

**Final Report
Magnetometer Survey
Barataria Basin Landbridge, BA-27 and BA-36
Bayou Perot and Bayou Rigolets, LA**

Prepared by:



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Prepared for:

**Louisiana Department of Natural Resources
Coastal Restoration Division
Baton Rouge, Louisiana**



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Introduction

The State of Louisiana Department of Natural Resources, in association with other federal government agencies, is planning to install a series of low dikes or concrete walls around the east edge of Bayou Rigolets and along the west edge of Bayou Perot, located in south central Louisiana. The Bayou Perot project will extend along the north side of Little Lake, located to the south of Bayou Perot. The area is known to have a large number of pipelines and related oil field structures. Mapping of these pipelines prior to conducting any dredging or additional construction was required.

Schedule

The Alpine equipment and personnel were mobilized to New Orleans on April 28, 2003. The Coastal Engineering team and the Alpine geophysicist and equipment drove to Lafitte, Louisiana on April 29, and spent the afternoon of that day on the survey vessel with the representative of the SJB group, learning the locations of the various parts of the project. The initial mobilization of the survey equipment on the survey vessel was conducted later that afternoon. Survey operations commenced on May 1 and were completed on May 7, including one day spent at the field office reviewing data and discussing the project with Mr. Dale Garber, an engineer with the US Department of Agriculture, Natural Resources Conservation Service.

Methods

In order to map the locations of the various pipelines in the survey areas, Alpine Ocean Seismic Survey, Inc. (Alpine) conducted a survey of magnetic anomalies in the areas of interest. The survey was conducted using a Marine Magnetics SeaSpy Marine magnetometer, interfaced to two computers. One computer was used to monitor the magnetic field along the survey lines, and the second computer, which was also being used to control the navigation of the survey vessel, was used to continuously store the magnetic data. The sensor was set to take a reading at one-second intervals along the survey lines.

The survey vessel and navigation control were supplied by Coastal Engineering Consultants, Inc. and were operated by their personnel. A DGPS navigation system was interfaced to Hypack software in the computer. Preplots of the proposed survey lines were pre-recorded and used to guide the survey vessel. The magnetometer sensor was floated on the water surface and towed at a fixed distance of 70 feet behind the survey vessel. The vessel was operated at a speed of between 3 and 5 knots.



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During the field survey, an Alpine geophysicist monitored the magnetometer data continuously, and noted the location of the major anomalies.

Magnetic Field Strength Calibration

In order to make an approximate calibration of the magnetic variation that might be expected from a known steel object, the magnetometer sensor was placed on the ground in an open field. Once the background level was stable, a section of one inch ID steel pipe ten feet long was carried past the sensor. The pipe was oriented parallel to the ground but across the axis of the sensor and carried at about 8 feet above the sensor. At that distance, the pipe created an anomaly of approximately 400 gammas. The same pipe, at a distance of 20 feet, gave an anomaly of about 60 gammas. A $\frac{3}{4}$ inch ID steel pipe, also ten feet long, at the 7-foot distance, gave an anomaly of between 250 and 300 gammas. A section of water pump suction hose with a steel basket on the end, carried past the sensor at a distance of about 10 feet, gave an anomaly of about 90 gammas.

The width or shape of each anomaly was a function of the speed that the object was walked past the tow fish, and the orientation of the object relative to the alignment of the tow fish. When the pipe was carried horizontally, but aligned perpendicularly to the tow fish, the anomaly was observed to be a steep di-pole. When the pipe was parallel to the orientation of the tow fish, the anomaly was more of a monopole. The suction pump basket gave a monopole shaped anomaly.

An automobile moving toward and then away from the tow fish at a distance of between 45 and 50 feet gave a broad monopole shaped anomaly with a total field variation of approximately 50 gammas from background.

Initial field trials were conducted on the first day by towing the magnetometer at varying distances behind the survey vessel until the magnetic field of the survey vessel motors no longer caused a change in the background during turns of the vessel. In this way, the layback of 70 feet was found to be a distance where no changes in the signal strength occurred during turns.

Data Interpretation

The magnetic data were reviewed using the Hypack single beam editor software, that allows the viewing of the magnetic field variation along each separate survey line. The location of each anomaly, the magnetic field variation and the width of the anomaly can be selected and recorded using this software. The data are then entered into a table (See Table 1) for plotting on the maps. Given that the purpose of the project was to determine the location of oil field pipelines, those anomalies of less than about 30 gammas were not plotted.



