

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



Th15a

Date Filed:	March 4, 2009
49 th Day:	April 22, 2009
180 th Day:	August 31, 2009
Staff:	Tom Luster-SF
Staff Report:	March 19, 2009
Hearing Date:	April 9, 2009

STAFF REPORT
COASTAL DEVELOPMENT PERMIT APPLICATION

APPLICATION FILE NO.: E-08-020

APPLICANT: West Basin Water District

LOCAL GOVERNMENT: City of Redondo Beach

PROJECT LOCATION: 1021 North Harbor Drive, City of Redondo Beach, County of Los Angeles

PROJECT DESCRIPTION: Construction and operation of a test desalination facility.

SUBSTANTIVE FILE DOCUMENTS: See Appendix A

STAFF RECOMMENDATION: Approval with conditions

EXHIBIT 1: Location Map

EXHIBIT 2: Site Layout

EXHIBIT 3: Wedgewire Screen System Diagram

EXHIBIT 4: Subsurface Intake Diagram

SUMMARY

Project Description: The proposed project is a temporary test desalination facility to be constructed and operated by the West Basin Water District. The District would use the facility to test the feasibility and effectiveness of various types of equipment, including two different screening systems meant to eliminate or reduce adverse effects on marine organisms. The facility would withdraw up to 580,000 gallons per day of seawater through an intake formerly used by the AES Redondo Beach power plant and now used by SEALab, a marine life education center, which draws in up to about 324,000 gallons per day. It would then separate, test, and recombine the water before discharging it back through a power plant outfall into the ocean near King Harbor.

Recommended findings herein evaluate the proposed project's conformity to Coastal Act provisions related to protection of marine life and water quality, placing fill in coastal waters, geologic stability, public access, and visual quality. Commission staff recommends **approval** of coastal development permit application No. E-08-020, as conditioned.

1.0 RECOMMENDED MOTION AND RESOLUTION

1.1 RECOMMENDED MOTION AND RESOLUTION

Staff recommends the Commission approve Coastal Development Permit No. E-08-020 subject to the conditions in Sections 2.0 and 3.0 below.

Motion

I move that the Commission approve Coastal Development Permit Application No. E-08-020 subject to the conditions set forth in the staff recommendation.

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by an affirmative vote by the majority of the Commissioners present.

RESOLUTION

The Commission hereby approves coastal development permit E-08-020 and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit complies with the California Environmental Quality Act because either: 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment; or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

2.0 STANDARD CONDITIONS

1. **Notice of Receipt and Acknowledgment:** This permit is not valid and development shall not commence until a copy of the permit, signed by the Permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. **Expiration:** If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. **Interpretation:** Any questions of intent or interpretation of any condition will be resolved by the Executive Director of the Commission (hereinafter, “Executive Director”) or the Commission.
4. **Assignment:** The permit may be assigned to any qualified person, provided the assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
5. **Terms and Conditions Run with the Land:** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

3.0 SPECIAL CONDITIONS

1. The Permittee shall submit to the Executive Director all reports describing the project’s effects on marine life. As described in the project’s Final Environmental Impact Report and the Permittee’s Intake Effects Assessment Study Plan (November 2008), these include an Aquatic Study Protocol, an Entrainment Study and Impact Assessment and quarterly progress reports. The Permittee shall also make available upon the Executive Director’s request all data collected regarding screen performance, marine life effects, and water quality effects.

If the Executive Director determines that the reports or data show project-related impacts are greater than those described in the permit application and in the Commission’s findings, the Permittee shall submit within three months of such determination a completed application to amend this permit that includes recommended mitigation for the identified adverse impacts.

2. The Permittee shall submit a complete application to amend this permit for any proposed increase in the project’s expected seawater use of 580,000 gallons per day or any proposed extension of the facility’s expected operating period of up to 42 months. The Permittee acknowledges that the Commission’s review and approval of this coastal development permit is for the test facility only. Any proposal to expand or extend the use of this test facility or to construct and operate a full-scale facility will require a separate permit application and will undergo separate review by the Commission.

3. Prior to starting construction, the Permittee shall provide for Executive Director review and approval documentation signed and stamped by a licensed civil engineer showing that the foundation to be built at the project site will be adequate to resist the seismic forces and the potential deformation due to liquefaction as identified in the project's geotechnical report (*Geotechnical Investigation WBMWD Temporary Ocean Water Desalination Project*, URS Corporation, February 1, 2008).

4.0 FINDINGS AND DECLARATIONS

4.1 PROJECT PURPOSE AND DESCRIPTION

PROJECT PURPOSE

The proposed project is a test desalination facility to be constructed and operated on a site adjacent to the AES Redondo Beach Generating Station (RBGS) in the City of Redondo Beach. (see Exhibit 1 – Location Map). The facility would be owned and operated by the West Basin Municipal Water District (the District). The main project purpose is to test various types of equipment to determine their efficiency in producing desalinated water or to determine their feasibility and effectiveness in reducing adverse effects on marine life. The project is meant to support local and regional planning efforts to determine how best to establish desalination as part of the area's water supply portfolio.

Note: The Commission's review and decision herein is for the test facility only. Any future proposed project will require additional Commission review. The Commission's decision on this current project does not affect its potential decisions on future projects.

