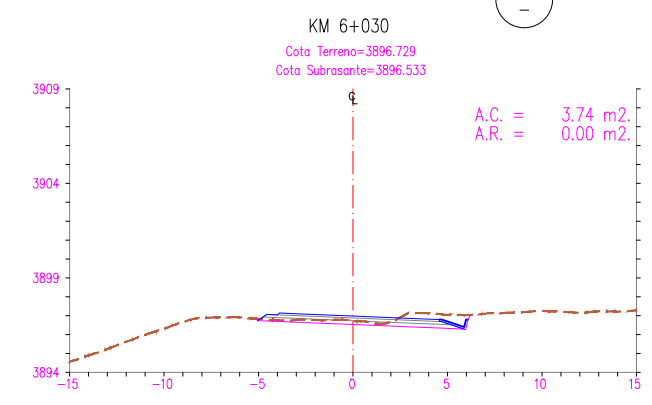
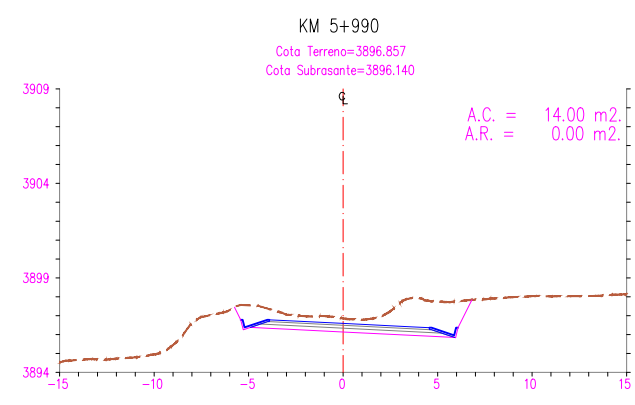
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	---
Nivel Rasante	—
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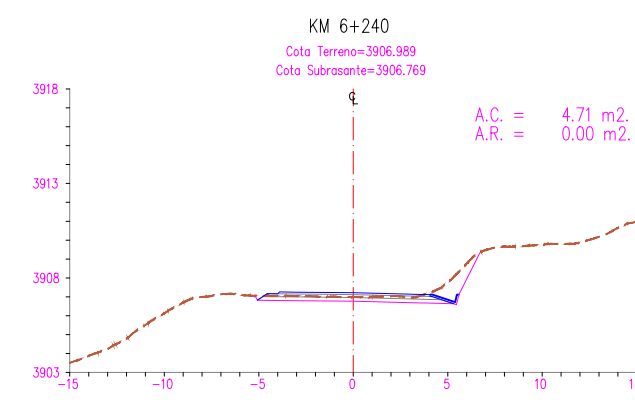
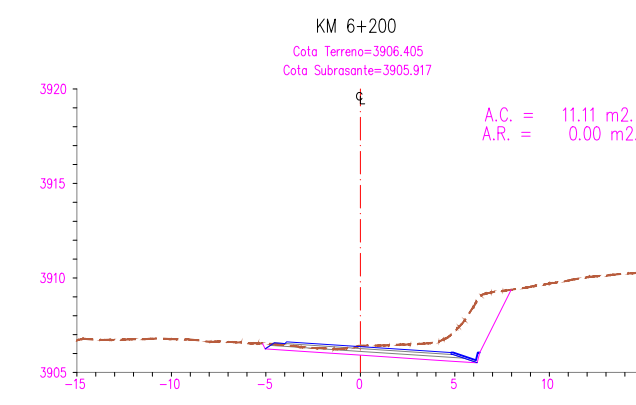
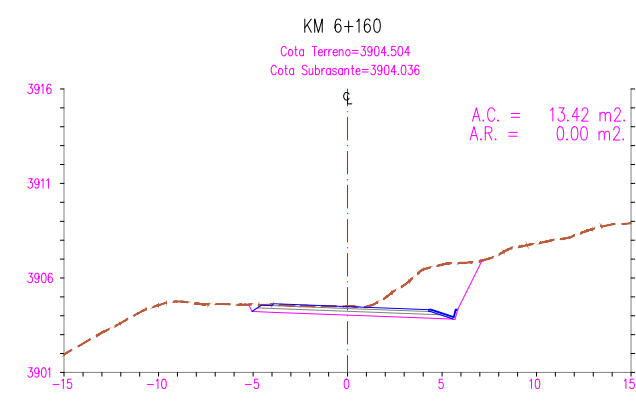
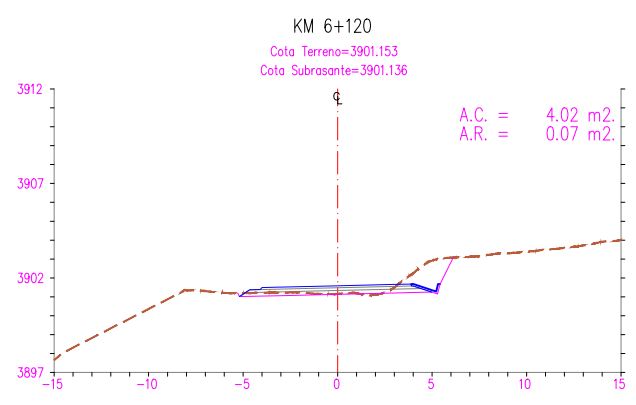
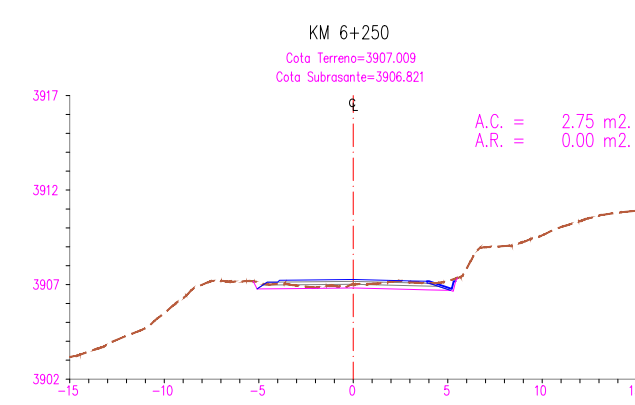
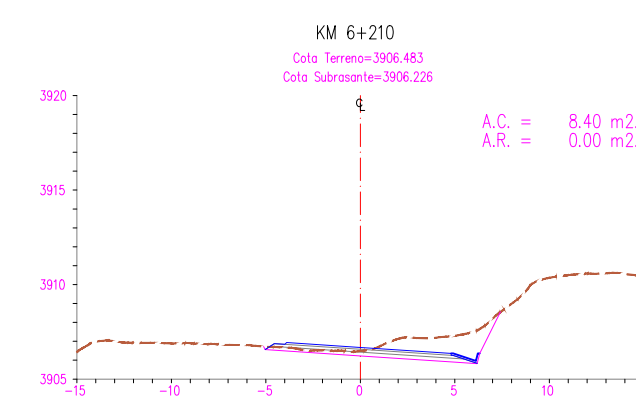
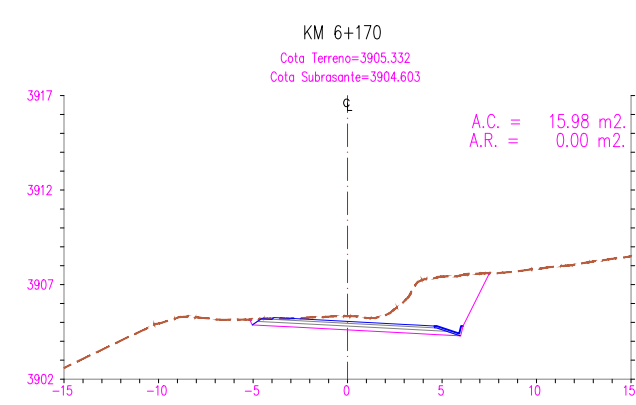
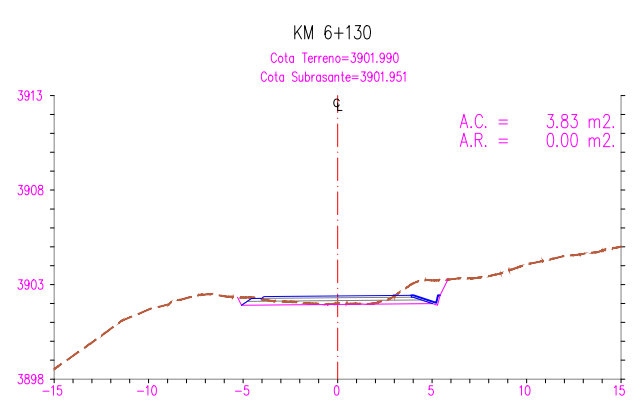
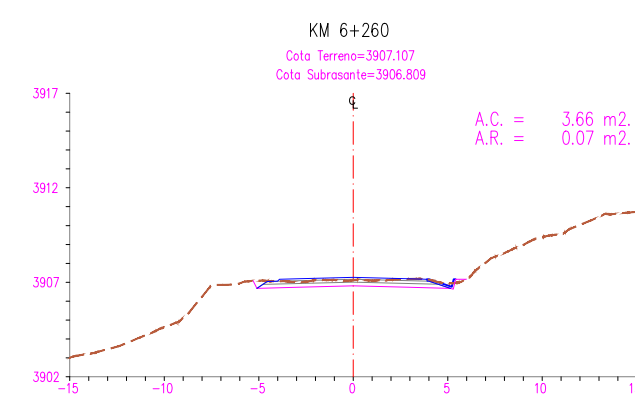
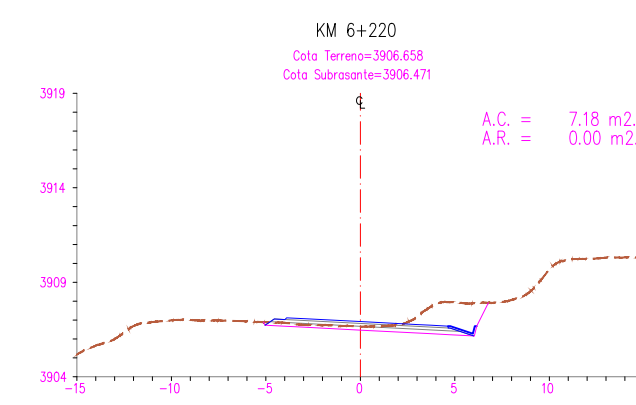
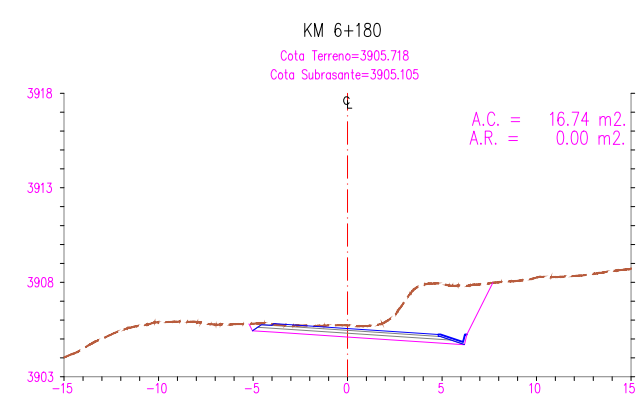
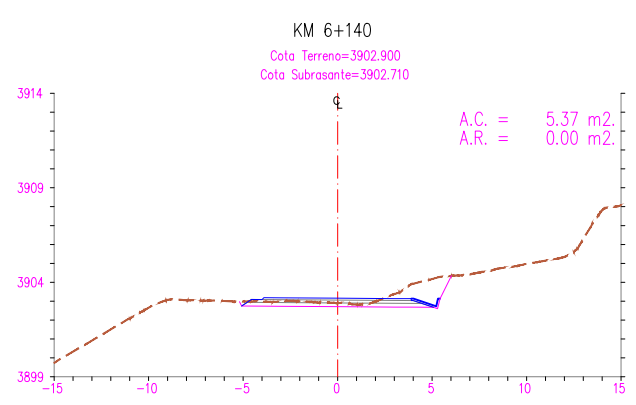
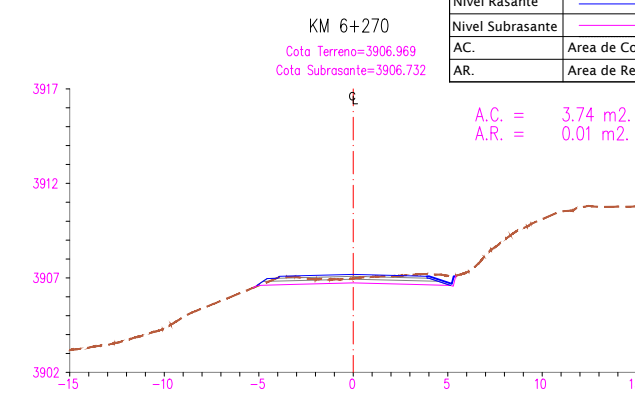
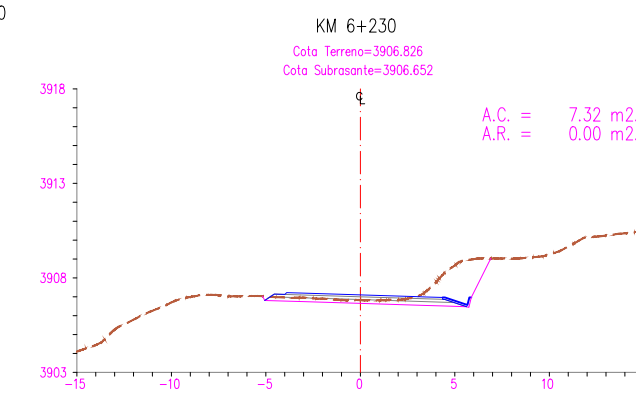
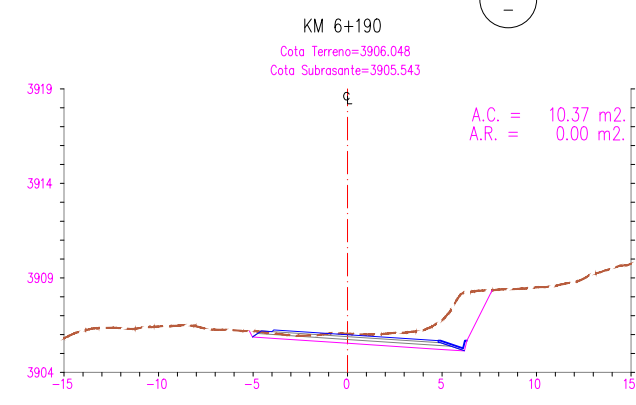
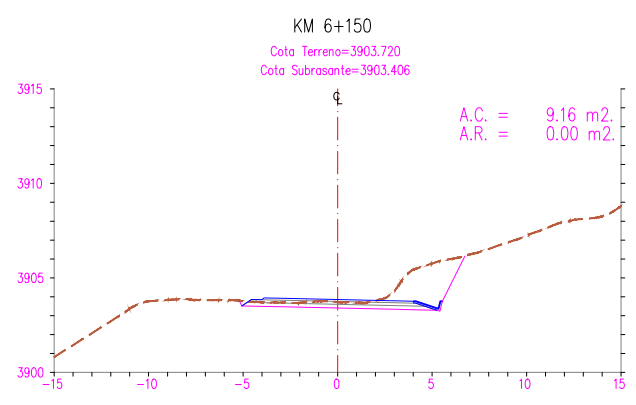
Proyecto de Tesis:
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 5+960 - Km 6+110

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-007
Lamina: 07-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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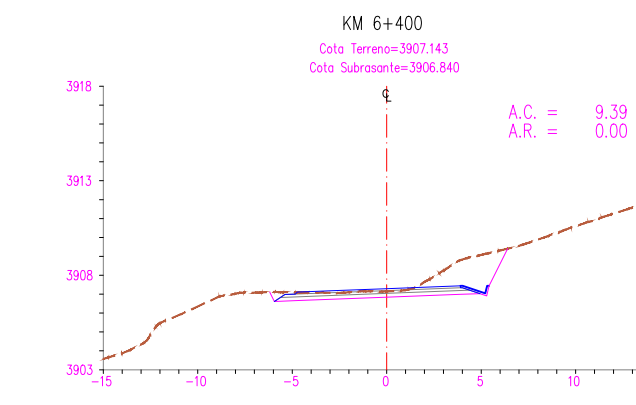
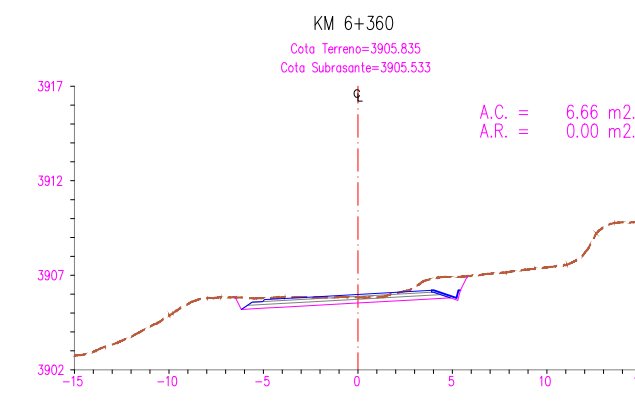
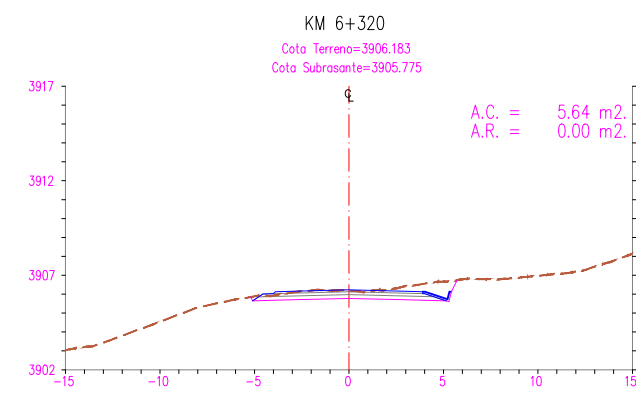
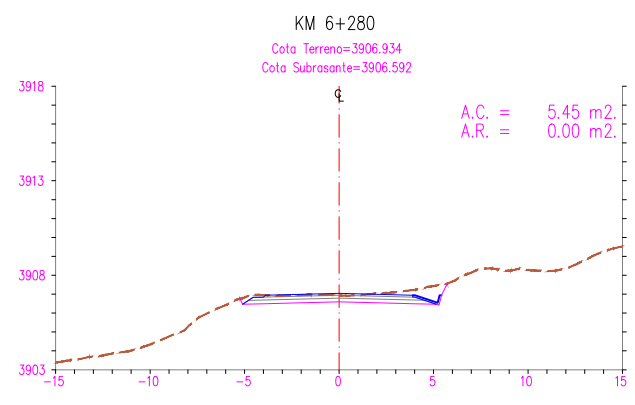
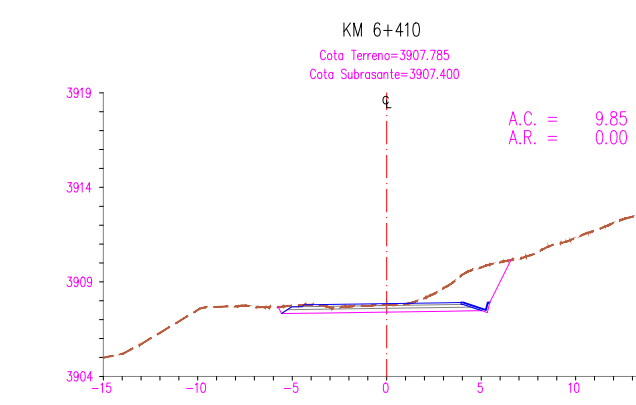
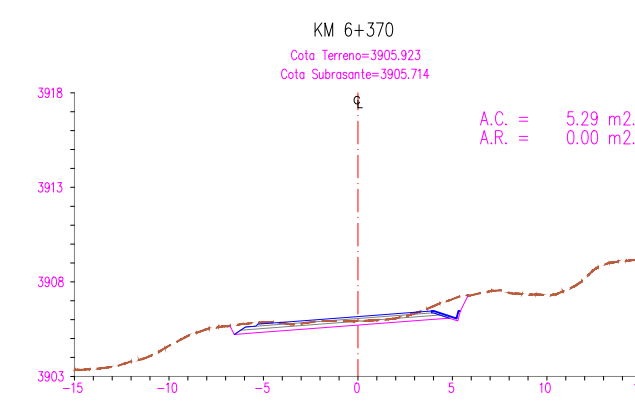
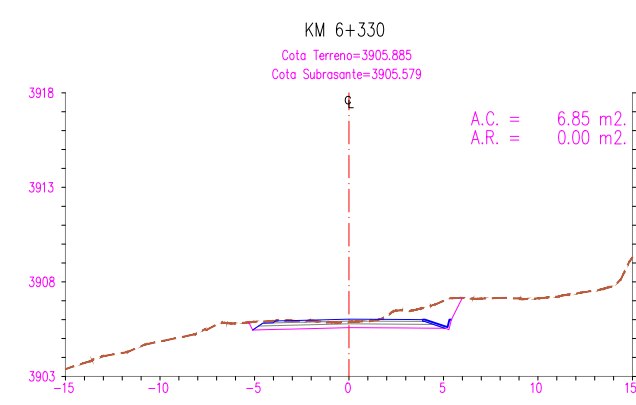
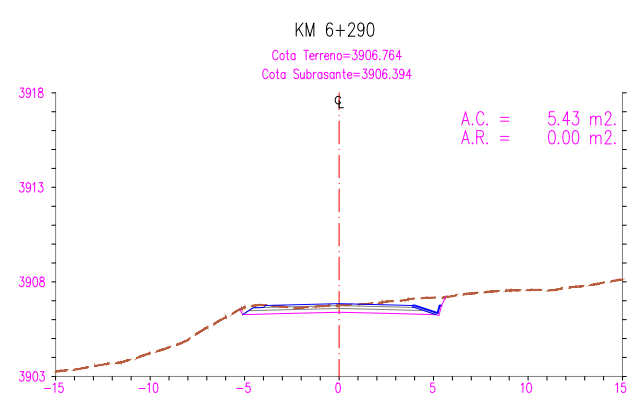
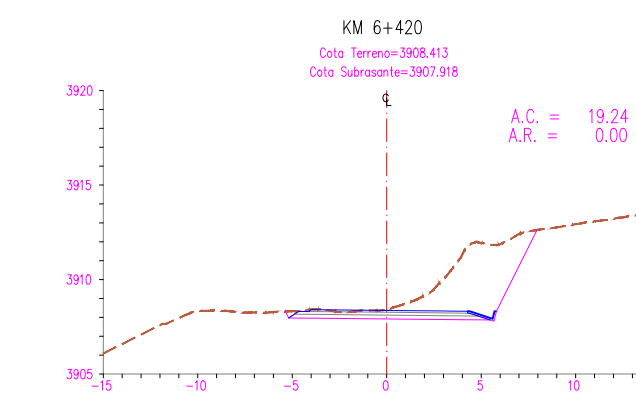
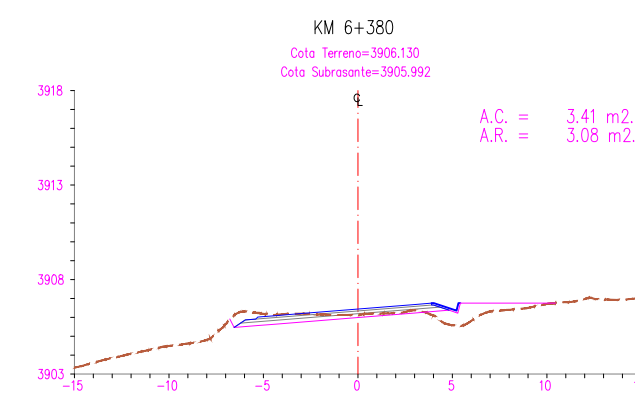
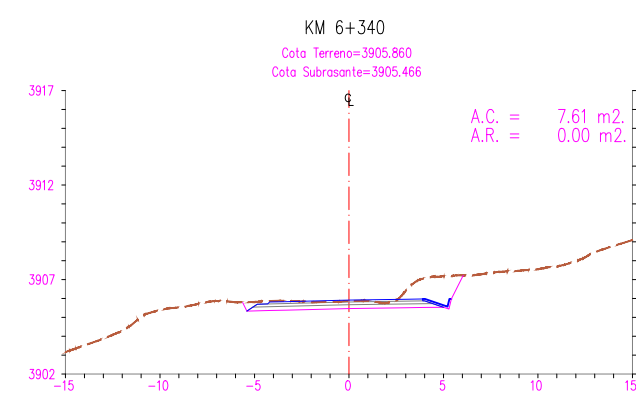
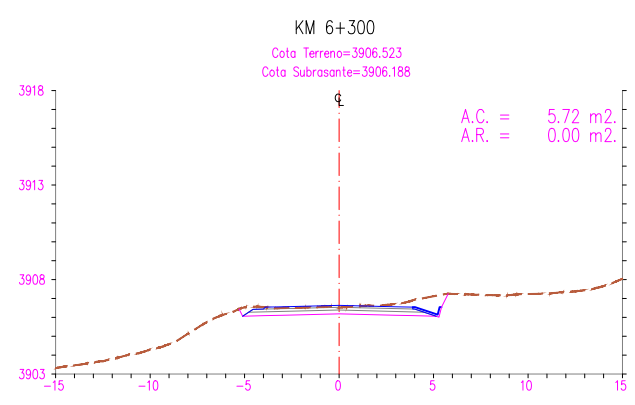
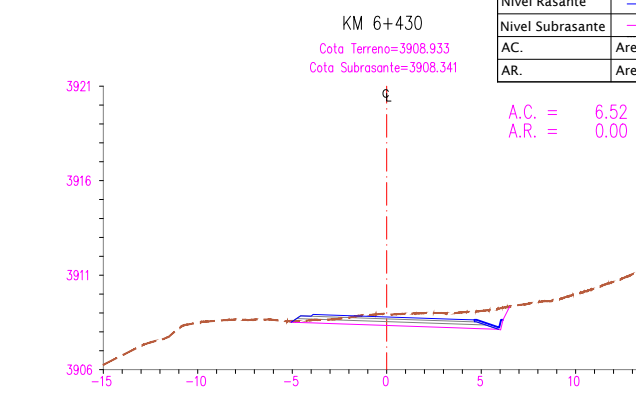
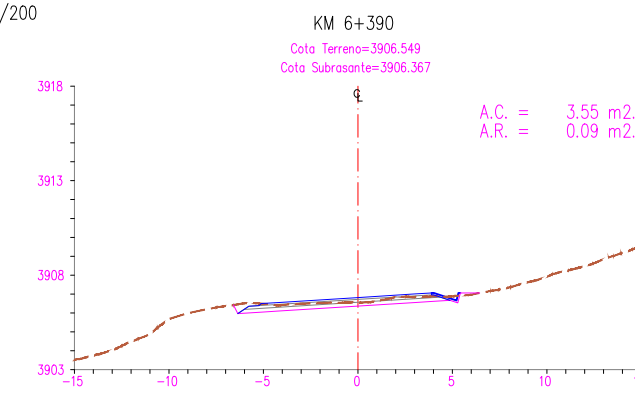
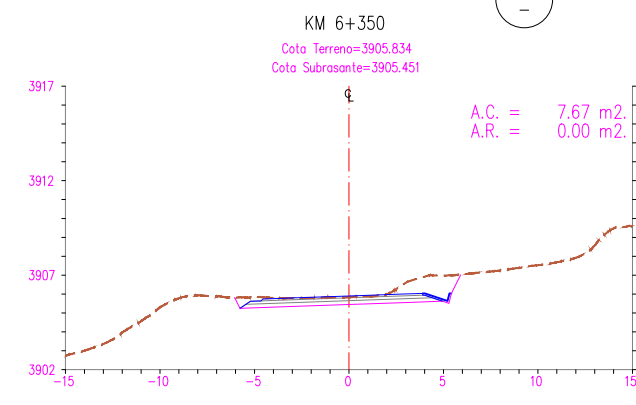
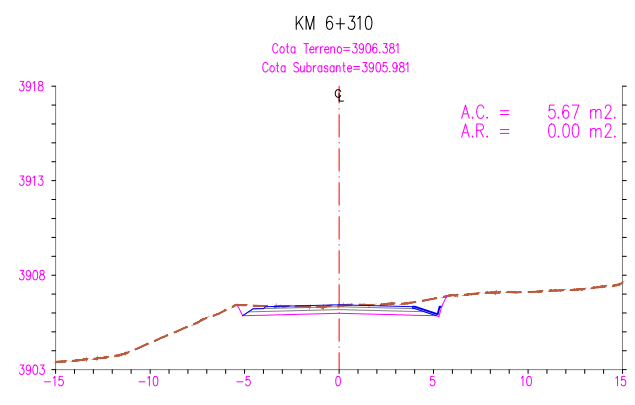
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 6+120 - Km 6+270

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-008
Lamina: 08-47
REV-00

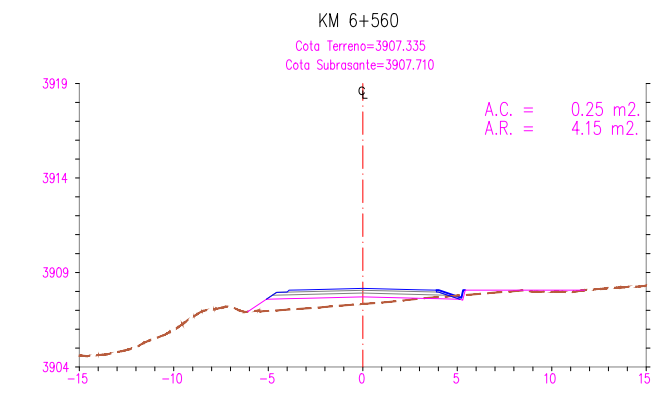
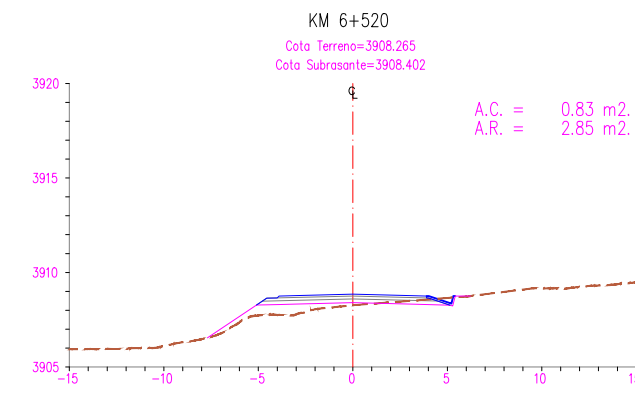
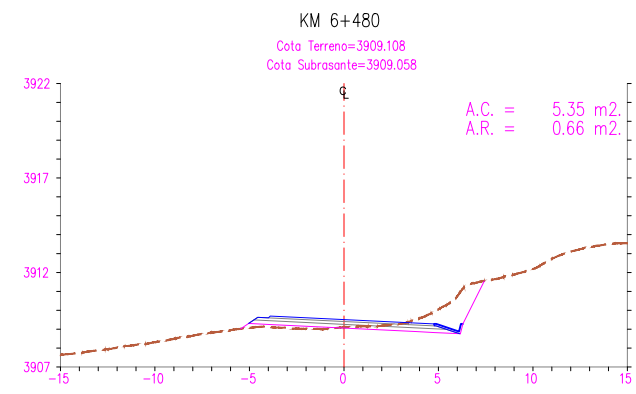
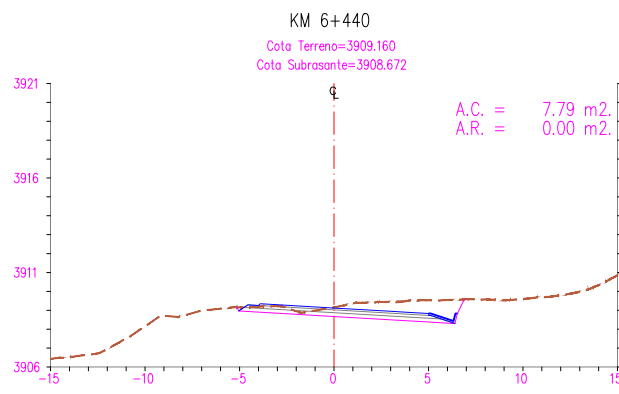
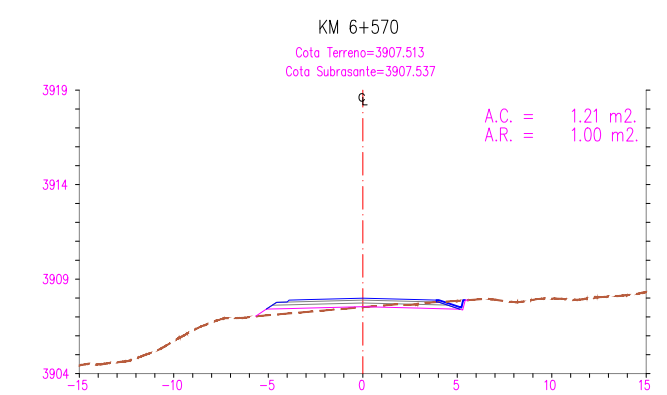
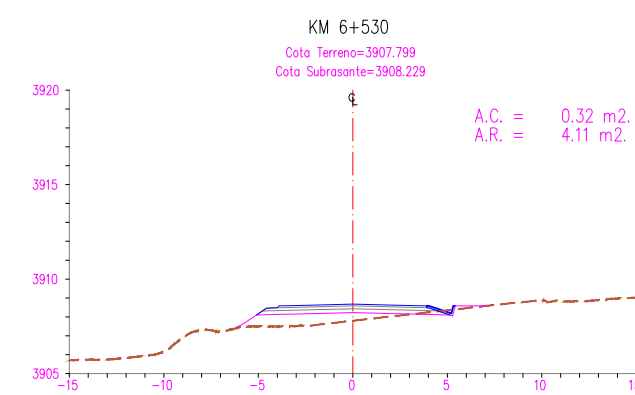
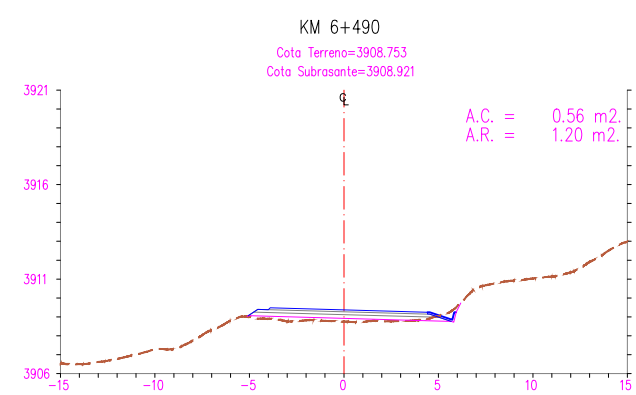
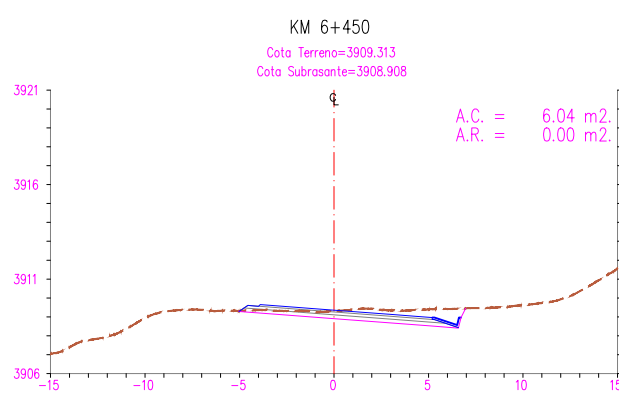
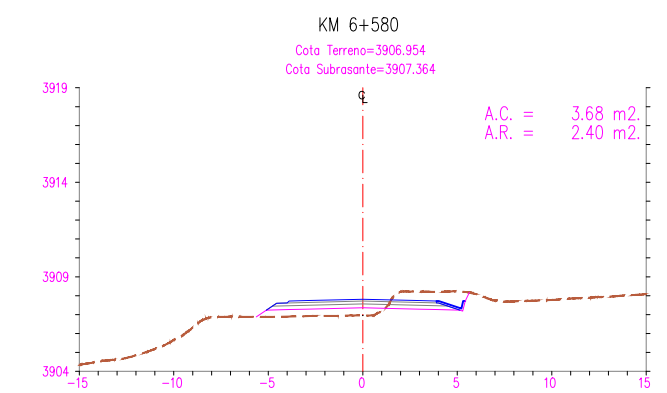
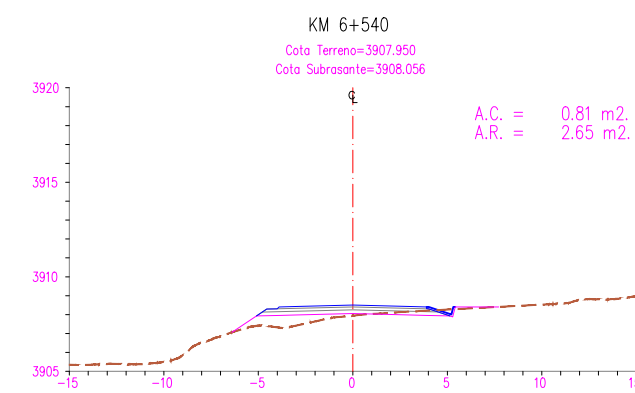
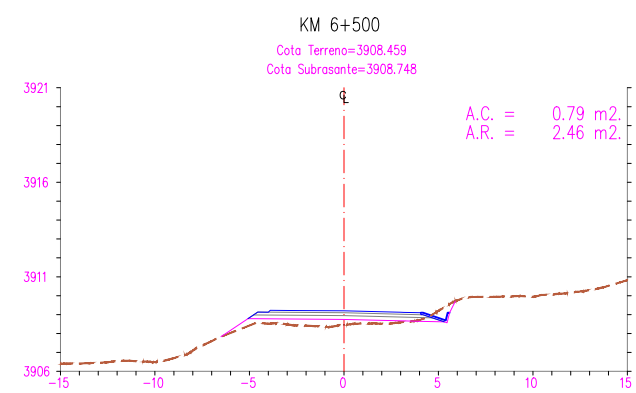
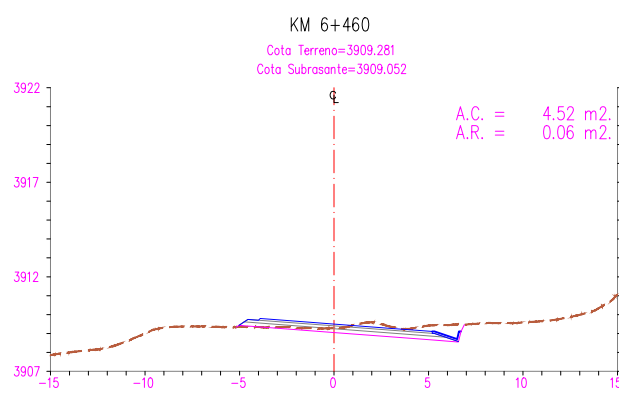
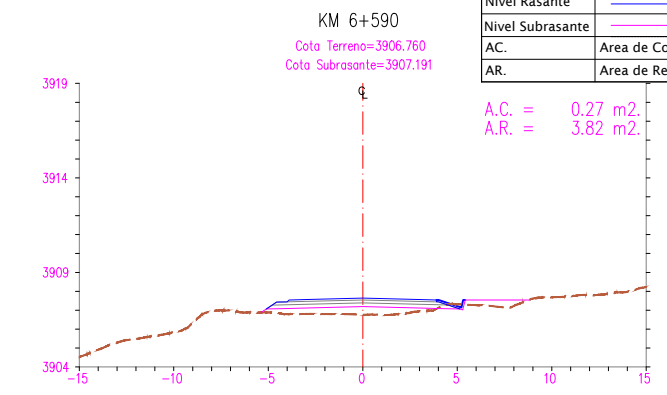
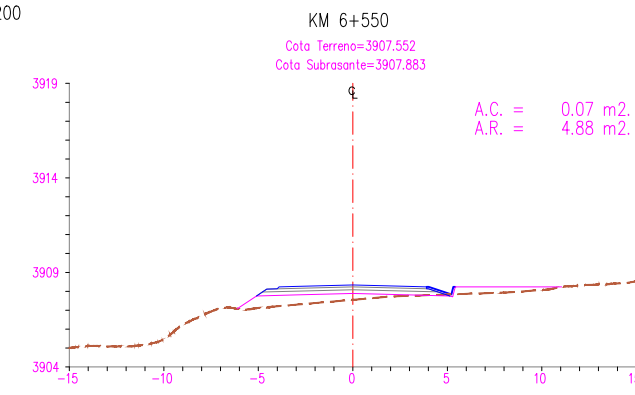
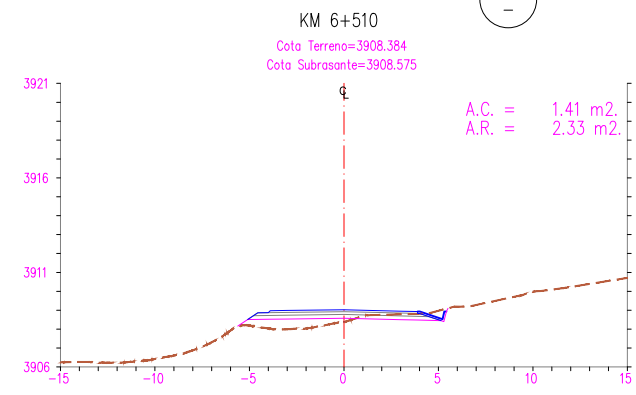
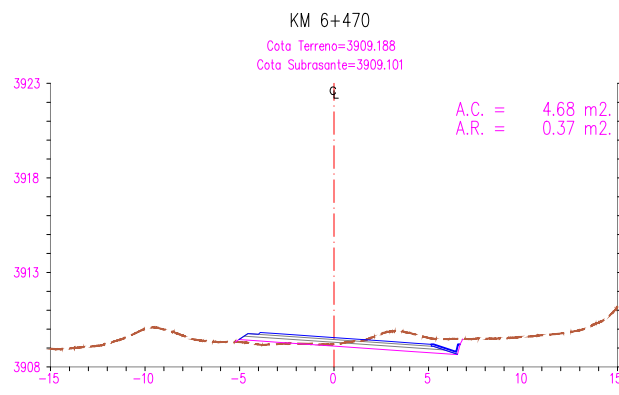
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



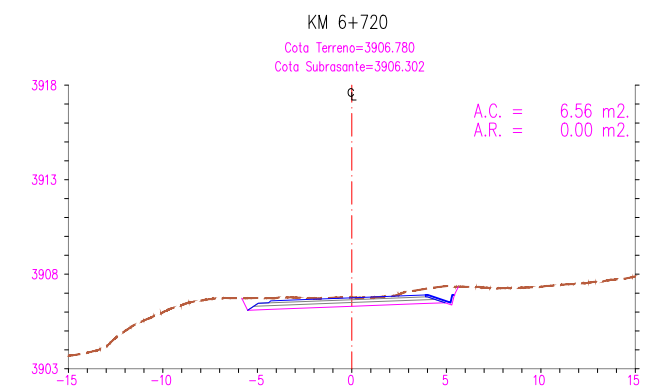
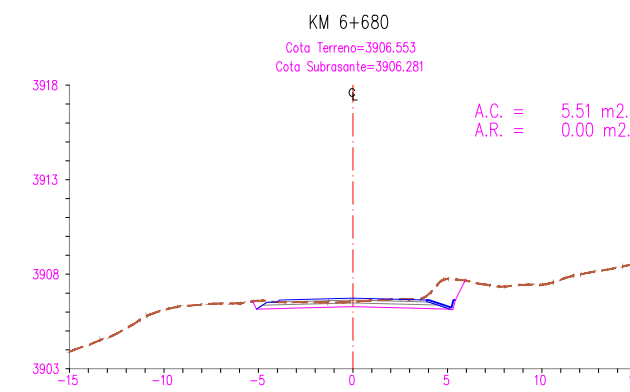
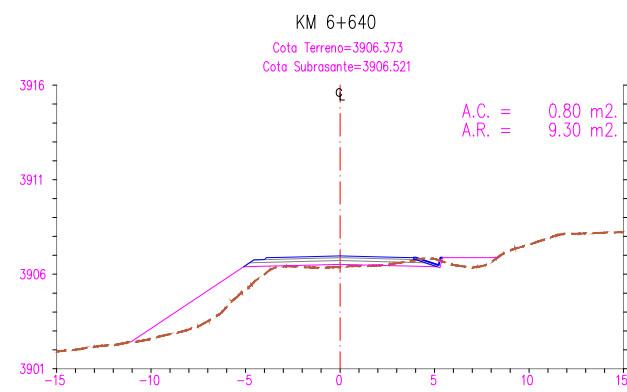
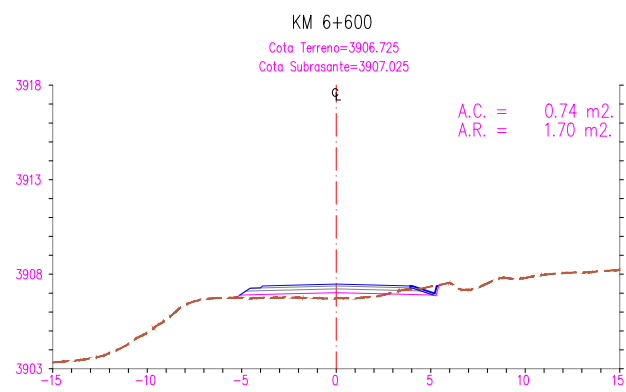
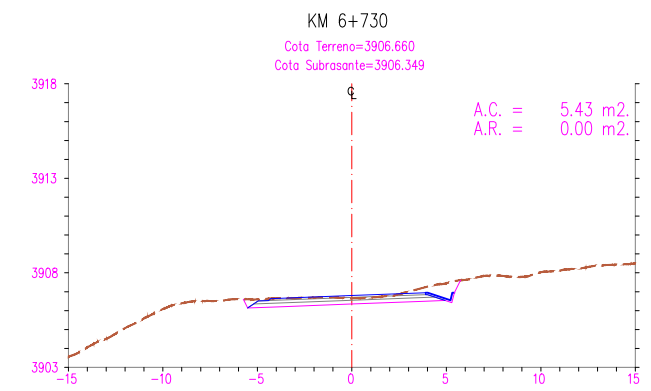
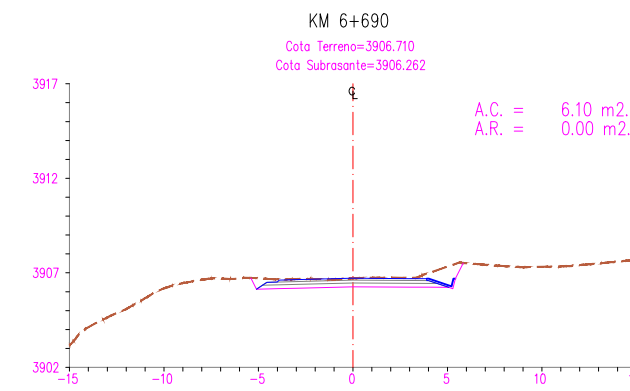
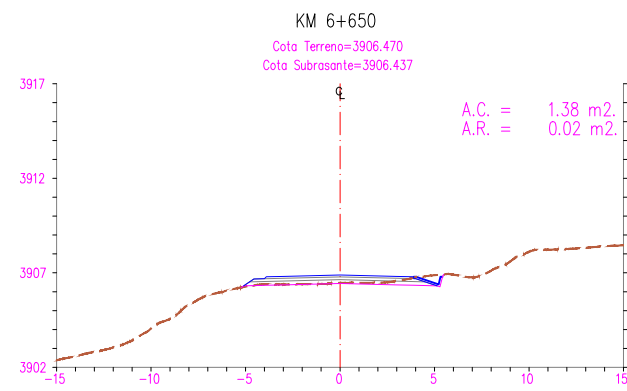
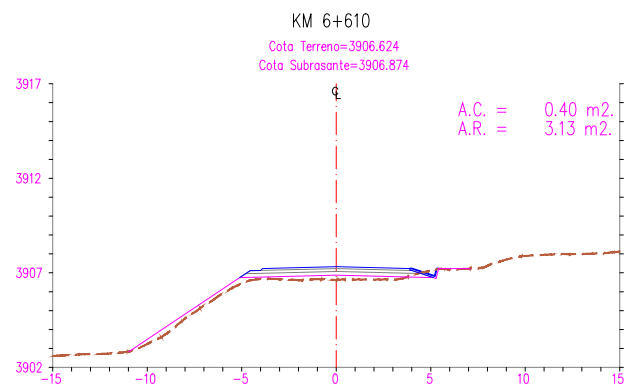
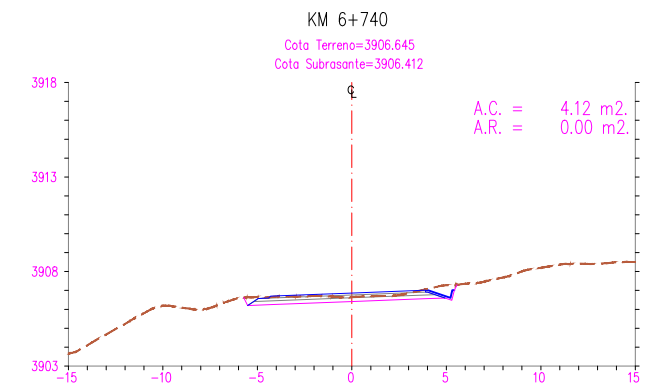
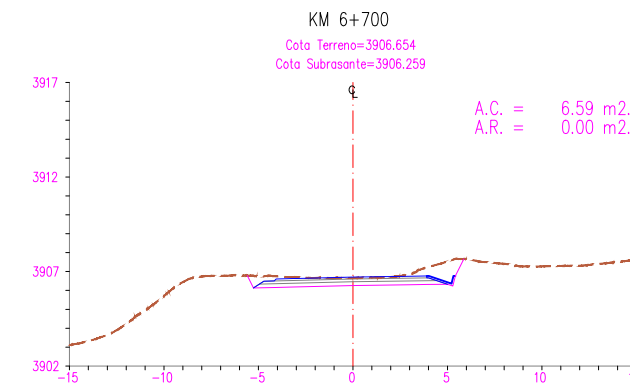
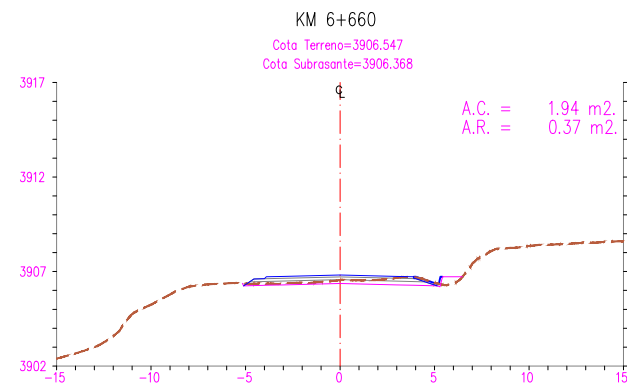
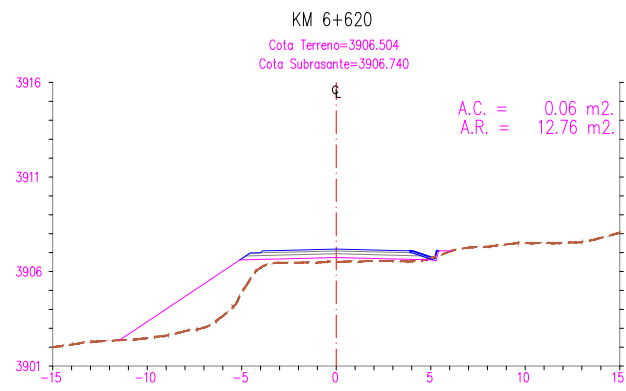
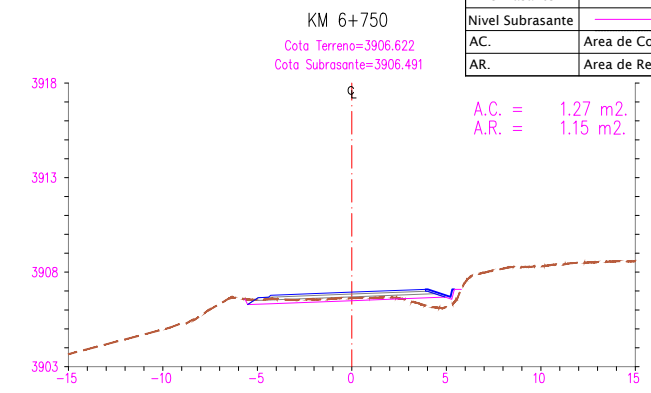
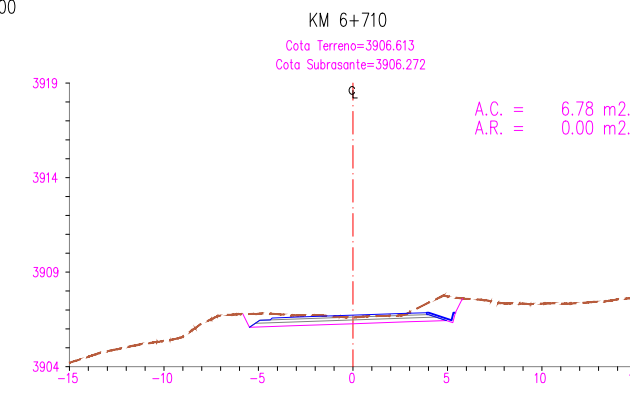
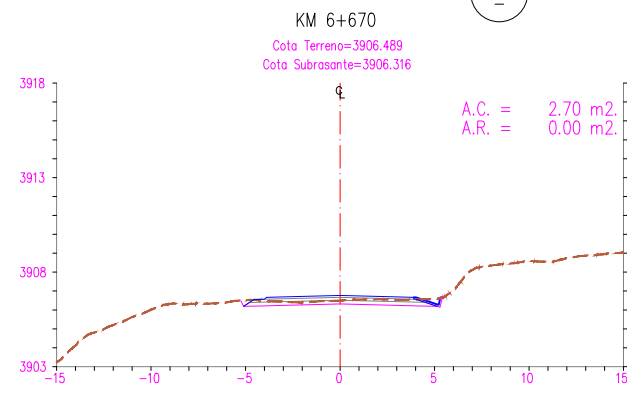
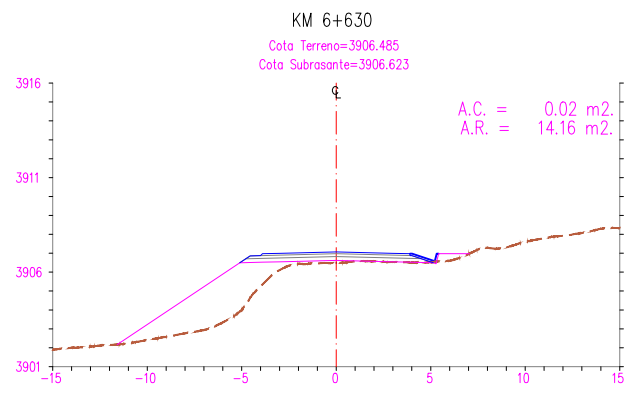
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
AR.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
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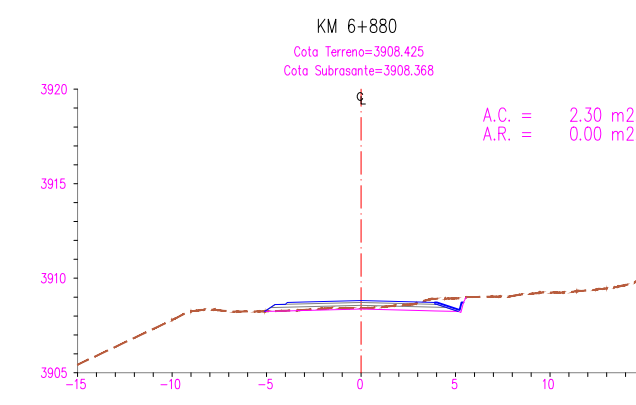
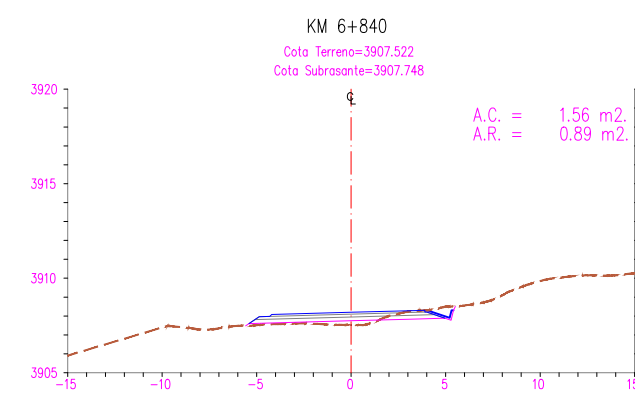
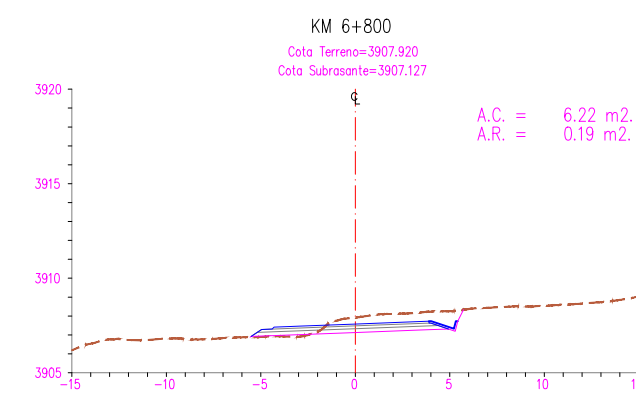
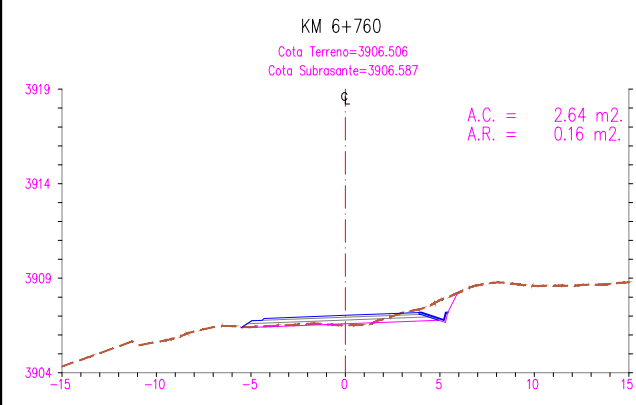
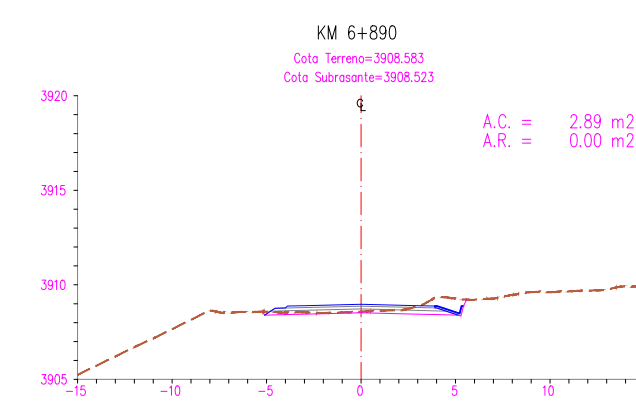
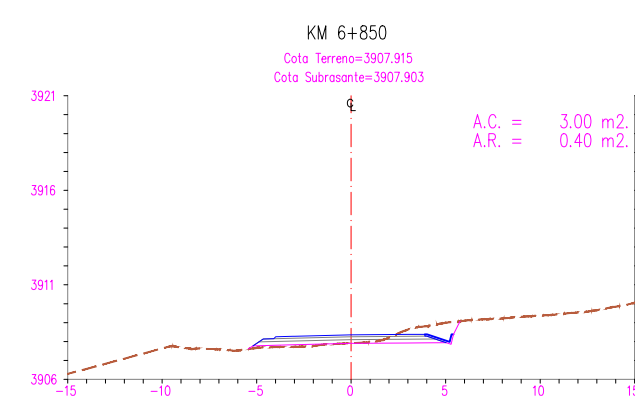
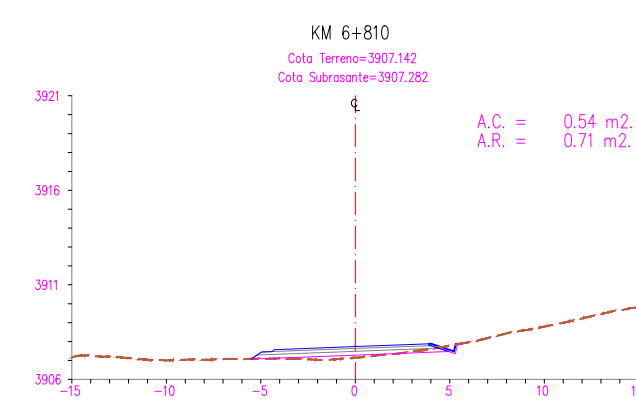
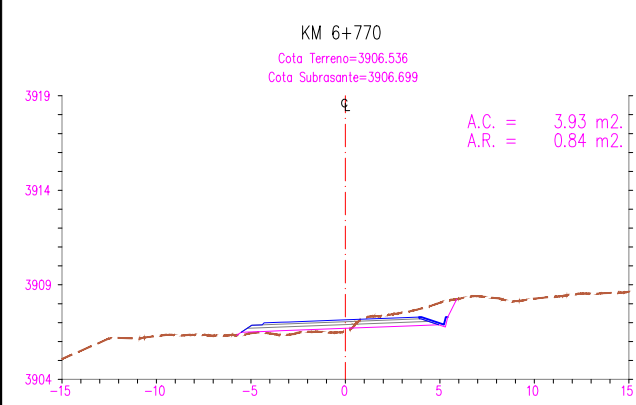
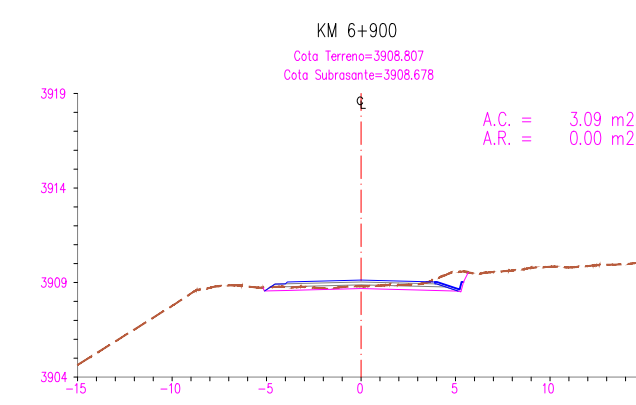
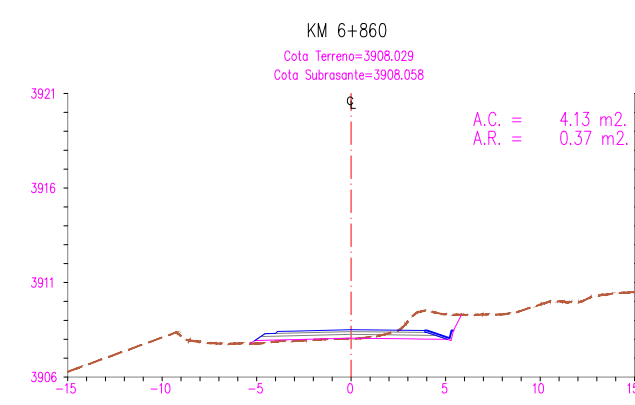
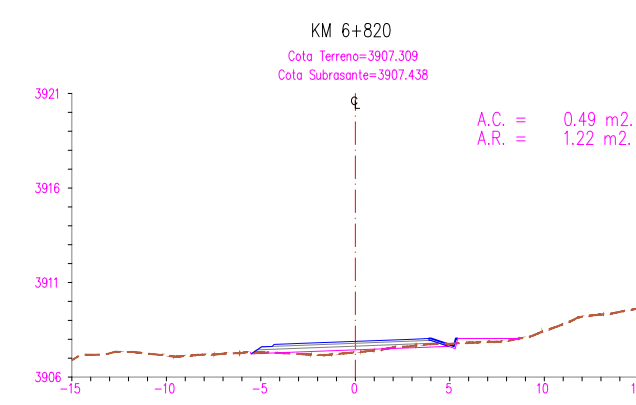
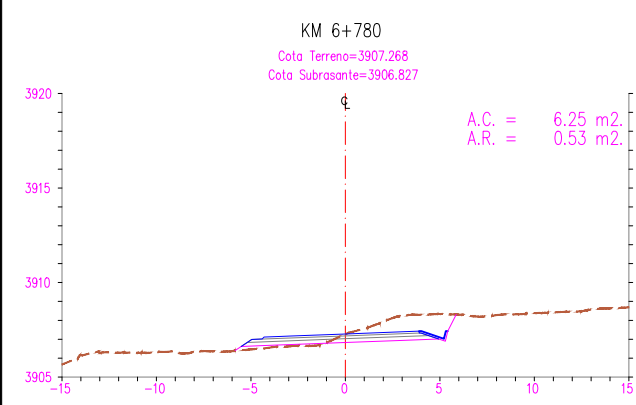
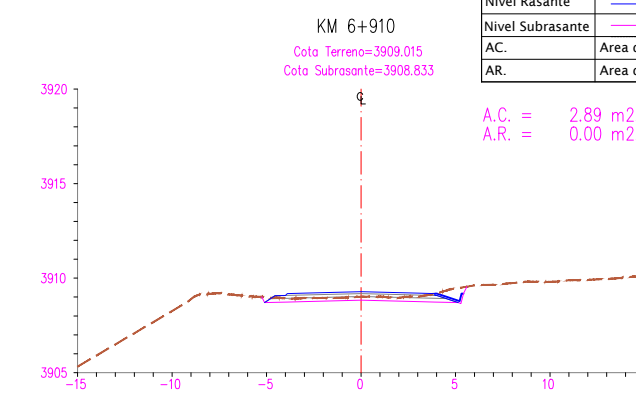
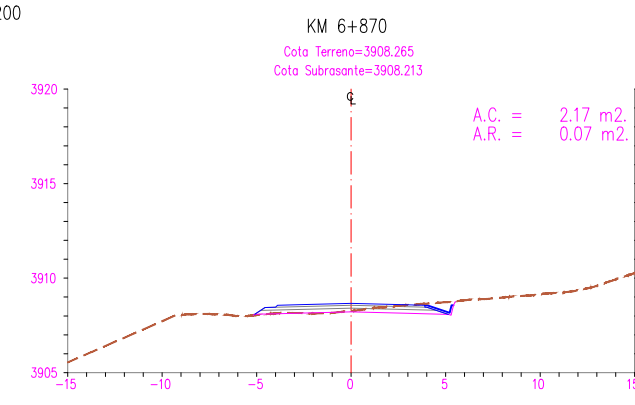
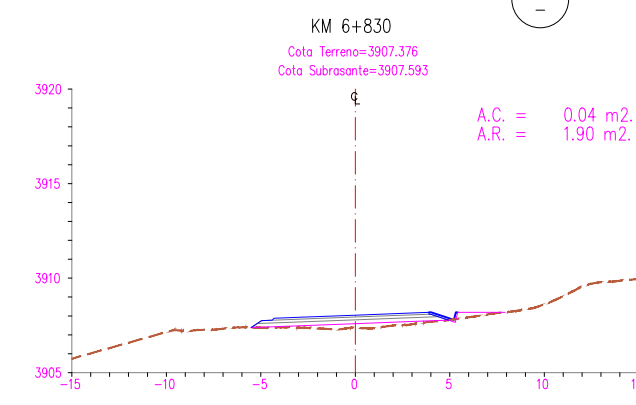
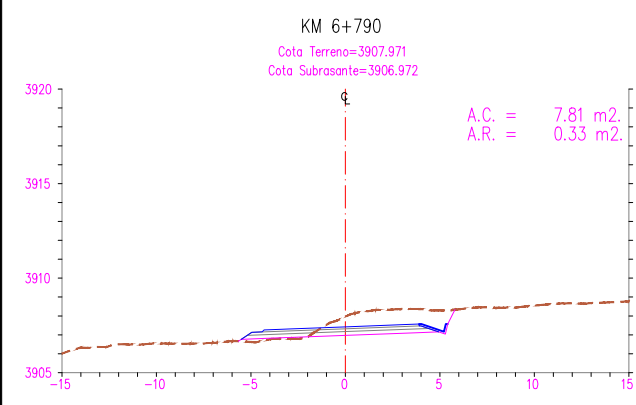
Proyecto de Tesis:
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 6+600 - Km 6+750

