7. Cathodic Protection System Drawings
CATHODIC PROTECTION SYSTEM DRAWINGS

DWD C0  Quick Reference Guide – Cathodic Protection
DWD C1  Wenner Four Pin Resistivity Test
DWD C2  Barnes Layer Resistivity Calculations
DWD C3  Soil Box Resistivity Test
DWD C4  Bond Cables – Metallic Pipe Joints Sacrificial Anode Systems
DWD C5  Bond Cables – Across Fittings on Metallic Pipe
DWD C6  Exothermic Weld
DWD C7  Pin Brazed Connection
DWD C8  Flush Grade Test Station
DWD C9  CTS – Corrosion Test Station
DWD C10  IJTS – Insulating Joint Test Station
DWD C11  FPTS – Foreign Pipeline Test Station
DWD C12  ATS – Anode Test Station
DWD C13  CATS – Casing Anode Test Station
DWD C14  VATS – Valve Anode Test Station
DWD C15  VATS – Valve and Tee Anode Test Station
DWD C16  FHATS – Fire Hydrant Anode Test Station
DWD C17  Metallic Riser Anode Test Station
DWD C18  Cross and Valves Anode Test Station
DWD C19  Elbow Anode Test Station
DWD C20  Double Detector Check Assembly Preventer or Reduced Pressure Backflow Preventer Anode Test Station
DWD C21  Double Offset Anode Test Station
DWD C22  Tapping Saddle Anode Test Station
DWD C23  Cable Identification
DWD C24  Anode at Leak Repair Clamp
DWD C25  Insulating Flange Assembly
DWD C26  Copper Water Laterals Anode Installation
DWD C27  2” Blow Off Anode Installation
DWD C28  Thrust Restraint Harness Anode Installation
DWD C29  Cable Splice Detail
DWD C30  Anode at Tapping Saddle
DWD C31  Galvanic Cathodic Protection System Checkout
DWD C32  Impressed Current Cathodic Protection System Checkout (page 1)
DWD C33  Impressed Current Cathodic Protection System Checkout (page 2)
DWD C34  Leak Repair Report
EQUALLY SPACED STEEL PINS IN STRAIGHT LINE CONFIGURATION

RESISTANCE MEASURING INSTRUMENT

VOLUME OF SOIL INCLUDED IN RESISTANCE MEASUREMENT

WHERE D = SAMPLE DEPTH.
VOLUME OF SOIL WITH RESISTANCE $R$ AND RESISTIVITY $\rho$

VOLUME OF SOIL WITH RESISTANCE $r$ AND RESISTIVITY $\rho$

GRADE (TYP)

LAYER OF SOIL WITH RESISTIVITY = $\frac{1}{\rho} - \frac{1}{r}$ $x$ (SPACING FACTOR)
FLANGED JOINT

PUSH-ON JOINT

MECHANICAL JOINT

FLEXIBLE COUPLING

NOTES:
1. USE #8 AWG/HMWPE BOND CABLES FOR BONDING METALLIC FITTINGS ON NONMETALLIC PIPING SYSTEMS.
2. USE #4 AWG/HMWPE BOND CABLES FOR BONDING PIPE JOINTS ON METALLIC PIPING SYSTEMS PER SPECIFICATIONS.
NOTES:
1. ALL BOND 'B' WIRES SHALL BE #4 AWG/HMWPE STRANDED COPPER WIRE.
2. ALL FITTING BOND WIRES 'A' SHALL BE #8 AWG/HMWPE STRANDED COPPER WIRE.
3. USE ONE (1) BOND CABLE 'B' ACROSS EACH FITTING FOR PIPE SIZES 18" IN DIAMETER OR SMALLER.
4. USE TWO (2) BOND CABLES 'B' ACROSS EACH FITTING FOR PIPE SIZES 20" IN DIAMETER OR LARGER.
**STEP 1.** FILE STRUCTURE CONNECTION AREA TO BARE SHINY METAL AND CLEAN.