The project's main objectives include:

- Assess the feasibility and effectiveness of two types of intakes – a passively-screened open water intake and a subsurface intake – for avoiding or reducing the project's effects on marine life;
- Evaluate various pretreatment methods, types of desalination equipment, etc., and test their effects on finished water quality; and,
- Provide public education opportunities.

Regarding the effects on marine life, there is increasing interest in California in developing seawater desalination as a larger part of the state's water supply. However, past desalination methods have caused a number of adverse environmental effects, including marine life mortality, that might now be avoided or reduced. One of desalination's most significant adverse effects is caused by use of an open water intake, which can result in substantial loss of marine life due to entrainment and impingement (see Section 4.4.1 of these Findings for a more complete discussion of these adverse effects). The District is proposing this project in part to help determine whether two alternatives to an open water intake might be feasibly used to avoid or reduce impacts to marine life.

PROJECT DESCRIPTION

The test facility would be built at a previously developed site adjacent to the RBGS. Part of the site is currently used by the Science, Education, & Adventure Lab (SEALab), a coastal science and education center operated by the Los Angeles Conservation Corps (see Exhibit 2 – Site Layout). The facility would be built on a 40' X 100' area of the site currently used for equipment storage. It would share with SEALab the use of one of the power plant's three intakes and would discharge its brine through one of the power plant's outfalls. The power plant no longer uses this intake and SEALab uses it only intermittently, so the facility would represent a new and increased use of seawater of up to about 580,000 gallons per day (GPD). The power plant uses the outfall only intermittently, so the facility would represent a change to the existing discharge. The proposed project also includes improvements to the adjacent and currently abandoned RBGS pumphouse to allow it to be used for educational exhibits and meetings.

Main features of the overall project include:

- **Temporary Desalination Facility:** This would consist of various pumps, equipment used to pretreat and treat seawater, monitoring and test equipment, and other similar devices. It would be housed beneath an all-weather canopy covering an area about 97 feet by 40 feet, and would be partially open on all sides. The facility would treat up to about 100,000 GPD of seawater (approximately 70 gallons per minute) to create about 50,000 GPD of potable water and 50,000 GPD of concentrate with a salinity about twice that of seawater. These two streams would be recombined in a holding tank at the facility before being discharged through an existing power plant outfall. The remaining 480,000 GPD would be used to test the two types of screening systems described below.
- **Ocean Intake Systems:** The facility would use an existing RBGS intake that was formerly used to provide cooling water to the power plant's now-decommissioned Units 1-4. SEALab currently uses the intake to provide up to about 324,000 GPD for its various marine life tanks and exhibits. The 10-foot diameter intake structure extends about 1600 feet from the shoreline and draws in seawater from about 22 feet below Mean Lower Low Water.

The District would install two different types of intakes on or within the structure – a passively screened wedgewire system and a subsurface intake system:

- **Passive Screening Wedgewire System:** The District would install two wedgewire screen devices at the seaward end of the intake, each just over one foot in diameter (see Exhibit 3 – Wedgewire Screen System Diagram). To test the effectiveness of different screen sizes, one device would use a 1.0-millimeter screen; the other a 2.0-millimeter screen. This system would also include two six-inch diameter HDPE feedwater pipes to bring water from the screens to the desalination facility and another similar pipe to carry air-cleaning lines and chlorine treatments to the wedgewire devices.

Wedgewire screen systems have been shown to be effective for reducing entrainment in freshwater environments but have not been proven in marine environments. These screens appear to work best in areas with steady water velocities and unidirectional currents, as most often found in rivers rather than nearshore coastal environments. However, recent laboratory tests have shown that screen effectiveness may rely in part on the relationship between the “sweeping velocity” – that is, the rate of flow past the screen – and the “through-screen velocity”.¹ The District’s modeling of flows off Redondo Beach shows that the combination of prevailing currents and local turbulent flows resulting from the screen interaction with ocean swells may provide adequate sweeping flows. The project would provide an opportunity to test actual screen performance against these modeling results and to determine their site-specific effectiveness in reducing entrainment. The screen will operate at “through-screen velocities” at flows of 0.5 feet per second (fps) or less, which is considered by U.S. EPA guidelines as the velocity range in which impingement impacts are *de minimis*. The District will test the effectiveness of the screens through monitoring the intake and concurrently conducting an entrainment study, as described in Section 4.4.1 of these Findings.

Wedgewire screens are also subject to high rates of biofouling, particularly in estuarine and marine waters, which both reduces screen effectiveness and makes it difficult to measure actual reductions in impacts to marine organisms. To address this issue, the District plans to use screens constructed with a copper nickel alloy that has been shown to resist biofouling. As noted above, the project also includes an air line and a chlorine line, which would be used as needed to help clear any fouling that does occur. Part of the testing the District will conduct includes determining the rate of biofouling, the amount of maintenance and cleaning needed, and the overall effectiveness of the test alloy.

- ***Subsurface Intake System:*** The District will install a four-inch diameter HDPE pipe running from the seaward end of the intake to the SEALab forebay, where it will connect to a sand media filter system (see Exhibit 4 – Subsurface Intake Diagram). This pipe will include a bar screen at the intake end to help reduce impingement.