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-011
Lamina: 11-47
REV-00

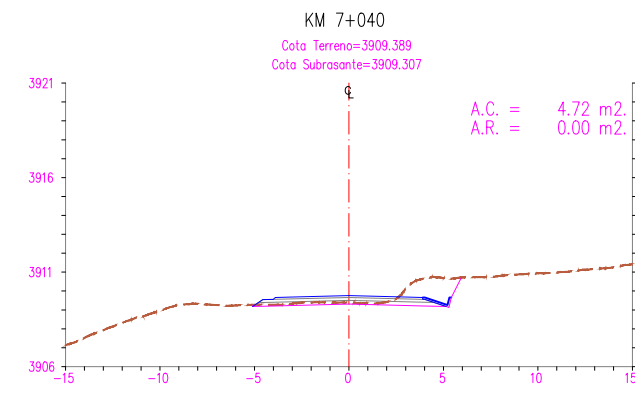
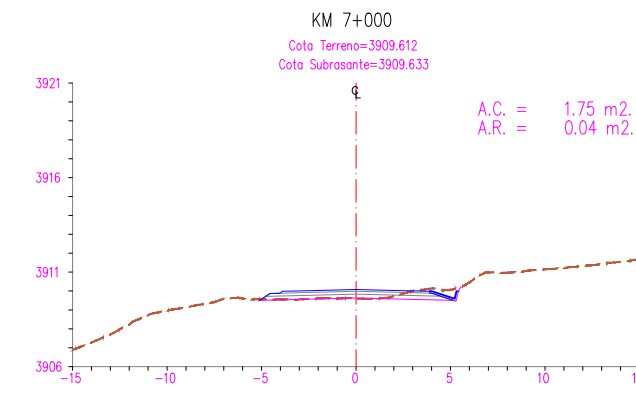
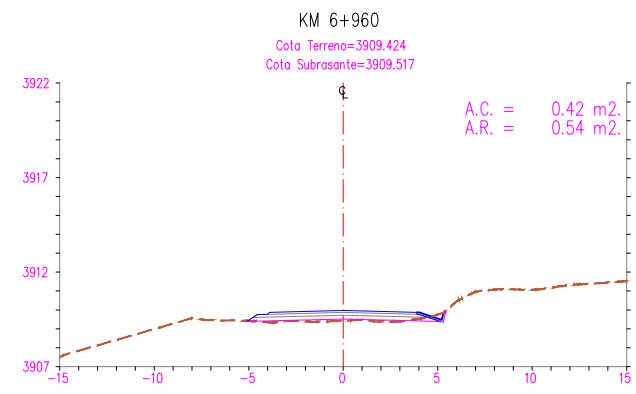
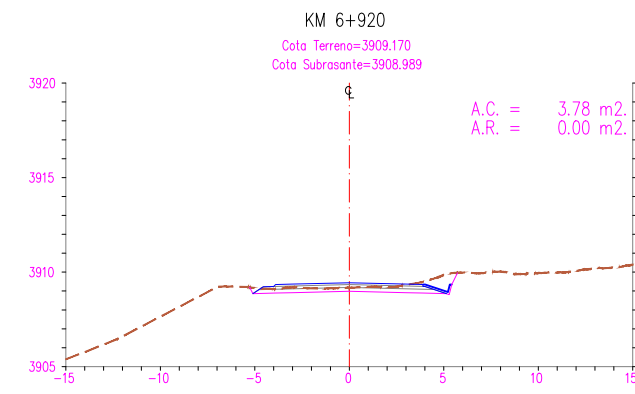
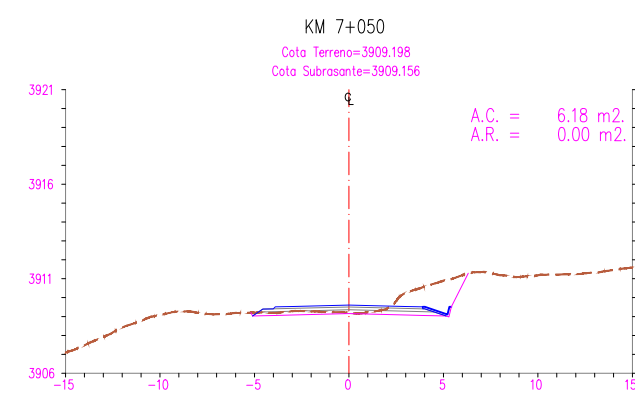
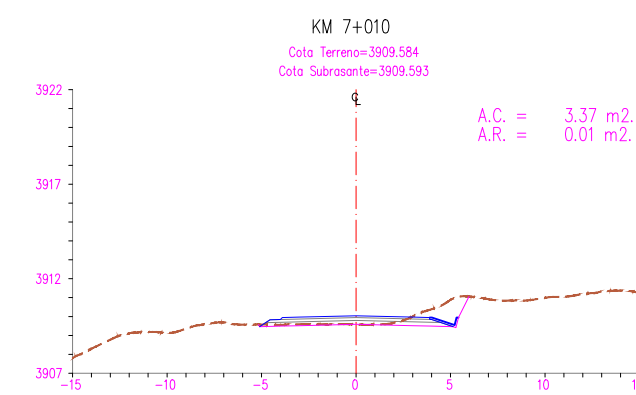
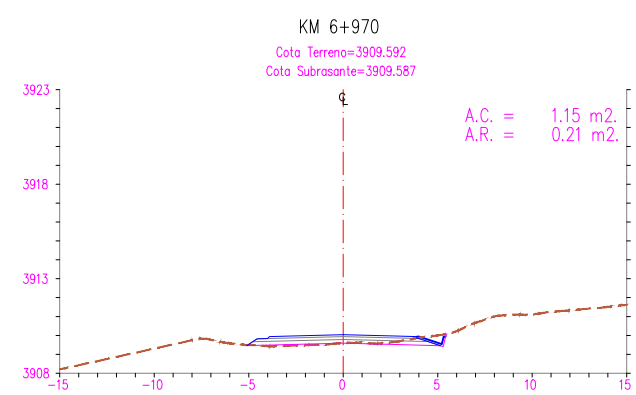
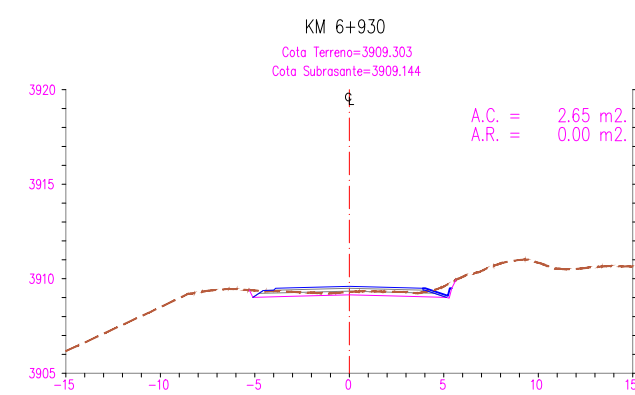
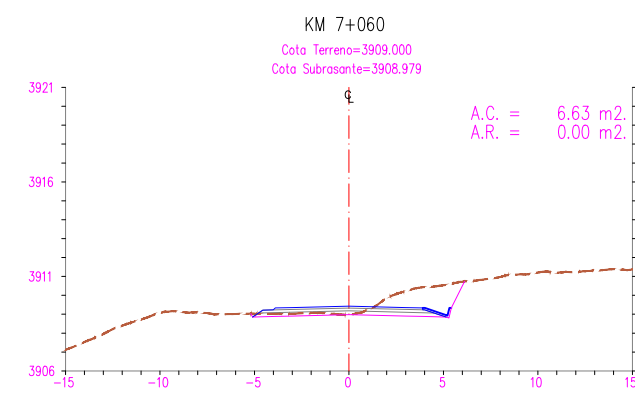
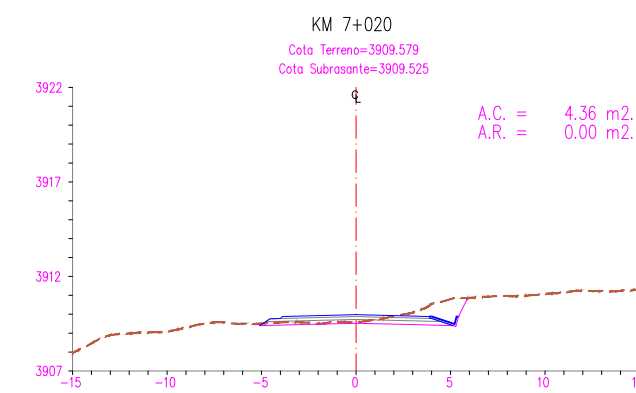
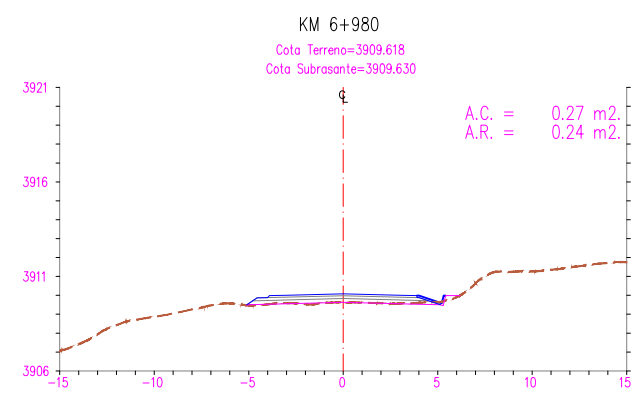
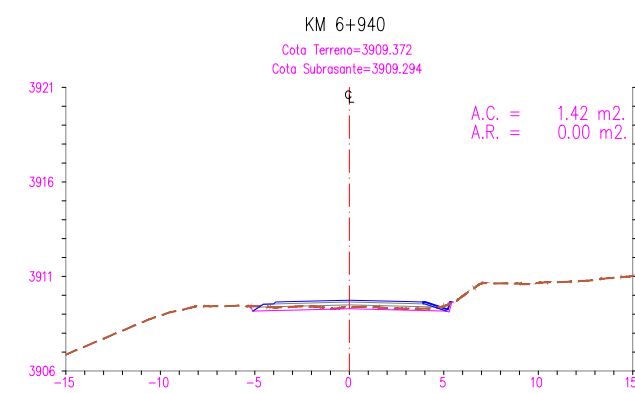
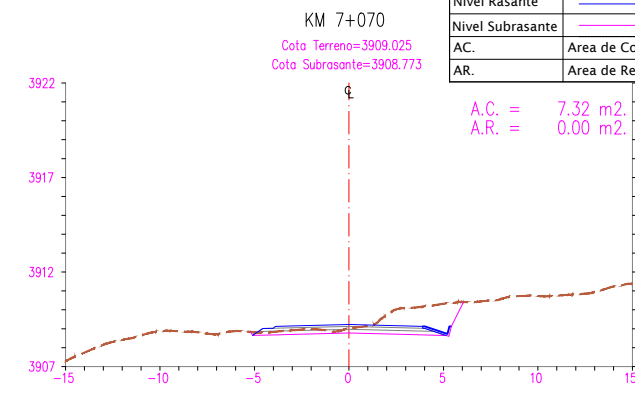
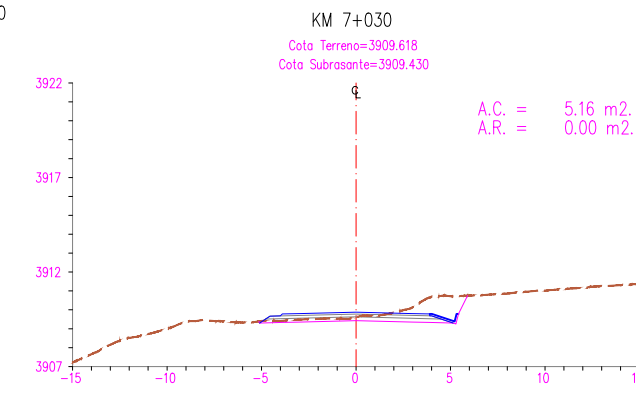
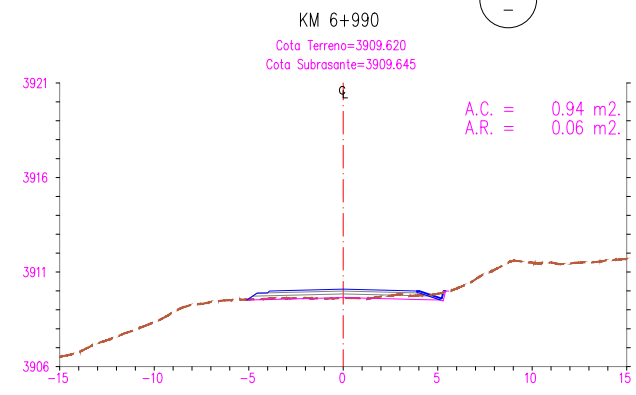
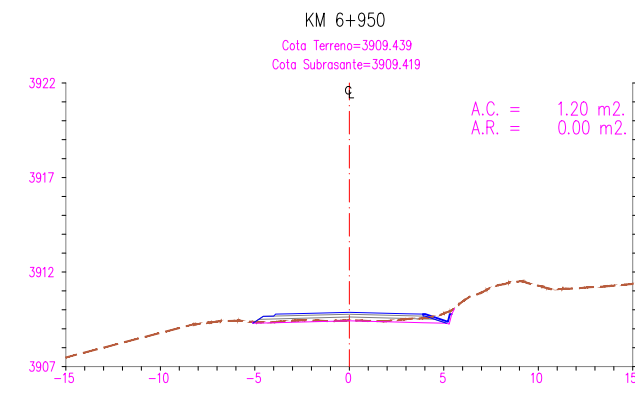
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
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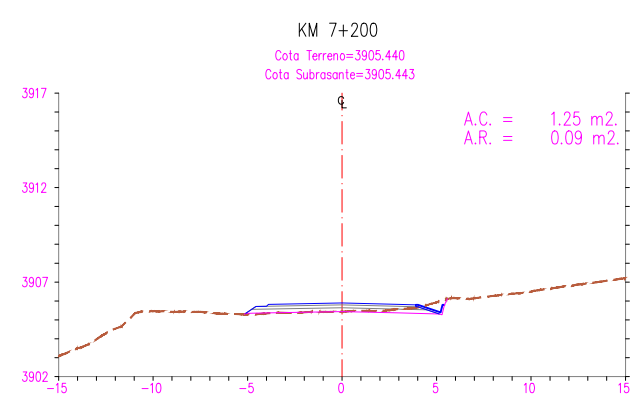
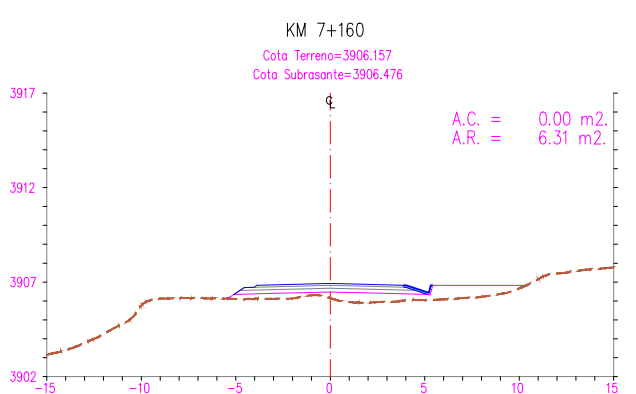
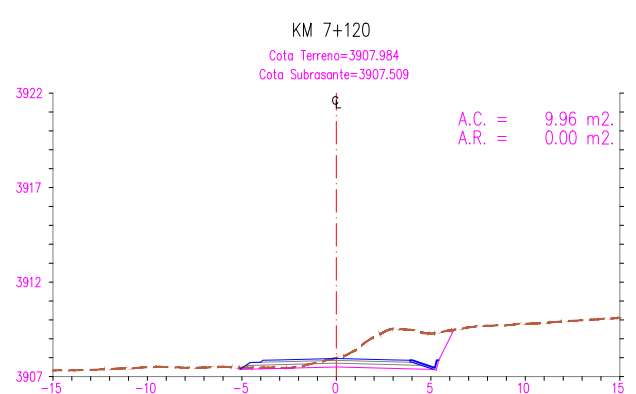
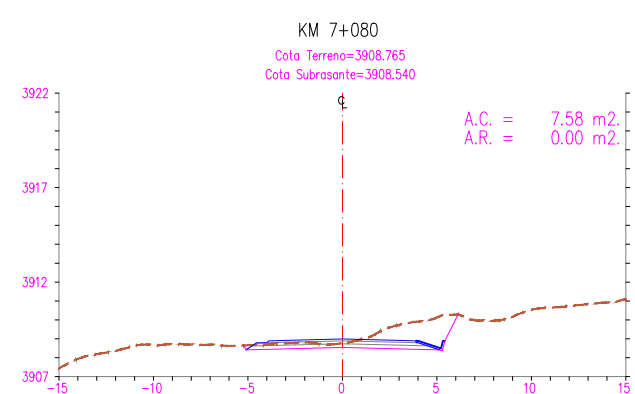
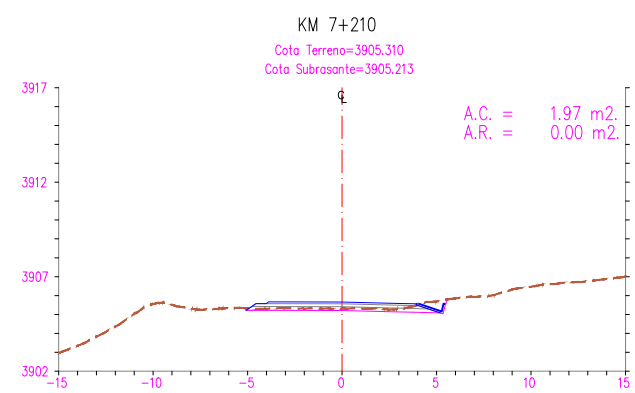
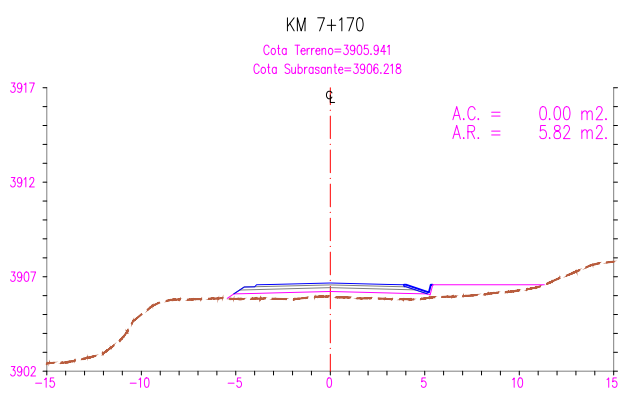
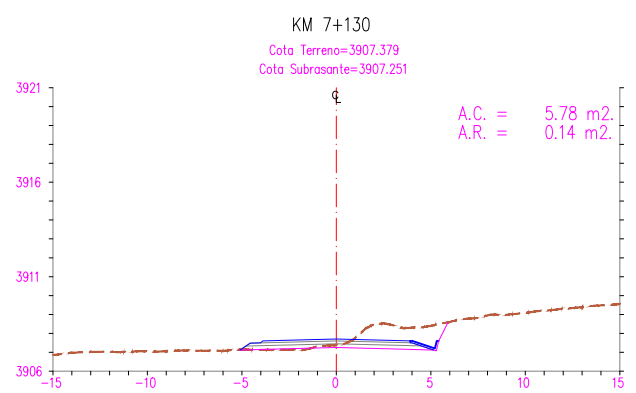
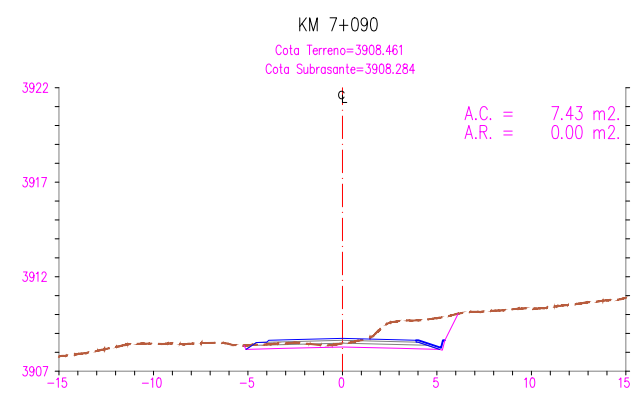
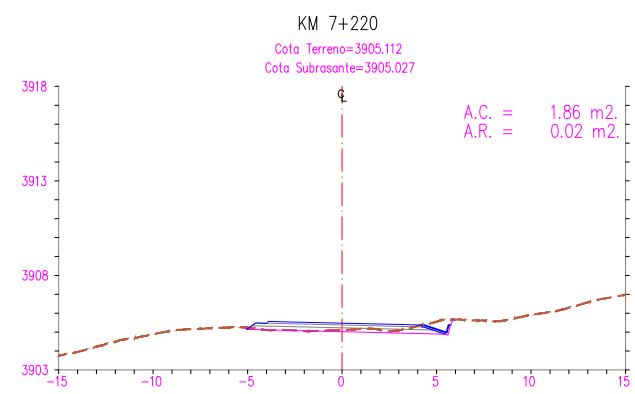
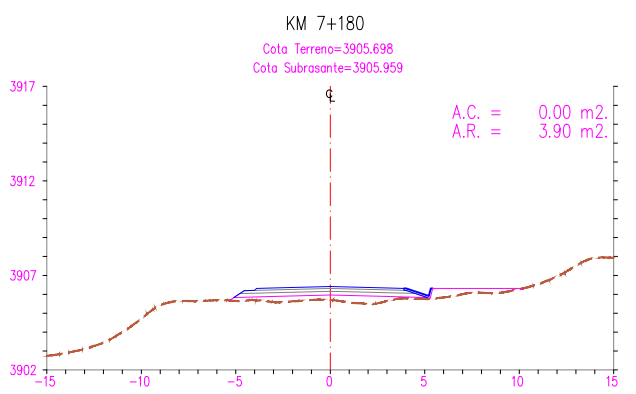
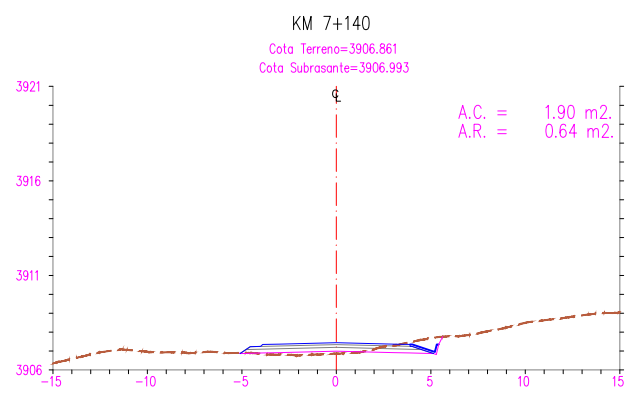
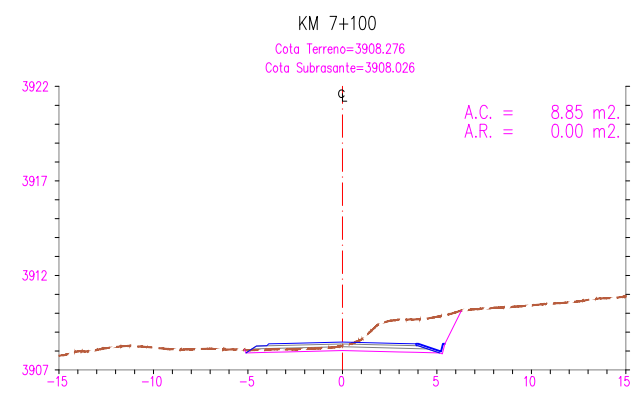
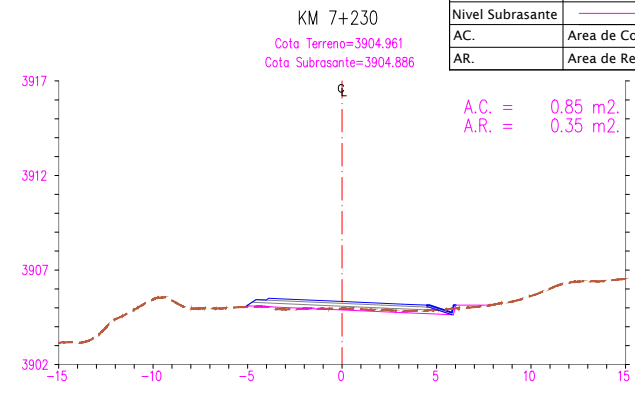
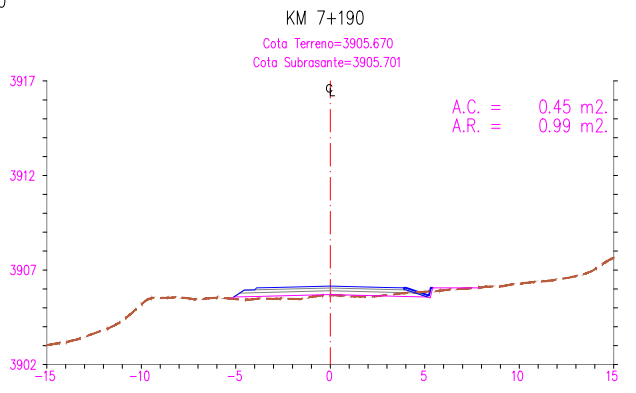
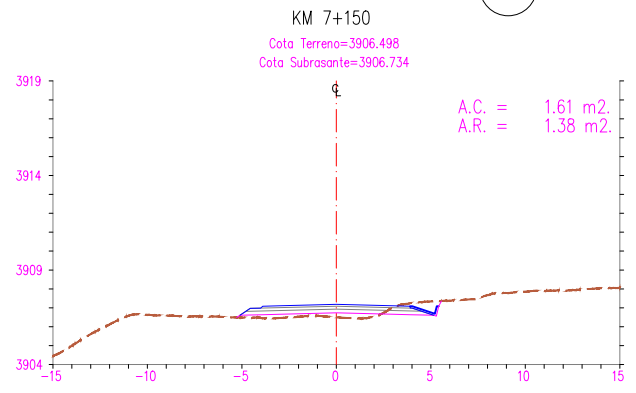
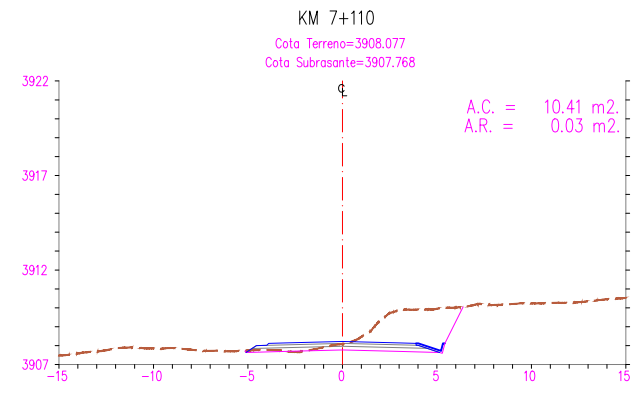
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 6+920 - Km 7+070

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-013
Lamina: 13-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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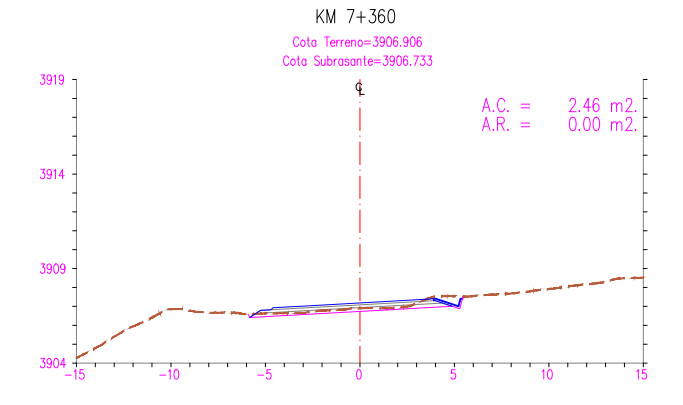
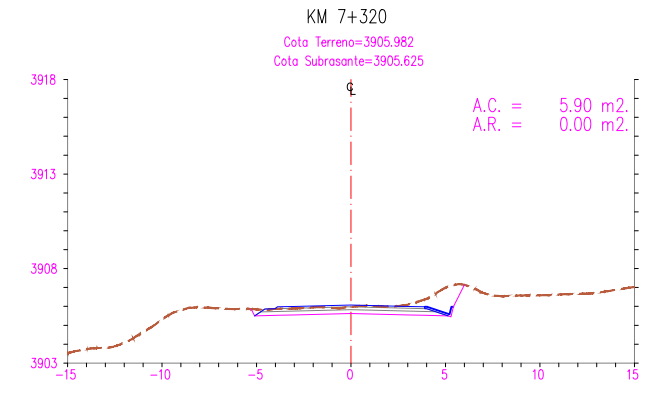
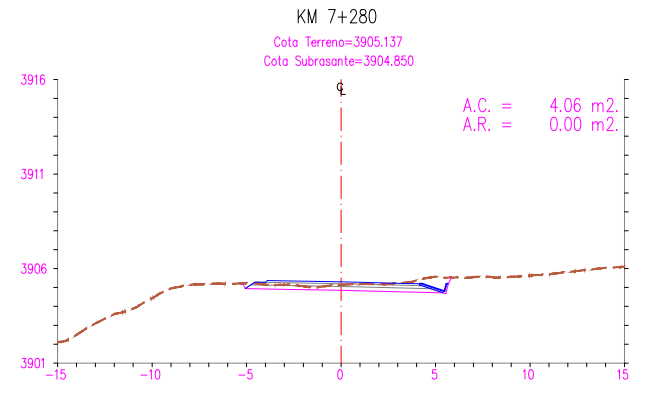
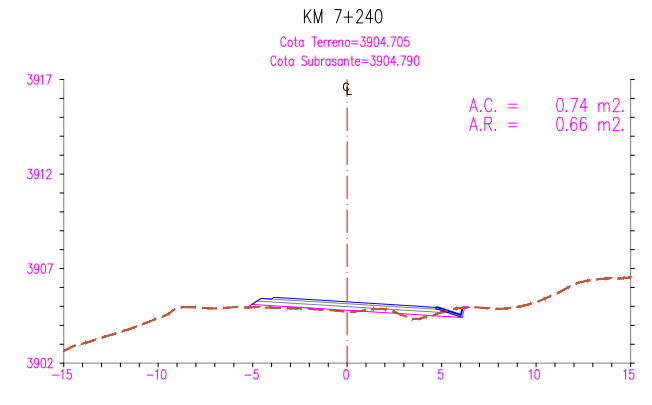
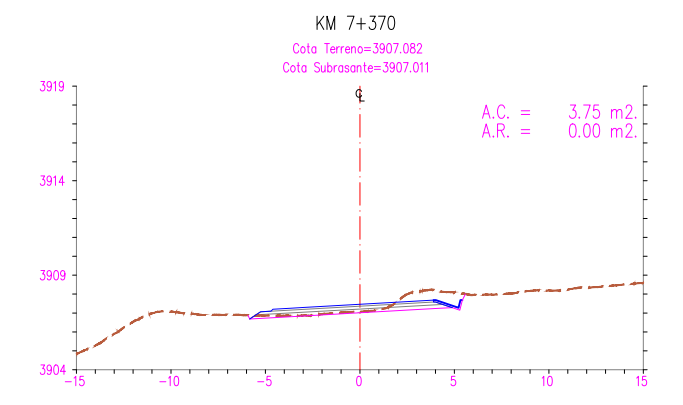
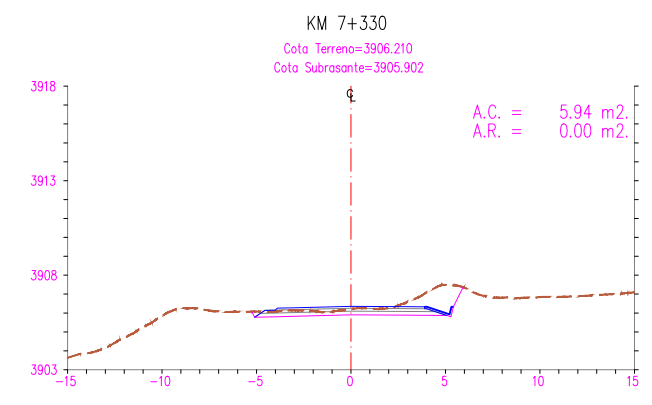
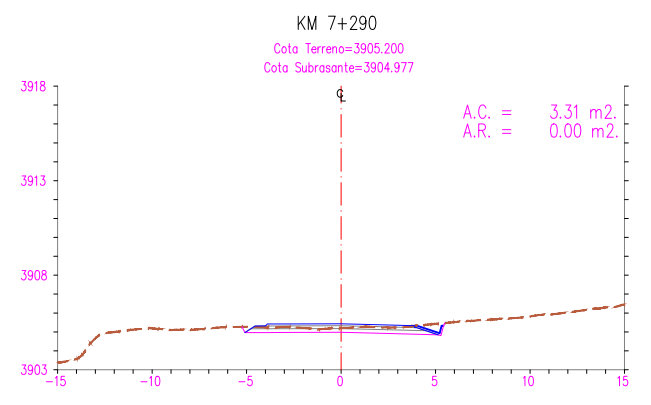
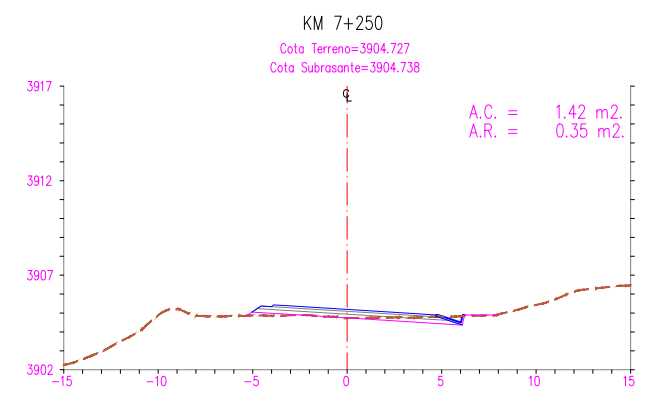
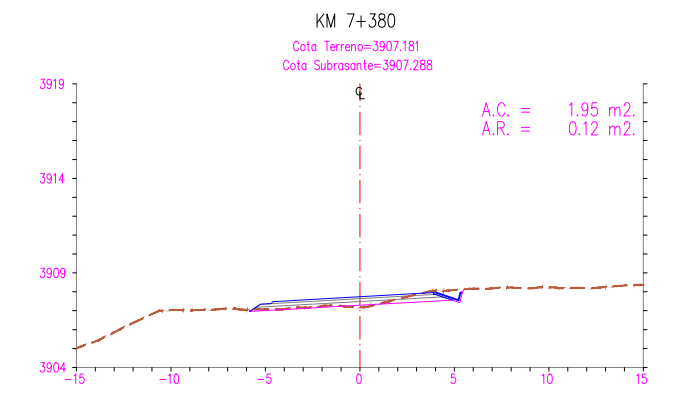
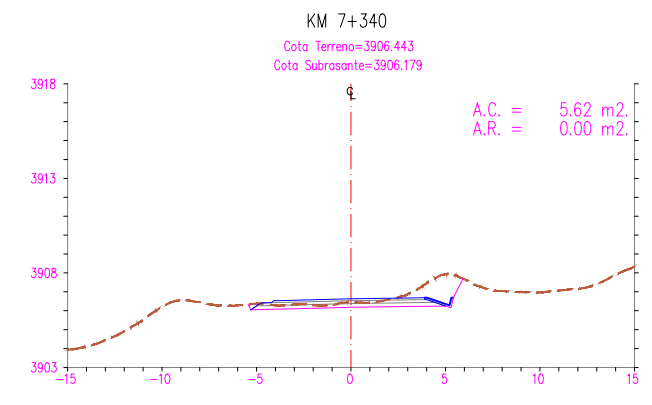
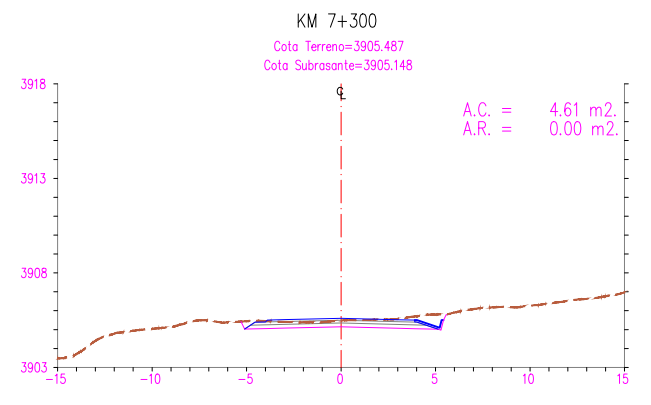
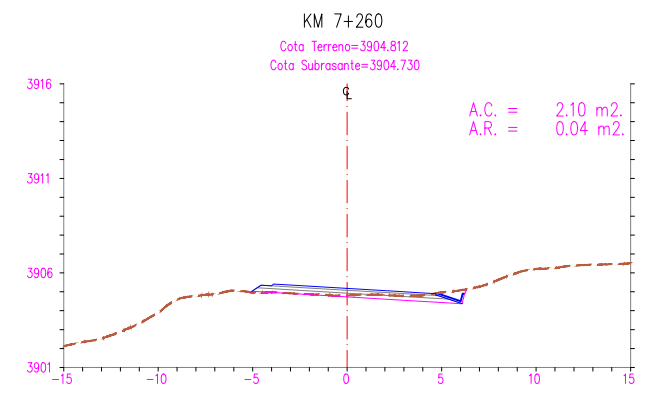
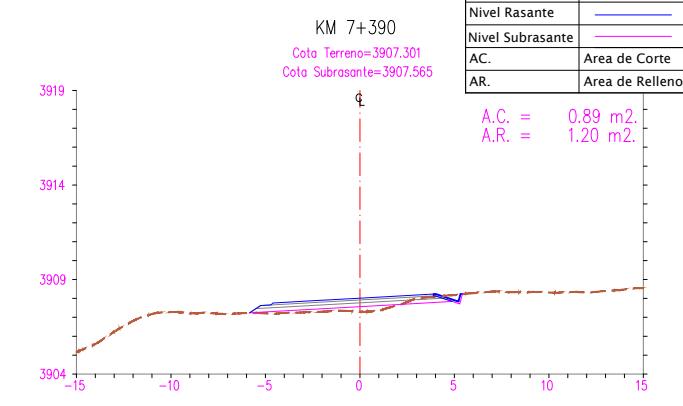
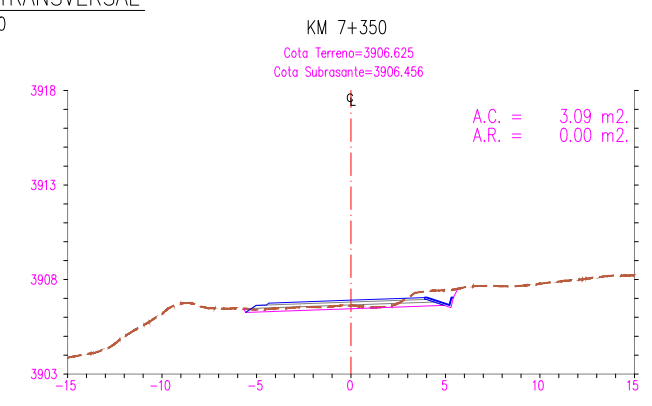
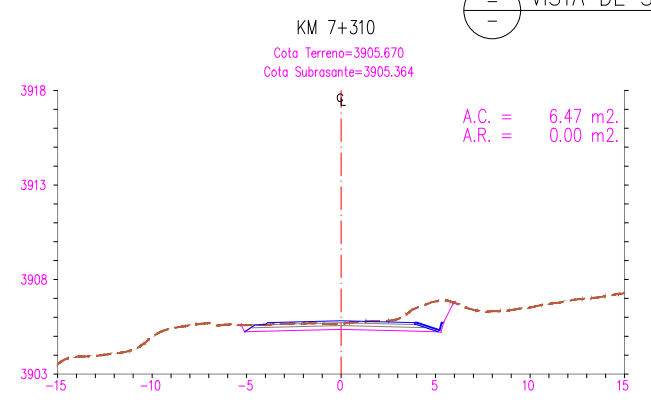
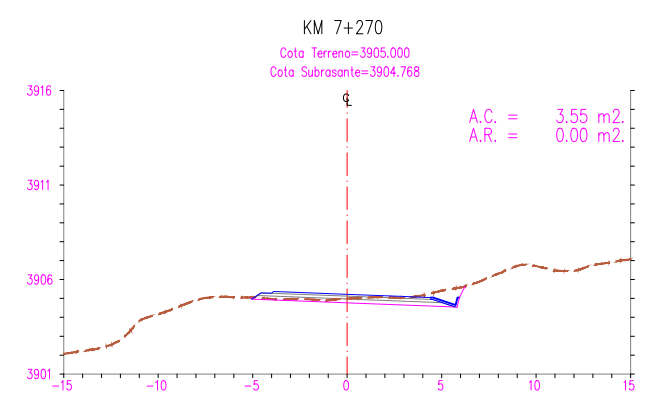
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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 7+080 - Km 7+230

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-014
Lamina: 14-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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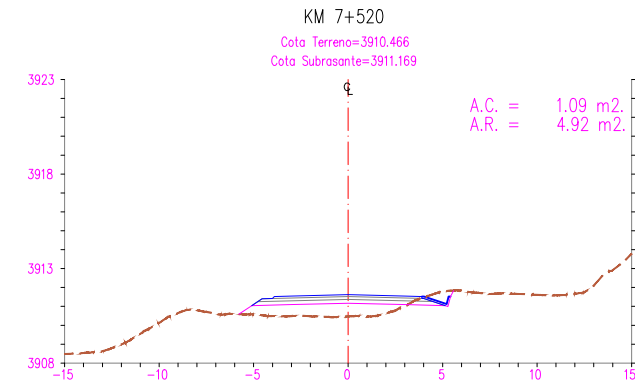
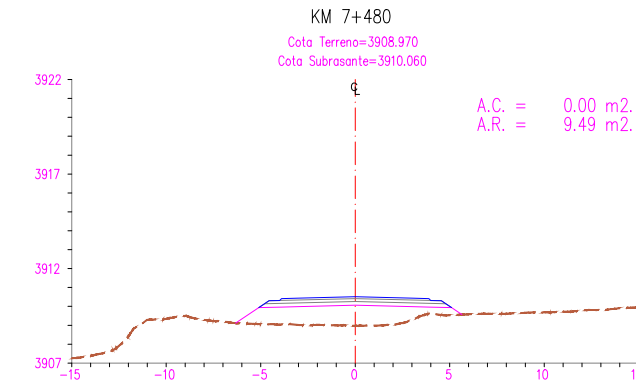
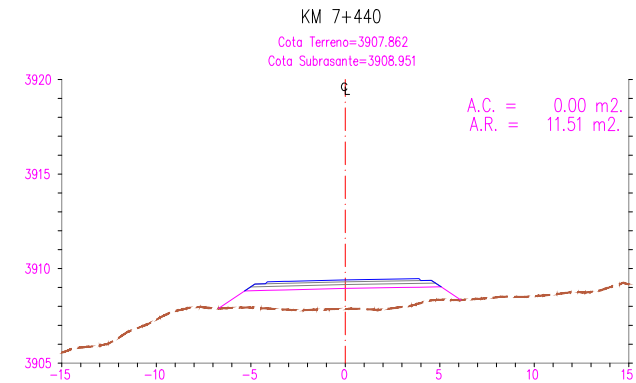
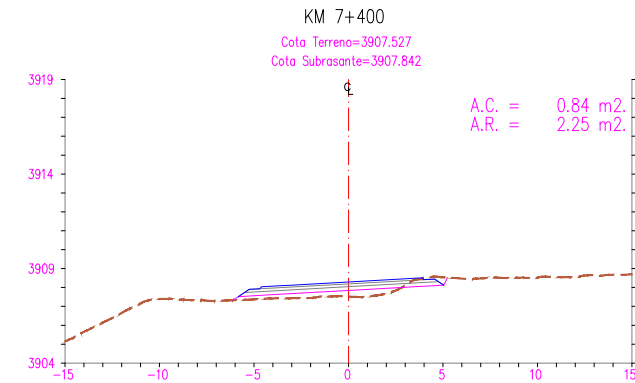
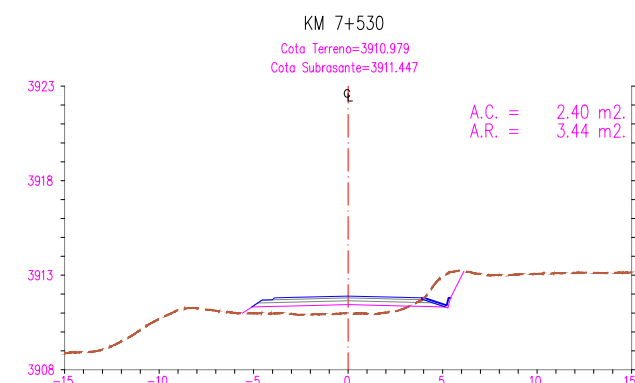
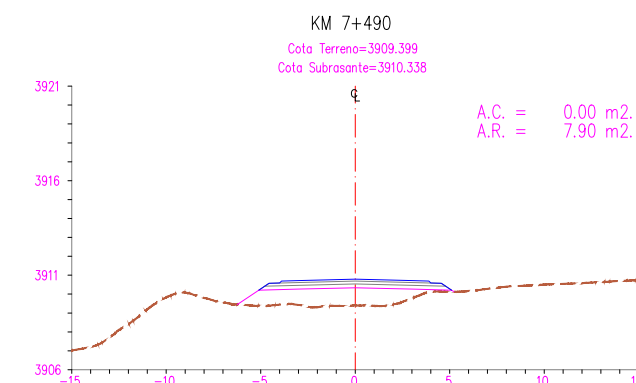
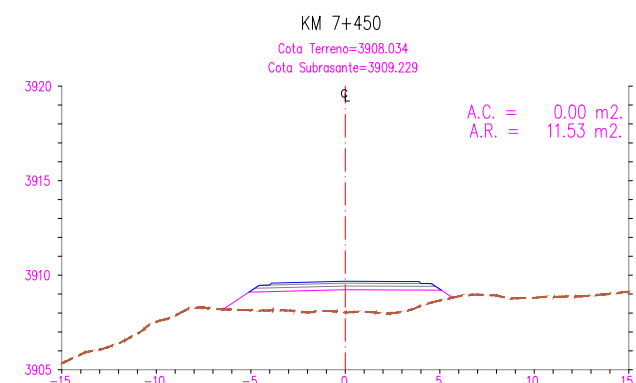
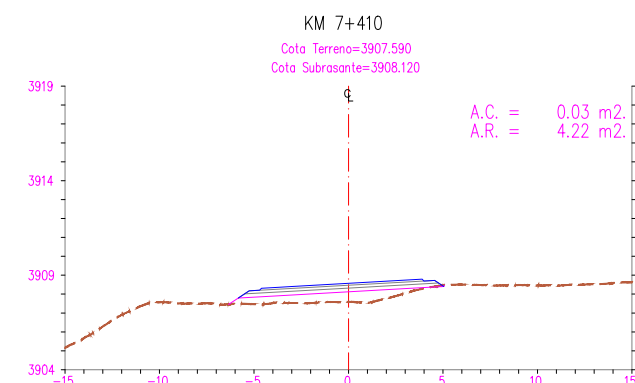
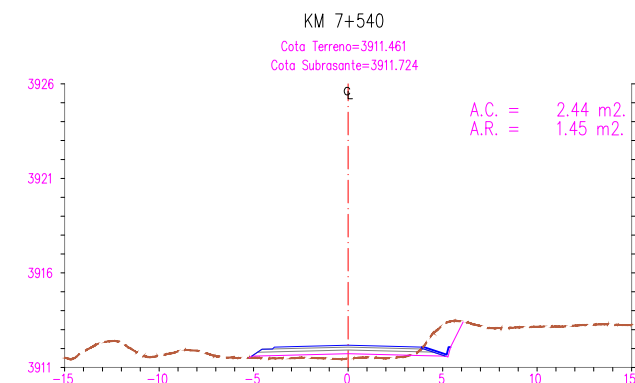
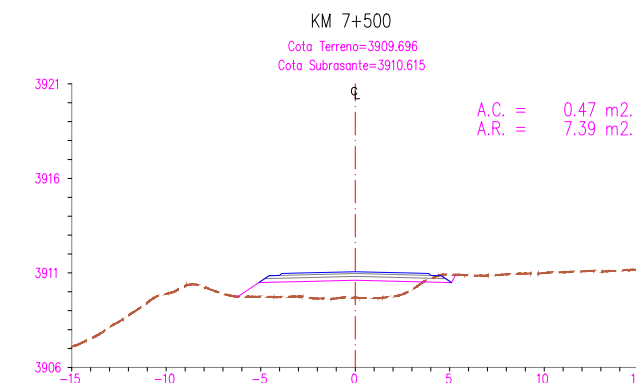
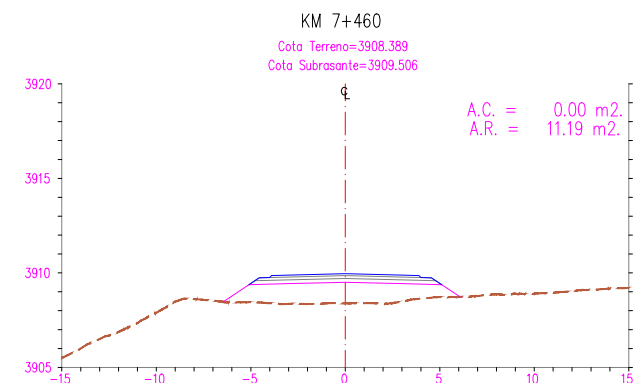
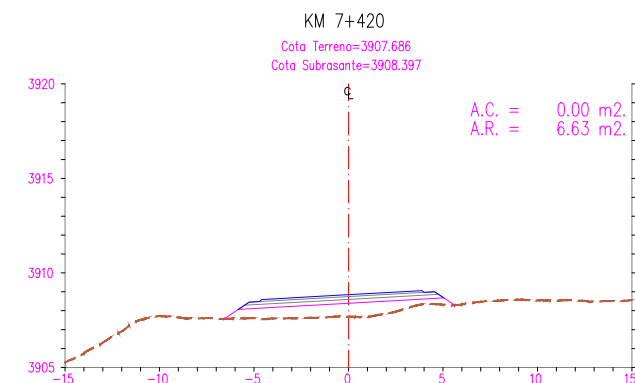
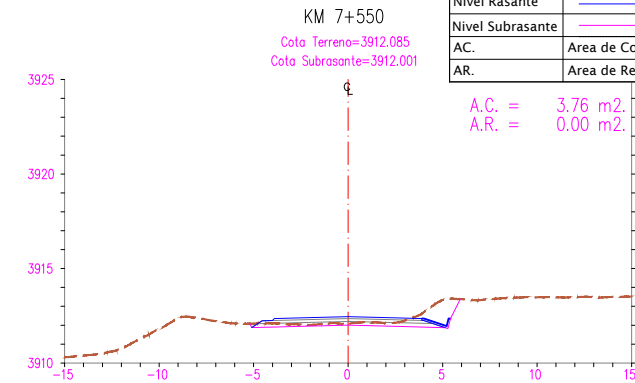
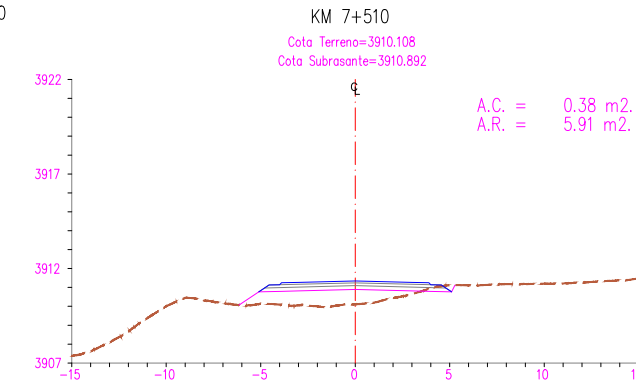
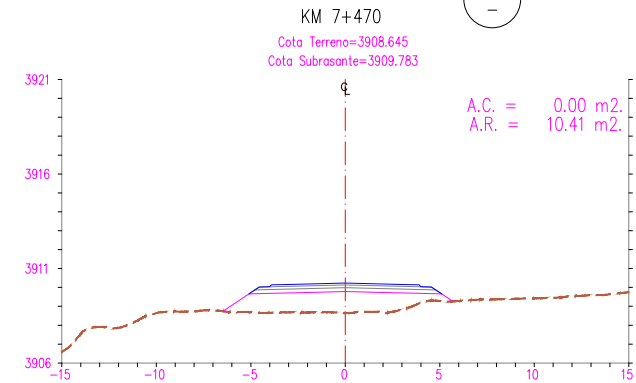
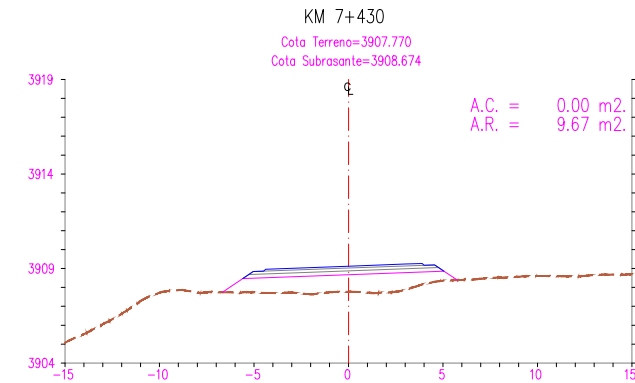
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Plano:
SECCIONES TRANSVERSALES
Km 7+240 - Km 7+390

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-015
Lamina: 15-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

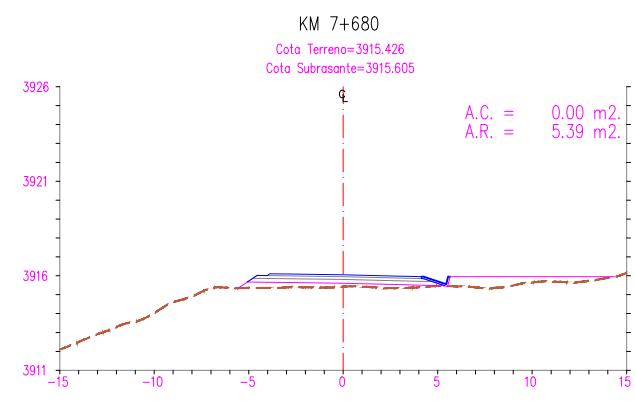
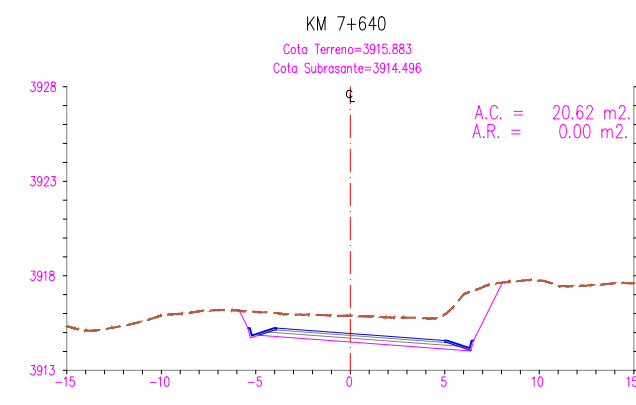
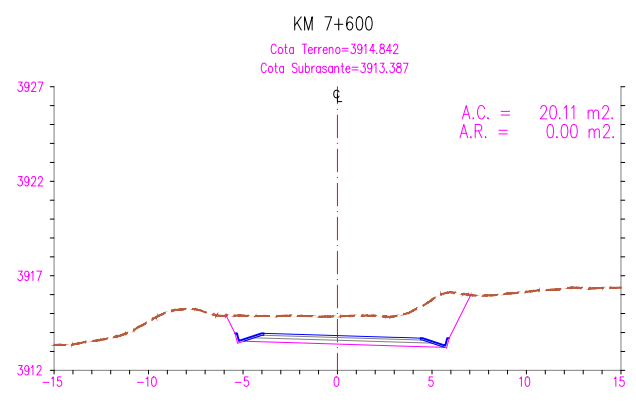
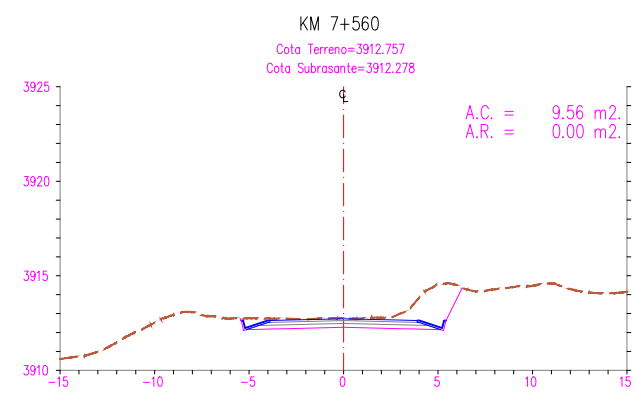
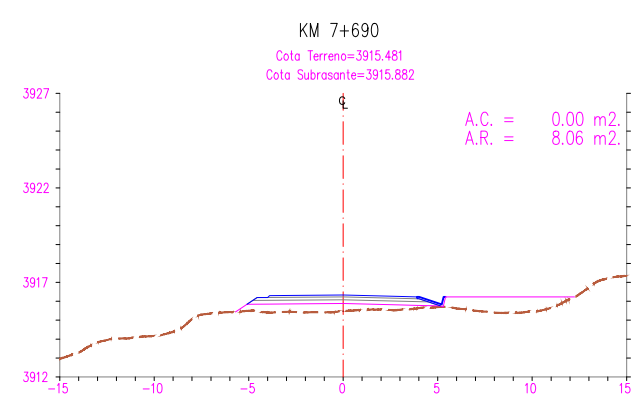
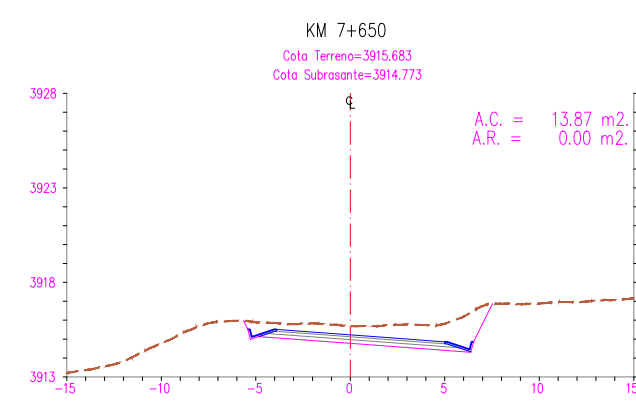
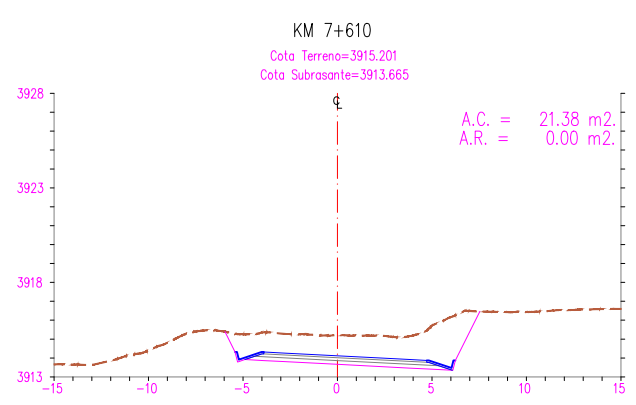
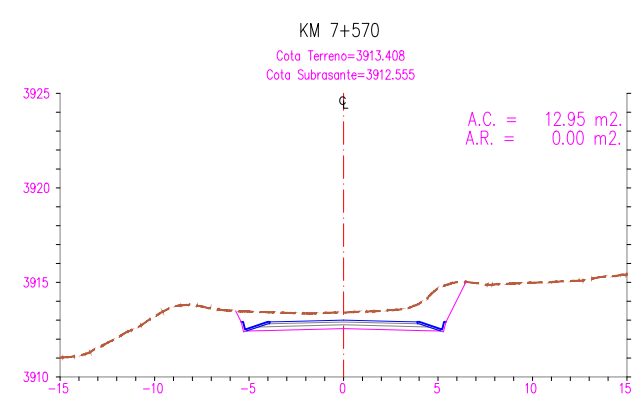
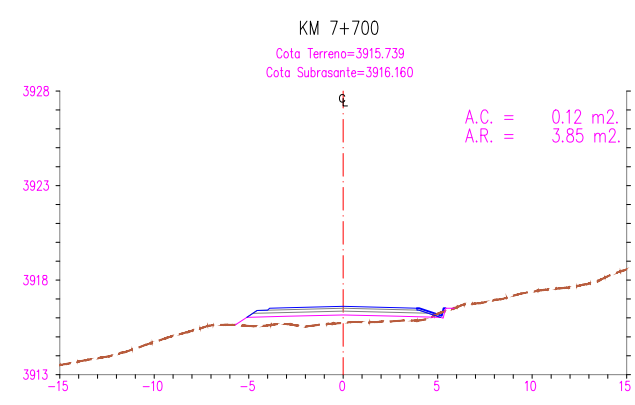
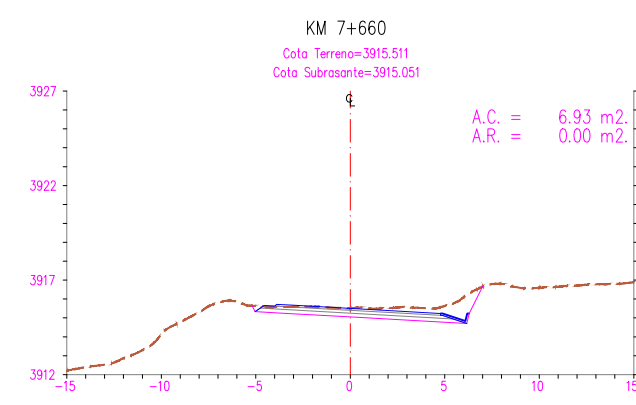
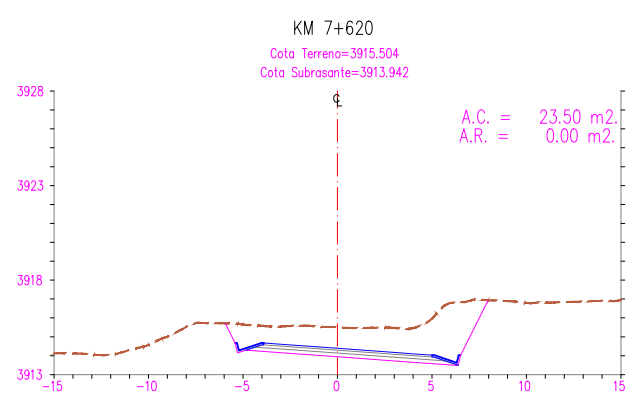
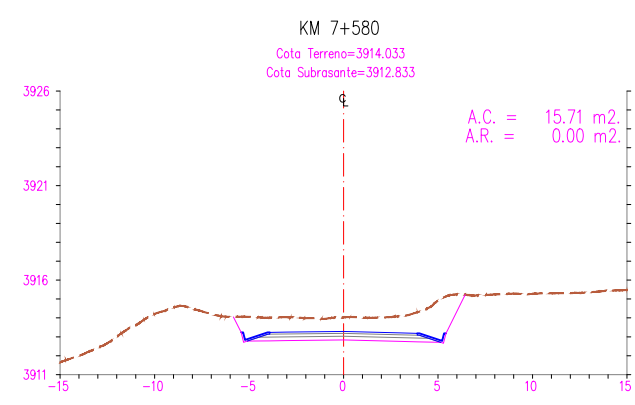
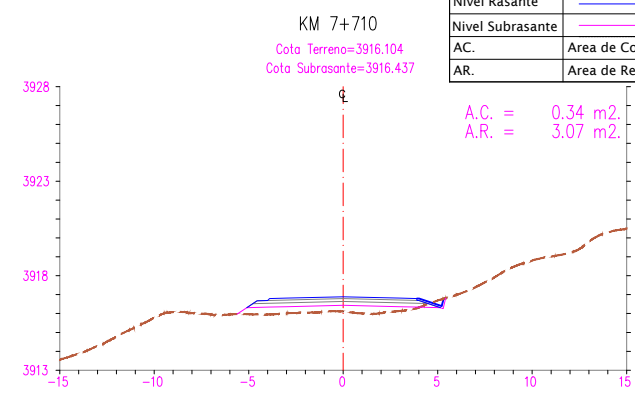
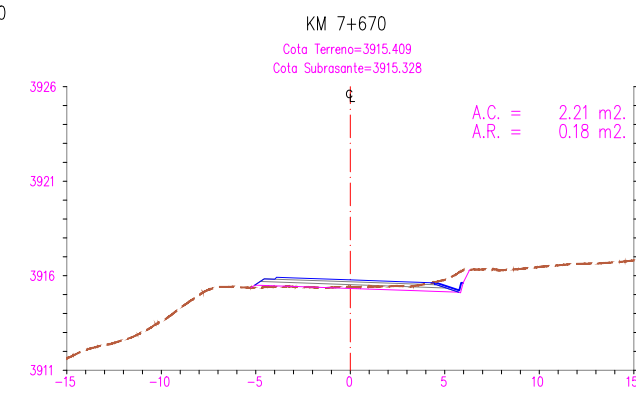
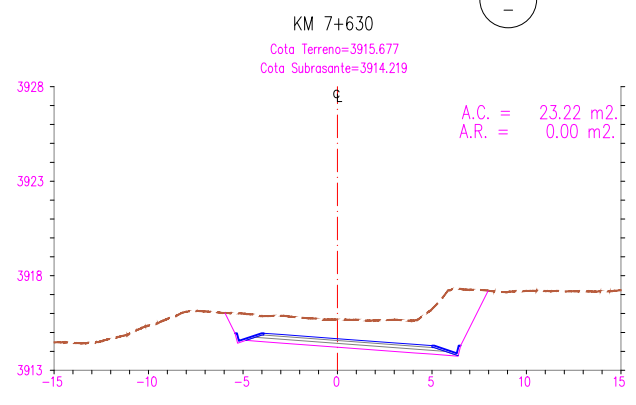
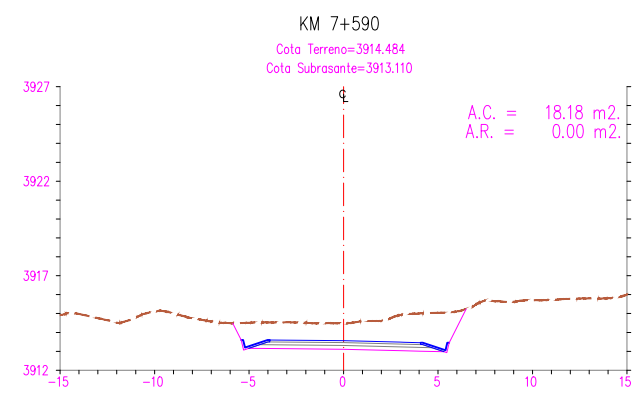
Plano:
SECCIONES TRANSVERSALES
Km 7+400 - Km 7+550

