



Anejo Nº 10

REPLANTEO

1. INTRODUCCIÓN
2. LISTADO DE BASES DEL LEVANTAMIENTO Y POSTERIOR REPLANTEO
3. LISTADO DE PUNTOS

ANEXO I: Fotografías de las Bases del Levantamiento y posterior Replanteo

1. INTRODUCCIÓN

El presente anejo tiene por objeto replantear la obra, una vez definidas todas sus características geométricas. Antes de comenzar los trabajos es necesario replantear el eje tanto en planta como en alzado, por lo que es necesario materializar en el terreno las coordenadas de los pk obtenidas en proyecto, para ello es necesario realizar una poligonal de aproximación, enganchada en el vértice Geodésico “El Encinal, (45333)”, de la Red Geodésica Nacional

Las bases de replanteo que se creen para dicha poligonal, deberán materializarse en el terreno, mediante hitos inamovibles y perdurables. En nuestro caso se han materializado con estacas, solo para la labor de levantamiento topográfico y posterior replanteo.

La poligonal estará enganchada tanto en su inicio como en su final al vértice geodésico anteriormente mencionado perteneciente a la red del I.G.N., y por último se comprobará la validez de la poligonal, debiendo cumplir en tolerancias tanto planimétricas como altimétricas.

Con la poligonal de aproximación ejecutada se replanteará el eje de la carretera cada 20 m y de los caminos proyectados cada 25 m, materializando los puntos en el terreno, procurando garantizar su conservación.

Mediante un acta de reconocimiento, el Contratista dará por recibidas las bases de replanteo que se hayan encontrado en condiciones satisfactorias de conservación. A partir de este momento será responsabilidad del Contratista la conservación y mantenimiento de las bases.

El Contratista, en base a la información del Proyecto, e hitos de replanteo conservados, elaborará un plan de replanteo que incluya la comprobación de las coordenadas de los hitos existentes y su cota de elevación, colocación y asignación de coordenadas y programa de replanteo y nivelación de puntos de las alineaciones y obras de fábrica.

Este programa será entregado a la Dirección de Obra para su aprobación e inspección y comprobación de los trabajos de replanteo.

Para el replanteo de la obra se ha optado por escoger las mismas bases que para el levantamiento. Esto facilitará el replanteo ya que dichas bases ya se encuentran marcadas en el terreno, y desde ellas se dispone de buena visibilidad sobre todo el nuevo trazado.

Por lo tanto utilizaremos las mismas bases descritas en el Anejo Nº 2: “Cartografía y Topografía”, para realizar todo el replanteo.



2. LISTADO DE BASES DEL LEVANTAMIENTO Y POSTERIOR REPLANTEO

Listado de coordenadas de las Bases del Levantamiento y posterior Replanteo			
Nombre	Coord.X	Coord.Y	Coord.Z
E1	298574,080	4547612,881	852,000
E2	297400,060	4547588,920	859,097
E3	296661,260	4546389,430	873,663
E4	295987,618	4545705,449	887,180
E5	295612,831	4545313,980	887,500
E6	295827,586	4545351,479	887,013
E7	296016,305	4545447,509	884,746
E8	296245,175	4545416,785	883,949
E9	296461,040	4545484,757	881,411
E10	296872,768	4545730,171	870,222
E11	297376,015	4545781,192	869,980
E12	297738,350	4545819,280	857,661
E13	298108,600	4546141,630	854,154
E14	298534,460	4546448,800	852,362
E15	298629,178	4546658,976	852,773
E16	298917,730	4546739,452	849,825
E17	299005,586	4546829,689	849,825
E18	299220,980	4546847,141	847,177
E19	299194,345	4546916,987	849,271
E20	299160,971	4547136,639	852,413
E21	299304,810	4547618,200	857,063
E22	296686,362	4545721,271	874,330
E23	296886,051	4545441,340	864,908

