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City of Morro Bay
Water Reclamation Facility Project

OUTFALL ASSESSMENT PLAN

DRAFT | March 2020

carollo

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This document is released for the purpose of information exchange review and planning only under the authority of Eric T. Casares, March 2020 California PE 73351

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Abbreviations

AFY	acre-feet per year
BOD	biochemical oxygen demand
BT	Bottom Times
Carollo	Carollo Engineers, Inc.
CCC	California Coastal Commission
CDP	Coastal Development Permit
City	City of Morro Bay
CWA	Clean Water Act
DDW	Division of Drinking Water
FMP	Water Reclamation Facility Master Plan
ft	feet
GSI	GSI Water Solutions
IPR	indirect potable reuse
MBR	membrane bioreactor
MCL	maximum contaminant limit
mgd	million gallons per day
NOI	Notice of Intent
Plan	Outfall Assessment Plan
PSO	Protected Species Observation
Rincon	Rincon Consultants Inc.
RO	reverse osmosis
ROV	remotely operated vehicle
RWQCB	Regional Water Quality Control Board
SWMM	Storm Water Management Model
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TSS	total suspended solids
WEAP	worker environmental awareness program
WRF	water reclamation facility
WRFCAC	Water Reclamation Facility Citizens Advisory Committee
WTP	water treatment plant
WWTP	wastewater treatment plant

Section 1

WRF PROJECT BACKGROUND

On July 11, 2019, the California Coastal Commission (CCC) approved Coastal Development Permit (CDP) 3-19-0463 for the City of Morro Bay's (City's) Water Reclamation Facility (WRF) Project. On July 19, 2019, the City received the Notice of Intent (NOI) for the CDP, which contains sixteen special conditions.

The existing Morro Bay-Cayucos wastewater treatment plant is located at 160 Atascadero Road in Morro Bay and is jointly owned and operated by the City of Morro Bay (City) and the Cayucos Sanitary District. The wastewater treatment plant was originally built in 1954 in a low-lying area near the confluence of Morro Creek with the Pacific Ocean, and it provides wastewater treatment services to the City and to the unincorporated community of Cayucos approximately six miles to the north. The wastewater treatment plant was built before modern state and federal water quality standards, and does not meet federal Clean Water Act (CWA) standards for full secondary treatment. Instead, the wastewater treatment plant has been operating under a CWA waiver for full secondary treatment requirements for biochemical oxygen demand (BOD) and total suspended solids (TSS) since 1984. In 2018, the City received a time schedule order from the Central Coast Regional Water Quality Control Board (RWQCB) requiring compliance with full CWA secondary treatment requirements by February 28, 2023.

Because of the age of the existing wastewater treatment plant, its failure to meet core CWA water quality standards and the possibility of potential fines/penalties for failure to meet the RWQCB's mandate for CWA compliance by 2023, the City has been pursuing a new upgraded wastewater treatment facility for more than a decade. The City and the Cayucos Sanitary District initially proposed to redevelop the wastewater treatment plant at its current site, but the Coastal Development Permit (CDP) was appealed to the California Coastal Commission (CCC), and ultimately in 2013, the CCC denied the City's redevelopment-in-place proposal on the basis of inconsistencies regarding avoiding coastal hazards, land use priorities, recycled water provisions and public view protections.

Following the CDP denial and given the CCC's direction to the City and the Cayucos Sanitary District on the appropriate path to upgraded wastewater and water reclamation functions, the City developed a Water Reclamation Facility Citizens Advisory Committee (WRFCAC), identified 17 potential sites for plant relocation, and developed criteria for a potential water reclamation facility project, including coastal hazards avoidance through plant relocation inland, water quality improvement through compliance with applicable water quality standards, and water supply security through recycled water provision. Over the past six and a half years, through significant public input that shaped this project, including making critical decisions in public forums regarding WRF siting (e.g., in town vs. outside of town), components/operations, recycled water end uses (e.g., agricultural uses only or full potable reuse), funding (e.g., through two City-wide votes to raise utility fees to pay for the project), and process (i.e., two public hearings to approve the project Environmental Impact Report and two affirmative votes by the

Morro Bay City Council and County Board of Supervisors to authorize a consolidated CDP approval process).

This proposed Project meets Coastal Act consistency on many fronts—for the protection and enhancement of coastal resources, for providing essential public services to Morro Bay residents and visitors, and for providing adaptation and resiliency in an era of increased hazards exacerbated by climate change. The Commission directed the City to propose a project of this type back in 2013, finding that a project that perpetuated the City's water and wastewater status quo was not appropriate or consistent with the Coastal Act. The City responded to the CCC's directive, and the proposed project is the end result that addresses the Coastal Act concerns previously raised by the CCC in a way that provides a more sustainable wastewater and water supply future for the City.

Section 2

DOCUMENT PURPOSE

This document describes the proposed measures to be taken by the City to address the requirements of Special Condition No. 2 – Construction Plan and Special Conditions No. 8 – Outfall Assessment Plan listed in the NOI to Issue CDP 3- 19- 0463 for the City's WRF Project.

The City is taking a phased approach to meeting the Special Conditions for the CDP. As described above, the Project is being delivered via three distinct construction efforts: WRF, Conveyance Facilities (i.e., pipelines and pump stations), and Recycled Water Facilities (i.e., injection wells). The outfall assessment is included in the WRF component and requires Special Conditions 2 and 8 measures to be met prior to construction. Special Conditions 1 – Revised Final Plan and 2 – Construction Plan for the WRF project have already been approved by the Executive Director to initiate WRF construction. Following the WRF, the next Project element that will begin construction is the Conveyance Facilities. The City will submit the Conveyance Facilities Final Plans and Specifications to the Executive Director for review and approval in the spring of 2020.The City will submit separate Recycled Water Facilities Final Plans and Specifications to the Executive Director at the appropriate time when that design has been completed. Construction of the Conveyance Facilities and Recycled Water Facilities will not begin until the Executive Director reviews and approves the designs and authorizes construction.

Section 3

BACKGROUND INFORMATION

3.1 Existing Ocean Outfall

The City of Morro Bay originally constructed an 18-inch outfall in 1953 to discharge treated wastewater effluent to the Pacific Ocean. The City and Cayucos Sanitation District jointly own and operate the existing wastewater treatment plant serving both communities. In 1981, an upgraded ocean outfall was constructed to discharge treated effluent from the wastewater treatment plant. This outfall is currently in service today serving both agencies and the original 18-inch ocean outfall serving Morro Bay was abandoned in place. The ocean outfall is located approximately 2,700 feet offshore through a 4,400 foot pipeline starting from the existing wastewater treatment plant. The discharge point is anchored approximately 50 feet below mean sea level and treated effluent is released in unstressed open sea-water. Figure 3.1 shows the approximate location of the ocean outfall discharge point relative to the shore. Treated effluent flows through a 27-inch diameter steel pipe that terminates in a 170 foot long diffuser. The diffuser section has a total of 34 diffuser ports which consist of a 6-inch flanged steel pipe connecting to the 27-inch steel outfall pipe, a PVC flanged section, 6-inch 45-degree elbow, and terminates with a 6 by 2-inch concentric reducer. Figure 3.2 shows the schematic design of the diffuser. Figure 3.3 shows an operational diffuser.

Figure 1 Ocean Outfall Discharge Point

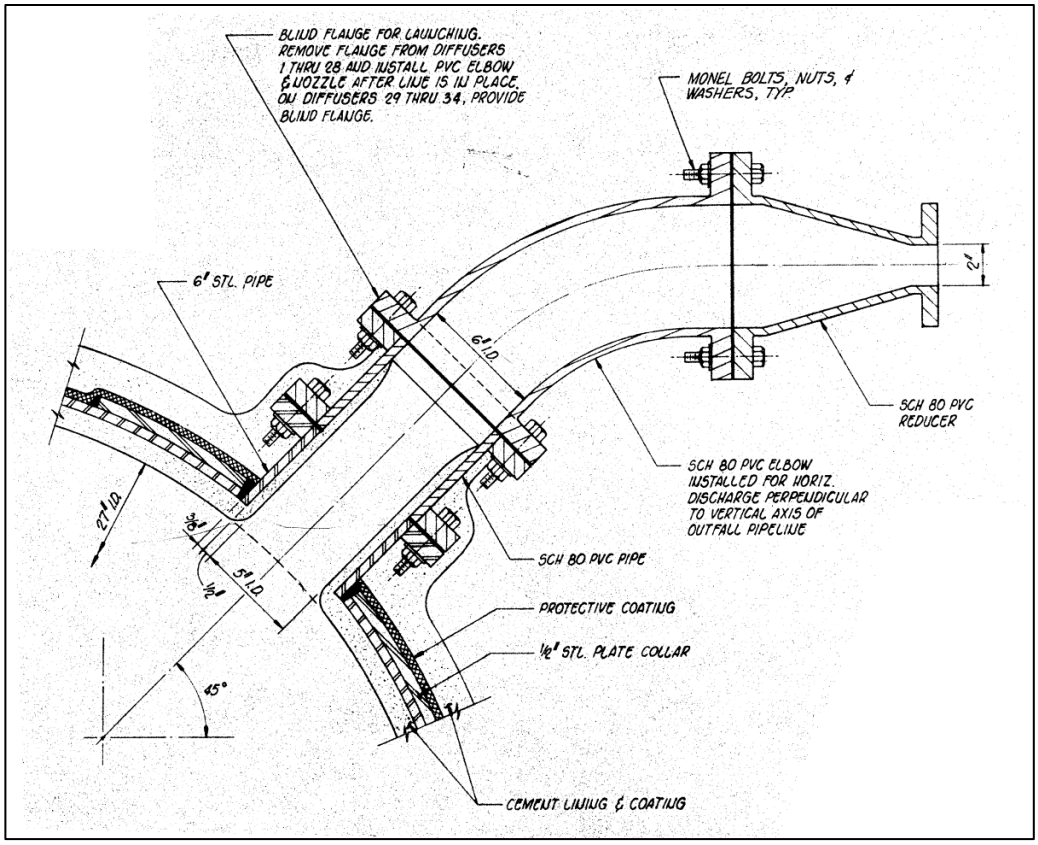


Figure 2 Diffuser Schematic Design

Figure 3 Diffuser in Service

3.2 2011 Ocean Outfall Assessment Results

The ocean outfall pipeline and diffuser section were visually inspected by a remotely operated vehicle (ROV) in 2011 by Ballard Diving & Salvage. This inspection can be found in Appendix A. In order to complete the internal inspection, the outfall pipeline was required to have a controlled flow to assist the ROV progression through the pipeline. Having flow in the pipeline prevented a clear image, therefore the inspection heavily relied on sonar to record sedimentation and other defects throughout the outfall. There were times when flow was not in the pipeline during the inspection, Figure 3.5 shows a typical ROV inspection photo from within the pipe without flow. Figure 3.6 shows a typical sonar inspection plot that shows sediment at the pipe invert. The inspection findings are listed below:

- Small debris piles on the invert of the outfall ranged from 1 to 2-inches deep. Debris material consisted of loose sediment, gravel, rubber joint seal sections or pieces of pipe corrosion.
- No significant cracks or out of round conditions were measured.
- Sections of joint seals were hanging from pipe joints.
- 7 of the diffusers were not flowing.

Figure 4 Typical ROV Inspection Photo

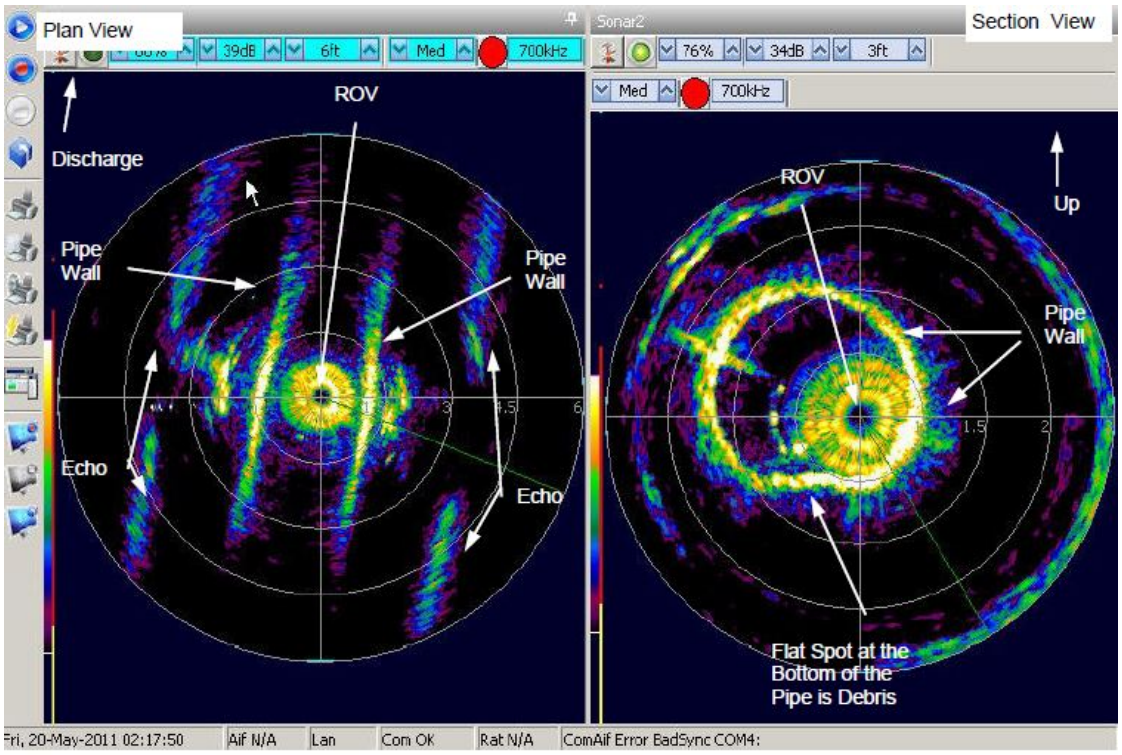


Figure 5 Typical Sonar Inspection Plot

Section 4

OUTFALL ASSESSMENT PLAN

This section introduces the purpose of the Outfall Assessment Plan (Plan) and the following components that comprise of that Plan. The Plan does not intend to reconfigure, redesign, or modify any components of the outfall facility; therefore construction site documents and specifications outlining grading, rehabilitation, sediment removal or dredging, demolition, manufacturing or other similar activities will not be performed to complete the assessment. Additionally, inspections will be performed by underwater commercial diving using sonar profiler for internal assessment. This work will not include a traffic control plan or encroachment permit being that there will be no disruption within the public right-of-way. The assessment will take place along the outfall pipelines as shown in figure 3.1 and in Appendix B – Outfall Record Drawings. The purpose of the Plan is to document the measures the City will take as a result of the assessment of outfall integrity and long-term functionality to protect coastal water quality and marine species and habitats and ensure worker and vessel safety during inspection activities.

4.1 Biological Considerations

Outfall assessment operations will be conducted primarily by commercial divers to perform repairs and inspection of the outfall pipe and integrated components. The offshore diving and inspection requires support of an ocean-going vessel(s) that will transit from Morro Bay Harbor

to the offshore outfall location daily for several consecutive days. Special condition 8 of the CDP outlines multiple conditions including the development of this Plan that is intended to specify the procedures of the inspection and repairs, identify best management practices and outline measures to avoid adverse impacts to coastal water quality, marine habitats and ensure worker and vessel safety during inspection activities to the maximum extent possible.

Rincon Consultants Inc. (Rincon) will serve as the environmental consultant for the Plan and serve as the protected species observation (PSO) contractor. Rincon will assist in the review of permit conditions and prepare a Worker Environmental Awareness Program (WEAP) which will be presented to all project-related personnel involved in the Plan. The WEAP training will address sensitive resources and species defined in the CDP to address site-specific marine wildlife and water resources, review the limits of the investigation and present measures to avoid and minimize impacts to resources from the proposed project activities. The WEAP will be presented by Rincon's lead PSO monitor and include an on-site visual presentation training and distribution of a hardcopy version of the presentation to participants. All personnel attending the training shall sign a roster sheet to document their attendance and review of the WEAP information presented. A hard copy of the WEAP materials and presentation will be kept in a binder on board the project vessel(s) and be available at all times during offshore project activities.

Rincon will provide a minimum of two qualified PSO monitors on duty during all offshore assessment activities including active vessel transit, anchoring and in-water inspection and repair activities. The PSO monitors will be experienced in marine mammal, sea turtle and sea otter observation and behavior. The lead PSO monitor will be responsible for identifying any scenarios that require an additional observer on the barge or project vessel and to make recommendations as to where that observer should be located to provide complete coverage of the surrounding marine environment.

The lead PSO monitor will organize and submit daily PSO sighting reports to the Inspection Manager prior to 0800 the day following monitoring to provide enough time for review and delivery to the CCC Executive Director. The sighting information will be presented in adequate detail to determine whether observable effects to protected species are occurring from project activities. PSO monitors will be equipped with a personal flotation device, binoculars, range finder, VHF radio, electronic data form or data sheets, and cell phones.

PSO monitors will collect electronic field notes daily for each protected species observed in the project area during in-water investigation time periods. During transit and in-water activities, PSO monitors will visually scan the avoidance zones from established vantage points on the barge or project vessels to determine if protected species are approaching the avoidance zones and to record behavioral responses. These zones will be monitored during all transit and in-water activities. If a protected species approaches the avoidance zone, the observation will be reported to the Inspection Manager and vessel captain and the observed species watched closely. In accordance with the CDP Special Condition 8 – Outfall Assessment Plan, the PSO monitors shall establish a 1,640-foot radius avoidance zone around the barge or project vessels for protection of large marine mammals (whales) and a 500-foot radius avoidance zone for the projection of smaller marine mammals (Pinnipeds) or sea turtles. If the protected species enters the avoidance zone, the observation will be reported to the Inspection Manager and the vessel captain. The Inspection Manager and vessel captain will be notified to adjust course, halt forward progress or

stop-work until the species is outside of the avoidance zone or has not been observed for at least 20 minutes.

Each observation will be documented with the following information:

- Date and time observation begin and ends.
- Assessment activities occurring during observation.
- Weather parameters (cloud cover, visibility).
- Water Conditions (e.g. sea state, tide state).
- Number of individuals, sex and age class, and flipper tag color and location.
- Description of behavioral patterns including travel direction, distance from vessel or diving area, and specific activity.
- Locations of all protected species observations.
- Other human activity in the area.

If a whale becomes entangled in any cables or lines the PSO will immediately notify the Inspection Manager, NMFS and the Executive Director, so appropriate response measures can be implemented. Similarly, if any take occurs, as that term is defined in the Federal Endangered Species Act, including to a marine mammal, sea turtle or sea otter, the observer shall immediately notify the inspection manager, NMFS, Executive Director and any other required regulatory agency.

Outfall assessment operations including vessel and inspection activities will minimize noise and other potentially harmful activities or biproducts from operations to the maximum extent possible. Vessel transit will be limited to no greater that 5 knots inside Morro Bay Harbor and not greater than 10 knots offshore during project activities. The vessels and inspection equipment shall not discharge any water, fluids or material into the marine environment and proper spill containment drip pans and emergency spill response materials shall always be maintained and ready for immediate deployment. All sediment removed from the outfall shall be removed and stored in containment bins on board the vessel and transported ashore for inland disposal. The captain of the barge or project vessel(s) and the Inspection Manager are responsible for ensuring that the Plan and its provisions are implemented.

Upon completion of the Outfall Assessment and the PSO monitoring, a final report summarizing monitoring activities will be developed and provided to the CCC Executive Director. The report will summarize all PSO sightings, observation times, and implemented avoidance and mitigation measures. The report will include an evaluation of the effectiveness of monitoring protocols and detailed documentation of PSO sightings including marine mammal, sea turtles, other wildlife sightings, wildlife behavioral changes, and project delays or investigation cessation of operations due to the presence of marine wildlife specifies subject to protection in the project area and/or avoidance zones.

4.2 Outfall Assessment

The purpose of this task is to assess the physical condition of the outfall, focusing primarily on the welded steel portion of the outfall and specifically on the integrity of the cement mortar lining and coating system. It will also be used to estimate the quantity and characteristics of the accumulated sediment and provide recommendations for improvements to the diffusers. Additionally, the results of the physical assessment will support the analysis of the outfall hydraulics and dilution modeling.

4.2.1 Outfall Inspection

The outfall assessment will utilize experienced and qualified topside marine technicians and commercial diving personnel with surface-supplied air diving equipment in compliance with OSHA and 29 CFR, Part 1910, Subpart T "Commercial Diving Operations". Due to the relatively shallow water depths (less than 50' deep) all diving operations will be performed according to "No Decompression" limits for diver Bottom Times (BT) . A Remotely Operated Vehicle (ROV) and scanning profiling sonar system will also be utilized in conjunction with and support of diving operations during the deeper water diffuser section investigation. All assessment work will be conducted during an approximate 1-week long time period of mild marine weather and calm ocean conditions or, if necessary, between short duration low-pressure storm events.

Up to five (5) consecutive dive shifts will be required to complete the outfall assessment in its entirety. Diving operations will commence and be conducted during Shift #1 to initially locate the outfall diffuser terminus section and other visible portions of the exposed nearshore pipeline not covered in sand. Temporary buoys at outfall stations 22+00 and 52+60 will also be placed for the duration of the assessment to identify the beginning and end points of the underwater outfall pipeline. An ROV video inspection and sonar profiling will be incorporated into ongoing diving operations during Shifts #2 and #3. Divers will remove 6-inch PVC pipe diffuser elbow/reducer sections (as shown in Figure 3.2) at selected diffuser port locations before inserting the scanning sonar profiling head to measure sediment accumulation within each. Divers will also collect and retrieve interior pipe sediment samples for lab testing before replacing the PVC ports. During Shift #4 the entire 170-foot long diffuser section will be inspected between stations 50+90 and 52+60. The flow rate of effluent discharge through all 34 individual diffuser ports will also be measured and recorded using a flow meter. Diving operations will conclude during Shift #5 with a complete inspection of the remaining exposed portions of the 27-inch welded steel outfall pipeline for any visible coating damage or deterioration between stations 22+00 to 50+90. Inspection for damage to the existing six burial anchors, (see sheet 5 of Appendix B - Outfall Record Drawings) and testing of the six visible cathodic protective joints/bracelets will also be performed during this shift as well.

Marine weather and ocean conditions may dictate minor deviations or changes to the sequence of inspection but temporary marker buoys will all be recovered and any diffuser ports removed will be replaced before demobilization. Upon completion of the outfall inspection a summary report documenting the overall outfall condition, inspection tables complete with diffuser port discharge flow velocities, diffuser port photos, and sonar profiling scans with estimated quantities of material to be removed will be provided.

4.2.2 Outfall Hydraulic Analysis

A Storm Water Management Model (SWMM) will be performed to model the hydraulic capacity and the ability to convey existing and future flows from the WRF. The model will be developed using the City's record drawings, and the configuration will be confirmed by City staff and verified by the physical inspection of the outfall conducted in section 4.2.1. Up to four scenarios to simulate conditions during a range of flows for three different tidal conditions will be developed (total of 12 scenarios) to calculate the hydraulic capacity of the outfall based on projected average and peak flows, and to identify any operational concerns during low flows.

4.2.3 Dilution Modeling

A dilution model of the outfall diffuser will be developed to ultimately calculate the dilution factor that will be used for the City's NPDES permit. The development of the model will consist of obtaining oceanographic data on density stratification and currents. This data combined with the results of the hydraulic assessment will be used to assess worst case and typical conditions of the diffuser's resulting density stratification given the existing diffuser port configuration and typical ocean currents during both average and peak dry weather flows. Three hydraulic analyses for each developed alternate diffuser configurations will be performed using the hydraulic model developed in section 4.2.2. Additionally, three dilution simulations will be developed for each alternate dilution configuration to recommended diffuser configuration modifications to meet dilution and environmental requirements.

4.3 Plan Implementation

The implementation of the Outfall Assessment Plan will follow the listed sequence below:

1. Approval of Special Conditions No. 2 and No. 8 for the Outfall Assessment by the Coastal Commission.
2. Notification to the Coastal Commission 3 days prior upon start of inspection.
3. WEAP Training.
4. Outfall Inspection and Marine Mammal Observation.
5. Notification to the Coastal Commission upon completion of inspection.
6. Outfall Hydraulic Analysis.
7. Dilution Modeling.
8. Summary Report.

Once each task is completed, an understanding of the Outfall's condition will be documented by the City to better understand the hydraulic and functional characteristics of the facility to better improve water quality as well as protect marine habitats. Additionally, with the conclusion of the assessment, the City will have a better understanding of repairs that may be required to maintain the physical integrity of the Outfall in the future.

4.4 Future Considerations

Future considerations for the use of the outfall are to possibly eliminate its use entirely as the treated effluent disposal option for the WRF. This could be done by a complete reuse option for the WRF or if an alternate treated effluent disposal option is found. At the moment, the City is not currently searching for an alternate treated effluent disposal option for the WRF and is pursuing an indirect potable reuse (IPR) option for the purified water produced at the WRF which in turn will reduce the volume of treated effluent being discharged by the Ocean Outfall in the future.

Appendix A

MORRO BAY OUTFALL INSPECTION BY BALLARD DIVING & SALVAGE - 2011

Morro Bay Outfall Inspection

Ballard Diving & Salvage
1-206-782-6750
www.ballarddiving.com



Morro Bay Waste Water Treatment Plant Outfall

Introduction:

Ballard Diving & Salvage (BDS) was contracted for ROV services to inspect the interior of the Morro Bay outfall. Operations were conducted under the USCG accepted ADCI Consensus Standards for Commercial Diving and Underwater Operations. The ROV inspection was performed from the onshore vault towards the end of the outfall. The inspection was performed in three Separate penetrations. The first penetration was to 1,100' on May 18th, the second penetration was to 3169' on May 19th and the third penetration was to 4,982' on Sept 30th. The diffusers were inspected externally on June 13th. The inspection recorded video and sonar plots. The plots were recorded at 100' intervals. Features such as sediment accumulation, joints, and the general condition of the outfall were recorded.

Method:

BDS deployed a Seabotix LBV inspection class ROV from the shore side vault at station 1+28 to perform the internal inspection of the outfall. The inspection starting at the vault required a high tide and controlled flow from the plant to assist the ROV and Crawler through the pipe. The crawler was used to push the ROV through the dry portion of the pipe above the tide line. The character of the joints and some small piles of debris required the outfall to have enough flow to float the ROV over the obstructions. The crawler pushed the ROV to the full length of the crawler tether; however the ROV wasn't floating enough to clear joints in the invert. Ultimately the ROV was assisted with flow through the dry portion to pass over the joints and overcome the friction of the tether. The flow through the outfall was carefully monitored and controlled by plant personnel with feedback from the observations through the ROV video. Video was recorded continuously as the ROV moved through the outfall. Sonar plots were recorded at 100' intervals. The 4,982' was the limit for the ROV as sediment prevented the ROV from safely passing the obstruction.

The inspection method relied heavily on sonar because the effluent prevented significant imaging with the video camera. There was one period during each penetration when a significant amount of hydrant water allowed the video camera to image the surfaces of the pipe.

The first penetration was to a distance of 3,169'. The tether counter was recalibrated when the ROV was at 3,169' so the return count would be accurate. The downstream measurements of the tether were correct as demonstrated by the tether counter reaching "1" once the ROV was in the shore vault. The first run has a linear offset. A second distance column has been added to the inspection notes with the correct distances. The recorded tether payout was multiplied by 3,169 divided by 2,576.

Sonar Plot Interpretation:

The sonar plots are recorded as snapshots. Each plot contains information from both the sector scan sonar and the profiling sonar. The right pane is the profiling sonar display. The display represents a vertical cross section at the front of the ROV. Up on the page is up and the right side of the right pane is to the right of the ROV. The left pane of the display is the information from the sector scan sonar. This is a plan view from the top where up on the display represents forward relative to the ROV. Again, the origin of the plot is located at the sonar head, which is fastened to the top of the ROV on center. There is a scale shown just below both panes that indicates the number of feet between each red line (profiler) or range ring (sector scan). Also, relative and absolute range information between two cursor-selected points is listed on the lower left part of the display. A vertical color bar on the left side shows the range of colors used to display the intensity of the returning sound wave. Red indicates the strongest return, yellow is moderate, and black indicates no return.

Sonar contains two common events that make interpreting the display more complicated. The first event is an echo. The sound wave can bounce off of multiple surfaces before returning, thus creating mirror images of features. This creates the illusion that there are more structures underwater than actually exist. These artifacts are easily distinguished and in many cases reveal additional information during analysis. One of the most common echoes is off of a water to air interface such as an air bubble in a tunnel or the free surface in a shaft. Many of the plots in this report contain echoes and mirror images of features. Shadows are the second event. The sound wave from the sonar head cannot see the backside of an object or around corners. These are the two most common events on a sonar plot that make the interpretation more complicated.

Data Collected:

- Major Findings
- Sonar Cross Sections every 100’
- Internal Video were effluent clarity permitted
- Debris accumulation
- Joint condition

Observations:

The inspection located some small debris piles in the invert of the outfall that ranged from 1" to 2" deep. Also sections of the joint seals were hanging from the pipe joints. The pipe was round and the joints could be seen on sonar and many locations throughout the length. No significant cracks or out of round conditions were measured. Locations of debris can be seen in the inspection notes. (Appendix 1) The debris that was recorded on video was loose sediment, gravel or pieces of corrosion. In addition, some of the debris appeared to be rubber joint seals. These pieces were either in the invert or partially hanging from the ID of the pipe.

The third penetration was to a range of 4,982'. The end of the outfall is listed as 52+60' and the shore vault is 1+28. The distance from the shore vault to the end of the outfall is 5,132'. The ROV was 150' from the end of the outfall when progress was blocked by sediment. The diffuser section starts 170' from the end of the outfall so the ROV was at the first diffusers when the sediment increased in the invert.

Video Captures

May 18th Inspection

Figure 1 - View of dry portion of pipe

Figure 2 - Typical Joint

Figure 3 - Closer View of Typical Joint

Figure 4 - Typical View of Pipe in Monochrome

Figure 5 - Circular Plug in Crown of Pipe

Figure 6 - Different View of Circular Plug in Crown at 155'

Figure 7 - Debris Caught on Left of Manipulator

Figure 8 - Joint Seal Hanging from Crown

Figure 9 - Joint Seal Partially Detached from Pipe and Downstream Portion of the Bend

Figure 10 - Bend in Pipe

Figure 11 - Debris Under ROV

Figure 12 - Typical Debris on Invert

Figure 13 - View of Pipe without Effluent

May 19th Inspection

Figure 14 – Seal Debris Partially Blocking Pipe

Figure 15 - Debris on Invert between 1300' and 1200'

Figure 16 - Seal Loose from Crown between 1300' and 1200'

Figure 17 – View of Pipe

Figure 18 - Seal Missing from Joint between 1100' and 1068'

Figure 19 - Start of Air Gap at 815'

September 30th Inspection

Figure 20 - Debris Caught in ROV Frame at End of Pipe at 4982'

Figure 21 - Invert Debris at 665'

June 13 Inspection

Figure 22 - Stand Pipe at End of Outfall

Figure 23 - Blind Flange on End of Outfall

Figure 24 - Anchor Chain at End of Outfall

Figure 25 - Typical Diffuser and Flow

Figure 26 - Typical Diffuser

Figure 27 - Capped Diffuser (one of last 6)

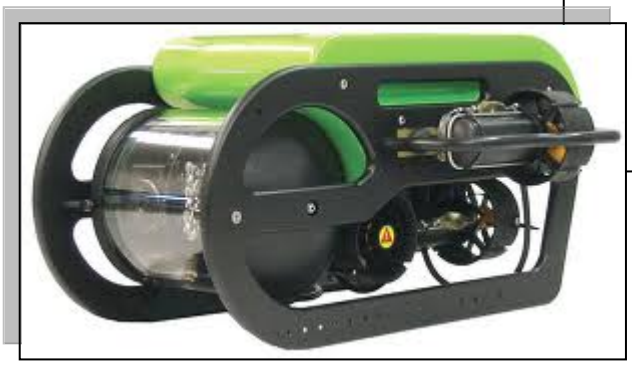
Figure 28 - Capped Diffuser Closest to the Shore

ROV System: Seabotix LBV 600-6

The LBV is an inspection class vehicle. The depth rating is 2000 feet and is equipped with dual video cameras (one color, one ultra low-lux) auto heading and depth, and is also highly reliable. All video is recorded to DVD or DVR.