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-016

Lamina:
16-47
REV-00

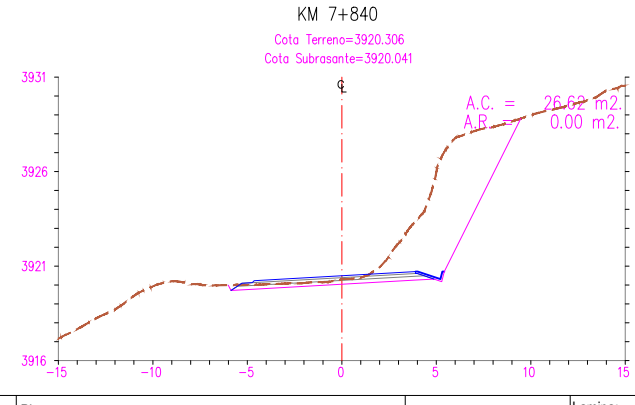
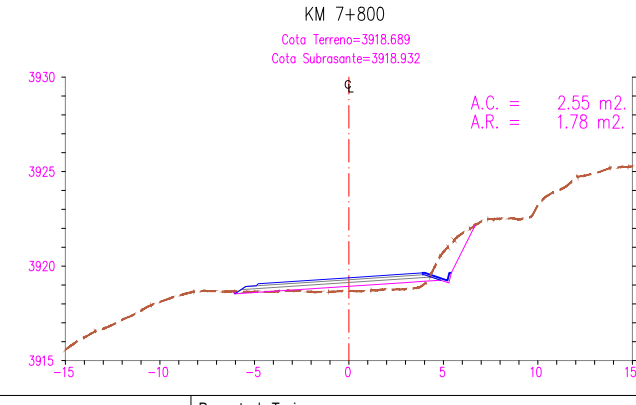
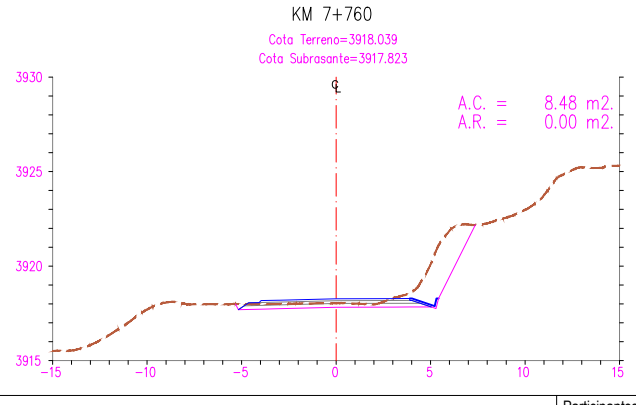
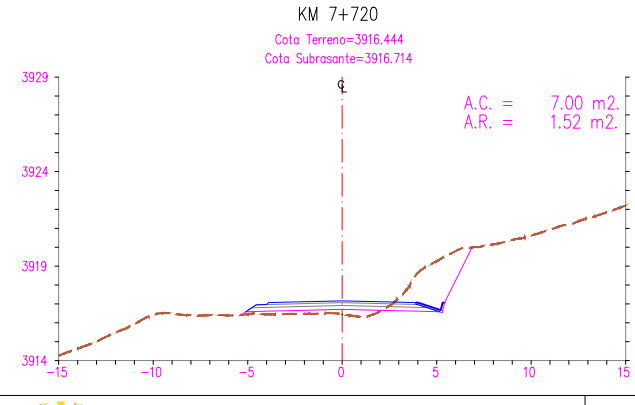
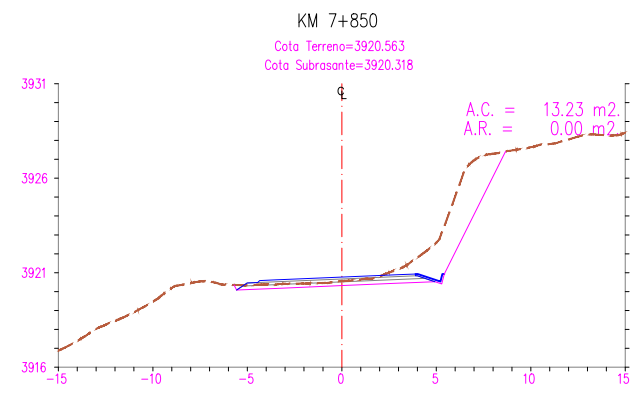
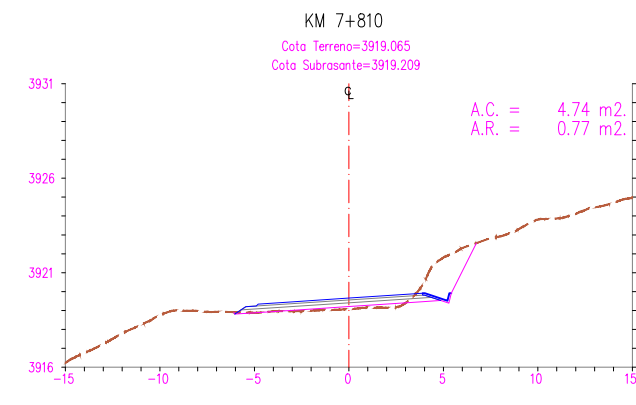
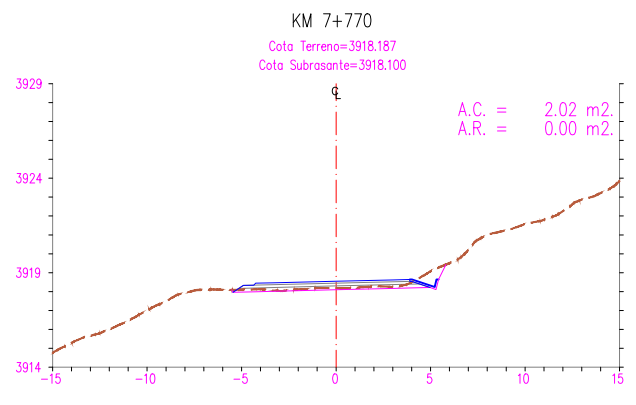
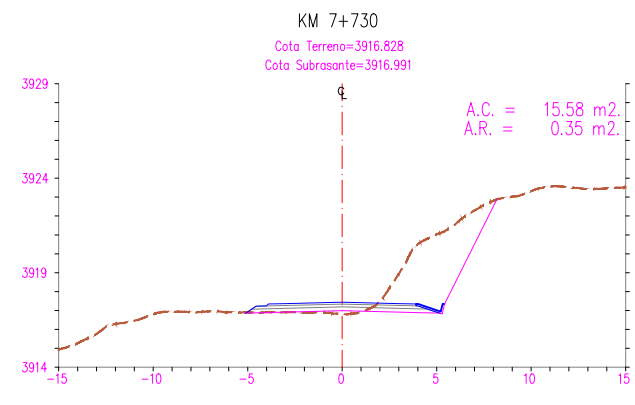
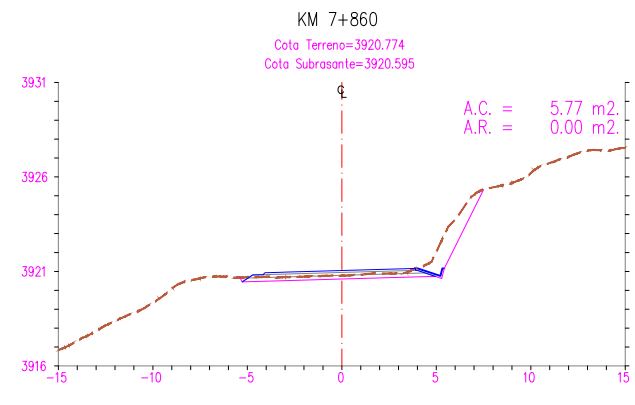
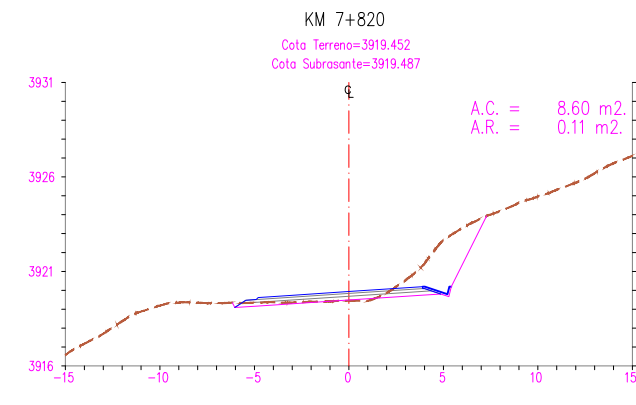
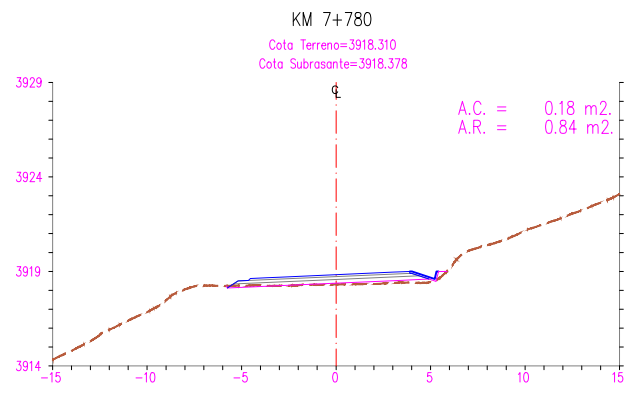
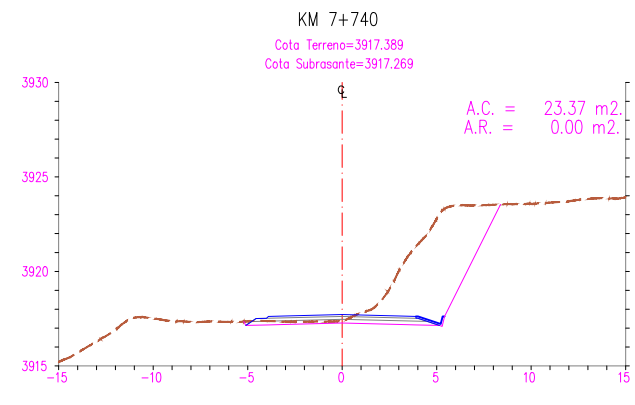
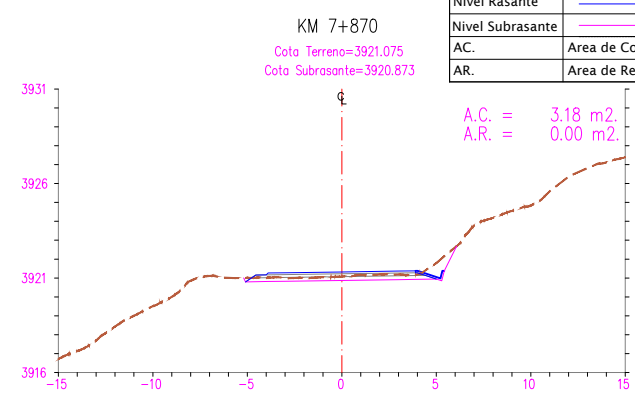
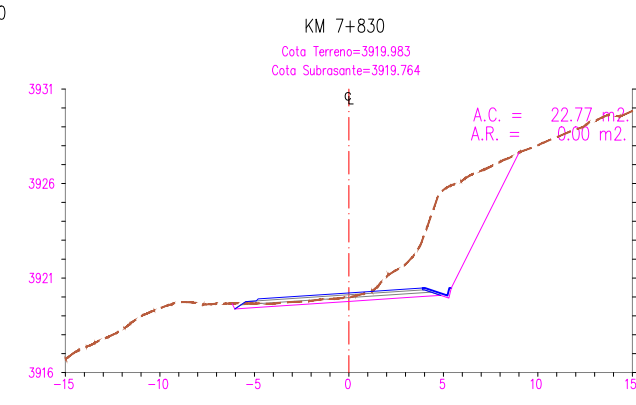
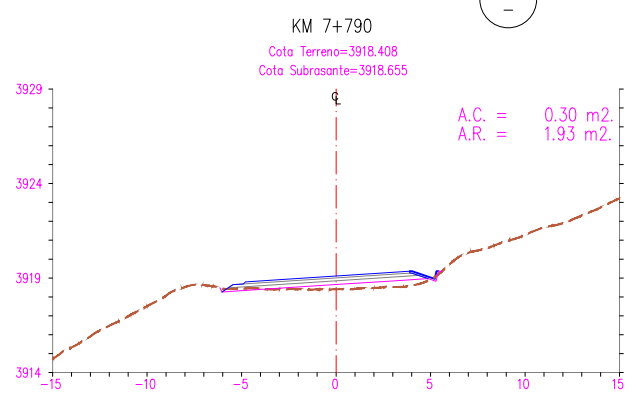
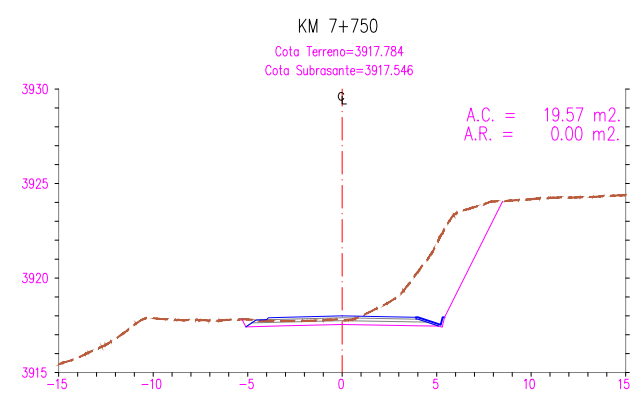
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
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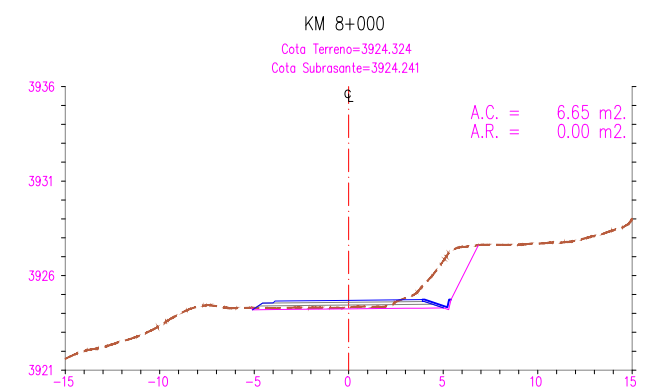
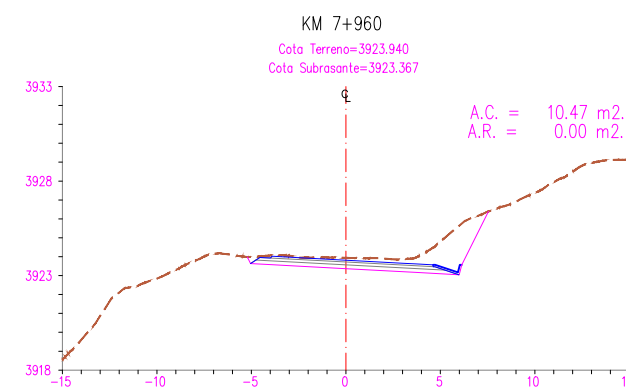
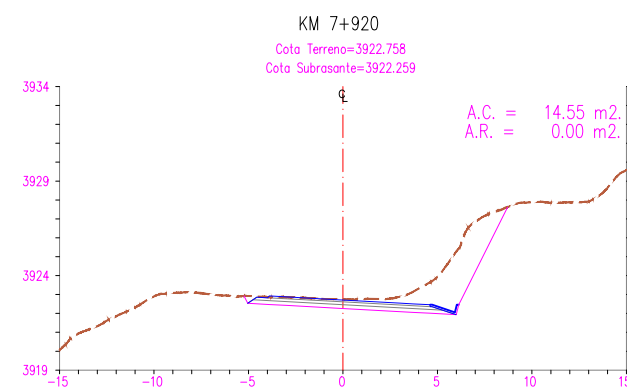
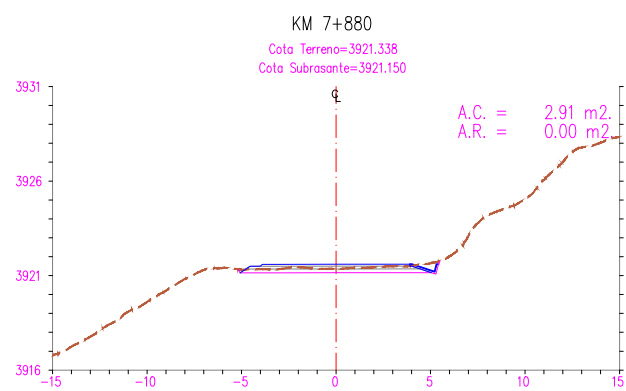
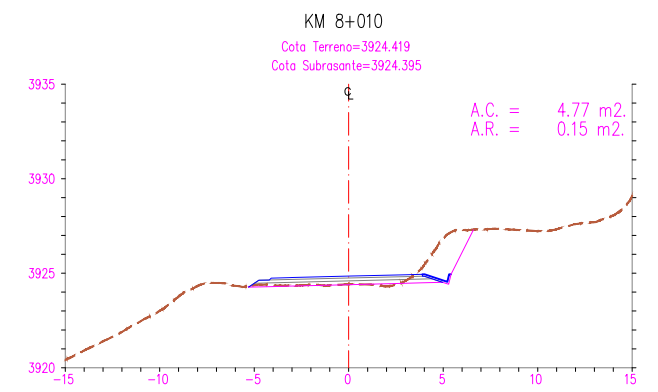
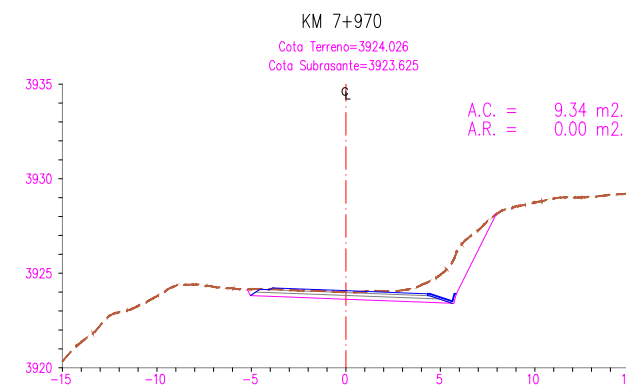
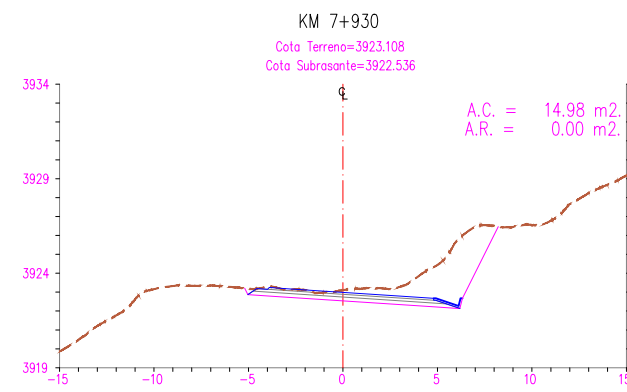
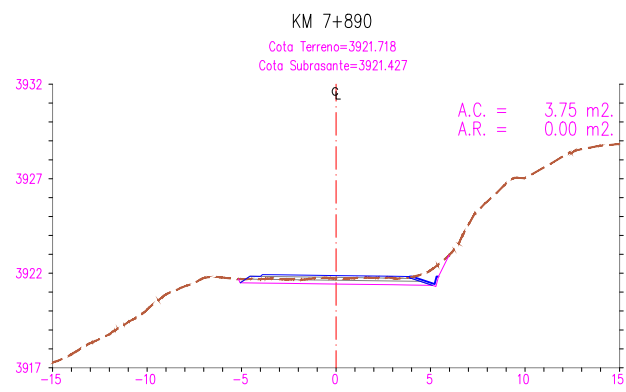
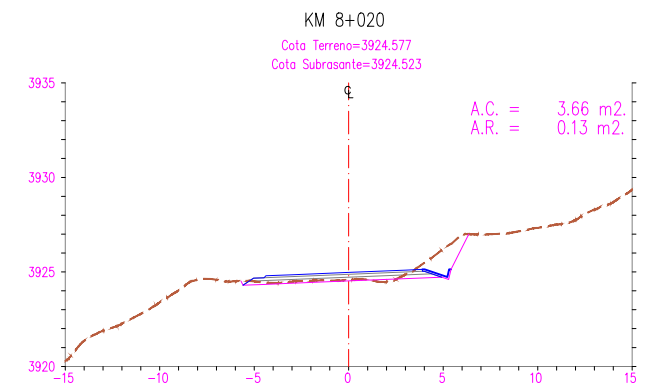
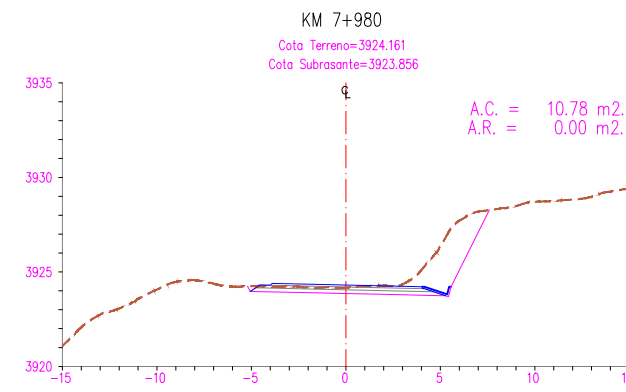
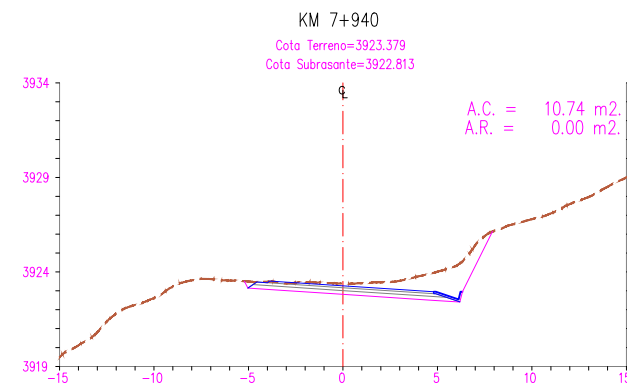
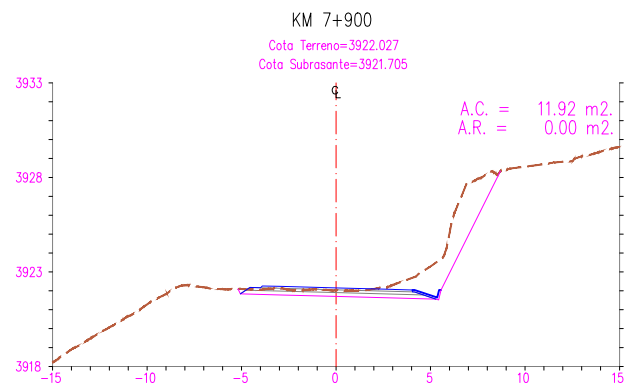
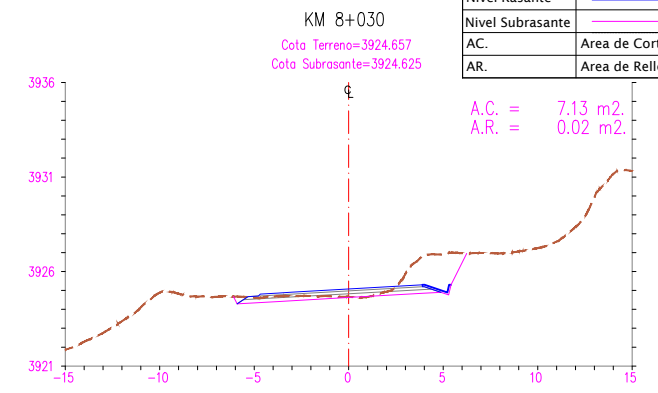
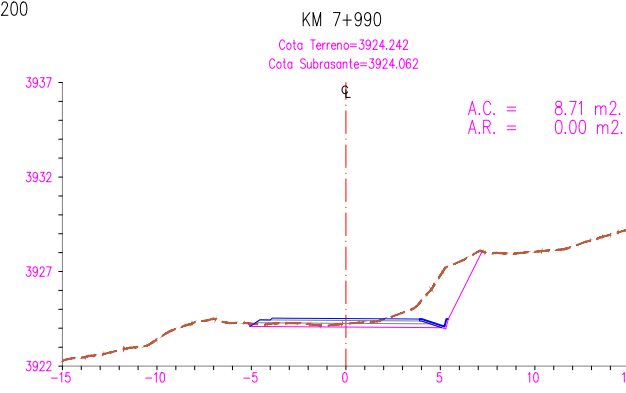
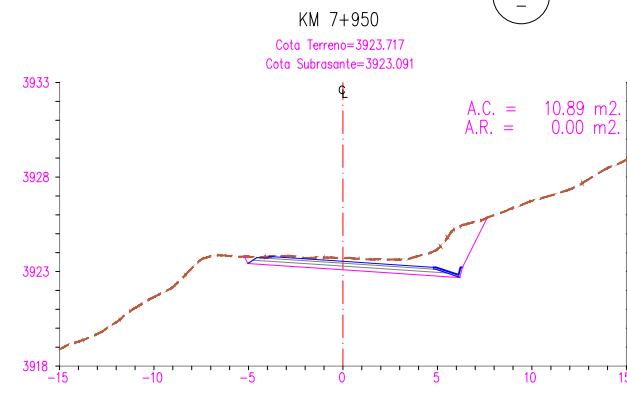
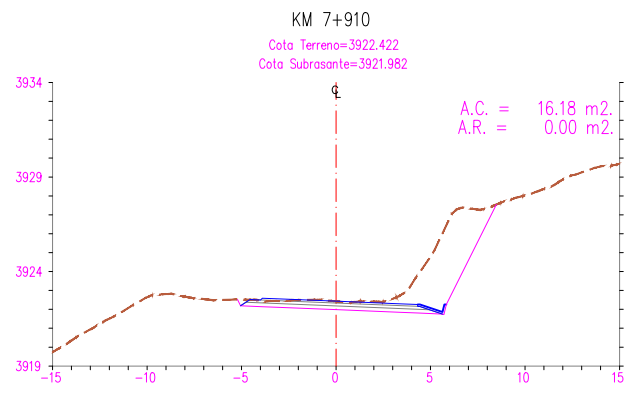
Proyecto de Tesis:
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 7+720 - Km 7+870

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-018
Lamina: 18-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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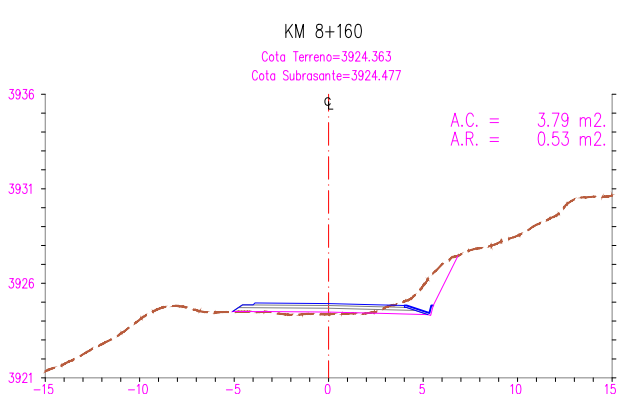
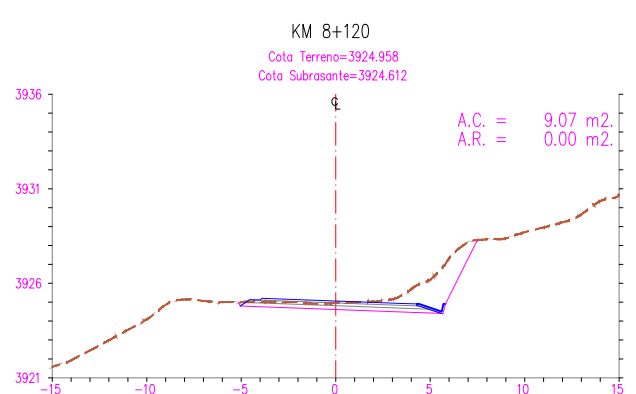
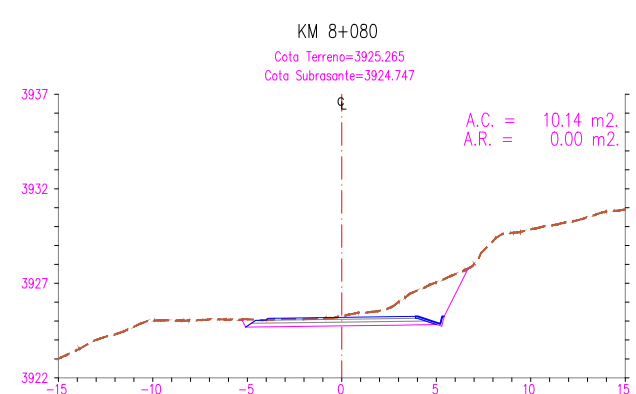
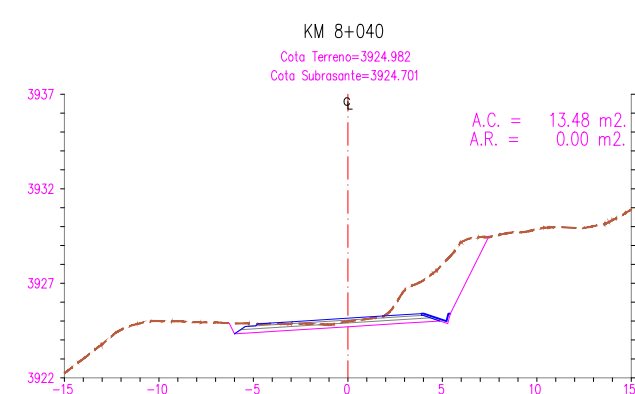
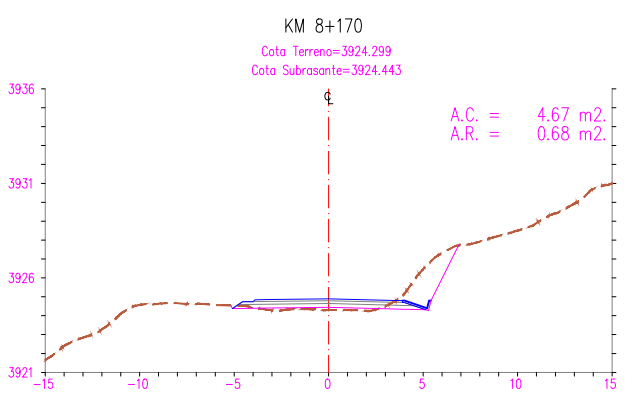
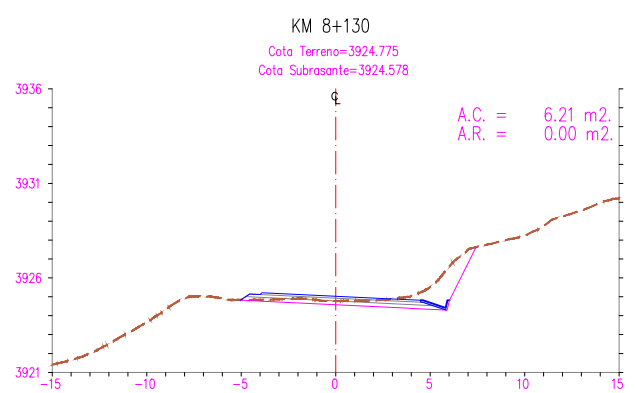
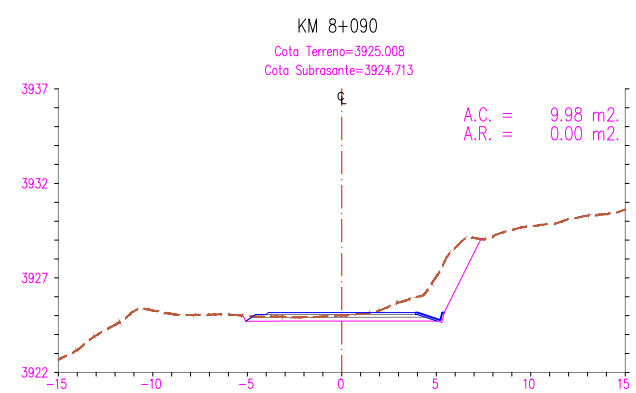
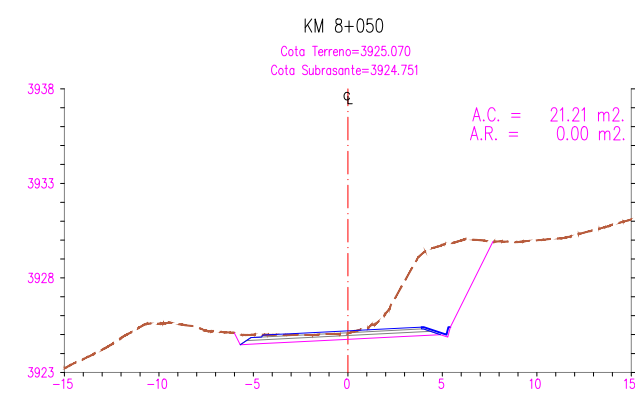
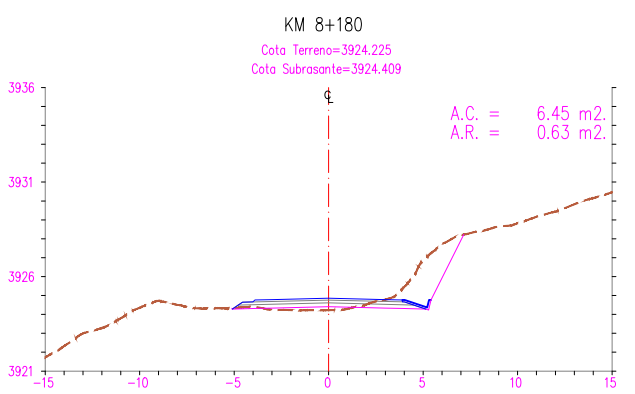
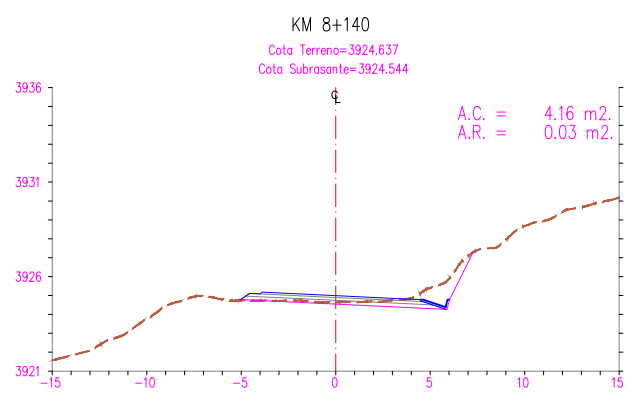
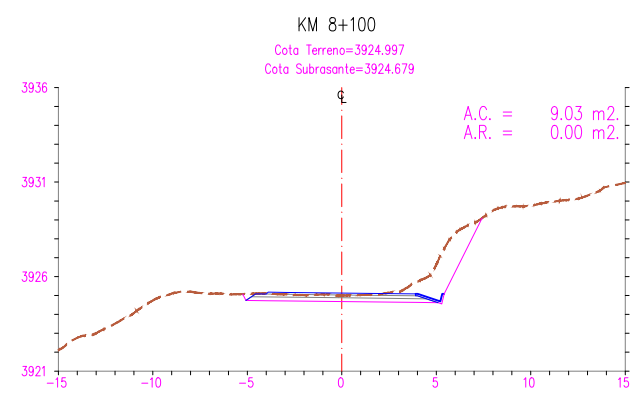
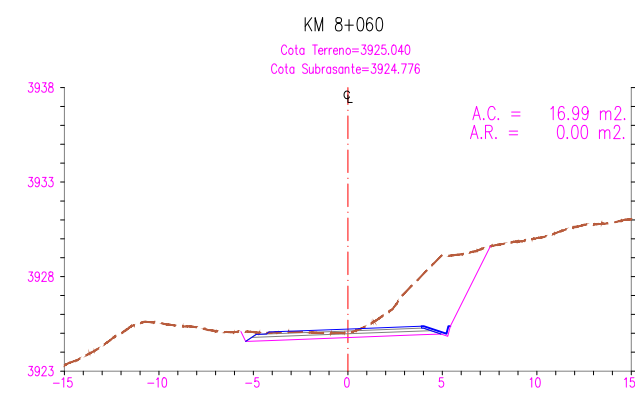
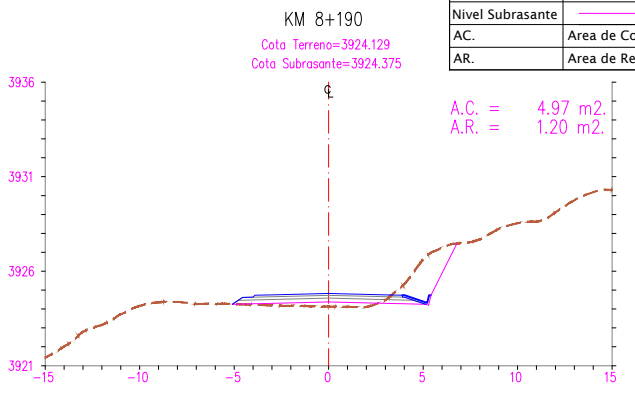
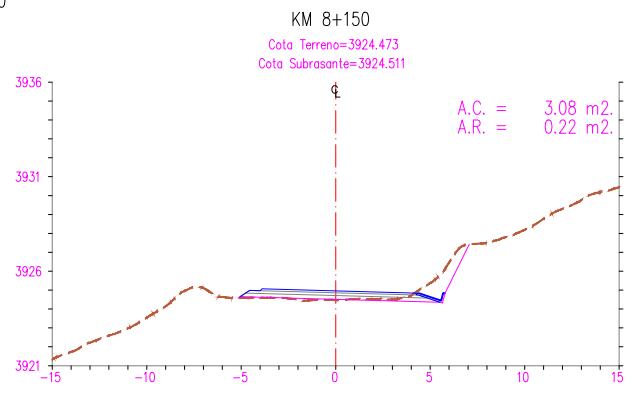
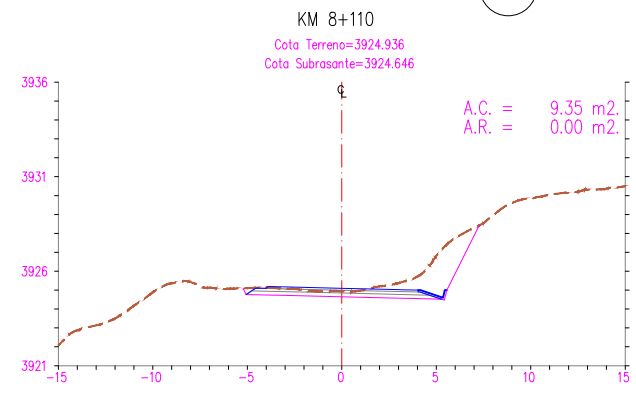
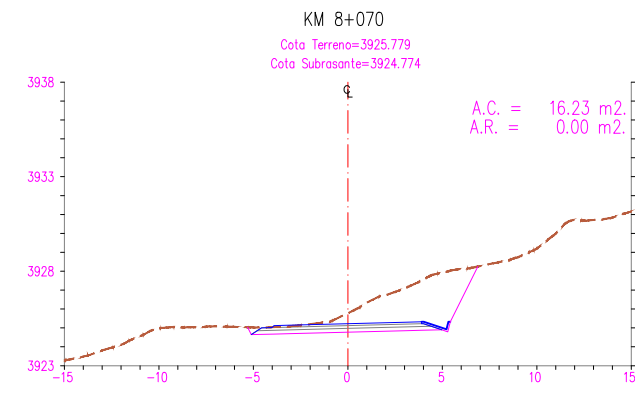
Proyecto de Tesis:
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 7+880 - Km 8+030

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-019
Lamina: 19-47
REV-00

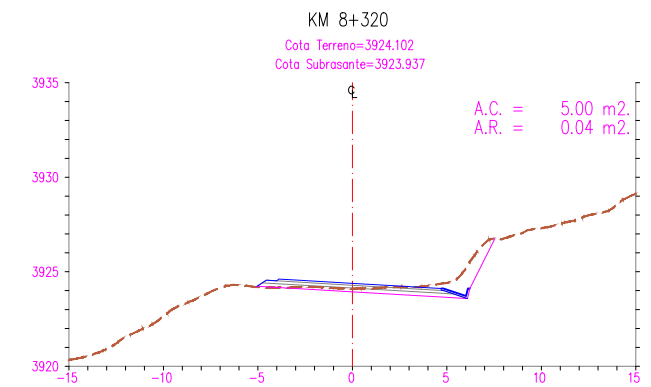
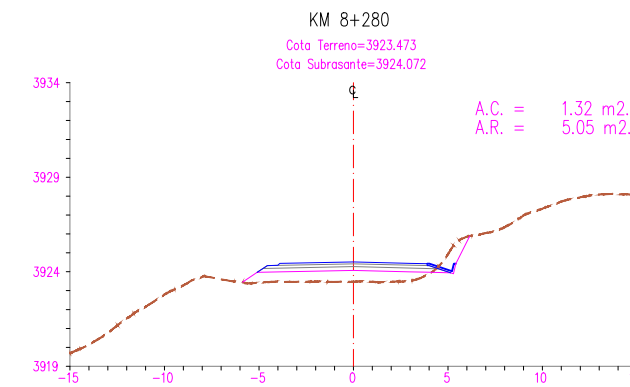
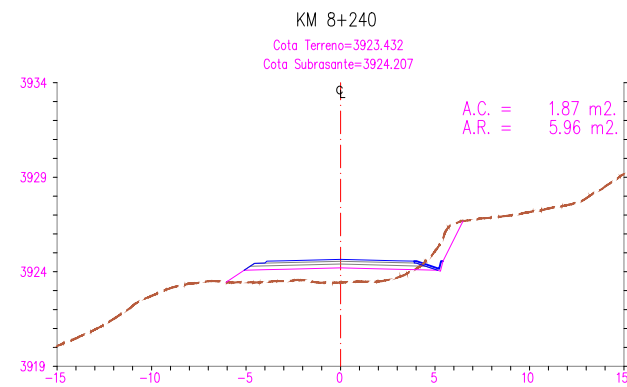
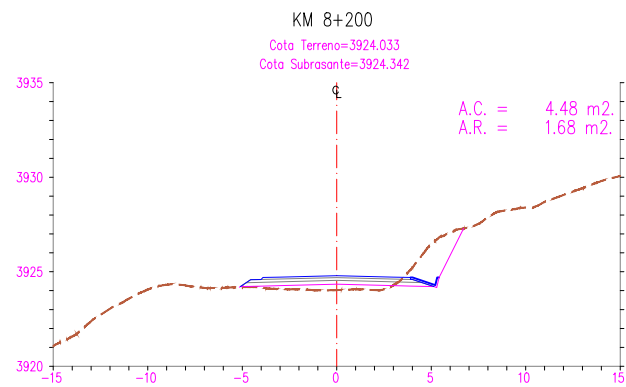
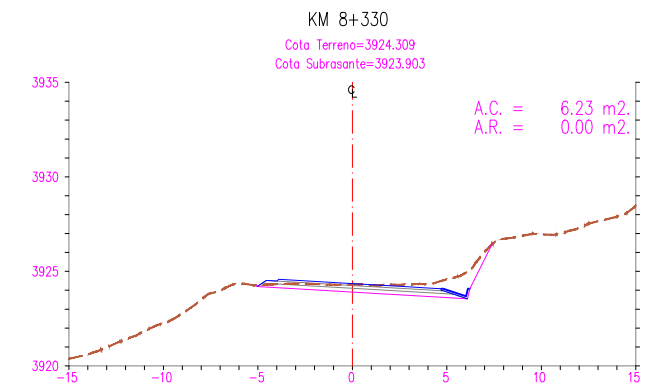
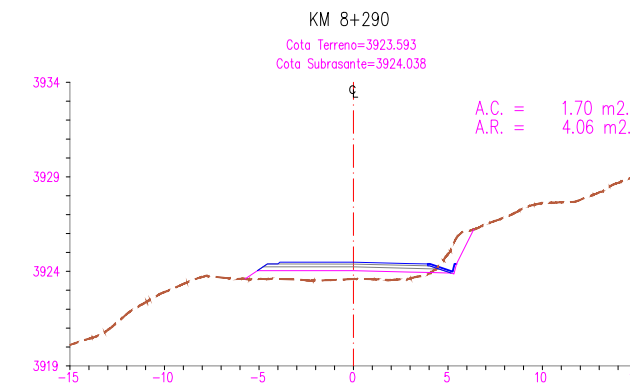
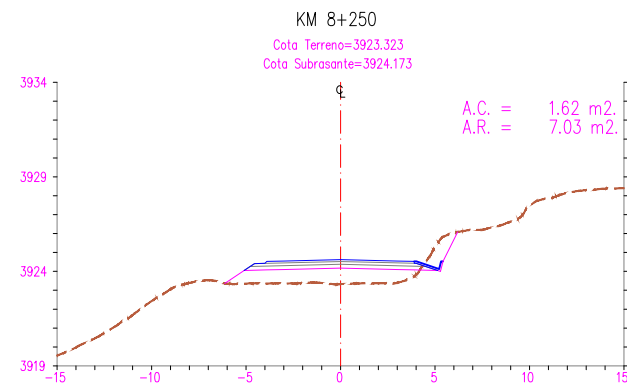
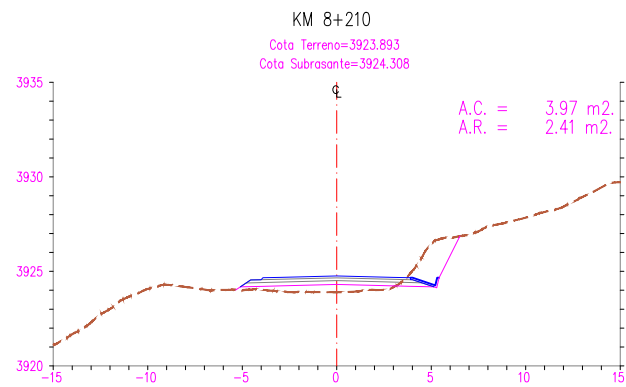
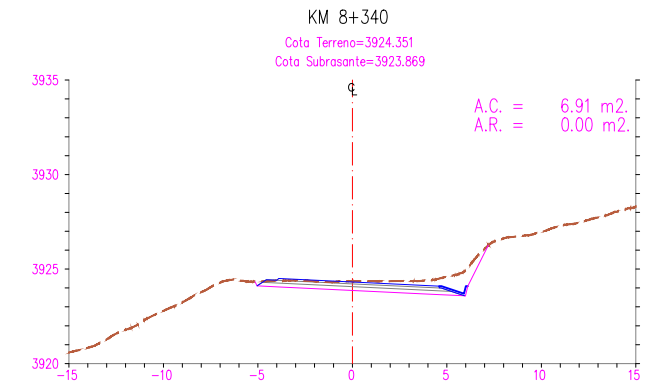
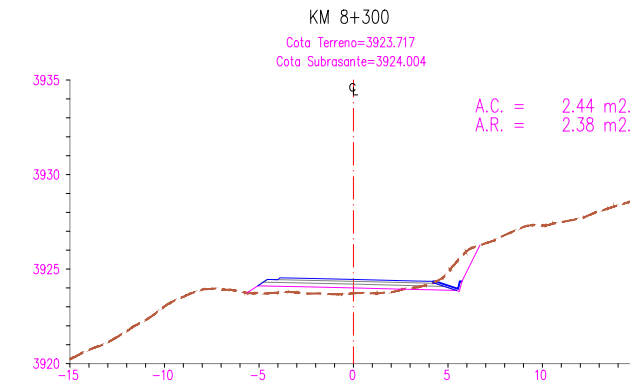
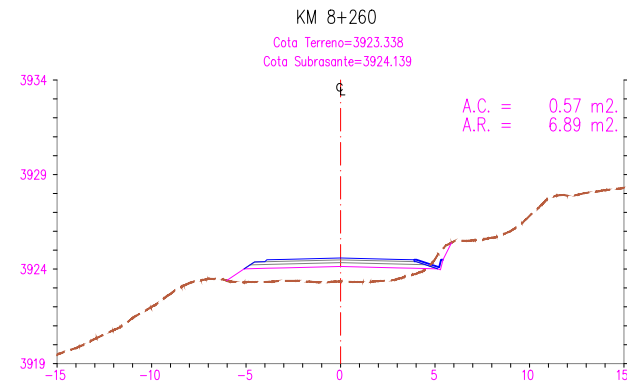
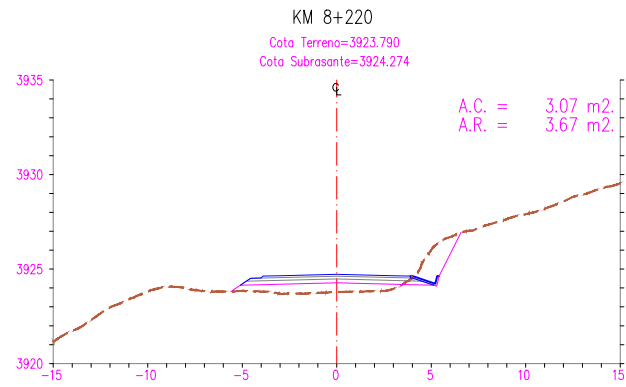
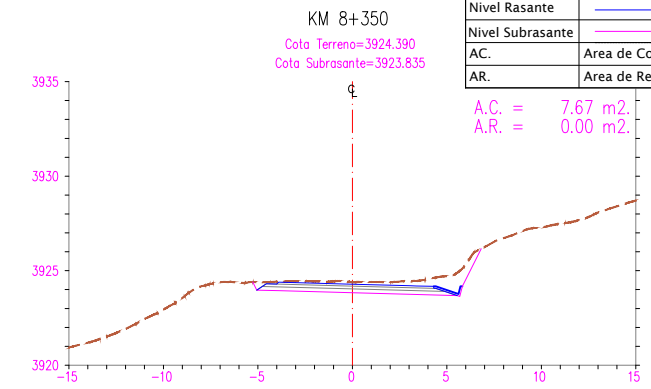
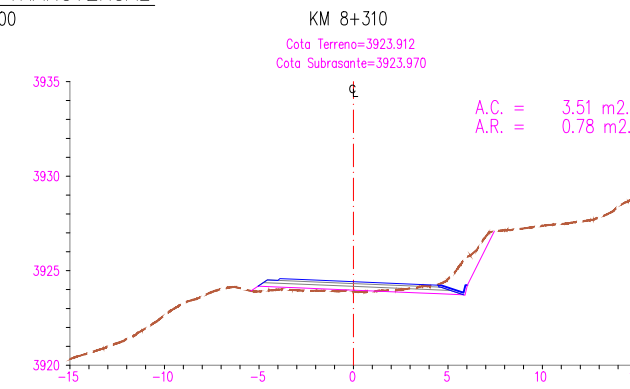
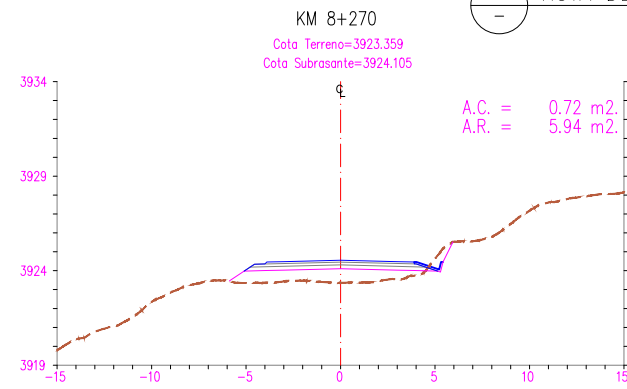
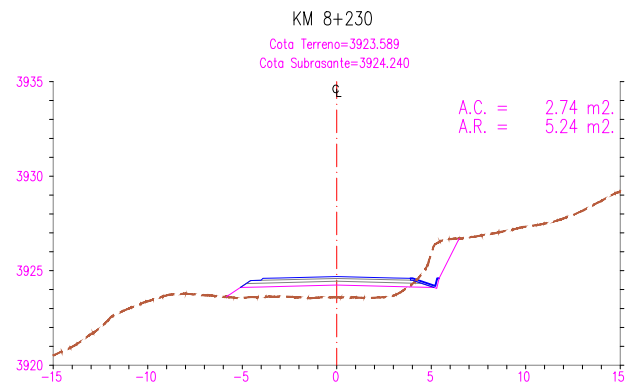
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
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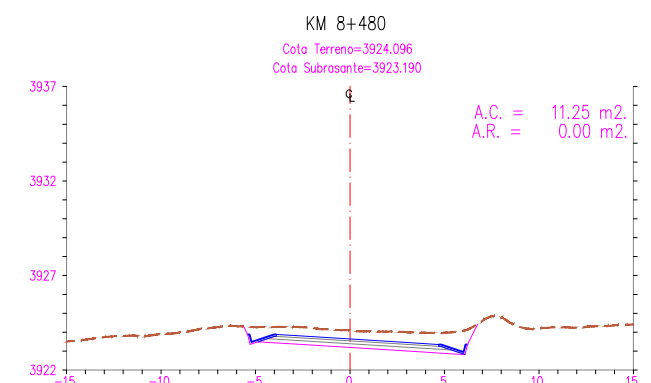
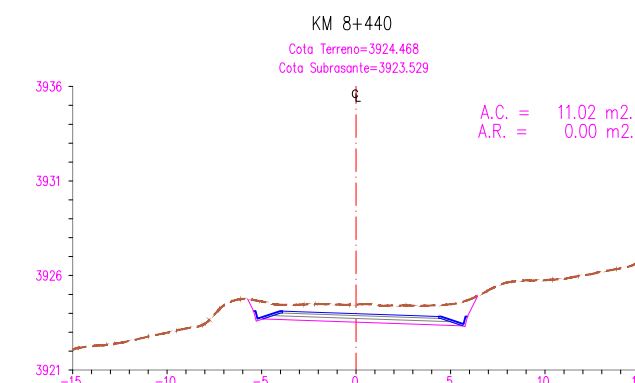
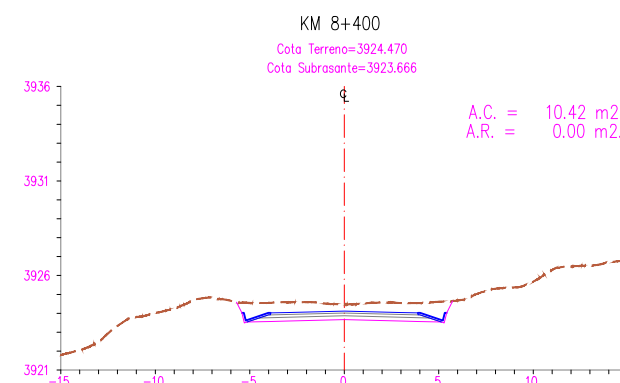
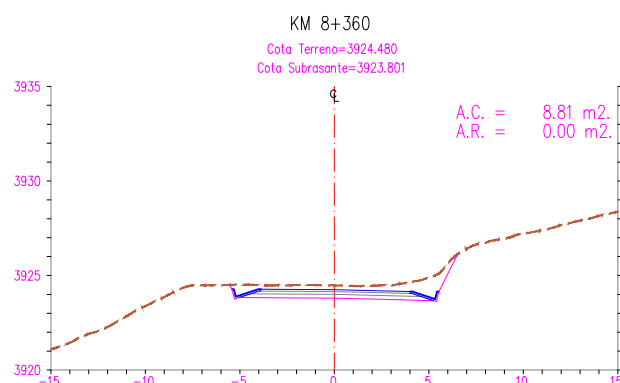
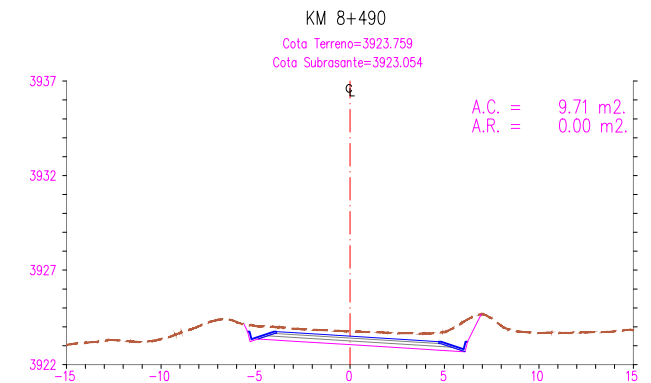
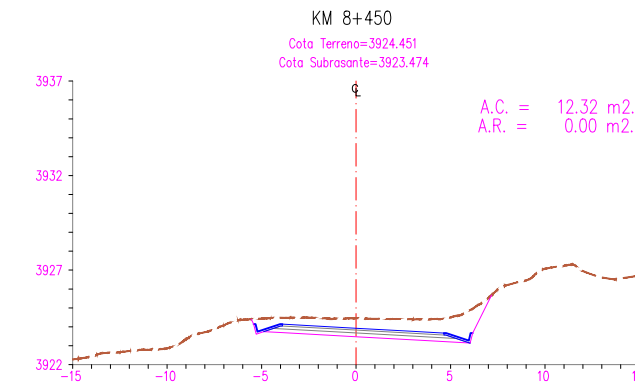
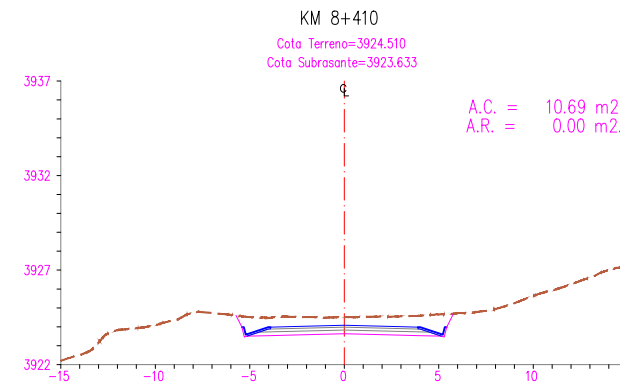
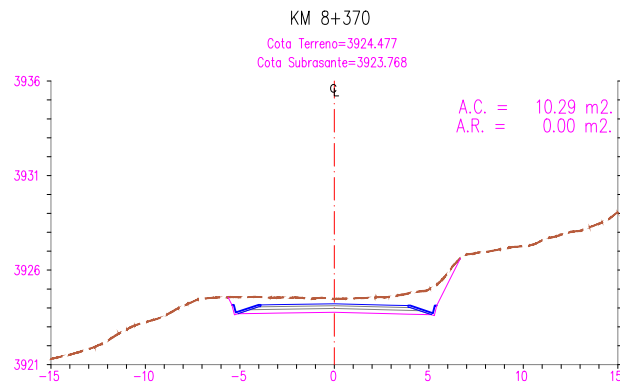
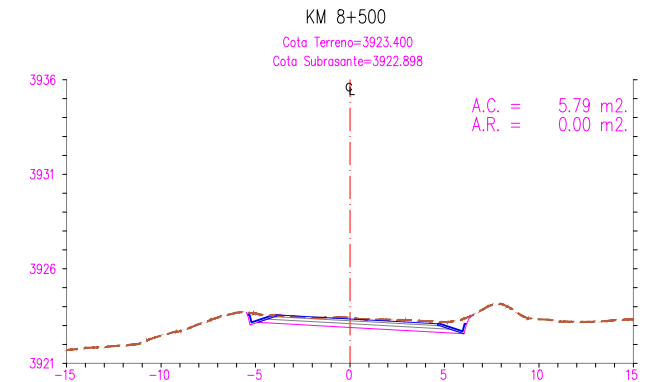
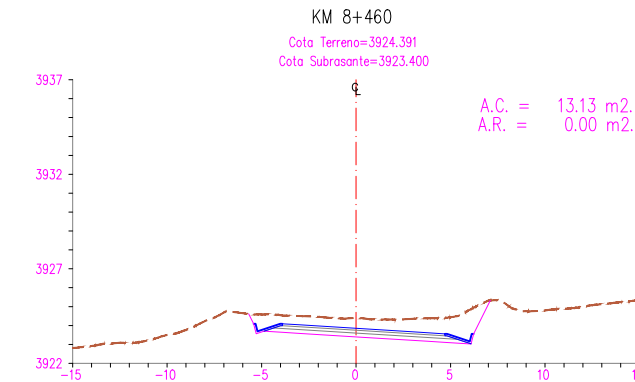
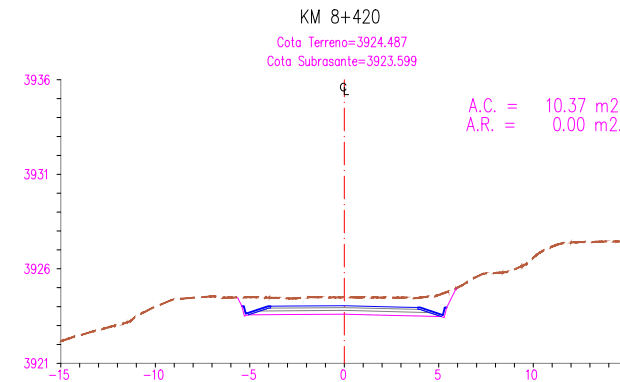
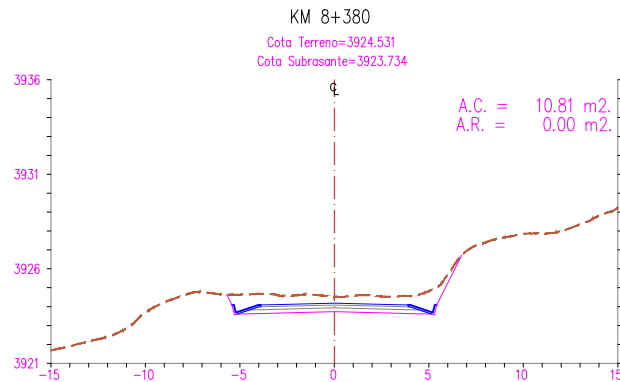
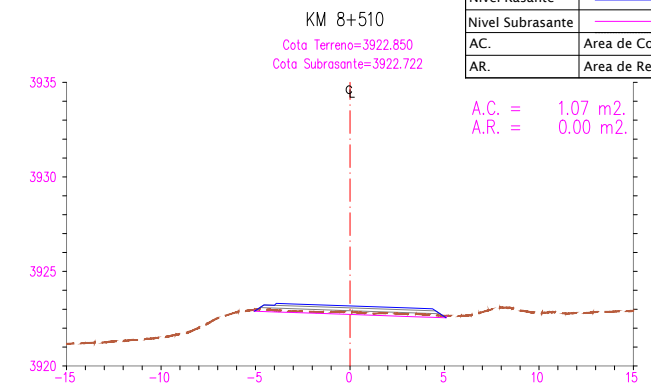
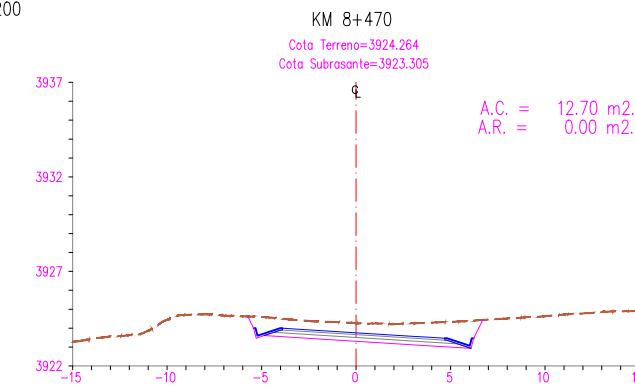
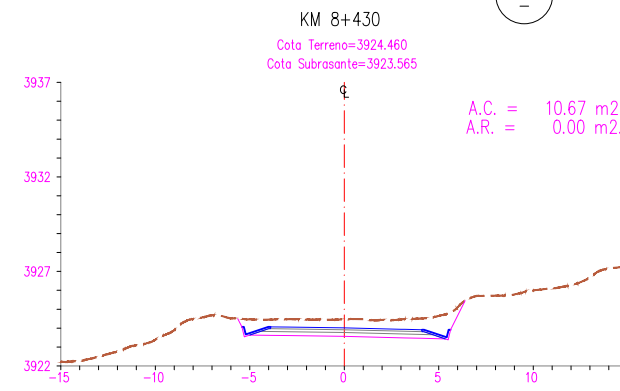
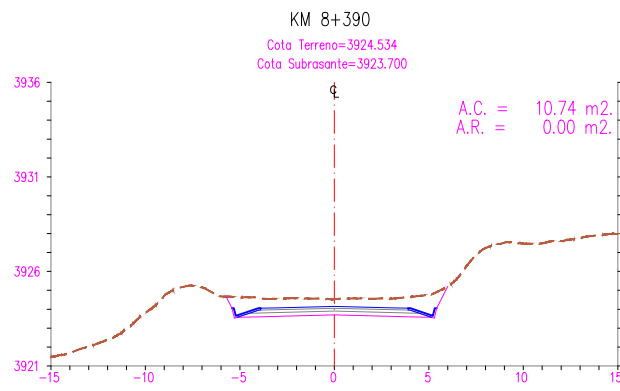
Plano:
SECCIONES TRANSVERSALES
Km 8+200 - Km 8+350

