FIGURES B-4.1 THROUGH B-4.19
GAS MONITORING WELL DIAGRAMS (PE PHASE)
METHANE VAPOR MONITORING WELL M-101

A. TOTAL DEPTH OF BORING: 81' BGS

B. DIAMETER OF BORING: 11 1/4"Ø
DRILLING METHOD: HOLLOW STEM AUGER

C. TOP OF BOX ELEVATION: NA

D. CASING LENGTH: 50' (A), 80' (B)
MATERIAL: PVC

E. CASING DIAMETER: 2"Ø (EACH)

F. DEPTH TO TOP OF SCREEN: 45' (A) & 60' (B)

G. PERFORATION LENGTH: 5' (A), 20' (B)
PERFORATION SIZE: 0.020" SLOTS

H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT

I. SEAL:
2'-14', 16'-20', 31'-43', 51'-58' (BGS)
MATERIAL: HYDRATED BENTONITE (CHIPS)

   a. 2'-14': BENTONITE CEMENT GROUT OVER
      1' OF BENTONITE CHIPS HYDRATED
   b. 16'-29': BENTONITE CEMENT GROUT OVER
      1' OF BENTONITE CHIPS HYDRATED
   c. 31'-43': HYDRATED BENTONITE CHIPS
   d. 51'-58': HYDRATED BENTONITE CHIPS

J. SAND PACK: 14'-16', 29'-31', 43'-51', 56'-81' (BGS)
MATERIAL: #3 SAND PACK
W/ TRANSITION SAND AT TOP AND FILTER FABRIC
SOCK PLACED OVER SCREEN
   a. 14'-16'
   b. 29'-31'
   c. 43'-51'
   d. 56'-81'

K. 2"Ø POLYETHYLENE TUBING

L. WATER LEVELS ON 6/29/2011 WERE AS FOLLOWS:
   A. 41 FEET BELOW TOC

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

Key

BGS Below Ground Surface
TOC Top Of Casing
" Feet
" Inches
METHANE VAPOR MONITORING WELL M-102

CAST IRON TRAFFIC COVER
GROUND SURFACE (ASPHALT CONCRETE)

6" LONG VAPOR PROBE (Ø 10' BGS)
A. TOTAL DEPTH OF BORING: 68' BGS

DIAMETER OF BORING: 10 1/2" Ø
DRILLING METHOD: HOLLOW STEM AUGER
C. TOP OF BOX ELEVATION: NA

6" LONG VAPOR PROBE (Ø 25' BGS)
D. CASING LENGTH: 40' (A), 52' (B)
MATERIAL: PVC
E. CASING DIAMETER: 2" Ø (EACH)
F. DEPTH TO TOP OF SCREEN: 39' (A) & 47' (B)

PERFORATION LENGTH: 6' (A), 5' (B)
PERFORATION SIZE: 0,020" SLOTS
G. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT

SEAL:
I. SEAL:
  2'-14", 16'-24", 26'-34", 41'-46" (SGS)
  MATERIAL: HYDRATED BENTONITE (CHIPS)
  a. 2'-14": BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  b. 16'-24": BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
  c. 26'-34": HYDRATED BENTONITE CHIPS
  d. 41'-46": HYDRATED BENTONITE CHIPS

SAND PACK:
J. SAND PACK: 14'-16", 24'-26", 34'-41", 46'-53" (SGS)
  MATERIAL: # 2112 SAND PACK
  w/ TRANSITION SAND AT TOP AND FILTER FABRIC
  SOCK PLACED OVER SCREEN
  a. 14'-16'
  b. 24'-26'
  c. 34'-41'
  d. 46'-53'

SOIL CUTTINGS
K. ½" Ø POLYETHYLENE TUBING

L. WATER LEVELS ON 4/22/2011 WERE AS FOLLOWS:
   a. 12.18 FEET BELOW TOC
   b. 13.27 FEET BELOW TOC

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

Key

BGS Below Ground Surface
TOC Top Of Casing
" Feet
" Inches
METHANE VAPOR MONITORING WELL M-104

