

J. Utilities Reports



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1.0 INTRODUCTION

The Pavilion at Oceanside is a proposed development (the Pavilion or Development) that is currently being planned within the City of Oceanside (City). This report is a water supply assessment (WSA) for the proposed Development that is being prepared on behalf of the City in order to satisfy the requirements set forth in Senate Bill 610 (SB 610).

As written in the “Guidebook for Implementation of Senate Bill 610 and Senate Bill 221” prepared by the California Department Water Resources, “Senate Bill 610 (Chapter 643, Statutes of 2001) and Senate Bill 221 (Chapter 642, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 are companion measures which seek to promote more collaborative planning between local water suppliers and cities and counties.”

“Both statutes require detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.”

“Under SB 610, water assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to the California Environmental Quality Act. Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply.”

The Pavilion is subject to the requirements of SB 610, and this WSA was written to satisfy these requirements. However the Pavilion is not subject to the requirements of SB 221 because it does not include a “subdivision” as defined in Government Code section 66473.7 to mean a residential development of more than 500 dwelling units for a public water system with more than 5,000 service connections. Hence, this WSA was not written to satisfy the requirements of SB 221.

1.1 Reference Projects

The City prepared a Water System Master Plan (WSMP) in 2006 to develop planning and projects to meet water system needs through the year 2030. The City used information and data developed for the 2006 WSMP to help develop an Urban Water Management Plan (UWMP) for 2005. The 2006 WSMP and the 2005 UWMP were adopted by the City and the 2005 UWMP was approved by the State. Information in this WSA is based on these two planning documents unless otherwise stated.

The land to be occupied by the proposed 92-acre Pavilion development was accounted for as commercial land use (Community Commercial) in the City’s 2006 WSMP and 2005 UWMP. A unit water use factor developed for commercial land use in the City was applied to this land to estimate a water demand for this land, which was included in all of the water demand projections in the City’s 2006 WSMP and 2005 UWMP. Accordingly, information directly taken from the City’s 2005 UWMP is used to satisfy pertinent requirements of this WSA.

2.0 PROJECT DESCRIPTION

The proposed Pavilion development is located in the northern portion of the City of Oceanside; east of U.S. Interstate 5 and west of E1 Camino Real. It is bound by open space to the north, Mission Avenue and Highway 76 to the south; existing development on Fireside Street to the east; and Fousat Road and the San Luis Rey River to the west. The project location is shown on Figure 1. The site functioned as a drive-in movie theater in the past, and is presently the location for a weekly swap meet. The City's reverse osmosis potable water treatment plant is located just to the north of the proposed development.

The proposed development will have 950,000 square feet of commercial building space over approximately 92 acres. Individual commercial spaces will range in size from approximately 4,000 square feet to 132,000 square feet to accommodate a movie theater, retail stores and shops, and restaurants. The proposed landscape coverage for the site (based on the most recent submittal and as shown on the tentative parcel map) is 16 acres, which is 18 percent of the net development area of 88.3 acres.

Water service to the project, which includes domestic, irrigation, and fire protection, would be provided by a private combined water system that would connect to the City's public water system. The on-site water system will supply the project's domestic service laterals, irrigation piping, fire hydrants, and fire sprinkler systems. The development's water system will also include the addition of a public water line adjacent to the project in Pala Road to serve the Pavilion development.

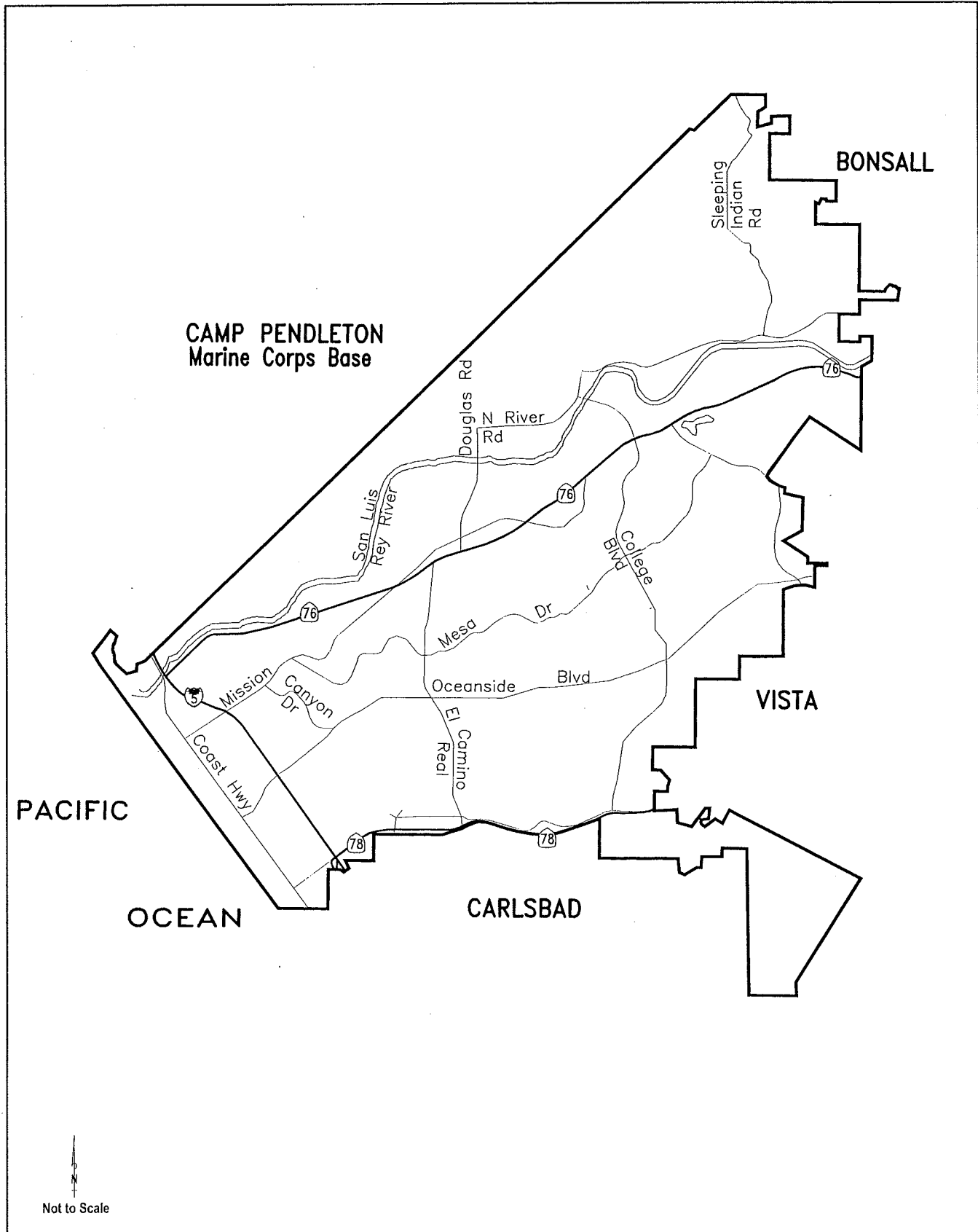
3.0 CITY CHARACTERISTICS

This section helps satisfy Section 5 (Step Three) of the Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 prepared by the California Department Water Resources (SB610 Guidebook) and pertains to State Water Code Section 10631.


The City, which encompasses approximately 42 square miles, is located in San Diego County (County), 35 miles north of the City of San Diego. The City is bordered on the west by the Pacific Ocean; on the north by Camp Pendleton Marine Base; on the south by the City of Carlsbad; and on the east by the City of Vista and unincorporated County land. A map of the City and surrounding municipalities is shown on Figure 1. The City, which was incorporated as a general law city in 1888, is governed by an elected five-member City Council. The City provides water service to the entire City through its Water Utilities Department, under the purview of the City Council.

3.1 Climate Characteristics

The City has a mild, coastal climate. As shown in Table 1, the average annual temperature is 60.7° F. Average rainfall is 10.4 inches as measured at the National Weather Service Oceanside Marina Weather Station 046377. This rainfall total is typical for Southern California, which is low compared with the national average.




 Not to Scale

| | | | |
|--|---|--|------------------------------------|
| <p>PLANS PREPARED BY: TETRA TECH, INC. 10815 Rancho Bernardo Rd, Suite 200 San Diego, California 92127 (658) 673-5505 (658) 673-1610 FAX</p> |  | <p align="center">CITY OF OCEANSIDE SERVICE AREA</p> | <p align="center">FIGURE 1</p> |
|--|---|--|------------------------------------|

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Evapotranspiration (ETo) is the quantity of moisture that is both transpired by plants and evaporated by the soil plant surfaces. ETo is important to irrigation management because crop yield relates directly to ETo. Irrigators who are working to achieve maximum yields need to apply water to meet the crop's ETo demand. As shown, the largest ETo demands occur in the summer months.

Table 1. Oceanside Climate Characteristics

| Climate Characteristic | Jan | Feb | Mar | Apr | May | Jun |
|--|------|------|------|------|------|------|
| Standard Monthly Avg ETo Demand (inches) | 2.08 | 2.40 | 3.70 | 4.79 | 5.35 | 5.72 |
| Average Rainfall (inches) | 2.14 | 2.16 | 1.73 | 0.97 | 0.21 | 0.08 |
| Average Temperature (Fahrenheit) | 54.2 | 54.7 | 55.6 | 57.7 | 60.7 | 63.4 |

Table 1 (continued). Oceanside Climate Characteristics

| Climate Characteristic | July | Aug | Sep | Oct | Nov | Dec | Annual |
|--|------|------|------|------|------|------|--------|
| Standard Monthly Avg ETo Demand (inches) | 6.06 | 5.98 | 4.60 | 3.61 | 2.44 | 1.99 | 48.7 |
| Average Rainfall (inches) | 0.03 | 0.08 | 0.26 | 0.38 | 1.08 | 1.27 | 10.4 |
| Average Temperature (Fahrenheit) | 67.2 | 68.8 | 67.3 | 63.7 | 58.6 | 54.7 | 60.7 |

3.2 City Population and Housing

Historical and projected City population and housing characteristics are shown in Table 2 and on Figure 2. Between 1990 and 2005, City population and total dwelling units increased 36.7 percent and 24.6 percent, respectively. As provided from the San Diego Association of Governments (SANDAG), the City's population is projected to increase 18.0 percent from 175,085 in 2005 to 206,607 in 2030, with total dwelling units (DUs) increasing 11.2 percent from 63,568 to 70,674.

The percentage of vacant DUs in the City decreased from 8.6 percent in 1990 to 5.2 percent in 2005. This percentage is projected to decrease to 3.35 percent by 2030. The number of people per occupied DU (population density) is projected to increase from 2.90 in 2005 to 3.02 by 2030, which is an increase of approximately 4 percent. The population and housing projections are used to help correlate water demand projections.

3.3 City Land Use

There are approximately 26,812 acres of land within the City boundaries. Existing land use is tabulated in Table 3. The land use information comes from the City's current zoning map. Approximately 49 percent of the City is zoned for residential land use. The next largest land use category is land zoned for agricultural use, which is approximately 14 percent of the City's total land use. The majority of the agricultural land is located in the northeast area of the City.

Table 2. Historical and Projected City Population and Housing (1990 - 2030)

| Item | Historical | | | Projected ^(a) | | | |
|------------------------|------------|---------|---------|--------------------------|---------|---------|---------|
| | 1990 | 2000 | 2005 | 2010 | 2015 | 2020 | 2030 |
| Population | 128,090 | 161,039 | 175,085 | 187,491 | 193,681 | 199,870 | 206,607 |
| Annual Increase (%) | - | 2.05 | 1.69 | 1.38 | 0.65 | 0.63 | 0.33 |
| Total Dwelling Units | 51,024 | 59,583 | 63,568 | 67,829 | 68,833 | 69,837 | 70,674 |
| Annual Increase (%) | - | 2.15 | 1.30 | 1.31 | 0.29 | 0.29 | 0.12 |
| Vacant DUs | 4,361 | 3,093 | 3,300 | 3,046 | 2,913 | 2,779 | 2,366 |
| Vacancy (%) | 8.55 | 5.19 | 5.19 | 4.49 | 4.23 | 3.98 | 3.35 |
| Population/Occupied DU | 2.75 | 2.85 | 2.90 | 2.89 | 2.94 | 2.98 | 3.02 |

(a) From San Diego Association of Governments. Data for 2015 was interpolated.

Figure 2. City Historical/Projected Population and Housing

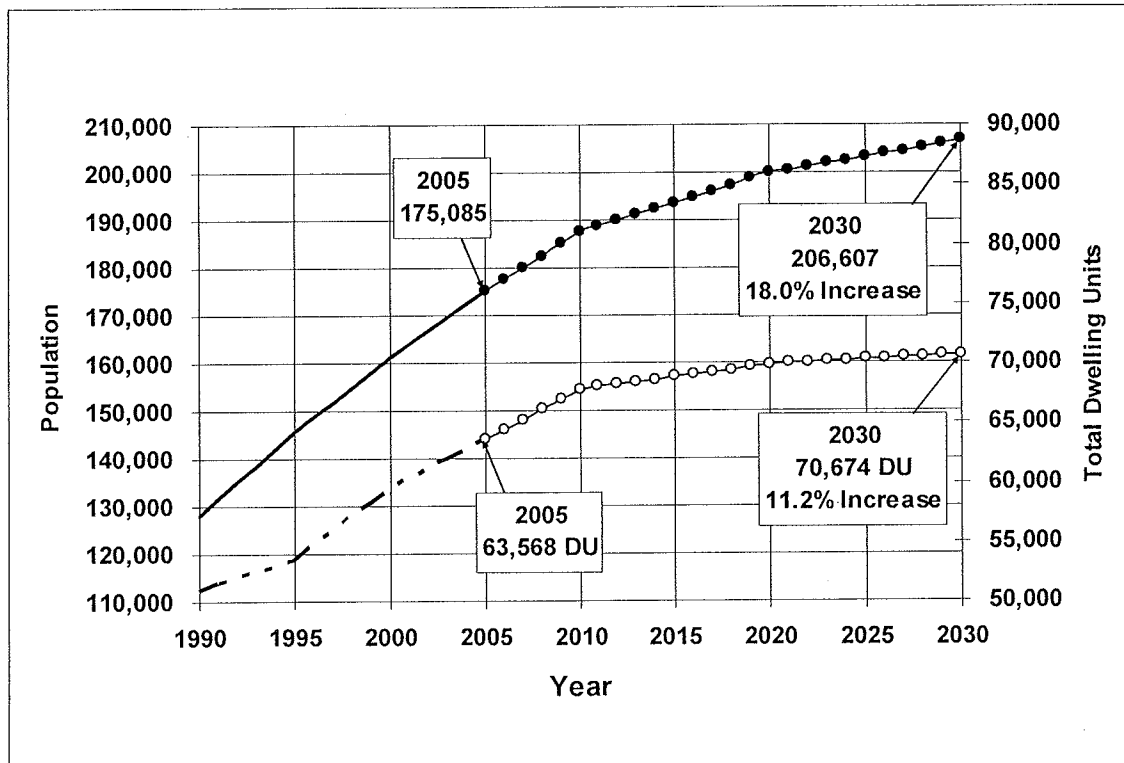


Table 3. City Land Use Summary (as of April 2005)

| Land Use Category | Gross Land | | Gross Vacant Developable Land | | |
|------------------------|------------|-----------------------|-------------------------------|--------------------------|---------------------------------------|
| | Area (ac) | % of Total Gross Area | Area (ac) | As % of Total Gross Area | As % of Total Vacant Developable Area |
| Residential | 13,010 | 48.5 | 946 | 3.5 | 33.8 |
| Downtown | 383 | 1.4 | 21 | 0.1 | 0.8 |
| Commercial | 1,555 | 5.8 | 234 | 0.9 | 8.4 |
| Public and Semi-Public | 1,212 | 4.5 | 123 | 0.5 | 4.4 |
| Industrial | 1,308 | 4.9 | 322 | 1.2 | 11.5 |
| Open Space | 2,672 | 10.0 | 172 | 0.6 | 6.1 |
| Agriculture | 3,639 | 13.6 | 378 | 1.4 | 13.5 |
| Caltrans | 133 | 0.5 | – | 0 | 0 |
| Harbor | 107 | 0.4 | – | 0 | 0 |
| Planned Developments | 2,682 | 10.0 | 590 | 2.2 | 21.1 |
| Unknown | 111 | 0.4 | 12 | 0.0 | 0.4 |
| Total | 26,812 | 100 | 2,797 | 10.4 | 100 |

The City has 21 planned developments identified on their current zoning map. This land use accounts for approximately 10 percent of the City’s total land use. The planned developments are composed of residential, non-residential, and/or open space land uses. As discussed later in this section, the majority of these 21 planned development areas have already been developed.