This system is meant to mimic one of several types of seafloor subsurface intakes, which have been shown to be effective in completely avoiding or significantly reducing entrainment impacts. These types of intakes pull seawater at a very low velocity through an overlying layer of sand or similar substrate and then into a desalination facility. The main type of adverse effect resulting from these intakes is seafloor disturbance during installation; however, because this system will be installed within an existing structure, it will not cause this disturbance.

¹ See, for example, *Electric Power Research Institute, Laboratory Evaluation of Wedgewire Screens for Protecting Early Life Stages of Fish at Cooling Water Intakes*, Palo Alto, CA, May 2003.

The system is designed to pull in about 80,000 GPD (or about 55 gallons per minute) through the intake. Of this amount, only about five gallons per minute will be pulled through the sand filter, and the remaining 50 gallons per minute will bypass the filter and be returned to the ocean. The low velocity (less than 0.5 fps) and the high ratio of bypass flows are expected to allow most of the entrainable organisms to continue moving past the sand filter and avoid entrainment.

- **Monitoring and Maintenance:** The District plans to conduct ongoing monitoring and maintenance as part of the project. Monitoring will include sampling entrained organisms from within the screens, determining the rate of biofouling on the screens through visual and photographic analysis and by examining the screens post-installation for corrosion. Maintenance is likely to include screen cleaning through air blasts, application of chlorine, or manual cleaning. Additionally, prior to installing equipment within the intake, the District will remove sediment that has collected within by vacuuming it out and disposing of it at an upland location.
- **Improvements to Existing Structures – Pumphouse and Intake:** The project is adjacent to a pumphouse formerly used by the power plant. The pumphouse will be improved with new flooring, electrical systems, lighting, paint, etc., to create an area to be used for informational displays, tours, and informal gatherings.
- **Decommissioning:** The District proposes to operate the facility for two years, with a possible extension of up to 18 months. At the end of operations, the District will remove the wedgewire systems, the piping within the intake, and the pumps, as well as any project-related improvements deemed undesirable by SEALab. The District will collaborate with the City and SEALab regarding final disposition of the canopy.

PROJECT SETTING

The project site is within an area of harbor-oriented commercial, industrial, and residential uses. It is bounded by North Harbor Drive and RBGS, the former RBGS pumphouse, a restaurant, and apartments. The upland portion of the project would be located about 700 feet from the shoreline of King Harbor, which provides various recreational facilities, including a marina and swimming area. There is a public parking area just to the north of the project site at the southern terminus of The Strand, an improved public right-of-way that extends along the shoreline for about four miles between the Cities of El Segundo and Hermosa Beach. The Strand is used by residents and visitors for recreation (walking, jogging, biking, etc.) and for shoreline access.

4.2 COASTAL COMMISSION JURISDICTION AND STANDARD OF REVIEW

The project would be located on land within the City of Redondo Beach and in the nearshore coastal waters of the Pacific Ocean. Portions of the project in coastal waters are within the Commission's retained permit jurisdiction. The land-based portion of the project is within the coastal zone but outside the area covered by the City's certified Local Coastal Program (LCP).² The entire project is therefore within the Commission's retained jurisdiction, and the standard of review is Chapter 3 of the Coastal Act.

4.3 OTHER PERMITS AND APPROVALS

- California Environmental Quality Act: Final Environmental Impact Report (lead agency: West Basin Municipal Water District), certified December 22, 2008.
- Regional Water Quality Control Board: pending Waste Discharge Permit/NPDES Permit, Section 401 Water Quality Certification.
- Corps of Engineers, Letter of Permission #SPL-2008-00164-KW, March 19, 2009.

4.4 CONFORMITY TO APPLICABLE COASTAL ACT POLICIES

4.4.1 Marine Biological Resources and Water Quality

Coastal Act Section 30230 states:

Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Coastal Act Section 30231 states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

² This area is within the City's certified Land Use Program (LUP) but the Commission has not yet certified this area under the City's LCP. The City approved revisions to its LCP; however, the Commission has not yet acted on the submitted revisions. However, under both the City's existing General Plan and LUP and the proposed LCP amendments, the project site designations – "Coastal Commercial" and "Commercial Recreation" – allow for public utilities such as the proposed project.

The proposed project is subject to the above Coastal Act provisions related to the protection of marine life and water quality, including requirements that marine resources be maintained, enhanced, and where feasible, restored. They also require that development minimize adverse effects of entrainment and waste discharges and that the marine environment be used in a sustainable manner.

EFFECTS ON MARINE BIOLOGICAL RESOURCES AND WATER QUALITY CAUSED BY INTAKE

The proposed facility would represent a new seawater use of about 580,000 gallons per day. The water would be withdrawn from an open water intake that extends about 1600 feet offshore into Santa Monica Bay and pulls in seawater from about 20 feet below the water surface.

Santa Monica Bay provides habitat for a wide variety of marine organisms. The intake is located within Essential Fish Habitat as designated under both the Coastal Pelagic and the Pacific Groundfish Fisheries Management Plans. The Bay's marine community includes several species protected under state or federal endangered species acts. The bay is home to a number of marine mammals, which are protected under the federal Marine Mammal Protection Act, protected sea turtles, and protected bird species, including the California brown pelican, the California least tern, and others. For several reasons, however, the project is not expected to cause substantial adverse effects to the above types of organisms – the project intake is located in an area of mostly open, sandy seafloor without nearby sensitive habitat, the project will operate at relatively low flows and velocities, and the intake will be screened to prevent large organisms from being caught or injured.

