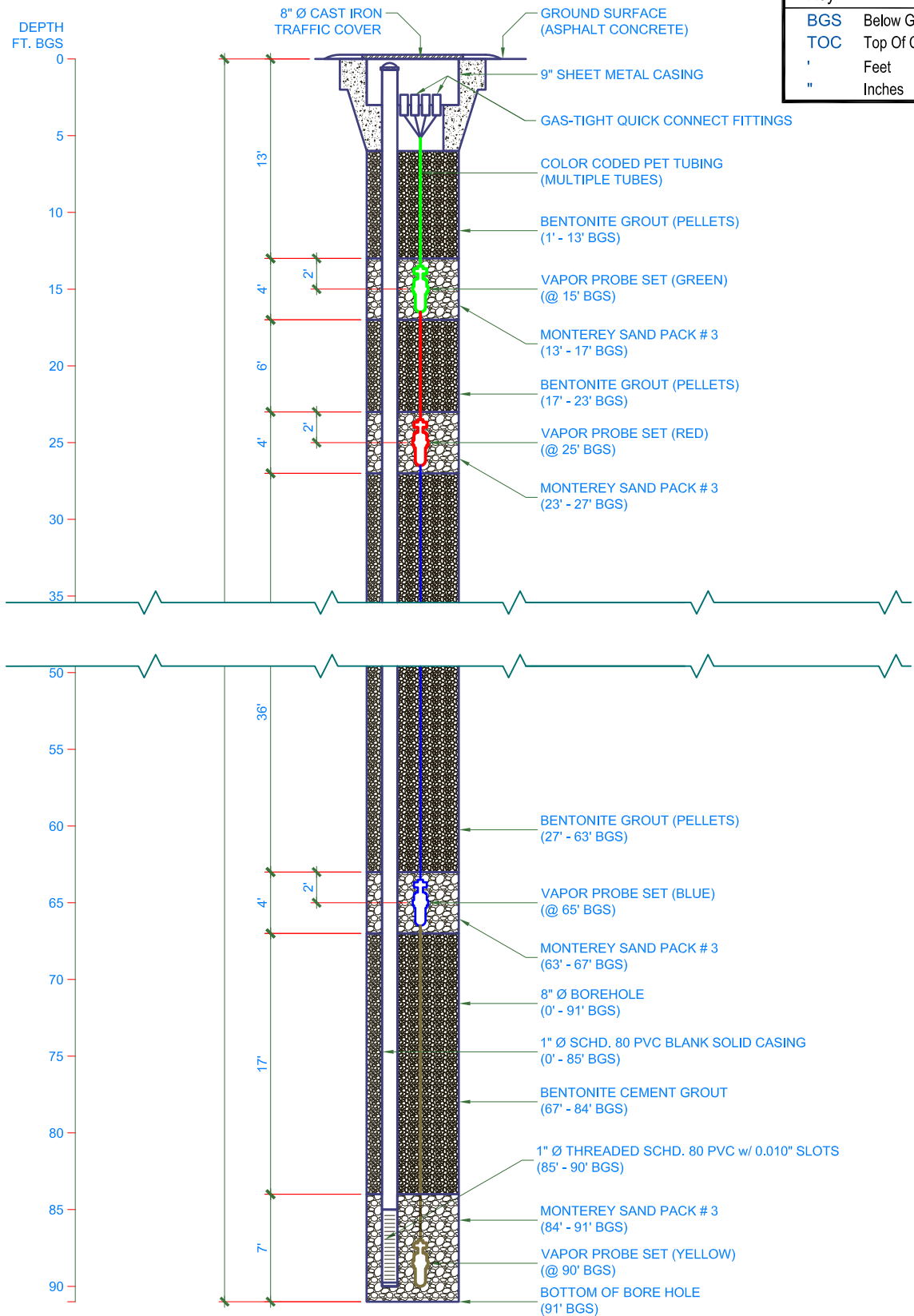


# BORING M-24 MONITORING WELL DETAIL

## METHANE

Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-24	DRAWN:	L. Morley
INSTALLED:	06/24/2009	CHKD:	Jag
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Cascade Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Paul Kane		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	La Cienega & West 3rd, Los Angeles, CA		

MTA WESTSIDE SUBWAY EXTENSION  
Parsons Brinckerhoff

WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

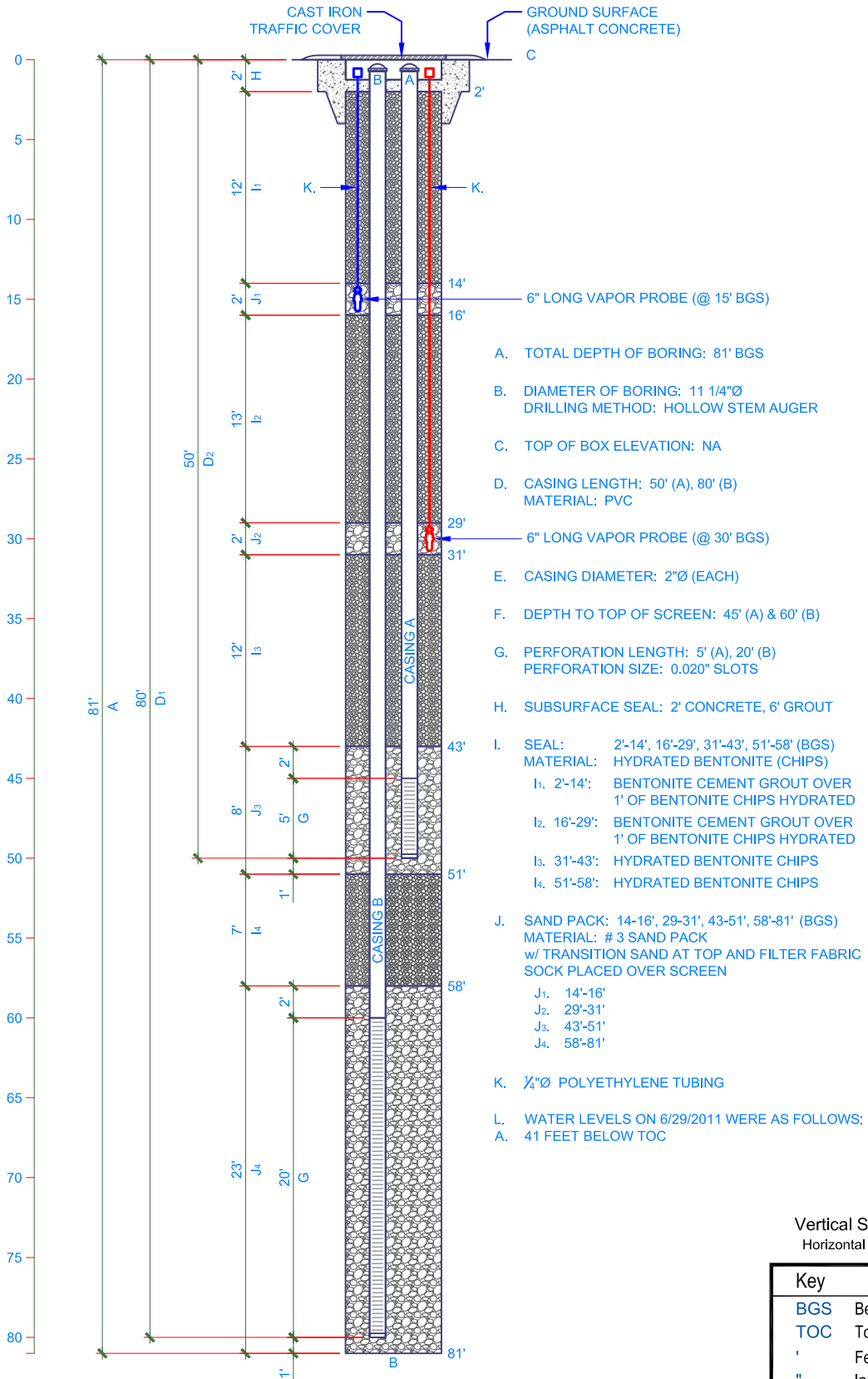
FIGURE NO.

**B-3.24**

PROJECT NO.  
4953-11-1421

**FIGURES B-4.1 THROUGH B-4.19  
GAS MONITORING WELL DIAGRAMS (PE PHASE)**

# METHANE VAPOR MONITORING WELL M-101



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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WELL NO.:	M-101	DRAWN:	L. Morley
INSTALLED:	06/30/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire & S. Cochran, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

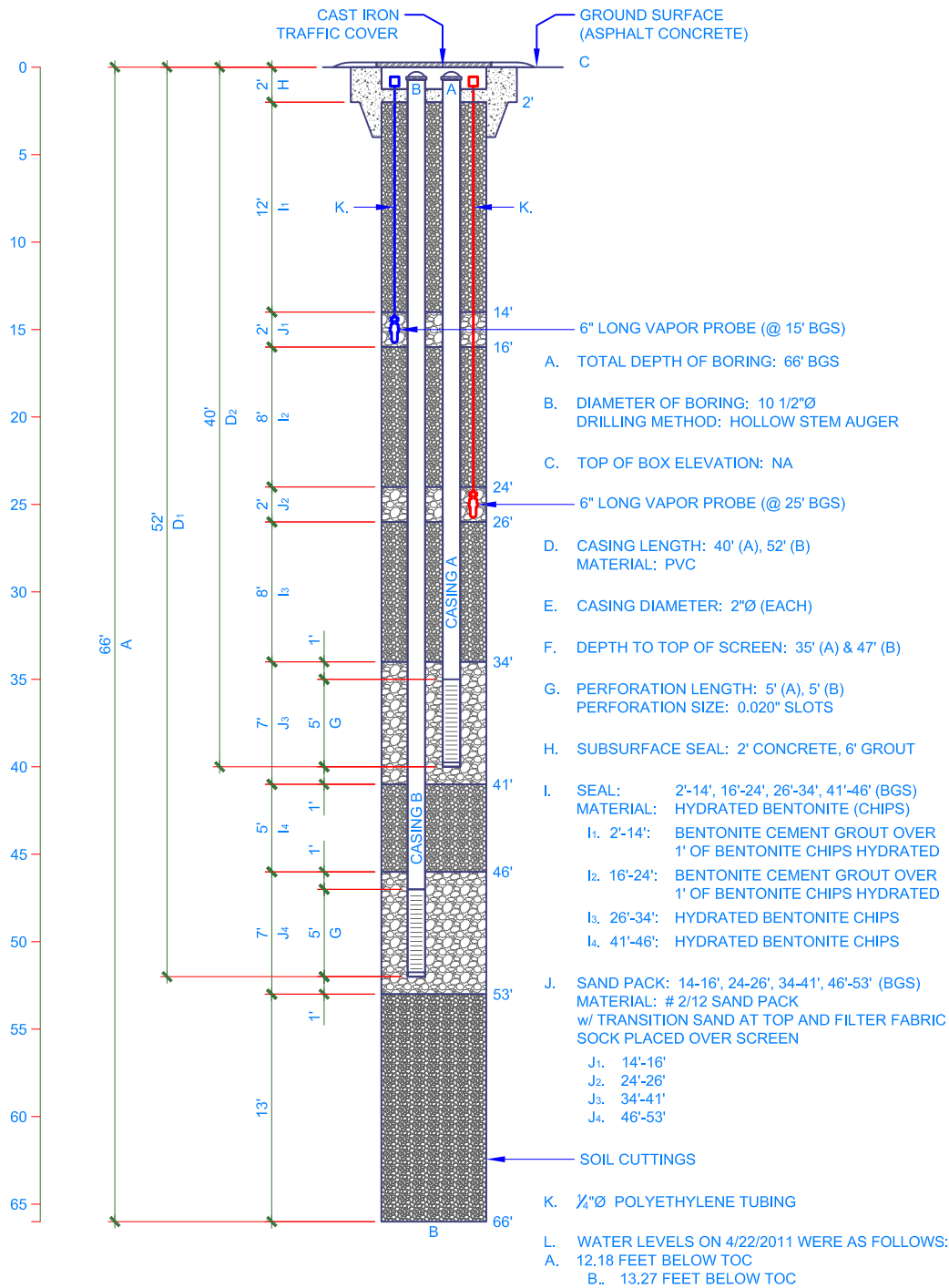
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.1**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-102



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-102	DRAWN:	L. Morley
INSTALLED:	03/31/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Jet Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire and S. Dunsmuir, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
Parsons Brinckerhoff

