RAINBOW
MUNICIPAL WATER DISTRICT

AGENDA

Engineering and Operations Committee Meeting

Board Room
3707 Old Highway 395
Fallbrook, CA 92028

Tuesday, November 3, 2026
1:00 PM

1. **CALL TO ORDER – Directors Irvine and Hoffman**
   (Hamilton - Alternate)

2. **PUBLIC COMMENT**

3. **DISCUSSION ITEMS**

   A. Construction Contract for the Eagles Perch Water Pipeline Improvement Project (Division 1)

   B. Notice of Completion and Acceptance of the Line NN Emergency Replacement Project (Division 1)

   C. Purchase of New Tow-Behind Generator

   D. Camino Del Rey Waterline Relocation Update

4. **ADJOURN**

ATTEST TO POSTING:

/s/Terese Quintanar	10/29/2026 11:23 AM
Terese Quintanar	Date and Time of Posting
Secretary of the Board	Outside Display Cases

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If you have special needs because of a disability that makes it difficult for you to participate in the meeting or you require assistance or auxiliary aids to participate in the meeting, please contact the District Secretary (760) 728-1178 by at least noon on the Friday preceding the meeting. The District will attempt to make arrangements to accommodate your disability.

RAINBOW
MUNICIPAL WATER DISTRICT

BOARD ACTION
Item No. 3.A

BOARD OF DIRECTORS

November 17, 2026

SUBJECT

CONSIDER ADDITIONAL FUNDING AND AWARD OF A CONSTRUCTION CONTRACT FOR THE EAGLES PERCH WATER PIPELINE IMPROVEMENT PROJECT (DIVISION 1)

BACKGROUND

Rainbow Municipal Water District's Eagles Perch water pipelines, built in 1959 and 1977, have reached the end of their useful life. The project will replace the pipelines and reroute them to avoid traversing private properties, relocating them to paved roadways. The project also addresses undersized pipeline(s) by upsizing the existing 4-inch line to 6- and 8-inch pipes to increase available fire flow, and and adds accessible hydrants along Eagles Perch Lane, Camino Del Rey, and Virgin Islands Road.

The District contracted with Omnis Consulting, Inc. in 2025 to provide plans and specifications for pipeline replacement. Design efforts included obtaining ten easements from property owners within the project's scope. Project design and easement acquisition were completed, and the project was put out to public bid in September 2026.

DESCRIPTION

On September 22, 2026, the District published a construction bid package for the Eagles Perch Pipeline Replacement project to the District's online bidding platform (Planet Bids) for public bidding. On October 20, 2026, the District received six (6) contractor bids. The lowest responsible and responsive bidder was M-Rae Engineering, Inc. with a bid amount of $1,861,493.50. Staff has evaluated the bid and found no irregularities.

Although the approved project budget is sufficient to cover the cost of the contract, additional appropriation to the overall project budget is needed. The following table provides a breakdown of the anticipated costs.

Eagles Perch Pipeline Replacement Project - Project Cost Summary

Item		Projected Cost	% of Total Cost
Construction Contract	$	1,861,493.50	78.6%
Staff Labor (Eng., Ops, & Inspection)	$	95,000.00	4.0%
Construction Management Contract	$	92,452.00	3.9%
Legal Services	$	7,500.00	0.3%
Engineering Contract (Design + Constr. Support)	$	125,000.00	5.3%
Contingency	$	185,554.50	7.8%
Totals	***$***	***2,367,000.00***	***100%***
Approved Budget to Date	***$***	***2,070,000.00***	
Additional Funding Request	**$**	**(297,000.00)**	

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As summarized in the above table, the total approved project budget to date is $2,070,000, therefore additional funding of $297,000 is needed to complete the Project at a total estimated cost of $2,367,000.

POLICY/STRATEGIC PLAN KEY FOCUS AREA

Strategic Focus Area One: Reliable Infrastructure

ENVIRONMENTAL

The Eagles Perch Pipeline Replacement project qualifies for a categorical exemption from the California Environmental Quality Act (CEQA) Guidelines Section 15302, Class 2, Replacement or Reconstruction. It also qualifies for a Statutory Exemption, CEQA Statute Section 21080.21 (a), This division does not apply to any project of less than one mile in length within a public street or highway or any other public right-of-way for the installation of a new pipeline or the maintenance, repair, restoration, reconditioning, relocation, replacement, removal or demolition of an existing pipeline. The Notice of Exemption was filed on January 9, 2026.

BOARD OPTIONS/FISCAL IMPACTS

The total approved project budget to date is $2,070,000, therefore an additional $297,000 is needed to complete the Project at an estimated cost of $2,367,000. Adequate funding exists in the District's capital replacement reserves to complete the Project.

Option 1:

(1) Approve a construction contract with M-Rae Engineering, Inc. in the amount of $1,861,493.50.
(2) Appropriate an additional $297,000 to the overall project budget raising the approved amount from $2,070,000 to $2,367,000.
(3) Make a determination that the Eagles Perch Water Pipeline Improvement project is categorically exempt from CEQA per Guidelines Section 15302, Class 2, replacement or reconstruction and statutory exemption pursuant to Section 21080.21a.
(4) Authorize the General Manager to execute the construction contract with M-Rae Engineering, Inc.

Option 2: (1) Reject all bids.

Option 3: (1) Provide other direction to staff.

STAFF RECOMMENDATION

Staff recommends Option 1.

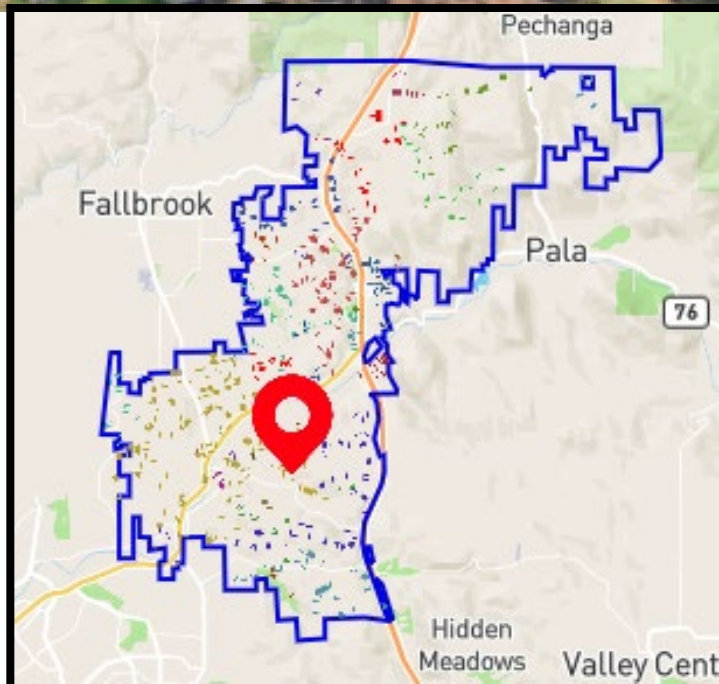
Chad Williams 11/17/2026
Engineering & CIP Program Manager

Attachment(s):
Project Site Map

Draft for Committee Review

EAGLES PERCH PIPELINE REPLACEMENT
DISTRICT PROJECT NO. 600043





RAINBOW
MUNICIPAL WATER DISTRICT

BOARD ACTION
Item No.3.B

BOARD OF DIRECTORS

November 17, 2026

SUBJECT

NOTICE OF COMPLETION AND ACCEPTANCE OF THE LINE NN EMERGENCY REPLACEMENT PROJECT (DIVISION 1)

BACKGROUND

Rainbow Municipal Water District (District) owns and operates a 16-inch diameter Fusible PVC pipeline (aka NN pipeline) which spans Highway 76 (Hwy 76) and the San Luis Rey River from North to South near the intersection of Via Montellano towards Old River Road. On June 11, 2025, operations staff were alerted via the District's Supervisory Control and Data Acquisition (SCADA) system that there was a high flow of water discharging from the Morro Reservoir. District staff located the main break just north of Hwy 76 along the Line NN pipeline. The section of the pipeline break was isolated, and the District's repair crew was dispatched to the scene. Upon excavation, the 16-inch PVC pipeline was severely damaged, and a crack was observed running horizontally along the pipeline under Hwy 76. Upon discovery of the catastrophic damage to the pipeline, the General Manager made a declaration of an emergency on Thursday June 12, 2025, per the Administrative Code Section 1.04.010 Emergency Policy, 1.04.010.01 Authority.

On June 24, 2025, the District's Board of Directors (Board) ratified the General Manager's Declaration of Emergency for the NN Pipeline Replacement Project and authorized expenditures up to $500,000 to facilitate planning, design, and environmental/regulatory clearances. Following the Declaration of Emergency, in-house construction crews started working on installing a highline using 18-inch PVC pipe from the District's inventory. The highline was successfully energized on August 7, 2025, and is currently conveying water to the suction side of the Dentro de Lomas pump station, which provides water to an area of significant population and demand in the District's South Pressure Zone. On July 2, 2025, the District entered into a professional services agreement with Hazen and Sawyer (Hazen) to assist with the emergency replacement of the pipeline. Hazen was tasked with the initial evaluation of trenchless replacement methods and concepts for the Line NN pipeline across Highway 76. As part of the scope, Hazen prepared a technical memorandum evaluating the alternatives. On September 23, 2025, the Board approved another agreement to Hazen to develop design plans and provide support services during construction for the Line NN replacement project, which was planned to be replaced via Microtunneling.

Staff and Hazen completed design and development of the contract documents in February 2026. Due to the specialized nature of the selected construction method, very few local Contractors have the expertise and equipment to complete the project. Vadnais Microtunneling (Vadnais) was selected based on its directional drilling qualifications and experience with similar projects. The Board awarded a construction contract to Vadnais at the March 2026 meeting.

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DESCRIPTION

Vadnais commenced construction on the Line NN pipeline in April 2026, one (1) change order was issued for a no-cost contract extension, which was approved by the General Manager as it was within their signing authority. The pipeline installation was completed on October 14, 2026.

CONTRACT SUMMARY			
Original Contract Amount	**Previous Change Orders**	**Additional Contract days**	**Total Contract Amount**
$3,549,790	**CO-01: ($0.00)**	**30 Days**	**$3,549,790**

The Line NN pipeline installation was completed per the approved plans and specifications, inspected, and tested according to the District's standards, and is ready for acceptance. Upon acceptance by the Board, the improvements become part of the District's water and wastewater system, and staff will take over operation of the newly constructed facilities. Warranty related maintenance falls under the purview of the Contractor until such time that the warranty period ends. Installation costs of $3,549,790 will be added to the District's Total Valuation along with all other costs associated with the project and a one (1) year warranty phase will commence upon the filing of the Notice of Completion (NOC).

In addition to design services, Hazen was contracted to perform a failure analysis of the Line NN pipeline. Hazen evaluated potential failure mechanisms by reviewing operational data, modeling geotechnical conditions, testing pipe material, and assessing hydraulic loading. Their Technical Memorandum (attached) concludes that no single factor would have caused the failure on its own:

- **Geotechnical:** External loads, deflection, and settlement-induced bending are all within acceptable limits for the pipe's depth and loading conditions.
- **Material:** The pipe meets applicable ASTM and ANSI/AWWA standards.
- **Pressure:** Both [operating and surge] pressures are within allowable ranges.
- **Fatigue:** Based on observed pressure fluctuations, fatigue from cyclic loading is unlikely.

POLICY/STRATEGIC PLAN KEY FOCUS AREA

Strategic Focus Area One: Reliable Infrastructure

ENVIRONMENTAL

The pipeline replacement project is an emergency repair, which is statutorily exempt from California Environmental Quality Act (CEQA) per CEQA Guidelines Section 15269: Emergency Projects. The project consists of repairs to publicly or privately owned service facilities necessary to maintain service essential to the public health, safety or welfare, therefore, a Notice of Exemption was filed on January 9, 2026. No additional action required.

BOARD OPTIONS/FISCAL IMPACTS

The construction costs of the improvements, totaling $3,549,790 will be added to the District's asset valuation. The final amount of other costs associated with the project will be added to the District's asset valuation once year-end financials have been completed.

Option 1:

- Accept the Emergency Line NN Pipeline project.
- Approve filing of the Notice of Completion.

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- Add installation costs of $3,549,790 to the District's valuation.

Option 2: Provide other direction to staff.

STAFF RECOMMENDATION

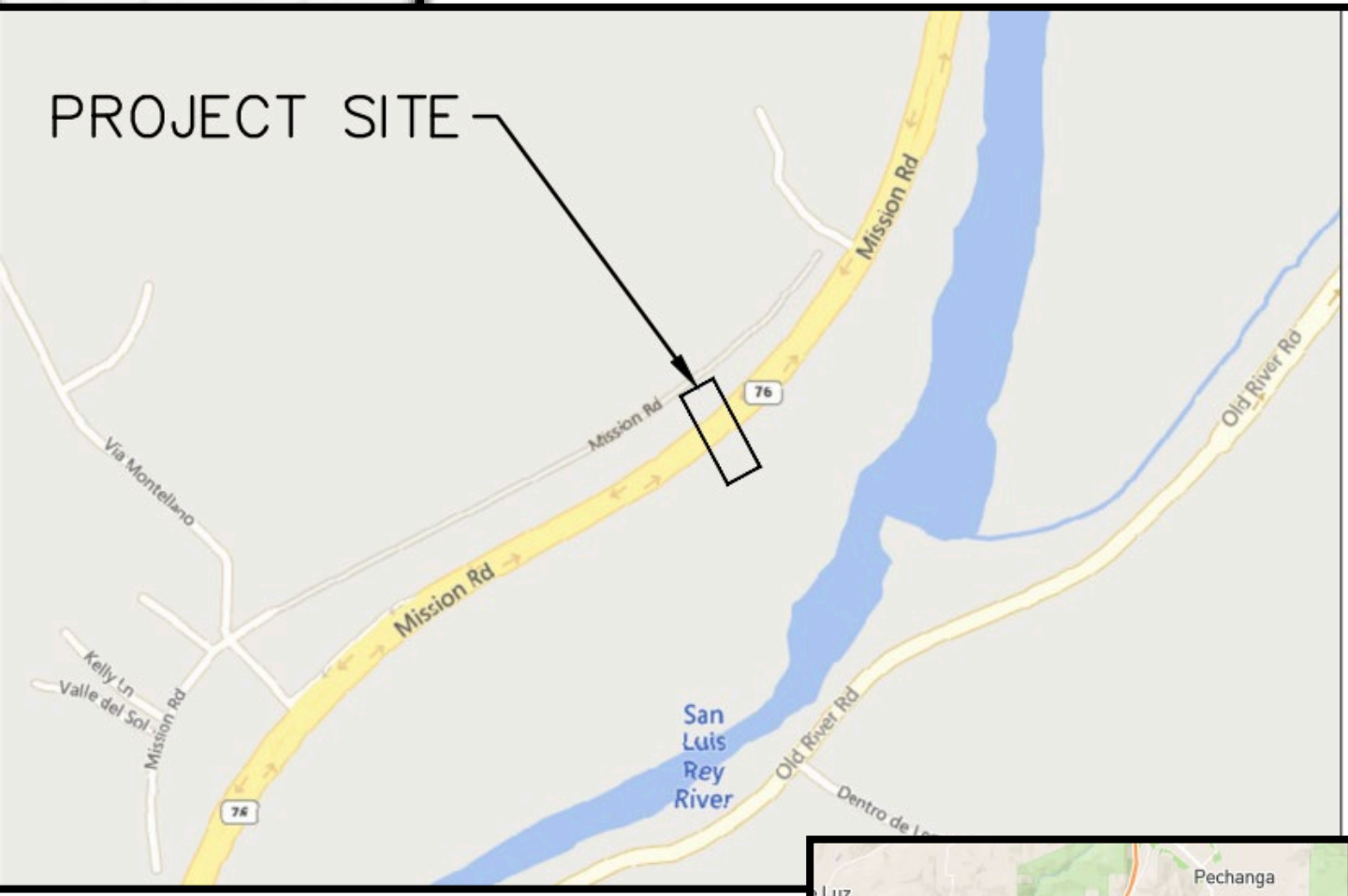
Staff recommends Option 1.

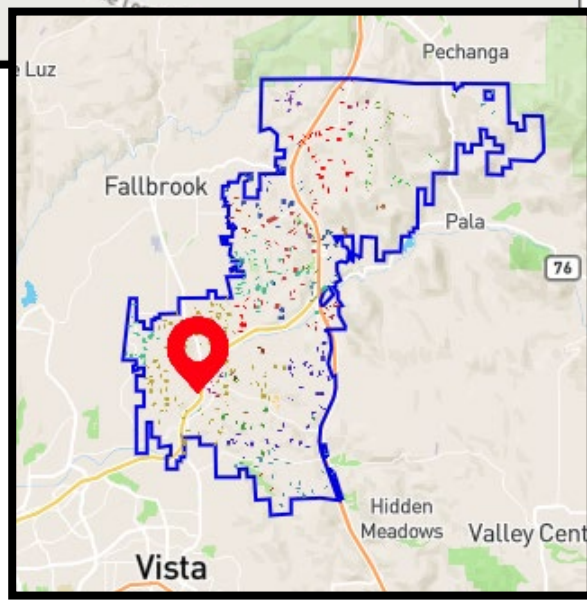
Chad Williams 11/17/2026
Engineering & CIP Program Manager

Attachment(s):
1. Project Site Map
2. Hazen and Sawyer Technical Memorandum

Draft for Committee Review

LINE NN EMERGENCY PIPELINE REPLACEMENT
DISTRICT PROJECT NO. 800061





Hazen *Technical Memorandum*

October 20, 2026

To: Jake Wiley
Rainbow Municipal Water District
3707 Old Highway 395
Fallbrook, CA 92028

From: Jack Adam
Hazen and Sawyer
11260 El Camino Real, Suite 100
San Diego, CA 92130



Line NN Pipe Failure Analysis

Rainbow Municipal Water District

RMWD Project No. 800061

Hazen Project No. 20273-001

Job no: 800061

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1. Introduction

1.1 Project Background

Rainbow Municipal Water District (Rainbow) owns and operates a critical 16-inch water transmission main (Line NN) in the community of Bonsall that conveys treated water to the Dentro De Lomas Pump Station and serves as a key interconnection between distribution systems on the north and south sides of State Route 76 (SR-76).

Constructed in 2011 using Horizontal Directional Drilling (HDD), the pipeline consists of AWWA C905 fusible PVC pipe and extends approximately 1,320 feet. The alignment includes two trenchless crossings: a 350-foot segment beneath SR-76 and a 970-foot segment beneath the environmentally sensitive San Luis Rey River corridor as shown in **Figure 1-1**.