The main adverse effects expected from use of this type of open water intake are impingement and entrainment. Impingement occurs when fish or other organisms are killed or injured by being caught on an intake's screening system. The rate of impingement at an intake is largely related to the velocity of the water being pulled into the intake. Entrainment occurs when small organisms, such as plankton, fish eggs, larvae, etc., are pulled into an open-water intake and killed when exposed to stressors such as high pressure, turbulence, being pulled into filters, etc. Entrainment rates are related primarily to the density of organisms within the source water and the amount of water being pulled into the intake.

At large-scale intakes, such as those used by coastal power plants or full-scale desalination facilities that withdraw millions to hundreds of millions of gallons per day of seawater, impingement and entrainment impacts can be significant. Impingement can result in the death of, or injury to, hundreds of adult fish each day. Entrainment can result in a loss of organisms each year equal to that produced in dozens or hundreds of acres of ocean and estuarine habitat. Entrainment losses are commonly measured as "Area of Production Foregone", which represents the area of habitat needed to produce the fish larvae and invertebrates of each species lost due to entrainment. It is based on the extent of habitat in which entrainable larvae are subject to being pulled in to the intake (the "source water population") multiplied by the percentage of larvae from that area actually pulled in. For example, if the source water area for a particular species covers 10,000 acres and the intake pulls in 1% of the larvae within that area, the Area of Production Foregone for that species would be $10,000 \text{ acres} \times 0.01 = 100 \text{ acres}$.

For this project, impingement and entrainment effects are expected to be relatively small. Regarding impingement, the project will limit its intake flows to at or below 0.5 feet per second, which is the velocity identified in U.S. EPA guidelines as a rate which usually allows fish to swim away from the pull of the intake and which generally results in *de minimis* impingement levels. Additionally, the wedgewire screens' small slot sizes (1.0 and 2.0 mm) and their sweeping flows make them unlikely to cause impingement. Further, the inlet of the subsurface intake pipe will include a 1.5-inch screen to additionally reduce the potential that adult fish would be pulled in to the system. With these measures, the Commission finds that the project will likely cause little, if any, impingement effects.

Regarding entrainment, the project will likely result in some level of entrainment, even with screens, simply because it will be pulling in seawater with organisms smaller than the screen slot sizes. The Commission usually requires an applicant to conduct an entrainment study prior to the proposed new or expanded use of an open water intake. These site-specific studies help identify expected entrainment impacts and may help assess whether there are feasible measures to avoid or reduce these impacts. These entrainment studies require at least one year of sampling followed by several months of data analysis to determine the type and extent of adverse effects on marine life. However, the Commission has determined that this proposed project, although it is expected to cause some entrainment, does not require the standard study prior to use, based on the following:

- One of the project's main objectives is testing the two types of intake systems to determine their effectiveness in reducing entrainment. Installations of both types in other locations have been shown to reduce entrainment, and the District's modeling results suggest the wedgewire screens will deflect many of the entrainable organisms away from the intakes and reduce entrainment substantially compared to an open intake.
- Much of the water pulled in to test the intakes will bypass the filters used for desalination and will be returned to the ocean. Most organisms in the bypass water will therefore not be subject to one of the main stressors in these systems that cause mortality, and may then have a higher rate of survival through the system.
- The adjacent power plant conducted entrainment sampling in 2006-07 that provides an adequate basis to determine that the intake's expected impacts are likely to be relatively small. That sampling showed that the most commonly entrained fish species – gobies, anchovies, and blennies – are those that are ubiquitous within Santa Monica Bay. The District concluded that the intake for this project would remove only a very small proportion (0.01 percent or less) of the source water populations of these species.
- Even if this project's screening systems are completely ineffective – that is, if they do not reduce entrainment at all – results from recent entrainment samples and studies suggest that the intake's 580,000 gallons per day withdrawal would result in an Annual Production Foregone of less than 0.3 acres of open water habitat.³

³ For example, at the Huntington Beach Generating Station, which has a similar intake located in similar nearshore habitat about 35 miles south of this project site, a 2004-05 entrainment study found that an intake rate of 254 million gallons per day would result in an Area of Production Foregone of about 120 acres of lost nearshore aquatic habitat. Applying that ratio to this project suggests its intake flows would result in an Area of Production Foregone of about 0.27 acres. While this projection does not necessarily provide a precise basis for determining this project's expected entrainment impacts, it strongly suggests the expected impacts would be relatively small.

As part of its project and in part to confirm these expectations, the District will conduct an entrainment study during the project as part of its sampling and testing. Given the relatively small expected impact and the temporary nature of the project, the Commission is not at this time requiring an advance entrainment study or entrainment mitigation. However, **Special Condition 1** requires the District to report the results of its monitoring and testing efforts to the Executive Director. It additionally requires that the District submit a permit amendment with proposed mitigation if the project's impacts to marine life are greater than anticipated. To further ensure the project's potential impacts are limited, **Special Condition 2** requires the District to submit a completed application for a permit amendment for any proposed increase in the amount of water used (i.e., more than 580,000 GPD) or any operating extension beyond the proposed 42-month operating period. Therefore, and as described above, the Commission finds that the project, as conditioned, is not expected to result in substantial entrainment impacts.