**WELL CONSTRUCTION  
DETAIL**  
Methane Gas Monitoring Well

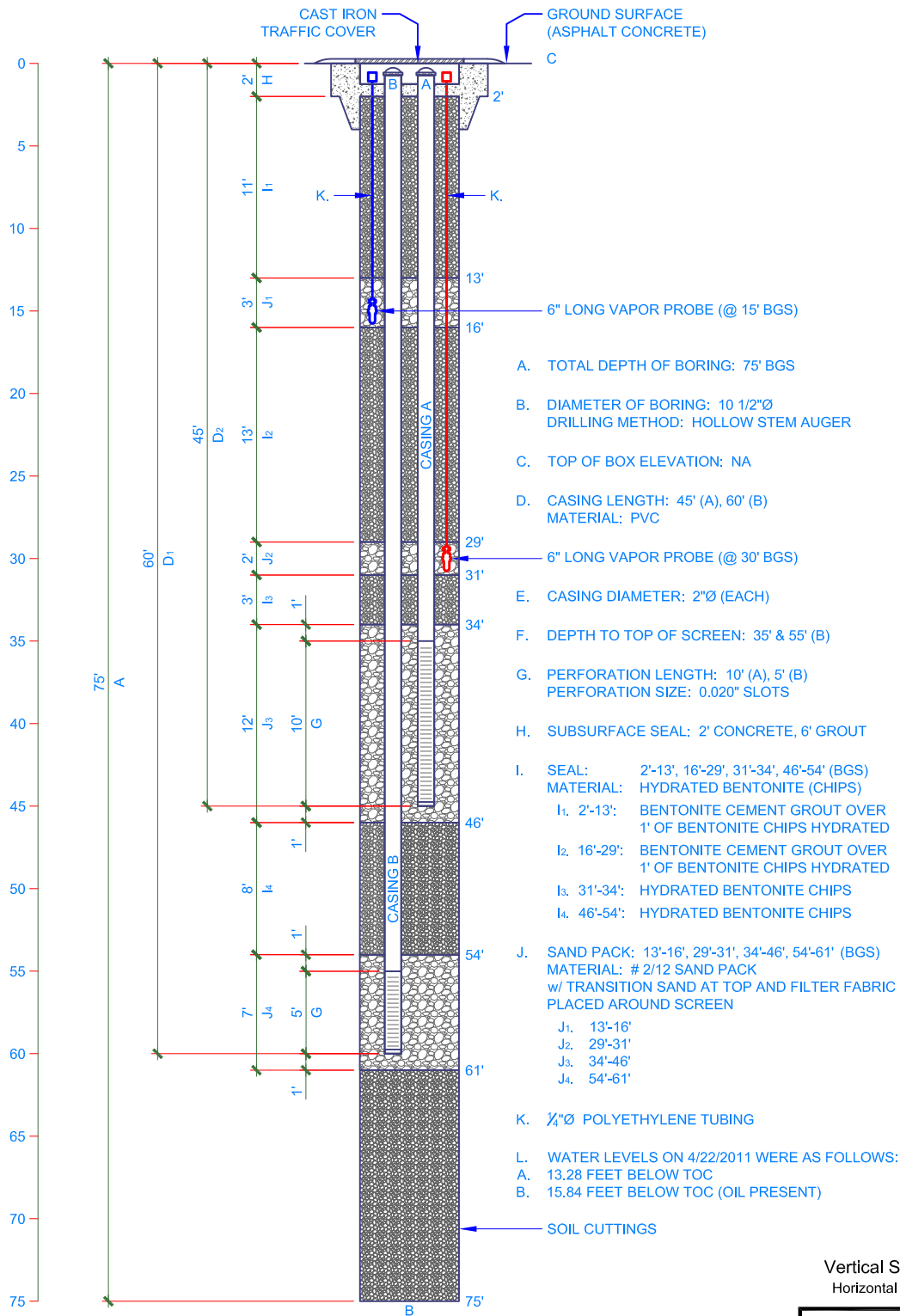
FIGURE NO.

**B-4.2**

PROJECT NO.  
4953-11-1421



# METHANE VAPOR MONITORING WELL M-103



- A. TOTAL DEPTH OF BORING: 75' BGS
- B. DIAMETER OF BORING: 10 1/2"Ø  
DRILLING METHOD: HOLLOW STEM AUGER
- C. TOP OF BOX ELEVATION: NA
- D. CASING LENGTH: 45' (A), 60' (B)  
MATERIAL: PVC
- E. CASING DIAMETER: 2"Ø (EACH)
- F. DEPTH TO TOP OF SCREEN: 35' & 55' (B)
- G. PERFORATION LENGTH: 10' (A), 5' (B)  
PERFORATION SIZE: 0.020" SLOTS
- H. SUBSURFACE SEAL: 2' CONCRETE, 6" GROUT
- I. SEAL: 2'-13', 16'-29', 31'-34', 46'-54' (BGS)  
MATERIAL: HYDRATED BENTONITE (CHIPS)
  - I1. 2'-13': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I2. 16'-29': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I3. 31'-34': HYDRATED BENTONITE CHIPS
  - I4. 46'-54': HYDRATED BENTONITE CHIPS
- J. SAND PACK: 13'-16', 29'-31', 34'-46', 54'-61' (BGS)  
MATERIAL: # 2/12 SAND PACK  
w/ TRANSITION SAND AT TOP AND FILTER FABRIC PLACED AROUND SCREEN
  - J1. 13'-16'
  - J2. 29'-31'
  - J3. 34'-46'
  - J4. 54'-61'
- K. 3/4"Ø POLYETHYLENE TUBING
- L. WATER LEVELS ON 4/22/2011 WERE AS FOLLOWS:
  - A. 13.28 FEET BELOW TOC
  - B. 15.84 FEET BELOW TOC (OIL PRESENT)

Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



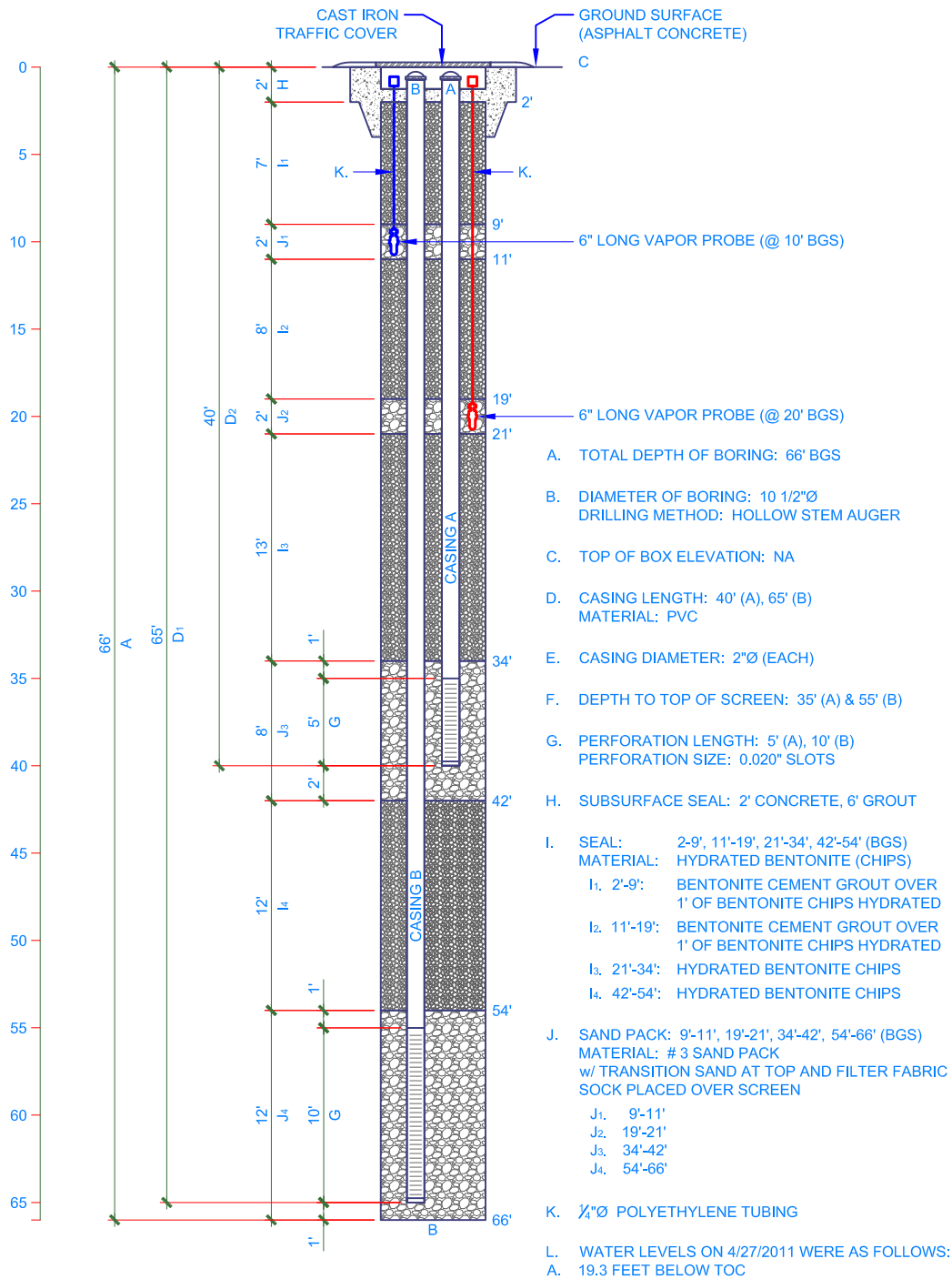
AMEC Environment & Infrastructure  
5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-103	DRAWN:	L. Morley
INSTALLED:	04/07/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Jet Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire and Ridgeley, Los Angeles, CA		

<b>MTA WESTSIDE EXTENSION</b> Parsons Brinckerhoff	
<b>WELL CONSTRUCTION DETAIL</b>	FIGURE NO. <b>B-4.3</b>
Methane Gas Monitoring Well	PROJECT NO. 4953-11-1421

Path: G:\4953\_Geotech\2011\11421\_Metro\Wells\4953-11-1421\_Wells.dwg [M103]  
Date: December 01, 2011 9:33pm By: LAINORLEY

# METHANE VAPOR MONITORING WELL M-104



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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WELL NO.:	M-104	DRAWN:	L. Morley
INSTALLED:	04/27/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL COS.:	Jet & Martini	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire west of Houser, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

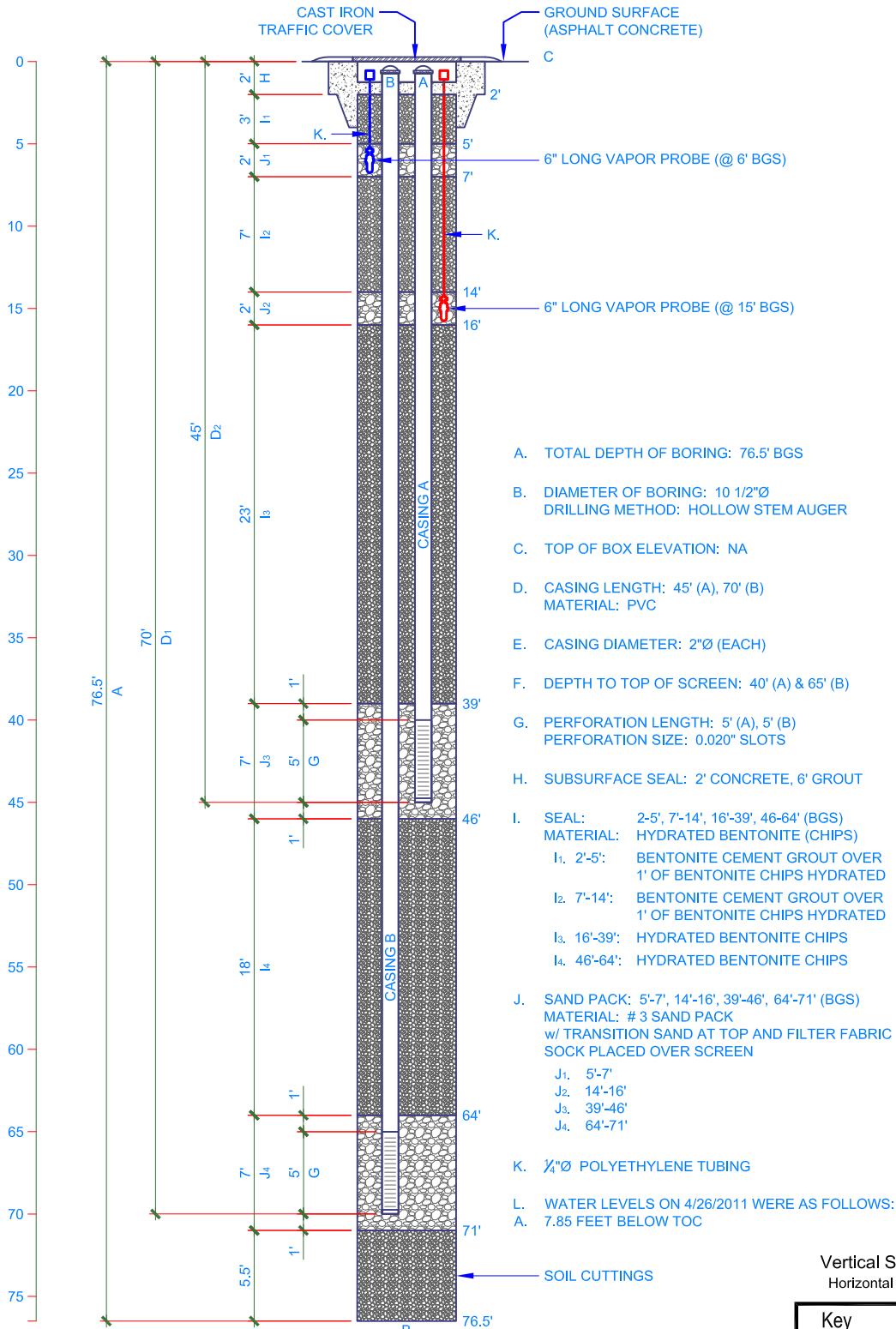
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.4**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-105



- A. TOTAL DEPTH OF BORING: 76.5' BGS
- B. DIAMETER OF BORING: 10 1/2"Ø  
DRILLING METHOD: HOLLOW STEM AUGER
- C. TOP OF BOX ELEVATION: NA
- D. CASING LENGTH: 45' (A), 70' (B)  
MATERIAL: PVC
- E. CASING DIAMETER: 2"Ø (EACH)
- F. DEPTH TO TOP OF SCREEN: 40' (A) & 65' (B)
- G. PERFORATION LENGTH: 5' (A), 5' (B)  
PERFORATION SIZE: 0.020" SLOTS
- H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT
- I. SEAL: 2'-5', 7'-14', 16'-39', 46'-64' (BGS)  
MATERIAL: HYDRATED BENTONITE (CHIPS)
  - I<sub>1</sub>. 2'-5': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I<sub>2</sub>. 7'-14': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I<sub>3</sub>. 16'-39': HYDRATED BENTONITE CHIPS
  - I<sub>4</sub>. 46'-64': HYDRATED BENTONITE CHIPS
- J. SAND PACK: 5'-7', 14'-16', 39'-46', 64'-71' (BGS)  
MATERIAL: # 3 SAND PACK  
w/ TRANSITION SAND AT TOP AND FILTER FABRIC SOCK PLACED OVER SCREEN
  - J<sub>1</sub>. 5'-7'
  - J<sub>2</sub>. 14'-16'
  - J<sub>3</sub>. 39'-46'
  - J<sub>4</sub>. 64'-71'
- K. 1/4"Ø POLYETHYLENE TUBING
- L. WATER LEVELS ON 4/26/2011 WERE AS FOLLOWS:  
A. 7.85 FEET BELOW TOC

Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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WELL NO.:	M-105	DRAWN:	L. Morley
INSTALLED:	04/26/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Jet Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire E of Court Yard Pl, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

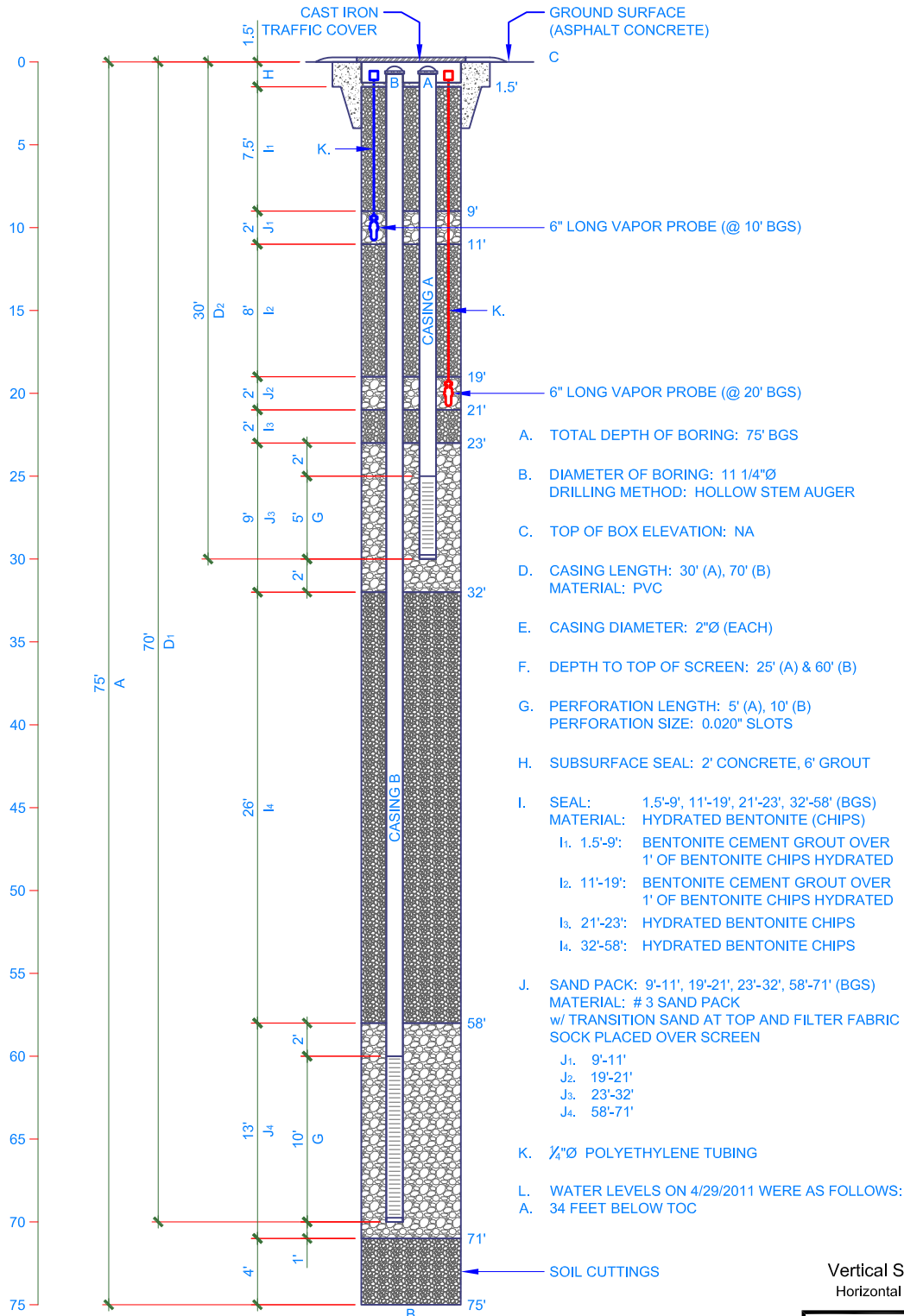
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.5**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-106



- A. TOTAL DEPTH OF BORING: 75' BGS
- B. DIAMETER OF BORING: 11 1/4"Ø  
DRILLING METHOD: HOLLOW STEM AUGER
- C. TOP OF BOX ELEVATION: NA
- D. CASING LENGTH: 30' (A), 70' (B)  
MATERIAL: PVC
- E. CASING DIAMETER: 2"Ø (EACH)
- F. DEPTH TO TOP OF SCREEN: 25' (A) & 60' (B)
- G. PERFORATION LENGTH: 5' (A), 10' (B)  
PERFORATION SIZE: 0.020" SLOTS
- H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT
- I. SEAL: 1.5'-9', 11'-19', 21'-23', 32'-58' (BGS)  
MATERIAL: HYDRATED BENTONITE (CHIPS)
  - I1. 1.5'-9': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I2. 11'-19': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I3. 21'-23': HYDRATED BENTONITE CHIPS
  - I4. 32'-58': HYDRATED BENTONITE CHIPS
- J. SAND PACK: 9'-11', 19'-21', 23'-32', 58'-71' (BGS)  
MATERIAL: # 3 SAND PACK  
w/ TRANSITION SAND AT TOP AND FILTER FABRIC SOCK PLACED OVER SCREEN
  - J1. 9'-11'
  - J2. 19'-21'
  - J3. 23'-32'
  - J4. 58'-71'
- K. 1/4"Ø POLYETHYLENE TUBING
- L. WATER LEVELS ON 4/29/2011 WERE AS FOLLOWS:  
A. 34 FEET BELOW TOC

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



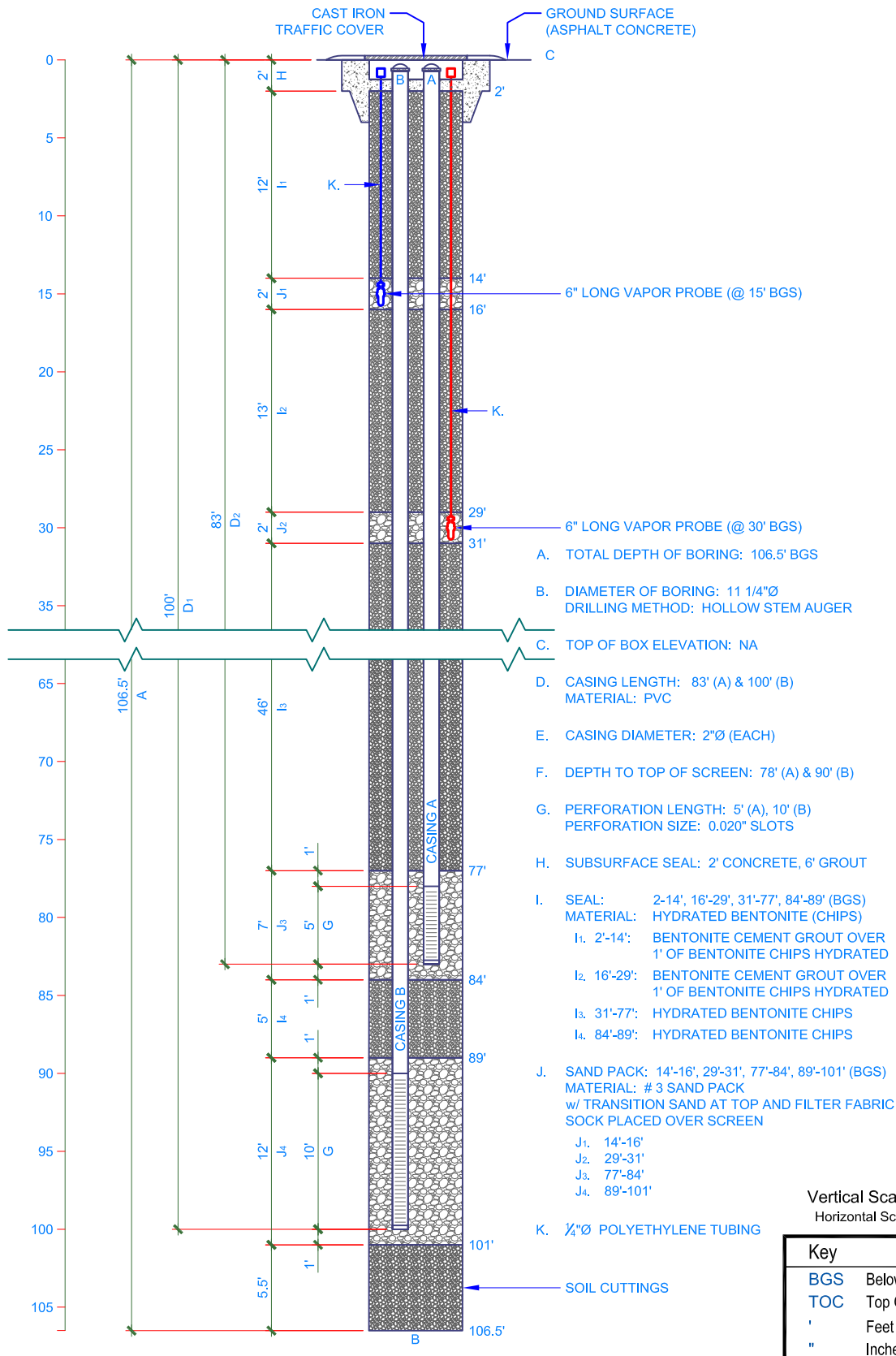
AMEC Environment & Infrastructure  
 5628 E. Slauson Avenue, Los Angeles, California 90040  
 Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-106	DRAWN:	L. Morley
INSTALLED:	04/29/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire W of Court Yard Pl, Los Angeles, CA		

<b>MTA WESTSIDE EXTENSION</b> Parsons Brinckerhoff	
<b>WELL CONSTRUCTION DETAIL</b>	FIGURE NO. <b>B-4.6</b>
Methane Gas Monitoring Well	PROJECT NO. 4953-11-1421

Path: G:\4893\_Geotech\2011\11421\_Metro\Wells\BoreCAD\m\Wells\M106.dwg (PE)\Wells.dwg [M106]  
 Date: December 01, 2011 11:53:49am By: LAINORLEY

# METHANE VAPOR MONITORING WELL M-107



Vertical Scale: 1" = 10'-0"  
 Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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WELL NO.: M-107	DRAWN: L. Morley
INSTALLED: 5/06 & 5/09/2011	CHKD: J. Neuhaus
SCALE: 1" = 10' Vertical	DATE: December 2, 2011
DRILL CO.: Martini Drilling	TECHNIQUE: Hollow Stem
FIELD PERSONNEL:	Rachel Mills
PROJECT NAME:	MTA Westside Subway Extension
WELL LOCATION:	Curson south of Wilshire, Los Angeles, CA

**MTA WESTSIDE EXTENSION**  
 Parsons Brinckerhoff

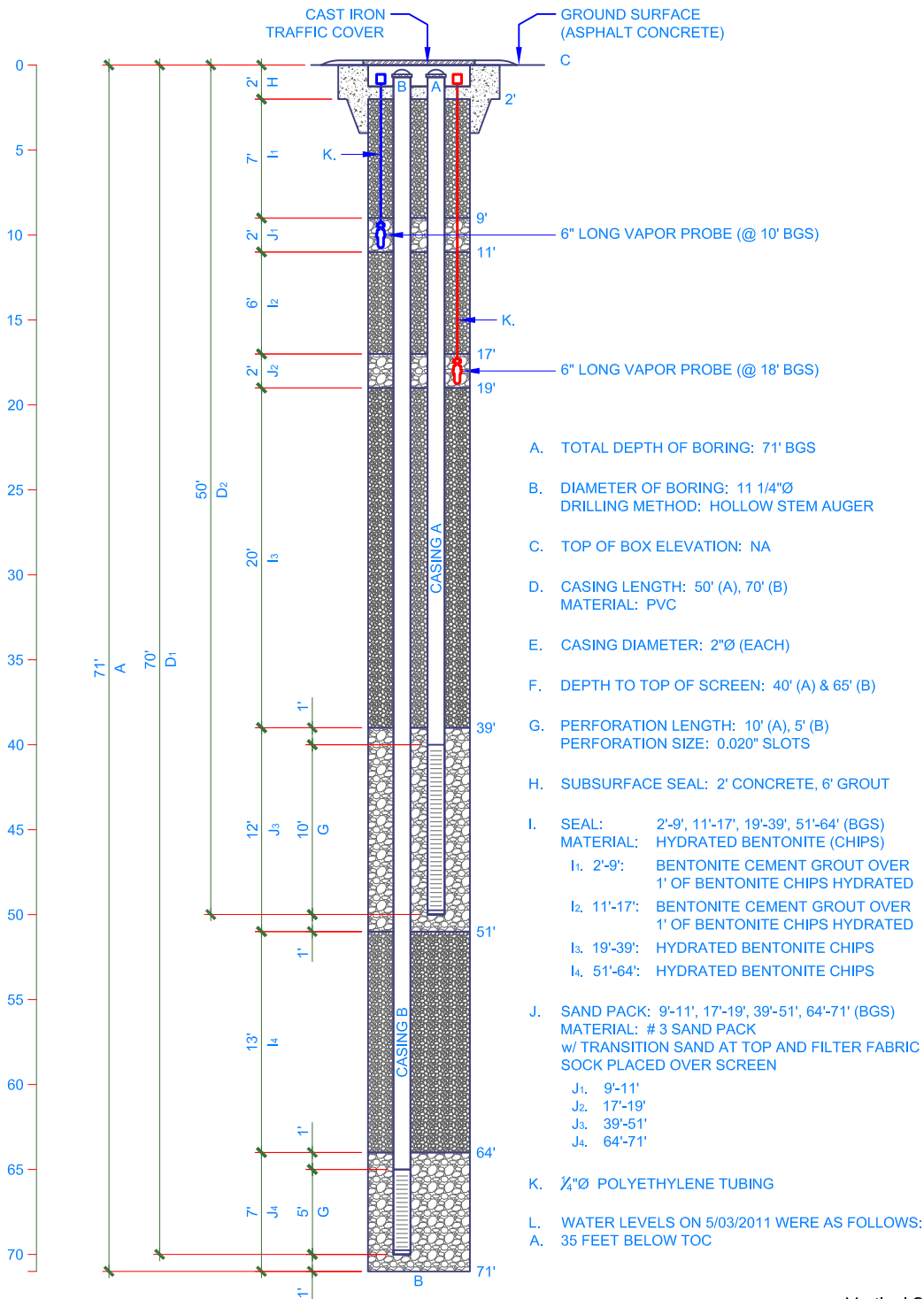
**WELL CONSTRUCTION**  
**DETAIL**  
 Methane Gas Monitoring Well

FIGURE NO.