The Seabotix LBV600-6 ROV outfitted with the following sensors/equipment:

- Color Video Camera
- Black and White Video Camera
- High Intensity Lighting
- Dual Imaging Sonar)



Voice 206-782-6750 Fax 360-993-5581 Visit us on the Web: www.ballarddiving.com

Reference: Data Key

Data Provided in Pictures:

- Top Row Left to Right: Vertical Thrust Gain, Magnetic Heading, Camera Angle and Date
- Bottom Row Left to Right: Horizontal Thrust Gain, External Lights, Depth in Feet, Water Temperature and Time

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Appendix 1 – Inspection Notes

Internal 3100' Inspection with Crawler

Date	Time	Tether	Sonar	Notes
18-May-11	0:39:56	0		LBV In water
18-May-11	0:40:00	0		Can't pass initial location
18-May-11	1:33:48	24		Waiting for flow to increase to push LBV
18-May-11	1:41:46			Turn on Crawler
18-May-11	2:10:47	47		Crawler moving down pipe to push LBV
18-May-11	2:13:34	47		Crawler starting to push LBV
18-May-11	2:15:48	50		LBV hung on joint
18-May-11	2:31:04	55		LBV Free
18-May-11	2:33:44	89		LBV hung on joint
18-May-11	2:35:41	92		LBV Free
18-May-11	2:40:03	159		Circular Plug in crown
18-May-11	2:40:23	163		LBV hung on joint
18-May-11	2:41:04	163		LBV Free
18-May-11	2:49:30	305		LBV hung on joint
18-May-11	2:51:17	308		LBV Free
18-May-11	3:11:24	512		Effluent over LBV camera
18-May-11	3:12:51	531		Small debris on invert
18-May-11	3:25:06	587		Effluent under camera, crown visible
18-May-11	3:32:24	605		LBV hung on joint
18-May-11	3:42:44	610		LBV Free
18-May-11	3:43:29	610		Effluent over LBV camera
18-May-11	3:58:36	1098		LBV not moving, crawler no longer pushing (cable limit)
18-May-11	4:32:35	1100		LBV tether fouled at front of Crawler, retrieve both vehicles
18-May-11	4:56:29			Joint seal visible hanging
18-May-11	5:02:01			Debris visible caught on manipulator
18-May-11	5:03:25			Bend
18-May-11	5:04:13			Debris on invert caught debris on manipulator and removed it.
18-May-11	5:10:29			Debris on invert continues

18-May-11	5:14:44		Debris caught on manipulator
18-May-11	5:23:23	0	Crawler at Shore Vault

Internal
3100'
Inspection

Date	Time	Tether payout (ft)	Corrected Tether (ft)	Sonar #	Observation
18-May-11	21:00				Onsite
18-May-11	22:00				ROV ready and lowered into Vault at Station 1+28
18-May-11	22:12				ROV and Crawler installed in Vault
18-May-11	22:32				Debris approximately 1' inside of Pipe blocking Crawler and ROV
18-May-11	22:39	52	64		Debris passed
18-May-11	22:41:20	100	123		
18-May-11	22:42:07	200	246		
18-May-11	22:43:35	300	369		
18-May-11	22:44:30	400	492		
18-May-11	22:45:29	500	615		
18-May-11	22:54:16	670	824		
18-May-11	23:09:48	790	972		
18-May-11	23:21:50	1100	1353		
18-May-11	23:26:00			2, 3	Debris
18-May-11	23:32:00	1144	1407		Past Debris
18-May-11	23:34:00				Thruster check - clear of debris
18-May-11	23:35:20	1230	1513		
18-May-11	23:43:00	1485	1827		
18-May-11	23:47:00	1600	1968		
18-May-11	23:57:00	1847	2272		
18-May-11	23:59:27	1900	2337		
19-May-11	0:02:50	2000	2460		About 1" debris in the invert
19-May-11	0:08:30	2140	2633		
19-May-11	0:15:00	2280	2805		No more debris in invert
19-May-11	0:16:30	2331	2868		Debris in invert

19-May-11	0:20:10	2380	2928	4	
19-May-11	0:25:26	2382	2930	5	Debris in invert
19-May-11	0:42:00	2576	3169		Actual tether length 3169', end of tether
19-May-11					Return inspection
19-May-11	1:10:00	3169		6	
19-May-11	1:13:03	3100		7	
19-May-11	1:23:46	3000		8	
19-May-11					Restart Run
19-May-11	2:01:00	3169		9	Inspect from end of tether to Vault
19-May-11	2:04:30	3100		10	
19-May-11	2:07:00	3000		11	
19-May-11	2:09:41	2900		12	Hazard at 2960
19-May-11	2:12:08	2800		13	
19-May-11	2:14:38	2700		14	
19-May-11	2:17:30	2600		15	
19-May-11	2:19:41	2500		16	
19-May-11	2:21:50	2400		17	
19-May-11	2:24:27	2300		18	
19-May-11	2:27:14	2200		19	
19-May-11	2:30:14	2100		20	
19-May-11	2:33:25	2000		21	
19-May-11	2:36:23	1900		22	
19-May-11	2:42:24	1800		23	
19-May-11	2:44:40	1700		24	
19-May-11	2:46:51	1600		25, 26	
19-May-11	2:53:08	1500		27	
19-May-11	2:55:30	1400		28, 29	
19-May-11	2:58:30	1300		30	Better effluent clarity
19-May-11	3:00:46				Debris on invert
19-May-11	3:06:07				Seal detached from crown
19-May-11	3:07:23	1200		31	
19-May-11	3:11:00	1100		33	
19-May-11	3:11:07				Seal missing
19-May-11	3:11:54	1068			Joint seal loose 11 o'clock

19-May-11	3:15:00			Joint seal folded back on itself 8 o'clock to 3 o'clock
19-May-11	3:16:35	1050		Debris on bottom of the pipe for about 70'
19-May-11	3:17:42	1000	34	
19-May-11	3:20:10	1000		Debris on bottom of pipe
19-May-11	3:21:43			Circular plug in crown
19-May-11	3:22:00	975		Marine growth
19-May-11	3:26:00	934		Joint seal with debris
19-May-11	3:26:22	925		Debris and seal
19-May-11	3:27:06	900	35	
19-May-11	3:30:00	815		Air Gap starts
19-May-11	3:30:06	800	36	
19-May-11	3:33:25	700	37	
19-May-11	3:33:30	700		Debris in invert for last 25'
19-May-11	3:34:00	675		Debris on invert
19-May-11	3:37:00	625		Possible tie in on crown for water treatment plant
19-May-11	3:35:00	600	38	
19-May-11	3:38:00	550		Debris for last 50'
19-May-11	3:41:00	500		Pipe not full of effluent
19-May-11	3:42:49	400		
19-May-11	3:45:00	300		
19-May-11	3:47:10	200		
19-May-11	3:53:00	3		"T" intersection
19-May-11	4:00:00	1		Vault at Station 1+28

Internal full length Inspection

Date	Time	Tether	Disk	Sonar	Notes
30-Sep-11	22:46:00	0	1		ROV in vault
30-Sep-11	22:41:29	3	1		ROV pushed by plant personnel to first joint 3' past "T"
30-Sep-11	22:44:53		1		Plant personnel out of vault
30-Sep-11	22:47:42		1		Plant started flow into outfall
30-Sep-11	22:51:38		1		2600 GPM
30-Sep-11	22:53:23		1		ROV moving with assistance of effluent flow
30-Sep-11	22:53:49	51	1		
30-Sep-11	22:54:12	75	1		
30-Sep-11	22:54:53	150	1		
30-Sep-11	22:55:15	200	1		
30-Sep-11	22:55:30	225	1		
30-Sep-11	22:56:10	300	1		Pipe half full, 800gpm
30-Sep-11	22:59:57	383	1		Pipe mostly full
30-Sep-11	23:06:30	460	1		
30-Sep-11	23:07:00	500	1		
30-Sep-11	23:07:30	550	1		
30-Sep-11	23:07:59	600	1		
30-Sep-11	23:08:25	650	1		
30-Sep-11	23:08:45	700	1		
30-Sep-11	23:09:43	790	1		Stop for tether handling
30-Sep-11	23:10:15	820	1		Resume travel downstream
30-Sep-11	23:11:25	1000	1		
30-Sep-11	23:12:40	1200	1		
30-Sep-11	23:15:20	1400	1		
30-Sep-11	23:18:05	1450	1		Manage tether
30-Sep-11	23:28:20	1459	1		ROV stuck, possible joint or joint seal
30-Sep-11	23:34:45	1459	1		Resume inspection after setting bottom sheave and stopping flow, ROV caught in joint
30-Sep-11	23:38:08	1500	1		
30-Sep-11	23:39:00	1600	1		
30-Sep-11	23:39:33	1675	1		Joint - significant return on sonar

30-Sep-11	23:41:50	1850	1		
30-Sep-11	23:42:55	2000	1		
30-Sep-11	23:44:50	2250	1		End tape 1
30-Sep-11	23:45:15	2250	1		Start tape 2
30-Sep-11	23:45:59	2400	1		25' deep, water temp 64 degrees
30-Sep-11	23:47:17	2447	1		ROV not moving, hooked on joint gasket, removing about 100' of slack
1-Nov-11	0:04:00	2447	1		ROV clear, feeding tether, sonar 1 and 2 show joint, slow payout
1-Nov-11	0:24:00	2449	1	3	Slack removed, some sediment
1-Nov-11	0:26:26	2500	1		30' depth
1-Nov-11	0:28:49	2600	1		
1-Nov-11	0:31:21	2700	1		32' depth
1-Nov-11	0:34:22	2800	1		
1-Nov-11	0:36:48	2900	1		
1-Nov-11	0:39:40	3000	1		Sediment less than 2"
1-Nov-11	0:42:25	3100	1	7	possible joint
1-Nov-11	0:45:20	3200	1		41' depth - past end of 1st mobilization inspection
1-Nov-11	0:47:20	3250			End tape 2, disk 1
1-Nov-11	0:48:18	3300		10	
1-Nov-11	0:51:17	3400		11	
1-Nov-11	0:54:20	3500		12	
1-Nov-11	1:00:30	3501	2		Start tape 3, disk 2 start, resume inspection
1-Nov-11	1:06:05	3600	2	15	
1-Nov-11	1:08:45	3700	2	16	
1-Nov-11	1:10:58	3800	2	17, 20	
1-Nov-11	1:16:50	3900	2	21	
1-Nov-11	1:20:39	4000	2	22	
1-Nov-11	1:24:15	4100	2	23	
1-Nov-11	1:28:06	4200	2	27	
1-Nov-11	1:33:35	4300	2	30	54' depth
1-Nov-11	1:39:45	4415	2	31	3.4 MGD
1-Nov-11	1:46:38	4550	2	32	
1-Nov-11	1:48:55	4600	2	33	Client stopping flow, leaving hydrant running
1-Nov-11	1:54:33	4700	2	34	60' depth

1-Nov-11	1:59:17	4775	2		Stop tape 3
1-Nov-11	1:59:57	4775	2		Start tape 4, resume disk 2
1-Nov-11	2:00:30	4800	2	35	
1-Nov-11	2:04:15	4900	2	36	
1-Nov-11	2:12:12	5000	2	37	
1-Nov-11	2:18:25	5100	2	38	61' depth
1-Nov-11	2:22:58	5200	2	39	
1-Nov-11	2:29:03	5310	2	40	
1-Nov-11	2:40:05	5300	2		
1-Nov-11	2:42:20	5400	2	41	
1-Nov-11	2:45:15	5500	2	42	
1-Nov-11	2:47:37	5600	2	43	
1-Nov-11	2:56:03	5800	2	44	
1-Nov-11	2:58:30	5900	2	45	
1-Nov-11	3:01:20	5900	2		Stop tape 4, stop disk 2
1-Nov-11	3:06:46	5993	3		Too much sediment to proceed
1-Nov-11	3:15:35	5970	3		Start tape 5, disk 3
1-Nov-11	3:36:17	4982	3		ROV hasn't moved from 5970, tether slack
1-Nov-11	3:37:29	4980	3		
1-Nov-11	3:46:44	4900	3		Stop tape, about 2" of sediment
1-Nov-11	3:50:46	4800	3		Start tape, resume haul back
1-Nov-11	3:58:42	4510	3		
1-Nov-11	4:03:35	4300	3		
1-Nov-11	4:08:50	4028	3		
1-Nov-11	4:17:08	3622	3		41' depth
1-Nov-11	4:20:18		3		End tape 5, start tape 6, continue disk 3
1-Nov-11	4:28:45	3192	3		
1-Nov-11	4:36:10	2957	3		
1-Nov-11	4:46:45	2400	3		24' depth, visibility improving
1-Nov-11	4:55:47	2081	3		Clear visibility
1-Nov-11	5:02:57	1725	3		
1-Nov-11	5:11:20	1107	3		
1-Nov-11	5:18:39	825	3		Start of air gap, stop tape 6, disk 3

1-Nov-11	5:23:58	768	4	Start disk 4, no tape
1-Nov-11	5:27:05	664	4	gravel pile
1-Nov-11	5:35:12	0	4	
1-Nov-11	5:38:28	-64	4	ROV in Vault
1-Nov-11	5:41:10			ROV out of the vault

External Inspection

Date	Time	Diffuser	Notes
13-Jun-11	22:46:00		Start Recording, ROV on bottom
13-Jun-11	22:47:30	1	Flowing
13-Jun-11	22:48:32	2	Flowing
13-Jun-11	22:49:13	3	Flowing
13-Jun-11	22:50:20	4	Flowing
13-Jun-11	22:51:00	5	Flowing
13-Jun-11	22:51:48	6	Flowing
13-Jun-11	22:52:30	7	Flowing
13-Jun-11	22:53:08	8	Flowing
13-Jun-11	22:53:41	9	Flowing
13-Jun-11	22:54:10	10	Flowing
13-Jun-11	22:54:47	11	Flowing
13-Jun-11	22:55:30	12	Flowing
13-Jun-11	22:56:50	13	Flowing
13-Jun-11	22:57:20	14	Flowing
13-Jun-11	22:58:05	15	Flowing
13-Jun-11	22:58:50	16	Flowing
13-Jun-11	22:59:00	17	Flowing
13-Jun-11	23:03:16	18	Flowing
13-Jun-11	23:03:51	19	Flowing
13-Jun-11	23:04:34	20	Flowing
13-Jun-11	23:05:19	21	Flowing
13-Jun-11	23:05:55	22	Flowing
13-Jun-11	23:06:41	23	Flowing
13-Jun-11	23:07:36	24	Flowing
13-Jun-11	23:08:14	25	Flowing

13-Jun-11	23:08:59	26	Flowing
13-Jun-11	23:09:30	27	Flowing
13-Jun-11	23:10:24	28	Flowing
13-Jun-11	23:10:56	29	Flowing
13-Jun-11	23:11:41	30	Flowing
13-Jun-11	23:12:10	31	Flowing
13-Jun-11	23:12:41	32	Flowing
13-Jun-11	23:13:31	33	Flowing
13-Jun-11	23:14:23	34	Flowing
13-Jun-11	23:14:55	35	Flowing
13-Jun-11	23:15:40	36	Flowing
13-Jun-11	23:16:20	37	Flowing
13-Jun-11	23:18:24	38	Flowing
13-Jun-11	23:18:50	39	Short and not flowing
13-Jun-11	23:19:30	40	Short and not flowing
13-Jun-11	23:21:02	41	Not Flowing
13-Jun-11		42	
13-Jun-11	23:22:01	43	Not Flowing
13-Jun-11	23:22:23	44	Not Flowing
13-Jun-11	23:22:55	45	Not Flowing
14-Jun-11	0:12:00		Leave Bottom, Down line set
14-Jun-11	0:24:00		Return Flight

Thank you for your business,

Please also reference video highlight film that is attached to the report.
If you have any questions or concerns please feel free to contact me anytime.

Jay Hibbard
248.705.4907 (direct)

Ryan Berg
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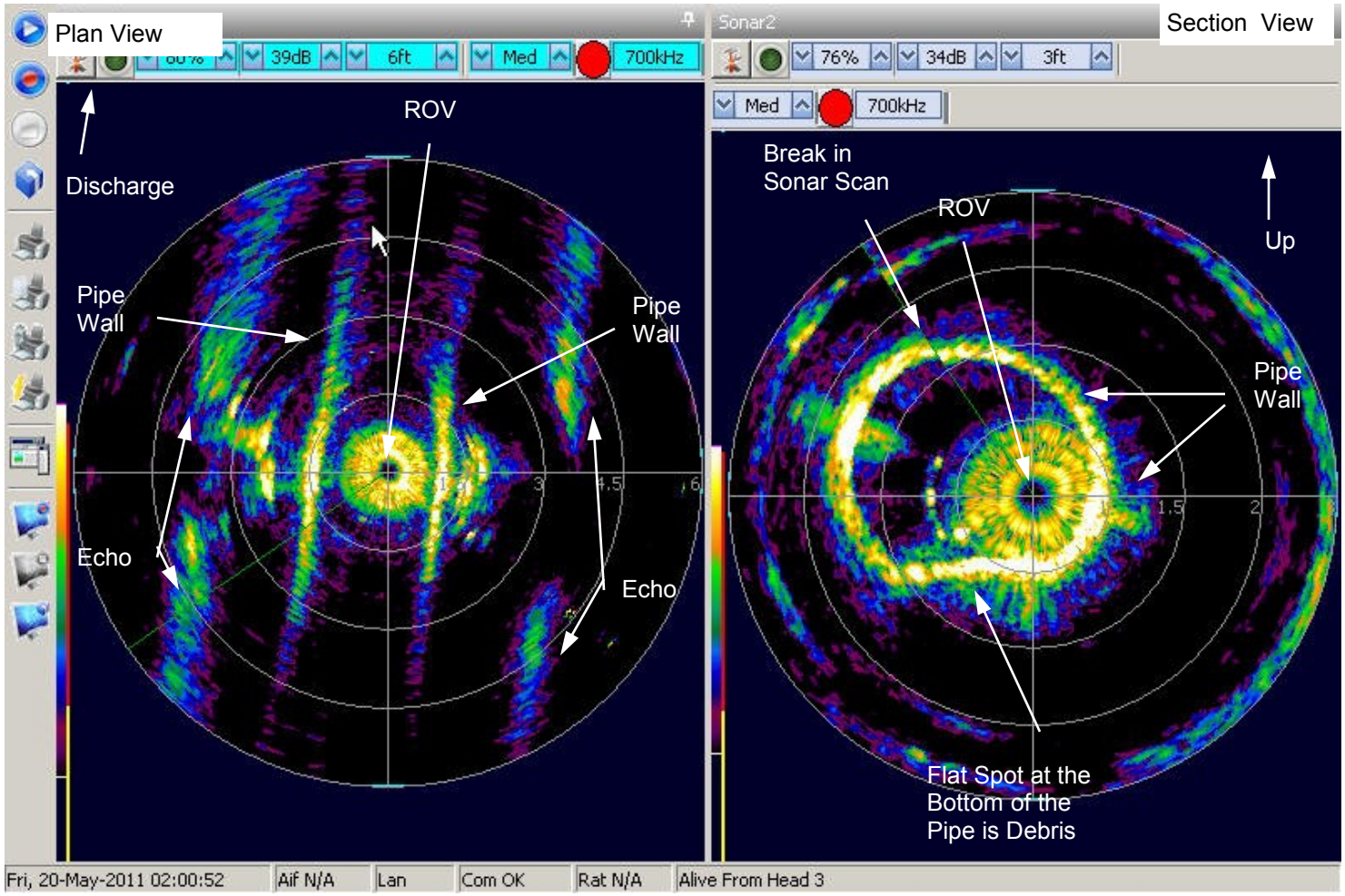
Rberg@ballarddiving.com

Appendix 2 – Sonar

Voice 206-782-6750 Fax 360-993-5581 Visit us on the Web: www.ballarddiving.com

Site: Morro Bay Waste Water Treatment Plant

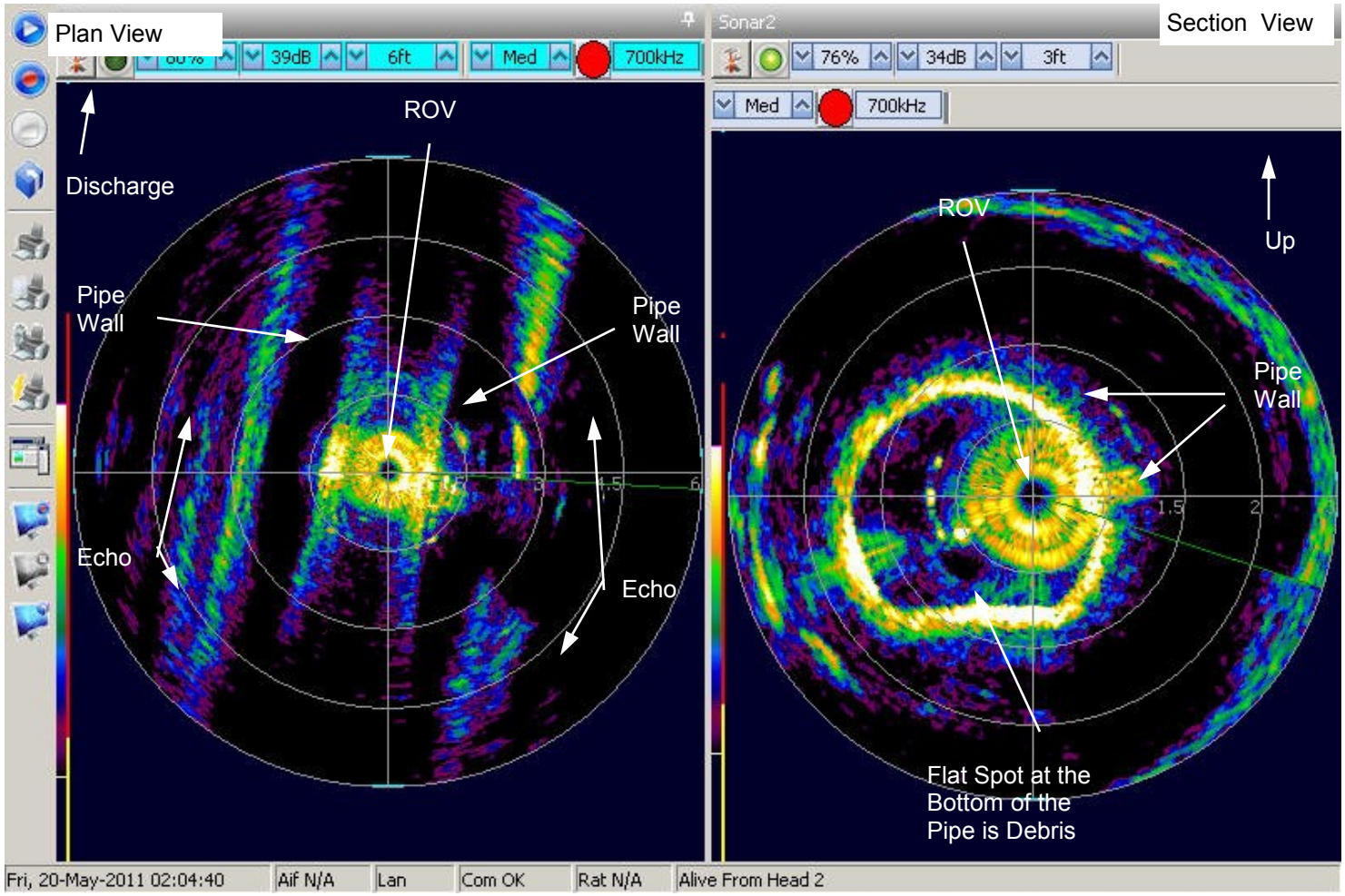
File Name: Morro009.jpg
Tether payout: 3169 feet



Notes: Left Side of image is a plan view with the ROV at the center. Upstream (down) and down-stream (up) are imaged relative to the ROV. The right half of the image is a cross section of the pipe.

Site: Morro Bay Waste Water Treatment Plant

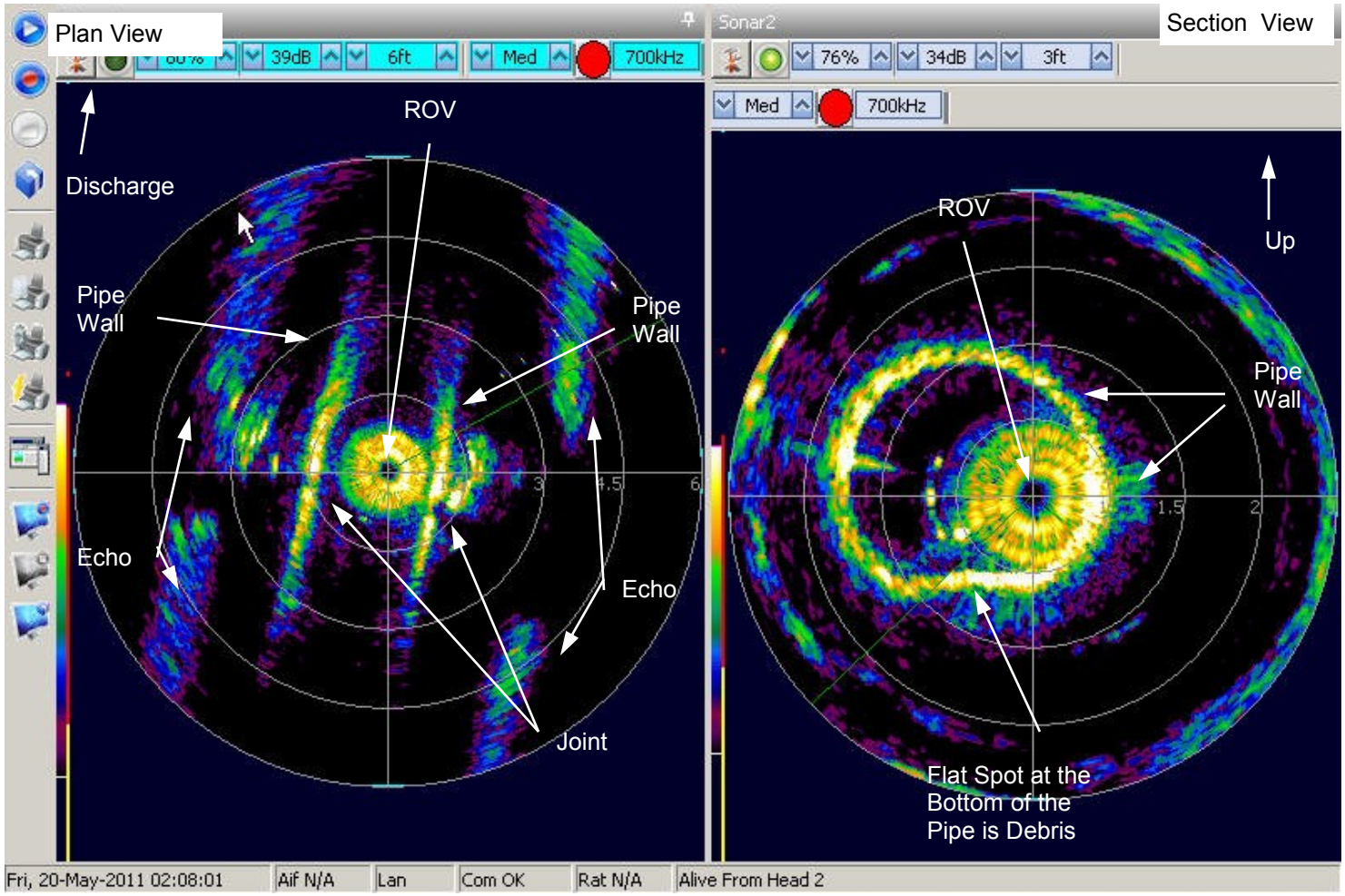
File Name: Morro010.jpg
Tether payout: 3100 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

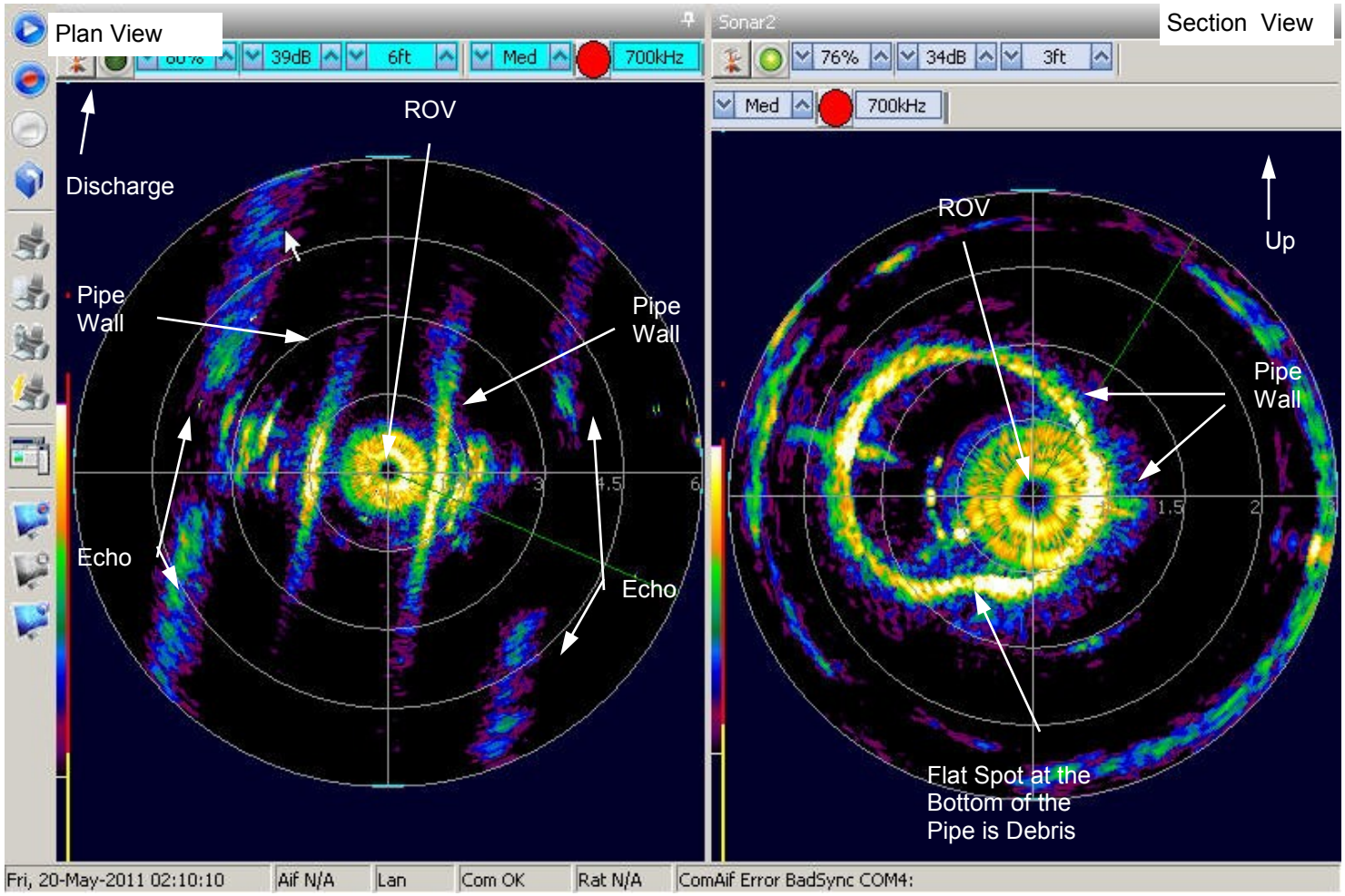
File Name: Morro011.jpg
Tether payout: 3000 feet



Notes: A joint is visible in the left plan view as a break in the line representing each wall.

Site: Morro Bay Waste Water Treatment Plant

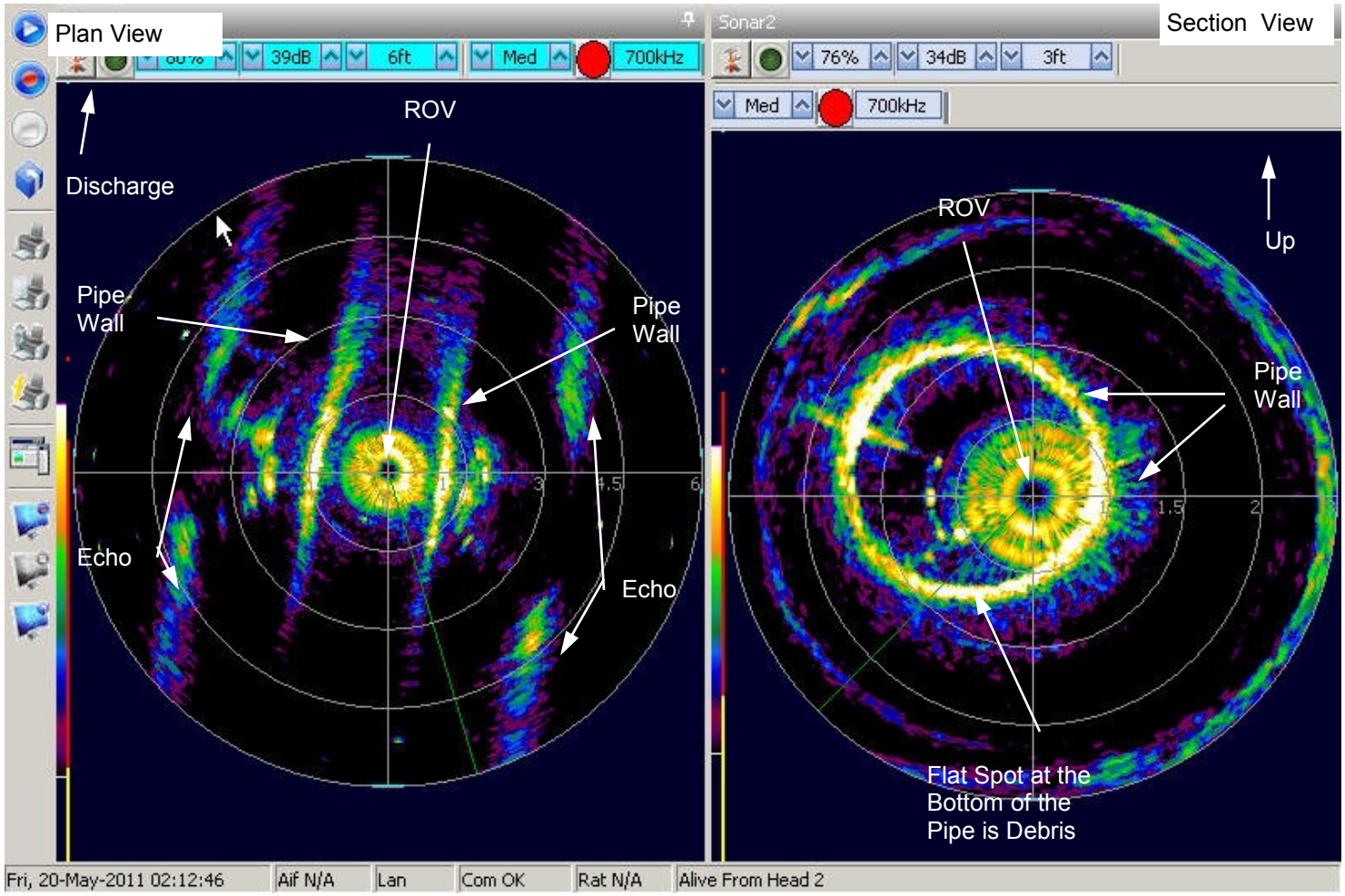
File Name: Morro012.jpg
Tether payout: 2900 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

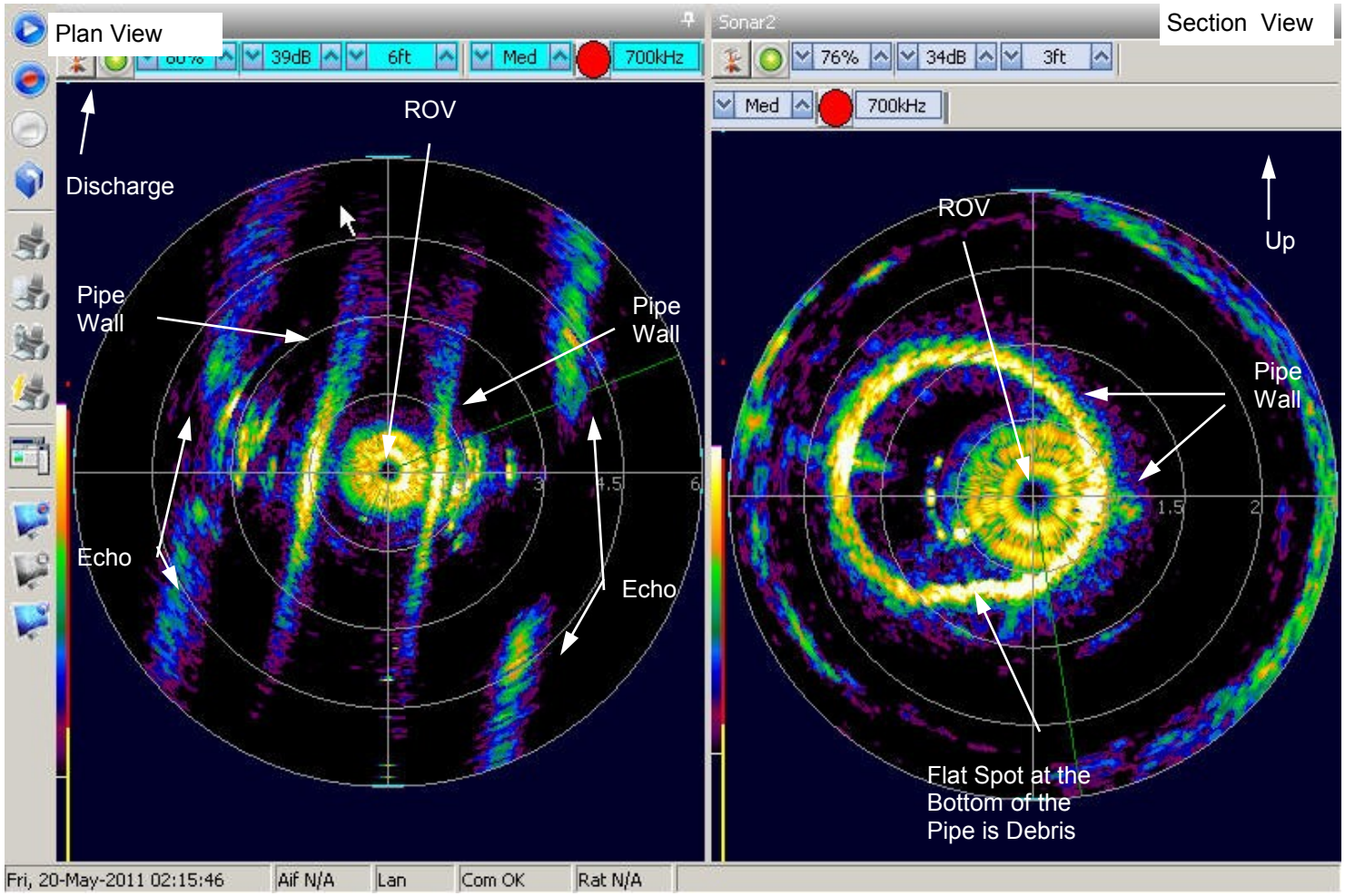
File Name: Morro013.jpg
Tether payout: 2800 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

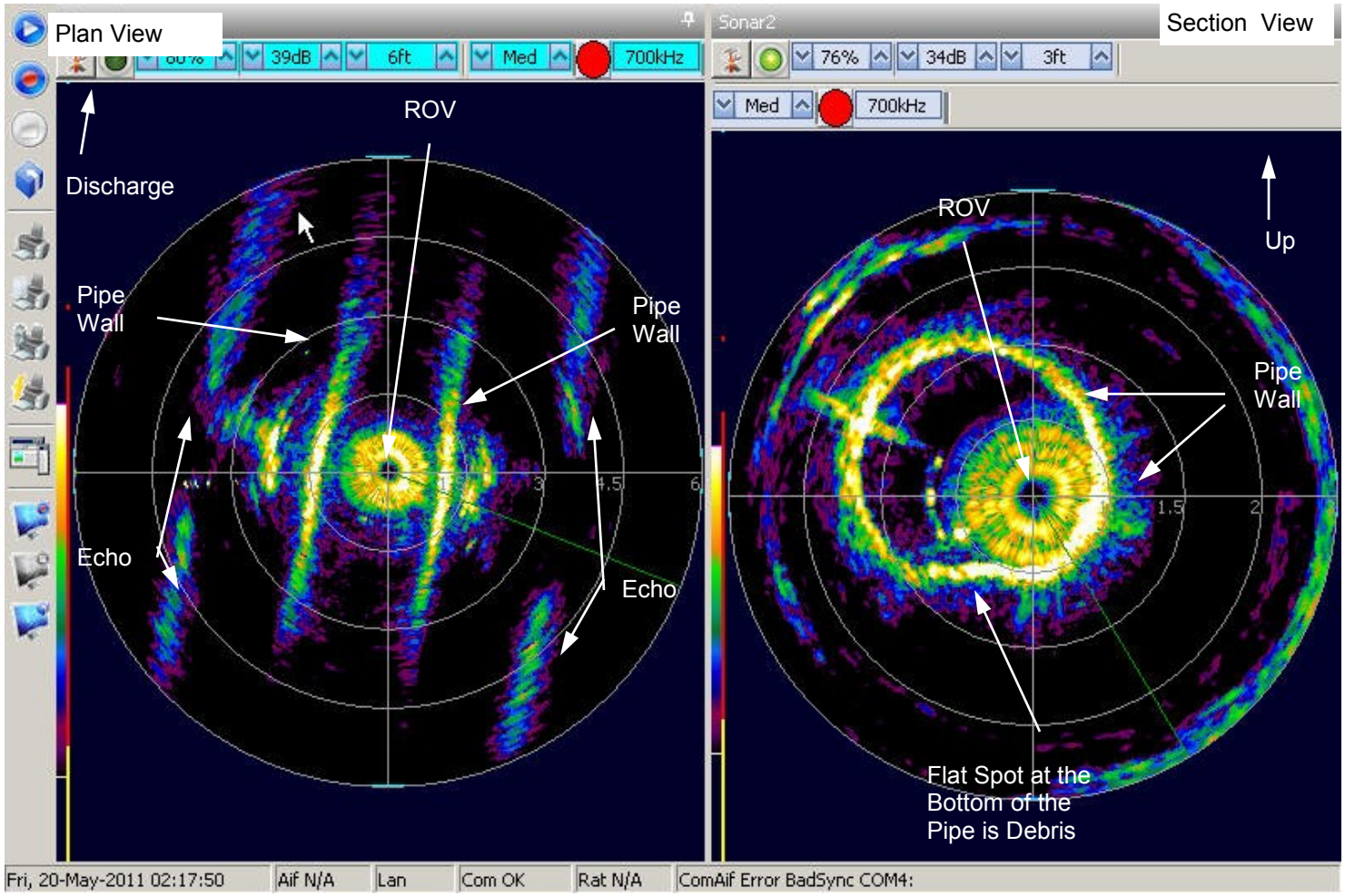
File Name: Morro014.jpg
Tether payout: 2700 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

