BORING E-125

DATE DRILLED: 8/5/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 181 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	0					4-inch thick Asphalt Concrete over 8-inch thick Portland Cement Concrete
	1				ML	SANDY SILT - stiff, very dark brown, fine to medium grained sand, with rocks
	5					
	10					
	15					
	20					
	25					
	30		0.3	■	CL-ML	SILTY CLAY - stiff, very dark brown, fine to medium grained sand
	35					
	40					

Field Tech: DDS
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.25a

BORING E-125 (Continued)

DATE DRILLED: 8/5/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 181 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
					CL-ML	SANDY SILTY CLAY - wet, very dark brown, fine to coarse grained sand
	45					
	50		0.0	■	CL-ML	SILTY CLAY - firm, greenish black, fine to medium grained sand, moist
	55		0.0	■	SM	SILTY SAND - wet, greenish black, fine to medium grained sand, rock
	60		0.0	■	ML	CLAYEY SILT - very stiff, very dark grayish green, with pockets of bluish gray sandy silt, fine to medium grained sand
	65		0.0	■	ML	CLAYEY SILT - very stiff, very dark grayish green, with pockets of bluish gray sandy silt, fine to medium grained sand
	70		0.0	■	ML	SANDY CLAYEY SILT (ml) - very dark grayish green, with bluish gray sandy silt, fine to medium grained sand
			0.0	■	ML	SANDY CLAYEY SILT - very dark grayish green, with bluish gray sandy silt, fine to medium grained sand
	75					END OF BORING AT 75 FEET
	80					

NOTES:

Hand augered upper 8 feet to avoid damage to utilities.
Ground-water sample collected at the shallowest depth of 42 feet below the ground surface.
Borehole grouted with cement-bentonite slurry and

Field Tech: DDS
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.25b

BORING E-125 (Continued)

DATE DRILLED: 8/5/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 181 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	
					patched with quick setting concrete.
	85				
	90				
	95				
	100				
	105				
	110				
	115				
	120				

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

Field Tech: DDS
Prepared By: LH/APR/YN
Checked By: DC

BORING E-126

DATE DRILLED: 9/6/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 223.4 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	2.5				ML	CLAYEY SILT - dark yellowish brown, mosit, no odor
	10		0.0	X	ML	CLAYEY SILT - very stiff, moist, yellowish brown, no odor
	15		0.0	X	ML	CLAYEY SILT - very stiff, moist, pale yellowish brown, no odor
	20		0.0	X	ML	CLAYEY SILT - very stiff, moist, yellowish brown, no odor, less clay
	25		0.0	X	ML	CLAYEY SILT - very stiff, moist, yellowish brown, no odor
	30		0.0	X	ML	SILT - hard, dark yellowish brown, slightly mosit, very fine grained sand, trace clay, some iron oxide staining, no odor
	35		0.0	X	ML	SILT - hard, dark yellowish brown, mist, some very fine to fine sand, no odor
	40		0.0	O		

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-126 (Continued)

DATE DRILLED: 9/6/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 223.4 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
						(Sample not recovered)
	45		0.0		ML	SILT - very stiff, moist, dark yellowish brown, some fine sand, some iron oxide staining, no odor
	50		0.0		CL-ML	SILTY CLAY - very stiff, dark yellowish brown, moist, on odor
	55		0.0		CL-ML	SILTY CLAY - very stiff, dark yellowish brown, moist, on odor
	60		0.0		CL-ML	SILTY CLAY - very stiff, dark yellowish brown, moist, on odor
	65		0.0		SP	POORLY GRADED SAND (sp) - dark yellowish brown, wet, very fine to fine sand, trace medium sand, on odor
	70		0.0		CL-ML	SILTY CLAY - very stiff, dark yellowish brown, moist to damp, no odor
	75		0.0		CL-ML	SILTY CLAY - very stiff, dark yellowish brown, moist to damp, no odor
	80					

END OF BORING AT 75 FEET

NOTES:

Hand augered upper 6 feet to avoid damage to utilities.
Ground-water sample collected at the shallowest depth of 64 feet below the ground surface.
Borehole grouted with cement-bentonite slurry and

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-126 (Continued)

DATE DRILLED: 9/6/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 223.4 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	
					patched with quick setting concrete.
	85				
	90				
	95				
	100				
	105				
	110				
	115				
	120				

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.26c

BORING E-127

DATE DRILLED: 8/18/2011
EQUIPMENT USED: Gregg HSA Rig
HOLE DIAMETER (in.): 8
ELEVATION: 226 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
						5-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete
					SM	**FILL [Af]** SILTY SAND - moist, light yellowish brown
					ML	SILT - moist, dark yellowish brown, trace fine sand
	5					
					CL-ML	CLAYEY SILT - moist, dark yellowish brown, no odor
	10					
	15					
	20					
	25					
	30					
	35					
	40					

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-127 (Continued)

DATE DRILLED: 8/18/2011
EQUIPMENT USED: Gregg HSA Rig
HOLE DIAMETER (in.): 8
ELEVATION: 226 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.		USCS	DESCRIPTION
	45						
	50						
	55						
	60		0.2			ML	SILT - very stiff, moist, strong brown (7.5YR 4/4) with olive gray, some clay, trace fine gravel, discoloration, no odors
	65						
	70						▽
	75						
	80						

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

BORING E-127 (Continued)

DATE DRILLED: 8/18/2011
EQUIPMENT USED: Gregg HSA Rig
HOLE DIAMETER (in.): 8
ELEVATION: 226 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			1.4		CL-ML	SILTY CLAY - dark brown (7.5YR 3/3), damp to wet, very stiff, no odors
	85					
	90					
	95					
	100		0.0		SM	SILTY SAND - strong brown (7.5YR 4/4), damp, dense, fine to coarse, trace fine gravel
	105					
	110		0.0		SM	SILTY SAND - dense, wet, strong brown (7.5YR 4/4), fine to coarse, trace fine gravel, iron oxide staining
	115					
	120					

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

BORING E-127 (Continued)

DATE DRILLED: 8/18/2011
EQUIPMENT USED: Gregg HSA Rig
HOLE DIAMETER (in.): 8
ELEVATION: 226 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			0.0	■	ML	CLAYEY SILT - dark yellowish brown (10YR 4/4), damp to wet, some fine sand, no odor
	125		0.0	■	ML	CLAYEY SILT - dark yellowish brown (10YR 4/4), damp to wet, some fine sand, no odor
			0.0	■	CL-ML	SILTY CLAY - dark yellowish brown (10YR 4/4), wet, no odors
	130					END OF BORING AT 130 FEET
	135					
	140					
	145					
	150					
	155					
	160					

NOTES:

Hand augered upper 7½ feet to avoid damage to utilities.
Ground-water sample collected at the shallowest depth of 70 feet below the ground surface.
Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