**B-4.7**

PROJECT NO.  
 4953-11-1421

# METHANE VAPOR MONITORING WELL M-108



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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5628 E. Slauson Avenue, Los Angeles, California 90040  
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WELL NO.:	M-108	DRAWN:	L. Morley
INSTALLED:	05/03/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Curson north of Wilshire, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

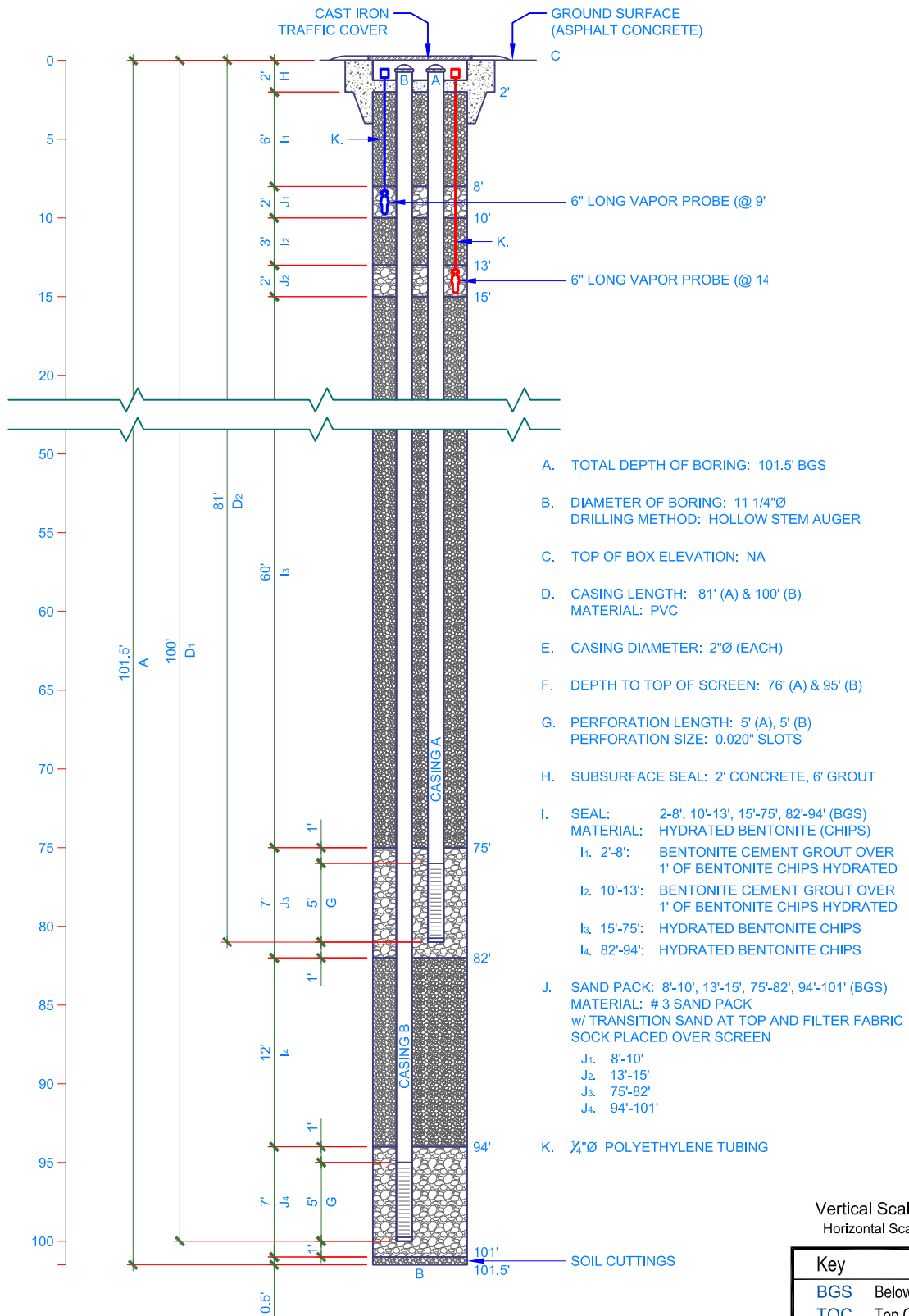
FIGURE NO.

**B-4.8**

PROJECT NO.

4953-11-1421

# METHANE VAPOR MONITORING WELL M-109



- A. TOTAL DEPTH OF BORING: 101.5' BGS
- B. DIAMETER OF BORING: 11 1/4"Ø  
DRILLING METHOD: HOLLOW STEM AUGER
- C. TOP OF BOX ELEVATION: NA
- D. CASING LENGTH: 81' (A) & 100' (B)  
MATERIAL: PVC
- E. CASING DIAMETER: 2"Ø (EACH)
- F. DEPTH TO TOP OF SCREEN: 76' (A) & 95' (B)
- G. PERFORATION LENGTH: 5' (A), 5' (B)  
PERFORATION SIZE: 0.020" SLOTS
- H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT
- I. SEAL: 2-8', 10'-13', 15'-75', 82'-94' (BGS)  
MATERIAL: HYDRATED BENTONITE (CHIPS)
  - I1. 2'-8': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I2. 10'-13': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I3. 15'-75': HYDRATED BENTONITE CHIPS
  - I4. 82'-94': HYDRATED BENTONITE CHIPS
- J. SAND PACK: 8'-10', 13'-15', 75'-82', 94'-101' (BGS)  
MATERIAL: # 3 SAND PACK  
w/ TRANSITION SAND AT TOP AND FILTER FABRIC SOCK PLACED OVER SCREEN
  - J1. 8'-10'
  - J2. 13'-15'
  - J3. 75'-82'
  - J4. 94'-101'
- K. 1/4"Ø POLYETHYLENE TUBING

Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-109	DRAWN:	L. Morley
INSTALLED:	5/11 & 5/12/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire and Stanley, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

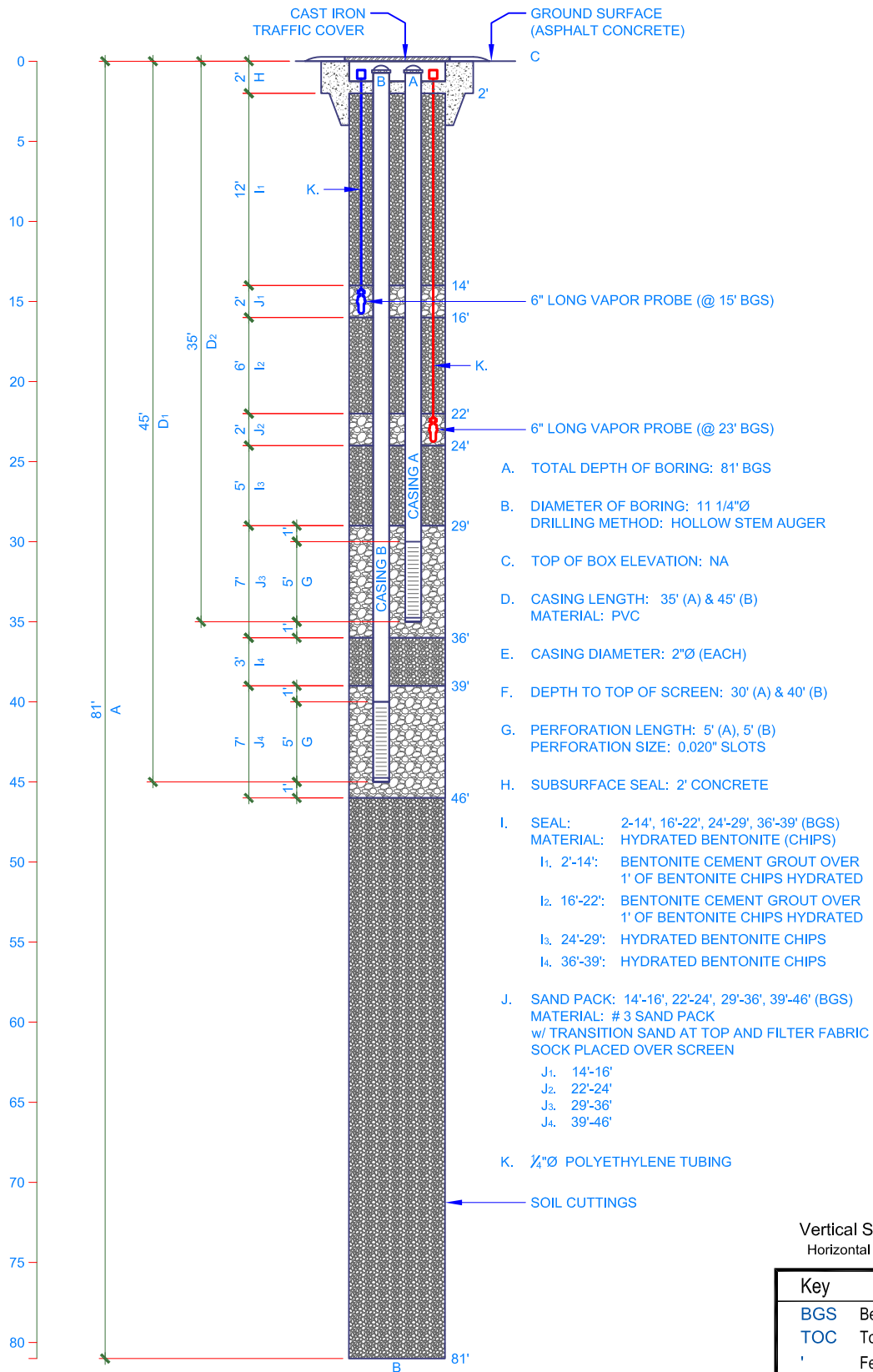
**B-4.9**

PROJECT NO.

4953-11-1421



# METHANE VAPOR MONITORING WELL M-110



Vertical Scale: 1" = 10'-0"  
 Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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 5628 E. Slauson Avenue, Los Angeles, California 90040  
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WELL NO.:	M-110	DRAWN:	L. Morley
INSTALLED:	05/17/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire west of Fairfax, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
 Parsons Brinckerhoff

**WELL CONSTRUCTION  
 DETAIL**  
 Methane Gas Monitoring Well

FIGURE NO.

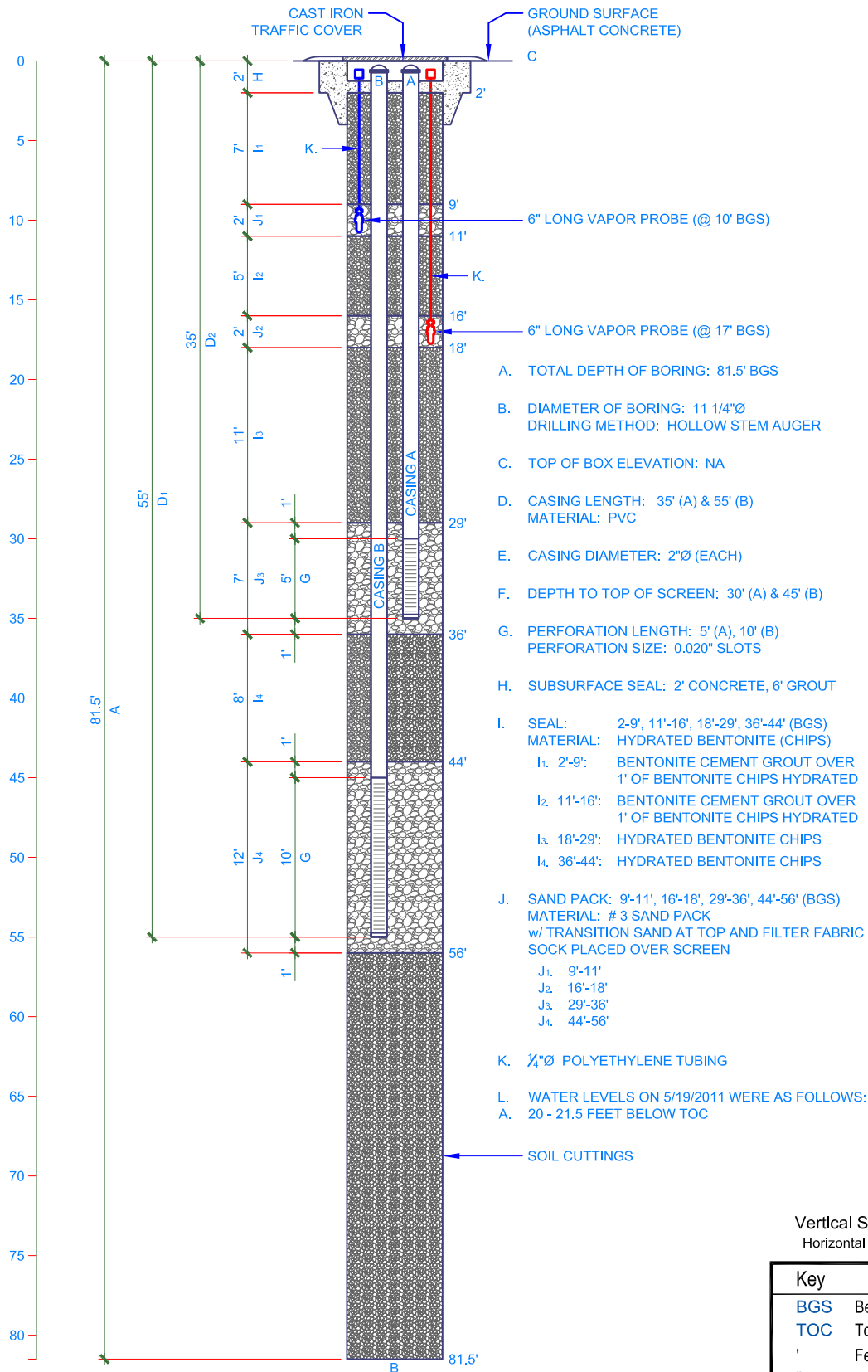
**B-4.10**

PROJECT NO.