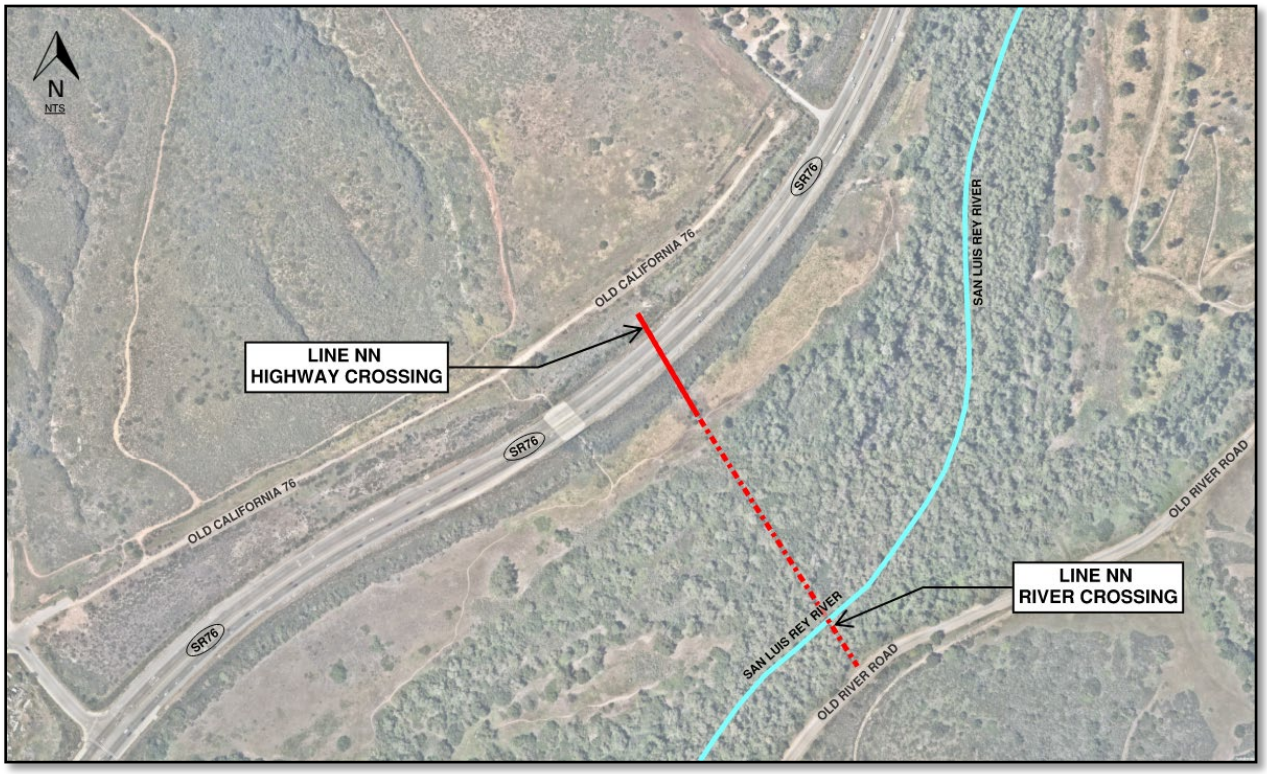


Figure 1-1: Project Location Map

In June 2025, Rainbow experienced a failure on the pipeline near the SR-76 crossing. Closed-circuit television (CCTV) inspection identified longitudinal cracks extending approximately 75 feet beneath the highway. Inspection efforts were halted prior to reaching the full extent of the alignment due to a collapsed pipe section and accumulated debris. Subsequent excavation on the south side of SR-76 confirmed that the damage was localized and did not extend through the full crossing.

1.2 Scope and Organization

Rainbow retained Hazen and Sawyer (Hazen) to design the replacement pipeline and to perform a pipe failure analysis evaluation of the failed portion. The failure analysis focuses on assessing internal and external loading conditions, reviewing available design and operational data, and evaluating material properties of the installed pipe. Laboratory testing was performed on recovered pieces of the broken pipeline as well as a 20ft intact section of pipe removed from the south side of the crossing to verify conformance with applicable standards and to assess material performance.

The purpose of this Technical Memorandum (TM) is to compile and evaluate available data, characterize subsurface conditions, and assess loading conditions through analytical methods, including finite element analysis (FEA), to identify potential failure mechanisms. The remaining sections of this TM are organized as follows:

Section 2 – Data and Existing Information – Summarizes relevant record drawings, construction documentation, and operational data.

Section 3 – Geotechnical Analysis – Presents site geology, modeling approach, and analysis results.

Section 4 – Failed PVC Pipe Material Testing – Summarizes laboratory testing of the failed C905 PVC pipe.

Section 5 – Pipe Pressure Analysis – Evaluates working, surge, and cyclic pressure conditions.

Section 6 – Conclusions – Summarizes key findings and conclusions.

2. Data and Existing Information

2.1 As-Builts and Construction Documents

In 2011, Line NN was replaced concurrent to the Caltrans SR-76 Widening and Realignment Project. The replacement included crossing both the newly constructed highway embankment and the San Luis Rey River. Although the SR-76 realignment was not fully complete at the time of installation, the embankment was already in place, necessitating a trenchless replacement method for both crossings.

The replacement maintained the 16-inch diameter pipeline but transitioned from the original steel pipe to DR-14 fusible PVC installed via HDD without a casing. Review of record drawings and construction documents indicates that the pipeline was originally designed as a 16-inch HDPE alignment intended only to cross the river and tie into the existing steel pipeline beneath the highway. During construction, both the pipe material and alignment scope were modified, resulting in a second HDD crossing to extend beneath SR-76. These late-stage changes are reflected in both the lack of geotechnical data near the highway crossing and record drawings that do not accurately depict the final HDD profile beneath SR-76.

Review of construction records and photographs also identified installation challenges. On March 9, 2011, during pullback operations, the HDD borehole reportedly collapsed while the PVC pipe was being

installed, resulting in the pipe becoming lodged within the bore. As shown in **Figure 2-1**, the contractor attached a pulling fitting to the end of the pipe and pulled until pipe failure occurred, as shown in **Figure 2-2**. Although this event did not occur within the highway crossing segment, it raises concerns regarding subsurface conditions and installation quality.



Figure 2-1: Borehole Collapse



Figure 2-2: Installation Concerns

2.2 Operational Data

Rainbow provided suction and discharge pressure data for the Dentro De Lomas Pump Station. The data was recorded at approximately 10-second intervals and included date, time, and pressure readings in pounds per square inch (psi). Suction pressure data was provided for the period of January 2025 through July 2025, while discharge pressure data extend through September 2025.

The maximum design flow capacity of the pump station is approximately 3,360 gallons per minute (GPM) with all three pumps operating. Based on information provided by Rainbow's operations team, the system is typically operated with two pumps running at approximately 85% variable frequency drive (VFD) speed, corresponding to an average flow rate of approximately 1,900 GPM.

Figure 2-3 presents a time series of suction and discharge pressures and captures the observed suction pressure loss at the time of failure. This dataset was used to evaluate operating conditions that may have contributed to the pipeline failure.

The Dentro De Lomas Pump Station is located at a significantly higher elevation than the failure location and is on the suction side of the system. As shown in **Figure 2-3**, suction pressures typically range from 120-160 psi, while discharge pressures generally range from 220-280 psi.

The conversion of these pressures to conditions at the failure location is discussed in Section 5.

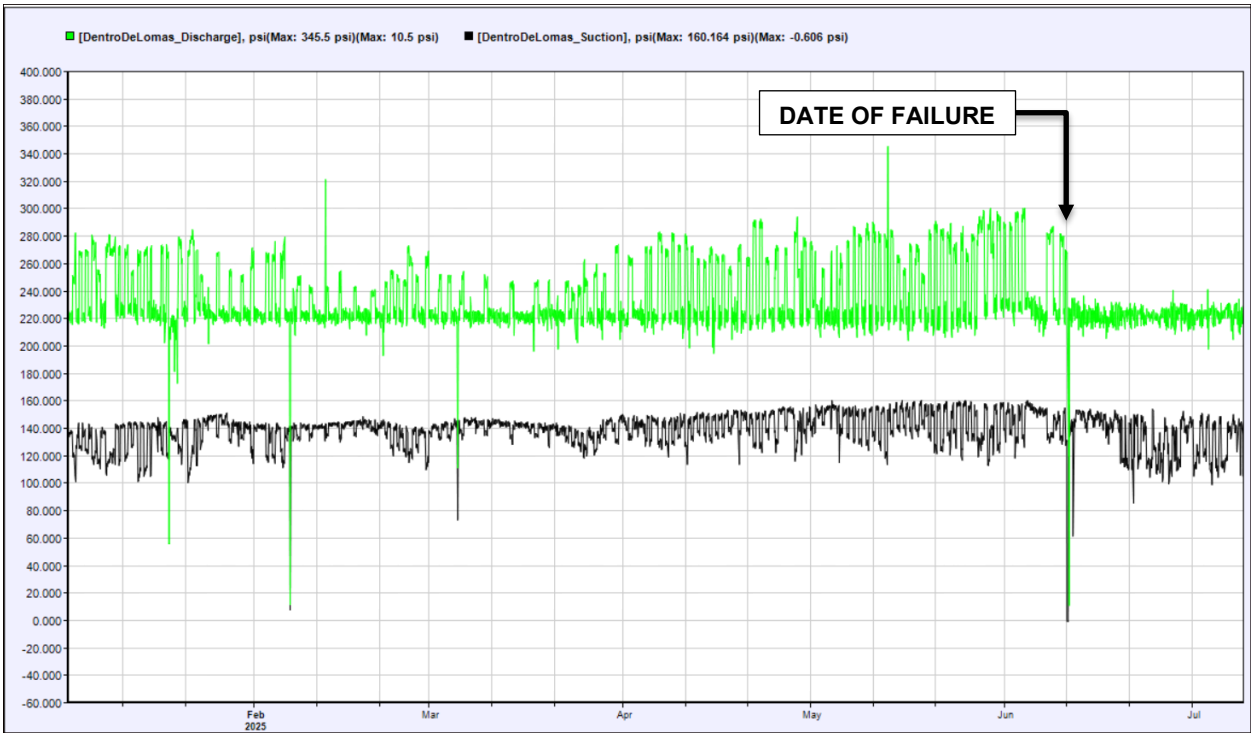


Figure 2-3: Dentro De Lomas Pump Station Suction and Discharge Pressure Data

3. Geotechnical Analysis

3.1 Site Geology

Line NN is located within the San Luis Rey River Valley in Bonsall, California. The site is underlain by Quaternary alluvial deposits associated with the river floodplain and surrounding drainage features. These alluvial soils consist primarily of loose to medium dense silty sands and sandy silts with variable gravel and cobble content, locally underlain by dense basal alluvium and highly weathered granitic bedrock. These soil conditions are generally considered among the most challenging ground conditions for HDD installation.

Previous geotechnical investigations performed along the SR-76 corridor and Line NN alignment indicate that the alluvial deposits vary in thickness and are generally saturated below relatively shallow depths due to groundwater and river influence. Groundwater conditions fluctuate seasonally and in response to river stage and storm events, resulting in partially to fully saturated soil conditions at the depth of Line NN.

3.2 Model Setup and Geometry

GeoStudio 2025.1.1 was used to model this system using SEEP/W and SIGMA/W. The model geometry was developed at the critical cross section where the pipe failure occurred at Line NN. The model represents a 2D section through the pipeline alignment and subsurface materials based on the available geotechnical data.

The model extends vertically downward from the ground surface to the underlying igneous rock and horizontally the model extends 8 times the diameter of the pipe to minimize boundary conditions affecting the results. Fixed boundary conditions were assigned along the base of the model, and the sides of the model were constrained to allow vertical movement but restrict horizontal displacement.

3.2.1 Two-Dimensional Transverse Section – Load Evaluation

The two-dimensional section represents a vertical cut perpendicular to Line NN that was taken at the critical cross section. This model includes the full soil profiles, groundwater condition, staged placement of the Caltrans fill, and the embedded 16” pipeline. The purpose of this section is to evaluate:

- Vertical load transfer through the soil column,
- Load redistribution around the pipe,
- Mean and total load acting at the pipe elevation resulting from overburden and embankment loading.

This section was selected because it is best suited for quantifying the total load on the pipe because it captures overburden loading, load concentration effects, and soil interaction in a cross-sectional view. SIGMA/W results from this section were used to estimate the magnitude and distribution of loads imposed on the pipe following installation and placement of the fill placement and establishment of steady state groundwater.

3.2.2 Longitudinal Section – Displacement Evaluation

The longitudinal section represents a vertical plane parallel to the pipeline and extends the entire length of Line NN through the failure area. This model captures the variations in soil thickness, ground surface geometry, and loading conditions along the pipe alignment that cannot be represented in the 2D section.

The longitudinal section was used primarily to evaluate vertical settlement patterns and differential displacement along the length of the pipe. This modeling approach allows identification of zones where non-uniform settlement develops and imposes curvature on the pipeline.

The longitudinal section was used primarily to evaluate vertical settlement patterns along the length of the pipeline. This section allows for the assessment of how settlement develops along the pipeline and identifies potential zones of differential settlement along the pipe. SIGMA/W results from this section provide context for the potential deformation that occurs along the pipe over the entire distance and complement the load analysis by showing the settlement in response to the soil mass.

3.2.3 Stratigraphy and Material Units

The Geostudio Model is made up of six layers described below and shown in **Figure 3-1**.

- *Caltrans Fill* - A surface layer that was placed in 2010-2011 that consisted of engineered fill and acted as the foundation of California SR-76.
- *Very Loose Fine Sands and Silty Sands* - This layer is comprised of loose, compressible alluvial deposits commonly encountered within the San Luis Rey River floodplain.
- *Medium Dense Alluvial Soils* - This layer consists of medium dense sandy alluvium with moderately improved stiffness and strength compared to overlying soils. Line NN is embedded within this layer, making it the primary soil controlling vertical displacement and load transfer to the pipe.
- *Poorly Graded Sand with Silt* - A transition layer consisting of sandy material with silt content, exhibiting lower permeability and moderate compressibility.
- *Cobbles* - A dense granular layer representing basal alluvium composed of cobbles and coarse gravel.
- *Igneous Rock (Bedrock)* - The lower boundary of the model consists of weathered to competent granitic bedrock. This layer was assumed to be non-deformable relative to the overlying soils and serves as a fixed support affecting stress reflection and settlement development in the overburden.

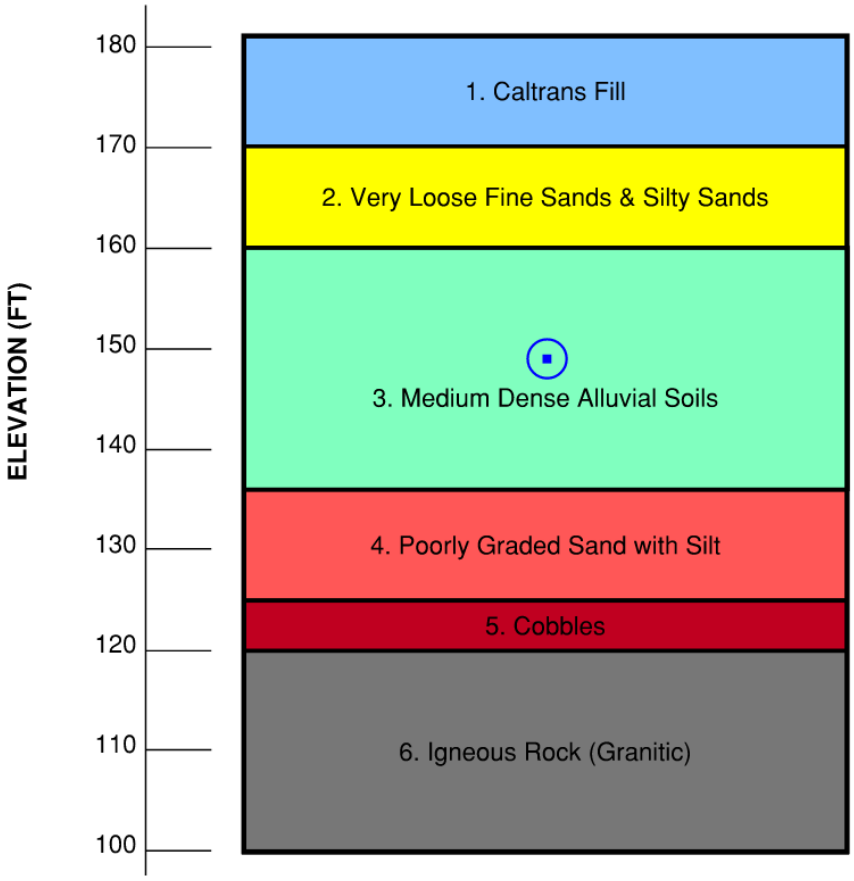


Figure 3-1: Model Geometry

3.2.4 Pipe Representation

Line NN is modeled as a 16-inch structural member located within the medium dense alluvial soil layer. The pipe is positioned at its approximate as-constructed depth relative to the ground surface and bedrock interface.

The pipe was included in the load-deformation analysis to evaluate:

- Total vertical load acting at the pipe elevation,
- Changes in effective load due to pore-water pressure,
- Vertical displacement imposed on the pipe by surrounding soil settlement.

3.3 Model Steps

Numerical modeling was performed using GeoStudio SEEP/W and SIGMA/W to evaluate groundwater conditions, soil loads, and vertical movement acting on Line NN at the failure location. The analyses were structured to represent site conditions and loading history. Initial modeling established existing

groundwater and load conditions surrounding the pipe under long-term equilibrium conditions prior to any additional surface loading.

To capture changes that occurred over time, the Caltrans fill was added using a staged construction approach representing gradual placement over approximately one year. Based on available information, the pipeline was assumed to have been installed approximately one year after the Caltrans fill was placed. This assumption was represented in the staged analyses by applying the embankment loading and allowing the soil mass to respond, then introducing the pipeline at the corresponding stage so that subsequent results reflect deformation imposed on the pipe after installation. Additional SEEP/W and SIGMA/W analyses evaluated how the added fill increased loading on the underlying soils and how groundwater pressures and vertical displacement developed at the pipe elevation. This staged modeling approach captures the combined effects of embankment loading, groundwater conditions, and soil compressibility and provides the basis for assessing load on the failed pipeline.

3.4 Results of GeoStudio Modeling

3.4.1 Total Vertical Load Results

Total vertical load contours from the 2D SIGMA/W section are shown in **Figure 3-2**. The results show a load profile consistent with the soil self-weight and the embankment loading.

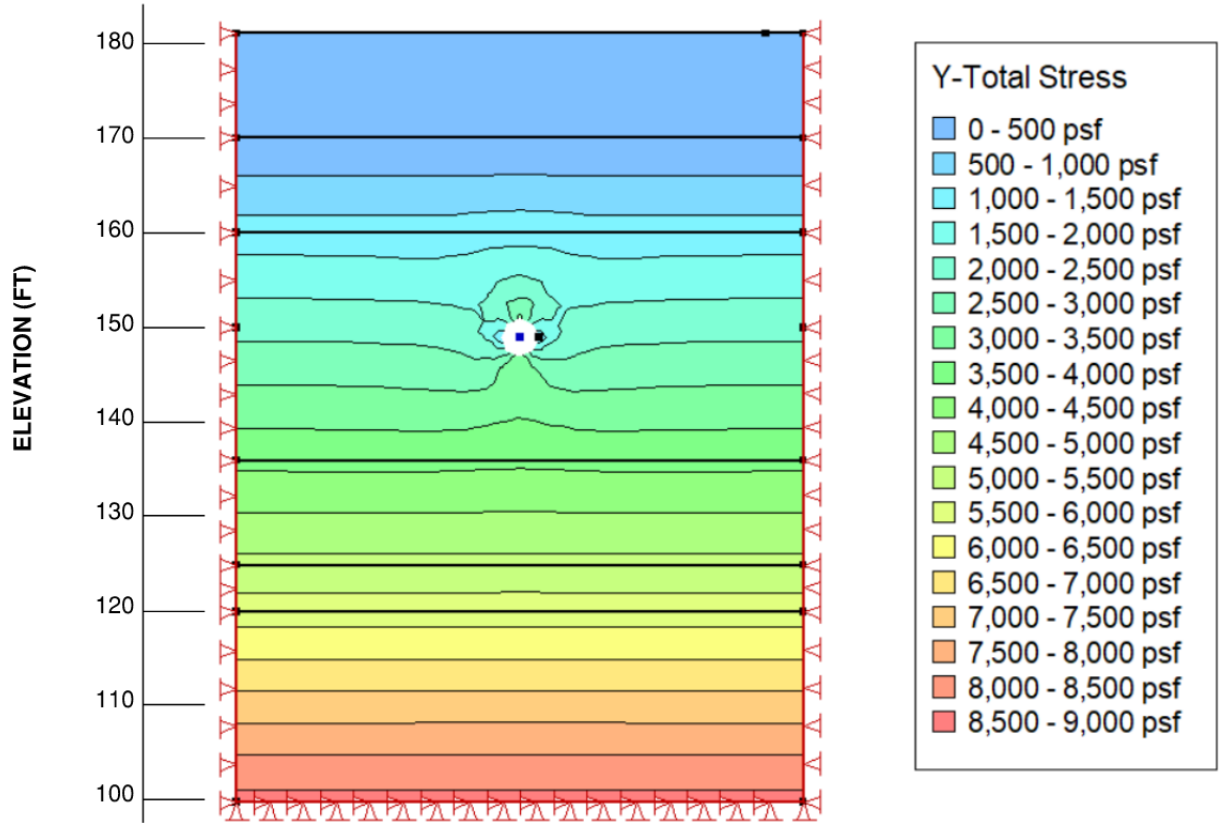


Figure 3-2: Total Vertical Load Section

Near the ground surface, the total vertical load ranges from approximately 0-500 pounds per square foot (psf). The load increases progressively with depth, reaching approximately 8,500-9,000 psf near the bottom of the soil profile in the granitic bedrock.