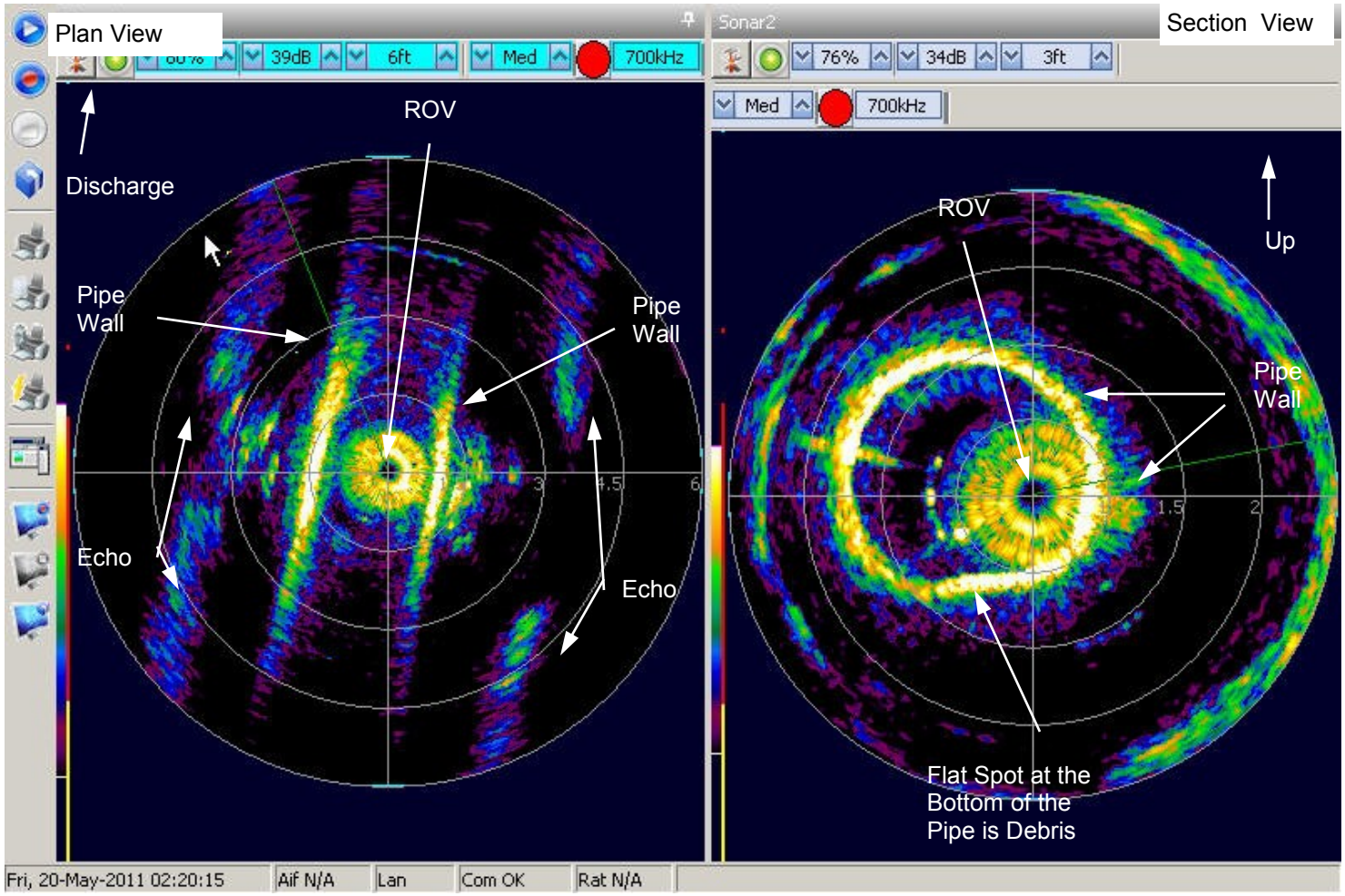
File Name: Morro015.jpg
Tether payout: 2600 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

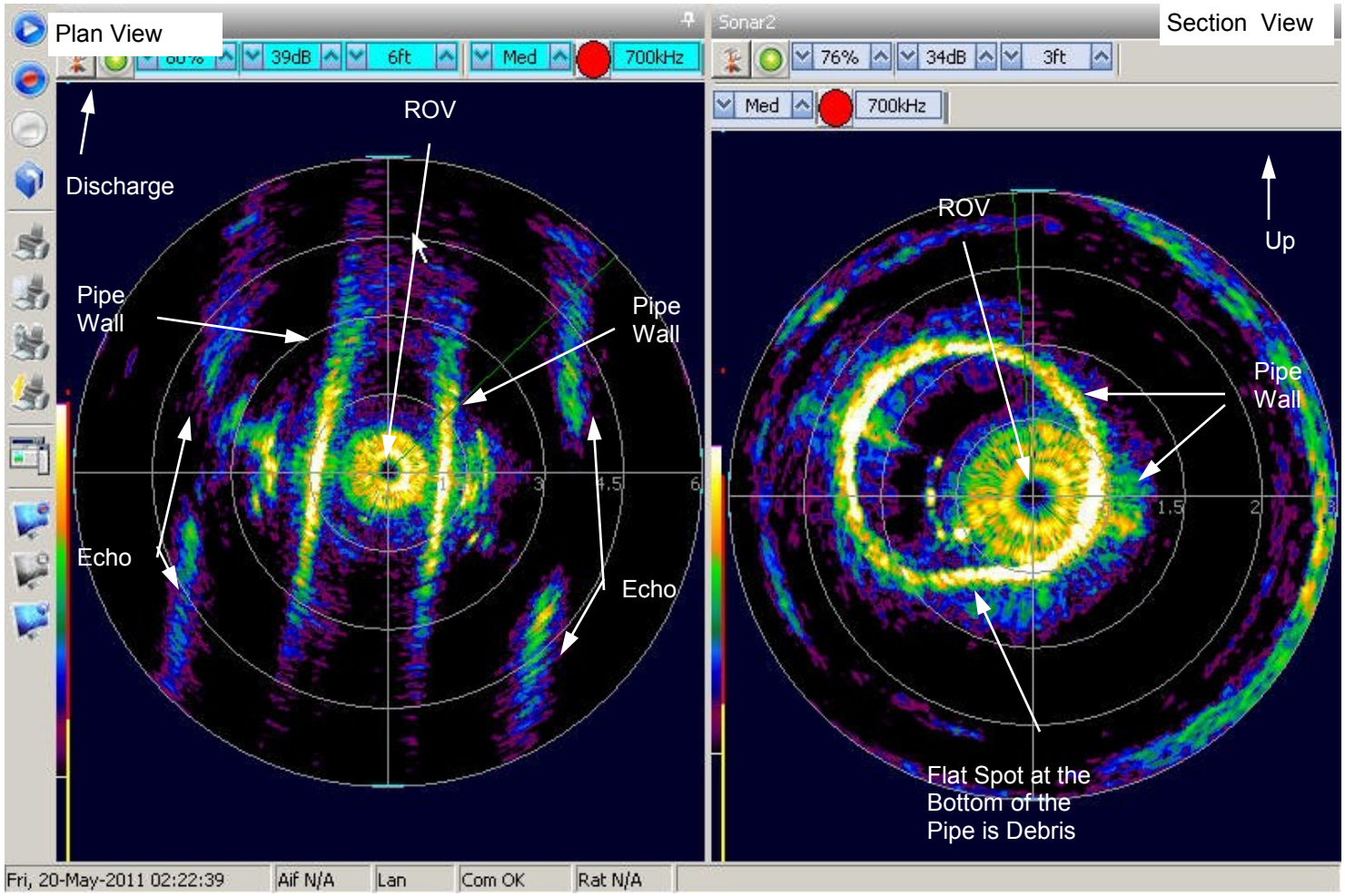
File Name: Morro016.jpg
Tether payout: 2500 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

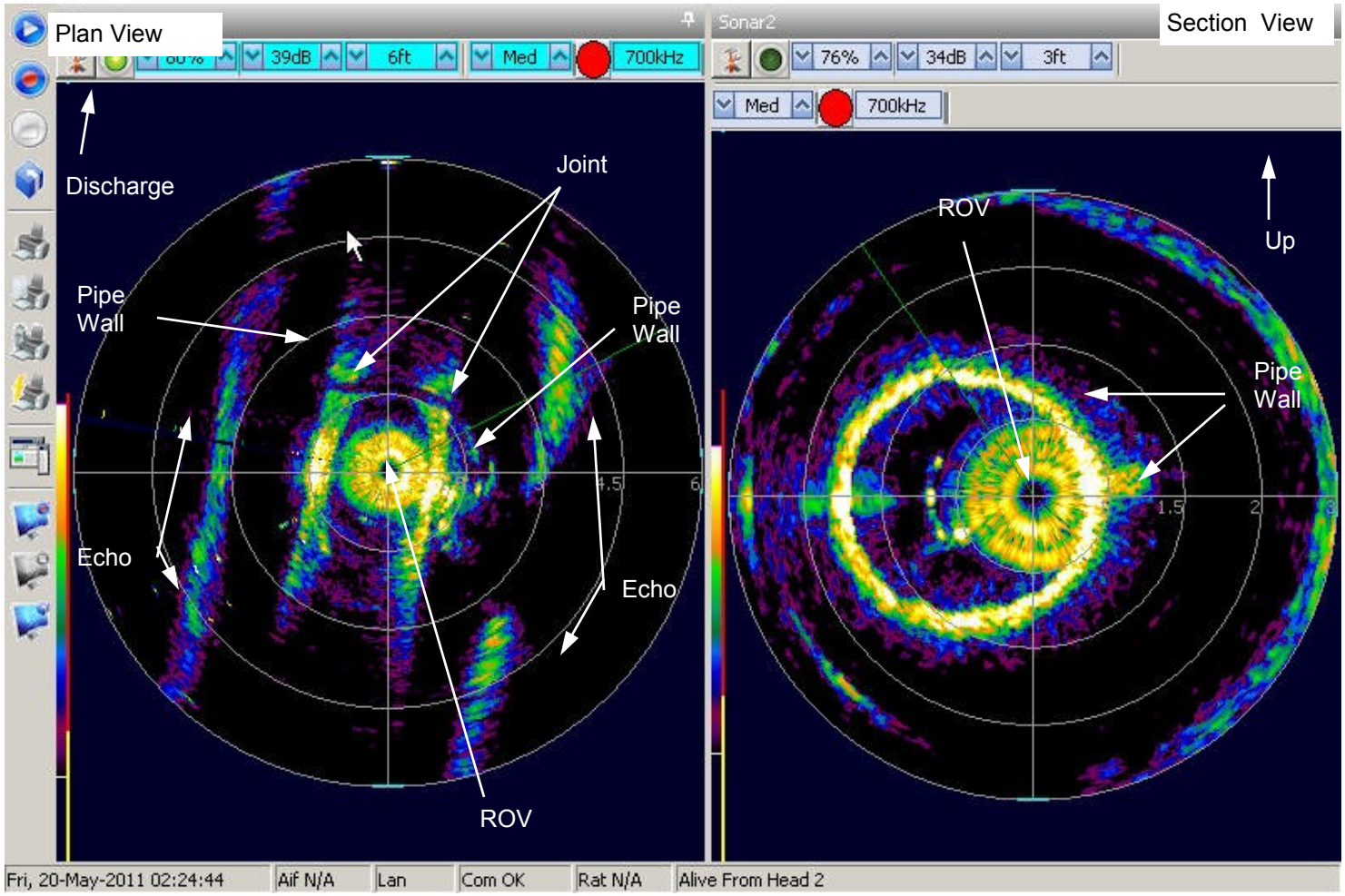
File Name: Morro017.jpg
Tether payout: 2400 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

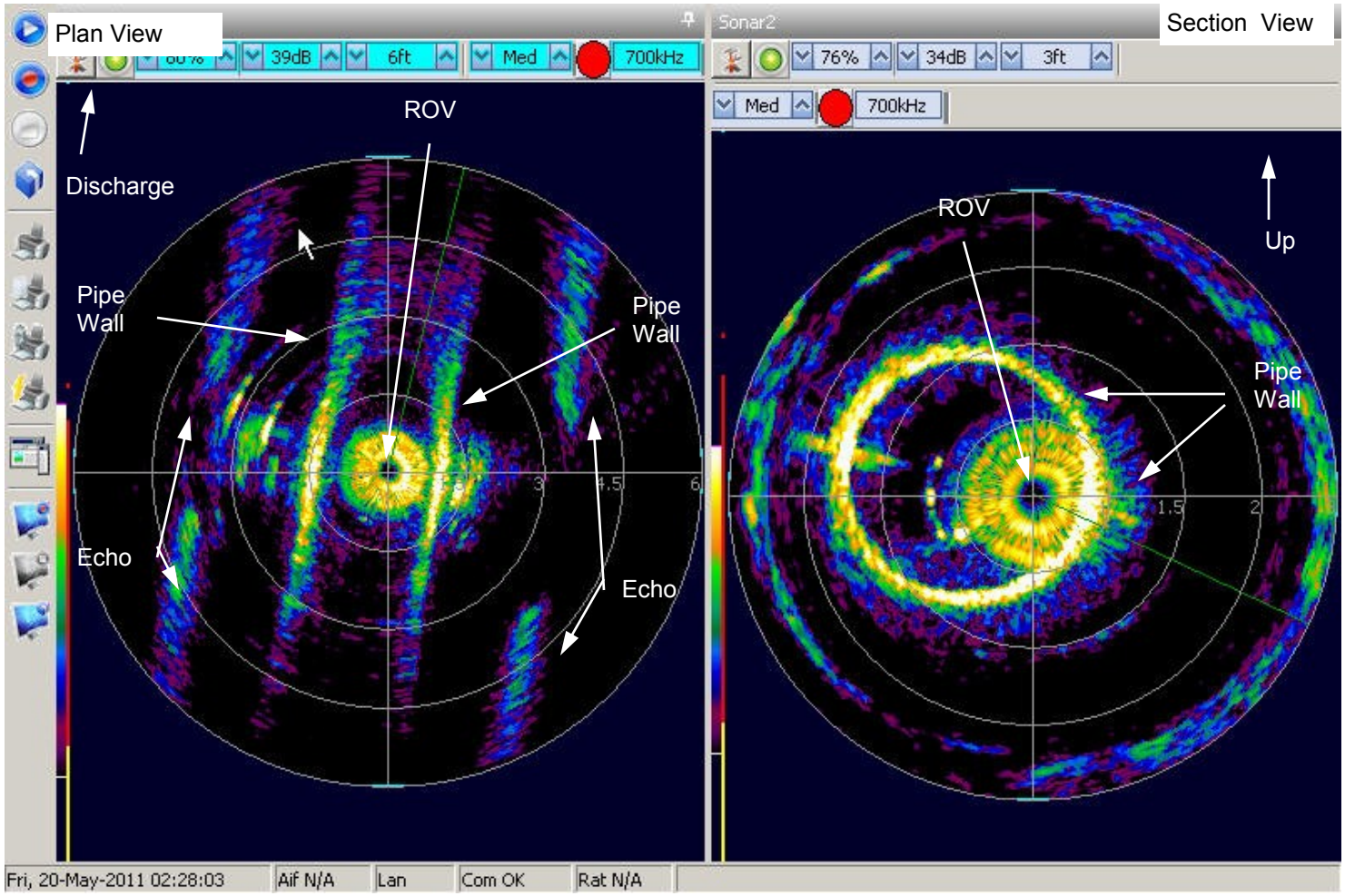
File Name: Morro018.jpg
Tether payout: 2300 feet



Notes: A joint is visible in the left plan view as a break in the line representing each wall.

Site: Morro Bay Waste Water Treatment Plant

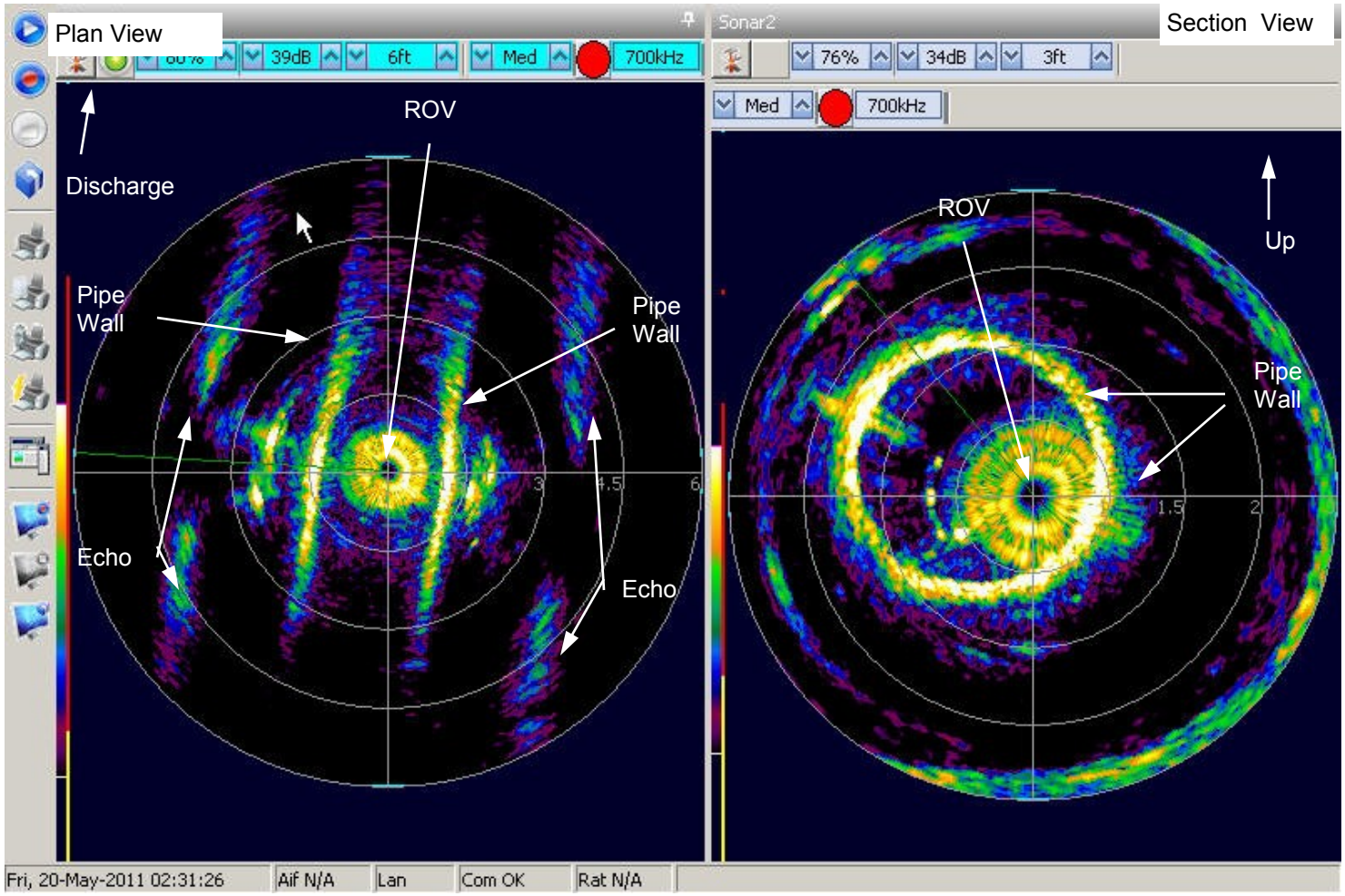
File Name: Morro019.jpg
Tether payout: 2200 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

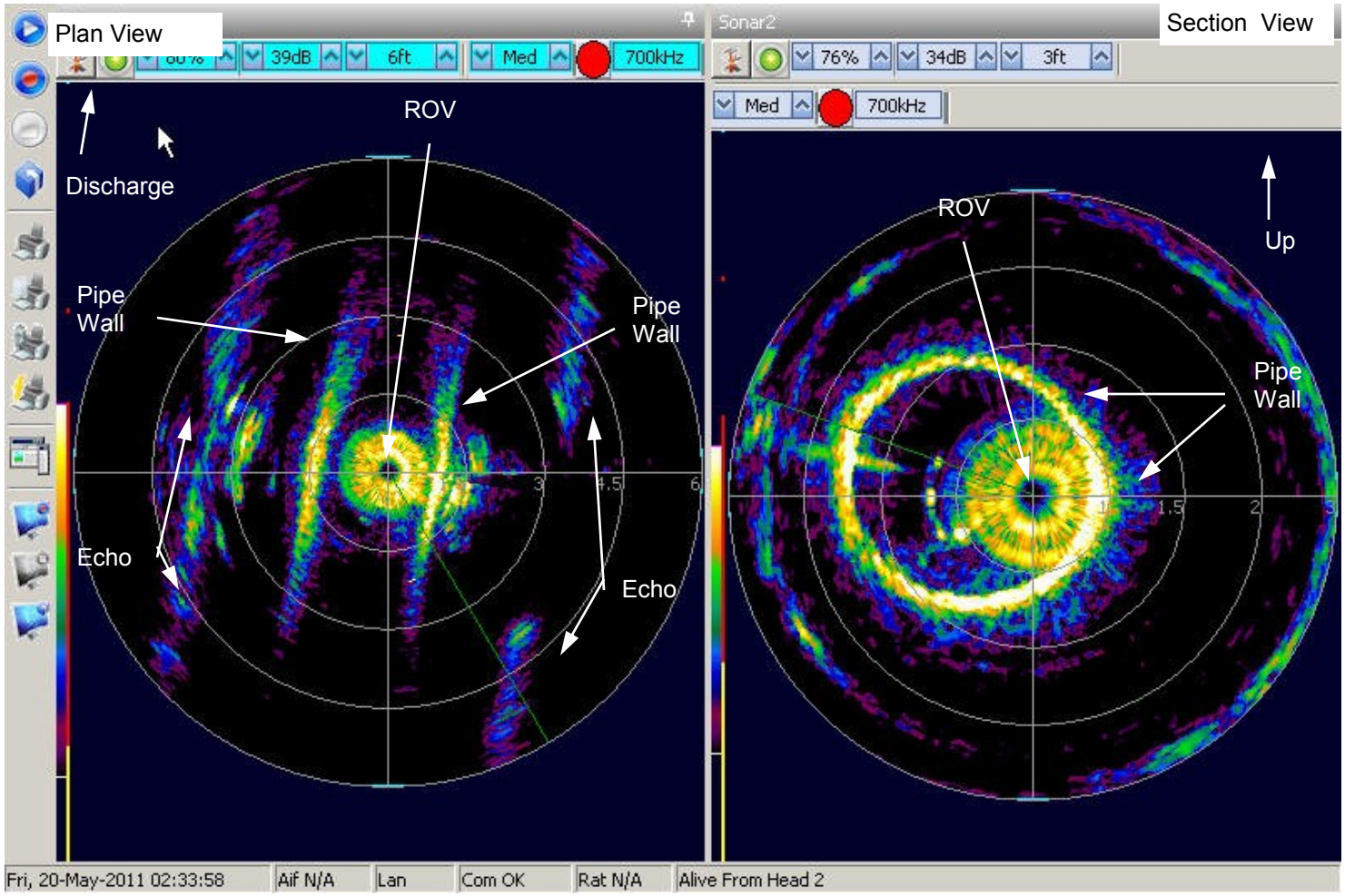
File Name: Morro020.jpg
Tether payout: 2100 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

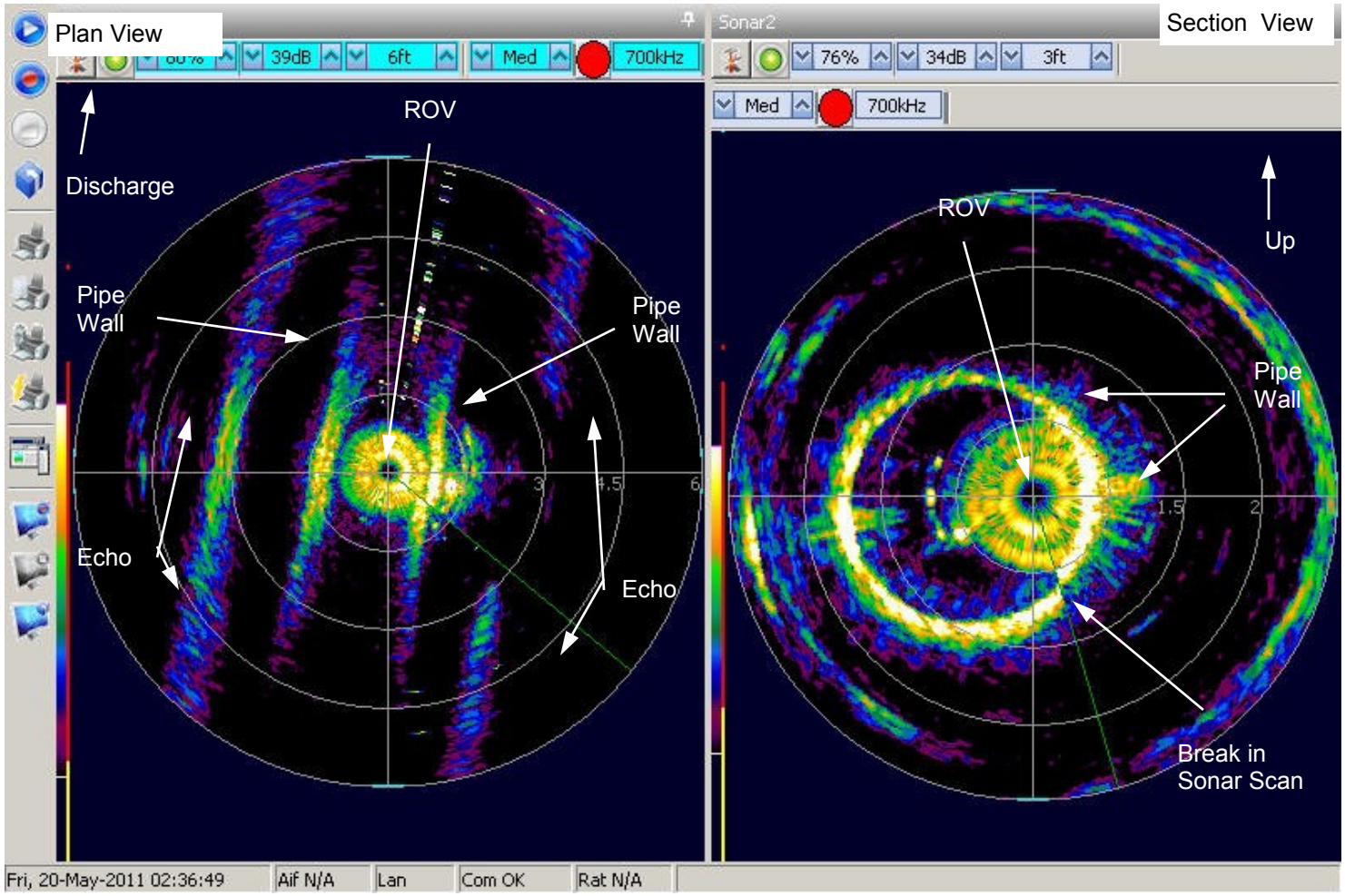
File Name: Morro021.jpg
Tether payout: 2000 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

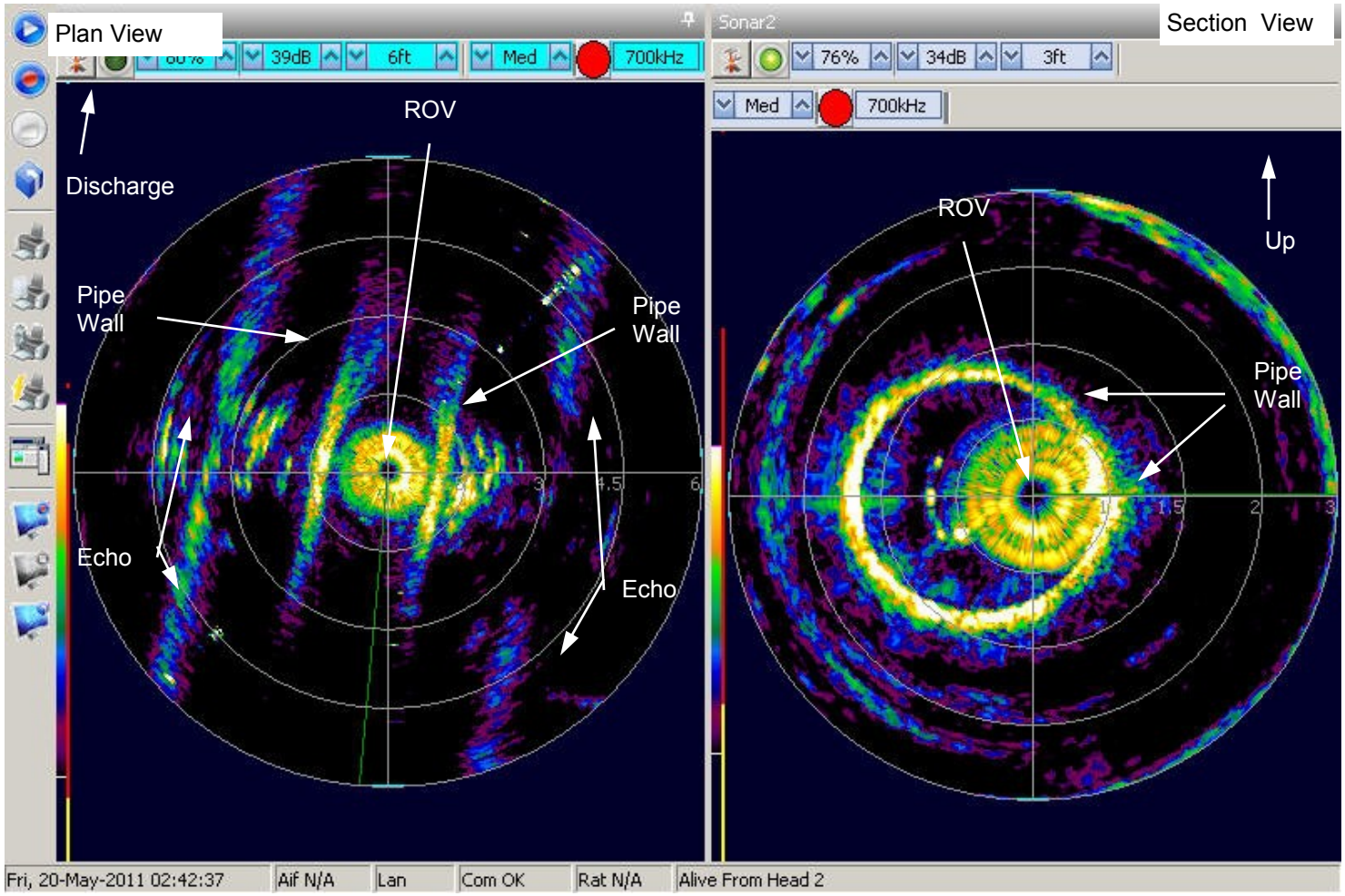
File Name: Morro022.jpg
Tether payout: 1900 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

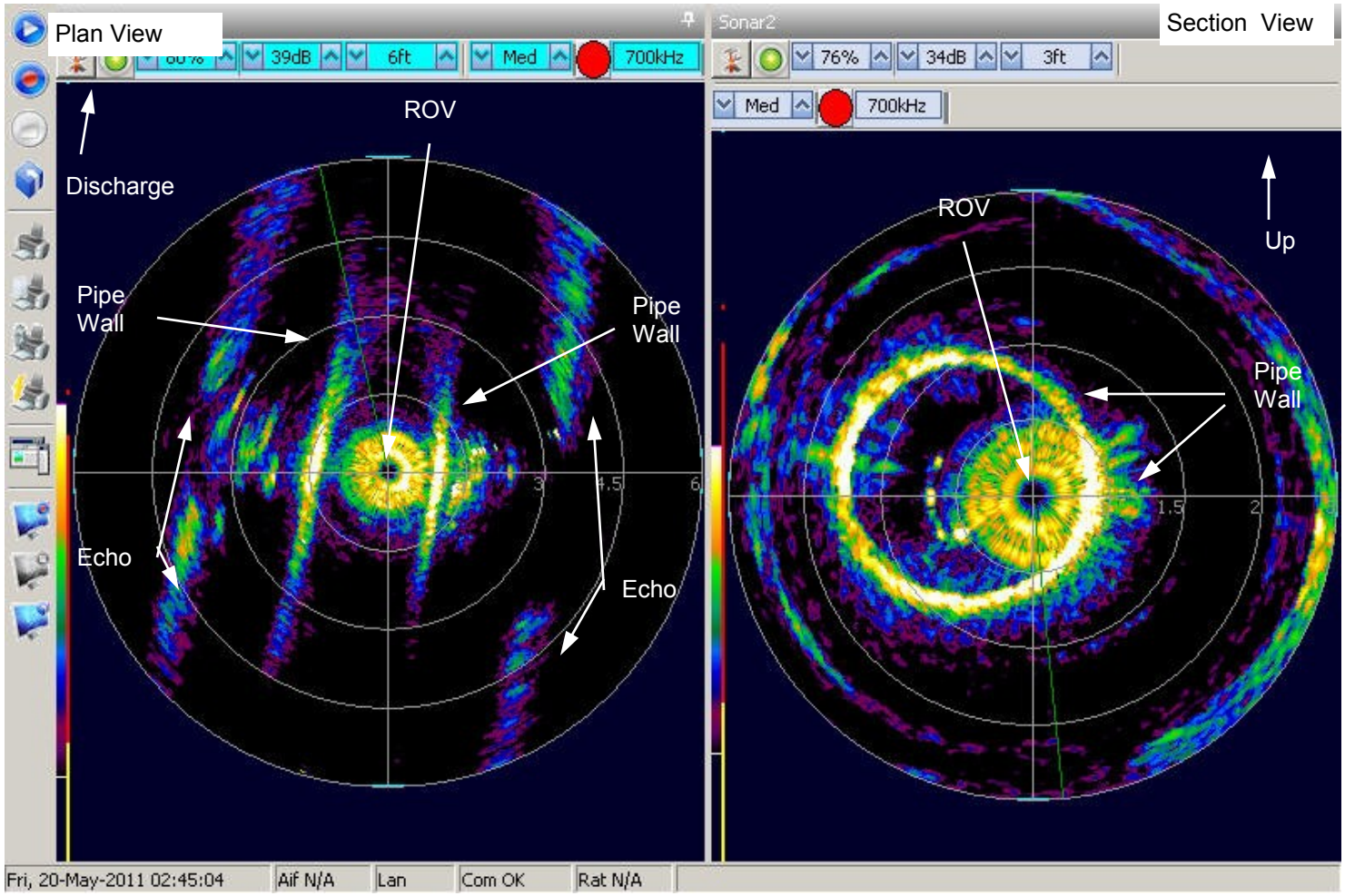
File Name: Morro023.jpg
Tether payout: 1800 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