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Data Presentation

Maps 1 and 2 show the survey lines in the two survey areas, at scale of 1=inch equals 5280 feet. The anomalies are shown on the plots. The data have also been plotted on a series of 11x17 inch maps at horizontal scale of 1"=500 feet.

The major pipelines show as sets of targets in a line across the survey area. Where individual targets of lower amplitude are present on only one line, and are not part of a linear set of targets, the source of the individual target is interpreted as being debris or perhaps a crab trap, as the area was observed to have numerous crab trap buoys.



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Magnetic Signature Types

DP = Dipole; This type of magnetic anomaly looks like a sine wave, starting with either a positive or negative pulse relative to the flat background, and then swinging rapidly in the opposite polarity when the source of the anomaly is crossed. Generally a dipole anomaly indicates the presence of a linear target, such as a pipeline.

A monopole anomaly is a spike, either increasing in gammas from the background (M+) or decreasing from background (M-). Both of these types are caused by isolated magnetic sources, such as a crab trap, or other more significant sized debris. The amount of deviation from background and the width of the anomaly are functions of the magnetic strength of the source and the distance of the source from the magnetometer tow fish.

Magnetic Anomalies
Bayou Perot and Bayou Rigolets, Louisiana
Job #1441

Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (y)	Width (ft)
1	011-1334	794	3654773	396700	3654735	396703	DP	67	38
2	011-1334	630	3663140	396726	3663104	396725	DP	156	36
3	011-1334	662-667	3661360	396720	3661111	396721	M+	965	249
4	012-1413	858-859	3650472	395714	3650555	395713	M-	23	83
5	012-1457	1049-1051	3650473	395708	3650577	395691	M-	534	105
6	012-1457	1158	3655894	395709	3655938	395710	DP	76	44
7	012-1457	1182-1183	3657127	395710	3657162	395706	M+	55	35
8	012-1457	1183-1188	3657162	395706	3657429	395674	DPs	87	269
9	012-1457	1247-1251	3660335	395709	3660564	395714	DPs	1108	229
10	012-1457	1265-1266	3661270	395709	3661320	395708	DP	99	50
11	001-1534	1351	3663919	397776	3663890	397774	DP	137	29
12	001-1534	1358	3663587	397730	3663568	397727	M-	50	19
13	001-1534	1389-1391	3661991	397714	3661904	397711	M-	2006	87
14	002-1550	1452	3659752	398666	3659769	398667	M+	105	17
15	002-1550	1506-1509	3662450	398715	3662572	398714	M+	4550	122
16	002-1550	1517-1518	3662990	398724	3663017	398725	M+	64	27
17	002-1550	1546-1547	3664421	398742	3664472	398754	DP	236	52
18	002-1550	1547	3664488	398763	3664503	398760	M+	136	15
19	002-1550	1563-1564	3665263	398662	3665289	398662	M+	225	26
20	002-1550	1577	3665953	398760	3665986	398757	M-	248	33
21	003-1610	1667	3663364	397707	3663204	397716	DP	2063	160
22	004-1626	1798	3663009	400697	3663058	400695	M-	299	49
23	004-1626	1815	3663843	400713	3663998	400713	DP	1415	155
24	004-1626	1853	3665752	400702	3665790	400701	DP	74	38
25	005-1700	1965	3664808	400703	3664770	400706	M-	73	38
26	005-1700	1966	3664701	400706	3664647	400703	M-	33	54
27	006-1717	2140	3665209	402706	3665306	402703	M+	3063	97
28	006-1717	2201	3668257	402731	3668273	402732	DP	274	16
29	007-1734	2254	3666225	403723	3665940	403719	DP	553	285
30	007-1734	2265	3665597	403714	3665559	403721	M-	74	39
31	008-1747	2419	3667121	404722	3667368	404722	DPs	215	247
32	008-1747	2446	3668455	404716	3668571	404719	DPs	551	116
33	012-1046	2544-2548	3660663	395717	3660388	395716	DPs	1221	275
34	012-1046	2574	3659121	395709	3659019	395710	DPs	95	102
35	012-1046	2603	3657644	395712	3657606	395713	DP	87	38
36	012-1046	2606	3657530	395713	3657492	395713	M-	72	38
37	012-1046	2609	3657368	395714	3657197	395715	DPs	172	171
38	012-1046	2613	3657197	395715	3657178	395715	M+	111	19
39	012-1046	2744	3650629	395712	3650533	395718	M-	1073	96
40	013-1117	2774	3652073	394711	3652181	394711	M+	1185	108
41	013-1117	2781	3652450	394700	3652816	394718	DPs	412	366
42	013-1117	2830	3654860	394724	3654930	394728	M-	119	70
43	013-1117	2835	3655133	394725	3655173	394722	M-	150	40
44	013-1136	2950	3659733	394705	3659889	394714	DPs	1024	156
45	013-1136	2965	3660481	394704	3660499	394714	M+	157	21
46	013-1136	2996	3662014	394706	3662050	394706	M+	240	36
47	014-1301	3069	3652195	393719	3652215	393716	M-	176	20
48	014-1310	3119	3652970	393711	3653149	393706	M-	61	179
49	014-1310	3127	3653361	393703	3653540	393703	DP	578	179
50	014-1310	3152	3654566	393635	3654612	393646	M-	459	47