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-021

Lamina:
21-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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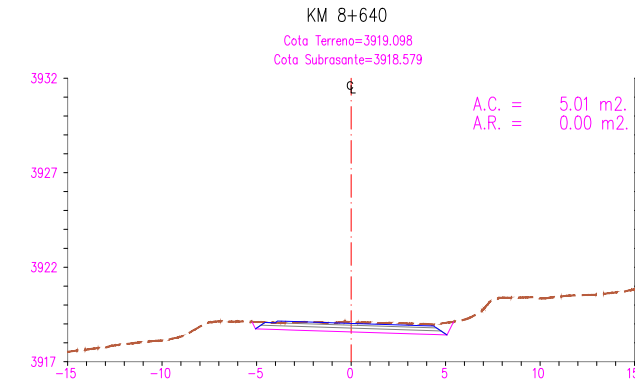
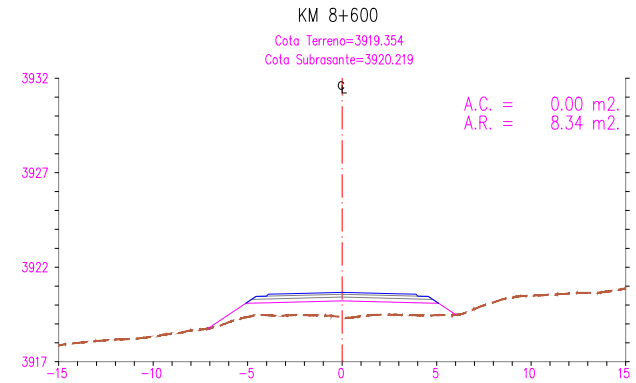
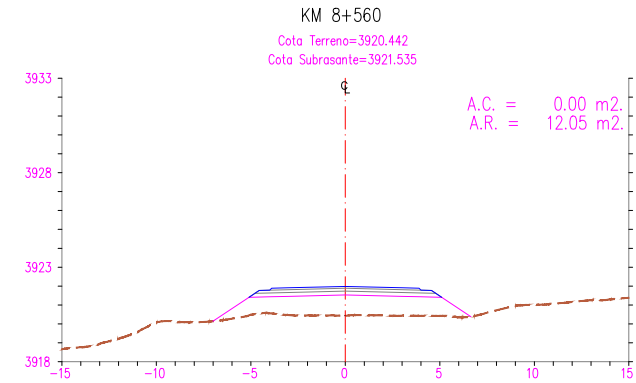
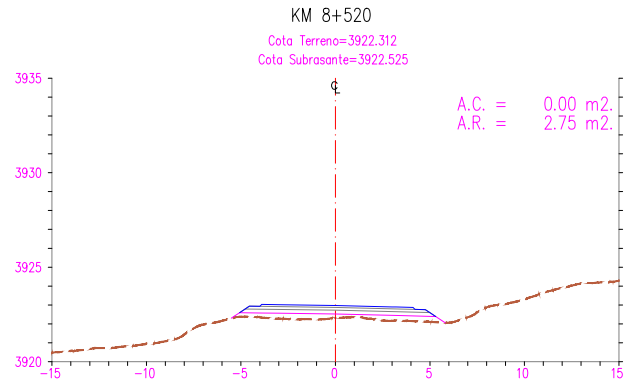
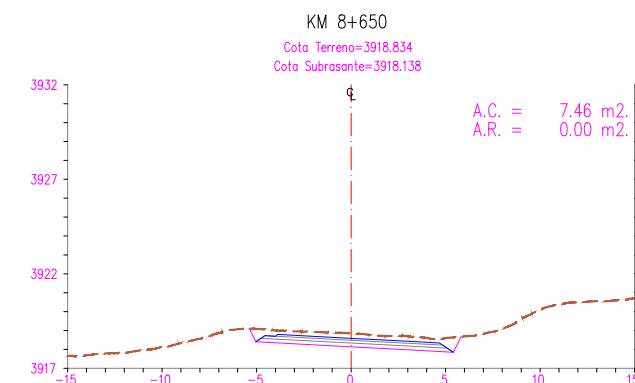
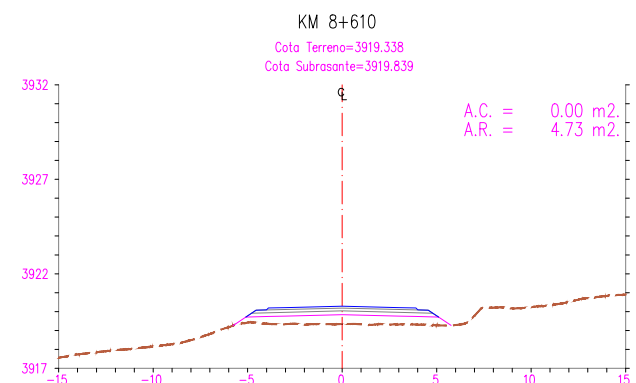
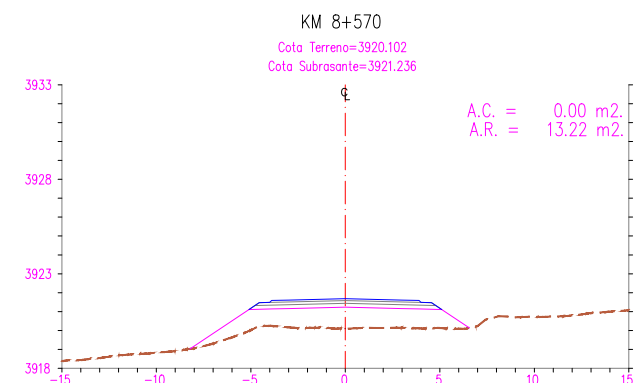
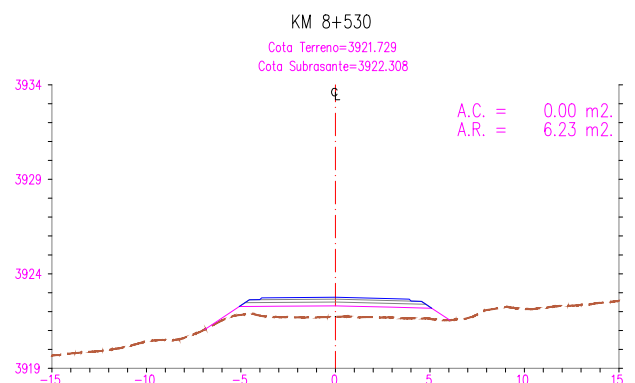
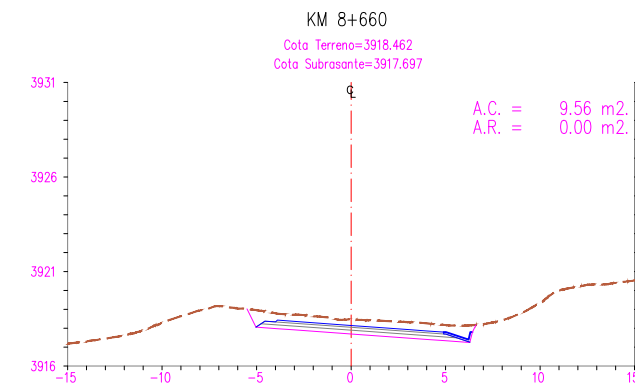
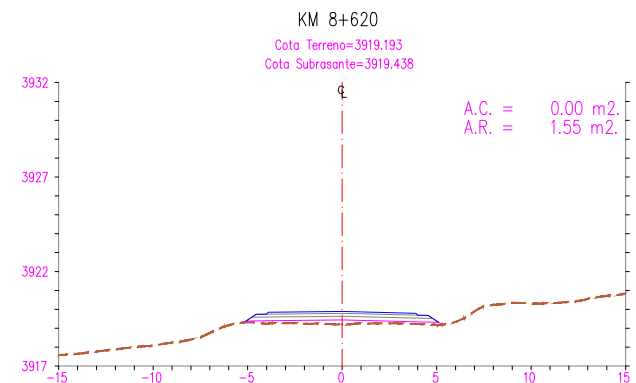
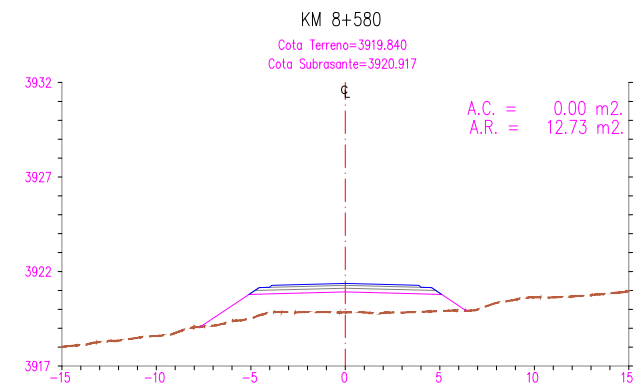
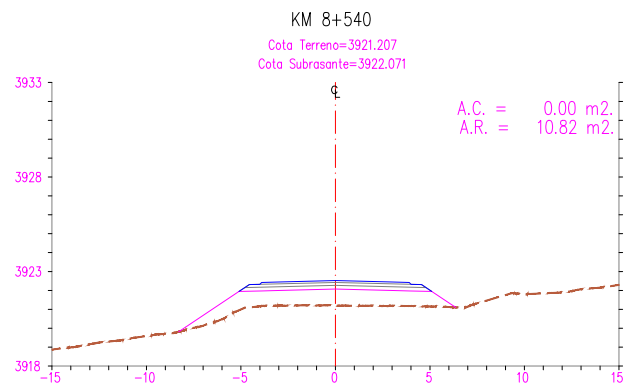
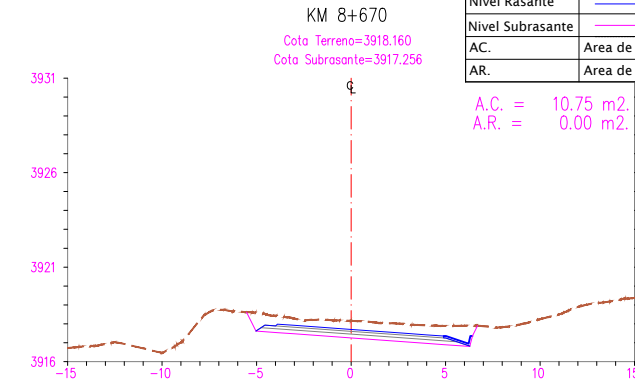
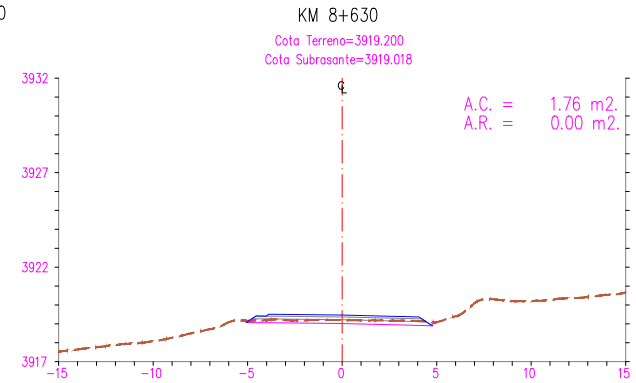
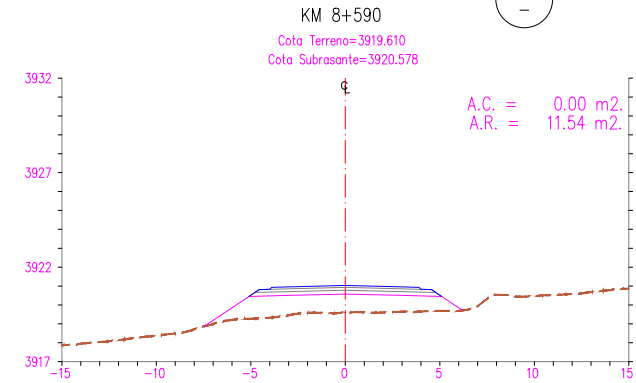
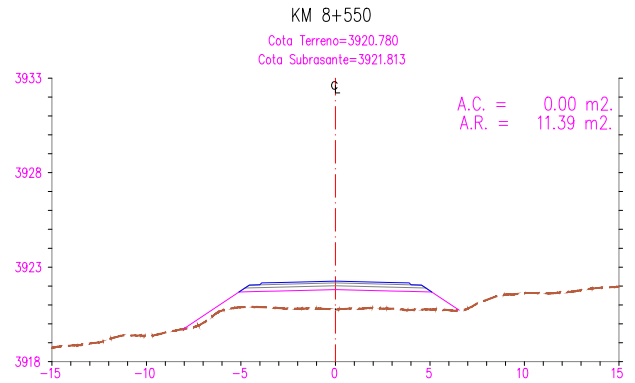
Proyecto de Tesis:
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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 8+360 - Km 8+510

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-022
Lamina: 22-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
AR.	Area de Relleno



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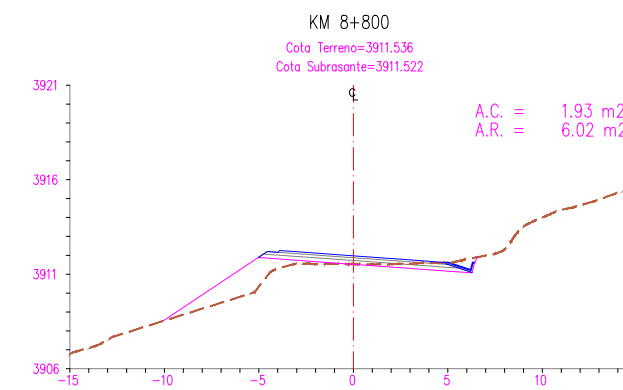
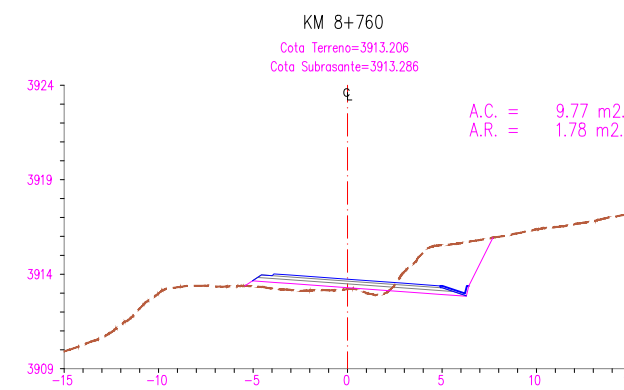
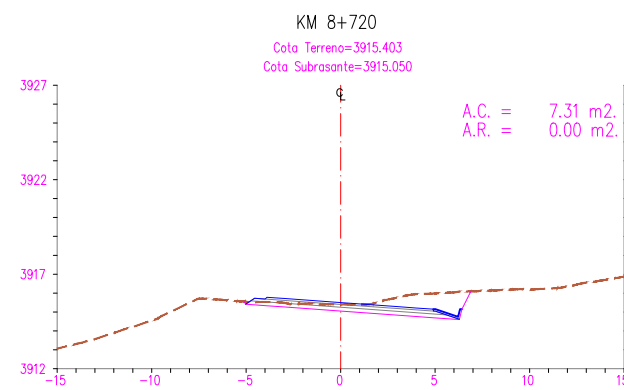
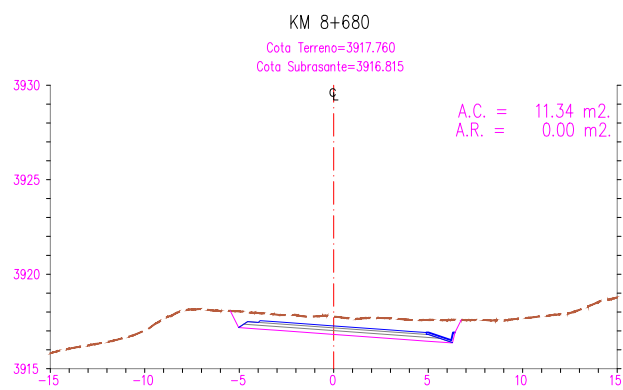
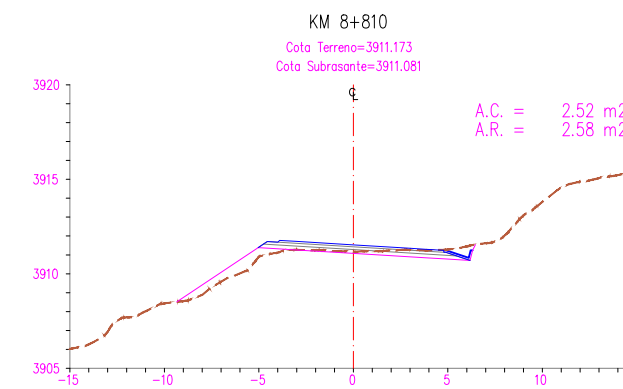
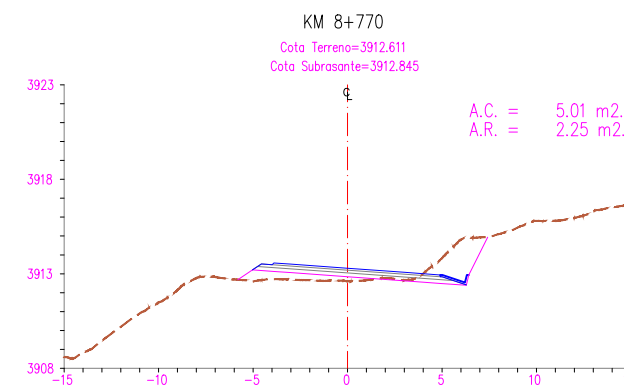
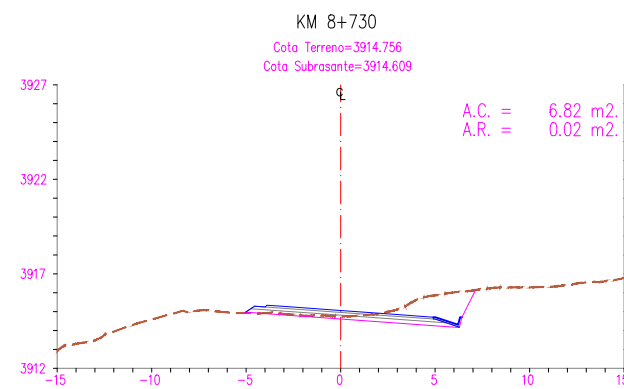
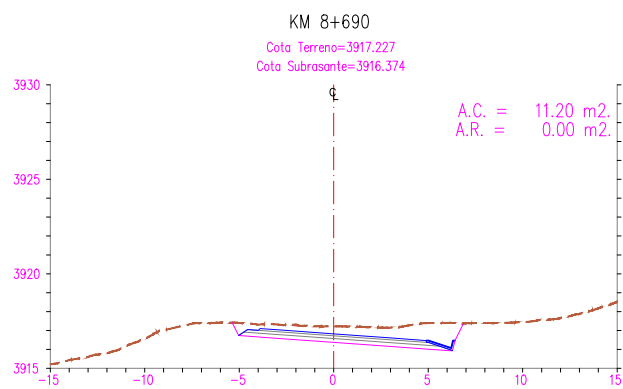
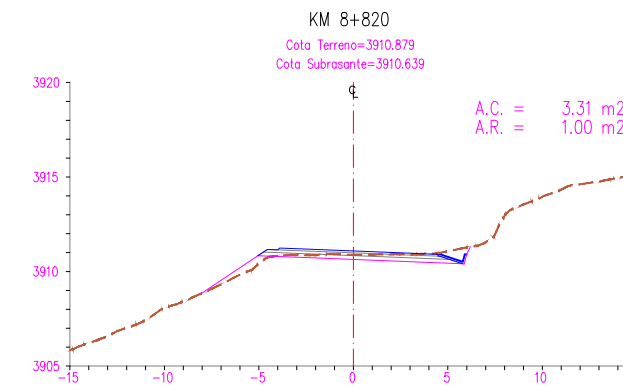
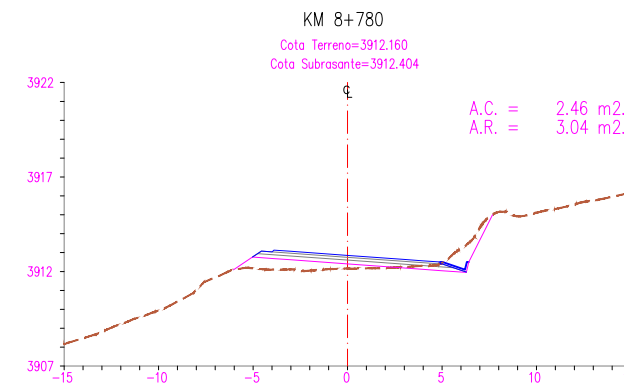
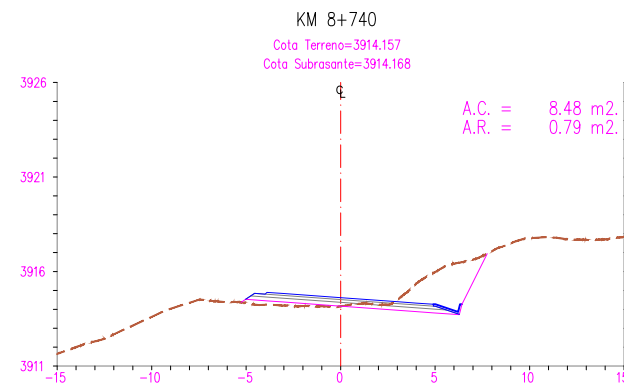
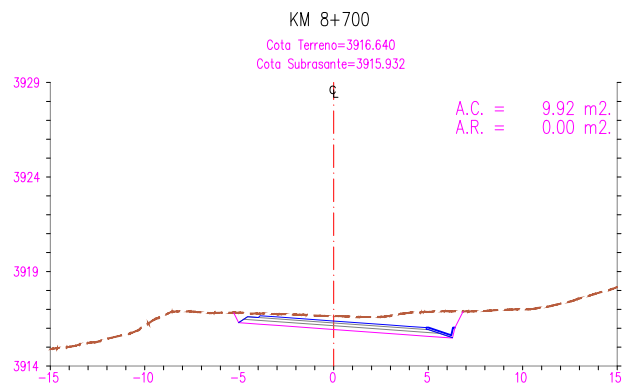
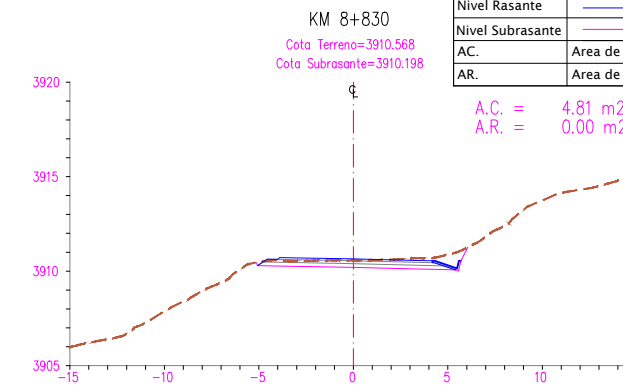
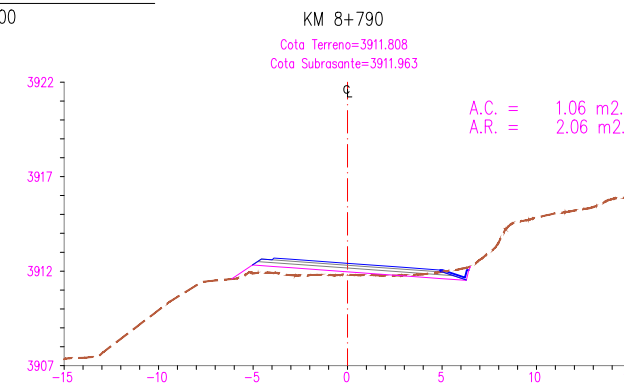
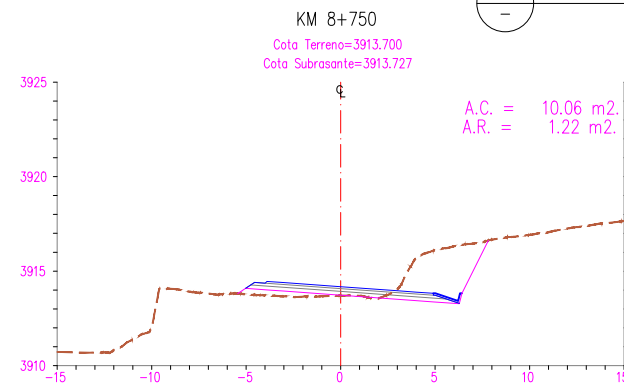
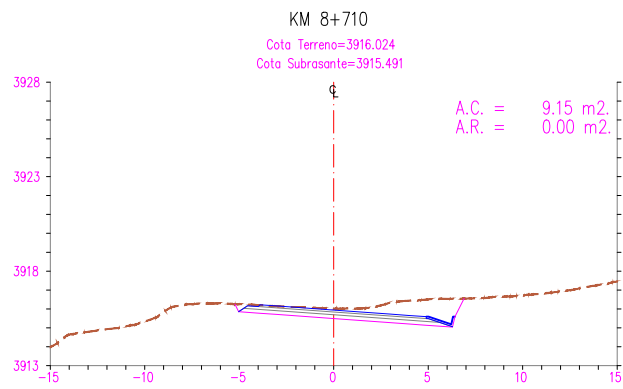
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 8+520 - Km 8+670

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-023
Lamina: 23-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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ALTIPLANO - PUNO

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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

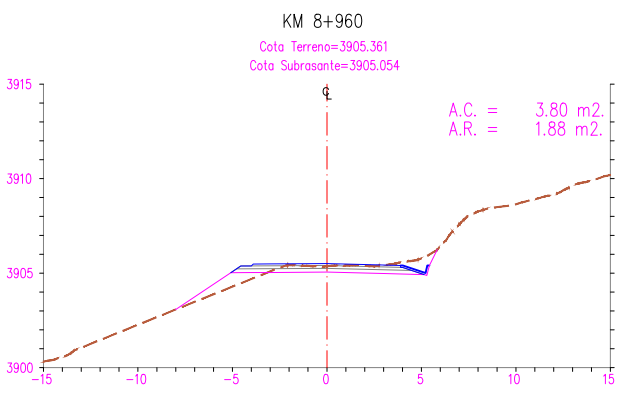
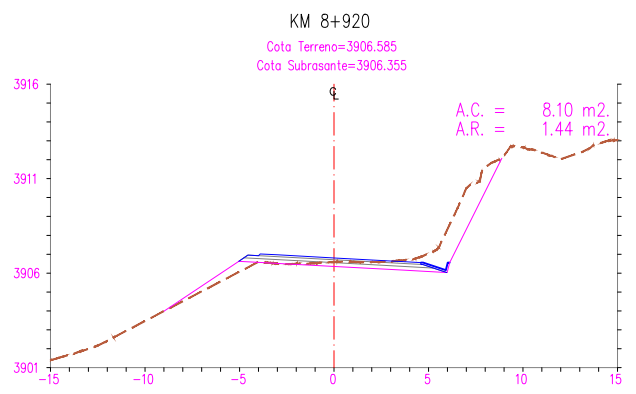
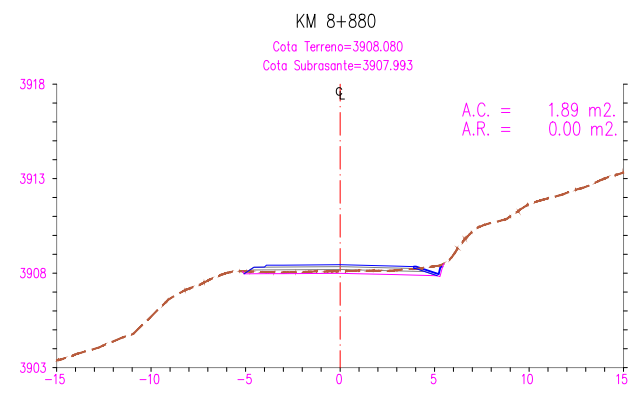
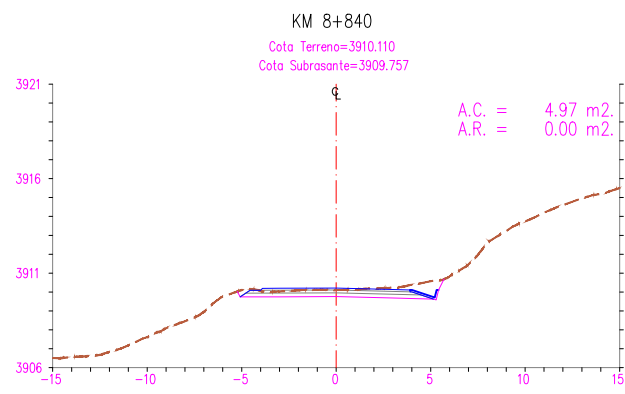
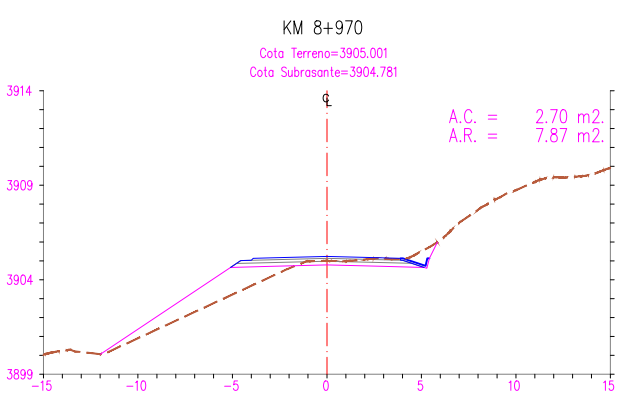
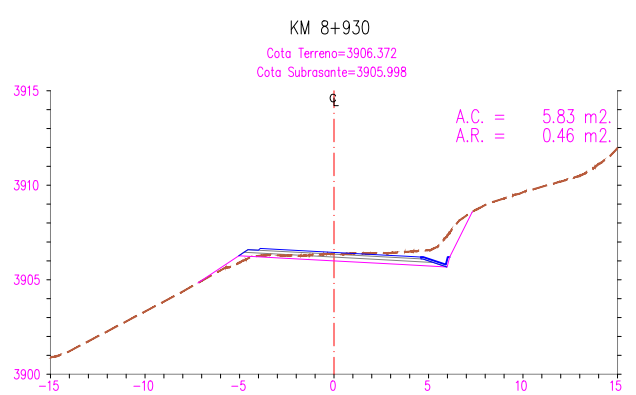
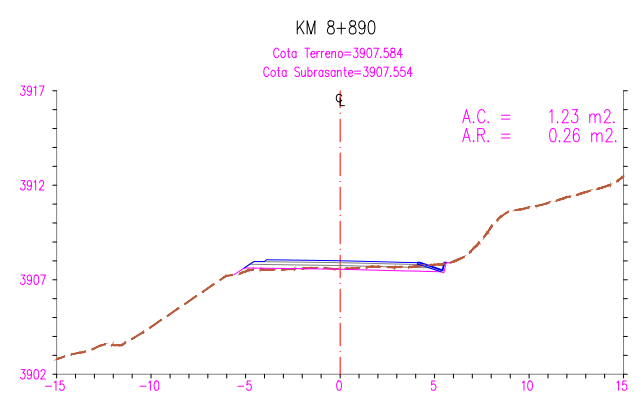
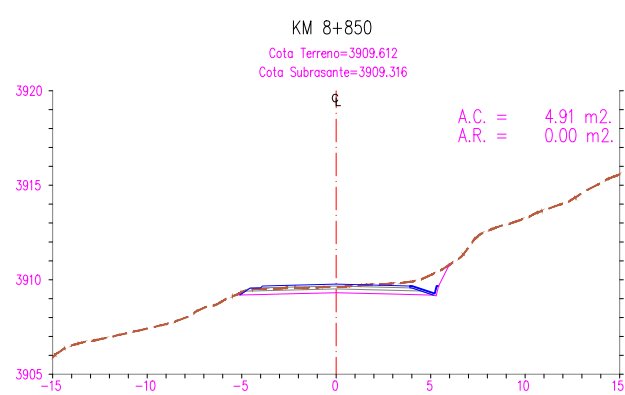
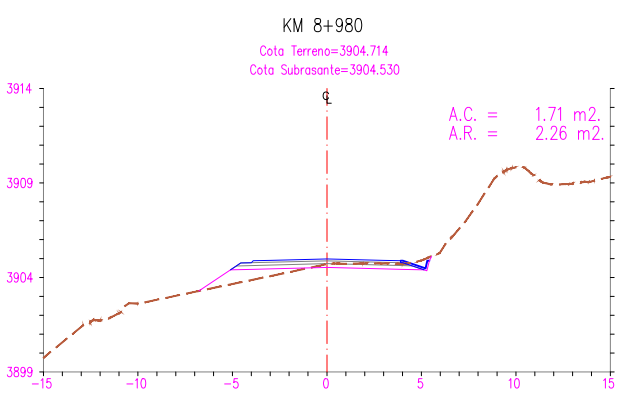
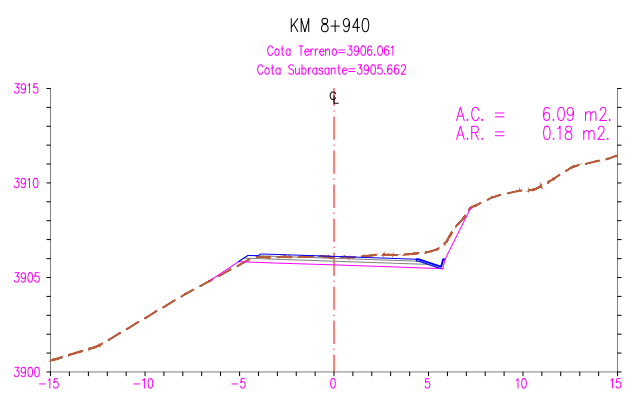
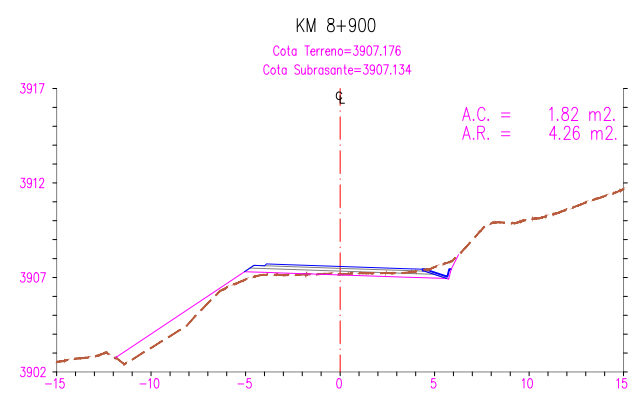
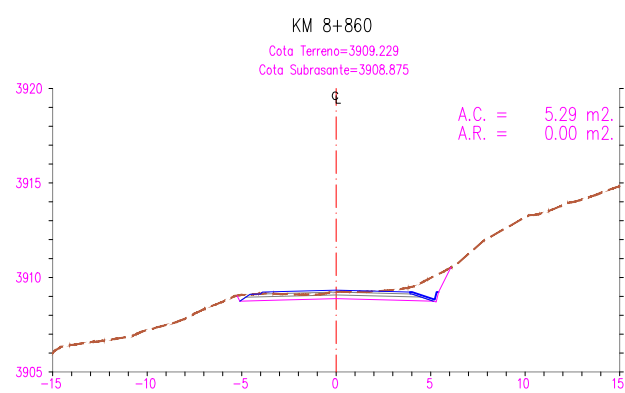
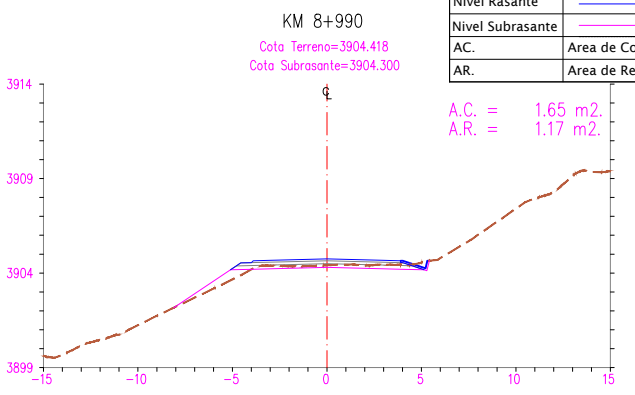
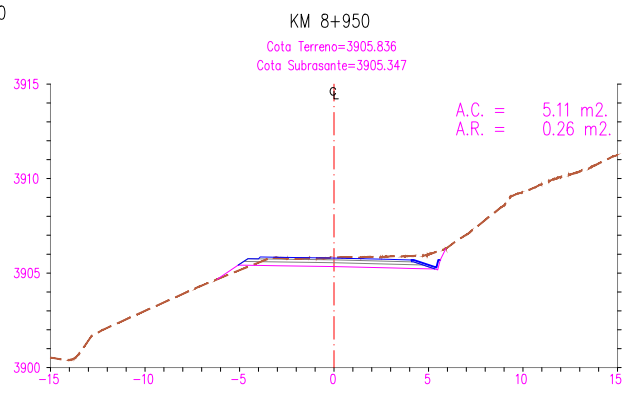
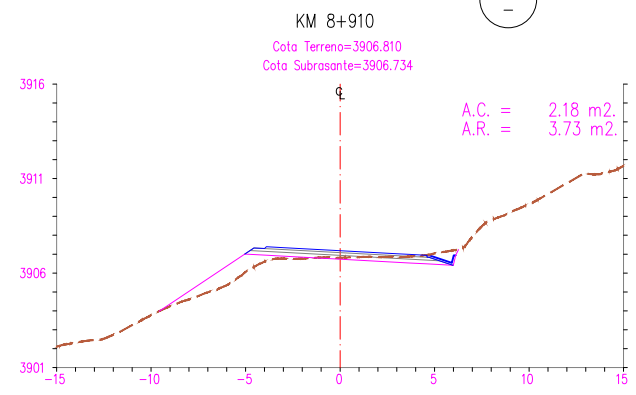
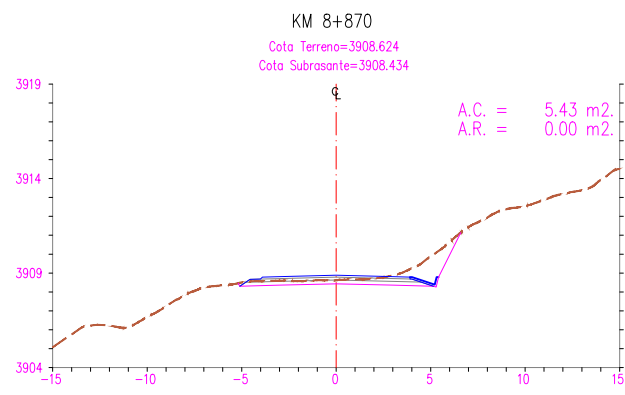
Plano:
SECCIONES TRANSVERSALES
Km 8+680 - Km 8+830

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-024

Lamina:
24-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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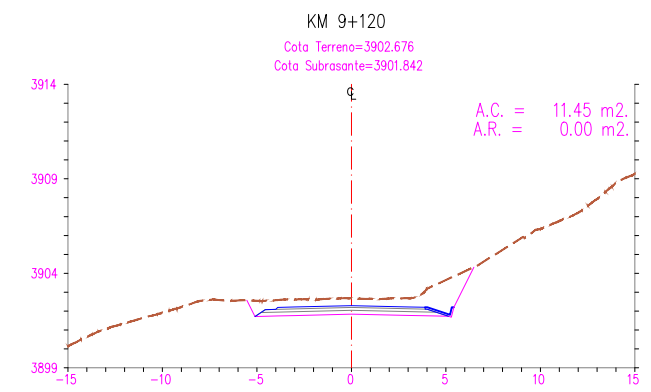
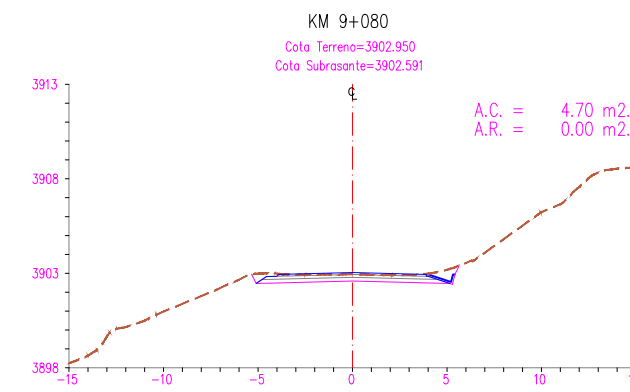
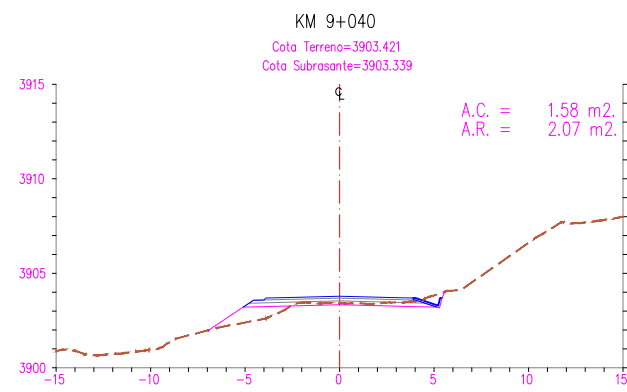
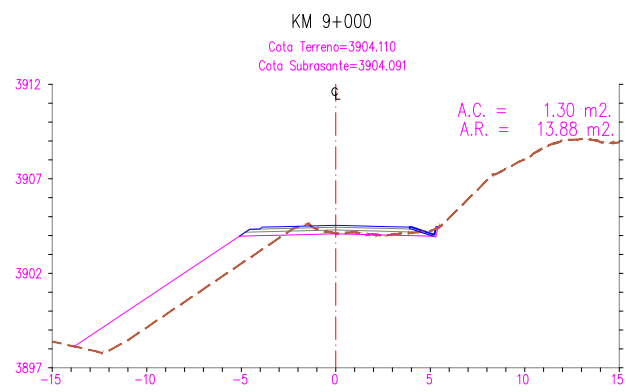
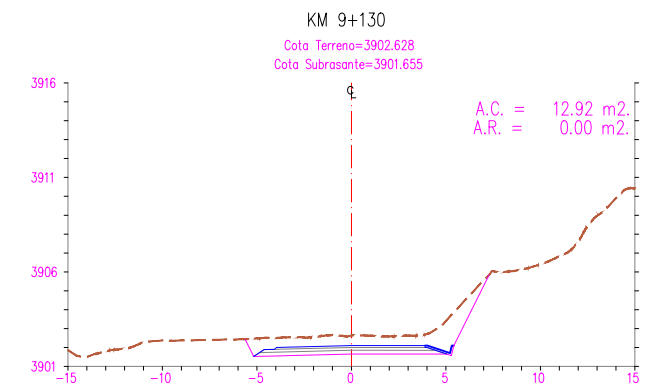
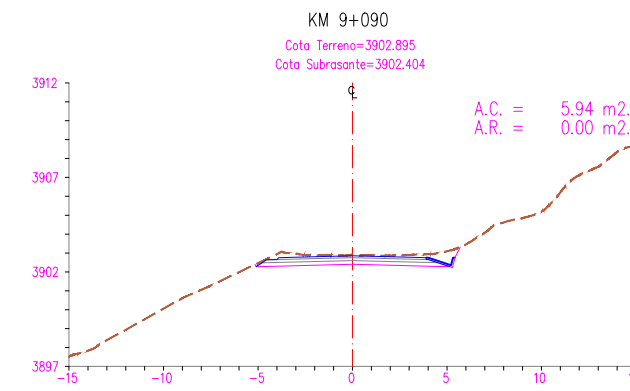
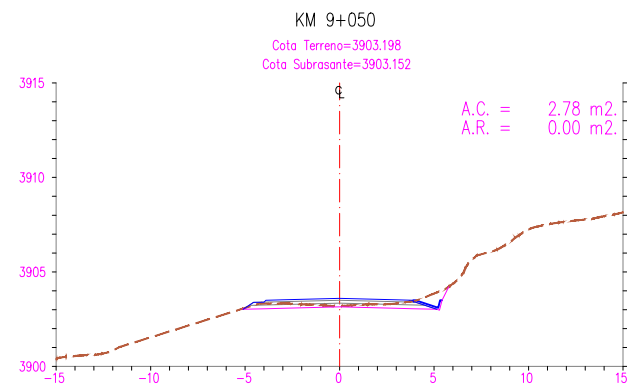
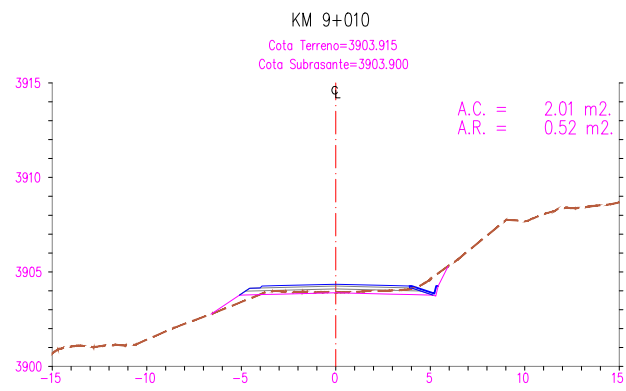
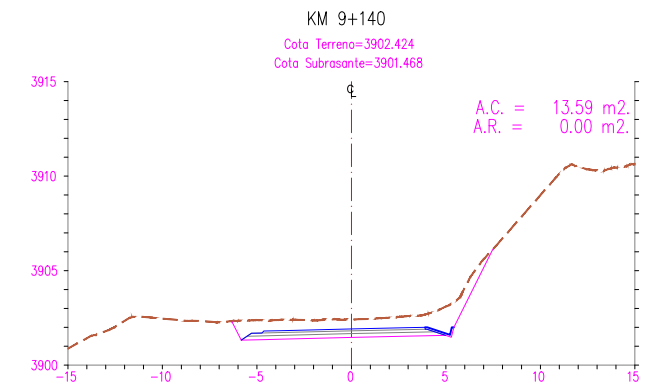
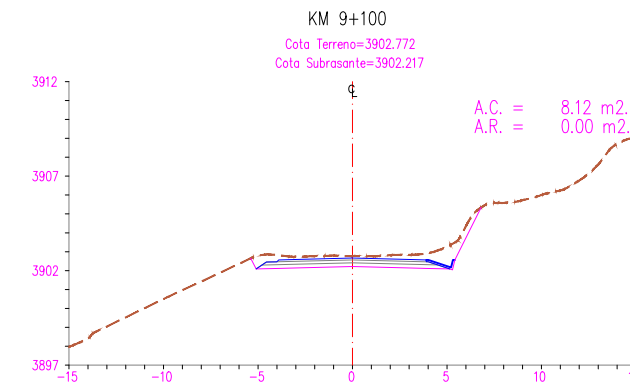
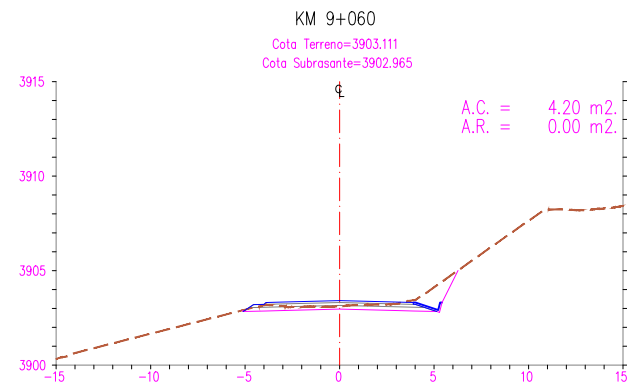
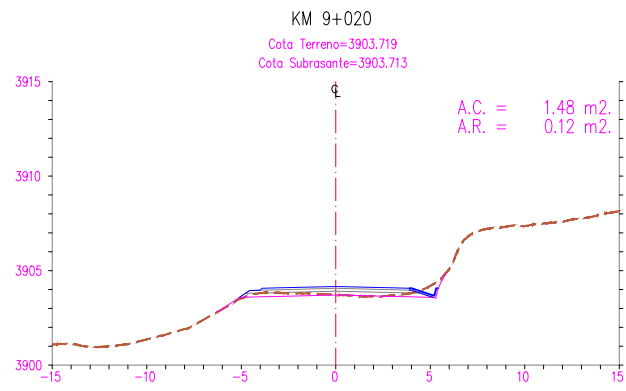
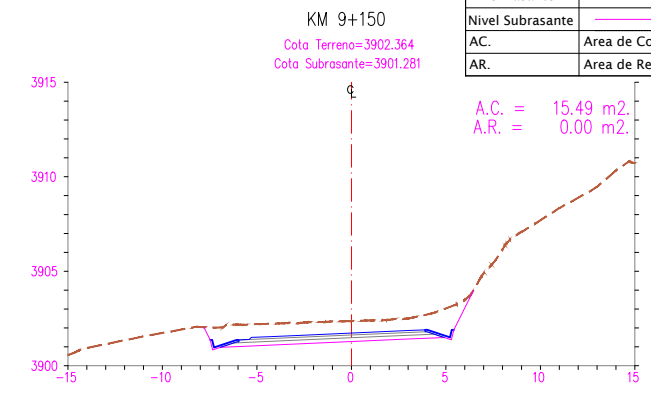
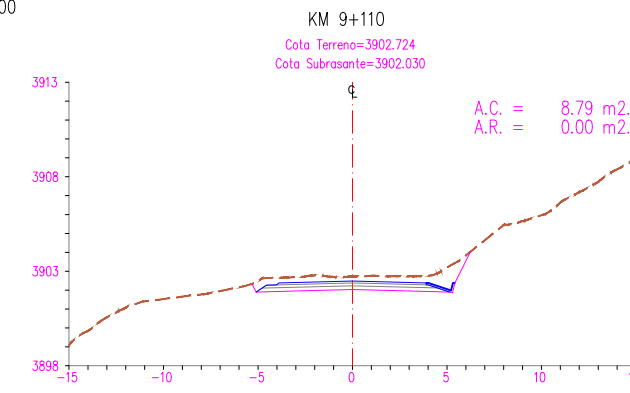
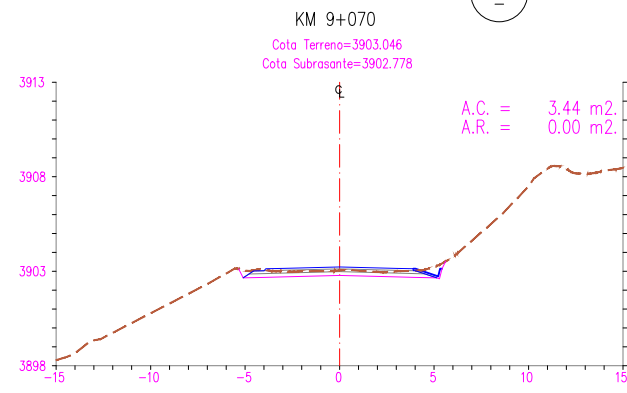
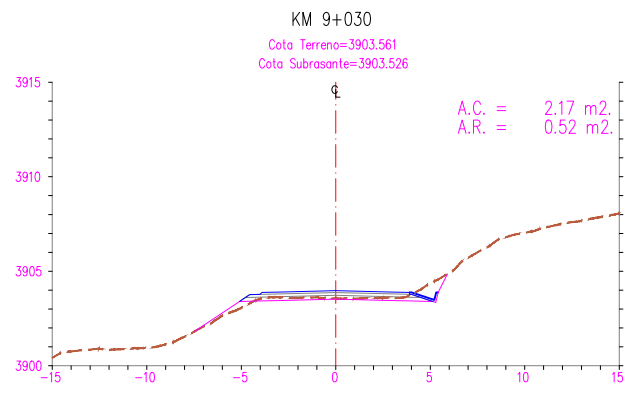
Proyecto de Tesis:
"COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA - CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES Km 8+840 - Km 8+990

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-025
Lamina: **25-47**
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



UNIVERSIDAD NACIONAL DEL
ALTIPLANO - PUNO

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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

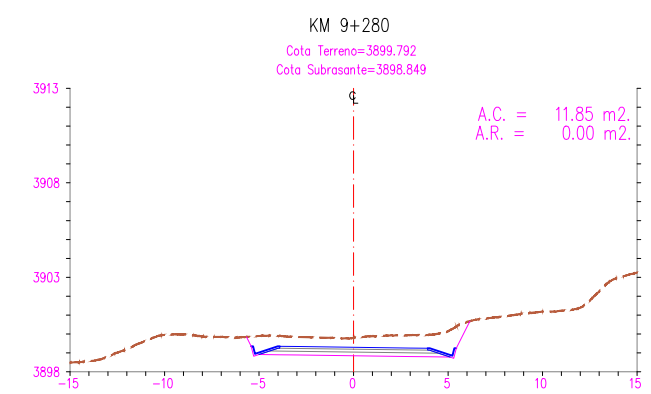
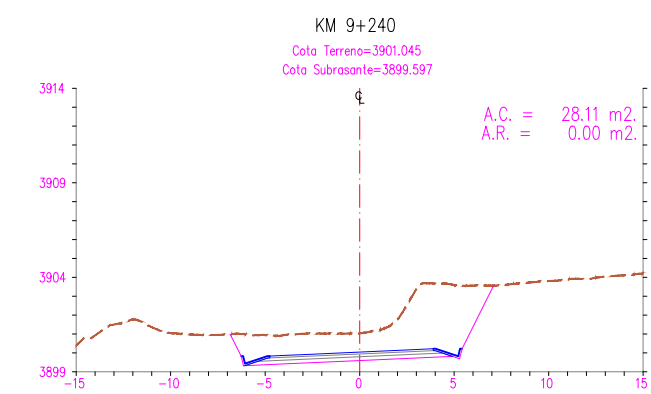
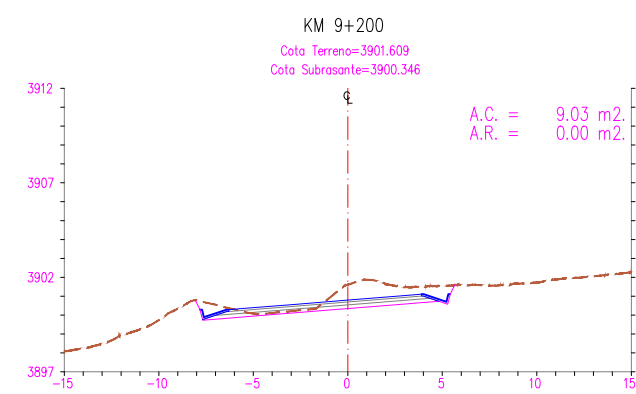
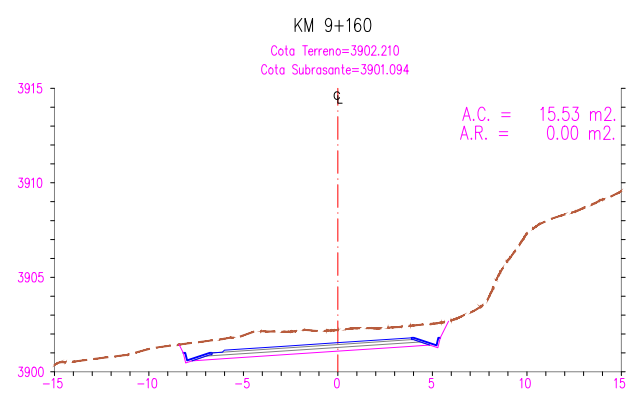
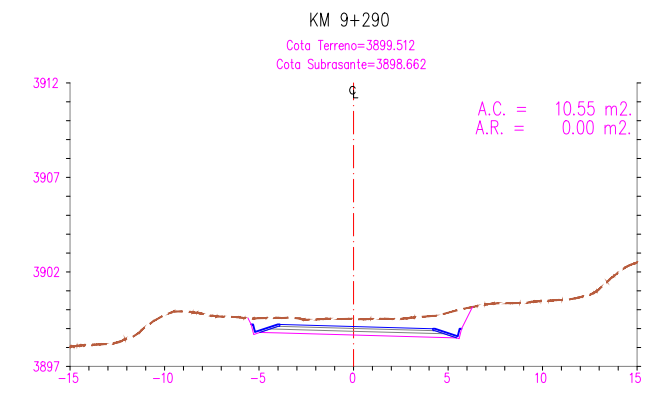
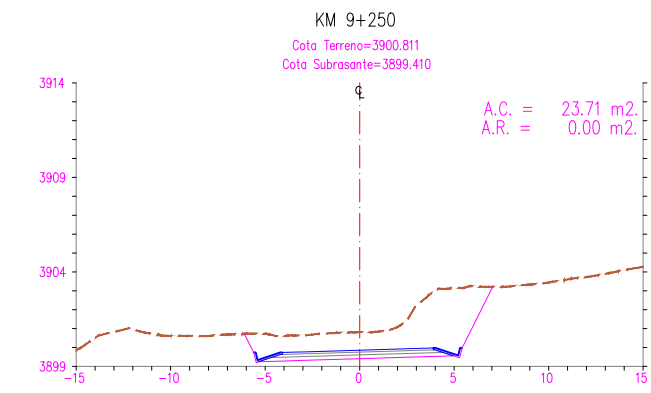
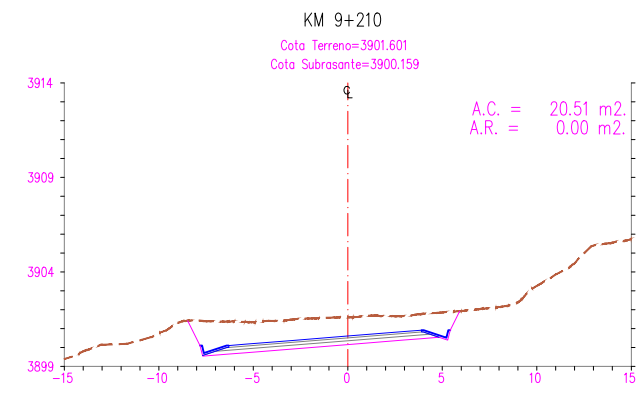
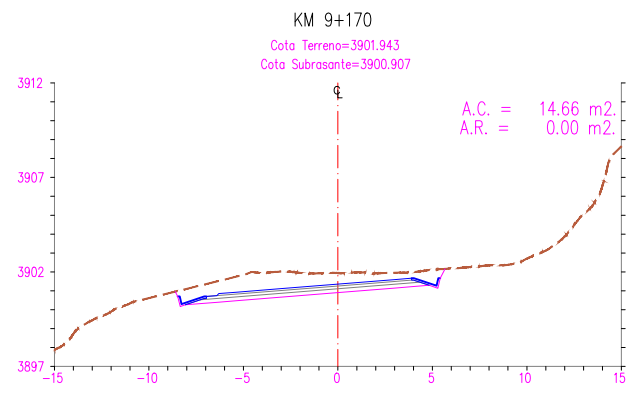
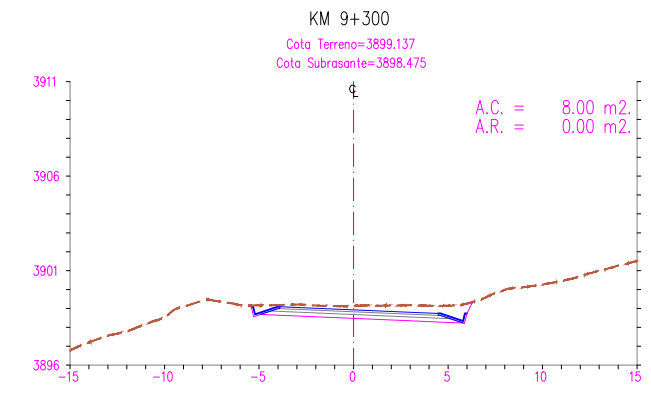
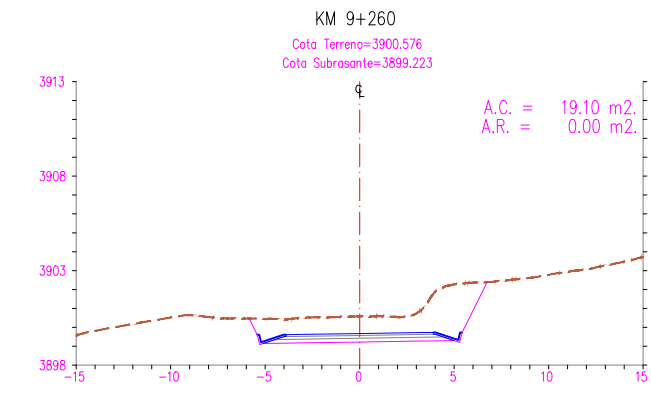
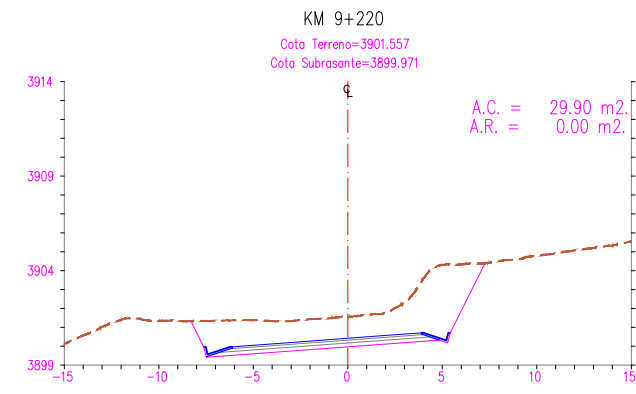
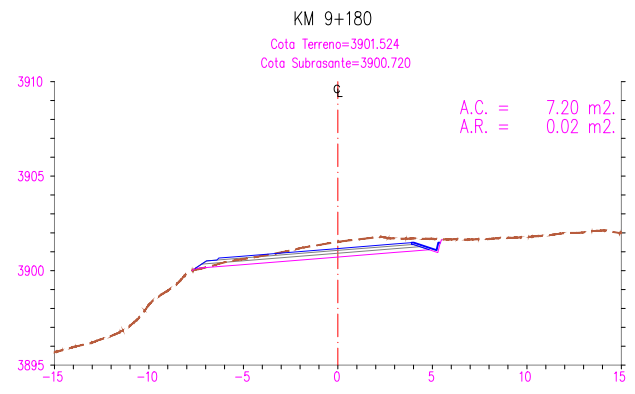
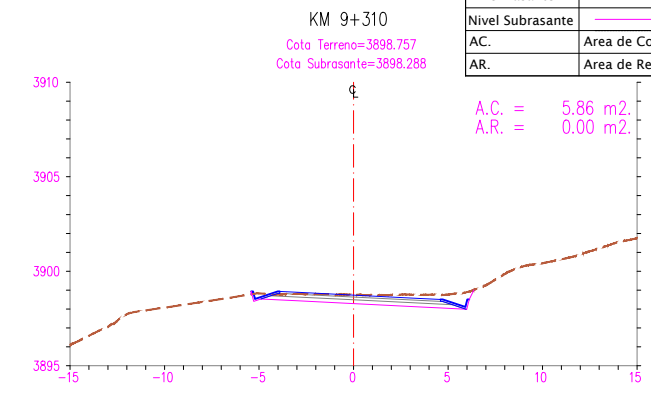
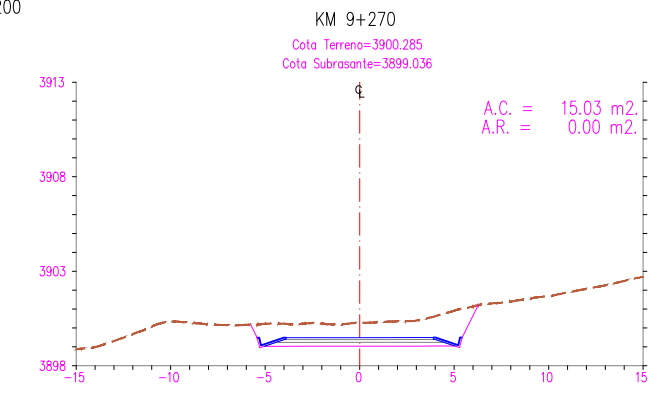
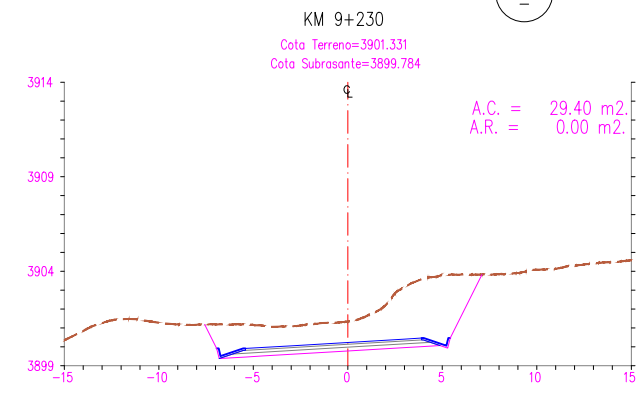
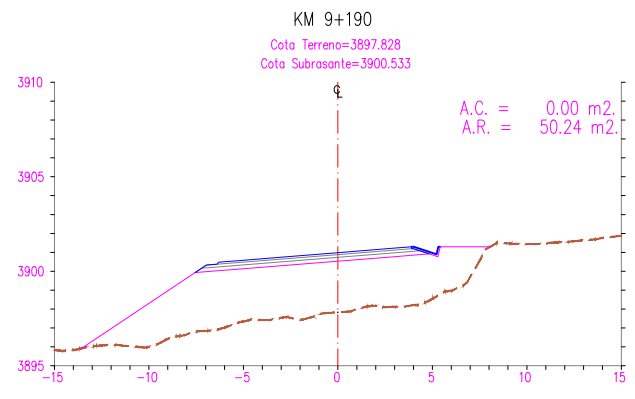
Plano:
SECCIONES TRANSVERSALES
Km 9+000 - Km 9+150