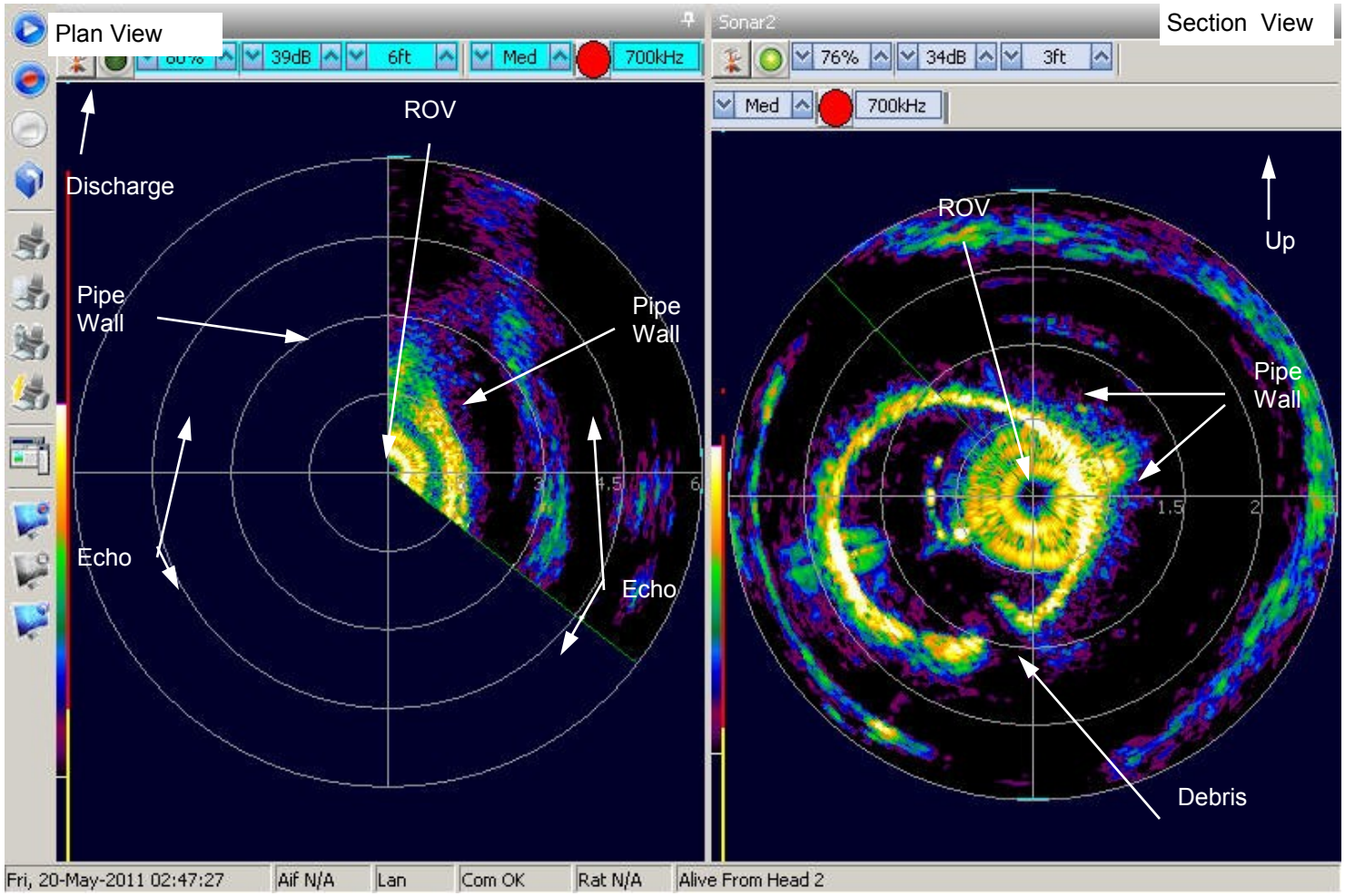
File Name: Morro024.jpg
Tether payout: 1700 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

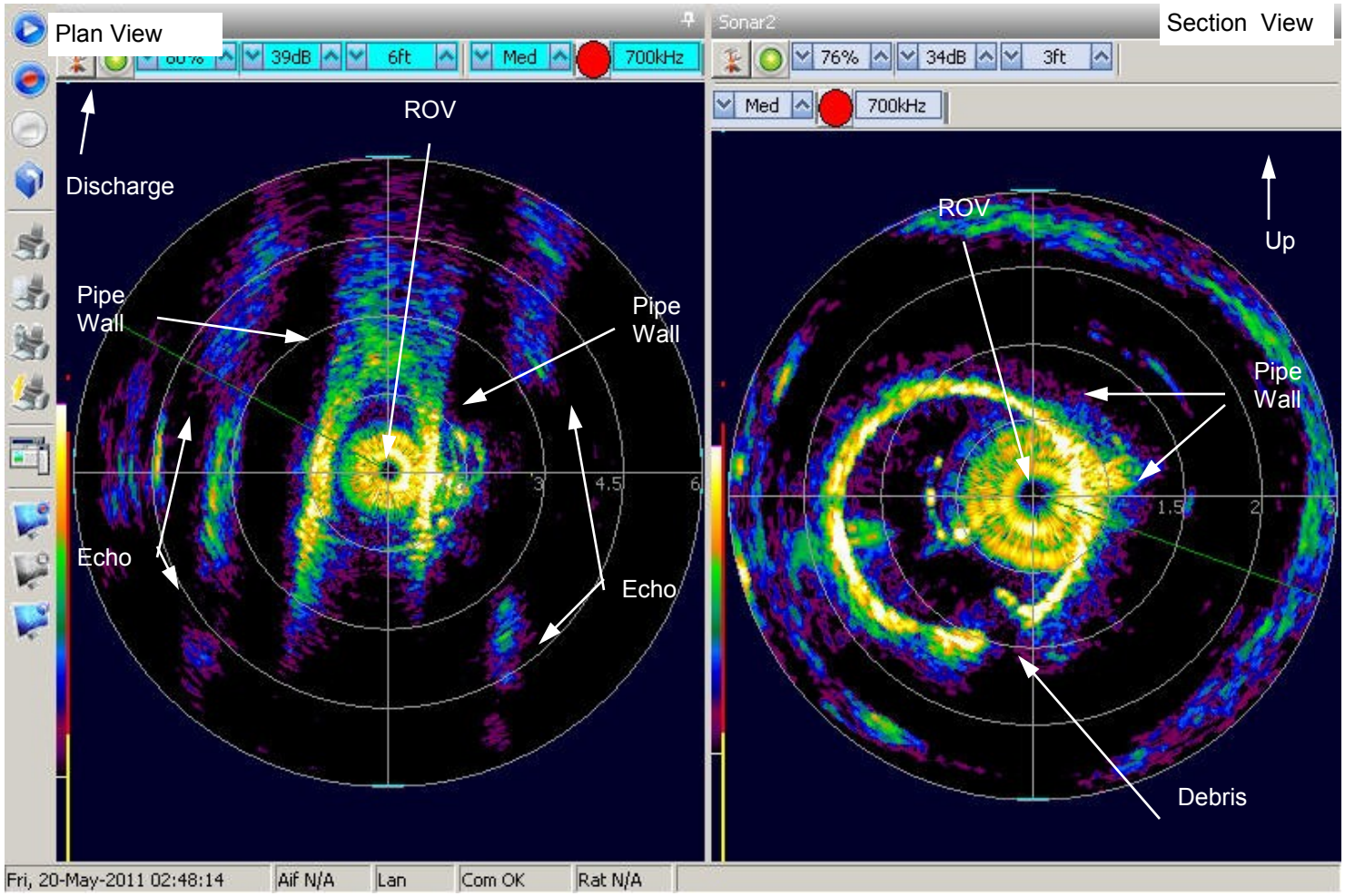
File Name: Morro025.jpg
Tether payout: 1600 feet



Notes: Large piece of debris in the invert.

Site: Morro Bay Waste Water Treatment Plant

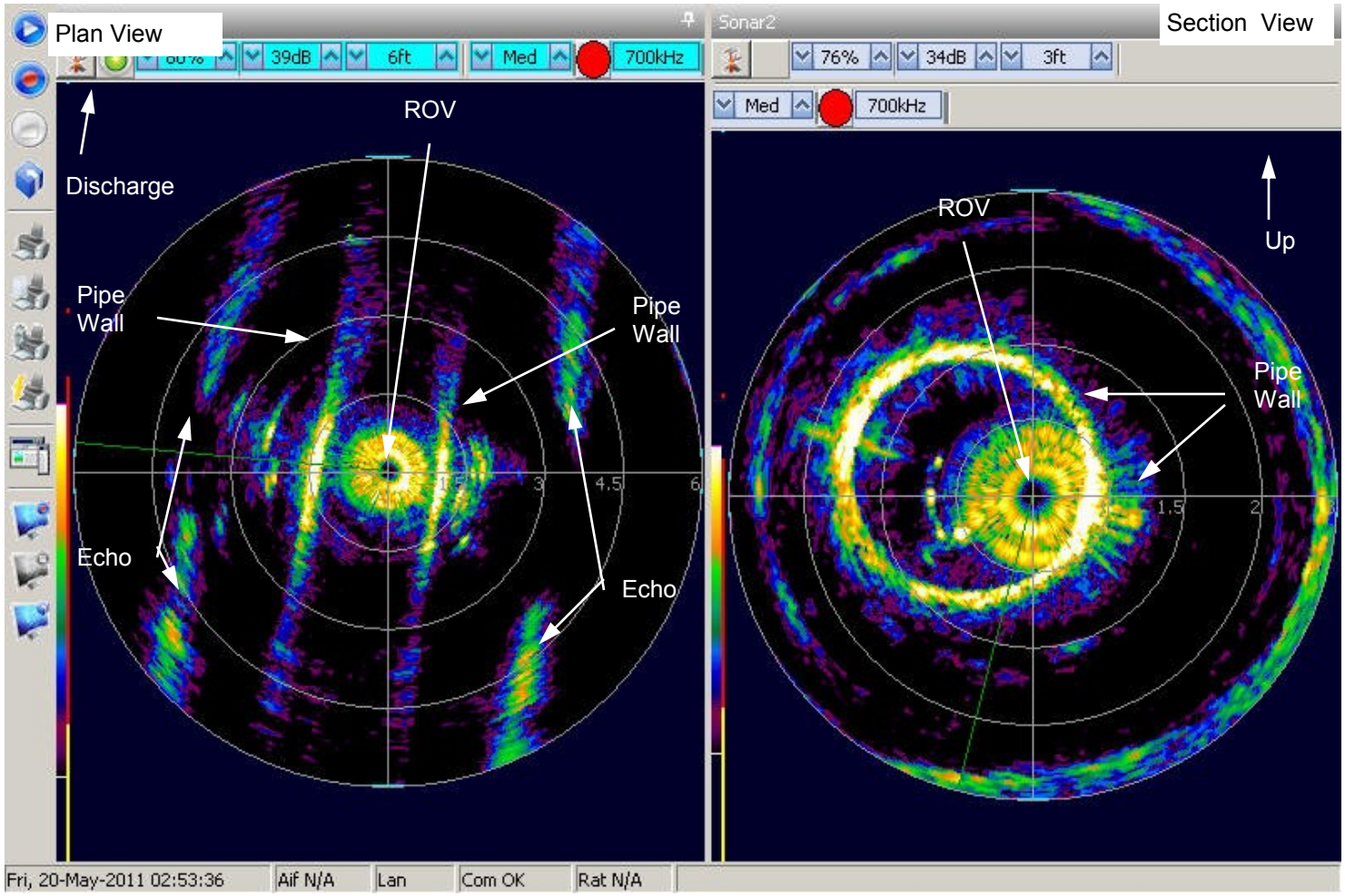
File Name: Morro026.jpg
Tether payout: 1600 feet



Notes: Large piece of debris in the invert.

Site: Morro Bay Waste Water Treatment Plant

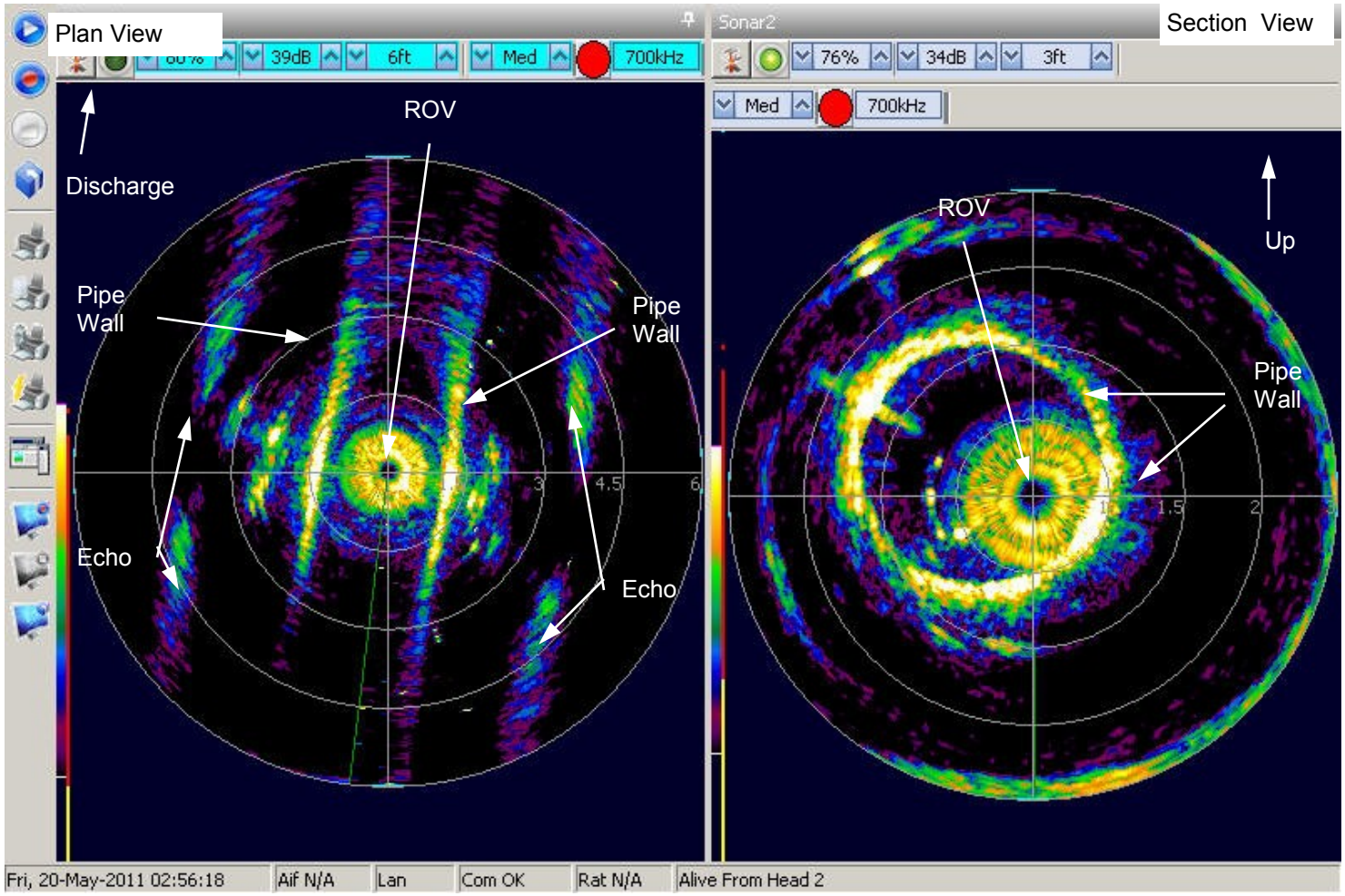
File Name: Morro027.jpg
Tether payout: 1500 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

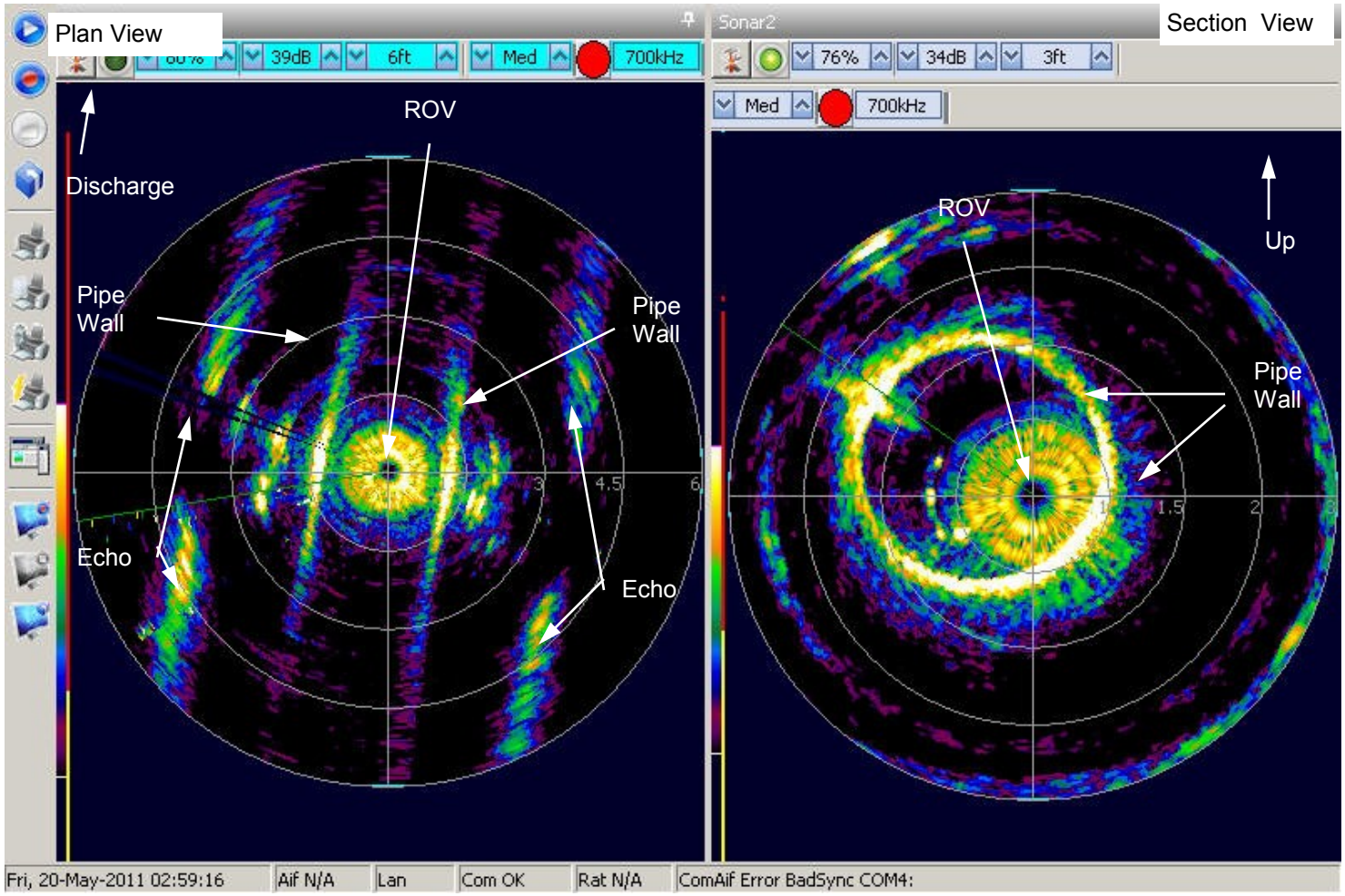
File Name: Morro029.jpg
Tether payout: 1400 feet



Notes: This plot is the same as plot 28 and at the same location.

Site: Morro Bay Waste Water Treatment Plant

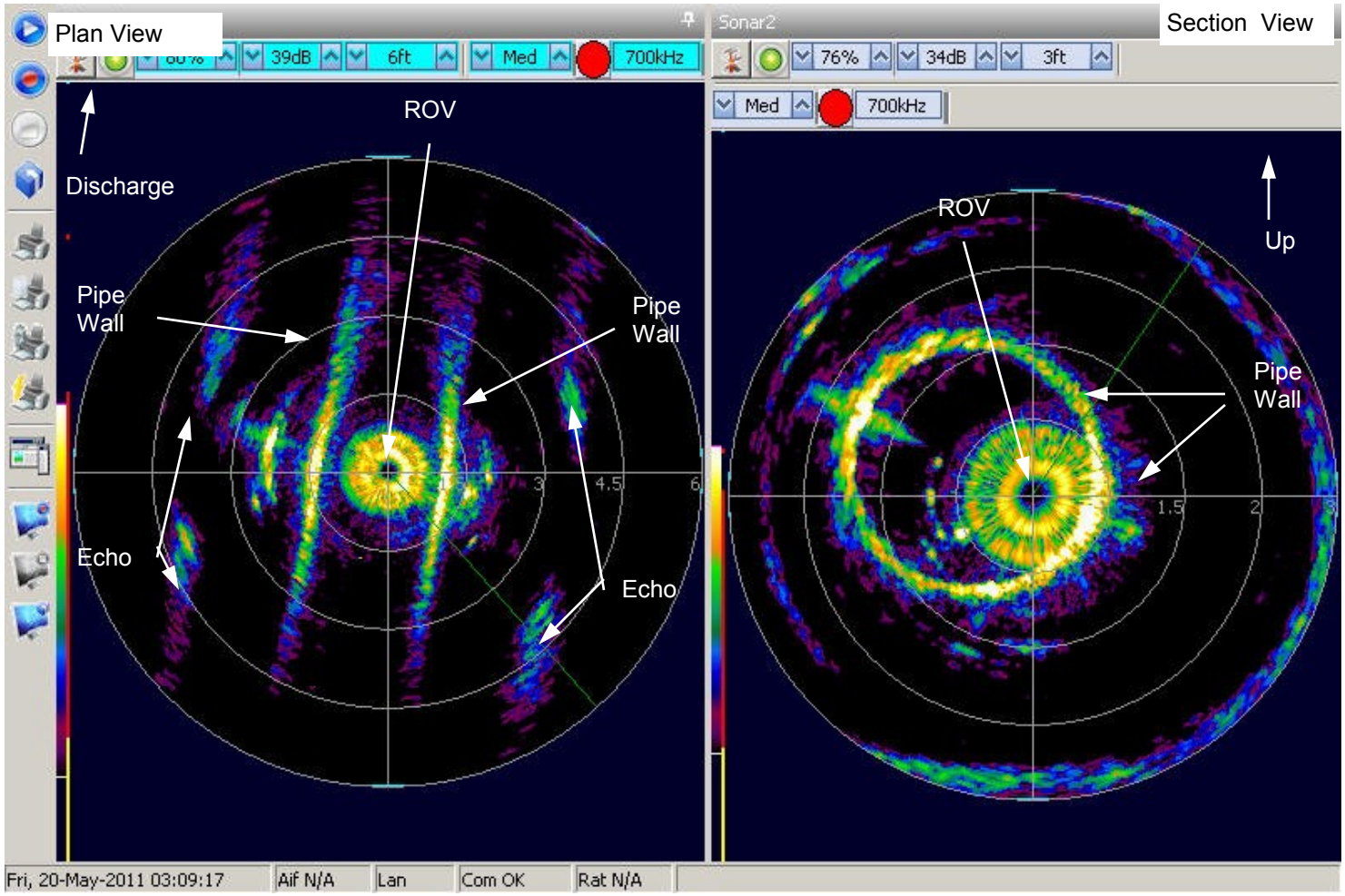
File Name: Morro030.jpg
Tether payout: 1300 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

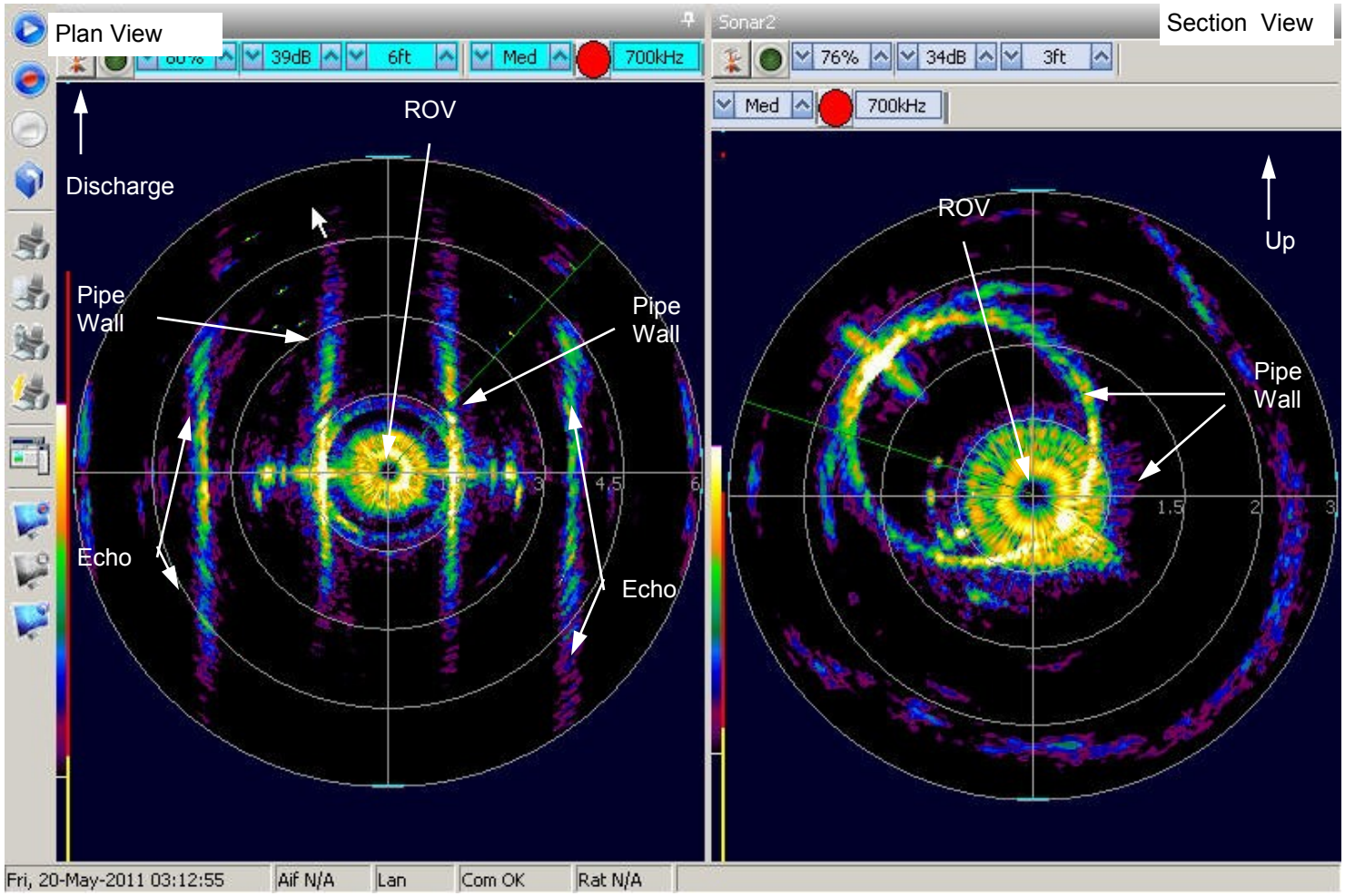
File Name: Morro031.jpg
Tether payout: 1200 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

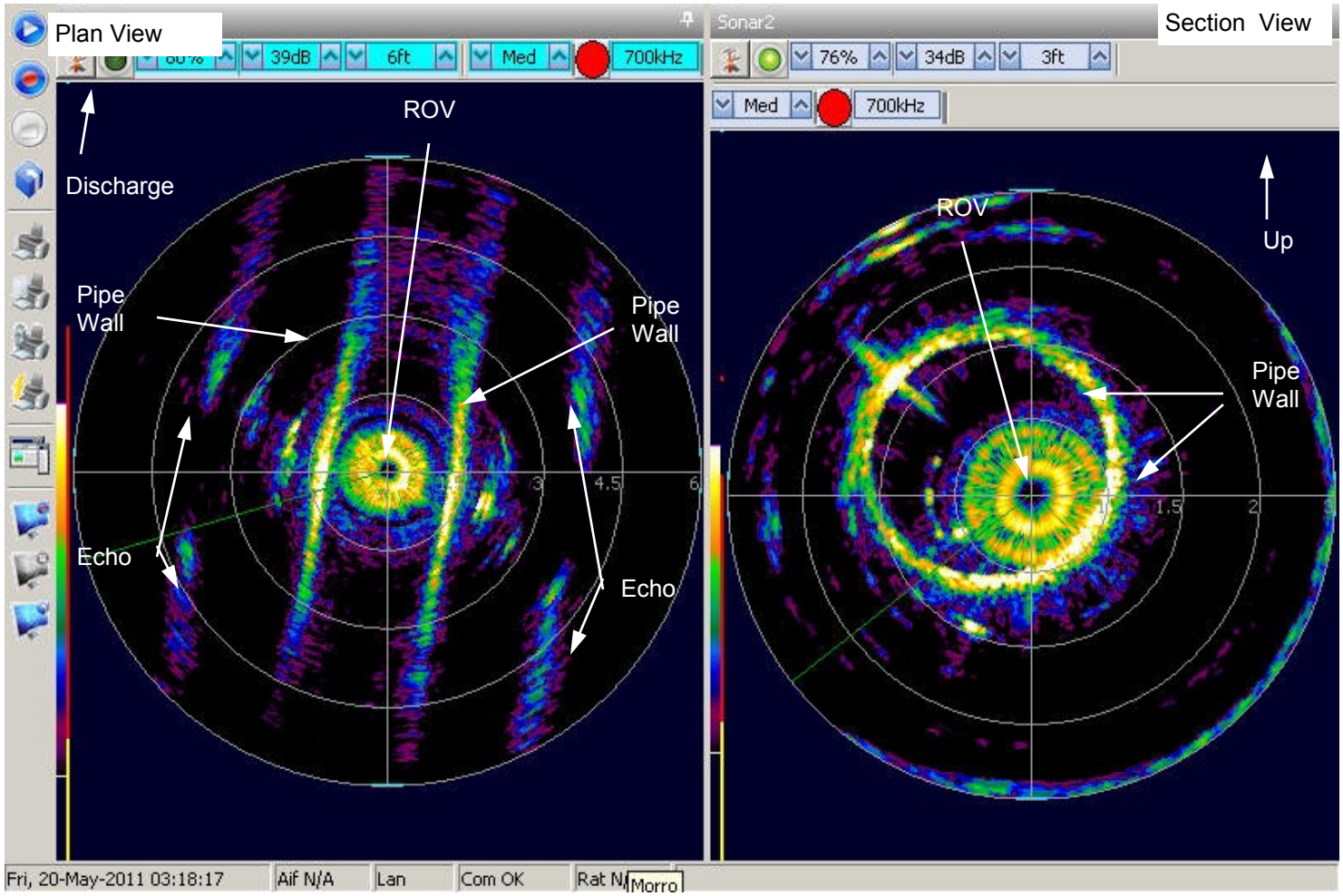
File Name: Morro033.jpg
Tether payout: 1100 feet



Notes: Plot number 32 is a duplicate

Site: Morro Bay Waste Water Treatment Plant

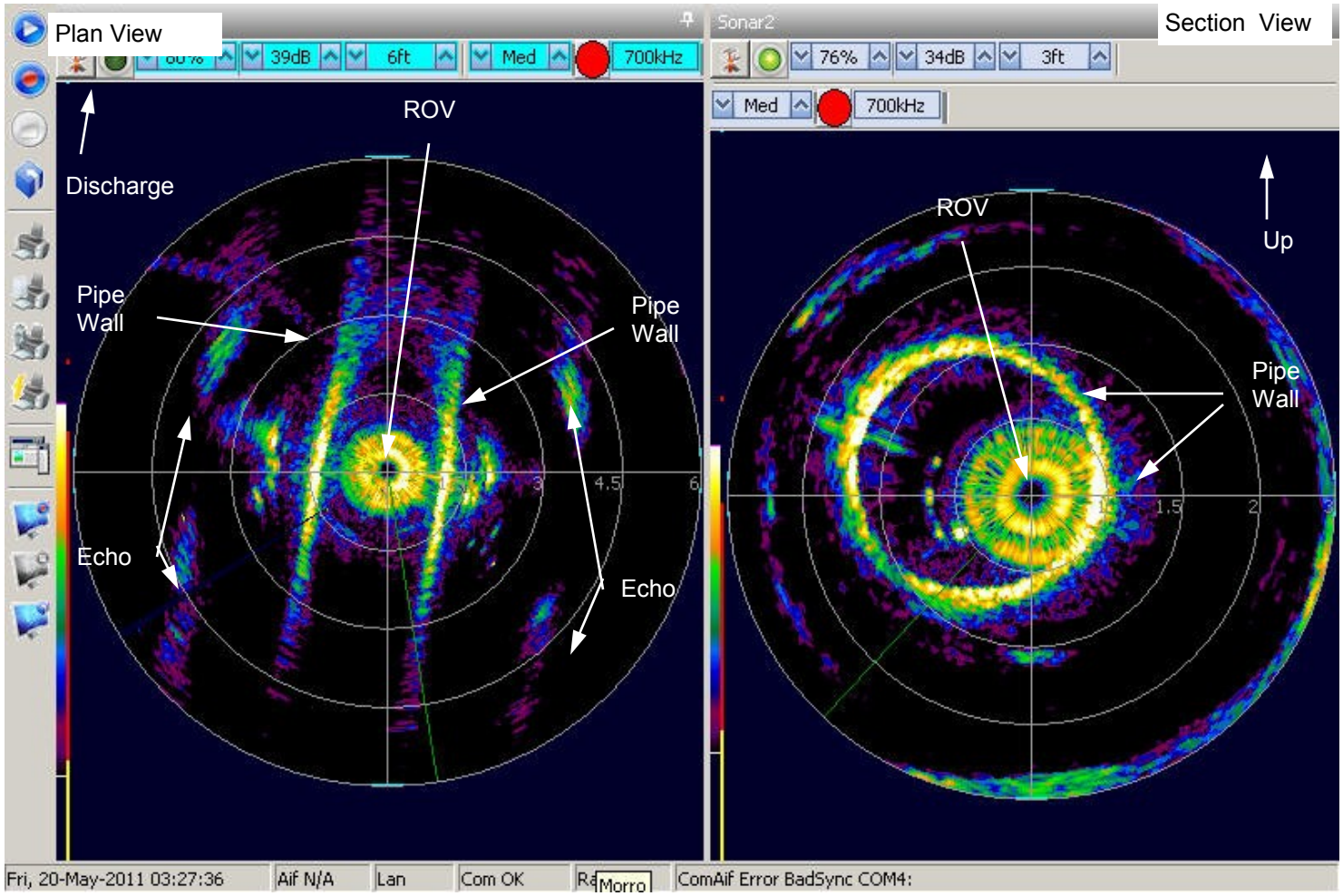
File Name: Morro034.jpg
Tether payout: 1000 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

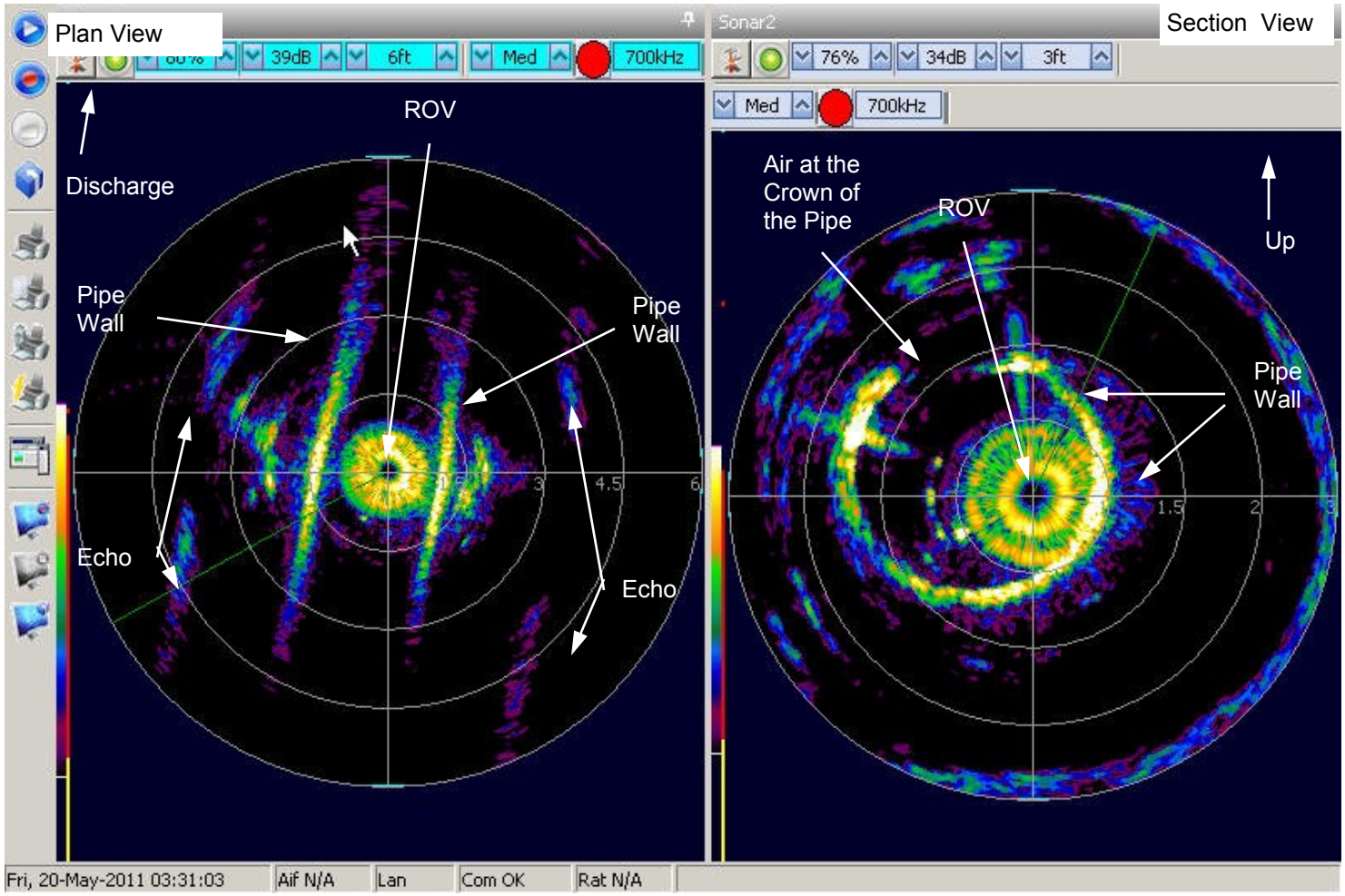
File Name: Morro035.jpg
Tether payout: 900 feet



Notes:

Site: Morro Bay Waste Water Treatment Plant

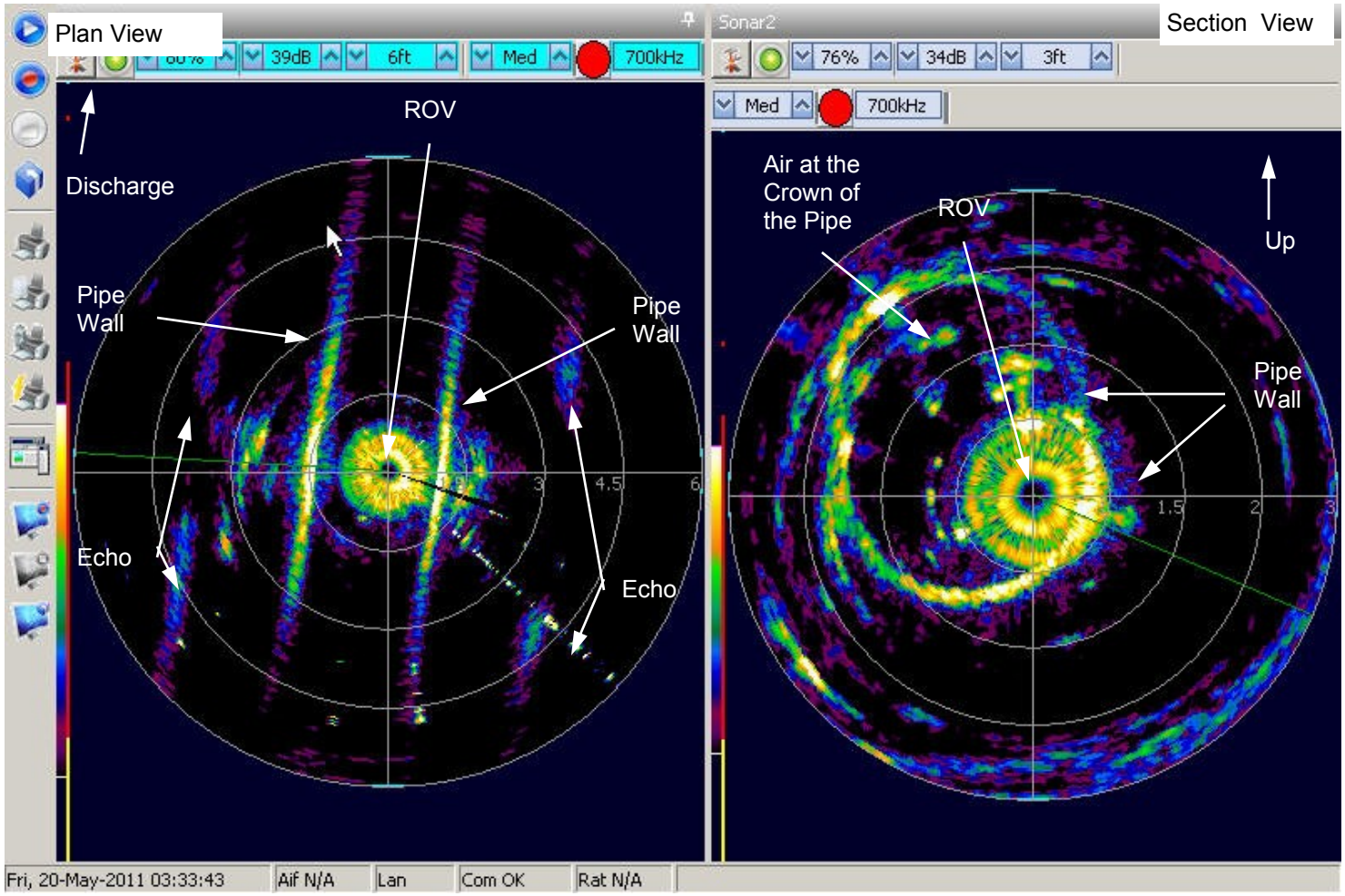
File Name: Morro036.jpg
Tether payout: 800 feet



Notes: Air at the crown of the pipe is producing a reflection and a black spot in the plot.