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Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (y)	Width (ft)
51	014-1310	3154	3654674	393659	3654765	393677	M-	175	93
52	014-1310	3160	3654977	393689	3654995	393695	DP	614	19
53	014-1412	3300	3658957	393846	3659006	393752	DPs	1298	106
54	014-1412	3354	3661558	393689	3661597	393681	M-	190	40
55	010-1501	3527	3657206	397714	3656945	397715	M-	46	261
56	010-1512	3691	3656150	397601	3656221	397601	DP	24	71
57	010-1522	3740	3658081	397801	3658008	397783	M+	428	75
58	009-1544	4035	3654110	398803	3654090	398804	M+	54	20
59	009-1544	4040	3653873	398835	3653825	398836	DP	117	48
60	008-0859	35	3667422	404752	3667250	404759	DP	1572	172
61	008-0912	181	3666945	404615	3667191	404617	DPs	1746	246
62	008-0932	222	3668801	404593	3668750	404598	M-	345	51
63	008-0932	224	3668720	404602	3668591	404616	DPs	6787	130
64	008-0932	254	3667204	404633	3667031	404642	DPs	1026	173
65	008-1008	275	3668589	404812	3668589	404814	M+	2546	2
66	008-1008	277	3668497	404815	3668388	404815	DPs	2420	109
67	008-1008	296	3667534	404824	3667330	404811	DPs	1415	204
68	007-1020	402	3664057	403800	3664086	403803	M+	69	29
69	007-1020	440	3665948	403805	3666351	403824	DP	1375	403
70	007-1032	536	3666303	403602	3666265	403609	DP	84	39
71	007-1032	542	3666008	403631	3665859	403631	DP	1971	149
72	007-1032	602	3663037	403622	3663003	403620	DP	112	34
73	006-1045	679	3665196	402830	3665595	402836	DP	1144	399
74	006-1058	794	3665467	402629	3665154	402600	DP	2803	314
75	005-1112	922	3663645	401823	3663714	401829	DP	106	69
76	005-1112	941	3664554	401775	3664869	401818	DPs	867	318
77	005-1124	1081	3664635	401592	3664443	401630	M+	1432	196
78	004-1136	1163	3663892	400835	3663981	400833	M+	82	89
79	004-1136	1165	3664000	400831	3664147	400813	M+	564	148
80	004-1136	1186	3665038	400815	3665108	400818	M+	230	70
81	004-1136	1189	3665187	400821	3665228	400823	DP	79	41
82	004-1146	1235	3667415	400656	3667394	400647	M-	586	23
83	004-1146	1237	3667313	400627	3667296	400628	M-	138	17
84	004-1146	1237	3667288	400629	3667270	400631	M-	69	18
85	004-1146	1302	3664080	400667	3663851	400663	DP	1232	229
86	003-1222	1388	3663660	399823	3663632	399822	M+	79	28
87	003-1222	1391	3663521	399814	3663483	399811	DP	95	38
88	003-1222	1393	3663437	399809	3663232	399814	DP	2118	205
89	003-1235	1516	3662981	399641	3663150	399626	DP	102	170
90	003-1235	1519	3663150	399626	3663280	399617	M+	862	130
91	003-1235	1528	3663595	399647	3663685	399643	M+	237	90
92	002-1246	1585	3664598	398847	3664569	398844	M+	48	29
93	002-1246	1588	3664433	398833	3664397	398829	DP	167	36
94	002-1246	1604	3663643	398826	3663625	398828	M+	48	18
95	002-1246	1605	3663608	398830	3663572	398836	DP	120	36
96	002-1246	1622	3662736	398770	3662446	398803	M-	3820	292
97	002-1246	1649	3661430	398819	3661393	398823	DP	110	37
98	002-1246	1659	3660929	398800	3660873	398792	DP	151	57
99	002-1256	1720	3662338	398609	3662690	398645	DP	1365	354
100	002-1256	1765	3664565	398582	3664398	398566	DP	66	168