**STEP 2.** STRIP INSULATION FROM WIRE. ATTACH SLEEVE REQUIRED ON #6 AWG WIRE OR SMALLER

**STEP 3.** HOLD MOLD FIRMLY WITH OPENING AWAY FROM OPERATOR AND IGNITE WITH FLINT GUN.

**STEP 4.** REMOVE SLAG FROM CONNECTION AND PEE N WELD FOR SOUNDNESS.

**STEP 5.** SPRAY PRIMER ON BARE METAL.

**STEP 6.** COVER CONNECTION AND EXPOSED STRUCTURE SURFACE WITH PLASTIC CAP & BITUMASTIC

**NOTE:** PROCEDURE SHOWN ABOVE IS TO BE USED AS A GENERAL GUIDE ONLY. CONSULT MANUFACTURER’S LITERATURE FOR SPECIFIC INSTALLATION INSTRUCTIONS.
**STEP 1.** File structure connection area to bare shiny metal and clean.

**STEP 2.** Strip insulation from wire. Attach lug to cable by crimping.

**STEP 3.** Load gun with the brazing pin and ferrule.

**STEP 4.** Adjust as necessary. Braze the cable & lug to the pipe.

**STEP 5.** Peen connection with a hammer to test connection for soundness.

**STEP 6.** Cover connection and exposed structure surface with epoxy coating compound with plastic cap & bitumastic.

---

**Diablo Water District**

**Standard Drawing**

**Pin Brazed Connection**

---

Weld cap

Pin brazed connection

Copper lug

Joint bond cable or test station cable (size as req'd)

1/4"

4"

Stainless steel pipe

---

**Designed:** MA  **Drawn:** SC  **Approved:** JDH  **Date:** June 2019  **Dwg. No.:** DWD C7

Section Rev. 8-14-2019
TERMINAL BOX

14-1/2" CHRISTIE G-12 CONCRETE TRAFFIC BOX W/CAST IRON COVER MARKED "CP-TEST"

SLOPE AWAY

12" MIN

11"  

#4 REBAR CENTERED IN COLLAR

12"

DRAIN ROCK

24" MIN

12"

14 3/4" MIN

11"

CONCRETE COLLAR

3,000 PSI

FINISHED GRADE

2'

PROVIDE 18" SLACK IN CABLES TO ALLOW REMOVAL OF TERMINAL BOX FROM TEST STATION

3/4" PVC PIPE (SEE NOTE 2.)

2" PVC PIPE—(SEE NOTE 1.)

NOTES:
1. INSTALL 2" PVC PIPE IN CLEAN NATIVE SOIL. FILL PIPE WITH CLEAN SOIL, FREE FROM ROCKS & DEBRIS.
2. INSTALL 18" LENGTH OF 3/4" PVC PIPE TO ENSURE THAT THE TERMINAL BOX WILL REMAIN IN THE UPRIGHT POSITION. POSITION THE PIPE SO THAT THE TERMINAL BOX WILL BE AS HIGH AS POSSIBLE WITH THE CAST IRON LID STILL CLOSING PROPERLY.

DIABLO WATER DISTRICT

STANDARD DRAWING

FLUSH GRADE TEST STATION

DWD C8
NOTES:
1. INSTALL THE REFERENCE CELL BETWEEN THE TWO PIPELINES.
2. PERMISSION MUST BE OBTAINED FROM THE FOREIGN PIPELINE OWNER PRIOR TO ATTACHMENT OF TEST WIRES TO FOREIGN PIPE.
#10 AWG/THHN TEST CABLE (WHITE)
CABLE IDENTIFICATION (TYP) SEE DWD C23
#10 AWG/THHN DRAIN CABLE (WHITE) TO PIPE

ATS TERMINAL BOX

TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)
0.01 OHM–6 AMP SHUNT
(2) #8 AWG/THHN (BLACK) ANODE HEADER CABLE

TERMINAL BOX SEE ABOVE
TEST STATION SEE DWD C8

#10 AWG/THHN TEST CABLE (WHITE)
EXOTHERMIC WELD (TYP) SEE DWD C6
#10 AWG/THHN DRAIN CABLE (WHITE)

CP WARNING DIG TAPE
LOOP BACK ANODE HEADER CABLE TO TEST STATION

#8 AWG/THHN (BLACK) ANODE HEADER CABLE

10" (TYP)

#10 AWG/THHN ANODE LEAD CABLE (TYP)
PREPACKAGED MAGNESIUM ANODE (SEE NOTE 1)
CABLE SPLICE (TYP) SEE DWD C29

METALLIC WATER MAIN (SEE NOTE 3)