Also shown in Table 3 is estimated vacant developable land in the City by land use category. City vacant land parcels with the potential for future development were identified in the SANDAG 2030 Regional Growth Forecast. SANDAG’s land layers were created for use in the 2030 Regional Growth Forecast to distribute projected growth for the San Diego region to suitable subareas in the region. These land layers include existing land use, planned land use, land ownership, constraints to development, land available for development, known site-specific developments, and lands available for redevelopment and infill. SANDAG updates the land layers when new information is available.

The 2030 Regional Growth Forecast and the SANDAG developable land use map were used in the City’s 2006 WSMP to estimate vacant developable land by City land use category. The SANDAG developable land map was overlaid onto the City’s zoning map and the 2005 aerial map of the City to estimate vacant developable land by City land use category. It was assumed in the City’s 2006 WSMP

and 2005 UWMP and is assumed in this WSA that all vacant developable land as identified will be developed by 2030, the end of the planning period, for the purpose of estimating potential “ultimate” water demands.

As shown in Table 3, approximately 2,797 acres of vacant developable land has been identified. This represents approximately 10.4 percent of the total land area within the City. Residential is the land use category with the most vacant developable land with 946 acres followed by planned developments with 590 acres and agriculture with 378 acres.

The land to be occupied by the proposed 92-acre Pavilion development was accounted for as commercial land use (Community Commercial) in the City’s 2006 WSMP and 2005 UWMP.

4.0 CITY WATER DEMANDS

This section helps satisfy Section 5 (Step Three) of the SB610 Guidebook and pertains to State Water Code Section 10631 and Section 10910.

4.1 Historical City Water Demands

Historical City potable water consumption by customer type and unaccounted-for water for the six years 1999 through 2004 is shown in Table 4. Water consumption was developed from City water meter and billing records. Unaccounted-for water is the difference between water production and water consumption and represents “lost” water.

Table 4. Historical City Potable Water Use/Unaccounted-For Water (1999-2004)

| City Billing Category | Historical City Metered Potable Water Use (Acre Feet) | | | | | | |
|--------------------------------|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Avg |
| Single-Family Residential | 13,924 | 14,273 | 13,799 | 14,632 | 14,789 | 15,428 | 14,474 |
| Multi-Family Residential | 4,656 | 4,846 | 4,769 | 5,330 | 4,361 | 5,303 | 4,878 |
| Commercial/Institutional | 2,888 | 3,097 | 2,845 | 2,713 | 2,989 | 3,070 | 2,934 |
| Landscape Irrigation | 5,278 | 5,427 | 4,779 | 5,118 | 4,686 | 5,370 | 5,110 |
| Government/City | 1,157 | 1,234 | 936 | 1,042 | 841 | 1,069 | 1,047 |
| Agricultural Irrigation | 2,329 | 2,718 | 2,370 | 3,255 | 2,480 | 2,169 | 2,554 |
| Total Potable Water Use | 30,232 | 31,596 | 29,497 | 32,090 | 30,145 | 32,409 | 30,995 |
| Potable Water Supply | 32,854 | 33,862 | 31,212 | 35,467 | 32,845 | 35,167 | 33,568 |
| Unaccounted-For Water | 2,622 | 2,266 | 1,715 | 3,377 | 2,700 | 2,758 | 2,573 |
| Unaccounted-For Water % | 8.0% | 6.7% | 5.5% | 9.5% | 8.2% | 7.8% | 7.6% |

Note that the percentage of unaccounted for water is typical for an agency of this size due to several variables which include the age and efficiency of the pipe system, users' practices, accuracy of the meters, etc. Unaccounted-for water occurs for a number of reasons:

- Water lost from system leakage. Water can be lost from leaking pipes, valves, pumps, and other water system appurtenances.
- Water used in hydrant testing and hydrant flushing that is not metered. The City Fire Department performs hydrant testing to monitor the level of fire protection available throughout the City. The City Water Department performs hydrant flushing to eliminate settled sediment and ensure better water quality. Hydrant testing and flushing is not metered. However, this quantity of water is estimated and taken into consideration when calculating unaccounted-for water.
- Water used by the Fire Department to fight fires. This water is also not metered.
- Customer meter inaccuracies. Meters have an inherent accuracy for a specified flow range. However, flow above or below this range is usually registered at a lower rate. Meters become less accurate with time due to wear.

The California Urban Water Conservation Council, which recommends and monitors water conservation practices in California, recommends a complete distribution system audit if unaccounted-for water exceeds 10 percent. However, the City is currently averaging 7.6 percent as shown in Table 4 and a water audit is not warranted. The lower unaccounted-for water for the City can be attributed in part to the proactive approach taken by the City's Water Department to prevent system leakage and to repair system leaks when they occur.

4.2 Year 2005 Water Demands

This section describes how "Existing System" water demand was determined for the City's 2006 WSMP and 2005 UWMP. The year 2005 was taken to be the Existing Water System for those two planning documents.

Water usage for 1999 through 2004 per person in reference to annual rainfall totals is shown in Table 5. This is total water usage (not just residential water usage) and includes unaccounted-for water. Water use averaged 181 gallons per capita per day (gpcd) for the six-year period and was 182 gpcd in 2004. However, per capita water use was 189 gpcd in 2002 following several years of low rainfall. The base demand for the existing water system (year 2005) is taken to be 36,500 afy, which is the year 2004 population of 172,800 multiplied by a per capita water usage of 189 gpcd. This water use is 3.8 percent greater than the actual water use in 2004 and factors in higher water consumption that occurs during lower-rainfall periods.

Year 2005 unit water use factors were developed for the various City land use categories by matching billed water use with acreage for the corresponding land use category. Year 2005 unit water use factors are shown in Table 6. Unaccounted-for water of 7.8 percent was applied to each water use category so that demands are consistent with water supply. The unit water use factors do not include water demand from the City's Top 14 water users in 2005, which are treated as specific point demands for analysis. By applying the unit water use factors to the corresponding land use acres in the City and

then adding the water demand from the 14 top City water users, year 2005 water demand for the City equates to 36,500 afy.

Table 5. Historical City Per-Capita Water Demands (1999-2004)

| Item | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Avg |
|---|--------|--------|--------|--------|--------|--------|--------|
| Demand ^(a) (af) ^(b) | 32,854 | 33,862 | 31,212 | 35,467 | 32,845 | 35,167 | 33,568 |
| Population (1,000) | 157.4 | 161.0 | 164.3 | 167.3 | 170.4 | 172.8 | 165.5 |
| Per Capita Demand (gpcd) ^(c) | 186 | 188 | 170 | 189 | 172 | 182 | 181 |
| Rainfall (in.) | 4.3 | 8.1 | 10.5 | 5.3 | 11.0 | 12.7 | 8.7 |

- (a) Total water demand including unaccounted-for water.
- (b) Acre feet.
- (c) Gallons per capita (person) per day.

Table 6. City Water Use Factors^(a)

| City Land Use Category | Year 2005 Unit Water Use Factor (gpad) ^(b) | Year 2030 Unit Water Use Factor (gpad) |
|----------------------------------|---|--|
| Residential Estates A & B | 1,000 | 1,020 |
| Single Family Residential | 1,200 | 1,224 |
| Medium Density Residential A | 2,100 | 2,142 |
| Medium Density Residential B & C | 3,400 | 3,468 |
| High Density Residential | 4,400 | 4,488 |
| Urban High Density & Tourist | 4,800 | 4,896 |
| All Commercial Categories | 1,420 | 1,420 |
| All Industrial Categories | 1,420 | 1,420 |
| All Public and Semi-Public | 1,420 | 1,420 |
| Open Space- Parks | 2,000 | 2,000 |
| Open Space - Other | 0 | 0 |
| Agriculture - Northeast Growers | 1,060 | 1,060 |
| Agriculture - Around Whelan Lake | 0 | 0 |
| Agriculture - Park & Equestrian | 2,000 | 2,000 |

- (a) Not including the City's Top 14 water users in 2005, which are treated as specific point demands for analysis.
- (b) Gallons per acre per day.

4.2.1 Water Conservation Program

City per capita water use has decreased since 1997 and this can be attributed in part to City water conservation efforts. In 1997, the City became a Signatory to the Memorandum of Understanding Regarding Best Management Practices for Urban Water Conservation (Urban MOU). The California Urban Water Conservation Council (CUWCC) has responsibility for monitoring implementation of the Urban MOU. As Signatory to the Urban MOU, the City has committed to using good faith efforts to implement 14 current Best Management Practices (BMPs) for water conservation. These BMPs are shown on Table 7.

Table 7. Current BMP Compliance for the City of Oceanside

| CUWCC Best Management Practice | Meeting CUWCC Requirements | BMP Status |
|--|-----------------------------------|---|
| BMP 01: Water Survey Programs for Single and Multi-Family Residential | No | Continues as an on-demand program. |
| BMP 02: Residential Plumbing Retrofit | Completed | Have reached 75% saturation. |
| BMP 03: System Water Audits, Leak Detection and Repair | Yes | Possibly metering of street sweeping trucks. Investigate AWWA guidelines. |
| BMP 04: Metering w/ Commodity Rates for all New Connections and Existing Retrofits | Yes | No un-metered accounts. |
| BMP 05: Large Landscape Conservation Programs and Incentives | No | Begin program on IRR accounts. Research needed. |
| BMP 06: High-Efficiency Washing Machine Rebate Programs | Yes | Participates in program with SDCWA. |
| BMP 07: Public Information Programs | Yes | Has active public information program. |
| BMP 08: School Education Programs | Yes | Active program. |
| BMP 09: Conservation Programs for CII Accounts | No | Attempting to comply with performance track. |
| BMP 09a: Conservation Programs for CII Accounts | No | Participates in program with SDCWA. |
| BMP 10: Wholesale Agency Assistance Programs | Not Applicable | Not wholesaler. |
| BMP 11: Conservation Pricing | Yes | Have tiered rate structure. |
| BMP 12: Conservation Coordinator | Yes | Complies with this BMP. |
| BMP 13: Water Waste Prohibition | Yes | Water Conservation Ordinance complies with this BMP. |
| BMP 14: Residential Ultra Low Flow Toilet (ULFT) Replacement Programs | Completed | Already reached water savings goals. Continue as an on-demand program. |

Table 7 also shows current compliance in meeting the CUWCC coverage requirements. Most requirements are met with the exception of large landscape irrigation conservation and conservation programs for commercial and industrial users. BMPs Nos. 2 and 14 have been completed and are not included as additional, future water conservation.

4.3 Year 2030 Water Demands

This section describes how “Ultimate System” water demand was determined for the City’s 2006 WSMP and 2005 UWMP. The year 2030 was taken to be the Ultimate Water System for those two planning documents.

Estimated year 2030 (ultimate) unit water use factors are also shown in Table 6. These unit water use factors are the same as the factors used to develop year 2005 demands with the exception that the residential factors were increased by 2 percent to account for a projected population density increase of approximately 4 percent. All developable vacant land is assumed to be developed by the year 2030. Demands were calculated for the developed vacant land by multiplying each vacant area by its corresponding water use factor.

As a result, the year 2030 system demand is estimated at 41,090 afy or 36.7 million gallons per day (mgd). This represents a 12.7 percent increase in demand for the year 2030 system relative to the year 2005 system.

4.3.1 Reduced Future Demands through Increased Water Conservation

The City conducted a water conservation evaluation as part of their 2006 WSMP. The analysis showed that the City could reduce future water demands as a result of new plumbing code requirements, full implementation of the 14 BMPs, and implementation and full compliance with three new BMPs.

New plumbing code requirements will result in future conservation due to replacement of plumbing fixtures as required by the Federal Energy Policy Act. After January 1, 1997, both residential and commercial replacement must meet the following standards:

- Toilets – 1.6 gallons/flush maximum
- Urinals – 1.0 gallons/flush maximum
- Showerheads and faucets – 2.5 gallons/minute at 80 pounds per square inch

New clothes washers are also required to meet increased energy efficiency standards in 2004 and 2007. The plumbing code is projected to reduce year 2030 water consumption by 1,456 afy (1.3 mgd).

The analysis also showed that year 2030 water consumption could be reduced by another 2,195 afy (2.0 mgd) through full compliance with the 14 BMPs as well as implementation of the following three water conservation measures: 1) providing rebates for the purchase of evapotranspiration (ET) controllers, 2) enforcing landscape requirements on new non-single family landscaping, and 3) providing rebates to businesses with high urinal use (restaurants, stadiums, etc.) to convert to efficient urinals (0.5 gallons/flush).

Reduced water demands in five-year increments through the year 2030 as a result of the aforementioned water conservation measures are shown in Table 8.

Table 8. Reduced Future Demands through Increased Water Conservation

| | Year | | | | |
|---|---------|---------|---------|---------|---------|
| | 2005 | 2010 | 2015 | 2020 | 2030 |
| Population | 175,085 | 187,491 | 193,681 | 199,870 | 206,607 |
| Annual Consumption -- Base Demand (af) ^(a) | 36,500 | 37,429 | 38,357 | 39,286 | 41,090 |
| Future demand reduction: | | | | | |
| Plumbing Code Savings (af) | 0 | -336 | -672 | -896 | -1,456 |
| Program Conservation (af) ^(b) | 0 | -1,232 | -1,848 | -2,016 | -2,195 |
| Net Future Demand (af) | 36,500 | 35,861 | 35,837 | 36,374 | 37,439 |

- (a) Demand with no further water conservation relative to water conservation in year 2005.
- (b) Full compliance with the 14 BMPs as well as implementation of three additional conservation measures.

With the additional water conservation, per capita water demand is estimated to be reduced from 189 gallons per day (gpcd) as conservatively estimated for the year 2005 to 172 gpcd after the water conservation measures are implemented.

4.4 Past and Projected Water Use by Customer Type

Past and projected City potable water uses for the various customer types metered are shown in Table 9. Note potable water does not include recycled water, which is nonpotable water. Water use includes unaccounted water estimated at 7.8 percent split between the customer types by percentage of use.