EFFECTS ON MARINE BIOLOGICAL RESOURCES DUE TO DISCHARGE

The facility would result in a new discharge to coastal waters. As noted previously, the facility would withdraw, treat, and process seawater to create a stream of permeate (potable water) and a stream of concentrated seawater, but would then recombine the two streams and discharge most of the withdrawn water back in to the ocean through an existing RBGS outfall. A small amount of the processed water present during cleaning will be discharged to the sanitary sewer system or will be retained for testing purposes. The discharge to the existing RBGS will have essentially the same salinity concentration as the ambient seawater.

During normal operations, the District will combine the two streams in a holding tank before discharging the water to the ocean. During processing, the District will add various cleaning chemicals, antiscalants, coagulants, and other similar water treatment chemicals, and will occasionally backwash various filters in the facility to remove solids. When concentrated cleaning chemicals are used, the discharge will be routed to a sanitary sewer. The District conducted a dilution analysis⁴ that showed the project's discharge would cause minimal to non-detectable changes in the receiving water under expected conditions.

Pursuant to the project's NPDES permit, all discharges are required to be consistent with the California Ocean Plan, which prohibits degradation of marine communities and discharges that can create toxic effects. The project's discharges are therefore expected to cause few, if any, detectable changes to the receiving seawater or nearby marine communities.

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the applicable provisions of Coastal Act Sections 30230 and 30231.

⁴ Jenkins, Scott, PhD, and Joseph Wasyl. *Receiving Water Dilution Analysis for the West Basin Municipal Water District Redondo Beach Temporary Ocean Water Desalination Facility*, November 10, 2008.

4.4.2 Fill in Coastal Waters

Coastal Act Section 30233(a) states:

The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

- (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.*
- (2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.*
- (3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.*
- (4) Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.*
- (5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
- (6) Restoration purposes.*
- (7) Nature study, aquaculture, or similar resource-dependent activities.*

Analysis of Proposed Dredging for Conformity to Coastal Act Section 30233(a): The project would result in fill within coastal waters in the form of new screens, pipes, and test equipment attached to the existing power plant intake. Coastal Act Section 30233(a) imposes a three-part “test” to determine whether such fill is allowable under the Act:

- 1) *Is the activity an allowable use?:* Proposed fill in coastal waters must fall within one of the categories of allowable uses identified in Section 30233(a). The purpose of this project is to test the feasibility and effectiveness of methods to reduce impacts caused by drawing seawater through an existing coastal-dependent industrial intake, and the project-related fill is considered part of this use. The Commission therefore is a use allowed under Section 30233(a)(1) and thereby meets the first test of Section 30233(a).
- 2) *Are there no feasible, less environmentally damaging alternatives?:* As noted above, the project purpose is to test equipment under controlled conditions on an existing seawater intake. The project’s Final Environmental Impact Report (FEIR) considered other potential alternative sites, including another nearby coastal power plant, but identified none that were available. While other similar intakes may be available nearby, those that are in open coastal waters would likely result in a similar level of environmental impact and those in estuarine areas would likely result in even greater adverse impacts due to higher concentrations of entrainable marine organisms. At nearby intakes that continue to be used for power plant cooling, the District would not have the degree of control needed over the amounts and rates of flow through the intake. Therefore, while other nearby intakes may be available, they are not feasible for the project or would not be less environmentally damaging. The Commission therefore finds the activity meets the second test of Section 30233(a).

- 3) *Have feasible mitigation measures been provided to minimize adverse environmental effects?:* As noted in Section 4.4.1 above, the District and the FEIR included with the project a number of mitigation measures to minimize impacts to marine life. The Commission is requiring additional measures through **Special Conditions 1 and 2** to ensure the project results in full conformity to applicable Coastal Act policies related to protecting marine life and water quality. The Commission therefore finds the project as proposed and conditioned meets the third test of Section 30233(a).

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the applicable provisions of Coastal Act Section 30233(a).

4.4.3 Geologic Stability

Coastal Act Section 30253 states, in relevant part:

New development shall do all of the following:

- (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs...*

Provisions of the above policy applicable to this project require that new development minimize risk and assure stability and structural integrity. The District's geotechnical study and subsurface investigations⁵ identified two main geologic concerns to address as part of project design and operation – seismic activity and liquefaction:

- **Seismic Activity:** The project site does not include any known faults or ruptures and is not within an Alquist-Priolo Fault Rupture Hazard Zone. The nearest known potential seismic source is the Palos Verdes Hills fault zone, which at its closest is about a mile southwest of the site. Other nearby faults include the Newport-Inglewood fault, about eight miles north-northeast of the site. The maximum magnitude earthquake expected in the area is expected to be about 7.1 on the Richter scale, which would result in groundshaking with Intensity in the range of VII to IX on the Modified Mercalli Scale.⁶

⁵ *Geotechnical Investigation WBMWD Temporary Ocean Water Desalination Demonstration Project, Final Report.* URS Corporation, February 1, 2008.