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-026

Lamina:
26-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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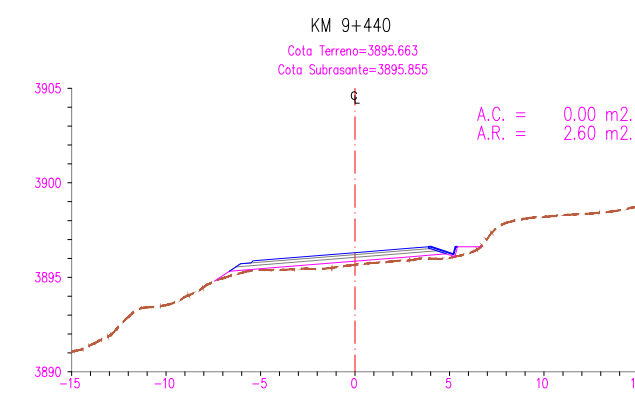
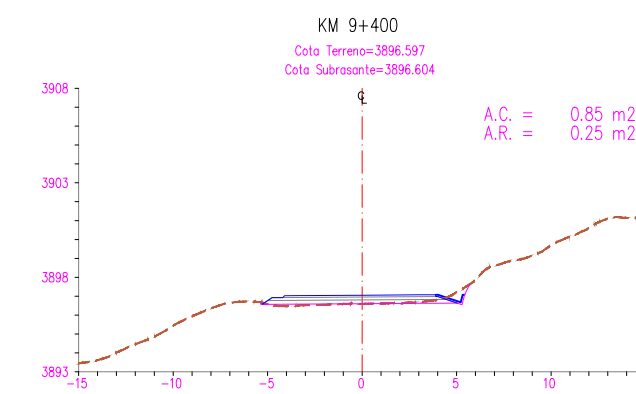
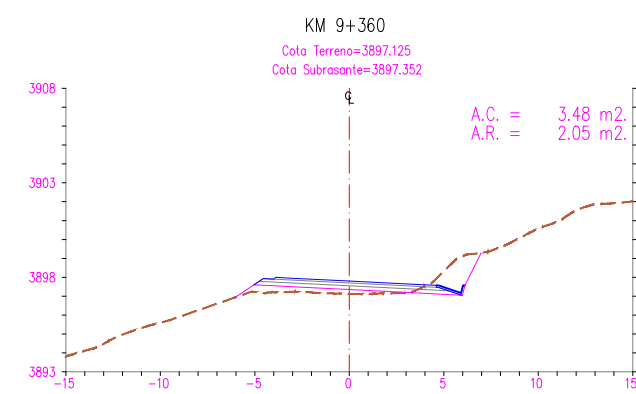
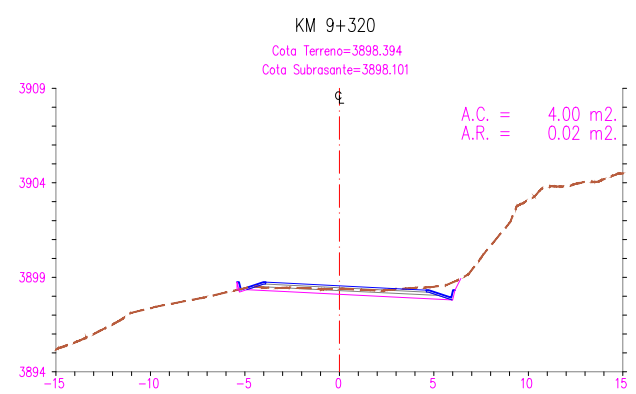
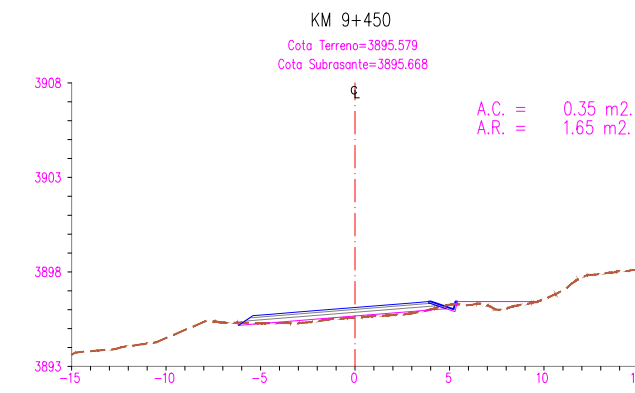
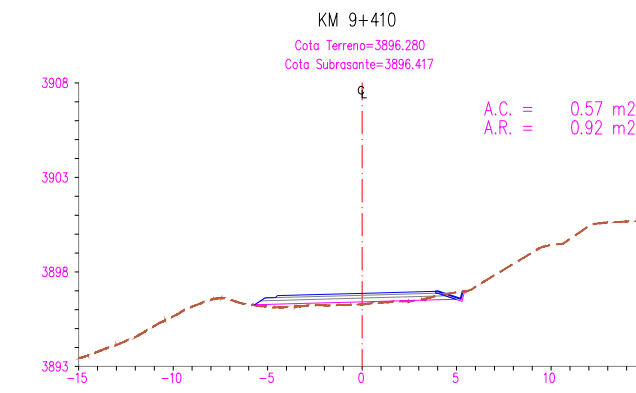
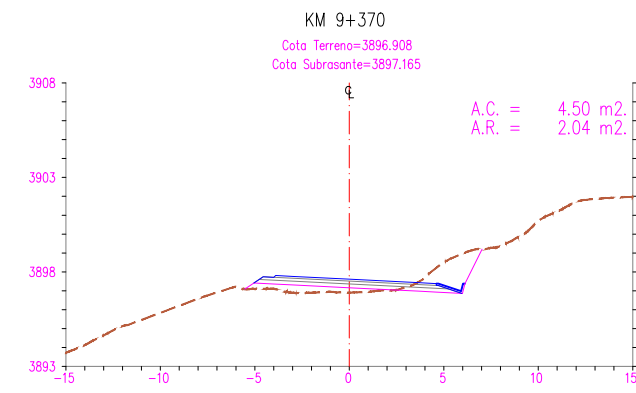
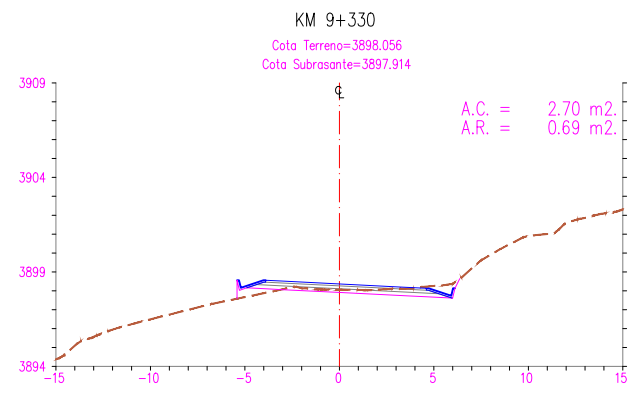
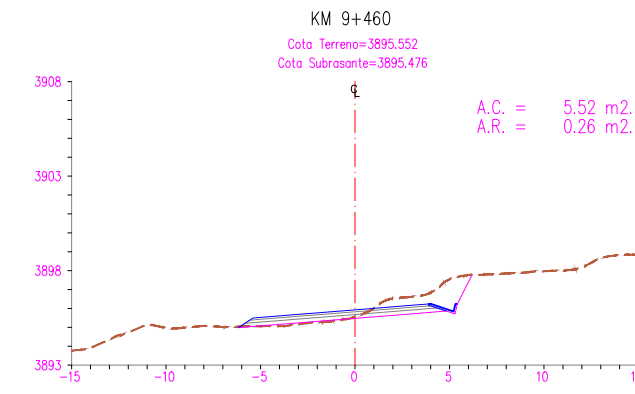
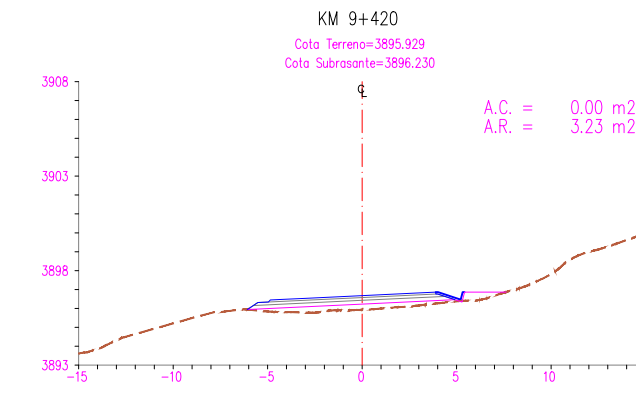
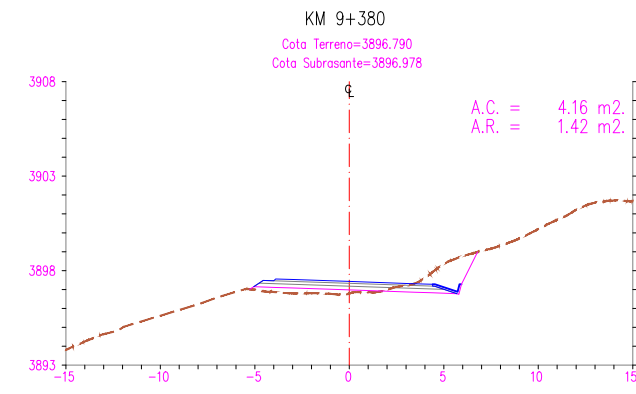
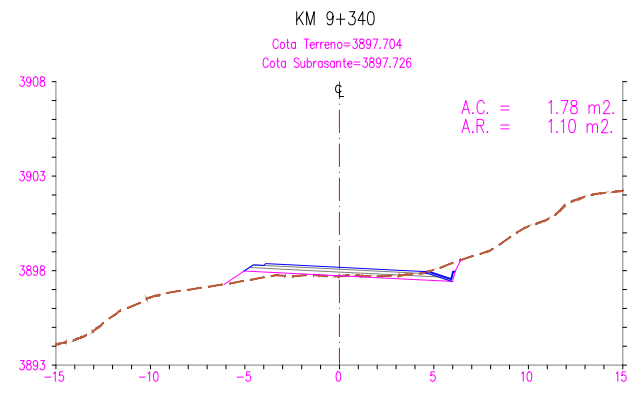
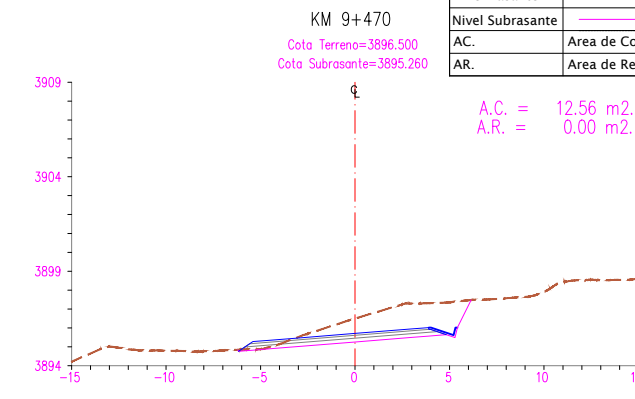
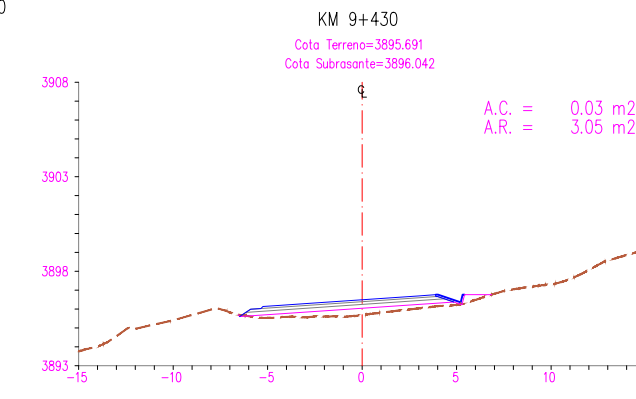
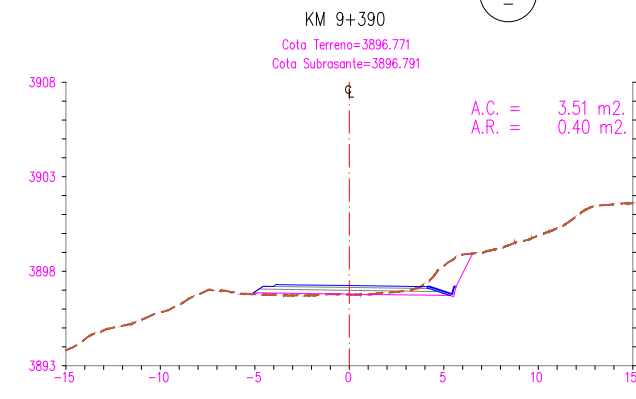
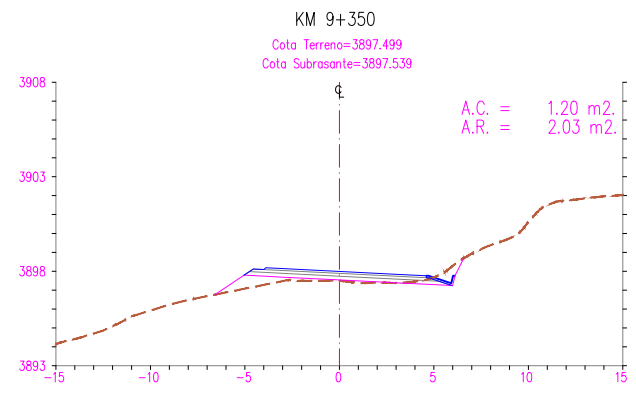
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 9+160 - Km 9+310

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-027
Lamina: 27-47
REV-00

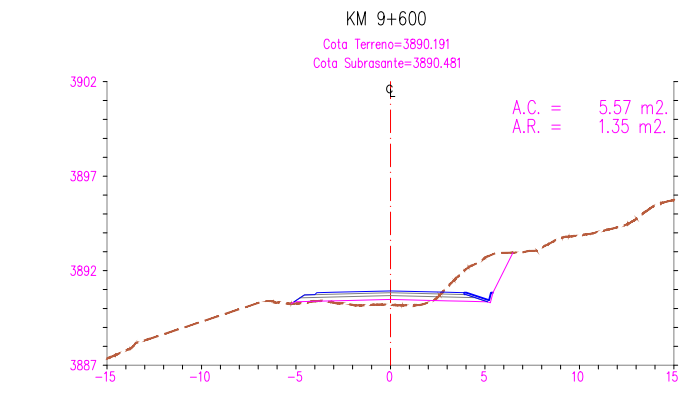
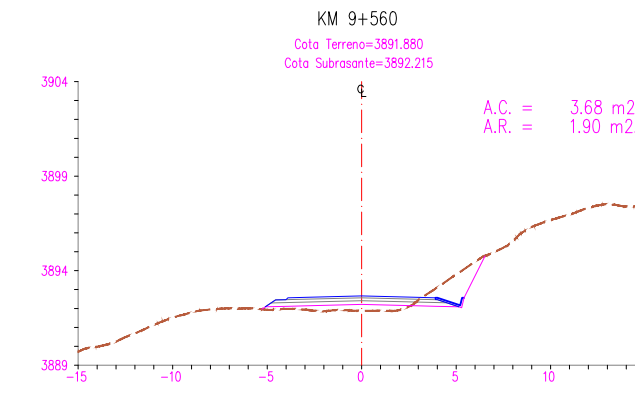
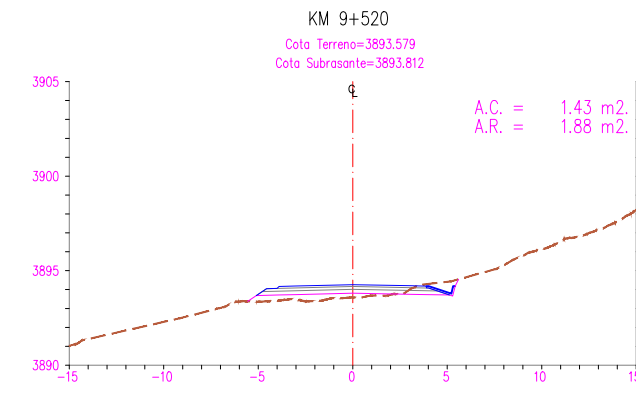
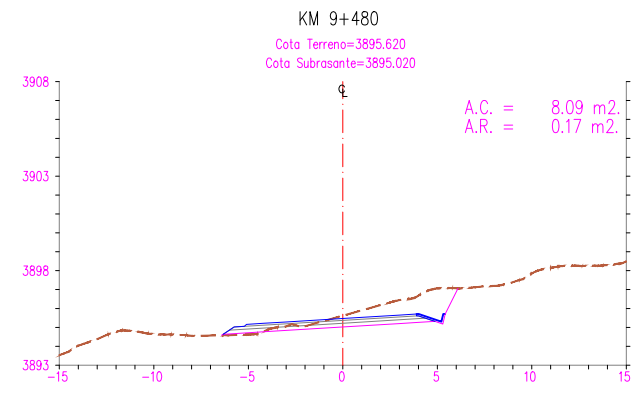
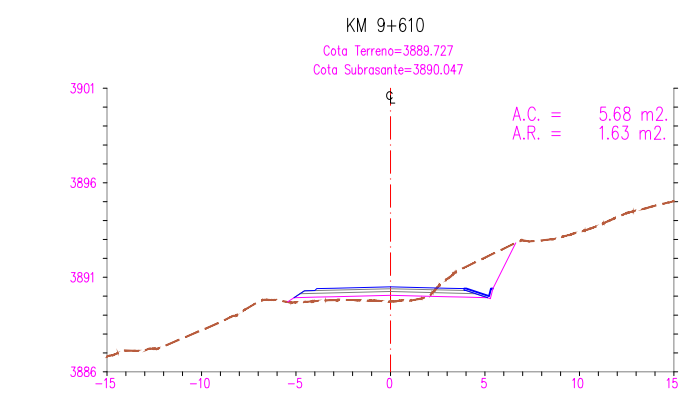
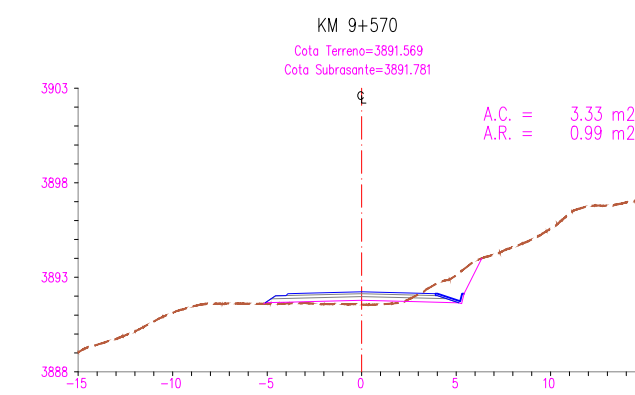
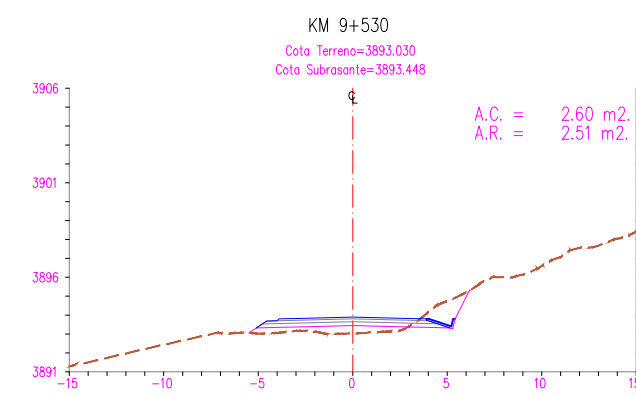
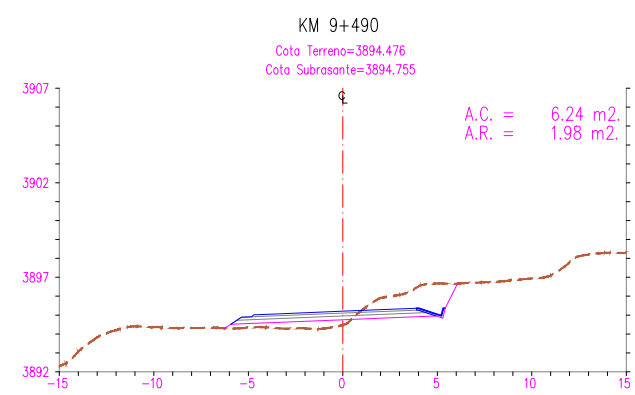
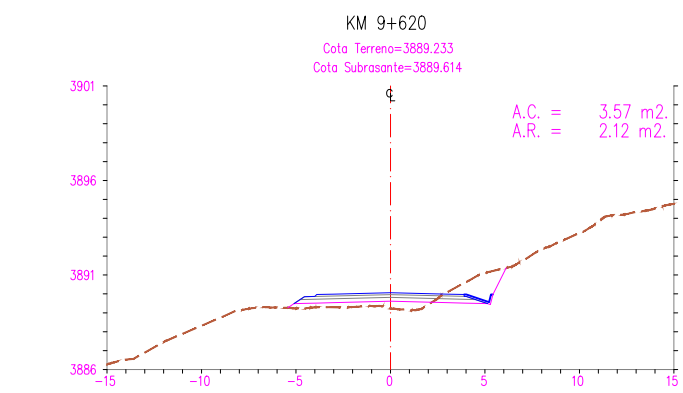
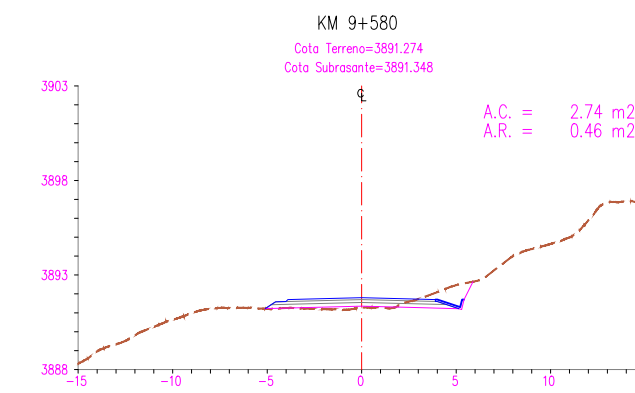
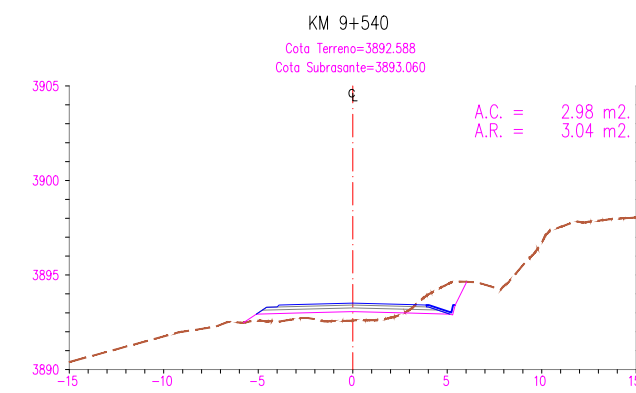
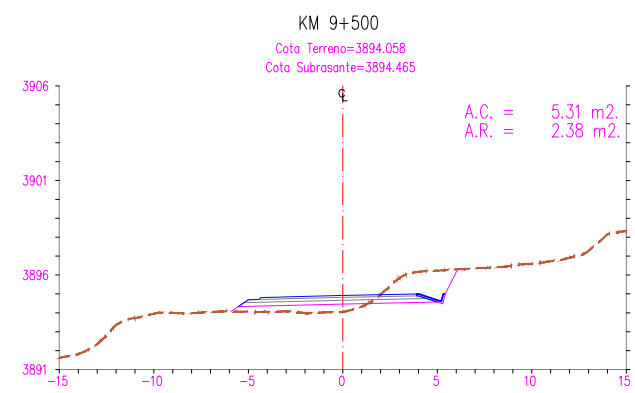
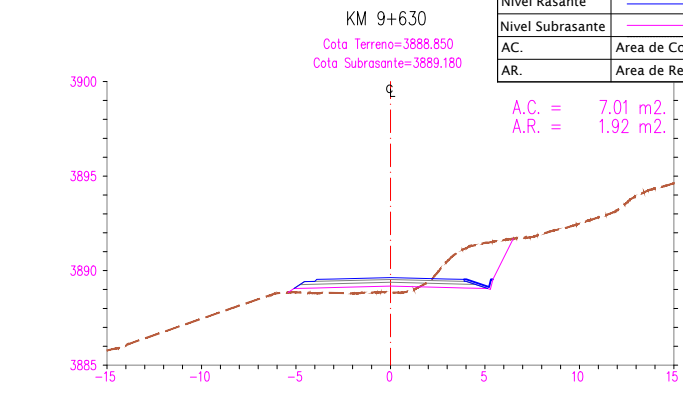
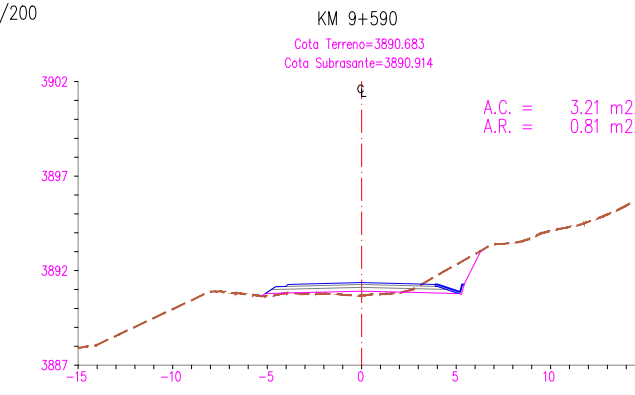
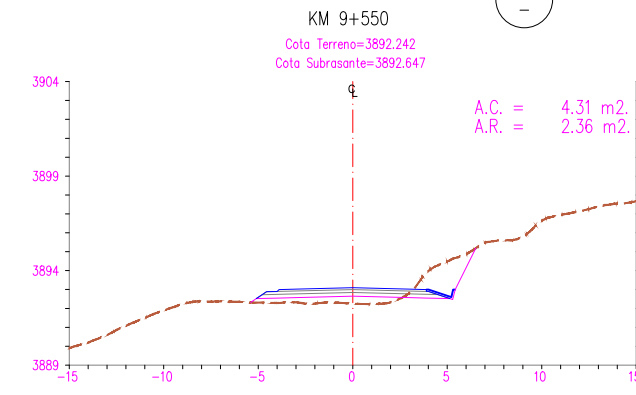
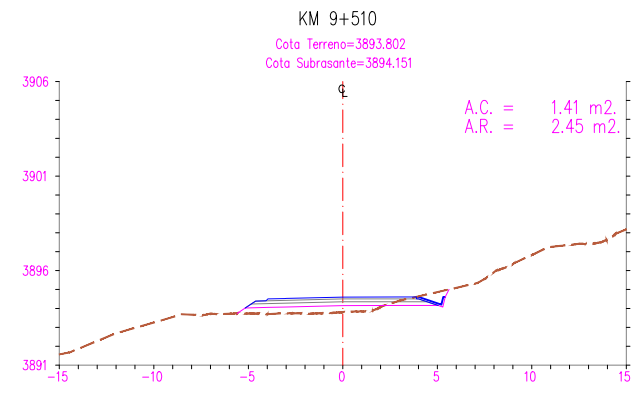
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	---
Nivel Rasante	—
Nivel Subrasante	—
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
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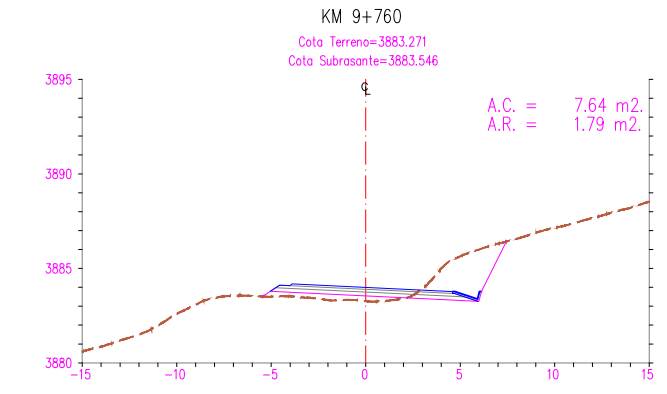
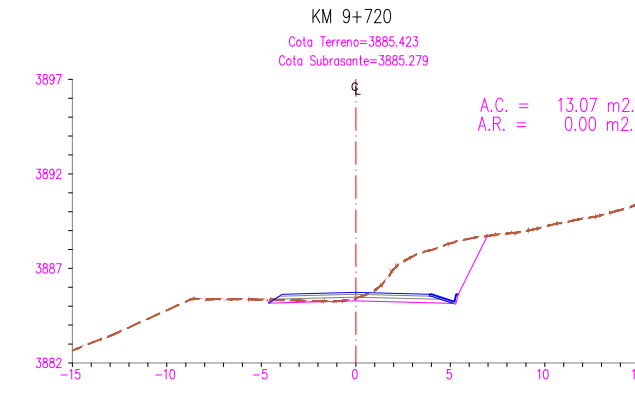
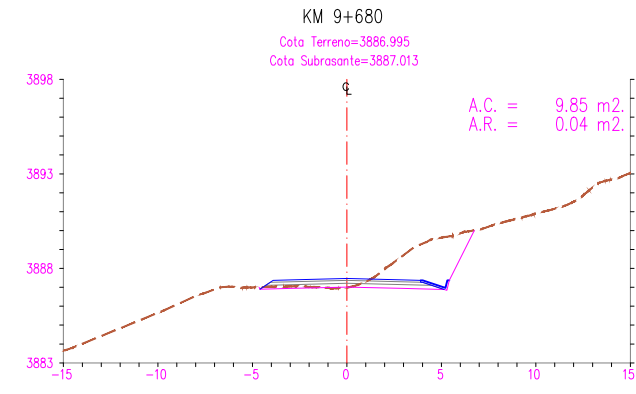
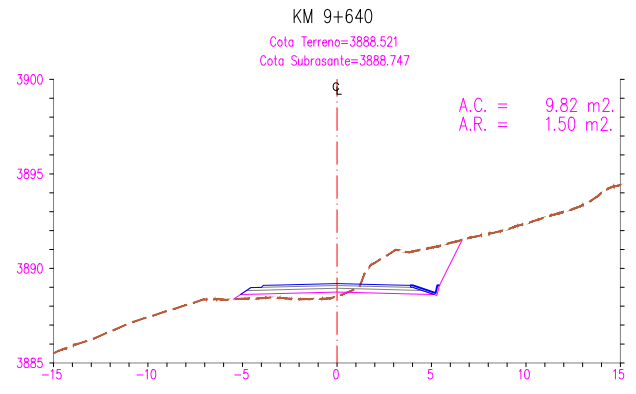
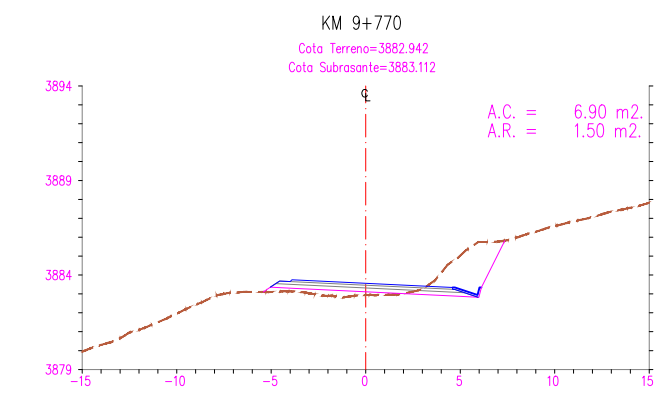
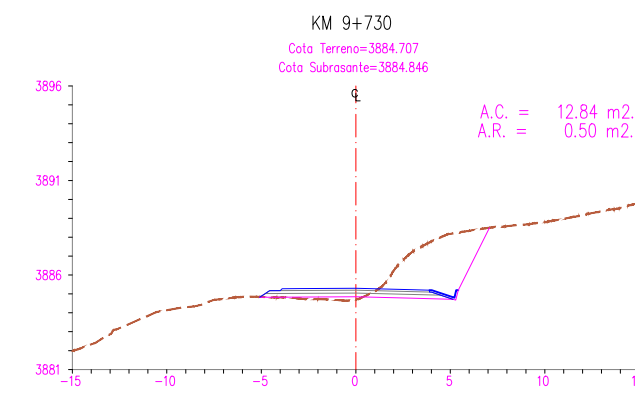
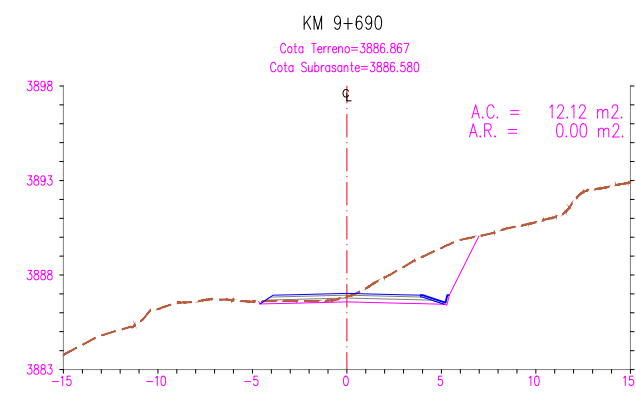
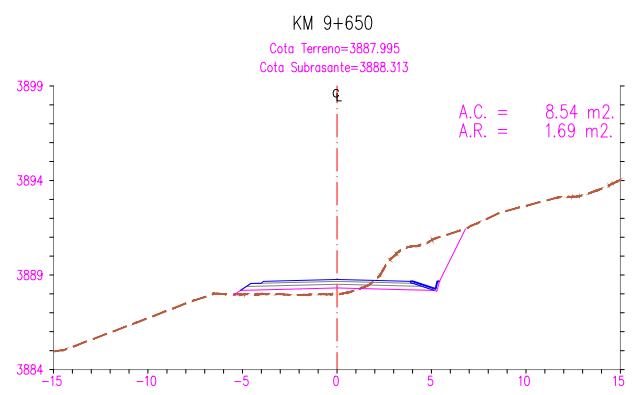
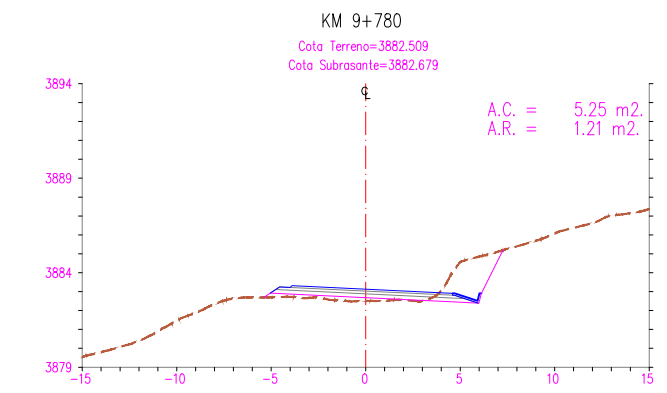
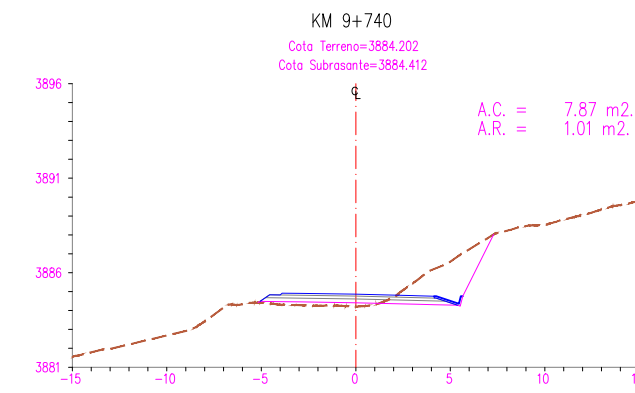
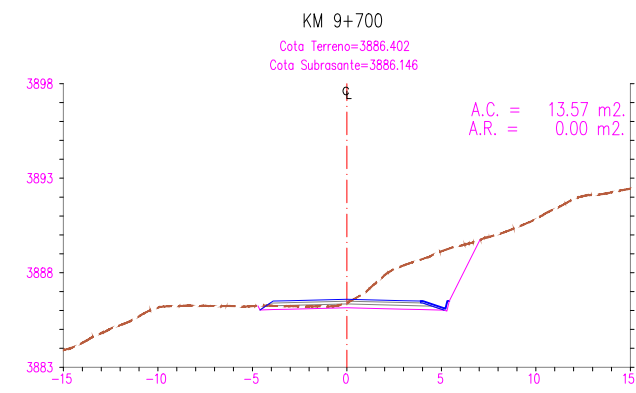
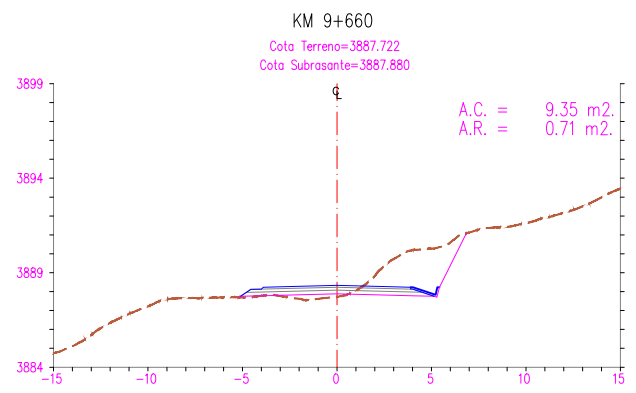
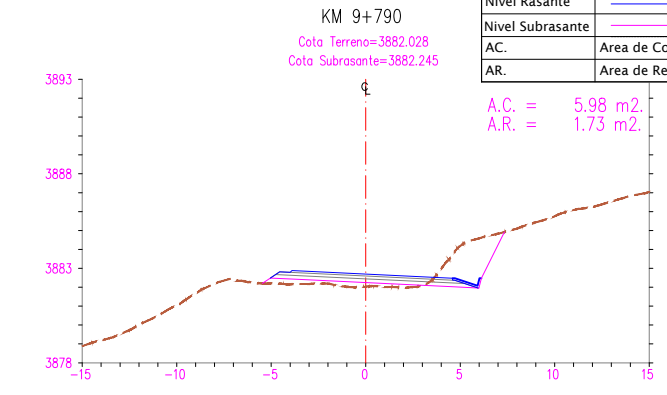
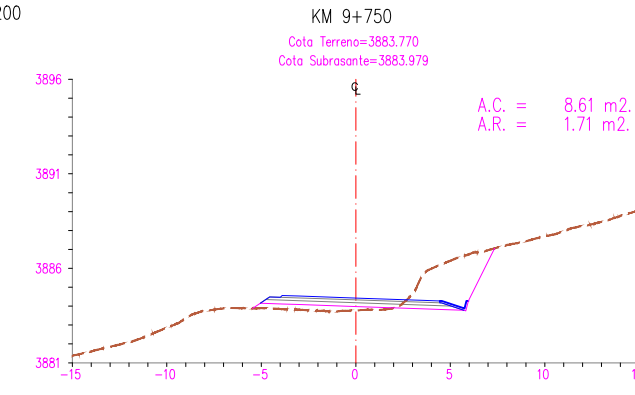
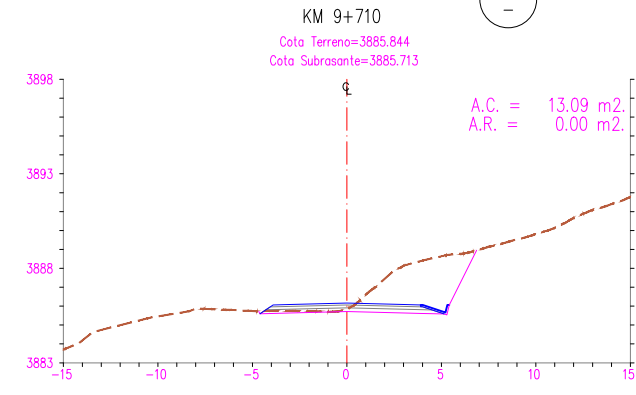
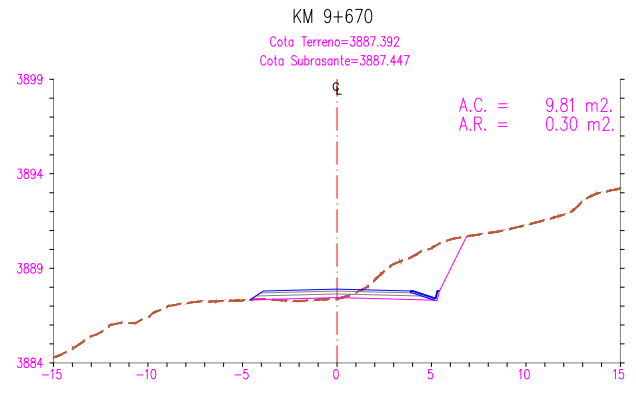
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OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 9+480 - Km 9+630

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-029
Lamina: 29-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

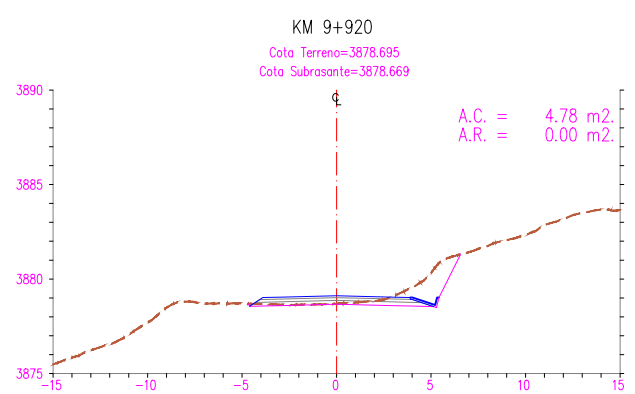
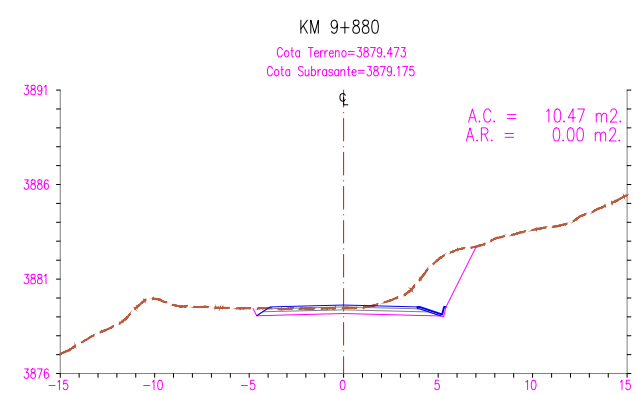
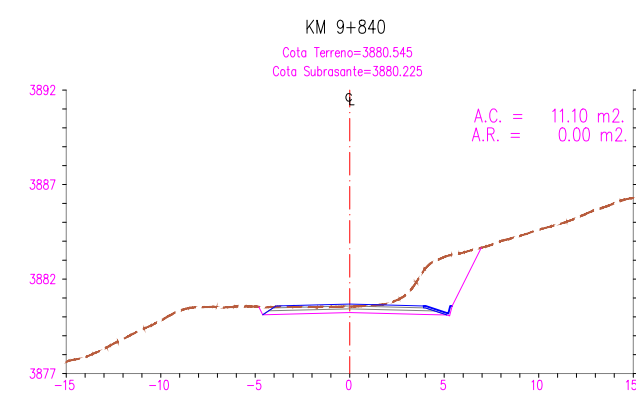
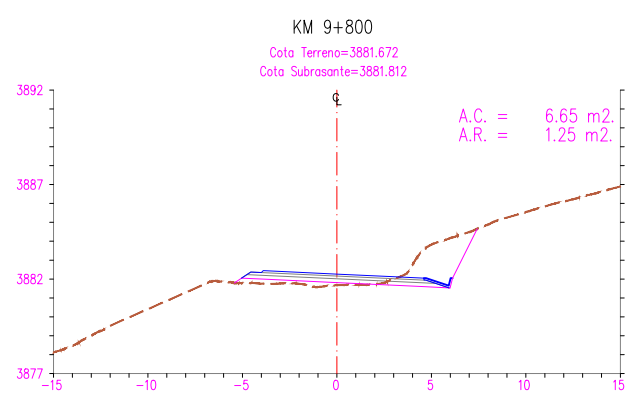
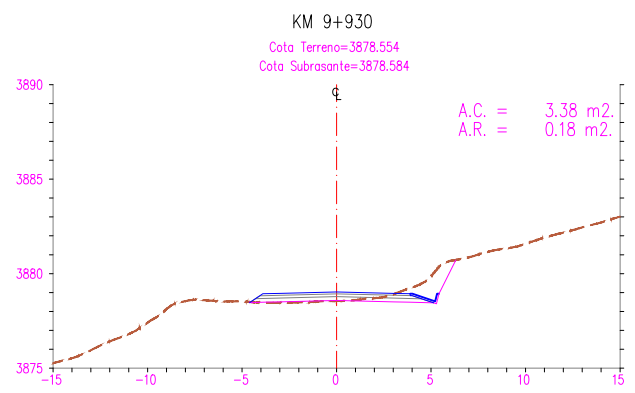
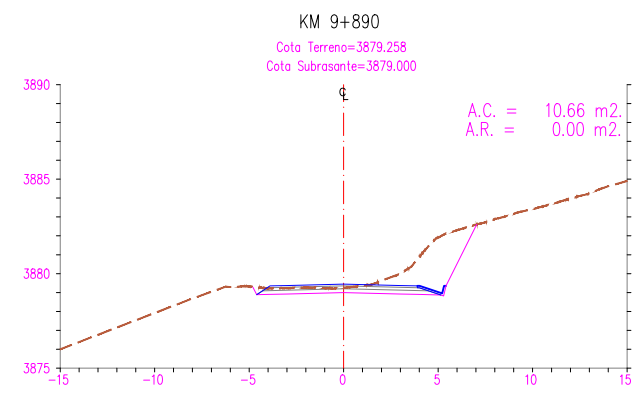
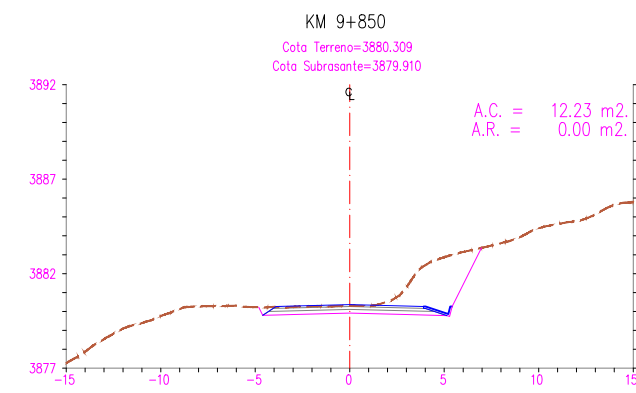
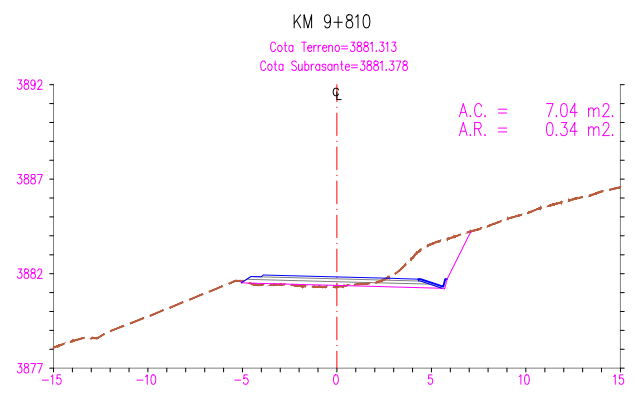
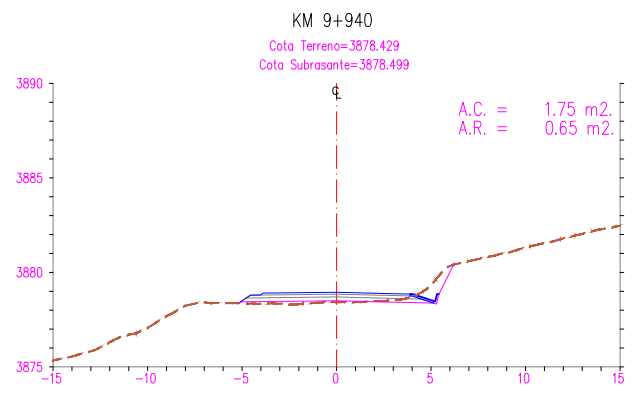
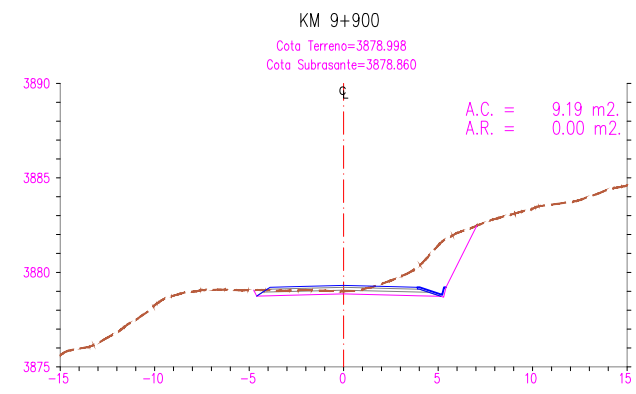
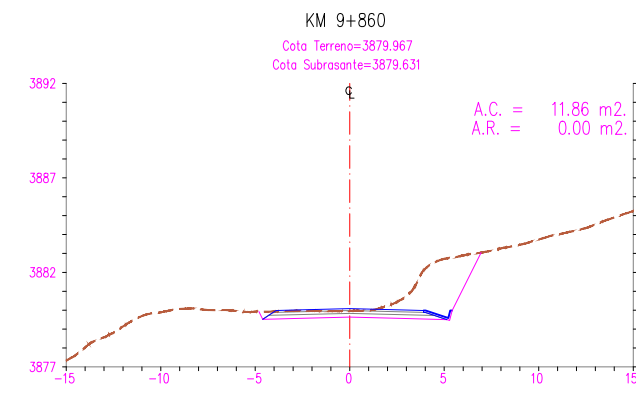
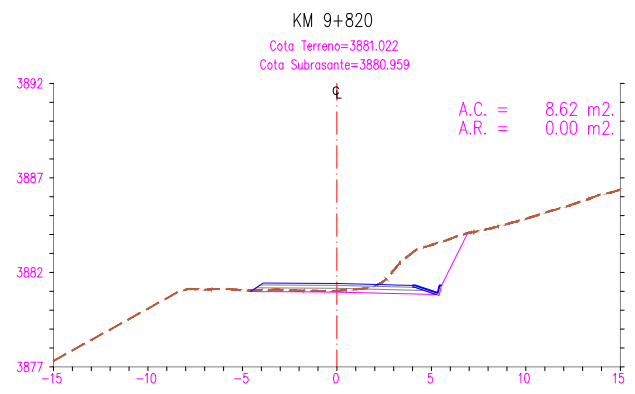
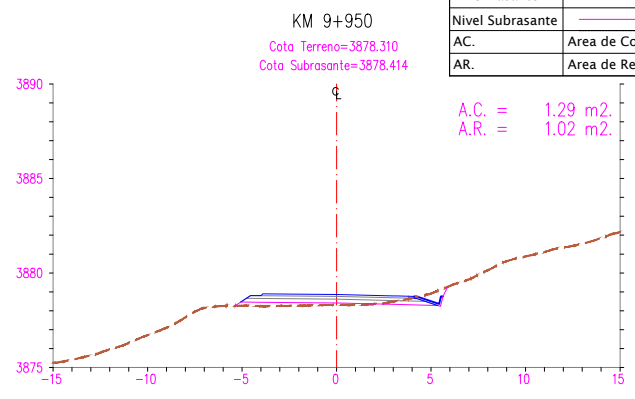
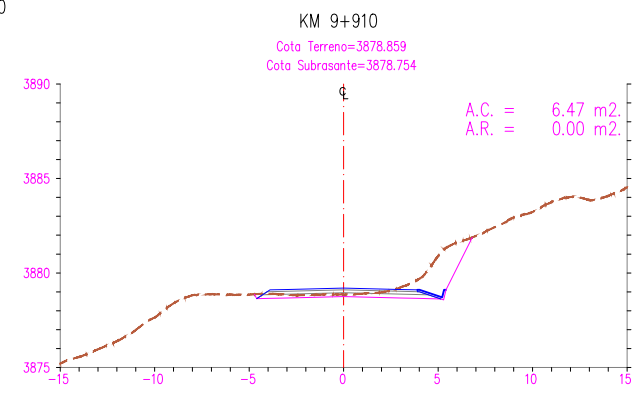
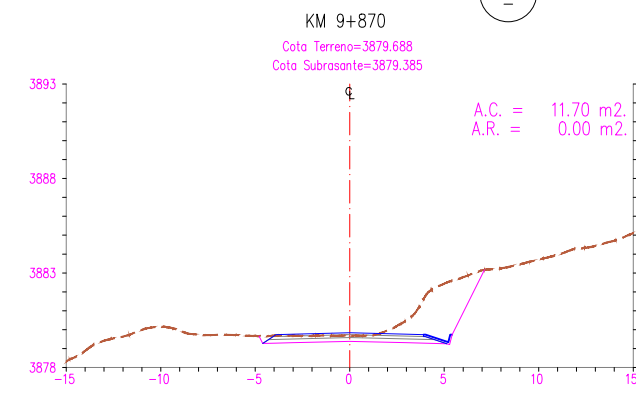
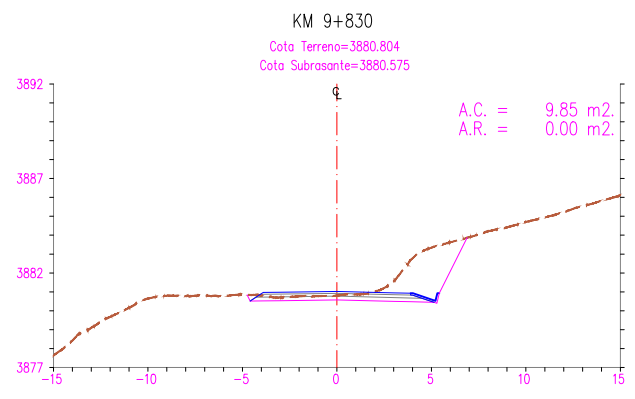
Plano:
SECCIONES TRANSVERSALES
Km 9+640 - Km 9+790

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-030

Lamina:
30-47
REV-00

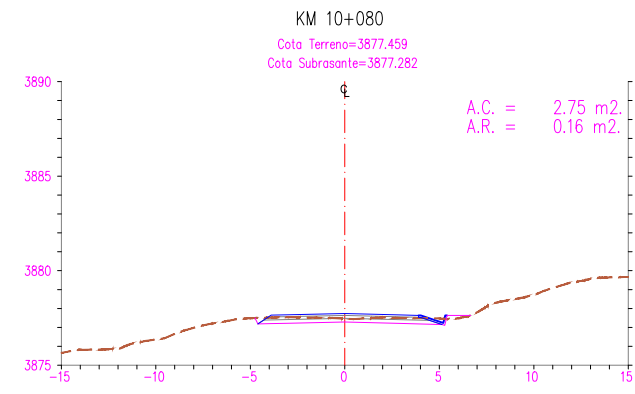
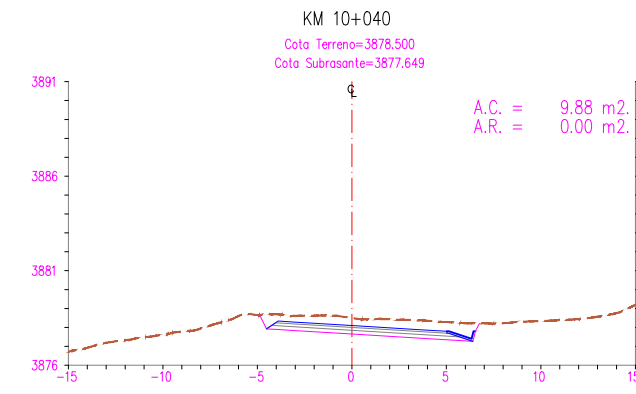
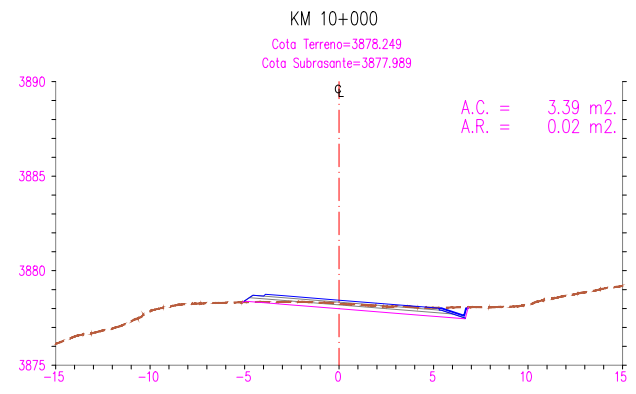
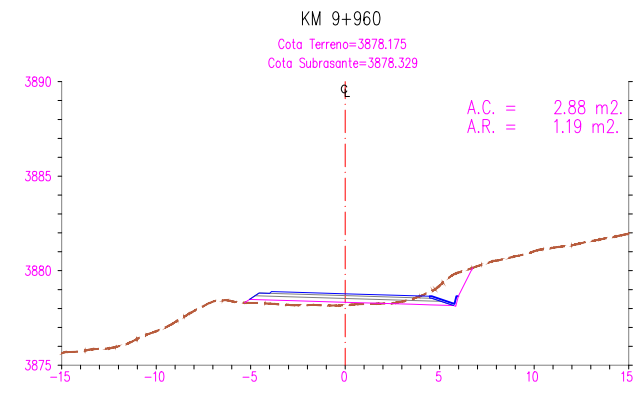
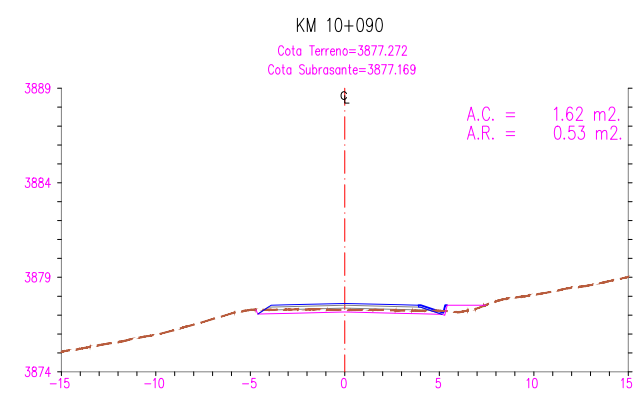
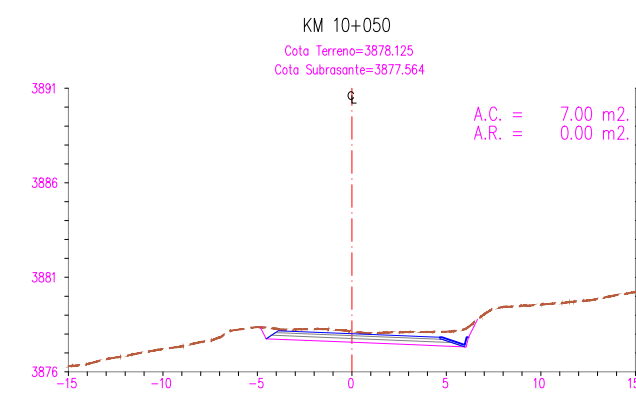
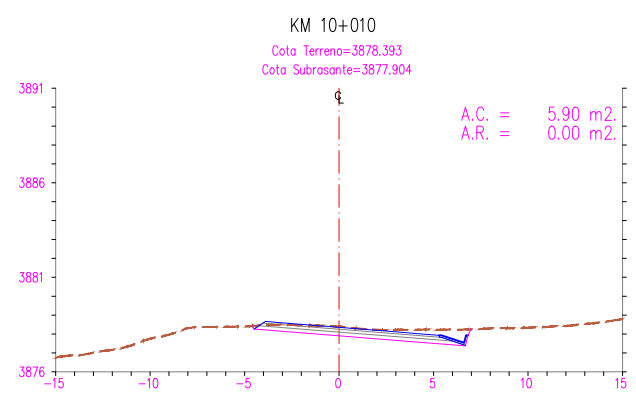
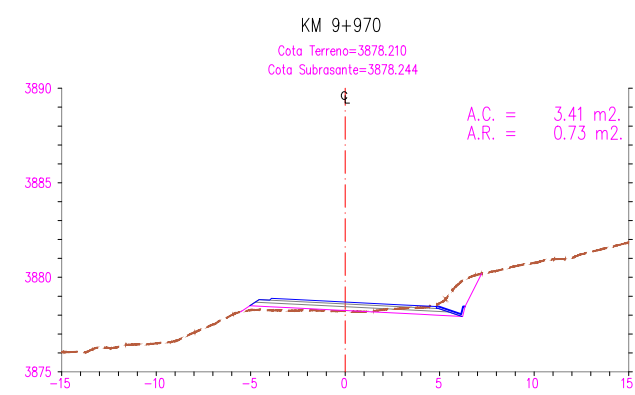
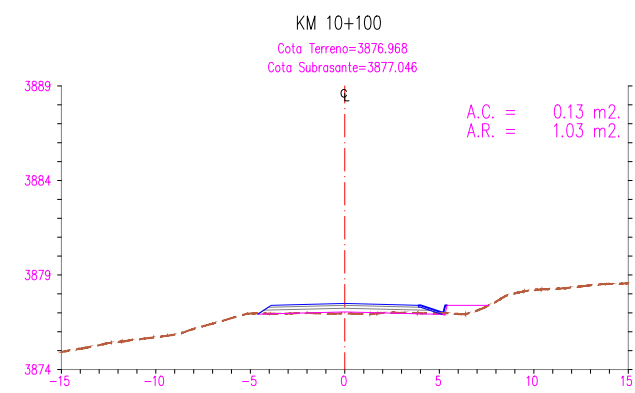
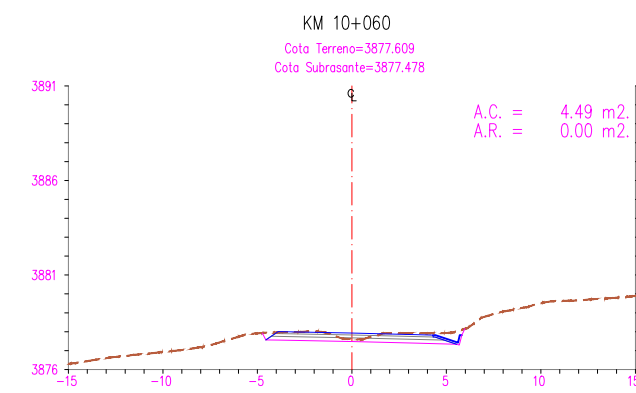
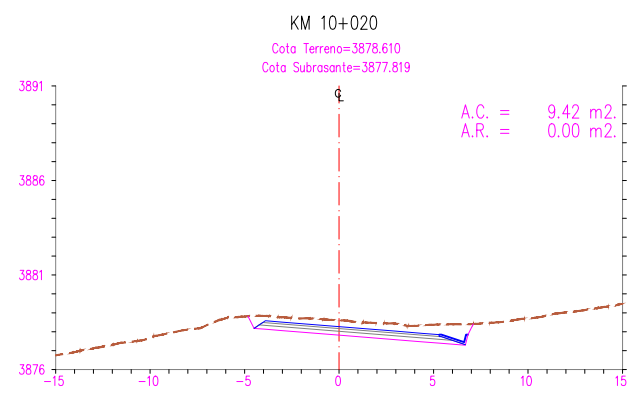
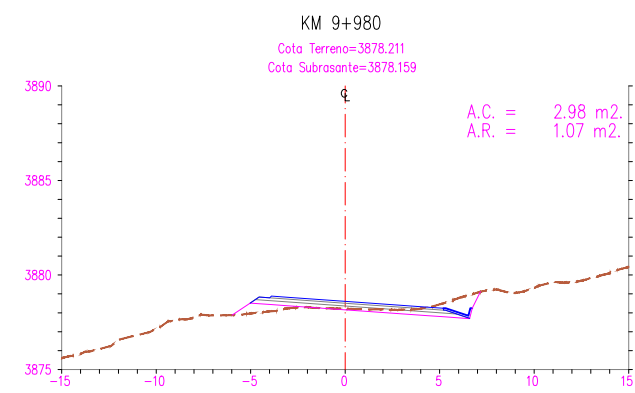
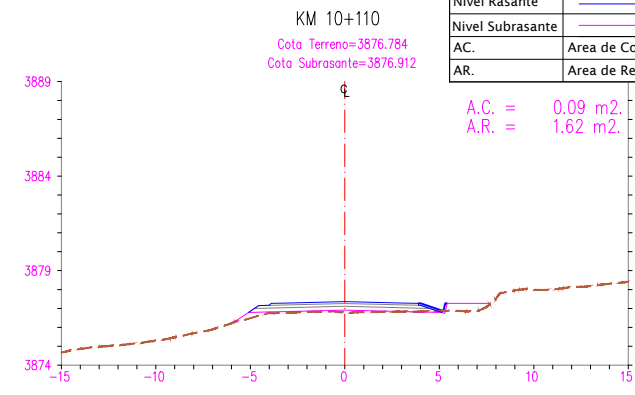
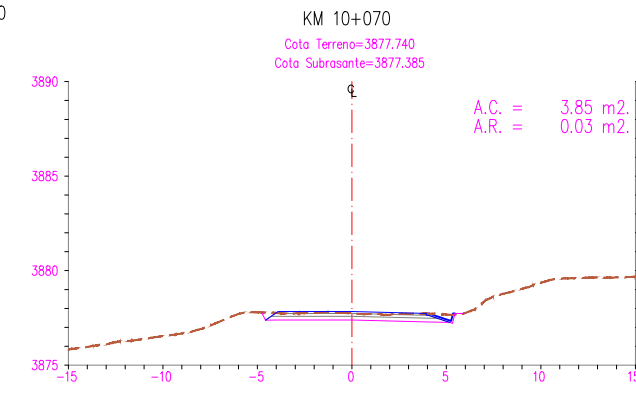
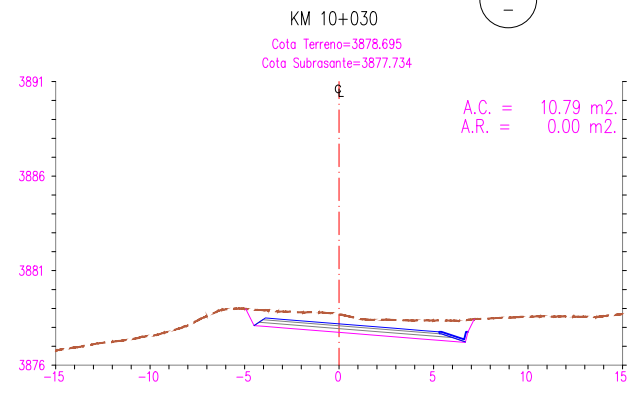
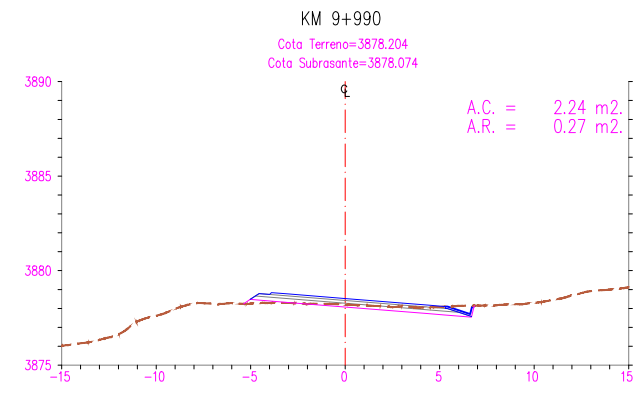
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