3. LISTADO DE PUNTOS

A continuación se muestra un listado con los puntos correspondientes a los ejes del nuevo trazado (carretera y caminos con desmontes importantes) y sus coordenadas UTM:

EJE CARRETERA

Base Coord.X Coord.Y	E5						
	295612.831 4545313.980						
Base Coord.X Coord.Y	E6						
	295827.586 4545351.479						
	P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2	
	18180,000	295619,870	4545270,996	889,642	189,6662 43,5571	276,4669 222,7631	
	18200,000	295637,058	4545281,222	889,744	159,4602 40,7434	277,5096 203,0688	
	18220,000	295654,247	4545291,447	889,845	131,7212 47,1485	278,7753 183,4404	
	18240,000	295671,498	4545301,566	889,947	113,275 59,9657	280,2968 163,8745	
	18260,000	295688,964	4545311,307	890,049	102,234 76,1801	282,0431 144,3252	
	18280,000	295706,789	4545320,374	890,151	95,6742 94,1753	283,9558 124,7375	
	18300,000	295725,064	4545328,493	890,250	91,813 113,1675	285,9591 105,0671	
	18320,000	295743,706	4545335,733	890,258	89,5144 132,6707	288,1869 85,3449	
Base Coord.X Coord.Y	E6						
	295827.586 4545351.479						
Base Coord.X Coord.Y	E7						
	296016.305 4545447.509						
	P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2	
	18340,000	295762,568	4545342,383	890,136	291,1514 65,6513	274,9948 274,6525	
	18360,000	295781,528	4545348,749	889,883	296,2312 46,1392	274,6509 254,7036	



18380,000	295800,501	4545355,075	889,539	308,4037	274,2372
				27,323	234,7669
18400,000	295819,474	4545361,402	889,193	356,3691	273,7468
				12,8165	214,8418
18420,000	295838,447	4545367,728	888,847	37,5106	273,1562
				19,5443	194,9322
18440,000	295857,420	4545374,054	888,501	58,7621	272,4313
				37,4125	175,0431
18460,000	295876,391	4545380,386	888,155	65,9583	271,523
				56,7235	155,1818
18480,000	295895,318	4545386,850	887,808	69,3616	270,4137
				76,4114	135,3419
18500,000	295914,180	4545393,500	887,462	71,2381	269,0309
				96,2509	115,5273
18520,000	295932,975	4545400,335	887,116	72,3652	267,2058
				116,163	95,756

18700,000	296099,203	4545469,296	883,987	83,6385	321,9837
				85,713	155,1299
18720,000	296117,518	4545477,331	883,619	81,7582	328,1938
				105,5148	141,2878
18740,000	296135,833	4545485,366	883,241	80,4731	335,6629
				125,3796	129,0703
18760,000	296154,176	4545493,336	882,861	79,5709	344,5238
				145,2878	118,915

Base E8
Coord.X 296245.175
Coord.Y 4545416.785

Base E9
Coord.X 296461.040
Coord.Y 4545486.757

Base E7
Coord.X 296016.305
Coord.Y 4545447.509

Base E8
Coord.X 296245.175
Coord.Y 4545416.785

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
18540,000	295951,703	4545407,354	886,770	264,5956	297,9549
				76,0645	293,6233
18560,000	295970,361	4545414,557	886,424	260,3902	299,4839
				56,5392	274,823
18580,000	295988,947	4545421,943	886,077	252,1545	301,2814
				37,4443	256,2797
18600,000	296007,460	4545429,511	885,731	229,0796	303,4049
				20,054	238,0555
18620,000	296025,897	4545437,261	885,385	152,1043	305,9274
				14,0373	220,2315
18640,000	296044,258	4545445,191	885,039	105,2676	308,9413
				28,0489	202,9151
18660,000	296062,573	4545453,225	884,692	92,1742	312,5398
				46,6199	186,2025
18680,000	296080,888	4545461,261	884,345	86,6438	316,8311
				66,0308	170,2009