⁶ The Modified Mercalli Scale is used to measure the intensity of an earthquake. It is a qualitative twelve-step scale and ranges from **Intensity I – Instrumental**, which is barely noticeable, through **Intensity XII – Catastrophic**, which results in almost total damage to the built environment. The Scale at this site ranges from **Intensity VII – Very Strong** (“Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars.”) to **Intensity IX – Ruinous** (“General panic; damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.”).

- **Liquefaction:** During some seismic groundshaking events, certain soils can behave like a dense fluid and cause surface structures to sink or deform. Liquefaction most often occurs in relatively loose soils where groundwater is within 40-50 feet of the land surface.

The project site is underlain with artificial fill that the District believes was placed during development of the nearby King Harbor. This fill ranges from about 20 to 30 feet below the ground surface and is underlain by native beach deposits. Groundwater levels at the site are within six to nine feet of the surface, and geotechnical tests done at the site indicate soils could settle by up to about 3.5 inches due to liquefaction.

As noted above, Coastal Act Section 30253(b) requires that development assure stability and structural integrity. The District has included several features with the project to help address this requirement. It has stated that the project will be designed to accommodate the expected level of seismic shaking and will be constructed in a manner consistent with “Special Publication 117, Guidelines for Evaluation and Mitigating Seismic Hazards in California” (California Geological Survey, adopted March 1997 by the State Mining and Geology Board). These guidelines are meant to establish minimum construction standards to protect public safety during seismic events. The District will also avoid placing heavy equipment within the Pumphouse, which will reduce the potential for damage during such events. To address potential liquefaction, the District will replace the existing concrete foundation at the South Yard Equipment Area with a new foundation. The District’s engineer determined the preferred approach would be to install an extensive series of piles, although due to costs and the relatively short-term nature of the project, the District has elected instead to construct a more robust concrete foundation than is currently at the site that is expected to provide the needed level of stability. **Special Condition 3** would require the District to provide documentation from a licensed civil engineer stating that this foundation is designed to resist the seismic forces and the amount of displacement due to liquefaction identified in the project’s geotechnical report.

Regarding other components of Coastal Act Section 30253(b), the project is not expected to create or contribute significantly to erosion or geologic instability, as it will be built on a previously developed and relatively level site that will not require significant grading or landform alteration. Results of the District’s site investigation also show that other seismic and geological hazards, such as fault rupture, landslides, and expansive soils, are not expected at the site.

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the applicable provisions of Coastal Act Sections 30253(a) and (b).

4.4.4. Public Access

Coastal Act Section 30211 states:

Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

The project is expected to have no more than minor effects on public access to the shoreline. It would be located along North Harbor Drive, a main accessway to the nearby shoreline areas of King Harbor and Redondo Beach. During project construction, there will be brief periods during equipment delivery and during reconstruction of the site entry gate when minor traffic detours may be needed; however, interruptions are not expected during project operations.

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the applicable public access provisions of Coastal Act.

4.4.5 Visual Resources

Coastal Act Section 30251 states, in relevant part:

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas...

Upland portions of the project would be located within a developed, urban landscape within the City of Redondo Beach about 700 feet from the shoreline of King Harbor. The temporary desalination facility would be sited between the RBGS, SEALab, and various industrial, commercial, residential, and harbor-serving uses. There is an approximately 8 ½-foot high wall on three of the four sides of the facility site, so views from public areas are limited. To reduce any visual impacts, the District will install a canopy over the facility that will shield the pipes, tanks, and other equipment. The canopy will be partially visible from the street, but will include translucent panels to mimic the appearance of the adjacent Pumphouse. The canopy will also include a parapet to screen its corrugated roof from view. Overall, the canopy will be about 14 feet above grade and will therefore be visually subservient to the adjacent 35-foot high SEALab. With these measures, the facility is expected to fit within the existing industrial/commercial setting of the site and is not expected to create adverse visual impacts.

Project construction will require use of an offsite staging area to be located at a little-used parking lot at RBGS. This staging area will include a construction administrative trailer and storage for tools, equipment and temporary debris placement, and will be surrounded by an opaque security fence. Similar to the facility description above, this use is compatible with the existing surroundings and is not expected to create a substantial adverse visual impact. During

inwater construction and project demobilization, the District will use a barge and support boats to place and remove the screens, pipes, and other equipment within the intake; however, this work is expected to take only a few days and will cause only a minor visual disruption.

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the applicable provisions of Coastal Act Section 30251.

5.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT

On December 22, 2008, the West Basin Municipal Water District certified a Final Environmental Impact Report for the proposed project. Section 13096 of the Commission's administrative regulations requires Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of the CEQA prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant impacts that the activity may have on the environment. Mitigation measures that will minimize or avoid all significant adverse environmental impacts have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found consistent with the requirements of the Coastal Act and to conform to the CEQA.

APPENDIX A: SUBSTANTIVE FILE DOCUMENTS

- Final Environmental Impact Report: Temporary Ocean Water Desalination Demonstration Project, December 22, 2008, West Basin Municipal Water District.
- Coastal Development Permit Application (December 17, 2008) and subsequent submittals, West Basin Municipal Water District.