Site: Morro Bay Waste Water Treatment Plant

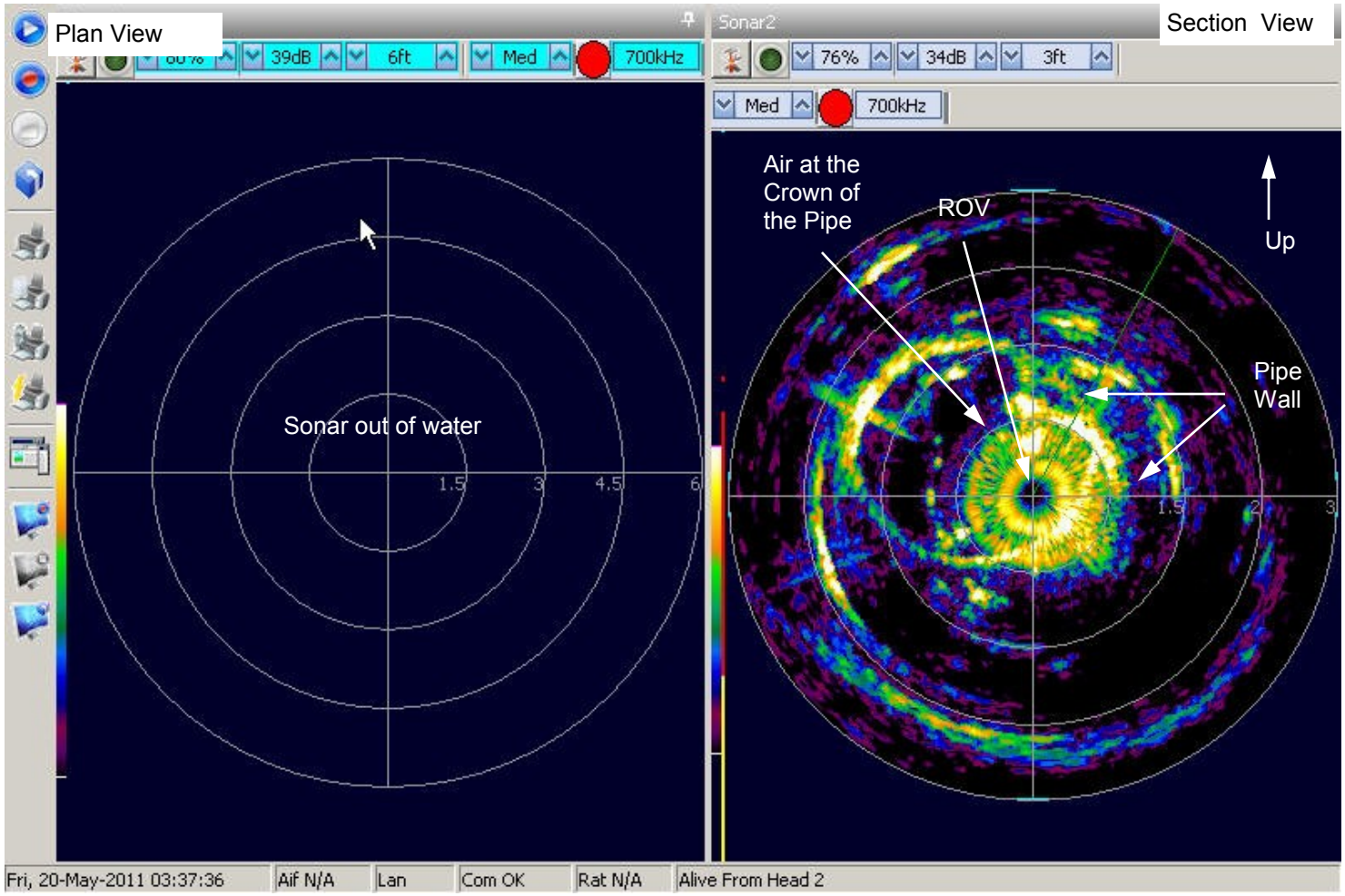
File Name: Morro037.jpg
Tether payout: 700 feet



Notes: Air in the crown of the pipe is causing a reflection of the data. The pipe is round as confirmed with video.

Site: Morro Bay Waste Water Treatment Plant

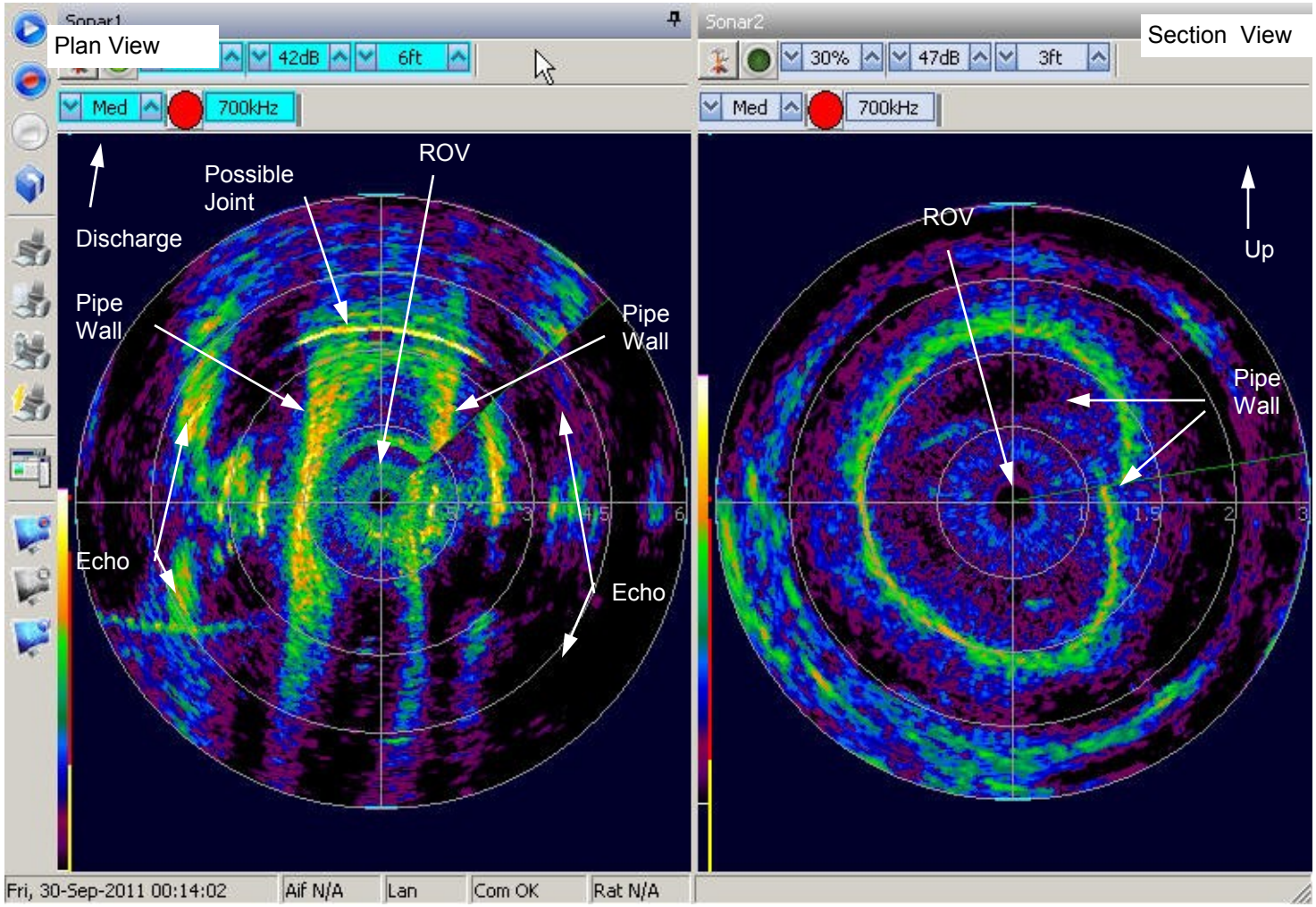
File Name: Morro038.jpg
Tether payout: 600 feet



Notes: Air in the crown of the pipe is causing a reflection of the data. The pipe is round as confirmed with video. End of sonar for inspection, both sonars out of water beyond this position.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

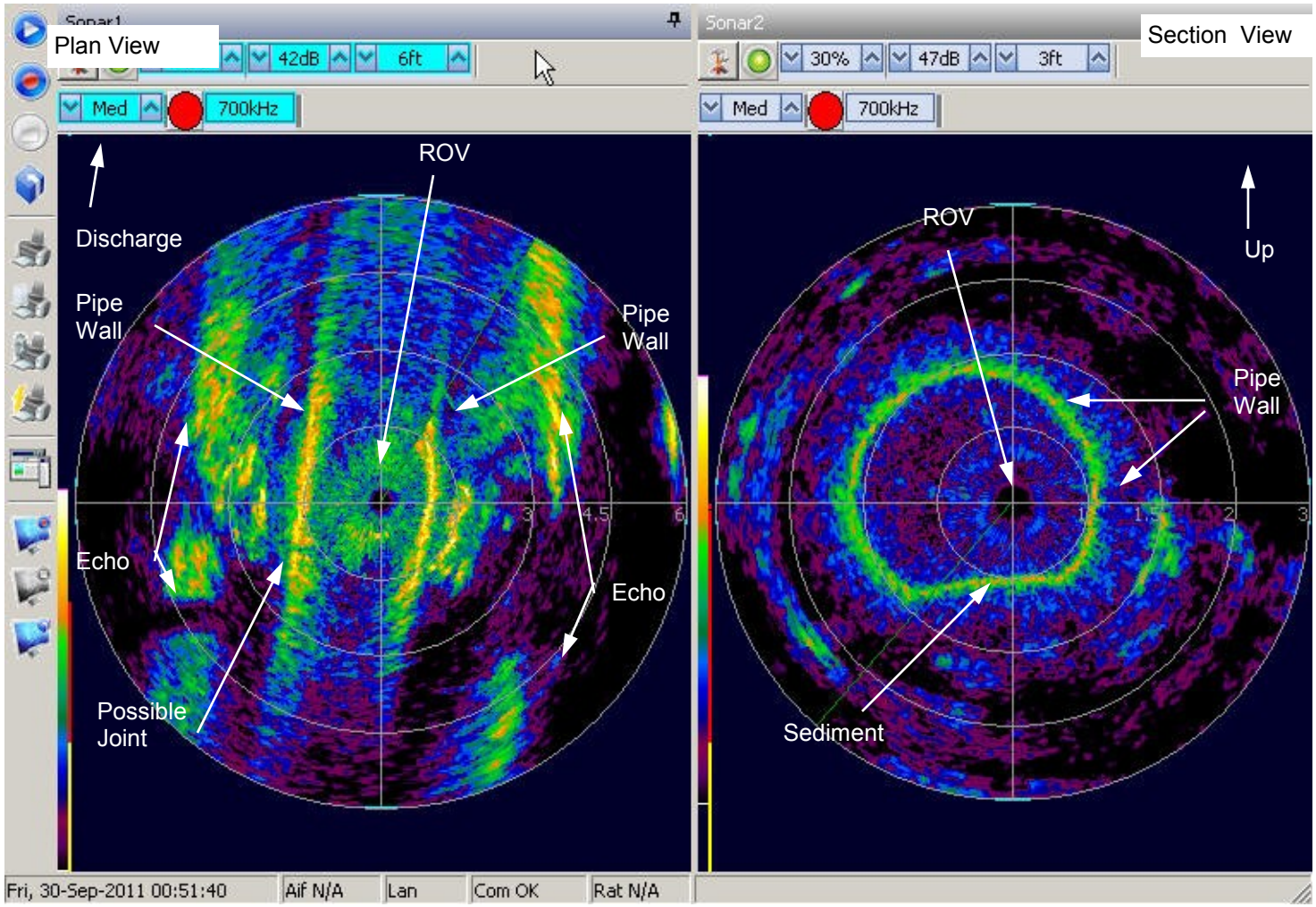
File Name: MorroSept003.jpg
Tether payout: 2449 feet



Notes: Possible Joint visible in left pane—ROV movement caused distortion in plot.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

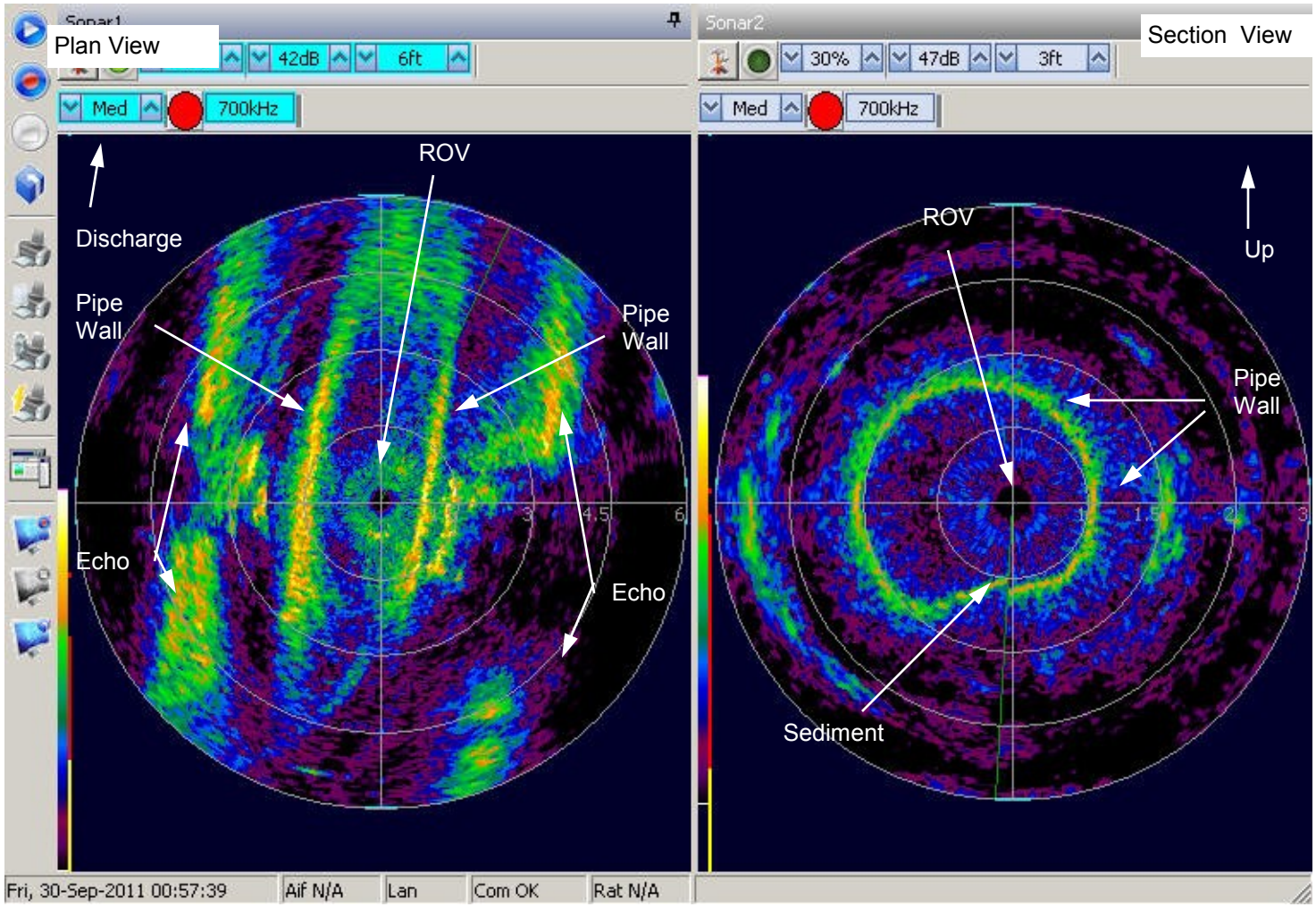
File Name: MorroSept007.jpg
Tether payout: 3100 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

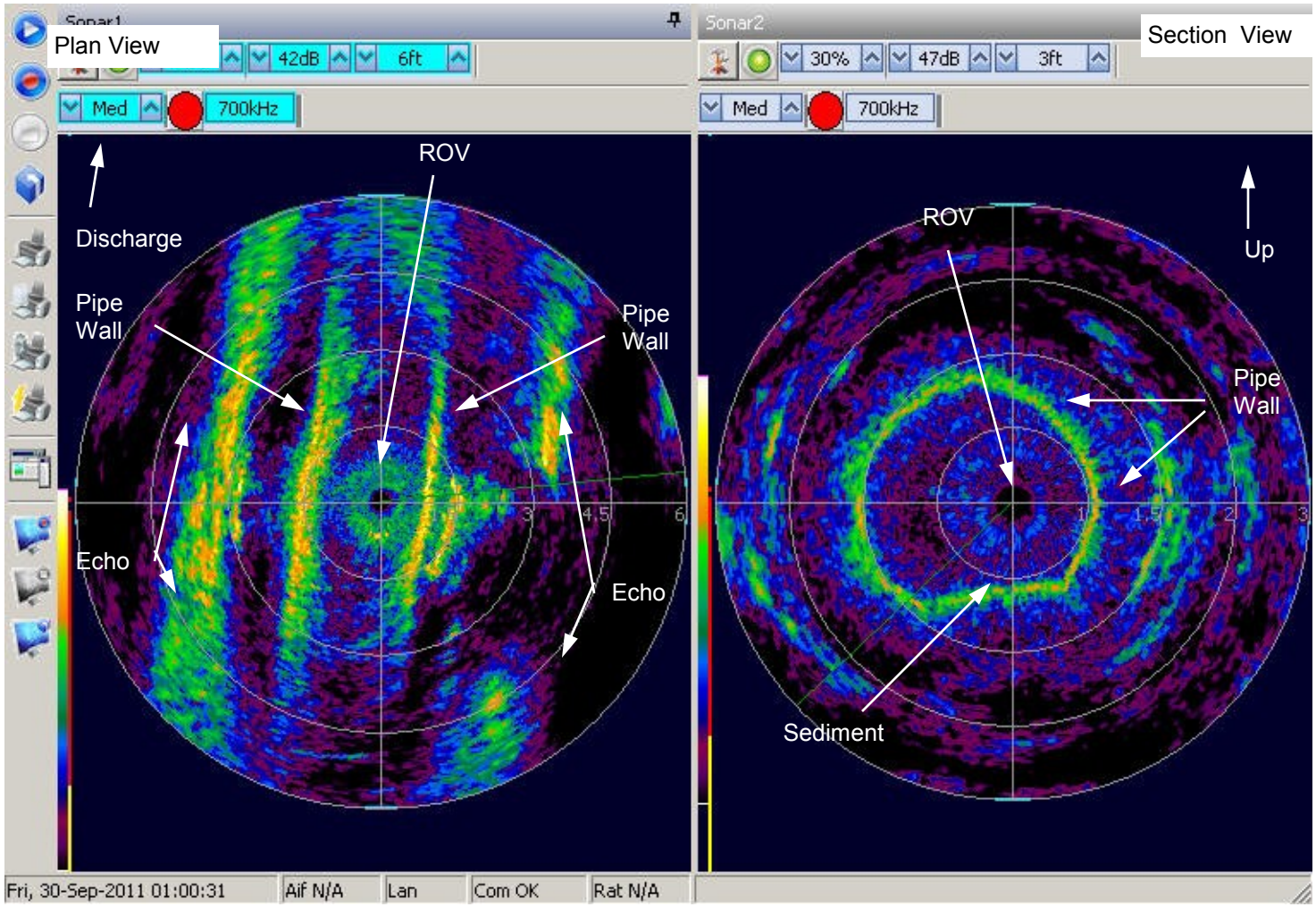
File Name: MorroSept010.jpg
Tether payout: 3300 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

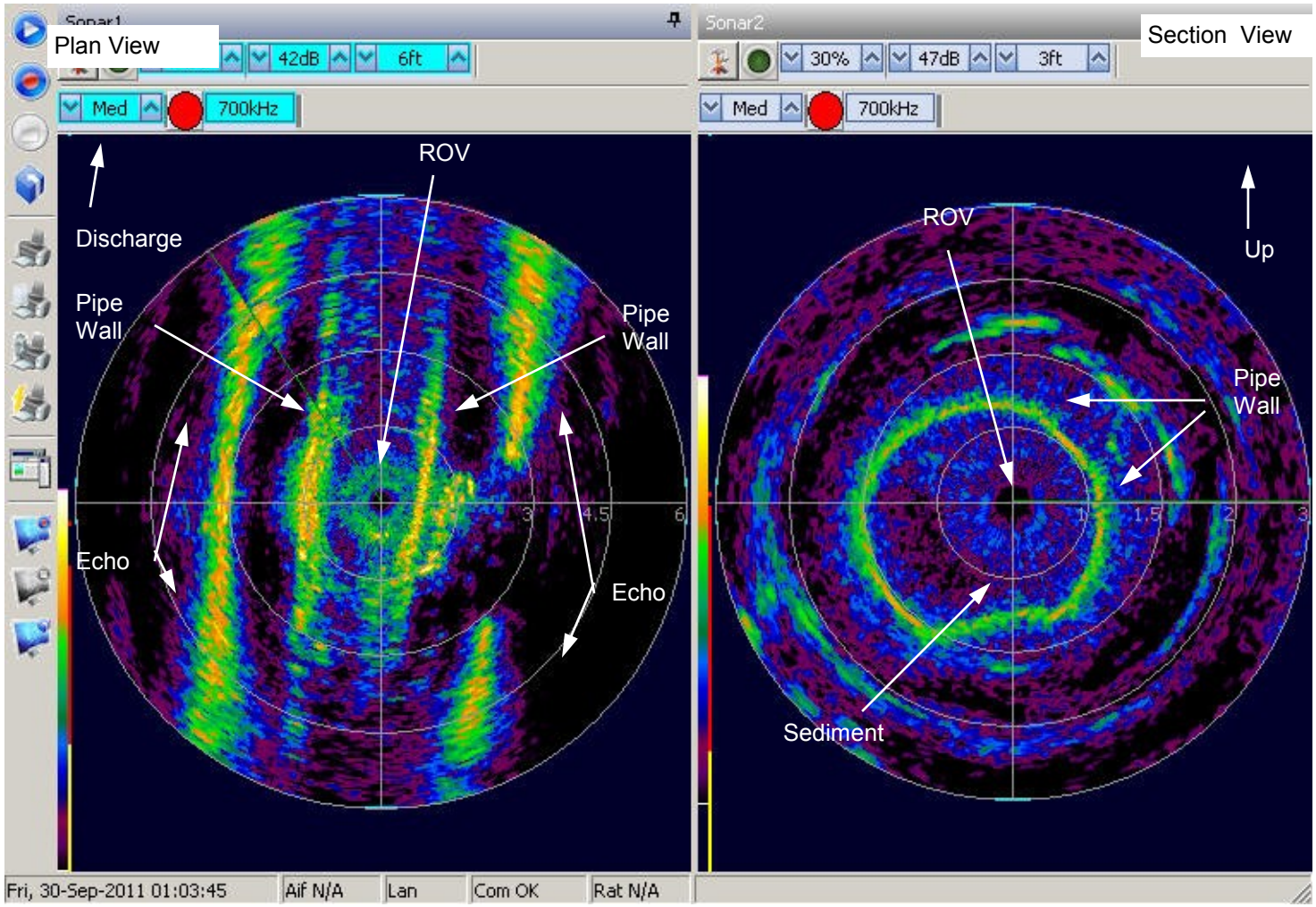
File Name: MorroSept011.jpg
Tether payout: 3400 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

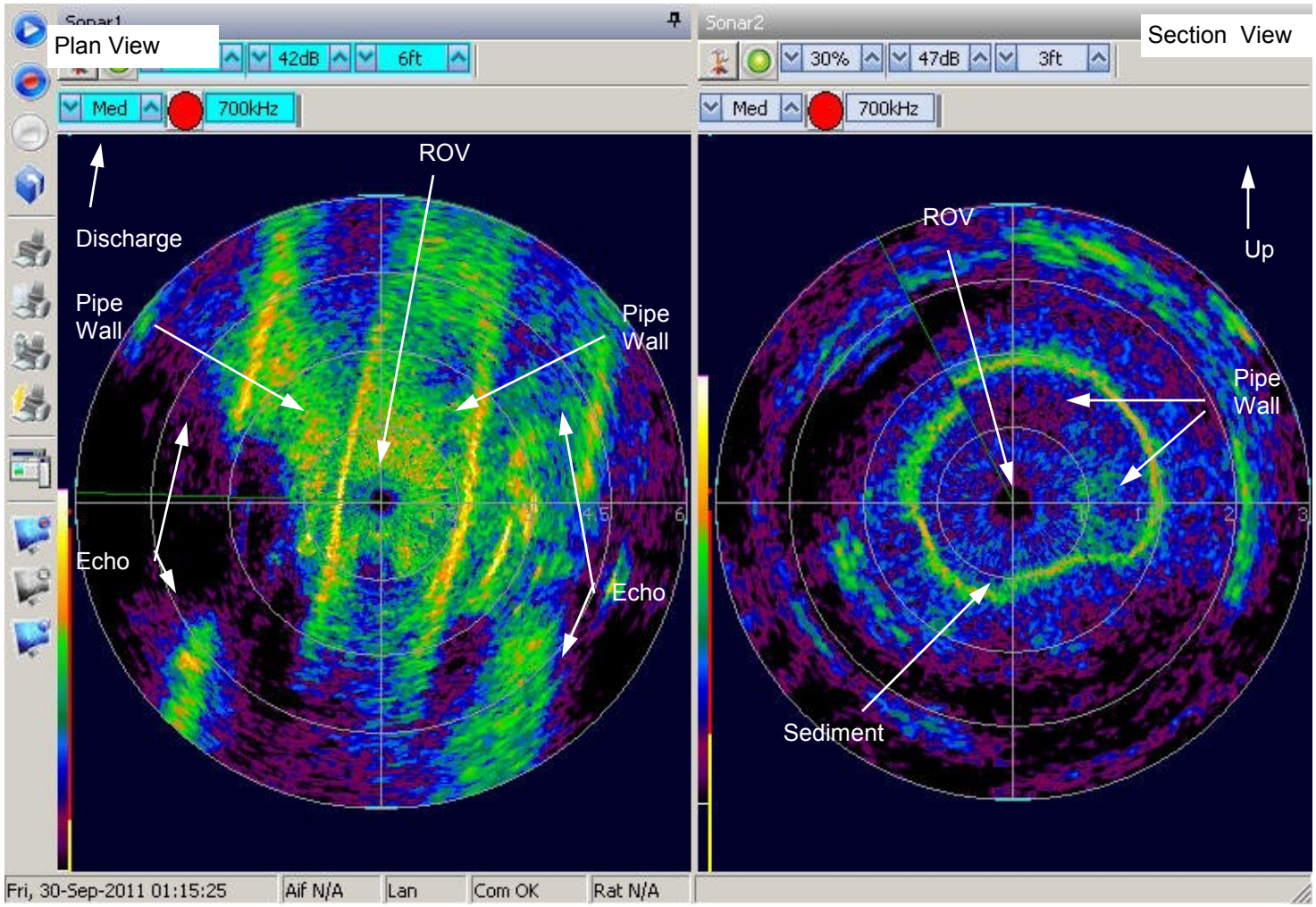
File Name: MorroSept012.jpg
Tether payout: 3500 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

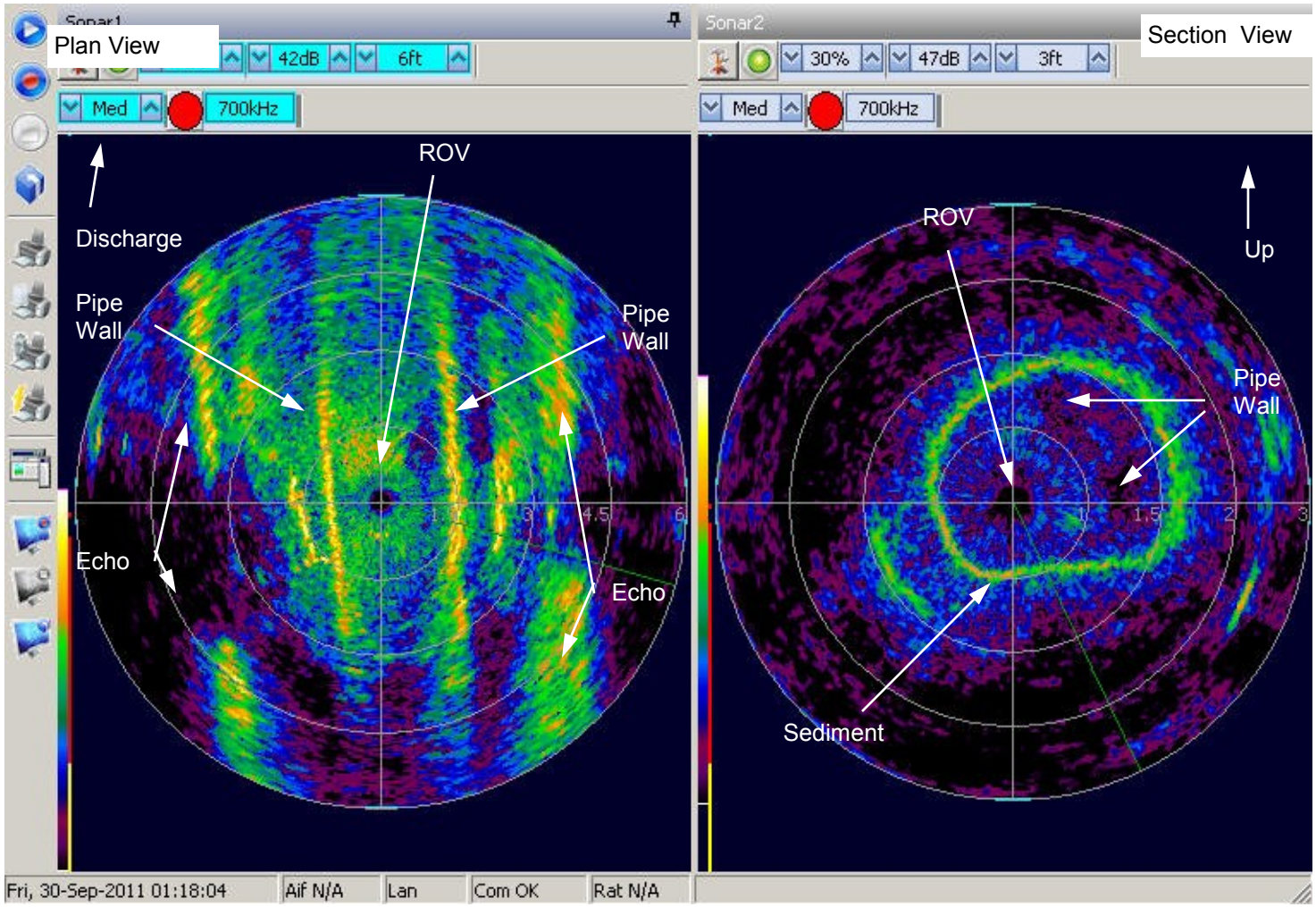
File Name: MorroSept015.jpg
Tether payout: 3600 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