All City accounts are metered and are expected to all be metered in the future. The number of accounts is estimated to increase one percent a year. Total water use is projected to increase to 41,100 acre feet in 2030 consistent with the projection made in the City's 2005 Water Master Plan Update.

4.5 Estimated Water Use for the Pavilion Development

The land to be occupied by the proposed 92-acre Pavilion development was accounted for as commercial land use (Community Commercial) in the City's 2006 WSMP and 2005 UWMP. An average unit water use factor of 1,420 gallons per acre per day (gpac) was applied to this land (as it was applied to all commercial land in the City not including the 14 top City water users) to estimate a water demand for this land. A corresponding water demand of 146 acre feet per year (afy) was estimated for the Pavilion development and was included in City water demand projections used in the City's 2006 WSMP and 2005 UWMP.

More specific information is now available to estimate the water demand for the Pavilion development. The development will have an estimated 950,000 square feet (sf) of building space on land that is zoned for Community Commercial land use. Building area is a more accurate means for projecting water demand than gross commercial land area. A unit water demand used by other local water agencies for building area within Community Commercial land use is 200 to 225 gallons per day per 1,000 sf of building space (gpd/ksf). This factor assumes a blend of office, retail, restaurant and other uses, with each use having somewhat different water demands based on final design, occupancies, number of fixtures, hours of operation, etc. Using 225 gpd/ksf, the interior water demand is estimated at 239 afy.

Table 9. Past and Projected Potable Water Use by Customer Type^(a)

| Year | Water Use Sectors | Single Family | Multi-Family | Commercial Industrial & Institutional | Landscape Irrigation ^(b) | Agriculture Irrigation | Government | Total |
|------|-------------------|---------------|--------------|---------------------------------------|-------------------------------------|------------------------|------------|--------|
| 2000 | Metered Accounts | 34,850 | 1,948 | 1,431 | 941 | 107 | 249 | 39,526 |
| | Water Use afy | 15,297 | 5,193 | 3,319 | 5,816 | 2,913 | 1,323 | 33,861 |
| 2005 | Metered Accounts | 38,085 | 1,996 | 1,951 | 1,131 | 146 | 265 | 43,574 |
| | Water Use afy | 17,375 | 5,973 | 3,458 | 6,048 | 2,442 | 1,204 | 36,500 |
| 2010 | Metered Accounts | 39,989 | 2,096 | 2,049 | 1,188 | 153 | 278 | 45,753 |
| | Water Use afy | 17,817 | 6,125 | 3,546 | 6,202 | 2,504 | 1,235 | 37,429 |
| 2015 | Metered Accounts | 41,989 | 2,201 | 2,151 | 1,247 | 161 | 292 | 48,040 |
| | Water Use afy | 18,259 | 6,277 | 3,634 | 6,356 | 2,566 | 1,265 | 38,357 |
| 2020 | Metered Accounts | 44,088 | 2,311 | 2,259 | 1,309 | 169 | 307 | 50,442 |
| | Water Use afy | 18,701 | 6,429 | 3,722 | 6,510 | 2,628 | 1,296 | 39,286 |
| 2025 | Metered Accounts | 46,293 | 2,426 | 2,371 | 1,375 | 177 | 322 | 52,964 |
| | Water Use afy | 19,143 | 6,581 | 3,810 | 6,664 | 2,691 | 1,327 | 40,215 |
| 2030 | Metered Accounts | 48,607 | 2,547 | 2,490 | 1,443 | 186 | 338 | 55,613 |
| | Water Use afy | 19,585 | 6,733 | 3,898 | 6,817 | 2,753 | 1,357 | 41,100 |

- (a) Water use by customer type includes unaccounted-for water as a % of metered water.
- (b) For parks and medians.

The proposed landscape coverage for the site (based on the most recent submittal and as shown on the tentative parcel map) is 16 acres, which is 18 percent of the net development area of 88.3 acres. The

The City currently has two direct sources of water: 1) imported water from the Metropolitan Water District of Southern California (MWD) through the San Diego County Water Authority (SDCWA), which is a member agency of the Metropolitan Water District of California (MWD), and 2) groundwater from the Mission Groundwater Basin of the Lower San Luis Rey River Valley.

The SDCWA supplies imported water to member agencies within San Diego County. The SDCWA boundaries and its member agencies are shown on Figure 3. Imported water is supplied to the SDCWA by MWD, which comes from the Colorado River and from northern California via the State Water Project.

Water purchased from the SDCWA includes both raw and treated water. Treated water is delivered directly into the City's distribution system. Raw water is treated at the City's Robert A. Weese Filtration Plant (WFP) prior to delivery into the City's distribution system.

In addition to water purchased from the SDCWA, water is pumped from the Mission Groundwater Basin. The City operates well fields that deliver raw groundwater to the Mission Basin Groundwater Purification Facility (MBGPF). Salts contained within the groundwater are removed at the MBGPF using a reverse osmosis treatment process.

The City's San Luis Rey Water Reclamation Plant (SLRWRP) provides secondary wastewater treatment for most of the City service area with a percentage of the secondary effluent treated further to meet Title 22 requirements for unrestricted reuse (recycled water).

5.1.1 SCWA Imported Water

SCWA supplies both filtered (treated) and untreated imported water to the City through five aqueduct connections. Filtered imported water is conveyed directly to the City's water distribution system while untreated imported water is conveyed first to the City's WFP for treatment and then delivered to the City's distribution system. As shown in Table 10, SCWA treated water supply averaged 10,348 afy between 1996 and 2004.

The WFP, which is owned and operated by the City of Oceanside, currently has a nominal design treatment capacity of 25 million gallons per day (mgd). The WFP was put into service in 1983, and it utilizes direct filtration to treat Colorado River Water and State Project Water delivered as a blend through the San Diego County Water Authority Second Aqueduct.

The WFP was commissioned in 1983 with a treatment capacity of 16 mgd at a filtration rate of 5 gallons per minute per square foot of filter area (gpm/sf). Since then, the maximum filtration rate was increased to 7.5 gpm/sf, which increased the overall treatment capacity to 25 mgd. As shown in Table 10, the WFP supply averaged 19,900 afy between 1996 and 2004.

5.1.2 Mission Basin Groundwater

The City has 7,130 afy of groundwater pumping rights from the Mission Groundwater Basin. MBGPF is a desalting treatment facility that treats brackish groundwater extracted from the Mission Basin via five wells including three "on-site" wells located at the MBGPF site and two "off-site" wells, located in the eastern portion of the basin. The MBGPF was put into service in 1992 with a capacity of 2.0 mgd, and expanded to its current capacity of 6.4 mgd in 2002.

The MBGPF treatment process utilizes reverse osmosis membranes to reduce salt concentrations present in the groundwater. The facility is capable of removing many impurities from the groundwater including particles, iron, manganese, and sodium to meet drinking water standards. Iron and manganese are present in the on-site wells, and manganese is present in the off-site wells.

The five existing wells can combine to produce a consistent yield of 4.2 mgd of brackish groundwater. However, the three on-site wells are currently out of service as a result of contamination with trichloropropane (TCP). TCP is a man made chemical that is mainly used in the manufacture of other chemicals. Some of it is also used as an industrial solvent, paint and varnish remover, and cleaning and degreasing agent.

The California Department of Health Services has determined that the on-site wells are “severely impacted” by TCP and the City has had to rely solely on its off-site wells in recent years. Production at the MBGPF was limited to approximately 2.2 mgd on average (2,415 afy) between 1996 and 2004 as shown in Table 10. The City is planning to construct additional wells southwest of the existing MBGPF to fully utilize the full 6.4 mgd treatment capacity of the MBGPF as discussed below.

5.1.3 Recycled Water

The San Luis Rey Water Reclamation Plant (SLRWRP) provides secondary treatment for most of the City service area. The rated secondary treatment capacity is 13.5 mgd on an average annual basis. Up to 0.7 mgd of the secondary effluent can be treated further to meet Title 22 requirements for unrestricted reuse (recycled water).

Secondary effluent is pumped to a continuous back-washing, down-flow filter. Sodium hypochlorite is added to the filtered effluent. The effluent is disinfected in a chlorine contact channel and then stored in a 2.2 million gallon, lined storage pond located at the southerly portion of the SLRWRP. The recycled water is then pumped to the City of Oceanside Municipal Golf Course for golf course irrigation and to provide water for the habitat at Whelan Lake. As shown in Table 10, recycled water supply averaged 101 afy between 1996 and 2004.

5.2 Future City Water Supplies

Future City water supplies in five-year increments through the year 2030 compared with supply in 2004 is shown in Table 11. These are supplies necessary to meet projected normal demands including a demand of 279 afy estimated for the Pavilion development. These are not necessarily supply capacities. For instance, the existing Weese Filtration Plant (WFP) has more supply capacity than the supplies shown for the WFP in Table 11.

5.2.1 SCWA Imported Water

Per the City’s Water Capital Improvement Plan (CIP) as developed in the 2006 WSMP, the WFP will be expanded from 25 mgd (28,000 afy) to 40 mgd (45,000 afy) by the year 2010. The plant will be master-planned for a capacity of 50 mgd at a filter loading rate of 7.5 gpm/sf. When the expansion is completed, both the existing and the new filters will be operated at a loading rate of 6 gpm/sf and a resulting plant capacity of 40 mgd.

Table 11. Projected Future Water Supplies Compared with Supplies in Year 2004^(a)

| Supply Source | Supply to Meet Projected Normal Demand (afy) | | | | | |
|--|--|---------------|---------------|---------------|---------------|---------------|
| | 2004 | 2010 | 2015 | 2020 | 2025 | 2030 |
| CWA Treated ^(b) | 12,195 | 7,011 | 7,011 | 7,011 | 7,011 | 7,011 |
| CWA Untreated - WFP ^(c) | 20,288 | 17,531 | 17,507 | 18,044 | 18,577 | 19,109 |
| MBGPF ^(d) | 2,684 | 6,452 | 6,452 | 6,452 | 6,452 | 6,452 |
| Carlsbad Desalination Plant ^(e) | 0 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| City Desalination Plant ^(f) | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Potable Water | 35,167 | 35,994 | 35,970 | 36,507 | 37,040 | 37,572 |
| Recycled Water ^(g) | 95 | 853 | 853 | 853 | 853 | 853 |
| Total | 35,262 | 36,847 | 36,823 | 37,360 | 37,893 | 38,425 |

- (a) These are supplies necessary to meet projected normal demands including a normal demand of 279 afy estimated for the Pavilion development. These are not necessarily supply capacities. The existing Weese Filtration Plant (WFP) has more supply capacity than the supplies shown for the WFP in this table.
- (b) Starting in 2010, only treated water from OC 4 will continue.
- (c) Weese Filtration Plant will be expanded from 25 mgd to 40 mgd in 2010. There will be provisions to re-rate plant to 50 mgd per high-rate filtration approval.
- (d) New wells and TCP treatment will allow plant to operate at rated capacity of 6.4 mgd by 2010.
- (e) The City recently signed a contract to purchase up to 5 mgd of water from this 50-mgd seawater desalination project.
- (f) City could build a 5 or 10 mgd desalination plant in future, if it is deemed feasible. City is still evaluating the feasibility of a potential plant.
- (g) The City will expand their recycled water system to a Phase 2 capacity of 853 afy by 2010.

Full-scale operational tests will then be performed to verify that the filters can meet the regulatory requirements at the higher loading rate. With approval from the Department of Health Services, the higher loading rate can be permitted with a 50 mgd capacity then available. A 40-mgd (45,000 afy) capacity is estimated in this WSA to be conservative.

5.2.2 Mission Basin Groundwater

As budgeted in the City's water CIP, the City is planning to construct additional wells southwest of the existing MBGPF to fully utilize the 6.4 mgd treatment capacity of the MBGPF.

Additionally, studies are currently underway to evaluate treatment alternatives for the removal of TCP at the MBGPF. Adsorption with granular activated carbon is being investigated for treatment of the membrane permeate. Also, membranes with a lower molecular weight cut-off are being tested for TCP

removal. The membrane alternative would likely reduce the capacity of the facility by impacting membrane recovery.

Between the development of new wells and the potential for TCP treatment, water production at the MBGPF is anticipated to increase to 6.4 mgd by 2010. This capacity matches the estimated safe yield of 6,452 afy.

The expansion project will include new pretreatment facilities for the entire 50 mgd of capacity. Other improvements include chemical storage and pumping facilities, solids dewatering improvements, and building improvements.

Starting in 2010, only treated water from SDCWA aqueduct OC 4 will continue at an estimated supply of 7,011 afy as shown in Table 11.

5.2.3 Recycled Water

Four potential expansion phases of the City's recycled water system were evaluated in the City's 2006 Recycled Water Master Plan. The Master Plan recommended that the City expand the Title 22 tertiary capacity of the SLRWRP and construct associated facilities and pipelines to implement a recycled water system expansion through Phase 2. Recycled water system expansion beyond Phase 2 was determined not to be feasible relative to using potable water supply to meet these demands.

The Phase 1 project would consist of new recycled water treatment facilities located at the SLRWRP to reliably serve the current demands at the City Municipal Golf Course, Whelan Lake, and the on-site demands at the SLRWRP. The Phase 2 project would serve the Arrowood Golf Course, Morro Hills, Wilmont Ranch, and median irrigation along Douglas Road and for Caltrans. These are all current demands. The Phase 1 and 2 expansions are estimated to be operational by approximately the year 2010. The recycled water demand of the expanded recycled water system is estimated to be 853 afy as shown in Table 11. The Phase 1 and Phase 2 recycled water system expansions will reduce potable water demand by 758 afy.

5.2.4 Carlsbad Desalination Project

A 50-mgd seawater desalination project is being planned in the City of Carlsbad adjacent to the Encina power station. The project, which could be operational by as early as 2010, would utilize reverse osmosis water treatment to produce up to 56,000 afy of potable water supply.

In December 2007, the City signed a 30-year contract with Poseidon Resources to provide the City with up to 5 mgd (5,000 afy) of desalinated sea water from the Carlsbad project. The water supply will provide the City with a local, drought-resistant source of potable water supply to supplement imported water deliveries to the City. The price for the desalinated water will be no more than what the City pays for SDCWA imported water.

Other water agencies that have executed agreements with Poseidon Resources and the amount of product water to be received by the agency are as follows: Carlsbad Municipal Water District (22,000 afy), Valley Center Municipal Water District (7,500 afy), Rincon del Diablo Municipal Water District

(4,000 afy), Sweetwater Authority (2,400 afy), Rainbow Municipal Water District (7,500 afy), Santa Fe Irrigation District (2,000 afy), Vallecitos Water District (7,500 afy), and Olivenhain Municipal Water District (5,000 afy).

5.2.5 City of Oceanside Seawater Desalination

The feasibility of a 5 mgd or 10 mgd City seawater desalination plant was evaluated in the City's 2006 WSMP. A City plant would provide additional local supplies that would further decrease City dependence on imported water.

The analysis considered the costs for current available, reverse osmosis desalination technology. The City would only move forward with seawater desalination based on planned research and development program. This program will investigate emerging technologies that could result in the needed cost reductions needed to make seawater desalination cost competitive with the other water sources available.

The source of the seawater would be a series of extraction wells near the mouth of the San Luis Rey River. The design of the wells would prevent drawdown of the Mission Basin and the drawdown potential effects on the other City wells and the habitat mitigation areas. The planning would also need to consider the operation of the seawater barrier if the recharge and extraction project were to be implemented.