At the elevation of the 16-inch pipeline (~139 feet), the surrounding soils are within the 2,500-3,000 psf load range. Directly above and below pipe higher load ranges are exhibited in the 3,500-4,000 psf range. The load contours show a disturbance around the pipe characterized by compression bulbs above and below the pipe and reduced loads on either side of the pipe.

This load redistribution is consistent with the presence of a pipe acting as a relatively stiff inclusion within the compressible soils. This indicates that the vertical loads from the overlying soil and embankment are redistributed around the pipe rather than being transmitted uniformly through it.

This level of vertical loading corresponds to an estimated long-term deflection of approximately 2.5% based on the *AWWA M23 – PVC Pipe Design and Installation, 3rd Edition* design equation, which is well below the recommended limit of 5%.

Therefore, long-term deflection is unlikely to have caused or contributed to the pipeline failure.

3.4.2 Mean Total Load Distribution at the Pipe Elevation

Mean total load contours from the 2D SIGMA/W section are shown in **Figure 3-3**. These contours provide an average load measurement considering all directions and are used to evaluate the general confinement and external pressure acting on the pipe.

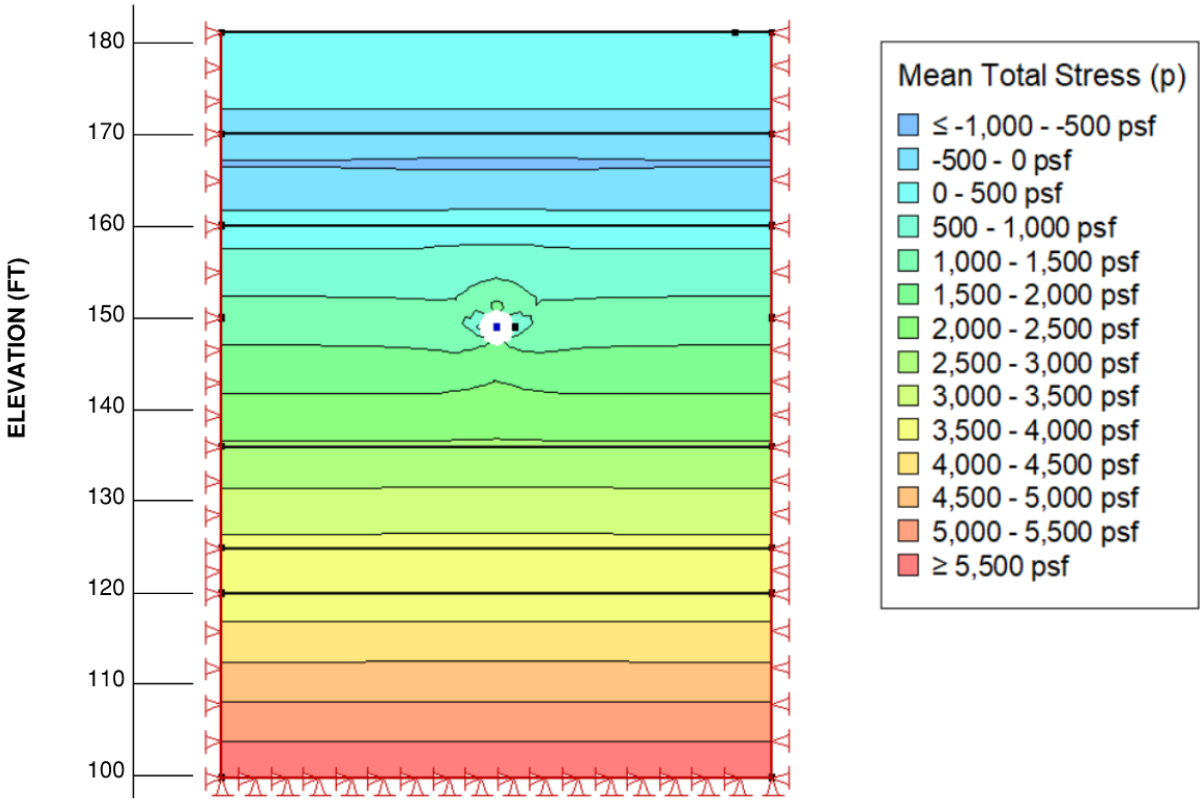


Figure 3-3: Mean Total Load Section

At the pipe location the mean total loads are approximately 2,000-3,000 psf, with localized variation around the pipe. Mean loads are lower than the vertical loads due to load arching and redistribution in the surrounding soil mass.

The uniform distribution of mean load around the pipe suggests that the external pressure acting on the pipe is moderate and consistent with the expected values for the depth of pipe and embankment loading. These results indicate that the pipe is not subject to extreme localized compressive or tensile stress concentrations in this section cut.

Therefore, mean total loads are unlikely to have caused or contributed to the pipeline failure.

3.4.3 Longitudinal Displacement Results (SIGMA/W Analysis)

Vertical displacement contours from the SIGMA/W longitudinal section analysis are shown in **Figure 3-4**. These displacements represent post-installation settlement, i.e., settlement that occurs after the pipeline was installed as the surrounding soil mass continues to deform under the applied loading conditions. Because project records do not clearly indicate how long after the Caltrans fill placement the pipeline was installed, the timing of the modeled post-installation settlement should be interpreted as conditional on the assumed installation stage represented in the model.

The results show that settlement is non-uniform along the alignment. The central portion of the modeled pipeline segment experiences greater downward displacement than the ends, producing a smooth sagging profile. The modeled pipe vertical displacement (red pipe element in the longitudinal section) varies from approximately 0.8 to 1.0 ft downward near the ends to a maximum of approximately 1.5 ft downward near the mid-length (around the 200-ft station). This corresponds to a differential settlement on the order of ~0.6 to 0.7 ft between the mid-length and the ends over the ~400-ft modeled reach.

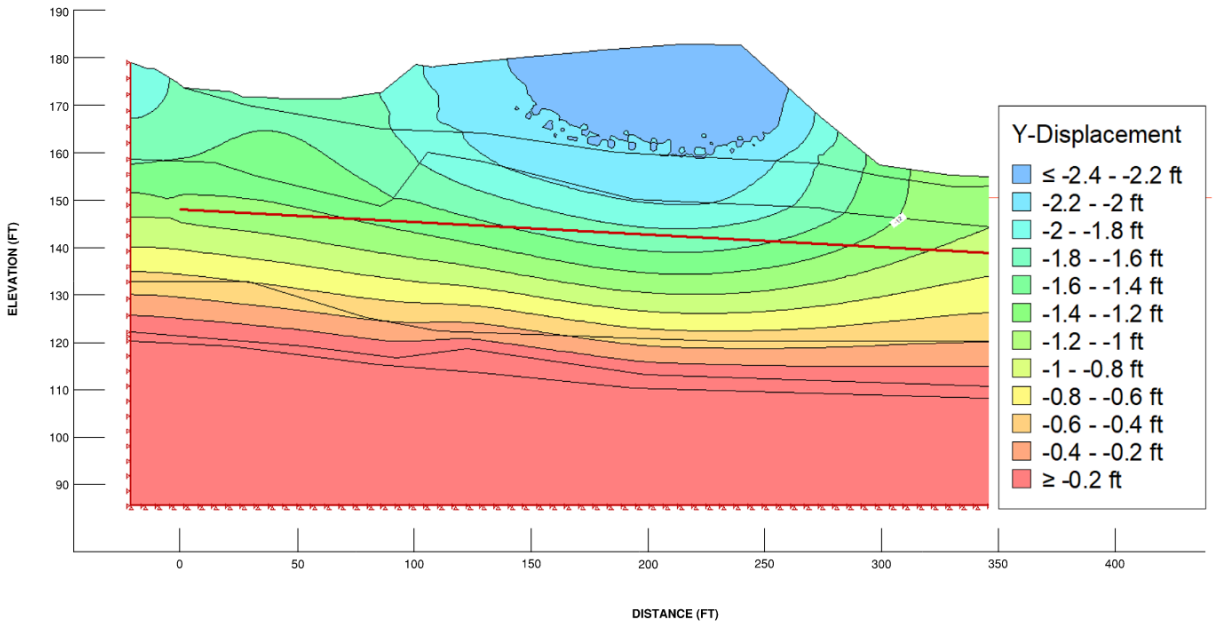


Figure 3-4: Longitudinal Displacement Section

To better illustrate how the pipe deforms longitudinally, **Figure 3-5** includes the modeled pipe centerline displacement along the full ~400-ft length. This presentation highlights that, while absolute settlement magnitudes are moderate to significant, settlement gradients develop along the pipeline, inducing longitudinal curvature (bending) as the pipe accommodates differential settlement of the surrounding soils. These longitudinal bending effects cannot be captured by the transverse cross-sectional analysis alone.

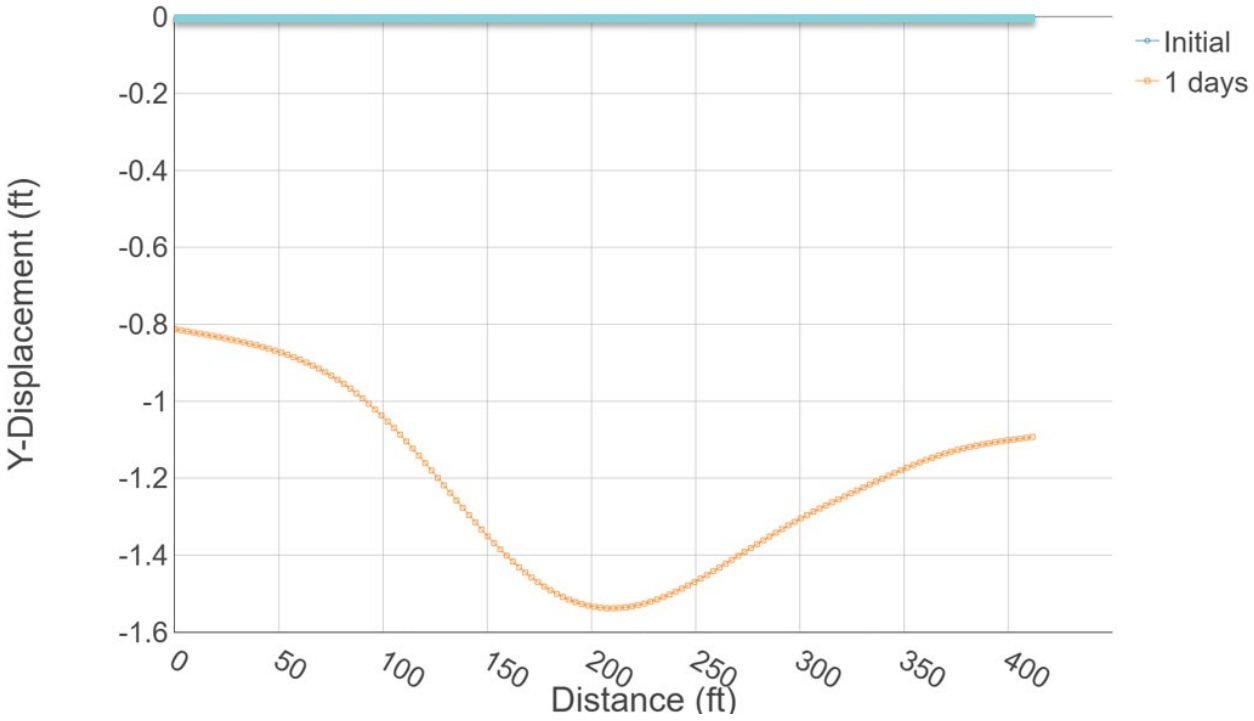


Figure 3-5: Modeled Post-Installation Pipe Vertical Displacement Along Longitudinal Alignment

Bending radii induced by the modeled differential settlement were calculated from the simulation results. The minimum (worst-case) radius is approximately 9,800 feet, which is significantly greater than the minimum allowable radius of 363 feet as shown in Table 12.2 of *AWWA M23 – PVC Pipe Design and Installation, 3rd Edition.*

Therefore, it is unlikely that additional deflection due to soil settlement caused or contributed to the pipeline failure. However, the installation radius is unknown and was not included in this evaluation.

4. Failed PVC Pipe Material Testing

4.1 Tensile Property Evaluation

Pieces of the failed PVC pipe were sent to a laboratory for strength testing to verify if the pipe material met applicable standards. The test results are shown below and are included in **Appendix A**. The pipe material is AWWA C905-11, DR14 with an ASTM D1784 Class12454. Below are the pertinent required minimum properties for this pipe material per ASTM D1784:

- Minimum Tensile Strength: 7,000 psi
- Minimum Tensile Modulus of Elasticity: 400,000 psi

Two sections of pipe were tested for Type 1 Tensile Properties per ASTM D-638-22 by CRT Laboratories, Inc on January 12, 2026. **Figure 4-1** shows a picture of the sample specimens and **Figure 4-2** shows the results of the testing and indicates that the pipe material strength is well within the strength standards for the pipe material.

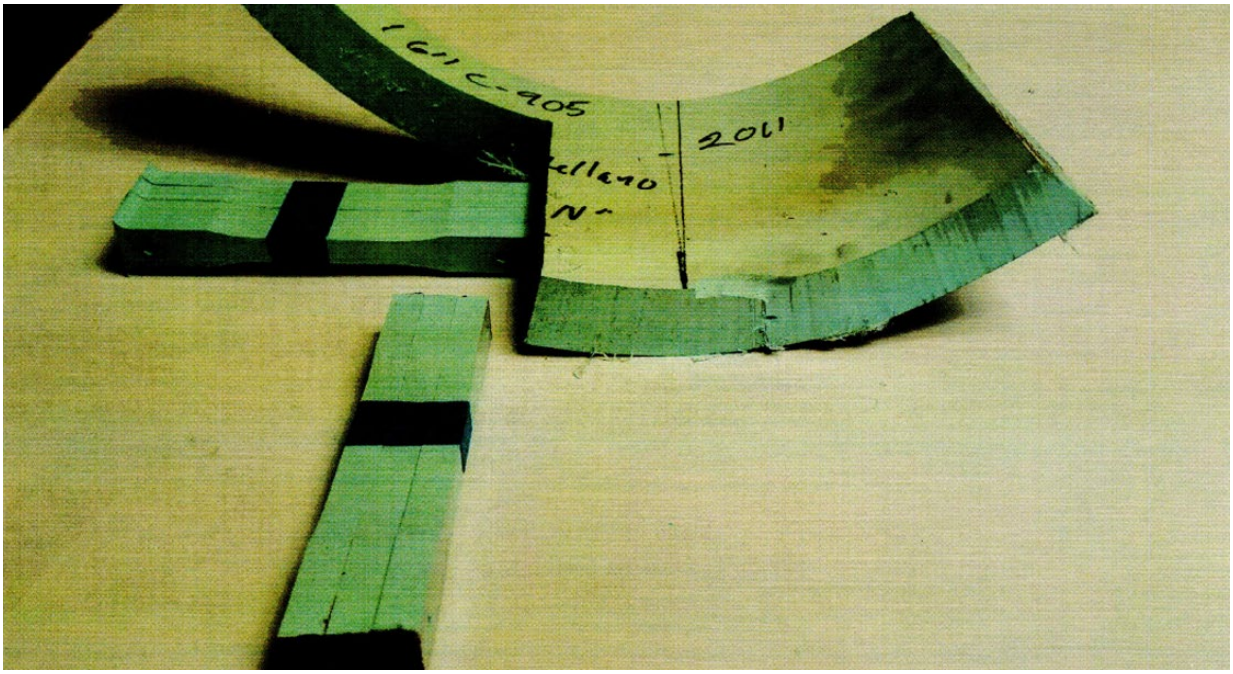


Figure 4-1: PVC Pipe Sample and Test Specimens

ASTM D638-22 TENSILE PROPERTIES (0.2 in/min.)

SAMPLE ID: Stave #1 (12" x 6") 16" C-905 2011 Mission Via Montellano Line NN

Specimen #	Yield Strength (Psi)	Peak Strength (Psi)	Break (Psi)	Tan Mod (Psi)	Elongation at Break (%)	Elongation at Yield (%)
1	7,300	7,305	2,282	461,700	48.6	15.0
2	7,388	7,392	2,385	472,800	52.3	15.3
3	7,436	7,443	1,580	447,400	59.8	15.4
4	7,456	7,469	4,187	457,200	68.2	14.8
Average (Psi / MPa)	7,395 / 51.0	7,402 / 51.0	2,608 / 18.0	495,800 / 3,170	57.2	15.1

SAMPLE ID: Stave #2 (8" x 4") 16" C-905 2011 Mission Via Montellano Line NN

Specimen #	Yield Strength (Psi)	Peak Strength (Psi)	Break (Psi)	Tan Mod (Psi)	Elongation at Break (%)	Elongation at Yield (%)
1	7,368	7,390	2,665	464,100	54.1	15.9
2	7,363	7,378	2,416	444,200	51.3	16.4
3	7,367	7,377	3,053	440,600	60.0	16.1
Average (Psi / MPa)	7,366 / 50.8	7,382 / 50.9	2,711 / 18.7	449,600 / 3,100	55.1	16.1

Figure 4-2: PVC Pipe Test Results

4.2 Comprehensive Material Testing

During construction, a 20-foot section of intact pipe was removed from the south side of the highway and delivered to CRT Laboratories Inc. for further laboratory testing. On October 12, 2026, six additional tests were performed in accordance with *ANSI/AWWA C900-22, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4" through 60"*, as summarized in **Table 4-1**. The complete laboratory test results are included in **Appendix B**.

Table 4-1: Comprehensive Material Testing

Test Method	Test Description	Test Result
AWWA C900-22	Sect. 4.3.1 Workmanship, Finish, & Markings	**Complies**
ASTM D2122-22	Sect. 4.3.2 Dimensions & Tolerances	**Complies**
ASTM D2412-21	Sect. 4.3.3.4 Pipe Flattening @ 23°C	**Complies**
ASTM D2152-23	Sect. 4.3.3.5 Extrusion Quality Acetone Immersion	**Complies**
ASTM F1057-21	Heat Reversion (Fusion Integrity)	**Complies**
ASTM D2290-19a	Sect. 4.3.3.6 Ring Tensile Strength - Procedure E	**Complies**

5. Pipe Pressure Analysis

5.1 Working Pressure Analysis

According to AWWA C-900, 16-inch diameter, DR-14 pipe has a working pressure rating of 305 psi (pressure class). The working pressure rating includes a safety factor of 2.0 from the hydrostatic design basis of 4,000 psi, which is a long-term pressure and material rating. The pipe does have a rapid burst pressure rating of 985 psi, which is approximately 3.2 times the working pressure rating.