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Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (y)	Width (ft)
101	002-1256	1774	3665028	398553	3665057	398560	M+	74	30
102	001-1312	1841	3662147	397826	3661835	397794	DPs	626	314
103	001A1323	1940	3661695	397642	3661981	397661	DPs	2390	287
104	001A1323	1950	3662223	397638	3662251	397628	DP	139	30
105	001A1323	1978	3663576	397622	3663614	397618	DP	101	38
106	011-1338	2072	3661737	396817	3661692	396821	DP	141	45
107	011-1338	2078	3661434	396856	3661188	396860	M+	4633	246
108	012-1405	2306	3653512	395832	3653623	395820	DP	542	112
109	012-1405	2377	3657073	395637	3657266	395641	M+	359	193
110	012-1405	2411	3658710	395629	3658790	395646	M+	242	82
111	012-1405	2442	3660251	395645	3660705	395584	DPs	412	458
112	012-1405	2502	3663229	395622	3663306	395630	M+	232	77
113	011-1433	2586	3661310	396628	3660861	396616	M-	440	449
114	011-1433	2606	3660295	396606	3660218	396615	M-	260	78
115	011-1433	2755	3652916	396599	3652810	396602	M-	893	106
116	012-1509	2986	3657085	395763	3657442	395794	M+	127	358
117	012-1509	3015	3658546	395818	3658605	395815	DP	73	59
118	012-1509	3025	3659024	395710	3659094	395716	M+	735	70
119	012-1509	3053	3660377	395827	3660728	395829	DPs	1539	351
120	012-1509	3076	3661563	395831	3661642	395832	DP	103	79
121	013-1531	3167	3660009	394838	3659798	394797	DP	1200	215
122	013-1539	3205	3659626	394598	3659828	394579	DPs	768	203
123	014-1549	3324	3659285	393819	3658965	393824	M-	913	320
124	014-1557	3344	3659032	393664	3658868	393743	DP	2873	182
125	013-1615	3376	3652186	394798	3652571	394829	DP	519	386
126	013-1615	3428	3654773	394806	3654825	394811	M+	164	52
127	013-1626	3492	3657019	394672	3656937	394668	M+	66	82
128	013-1626	3543	3654488	394609	3654421	394608	DP	319	67
129	013-1626	3553	3653989	394596	3653756	394605	DPs	2284	233
130	013-1626	3571	3653066	394678	3652787	394649	DP	450	281
131	001-1200	47	3647978	407172	3647986	407140	DP	224	33
132	001-1200	96	3649379	405307	3649520	405063	DPs	4173	282
133	001-1200	187	3652126	401710	3652142	401688	DP	57	27
134	001-1200	188	3652159	401664	3652183	401630	DP	74	42
135	001-1200	215	3652771	400498	3652739	400368	M-	128	134
136	001-1200	319	3651942	396405	3651901	396400	DP	103	41
137	001-1200	327	3651532	396423	3651500	396424	M-	124	32
138	001-1200	349	3650579	396006	3650483	395891	M-	1384	150
139	001-1200	359	3650304	395604	3650292	395513	M-	290	92
140	001-1200	369	3650297	395536	3650420	395545	DPs	604	123
141	001-1200	373	3650493	395525	3650675	395463	DP	204	192
142	001-1200	378	3650721	395429	3650784	395325	DP	119	122
143	001-1200	474	3651540	393288	3651582	393277	DP	150	43
144	001-1200	485	3652026	393295	3652123	393309	M+	1057	98
145	001-1200	487	3652123	393309	3652180	393267	DPs	2901	71
146	001-1200	493	3652286	393112	3652256	392996	DPs	3320	120
147	001-1200	504	3652379	392702	3652494	392667	M-	435	120
148	001-1200	526	3653268	392352	3653288	392308	DP	429	48
149	001-1331	607	3653439	391936	3653439	391858	DP	290	78
150	001-1331	611	3653414	391744	3653424	391635	M+	510	109