The seawater would be pumped from the wells back to the MBGPF. The seawater reverse osmosis plant would be constructed at this site, which has sufficient City-owned land to house these facilities. The treated water would be introduced into the distribution system.

Based on relative costs and capacity utilization of all supply sources evaluated in the 2006 WSMP, a 5 mgd or 10 mgd desalination plant was not included in the recommended supply combination to meet City demands through the year 2030. As recommended in the 2006 WSMP, the City is continuing to evaluate the feasibility of seawater reverse osmosis, as it could prove to be an important element for providing a future drought-proof supply. However, to be conservative, a City desalination plant is not estimated as a future water supply in this WSA.

6.0 WATER SUPPLY RELIABILITY

This section helps satisfy Section 5 (Step One) of the SB610 Guidebook and pertains to State Water Code Section 10910.

6.1 Imported Water

In their 2005 UWMP, SDCWA concluded that if projected SDCWA and member agency supplies are developed as planned, along with Metropolitan Water District of Southern California's (MWD) Integrated Resources Plan (IRP), no shortages are anticipated within SDCWA's service area under normal-year, single-dry year or multiple dry water years through 2030. However, SDCWA is pursuing development of other potential supplies including seawater desalination, construction of carry-over storage and acquiring out-of-region conjunctive-use supplies as a safeguard.

As reported in SDCWA's 2005 UWMP, MWD has stated, consistent with Section 4202 of its Administrative Code, "that it is prepared to provide the Water Authority's service area with adequate supplies of water to meet expanding and increasing needs in the years ahead. When, and as additional water resources are required to meet increasing needs, Metropolitan stated that it will be prepared to deliver such supplies. In their draft 2005 Regional Urban Water Management Plan (RUWMP), Section II.4, Metropolitan also states that as a result of investments made in supply and storage, that they have identified a resource management plan that should result in 100 percent reliability for non-discounted non-interruptible demands through 2025."

MWD's IRP "identifies a mix of resources (imported and local) that when implemented will provide 100 percent reliability for full-service demands through the attainment of regional targets set for conservation, local supplies, {State Water Project} supplies, Colorado River supplies, groundwater banking, and water transfers. The 2003 update to the IRP now includes a planning buffer supply to mitigate against the risk associated with implementation of local and imported supply programs. The planning buffer identifies an additional increment of water that could potentially be developed if other supplies are not implemented as planned."

6.1.1 Responses to Recent Supply Restrictions

Recent drought and environmental issues have made MWD enter the water market to pursue back-up water supplies to meet Southern California needs in 2008 and beyond. Due to an eighth year of drought, Colorado River surplus water will not be made available to MWD in 2008. Also, on August 31, 2007, a federal court ordered operational limits on water pumped from northern California to Southern California in order to protect the ecosystem of the San Francisco Bay/Sacramento-San Joaquin River Delta (Bay Delta), which will result in a reduction in water supplies from northern California in 2008 with this reduction possibly being as high as 30 percent. The water supplies pumped from northern California to Southern California is termed State Water Project water.

In response to these water supply issues, MWD outlined plans to work with the State Department of Water Resources and the State Water Project Contractors Authority to purchase additional water in 2008 through transfers with willing sellers in Yuba County and the state's Central Valley.

In November 2007, MWD's board authorized the purchase of between 13,750 acre-feet and 35,000 acre-feet in dry years over the next 18 years from the Yuba County Water Agency. The board also authorized MWD, in conjunction with the State Water Project Contractors Authority, to pursue up to 200,000 acre-feet of water for 2008 from the Central Valley through one-year option transfer agreements.

These proposed transfers represent a cooperative effort among the State and a number of water contractors to create a pool of supplies that agencies can call upon as insurance against drought and environmentally-caused water supply reductions.

In order to comprehensively address the impacts of the State Water Project cutback on MWD's water supply development targets, MWD is in the process of updating their long-term IRP. The updated IRP, which is expected in early 2008, will identify changes to long-term water resources planning brought on by the Delta smelt environmental concerns, global warming, and climate change among other issues.

6.2 Mission Groundwater Basin

The City has conducted studies to determine the impact of groundwater pumping on local groundwater levels. Those studies concluded that the planned expansion of the MBGPF will result in no significant impacts to existing groundwater dependent vegetation during extended dry-year periods lasting up to three years. Therefore the MBGPF is considered a reliable source of up to 7,130 acre-feet per year of potable water during multiple-dry water years.

7.0 WATER DEMANDS DURING DRY YEARS

This section helps satisfy Section 5 (Steps Four and Five) of the SB610 Guidebook and pertains to State Water Code Section 10910, Section 10631, and Section 10632. In their 2005 UWMP, SDCWA projected normal water demands for their service area for 2005 through 2030 in five-year increments utilizing their Water Resources-Municipal and Industrial Needs (MAIN) computer model. The MAIN model uses demographic and economic data to project sector-level water demands. The SDCWA-MAIN modeling effort utilized the latest official SANDAG demographic and economic projections and the new SANDAG 2030 (December 2003) forecast through the year 2030.

SDCWA then analyzed historic dry-year events and selected the year 1989 as the representative single-dry year event. The 1989 data was then run through the model for each five-year increment. The results indicated that dry-year demands were approximately 7 percent greater than the corresponding normal-year demands. The single dry year of 1989 occurred during the historic drought of 1987 through 1992.

To develop single-dry year and multiple dry-year demand projections, the 7 percent average increase was applied to the normal year demand. Supplies to meet projected dry-year demands are shown in Table 12. These are supplies necessary to meet dry-year demands including a dry-year demand of 298 afy estimated for the Pavilion development (a normal year demand multiplied by a factor of 1.07). These are not necessarily supply capacities. For instance, the existing Weese Filtration Plant (WFP) has more supply capacity than the supplies shown for the WFP in Table 12.

7.1 City Water Shortage Contingency Plan

The City has formally codified an ordinance establishing a water contingency plan in the Oceanside City Code, Article V. Water Conservation Program. The following water shortage contingency plan components are included in the City Code.

The City Water Utilities Director shall from time to time, based upon all available data, determine and declare whether the City's water supply is in one of seven (7) stages and post a notice thereof. A waiver of any of the following measures or addition of other conservation measures to achieve goals in a declared stage shall be made by the water utilities director or his designee.

- Stage I.** The City is able to meet all the water demands of its customers in the immediate future. The stages below reflect the percentage of water supply shortage

- Stage II.** Effect a 10 percent cutback in consumption based on a three-year average of water consumption prior to a water shortage.

Table 12. Supplies to Meet Projected Dry-Year Demands^(a)

| | Supply to Meet Projected Dry-Year Demand (afy) | | | | |
|------------------------|--|--------|--------|--------|--------|
| | 2010 | 2015 | 2020 | 2025 | 2030 |
| Dry-Year Demand | 39,426 | 39,400 | 39,975 | 40,545 | 41,114 |
| % of Normal | 107% | 107% | 107% | 107% | 107% |
| Supply | | | | | |
| SCWA Treated | 7,011 | 7,011 | 7,011 | 7,011 | 7,011 |
| SCWA Untreated - WFP | 20,110 | 20,084 | 20,659 | 21,229 | 21,798 |
| MBGPF | 6,452 | 6,452 | 6,452 | 6,452 | 6,452 |
| Carlsbad Desal Project | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Recycled Water | 853 | 853 | 853 | 853 | 853 |
| Total Potable Water | 39,426 | 39,400 | 39,975 | 40,545 | 41,114 |
| % of Normal | 107% | 107% | 107% | 107% | 107% |

(a) These are supplies necessary to meet projected dry-year demands including a dry-year demand of 298 afy estimated for the Pavilion development. These are not necessarily supply capacities. The existing Weese Filtration Plant (WFP) has more supply capacity than the supplies shown for the WFP in this table.

- Stage III.** Effect a 15 percent cutback in consumption based on a three-year average of water consumption prior to a water shortage.
- Stage IV.** Effect a 22 percent cutback in consumption based on a three-year average of water consumption prior to a water shortage
- Stage V.** Effect a 30 percent cutback in consumption based on a three-year average of water consumption prior to a water shortage
- Stage VI.** Effect a 40 percent cutback in consumption based on a three-year average of water consumption prior to a water shortage.
- Stage VII.** A major failure of any supply, distribution facility or a declaration by the City council of a water shortage emergency pursuant to Water Code Sections 350 et seq. Effect a 50 percent cutback, or more as required, in consumption based on a three-year average of water consumption prior to a water shortage.

Corresponding prohibitions and details can be found in Oceanside City Code, Article V. Water Conservation Program as well as in the City's 2005 UWMP.

8.0 WATER SUPPLY SUFFICIENCY FOR PROPOSED PROJECT

The City has sufficient supply source capacity to satisfy all existing demands. The City is planning expansions of two of its existing supply sources: 1) WFP from 25 mgd (28,000 afy) to 40 mgd (45,000 afy) and possibly to 50 mgd, and 2) the recycled water system from approximately 100 afy to 853 afy. Both of these expansions are anticipated to occur by 2010.

The Mission Groundwater Basin is also an existing City supply source. The City's MBGPF removes salts and other impurities from the groundwater in order for the groundwater to meet drinking water standards. The City has only been able to utilize less than half of the plant's 6.4-mgd treatment capacity because several City wells are contaminated with TCP. The City is planning to construct additional wells and also TCP treatment facilities at MBGPF in order to fully utilize the rated capacity of the plant. These improvements are also anticipated to occur by 2010 and will increase groundwater supply from approximately 2,400 afy to 6,500 afy.

All of the aforementioned water supply expansion and rehabilitation projects are included in the City's Water System Capital Improvement Program (CIP), which was updated as part of the 2006 WSMP. As such, the City is committed to implementing the project in accordance with the timeframe developed for the CIP. This same timeframe is used to estimate supply availability in this WSA.

With these expansions or rehabilitations of existing supply sources, the City will have sufficient supply capacities to meet all projected demands including single-dry year and multiple dry-year demands through the year 2030.

Normal water demands were estimated for the proposed 92-acre Pavilion development in the City's 2006 WSMP and 2005 UWMP at 146 afy. More specific information, now available, was used to re-estimate the Pavilion normal water demand more accurately at 279 afy. This is 133 afy greater than the average demand estimated for this land in the City's 2006 WSMP and 2005 UWMP. The supply and demand projections from the 2005 UWMP were increased by 133 afy in assessing water supply available for the Pavilion development in this report. City water supply was determined to be sufficient to accommodate all existing and projected City demands including water demand for the Pavilion.

To help ensure supply reliability, the City recently signed a 30-year contract with Poseidon Resources to provide up to 5 mgd (5,000 afy) of desalinated sea water from the Carlsbad Desalination Project. The water supply will provide the City with a local, drought-resistant source of potable water supply to supplement imported water deliveries to the City.

WATER SYSTEM ANALYSIS
FOR THE PAVILION PROJECT
IN THE
CITY OF OCEANSIDE

August 10, 2007

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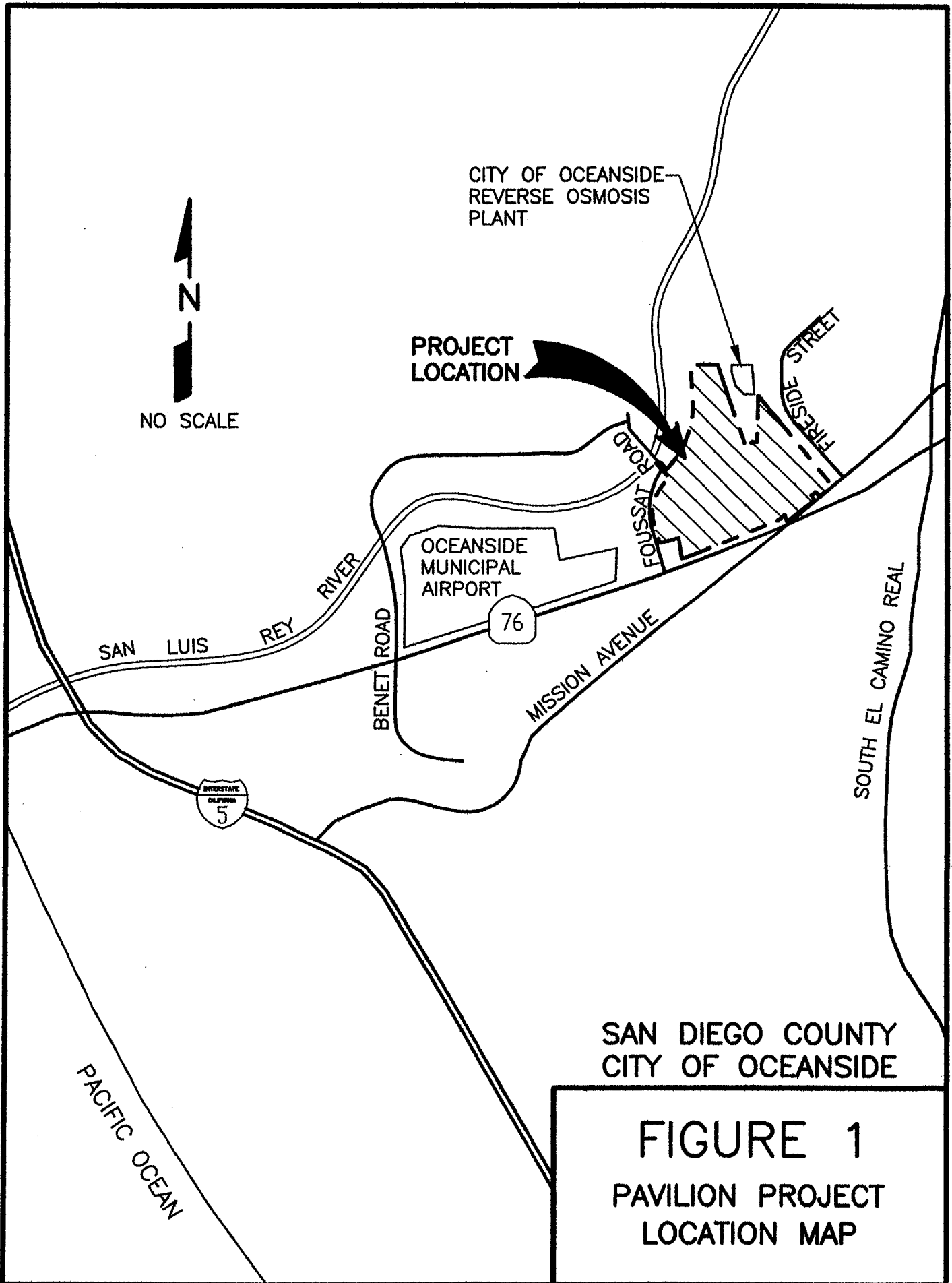
Attention: John Strohminger, Project Manager

Subject: Water System Analysis for the Pavilion Project in the City of
Oceanside

Introduction

The Pavilion Project is located in the northern portion of the City of Oceanside. It is generally situated east of US Interstate 5 and west of El Camino Real. Specifically, it is bound by open space to the north, Mission Avenue and Highway 76 to the south, existing development on Fireside Street to the east, and Foussat Road and the San Luis Rey River to the west. See Figure 1 for the location of the project. Historically, the site has functioned as a drive-in movie theater and is presently a meeting location for a weekly swap meet.