As **Figure 2-3** showed, the suction pressure at the Dentro De Lomas Pump Station ranged from 120-160 psi, at least around the time of the failure, with an average around 140 psi. In order to estimate the pressure at the location of the failure, the elevation difference along with estimated friction losses from the failure location to the pump station is calculated below:

1. Elevation of the gauge at the pump station is approximately 460 ft and the elevation at the pipe failure is approximately 160 ft for an elevation difference of 300 ft or an equivalent of approximately 130 psi.

2. The inside diameter of 16-inch DR-14 pipe is approximately 14.9 inches per AWWA C-900. The estimated velocity at 1,900 gpm (average flow per data) is 3.5 fps.

3. The distance between the pipe failure and the pump station is approximately 10,000 Linear Feet (LF).

4. The head loss assuming a Hazen-Williams C-factor of 130 is 2.4 ft / 1,000 ft.

5. At 10,000 LF the total estimated friction loss is 24 ft or 10.4 psi

6. The total head difference is therefore 130 psi + 10.4 psi = 140.4 psi

7. The average working pressure at the location of the pipe failure is 140.4 psi + 140 psi = **280.4 psi**

Given a working pressure rating of 305 psi and the estimated long-term pressure is approximately 280.4 psi, the pipe is operating within its design pressure. Further, the strength testing described in Section 4 confirmed that the tensile properties of the pipe material exceed the minimum standards and therefore provides further support that the failure was not caused by excessive operating pressure.

5.2 Surge Pressures

As described previously, the pipe has a surge allowance of 1.6 times the working pressure or 488 psi. In order to calculate the potential surge pressure, the maximum capacity of the pump station was used. As described in Section 2.2, the peak capacity of the pump station is 3,360 gpm. This results in a velocity of 6.2 fps. The surge pressure from a sudden valve closure can be estimated using the Joukowsky equation, which is $\Delta P=\rho a \Delta V$.

Where:

- ΔP = surge pressure
- ρ = density of water
- a = wave speed (ft/s)
- ΔV = change in velocity

According to *AWWA M23 – PVC Pipe Design and Installation, 3rd Edition* Table 5-3, the pressure surge for DR 14 PVC pipe is approximately 19.8 psi per 1 ft/s over velocity. Therefore, the estimate of total pressure under surge conditions is:

280.4 psi (working pressure) + 19.8 psi/fps x 6.2 fps = 122.8 psi (surge pressure) = **403.2 psi**

This surge pressure is somewhat conservative since the pressure at the location of the break would be somewhat lower with all pumps running. The calculations show that it is unlikely that pressure surges alone would cause a pipe failure.

5.3 Cyclic Surge Loading

Cyclic fatigue can cause premature failure of PVC pipe under certain conditions. Cyclic surges are pressure fluctuations that occur somewhat frequently within a pipeline and, if frequent and large enough, can cause a PVC pipe to fail much sooner than the estimate life using working pressure alone.

The calculation to estimate cyclic life for PVC pipe is contained in the 2022 *AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. through 60 In.* and is shown in **Figure 5-1** below.

$$\text{Cyclic Life (years)} = \frac{N}{n} \qquad \text{(Eq 4)}$$

Where:

N = Number of pressure surges (cycles) to failure

n = Anticipated number of pressure surges (cycles) per year

The equation for calculating the number of pressure surges (N) to failure is:

$$N = 10^{-4.196 \log(\sigma_{amp}) + 17.76} \qquad \text{(Eq 5)}$$

Where:

σ_{amp} = amplitude of pipe wall hoop stress from cyclic pressures, psi (Appendix B)

Figure 5-1: PVC Pipe Cyclic Life Calculation

Unfortunately, there is no data available to directly quantify transient surge pressures, as the provided pressure data was recorded at intervals too large to capture transients. Transient pressure monitoring systems typically sample pressures over 100 times per second, which was not available for this evaluation.

However, the available data still provides useful insight into system operation. **Figure 2-3,** which presents the full dataset provided to Hazen, indicates that the pump station does not fully turn off, and the suction pressures remain relatively steady over time. As shown in **Figure 5-2**, periodic pressure fluctuations of approximately 20 psi are observed in response to changes in pump speed occurring at a frequency of roughly 2 times per day.

Even if these fluctuations are assumed to represent cyclic surge events, the calculated cyclic life is orders of magnitude greater than a typical 50-year design life. Therefore, it is highly unlikely that cyclic fatigue caused or contributed to the premature failure of the pipe.

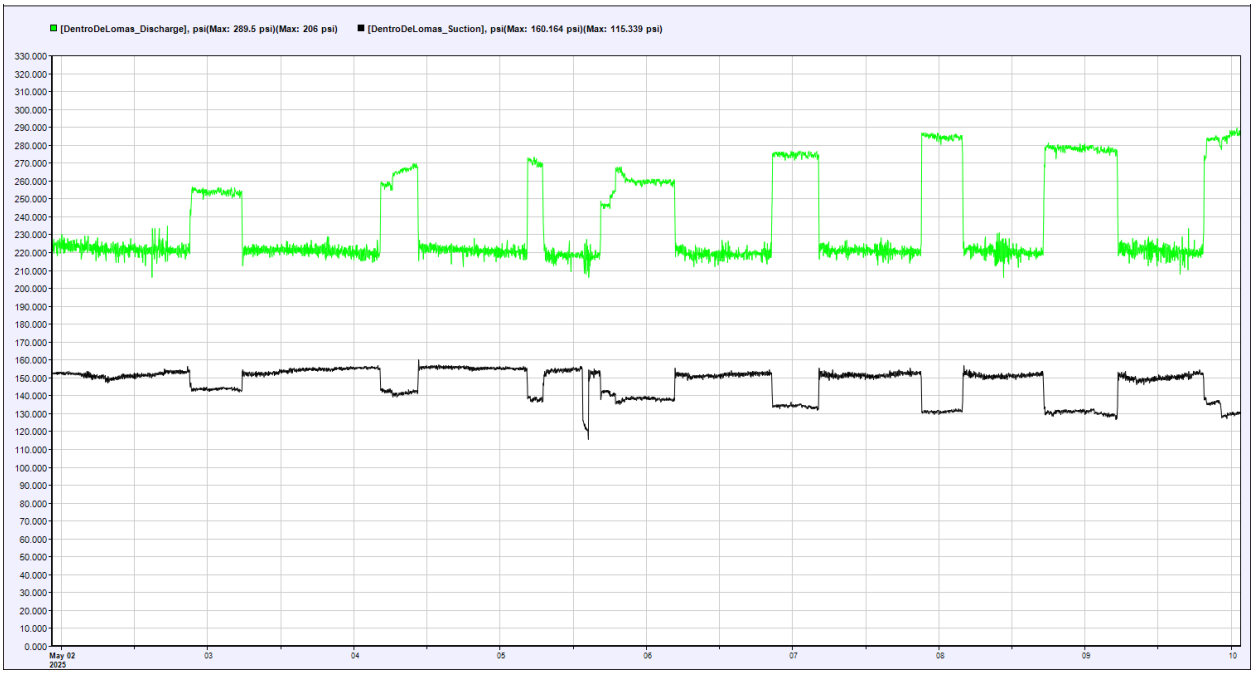


Figure 5-2: Dentro De Lomas Pump Station Suction and Discharge Pressure Data May 2-10, 2025

6. Conclusions

The analyses presented in this Technical Memorandum evaluated potential failure mechanisms through a combination of operational data review, geotechnical modeling, material testing, and hydraulic loading assessment. Across these evaluations, no single factor was identified that would independently cause the observed failure of the pipeline.

Geotechnical analyses indicate that external loads, deflections, and settlement-induced bending are all within acceptable limits for the pipe's depth and loading conditions. Material testing confirmed compliance with applicable ASTM and ANSI/AWWA standards, while pressure analyses show that both working and surge pressures remain within allowable ranges. Evaluation of cyclic loading further indicates that fatigue-related failure is unlikely based on the observed pressure fluctuations.

A summary of these evaluation results is provided in **Table 6-1**.

Table 6-1: Evaluation Summary

Evaluation	Result	Failure Limit / Check
Material Properties and Laboratory Testing	Pipe samples complied with the material testing requirements summarized in Table 4-1	No deficiency identified in tested material properties.
Long Term Deflection	Calculated Deflection: 2.5%	Allowable Deflection: 5%
Combined Loadings	Modeled pipe elevation loads: ~ 2,000-3,000 psf mean and ~2,500 – 3,000 psf vertical	Within expected range for burial depth and embankment loading.
Bending Due to Longitudinal Deflection from Settlement	Calculated minimum bending radius: 9,800 ft	Allowable minimum bending radius: 363 ft
Working Pressures	Estimated operating pressure: 280.4 psi	Working pressure rating: 305 psi
Surge Pressures	Estimated surge pressure: 403.2 psi	Allowable surge pressure: 488 psi
Cyclic Fatigue	Observed pressure fluctuations about 20 psi at about 2 cycles/day.	Not indicative of fatigue conditions sufficient to shorten service life materially.

This failure analysis did not include a detailed review of installation conditions, such as pull forces, potential damage during installation, or fusion weld quality, due to the lack of available data. Therefore, it is possible that the failure was influenced by one or more factors that could not be assessed, including installation-related effects.

Appendix A: PVC Pipe Test Report Pt.1

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TEST REPORT

FOR: Hazen & Sawyer
11260 El Camino Real, Suite-102
San Diego, CA 92130
Tel: (619) 993-2489 / Fax: N/A
ATTN: Mr. Jack Adams

LWR NO.: 22408 DATE: Jan. 12, 2026

BACKGROUND: The client submitted two (2) sections of Blue 16" PVC pipe for testing. The sections were received on 11/15/2025 by customer supplied courier. Visual inspection was performed on 11/15/2025 and no shipping discrepancies were noted. The sample was submitted for testing in accordance with CRT-supplied quote and approval received on 12/22/2025. The following additional information is shown below.

CRT Order Entry Log Date: 12/22/2025 / **Report Due Date:** 01/20/2026

SAMPLE ID: Two (2) sections of 16" Blue AWWA PVC Pipes, identified as -

1) Stave #1 (12" x 6") 16" C-905 2011 Mission Via Montellano Line NN

2) Stave #2 (8" x 4") 16" C-905 2011 Mission Via Montellano Line NN

PREPARATION: CNC Machining (taken from quote) – test specimens to be obtained from transversal direction, therefore we will need fly-cutting to remove the curvature of the pipe. The thickness of the test specimen will be the closest to 0.5" but will depend on how much fly-cut is needed.

TEST PROCEDURES: **Type-I Tensile Properties** – per ASTM D638-22, Type-I Tensile specimens (transversal direction) were CNC from PVC pipe sections with a thickness of 0.500"

TEST RESULTS: The results of testing are shown in the attached data table 1. In addition, no compliance data was submitted, therefore all test results are for customer information only

Specimen Retain Bin: N/A - client to P/U sampling(s)

Signed on behalf of:

CRT LABORATORIES, INC.

IAPMO R&T ANAB ISO 9001:15 Certified – Registered / ISO/IEC 17025:17 Recognized Co.

Ken A. Le Jeune
CEO / Laboratory Director

Raul Gonzalez
Senior Laboratory Technician

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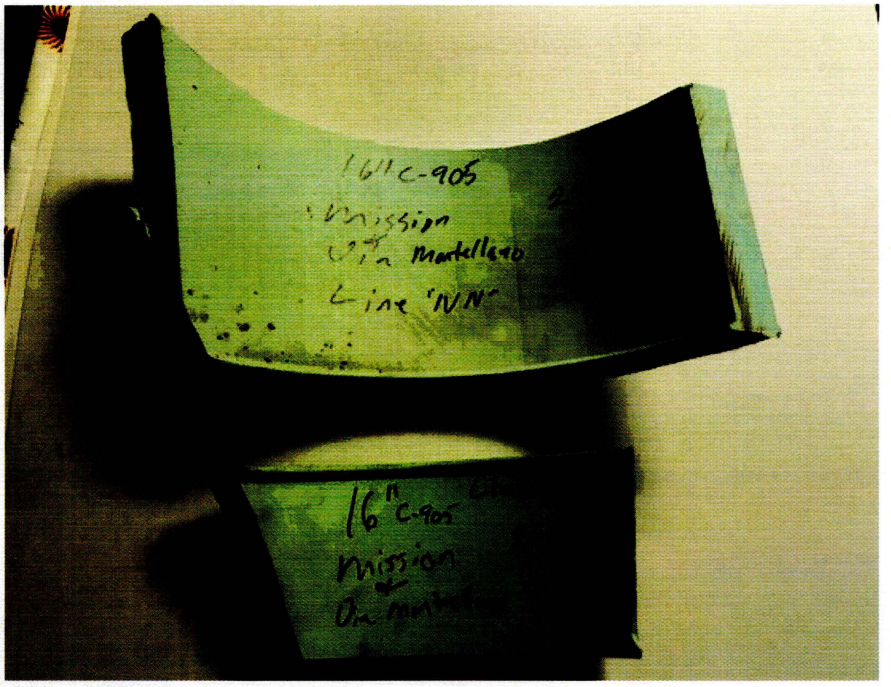
TEST REPORT

FOR: Hazen & Sawyer
11260 El Camino Real, Suite-102
San Diego, CA 92130
Tel: (619) 993-2489 / Fax: N/A
ATTN: Mr. Jack Adams

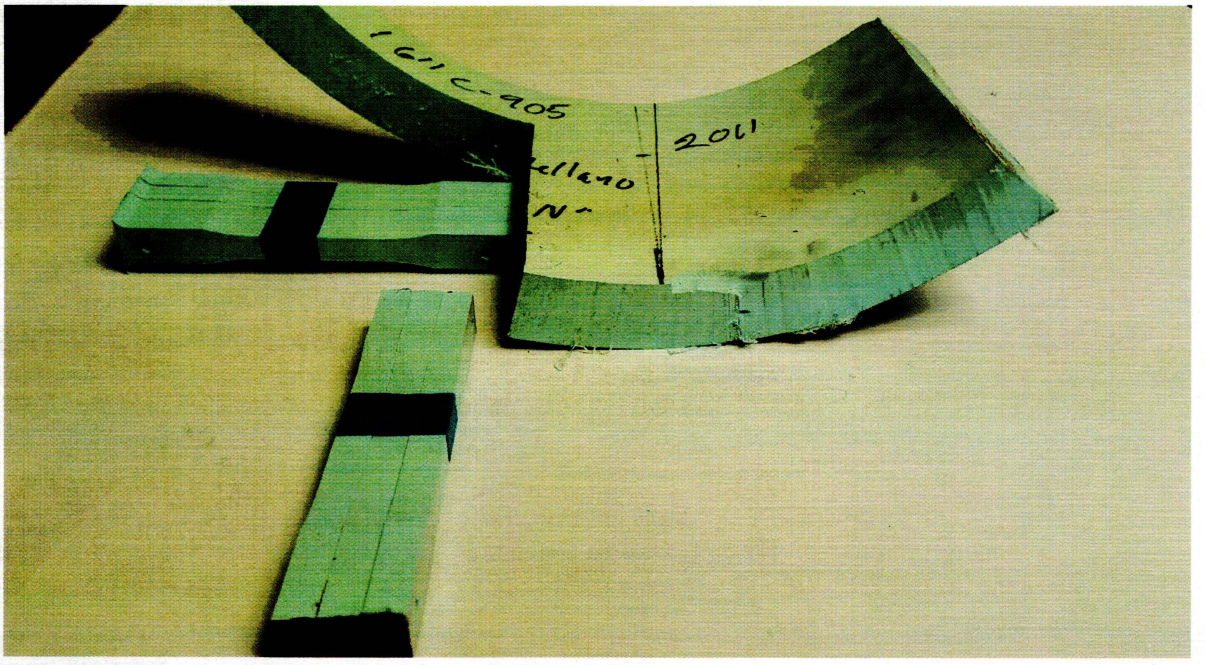
LWR NO.: 22408 DATE: Jan. 12, 2026

TABLE 1

SAMPLE ID: Two (2) Section of 16" Blue AWWA PVC Pipes



Samples as received



Type-I Tensile specimens CNC in transversal direction

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San Diego, CA 92130
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ATTN: Mr. Jack Adams

LWR NO.: 22408 DATE: Jan. 12, 2026

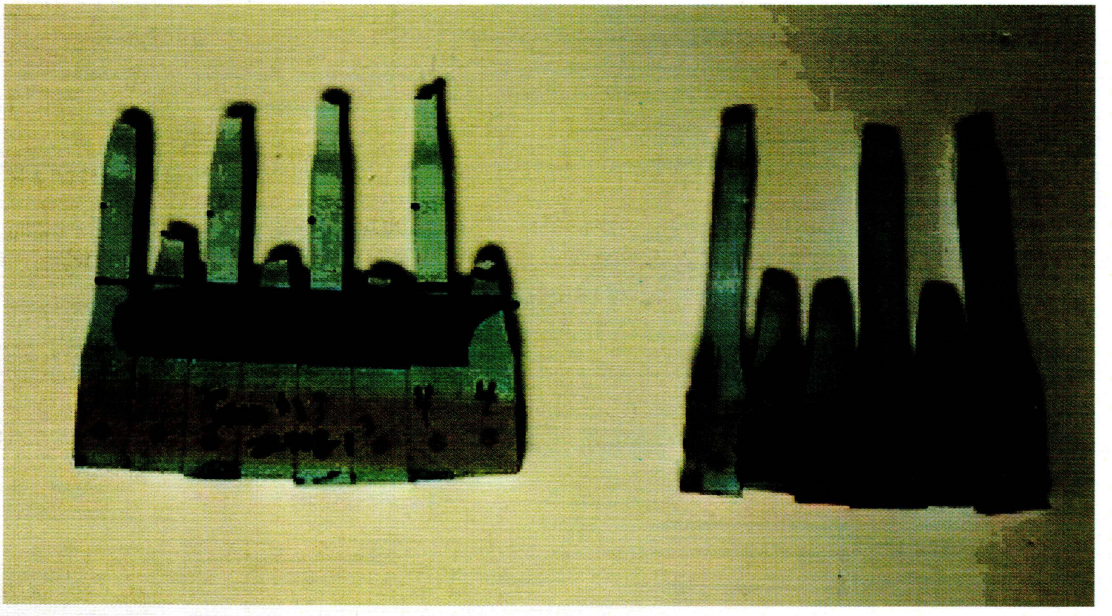
TABLE 2
ASTM D638-22 TENSILE PROPERTIES (0.2 in/min.)

SAMPLE ID: Stave #1 (12" x 6") 16" C-905 2011 Mission Via Montellano Line NN

Specimen #	Yield Strength (Psi)	Peak Strength (Psi)	Break (Psi)	Tan Mod (Psi)	Elongation at Break (%)	Elongation at Yield (%)
1	7,300	7,305	2,282	461,700	48.6	15.0
2	7,388	7,392	2,385	472,800	52.3	15.3
3	7,436	7,443	1,580	447,400	59.8	15.4
4	7,456	7,469	4,187	457,200	68.2	14.8
Average (Psi / MPa)	7,395 / 51.0	7,402 / 51.0	2,608 / 18.0	495,800 / 3,170	57.2	15.1

SAMPLE ID: Stave #2 (8" x 4") 16" C-905 2011 Mission Via Montellano Line NN

Specimen #	Yield Strength (Psi)	Peak Strength (Psi)	Break (Psi)	Tan Mod (Psi)	Elongation at Break (%)	Elongation at Yield (%)
1	7,368	7,390	2,665	464,100	54.1	15.9
2	7,363	7,378	2,416	444,200	51.3	16.4
3	7,367	7,377	3,053	440,600	60.0	16.1
Average (Psi / MPa)	7,366 / 50.8	7,382 / 50.9	2,711 / 18.7	449,600 / 3,100	55.1	16.1



Specimens after Tensile testing

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Appendix B: PVC Pipe Test Report Pt.2

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TEST REPORT

FOR: Hazen & Sawyer
11260 El Camino Real, Suite 102
San Diego, CA 92130
Tel: (619) 993-2489 / Fax: (619) N/A
ATTN: Mr. Jack Adams

LWR NO.: 22526 DATE: Oct. 12, 2026

BACKGROUND: The client submitted one sample of 16" PVC Pipe for testing. The sample was received on 09/18/2026 by customer supplied courier. Visual inspection was performed on 09/18/2026 and no shipping discrepancies were noted. Sample submitted to test in accordance with customer signed quotation received on 09/22/2026. Additional information is provided.