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
18780,000	296172,634	4545501,035	882,481	354,7456	303,5894
				111,1764	288,8646
18800,000	296191,291	4545508,238	882,102	366,104	305,5276
				106,1462	270,7685
18820,000	296210,213	4545514,710	881,722	378,1692	307,5666
				103,9794	252,6088
18840,000	296229,438	4545520,216	881,342	390,3875	309,6718
				104,6216	234,3009
18860,000	296248,943	4545524,624	880,963	2,2238	311,8282
				107,9045	215,8108
18880,000	296268,651	4545528,021	880,583	13,2414	314,0818
				113,6861	197,1935
18900,000	296288,479	4545530,631	880,203	23,1395	316,5414
				121,8036	178,5545
18920,000	296308,372	4545532,690	879,824	31,7794	319,3674
				132,0146	160,0155
18940,000	296328,296	4545534,437	879,444	39,1567	322,7985
				144,0525	141,7362
18960,000	296348,227	4545536,099	879,064	45,3524	327,1895
				157,6562	123,947
18980,000	296368,158	4545537,760	878,685	50,5239	333,0122
				172,5098	106,9413



Base E9
Coord.X 296461.040
Coord.Y 4545484.757
Base E10
Coord.X 296872.768
Coord.Y 4545730.131

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
19000,000	296388,088	4545539,421	878,305	340,9386 91,1594	276,1304 520,8646
19020,000	296408,019	4545541,081	877,925	351,9229 77,3538	275,4004 501,7431
19040,000	296427,950	4545542,742	877,546	366,9872 66,7623	274,6126 482,6928
19060,000	296447,881	4545544,403	877,166	386,1767 61,0802	273,7602 463,7224
19080,000	296467,812	4545546,064	876,786	7,004 61,6796	272,8353 444,8423
19100,000	296487,743	4545547,726	876,407	25,5334 68,3971	271,8289 426,0638
19120,000	296507,666	4545549,483	876,027	39,7412 79,7712	270,7438 407,3669
19140,000	296527,557	4545551,564	875,647	49,8611 94,2745	269,6041 388,6788
19160,000	296547,380	4545554,208	875,268	56,8745 110,8066	268,4405 369,9191
19180,000	296567,080	4545557,651	874,888	61,6605 128,6778	267,2902 351,0106
19200,000	296586,573	4545562,114	874,508	64,8417 147,4534	266,1978 331,8901
19220,000	296605,781	4545567,677	874,129	66,8804 166,8099	265,1937 312,5486
19240,000	296624,678	4545574,220	873,749	68,1488 186,4969	264,2737 293,0345

Base E10
Coord.X 296872.768
Coord.Y 4545730.171
Base E11
Coord.X 297376.015
Coord.Y 4545781.192

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
19260,000	296643,301	4545581,510	873,370	263,4029 273,4138	283,0619 759,4355
19280,000	296661,717	4545589,311	873,002	262,5335 253,7403	283,293 739,6218
19300,000	296680,008	4545597,399	872,655	261,6013 234,0613	283,5641 719,8648
19320,000	296698,266	4545605,564	872,330	260,5228 214,4247	283,8581 700,1353
19340,000	296716,523	4545613,730	872,016	259,2277 194,8618	284,1692 680,4217
19360,000	296734,780	4545621,896	871,702	257,6443 175,3975	284,4988 660,7254
19380,000	296753,037	4545630,062	871,389	255,6672 156,0688	284,8487 641,0479
19400,000	296771,294	4545638,228	871,075	253,1345 136,9329	285,2208 621,3909
19420,000	296789,551	4545646,393	870,761	249,7864 118,0838	285,6171 601,7566
19440,000	296807,808	4545654,559	870,448	245,1854 99,6843	286,0402 582,1472
19460,000	296826,065	4545662,725	870,134	238,5566 82,0374	286,4927 562,5653
19480,000	296844,322	4545670,891	869,820	228,4829 65,7518	286,9779 543,0138
19500,000	296862,579	4545679,057	869,507	212,5264 52,1198	287,4993 523,4963
19520,000	296880,836	4545687,223	869,193	188,1789 43,6994	288,0609 504,0165
19540,000	296899,093	4545695,389	868,880	158,7556 43,6212	288,6678 484,5792
19560,000	296917,350	4545703,554	868,566	134,2648 51,9228	289,3252 465,1896
19580,000	296935,607	4545711,720	868,252	118,1814 65,4916	290,0398 445,8538
19600,000	296953,881	4545719,848	867,939	108,0591 81,7674	290,813 426,5679