NOTES:
1. NUMBER AND SIZE OF ANODES SHALL BE DETERMINED BY THE PROJECT CORROSION ENGINEER.
2. THE ANODES SHALL BE INSTALLED A MINIMUM OF 3 FT. OFF THE WALL OF THE WATER PIPE.
3. BOND ALL PIPE JOINTS PER DRAWING DWD C4.
CATS TERMINAL BOX

NOTES:
1. NUMBER AND SIZE OF ANODES SHALL BE DETERMINED BY THE PROJECT CORROSION ENGINEER.
2. CARRIER PIPE & CASING ARE TO BE ELECTRICALLY ISOLATED VIA CASING INSULATORS.
3. IF CARRIER PIPE IS NON-METALLIC DELETE WHITE CABLES AND EXOTHERMIC WELDS.
4. BOND ALL PIPE JOINTS PER DRAWING DWD C4.
NOTE:
1. INSTALL ANODE A MINIMUM OF 3 FEET FROM VALVE.
VATS TERMINAL BOX

TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)

#10 AWG/THHN (WHITE) TEST & DRAIN CABLES

NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)

0.01 OHM-6 AMP SHUNT

#10 AWG/THHN (BLACK) ANODE CABLE(S)

CABLE IDENTIFICATION (TYP) SEE DWD C23

METALLIC FITTING

METALLIC VALVE

NONMETALLIC PIPE

EXOTHERMIC WELD (TYP) SEE DWD C6

NONMETALLIC PIPE

PLAN

TERMINAL BOX
SEE ABOVE

TEST STATION
SEE DWD C8

VALVE STEM CASING

#10 AWG THHN (WHITE) TEST & DRAIN CABLE

#10 AWG/THHN (BLACK) ANODE CABLE

#8 AWG BOND CABLE
SEE DWD C4

NONMETALLIC PIPE

ANODE

PROFILE

NOTE:
1. INSTALL ANODE A MINIMUM OF 3-FEET FROM THE VALVE & TEE.
ATS TERMINAL BOX

TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)

#10 AWG/THHN (WHITE) TEST & DRAIN CABLES

NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)

0.01 OHM-6 AMP SHUNT

#10 AWG/THHN (BLACK) ANODE CABLE(S)

CABLE IDENTIFICATION SEE DWD C23 (TYP)

CONCRETE SLAB

3' MN

CP-TEST

WRAP SEAL POLYBAG W/10 MIL TAPE WITHIN AND TO 1" ABOVE CONCRETE SLAB. TRIM EXCESS POLYBAG ABOVE TAPE FOLLOWING REVIEW BY DWD INSPECTOR

CP WARNING DIG TAPE

METALLIC FITTING

METALLIC VALVE

TEST STATION SEE DWD C8

TERMINAL BOX SEE ABOVE

#10 AWG/THHN (WHITE) DRAIN CABLE

#10 AWG/THHN (WHITE) TEST CABLE

#8 AWG BOND CABLE (TYP) SEE DWD C4

NONMETALLIC PIPE

#8 AWG BOND CABLE

#10 AWG/THHN (BLACK) ANODE CABLE

ANODE

EXOTHERMIC WELD (TYP) SEE DWD C6

NOTE:
1. INSTALL TEST STATION IN COMMON CONCRETE SLAB WITH F.H. RISER.
2. INSTALL ANODE A MINIMUM OF 3 FEET AWAY FROM THE PIPE.

DIABLO WATER DISTRICT

FHATS - FIRE HYDRANT ANODE TEST STATION

STANDARD DRAWING

DWD C16

Section Rev. 8-14-2019
INSTALL INSULATING FLANGE KIT
SEE DWD C25

METALLIC RISER

EXOTHERMIC WELD (TYP)
SEE DWD C6

#8 AWG BOND CABLE
SEE DWD C4

METALLIC FITTING

NONMETALLIC PIPE

NOTE:
1. INSTALL ANODE A MINIMUM OF 3 FEET AWAY FROM THE PIPE.