CRT Order Entry Log Date: 09/22/2026 / **Report Due Date:** 10/14/2026

SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

SPECIFICATION: ANSI/AWWA C900-22 Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4" through 60".

TEST PROCEDURES:
Workmanship & Markings – section 4.3.1
Dimensions & Tolerances – section 4.3.2 of ASTM D2122-22
Pipe Flattening @ 23^{0}C (Psi) – section 4.3.3.4 (ASTM D2412-21)
Extrusion quality (acetone) @ 23^{0}C – section 4.3.3.5 per ASTM D2152-23
Hoop Tensile Strength – section 4.3.3.6 per ASTM D2290-19a, Procedure-E
Heat Reversion (Fusion integrity) – per ASTM F1057-21

TEST RESULTS: Test results are shown in the attached data tables (1-5), attached (pages 2-6).

CONCLUSION(s): In summary, sample complies with the limited testing performed per test methods described above...***Complies***



Specimen Retain Bin: (sample/specimens ready for pick up)

Signed on behalf of:

CRT LABORATORIES, INC.

IAPMO R&T ANAB ISO 9001:15 Certified – Registered / ISO/IEC 17025:17 Recognized Co.

Ken A. Le Jeune
CEO / Laboratory Director

Raul Gonzalez
Senior Laboratory Technician

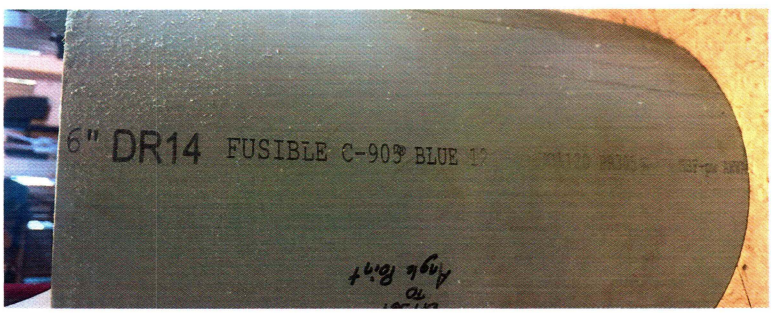
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TABLE 1
SPECIFICATION: AWWA C900-22
SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

4.3.1 WORKMANSHIP, FINISH & MARKINGS

Section 4.3.1 states that pipe shall be homogeneous throughout free from voids, cracks, inclusions, and other defects when manufactured. Sample was received with visible evidence (marks) that pipe was installed underground.

Printed markings: UNDERGROUND SOLUTIONS INC.16" DR14 FUSIBLE C-905 BLUE ***Complies with markings***



4.3.2 DIMENSIONS & TOLERANCES

The dimensions of the pipe were measured in accordance with ASTM D2122-22, "Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings". The pipe outer diameter (O.D.) was measured with circumferential wrap tape. The wall thickness was measured at eight equidistant locations around the circumference using a caliper. The outside diameter and wall thickness of the pipe were in the range specified (O.D: 17.400 ± 0.020 and wall thickness: 1.243" +0.149); for 16-inch DR14 pipe per AWWA C900-22, Table 1A. The data is shown below:

	Location	Subject pipe
Wall Thickness **1.243" – 1.392"**	1	1.294
	2	1.306
	3	1.293
	4	1.300
	5	1.289
	6	1.313
	7	1.302
	8	1.316
	Average	1.302 / Pass
O.D. **17.400 ± 0.020**	Average	17.420 / Pass

…Complies

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CERTIFIED BY SCB ISO 9001 Certification No. ISO-09-23-12-11019

FOR: Hazen & Sawyer
11260 El Camino Real, Suite 102
San Diego, CA 92130
Tel: (619) 993-2489 / Fax: (619) N/A
ATTN: Mr. Jack Adams

LWR NO.: 22526 DATE: Oct. 12, 2026

TABLE 2
SPECIFICATION: AWWA C900-22
SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

AWWA C900-22, section 4.3.3.4 PIPE FLATTENING @ 23°C

Testing was performed on three (3) 6" wide specimen, as described by the techniques shown in ASTM D2412. Preload was set to 2-lbf for zero deflection. Per AWWA C900-22, section 4.3.3.4, the specimen must withstand 40% deflection without evidence of cracking and/or splitting. The rate of compression must be accomplished within 2-5 minutes, which equates to a test speed of 1.65"/min (cross-head compression). Upon completion of testing, each specimen was inspected for cracks, crazes, splitting, and/or catastrophic failure. The following results were obtained:

PIPE FLATTENING @ 40%
(pass or fail)

#1 Specimen / Pass
#2 Specimen / Pass
#3 Specimen / Pass
Pass

Avg: Pass 40% deflection



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CRT LABORATORIES, INC.
1680 North Main Street, Orange, CA 92867
Tel.: (714) 283-2032
www.crtlabs.com • e-mail: crtlabs@crtlabs.com
ASTM Physical & Mechanical • Chemical-Thermal Analysis • IAPMO Cell Class
Geosynthetic Materials • Plumbing & Faucet Assemblies • Resin & Finished Product Testing

ANAB ACCREDITED ISO/IEC 17025 MANAGEMENT SYSTEMS CERTIFICATION BODY
CERTIFIED BY SCB ISO 9001 Certification No. ISO-09-23-12-11019

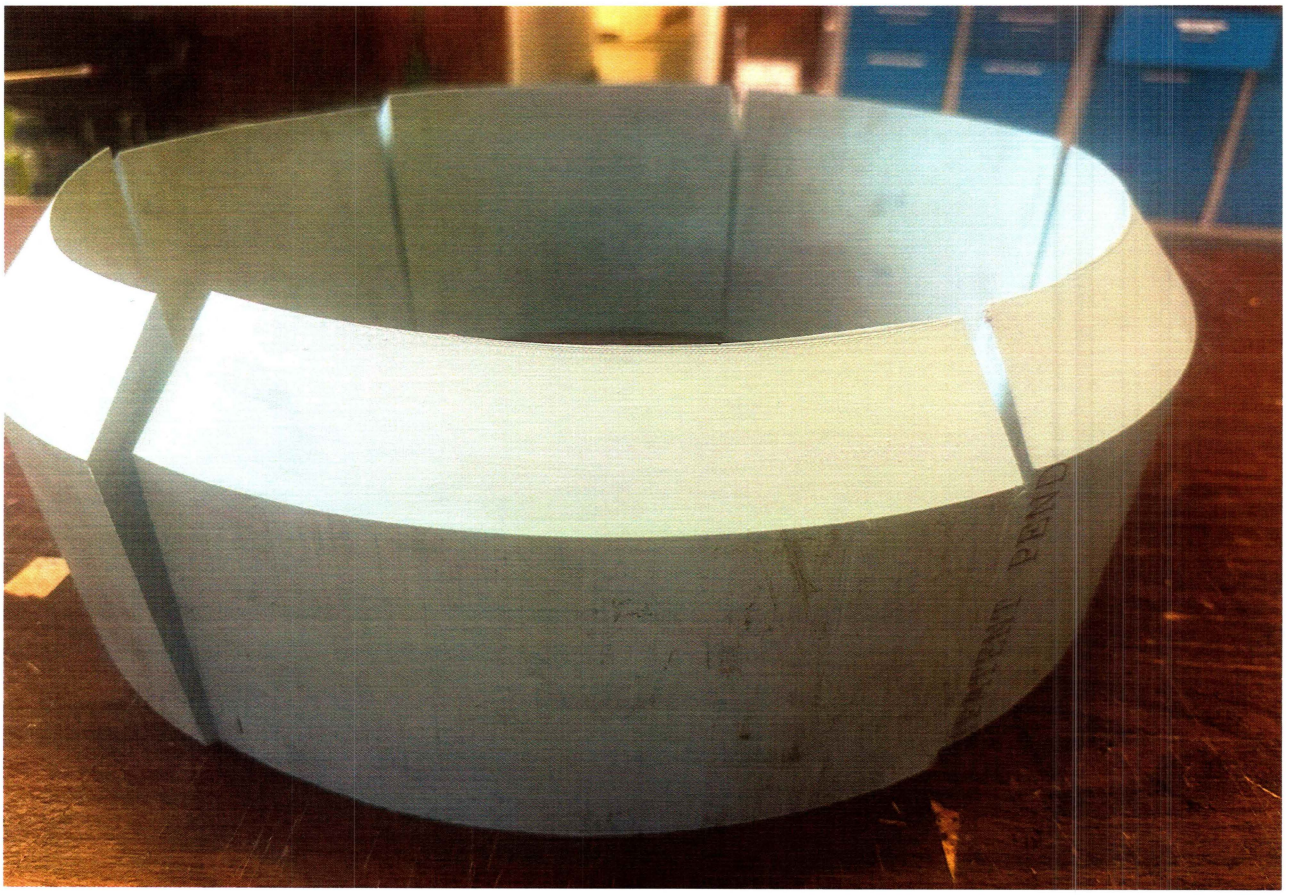
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Tel: (619) 993-2489 / Fax: (619) N/A
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LWR NO.: 22526 DATE: Oct. 12, 2026

TABLE 3
SPECIFICATION: AWWA C900-22
SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

4.3.3.5 EXTRUSION QUALITY ACETONE IMMERSION

An acetone immersion test was performed on a sample section removed from the pipe specimen shown on page 3 per ASTM D2152-13, "Standard Test Method for Adequacy of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion". An unfused PVC compound attacked by an anhydrous acetone causes the material to swell, flake, or completely disintegrate. A properly fused PVC compound is impervious to anhydrous acetone and only a minor swelling will be observed. Observations of the pipe samples after 20 minutes of exposure showed no signs of attack along the cross section of the pipe, indicating good fusion of the PVC material…***Complies***



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CERTIFIED BY SCB ISO 9001 Certification No. ISO-09-23-12-11019

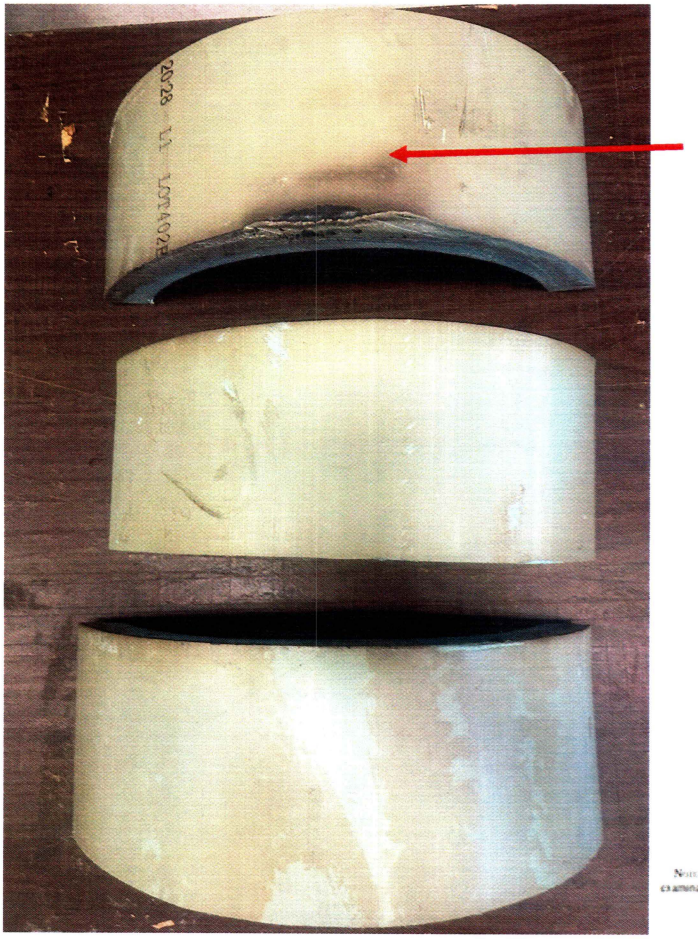
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Tel: (619) 993-2489 / Fax: (619) N/A
ATTN: Mr. Jack Adams

LWR NO.: 22526 DATE: Oct. 12, 2026

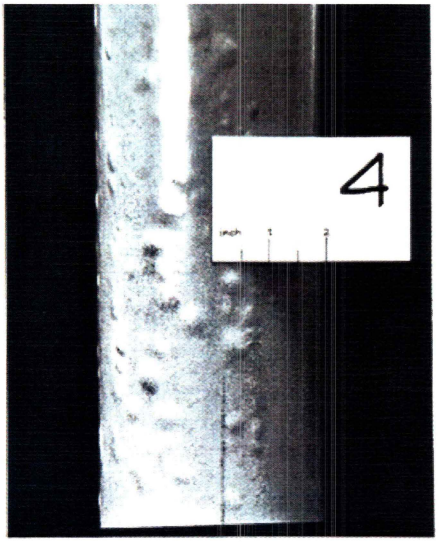
TABLE 4
SPECIFICATION: AWWA C900-22
SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

HEAT REVERSION

Heat reversion test procedure section 4.1.1 requires a full round pipe section to be tested in accordance with ASTM F1057-21, "Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique". The specimen(s) were machined per section 4.1 and conditioned for 24h in standard laboratory conditions prior to testing. Upon completion of conditioning, the pipe segments were exposed to a temperature of 180°C for a period of 30 minutes in an air circulating oven. Upon completion, the specimens did show slight signs of blistering of the exterior surface. Fig X1.4 is an example of severe blistering but does not state the exact failure criteria. The statement of less severe blistering recommends further examination. Therefore, based on the test results achieved, the sample complies with a suggested interpretation of the results explained in Appendix X1…***Complies***



Blistering effect resembles Fig X1.4 in ASTM F1057. Although, not as severe.



NOTE 1—External blistering is pronounced in this case and shows the presence of moisture in the extrudate. Less severe blistering requires careful examination. Dark axial lines below the number tag are signs of contamination by burnt PVC compound picked up inside the extruder head.
FIG. X1.4 External Blistering

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ANAB ACCREDITED ANSI National Accreditation Board ISO/IEC 17021-1 MANAGEMENT SYSTEMS CERTIFICATION BODY
CERTIFIED BY SCB ISO 9001 Certification No. ISO-09-23-12-11019

TEST REPORT

FOR: Hazen & Sawyer
11260 El Camino Real, Suite 102
San Diego, CA 92130
Tel: (619) 993-2489 / Fax: (619) N/A
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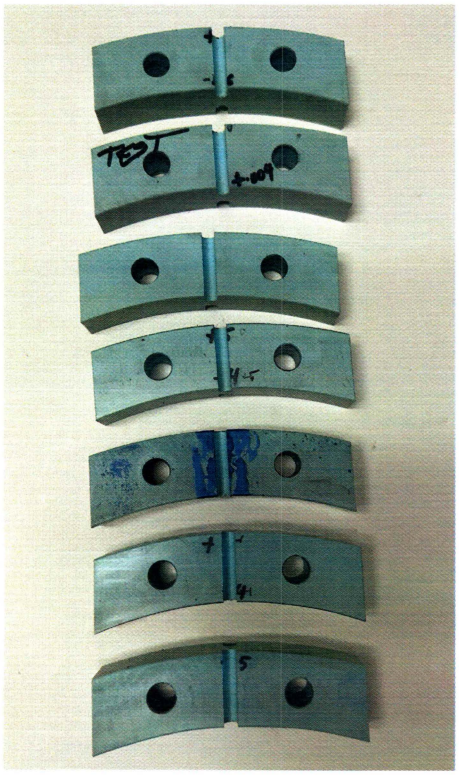
TABLE 5
SPECIFICATION: AWWA C900-22
SAMPLE ID: 16" AWWA C905 DR. 14 PVC Pipe

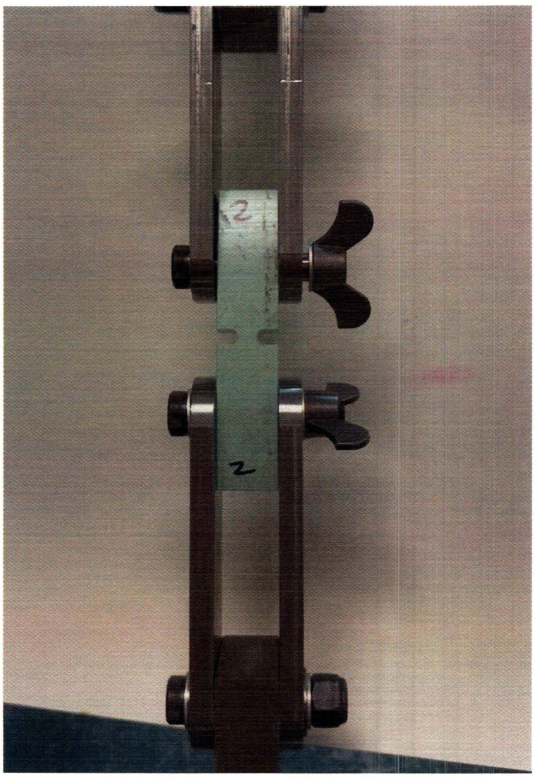
ASTM D2290-19a RING TENSILE STRENGTH – PROCEDURE-E

Testing was performed in accordance with Procedure-E as described by the techniques shown in ASTM D2290-19a. Each ring tensile segment was cut from each ring sample as prescribed by sections 6.5, 6.5.1, 6.5.2 and Figure 5. A self-align test fixture for Procedure-E was used in accordance with Figure 4. The test speed was set to 0.20 in/min. The minimum tensile requirement, as prescribed by AWWA C900-22, section 4.3.3.6 is 6,300Psi. The following test results were obtained:

Ring Tensile Specimen	Yield Strength (Psi)
1	7,511
2	7,448
3	7,392
4	7,595
5	7,582
Average	7,506
Requirement:	6,300 / Pass

Complies





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RAINBOW
MUNICIPAL WATER DISTRICT

BOARD ACTION
Item No. 3.C

BOARD OF DIRECTORS

November 17, 2026

SUBJECT

CONSIDER APPROVAL OF THE PURCHASE OF NEW TOW BEHIND GENERATOR

BACKGROUND

Over the past several years, RMWD has experienced longer and more widespread power outages due to Public Safety Power Shutoffs (PSPS), fires, or on-site generator failures. Those power outages affect RMWD's ability to keep pump stations and tanks operating to maintain water supply, pressure, and fire flow for customers, and to keep lift stations running so that sewage does not back up or overflow.

From October 2 through October 3, 2026, SDG&E conducted a PSPS driven by an Extreme Heat Watch, an Extreme Fire Potential Index, and Santa Ana winds of 30–40 mph. The shutoff was confirmed to affect 14 RMWD sites. During the same period, two outages unrelated to the PSPS affected the Morro Hills area (Morro Reservoir and pump station) and the Gird/Reche area (Fallbrook Oaks Lift Station). Both sites operated on generator backup until power was restored.