4953-11-1421



# METHANE VAPOR MONITORING WELL M-111



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-111	DRAWN:	L. Morley
INSTALLED:	05/19/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Fairfax south of Wilshire, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

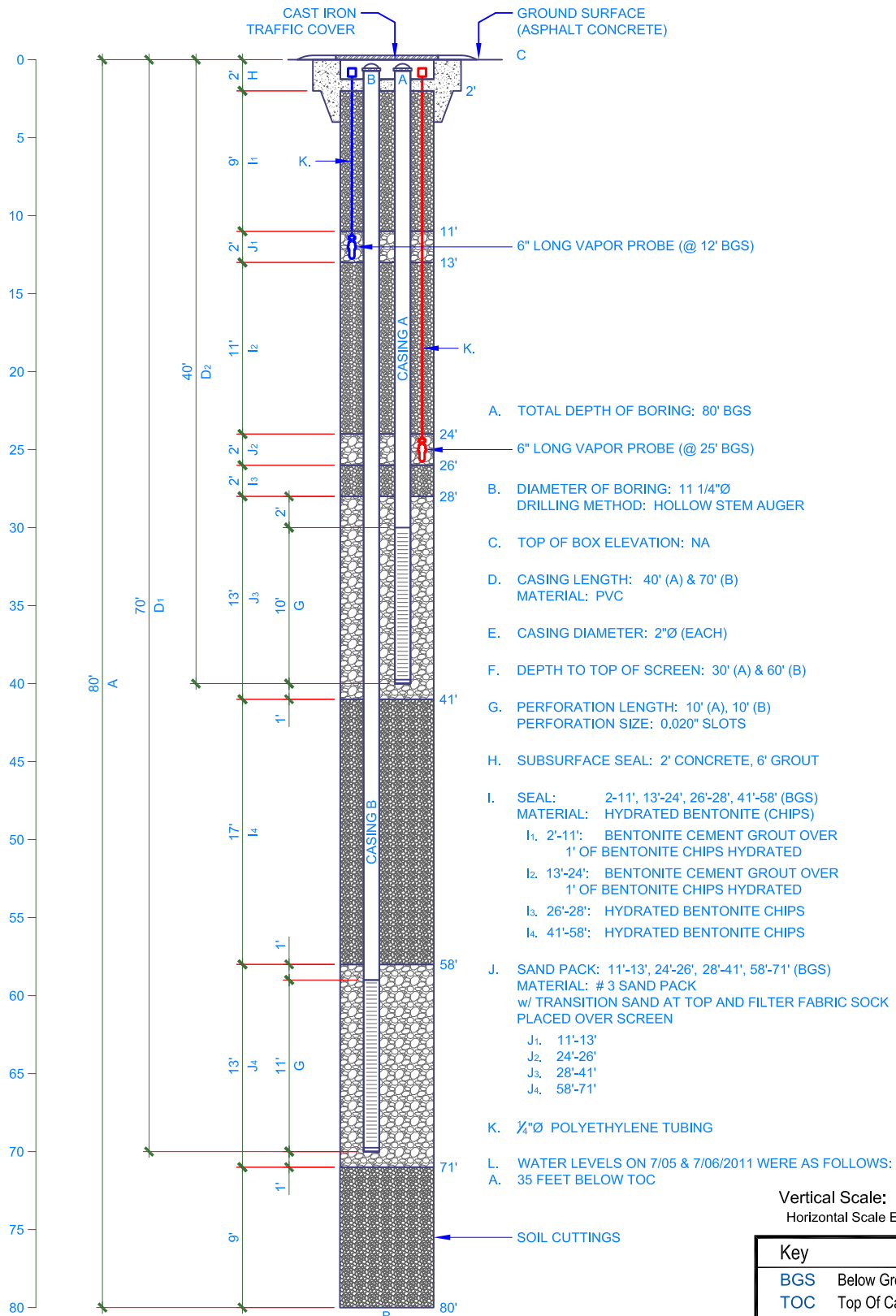
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.11**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-112



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated



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5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-112	DRAWN:	L. Morley
INSTALLED:	07/06/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Fairfax north of Wilshire, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

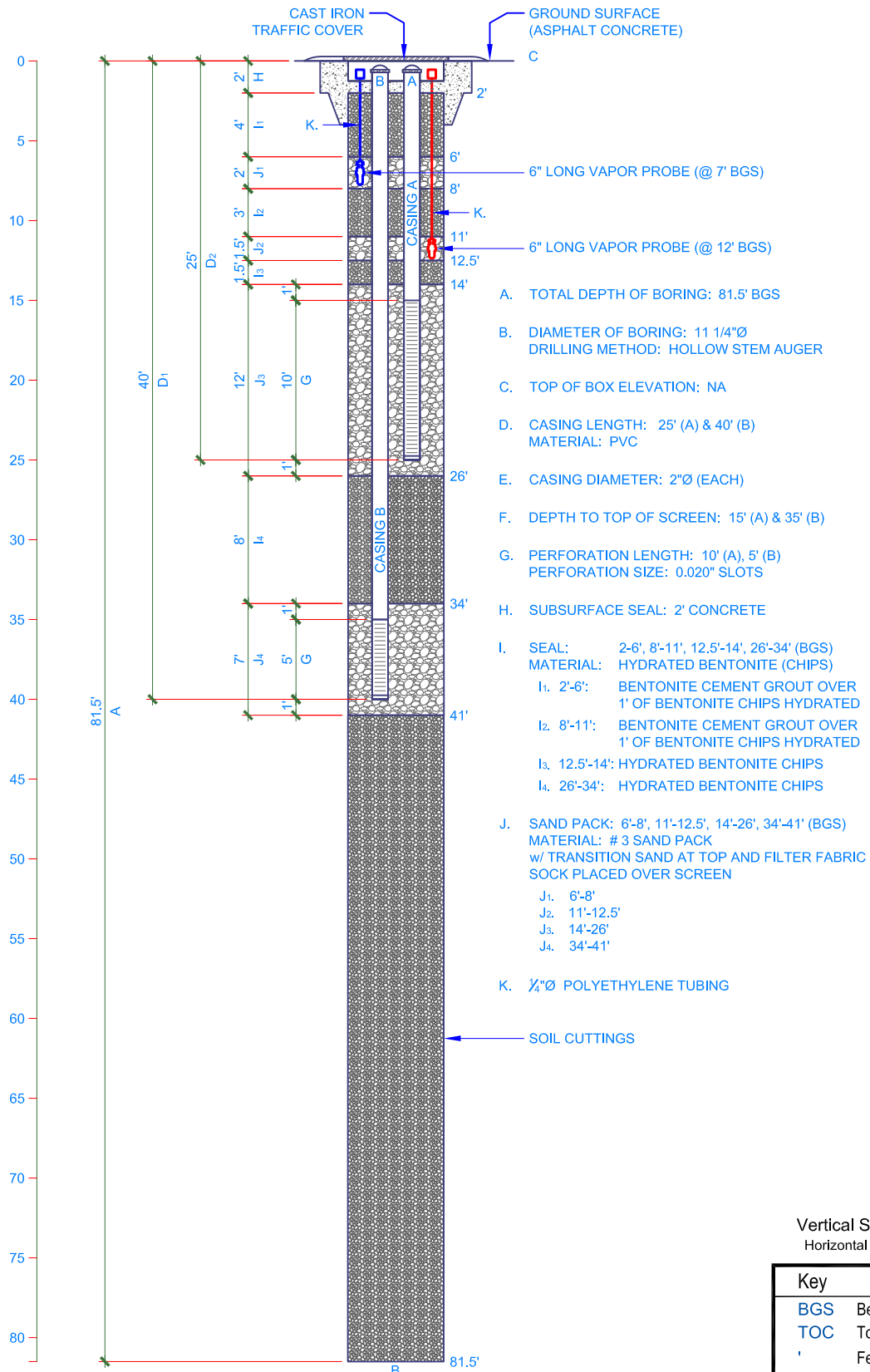
FIGURE NO.

**B-4.12**

PROJECT NO.

4953-11-1421

# METHANE VAPOR MONITORING WELL M-113



Vertical Scale: 1" = 10'-0"  
 Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



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 5628 E. Slauson Avenue, Los Angeles, California 90040  
 Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-113	DRAWN:	L. Morley
INSTALLED:	05/24/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire west of Fairfax, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
 Parsons Brinckerhoff

**WELL CONSTRUCTION  
 DETAIL**  
 Methane Gas Monitoring Well

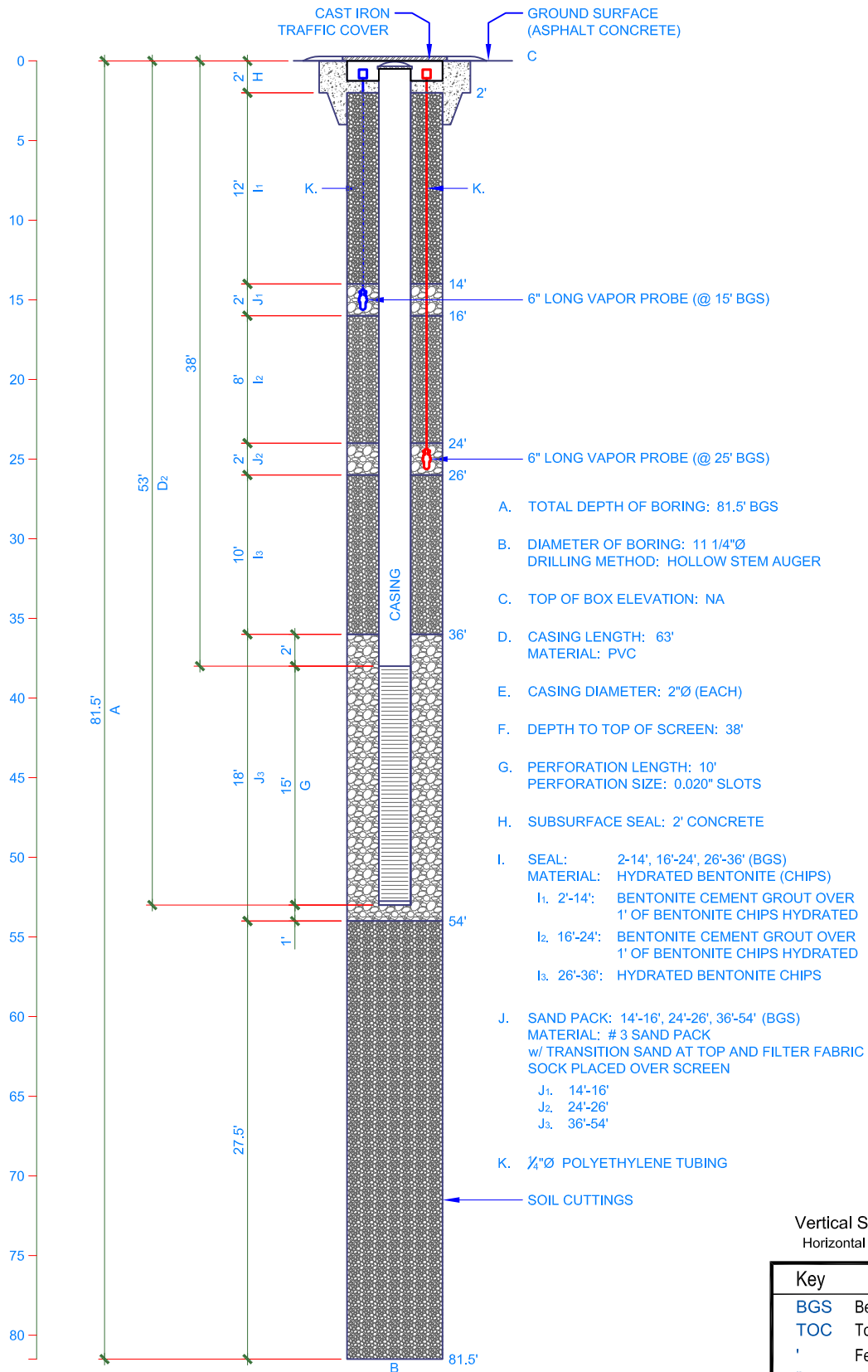
FIGURE NO.

**B-4.13**

PROJECT NO.