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151	001-1331	641	3652248	3911110	3651950	390972	M+	196	328
152	001-1331	663	3651258	390721	3651092	390674	M+	2703	173
153	001-1331	793	3648344	391704	3648301	391706	DP	189	43
154	001-1331	806	3647649	391721	3647584	391719	M-	73	65
155	001-1331	843	3646276	391655	3646298	391657	M-	72	22
156	001-1331	886	3644807	391712	3644781	391730	M+	186	32
157	001-1331	902	3644520	391346	3644527	391309	M-	93	38
158	001-1331	957	3642270	390532	3642221	390522	DPs	106	50
159	001-1331	971	3641626	391801	3641408	391721	M-	576	232
160	ACCESS1B	1039-1041	3648151	408214	3648055	408227	DP	1282	97
161	ACCESS2	1052-1054	3649349	405782	3649329	405869	DP	82	89
162	ACCESS2	1054-1058	3649354	405600	3649350	405774	DP	30	174
163	ACCESS3	1081	3649562	405137	3649452	405171	M+	1301	115
164	ACCESS3	1084-1085	3649430	405062	3649460	405002	DP	1059	67
165	ACCESS4	1109	3652066	401989	3652085	402002	M+	122	23
166	ACCESS4	1088	3652985	402510	3653005	402516	M-	49	21
167	ACCESS5	1121	3653845	398253	3653877	398242	M-	61	34
168	ACCESS6	1149	3652272	396288	3652252	396306	M-	37	27
169	ACCESS6	1150	3652252	396306	3652166	396384	M+	24	116
170	ACCESS7A	1194	3650984	395541	3650969	395542	M-	421	15
171	ACCESS7A	1202-1204	3650623	395664	3650534	395697	M-	1263	95
172	ACCESS7A	1204	3650518	395702	3650502	395707	M-	33	17
173	ACCESS7A	1205-1206	3650486	395711	3650470	395716	M-	133	17
174	ACCESS8	1220	3651388	394912	3651367	394937	M+	166	33
175	ACCESS9	1247-1248	3651950	393907	3651916	393879	DP	57	44
176	ACCESS9A	1270	3652316	393893	3652293	393875	M-	45	29
177	ACCESS9A	1288-1289	3651617	393338	3651582	393302	DP	122	50
178	ACCESS10	1313	3652875	392846	3652856	392822	M+	145	31
179	ACCESS10	1317	3652742	392694	3652715	392665	M-	3070	40
180	ACCESS10	1320	3652649	392589	3652634	392573	DP	163	22
181	ACCESS11	1326	3653327	391067	3653299	391111	M-	23	52
182	ACCESS12	1338	3649324	390873	3649326	390891	M-	56	18
183	ACCESS12	1355	3649453	391706	3649435	391879	M+	1330	174
184	ACCESS12	1362	3649432	392079	3649432	392086	M-	497	7
185	ACCESS12	1367	3649444	392340	3649448	392366	DP	109	26
186	ACCESS12	1368	3649450	392377	3649453	392394	M+	124	17
187	ACCESS12	1371-1373	3649467	392528	3649465	392625	DP	209	97
188	ACCESS12	1374	3649465	392637	3649463	392673	M-	715	36
189	ACCESS12	1374	3649463	392673	3649463	392692	M-	209	19
190	ACCESS12	1375-1376	3649464	392923	3649464	392754	M-	549	169
191	ACCESS12A	1380-1381	3649522	392965	3649524	392930	M-	96	35
192	ACCESS12A	1382-1385	3649524	392892	3649526	392714	DPs	1863	178
193	ACCESS12A	1395	3649528	392238	3649522	392205	DP	46	34
194	ACCESS12A	1420	3649452	391029	3649449	390992	DP	125	37
195	ACCESS13	1431	3643381	390224	3643336	390287	M-	43	77
196	ACCESS13	1435-1436	3643265	390415	3643256	390442	DP	32	28
197	ACCESS15	1442-1443	3641537	389887	3641578	389897	M-	374	42
198	ACCESS15	1449-1450	3641668	390168	3641671	390228	M-	847	60
199	ACCESS15A	1458-1460	3641583	391086	3641581	390982	DP	726	104
200	ACCESS15A	1461	3641581	390929	3641581	390898	DP	57	31