BORING E-132

DATE DRILLED: 9/20/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 270 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
					ML	**FILL [Af]** CLAYEY SILT - trace sand, some gravel-size rock fragments, dark yellowish brown (10YR 3/6), moist, no odor
	5					
	10		0.0		ML	Increasing clay content
	15		0.0		CL-ML	SILTY CLAY - dark olive brown (2.5Y 3/3), moist, very stiff, no odor
	20		0.0		CL	SILTY CLAY - dark olive brown (2.5Y 3/3), moist, very stiff, no odor
	25		0.0		ML	SILT - some clay, trace fine sand, dark yellowish brown (10YR 3/6), moist, hard, iron oxide staning, black stringers
	30		0.0		CL	SILTY CLAY - olive brown (2.5Y 4/4), moist, very stiff, no odor
	35		0.0		ML	CLAYEY SILT - olive brown (2.5Y 4/4), moist, very stiff, iron oxide staining, no odor Encountered gravel layer
	40					

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

BORING E-132 (Continued)

DATE DRILLED: 9/20/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 270 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			0.0		ML	CLAYEY SILT - very stiff, moist, olive brown (2.5Y 4/4), no odor
	45		0.7		ML	SILT - trace clay, olive gray (5Y 5/1), moist, very stiff, no odor, yellowish brown discoloration
	50		0.8		SM	SILTY SAND - very fine grained, greenish gray (GLEY1 5/1), moist, very dense, no odor
	55		1.0		SM	SILTY SAND - very fine to fine grained, some medium grained sand, trace fine gravel, greenish gray (GLEY1 5/1), very moist, very dense, no odor
	60		0.7		SM	SANDY SILT - very fine grained, greenish gray (GLEY1 5/1), very moist to damp, hard, no odor
	65		0.5		SM	SILTY SAND - very fine to fine grained, greenish gray (GLEY1 5/1), very moist, dense, no odor
	70		0.6		SM	SILTY SAND - very fine to fine grained, greenish gray (GLEY1 5/1), moist, very dense, no odor, damp at bottom of sampler
	75		0.7		SM	SILTY SAND - very fine to fine grained, very dark greenish gray (GLEY1 3/1), moist, very dense, no odor, damp at bottom of sampler
	80					

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-132 (Continued)

DATE DRILLED: 9/20/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 270 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			0.5	X	SP	SAND - poorly graded, very fine to fine, dark greenish gray (GLEY1 3/1), moist to damp, very dense, no odor
			0.2	X	SP	SAND - poorly graded, very fine to fine, dark greenish gray (GLEY1 3/1), saturated, very dense, no odor
	85					END OF BORING AT 85 FEET
	90					
	95					
	100					
	105					
	110					
	115					
	120					

NOTES:

Hand augered upper 7½ feet to avoid damage to utilities.
Ground-water sample not collected.
Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.28c

BORING E-133

DATE DRILLED: 8/19/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 271 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	0					8-inch thick Asphalt Concrete
					CL-ML	SILTY CLAY with SAND - moist, brown (10YR 4/3)
	10		0.0	■	CL-ML	SILTY CLAY with SAND - brown, (10YR 4/3), moist, sand is medium grained, trace coarse grained sand
	15		0.0	■	CL-ML	SILTY CLAY with SAND - very dark gray (10YR 3/1), moist, medium sand, trace coarse, trace gravel (up to 1½cm in size)
	20		0.0	■	ML	SANDY SILT - very dark grayish brown (10YR 3/2), moist, some clay, crumbles easier than the above samples (gas meter not working for CO_2 reading)
	25		N/A	■		(No sample recovery)
					▽	Installed hydropounch at approximately 23 to 27 feet, screened to collect grab ground water
	30		0.0	■	CL-ML	SILTY CLAY with SAND - moist, very dark gray (10YR 3/1), trace gravel (up to 1 cm in size)
	35		0.0	■	SP	POORLY GRADED SAND - brown (10YR 5/3), moist, fine to medium grained
	40					

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: RM
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

BORING E-133 (Continued)

DATE DRILLED: 8/19/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 271 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			0.0		SP	POORLY GRADED SAND - very dense, moist, brown (7.5YR 4/3), no odor
	45		0.0		SP	POORLY GRADED SAND - very dense, very moist, brown (7.5YR 4/3), no odor
	50		0.0		SM	SILTY SAND with GRAVEL - very dense, very moist, brown (7.5YR 4/3), fine to medium-grained, fine gravel
	55		0.0		SM	SILTY SAND - very dense, very moist, yellowish brown (10YR4/4), trace coarse gravel
	60		0.1		SP	POORLY GRADED SAND - very dense, moist, brown (10YR 4/4) with olive gray discoloration, no odor
	65		0.1		SM	SILTY SAND - very dense, moist to wet, brown (7.5YR, 4/4), fine-grained
	70		0.0		SM	SILTY SAND - very dense, moist to wet, dark greenish gray (GLEY 4/1), fine-grained
	75		0.1		SP	POORLY GRADED SAND - dense, moist, greenish gray (GLEY 5/1)
	80					

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: RM
Prepared By: LH/APR/YN
Checked By: DC

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-133 (Continued)

DATE DRILLED: 8/19/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 271 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
			0.3	■	SP	POORLY GRADED SAND - dense, moist, greenish gray (GLEY 5/1), trace gravel
	85		0.2	■	SP	POORLY GRADED SAND - very dense, moist, greenish gray (GLEY 5/1), trace gravel
			1.1	■	SM	SILTY SAND - very dense, moist, dark greenish gray (GLEY 3/1), fine-grained
	90					END OF BORING AT 90 FEET
	95					
	100					
	105					
	110					
	115					
	120					

NOTES:

Hand augered to 5 feet bgs to avoid damage to utilities.
Ground-water sample collected at the shallowest depth of 27 feet below the ground surface.
Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: RM
Prepared By: LH/APR/YN
Checked By: DC

BORING E-134

DATE DRILLED: 9/6/2011 and 9/22/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 277 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	0					4-inch thick Asphalt Concrete over 3-inch thick Portland Cement Concrete
					CL	**FILL [Af]** GRAVELLY CLAY - moist, dark olive brown, mottled, fine gravel and rock fragments
	5					
	10		0.0	■	CL-ML	SILTY CLAY - stiff, moist, dark yellowish brown (10YR 3/6), no odor
	15		0.0	■	CL-ML	SILTY CLAY - stiff, moist, dark yellowish brown (10YR 3/6), no odor
	20		0.0	■	ML	SILT - very stiff, moist, dark yellowish brown, some clay and coarse sand, no odor
	25		0.0	■	ML	CLAYEY SILT - stiff, dark yellowish brown (10YR 3/6), with gray mottling, very moist, no odor
	30		0.0	■	ML	CLAYEY SILT - stiff, moist, dark yellowish brown (10YR 3/6), with gray mottling, no odor
	35		0.0	■	ML	CLAYEY SILT - hard, moist, dark yellowish brown (10YR 3/6)
	40		0.0	■		

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: PK/AR
Prepared By: LH/APR/YN
Checked By: DC

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING E-134 (Continued)