Additional features to note in proximity to the project are the City of Oceanside's reverse osmosis plant to the north and the two utility easements traversing the project. The larger of the two easements, in the eastern portion of the property, contains City of Oceanside water and sewer lines as well as San Diego Gas and Electric transmission lines. The easement in the western portion of the property is a prior extension of Foussat Road, and contains City water and sewer lines.



The Pavilion Project proposes to construct 930,805 square feet of commercial space over approximately 92 acres. Individual commercial spaces shall range in size from approximately 4,000 ft² to 132,000 ft² to accommodate a movie theater, retail stores and shops, restaurants, and the like. Water service to the project, which includes domestic, irrigation, and fire protection, shall be provided by a private combined water system which will connect to the City of Oceanside's public water system. The Pavilion project's on-site water system will supply the project's domestic service laterals, irrigation piping, fire hydrants, and fire sprinkler systems. The water system will also include the addition of a public water line adjacent to the project in Pala Road to serve the Pavilion project.

The purpose of this letter report is to present the results of an hydraulic analysis of the proposed combined water system which will provide domestic, irrigation, and fire protection service to the Pavilion project. Design of the fire-sprinkler systems is outside the scope of this report and therefore has not been included in the hydraulic analysis. Included in this analysis are existing off-site public water lines in the vicinity of the Pavilion project which will supply the project's private water system.

Water System Design Criteria

The Pavilion project's water system has been designed in accordance with the City of Oceanside's *Water, Sewer, and Reclaimed Water Design and Construction Manual*, August 2005 edition.

The average day demand for the project, based on the commercial land use type, is 1,850 gpd/ac (gallons per day per acre). Maximum day demand and peak hour demand are based on the average day demand multiplied by peak factors of 2 and 3, respectively. The commercial fire flow requirement is 4,000 gpm (gallons per minute) as specified in the City's design manual. Additionally, the project has a maximum daily irrigation demand of 170 gpm.

In addition to the flow requirements, the Pavilion water system must be designed to provide a minimum residual pressure to all locations of 35 psi (pounds per square inch) during a peak hour demand scenario and 20 psi during the maximum day demand plus fire flow scenario. The maximum day demand referred to here, and throughout the following report, refers to the combination of the domestic and irrigation maximum day demands.

Existing Water System

The Pavilion project is within the City of Oceanside and shall receive service from the City's public water system. The project will be served by the City's 320 Pressure Zone where 320 corresponds to the high water level (in feet) within the storage reservoirs. The 320 Zone in the vicinity of the project is supplied by two primary sources, Wire Mountain Reservoir and Heritage Reservoir, both with low water levels of 290 feet. The Wire Mountain Reservoir is located northwest of the project on the north side of the San Luis Rey River and the Heritage Reservoir is located southeast of the project, along Rancho Del Oro Drive.

From the Wire Mountain Reservoir, a 30-inch transmission main carries water east to the Foussat Road Bridge and crosses the San Luis Rey River west of the project. The 30-inch main travels south through the Pavilion project via the western utility easement and connects to the 24-inch transmission main in Mission Avenue. This 24-inch transmission main continues east along Mission Avenue and eventually connects to the Heritage Reservoir, providing customers in this area with two sources of water supply.

From the 30-inch transmission main, an 18-inch connection is made on the north side of the Foussat Road Bridge. This 18-inch, paralleling the 30-inch, becomes a

12-inch after crossing the bridge and continues to parallel the larger piping into Mission Avenue. The Pavilion project is proposing to connect to this 12-inch pipe in two places to be detailed in following sections.

The output of the City's reverse osmosis plant north of the project is connected into the 320 Pressure Zone as well. For a conservative analysis, however, it was assumed that the project is supplied only by the Wire Mountain and Heritage Reservoir sources which are further from the project location.

Project Demands

Domestic demands for the Pavilion project were determined based on established City criteria for commercial land use. Table 1 details the calculated demands for the project.

| Demand Type | Demand Factor | Peak Factor | Demand (gpd) | Demand (gpm) |
|-------------------------|---------------|-------------|--------------|--------------|
| <u>Domestic</u> | | | | |
| Average Day (ADD) | 1,850 gpd/ac | 1 | 163,688 | 113.7 |
| Maximum Day (MDD) | 1,850 gpd/ac | 2 | 327,376 | 227.3 |
| Peak Hour (PH) | 1,850 gpd/ac | 3 | 491,064 | 341.0 |
| <u>Irrigation (MDD)</u> | -- | -- | -- | 170.0 |
| <u>Fire Flow</u> | -- | -- | -- | 4,000.0 |

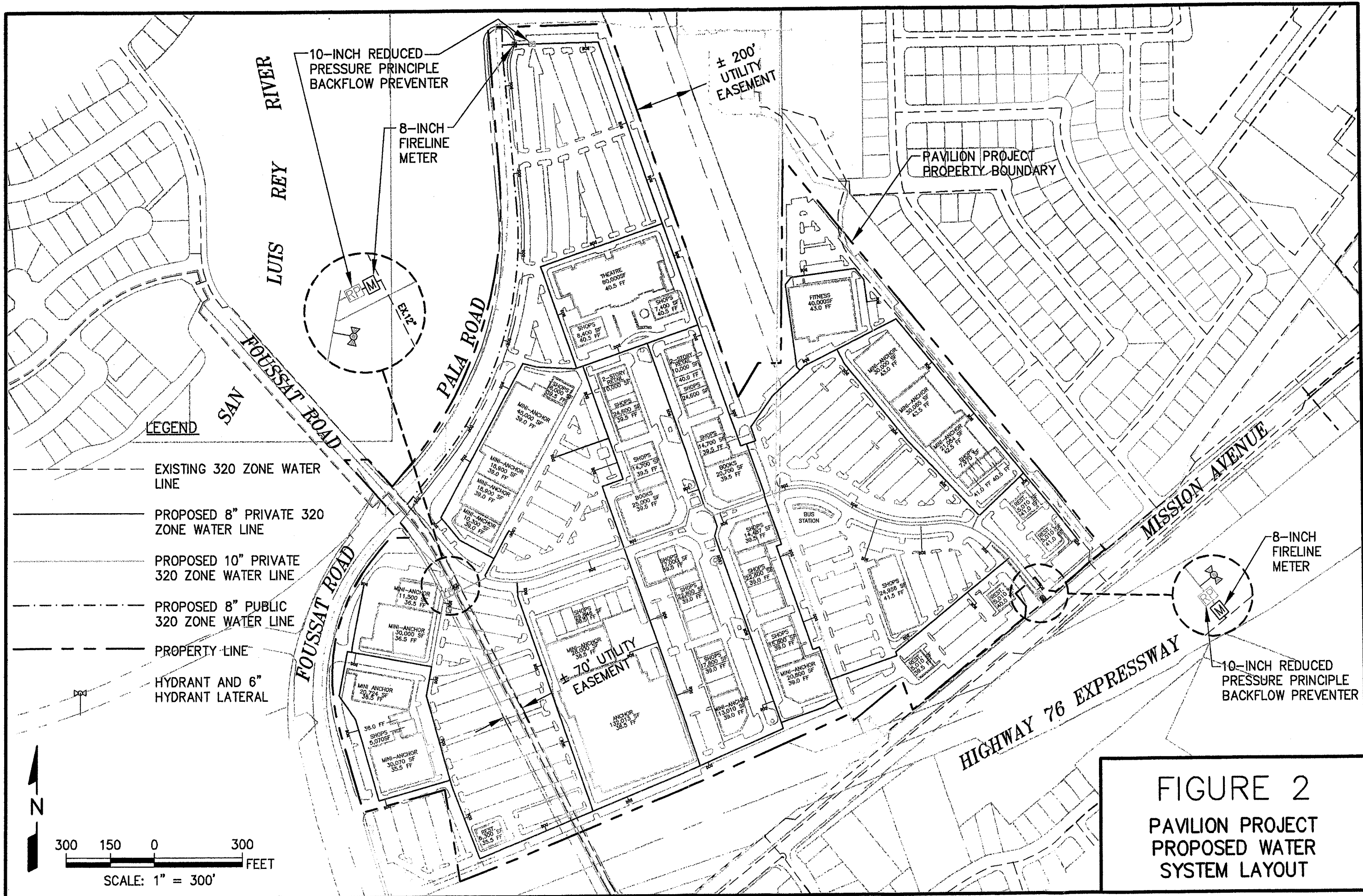
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Water service to the project will be from the 320 Pressure Zone of the City's public water system. Finished floor elevations within the project range from 35.5 feet to 43.5 feet resulting in a maximum static water pressure range of 119.8 psi to 123.3 psi. As such, pressure regulators are recommended for each commercial unit to limit building service pressures to 80 psi for compliance with the Uniform Plumbing Code and City of Oceanside requirements.

Proposed Water System

The Pavilion project is proposing to connect to the City of Oceanside's public water system in three locations. The first location is to the 12-inch water main in Mission Avenue along the southern boundary of the property, secondly to the 12-inch water main in the western utility easement (also known as Old Foussat Road), and thirdly to the proposed public water line adjacent to the project in Pala Road which is expected to be constructed as part of the Pavilion project. See Figure 2.

Each connection between the public and private main shall consist of a master meter and reduced pressure principle backflow preventer. These devices shall be placed in proximity to the project's property line as all piping and appurtenances downstream of the water meter shall be private and the responsibility of the Pavilion project. Although pressure regulators shall be required for each building, pressure reducing stations prior to the meter and backflow arrangements are not necessary.



LEGEND

- EXISTING 320 ZONE WATER LINE
- PROPOSED 8" PRIVATE 320 ZONE WATER LINE
- - - PROPOSED 10" PRIVATE 320 ZONE WATER LINE
- · - · - PROPOSED 8" PUBLIC 320 ZONE WATER LINE
- PROPERTY LINE
- HYDRANT AND 6" HYDRANT LATERAL

300 150 0 300
 FEET
 SCALE: 1" = 300'

FIGURE 2
PAVILION PROJECT
PROPOSED WATER
SYSTEM LAYOUT

Proposed Water System Sizing

To establish the appropriate pipe sizing of the on-site private water system and the public water line adjacent to the project in Pala Road, a computer model was developed to evaluate the water system under various demand scenarios. The computer modeling also included portions of the existing public system in the project vicinity which shall supply the project's water system.

Model Development. The KYPIPE computer software developed by the University of Kentucky was used to evaluate the Pavilion project's water system and the existing system in the vicinity of the project. The program utilizes the Hazen-Williams equation for determining headloss in pipes and a "C" value of 120 was used for all pipes. Minor fitting losses throughout the system were modeled as equivalent lengths of pipe.

As previously detailed, water shall be supplied to the Pavilion project by the City of Oceanside's 320 Pressure Zone, Wire Mountain and Heritage Reservoirs. As such, 290 feet, which corresponds to the low water level in both tanks, was the available hydraulic grade line used in the computer model to provide for a conservative analysis.

Water demands served by the existing off-site public system were also included in the analysis to provide for a more accurate modeling process. The specific demands and their associated Nodes can be found in Appendix A, Table A-1 with the corresponding Node and Pipe Diagram available on Exhibit A at the back of the report.

The exact location of the irrigation system connections to the private main are not known at this time. However, it has been estimated that there will be 10 to 15 connections between the two systems throughout the project. The irrigation

demand was therefore divided between ten computer modeling Nodes within the project to simulate a possible arrangement. The list of these Nodes can be found in Appendix A, Table A-2.

Water System Analysis. Appendix B presents the computer modeling results of the project's water system. Maximum day and peak hour demands were modeled. During the peak hour demand scenario, all demands were met with residual pressures greater than 35 psi at all locations, as required by the City.

Additionally, the maximum day plus 4,000 gpm fire flow demand scenario was modeled by splitting the fire flow between 2 hydrants. This scenario was modeled at ten of the most critical fire hydrant pairings on the project. During all scenarios, the domestic and fire flow demands were achieved while maintaining residual pressures at all locations above 20 psi.

The computer model analyses confirmed that the pipe sizing and layout illustrated in Figure 2 can adequately supply the Pavilion project with its domestic, irrigation, and fire protection needs. The proposed system includes an 8-inch public water line in Pala Road and 8-inch in diameter connections from the public main to the project's three water meters. Each meter shall be followed by a 10-inch reduced pressure principle backflow preventer in accordance with the City of Oceanside's backflow requirements. Following the backflow devices, on-site piping shall include a 10-inch transmission line between the Old Foussat Road and Mission Avenue connections, with 8-inch piping throughout the remainder of the project.

Water Meter Sizing

The Pavilion project will connect to the City of Oceanside's public water system in three places, each of which will require a water meter and a reduced pressure principle backflow preventer.

Water meter sizing is based on accommodating the domestic, irrigation, and fire flow demands of the project. The maximum water demand by the project is the domestic and irrigation maximum day demand plus fire flow scenario. For the Pavilion project, this total demand is 4,397.3 gpm.

The City of Oceanside requires the use of Sensus Compact FireLine Meters for combined water systems. Based on the City's sizing chart for meter selection, a 6-inch meter is only capable of handling up to 2,000 gpm. Therefore, an 8-inch meter capable of handling 3,500 gpm is recommended at each connection. The City's chart can be found in Appendix C.

Each meter shall be followed by an approved 10-inch reduced pressure principle backflow preventer. The City's standard drawings for meter and backflow preventer installation can be found in Appendix C.

Recommendations and Conclusions

The following recommendations and conclusions are presented based upon the water system analyses performed for the Pavilion project.

1. Water service to the project will be provided by the 320 Pressure Zone of the City of Oceanside's public water system.
2. Finished floor elevations for buildings within the Pavilion project range from 35.5 feet to 43.5 feet resulting in a maximum static pressure range of 119.8 psi to 123.3 psi.
3. Individual pressure regulators shall be required at each unit to limit service pressures to 80 psi in accordance with Uniform Plumbing Code and City of Oceanside standards.

4. A private combined water system will serve the Pavilion project which shall supply the necessary domestic and irrigation demands and the required fire flow.
5. The Pavilion project will connect to the existing public 320 Zone 12-inch water lines in Old Foussat Road and Mission Avenue. The project will also connect to the proposed public 320 Zone 8-inch water line in Pala Road.
6. Each 8-inch connection to the public main shall include an 8-inch Fireline meter and a 10-inch reduced pressure principle backflow preventer according to the City of Oceanside's standards.
7. The proposed water system as shown on Figure 2 which includes on-site private water lines and a public water line adjacent to the project are adequate to supply the domestic, irrigation, and fire protection needs of the Pavilion project.
8. The fire flow available to the project meets the City of Oceanside's fire flow requirement of 4,000 gpm while maintaining a residual pressure of 20 psi at all locations.
9. This report presents the sizing and a general schematic layout of the proposed water system. The location of water lines, supply laterals, and water meters should be in accordance with the City of Oceanside's requirements.
10. If PVC pipe is used for the water lines within the project, we recommend the 8-inch and 10-inch diameter piping to be AWWA C900, Class 150.

John Strohminger
August 10, 2007

Thank you for the opportunity to assist you with the water system planning for the Pavilion project. If you have any questions regarding the information presented in this report, please do not hesitate to call.

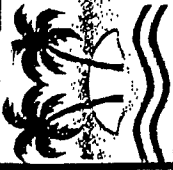
Dexter Wilson Engineering, Inc.