All RMWD pump stations (PS) and lift stations have onsite backup generators except Rainbow Hills PS, Lookout PS, Morro PS, Lilac PS, Dentro PS and Vallecitos PS. Currently, the on-site generator at Rancho Viejo Sewer Lift Station is not functional, and a standby unit was deployed there for the PSPS. Small portable generators that the District owns cannot operate a pump station or lift station loads. Forecasts also call for a very strong El Niño this winter, which has the potential to bring heavy rain and storm-related outages at the same time inflow and infiltration is stressing the wastewater system.

DESCRIPTION

Staff requests Board approval to purchase a new tow-behind generator. The unit would be a mobile source of emergency power that can be towed to any pump station, lift station, or tank site that loses power, including the sites without a fixed backup generator and any site where a fixed unit fails. It would also serve as a spare when a fixed generator is out of service for repair or maintenance.

This approach closes much of the current backup power gap quickly, at lower cost than installing permanent generators at every unprotected site, and reduces reliance on rental equipment and mutual aid during regional events when obtaining the equipment could prove difficult. The District already owns a tow-behind generator that operates at limited capacity due to its age and APCD/CARB regulations limiting its use.

Quotes were solicited from three vendors: Bay City, MQ, and Hawthorne CAT. Fleet services, District Electrician, and Pumps and Motors Technician reviewed all three quotes to ensure they met our operational needs. MQ was the lowest quote; however, it did not meet the maximum weight requirement of 15,000 lbs., which is the towing capacity of our large utility trucks, and is therefore deemed non-responsive.

Draft for Committee Review

MQ	**John Deere**	**$182,219.43**
Bay City	**Bobcat**	**$198,950.00**
Hawthorne	**CAT**	**$234,887.50**

POLICY/STRATEGIC PLAN KEY FOCUS AREA

Strategic Focus Area- Enterprise Resilience-Ensure safe and dependable services, mitigate risks and customer impacts, and expand our ability to navigate and recover from threats and disruptions.

ENVIRONMENTAL

In accordance with California Environmental Quality Act (CEQA) guidelines Section 15378, the action before the Board does not constitute a "project" as defined by CEQA and further environmental review is not required at this time.

BOARD OPTIONS/FISCAL IMPACTS

Option 1 The proposed tow-behind generator is a new addition to the District's CIP and will require a midyear CIP budget adjustment. The purchase will be budgeted as districtwide capital equipment because the generator will support both water pump stations and wastewater lift stations. Acquisition costs will be allocated 87% to the Water Fund and 13% to the Wastewater Fund, funded from the respective funds' restricted CIP reserves. Staff requests Board approval of the corresponding increase in CIP appropriations and use of restricted CIP reserves in the amount of $207,118.32. This includes the generator, trailer, connections, cabling, delivery, and training. Adequate funding exists for this purchase.

Option 2 – Continue renting generators as needed. No capital cost, but rental availability drops during regional events, costs accumulate over multi-day outages, and the District has no guaranteed power at the unprotected sites. Rental: $15,000.00 per month.

STAFF RECOMMENDATION

Staff recommends that the Board approve the purchase of a tow-behind generator sized to the District's critical pump station and lift station loads, in an amount not to exceed *$207,118.32,* and authorize staff to complete the required procurement process before the peak of the storm season. This approach closes much of the current backup power gap quickly, at lower cost than installing permanent generators at every unprotected site, and reduces reliance on rental equipment and mutual aid during regional events when obtaining the equipment could prove difficult.

Robert Gutierrez 11/17/26
Chief Operating Officer

Draft for Committee Review

QUOTE #: ED-260274-0

Rainbow XQ330 Genset

To: Steve Coffey
Company: Rainbow Municipal Water District
Date: 9/12/2026

Prepared By: ED DAWE
Quote Valid Through: 10/27/2026

Pricing Summary

Thank you for the opportunity for Hawthorne Power Systems to work with you on this project. Below is a price breakout for the major items we intend to provide for this project, more detail can be found on the Bill of Materials sheets. If you would like to discuss our proposal in more detail please do not hesitate to contact me. Thank you!

Base Bid

Item #	Qty	Basic Description	Price	Extended Price
1	1	XQ330 (Emergency Standby) Diesel Genset Multi-Voltage, 3-Phase, 4-Wire Enclosure: SA 72 dBA (Steel) Mounting: Trailer Delivery, Startup, Training	$ 218,500.00	$ 218,500.00
2	1	Local Sales Tax (7.75%)	$ 16,387.50	$ 16,387.50
				$ -

Note: Tax is not included and will be added to invoice at the rate based on where the equipment is delivered. See General Note #14.

TOTAL: $ 234,887.50

Value Engineering & Optional Adders

	$ -
	$ -
	$ -
	$ -

Hawthorne Power Systems
San Diego, CA

ED DAWE
EPG Sales Engineer

edawe@hawthornecat.com
808-342-1300

HAWTHORNE CAT

QUOTE # ED-260274-0

RAINBOW XQ330 GENSET

DETAILED BILL OF MATERIALS

Revision Tracking

REV0 Summary (Date: 9-12-26):
Original Proposal

LINE ITEM #1 EXTENDED DESCRIPTION:

Diesel Engine Generator Set

Qty. (1) CAT Generator Set
Model: XQ330
Rating: 330 kVA
Voltage: Multiple Voltage, 3-phase, 4-wire, 60 Hz
Engine: Diesel, 1800 RPM, ADEM A4 Electronic Engine Controller
Certification: EPA Emergency Stationary Certified (Tier 4F)

The following features will be included:

Quantity	Characteristic Name	Feature Description
1	APPLICATION INDICATOR	PRIME POWER APPLICATION
1	PGS EMISSION CERTIFICATION	EPA/CARB TIER 4F EMISSION CERT
1	VOLTAGE OPTION	60HZ 480 VOLT (WYE) TECHNICAL: Wye connection. Selectable voltages are (480/277V 3PH), (240/139V 3PH), (240/120V 1PH),(208/120V 3PH) is achieved using the voltage potentiometer.
1	ENGINE RATING	60 HZ, 264 KW
1	CONFIGURATION	C9 XQ330 480V T4F PRI REN GS. 2013 EPA (TIER 4) & CARB EMISSIONS CERTIFIED (NON-ROAD) 60 HERTZ, 1800 RPM, 3-PHASE (480/277 VOLT, 208/120 VOLT) AND 1-PHASE (240/120 VOLT) SWITCHABLE, PERMANENT MAGNET 264 ekW Prime, 290 ekW Standby. 330kVA Prime, 363kVA Standby C9.3 Engine; Governor = Isochronous Electronic, Aspiration = ATAAC. Generator Ar = 613-7668 EMCP4.4 Control Panel TECHNICAL:EMCP 4.2B features plus an 8-line graphical screen, additional I/O, and Ethernet (ModbusTCP) and on-package paralleling control. On package paralleling adds the following features: automatic synchronizing, dead bus arbitration, load sharing (kW and kVAr), and load sense/ load demand.

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edawe@hawthornecat.com

		Includes 3 POLE MOTORIZED CIRCUIT BREAKER
1	ALTERNATOR / GENERATOR	STANDARD ALTERNATOR
1	GENSET CONTROL OPTION	EMCP4.4 CONTROL PANEL
1	GENSET CONTROLLER LANGUAGE	ENGLISH PANEL LANGUAGE
1	DECAL LANGUAGE	ENGLISH INSTRUCTION LANGUAGE
1	MARKET SEGMENT	GENERAL EPG All diesel and gas powered generator sets utilized in the generation of electrical power for general residential, commercial, utility, construction and rental applications including energy utilities, communications, commercial and residential buildings, agricultural, construction, mining, manufacturing, public and civil services. This category should not be used for Petroleum,Locomotive or Marine electric power applications.
1	CUSTOMER SEGMENT	COMMERCIAL BUSINESSES
1	MARKET WORK CODE	STANDBY POWER
1	EMISSION CERTIFICATION LOC	INSIDE US EPA LOCATIONS Initial application inside US EPA locations.
1	TELEMATICS HARDWARE	PRODUCT LINK 4G LTE TELEMATICS
1	TELEMATICS HARDWARE CERTIFIED	ACCEPT - REVIEW LINK IN DESC
1	CELLULAR BAND	AMERICAS BAND
1	BASE TYPE (MOUNTING OPTION)	STANDARD BASE
1	TRAILER	TRAILER -ELECTRIC BRAKES XQ330 Installed genset on trailer. TECHNICAL: Leaf Spring suspension Brakes: Electric Hitch: 3- Pintle Approximate weight empty: 1990 lbs. Bed dimensions: (L x W x H). 162.83 - x 60 x 12.84(Rear Step height) The trailer Length Does not include a hitch. Tires: WH 215-75-R17.5 LRH 865 WHEEL, 4805# CAPACITY Electrical connection: 7-prong plug Complies with Federal DOTs Federal Motor Vehicle Safety Standards. Label: National Association of Trailer Manufacturers
1	ENCLOSURE	STANDARD ENCLOSURE
1	RADIATOR	STANDARD RADIATOR
1	MUFFLERS	STANDARD MUFFLER
1	AUTOMATIC VOLTAGE REGULATOR	INTEGRATED VOLTAGE REGULATOR

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1	BATTERY OPTIONS	STANDARD BATTERY
1	PUMP ELECTRONIC UNITS	PTU REMOTE FILL 88.4L - 24V
1	CUSTOMER CONNECTION GROUP	INCLUDES CAMLOCK CONNECTIONS TECHNICAL: Ring terminal connections from BUSCON2 plus 400A Camlock connection
1	SPECIAL TEST (PGS) - GEN	PGS TEST REPORT

Application Indicator:
Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand of 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

Generator Set Emissions Certification:
The generator set meets non-road EPA Tier 4 emission levels (applicable to new engines found in off-road equipment or mobile applications).

Alternator:
Standard Alternator

Control Panel:
The EMCP 4.4 includes a 5.5 inch graphical display and offers fully featured power metering, protective relaying, engine/generator control and monitoring, and on package paralleling. On package paralleling (generator set to generator set) adds the following features: automatic synchronization, dead bus arbitration, load sharing (kW and kVAr), and load sense/load demand. Does not include utility grade protective relaying for utility paralleling applications. Engine and generator controls, diagnostics, and operating information are accessible via the control panel keypads; diagnostics from the EMCP 4 optional modules can be viewed and reset through the EMCP 4.4 controller. The EMCP 4.4 also provides remote communications capability via Modbus RS485 or Modbus TCP/IP datalink.

Telematics:
The Cat® Product Link™ PL444 is designed as a reliable telematics solution. The device comes pre-configured with a standard set of parameters including hours fuel usage, and productivity which report each day and enables immediate alerting of fault codes. Utilizes 3G/4G LTE cellular networks. Contact your local Cat dealer for local radio compliance certifications.

Integral Tank:
Standard generator set base.

Trailer:
This trailer complies with Federal Department of Transportation's (DOT) Federal Motor Vehicle Safety Standards. The mounted genset is equipped with leaf spring suspension and has an electric brake.

Enclosure:
Robust steel constructed, sound attenuated enclosure which includes interior mounted exhaust system for quick installation and vertically hinged doors for improved service access.

Radiator:
This provides a standard radiator for the generator set.

Automatic Voltage Regulator:

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The Integrated Voltage Regulator (IVR) is designed to provide robust, precise closed-loop control of the generator voltage, optimized transient performance and industry leading feature specification.

Batteries:
Standard battery set, installed on the generator set package.

Dealer provided components and services:

Quantity	Category	Description	Number
1	Startup & Commissioning	Startup (per CAT Checklist)	C9-C18 (250-750 kW)

Engineering Services:
- Submittal per specification or commercial type submittal if there is no specific requirement.
- Hard Copy of Operation and Maintenance Manuals
- Seismic Anchoring calculation and recommended anchor type w/PE Stamp

Maintenance Service (Available at Additional Charge):
- 1-year CAT PM Services by CAT certified technicians (3 quarterly inspections + 1 annual inspection).
- Quarterly Service includes 58-point inspection
- Annual includes lube oil and filter change

VALUE ENGINEERING & OPTIONAL ADDERS:

LINE ITEM #1A OPTIONAL (ADDER) EXTENDED DESCRIPTION:

San Diego-Air Pollution Control Permit per General Note #8 to be provided. This service includes Hawthorne CAT submitting the necessary permit for a New Generator Installation to SD-APCD. It does not include any additional after-treatment in the event it is required.

DELIVERY:
All equipment is delivered to jobsite-offloading is not included.

LEAD TIME:

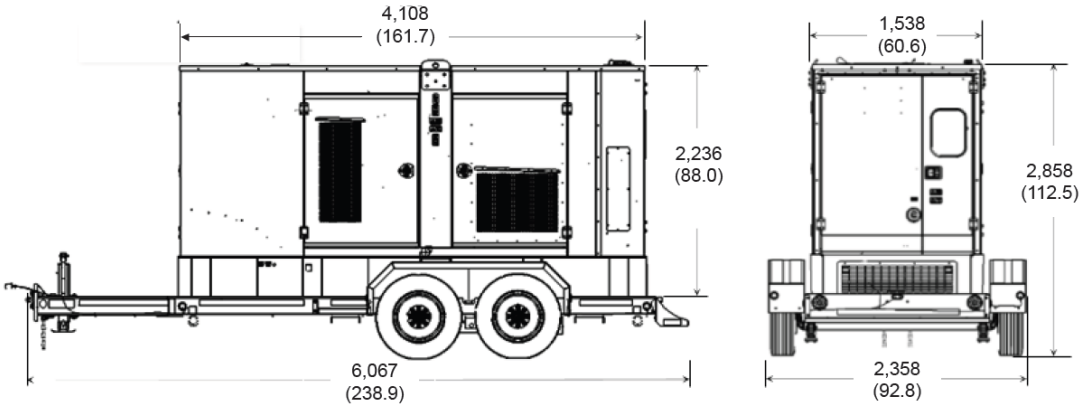
Production Lead Time:
- Genset: 6 weeks

DIMENSION AND WEIGHT:
Genset (each):

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edawe@hawthornecat.com

General Layout Dimensions

Dimensions in millimetres (inches)
Shown with optional trailer



TERMS OF PAYMENT:

Terms to be established upon receipt of Purchase Order and completion of Hawthorne Machinery, Inc. customer account review. Terms may require down payment, COD, NET-10, or NET-30.

GENERAL NOTES:

1. The quotation is based on the following documents (no other documents or plans have been reviewed):
   a. Project: Rainbow XQ330 Genset
   b. Specifications:
      i. NONE
   c. Drawings: NONE
   d. Addendums: NONE
   e. Bill of Materials is based on customer request, no bid documents have been reviewed.
2. Proposal scope limited to items specifically listed in this proposal.
3. All "shipped loose items" are for contractor installation
4. Fuel for startup or testing not included.
5. Temporary generator set (if required) not included in Hawthorne's scope of work or supply. If temporary power is needed, please contact the Hawthorne Rent-It Service obtain a quotation.
6. Offloading not included. Equipment is delivered curbside, offloading is customer's responsibility.
7. Cost for permits, special inspections, and fees (i.e. building, local, air quality or any other not specifically called out in our supply) are not included.
8. Diesel Emergency Generator – The San Diego Air Pollution Control District may require that owners/developers complete a Health Risk Assessment (HRA) for the facility as part of a new source permit to operate the generator. The HRA considers many factors on site as well as the surrounding area and environment. The costs associated with the HRA or add-on particulate control systems are NOT included in our proposal. If after an HRA is performed and particulate reduction equipment is required, we will provide information and costs associated with the addition of emission control equipment
9. Installation, including but not limited to: anchoring, electrical conduit, fuel oil and exhaust piping and insulation, interconnecting wire and cable, not included.
10. 3rd Party testing, such as NETA, infrared testing, or testing normally conducted by an independent testing agency is not included.
11. Protective device coordination, short circuit study, and arc flash analysis by others.

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12. Sound Levels and Noise Mitigation: It is the responsibility of the owner, contractor or other delegated representative of owner to meet sound levels required by City, County or other ordinance required by Authorities Having Jurisdiction. Equipment quoted referencing sound levels only represents band width average dB(A) levels at specific horizontal distances, 5-½ feet above grade in any direction and in an open free field environment. The requirements of specified site property line sound levels and the effect of adjacent structure walls, obstructions, or location cannot be determined or predicted by Hawthorne Power Systems.
13. There may be overlap between mechanical and electrical Scope of Work/Supply particularly on the fuel system and exhaust systems. We recommend the purchaser consult with the appropriate contractors to determine any overlap or gaps in supply.
14. If equipment is not for resale or buyer does not have resale tax certificate on file with Hawthorne Power Systems then tax at the applicable rate will be charged.
15. Scope of Work/Supply is based on all onsite work being performed M-F 8AM-4PM. Weekend and/or overtime service hours are available. A copy of our non-standard service rates is available upon request. Four (4) week notice is required for field service.

CLARIFICATIONS SPECIFIC TO BID PLANS:

1. Fuel for startup or testing not included.

SINCERELY,



ED DAWE

TERMS & CONDITIONS

"Hawthorne's Power Sales Terms and Conditions (available at www.hawthornecat.com/terms) are hereby incorporated by this reference with the same force and effect as if set forth in full herein."

1. A 3% credit card surcharge (of total transaction amount) will be assessed for all purchases greater than $3,000.00. Additionally, prior approval is required for credit card purchases greater than $3,000.00.

SUBMITTED BY:_____

APPROVED BY:_____ DATE:_____

COMPANY/FIRM:_____

PO#:_____

Ed Dawe -- Sales Engineer – Electric Power Generation

Phone: (858) 376-6824| Fax: (858) 674-3278 | Cell: (808) 342-1300

edawe@hawthornecat.com

MULTIQUIP INC.
6141 KATELLA AVE, SUITE 200
CYPRESS, CA 90630
PH: 800-421-1244 / 310-537-3700 FAX: 310-537-3927

Quotation

Sold-to (423253)
Rainbow Municipal Water District
3707 OLD HWY 395
FALLBROOK CA 92028-9372

Ship-to (423253)
Rainbow Municipal Water District
3707 OLD HWY 395
FALLBROOK CA 92028-9372

Document Information

Quotation # 21037001 QT **Date** 09/11/2026
P.O. # WebQuote **Date** 09/11/2026
Requested Ship 09/11/2026
Carrier No 408847 MQ LTL
Entered by MQAPPS
Ordered by jwooten@multiquip.com
Order Reason P07 APPL-End User-Government Solutions
Currency USD
Delivery PPS Prepay/Chrg SPL Frt (Units)
Payment Terms Net 30
Within 30 days without deduction

= =
Availability is subject to stock on hand at the time purchase order is received.
Quote is valid for 30 days from issue date.