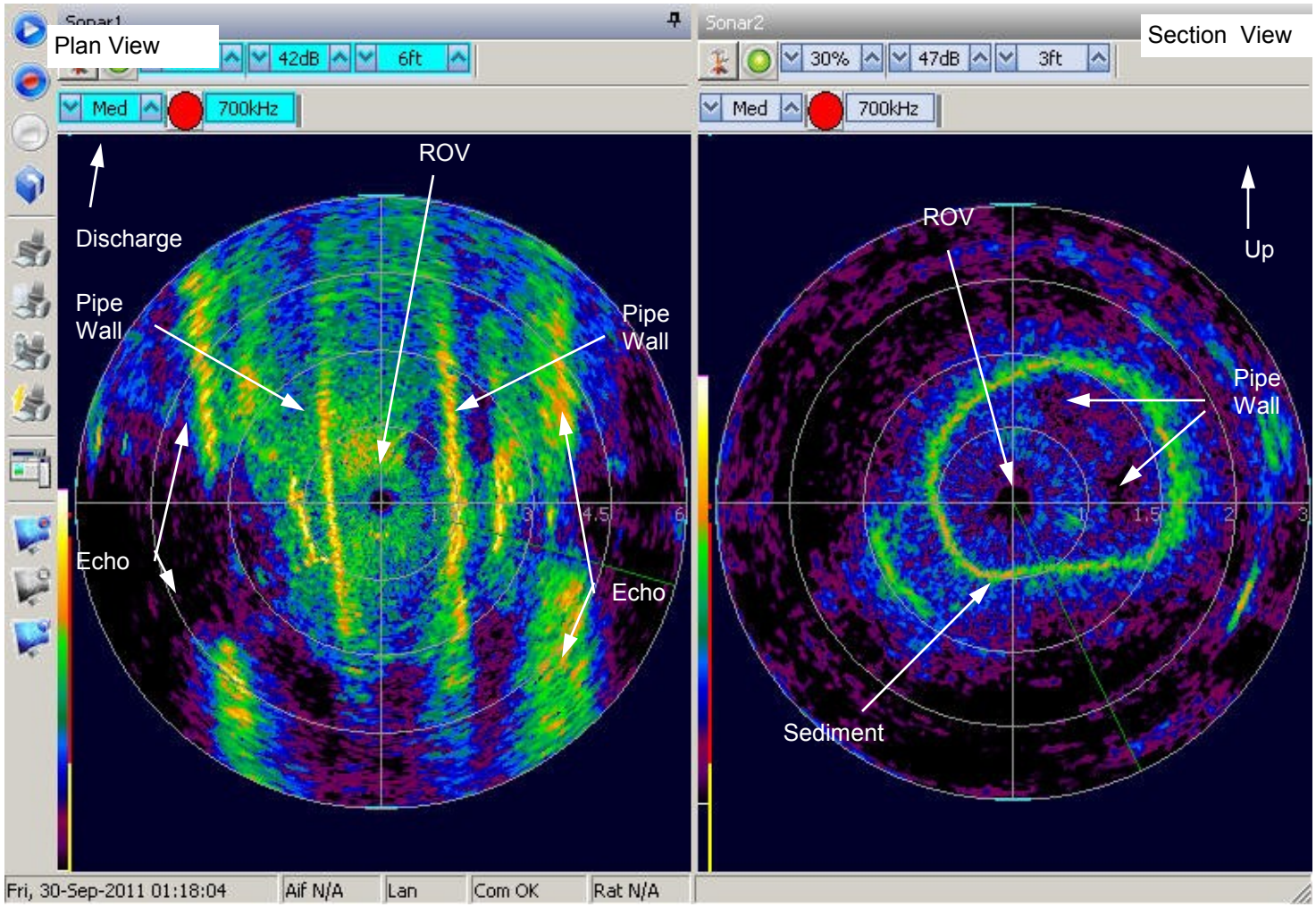
File Name: MorroSept016.jpg
Tether payout: 3700 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

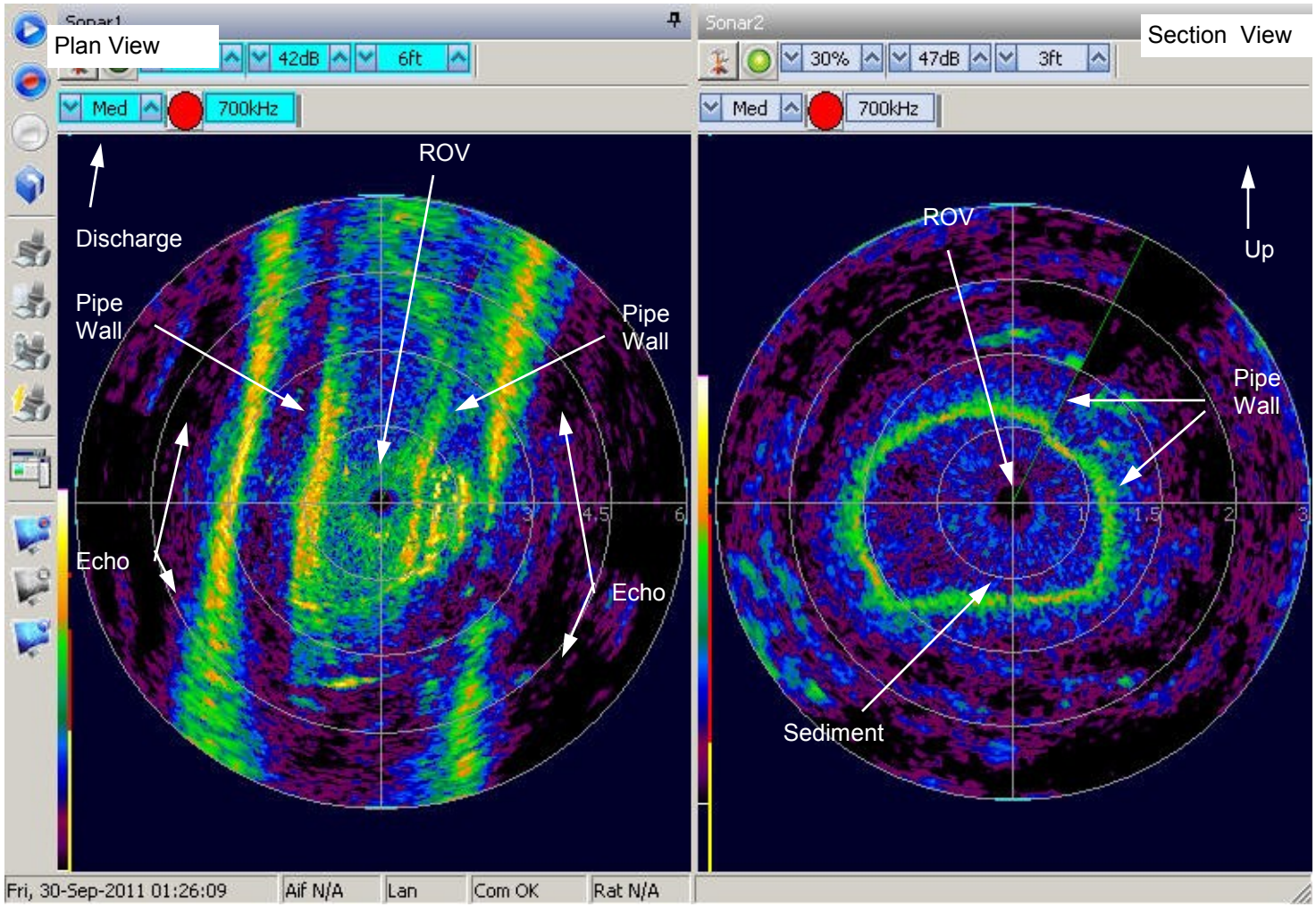
File Name: MorroSept020.jpg
Tether payout: 3800 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

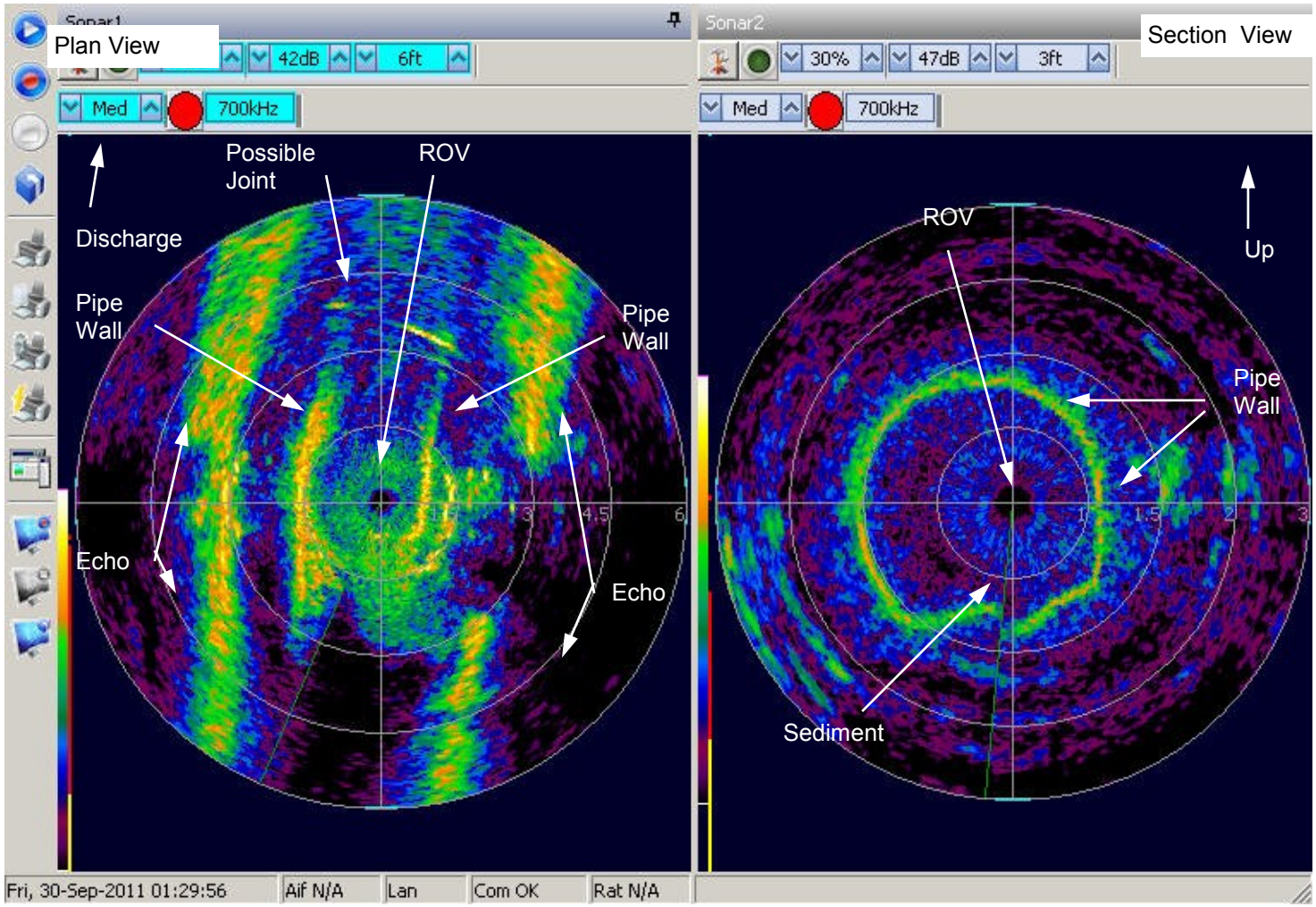
File Name: MorroSept021.jpg
Tether payout: 3900 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

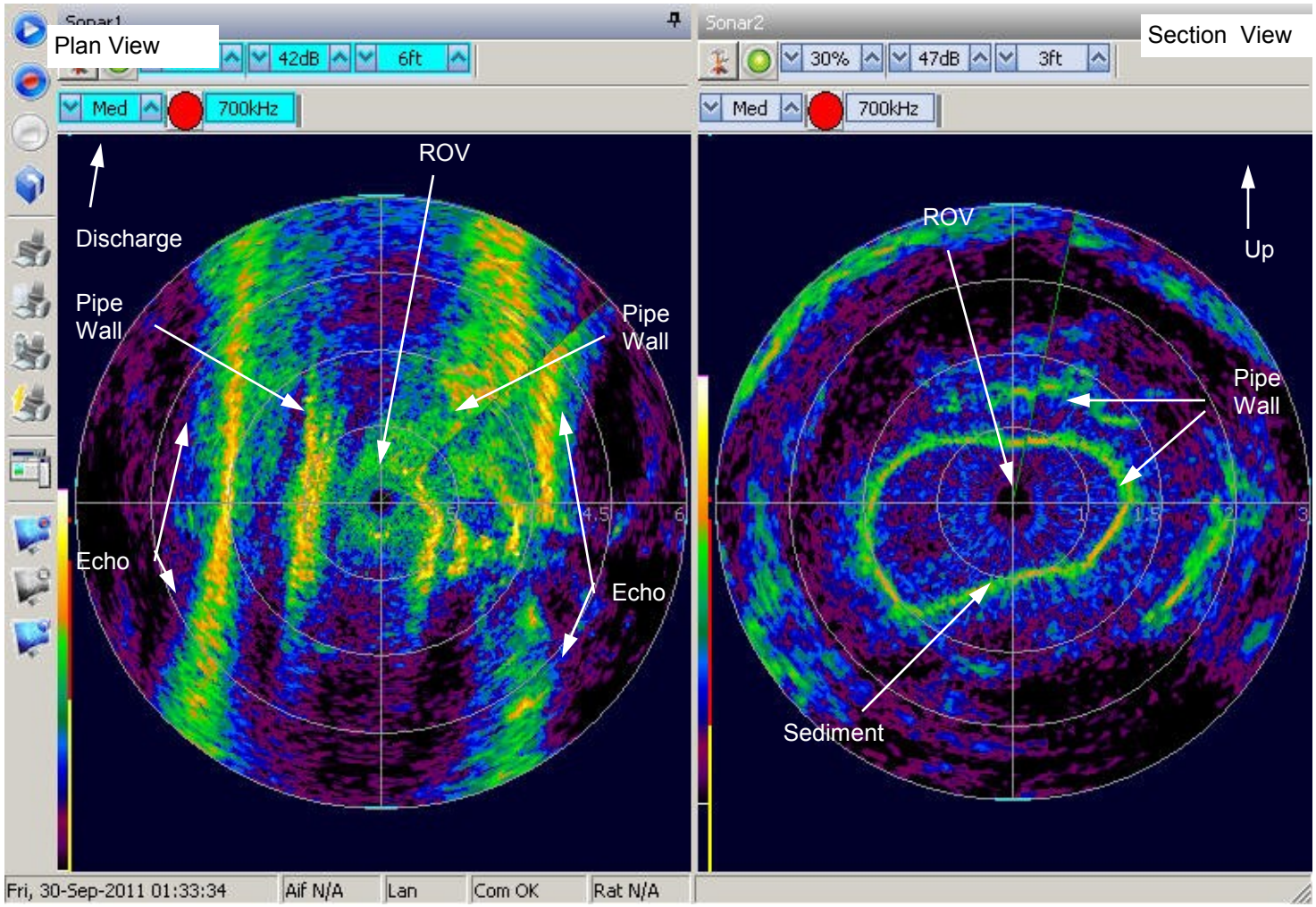
File Name: MorroSept022.jpg
Tether payout: 4000 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

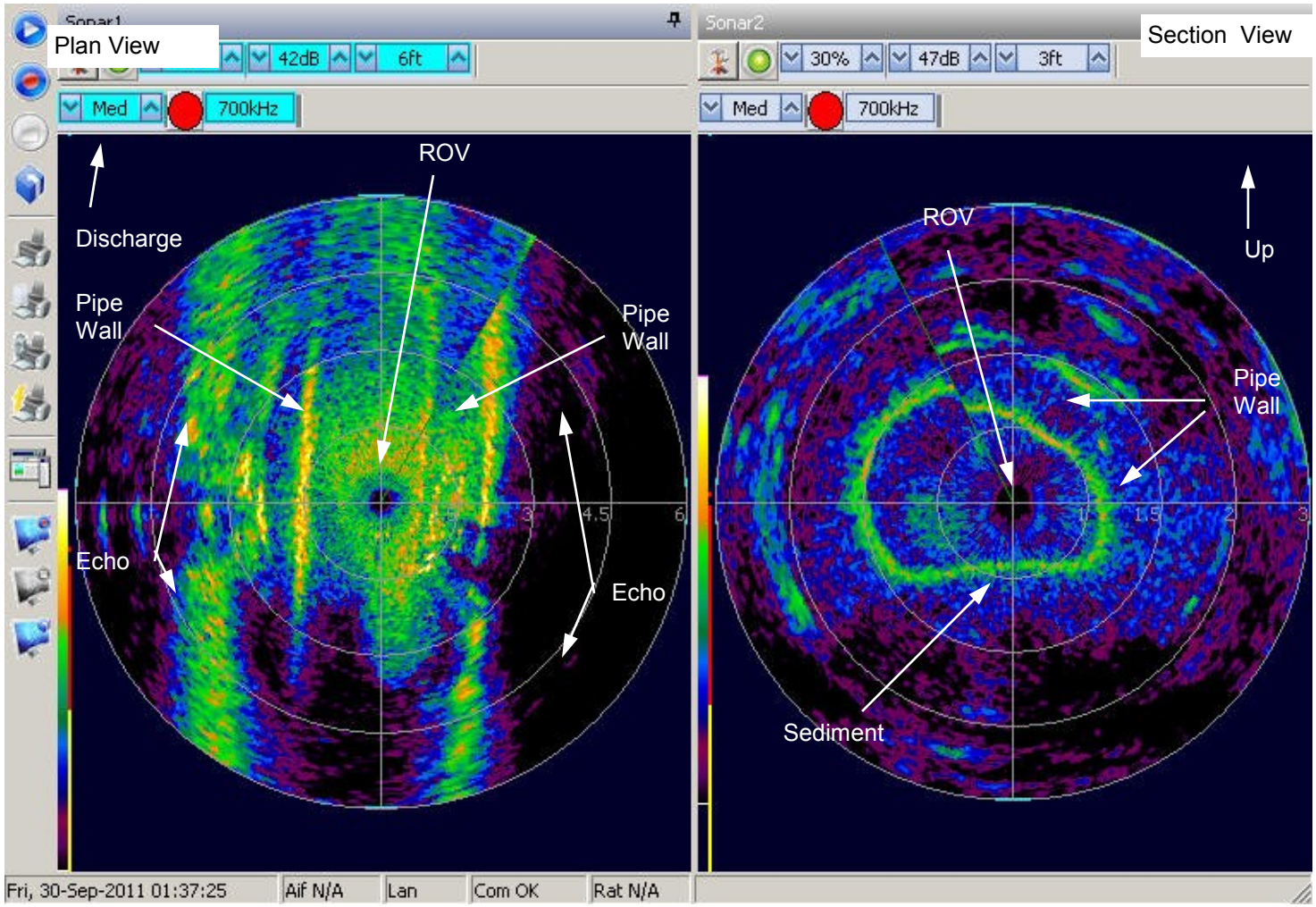
File Name: MorroSept023.jpg
Tether payout: 4100 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

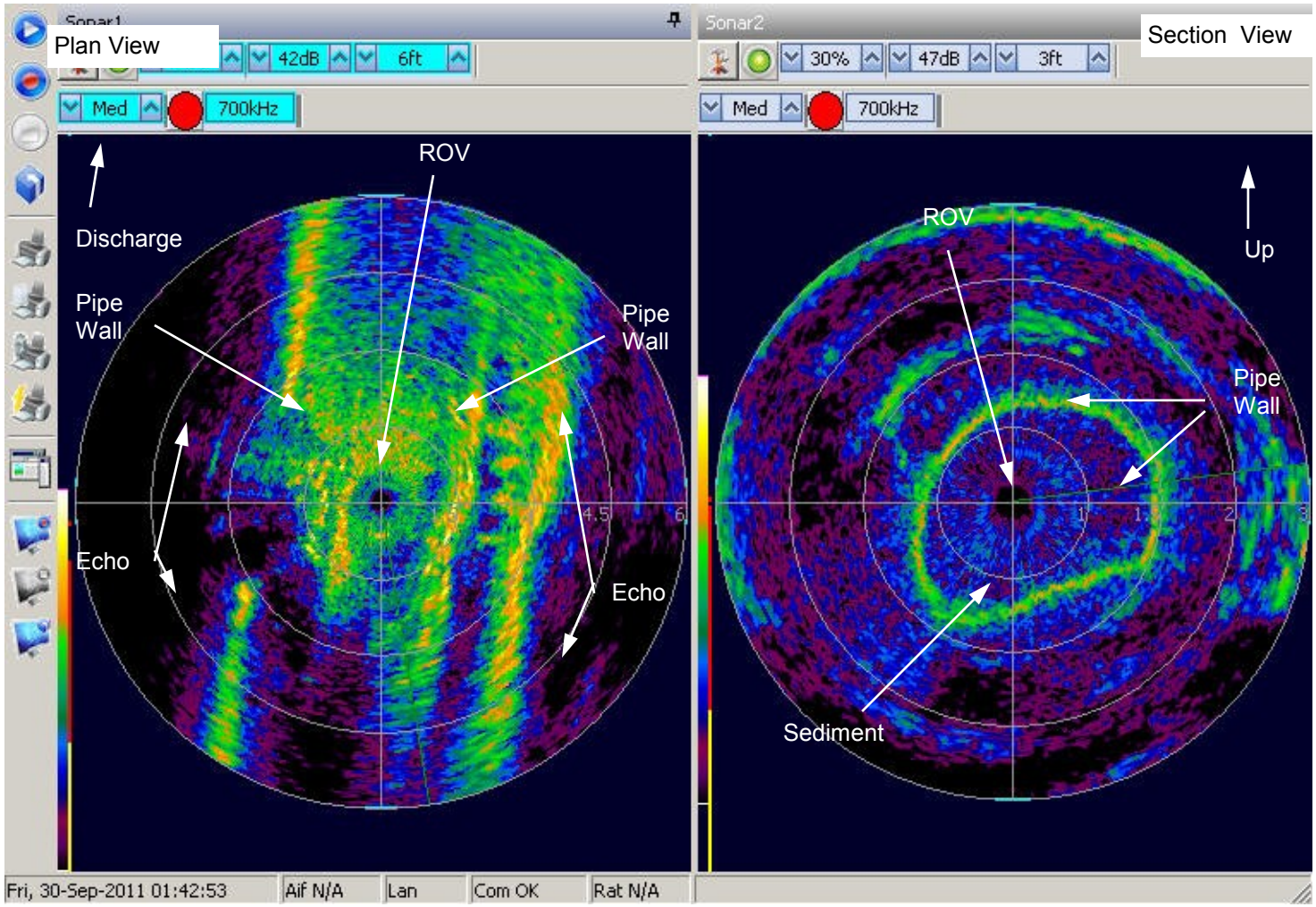
File Name: MorroSept027.jpg
Tether payout: 4200 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

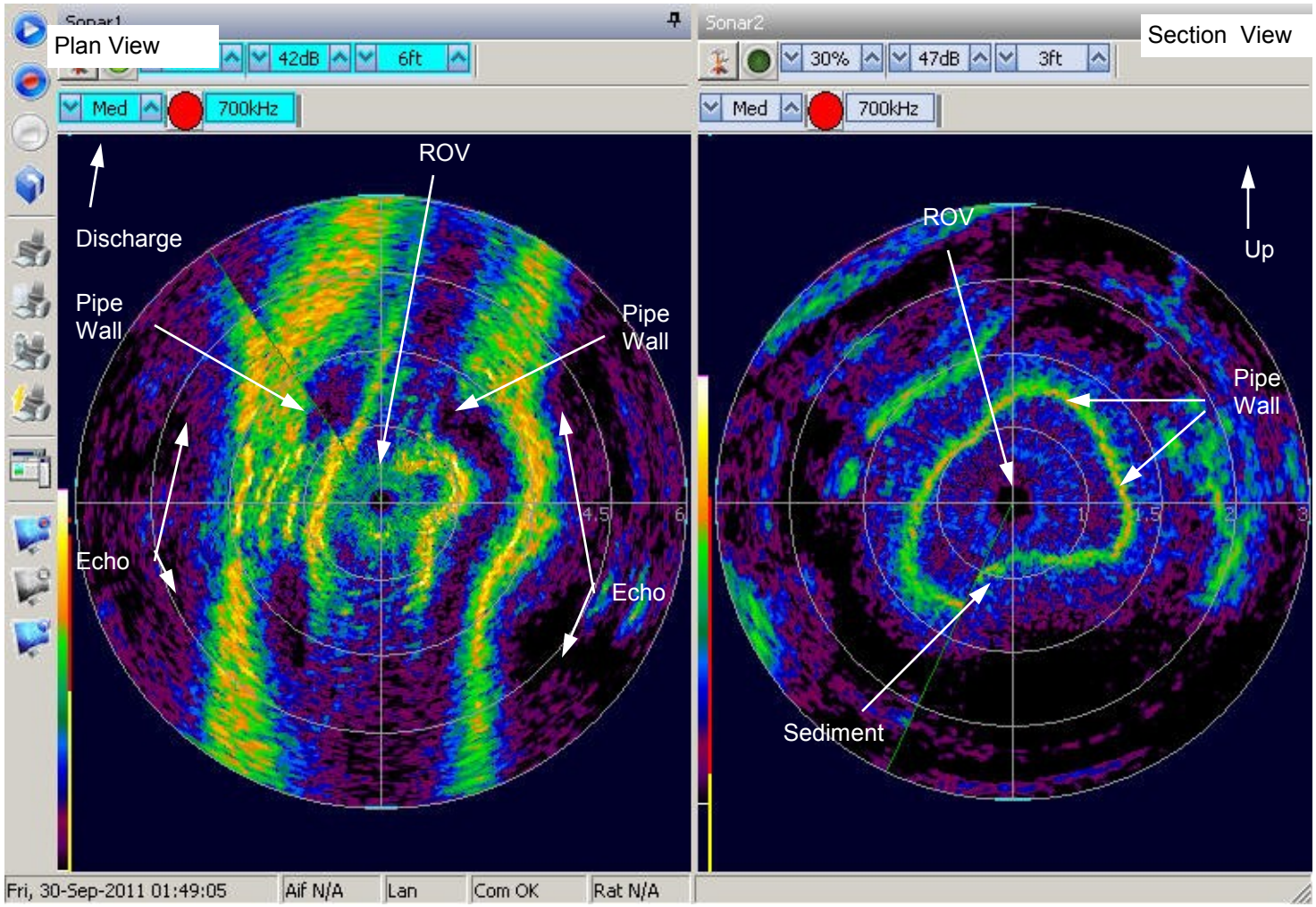
File Name: MorroSept030.jpg
Tether payout: 4300 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

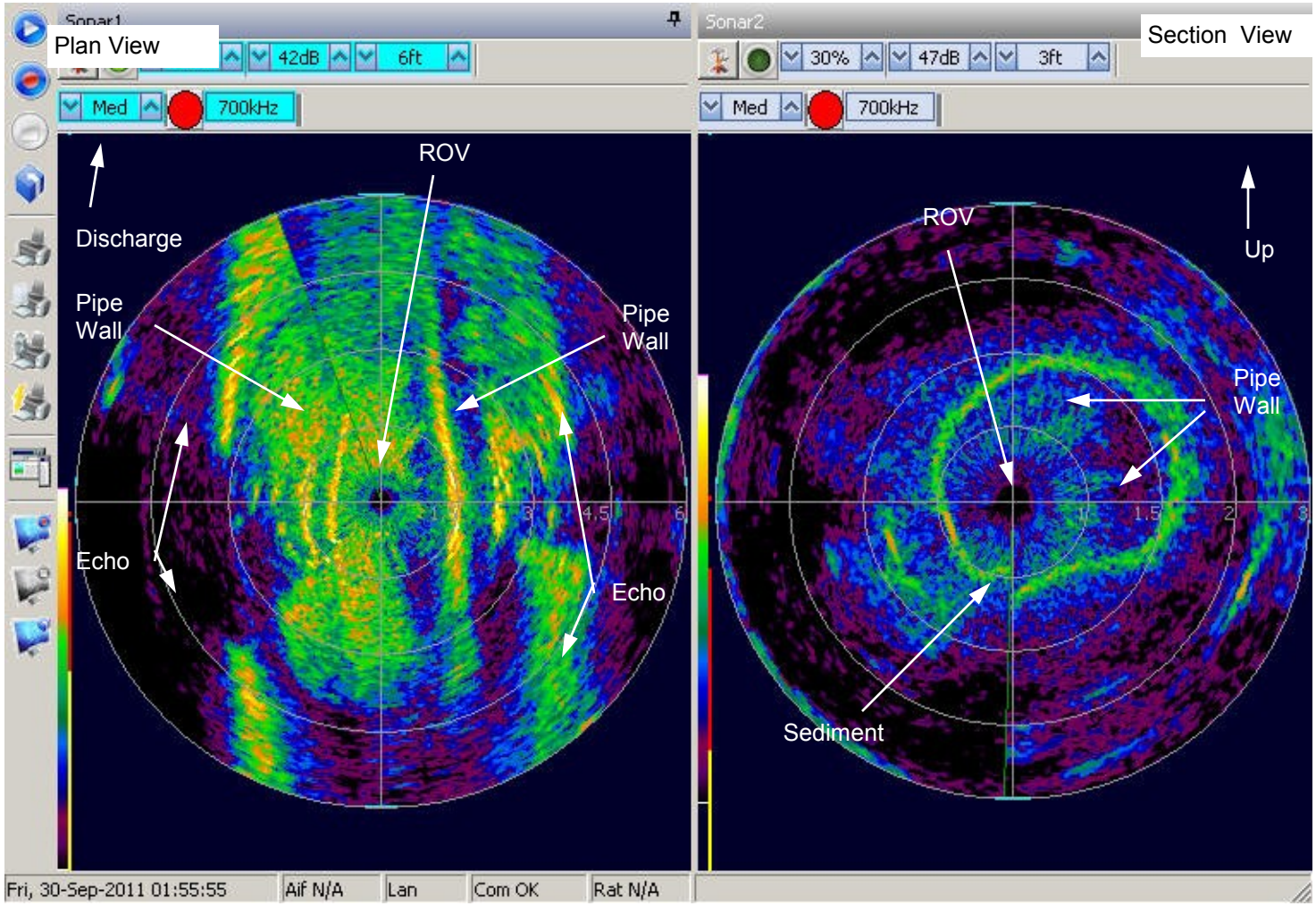
File Name: MorroSept031.jpg
Tether payout: 4415 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

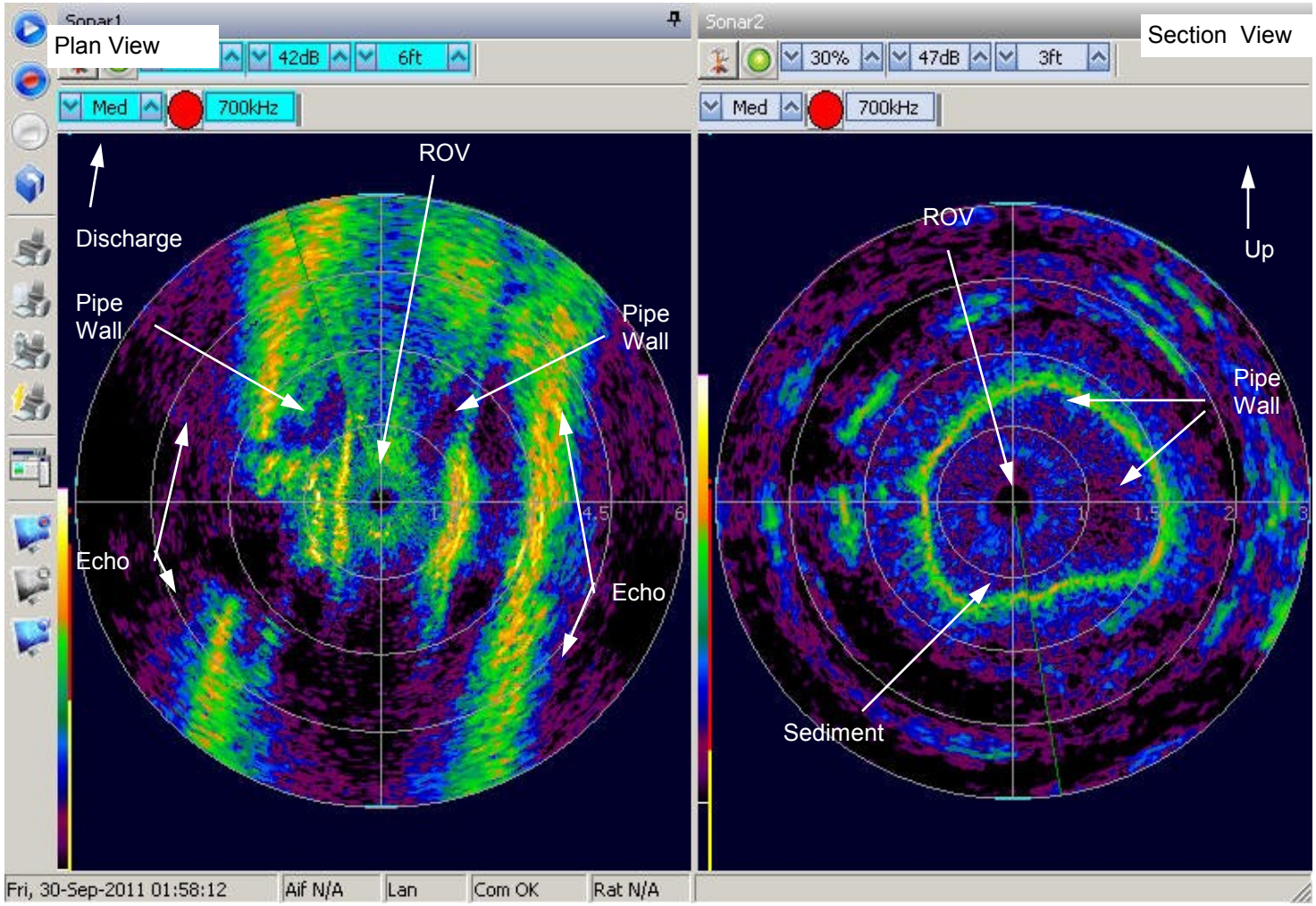
File Name: MorroSept032.jpg
Tether payout: 4550 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

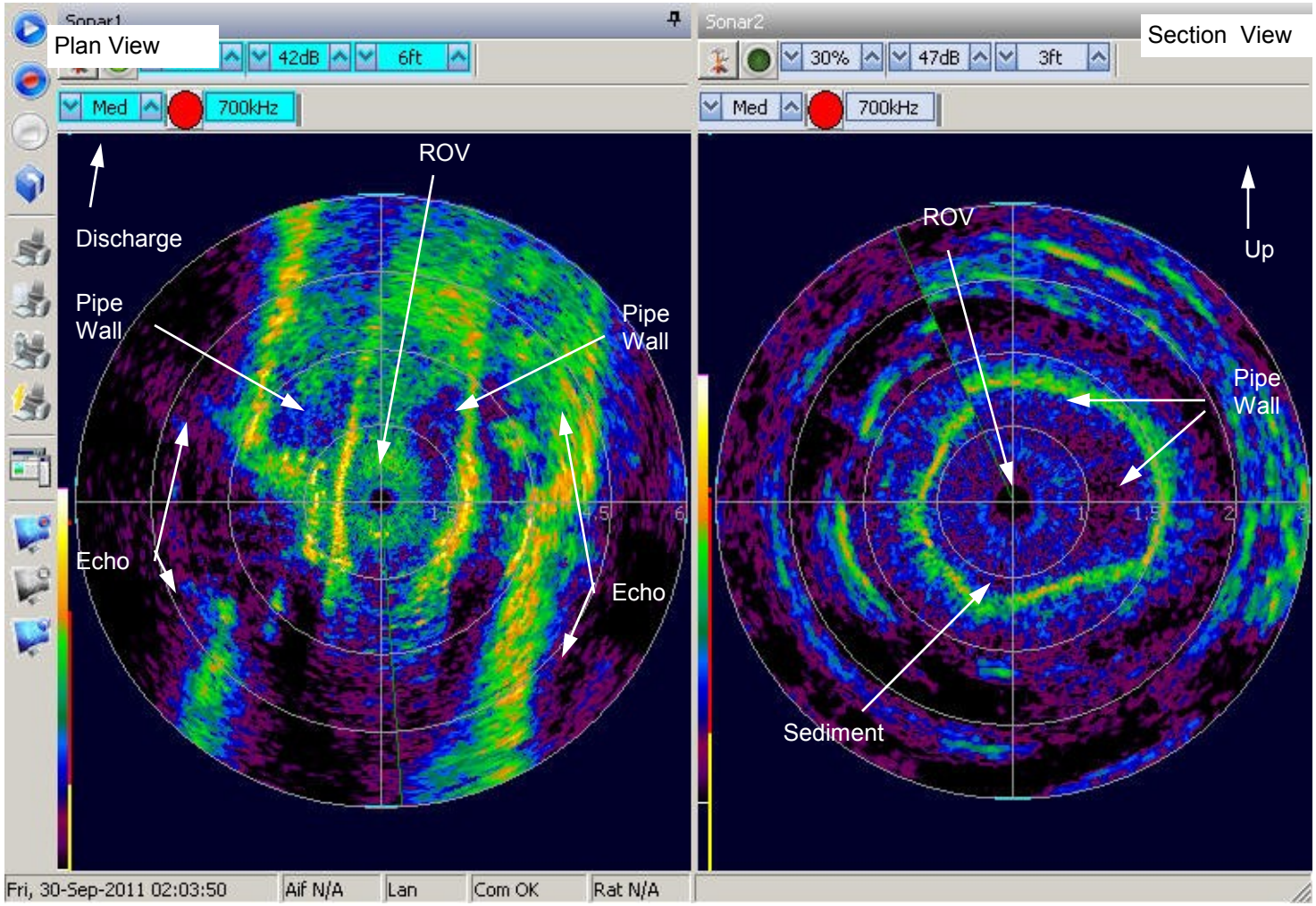
File Name: MorroSept033.jpg
Tether payout: 4600 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