CAST IRON TRAFFIC COVER

GROUND SURFACE (ASPHALT CONCRETE)

6" LONG VAPOR PROBE (© 10' BGS)

A. TOTAL DEPTH OF BORING: 66' BGS

B. DIAMETER OF BORING: 10 1/2" Ø
   DRILLING METHOD: HOLLOW STEM AUGER

C. TOP OF BOX ELEVATION: NA

D. CASING LENGTH: 40' (A), 65' (B)
   MATERIAL: PVC

E. CASING DIAMETER: 2" Ø (EACH)

F. DEPTH TO TOP OF SCREEN: 35' (A) & 55' (B)

G. PERFORATION LENGTH: 5' (A), 10' (B)
   PERFORATION SIZE: 0.020" SLOTS

H. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT

I. SEAL:
   - 2'–9': HYDRATED BENTONITE CHIPS
   - 9'–11': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   - 11'–19': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   - 19'–34': HYDRATED BENTONITE CHIPS
   - 34'–54': HYDRATED BENTONITE CHIPS

J. SAND PACK: 9'–11', 19'–21', 34'–42', 54'–66' (BGS)
   MATERIAL: #3 SAND PACK
   W/ TRANSITION SAND AT TOP AND FILTER FABRIC
   SOCK PLACED OVER SCREEN
   Jn. 9'–11'
   Jn. 19'–21'
   Jn. 34'–42'
   Jn. 54'–66'

K. 3/4" POLYETHYLENE TUBING

L. WATER LEVELS ON 4/27/2011 WERE AS FOLLOWS:
   A. 19.3 FEET BELOW TOC

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

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

AMEC Environment & Infrastructure
5238 E. Slauson Avenue, Los Angeles, California 90040
Phone (323) 888-5200 Fax (323) 884-9296

MTA WESTSIDE EXTENSION
Parsons Brinckerhoff

WELL NO.: M-104 DRAWN: L. Morley
INSTALLED: 04/27/2011 CHECKED: J. Neuhaus
SCALE: 1" = 10' Vertical DATE: December 2, 2011
FIELD PERSONNEL: Rachael Mills
PROJECT NAME: MTA Westside Subway Extension
WELL LOCATION: Wilshire west of Houser, Los Angeles, CA

MTA WEST CONSTRUCTION DETAIL
Methane Gas Monitoring Well

FIGURE NO. B-4.4 PROJECT NO. 4903-1-1421
METHANE VAPOR MONITORING WELL M-106

CAST IRON TRAFFIC COVER

GROUND SURFACE (ASPHALT CONCRETE)

6' LONG VAPOR PROBE (§ 10' BGS)

1.5'

19'

6' LONG VAPOR PROBE (§ 20' BGS)

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: 20' (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'-5': HYDRATED BENTONITE (CHIPS)

1.5'-5': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED

5'-11': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED

21'-23': HYDRATED BENTONITE CHIPS

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

K. ½" Ø POLYETHYLENE TUBING

L. WATER LEVELS ON 4/29/2011 WERE AS FOLLOWS:

A. 34 FEET BELOW TOC

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

Key

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

WELL NO.: M-106  DRAWN: L. Morley
INSTALLED: 04/29/2011  CHECKED: J. Neuhaus

MTA WESTSIDE EXTENSION
Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Methane Gas Monitoring Well

B-4.6

PROJECT NO.
4903-11-1421
**METHANE VAPOR MONITORING WELL M-108**

A. TOTAL DEPTH OF BORING: 71' 3"

B. DIAMETER OF BORING: 11 1/4" ID
   DRILLING METHOD: HOLLOW STEM AUGER

C. TOP OF BOX ELEVATION: NA

D. CASING LENGTH: 50' (A), 70' (B)
   MATERIAL: PVC

E. CASING DIAMETER: 2" OD (EACH)

F. DEPTH TO TOP OF SCREEN: 40' (A) & 65' (B)
   PERFORATION LENGTH: 10' (A), 5' (B)
   PERFORATION SIZE: 0.020" SLOTS

G. SUBSURFACE SEAL: 2' CONCRETE, 6' GROUT

H. SEAL:
   2'-6", 11'-17', 19'-39', 51'-64' (BGS)
   MATERIAL: HYDRATED BENTONITE (CHIPS)
   Is. 2'-6": BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   Is. 11'-17": BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   Is. 19'-39": HYDRATED BENTONITE CHIPS
   Is. 51'-64": HYDRATED BENTONITE CHIPS