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	20300,000	297642,468	4545830,353	858,472	307,3198 96,5193	262,5173 560,5107		20640,000	297949,262	4545976,608	857,047	248,8844 229,3923	256,778 751,9454
	20320,000	297661,220	4545837,302	858,391	314,6126 79,2072	261,9718 541,0772		20660,000	297967,159	4545985,535	856,959	246,8669 210,6448	256,4049 732,424
	20340,000	297679,662	4545845,039	858,309	326,33 64,0922	261,4865 521,4925		20680,000	297984,870	4545994,825	856,872	244,583 191,992	256,0471 712,8413
	20360,000	297697,856	4545853,343	858,228	344,5221 52,9159	261,0404 501,817		20700,000	298002,239	4546004,736	856,785	242,0508 173,3563	255,733 693,1458
	20380,000	297715,884	4545862,001	858,147	369,1794 48,2683	260,6085 482,0974		20720,000	298019,090	4546015,505	856,698	239,2923 154,6596	255,4941 673,3135
	20400,000	297733,842	4545870,806	858,066	394,4442 51,7227	260,1619 462,3736		20740,000	298035,300	4546027,215	856,611	236,2729 135,8814	255,351 653,3719
	20420,000	297751,794	4545879,623	857,984	13,9553 61,822	259,6774 442,6722		20760,000	298050,818	4546039,828	856,524	232,8653 117,0576	255,3131 633,3782
	20440,000	297769,745	4545888,439	857,903	27,129 75,9518	259,1478 422,9988		20780,000	298065,688	4546053,200	856,437	228,7616 98,292	255,3763 613,3893
	20460,000	297787,697	4545897,256	857,822	35,9197 92,2788	258,5666 403,3576		20800,000	298080,079	4546067,088	856,350	223,2646 79,8117	255,5194 593,4359
	20480,000	297805,649	4545906,073	857,740	41,9889 109,8276	257,926 383,7534		20820,000	298094,185	4546081,266	856,262	214,9226 62,0616	255,7171 573,5183
	20500,000	297823,601	4545914,889	857,655	46,3579 128,0969	257,2164 364,1922		20840,000	298108,209	4546095,525	856,175	200,54 46,1063	255,9425 553,6181
	20520,000	297841,553	4545923,706	857,569	49,6249 146,818	256,4265 344,6814		20860,000	298122,231	4546109,787	856,088	174,2512 34,6382	256,1849 533,7255
	20540,000	297859,504	4545932,522	857,482	52,148 165,838	255,5418 325,2301		20880,000	298136,253	4546124,048	856,001	136,0542 32,7692	256,4461 513,8412
	20560,000	297877,456	4545941,339	857,395	54,1495 185,0647	254,5449 305,8495		20900,000	298150,275	4546138,309	855,914	105,0623 41,8071	256,7284 493,9663
	20580,000	297895,408	4545950,156	857,308	55,773 204,4399	253,4134 286,5541		20920,000	298164,297	4546152,570	855,827	87,6524 56,7613	257,0342 474,102
	20600,000	297913,360	4545958,972	857,221	57,1147 223,9249	252,119 267,3622		20940,000	298178,319	4546166,831	855,740	77,9183 74,1341	257,3669 454,2495
								20960,000	298192,341	4546181,093	855,652	71,9644 92,5737	257,7299 434,4105
								20980,000	298206,363	4546195,354	855,565	68,0109 111,5522	258,1276 414,5871
								21000,000	298220,385	4546209,615	855,478	65,2145 130,8354	258,5653 394,7814
								21020,000	298234,407	4546223,876	855,391	63,1393 150,3061	259,0492 374,9964
								21040,000	298248,429	4546238,138	855,304	61,5414 169,8998	259,5869 355,2354
								21060,000	298262,451	4546252,399	855,217	60,2746 189,5784	260,188 335,5028
Base	E13												
Coord.X	298108.600												
Coord.Y	4546141.630												
Base	E13												
Coord.X	298108.600												
Coord.Y	4546141.630												
	P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2							
	20620,000	297931,311	4545967,789	857,134	250,6251 248,298	257,1418 771,4659							