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Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (y)	Width (ft)
201	ACCESS15A	1462	3641580	390883	3641579	390838	M+	296	45
202	ACCESS15A	1463-1465	3641579	390838	3641573	390710	DP	1090	128
203	ACCESS15A	1465-1467	3641573	390710	3641578	390595	DP	992	115
204	ACCESS15A	1468	3641579	390584	3641582	390545	DP	210	39
205	ACCESS15A	1468-1469	3641582	390545	3641583	390503	M+	220	42
206	ACCESS15A	1470-1471	3641573	390439	3641565	390391	M-	97	49
207	ACCESS15A	1473-1474	3641566	390333	3641589	390246	DP	495	90
208	ACCESS15A	1476-1477	3641583	390179	3641575	390141	DP	419	39
209	ACCESS14	1489-1490	3642682	390190	3642698	390265	DP	55	77
210	ACCESS16	1505-1507	3642867	390249	3642963	390272	M-	128	99
211	ACCESS16	1507-1508	3642971	390273	3643059	390288	M+	308	89
212	ACCESS16	1509	3643059	390288	3643083	390290	M+	91	24
213	ACCESS16	1510	3643090	390291	3643145	390293	M-	193	55
214	ACCESS16	1511	3643162	390293	3643209	390297	DP	142	47
215	001A1019	1649-1650	3651436	392949	3651402	392910	DP	528	52
216	001A1019	1652-1655	3651339	392836	3651271	392757	M-	5614	104
217	001A1019	1657	3651200	392678	3651167	392636	M-	267	53
218	001A1019	1661-1663	3651056	392539	3650982	392504	M+	566	82
219	001A1019	1665-1666	3650898	392471	3650863	392458	M-	100	37
220	001A1019	1667-1668	3650763	392426	3650727	392416	DP	178	37
221	001A1019	1666-1671	3650808	392440	3650604	392369	DP	1404	216
222	001A1019	1671	3650588	392362	3650562	392351	M+	161	28
223	001A1019	1672	3650537	392341	3650502	392327	DP	385	38
224	001A1019	1674	3650431	392302	3650404	392291	M+	69	29
225	001A1019	1707	3649444	391172	3649433	391146	M+	69	28
226	001-1029	1731-1734	3649406	391727	3649458	391867	M+	402	149
227	001-1029	1734	3649464	391886	3649471	391905	M-	35	20
228	001-1029	1736	3649493	391950	3649510	391975	M+	27	30
229	001-1029	1740	3649652	392086	3649678	392099	DP	93	29
230	001-1029	1741-1742	3649706	392112	3649733	392125	DP	48	30
231	001-1029	1753-1754	3650239	392395	3650266	392412	M+	90	32
232	001-1029	1754-1756	3650266	392412	3650383	392477	M+	1530	134
233	001-1029	1763-1764	3650677	392547	3650730	392560	M+	602	55
234	001-1029	1766-1767	3650835	392593	3650866	392603	M-	1165	33
235	001-1029	1767-1768	3650898	392613	3650941	392626	M-	1531	45
236	001-1029	1776	3651219	392836	3651234	392860	M+	755	28
237	001-1029	1776-1777	3651239	392868	3651253	392891	M+	685	27
238	001-1029	1777-1779	3651262	392906	3651301	392973	DP	2240	78
239	001-1057	1904-1906	3649421	405093	3649463	405022	DP	5444	82
240	001-1057	1925-1926	3650075	404307	3650114	404263	M-	94	59
241	001-1057	1986	3651905	401918	3651893	401936	DP	27	22
242	001-1057	2011	3652495	400951	3652537	400870	M-	31	91
243	001-1057	2014-2015	3652579	400778	3652638	400684	M-	28	111
244	001-1057	2030	3652807	400098	3652816	400078	M-	55	22
245	001-1057	2111	3651873	396775	3651864	396746	M+	80	30
246	001-1057	2115	3651814	396580	3651822	396559	DP	1604	22
247	001-1057	2117	3651792	396510	3651773	396501	M+	339	21
248	001-1057	2142	3650616	396105	3650568	396078	M+	1984	55
249	001-1057	2155	3650249	395645	3650247	395630	M+	139	15
250	001-1057	2168-2170	3650244	395511	3650336	395504	DP	166	92