Natch Fraebeth, for Andrew Owen

Andrew Owen

AO, NF:sbr

Attachments



CITY OF OCEANSIDE WATER UTILITIES DEPARTMENT



WATER SYSTEM BUY-IN FEES

Based on Meter Size

| Meter Size | Meter Only | Water System Buy-in Fees | San Diego County Water Authority Capacity Charge | SDCWA Water Treatment Capacity Charge | Max. Rated Capacity (G.P.D.) | Monthly Service Charge |
|------------|------------------|--------------------------|--|---------------------------------------|------------------------------|------------------------|
| 5/8" *3/4" | \$ 100 | \$ 3,746 | \$ 4,326 | \$ 166.00 | 20 *30 | \$ 12.10 |
| 1" | \$ 170 | \$ 6,257 | \$ 6,922 | \$ 266.00 | 50 | \$ 26.78 |
| 1 1/2" | \$ 320 | \$ 12,475 | \$ 12,978 | \$ 498.00 | 120 | \$ 51.24 |
| 2" | \$ 430 | \$ 19,967 | \$ 22,495 | \$ 863.00 | 160 | \$ 80.59 |
| 3" | \$ 880 | \$ 37,463 | \$ 41,530 | \$ 1,594.00 | 350 | \$ 149.09 |
| 4" | \$ 1730 | \$ 62,450 | \$ 70,946 | \$ 2,722.00 | 1000 | \$ 246.92 |
| 6" | \$ 2560 | \$ 124,864 | \$ 129,780 | \$ 4,980.00 | 2000 | \$ 491.53 |
| 8" | \$ 9930 | \$ 199,789 | \$ 224,952 | \$ 8,632.00 | 3500 | \$ 785.53 |
| 10" | To be determined | \$ 287,228 | \$ 337,428 | \$ 12,948.00 | 5500 | \$ 1127.49 |

* 3/4" water meters available for fire sprinkler system requirements (SFD)
\$42.00 per construction water spacer for residential subdivisions (3 months water usage)
Additional irrigation meter required for non-residential and multi-family projects

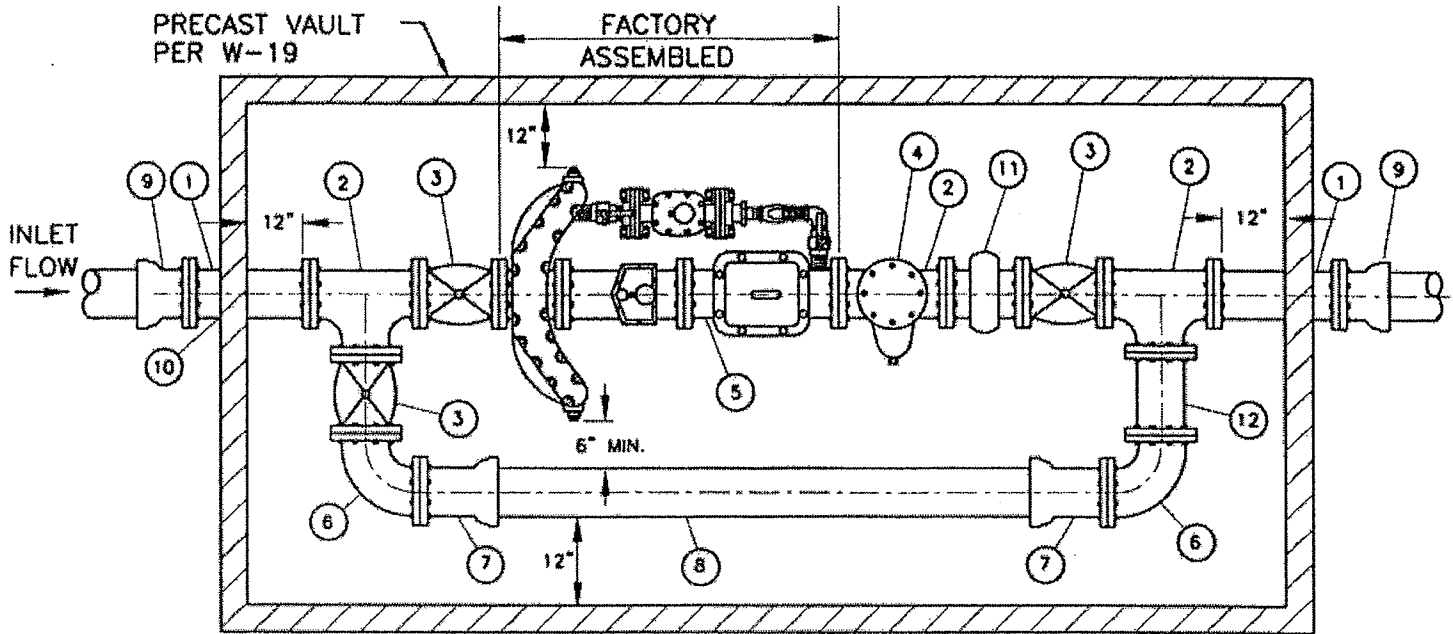
WASTEWATER SYSTEM BUY-IN FEES

| Meter Size | Multi-Family & Non-Residential Buy-in Fees |
|------------|--|
| 5/8" | \$ 4,587 |
| 1" | \$ 7,660 |
| 1 1/2" | \$ 15,272 |
| 2" | \$ 24,444 |
| 3" | \$ 45,863 |
| 4" | \$ 76,452 |
| 6" | \$ 152,859 |
| 8" | \$ 244,583 |
| 10" | \$ 351,625 |

**SINGLE FAMILY WASTEWATER SYSTEM
BUY-IN FEE: \$4,587**

CITY CODES & ORDINANCES FOR FEES

Water System Buy-in Fees: Oceanside City Code, Chapter 32, Sec. 32B.7, Chapter 37, Ord. No. 05-OR0611-1
Wastewater System Buy-in Fees: Oceanside City Code, Chapter 32, Sec. 32B.7, Chapter 29, Ord. No. 05-OR0610-1
SDCWA Capacity Charge: SDCWA Ordinance No. 2005-03



MATERIAL LIST

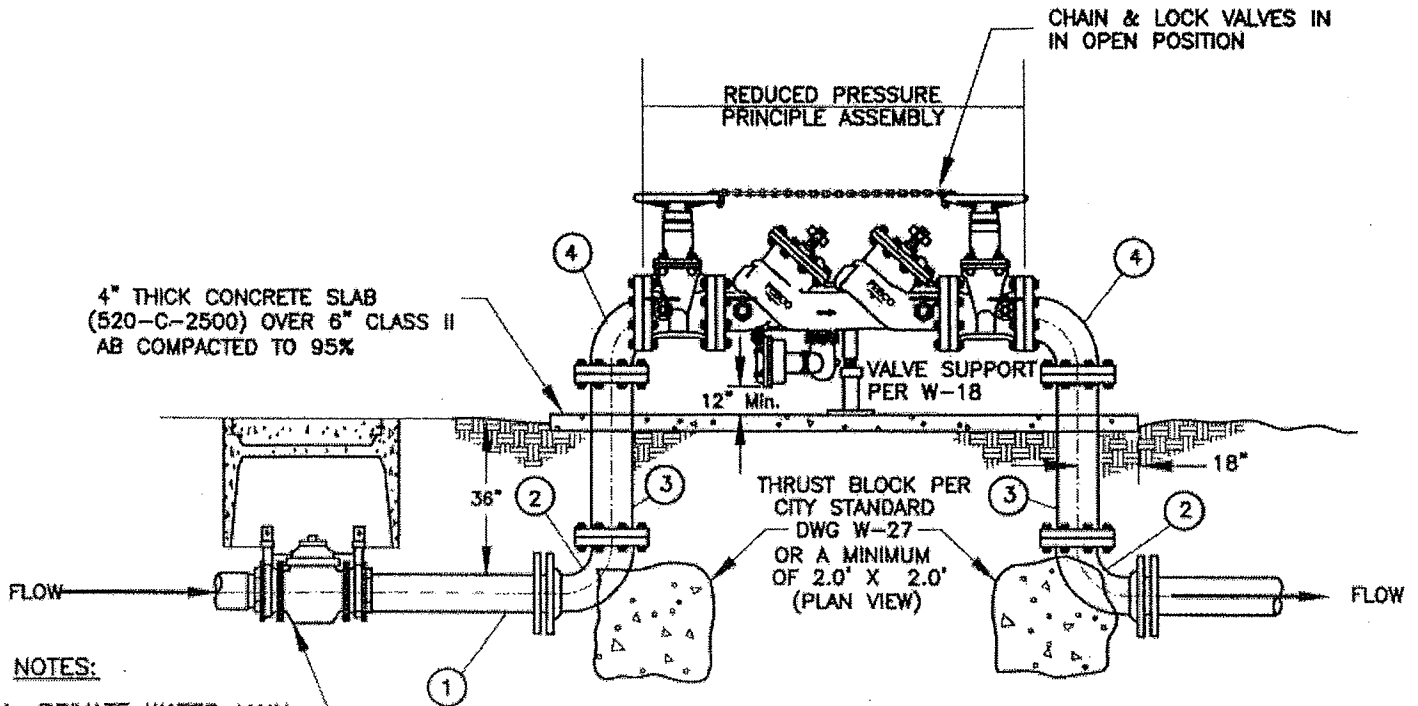
1. 18" LONG FLANGED DUCTILE IRON SPOOL.
2. FLANGED DUCTILE IRON TEE, WITH 4" OUTLET.
3. FLANGED RESILIENT WEDGE (R/W) GATE VALVE, WITH FACTORY FUSION BONDED EPOXY INSIDE, WEDGE TO BE RUBBER ENCAPSULATED DUCTILE IRON WITH 2" SQUARE OPERATING NUT.
4. 4" RW GATE VALVE. EPOXY & WEDGE SAME AS #3.
5. FACTORY ASSEMBLED COMPACT FIRE FLOW METER MANUFACTURED BY SENSUS.
6. 90° FLANGED DUCTILE IRON ELBOW.
7. DUCTILE IRON ADAPTER, FLANGED X P.O.
8. P.V.C. PIPE C900 CLASS 200.
9. FLANGE X PUSH ON ADAPTER.
10. APPROVED SEALANT AROUND PIPE OPENINGS.
11. VICTAULIC COUPLING W/ 2 EACH 6" FLG X VIC GROOVE SPOOLS.
12. FLANGED SPOOLE.

NOTE: VAULT DEPTH NOT TO EXCEED 5'-0" FROM TOP OF VAULT TO FLOOR.

| Revision | By | Approved | Date |
|----------|-----|----------|------|
| 11/07/00 | kal | | |
| 06/06/01 | DW | | |
| 10/22/02 | DW | | |
| 08/06/04 | AC | | |

CITY OF OCEANSIDE
STANDARD
FIRE FLOW MASTER METER

John T. ...
CITY ENGINEER & Date
STANDARD
DRAWING NO. **W-9**



ELEVATION VIEW

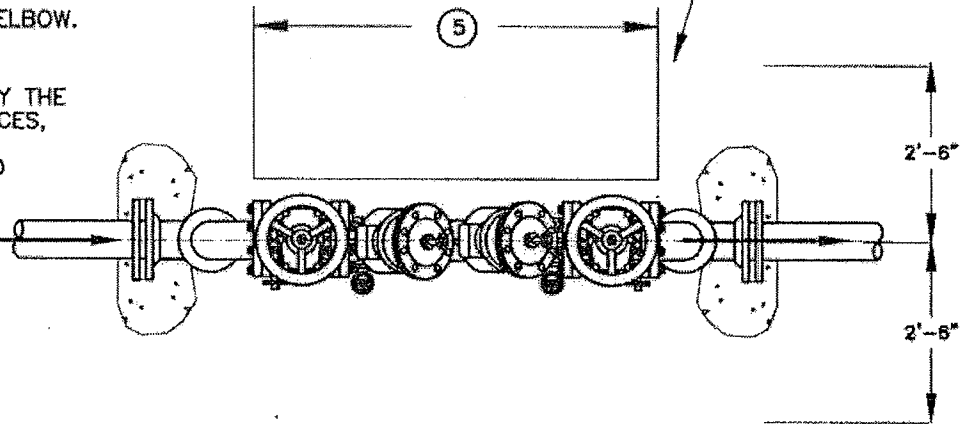
NOTES:

1. PRIVATE WATER MAIN.
2. 90° DUCTILE IRON ELBOW: FLG X FLG; FLG X P.O.; (UNI-FLANGE SHALL NOT BE USED).
3. FLANGED DUCTILE IRON SPOOL (BOTH ENDS SHALL BE FLANGED).
4. 90° FLANGED DUCTILE IRON ELBOW.
5. FACTORY ASSEMBLED.

* ASSEMBLY TO BE APPROVED BY THE DEPARTMENT OF HEALTH SERVICES, OFFICE OF DRINKING WATER. ASSEMBLY SHALL BE INSTALLED DOWNSTREAM OF THE METER WITHIN 18". NO CONNECTION BETWEEN THE METER AND THE ASSEMBLY IS PERMITTED.

WATER METER AND METER BOX

4" THICK CONCRETE SLAB (520-C-2500) OVER 6" CLASS II AB COMPACTED TO 95%.



PLAN VIEW

THIS ASSEMBLY SHALL BE INSPECTED BY THE WATER UTILITIES DEPARTMENT. AFTER WATER UTILITIES DEPARTMENT'S APPROVAL ASSEMBLY SHALL BE TESTED BY A TESTER ON THE CITY'S APPROVED TESTER LIST. THE DEVELOPER/OWNER IS RESPONSIBLE FOR THE COST OF TESTING THE ASSEMBLY. THERE AFTER, THE ASSEMBLY SHALL BE TESTED ANNUALLY AT THE OWNER'S EXPENSE. THE TEST REPORT IS TO BE SUBMITTED TO THE CITY WATER UTILITIES DEPARTMENT. PHONE NUMBER 760-435-5862