J. SAND PACK: 9'-11", 17'-19", 39'-51", 64'-71' (BGS)
   MATERIAL: #3 SAND PACK
   w/ TRANSITION SAND AT TOP AND FILTER FABRIC
   Sock Placed over Screen
   Js. 9'-11"
   Js. 17'-19"
   Js. 39'-51"
   Js. 64'-71"

K. 2" ID POLYETHYLENE TUBING

L. WATER LEVELS ON 05/03/2011 WERE AS FOLLOWS:
   A. 35 FEET BELOW TOC

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

---

**Key**

- **BGS**: Below Ground Surface
- **TOC**: Top Of Casing
- "": Feet
- ": Inches

---

**AMEC WESTSIDE EXTENSION**

Parsons Brinckerhoff

**WELL NO.** M-108  
**DRAWN** L. Morley  
**INSTALLED** 05/03/2011  
**CHKED** J. Neuhau

---

**MTA WESTSIDE EXTENSION**

Methane Gas Monitoring Well

---

**WELL LOCATION** Curson north of Wilshire, Los Angeles, CA

**PROJECT NO.** 4903-11-1421

**DRILL CO.** Martini Drilling  
**TECHNIQUE** Hollow Stem

---

**FIELD PERSONNEL** Rachael Mills

---

**SCALE** 1" = 10' Vertical

---

**DATE** December 2, 2011

---

**FIGURE NO.** B-4.8
METHANE VAPOR MONITORING WELL M-109

A. TOTAL DEPTH OF BORING: 101.5' BGS
B. DIAMETER OF BORING: 11'4"D
   DRILLING METHOD: HOLLOW STEM AUGER
C. TOP OF BOX ELEVATION: NA
D. CASING LENGTH: 81' (A) & 100' (B)
   MATERIAL: PVC
E. CASING DIAMETER: 2'0" (EACH)
F. DEPTH TO TOP OF SCREEN: 78' (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)
   | 2'-8": BENTONITE CEMENT GROUT OVER
   | 1' OF BENTONITE CHIPS HYDRATED
   | 10'-13": BENTONITE CEMENT GROUT OVER
   | 1' OF BENTONITE CHIPS HYDRATED
   | 15'-75": HYDRATED BENTONITE CHIPS
   | 82'-94": HYDRATED BENTONITE CHIPS
J. SAND PACK: 8'-10", 13'-15", 75'-82", 94'-101' (BGS)
   MATERIAL: # 5 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. ¾" POLYETHYLENE TUBING

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

Key

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

WELL NO.: M-109  DRAWN: L. Morley
MARTINI DRILLING  SCALE: 1" = 10' Vertical
FIELD PERSONNEL: Rachael Mills  DATE: December 2, 2011
PROJECT NAME: MTA Westside Subway Extension  TECHNIQUE: Hollow Stem
WELL LOCATION: Wilshire and Stanley, Los Angeles, CA
METHANE VAPOR MONITORING WELL M-110

A. TOTAL DEPTH OF BORING: 81' BGS
B. DIAMETER OF BORING: 11 1/4"Ø
    DRILLING METHOD: HOLLOW STEM AUGER
C. TOP OF BOX ELEVATION: NA
D. CASING LENGTH: 35' (A) & 45' (B)
    MATERIAL: PVC
E. CASING DIAMETER: 2"Ø (EACH)
F. DEPTH TO TOP OF SCREEN: 30' (A) & 40' (B)
G. PERFORATION LENGTH: 5' (A), 5' (B)
    PERFORATION SIZE: 0.020" SLOTS
H. SUBSURFACE SEAL: 2' CONCRETE
I. SEAL: 2'-14', 16'-22', 24'-29', 36'-39' (BGS)
    MATERIAL: HYDRATED BENTONITE (CHIPS)
    2'-14': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
    16'-22': BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
    24'-29': HYDRATED BENTONITE CHIPS
    36'-39': HYDRATED BENTONITE CHIPS
J. SAND PACK: 14'-16', 22'-24', 29'-36', 39'-46' (BGS)
    MATERIAL: #3 SAND PACK
    w/ TRANSITION SAND AT TOP AND FILTER FABRIC
    SOCK PLACED OVER SCREEN
    14'-16'
    22'-24'
    29'-36'
    39'-46'
K. 1/4"Ø POLYETHYLENE TUBING