Base Coord.X Coord.Y Base Coord.X Coord.Y	E14 298534.460 4546448.800 E15 298629.178 4546658.976	21080,000	298276,473	4546266,660	855,130	59,2463	260,8641									57,0165	208,3627
						209,3179	315,8038		21420,000	298514,848	4546509,101	853,649	379,9818	241,4862			
		21100,000	298290,495	4546280,921	855,043	58,3955	261,6301						63,4098	188,5044			
						229,1026	296,1452		21440,000	298528,870	4546523,362	853,561	395,2362	240,5431			
													74,7712	168,6797			
									21460,000	298542,895	4546537,621	853,474	6,0275	239,3475			
													89,2203	148,9024			
									21480,000	298557,000	4546551,799	853,384	13,7154	237,7314			
													105,4368	129,2149			
									21500,000	298571,348	4546565,732	853,281	19,4543	235,3411			
											122,6122	109,7214					
		P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2	Base Coord.X Coord.Y Base Coord.X Coord.Y	E15 298629.178 4546658.976 E16 298917.730 4546739.452								
21120,000	298304,517	4546295,182	854,955	262,5048	246,3852												
				276,5356	487,5964												
21140,000	298318,539	4546309,444	854,868	263,5129	246,2537												
				256,9861	467,6207												
21160,000	298332,562	4546323,705	854,781	264,6865	246,1104												
				237,5116	447,6472												
21180,000	298346,584	4546337,966	854,694	266,0693	245,9538												
				218,1323	427,6762												
21200,000	298360,606	4546352,227	854,607	267,7208	245,7818												
				198,8759	407,7081												
21220,000	298374,628	4546366,489	854,520	269,7246	245,5921												
				179,7819	387,7432												
21240,000	298388,650	4546380,750	854,433	272,2015	245,3818												
				160,9083	367,7821												
21260,000	298402,672	4546395,011	854,346	275,3303	245,1474												
				142,3425	347,8255												
21280,000	298416,694	4546409,272	854,258	279,3843	244,8844												
				124,2229	327,8742												
21300,000	298430,716	4546423,533	854,171	284,7914	244,5874												
				106,7766	307,9293												
21320,000	298444,738	4546437,795	854,084	292,23	244,2492												
				90,3946	287,9919												
21340,000	298458,760	4546452,056	853,997	302,7364	243,8607												
				75,7701	268,0639												
21360,000	298472,782	4546466,317	853,910	317,6167	243,4099												
				64,1173	248,1475												
21380,000	298486,804	4546480,578	853,823	337,4405	242,8804												
				57,2796	228,2457												
21400,000	298500,826	4546494,840	853,736	359,8335	242,2498												

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22300,000	299282,639	4546913,535	847,543	47,6473	102,488	75,000	296705,823	4545693,977	873,407	160,5676	286,4084
				90,6087	88,3614					33,5212	170,8237
22320,000	299302,632	4546912,999	847,184	56,7905	102,3438	100,000	296691,309	4545714,333	874,095	160,5695	294,4574
				104,9009	108,36					8,5212	182,1491
22338,443	299321,064	4546912,383	846,854	63,223	102,3119	108,521	296686,362	4545721,271	874,330	160,5692	296,9627
				119,471	126,8025					0,0004	186,6187