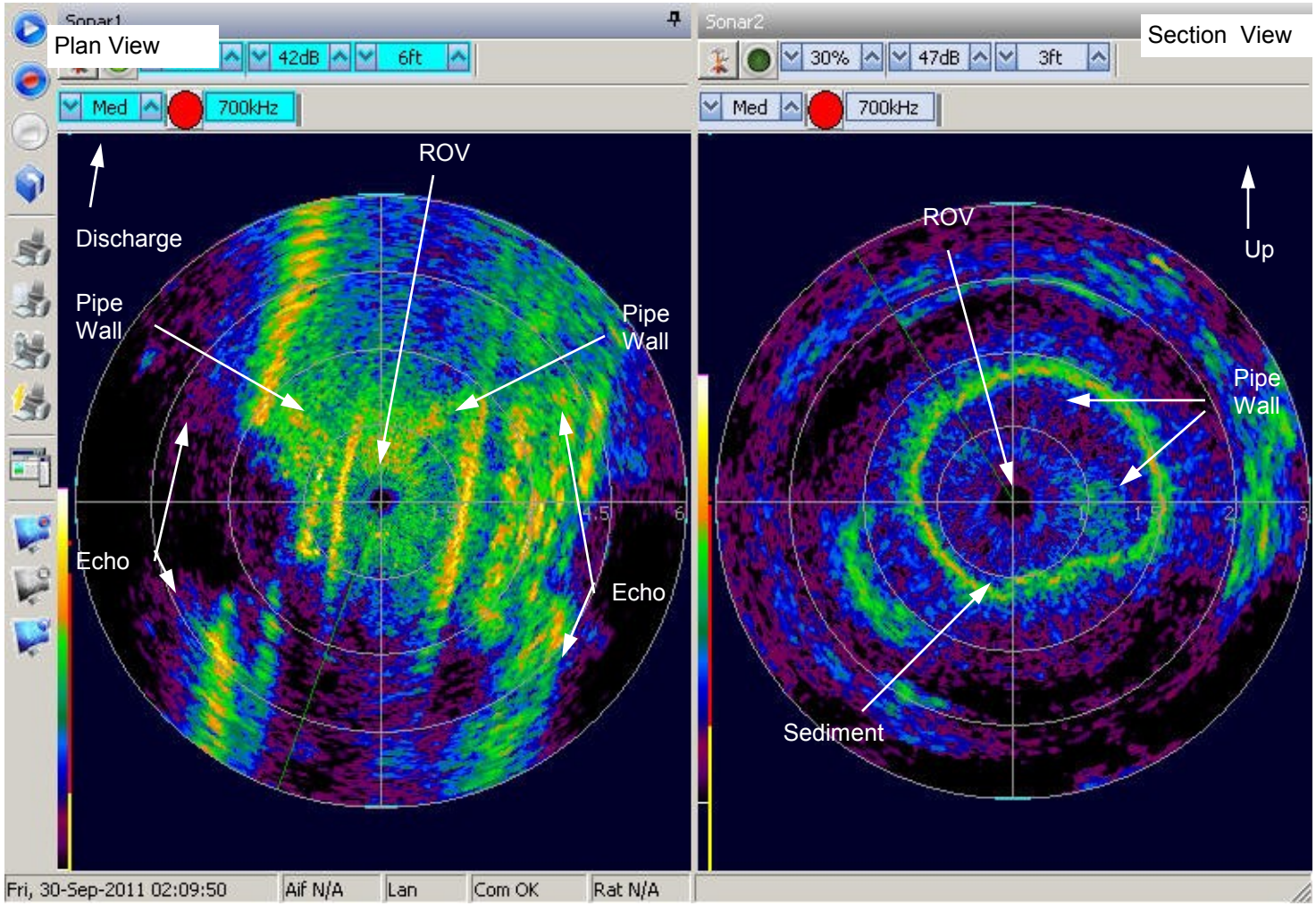
File Name: MorroSept034.jpg
Tether payout: 4700 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

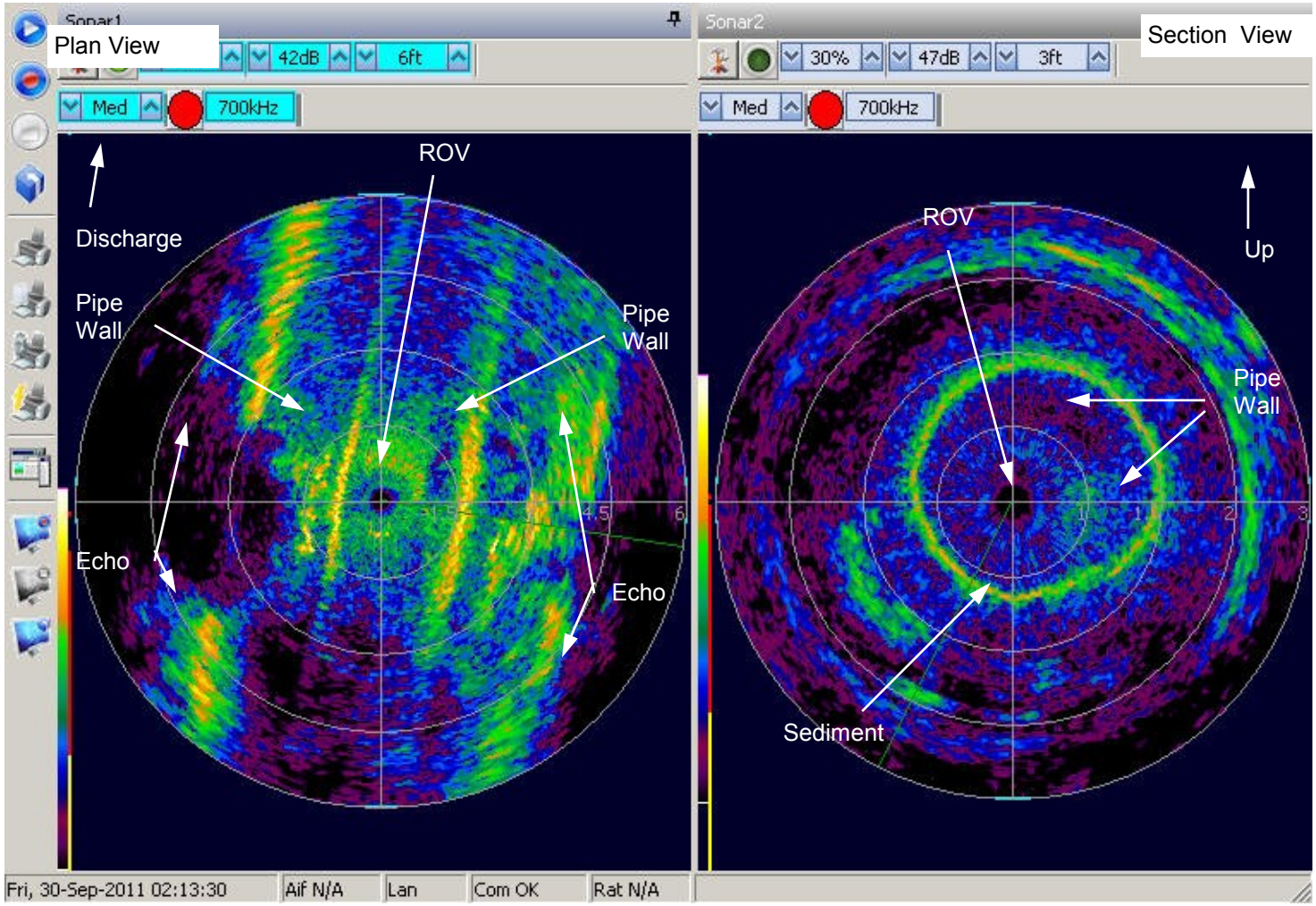
File Name: MorroSept035.jpg
Tether payout: 4800 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

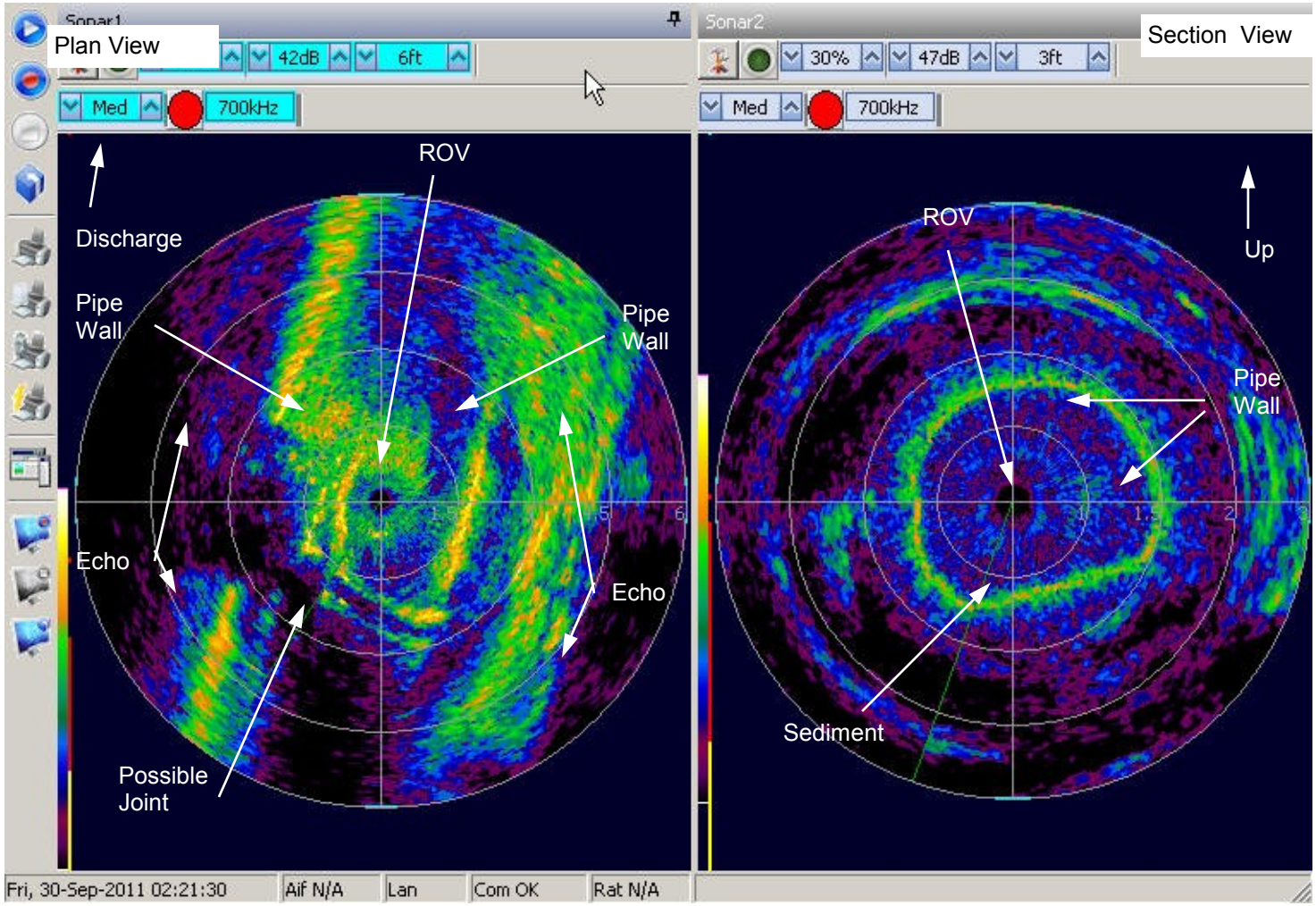
File Name: MorroSept036.jpg
Tether payout: 4900 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

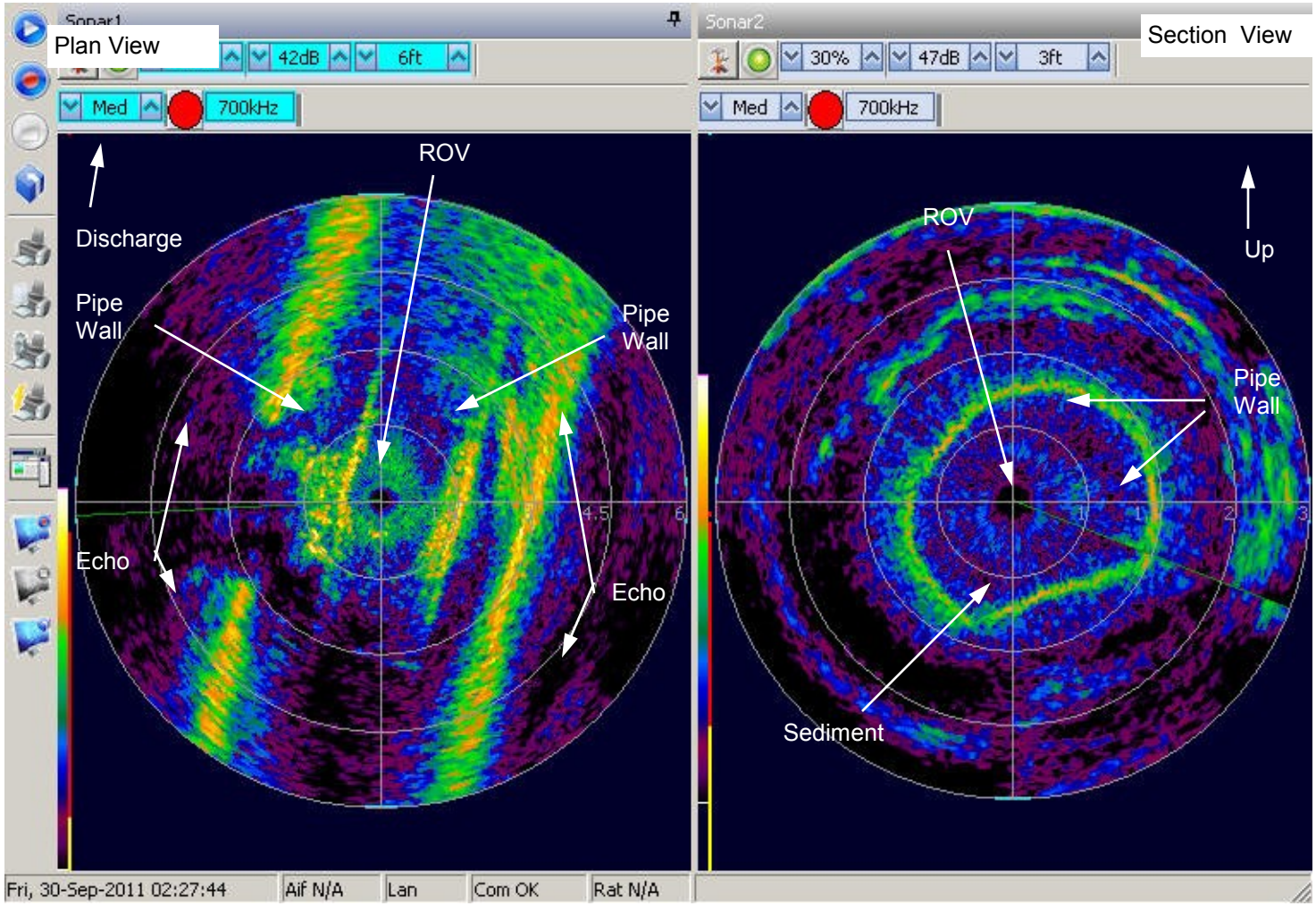
File Name: MorroSept037.jpg
Tether payout: 5000 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

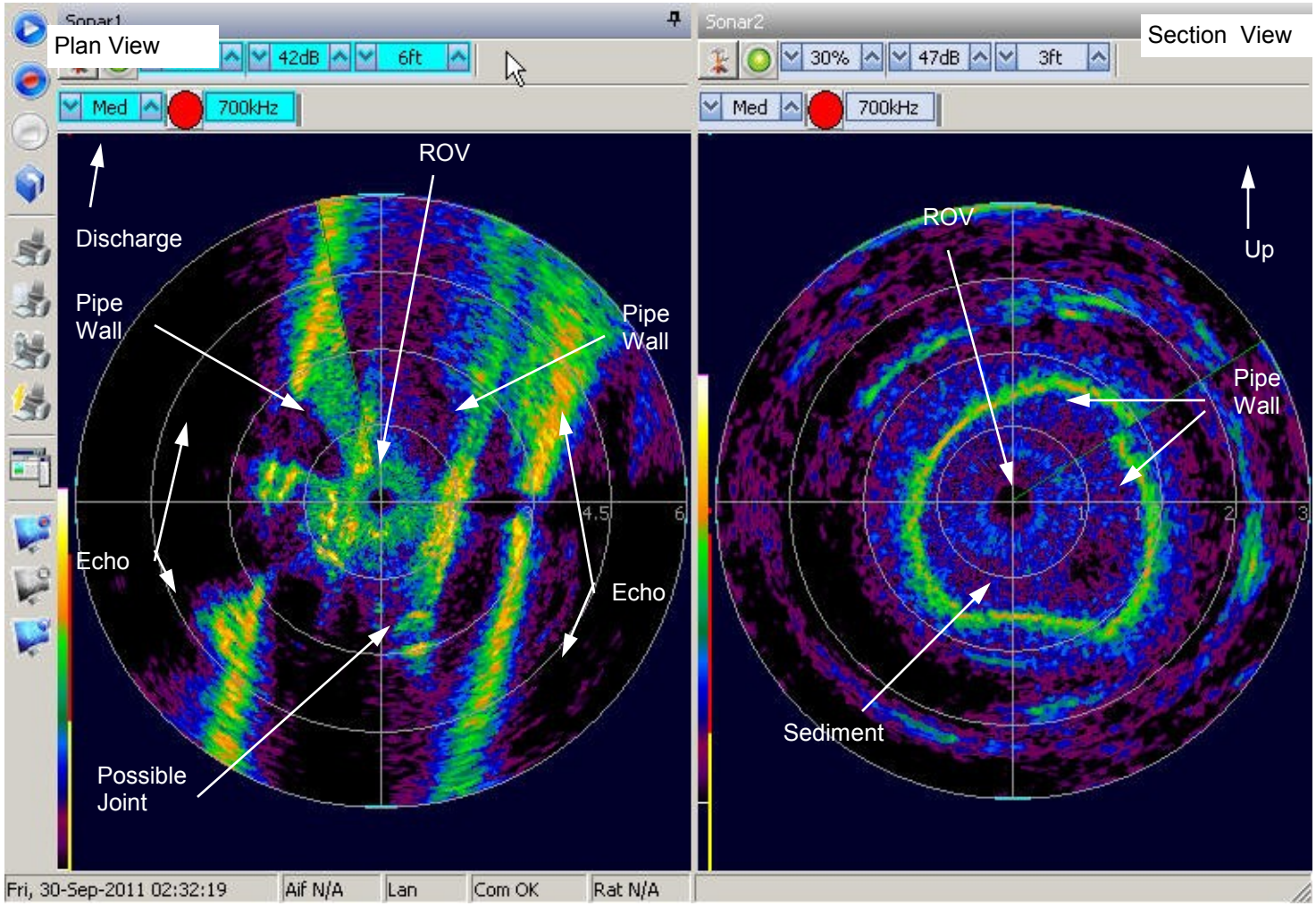
File Name: MorroSept038.jpg
Tether payout: 5100 feet



Notes: Approximately 3” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

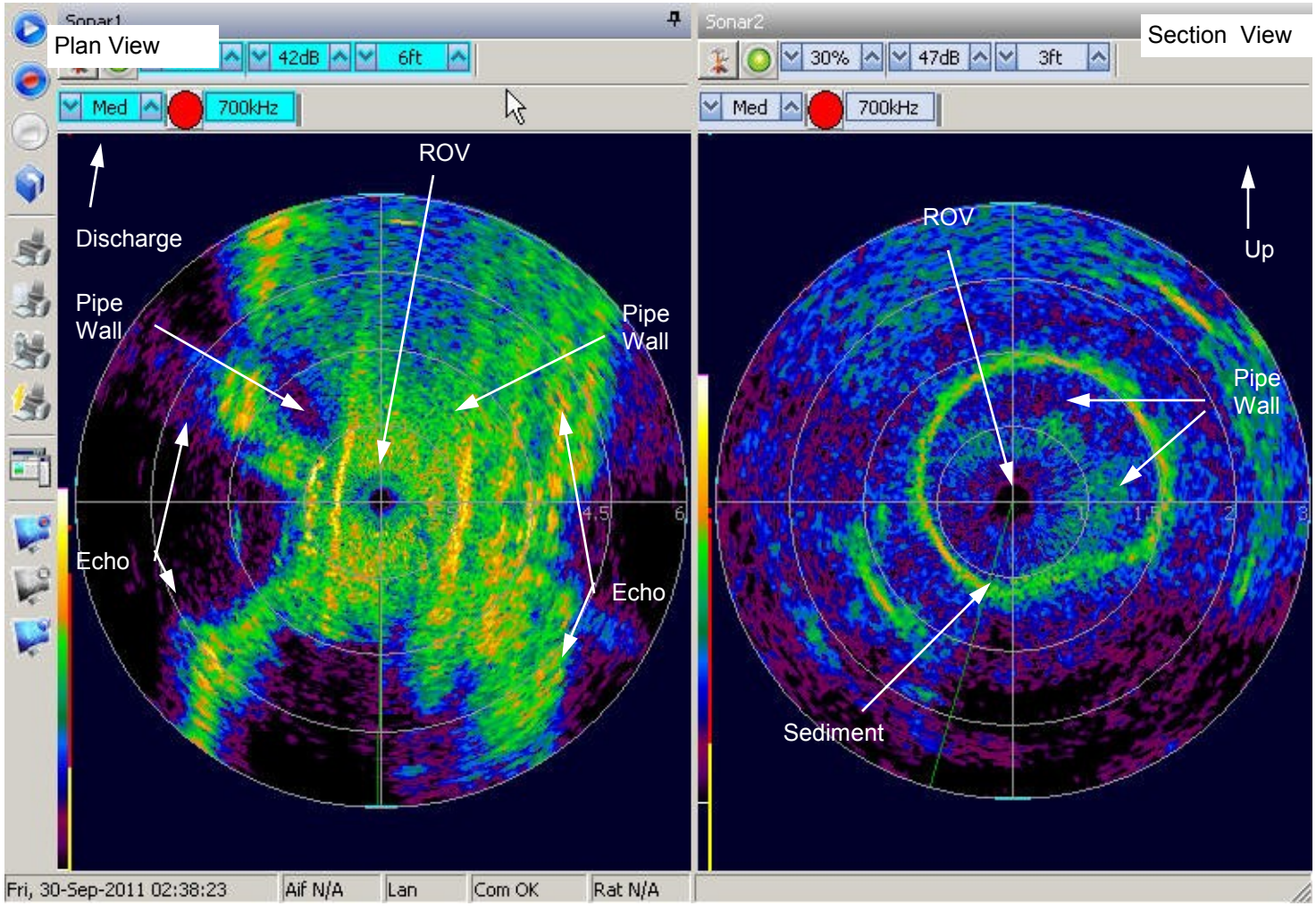
File Name: MorroSept039.jpg
Tether payout: 5200 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

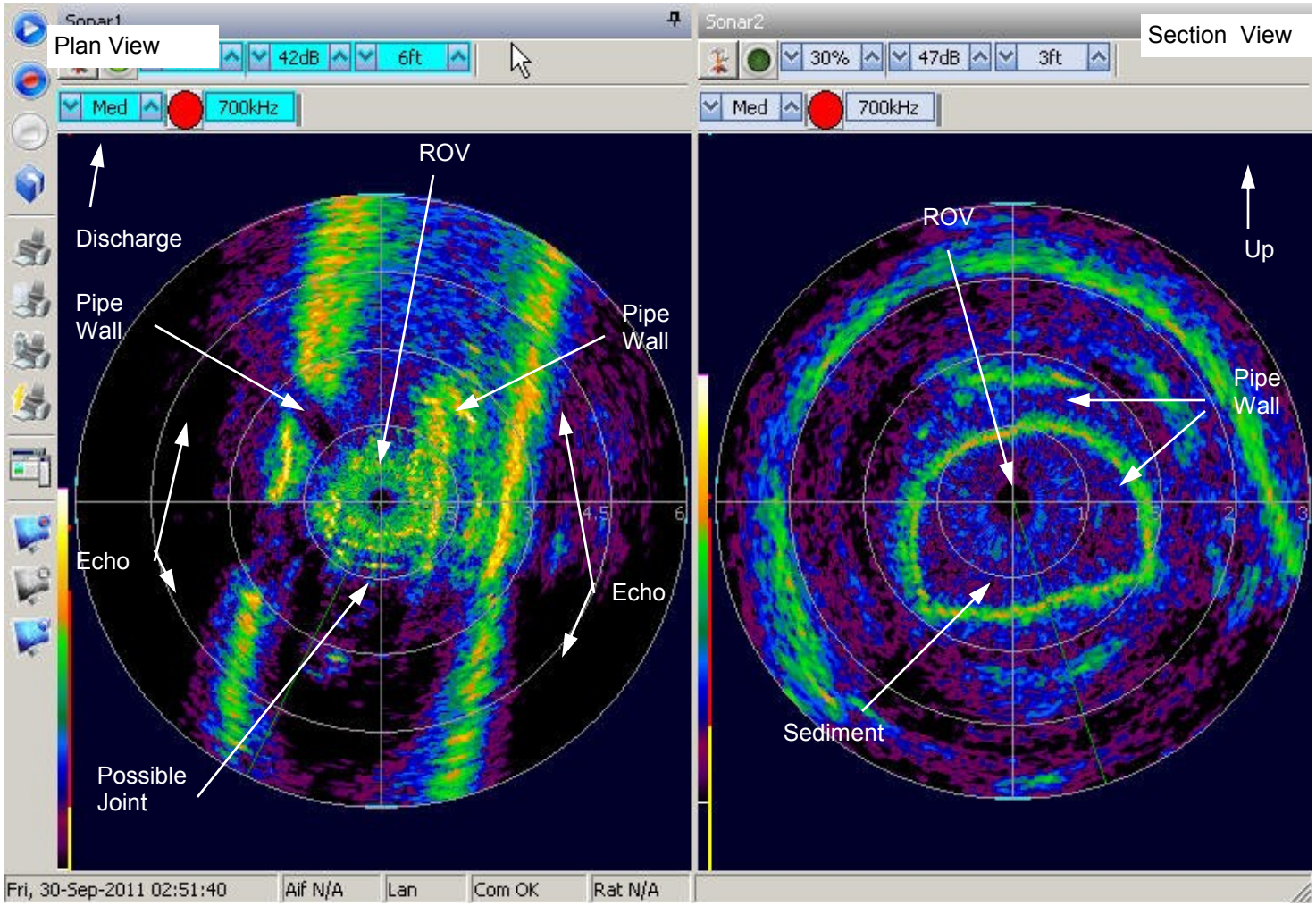
File Name: MorroSept040.jpg
Tether payout: 5310 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

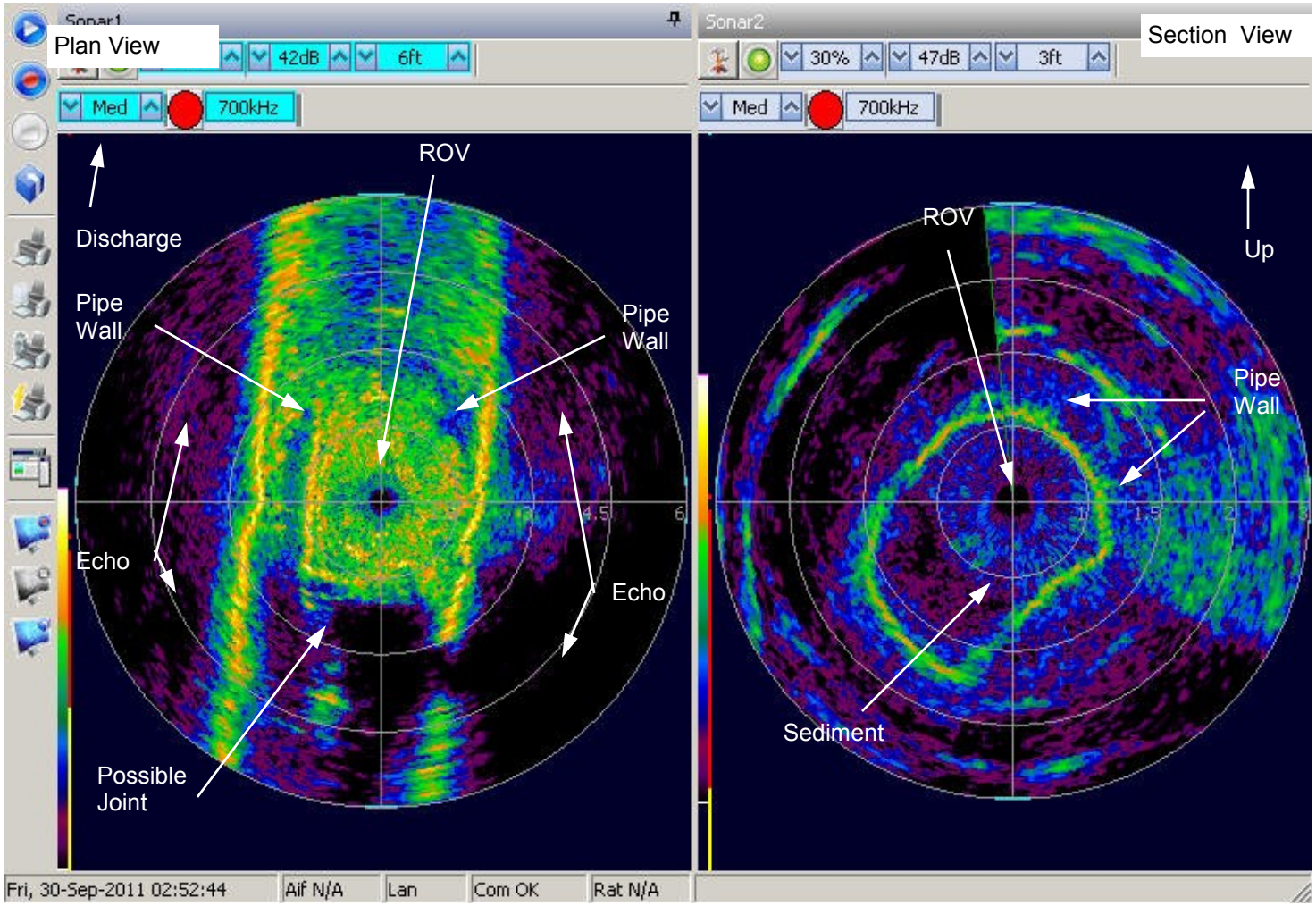
File Name: MorroSept041.jpg
Tether payout: 5400 feet



Notes: Approximately 2” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

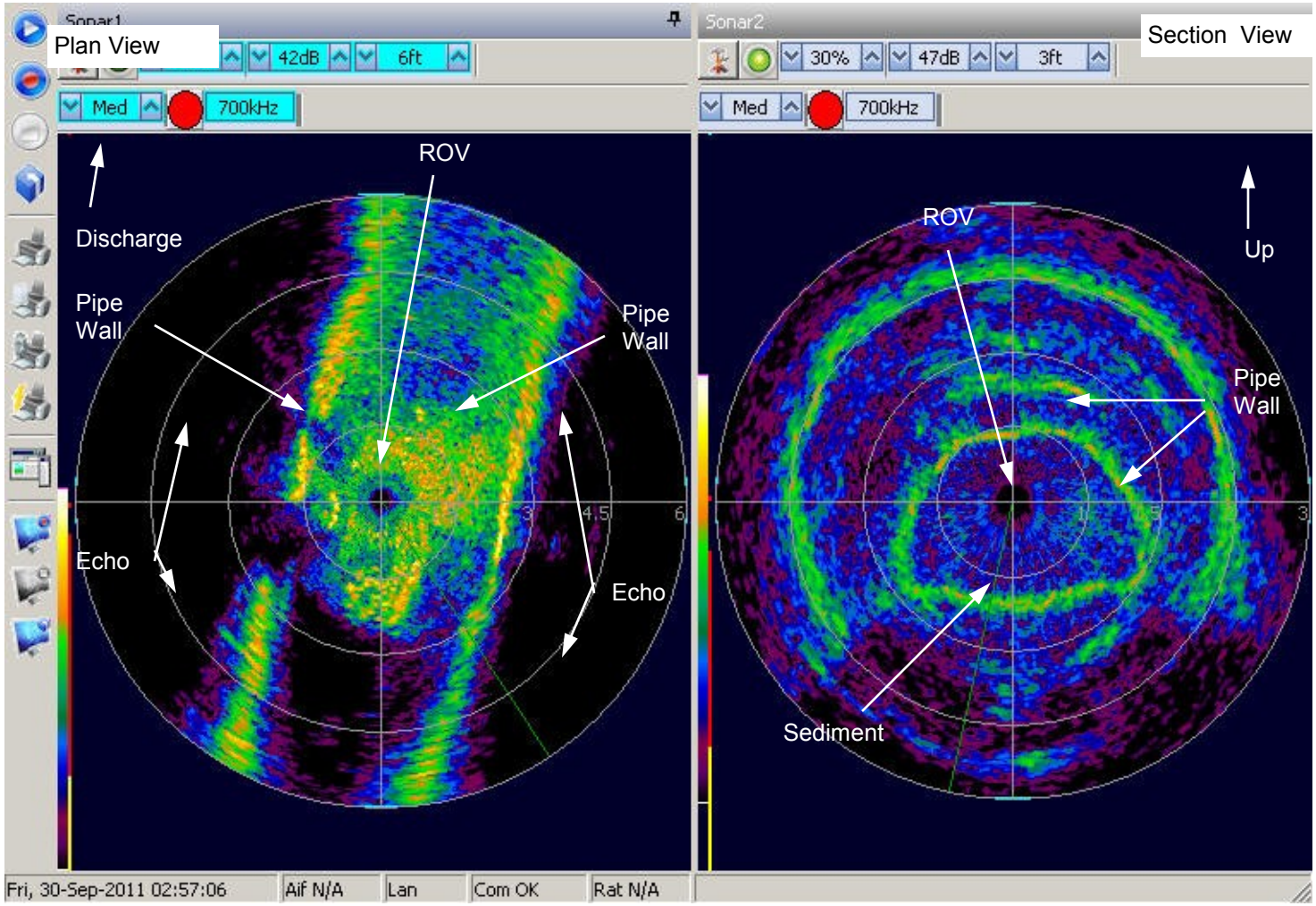
File Name: MorroSept042.jpg
Tether payout: 5500 feet



Notes: Approximately 4” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

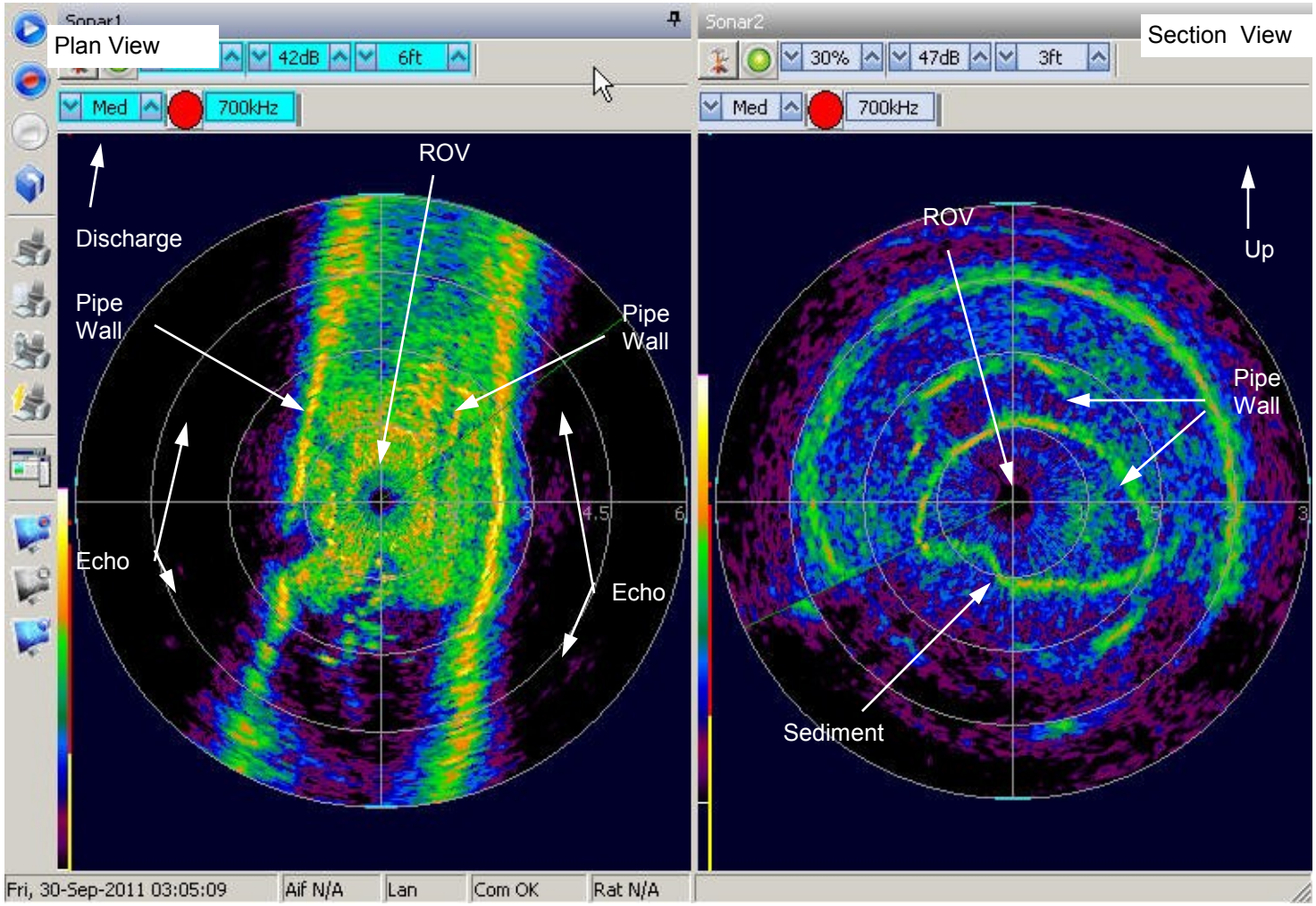
File Name: MorroSept043.jpg
Tether payout: 5600 feet



Notes: Approximately 6” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

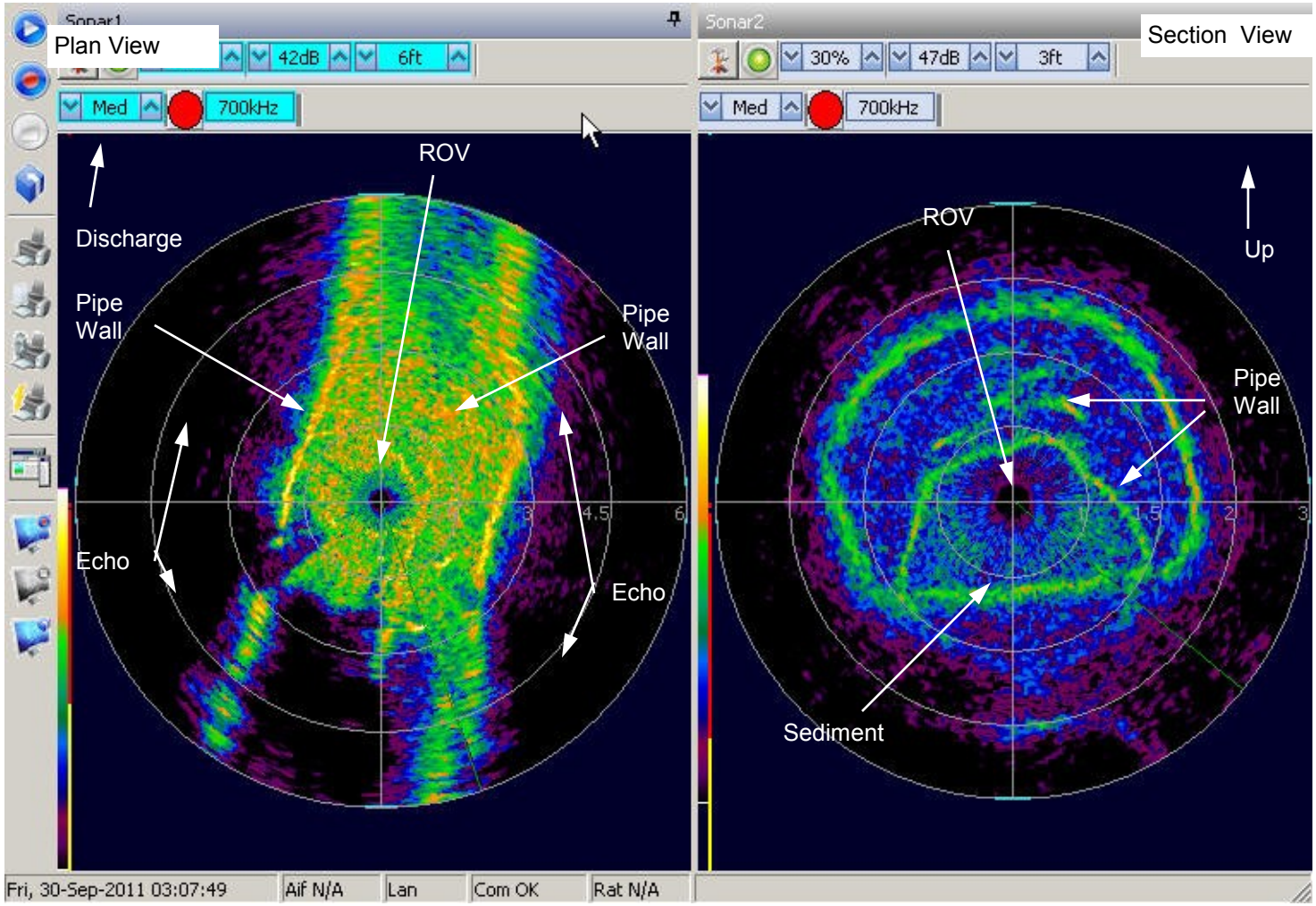
File Name: MorroSept044.jpg
Tether payout: 5800 feet



Notes: Approximately 6” of sediment.