DIABLO WATER DISTRICT

STANDARD DRAWING
METALLIC RISER ANODE TEST STATION

DESIGNED MA DRAWN SC APPROVED JDH DATE JUNE 2019 Dwg. No. DWD C17
ATS TERMINAL BOX

NOTE:
1. INSTALL ANODE A MINIMUM OF 3 FEET AWAY FROM THE VALVE/FITTING.
ATS TERMINAL BOX

TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)

#10 AWG/THHN (WHITE) TEST & DRAIN CABLES

NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)

0.01 OHM-6 AMP SHUNT

#10 AWG/THHN (BLACK) ANODE CABLE(S)

CABLE IDENTIFICATION (TYP) SEE DWD C23

EXOTHERMIC WELD (TYP) SEE DWD C6

#8 AWG BOND CABLE (TYP). SEE DWD C4

METALLIC ELBOW

TEST STATION (SEE DWD C8) & TERMINAL BOX (SEE ABOVE)

(2) #10 AWG THHN (WHITE) TEST LEADS

ANODE

#10 AWG THHN (BLACK) ANODE CABLE

NONMETALLIC PIPE (TYP)

PLAN

NOTE:
1. INSTALL ANODE A MINIMUM OF 3 FEET AWAY FROM THE ELBOW.

DIABLO WATER DISTRICT

STANDARD DRAWING

ELBOW ANODE TEST STATION

DESIGNED MA DRAWN SC APPROVED JDH DATE JUNE 2019 DWG. NO. DWD C19
ATS TERMINAL BOX

- TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)
- #10 AWG/THHN (WHITE) TEST & DRAIN CABLES
- NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)
- 0.01 OHM-6 AMP SHUNT
- #12 AWG/THHN (BLACK) ANODE CABLE(S)
- CABLE IDENTIFICATION SEE DWD C23 (TYP)

NOTE:
1. INSTALL ANODE A MINIMUM OF 3-FEET FROM RISER.

DIABLO WATER DISTRICT

STANDARD DRAWING
DOUBLE DETECTOR CHECK ASSEMBLY PREVENTER OR RPBP ANODE TEST STATION

DESIGNED MA DRAWN SC APPROVED JDH DATE JUNE 2019 DWG. NO DWD C20
**Section Rev. 8-14-2019**

**ATS TERMINAL BOX**

- **#10 AWG/THHN (WHITE) TEST & DRAIN CABLES**
- **NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)**
- **0.01 OHM-6 AMP SHUNT**
- **#10 AWG/THHN (BLACK) ANODE CABLE(S)**
- **CABLE IDENTIFICATION (TYP)**
  - SEE DWD C23

**Diagram:**

- PVC PIPE
- MORTAR COATED STEEL PIPE
- PVC PIPE
- GRADE
- TEST STATION
  - SEE DWD C8
- TERMINAL BOX
  - SEE ABOVE
- #8 AWG/HMWPE BOND CABLE (TYP)
  - SEE DWD C4
- #10 AWG/THHN (WHITE) TEST & DRAIN CABLES
- PVC PIPE
- OFFSET
- EXOTHERMIC WELD (TYP)
  - SEE DWD C6
- ANODE

**NOTE:**

1. The anode shall be installed vertically or horizontally with the top of the anode 5 feet below grade and 3 feet below pipe.
**DIABLO WATER DISTRICT**

**STANDARD DRAWING**

**TAPPING SADDLE ANODE TEST STATION**

<table>
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<th>DESIGNED</th>
<th>MA</th>
<th>DRAWN</th>
<th>SC</th>
<th>APPROVED</th>
<th>JDH</th>
<th>DATE</th>
<th>JUNE 2019</th>
<th>Dwg. No.</th>
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NOTE:
1. CABLE-TO-PIPE CONNECTIONS TO STAINLESS STEEL FITTINGS SHALL BE MADE BY PIN BRAZING.

---

**ATS TERMINAL BOX**

- **#10 AWG/THHN (WHITE) TEST & DRAIN CABLE**
- **#8 AWG BOND CABLE (TYP) SEE DWD C4**
- **#10 AWG/THHN (BLACK) ANODE CABLE**
- **PVC PIPE**
- **EXOTHERMIC WELD (TYP) SEE DWD C6**
- **VALVE**
- **TERMINAL BOX (COVER NOT SHOWN FOR CLARITY)**
- **#10 AWG/THHN (WHITE) TEST & DRAIN CABLE**
- **NICKEL-PLATED BRASS BINDING POST W/BRASS SET SCREW (TYP)**
- **0.01 OHM-6 AMP SHUNT**
- **#10 AWG/THHN (BLACK) ANODE CABLE(S)**
- **CABLE IDENTIFICATION SEE DWD C21 (TYP)**