DATE DRILLED: 9/6/2011 and 9/22/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 277 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	40				ML	CLAYEY SILT - hard, moist, dark yellowish brown (10YR 3/6)
	45		0.0		ML	SILT - hard, moist, dark yellowish brown (10YR 3/6)
	50		0.0		SP	POORLY GRADED SAND - dense, moist, light gray with some iron stain, fine to medium sand, with some coarse sand
	55	50/5"	0.1			Some gravel
						Trace gravel
	60		0.0		SM	SILTY SAND - moist, light to medium brown, fine to medium sand
					SP	POORLY GRADED SAND - very dense, moist, light brown, fine to medium sand
	65	50/6"	0.0			
	70		0.0		SM	SILTY SAND - dense, light brown with some gray, moist, fine to medium sand, with some very thin layers of silt
	75		0.0			Becomes bluish gray
	80				SP	POORLY GRADED SAND - very dense, moist, bluish gray, fine to medium

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK/AR
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.30b

BORING E-134 (Continued)

DATE DRILLED: 9/6/2011 and 9/22/2011
EQUIPMENT USED: Kehoe CPT Direct Push and HSA Rigs
HOLE DIAMETER (in.): 2 and 8
ELEVATION: 277 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	DESCRIPTION
		50/5"	0.0		sand, some coarse sand, trace gravel Thin layer of Silty Sand
	85	50/6"	0.1		∇
	90		0.0		
					END OF BORING AT 91½ FEET
	95				
	100				
	105				
	110				
	115				
	120				

NOTES:

Hand augered to 6½ feet bgs to avoid damage to utilities.
Ground-water sample collected at the shallowest depth of 85 feet below the ground surface.
Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ENVIRONMENTAL LOG 2 S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.4 PHASE II ENVIRONMENTAL\3.0 FIELD DOCUMENTS\GINTED LOGS\METRO WESTSIDE EXT. ENVIRO LOGS.GPJ 10/21/11

Field Tech: PK/AR
Prepared By: LH/APR/YN
Checked By: DC

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.30c

BORING E-135

DATE DRILLED: 9/12/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 280 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
	0					4-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete
					ML	SILT - dark yellowish brown (10YR 3/4), moist, trace clay, no odor
	5					
	10		0.7		ML	SILT - dark yellowish brown (10YR 3/4), moist, trace clay, no odor
	15		0.6		ML	CLAYEY SILT - dark yellowish brown (10YR 3/4), moist, very stiff, no odor
	20		0.2		CL-ML	CLAYEY SILT - dark yellowish brown (10YR 3/4), moist, very stiff, no odor
	25		1.3		CL-ML	CLAYEY SILT - dark yellowish brown (10YR 3/4), moist, very stiff, no odor
	30		1.5		CL-ML	CLAYEY SILT - dark yellowish brown (10YR 3/4), moist, hard, no odor
	35		0.1		CL-ML	CLAYEY SILT - dark yellowish brown (10YR 3/4), moist, hard, no odor
	40		0.1			

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

(CONTINUED ON FOLLOWING FIGURE)

Metro Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
Project: 4951-10-1561 Figure: D-1.31a

BORING E-135 (Continued)

DATE DRILLED: 9/12/2011
EQUIPMENT USED: Kehoe CPT Direct Push Rig
HOLE DIAMETER (in.): 2
ELEVATION: 280 feet*

ELEVATION (ft)	DEPTH (ft)	SAMPLE ID	OVA(ppm)	SAMPLE LOC.	USCS	DESCRIPTION
				■	ML	SILT - very stiff, dark yellowish brown, very moist, no odor
	45		0.2	■	ML	CLAY - moist to damp, some very fine sand
	50		0.1	■	ML	SILT - moist, dark olive brown (10YR 4/6), trace clay
	55		0.0	■	ML	CLAYEY SILT - very stiff, very moist, dark yellowish brown, no odor
	60		0.1	■	ML	
						∇
	65		0.0	■	CL-ML	SILTY CLAY - very stiff, moist to damp, dark yellowish brown, no odor
	70					
	75		0.0	■	CL-ML	
	80					

END OF BORING AT 75 FEET

NOTES:

Hand augered to 10 feet bgs to avoid damage to utilities.
Ground-water sample not collected.
Borehole grouted with cement-bentonite slurry and patched with quick setting concrete.

Field Tech: PK
Prepared By: LH/APR/YN
Checked By: DC

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

APPENDIX E
OIL WELL SURVEY

FIGURES E-1.1 THROUGH E-1.50
OIL WELL SURVEY REPORTS

REPORT
GEOPHYSICAL INVESTIGATION

Geophysical Survey for the MTA Westside Extension Beverly Hills, California

GEO*Vision* Project No. 11065

Prepared for:

MACTEC Engineering and Consulting, Inc.
2171 Campus Drive
Irvine, CA 92612
(949) 224-0050

Prepared by:

GEO*Vision* Geophysical Services, Inc.
1124 Olympic Drive
Corona, CA 92881
(951) 549-1234

Report 11065-001

April 8, 2011

TABLE OF CONTENTS

LIST OF FIGURES

1 INTRODUCTION

A geophysical investigation was conducted on February 27th, March 5th and March 19th, 2011, for MACTEC Engineering and Consulting, Inc. in Beverly Hills, California. The purpose of the investigation was to locate any existing abandoned oil wells in the alignment right of way of the MTA Westside Extension at three locations at Beverly Hills High School: the tennis courts and front lawn, the football field and the lacrosse field (Figure 1).

The portions of Beverly Hills High School surveyed during this investigation consisted of: natural and artificial grass fields, reinforced concrete tennis courts, an asphalt road and a reinforced concrete sidewalk (Figure 1).

The geophysical techniques used during this investigation were the magnetic method and the electromagnetic (EM) method. These methods complement one another as each responds to different physical properties and has different strengths and limitations. The magnetic method is the most commonly used geophysical technique for locating abandoned oil wells because the magnetic anomalies associated with oil wells have very high amplitudes, large spatial dimensions and a different signature from many other types of buried metallic objects. The electromagnetic (EM) method was used to scan selected areas for metallic pipes and to further characterize anomalies found in the magnetic data.

The geophysical techniques used during the investigation are discussed in Section 2. Field procedures are described in Section 3. Data processing and interpretation are discussed in Section 4. The results of the geophysical survey are presented in Section 5 and our professional certification is presented in Section 6.

2 GEOPHYSICAL TECHNIQUES

This section presents background information on the magnetic and electromagnetic methods used during this investigation. A description of the geophysical methods used during this investigation, common applications of the method, photographs of the instruments and example applications are included in Appendix A.

2.1 Magnetic Method

The magnetometer used during this investigation consisted of a Geometrics G-858 optically pumped cesium-vapor magnetometer (G-858). This instrument measures the intensity of the earth's magnetic field in nanoteslas (nT) and, optionally, the vertical gradient of the earth's magnetic field in nanoteslas per meter (nT/m). The vertical magnetic gradient is calculated by measuring the total magnetic field with two sensors at different heights, subtracting the top sensor reading from the bottom sensor reading and dividing by the sensor separation. The vertical magnetic gradient has better lateral resolution than total magnetic field measurements and is less sensitive to deep (e.g. geologic) structure.