4953-11-1421

# METHANE VAPOR MONITORING WELL M-114



AMEC Environment & Infrastructure  
 5628 E. Slauson Avenue, Los Angeles, California 90040  
 Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-114	DRAWN:	L. Morley
INSTALLED:	06/21/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire E of McCarthy Vista, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
 Parsons Brinckerhoff

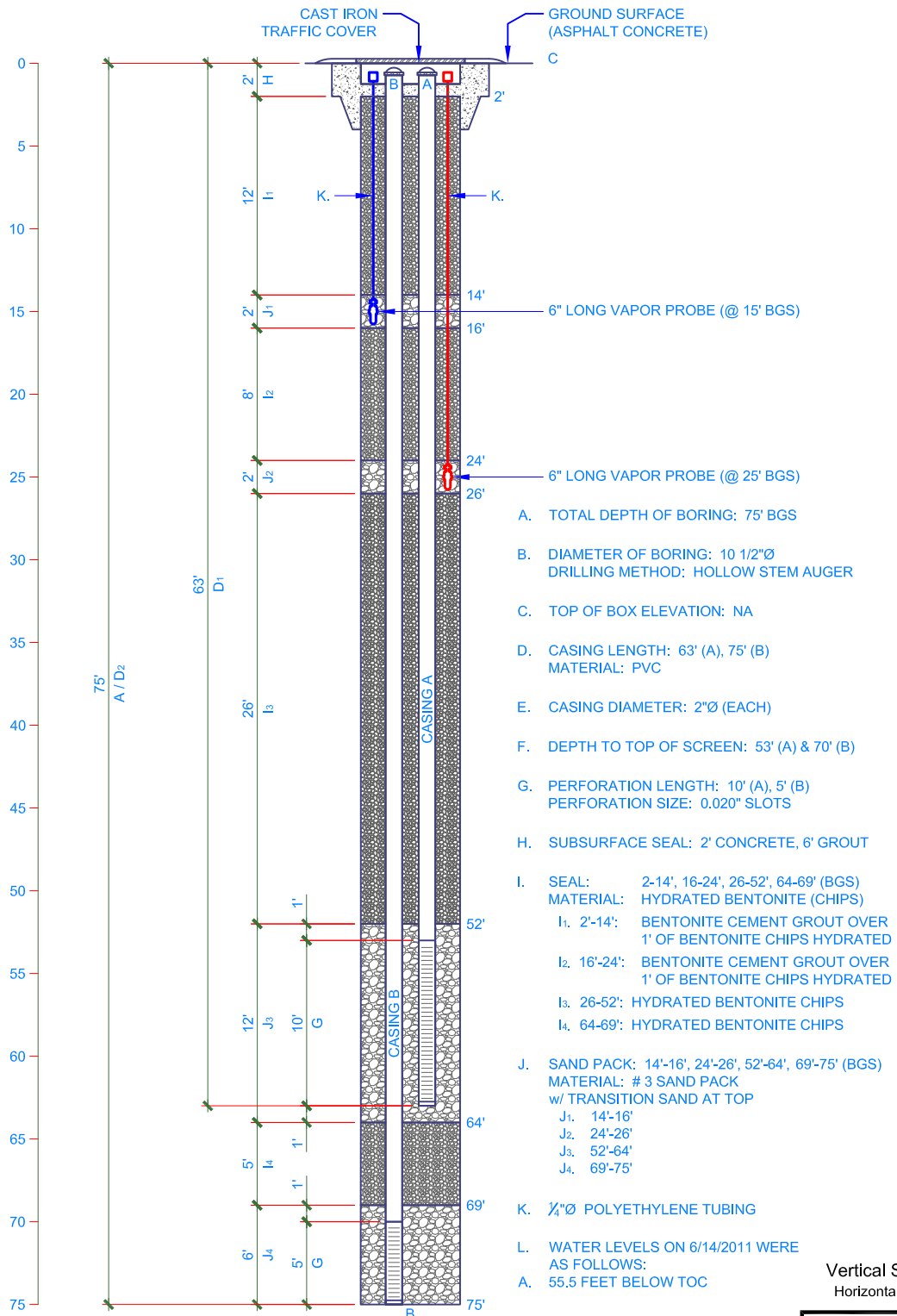
**WELL CONSTRUCTION  
 DETAIL**  
 Methane Gas Monitoring Well

FIGURE NO.

**B-4.14**

PROJECT NO.  
 4953-11-1421

# METHANE VAPOR MONITORING WELL M-115



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated

Key	
BGS	Below Ground Surface
TOC	Top Of Casing
'	Feet
"	Inches



AMEC Environment & Infrastructure  
5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-115	DRAWN:	L. Morley
INSTALLED:	06/14/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Gregg Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire W of McCarthy Vista, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

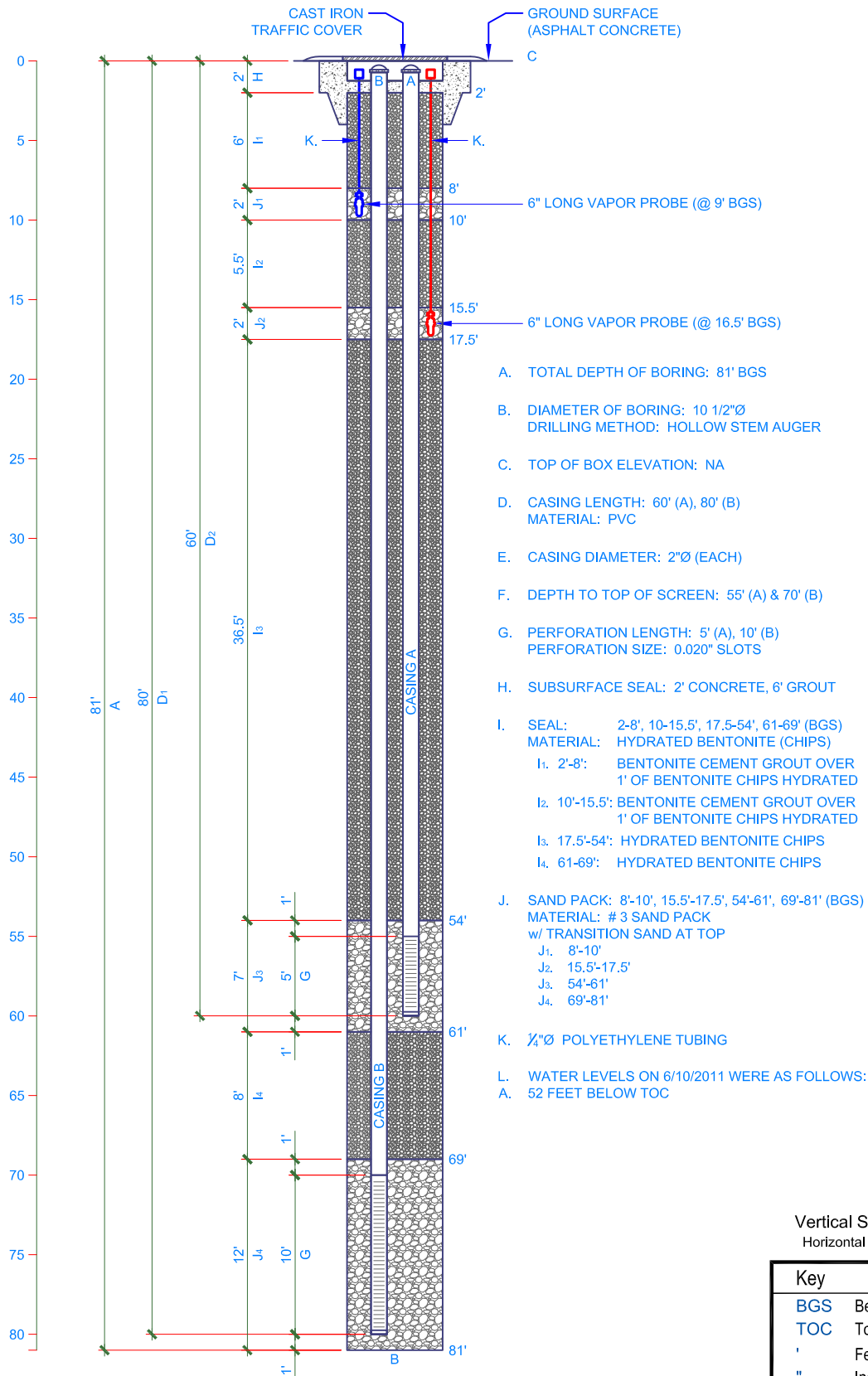
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.15**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-116



- A. TOTAL DEPTH OF BORING: 81' BGS
- B. DIAMETER OF BORING: 10 1/2"Ø  
DRILLING METHOD: HOLLOW STEM AUGER
- C. TOP OF BOX ELEVATION: NA
- D. CASING LENGTH: 60' (A), 80' (B)  
MATERIAL: PVC
- E. CASING DIAMETER: 2"Ø (EACH)
- F. DEPTH TO TOP OF SCREEN: 55' (A) & 70' (B)
- G. PERFORATION LENGTH: 5' (A), 10' (B)  
PERFORATION SIZE: 0.020" SLOTS
- H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT
- I. SEAL: 2-8', 10-15.5', 17.5-54', 61-69' (BGS)  
MATERIAL: HYDRATED BENTONITE (CHIPS)
  - I1. 2'-8': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I2. 10'-15.5': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  - I3. 17.5-54': HYDRATED BENTONITE CHIPS
  - I4. 61-69': HYDRATED BENTONITE CHIPS
- J. SAND PACK: 8'-10', 15.5'-17.5', 54'-61', 69'-81' (BGS)  
MATERIAL: # 3 SAND PACK  
w/ TRANSITION SAND AT TOP
  - J1. 8'-10'
  - J2. 15.5'-17.5'
  - J3. 54'-61'
  - J4. 69'-81'
- K. 1/4"Ø POLYETHYLENE TUBING
- L. WATER LEVELS ON 6/10/2011 WERE AS FOLLOWS:  
A. 52 FEET BELOW TOC

Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated



AMEC Environment & Infrastructure  
5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-116	DRAWN:	L. Morley
INSTALLED:	06/10/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Gregg Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire E of San Vicente, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

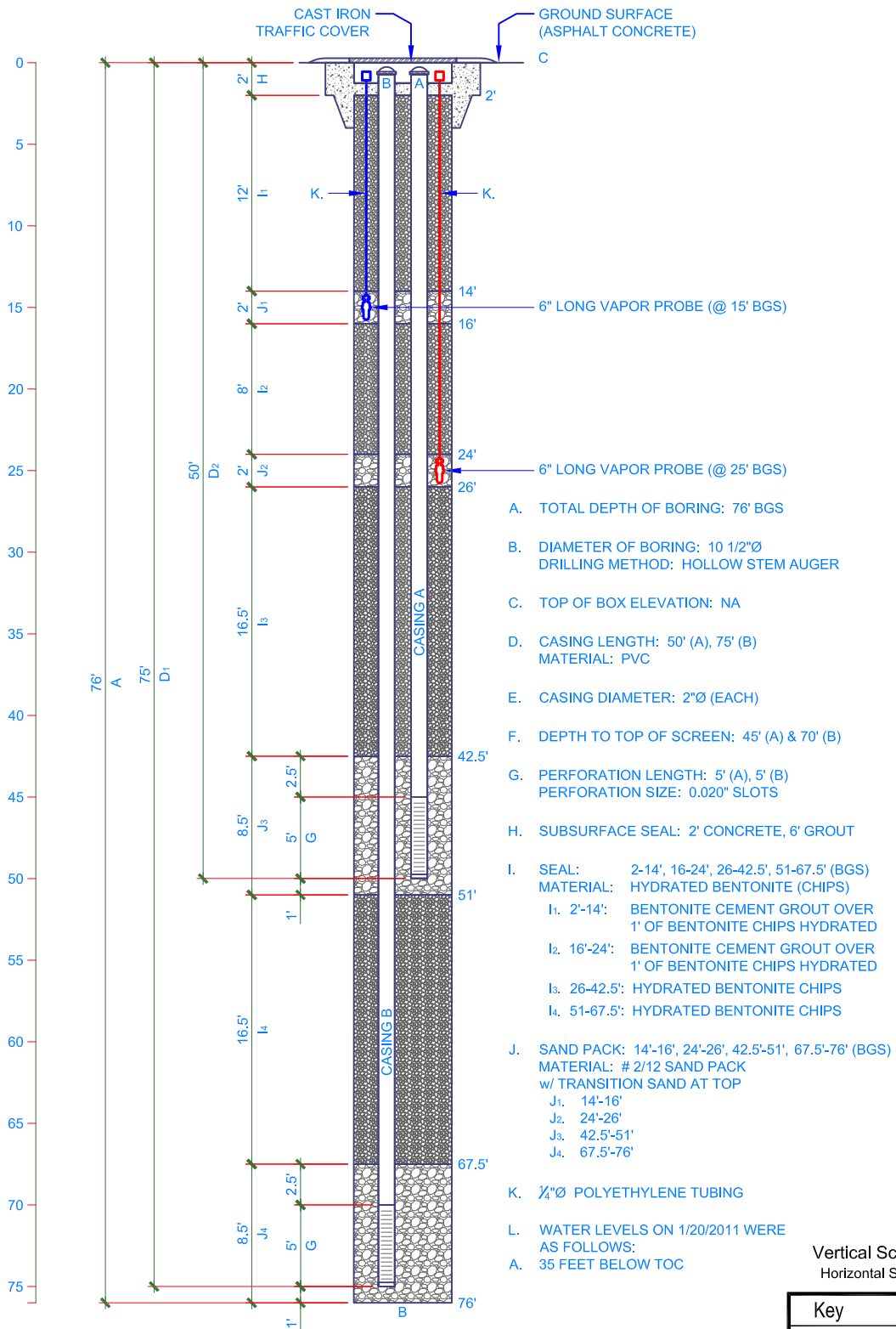
WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.16**