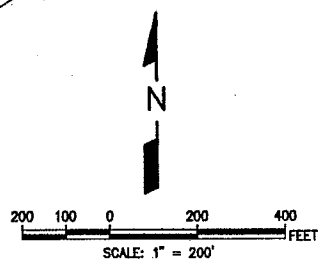
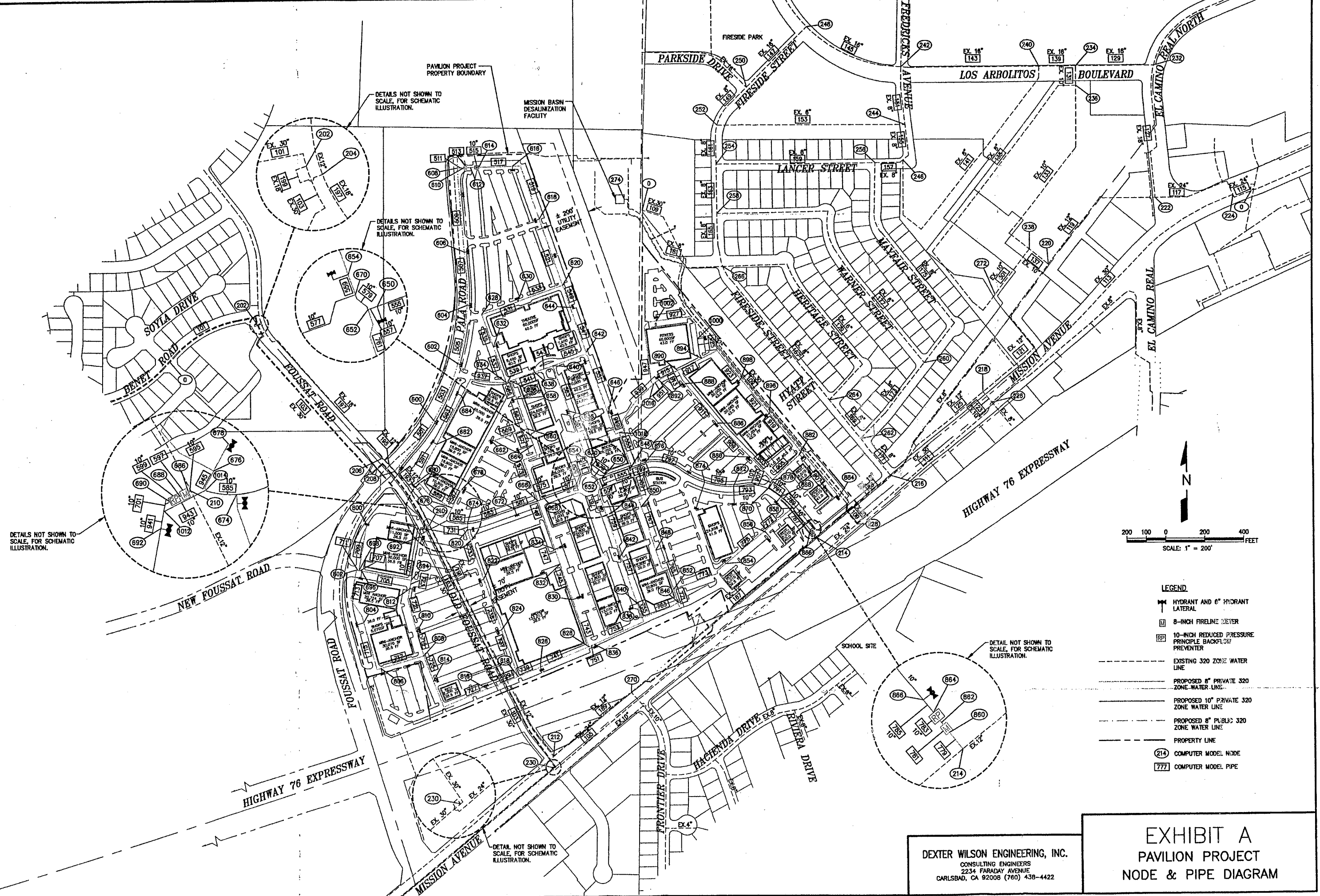
| Revision | By | Approved | Date |
|----------|-----|----------|------|
| 04/05/01 | kal | | |
| 06/08/01 | DW | | |
| 09/17/02 | DW | | |
| 07/08/04 | AC | | |

CITY OF OCEANSIDE

REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" & LARGER)

M. J. Doyle
 CITY ENGINEER
 Date
 STANDARD DRAWING NO. **W-13**

PACIFIC POWER & LIGHT COMPANY WATER EXHIBIT - LIVING 08-10-07 09:23:08 LAYOUT: WFL



LEGEND

- HYDRANT AND 6" HYDRANT LATERAL
- 8-INCH FIRELINE METER
- 10-INCH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER
- EXISTING 320 ZONE WATER LINE
- PROPOSED 8" PRIVATE 320 ZONE WATER LINE
- PROPOSED 10" PRIVATE 320 ZONE WATER LINE
- PROPOSED 8" PUBLIC 320 ZONE WATER LINE
- PROPERTY LINE
- (214) COMPUTER MODEL NODE
- (777) COMPUTER MODEL PIPE

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

EXHIBIT A
PAVILION PROJECT
NODE & PIPE DIAGRAM

**WATER SYSTEM ANALYSIS
FOR THE PAVILION PROJECT
IN THE
CITY OF OCEANSIDE**

Revised December 19, 2007

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008

Job No. 866-001

Filed w/Applica.

12/20/07

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
DIANE H. SHAUGHNESSY, P.E.

December 19, 2007

866-001

O'Day Consultants
2710 Loker Avenue West, Ste. 100
Carlsbad, CA 92008

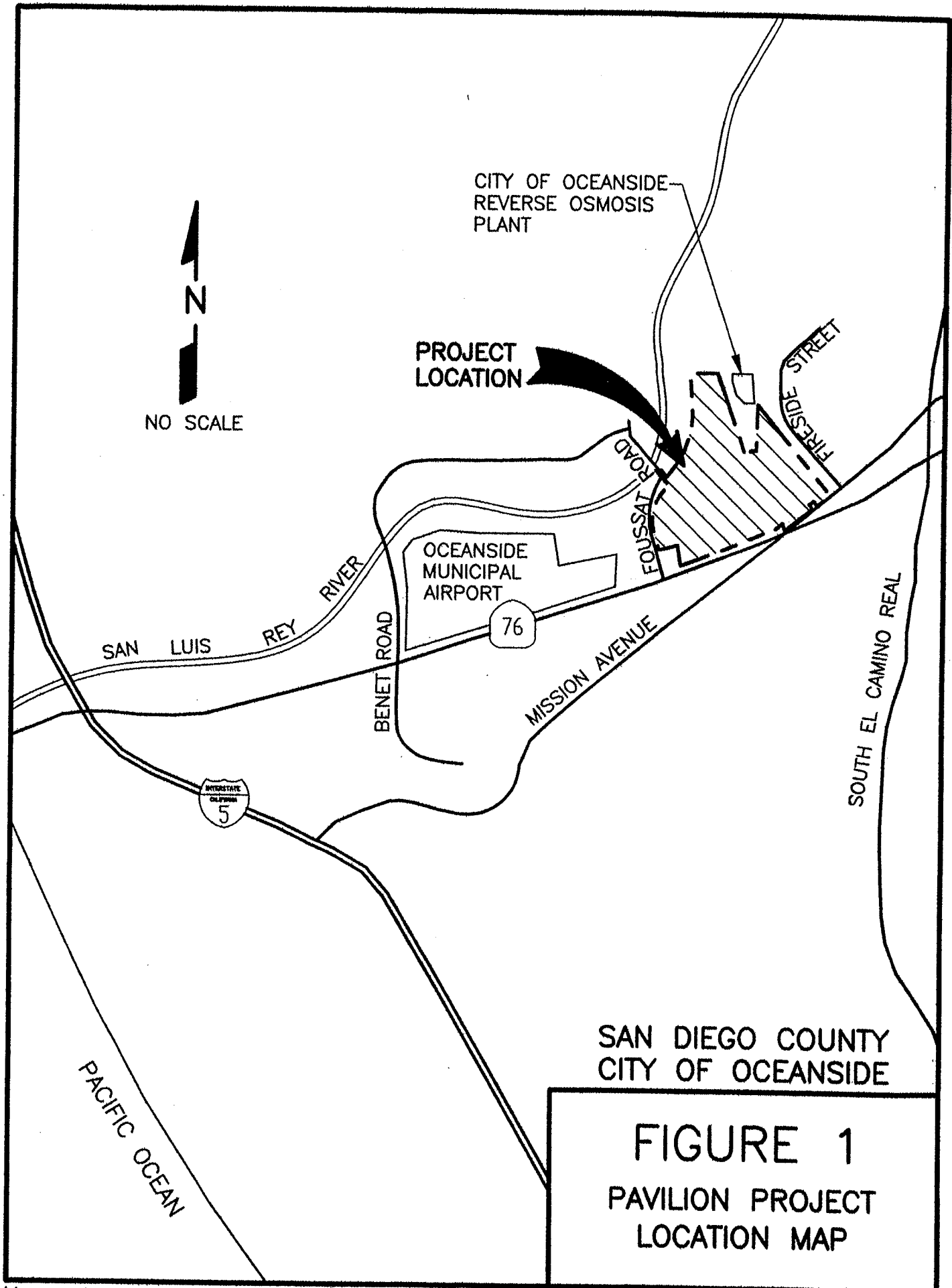
Attention: John Strohminger, Project Manager

Subject: Water System Analysis for the Pavilion Project in the City of
Oceanside

Introduction

The Pavilion Project is located in the northern portion of the City of Oceanside. It is generally situated east of US Interstate 5 and west of El Camino Real. Specifically, it is bound by open space to the north, Mission Avenue and Highway 76 to the south, existing development on Fireside Street to the east, and Foussat Road and the San Luis Rey River to the west. See Figure 1 for the location of the project. Historically, the site has functioned as a drive-in movie theater and is presently a meeting location for a weekly swap meet.

Additional features to note in proximity to the project are the City of Oceanside's reverse osmosis plant to the north and the two utility easements traversing the project. The larger of the two easements, in the eastern portion of the property, contains City of Oceanside water and sewer lines as well as San Diego Gas and Electric transmission lines. The easement in the western portion of the property is a prior extension of Foussat Road, and contains City water and sewer lines.



CITY OF OCEANSIDE
REVERSE OSMOSIS
PLANT

N
NO SCALE

PROJECT
LOCATION

OCEANSIDE
MUNICIPAL
AIRPORT

76

INTERSTATE
CALIFORNIA
5

SAN DIEGO COUNTY
CITY OF OCEANSIDE

FIGURE 1
PAVILION PROJECT
LOCATION MAP

The Pavilion Project proposes to construct 930,805 square feet of commercial space over approximately 92 acres. Individual commercial spaces shall range in size from approximately 4,000 ft² to 132,000 ft² to accommodate a movie theater, retail stores and shops, restaurants, and the like. Water service to the project, which includes domestic, irrigation, and fire protection, shall be provided by a private combined water system which will connect to the City of Oceanside's public water system. The Pavilion project's on-site water system will supply the project's domestic service laterals, irrigation piping, fire hydrants, and fire sprinkler systems. The water system will also include the addition of a public water line adjacent to the project in Pala Road to serve the Pavilion project.

The purpose of this letter report is to present the results of an hydraulic analysis of the proposed combined water system which will provide domestic, irrigation, and fire protection service to the Pavilion project. Design of the fire-sprinkler systems is outside the scope of this report and therefore has not been included in the hydraulic analysis. Included in this analysis are existing off-site public water lines in the vicinity of the Pavilion project which will supply the project's private water system.

Water System Design Criteria

The Pavilion project's water system has been designed in accordance with the City of Oceanside's *Water, Sewer, and Reclaimed Water Design and Construction Manual*, August 2005 edition.

The average day demand for the project, based on the commercial land use type, is 1,850 gpd/ac (gallons per day per acre). Maximum day demand and peak hour demand are based on the average day demand multiplied by peak factors of 2 and 3, respectively. The commercial fire flow requirement is 4,000 gpm (gallons per minute) as specified in the City's design manual. Additionally, the project has a maximum daily irrigation demand of 170 gpm.

In addition to the flow requirements, the Pavilion water system must be designed to provide a minimum residual pressure to all locations of 35 psi (pounds per square inch) during a peak hour demand scenario and 20 psi during the maximum day demand plus fire flow scenario. The maximum day demand referred to here, and throughout the following report, refers to the combination of the domestic and irrigation maximum day demands.

Existing Water System

The Pavilion project is within the City of Oceanside and shall receive service from the City's public water system. The project will be served by the City's 320 Pressure Zone where 320 corresponds to the high water level (in feet) within the storage reservoirs. The 320 Zone in the vicinity of the project is supplied by two primary sources, Wire Mountain Reservoir and Heritage Reservoir, both with low water levels of 290 feet. The Wire Mountain Reservoir is located northwest of the project on the north side of the San Luis Rey River and the Heritage Reservoir is located southeast of the project, along Rancho Del Oro Drive.

From the Wire Mountain Reservoir, a 30-inch transmission main carries water east to the Foussat Road Bridge and crosses the San Luis Rey River west of the project. The 30-inch main travels south through the Pavilion project via the western utility easement and connects to the 24-inch transmission main in Mission Avenue. This 24-inch transmission main continues east along Mission Avenue and eventually connects to the Heritage Reservoir, providing customers in this area with two sources of water supply.

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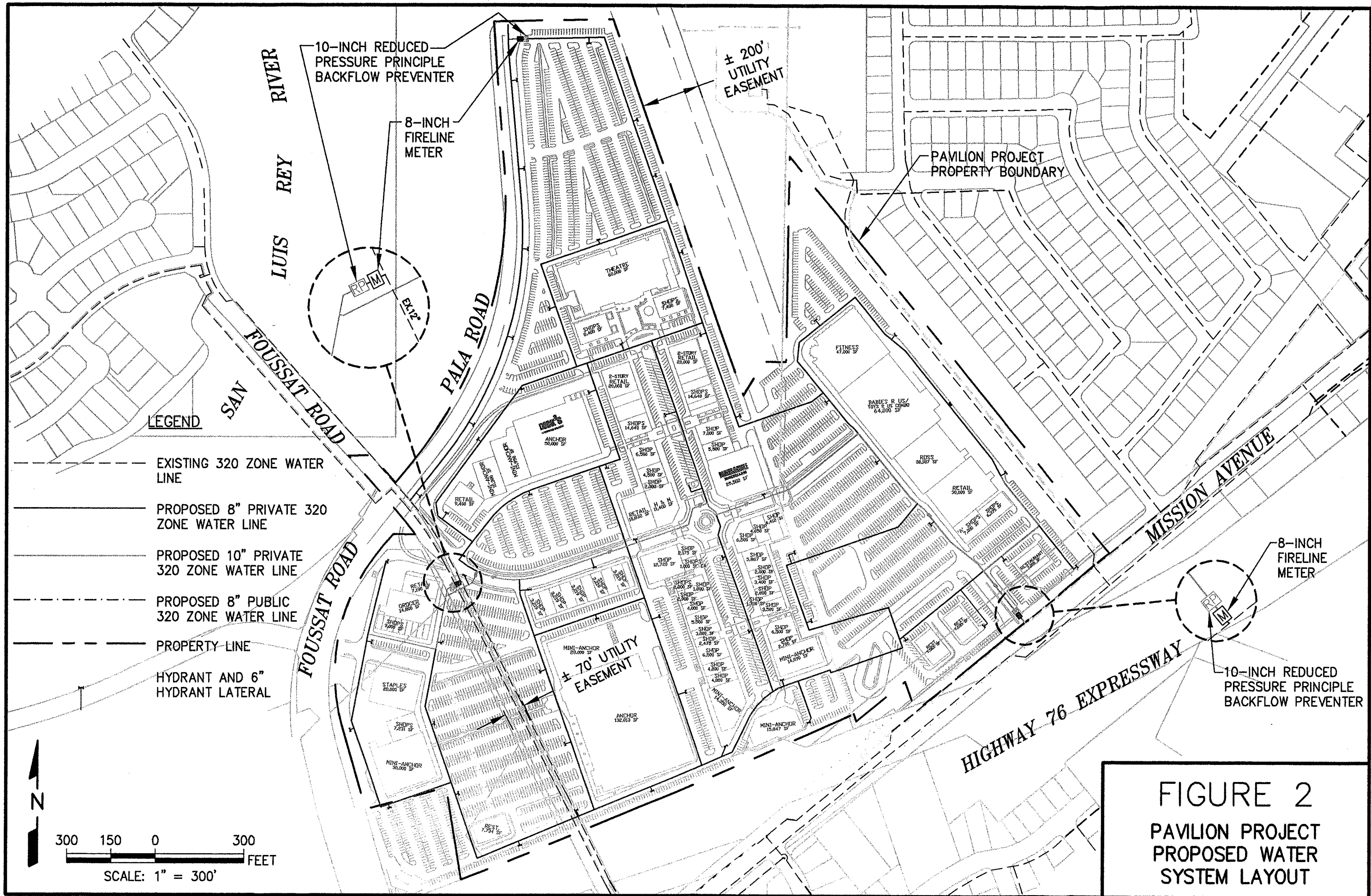
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Each meter shall be followed by an approved 10-inch reduced pressure principle backflow preventer. The City's standard drawings for meter and backflow preventer installation can be found in Appendix C.