The earth's magnetic field is believed to originate in convection currents in the earth's liquid outer core. The magnetic field varies in intensity from about 25,000 nT at the equator, where it is parallel to the earth's surface, to about 70,000 nT at the poles where it is perpendicular to the earth's surface. The intensity of the earth's magnetic field in North America varies from about 48,000 to 60,000 nT, and has an associated inclination that varies from about 60 to 75 degrees.

The earth's magnetic field undergoes low-frequency diurnal variations (drift) caused by the earth's rotation. The magnetic field can also undergo short-period, high-amplitude variations during periods of sunspot activity called magnetic storms. Often magnetic field intensity can be so variable during a magnetic storm that meaningful magnetic data cannot be acquired. When necessary to correct for magnetic drift, a base station magnetometer is set up in a quiet portion of the site and programmed to record total magnetic field intensity at fixed increments (i.e. 5-second intervals) throughout the day. This base station data is then used to remove the effects of drift from the field data. In small survey areas, where the data is acquired over a small amount of time and the anomalies have large amplitudes, correction for magnetic drift is not necessary.

Buried ferromagnetic objects give rise to local perturbations (anomalies) in the earth's magnetic field. There are two types of magnetic anomalies: an anomaly induced in an object or rock by the earth's magnetic field (induced magnetic anomaly) and an anomaly associated with remnant or permanent magnetism. In North America, the induced magnetic anomaly associated with an oil well consists of a very high amplitude, positive magnetic anomaly with the maximum response (peak) about 1- foot, or more, south of the well. In very rare cases, the conductor casing or oil well casing may have a permanent magnetism in the opposite direction of the earth's magnetic field, which, therefore subtracts from the induced magnetic field. If the permanent magnetic field associated with the well casing is stronger than the induced magnetic field then a negative magnetic anomaly may result. These cases have been observed and documented on very few sites previously by **GEO***Vision* and such wells can be difficult to detect, especially in the presence of other subsurface infrastructure, due to the atypical nature of the magnetic response. Other buried ferrous metallic objects; such as pipes, drums, tanks and debris, generally give rise to dipolar anomalies with a positive response south of the object and a negative response north of the object. The dimensions and amplitude of a magnetic anomaly are a function of the size, mass, depth and magnetic properties of the source. The magnetic anomaly over a buried oil well often has a diameter of over 50 feet and amplitude of several thousand nanoteslas above background, depending on depth and casing characteristics. A magnetometer can typically locate an abandoned oil well to a depth of over 20 feet providing background noise levels are not too high and the well casing is not significantly corroded. Magnetometers are not able to detect nonferrous metals such as aluminum or brass.

Typical applications of the magnetic method include:

- Locating pits and trenches containing ferrous metallic debris
- Locating buried drums, tanks and pipes
- Delineating boundaries of landfills containing ferrous debris
- Locating abandoned steel well casing
- Detecting unexploded ordnance
- Mapping basement faults and geology
- Mapping archeological sites

Some advantages of magnetic surveys are:

- Rapid – modern instruments can acquire up to 10 readings per second as the operator walks down survey lines
- Depth of investigation – magnetometers can often locate buried ferrous metallic objects to greater depths than other methods
- Anomalies are much larger than the source allowing for larger line spacing in some situations

Some limitations of the magnetic surveys are:

- Unable to detect non-ferrous metals such as aluminum or brass
- Magnetic anomalies may be asymmetrical and much larger than the source and it can, therefore, be difficult to determine the precise locations and size of the source
- Ineffective in areas having extensive metallic debris at the surface, as no distinction can be made between anomalies caused by surface and buried debris
- Metallic structures such as buildings, fences, reinforced concrete and light posts interfere with the measurements
- High voltage power lines can often strongly interfere with the measurements
- Data can be very noisy in areas containing volcanic rock, specifically basalt

2.2 Electromagnetic Method

EM equipment used during this investigation consisted of a Geonics EM-61 Mk2A high-resolution digital metal detector (EM-61). The EM-61 has a single transmitter and two receiver coils. The bottom coil is the transmitter during the current on-time and receiver during current off-time. The top coil, mounted 40-cm above the bottom coil, is a receiver coil only. The transmitter and receiver electronics controls are mounted on a backpack or on the instrument handle. A hand-held data logger is used to store field measurements. During operation, a half-duty cycle waveform is applied to the transmitter coil. During the off-time, the receiver coils measure the decay of eddy currents, in millivolts (mV), produced in subsurface metallic objects by the pulsed primary EM field. The top coil is gained in such a manner that the instrument response to a metallic object lying on the ground surface will be approximately equal at both the top and bottom coils. The effects of surface debris can, therefore, be suppressed by calculating the differential response (subtraction of the bottom coil from top coil response). Positive EM-61 anomalies centered over the source are typically observed over buried metallic objects. Above ground metallic objects will often give rise to a negative differential response, as the top coil response is larger than the bottom coil response.

3 FIELD PROCEDURES

This section describes the field procedures used during the investigation, including site preparation and the magnetometer and EM-61 Mk2A survey procedures.

3.1 Site Preparation

Before conducting the geophysical investigation, the suspected well locations in each area were marked by a representative from MACTEC Engineering and Consulting, Inc. Each area was then visually inspected for anything that may interfere with the survey and, if possible, it was removed from the survey area. The magnetometer and the EM-61 were used in conjunction with a Trimble ProXRS GPS system with OmniSTAR real-time, submeter corrections as discussed below. GPS data were collected in the geodetic coordinate system and then converted to California State Plane 1983, NAD83, Zone V (0405) in US Survey Feet during data processing. Data were not collected in areas where there were surface obstructions or other limiting features, or where the GPS did not have sufficient satellite coverage. Obvious surface cultural features that could potentially affect the geophysical data (e.g. metal fences, goalposts and other surface metallic objects) were identified in the field and their positions recorded using the submeter GPS system. Color contour maps showing surface metallic objects and the geophysical anomalies are presented as Figures 2 through 6.

3.2 Geometrics G-858 Survey

Prior to data acquisition, the G-858 was programmed with the appropriate sampling interval and GPS input settings. Measurements of the earth's total magnetic field and vertical magnetic gradient were made in accessible areas at 0.2-second intervals as the operator walked along approximately south to north (S-N) survey lines nominally spaced 5 feet apart. A Trimble ProXRS GPS system with OmniSTAR differential corrections was used for spatial control. Real-time submeter corrections were input every second into the data collector of the magnetometer using a serial cable and a GGA NMEA stream GPS output. The magnetic data were stored in the internal memory of the magnetometer, along with GPS statistics and location data. If a location error was made on a survey line (large data gap, etc.) the line was repeated to attain desired coverage. Magnetic data were downloaded to a laptop computer at the end of the survey using the program MAGMAP 2000 by Geometrics, Inc.