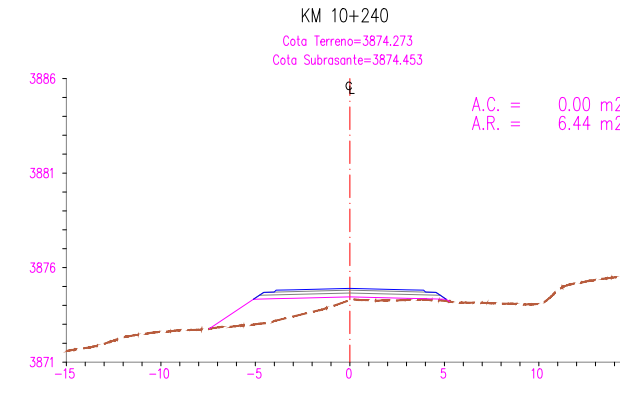
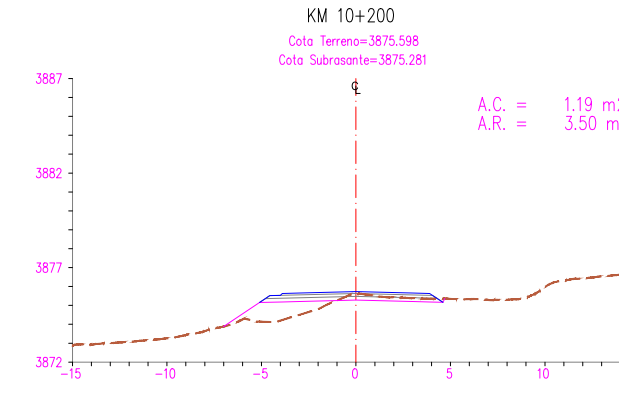
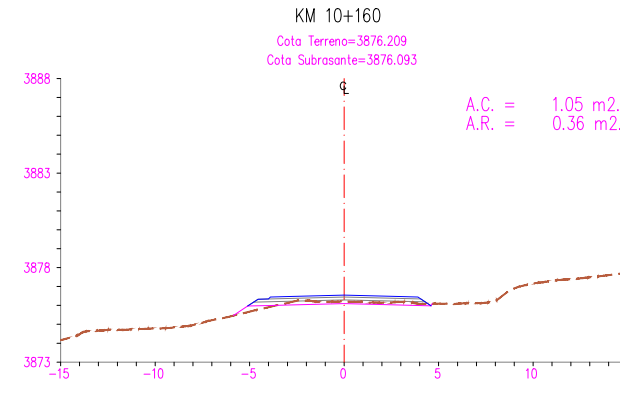
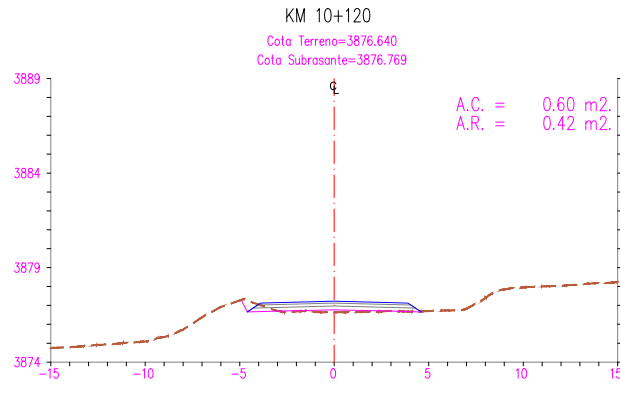
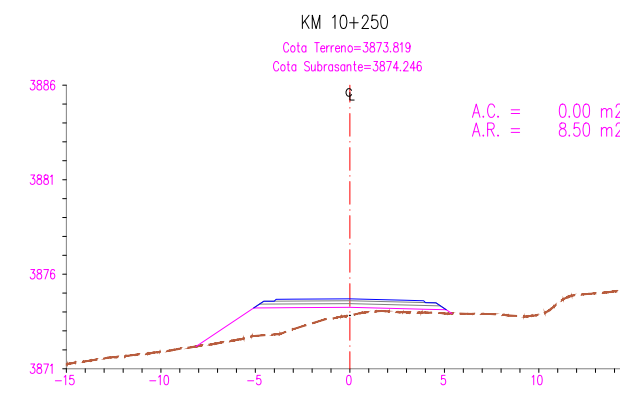
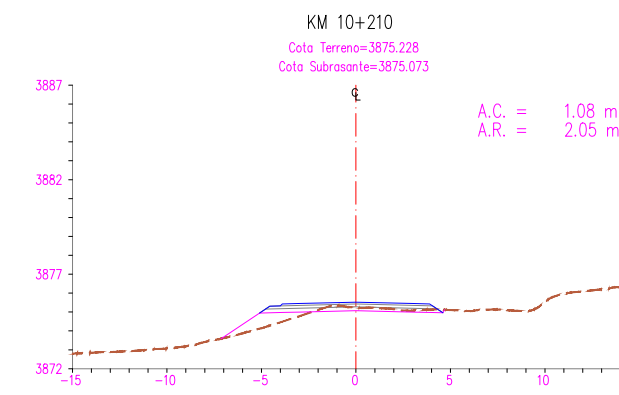
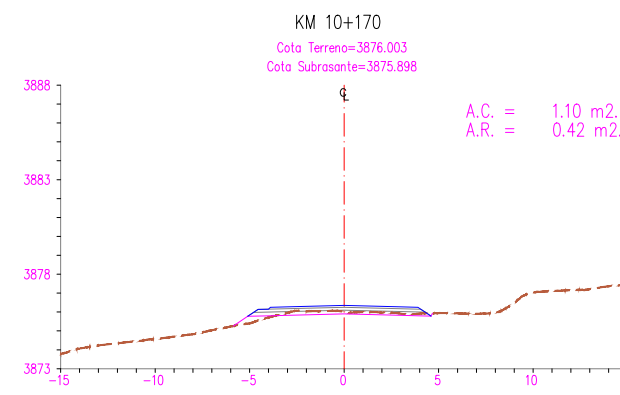
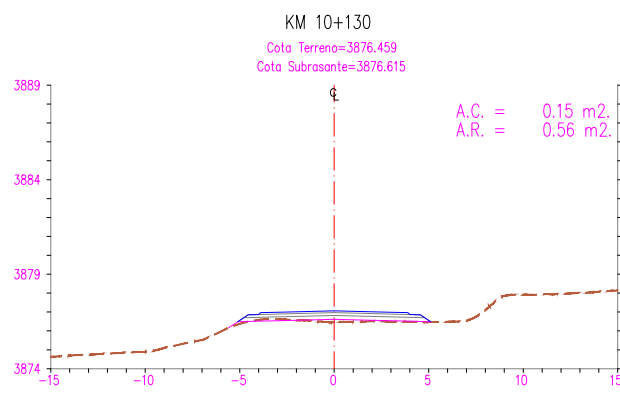
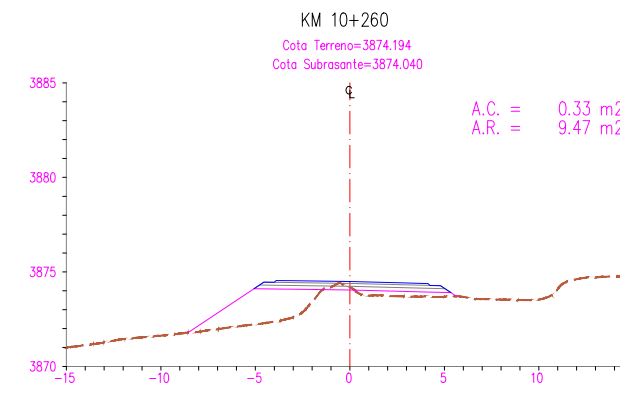
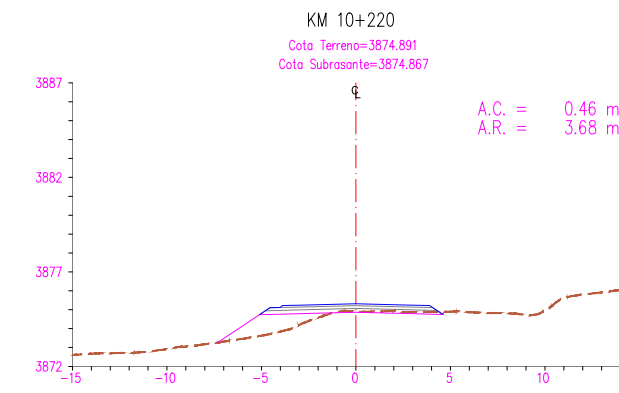
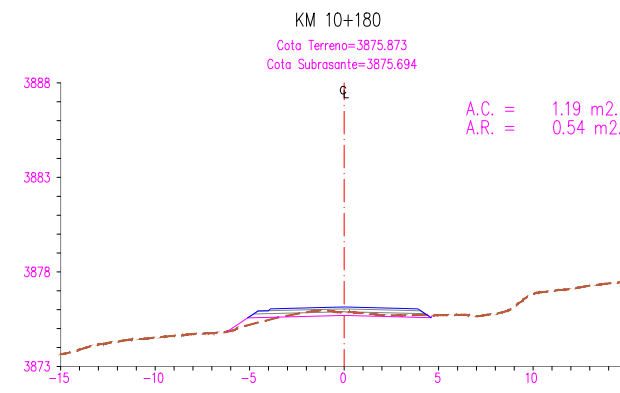
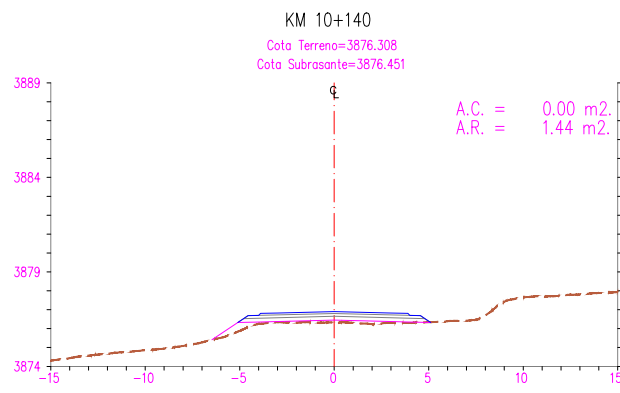
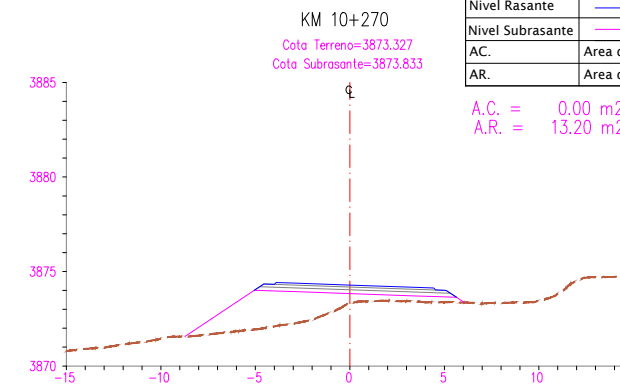
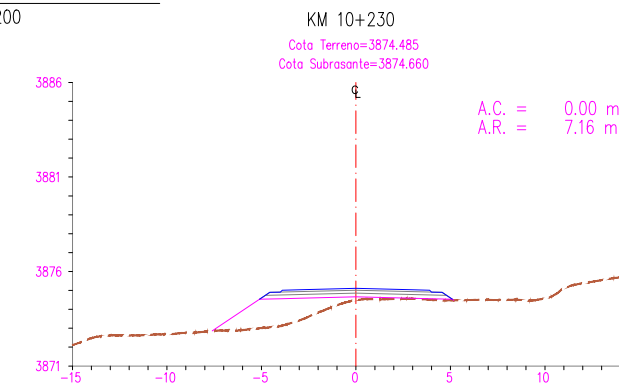
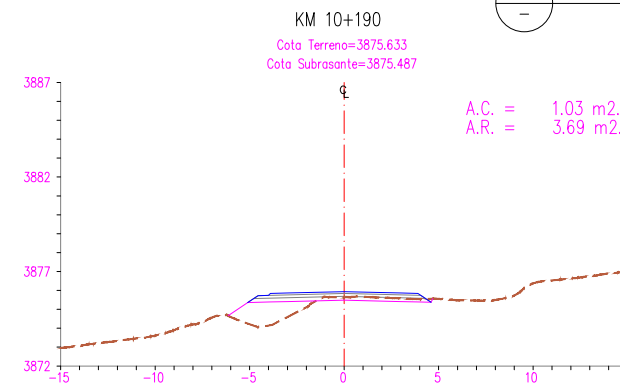
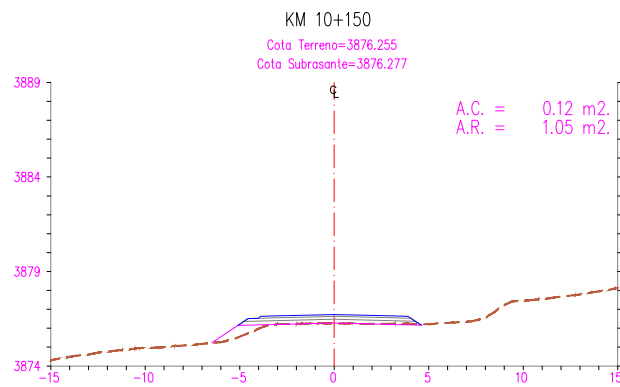
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



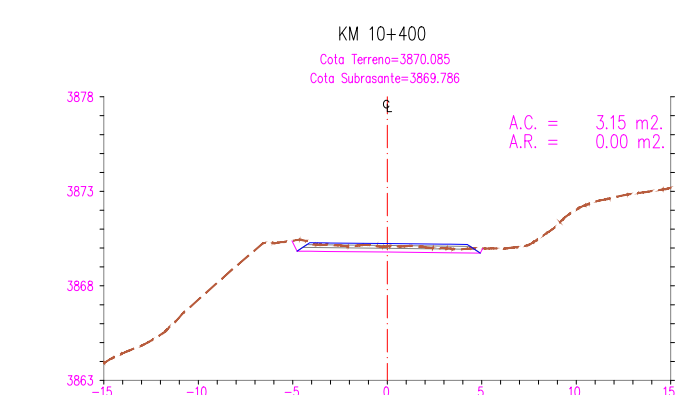
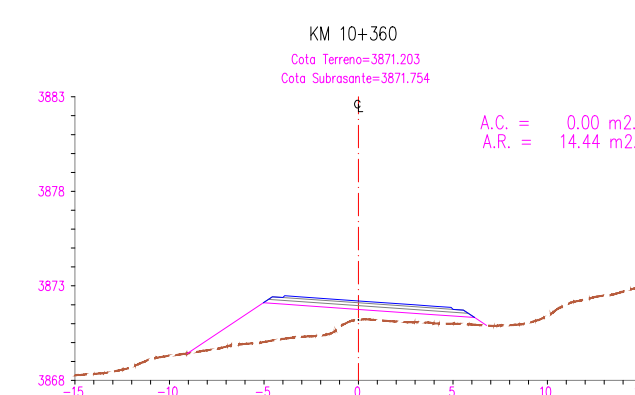
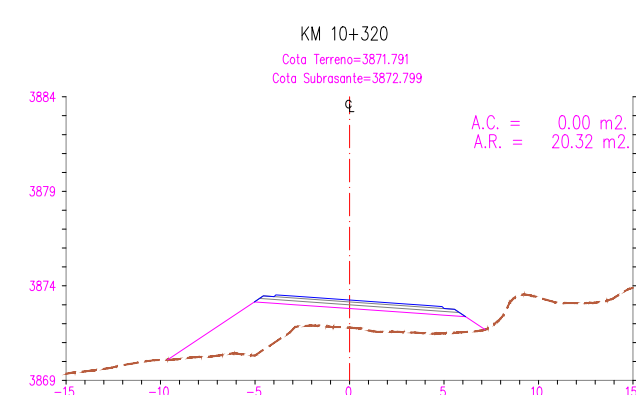
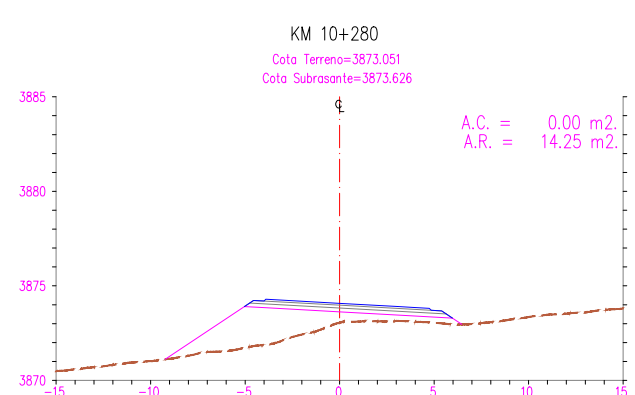
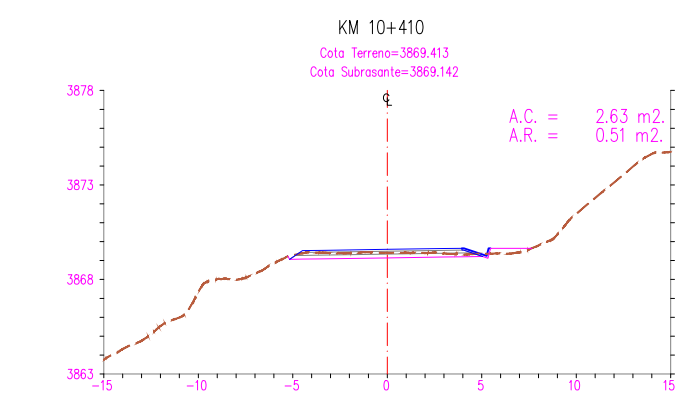
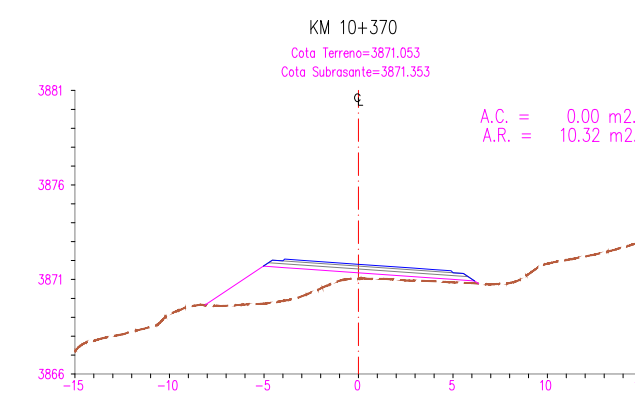
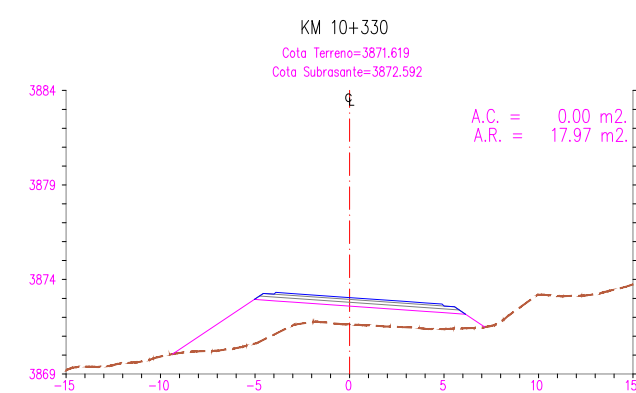
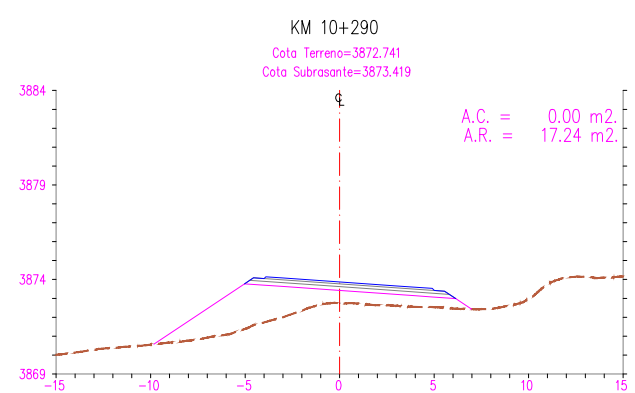
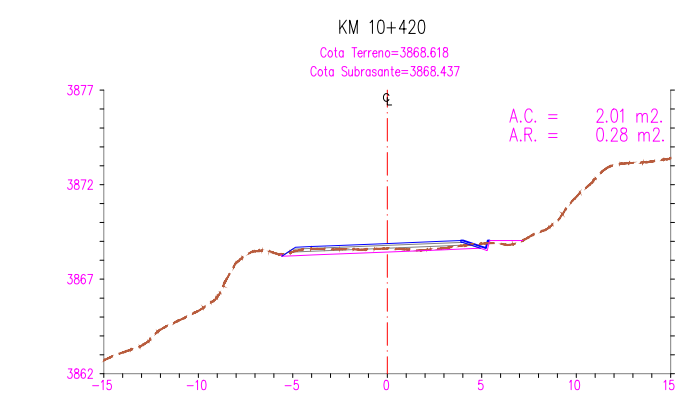
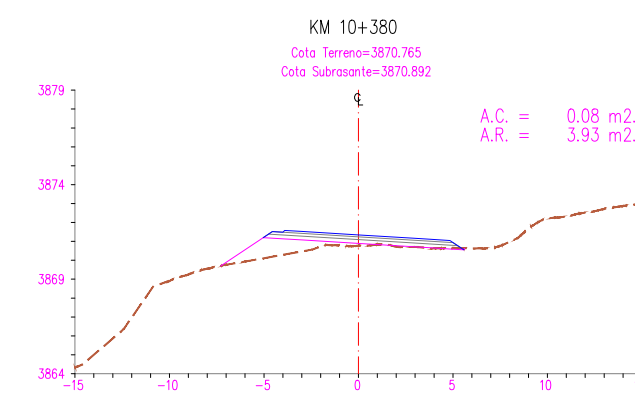
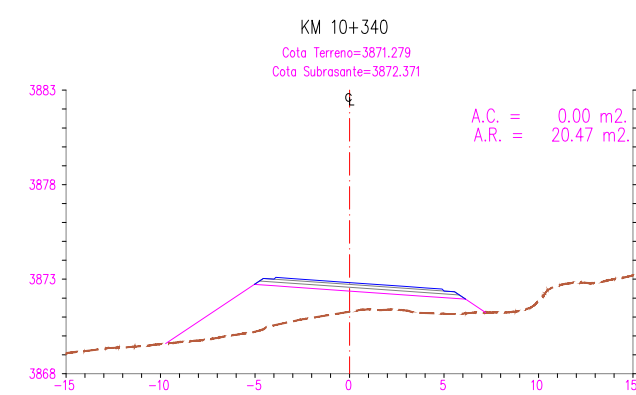
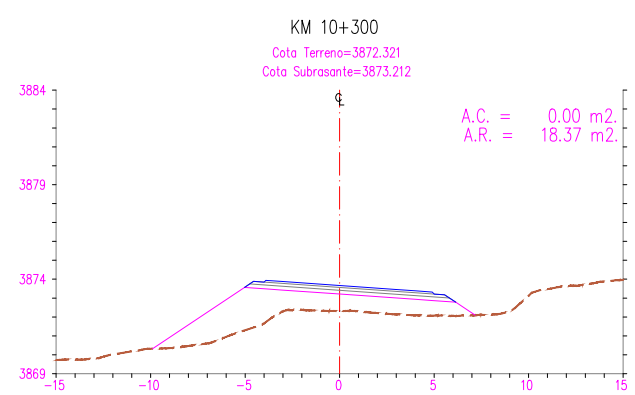
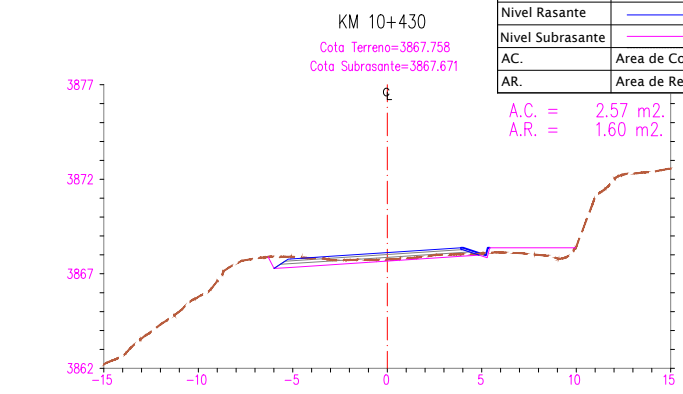
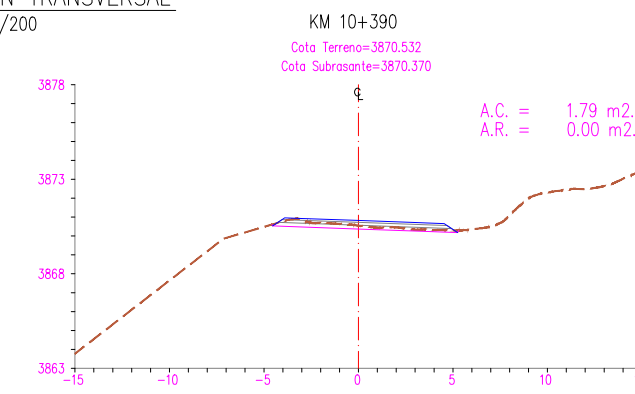
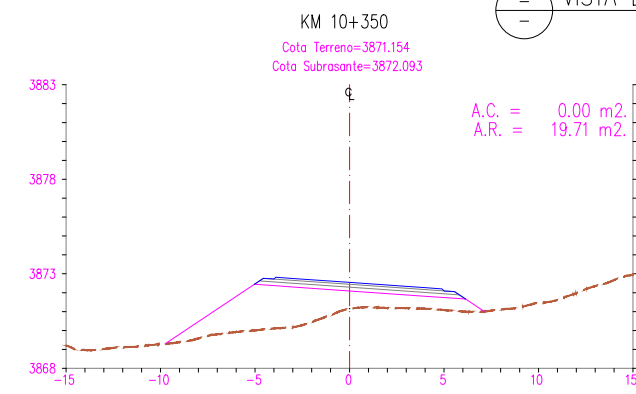
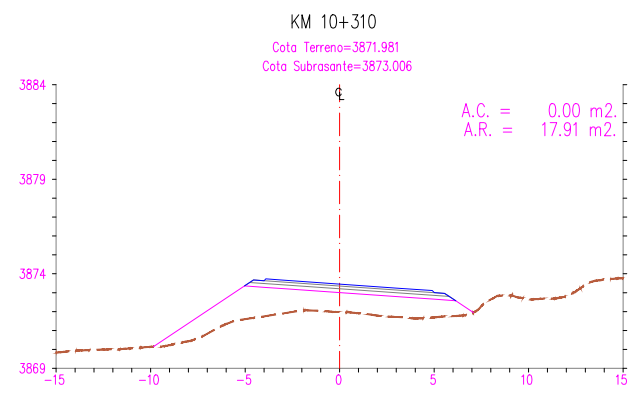
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	---
Nivel Rasante	—
Nivel Subrasante	—
A.C.	Area de Corte
AR.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



UNIVERSIDAD NACIONAL DEL
ALTIPLANO - PUNO

FACULTAD DE CIENCIAS AGRARIAS
"ESCUELA PROFECIONAL DE INGENIERIA
TOPOGRAFICA Y AGRIMENSURA"



Participantes:
Presidente de Jurado : D.sc Valeriano Condori Apaza
Primer Miembro : Ing. Victor Raul Banegas Layme
Segundo Miembro : Ing. Juan Esteban Araoz Barrios
Asesor de Tesis : Ing. Arturo Joels Ventura Mamani
Tesisista : Bach. Javier Rolando Maquera Ccalte

Proyecto de Tesis:
"COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS
OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

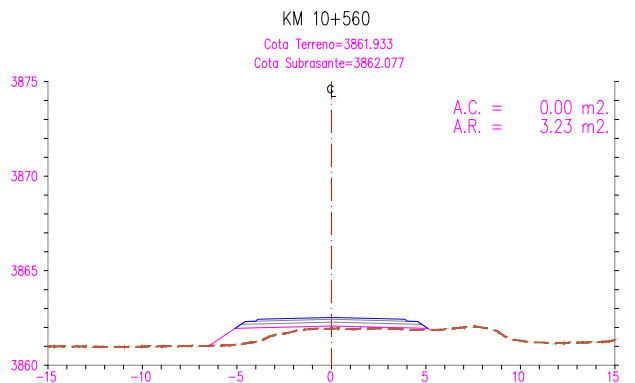
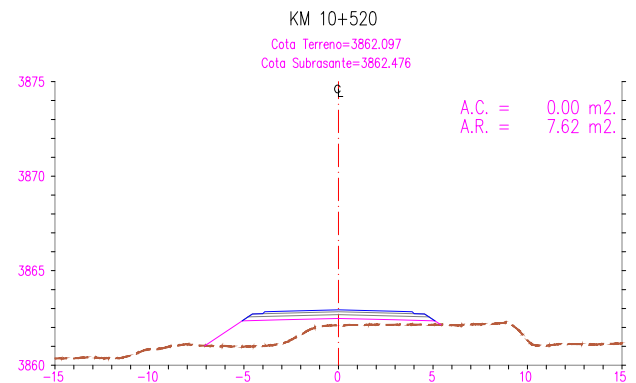
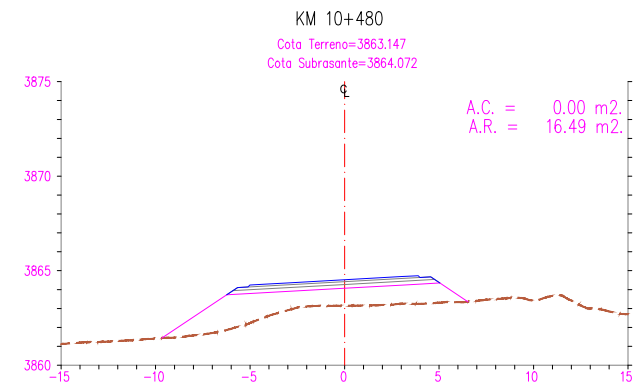
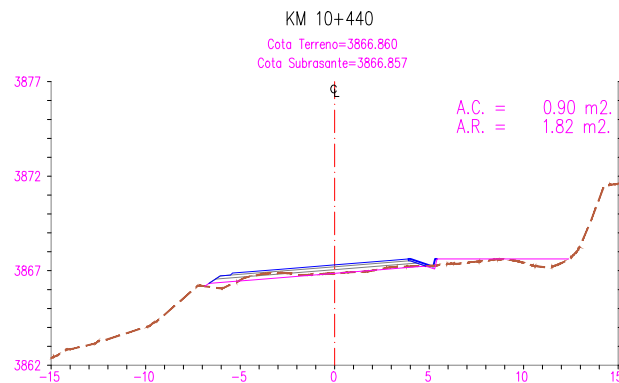
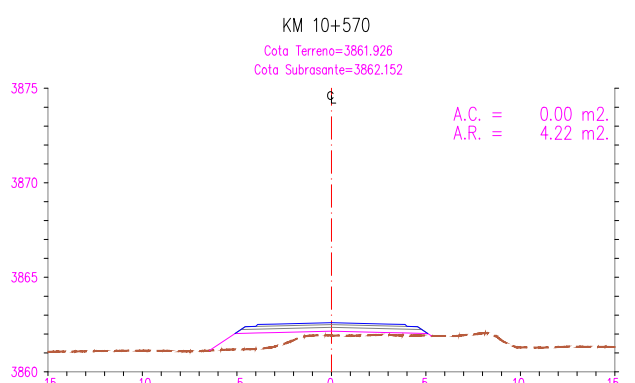
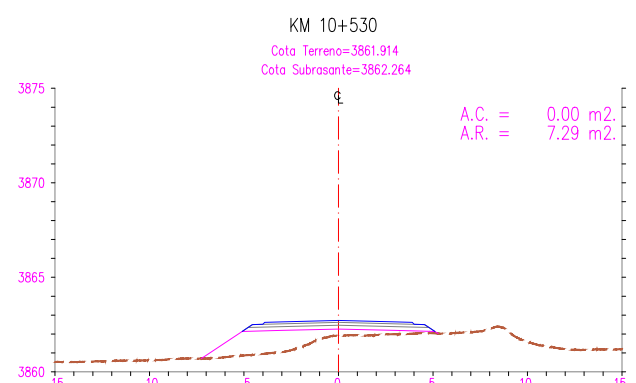
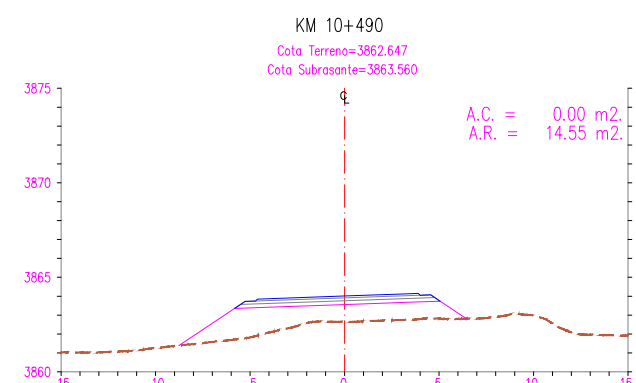
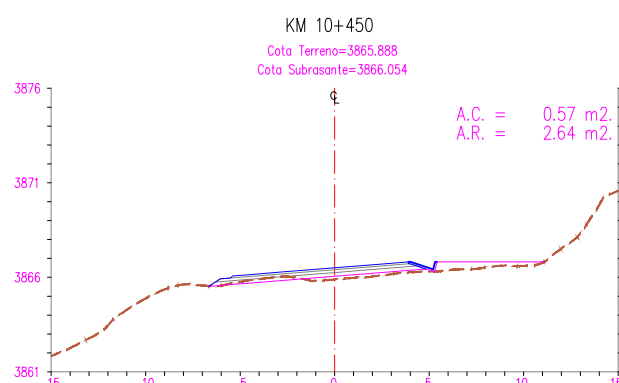
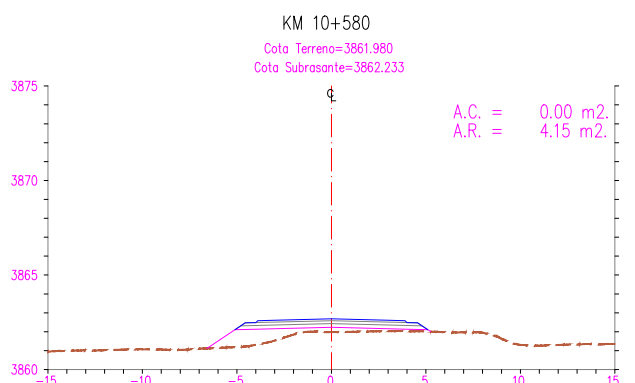
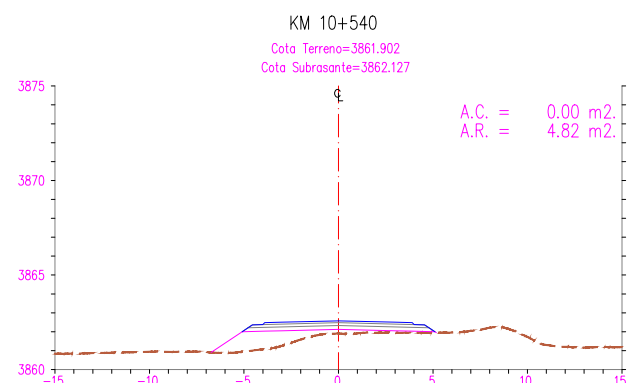
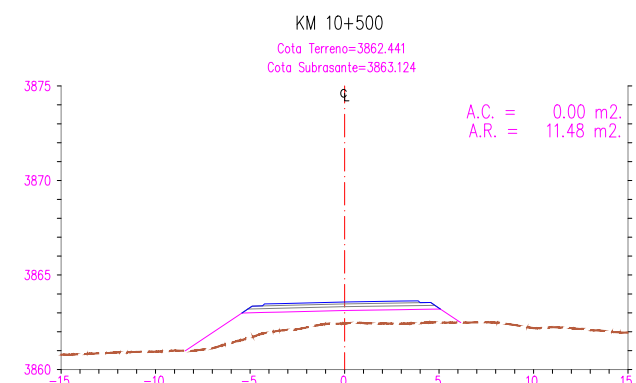
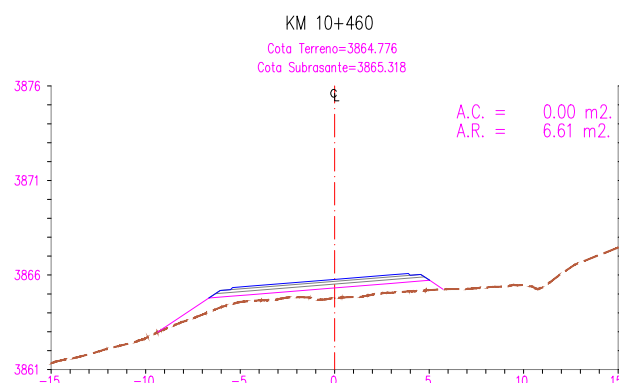
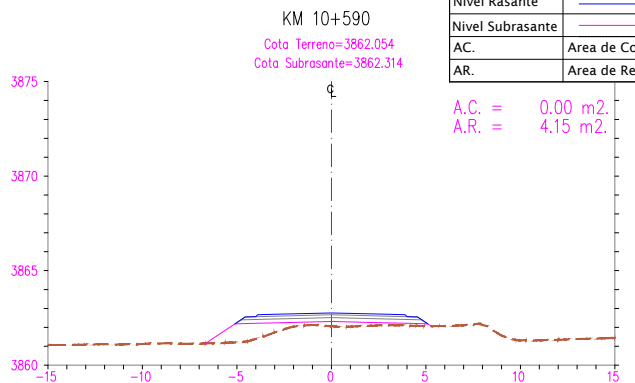
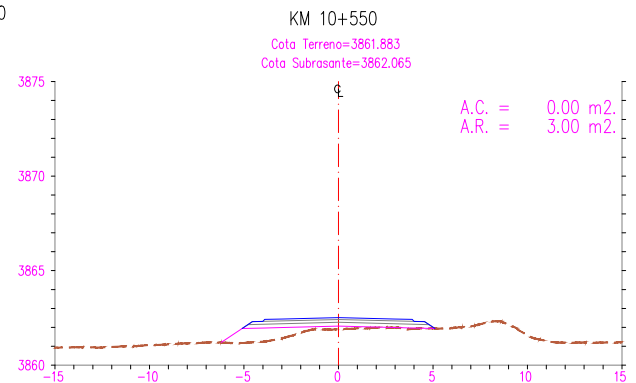
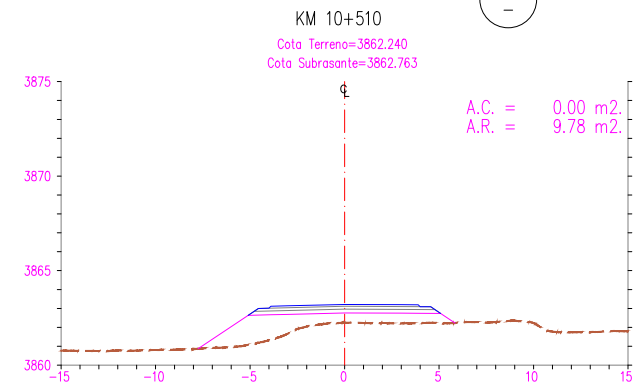
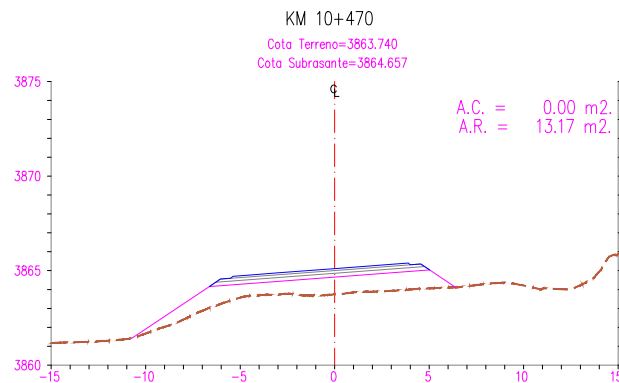
Plano:
SECCIONES TRANSVERSALES
Km 10+280 - Km 10+430

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-034

Lamina:
34-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



UNIVERSIDAD NACIONAL DEL
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

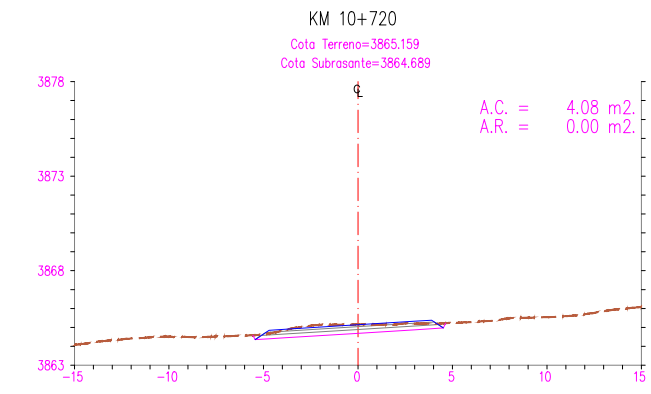
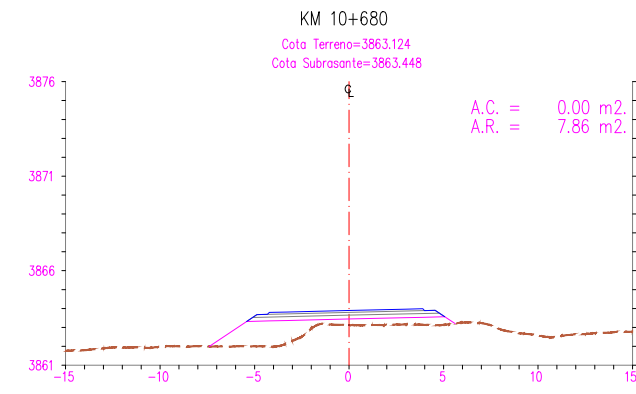
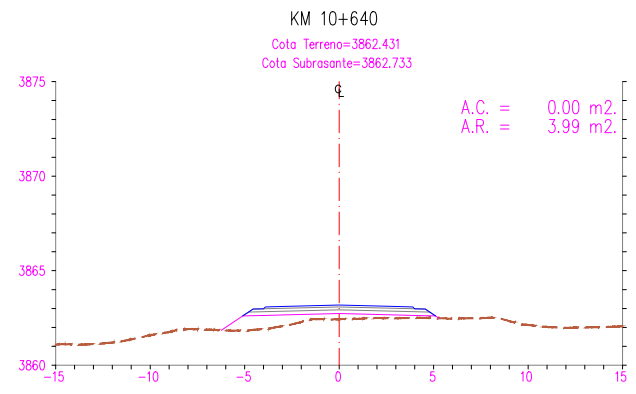
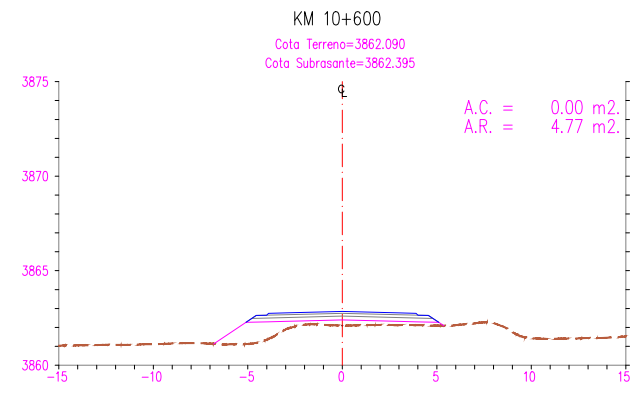
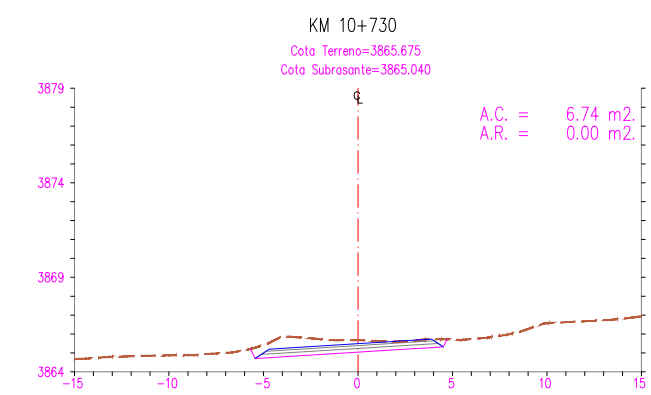
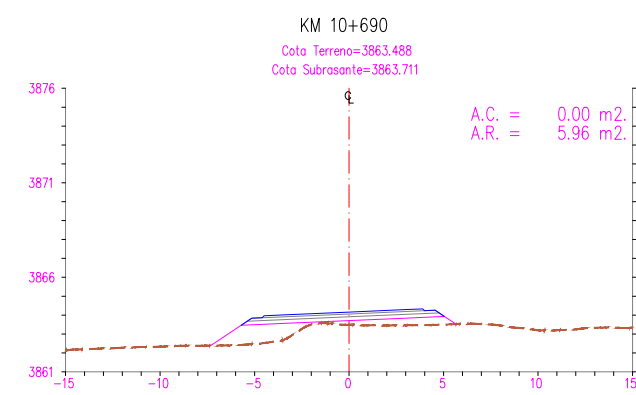
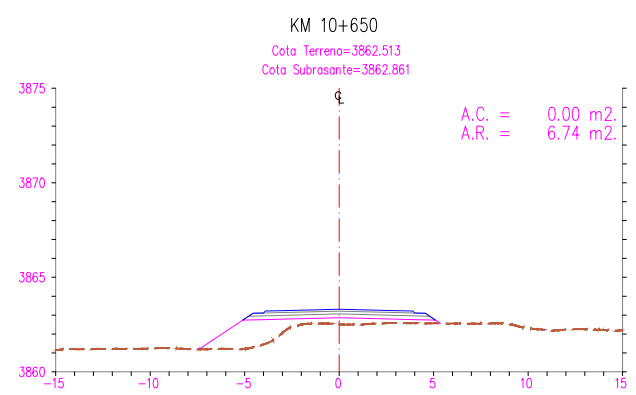
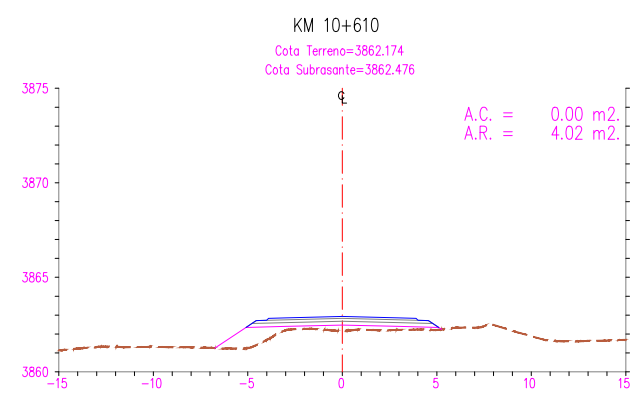
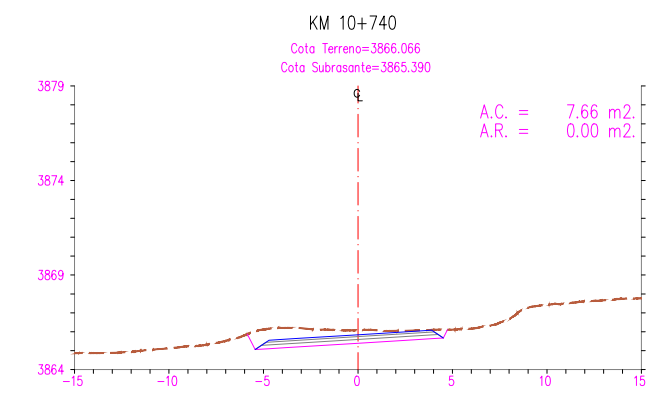
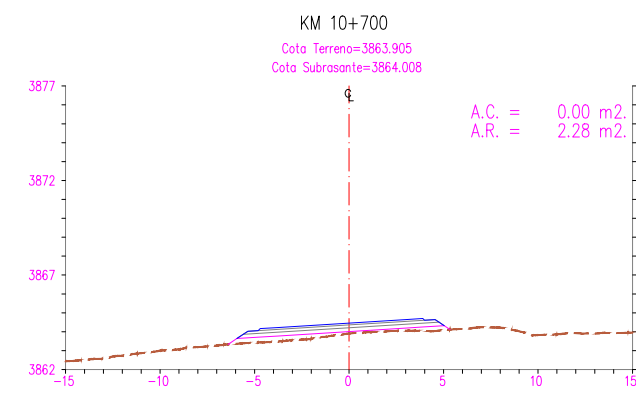
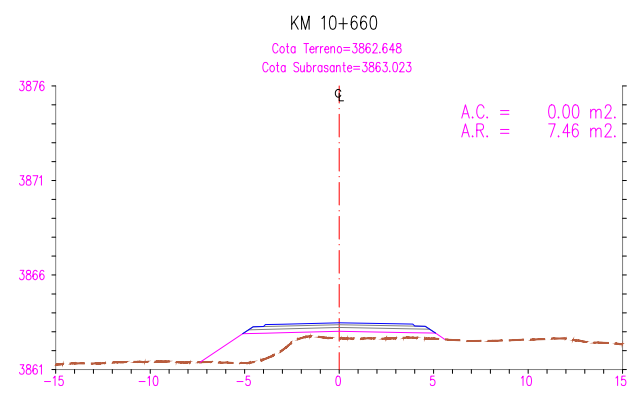
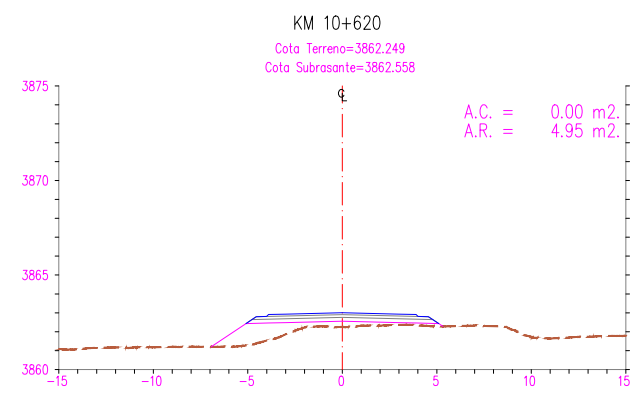
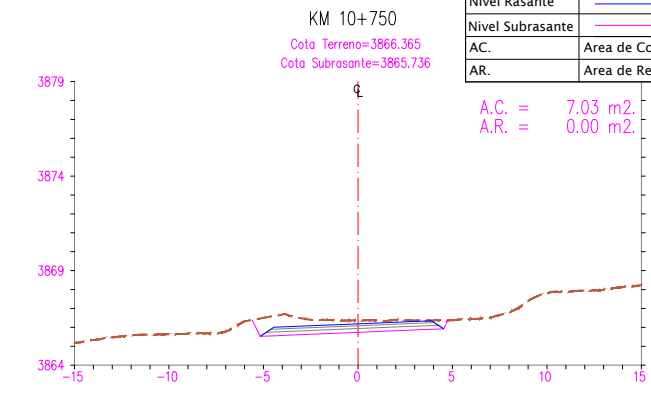
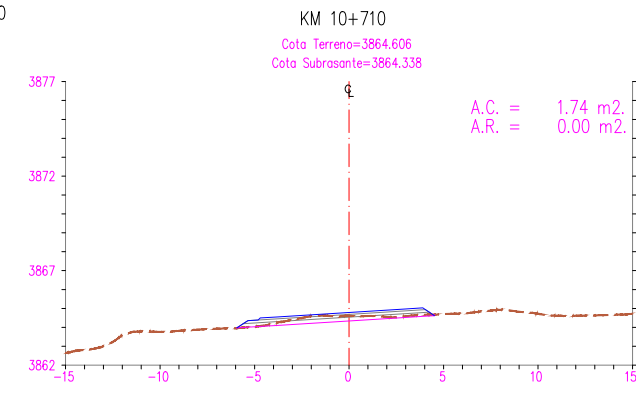
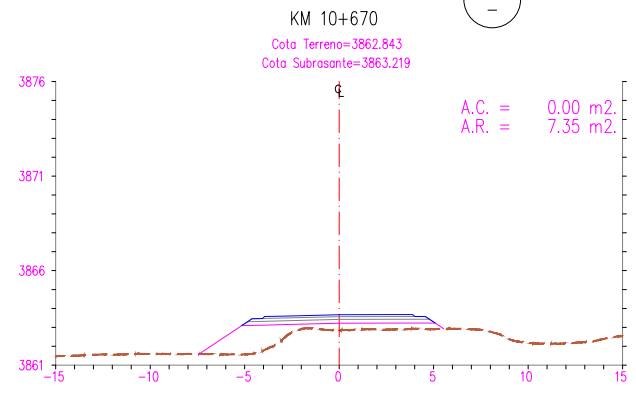
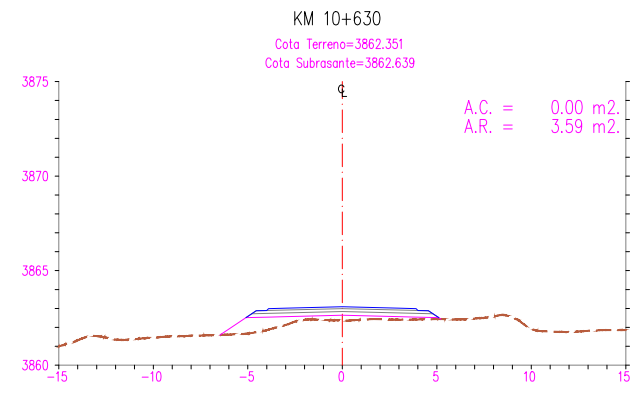
Plano:
SECCIONES TRANSVERSALES
Km 10+440 - Km 10+590