NOT TO SCALE

SOURCE: Thomas Brothers Los Angeles Co. 2006



1:17:08 JN 23-102173

EXHIBIT NO. 1
APPLICATION NO.
F-08-020

TEMPORARY OCEAN WATER DESALINATION DEMONSTRATION PROJECT
EXPANDED NOP

Site Vicinity Map

Exhibit 2



09-08-08 JUN 25 102173

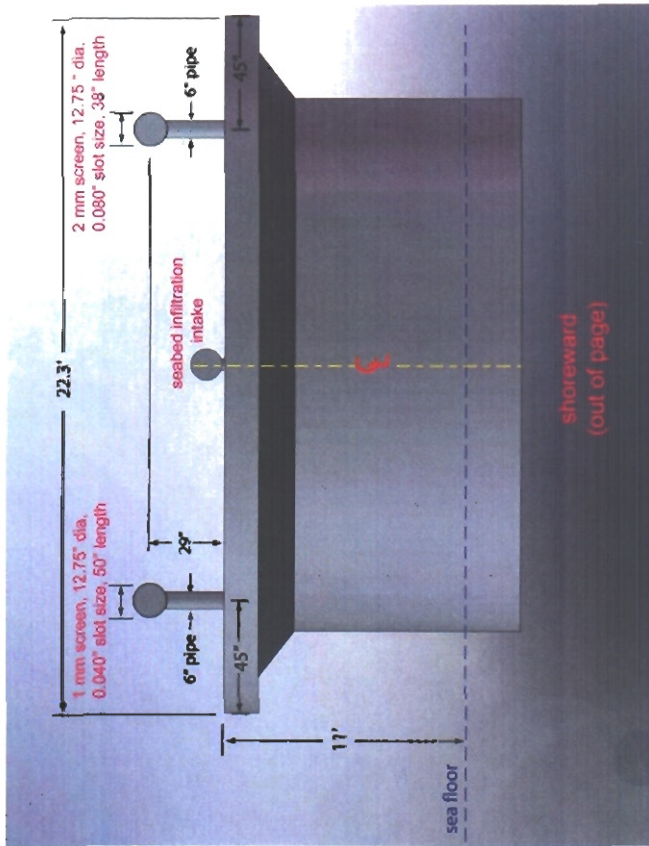
EXHIBIT NO. 2

APPLICATION NO.

E-08-020

TEMPORARY OCEAN WATER DESALINATION DEMONSTRATION PROJECT
 Intake & Discharge Location Map

EXHIBIT 3-11

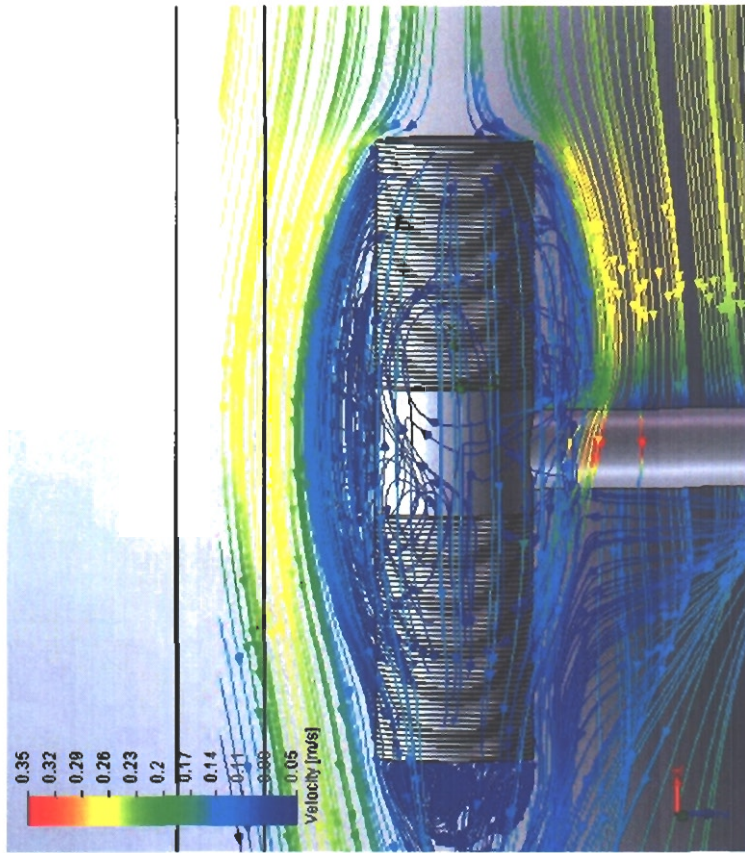


Front view of optimal layout of wedge-wire screens.