3.3 Geonics EM-61 Mk2A Survey

The EM-61 was assembled and battery levels were checked and found to be within acceptable levels. The EM-61 digital data logger was then programmed with the appropriate file name and sample rate (10 readings/sec). EM-61 measurements were made in accessible areas, along approximately S-N survey lines nominally spaced 5 feet apart for each area where deemed necessary. EM-61 measurements were not collected in areas containing reinforced concrete (e.g. the tennis courts and the small area southeast of the lacrosse field) due to the interference of surface metal. EM-61 data were also not collected in the front lawn area, as the magnetic data indicated no significant subsurface anomalies warranting further investigation. A Trimble ProXRS GPS system with OmniSTAR differential corrections was used for spatial control. Real-time submeter corrections were input every second into the data collector of the EM-61 using a serial cable and a GGA NMEA stream GPS output. The EM-61 data were stored in a digital data logger, along with GPS statistics and location data. If a location error was made on a survey line (large data gap, etc.) the line was repeated to attain desired coverage. EM-61 data were downloaded to a laptop computer at the end of the survey using the computer program Trackmaker61 by Geomar Software, Inc. The EM-61 is a wheel mounted system and data coverage was limited to areas where the instrument was able to be pushed, where there was no metal reinforcement and where there was sufficient GPS satellite coverage.

4 DATA PROCESSING AND INTERPRETATION

This section presents the data processing procedures and interpretation of the geophysical data.

4.1 Data Processing

Color-enhanced contour maps of the magnetic data were generated using the GEOSOFT® Oasis montaj ™ geophysical mapping system. The maps were color-enhanced to aid in the interpretation of subtle anomalies. Prior to map generation, a number of preprocessing steps were completed and included:

- Backup of all original field data files to computer.
- Correcting of all data acquisition errors (typically removing null data and erroneous GPS points).
- Reformatting field data files to free format XYZ files containing at a minimum GPS time and field measurements.
- Merging GPS position data and geophysical data using commercial and in-house software.
- Merging of multiple data files into a single file and sorting, if necessary.
- Converting of data files to State Plane northings and eastings.

These data adjustments were made using a combination of commercial and in-house software. All adjustments made to data files and resulting file names were documented and are retained in project files. The outputs of the data preprocessing were data files containing the various data measurements. The magnetic data file contained total field and vertical gradient response.

Data processing steps included the following:

- Reformatting of data files to GEOSOFT® format.
- Generating final map scale.
- Gridding data using down- and cross-line splines or minimum curvature.
- Masking grid in areas where data not acquired (i.e. around site perimeter or building).
- Applying Hanning filter to smooth the data, as necessary.
- Generating color zone file describing color for different data ranges.
- Contouring the data.
- Generating map surrounds (title block, legend, scale, color bar, north arrow, etc.).
- Annotating anomalies.
- Merging various plot files and plotting final map.

The names of the files generated and the processing parameters used were documented and are retained in project files. All files generated during the processing sequence were archived on a backup drive.

4.2 Interpretation

Color-enhanced contour maps of the magnetic total field response generated for each area (the tennis courts and front lawn area, the football field and the lacrosse field) are presented as Figures 2, 3 and 5, respectively. For the football and lacrosse field areas, color-enhanced contour maps of the EM-61 Mk2A Channel 3 response are presented as Figures 4 and 6, respectively. The coordinates shown on all figures reference the California State Plane 1983, NAD83, Zone V (0405) coordinate system, in US Survey Feet. The color bar indicates the amplitude of the measured quantity with the magenta and cyan colors representing high and low amplitudes, respectively. The light orange, yellow and light green colors indicate average "background" values of the measured quantity.

An example magnetic anomaly from an oil well is presented in Appendix A. The typical magnetic anomaly characteristics of an oil well are: a monopolar response (large positive peak with only a minor negative response to the north); a large diameter anomaly (50 to 100 ft typical) and a large amplitude for shallow wells. However, in very rare cases, a monopolar, magnetic low have been observed for an oil well response. In these cases, the permanent magnetic field of the oil well casing is stronger than the induced magnetic field and a magnetic low is observed.

4.2.1 Tennis Courts and Front Lawn

The color-enhanced contour map of the total magnetic field response is presented as Figure 2. No abandoned oil well anomalies are interpreted in the magnetic data. The top portion of the site consists of a grass lawn with sidewalks and some surface metal, such as signage, posts or rails. The tennis courts in the lower portion of the area consist of reinforced concrete bounded by metallic chain link fencing on all sides. All magnetic anomalies are accounted for by surface metallic objects at this location.

4.2.2 Football Field – "Rodeo" 114

The color-enhanced contour map of the total magnetic field response is presented as Figure 3. The color-enhanced contour map of the EM-61 Mk2A Channel 3 response is presented as Figure 4. No abandoned oil well anomalies are interpreted in the magnetic data. Several linear anomalies were interpreted in both the total magnetic field response and EM-61 Channel 3 response and are marked with a "P" on both figures. These anomalies bear responses that are indicative of buried metallic pipes or utilities. There are also several small monopolar anomalies in the total magnetic field response that correlate with small amplitude anomalies in the EM-61 Channel 3 response. These anomalies are indicative of small buried metallic objects and are marked with a "B" on the figures.

4.2.3 Lacrosse Field – "Wolfskill" 23 and "Rodeo" 107

The color-enhanced contour maps of the total magnetic field response and the EM-61 Mk2A Channel 3 response are presented as Figures 5 and 6, respectively. Several linear anomalies were interpreted in both the total magnetic field response and EM-61 Channel 3 response and are marked with a "P" on both figures. These anomalies bear responses that are indicative of buried metallic pipes, utilities or previous building footings. There are also several small dipolar anomalies in the total magnetic field response that correlate with small amplitude anomalies in the EM-61 Channel 3 data. These anomalies are indicative of small buried metallic objects, marked with a "B" on the figures.

Four large magnetic anomalies are present in the total magnetic field data, and are labeled as anomalies A-1 through A-4 (Figure 5). Anomalies A-1 through A-3 are located on or near the grass lacrosse field, which is surrounded by a metallic chain link fence to the north, south and east and a block retaining wall to the west, south and east. Anomaly A-4 is located southeast of the lacrosse field, in a small area adjacent to an asphalt road with utility vaults, chain link fencing, reinforced concrete, a building and a retaining wall.

The western most anomaly, A-1, located at 6,436,652E, 1,844,819N, presents with a strong dipolar magnetic response (a low of 45,300 nT and a high of 49,000 nT) and a strong EM-61 response (4,200 mV). This anomaly may be related to a pipe segment or previous building infrastructure. However, it cannot be fully discounted that this anomaly is related to an abandoned oil well or its infrastructure.

The southwestern most anomaly, A-2, located at 6,436,780E, 1,844,724N, also presents as a strong, dipolar magnetic response (a low of 45,550 nT and a high of 49,650 nT), but as a weaker EM-61 response (196 mV). This may indicate that the source of this anomaly is deeper than the source of anomaly A-1. This anomaly may be related to a pipe segment or previous building infrastructure. However, it cannot be fully discounted that this anomaly is related to an abandoned oil well or its infrastructure.

The northeastern most anomaly, A-3, located at 6,436,897E, 1,844,758N, presents as a broad positive magnetic response (greater than 48,000 nT), but is not evident in the EM-61 data. However, it cannot be fully discounted that this anomaly is related to a steel-cased abandoned oil well due to the large magnetic response. It is estimated that the source of this anomaly is east of the fencing and retaining wall surrounding the lacrosse field. An additional survey would be needed to further characterize this anomaly. Due to the proximity of the anomaly to surface metallic features (e.g. metal fencing, retaining walls and reinforced concrete), there is no guarantee that results from a further investigation would be conclusive.