Site: Morro Bay Waste Water Treatment Plant
Mobilization 2

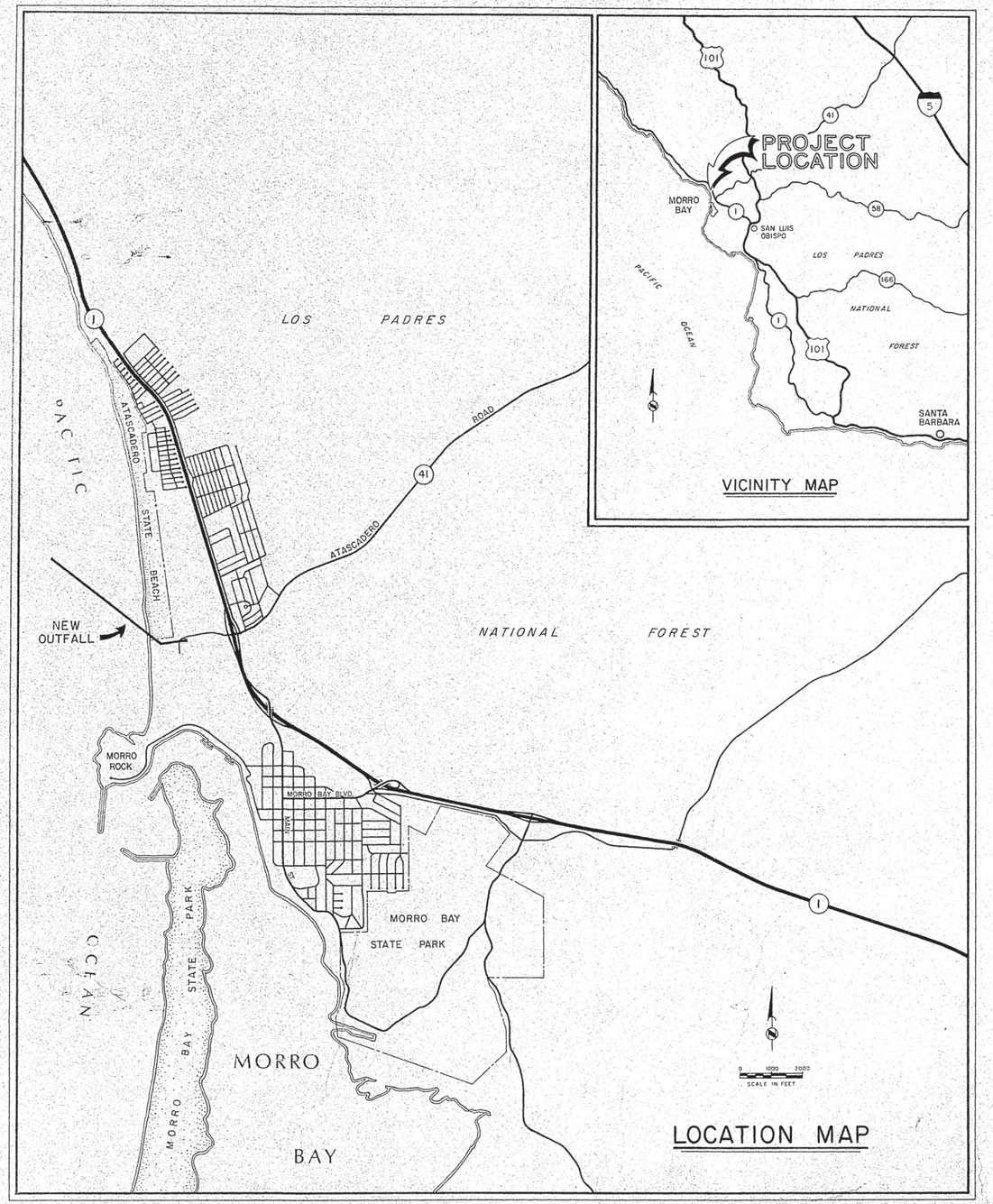
File Name: MorroSept045.jpg
Tether payout: 5900 feet



Notes: Approximately 6” of sediment.—too much for ROV to pass

Appendix B

MORRO BAY – CAYUCOS OUTFALL RECORD DRAWINGS



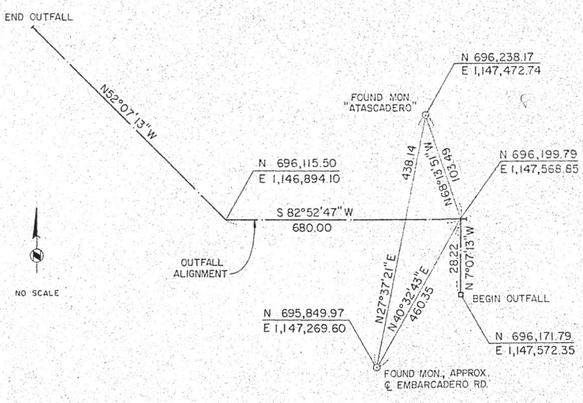
LOCATION MAP

VICINITY MAP

INDEX OF DRAWINGS

DRAWING NO.	SHEET NO.	TITLE
G1	1	LOCATION AND VICINITY MAPS, SURVEY CONTROL AND INDEX OF DRAWINGS
P1	2	PLAN AND PROFILE - STA. 1+00 TO STA. 10+00
P2	3	PLAN AND PROFILE - STA. 10+00 TO STA. 52+60
P3	4	SECTIONS AND DETAILS
P4	5	SECTIONS AND DETAILS

SURVEY CONTROL



CROSS - REFERENCING

SECTION CUT ON DRAWING: 1/P3 — SECTION NUMBER; DRAWING ON WHICH SECTION APPEARS

SECTION SHOWN ON DRAWING: SECTION 1/P3 — SECTION NUMBER; DRAWING FROM WHICH SECTION WAS TAKEN

NOTE: DETAILS SHOWN IN SIMILAR MANNER EXCEPT IDENTIFIED BY LETTER RATHER THAN NUMBER.

REVISED DRAWING 8/18/82

REGISTERED PROFESSIONAL ENGINEER MICHAEL G. HOOVER No. 11955 CIVIL STATE OF CALIFORNIA

BCDSPB

BROWN AND CALDWELL
CONSULTING ENGINEERS
EUGENE • PASADENA • SEATTLE
TUCSON • WALNUT CREEK

DESIGNED BAP
CHECKED BAP
CHECKED LYY

SUBMITTED DATE 1-13-81
APPROVED DATE 1-13-81
APPROVED For Brown and Caldwell DATE 7-22-81
For City of Morro Bay

FILE 515
DATE SEPT. '80

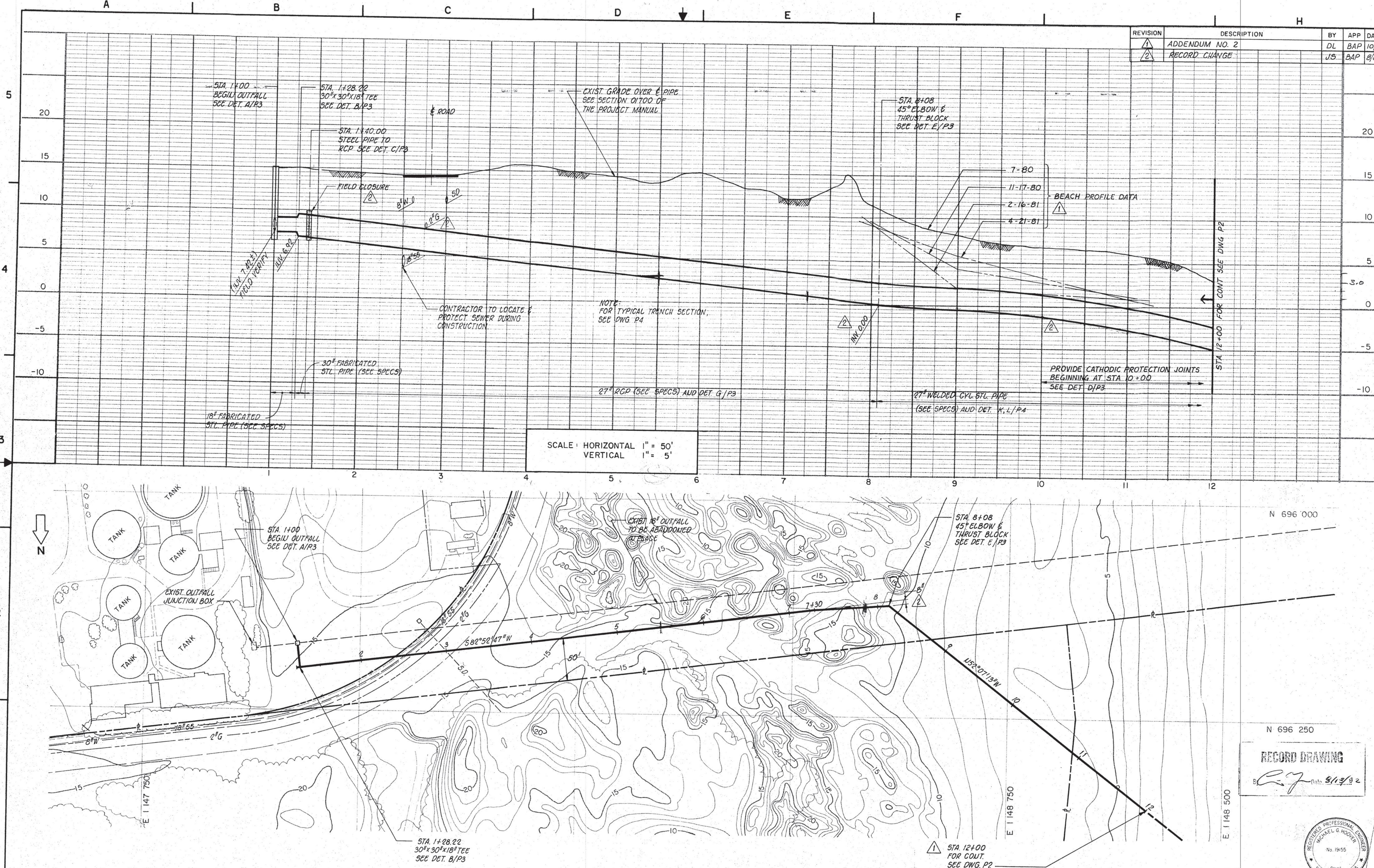
CITY OF MORRO BAY

MORRO BAY - CAYUCOS OUTFALL

LOCATION AND VICINITY MAPS, SURVEY CONTROL AND INDEX OF DRAWINGS

DRAWING NUMBER G1
SHEET 1 OF 5

REVISION	DESCRIPTION	BY	APP	DATE
1	ADDENDUM NO. 2	DL	BAP	10/81
2	RECORD CHANGE	JS	BAP	8/82



RECORD DRAWING

Date 3/13/92

REGISTERED PROFESSIONAL ENGINEER MICHAEL G. HOOVER No. 19455 CIVIL STATE OF CALIFORNIA

BCD6PB

BROWN AND CALDWELL CONSULTING ENGINEERS EUGENE • PASADENA • SEATTLE TUCSON • WALNUT CREEK	DESIGNED BAP CHECKED BAP CHECKED LYY	SUBMITTED — DATE 1-13-81 APPROVED Michael G. Hoover (For Brown and Caldwell) DATE 1-13-81 APPROVED (For City of Morro Bay) DATE 4-31-81	FILE 515 DATE SEPT. '80	CITY OF MORRO BAY	MORRO BAY - CAYUCOS OUTFALL	PLAN AND PROFILE STA. 1+00 TO STA. 10+00	DRAWING NUMBER P1 SHEET 2 OF 5

REVISION	DESCRIPTION	BY	APP	DATE
1	ADDENDUM NO. 2	DL	BAP	10/81
2	RECORD CHANGE	JS	BAP	8/82

TIDE — MLLW
=
6 ft high tide
= 6 ft − MLLW
6 ft − 2.8 = 3.2 ft
Add 3.2 ft to mean sea level
= 3.2 ft

SAW
½ pipe at
300-825'
12-3-10
Time 0645 Tide 7:19

BK - 462'
GH 666' SS 630
DB - 378' DW 575
LA 248'
JS - 501

EXIST. GRADE OVER 8" PIPE
MEAN HIGHER HIGH WATER EL. 2.40
MEAN SEA LEVEL EL. 0.00
MEAN LOWER LOW WATER EL. -2.80
STA 12+00 FOR CONT SEE DWG. P1
AS BUILT INV. ELEV. -3.00 @ STA. 15+50
PROVIDE CATHODIC PROTECTION JOINTS SEE DET D/P3
27" WELDED STL. CYL. PIPE (SEE SPECS) AND DET. K, L/P3
STA. 37+57
STA. 40+57
STA. 43+57
STA. 46+57
STA. 49+57
STA. 52+57
STA. 52+60
170' DIFFUSER SECTION, SEE DET. H/P4
BURIAL ANCHOR, TYP. SEE DET. M/P4

SCALE: HORIZONTAL 1" = 200'
VERTICAL 1" = 10'

NOTE: CHANGE IN SCALE FROM PREVIOUS DRAWING

EXIST. 18" OUTFALL
STA. 12+00 FOR CONT. SEE DWG. P1
STA. 10+00 P.C. N 696,000 R=1150 L=400
STA. 14+07 E.C.
STA. 14+87 B.C. R=210 L=120
STA. 16+07 E.C.
E 1,145,000
N 697,000
N 698,000
N 699,000
E 1,144,000
E 1,143,000
300' TYP.
BURIAL ANCHOR, TYP. SEE DET. M/P4
170' DIFFUSER SECTION, SEE DET. H/P4
STA. 52+60 END OUTFALL PIPELINE

RECORD DRAWING
By ____ Date 8/18/82

OCEAN BOTTOM PROFILE BELOW MEAN SEA LEVEL OBTAINED BY SOUNDINGS TAKEN JUNE, 1980

BEACH PROFILE ABOVE MEAN SEA LEVEL BASED ON SURVEY INFORMATION TAKEN JULY, 1980

REGISTERED PROFESSIONAL ENGINEER MICHAEL G. HARRIS No. 19155 CIVIL STATE OF CALIFORNIA

BCD6PB

BROWN AND CALDWELL
CONSULTING ENGINEERS
EUGENE • PASADENA • SEATTLE
TUCSON • WALNUT CREEK

DESIGNED BAP
CHECKED BAP
CHECKED LYY

SUBMITTED ____ DATE 1-13-81
APPROVED ____ For Brown and Caldwell DATE 1-13-81
APPROVED ____ For City of Morro Bay DATE 5-26-81

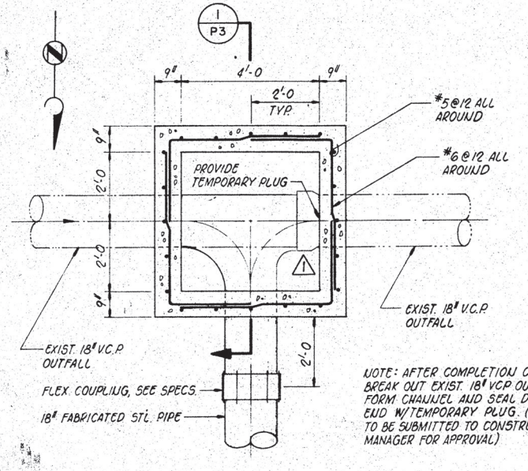
FILE 515
DATE SEPT. '80

CITY OF MORRO BAY

MORRO BAY - CAYUCOS OUTFALL

PLAN AND PROFILE
STA. 10+00 TO STA. 52+60

DRAWING NUMBER P2
SHEET 3 OF 5
D

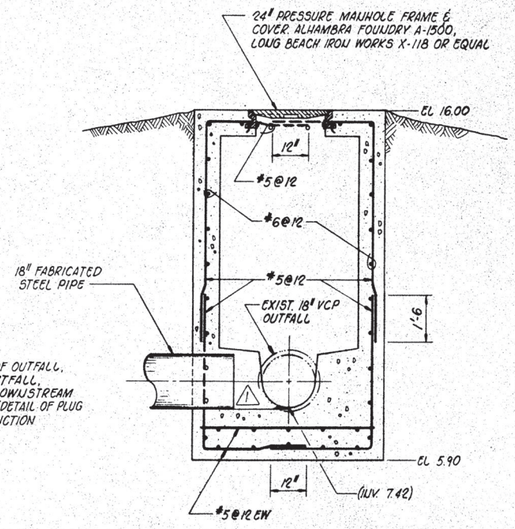


PLAN - PRESSURE MANHOLE

DETAIL (A / P1)

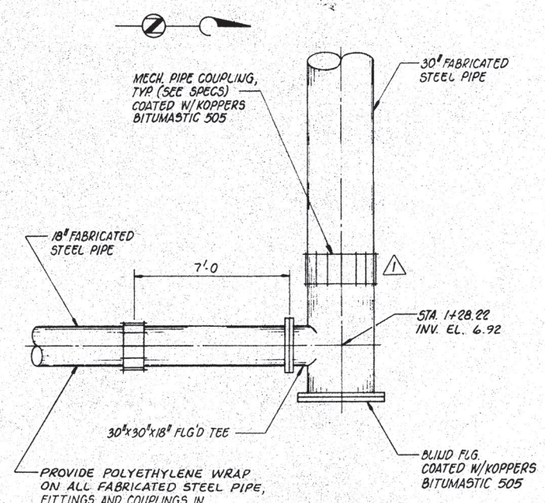
SCALE: 1/2" = 1'-0

NOTE: AFTER COMPLETION OF OUTFALL, BREAK OUT EXIST. 18" VCP OUTFALL, FORM CHANNEL AND SEAL DOWNSTREAM END W/TEMPORARY PLUG. (DETAIL OF PLUG TO BE SUBMITTED TO CONSTRUCTION MANAGER FOR APPROVAL)



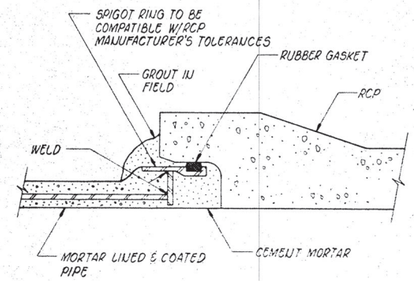
SECTION (1 / P3)

SCALE: 1/2" = 1'-0



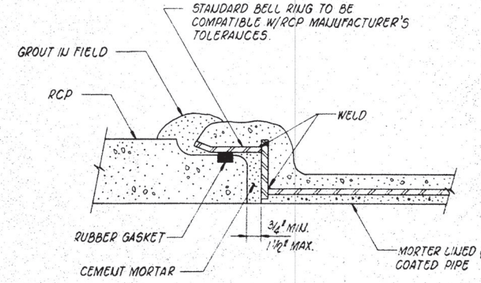
DETAIL (B / P1)

NO SCALE



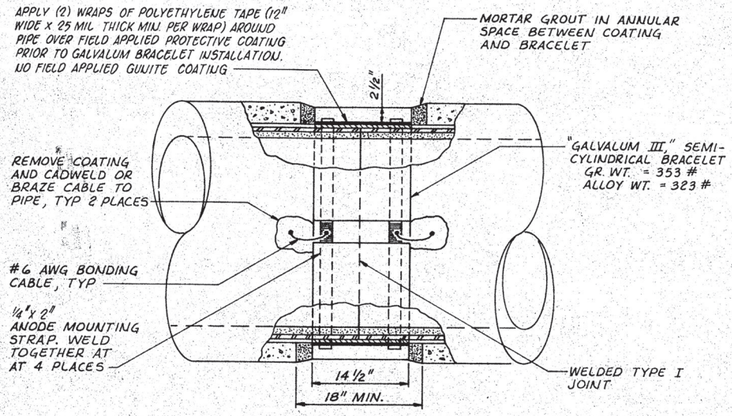
DETAIL (C / P1)

NO SCALE



DETAIL (F / P3)

NO SCALE



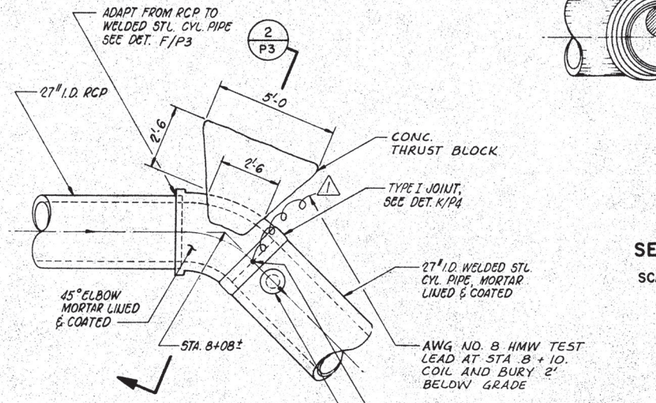
CATHODIC PROTECTION JOINT

DETAIL (D / P2)

NO SCALE

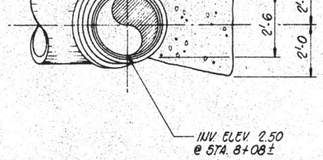
NOTES:

1. PREPARATION OF SURFACES AND INSTALLATION OF BRACELET AND CONNECTIONS SHALL BE IN STRICT ACCORDANCE WITH BRACELET MANUFACTURE'S INSTRUCTIONS.
2. PROVIDE 9 BRACELETS STARTING AT STA 10 + 00 AND ENDING AT STA 50 + 00. BRACELETS SHALL BE APPROXIMATELY EQUALLY SPACED AND SHALL BE LOCATED ON TYPE I JOINTS.
3. CATHODIC PROTECTION SYSTEM SHALL BE FIELD TESTED UPON COMPLETION OF OUTFALL CONSTRUCTION IN ACCORDANCE WITH PROCEDURES APPROVED BY THE CONSTRUCTION MANAGER.
4. PIPELINE BRACELET ANODES, HARCO CORP, VANODE CO., OR EQUAL.



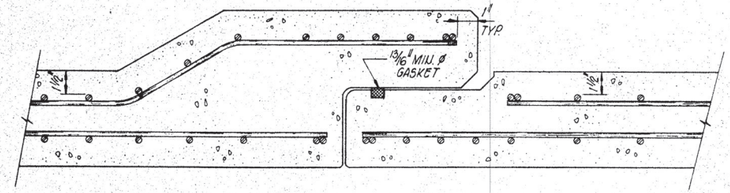
DETAIL (E / P1)

SCALE: 3/8" = 1'-0



SECTION (2 / P3)

SCALE: 3/8" = 1'-0



TYPICAL RCP JOINT

DETAIL (G / P1)

NO SCALE

RECORD DRAWING

By _____ Date 8/6/82

REGISTERED PROFESSIONAL ENGINEER MICHAEL G. HOOVER No. 19155 CIVIL STATE OF CALIFORNIA

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APVD
	1	RECORD CHANGE	8/82	BAP

DWG NO | SH

BCDSPB

BROWN AND CALDWELL
CONSULTING ENGINEERS
EUGENE • PASADENA • SEATTLE
TUCSON • WALNUT CREEK

DESIGNED BAP
CHECKED BAP
CHECKED LYY

SUBMITTED _____ DATE 1-13-81
APPROVED _____ DATE 1-13-81
For Brown and Caldwell
APPROVED _____ DATE 2-27-81
For City of Morro Bay

FILE 515
DATE SEPT. '80

CITY OF MORRO BAY

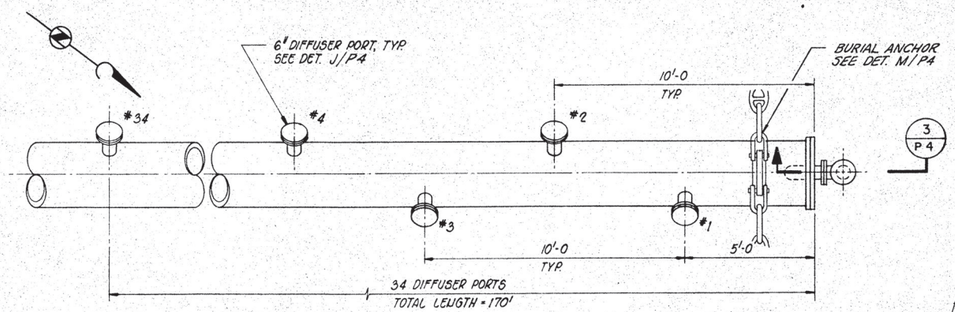
MORRO BAY - CAYUCOS OUTFALL

SECTIONS AND DETAILS

DRAWING NUMBER P3
SHEET 4 OF 5 D

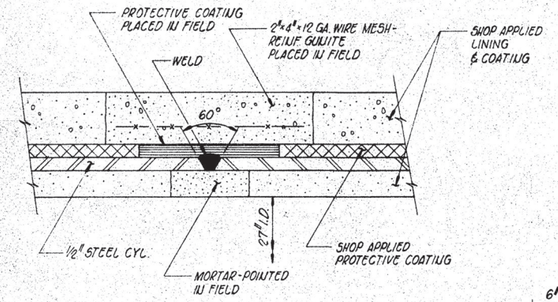
DWG NO	SH

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APVD
	1	RECORD CHANGE	6/82	BAP



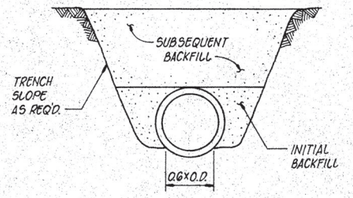
PLAN - DIFFUSER SECTION DETAIL (H/P2)

NO SCALE



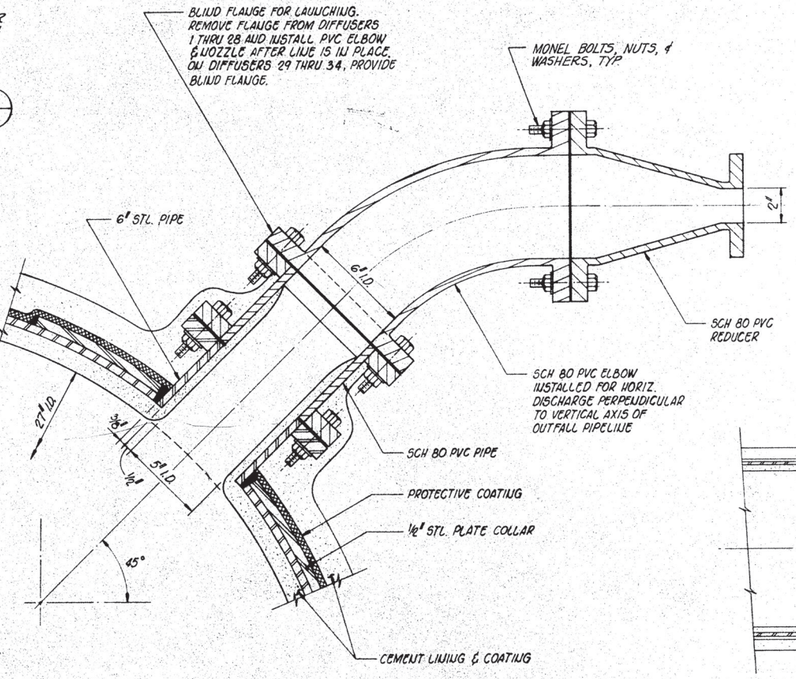
TYPE I JOINT DETAIL (K/P1 K/P2)

NO SCALE



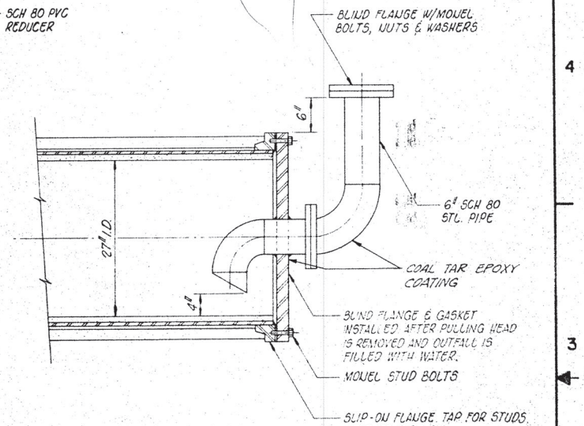
TYPICAL TRENCH SECTION FROM STA. 1+00 TO STA. 8+00±

NO SCALE



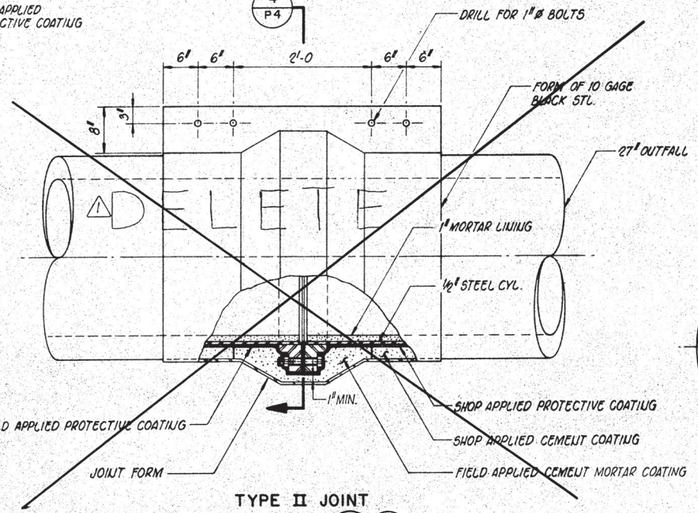
DIFFUSER PORT DETAIL (J/P4)

NO SCALE



NOTE:

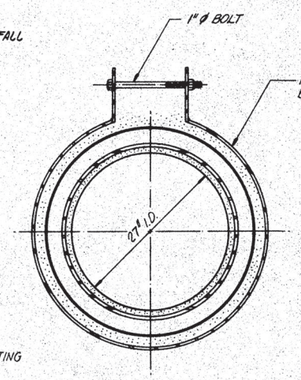
WHERE PAINTING IS REQUIRED, THE SURFACES SHALL BE COATED WITH 20 MILS OF COAL TAR EPOXY. PAINT SHALL BE KOPPER BITUMASTIC No. 300-M, ENGARD 463 EPOXY TAR COATING OR EQUAL. PREPARATION OF SURFACES AND APPLICATION OF PAINT SHALL BE IN STRICT ACCORDANCE WITH PAINT MANUFACTURER'S INSTRUCTIONS.



TYPE II JOINT DETAIL (L/P1 L/P2)

NO SCALE

NOTE: FORM TO REMAIN IN PLACE AFTER JOINT IS POURED.

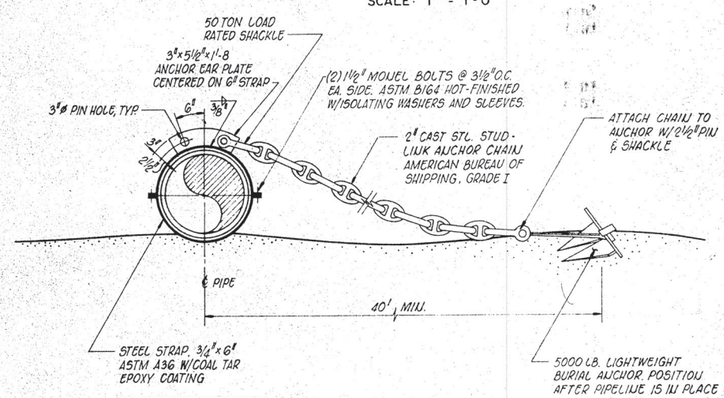


SECTION (4/P4)

NO SCALE

SECTION (3/P4)

SCALE: 1" = 1'-0



RECORD DRAWING

By _____ Date 5/18/82

BURIAL ANCHOR DETAIL (M/P2 M/P4)

NO SCALE

REGISTERED PROFESSIONAL ENGINEER MICHAEL G. HOPPER No. 19155 CIVIL STATE OF CALIFORNIA

BCDWP8

BROWN AND CALDWELL CONSULTING ENGINEERS EUGENE • PASADENA • SEATTLE TUCSON • WALNUT CREEK	DESIGNED BAP CHECKED BAP CHECKED LYY	SUBMITTED DATE 1-13-81 APPROVED DATE 1-13-81 APPROVED For Brown and Caldwell DATE 5-21-81 For City of Morro Bay	FILE 515 DATE SEPT. '80	CITY OF MORRO BAY	MORRO BAY - CAYUCOS OUTFALL	SECTIONS AND DETAILS	DRAWING NUMBER P4 SHEET 5 OF 5 D