Item	Material	Plant	B/O	Order Qty	Gross Price EA	Net Price EA	Total Value
0010	DCA300SSJU4F3 Gen 300kVA 3Ph John Deere Tier 4F Env Estimated Ship: Contact us	A212	1	1.000	241,880.00	140,290.40	140,290.40
0020	TRLR300EVE Trailer DCA300SSJU4F3 Elec Estimated Ship: Contact us	A212	1	1.000	24,318.00	14,104.44	14,104.44
0030	EE36264 COUPLER, 3IN PINTLE 25K TRLRMP THRU 400 Estimated Ship: 09/11/26	A212		1.000	88.60	51.39	51.39
0040	MQPBCKIT-H Batt Chg 10A DCA150-600 Estimated Ship: Contact us	A212	1	1.000	2,089.00	1,211.62	1,211.62
0050	CAMLOK2KIT45J Camlok 2 Set 45° DCA300 Estimated Ship: 09/11/26	A212		1.000	1,857.00	1,077.06	1,077.06
0060	MQPPBNK300J4F3 Kit PowerBalance DCA300SSJU4F3/B/PB Estimated Ship: 09/11/26	A212		1.000	10,445.00	7,833.75	7,833.75
	Items total						164,568.66
	Freight (Units)						4,896.70
	Taxable amount						164,568.67
	State/GST Tax						9,874.12
	Local/PST Tax						411.42
	Local Tax						2,468.53
	Total amount						**182,219.43**

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PH: 800-421-1244 / 310-537-3700 FAX: 310-537-3927

Quotation

Document Information

Order # 21037001 **Date** 09/11/2026
Purchase Order # WebQuote **Date** 09/11/2026

Sold-to (423253)
Rainbow Municipal Water District
3707 OLD HWY 395
FALLBROOK CA 92028-9372

Item	Material	Plant	B/O	Order Qty	Gross Price EA	Net Price EA	Total Value
	Current ETA - Early November - Subject to change FOB Lewisville, TX - Freight estimate to Fallbrook, CA, included Freight Quote ID - LIDPE7F99/Core Freight/$4,896.70						

TES TEMECULA ELECTRICAL SUPPLY

QUOTE

QUOTE #	DATE	ACCT #
142382	10/2/2026	101427
CUST PO		JOB
10/02 RFQ		

SOLD TO:
RAINBOW MWD
3707 OLD HWY 395
FALLBROOK, CA 92028

SHIP TO:
RAINBOW MWD
3707 OLD HWY 395
FALLBROOK, CA 92028

PLACED BY	SHIPPING METHOD	REQ. DELIVERY DATE	TERMS	SALESPERSON
		10/6/2026	Net 30 Days	Kevin Alpichi Jr

LN	MFG	PART NUMBER	DESCRIPTION	ORD	BO	NET	U/M	EXT. NET
1	LEV	4100C9WLEV	IEC Pin & Sleeve Conn 100/125 Amp, 250 Volt 3-Phase, 3P/4W 3-4 Days	2		429.85	E	859.70
2	LEV	4100P9WLEV	IEC Pin & Sleeve Plug 100/125 Amp, 250 Volt 3-Phase, 3P4W 4-6 Weeks	4		336.72	E	1,346.88
3	LEV	4100C7WLEV	100 Amp Pin & Sleeve Connector-RED 3-4 Days	2		429.86	E	859.72
4	LEV	4100P7WLEV	IEC Pin & Sleeve Plug 100 Amp, 480 Volt 3-Phase, 3P4W 3-4 Days	4		336.72	E	1,346.88
5	OMC	B50104	#1/4C TYPE W 2KV 90C INDUST GRADE UL/CSA 1-2 days	80		31,951.22	M	2,556.10
6	HUB	PC100	PIN & SLEEVE CAP 100A 2-3 days	2		77.83	E	155.66
7	HUB	07401034	STRAIN RELIEF CORD GRIP, 1.56 to 1.69in 2" 4-week lead time	2		226.89	E	453.78
8	ORB	RW-200/150	REDUCING WASHER 2" ~ 1-1/2" Stock	6		34.78	C	2.09

COMMENTS

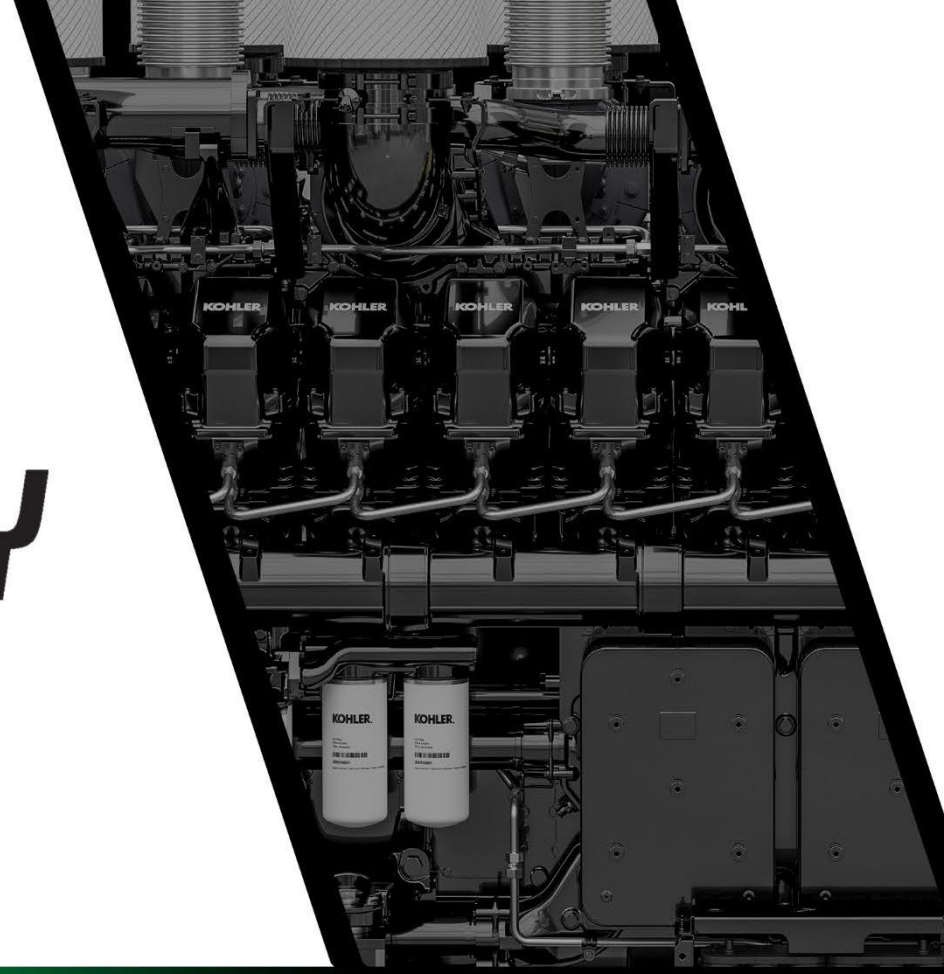
PAYMENT DATE	
CHECK NO.	
CCRD NO.	
EXP/AUTH	

SUBTOTAL	$7,580.81
TAX:	$587.51
TOTAL:	**$8,168.32**
DEPOSIT (-):	$0.00
DISCOUNT (-):	$0.00
EST. FREIGHT:	$0.00
MISC CHARGE:	$0.00

* RETURNABLE MATERIAL IS SUBJECT TO RESTOCKING CHARGE.
* NON-STOCK SPECIAL ORDERS ARE NON-RETURNABLE.
* CUT WIRE IS NON-RETURNABLE.

TOTAL DUE **$8,168.32**

RETURNABLE ITEMS ARE SUBJECT TO RESTOCKING FEE. NON-STOCK ITEMS & CUT WIRE ARE NON-RETURNABLE.



Power Systems Quotation

Job Name: Rainbow Municipal Water District ~ PG325

Job #: B08800

Date: 9/21/2026

Sales Executive: Eric Beyer
Mobile: (619) 733-3706
Email: ebeyer@bcew.com

Bay City Electric Works is pleased to offer the following generator system for your use on the referenced project. This proposal is in accordance with your verbal request. No written details, plans, or specifications were provided.

Major system components include:

Generator

One (1) Bobcat model PG325WCU-3B-T4F towable diesel-powered generator set, rated for standby and prime power duty at multiple voltages and phases (3 phase only) via link board, 60 Hertz, 1800 RPM, outdoor in weatherproof sound attenuated enclosure with 480-gallon usable subbase diesel fuel tank rated for 25.2-hours at 100% load, with Block Heater, Battery Charger, and Camlock Connectors option included.

One (1) Start Up training and Freight to 3707 Old Hwy 395, Fallbrook, CA 92028

System price is .....$185,000.00 (Tax Not Included)
Estimated Tax Rate 7.75%
Estimated Tax $13,950.00

Limited generator warranty, effective from date of startup, for:
All models are covered by a comprehensive limited warranty:

- Package: 1 year / 3000 hours
- Cummins engine: 1 year / unlimited hours or 2 years / 2000 hours
- Leroy Somer alternator: 2 years / 4000 hours

Emissions Permit is not included. To be provided by others. Contact ProActive Consulting Group at 714-893-7900 for Permit application processing information and pricing.

Quotation Notes:

1. Applicable taxes are not included.
2. 3% fee will be added to any payments made by credit card.
3. The kW output listed on this quote letter is at **rated conditions** unless stated otherwise. Actual output may vary by site conditions including temperature and elevation. Please check with your Salesperson for any potential deration due to site conditions or specifications.
4. Air quality permit fees and compliance are excluded. Local air quality authorities may require a health risk study or environmental quality assessment. The cost for a health risk study is excluded.
5. Any additional equipment required because of the local Air Quality permit application will be quoted separately. Air quality requirements are ever-changing and vary based on various factors including jobsite location and proximity to adjacent structures. BCEW is quoting the latest Tier compliant generators to meet State and Federal regulations unless otherwise noted. It is the customer or end user's responsibility to obtain all permits related to the installation and operation of the equipment quoted herein. *All permits must be obtained prior to installation of the equipment.*

   Many air jurisdictions are discussing changing the rules regarding emissions, tier levels, aftertreatment, etc. We are quoting based on the specifications and our current understanding of the application of the air jurisdiction's rules at the time of quote.
6. Generators installed on or after January 1st, 2013 in SCAQMD's jurisdiction will require the installation of a Particulate Matter Filter if they are within 50 meters of a sensitive receptor and over 175bhp. If the generator is within 50 meters of a sensitive receptor and there is not a price for a PM Filter on this quote please contact your salesperson immediately. A sensitive receptor is defined as, "any residence including private homes, condominiums, apartments, and living quarters, schools as defined in (5), preschools, daycare centers, and health facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing."
7. "Engines located on or near school grounds: New Stationary emergency standby diesel-fueled engines (>50 bhp) located on school grounds or 100m or less from a school which exists at the date the application for Permit to Construct or Permit to Operate is deemed complete, whichever is earlier shall emit diesel PM at a rate less than or equal to 0.01 g/bhp-hr" which means that a PM Filter will be necessary. If the generator is within 100 meters of a Kindergarden-12th grade school and there is not a price for a PM Filter on this quote please contact your salesperson immediately.
8. Minimum engine loading will be required for proper operation of Tier 4 systems. Underloading may cause engine damage. Proper loading and operation is the responsibility of the end user. Quarterly maintenance is always recommended for all generators and strongly advised when aftertreatment is utilized. Please review the Installation Manual and the Operation and Maintenance Manuals for the Tier 4 system and the generator to ensure proper performance and avoid issues.
9. Some local Authority Having Jurisdiction (AHJ's) will require field inspections, additional testing, interconnection with a Fire Alarm system or Building Management System (BMS), or functional verification for particular components/alarms/monitoring. We are bidding to the plans and specifications provided and cannot cover all potential testing that may be requested by AHJ's. We are bidding to a design spec for a project awarded based on pricing. It is the responsibility of the Consulting/Specifying Engineer to provide the required information to bid the project properly. Testing/inspection often requires attendance by a BCEW technician but in certain instances it may. Please contact us with the specific requirements in writing that apply to your project (from your approved fire permit, County HazMat permit or your inspection

corrections) once you have them and our Service Department can quote it accordingly. Tank pressure tests are required in very few areas. These are not included and will be quoted on an as required basis unless they are listed in the specification and specifically listed on our quote.

10. All supplied fuel tanks will be certified UL142 unless specifically noted UL2085. UL142 tanks are NOT fire-rated or ballistic-rated.
11. All power system studies, including short circuit analysis, protective device coordination and arc flash analysis and mitigation, are the responsibility of others and are not included in this proposal.
12. Protective device calibration, testing (NETA) and setting of protective relays and circuit breaker trip units are the responsibility of others and not included in this proposal.
13. Fuel, initial fuel fill and fuel for testing is excluded.
14. Special lugs are not included unless specifically identified in this proposal. You will receive the standard lugs for the provided breakers.
15. Prices quoted are not applicable for work subject to any state or federal prevailing wage requirements. We are an equipment supplier, not a subcontractor. Please contact your sales executive if prevailing wage still applies.
16. Vapor Gas Fuel System includes fuel mixer, electronic secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components. External fuel supply components are not included.
17. **Quotation is valid for 30 Days**. This quote may be modified and/or rescinded by BCEW at its sole discretion unless the quote is accepted before the expiration date.
18. We reserve the right to adjust pricing if this quote is affected by new tariffs or fees are imposed on certain materials and/or components after the submittal of this proposal.

Terms and Conditions:

1. Terms of payment are Net 30; invoicing schedule as follows:
2. Materials will be invoiced on the date of shipment from the factory.
3. Acceptance of purchase order is based on materials quoted.
4. 1.5% per month will be assessed on unpaid balances if not paid within terms.
5. Terms for retention and liquidated damages will not be accepted.
6. The following charges will be assessed for cancellation of any order:
   a. 10% of total order price if cancelled after we have provided submittals but prior to release for manufacture.
   b. 25% of total order price if cancelled after release for manufacture, or if the equipment is already on order with the factory (Kohler paralleling switchgear is on order as soon as submittals are requested).
   c. 50% of total order price if cancelled less than 60 days prior to scheduled shipment date.
   d. 100% of total order price if cancelled after the equipment ships from the manufacturing plant.

Lead Times:

1. Current lead time for the PG325 Bobcat unit is about 5 - 6 months from written release for production. Lead times are estimated at time of quote and may vary at time of order.

We appreciate this opportunity to offer our equipment for your consideration. Please call if you have any questions or if I can help in any way. Bay City Electric Works wants to be your Generator System Supplier.

The authorized purchaser identified below accepts this proposal and agrees, upon acceptance of this contract by Bay City Electric Works, to purchase and pay for the equipment, accessories, and service in accordance with the terms and conditions set forth above.

Company name: _____

Purchaser name and title (please print): _____

Purchaser signature: _____

Date: _____ Purchase Order #: _____

Delivery Date Requested by Purchaser: _____

If a delivery date is not provided, BCEW will postpone the release of product orders with its respective vendors until the date is provided in writing. It is the sole responsibility of the Purchaser to provide a delivery date within the current factory lead times.

PLEASE INCLUDE PRELIM INFORMATION WHEN ISSUING A PURCHASE ORDER.

KOHLER GENERATOR SALES - SERVICE - PARTS - RENTALS

To learn more, visit our website at www.BCEW.com

BAY CITY ELECTRIC WORKS

Eric Beyer
Rental & Portable Power Sales Executive
Bay City Electric Works|www.bcew.com
Phone: (619) 938-8200 x726|Mobile: (619) 733-3706
Email: ebeyer@bcew.com

PG325WCU-3B-T4F

Diesel Rental Generator

Serial Code: L36



Key Features

- Designed and manufactured in an ISO9001-certified facility in Statesville, North Carolina, USA.
- Heavy duty mobile generator system designed for prime power operation in rental, construction and special events applications.
- Generator is CSA certified for electrical equipment per C22.2, No. 14.

Voltage Configuration	Frequency (Hz)	Power Factor	Prime Power Rating			Standby Power Rating		
			kVA	kW	Current (A)	kVA	kW	Current (A)
600/346V - 3Ø WYE	60	0.8	N/A	N/A	N/A	N/A	N/A	N/A
480/277V - 3Ø WYE	60	0.8	334	267	401	357	286	430
240/139V - 3Ø WYE	60	0.8	334	267	803	357	286	860
208/120V - 3Ø WYE	60	0.8	316	253	877	350	280	972
240/120V - 1Ø ZIG ZAG*	60	1	197	197	821	198	198	826
400/230V - 3Ø WYE	50	0.8	280	224	404	290	232	419

* Note: Not all listed voltages are available on standard product. Some voltages may require selection of optional features.

Skidbase and Enclosure

- Package foundation is a heavy duty, oilfield-ready skidbase equipped with four-point tie downs.
- The skidbase is a fully bunded, Environmental Containment design, sized to contain at least 110% of total oil and fuel volume, to prevent any leakage of hazardous fluids from the package.
- Ducted air intakes ensure near-zero water ingression into the containment area, even during operation in the heaviest rain conditions.
- The enclosure is constructed from corrosion-resistant galvannealed steel and coated with a multi-stage powder paint process for long life even in harsh environments.
- The enclosure panels are fitted with sound-absorbing acoustical material to help reduce noise for quiet operation in noise sensitive applications such as concerts, events and nighttime construction.
- Wide opening access doors are side hinged, providing easy access to service and maintenance points and are equipped with recessed, pad-lockable handles and safety latches to hold doors open during servicing.
- Package is equipped with a center-point lifting eye for safe, well-balanced hoisting, designed with a 5 x safety factor for the weight of a fully fueled unit with running gear.

Diesel Engine

- Heavy-duty Cummins diesel engine (EPA Tier 4-final) provides the optimum mix of performance and fuel economy.
- The Diesel Oxidation Catalyst (DOC) and Selective Catalyst Reduction (SCR) aftertreatment system meet the stringent NOx and particulate limits without the use of a Diesel Particulate Filter (DPF).
- Dual frequency capability allows operation at 50-hertz or 60-hertz with the flip of a switch.
- Electronically controlled engine provides isochronous frequency control and advanced diagnostic monitoring and protection.
- The engine generator assembly is mounted on fail-safe vibration isolators.
- Coolant and oil drains are piped to bulkhead fittings mounted on the enclosure and all filters and maintenance points are easily accessed for safe and easy servicing.
- Engines are globally supported by the engine OEM and Doosan Portable Power.

DualBox Cooling System

- Doosan’s industry-exclusive DualBox design provides an innovative solution to ensure optimum package cooling for virtually any ambient condition by independently controlling engine compartment temperature and cooling system performance.
- The engine compartment temperature is controlled by a pair of electric, variable-speed cooling fans that are programmed to limit airflow in low ambient conditions to prevent freeze up of vital engine components while also ensuring the proper cooling of the package in high temperature / high load conditions.
- The cooling system compartment is isolated from the engine compartment to ensure the most efficient system performance as cooler airflow from outside the package is directed through the cooling system instead of using hotter air from the engine compartment.
- The engine driven cooling fan features a radial design which provides a significant performance advantage with respect to increased heat transfer, reduced noise level, and reduced fuel consumption.
- The DualBox solution maximizes performance to achieve the lowest noise levels, minimum water ingression and independent control of engine compartment temperature and cooling system to achieve optimum performance.
- Doosan generators provide performance at the full prime power rating at ambient temperatures up to 104ºF (40ºC) without derating.

Alternator

- Leroy Somer alternators feature brushless excitation providing industry leading motor starting kVA and 300% overload capability.
- R450 automatic voltage regulator provides precision control of voltage level and fast response to load changes.
- Class H insulation with upgraded environmental coating for ultimate resistance to high temperature and humidity.
- A link board allows for easy configuration for operation at most common voltages. The standard link board supports series wye and parallel wye configurations with optional link board available to support 120/240V-1Ø configurations.

Control System

- A complete array of operator-preferred analog gauges provide at-a-glance monitoring of vital engine and generator parameters.
- Solid state engine control module provides convenient, microprocessor-controlled startup at the push of a button and protects the generator system from an array of faults while providing the operator with indication of any faults on the LED display.

- Standard Run / Idle selector switch allows operators to start and warm up the generator at low engine speed to prevent excess engine wear when operating in cold climates.
- Engine Diagnostic Trouble Codes (DTCs) are displayed on the LCD screen, providing operators and technicians with a numeric and text explanation of the fault code, minimizing the need for expensive hand-held code scanners.
- Standard remote Auto Start / Stop capability via two wire, closed contact logic, allows for connection to automatic transfer switchgear and other remote starting devices.
- Pad-lockable battery disconnect switch is mounted inside the enclosure.

Power Connections

- All controls and connection points are grouped at the rear of the unit for safety and operator convenience.
- Power cables are connected at an oversized five lug (L1 L2 L3 N PE) terminal board capable of accepting bare end cable or terminated cables.
- Convenience receptacle panel includes individual branch circuit breakers.
- Optional camlock panel includes two panel mounted sets of 400A female connectors to further expand connection capabilities.