The southeastern most anomaly, A-4, located at 6,437,017E, 1,844,638N on asphalt, presents with a strong positive magnetic response (greater than 52,000 nT). The suspected location of abandoned oil well "Rodeo" 107 was surveyed and marked on the ground near the retaining wall in this area. The source of this anomaly is located outside of the survey boundary in an area that could not be surveyed due to poor satellite coverage. However, due to the intensity of the magnetic response, it cannot be fully discounted that this anomaly is related to a steel-cased abandoned oil well. An additional gridded survey would need to be conducted on the asphalt road to further characterize this anomaly.

5 CONCLUSIONS

A geophysical survey was conducted at Beverly Hills High School in Beverly Hills, California. The purpose of the survey was to screen three areas: the tennis courts and front lawn, the football field and the lacrosse field, for multiple suspected abandoned, steel-cased oil wells in the alignment right of way of the MTA Westside Extension.

In the area consisting of the tennis courts and the front lawn, there was no indication of any abandoned oil wells in the magnetic data. In the area consisting of the football field, where the suspected location of abandoned oil well "Rodeo" 114 was marked, there was no indication of any abandoned oil wells in the magnetic or EM data. Four anomalies were interpreted in the magnetic and EM data, in the area consisting of the lacrosse field and adjacent area where suspected abandoned oil well "Rodeo" 107 was marked. Anomalies A-1 and A-2 may be related to abandoned oil well infrastructure or other buried metallic debris. Anomalies A-3 and A-4 may be related to steel-cased abandoned oil wells. However, further investigation would be needed to fully characterize anomalies A-3 and A-4.

The geophysical survey was designed to map abandoned wells with ferrous metallic pipe in the upper 15 feet. It is our opinion that the geophysical survey was appropriately designed to locate such objects less than about 15 feet deep; except in portions of the survey area where data were affected by surface structures, such as reinforced concrete, utility corridors, obstructing foliage and other large surface metallic objects.

6 CERTIFICATION

All geophysical data, analysis, interpretations, conclusions and recommendations in this document have been prepared under the supervision of and reviewed by a **GEO*Vision*** California Professional Geophysicist.

Prepared by

04/08/11

Emily Feldman　　　　　　　　　　　　　　　　　　　　　　　　Date
Staff Geophysicist
GEO*Vision* Geophysical Services

Reviewed and approved by

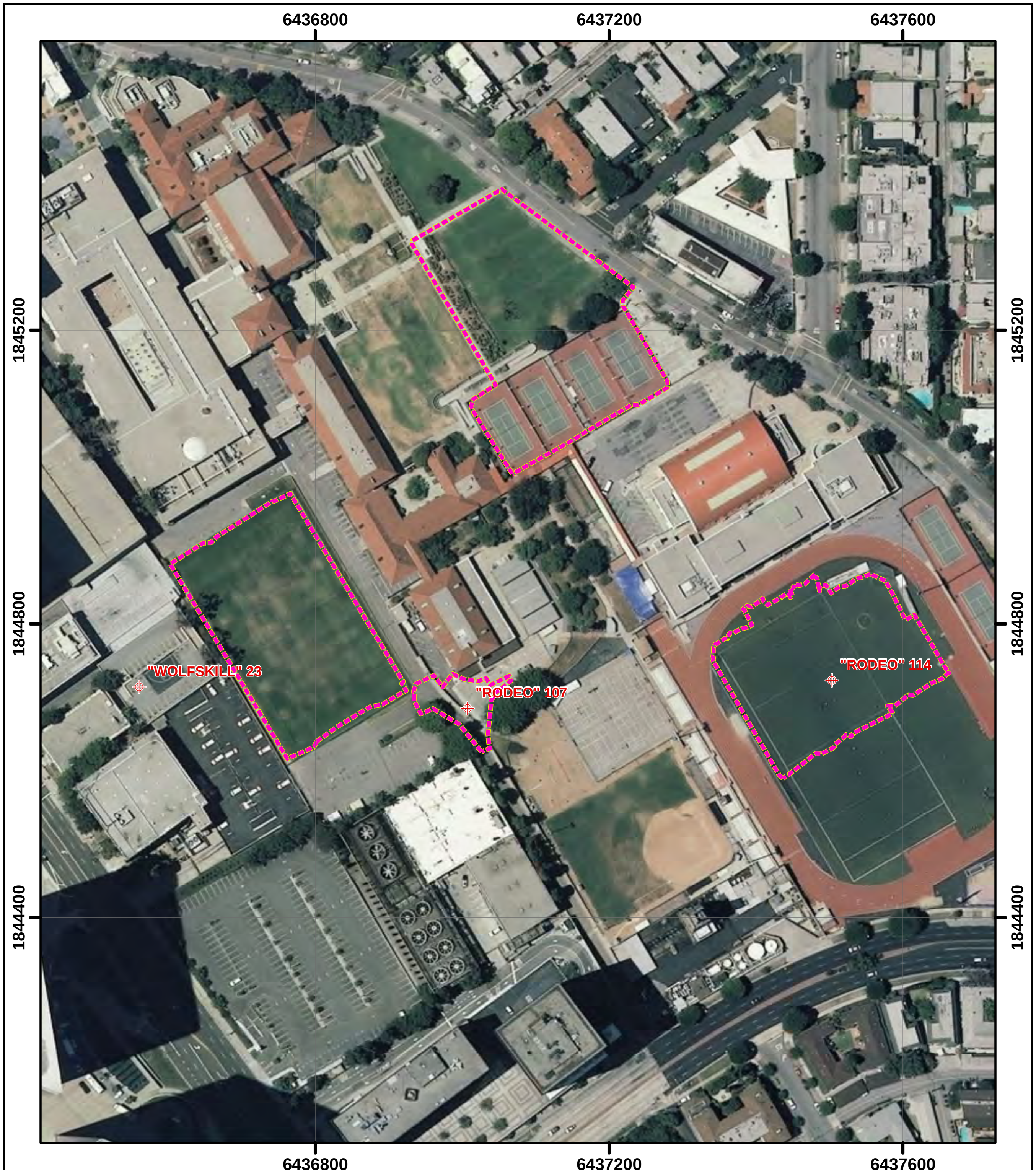
04/08/11

Antony Martin　　　　　　　　　　　　　　　　　　　　　　　　Date
California Professional Geophysicist, P.GP 989
GEO*Vision* Geophysical Services

* This geophysical investigation was conducted under the supervision of a California Professional Geophysicist using industry standard methods and equipment. A high degree of professionalism was maintained during all aspects of the project from the field investigation and data acquisition, through data processing interpretation and reporting. All original field data files, field notes and observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A professional geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations or ordinances.