Source: Scott A. Jenkins Consulting

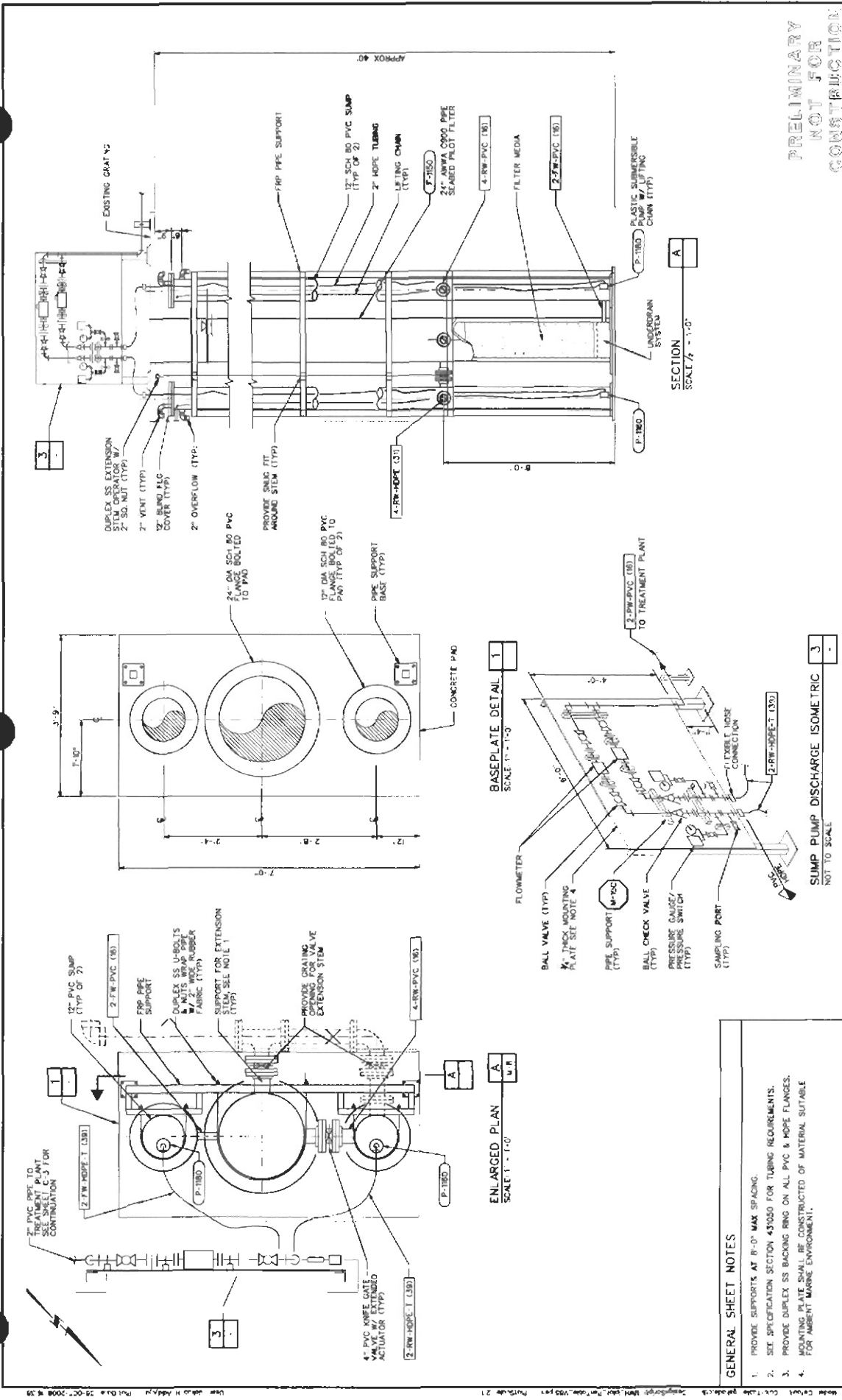


09-09-08 JUN 25 10:21:13



Interaction of the sweeping flow with the suction induced slot flow for the 1 mm wedge-wire screen drawing 350 gpm in a 25 cm/sec ambient flow atop the intake riser as shown in Figures 1.5 - 1.7 of the Wedge-Wire Intake Screen Flow Analysis prepared by Scott A. Jenkins, Ph.D. and Joseph Wasyli, September 19, 2008.

EXHIBIT NO. 3
APPLICATION NO.
E-08-020



GENERAL SHEET NOTES

1. PROVIDE SUPPORTS AT 8'-0" MAX SPACING.
2. SEE SPECIFICATION SECTION 43050 FOR TUBING REQUIREMENTS.
3. PROVIDE DUPLEX SS BACKING RING ON ALL PVC & HOPE FLANGES.
4. MOUNTING PLATE SHALL BE CONSTRUCTED OF MATERIAL SUITABLE FOR AMBIENT MARINE ENVIRONMENT.

PRELIMINARY
NOT FOR
CONSTRUCTION

DATE: 04.11.14	DESCRIPTION:	SCALE: AS NOTED	NO. OF SHEETS: 1	TOTAL SHEETS: 1	DESIGNED BY: J. KODAKA	DRAWN BY: R. LARROD	CHECKED BY: R. LARROD	DATE: 04.11.14
SUBMITTED BY: WEST BASIN MUNICIPAL WATER DISTRICT								
PROJECT MANAGERS NAME: GARY GALT								
COMPANY OR O&M'S NAME: MWH								
TEMPORARY OCEAN WATER DESALINATION DEMONSTRATION PROJECT								
SUBMERGED INTAKE PILOT MECHANICAL PLAN AND SECTION								
SHEET: M-9								

EXHIBIT NO. 4
APPLICATION NO.
E-08-020