---

**PROFILE**

- **#10 AWG/THHN (WHITE) TEST & DRAIN CABLE**
- **PIN BRAZED CABLE-TO-PIPE CONNECTION (TYP) (SEE NOTE 2.)**
- **PVC PIPE**
- **EXOTHERMIC WELD (TYP) SEE DWD C6**
- **ANODE**

---

**PLAN**

- **EXISTING DUCTILE IRON PIPE**
- **EXOTHERMIC WELD (TYP) SEE DWD C6**
- **STAINLESS STEEL TAPPING SADDLE**
- **PIN BRAZED CABLE-TO-PIPE CONNECTION (TYP) (SEE NOTE 2.)**
- **EXOTHERMIC WELD (TYP) SEE DWD C6**
- **EXISTING DUCTILE IRON PIPE**
- **3’ PVC PIPE**
- **ANODE**

---

**TEST STATION (SEE DWD C8) & TERMINAL BOX (SEE ABOVE)**

- **#10 AWG/THHN (WHITE) TEST & DRAIN CABLE**
- **#8 AWG BOND CABLE (TYP)**
- **VALVE**
- **EXOTHERMIC WELD (TYP) SEE DWD C6**
- **CP-TEST**
- **3’**

---

Section Rev. 8-14-2019
#10 AWG THHN (BLACK) ANODE LEAD CABLE WRAPPED AROUND MAIN

CONNECT WIRE TO COUPLING BOLT USING CRIMP ON LUG

STAINLESS STEEL LEAK REPAIR CLAMP

EXISTING METALLIC MAIN

ANODE

2’ MIN

5’ MAX

NOTES:
1. INSTALL ANODE A MINIMUM OF 2–FEET BELOW PIPE DEPTH IN NATIVE SOIL.
2. MAXIMUM HORIZONTAL DISTANCE FROM ANODE TO LEAK REPAIR CLAMP IS 5–FEET.
BELOW GRADE INSULATING JOINT COATING

ABOVE GRADE INSULATING JOINT COATING

NOTE:
1. GASKET SHALL BE FOR WATER SERVICE AND BE OF THE SAME PRESSURE RATING AS THE FLANGE.
NOTES:
1. IF WATER MAIN IS METALLIC, PLACE INSULATING COUPLING BETWEEN COPPER WATER LATERAL AND WATER MAIN.
2. MAINTAIN A MINIMUM CLEARANCE OF 2 FEET BETWEEN THE ANODE AND THE LATERAL.
3. TOP OF ANODE SHALL BE 5 FEET MINIMUM FROM THE GROUND SURFACE.
4. SAME DETAIL APPLIES TO AIR RELEASE VALVES.
NOTE:
1. WHEN INSTALLING A COPPER BLOW OFF PER DWD STANDARD DRAWING DWD21, PRIOR TO INSTALLING THRUST BLOCK, COAT WITH BITUMASTIC TO COMPLETELY COVER THE DUCTILE IRON CAP. ENCASE ALL BURIED BRASS TUBING IN POLYETHYLENE SLEEVE. INSTALL INSULATING UNION BETWEEN COPPER PIPE AND END CAP, AND COAT THE INSULATING UNION WITH BITUMASTIC.
NOTE:
1. INSTALL THE ANODE 1"–0" BELOW BOTTOM OF TRENCH IN 1 FOOT OF NATIVE BACKFILL. ATTACH ANODE CABLE DIRECTLY TO THRUST RESTRAINT FITTING.
#8 AWG/THHN ANODE HEADER CABLE (TYP)

COPPER SPLIT BOLT CONNECTOR

2 LAYERS HALF-LAPPED RUBBER TAPE

3 LAYERS OF SCOTCH-KOTE COATING (MANUFACTURED BY 3M)

#8 AWG/THHN ANODE HEADER CABLE (TYP)

TO ANODE

1.5" MIN

2 LAYERS HALF-LAPPED PVC TAPE

#10 AWG/THHN ANODE LEAD CABLE (TYP)

TO HEADER CABLE LOOP

FROM TEST STATION
ELEVATION VIEW

NOTES:
1. COAT ALL NUTS AND BOLTS WITH BITUMASTIC AND ENCASE ALL DUCTILE IRON PIPE & FITTINGS IN POLYETHYLENE. DO NOT POLYETHYLENE ENCASE THE STAINLESS STEEL SADDLE.
2. NO BONDING REQUIRED FOR PVC PIPE.