FIGURES



Legend

- Geophysical survey boundary
- Suspected location of abandoned oil well

90 0 90 180
Feet

N

NOTES:
1. California State Plane Coordinate System NAD 83, Zone V (0405), US Survey Feet
2. Image Source: ESRI, i-cubed, UDSA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IG

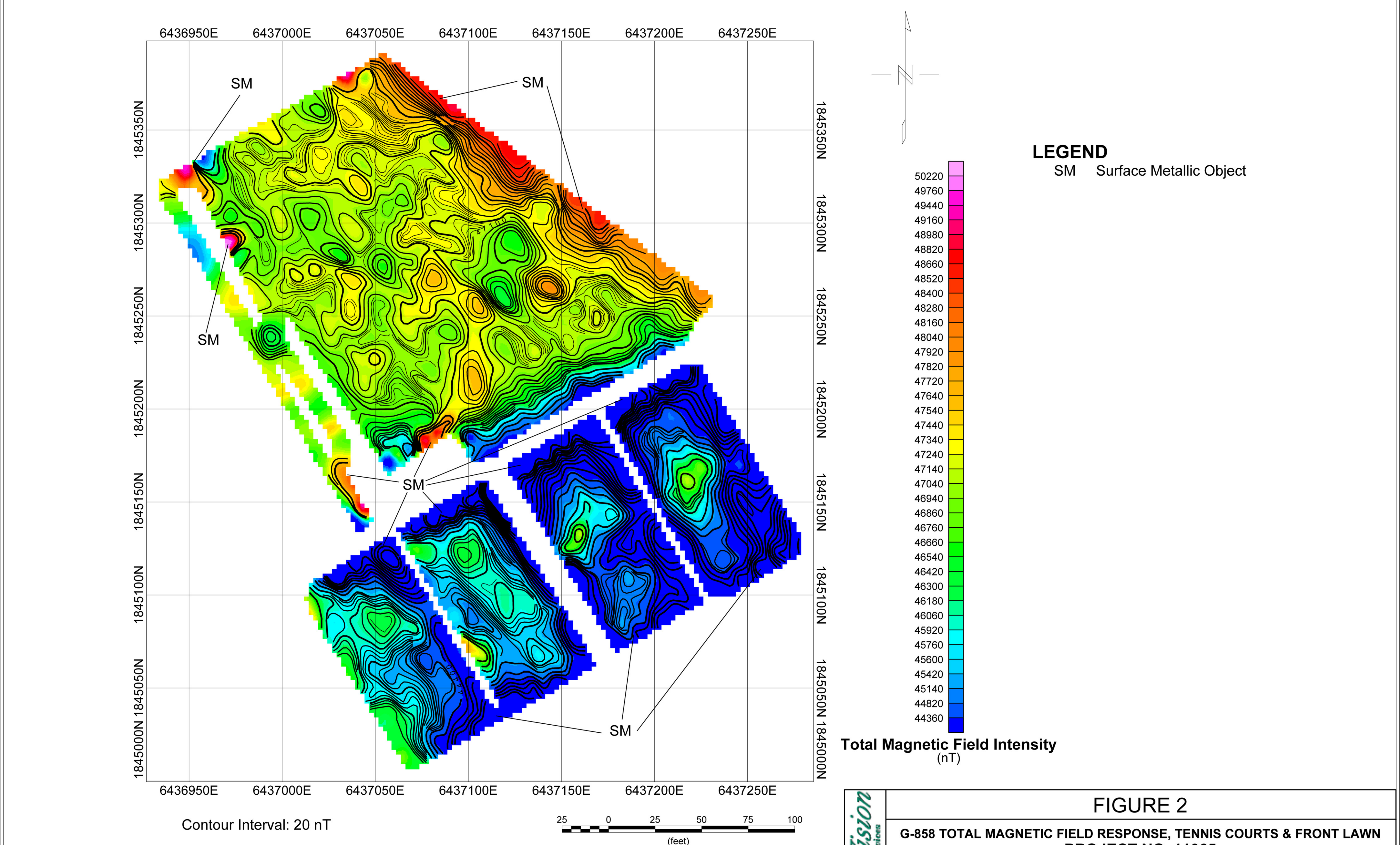
GEOVision geophysical services

Date:	4/7/2011
GV Project:	11065
Developed by:	E Feldman
Drawn by:	T Rodriquez
Approved by:	L Demine
File Name:	11065-1

FIGURE 1
SITE MAP

BEVERLY HILLS HIGH SCHOOL
BEVERLY HILLS, CALIFORNIA

PREPARED FOR
MACTEC ENGINEERING AND CONSULTING, INC.