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251	001-1057	2170-2173	3650353	395500	3650496	395454	DP	343	150
252	001-1057	2173-2176	3650519	395446	3650606	395420	DP	4183	91
253	001-1057	2176	3650611	395419	3650631	395416	M+	399	20
254	001-1057	2218-2219	3650816	394024	3650810	393986	M+	228	38
255	001-1057	2219-2221	3650808	393975	3650770	393938	DP	2440	53
256	001-1057	2235-2236	3651258	393611	3651268	393593	DP	86	21
257	001-1057	2256	3652000	393232	3652027	393244	DPs	1334	30
258	001-1057	2257	3652027	393244	3652041	393259	M+	3169	21
259	001-1057	2257	3652043	393261	3652058	393270	DP	373	17
260	001-1057	2261-2262	3652218	393202	3652223	393144	DP	2956	58
261	001-1228	2289-2291	3652486	392486	3652775	392431	M-	2655	294
262	001-1228	2294-2295	3652899	392438	3652913	392438	M-	61	14
263	001-1228	2295	3652927	392438	3652967	392436	DPs	59	40
264	001-1228	2298	3653057	392429	3653124	392387	DPs	294	79
265	001-1228	2305-2307	3653253	392147	3653248	392069	M-	682	78
266	001-1228	2307-2309	3653244	392050	3653306	391970	M-	74	101
267	001-1228	2313-2315	3653353	391807	3653381	391690	DP	4230	120
268	001-1228	2342-2344	3652145	391215	3652226	391283	M+	62	106
269	001-1228	2344	3652145	391215	3652122	391197	M+	68	29
270	001-1228	2345	3652122	391197	3652097	391179	M+	169	31
271	001-1228	2348	3651987	391084	3651962	391066	M+	27	31
272	001-1228	2350	3651917	391039	3651903	391033	M-	43	15
273	001-1228	2365	3651239	390783	3651202	390775	M+	607	38
274	001-1228	2441	3648428	391768	3648375	391778	DPs	400	54
275	001-1228	2453	3647836	391757	3647795	391760	DP	848	41
276	001-1228	2455	3647707	391764	3647685	391764	M+	563	22
277	001-1228	2506	3645604	391704	3645576	391702	M-	26	28
278	001-1228	2519	3644988	391696	3644972	391704	M-	27	18
279	001-1228	2578	3643049	390468	3643021	390462	M-	115	29
280	001-1228	2605-2608	3641762	390600	3641682	390621	DP	4295	83
281	001-1316	2615	3641479	390475	3641589	390467	M+	271	110
282	001-1316	2617	3641643	390643	3641664	390450	M+	261	194
283	001-1316	2642	3642854	390344	3642862	390339	M-	156	9
284	001-1316	2642-2646	3642878	390330	3643038	390309	DP	660	161
285	001-1316	2756-2757	3648211	391580	3648266	391559	M-	1135	59
286	001-1316	2786	3649524	391090	3649541	391067	M+	98	29
287	001-1316	2822-2824	3651092	390418	3651208	390453	M+	517	121
288	001-1316	2829-2831	3651407	390551	3651518	390610	DP	23	126
289	001-1316	2930	3653561	391637	3653604	391806	DP	1804	174
290	001-1316	2946-2947	3653488	392300	3653462	392380	M+	65	84
291	001-1357	2960-2961	3653477	392214	3653460	392240	DP	24	31
292	001-1357	2961-2965	3653460	392240	3653369	392368	M+	242	157
293	001-1357	2967-2968	3653270	392494	3653246	392521	M+	179	36
294	001-1357	2968-2969	3653235	392531	3653198	392556	M-	73	45
295	001-1357	2971-2972	3653107	392579	3653068	392578	M+	120	39
296	001-1357	2973-2974	3653006	392575	3652975	392576	M-	1114	31
297	001-1357	2974	3652975	392576	3652959	392578	M-	47	16
298	001-1357	2977-2978	3652819	392619	3652765	392634	M-	33	56
299	001-1357	2978-2980	3652750	392637	3652683	392660	DP	1253	71
300	001-1357	2980-2983	3652683	392660	3652602	392728	DP	1101	106