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-035

Lamina:
35-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

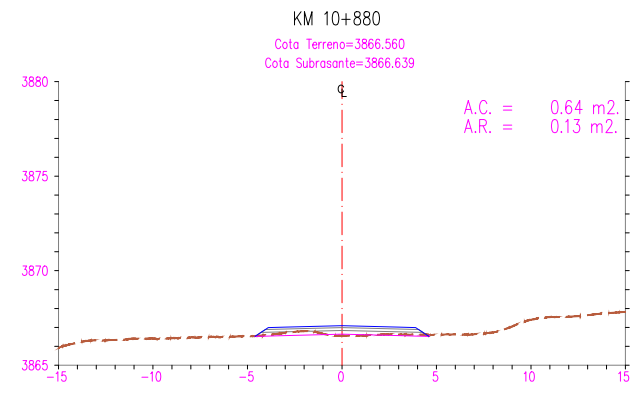
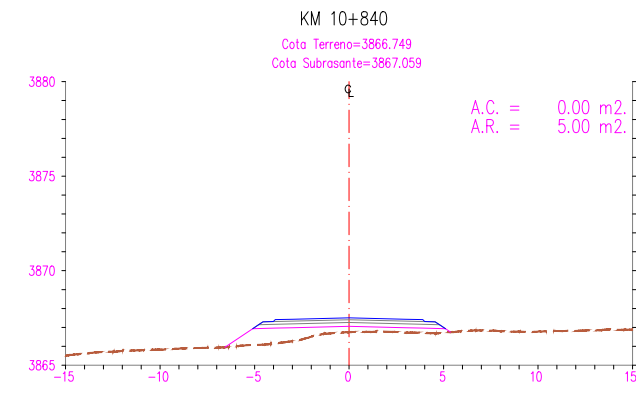
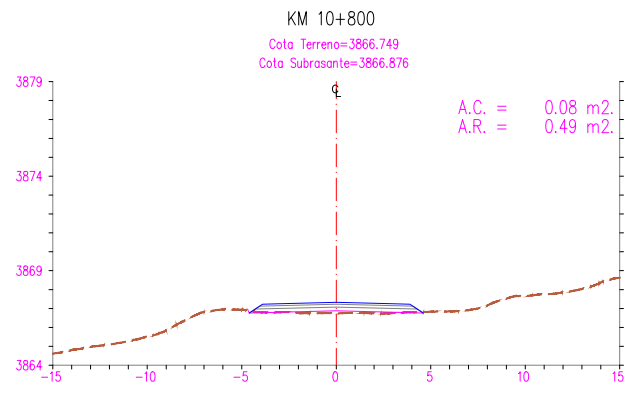
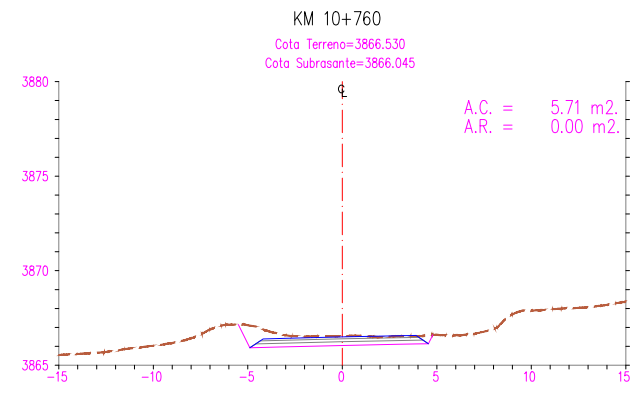
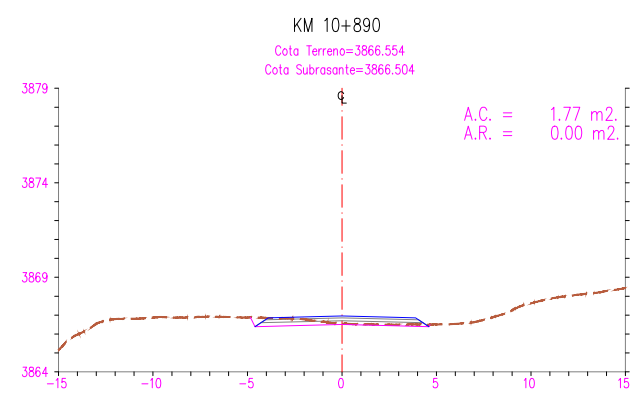
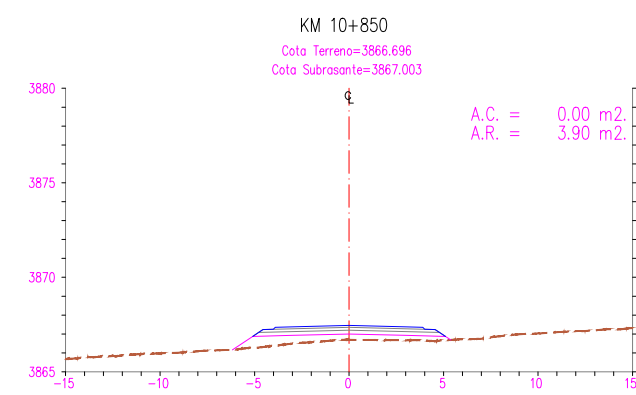
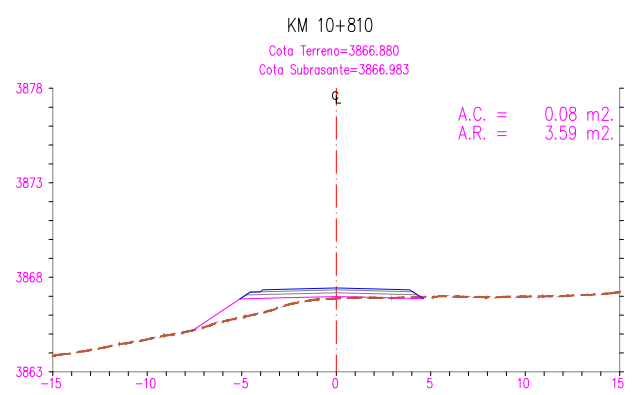
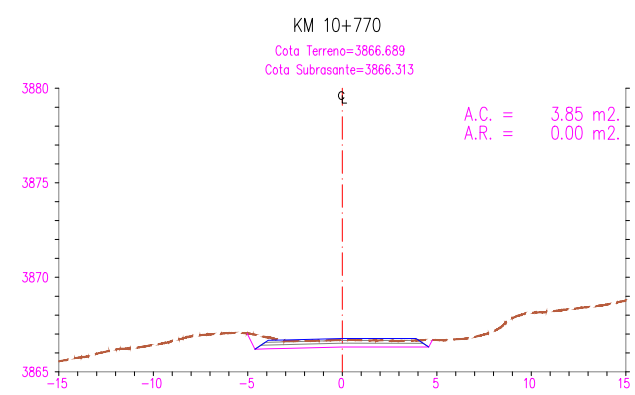
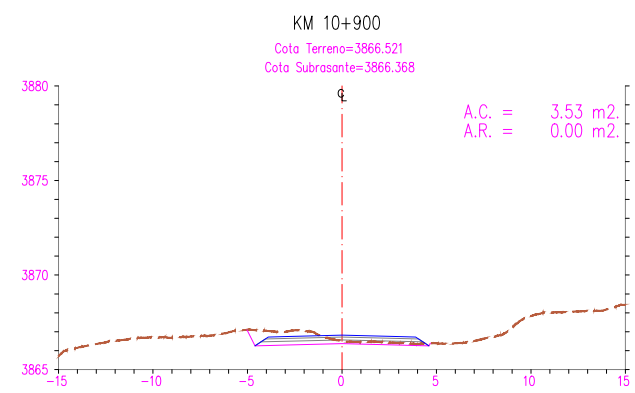
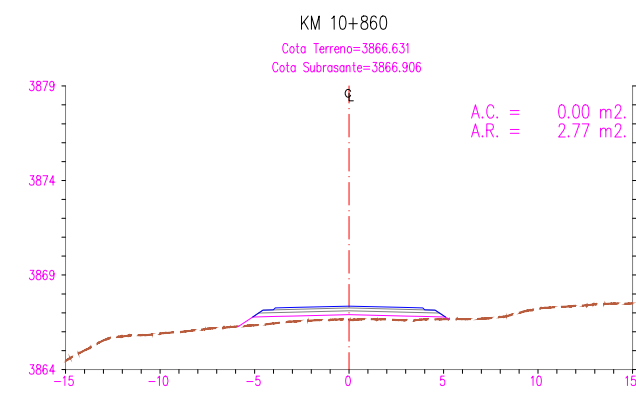
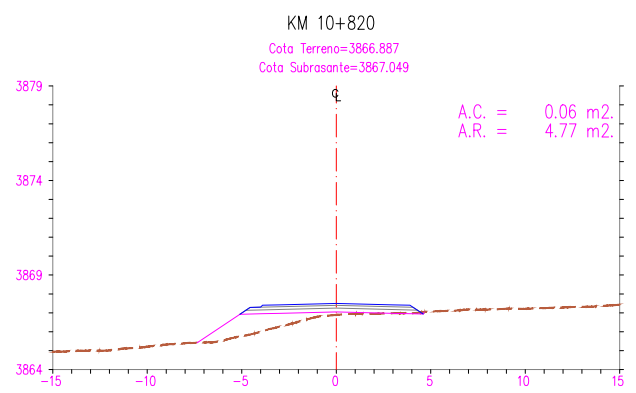
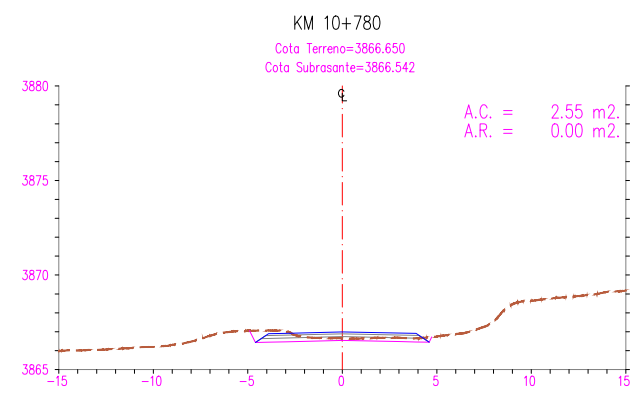
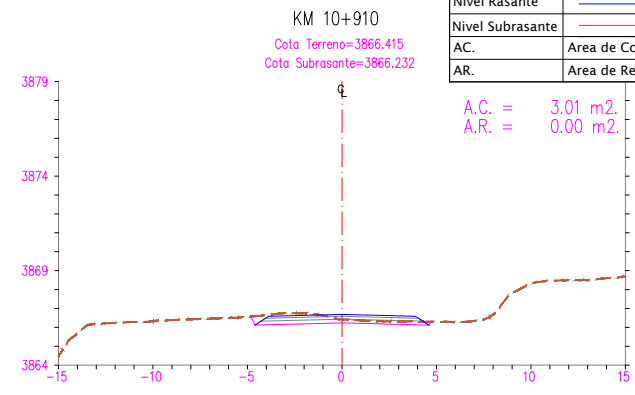
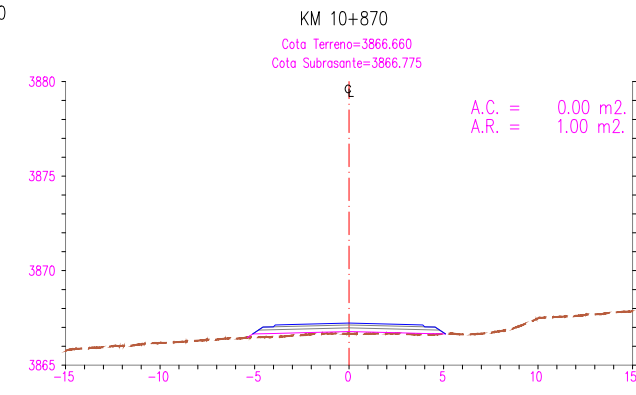
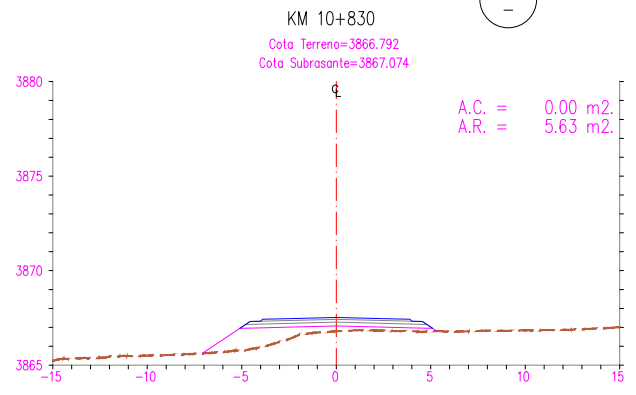
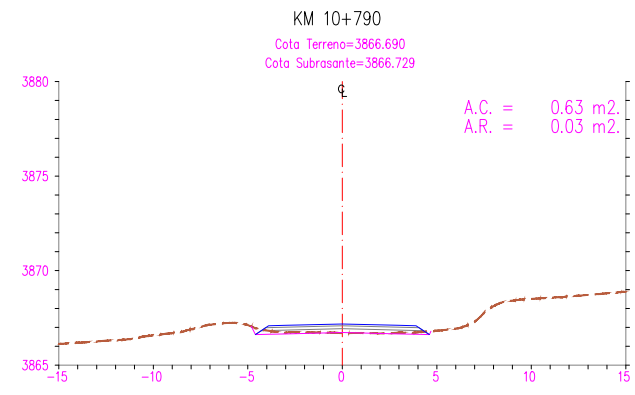
Plano:
SECCIONES TRANSVERSALES
Km 10+600 - Km 10+750

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-036

Lamina:
36-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	---
Nivel Rasante	—
Nivel Subrasante	—
A.C.	Area de Corte
A.R.	Area de Relleno



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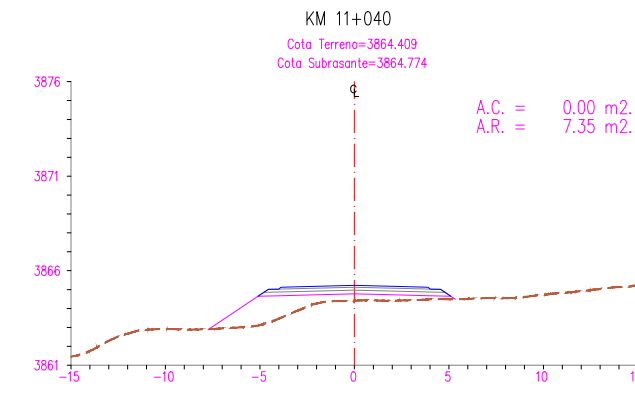
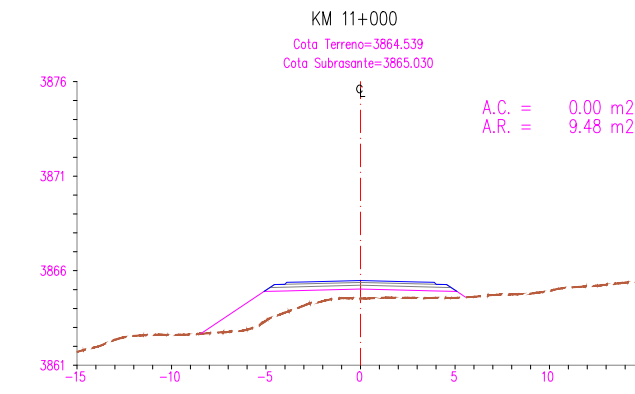
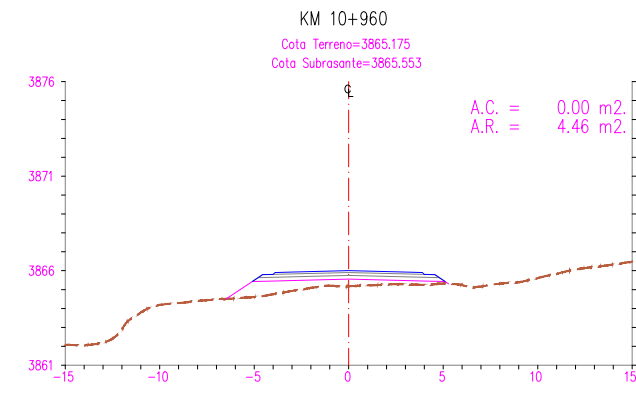
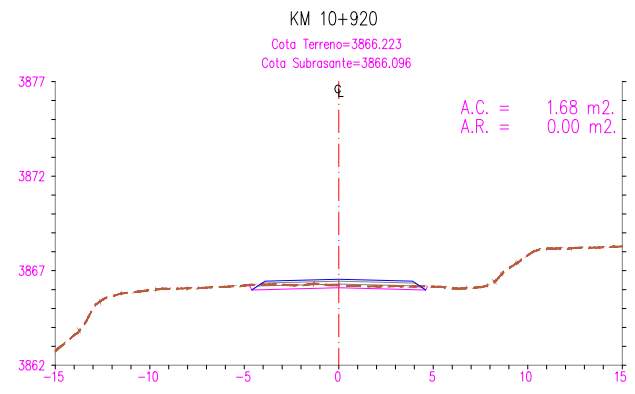
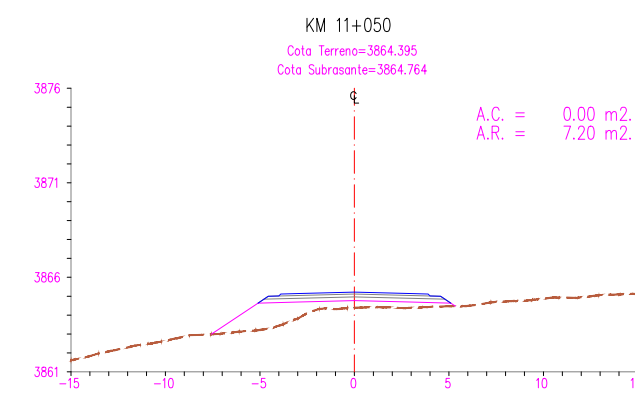
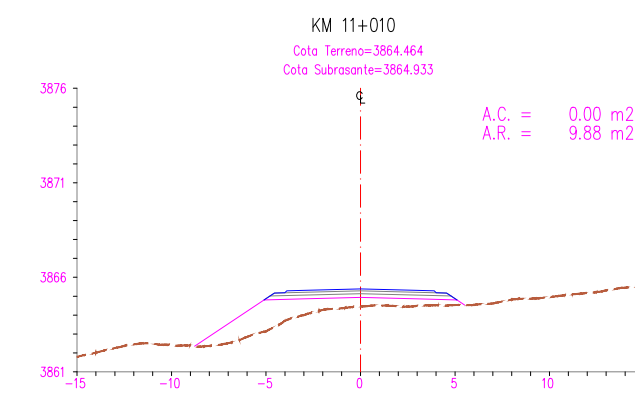
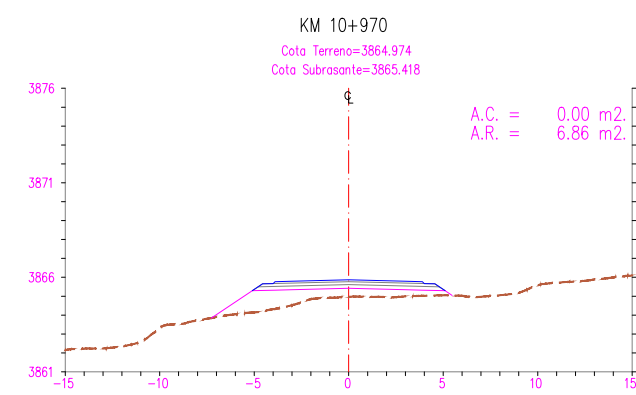
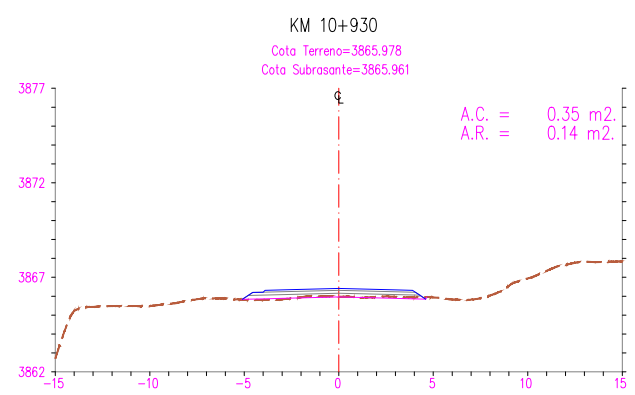
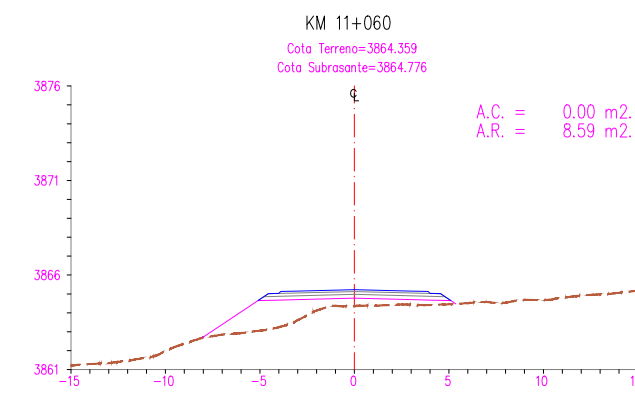
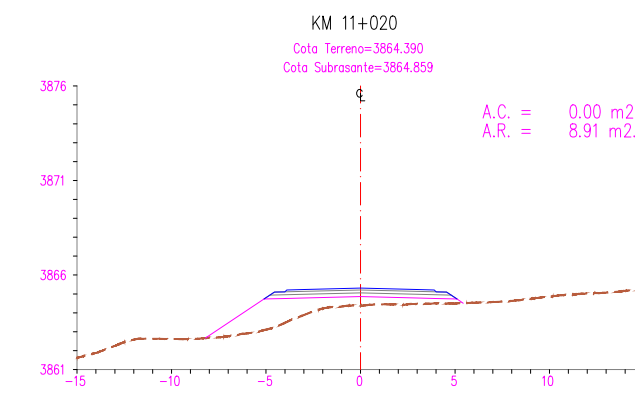
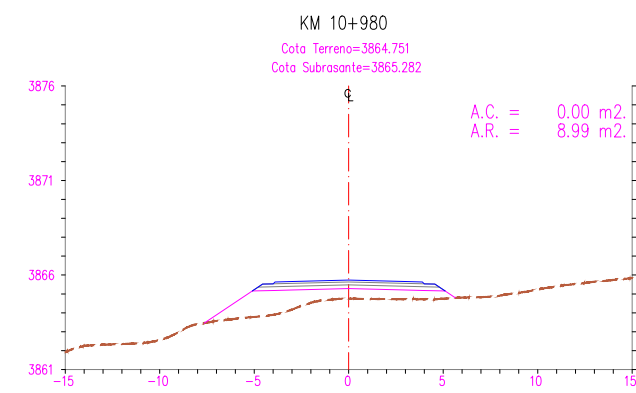
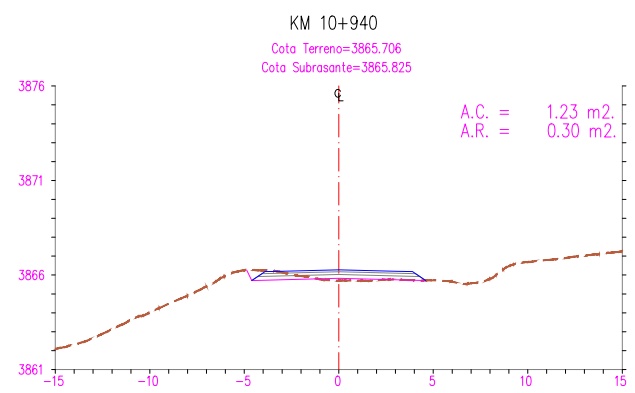
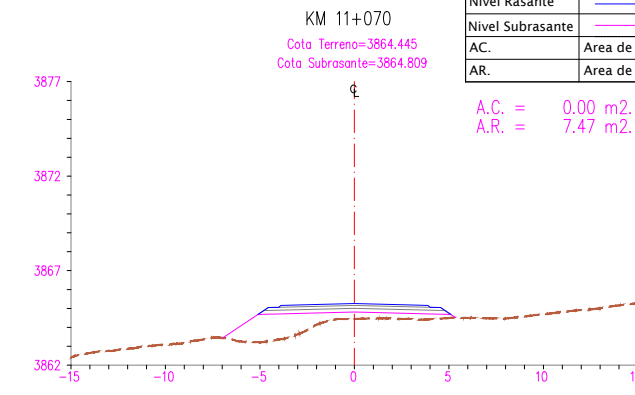
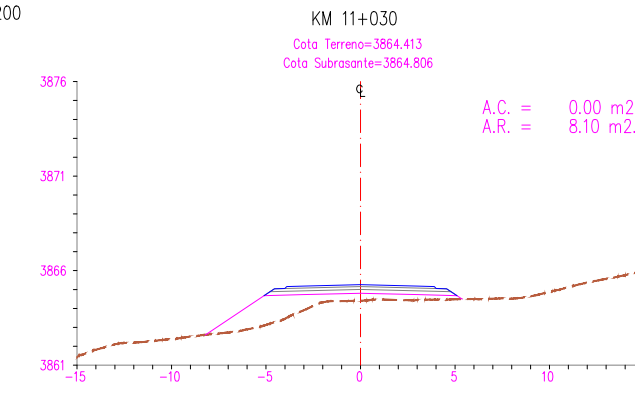
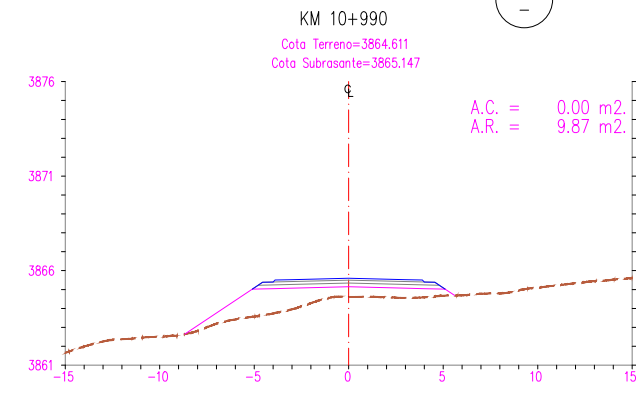
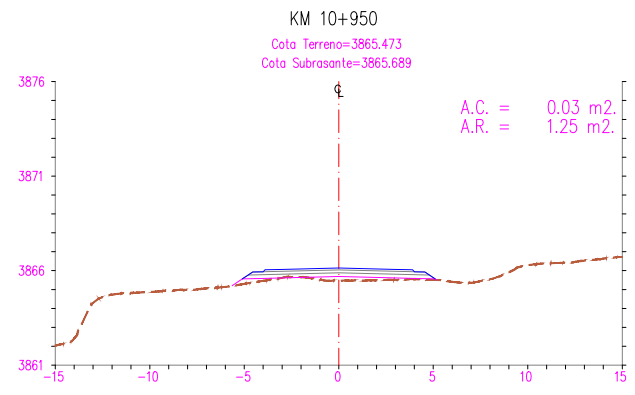
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DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 10+760 - Km 10+910

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-037
Lamina: 37-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

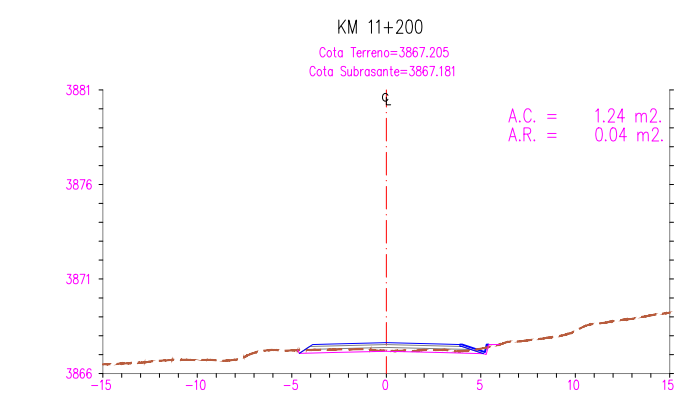
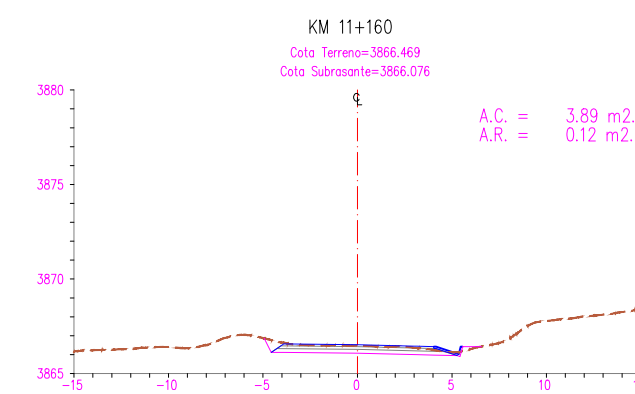
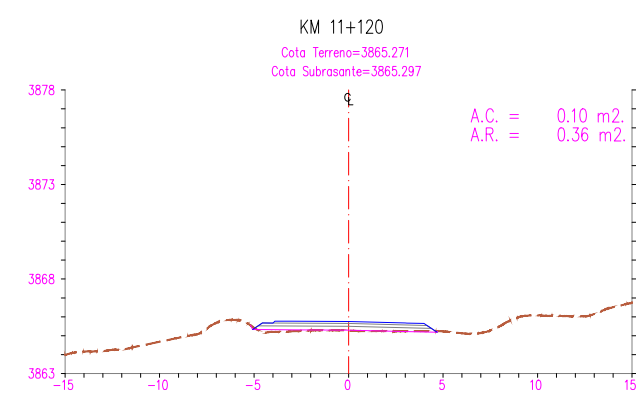
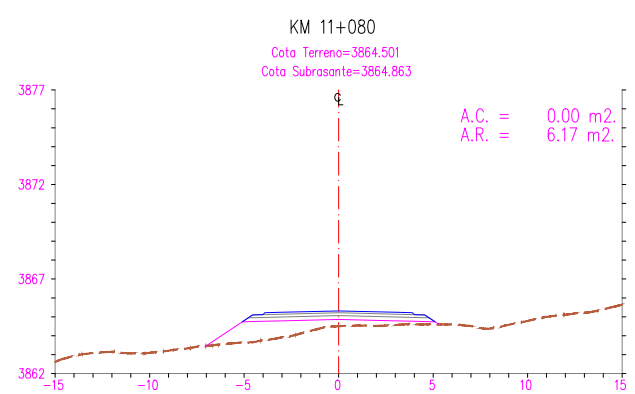
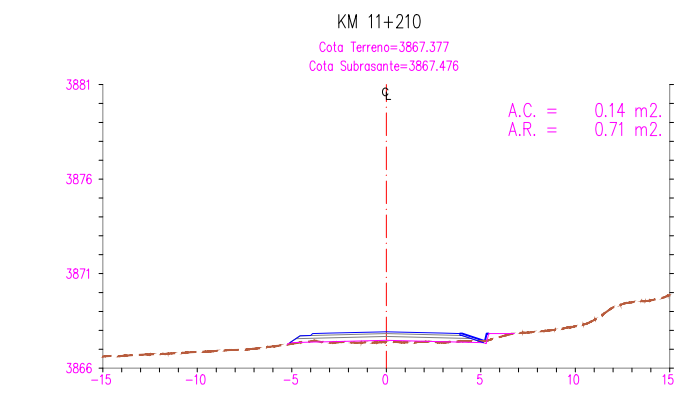
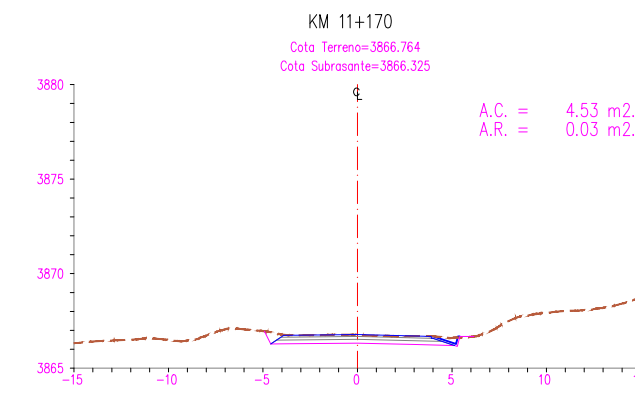
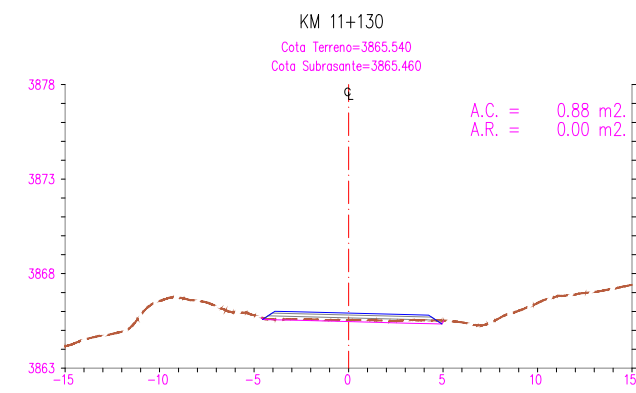
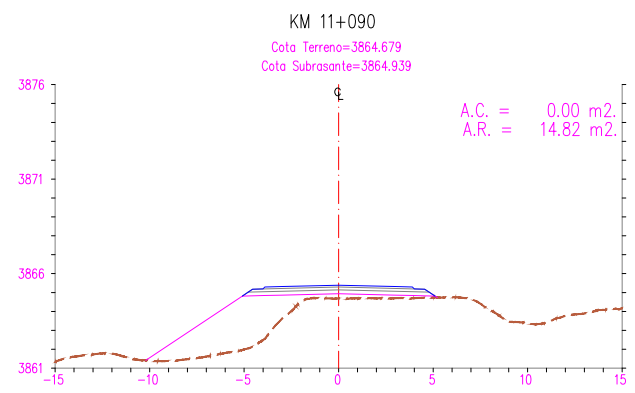
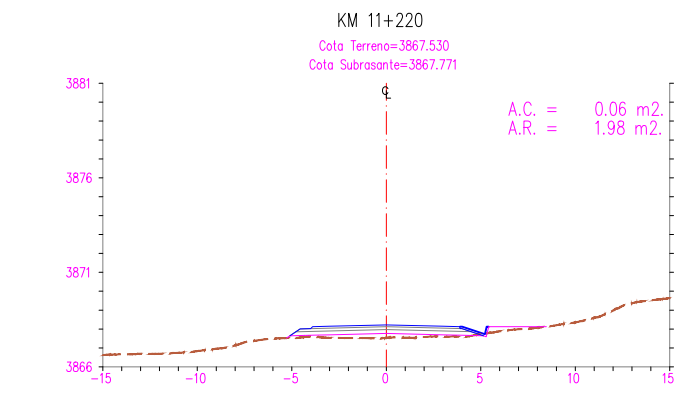
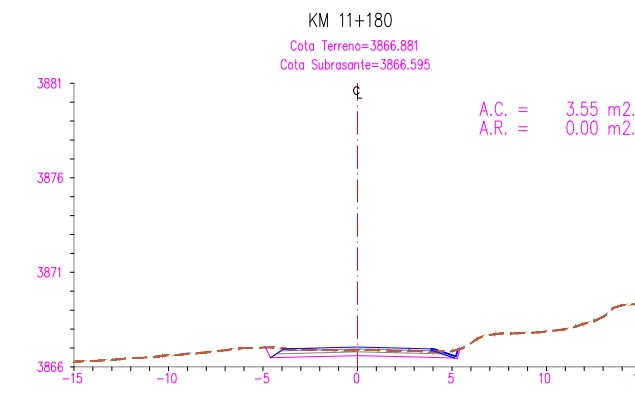
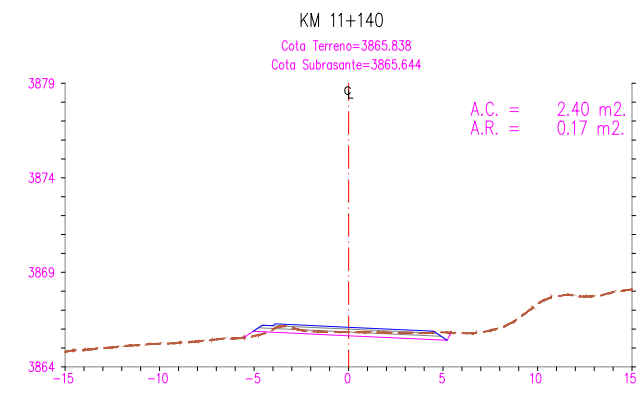
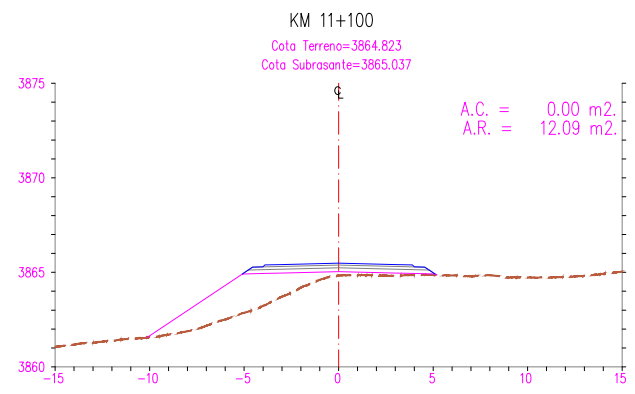
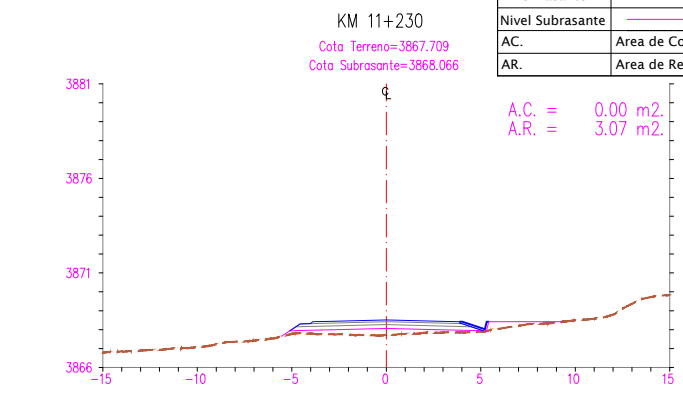
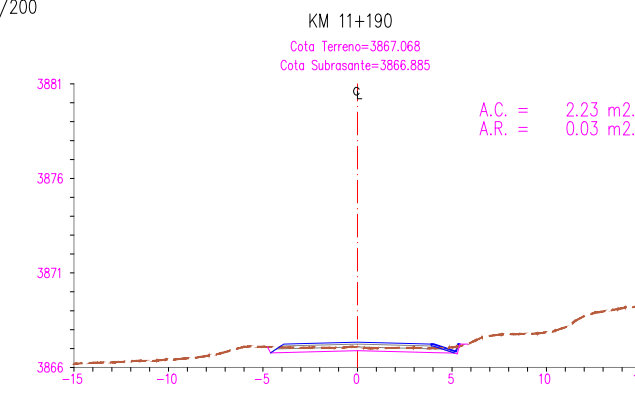
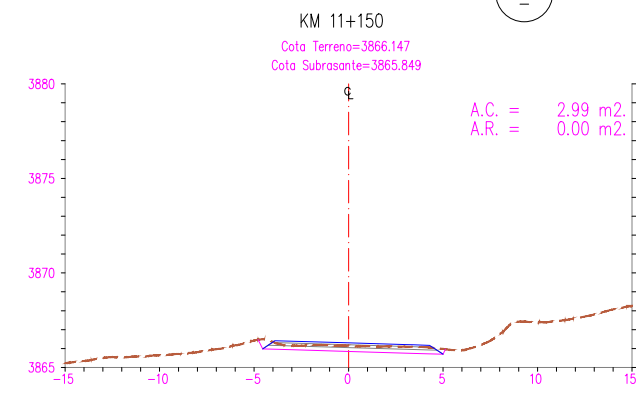
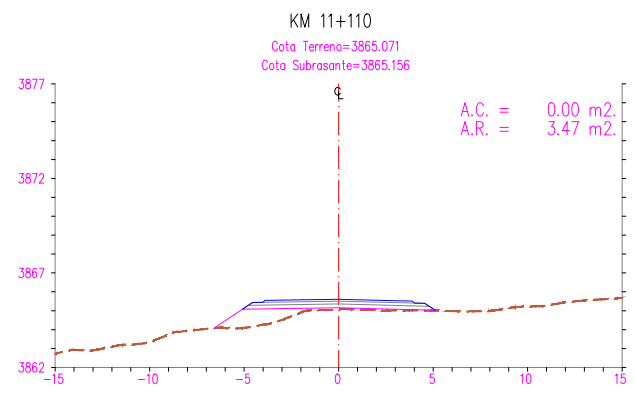
Plano:
SECCIONES TRANSVERSALES
Km 10+920 - Km 11+070

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-038

Lamina:
38-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

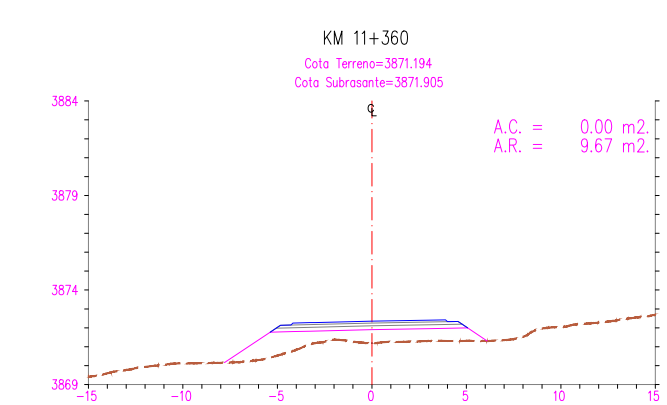
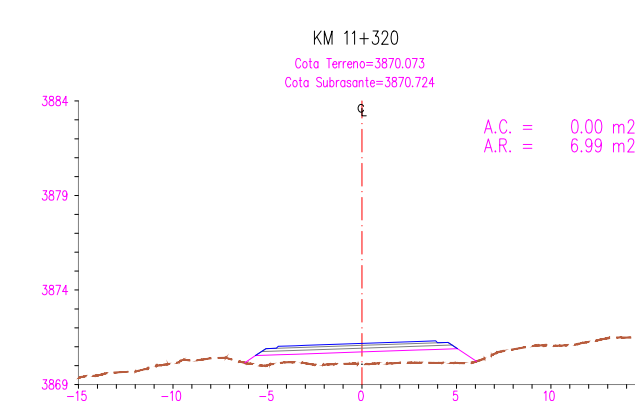
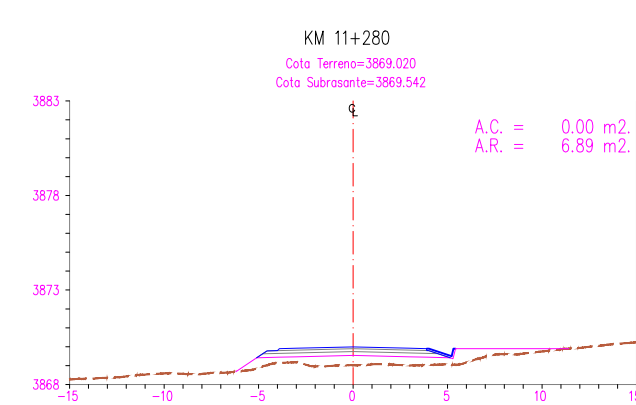
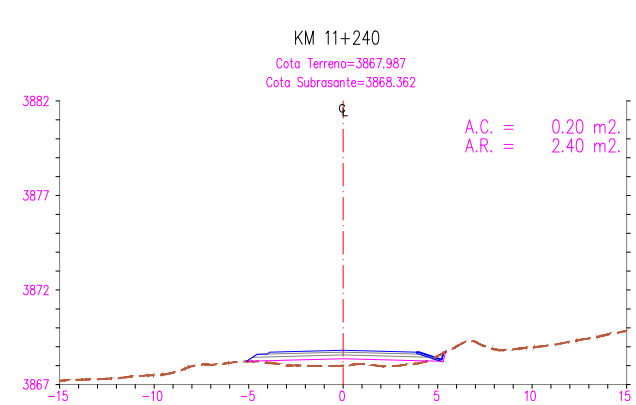
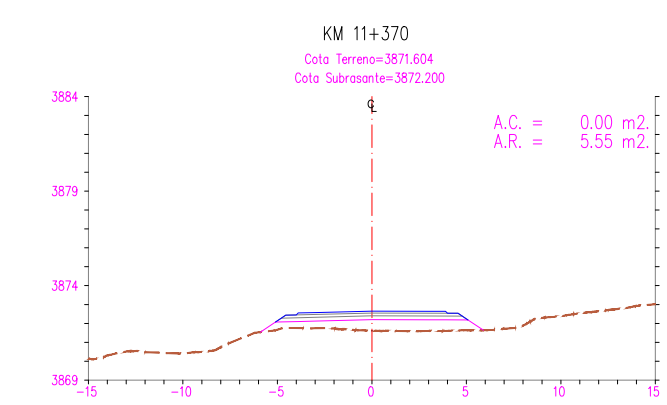
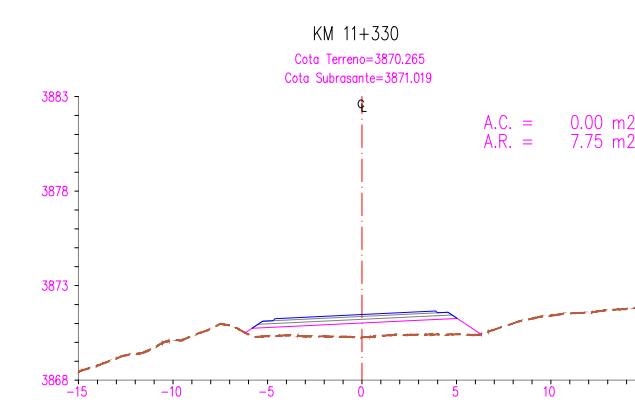
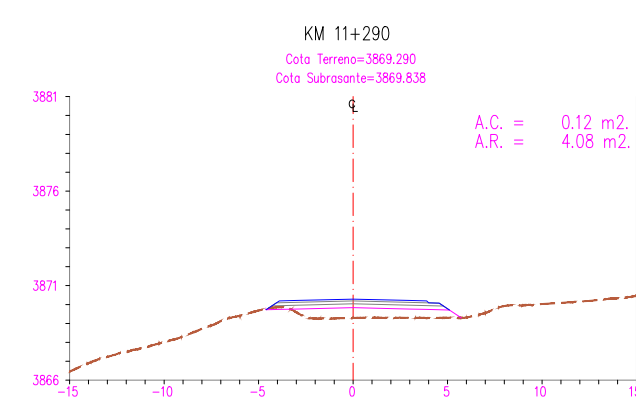
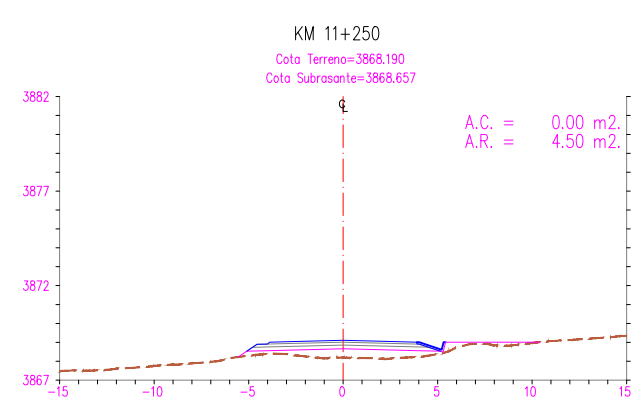
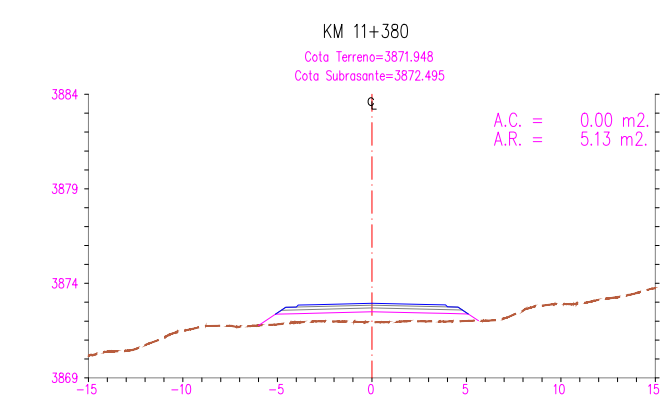
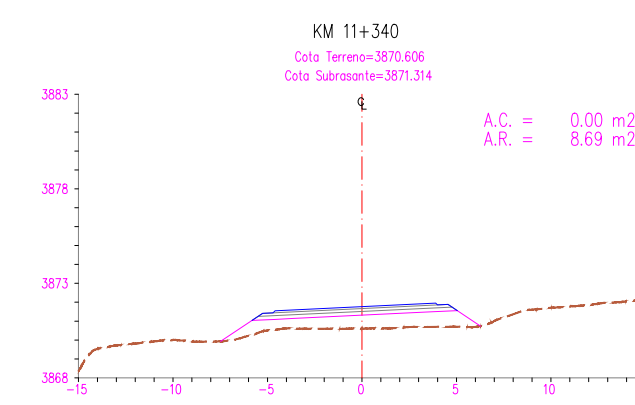
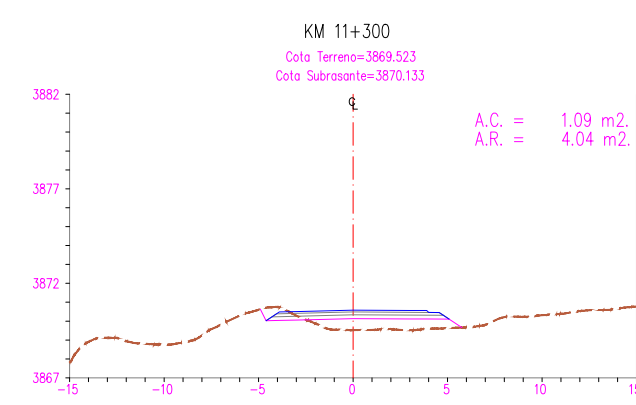
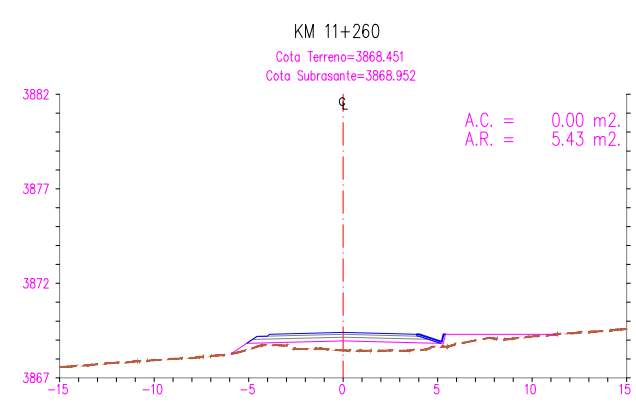
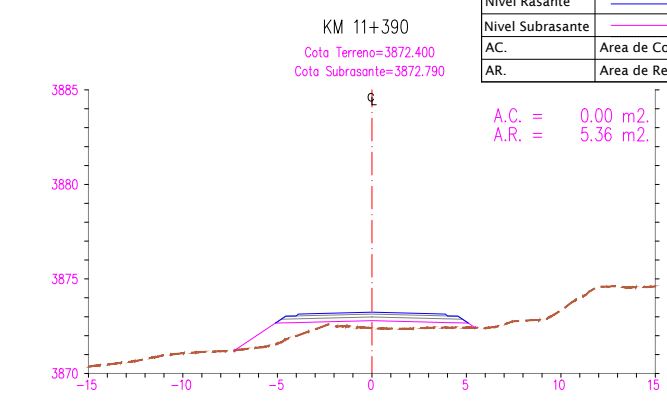
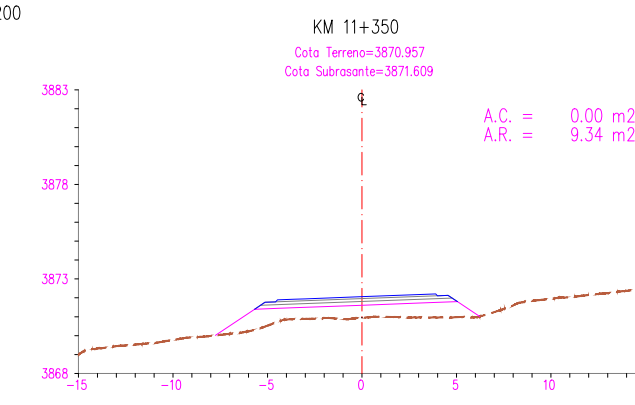
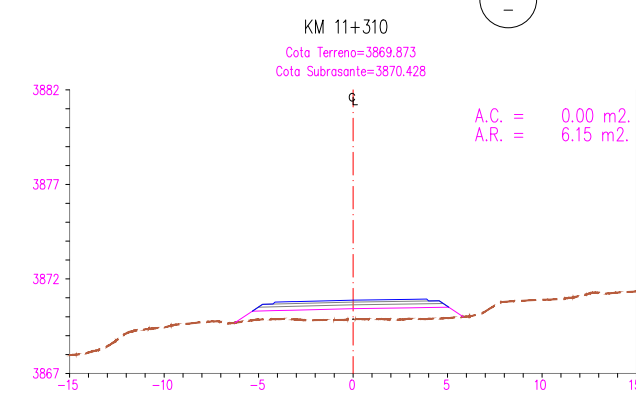
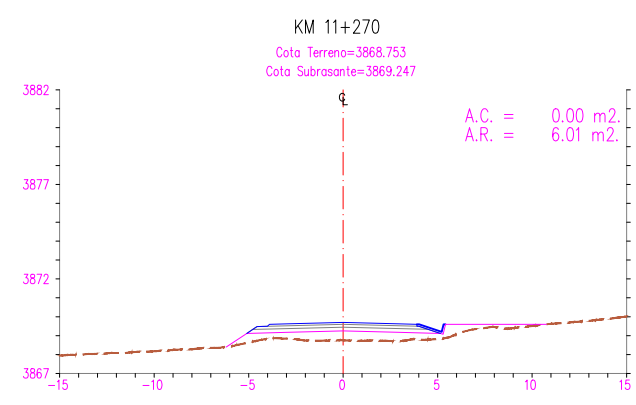
Plano:
SECCIONES TRANSVERSALES
Km 11+080 - Km 11+230

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-047

Lamina:
39-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
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Participantes:
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

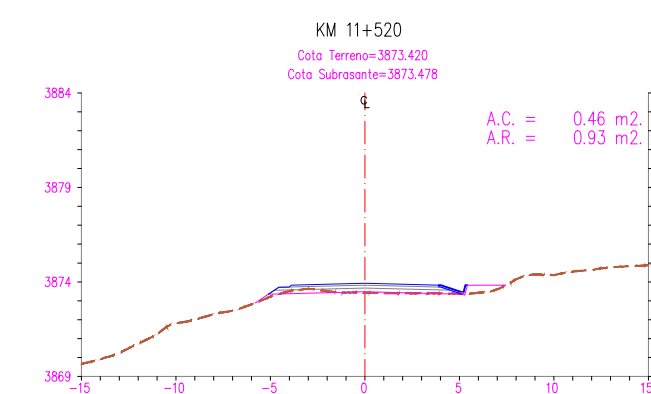
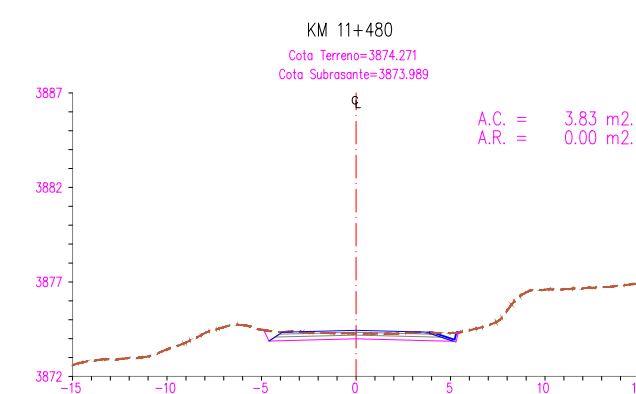
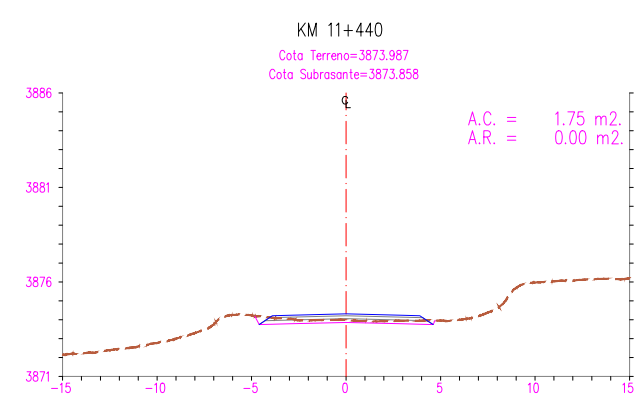
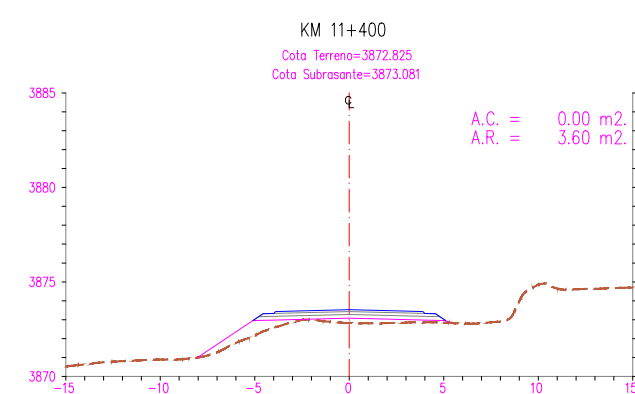
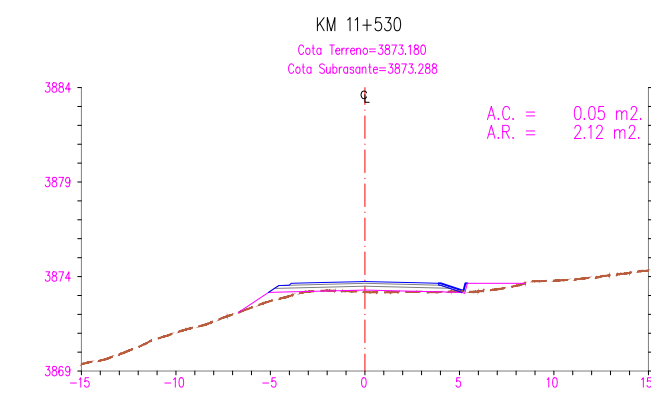
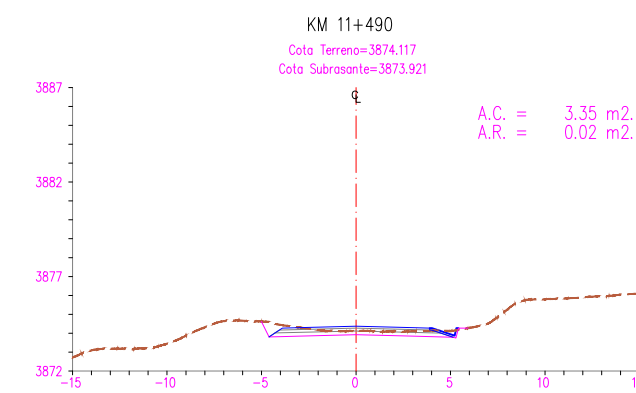
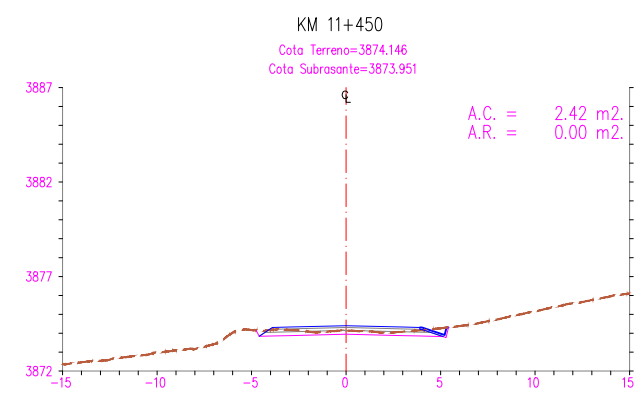
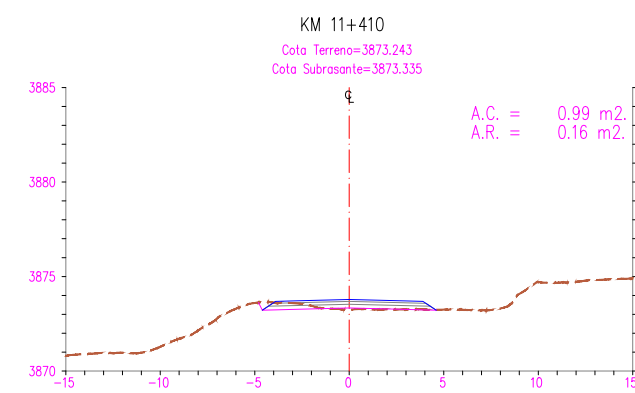
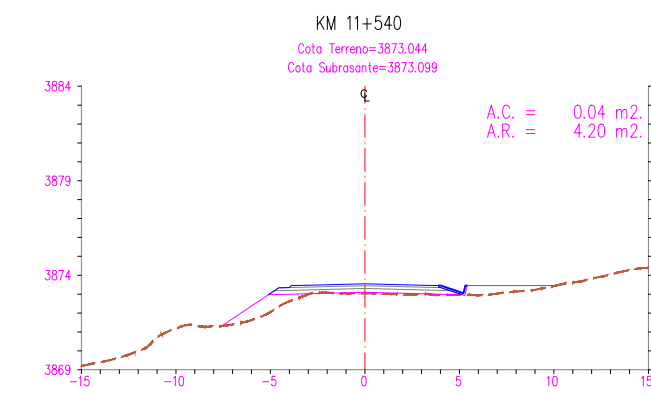
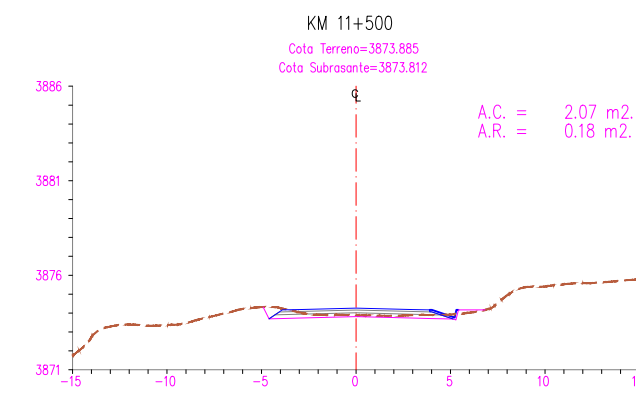
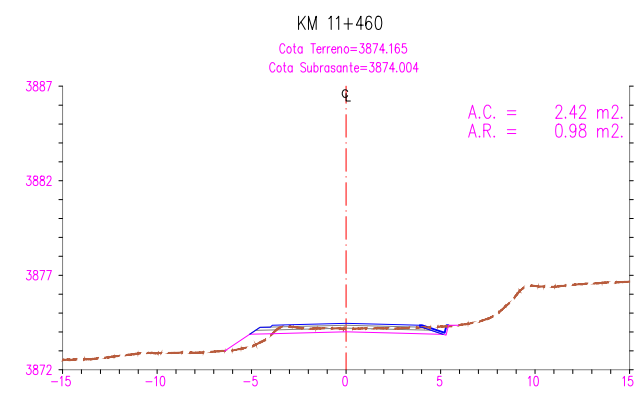
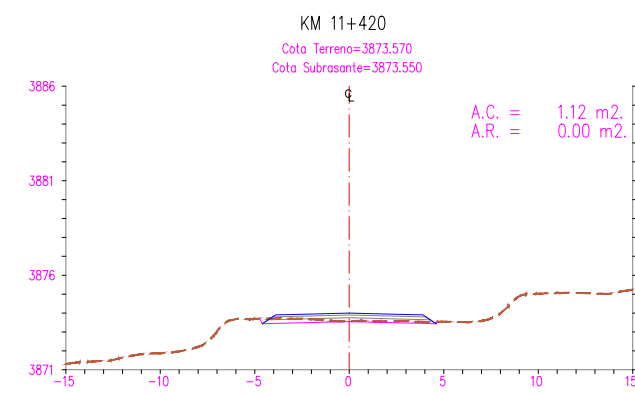
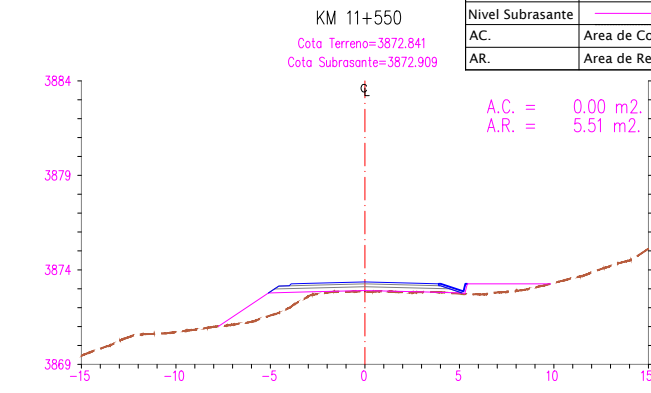
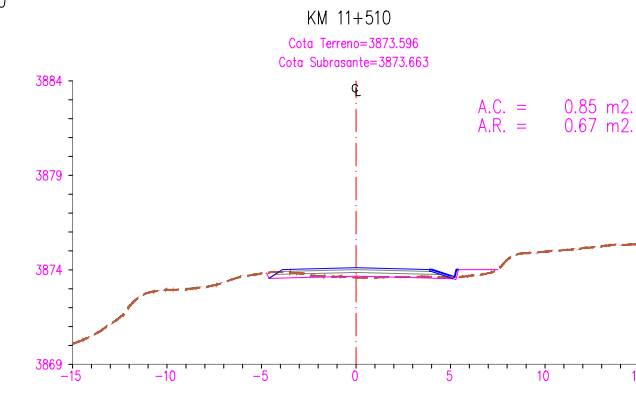
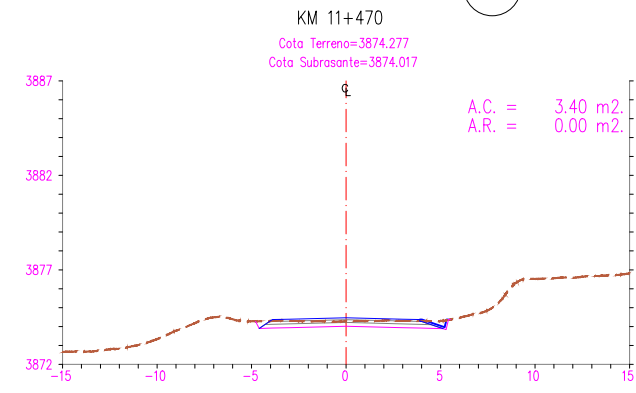
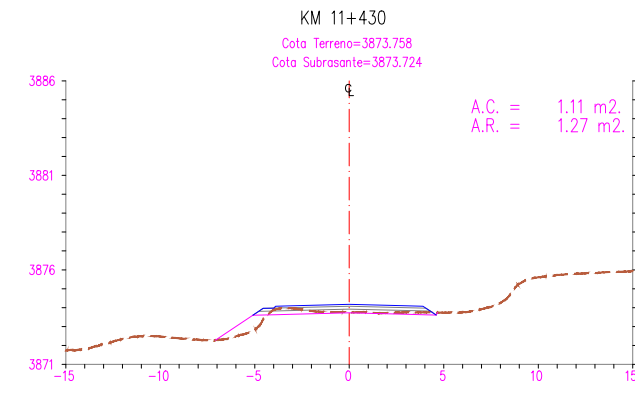
Plano:
SECCIONES TRANSVERSALES
Km 11+240 - Km 11+390