GEOVision geophysical services

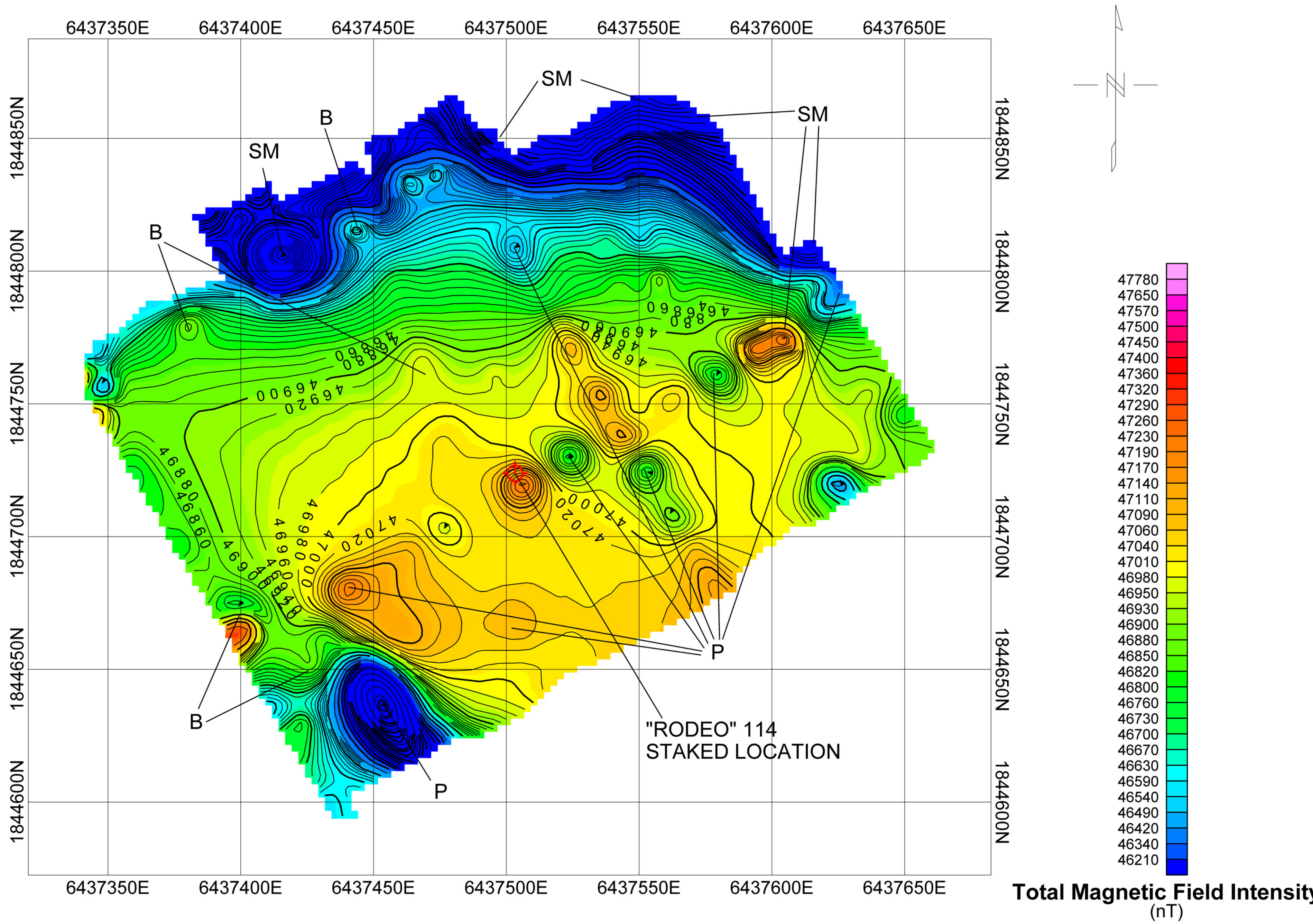
FIGURE 2

G-858 TOTAL MAGNETIC FIELD RESPONSE, TENNIS COURTS & FRONT LAWN
PROJECT NO. 11065

BEVERLY HILLS HIGH SCHOOL
BEVERLY HILLS, CALIFORNIA

PREPARED FOR MACTEC ENGINEERING AND CONSULTING, INC.

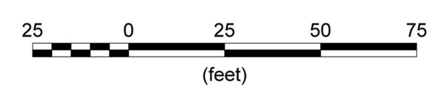
Notes: 1. Coordinate System California State Plane, NAD83, Zone V (0405), US Survey Feet
2. Positions collected using a Trimble ProXRS GPS with OmniSTAR real-time, submeter differential corrections



LEGEND

SM Surface Metallic Object
P Underground Pipe/Previous Building Footing
B Small Buried Metallic Object

Contour Interval: 20 nT



Notes: 1. Coordinate System California State Plane, NAD83, Zone V (0405), US Survey Feet
2. Positions collected using a Trimble ProXRS GPS with OmniSTAR real-time, submeter differential corrections

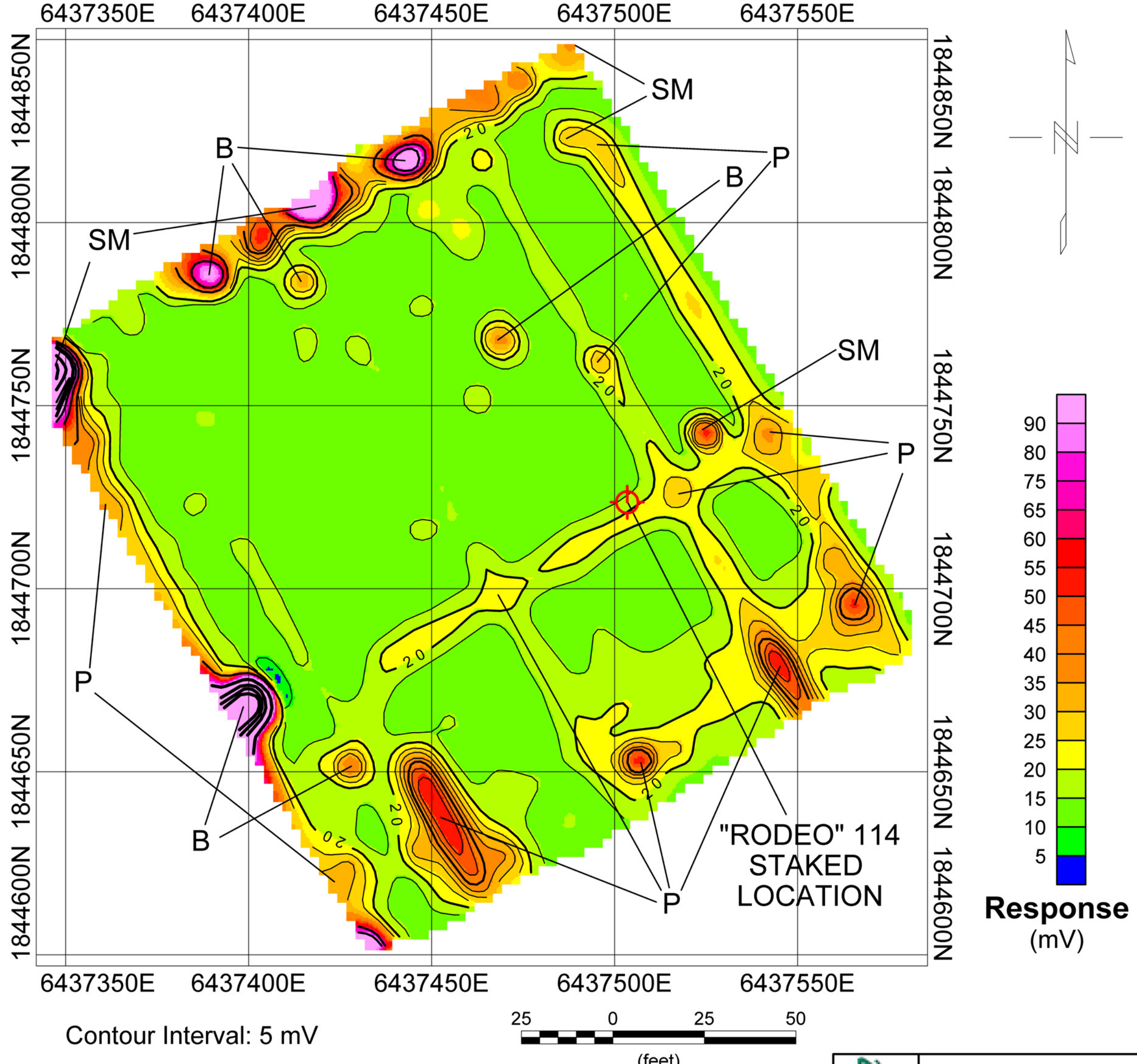
GEOVision geophysical services

FIGURE 3

G-858 TOTAL MAGNETIC FIELD RESPONSE, FOOTBALL FIELD
PROJECT NO. 11065

BEVERLY HILLS HIGH SCHOOL
BEVERLY HILLS, CALIFORNIA

PREPARED FOR MACTEC ENGINEERING AND CONSULTING, INC.



LEGEND

SM Surface Metallic Object
P Underground Pipe/Previous Building Footing
B Small Buried Metallic Object

GEOVision geophysical services

FIGURE 4

EM-61 MK2A CHANNEL 3 RESPONSE, FOOTBALL FIELD
PROJECT NO. 11065

BEVERLY HILLS HIGH SCHOOL
BEVERLY HILLS, CALIFORNIA

PREPARED FOR MACTEC ENGINEERING AND CONSULTING, INC.

Notes: 1. Coordinate System California State Plane, NAD83, Zone V (0405), US Survey Feet
2. Positions collected using a Trimble ProXRS GPS with OmniSTAR real-time, submeter differential corrections