EJE CAMINO 1

Base E8
Coord.X 296245.175
Coord.Y 4545416.785

Base E7
Coord.X 296016.305
Coord.Y 4545447.509

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
0,000	296209,262	4545510,039	881,477	376,5977	80,0493
				99,9304	202,8361
25,000	296217,193	4545486,330	882,462	375,6468	87,8472
				74,9639	204,6045
32,757	296219,653	4545478,974	882,767	375,2083	90,2267
				67,2225	205,7684

EJE CAMINO 2

Base E22
Coord.X 296686.362
Coord.Y 4545721.271

Base E10
Coord.X 29682.768
Coord.Y 4545730.171

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
0,000	296749,364	4545632,911	871,341	160,5671	257,5074
				108,5212	157,1241
25,000	296734,851	4545653,266	872,030	160,5672	267,617
				83,5212	157,91
50,000	296720,337	4545673,622	872,718	160,5673	277,3845
				58,5212	162,5827

EJE CAMINO 3

Base E23
Coord.X 296886.051
Coord.Y 4545441.340

Base E10
Coord.X 29682.768
Coord.Y 4545730.171

P.K.	Coord. X	Coord. Y	Coord. Z	Az/Dist 1	Az/Dist 2
0,000	296754,169	4545626,077	871,341	0,5303	254,1407
				226,9814	157,8016
25,000	296768,695	4545605,730	870,632	0,5303	244,3407
				201,9814	162,2249
50,000	296783,220	4545585,383	869,924	0,5303	235,2619
				176,9814	170,2425
75,000	296797,746	4545565,035	869,215	0,5303	227,1473
				151,9814	181,3783
100,000	296812,271	4545544,688	868,507	0,5303	220,0712
				126,9814	195,0991
125,000	296826,797	4545524,341	867,798	0,5303	213,9889
				101,9814	210,9011
150,000	296841,323	4545503,994	867,090	0,5303	208,7945
				76,9814	228,3524
175,000	296855,848	4545483,647	866,381	0,5302	204,3624
				51,9814	247,1041
200,000	296870,374	4545463,300	865,673	0,5301	200,5711
				26,9814	266,882
225,000	296884,900	4545442,953	864,964	0,5277	197,3126
				1,9814	287,4745
226,981	296886,051	4545441,340	864,908	0,5273	197,0744
				0,0003	289,1361