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-040

Lamina:
40-47
REV-00

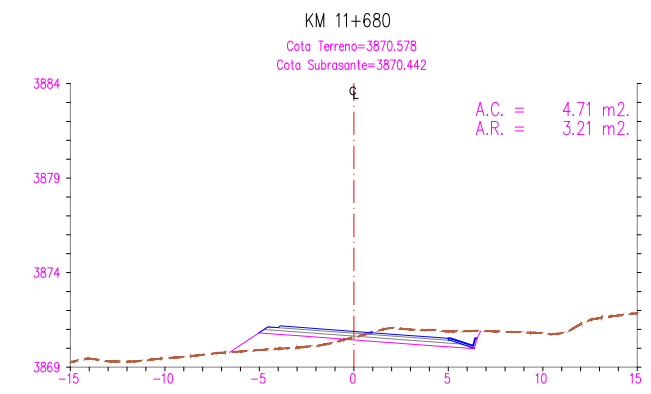
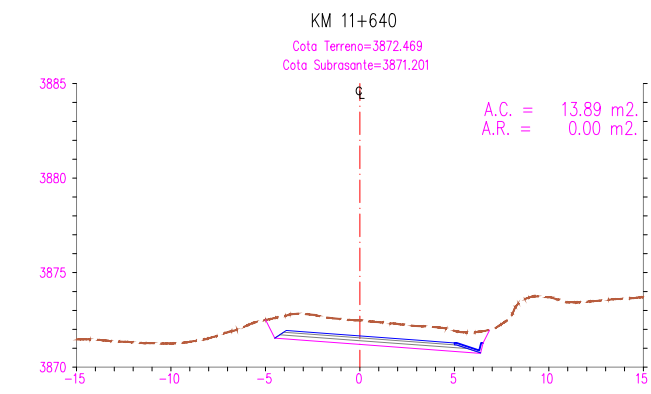
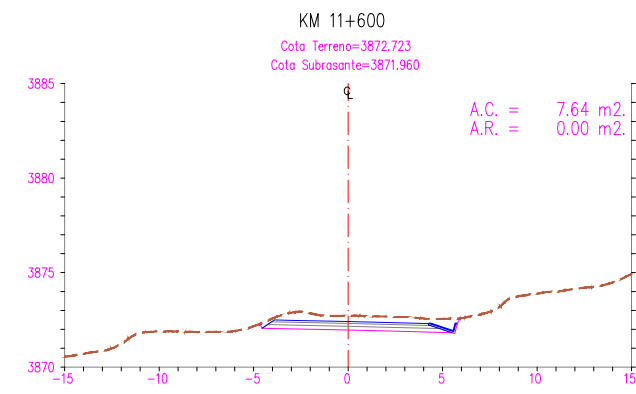
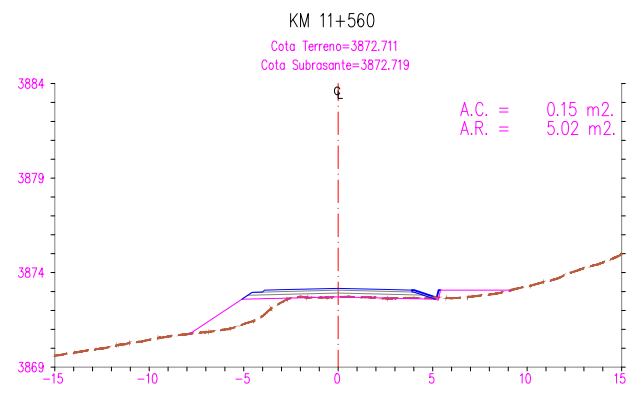
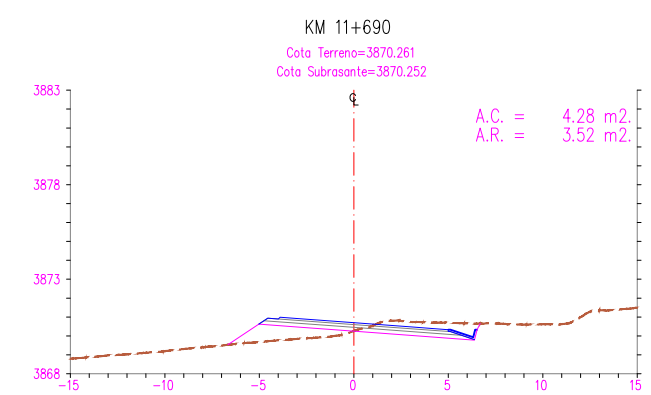
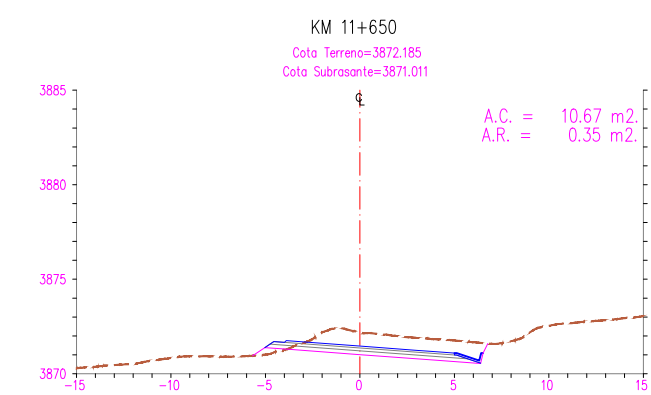
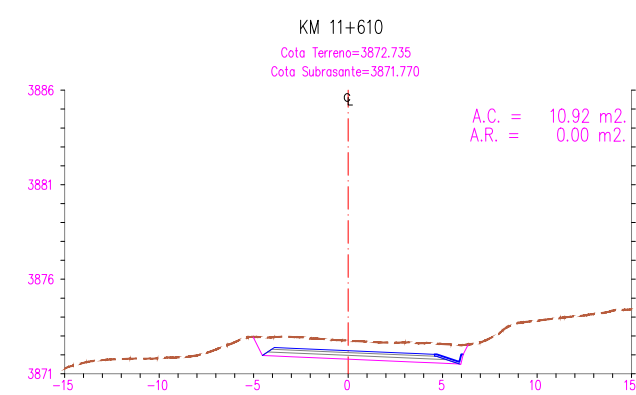
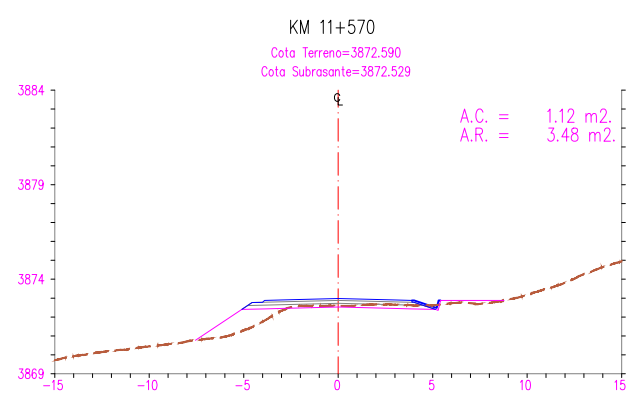
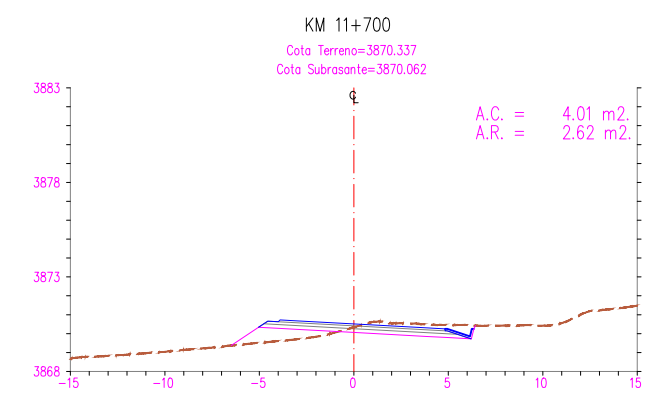
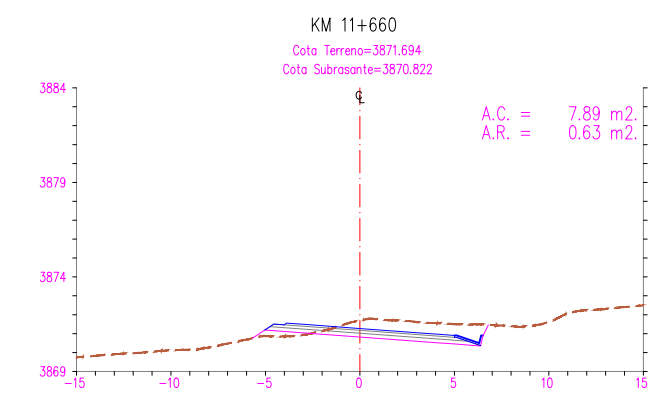
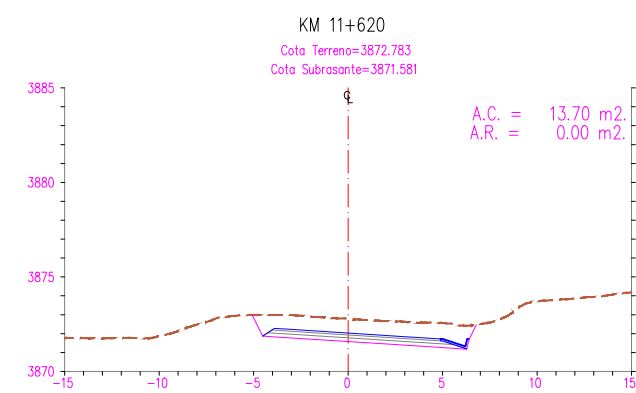
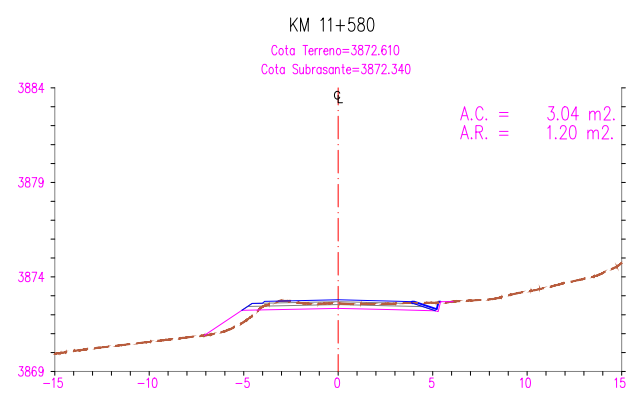
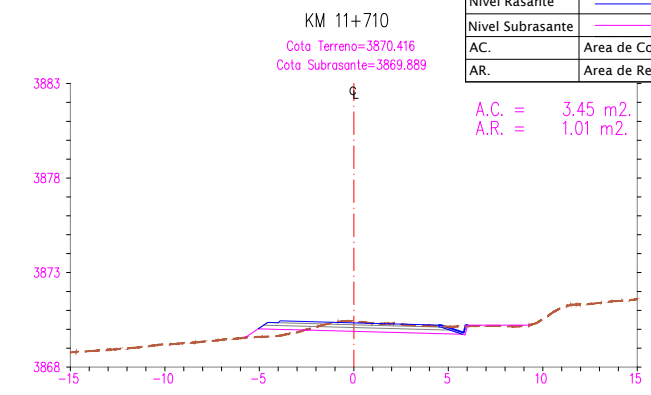
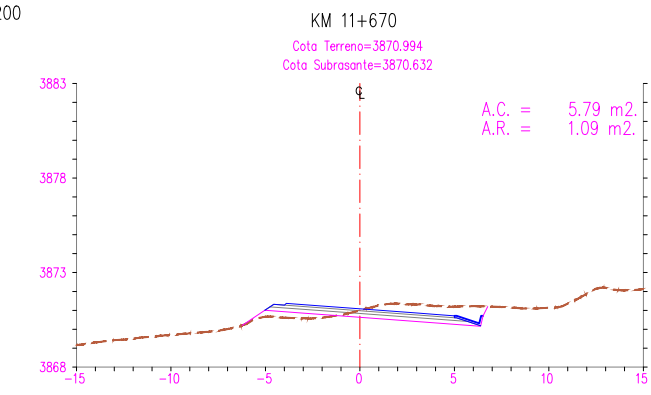
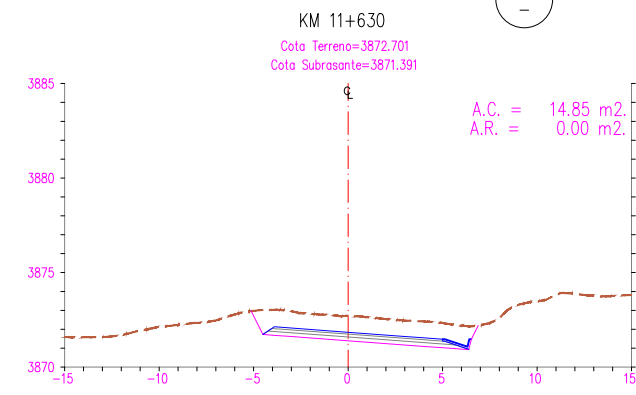
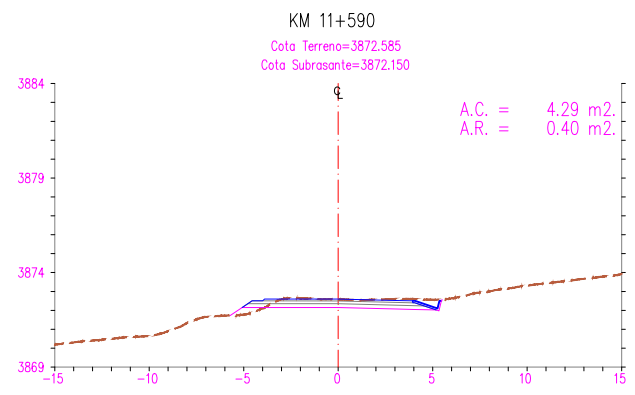
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
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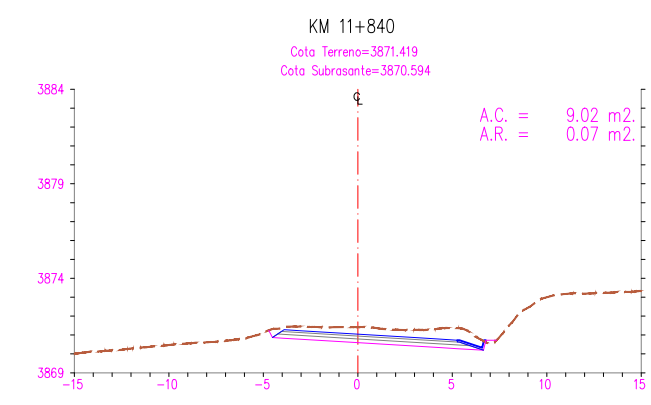
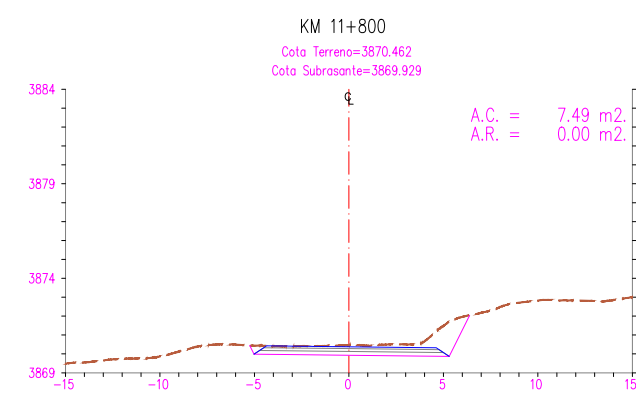
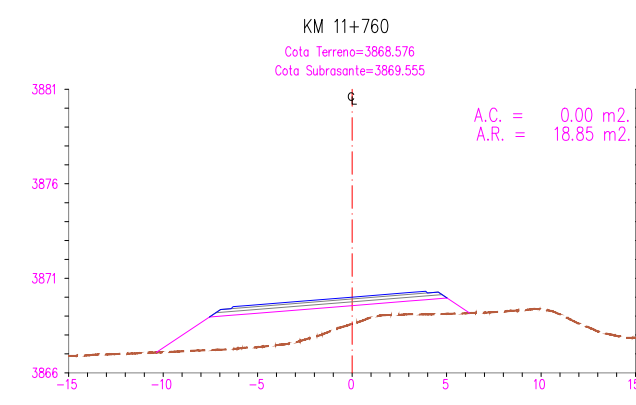
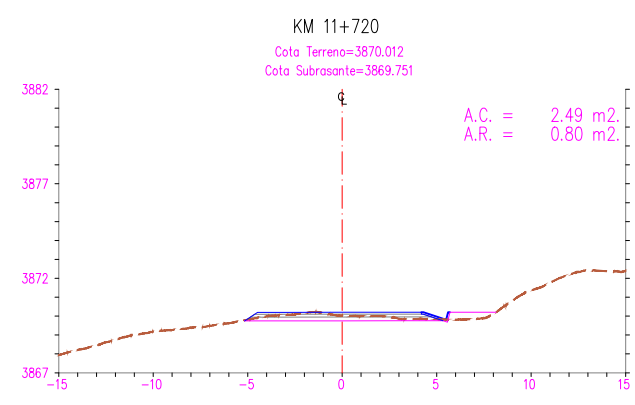
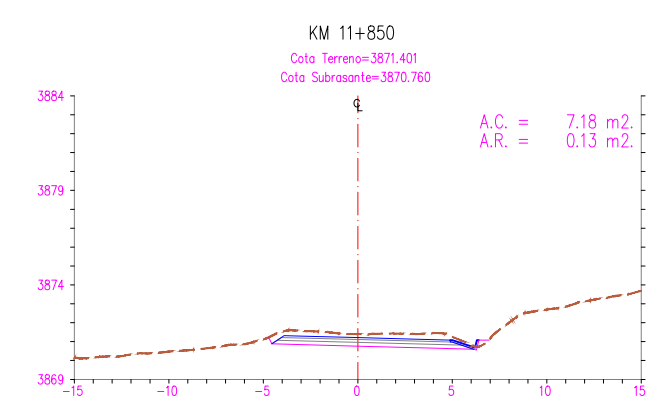
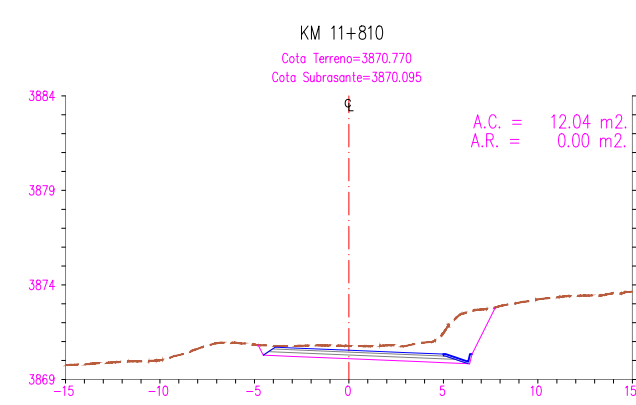
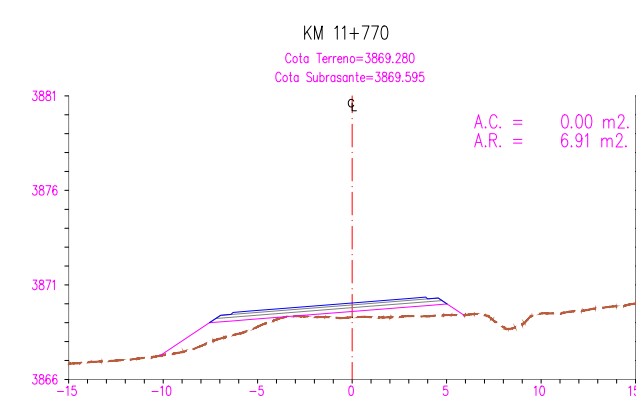
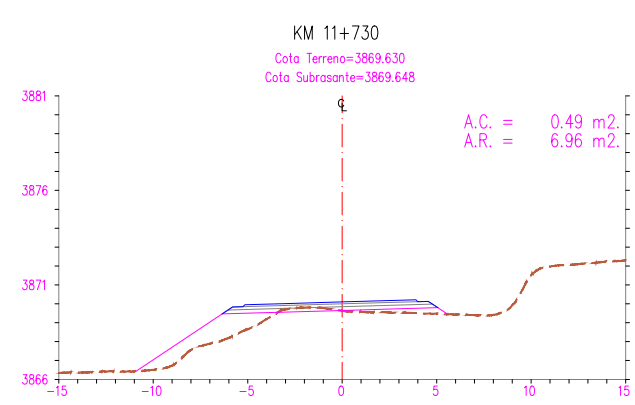
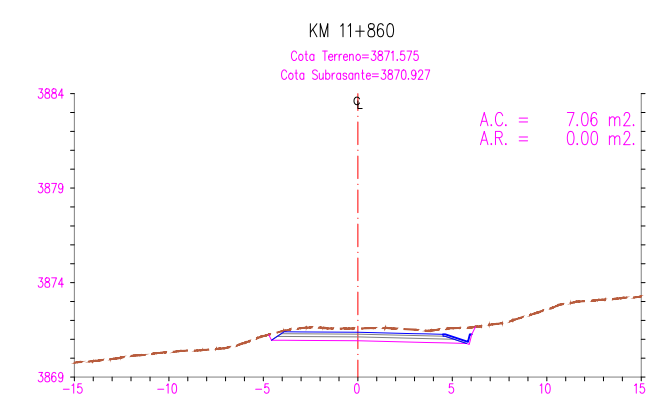
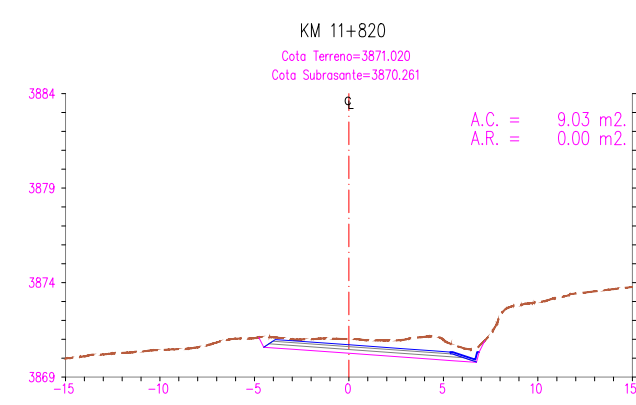
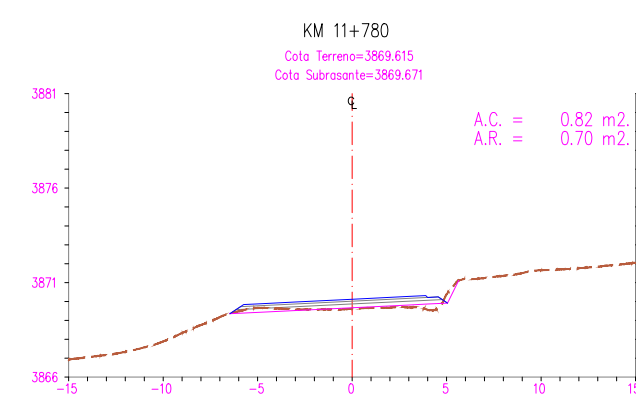
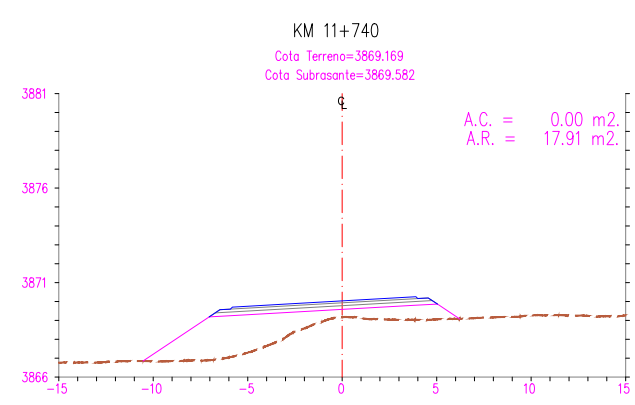
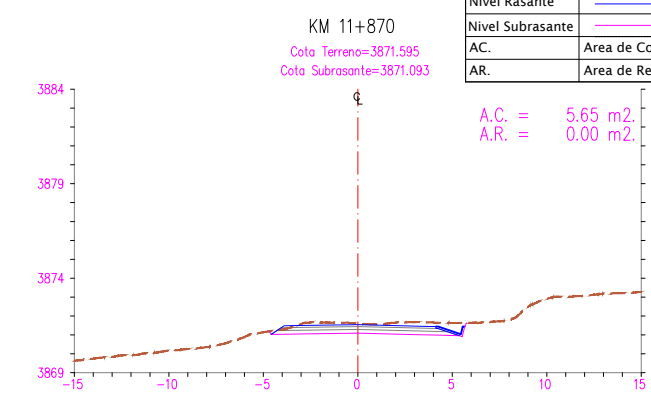
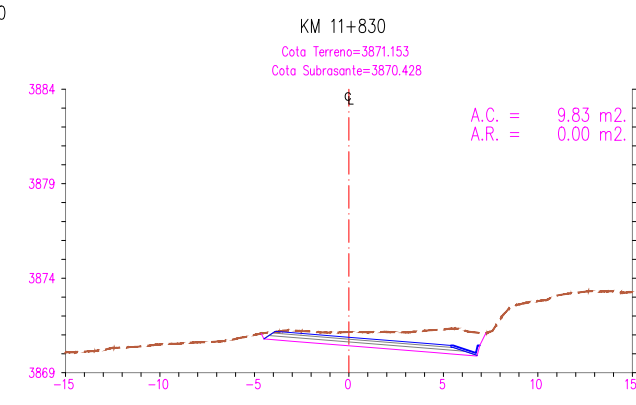
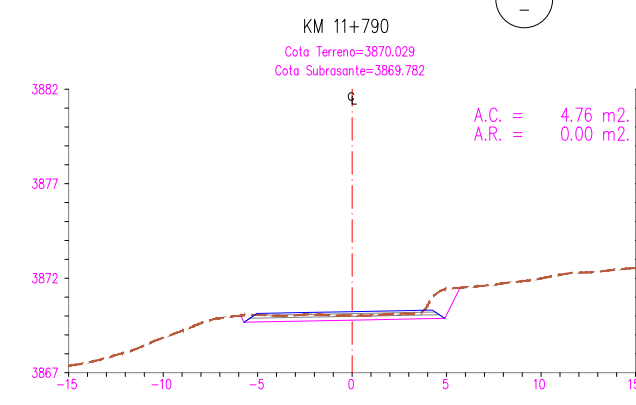
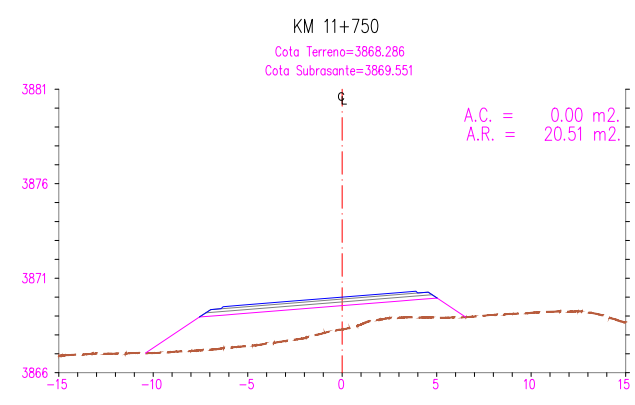
Plano:
SECCIONES TRANSVERSALES
Km 11+560 - Km 11+710

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-042

Lamina:
42-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
A.R.	Area de Relleno



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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

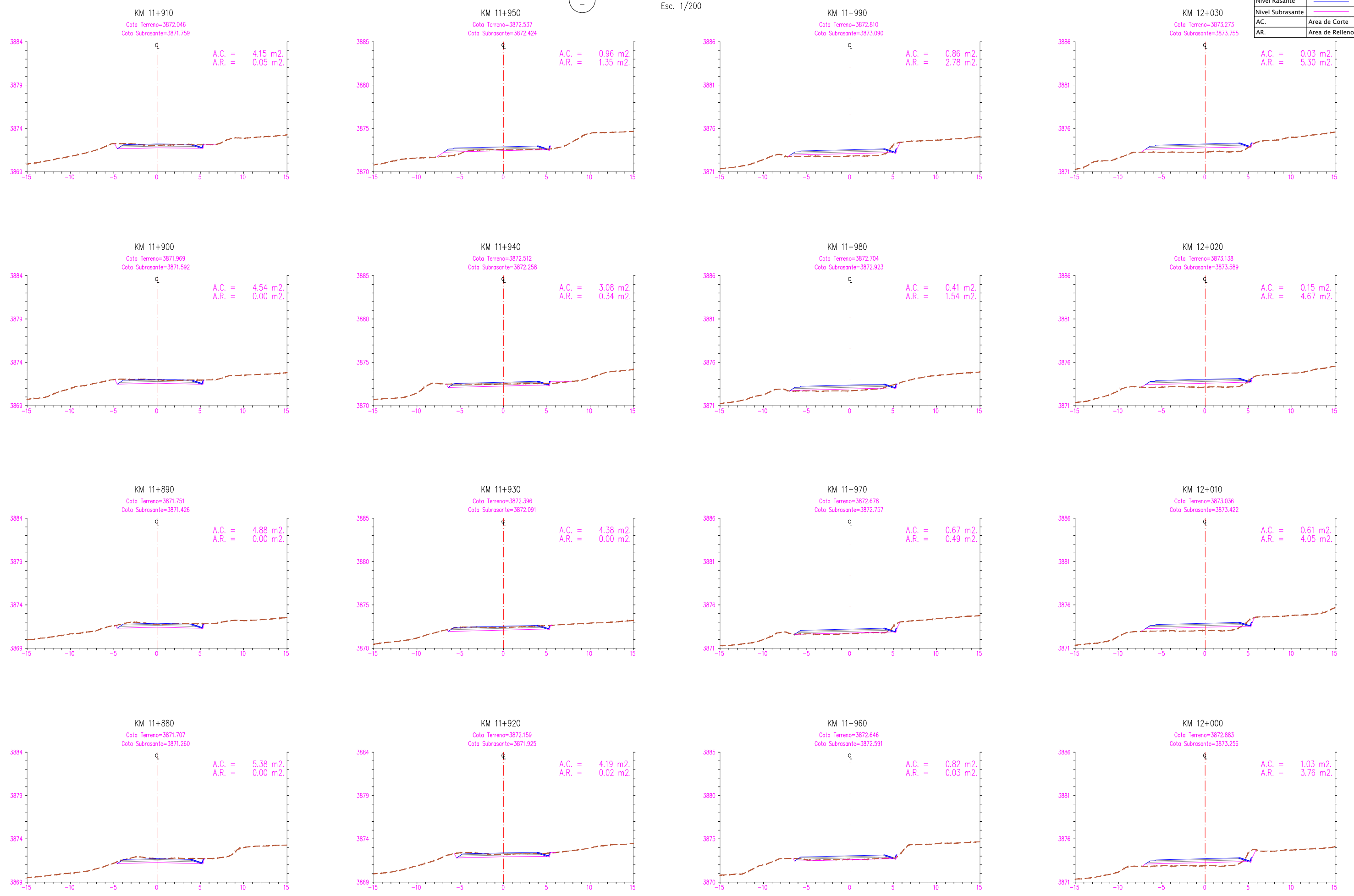
Plano:
SECCIONES TRANSVERSALES
Km 11+720 - Km 11+870

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-043

Lamina:
43-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



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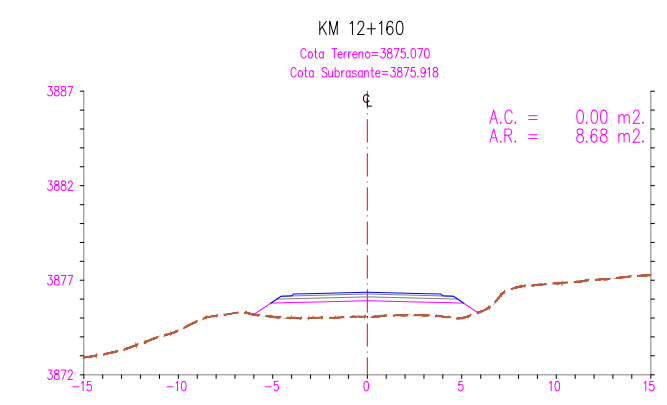
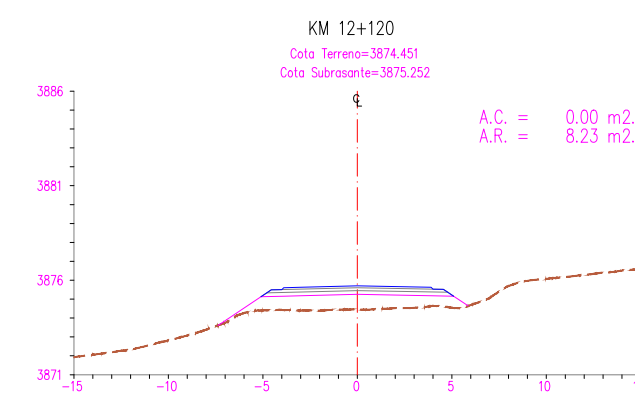
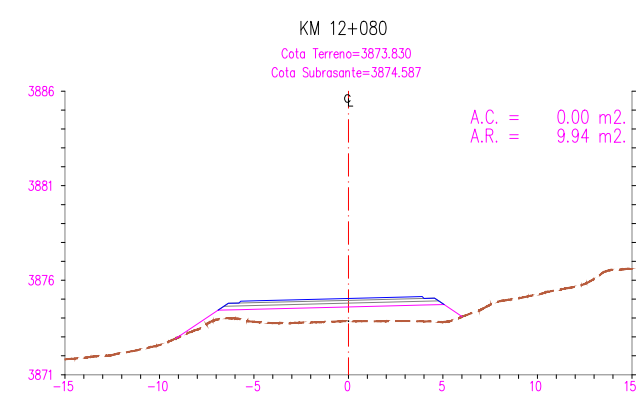
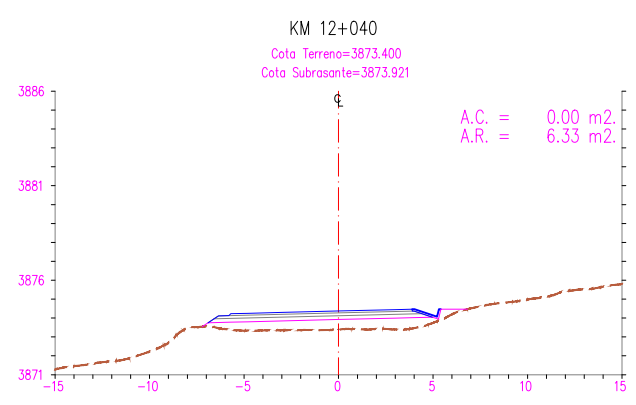
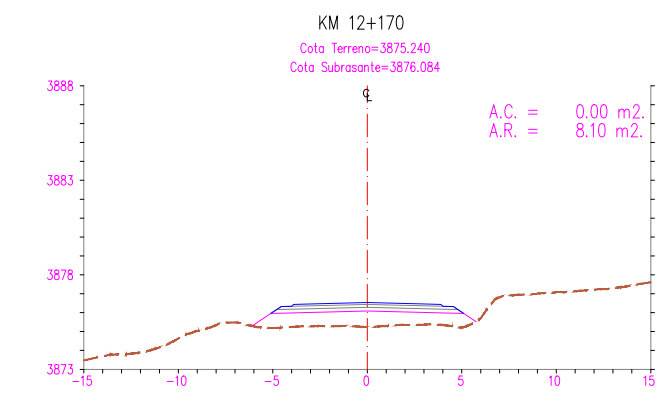
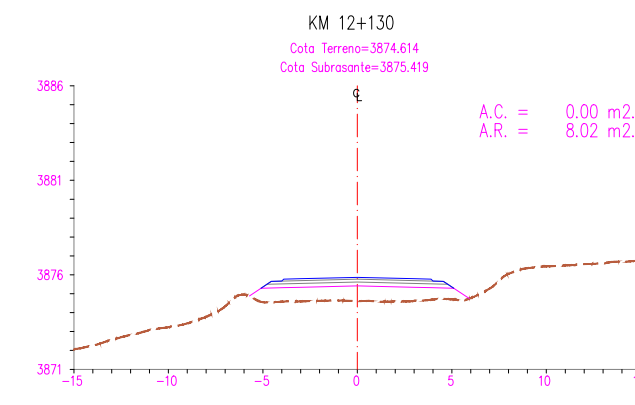
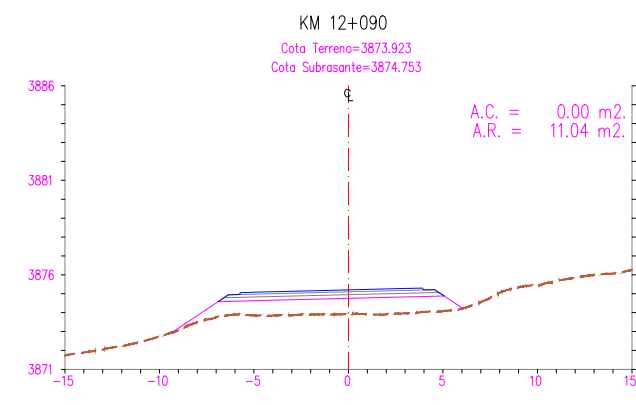
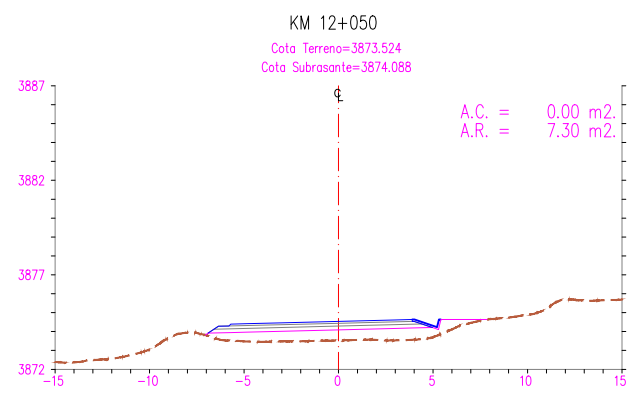
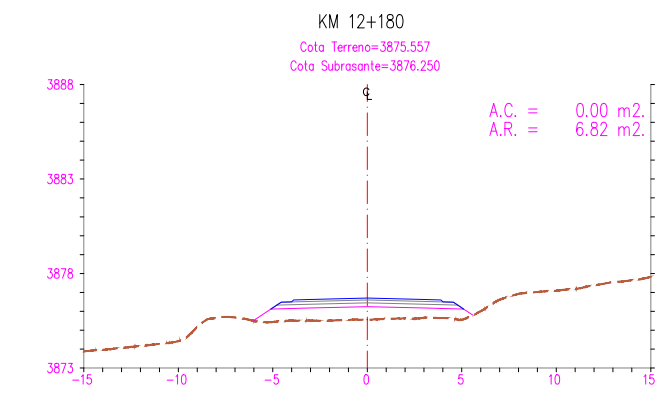
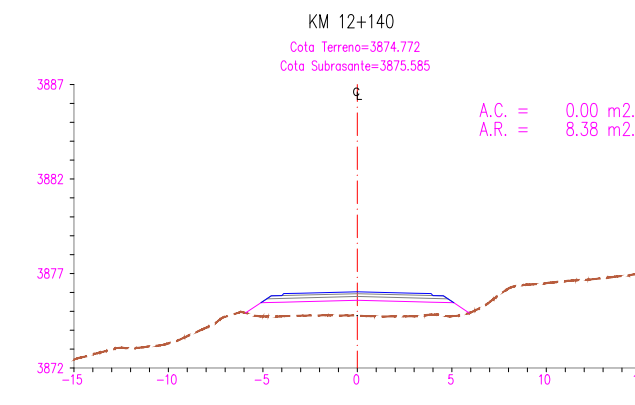
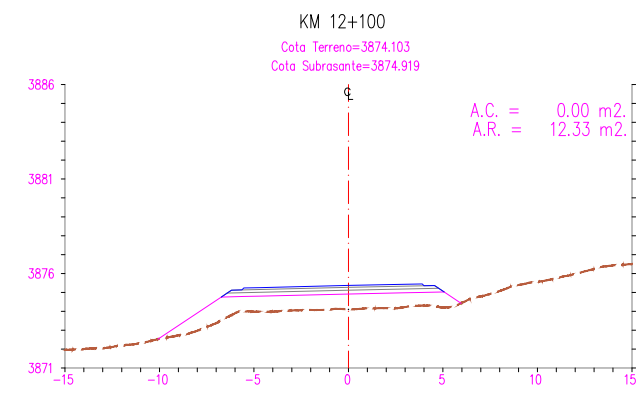
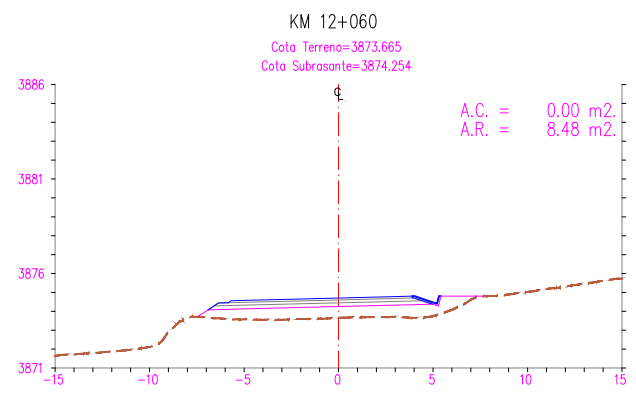
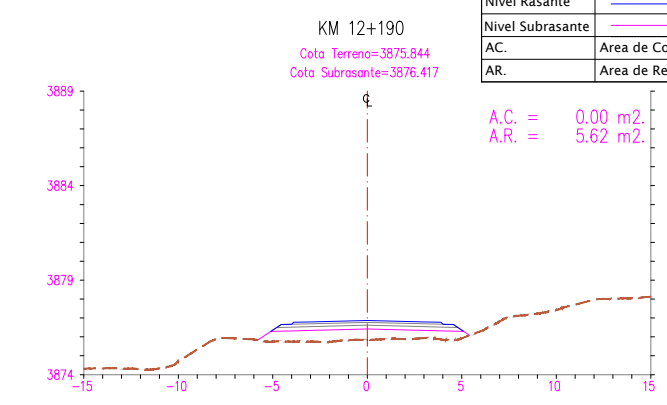
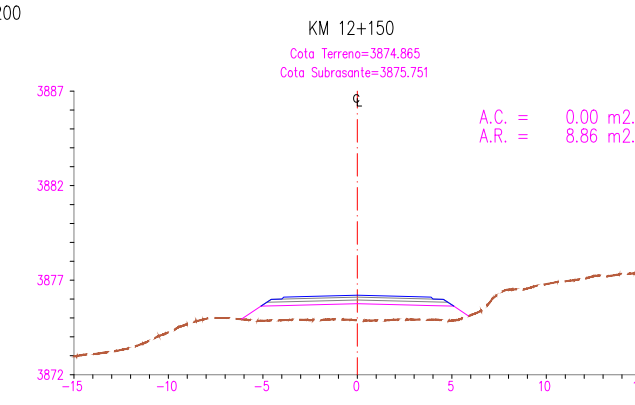
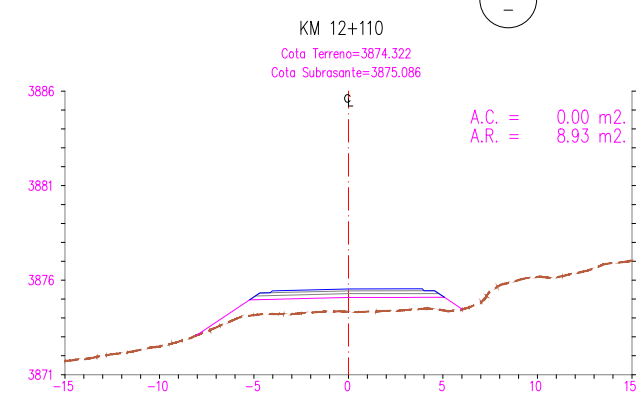
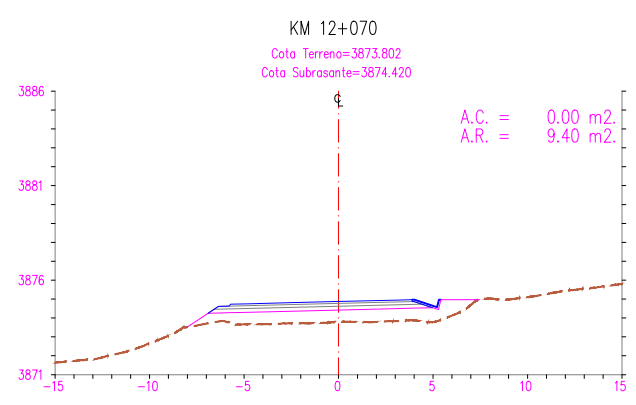
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Plano:
SECCIONES TRANSVERSALES
 Km 11+880 - Km 12+030

Escala: 1/200
 Fecha: Marzo 2022
 Codigo: DG-ST-044
 Lamina: 44-47
 REV-00

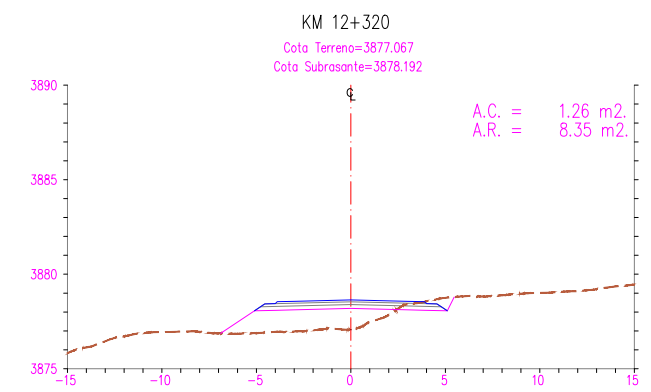
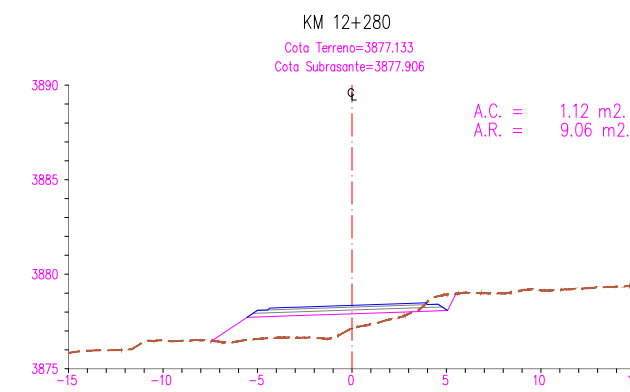
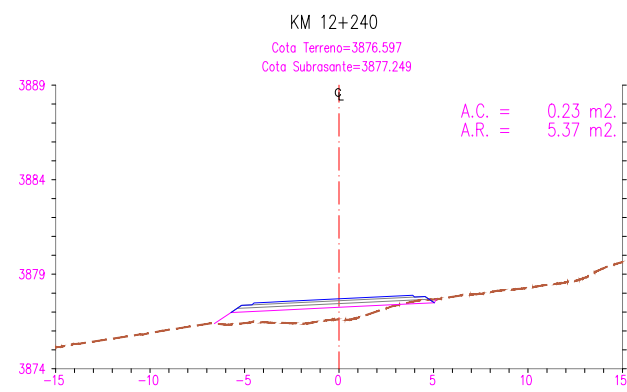
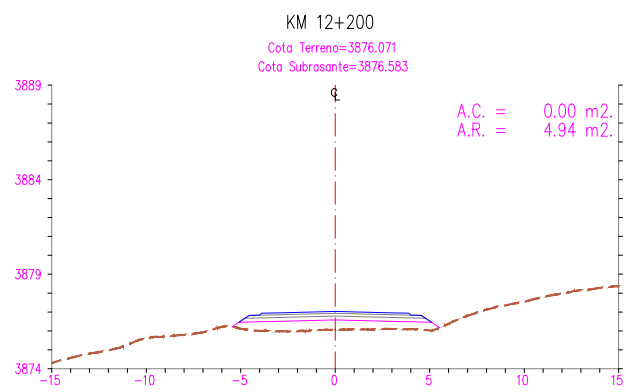
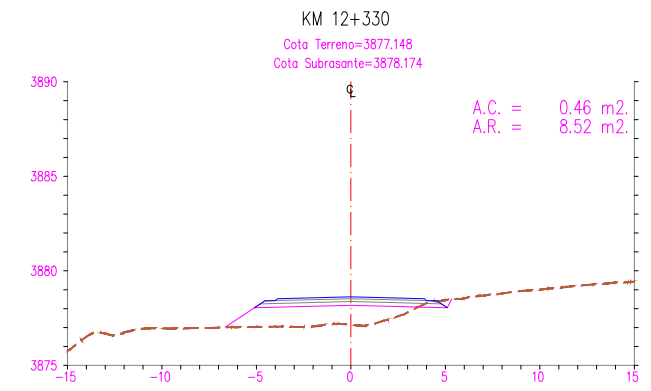
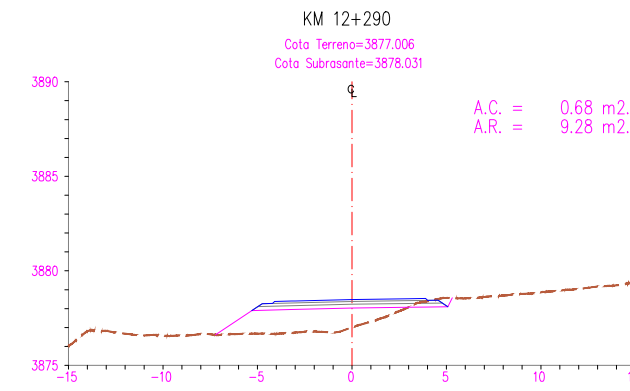
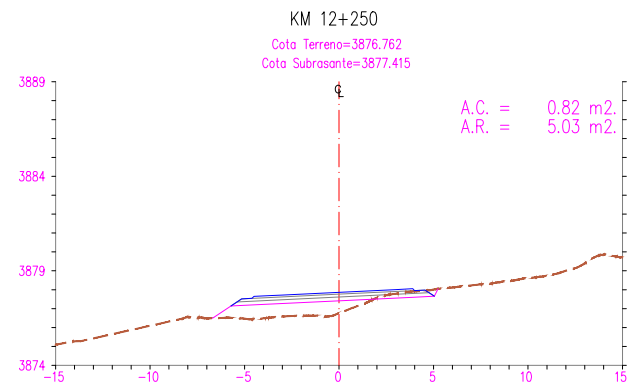
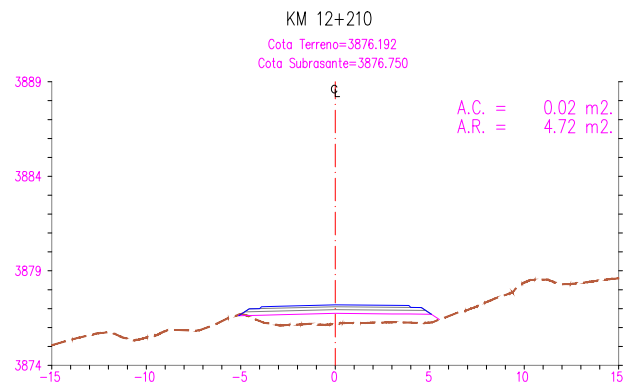
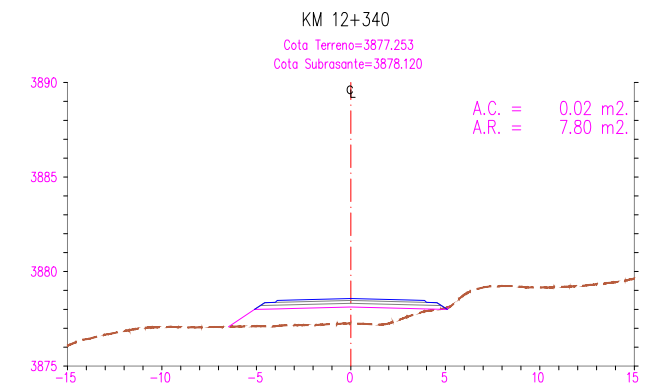
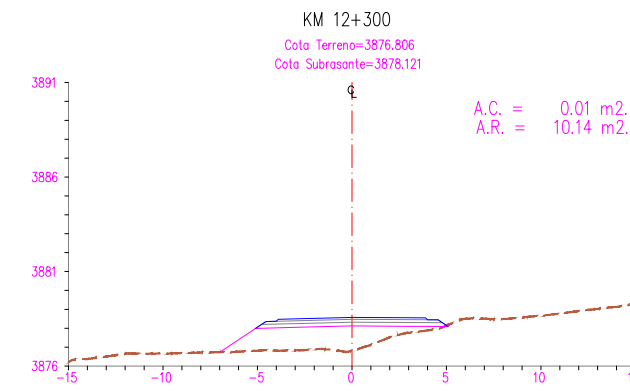
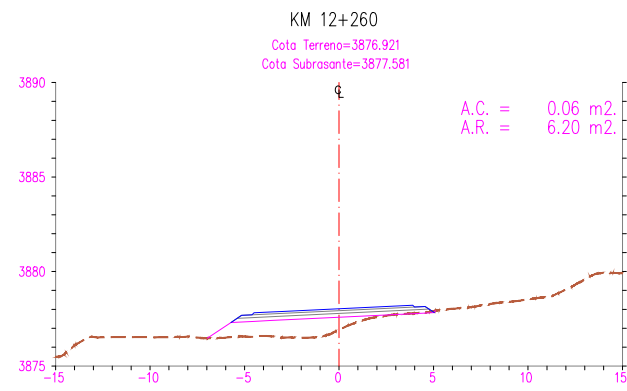
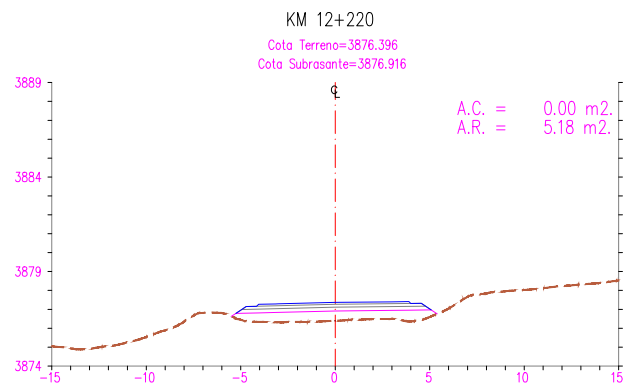
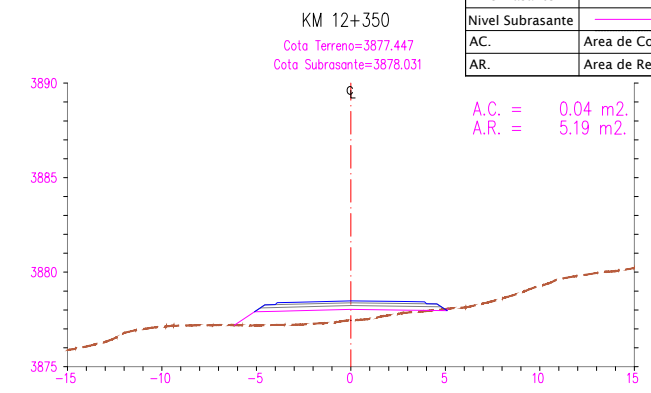
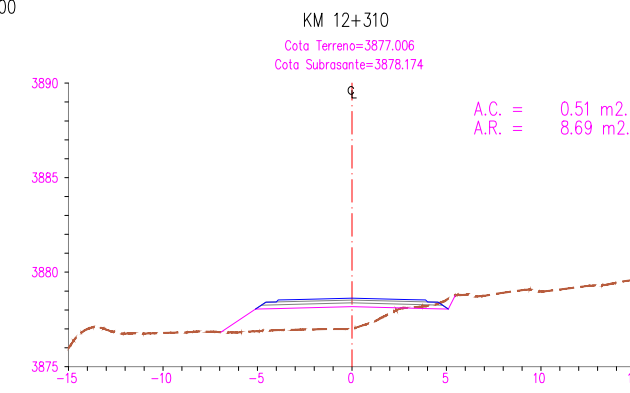
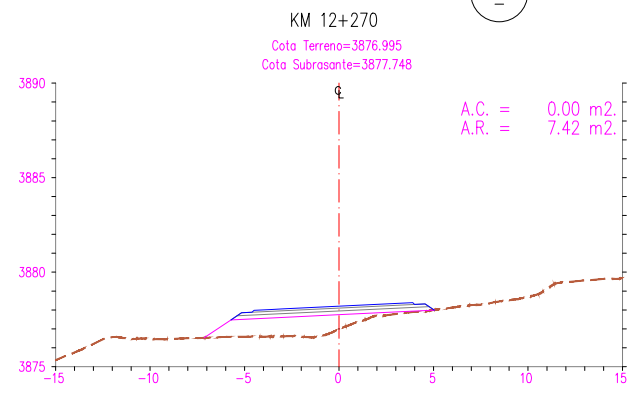
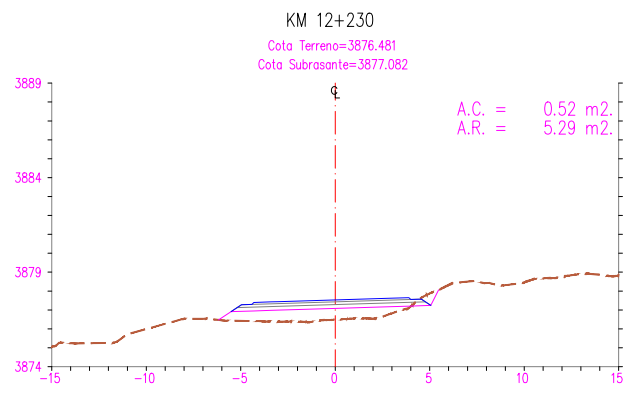
VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	
Nivel Rasante	
Nivel Subrasante	
A.C.	Area de Corte
A.R.	Area de Relleno



VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
Nivel Subrasante	-----
A.C.	Area de Corte
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TOPOGRAFICA Y AGRIMENSURA"



Participantes:
Presidente de Jurado : D.sc Valeriano Condori Apaza
Primer Miembro : Ing. Victor Raul Banegas Layme
Segundo Miembro : Ing. Juan Esteban Araoz Barrios
Asesor de Tesis : Ing. Arturo Joels Ventura Mamani
Tesisista : Bach. Javier Rolando Maquera Ccalle

Proyecto de Tesis:
" COMPARACION DE VOLUMENES DE MOVIMIENTO DE TIERRAS
OBTENIDOS POR EL METODO TRADICIONAL 2D Y BIM EN EL
DISEÑO GEOMETRICO DE LA CARRETERA HUAQUINA -
CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

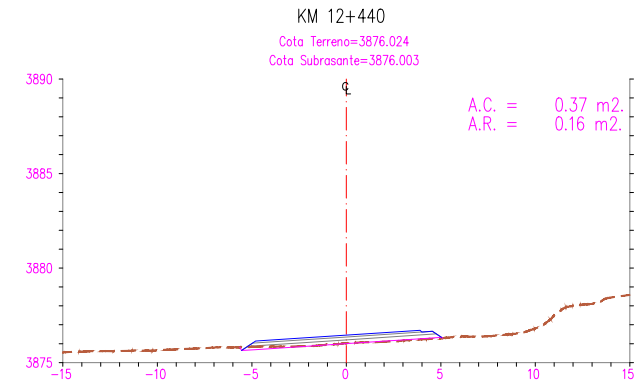
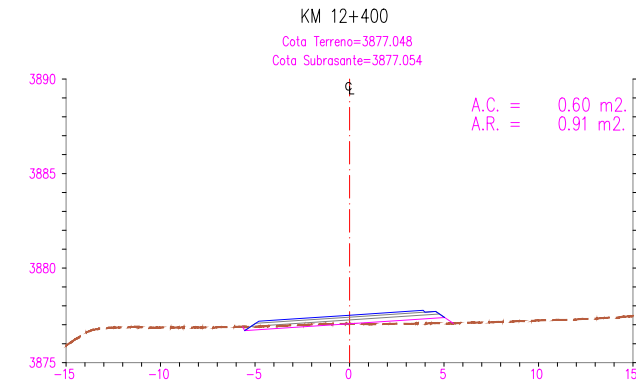
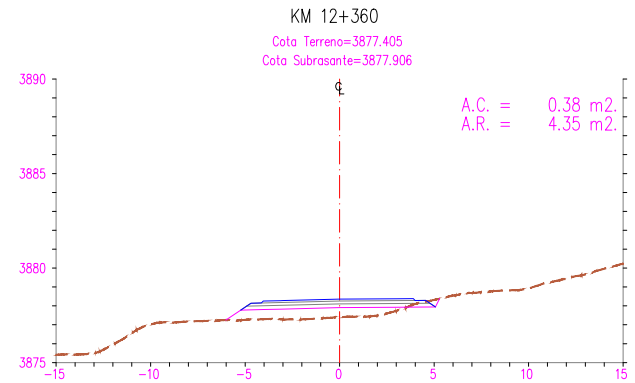
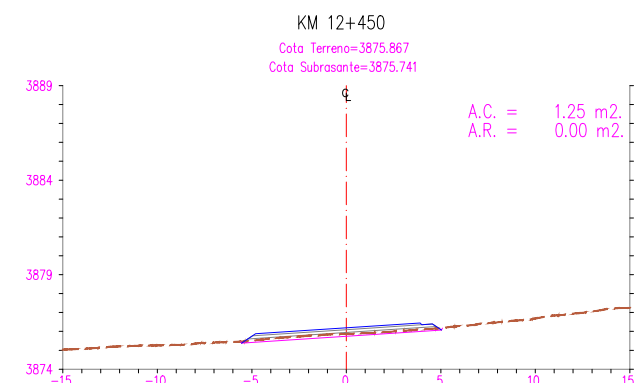
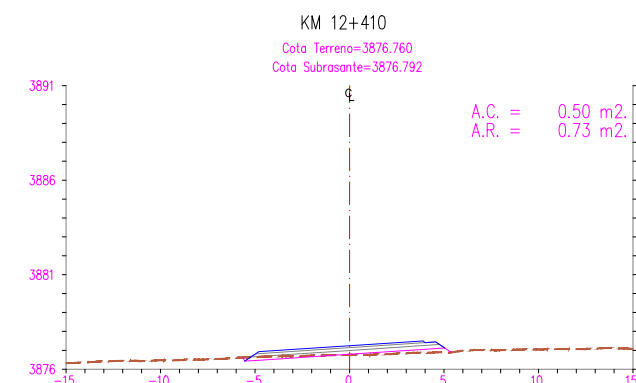
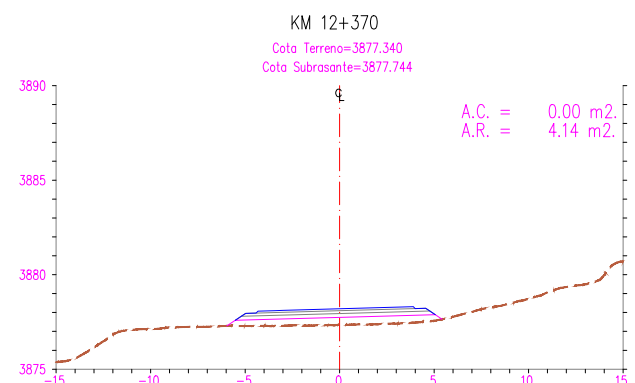
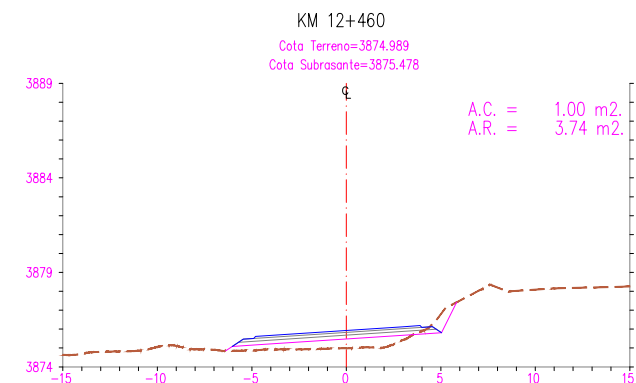
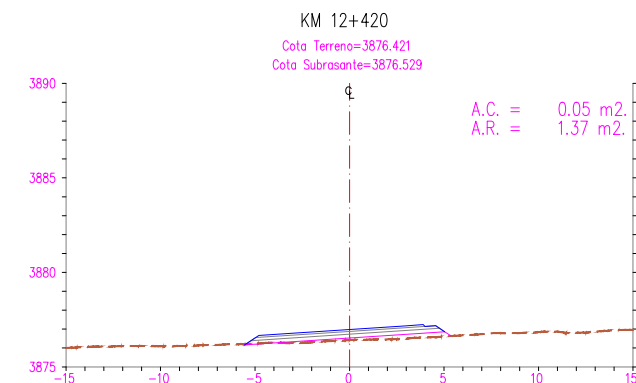
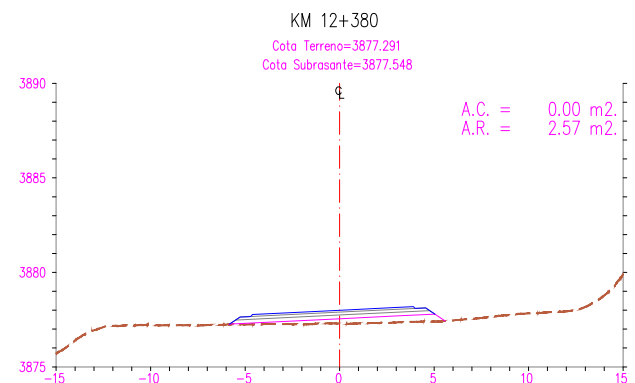
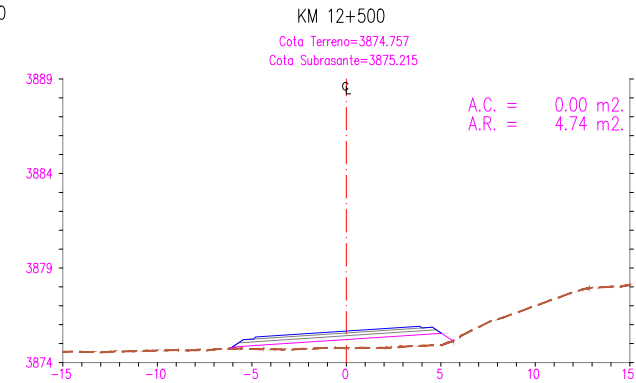
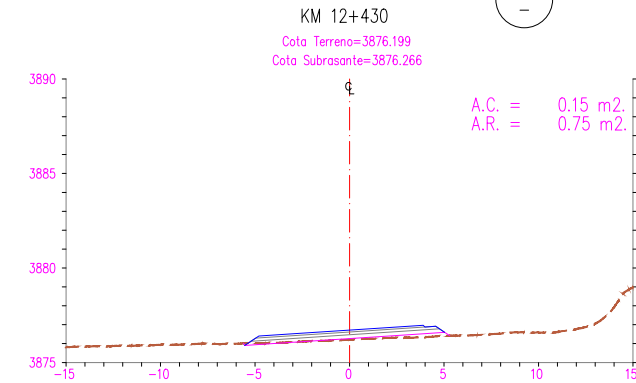
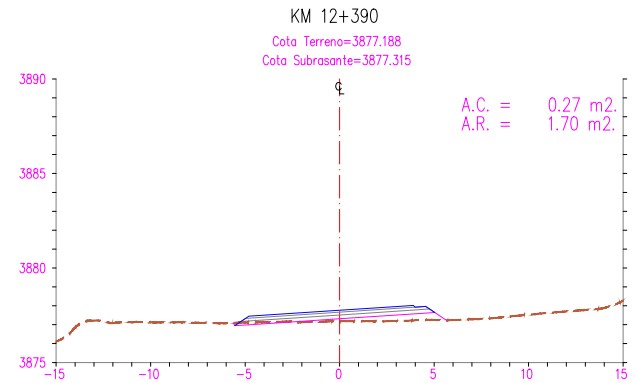
Plano:
SECCIONES TRANSVERSALES
Km 12+200 - Km 12+350

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-046

Lamina:
46-47
REV-00

VISTA DE SECCION TRANSVERSAL
Esc. 1/200

LEYENDA	
Terreno Natural	-----
Nivel Rasante	-----
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CHUCASUYO KM 5+000 AL KM 12+500 JULI, CHUCUITO, PUNO"

Plano:
SECCIONES TRANSVERSALES
Km 12+360 - Km 12+500

Escala: 1/200
Fecha: Marzo 2022
Codigo: DG-ST-047

Lamina:
47-47
REV-00