DIABLO WATER DISTRICT

STANDARD DRAWING
ANODE AT TAPPING SADDLE

DWD C30
## Galvanic Cathodic Protection System Checkout

**Station** | **Anode Potential (mV)** | **Structure Potential Disconnected (mV)** | **Structure Potential Connected (mV)** | **Shift in Potential (mV)** | **Shunt Measurement (A)**
--- | --- | --- | --- | --- | ---

DWD C31

DIABLO WATER DISTRICT

Galvanic Cathodic Protection System Checkout

Date: ___________________________  Data Sheet No. ___________________________

Job. No. ___________________________  Job Title: ___________________________

System No.: ___________________________  Location: ___________________________

Engr.: ___________________________  Structure: ___________________________

Section Rev. 8-14-2019
**DIABLO WATER DISTRICT**

*Impressed Current Cathodic Protection System Checkout*

Date: ______________ Data Sheet No. ______________

Job. No. ______________ Job Title: __________________________

Rectifier No. ______________ Location: __________________________

Engr.: ______________ Structure: __________________________

**RECTIFIER DATA:**

Input (AC): ______________ Volts: ______________ Amps: ____________

Phase: ______________ Cycles: ______________

Rated Output (DC): ______________ Volts: ______________ Amps: ____________

Coarse: ______________ Fine: ______________

Date Energized: ______________

**DC OUTPUT:**

By Panel Meter: Volts: ______________ Amps: ____________

By Volt Meter: Volts: ______________ Amps: ____________

Shunt Potential Measured: ______________

Shunt Rating: Amps: ______________ per mV: ______________

Current Calculated: ______________ Amps

**ANODE DATA:**

Anode Description: __________________________ No. ____________

Size: ______________ X ______________ Long ____________ Lbs. ____________

Shunt Rating: ______________ mV

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<th>Reading (mV)</th>
<th>Amps</th>
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## DIABLO WATER DISTRICT
### Impressed Current Cathodic Protection System Checkout

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<tr>
<th>Station</th>
<th>Structure Potential Rectifier &quot;On&quot; (mV)</th>
<th>Structure Potential Rectifier &quot;Off&quot; (mV)</th>
<th>Comments</th>
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### Details
- **Date:**
- **Data Sheet No.:**
- **Job. No.:**
- **Job Title:**
- **System No.:**
- **Location:**
- **Engr.:**
- **Structure:**

---

DIABLO WATER DISTRICT
Impressed Current Cathodic Protection System Checkout

Date: _______________________
Data Sheet No.: ______________

Job. No.: ____________________
Job Title: ____________________

System No.: _______________
Location: ____________________

Engr.: ______________________
Structure: ____________________

---

DWD C33
# DIABLO WATER DISTRICT
## Leak Repair Report

<table>
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<th>Date:</th>
<th>Data Sheet No.</th>
<th>Job. No.:</th>
<th>Location:</th>
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### Structure Description:

<table>
<thead>
<tr>
<th>Type of Pipe:</th>
<th>Pipe Diameter:</th>
<th>Year Installed:</th>
<th>Internal Lining:</th>
<th>Exterior Coating:</th>
<th>Polywrap:</th>
<th>Cathodic Protection:</th>
<th>Yes:</th>
<th>No:</th>
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### What Part of the Main was damaged?

### Describe the Leak:

- **Approximate Size:**
- **Orientation on Pipe:**
- **Photographs:** Yes: | No: |

### Describe backfill around pipe:

### Does damage appear to be mechanical or corrosion related?

- **What type of corrosion damage:**
  - No corrosion damage
  - Pitting
  - General corrosion
  - Graphitized cast or ductile iron (looks okay but cuts easily)

If corrosion related, collect soil sample for chemical analysis!

### Describe the condition of the pipe adjacent to the failure:

### Describe repairs made:

### Materials used:

---

DWD C34

Section Rev. 8-14-2019