Fuel and DEF System

- Single fuel tank sized for 24 hour runtime at full load is mounted within the skid base, providing double wall protection.
- Fuel tank mounted low in frame and centered to ensure balanced lifting and low center of gravity.
- The fuel filler is located within the containment basin, minimizing possible spillage.
- Standard primary fuel / water separator and fine micron secondary fuel filter keep contaminates out of the system and increase reliability.
- The containment system features a three-inch drain plug for easy cleaning, and the fuel tank is equipped with a drain plug mounted behind the containment plug for easy cleaning.
- Leak-proof fuel vents eliminate the potential for fuel purge during out-of-level conditions during transport and load / unload.
- Low fuel shutdown ensures the engine will not lose prime if it runs out of fuel.
- Diesel Exhaust Fluid (DEF) tank sized for a minimum of 24-hour runtime.

Running Gear

- Integrated running gear system mounts directly to generator skidbase providing an industry-best low center of gravity for safe, stable towing, on-road or off-road.
- Tandem axle torsion suspension with E-Z-Lube hub assemblies and electric brakes or optional hydraulic surge brakes.
- All models feature high quality, grommet-mount lighting and meet Federal Motor Vehicle Safety Standards for lighting and conspicuity.
- Trailer-to-vehicle connector is a 7-pole SAE J560 plug with a high quality, jacketed wiring harness.
- All units are equipped with a 3” pintle eye or optional 2 $^{5}/_{16}$” ball hitch, heavy-duty safety chains and a high quality, heavy-duty jack stand.

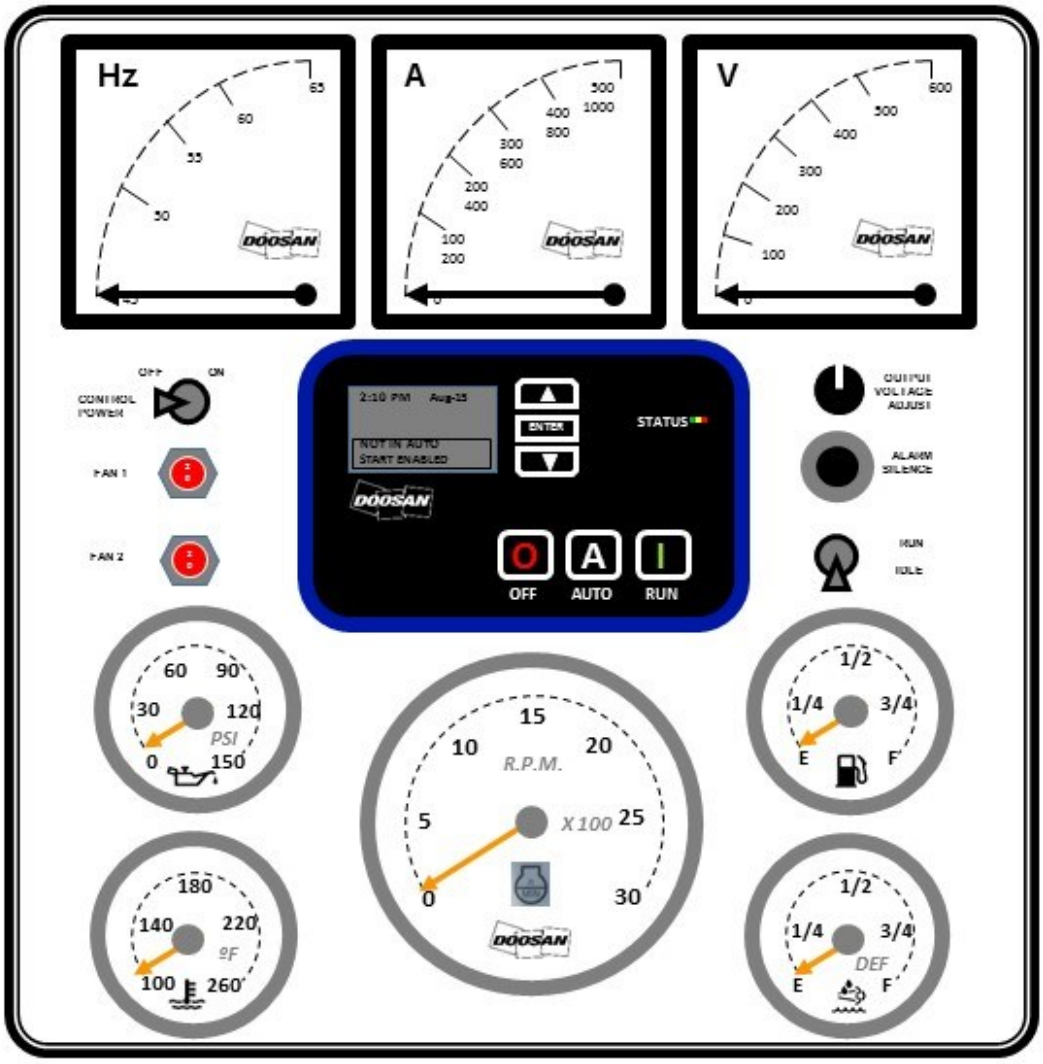
Options

- Doosan models can be equipped to meet specific application needs. Common options include:
  - Cold start options including engine coolant heater, battery pad warmers, and heated crankcase breather systems
  - Three-way fuel valve for connection to a remote fuel tank
  - Battery charger
  - Keyed door locks
  - Running gear options including rear stabilizer jacks, drawbar-mounted tool box and spare tire.

Warranty

- All models are covered by a comprehensive limited warranty:
  - Package: 1 year / 3000 hours
  - Cummins engine: 1 year / unlimited hours or 2 years / 2000 hours
  - Leroy Somer alternator: 2 years / 4000 hours

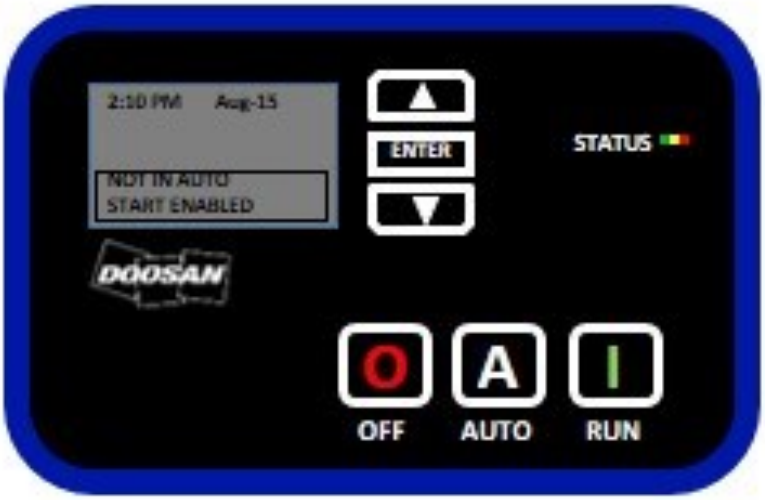
Operator Panel



Operator Panel Features

1. Tachometer: 0-3000 RPM scale
2. Oil Pressure: 0-150 PSI scale
3. Coolant Temperature: 100º-260ºF scale
4. Fuel Level: E-1/4-1/2-3/4-F scale
5. Diesel Exhaust Fluid (DEF) Level: E-1/4-1/2-3/4-F scale
6. Control Power On / Off Switch
7. Engine Compartment Cooling Fan Circuit Breakers
8. Alarm Silence Button (optional)
9. Voltage Adjustment Control
10. Run / Idle Control Switch
11. TG410 Controller
12. Frequency-meter: 45-65 Hz scale
13. AC Ammeter: Dual scale: 0-500A @ 480V / 0-1000A @ 208V
14. AC Voltmeter: 0-600 V scale

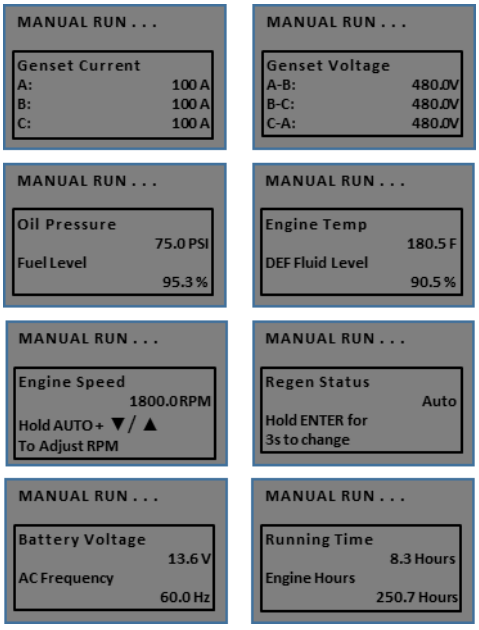
TG410 Automatic Start Stop Controller



TG410 Genset Controller Features

Functionality

- Automatic shutdowns and warnings
- Manual and remote AutoStart
- Engine speed adjustment
- Aftertreatment conditioning controls and status Icons
  Auto / Force / Inhibit
- SAE J1939 electronic engine communication
- Engine Fault Code Annunciation
  SPN / FMI / OC
- 150 Event Fault Log
- Isolated RS 485 Modbus communication capable
- NFPA 110 Level 1 capable
- Maintenance counter
- AutoStart on low battery capable
- Exerciser clock
- Automatic, inverse time delay overcurrent protection



Form Factor

- 6-Button control
- 6-Line LCD Display with user adjustable contrast and temperature compensation from -4ºF (-20ºC) to 158ºF (70ºC)
- 1 Multicolor (Red/Yellow/Green) Status LED
- Front Gasket Seal for water ingress prevention to IP65 protection
- Conformal coated circuit board for protection against moisture and contaminants
- Rugged polycarbonate enclosure designed to survive extreme applications and abuse
- Controller functions in ambient conditions ranging from -40ºF/C to 158ºF (70ºC)
- Meets or exceeds SAE J1113-11 with respect to electrical transients
- Meets or exceeds SAE J1455 with respect to vibration, thermal shock and cycling
- Meets or exceeds MIL-STD-461E with respect to electromagnetic compatibility
- Maximum 600V AC, true RMS sensing, +/- 1% full scale accuracy
- Current sensing, +/- 2% full scale accuracy

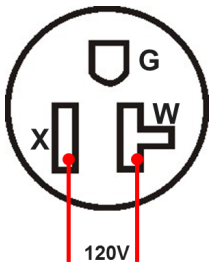
Engine Data		
Engine Manufacturer	Cummins	
Model Number	QSL9-G9	
Prime Output @ 1800 RPM	393 bhp	293 kWm
Standby Output @ 1800 RPM	433 bhp	323 kWm
Prime Output @ 1500 RPM	339 bhp	253 kWm
Standby Output @ 1500 RPM	373 bhp	278 kWm
Engine Type	Four Cycle, Inline	
Engine Control	ECU	
Emissions Certification	EPA Tier 4 Final	
Number of Cylinders	6	
Aspiration	Turbocharged / Intercooled / cEGR	
Aftertreatment Technology	Diesel Oxidation Catalyst (DOC) / Selective Catalyst Reduction (SCR)	
Bore × Stroke	4.49 x 5.71 in	114 x 145 mm
Displacement	543 in^3	8.9 L
Compression Ratio	17.8:1	
Governor Type	Isochronous	
Speed Regulation Accuracy	+ / - 0.25% Steady State	
Single Step Load Acceptance	100%	
Cooling System	50% Glycol / 50% Water	
Charging Alternator Output	70A	
DC System Voltage	24 V	
Battery Size / Output	2 × Group 31 / 1000CCA	

Fluid Capacities		Gal	L
Engine Crankcase Lubricant Capacity		7	26.5
Cooling System Capacity		15	56.8
Usable Fuel Cell Capacity		480	1817
Usable DEF Tank Capacity		24	91
60Hz Fuel Consumption	**Gal / h**	**L / h**	**Runtime**
@ 25% Load	6.0	23.0	79
@ 50% Load	10.3	39.0	46.5
@ 75% Load	14.8	56.0	32.5
@ 100% Load	19.1	72.0	25.2
DEF Runtime		>24	

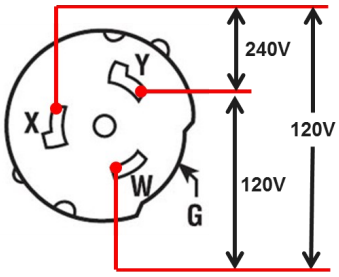
Reference Conditions		
Rated Ambient Temperature	-20ºF—104ºF	-29ºC—40ºC
Minimum Starting Temperature (Standard)	0ºF	-18ºC
Minimum Starting Temperature (w/ Cold Start Opt)	-20ºF	-29ºC
Maximum Altitude		

Alternator Data		
Alternator Manufacturer	Leroy Somer	
Alternator Model	LSA 46.2 L9 C7	
Alternator Type	Four Pole Revolving Field	
Number of Leads	12	
Insulation Class	H	
Winding Pitch	2/3	
Voltage Connection Method	Two-Position Link Board: Series Wye / Parallel Wye Optional Link Board: 1Ø Zig Zag	
Excitation Method	Brushless w/ AREP	
Voltage Regulator Model	R450	
Voltage Regulation Accuracy	+/-0.5%	
Maximum Unbalance Load	25%	
Total Harmonic Distortion (THD)	<2.5% @ 0% Load	
Telephone Influence Factor (TIF)	<50	
Motor Starting Capability	**480V**	**600V**
SkVA @ 20% Voltage Dip	475	N/A
SkVA @ 25% Voltage Dip	640	N/A
SkVA @ 30% Voltage Dip	825	N/A
SkVA @ 35% Voltage Dip	1000	N/A

Power Connections	
Main Circuit Breaker Rating	1000 A
Overcurrent Trip Setpoint (240V-1Ø)	829 A
Overcurrent Trip Setpoint (208V-3Ø & 240V-3Ø)	973 A
Overcurrent Trip Setpoint (240V-3Ø Delta)	N/A
Overcurrent Trip Setpoint (480V-3Ø)	445 A
Overcurrent Trip Setpoint (600V-3Ø)	N/A
20A—125V GFCI Duplex (NEMA 5-20R) Receptacles	2
50A—125/250V Temp Power (CS6369) Receptacles	3
400A-600V Camlock Connectors (Optional)	3 Sets
Terminal Board Maximum Cable Size (Bare Wire)	4 × AWG 2—600MCM
Terminal Board Maximum Cable Lug Size	1/2 in (12.7 mm)



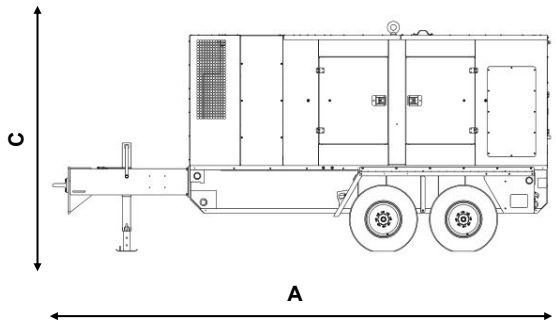
NEMA 5-20R Receptacle

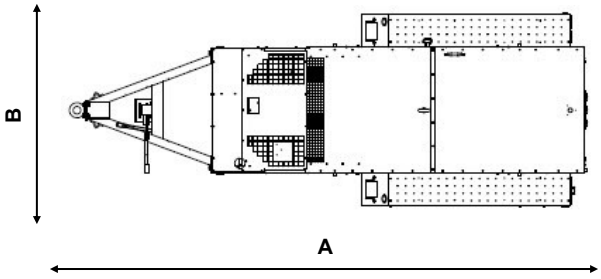


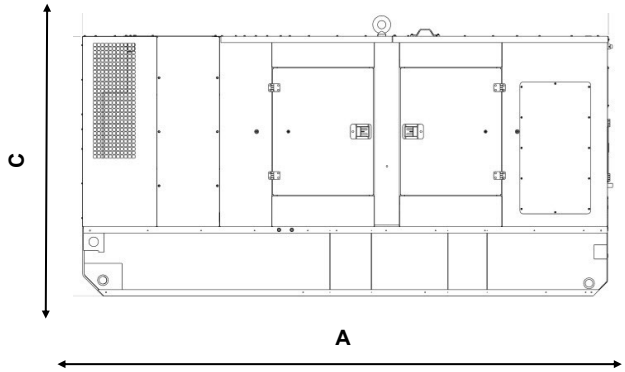
CS6369 Receptacle

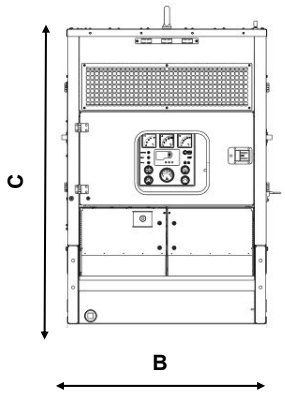
Running Gear	To 49CFR571 requirements	
Gross Vehicle Weight Rating (GVWR)	14540 lb	6595 kg
Gross Axle Weight Rating (GAWR)	13668 lb	6200 kg
Configuration	Tandem Axle	
Suspension	Torsion	
Standard Brake System Configuration	Electric	
Optional Brake System Configuration	Hydraulic Surge	
Tires	ST235/80R16, Radial	
Wheels	16” × 6”, 8 lug on 6.5” bolt circle	
Track Width	72.6 in	1843 mm
Lighting and Reflectors	Meets Federal/Canada Motor Vehicle Safety Standard 571.108	
Electrical Connection to Towing Vehicle	7-Pole Round SAE J560 Connector	
Standard Trailer Coupling	3” (78 mm) Pintle Eye	
Optional Trailer Coupling	2-5/16-Inch Ball Coupler	
Hitch Height	4-Position Adjustment 21 in—34.5 in	
Safety Chains	2 × 3/8” with slip hooks and safety latches	
Jack Stand Configuration	Fixed Mount, 10000 lb Capacity	

Package Data	With Running Gear		Skidmount	
Length (A)	240 in	6098 mm	178 in	4511 mm
Width (B)	83 in	2109 mm	54 in	1360 mm
Height (C)	113 in	2870 mm	90 in	2279 mm
Weight (Shipping)	10357 lb	4707 kg	9183 lb	4165 kg
Weight (Ready to Run)	14032 lb	6378 kg	12855 lb	5831 kg
Sound Level @ 23ft (7m), 100% Load	76 dB(A)			









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Due to continuous product improvement, specifications are subject to change without notice
REV_5 6/21/2024

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Camino Del Rey Waterline Relocation Update

November 2026

County Project Background

- This is a County of San Diego CIP which affects existing RMWD facilities.
- Segment of Camino Del Rey within 100-year flood plain, which is prone to flooding.
- Mitigate flooding by raising roadway level approximately 10 - feet above limits of flood plain.

RMWD Utilities

- RMWD facilities impacted by County roadway project.
- RMWD has a 14-inch steel water line built in 1959 along CDR.
- Full impacts to RMWD facilities are still being analyzed.

County Project Limits



RMWD Project Overview

Description: This project proposes to relocate existing water and sewer infrastructure due to the County of San Diego's Road Improvement Project.

Rationale: The project will ensure continuity of service during the County-initiated construction project and upgrade water facilities.

Status/Schedule: The project is partially funded and is in the planning phase. The project's anticipated completion is determined by the County's construction schedule.



County Project Timeline

- 100% Design for County Project: September/October 2026.
- Final Design: January 2027.
- SDGE to analyze and comment on County's Final Design approximately 18-months.
- Bid ready plans incorporating all utility and right of way changes will then be prepared.
- County project out to bid: Summer 2028.

Questions?

Thank You