SOIL CUTTINGS

CAST IRON TRAFFIC COVER
GROUND SURFACE (ASPHALT CONCRETE)

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

Key

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

WELL NO.: M-110
DRAWN: L. Morley
INSTALLED: 05/17/2011

MTA WESTSIDE EXTENSION
Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Methane Gas Monitoring Well

FIELD PERSONNEL: Rachel Mills
PROJECT NAME: MTA Westside Subway Extension
WELL LOCATION: Wilshire west of Fairfax, Los Angeles, CA

FIGURE NO. B-4.10
PROJECT NO. 4903-1-1421
METHANE VAPOR MONITORING WELL M-111

CAST IRON TRAFFIC COVER

GROUND SURFACE (ASPHALT CONCRETE)

6' LONG VAPOR PROBE (9' 10" BGS)

6' LONG VAPOR PROBE (9' 17" BGS)

A. TOTAL DEPTH OF BORING: 81.5' BGS
B. DIAMETER OF BORING: 11 1/4" Ø
   DRILLING METHOD: HOLLOW STEM AUGER
C. TOP OF BOX ELEVATION: NA
D. CASING LENGTH: 35' (A) & 55' (B)
   MATERIAL: PVC
E. CASING DIAMETER: 2" Ø (EACH)
F. DEPTH TO TOP OF SCREEN: 30' (A) & 45' (B)
G. PERFORATION LENGTH: 5' (A), 10' (B)
   PERFORATION SIZE: 0.020" SLOTS
H. SUBSURFACE SEAL: 2" CONCRETE, 6" GROUT
I. SEAL:
   2'-9", 11'-16", 18'-29", 36'-44" BGS
   MATERIAL: HYDRATED BENTONITE (CHIPS)
   A. 2'-9' BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   B. 11'-16' BENTONITE CEMENT GROUT OVER 1' OF BENTONITE CHIPS HYDRATED
   C. 18'-29' HYDRATED BENTONITE CHIPS
   D. 36'-44' HYDRATED BENTONITE CHIPS
J. SAND PACK:
   9'-11", 16'-18", 29'-36", 44'-56" BGS
   MATERIAL: #3 SAND PACK
   w/ TRANSITION SAND AT TOP AND FILTER FABRIC
   SOIL PLACED OVER SCREEN
   A. 9'-11"
   B. 16'-18"
   C. 29'-36"
   D. 44'-56"
K. 1/8" POLYETHYLENE TUBING
L. WATER LEVELS ON 5/10/2011 WERE AS FOLLOWS:
   A. 20' - 21.5 FEET BELOW TOC

SOIL CUTTINGS

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

Key

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

AMEC Environment & Infrastructure
5638 E. Slauson Avenue, Los Angeles, California 90040
Phone (323) 888-5020 Fax (323) 888-5099

M-111       DRAWN: L. Morley
INSTALLED: 05/19/2011
CHK'd: J. Neuhaus

WELL NO.

1" = 10' Vertical

MTA WESTSIDE EXTENSION
Parsons Brinckerhoff

WELL CONSTRUCTION DETAIL
Methane Gas Monitoring Well

PROJECT NO.
4903-11-1421

B-4.11

WELL LOCATION
Fairfax south of Wilshire, Los Angeles, CA

DRILL CO.
Martini Drilling

FIELD PERSONNEL
Rachel Mills

TECHNIQUE
Hollow Stem