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Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (y)	Width (ft)
301	001-1357	2983-2984	3652592	392741	3652552	392791	DP	148	64
302	001-1357	2984-2985	3652552	392791	3652526	392822	DP	92	40
303	001-1357	2986-2987	3652488	392865	3652450	392909	M-	108	58
304	001-1357	2988-2990	3652429	392934	3652364	393007	M-	48	98
305	001-1357	2995-2996	3652287	393268	3652279	393298	M+	254	31
306	001-1357	2996-2997	3652279	393298	3652272	393329	DP	62	32
307	001-1357	2997	3652270	393336	3652264	393358	M-	96	23
308	001-1357	3010	3651704	393564	3651681	393572	M+	27	24
309	001-1357	3044	3651072	394953	3651066	394978	DP	98	26
310	001-1357	3050-3053	3650931	395244	3650889	395348	DP	886	112
311	001-1357	3061-3062	3650682	395588	3650633	395592	M+	545	49
312	001-1357	3074-3077	3650448	395779	3650568	395870	DP	635	151
313	001-1357	3107-3108	3651941	396375	3651956	396404	M-	111	33
314	001-1357	3108-3109	3651968	396437	3651977	396470	M+	103	34
315	001-1357	3164-3165	3653217	398772	3653221	398791	M-	48	19
316	001-1357	3321-3324	3649501	405383	3649410	405518	DP	1177	163
317	001-1357	3388	3648270	408242	3648275	408273	M+	82	31
318	001-1357	3388-3389	3648275	408273	3648276	408315	DP	366	42
319	001-1546	3480-3483	3649577	391776	3649480	391872	M+	373	136
320	001-1546	3483	3649480	391872	3649472	391900	DP	33	29
321	001-1546	3486	3649461	392007	3649460	392016	DP	94	9
322	001-1546	3494-3495	3649486	392435	3649479	392479	DP	375	45
323	001-1546	3498-3499	3649472	392613	3649472	392690	M-	398	77
324	001-1546	3498-3499	3649472	392627	3649472	392662	DP	124	35
325	001-1546	3500-3502	3649473	392740	3649472	392840	DP	535	100
326	001-1546	3503-3504	3649470	392900	3649468	392961	DP	32	61
327	001-1546	3534-3535	3649451	394407	3649453	394492	M+	66	85
328	001-1546	3553	3649629	395307	3649644	395320	M+	38	20
329	001-1546	3568-3569	3650352	395475	3650418	395492	M+	1073	68
330	001-1556	3577-3578	3650730	395452	3650689	395441	DP	330	42
331	001-1556	3578	3650689	395441	3650656	395433	M-	2329	34
332	001-1556	3595-3596	3649836	395294	3649810	395288	DP	76	27
333	001-1556	3602	3649599	395085	3649596	395072	M-	57	13
334	001-1556	3603-3605	3649589	395044	3649573	394950	M+	3652	95
335	001-1556	3616-3617	3649538	394372	3649537	394324	DP	73	48
336	001-1556	3618-3619	3649537	394267	3649536	394218	M-	345	49
337	001-1556	3629-3631	3649553	393708	3649557	393619	M+	3393	89
338	001-1556	3634-3635	3649561	393496	3649563	393445	M+	292	51
339	001-1556	3638-3640	3649555	393294	3649549	393193	DP	426	101
340	001-1556	3641-3642	3649548	393123	3649548	393091	DP	40	32
341	001-1556	3642-3643	3649548	393091	3649548	393050	DP	109	41
342	001-1556	3643	3649549	393035	3649550	393013	DP	106	22
343	001-1556	3644-3645	3649556	392970	3649556	392923	DP	80	47
344	001-1556	3645-3646	3649555	392917	3649553	392868	M-	526	49
345	001-1556	3648-3649	3649554	392800	3649557	392740	M-	512	60
346	001-1556	3649	3649558	392735	3649560	392713	M-	95	22
347	001-1556	3651-3654	3649568	392642	3649580	392509	M+	1250	134
348	001-1556	3654	3649580	392503	3649582	392486	DP	40	17
349	003-1612	3671	3653080	392655	3653054	392644	DP	67	28
350	003-1612	3673-3674	3653016	392632	3652959	392615	DPs	335	59

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Target #	Line #	Event #	Easting ¹	Northing ¹	Easting ²	Northing ²	Type	Amplitude (γ)	Width (ft)
351	003-1612	3676-3677	3652876	392591	3652819	392579	M-	183	58
352	003-1612	3680	3652660	392552	3652643	392549	M+	1078	17
353	003-1612	3683-3684	3652499	392519	3652452	392510	DP	75	48
354	003-1612	3686-3687	3652347	392496	3652314	392491	M+	42	33
355	003-1612	3689-3690	3652214	392476	3652164	392468	DPs	32	51
356	003-1612	3690-3691	3652147	392465	3652113	392459	M+	418	35
357	003-1612	3702	3651603	392374	3651564	392373	DP	101	39
358	003-1612	3706	3651406	392372	3651386	392374	DP	59	20
359	003-1612	3713-3715	3651201	392158	3651189	392053	DP	6206	106
360	003-1612	3721	3651159	391758	3651157	391724	M-	83	34
361	003-1612	3723-3727	3651159	391647	3651181	391511	M+	1092	138
362	003-1612	3729-3735	3651313	391407	3651259	391670	DP	642	268
363	003-1612	3737	3651233	391770	3651227	391805	M+	128	36
364	003-1612	3741	3651235	391959	3651243	391995	M-	123	37
365	003-1612	3742-3744	3651249	392031	3651266	392112	DP	42	83
366	003-1612	3745-3746	3651275	392157	3651291	392215	M-	61	60
367	003-1619	3756-3757	3651742	392290	3651783	392290	M+	81	41
368	003-1619	3760-3764	3651912	392312	3652138	392370	M+	181	233
369	003-1619	3770-3771	3652422	392402	3652461	392407	M-	45	39
370	003-1619	3772-3773	3652495	392414	3652547	392426	M+	53	53
371	014-1636	3786-3788	3658977	393884	3659100	393875	DP	2372	123
372	014-1636	3833	3661293	393921	3661314	393920	M-	30	21