PROJECT NO.  
4953-11-1421

# METHANE VAPOR MONITORING WELL M-119



Vertical Scale: 1" = 10'-0"  
Horizontal Scale Exaggerated



AMEC Environment & Infrastructure  
5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-119	DRAWN:	L. Morley
INSTALLED:	01/20/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Jet Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire W of Century Park, Los Angeles, CA		

MTA WESTSIDE EXTENSION  
Parsons Brinckerhoff

WELL CONSTRUCTION  
DETAIL  
Methane Gas Monitoring Well

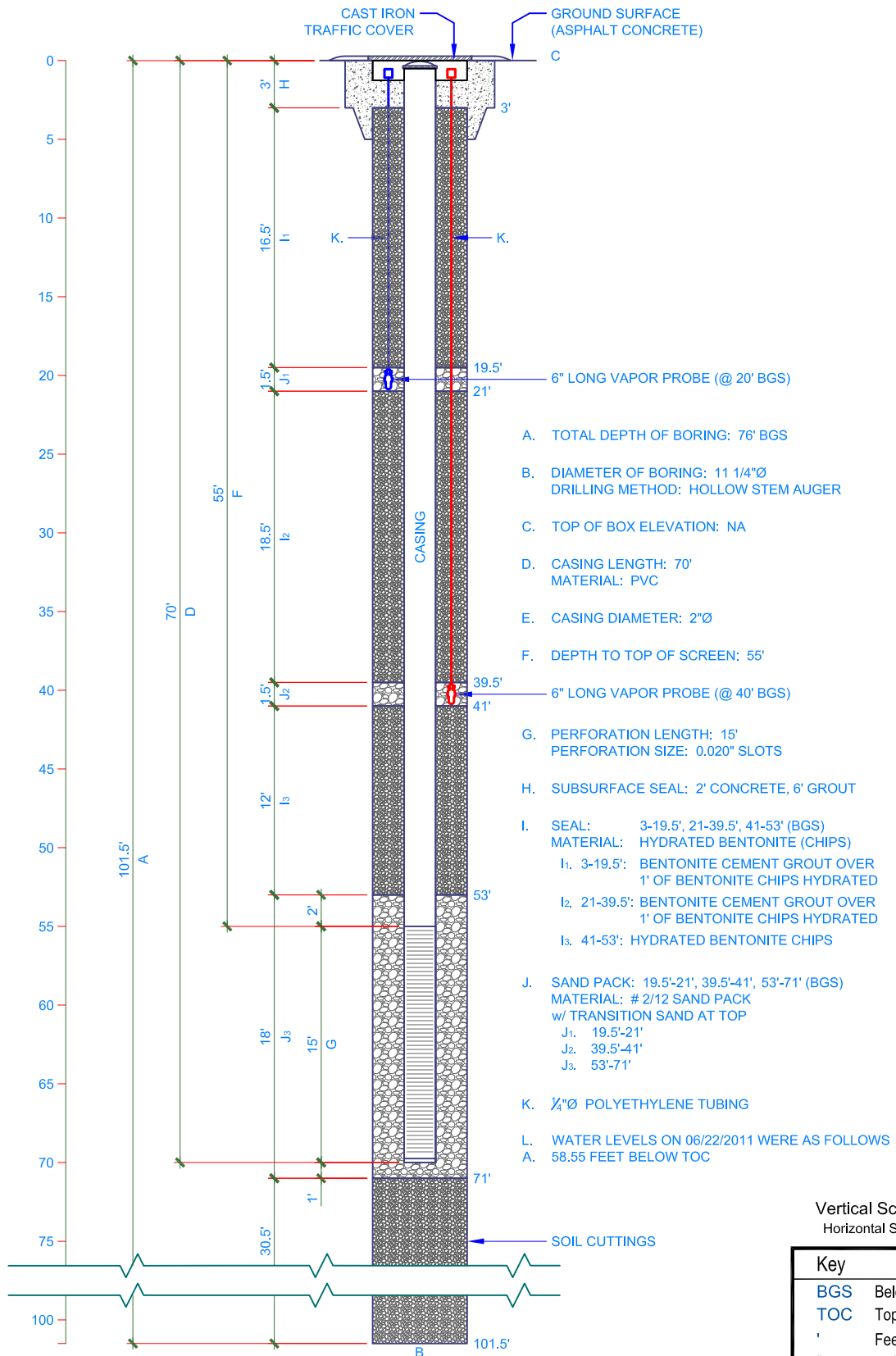
FIGURE NO.

**B-4.17**

PROJECT NO.  
4953-11-1421



# METHANE VAPOR MONITORING WELL M-122



AMEC Environment & Infrastructure  
 5628 E. Slauson Avenue, Los Angeles, California 90040  
 Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-122	DRAWN:	L. Morley
INSTALLED:	06/22/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	Wilshire W of Veteran Ave, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
 Parsons Brinckerhoff

**WELL CONSTRUCTION  
 DETAIL**  
 Methane Gas Monitoring Well

FIGURE NO.

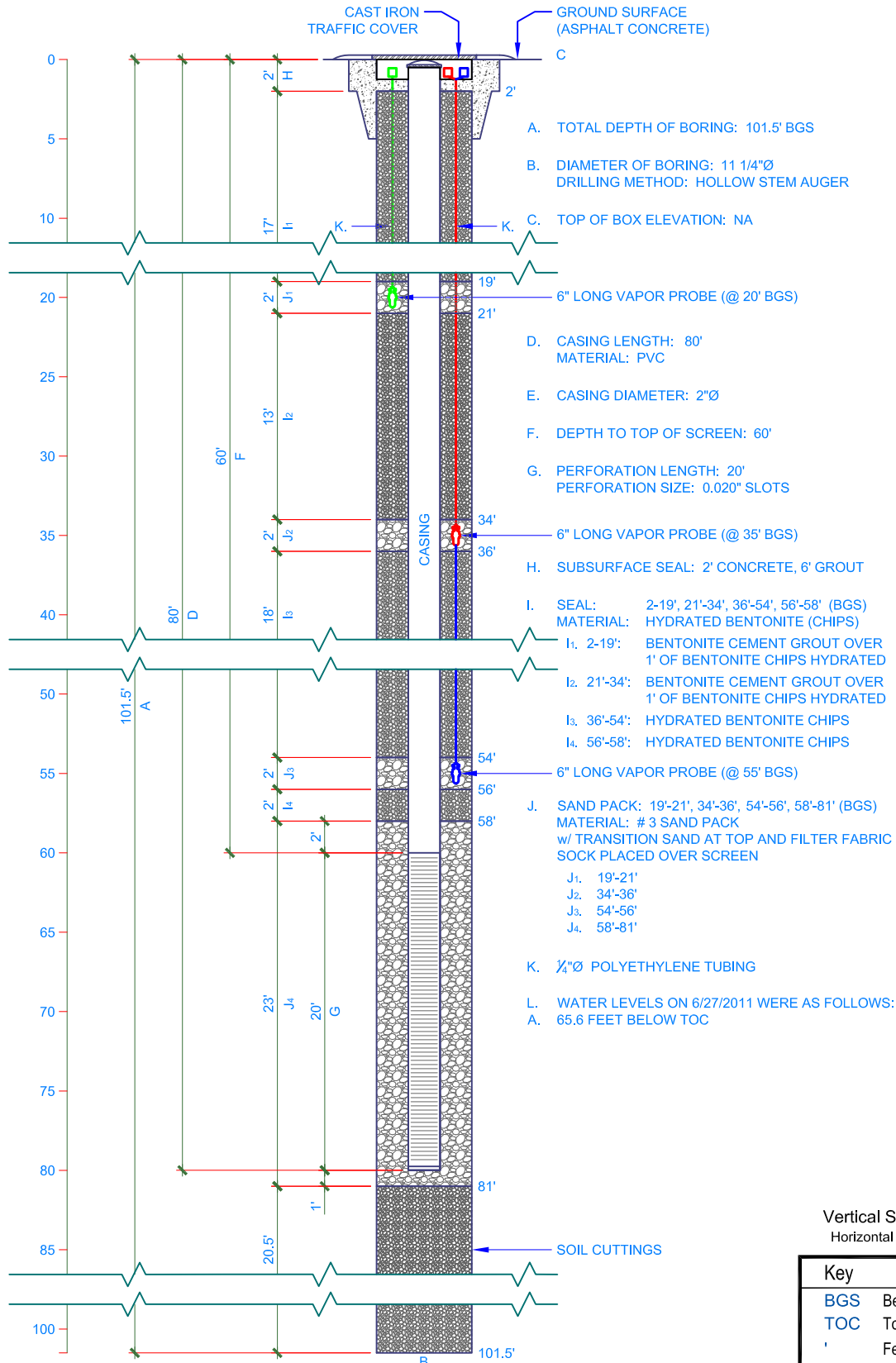
**B-4.18**

PROJECT NO.

4953-11-1421



# METHANE VAPOR MONITORING WELL M-124



AMEC Environment & Infrastructure  
5628 E. Slauson Avenue, Los Angeles, California 90040  
Phone (323) 889-5300 Fax (323) 889-5398

WELL NO.:	M-124	DRAWN:	L. Morley
INSTALLED:	06/28/2011	CHKD:	J. Neuhaus
SCALE:	1" = 10' Vertical	DATE:	December 2, 2011
DRILL CO.:	Martini Drilling	TECHNIQUE:	Hollow Stem
FIELD PERSONNEL:	Rachel Mills		
PROJECT NAME:	MTA Westside Subway Extension		
WELL LOCATION:	VA Hospital Station, Los Angeles, CA		

**MTA WESTSIDE EXTENSION**  
Parsons Brinckerhoff

**WELL CONSTRUCTION  
DETAIL**  
Methane Gas Monitoring Well

FIGURE NO.

**B-4.19**

PROJECT NO.

4953-11-1421

**FIGURES B-5.1 THROUGH B-5.8  
FIELD SOIL GAS AND HYDROGEN SULFIDE MEASUREMENTS**

MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

H&P Project #MAC081809 TECH LANDTEC

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE & BAROMETERIC PRESSURE ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	METHANE (%)	CO2 (%)	OXYGEN (%)	PROBE PRESSURE " of Water	BAROMETERIC PRESSURE " of Hg
M-2-15'	08/18/09	9:51	15'	ND	0.6	10.5	0.0	29.68
M-2-25'	08/18/09	9:58	25'	ND	4.8	13.9	0.0	29.68
M-2-65'	08/18/09	--	65'	--	--	--	0.2	29.68
M-2-90'	08/18/09	10:00	90'	ND	2.8	11.5	0.0	29.68
M-3-15'	08/18/09	10:31	15'	0.4	6.0	0.3	0.0	29.68
M-3-25'	08/18/09	10:35	25'	0.2	1.8	7.9	0.0	29.68
M-3-65'	08/18/09	10:38	65'	0.1	0.5	12.3	0.0	29.68
M-3-90'	08/18/09	10:40	90'	0.1	1.8	8.7	0.0	29.68
M-9-15'	08/18/09	11:01	15'	0.6	3.3	16.7	0.0	29.68
M-9-25'	08/18/09	11:06	25'	5.5	5.9	8.3	0.2	29.68
M-9-65'	08/18/09	11:09	60'	5.7	4.6	9.7	0.0	29.68
M-9-90'	08/18/09	11:13	90'	9.1	4.0	9.1	0.0	29.68
M-14-15'	08/18/09	11:41	15'	ND	0.4	0.7	0.0	29.68
M-14-25'	08/18/09	11:44	25'	0.7	1.5	0.9	0.0	29.68
M-14-65'	08/18/09	11:46	65'	3.2	0.1	7.0	0.0	29.68
M-14-90'	08/18/09	11:50	90'	4.3	0.2	6.5	0.0	29.68
M-15-15'	08/18/09	12:07	15'	ND	1.3	17.6	0.0	29.68
M-15-25'	08/18/09	12:10	25'	ND	2.0	15.4	0.0	29.68
M-15-65'	08/18/09	12:13	60'	ND	1.5	14.7	0.0	29.68
M-15-90'	08/18/09	12:16	90'	ND	1.5	14.5	0.0	29.68
M-17-15'	08/18/09	12:48	15'	ND	2.5	6.8	0.0	29.73
M-17-25'	08/18/09	12:55	25'	ND	0.8	9.2	0.0	29.73
M-17-65'	08/18/09	12:58	65'	ND	0.7	8.7	0.2	29.73
M-17-90'	08/18/09	13:01	90'	ND	0.3	11.5	0.2	29.73
M-25-15'	08/18/09	14:17	15'	ND	2.0	3.3	0.0	29.73
M-25-25'	08/18/09	14:20	25'	ND	0.3	10.2	0.0	29.73
M-25-60'	08/18/09	14:52	60'	ND	ND	19.2	0.0	29.73
M-25-100'	08/18/09	14:56	100'	ND	ND	18.9	0.0	29.73
M-21-15'	08/18/09	15:25	15'	ND	0.1	19.1	0.0	29.73
M-21-25'	08/18/09	15:28	25'	ND	0.4	19.1	0.0	29.73
M-21-65'	08/18/09	15:31	65'	ND	0.2	19.0	0.1	29.73
M-21-90'	08/18/09	15:35	90'	ND	0.2	18.7	0.1	29.73
MDL				0.1	0.1	0.1		

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE, AND BAROMETERIC PRESSURE MEASURED BY LANDTEC MODEL GEM 2000  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL

MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

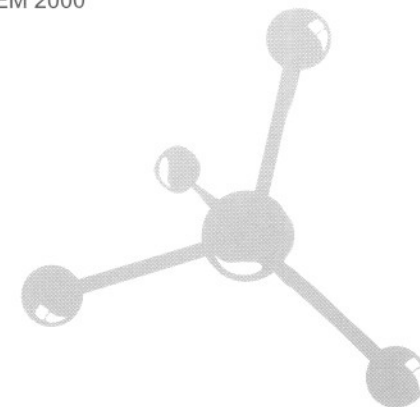
H&P Project #MAC081809 TECH LANDTEC

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE & BAROMETRIC PRESSURE ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	METHANE (%)	CO2 (%)	OXYGEN (%)	PROBE PRESSURE " of Water	BAROMETRIC PRESSURE " of Hg
M-1-15'	08/19/09	9:28	15'	ND	7.0	5.1	0.0	29.63
M-1-25'	08/19/09	9:37	25'	ND	0.1	19.5	0.0	29.63
M-1-65'	08/19/09	9:31	65'	ND	3.6	8.8	0.0	29.63
M-1-90'	08/19/09	9:33	90'	ND	4.1	6.3	0.0	29.63
M-4-15'	08/19/09	10:03	15'	0.6	4.2	0.1	0.0	29.63
M-4-25'	08/19/09	10:06	25'	0.4	0.4	4.6	0.0	29.63
M-4-65'	08/19/09	10:09	65'	0.5	0.5	3.9	0.0	29.63
M-4-90'	08/19/09	10:12	90'	0.4	0.2	6.0	0.0	29.63
M-5-15'	08/19/09	10:29	15'	0.7	1.3	1.3	0.0	29.63
M-5-25'	08/19/09	10:34	25'	0.1	ND	16.9	0.0	29.63
M-5-65'	08/19/09	10:35	65'	0.4	0.3	8.5	0.0	29.63
M-5-90'	08/19/09	10:37	90'	0.3	ND	12.9	0.0	29.63
M-6-15'	08/19/09	10:53	15'	ND	ND	19.5	0.0	29.63
M-6-25'	08/19/09	10:56	25'	4.8	0.6	4.2	0.0	29.63
M-6-65'	08/19/09	10:58	65'	2.5	1.2	15.2	2.3	29.63
M-6-80'	08/19/09	11:00	80'	1.3	0.6	18.5	1.4	29.63
M-7-15'	08/19/09	11:33	15'	ND	ND	19.7	0.0	29.63
M-7-25'	08/19/09	--	25'	*	--	--	>5.0	29.63
M-7-65'	08/19/09	--	65'	--	--	--	--	29.63
M-7-90'	08/19/09	--	90'	--	--	--	--	29.63
MDL				0.1	0.1	0.1		

\* - METHANE LEVELS TOO HIGH

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE, AND BAROMETRIC PRESSURE MEASURED BY LANDTEC MODEL GEM 2000  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL



MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

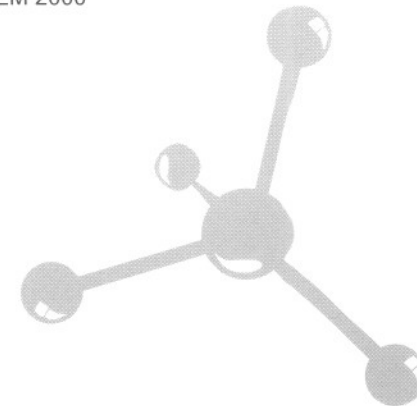
H&P Project #MAC081809 TECH LANDTEC

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE & BAROMETRIC PRESSURE ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	METHANE (%)	CO2 (%)	OXYGEN (%)	PROBE PRESSURE " of Water	BAROMETRIC PRESSURE " of Hg
M-8-15'	08/19/09	12:04	15'	84.5	13.9	1.3	2.6	29.63
M-8-25'	08/19/09	12:10	25'	84.3	11.3	1.5	>5.0	29.63
M-8-65'	08/19/09	--	65'	--	--	--	4.0	29.63
M-8-95'	08/19/09	--	95'	--	--	--	1.4	29.63
M-10-15'	08/19/09	13:03	15'	82.8	14.5	4.0	0.4	29.63
M-10-30'	08/19/09	--	30'	--	--	--	0.0	29.63
M-10-65'	08/19/09	13:07	65'	37.9	8.5	11.5	0.0	29.63
M-10-100'	08/19/09	--	100'	--	--	--	--	29.63
M-11-15'	08/19/09	--	15'	*	--	--	2.2	29.63
M-11-35'	08/19/09	13:54	35'	90.4	4.3	4.2	0.0	29.63
M-11-65'	08/19/09	13:34	65'	39.1	10.1	12.2	0.3	29.63
M-11-100'	08/19/09	--	100'	*	--	--	0.8	29.63
M-12-15'	08/19/09	14:13	15'	2.7	0.4	0.8	0.0	29.63
M-12-30'	08/19/09	14:23	30'	1.6	0.1	17.8	0.0	29.63
M-12-65'	08/19/09	14:16	65'	20.6	0.6	2.8	>5	29.63
M-12-100'	08/19/09	14:19	100'	48.2	0.8	1.2	1.0	29.63
M-16-15'	08/19/09	14:38	15'	ND	3.2	1.2	0.0	29.63
M-16-25'	08/19/09	14:40	25'	ND	2.4	0.8	0.0	29.63
M-16-65'	08/19/09	14:43	65'	0.6	1.4	6.1	0.0	29.63
M-16-90'	08/19/09	14:45	90'	0.6	1.4	3.2	0.0	29.63
MDL				0.1	0.1	0.1		

\* - METHANE LEVELS TOO HIGH

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE, AND BAROMETRIC PRESSURE MEASURED BY LANDTEC MODEL GEM 2000  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL



MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

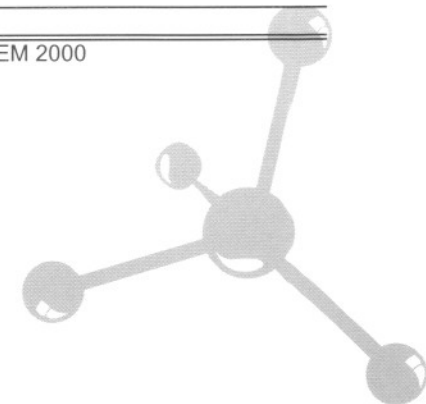
H&P Project #MAC081809 TECH LANDTEC

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE & BAROMETRIC PRESSURE ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	METHANE (%)	CO2 (%)	OXYGEN (%)	PROBE PRESSURE " of Water	BAROMETRIC PRESSURE " of Hg
M-23-15'	08/20/09	9:10	15'	ND	ND	19.8	0.0	29.70
M-23-25'	08/20/09	--	25'	--	--	--	--	29.70
M-23-65'	08/20/09	--	65'	--	--	--	--	29.70
M-23-90'	08/20/09	--	90'	--	--	--	--	29.70
M-24-15'	08/20/09	9:49	15'	ND	1.7	6.3	0.0	29.70
M-24-25'	08/20/09	9:52	25'	ND	2.3	7.0	0.0	29.70
M-24-65'	08/20/09	9:54	65'	ND	3.0	10.8	0.0	29.70
M-24-90'	08/20/09	9:57	90'	ND	2.8	7.6	0.0	29.70
M-18-15'	08/20/09	10:25	15'	ND	9.2	5.4	0.0	29.70
M-18-25'	08/20/09	10:29	25'	ND	5.0	2.3	0.0	29.70
M-18-65'	08/20/09	10:31	65'	ND	5.5	7.6	0.0	29.70
M-18-90'	08/20/09	10:33	90'	ND	5.4	7.1	0.0	29.70
M-19-70'	08/20/09	10:59	70'	0.7	15.1	0.2	0.0	29.70
M-19-15'	08/20/09	10:55	15'	ND	14.8	1.9	0.0	29.70
M-19-40'	08/20/09	10:58	40'	ND	13.4	0.2	0.0	29.70
M-22-15'	08/20/09	11:25	15'	ND	ND	19.2	0.0	29.70
M-22-25'	08/20/09	11:28	25'	ND	ND	18.4	0.5	29.70
M-22-65'	08/20/09	--	65'	--	--	--	--	29.70
M-22-90'	08/20/09	--	90'	--	--	--	--	29.70
M-20-15'	08/20/09	11:47	15'	ND	0.4	14.3	0.0	29.61
M-20-25'	08/20/09	11:50	25'	ND	ND	14.4	0.0	29.61
M-20-65'	08/20/09	11:53	65'	ND	0.3	14.4	0.0	29.61
M-20-90'	08/20/09	11:57	90'	ND	0.8	17.3	0.0	29.61

MDL 0.1 0.1 0.1

METHANE, CARBON DIOXIDE, OXYGEN, PROBE PRESSURE, AND BAROMETRIC PRESSURE MEASURED BY LANDTEC MODEL GEM 2000  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL



MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

H&P Project #MAC081809 TECH H2S

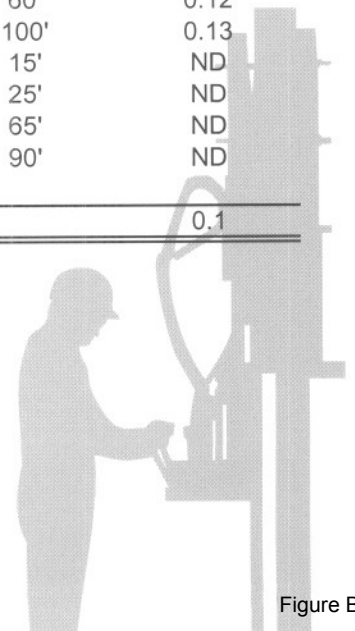
H2S ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	H2S (ppmv)
M-2-15'	08/18/09	9:52	15'	ND
M-2-25'	08/18/09	9:55	25'	ND
M-2-65'	08/18/09	--	65'	--
M-2-90'	08/18/09	10:07	90'	ND
M-3-15'	08/18/09	10:32	15'	ND
M-3-25'	08/18/09	10:36	25'	ND
M-3-65'	08/18/09	10:39	65'	ND
M-3-90'	08/18/09	10:41	90'	ND
M-9-15'	08/18/09	--	15'	--
M-9-25'	08/18/09	11:07	25'	ND
M-9-65'	08/18/09	11:10	65'	ND
M-9-90'	08/18/09	11:14	90'	ND
M-14-15'	08/18/09	11:42	15'	ND
M-14-25'	08/18/09	11:45	25'	ND
M-14-65'	08/18/09	11:47	65'	ND
M-14-90'	08/18/09	11:51	90'	ND
M-15-15'	08/18/09	12:08	15'	ND
M-15-25'	08/18/09	12:11	25'	ND
M-15-65'	08/18/09	12:14	65'	ND
M-15-90'	08/18/09	12:17	90'	--
M-17-15'	08/18/09	12:49	15'	ND
M-17-25'	08/18/09	12:56	25'	ND
M-17-65'	08/18/09	12:59	65'	ND
M-17-90'	08/18/09	13:02	90'	ND
M-25-15'	08/18/09	14:18	15'	ND
M-25-25'	08/18/09	14:21	25'	ND
M-25-60'	08/18/09	14:53	60'	0.12
M-25-100'	08/18/09	14:57	100'	0.13
M-21-15'	08/18/09	15:26	15'	ND
M-21-25'	08/18/09	15:29	25'	ND
M-21-65'	08/18/09	15:32	65'	ND
M-21-90'	08/18/09	15:36	90'	ND

MDL

0.1

H2S MEASURED BY JEROME MODEL 631-X  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL



MACTEC ENGINEERING & CONSULTING INC. PROJECT  
 METRO WESTSIDE EXTENSION  
 WILSHIRE BOULEVARD  
 LOS ANGELES, CA

H&P Project #MAC081809 TECH H2S

H2S ANALYSES OF SOIL VAPOR

Sample ID	DATE	TIME	DEPTH (feet)	H2S (ppmv)
M-1-15'	08/19/09	9:29	15'	ND
M-1-25'	08/19/09	9:38	25'	ND
M-1-65'	08/19/09	9:32	65'	ND
M-1-90'	08/19/09	9:34	90'	ND
M-4-15'	08/19/09	10:04	15'	ND
M-4-25'	08/19/09	10:07	25'	ND
M-4-65'	08/19/09	10:10	65'	ND
M-4-90'	08/19/09	10:13	90'	ND
M-5-15'	08/19/09	--	15'	--
M-5-25'	08/19/09	10:34	25'	ND
M-5-65'	08/19/09	10:36	65'	ND
M-5-90'	08/19/09	10:37	90'	ND
M-6-15'	08/19/09	10:54	15'	0.41
M-6-25'	08/19/09	10:57	25'	ND
M-6-65'	08/19/09	10:59	65'	ND
M-6-80'	08/19/09	11:01	80'	ND
M-6-PVC Sample	08/19/09	11:10	N/A	>50
M-7-15'	08/19/09	11:34	15'	ND
M-7-25'	08/19/09	11:37	25'	30
M-7-65'	08/19/09	--	65'	--
M-7-90'	08/19/09	--	90'	--
MDL				0.1

H2S MEASURED BY JEROME MODEL 631-X  
 ANALYSES PERFORMED BY: MR. KURT SCHINDLER  
 DATA REVIEWED BY: MS. JANIS VILLARREAL

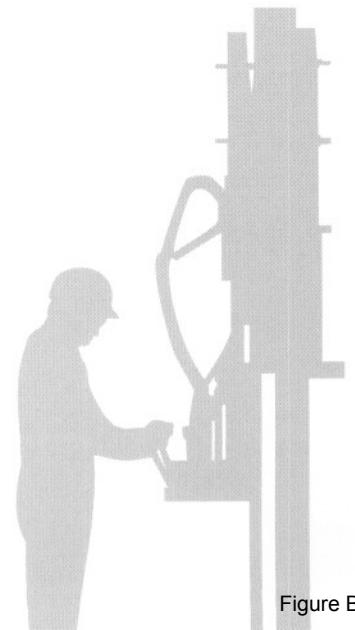


Figure B-5.6