ANEXO I: Fotografías de las Bases del Levantamiento y consiguiente Replanteo

FOTOGRAFÍAS DE LAS BASES DEL LEVANTAMIENTO Y POSTERIOR REPLANTEO



Base: E1

Coord.X	Coord.Y	Coord.Z
298574,080	4547612,881	852,000



Base: E3

Coord.X	Coord.Y	Coord.Z
296661,260	4546389,430	873,663



Base: E5

Coord.X	Coord.Y	Coord.Z
295612,831	4545313,980	887,500



Base: E2

Coord.X	Coord.Y	Coord.Z
297400,060	4547588,920	859,097



Base: E4

Coord.X	Coord.Y	Coord.Z
295987,618	4545705,449	887,180



Base: E6

Coord.X	Coord.Y	Coord.Z
295827,586	4545351,479	887,013



Base: E7

Coord.X	Coord.Y	Coord.Z
296016,305	4545447,509	884,746



Base: E9

Coord.X	Coord.Y	Coord.Z
296461,040	4545484,757	881,411



Base: E11

Coord.X	Coord.Y	Coord.Z
297376,015	4545781,192	869,980



Base: E8

Coord.X	Coord.Y	Coord.Z
296245,175	4545416,785	883,949



Base: E10

Coord.X	Coord.Y	Coord.Z
296872,768	4545730,171	870,222



Base: E12

Coord.X	Coord.Y	Coord.Z
297376,015	4545781,192	869,980



Base: E13

Coord.X	Coord.Y	Coord.Z
298108,600	4546141,630	854,154



Base: E15

Coord.X	Coord.Y	Coord.Z
298629,178	4546658,976	852,773



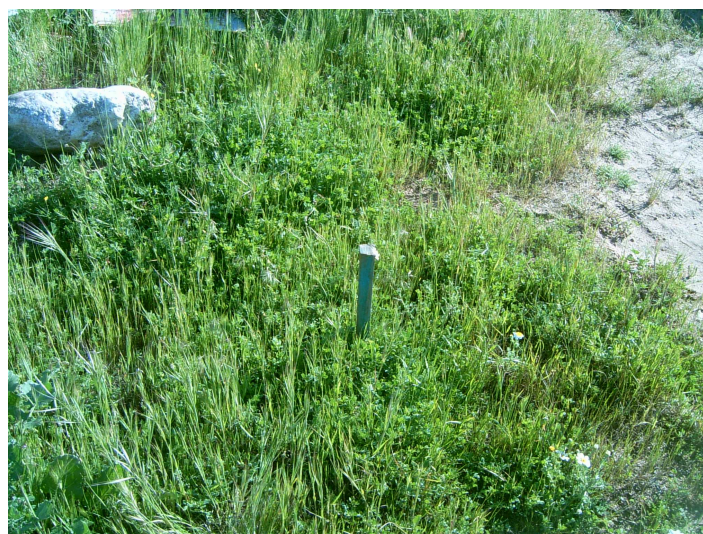
Base: E17

Coord.X	Coord.Y	Coord.Z
299005,586	4546829,689	849,825



Base: E14

Coord.X	Coord.Y	Coord.Z
298534,460	4546448,800	852,362



Base: E16

Coord.X	Coord.Y	Coord.Z
298917,730	4546739,452	849,825



Base: E18

Coord.X	Coord.Y	Coord.Z
299220,980	4546847,141	847,177



Base: E19

Coord.X	Coord.Y	Coord.Z
299194,345	4546916,987	849,271



Base: E21

Coord.X	Coord.Y	Coord.Z
299304,810	4547618,200	857,063



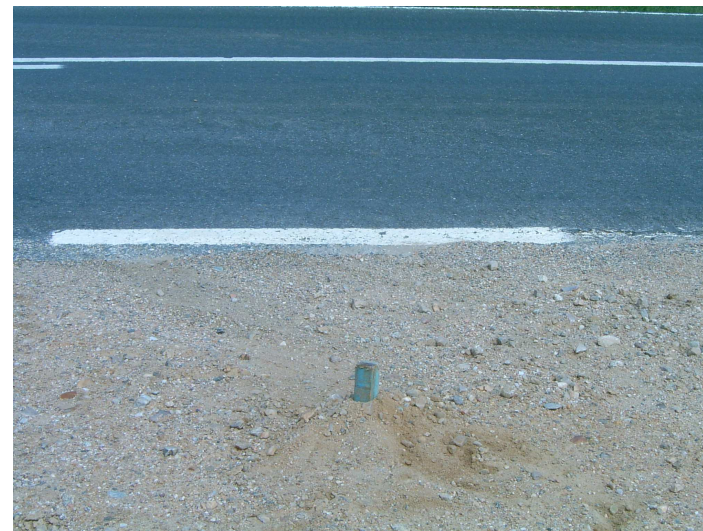
Base: E23

Coord.X	Coord.Y	Coord.Z
296886,051	4545441,340	864,908



Base: E20

Coord.X	Coord.Y	Coord.Z
299160,971	4547136,639	852,413



Base: E22

Coord.X	Coord.Y	Coord.Z
296686,362	4545721,271	874,330