Recommendations and Conclusions

The following recommendations and conclusions are presented based upon the water system analyses performed for the Pavilion project.

1. Water service to the project will be provided by the 320 Pressure Zone of the City of Oceanside's public water system.
2. Finished floor elevations for buildings within the Pavilion project range from 35.5 feet to 43.5 feet resulting in a maximum static pressure range of 119.8 psi to 123.3 psi.
3. Individual pressure regulators shall be required at each unit to limit service pressures to 80 psi in accordance with Uniform Plumbing Code and City of Oceanside standards.

4. A private combined water system will serve the Pavilion project which shall supply the necessary domestic and irrigation demands and the required fire flow.
5. The Pavilion project will connect to the existing public 320 Zone 12-inch water lines in Old Foussat Road and Mission Avenue. The project will also connect to the proposed public 320 Zone 8-inch water line in Pala Road.
6. Each 8-inch connection to the public main shall include an 8-inch Fireline meter and a 10-inch reduced pressure principle backflow preventer according to the City of Oceanside's standards.
7. The proposed water system as shown on Figure 2 which includes on-site private water lines and a public water line adjacent to the project are adequate to supply the domestic, irrigation, and fire protection needs of the Pavilion project.
8. The fire flow available to the project meets the City of Oceanside's fire flow requirement of 4,000 gpm while maintaining a residual pressure of 20 psi at all locations.
9. This report presents the sizing and a general schematic layout of the proposed water system. The location of water lines, supply laterals, and water meters should be in accordance with the City of Oceanside's requirements.
10. If PVC pipe is used for the water lines within the project, we recommend the 8-inch and 10-inch diameter piping to be AWWA C900, Class 150.

John Strohminger
December 19, 2007

Thank you for the opportunity to assist you with the water system planning for the Pavilion project. If you have any questions regarding the information presented in this report, please do not hesitate to call.

Dexter Wilson Engineering, Inc.



Andrew Oven

AO, NF:sbr

Attachments

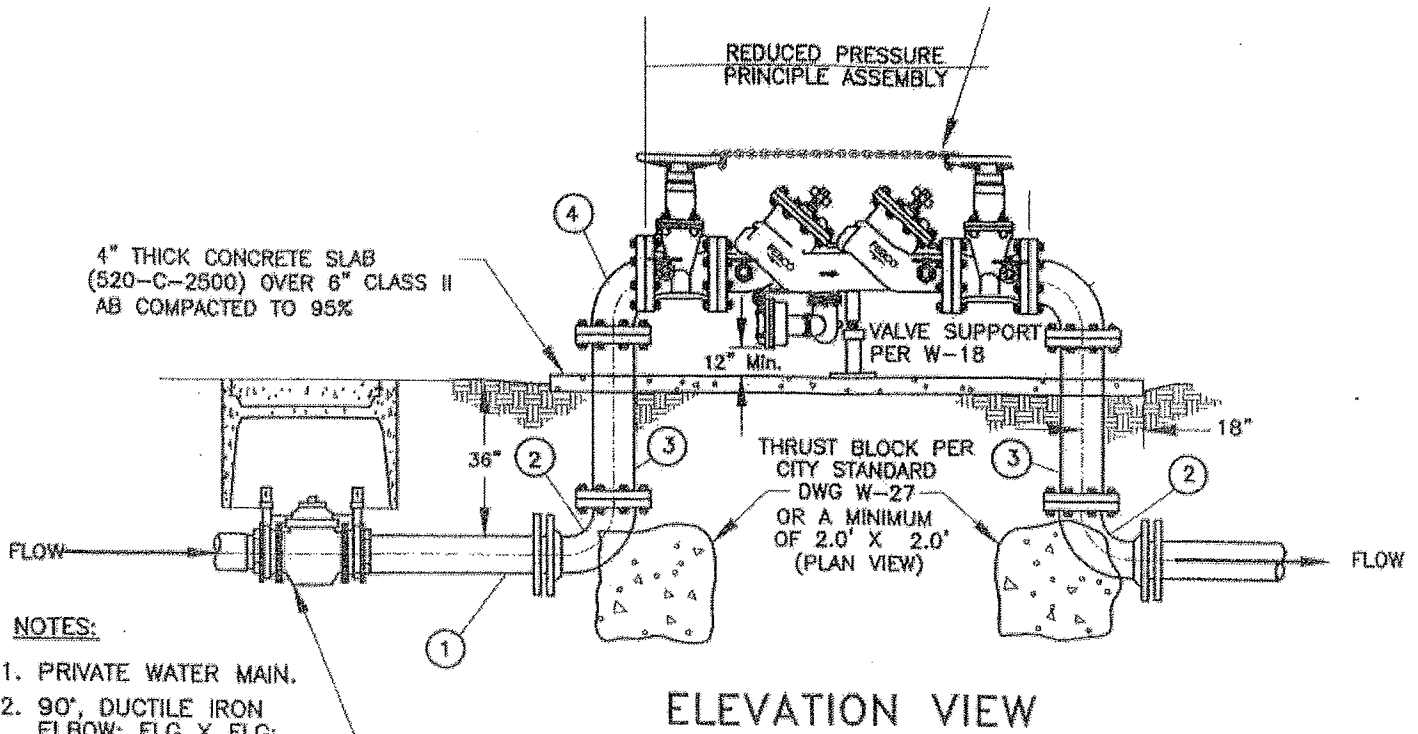


NOTE:

**APPENDICES A & B (WORKSHEETS) ARE BOUND
IN A SEPARATE TECHNICAL APPENDIX ON FILE
WITH THE CITY OF OCEANSIDE'S PLANNING
DEPARTMENT AND MAY BE REVIEWED AT
THAT LOCATION.**

APPENDIX C

City of Oceanside Reference Information

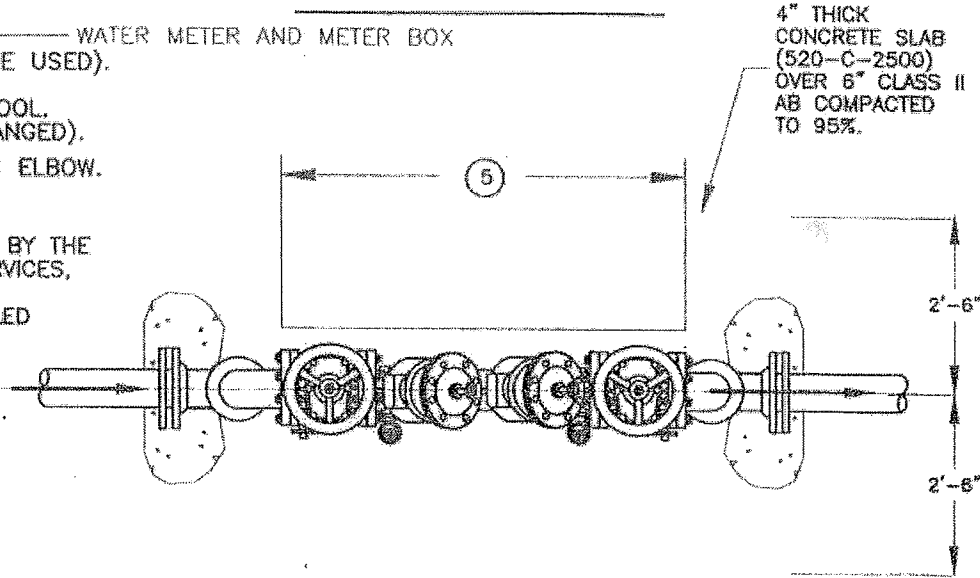


ELEVATION VIEW

NOTES:

1. PRIVATE WATER MAIN.
2. 90° DUCTILE IRON ELBOW: FLG X FLG; FLG X P.O.; (UNI-FLANGE SHALL NOT BE USED).
3. FLANGED DUCTILE IRON SPOOL (BOTH ENDS SHALL BE FLANGED).
4. 90° FLANGED DUCTILE IRON ELBOW.
5. FACTORY ASSEMBLED.

* ASSEMBLY TO BE APPROVED BY THE DEPARTMENT OF HEALTH SERVICES, OFFICE OF DRINKING WATER. ASSEMBLY SHALL BE INSTALLED DOWNSTREAM OF THE METER WITHIN 18". NO CONNECTION BETWEEN THE METER AND THE ASSEMBLY IS PERMITTED.



PLAN VIEW

THIS ASSEMBLY SHALL BE INSPECTED BY THE WATER UTILITIES DEPARTMENT. AFTER WATER UTILITIES DEPARTMENT'S APPROVAL ASSEMBLY SHALL BE TESTED BY A TESTER ON THE CITY'S APPROVED TESTER LIST. THE DEVELOPER/OWNER IS RESPONSIBLE FOR THE COST OF TESTING THE ASSEMBLY. THERE AFTER, THE ASSEMBLY SHALL BE TESTED ANNUALLY AT THE OWNER'S EXPENSE. THE TEST REPORT IS TO BE SUBMITTED TO THE CITY WATER UTILITIES DEPARTMENT. PHONE NUMBER 760-435-5862

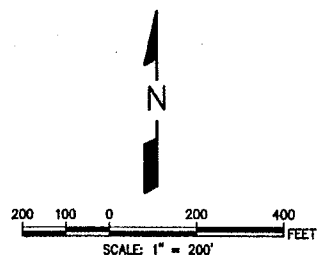
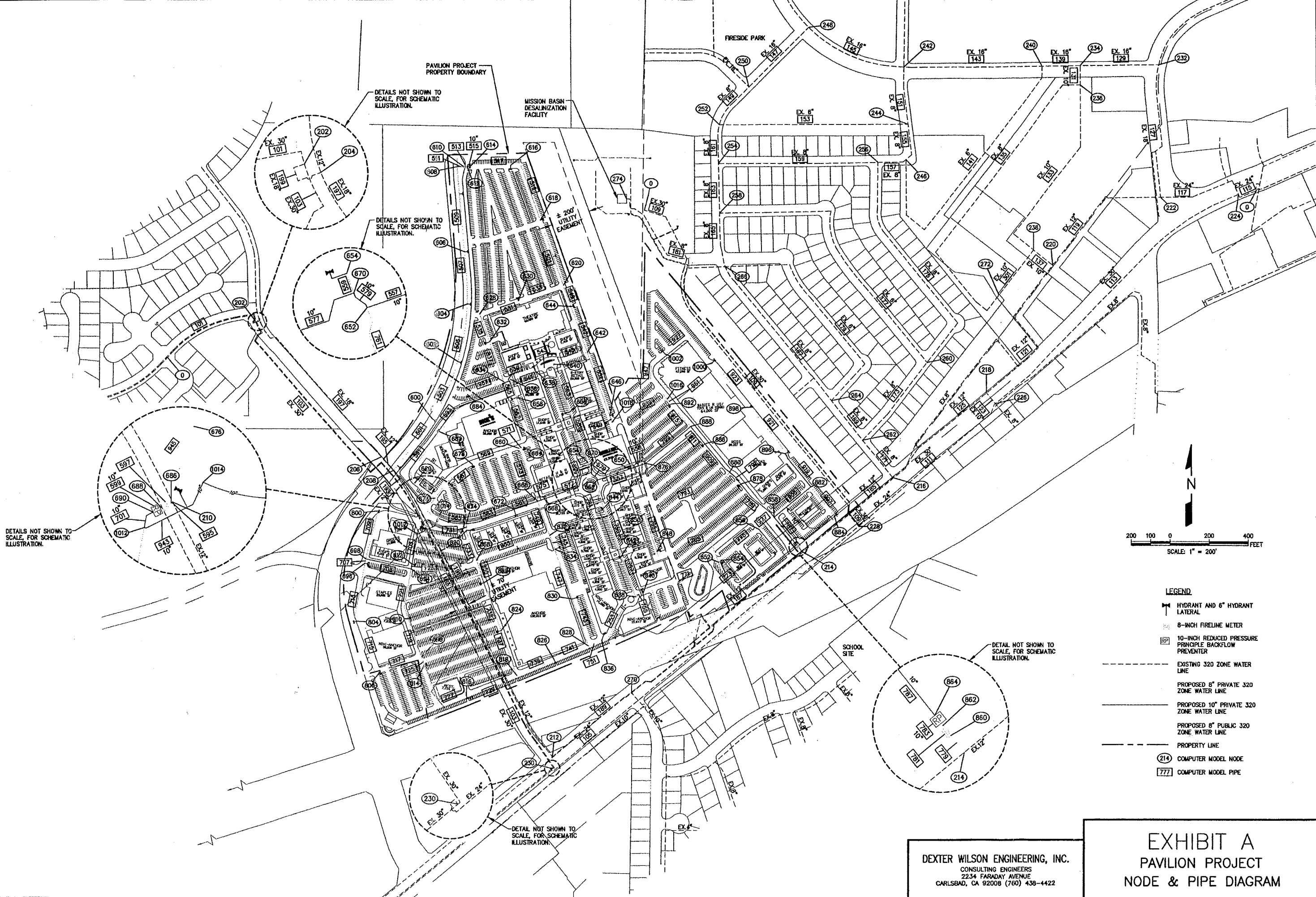
| Revision | By | Approved | Date |
|----------|-----|----------|------|
| 04/05/01 | kal | | |
| 06/08/01 | DW | | |
| 09/17/02 | DW | | |
| 07/08/04 | AC | | |

CITY OF OCEANSIDE

REDUCED PRESSURE PRINCIPLE ASSEMBLY (3" & LARGER)

[Signature]
 CITY ENGINEER *[Signature]* Date
 STANDARD DRAWING NO. **W-13**

PACIFIC POWER & LIGHT CO. WATER EXHIBIT - A.DWG. 12-18-07 15:55:22 LAYOUT: WTR



- LEGEND**
- HYDRANT AND 6" HYDRANT LATERAL
 - 8-INCH FIRELINE METER
 - 10-INCH REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER
 - EXISTING 320 ZONE WATER LINE
 - PROPOSED 8" PRIVATE 320 ZONE WATER LINE
 - PROPOSED 10" PRIVATE 320 ZONE WATER LINE
 - PROPOSED 8" PUBLIC 320 ZONE WATER LINE
 - PROPERTY LINE
 - (214) COMPUTER MODEL NODE
 - [777] COMPUTER MODEL PIPE

DEXTER WILSON ENGINEERING, INC.
 CONSULTING ENGINEERS
 2234 FARADAY AVENUE
 CARLSBAD, CA 92008 (760) 438-4422

EXHIBIT A
PAVILION PROJECT
NODE & PIPE DIAGRAM

RECEIVED
SEP 07 2007
BY AFFINIS

**SEWER STUDY
FOR THE PAVILION PROJECT
IN THE
CITY OF OCEANSIDE**

August 10, 2007

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008

Job No. 866-001

Filed w/Application

8/29/07

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
DIANE H. SHAUGHNESSY, P.E.

August 10, 2007

866-001

O'Day Consultants
2710 Loker Avenue West, Ste. 100
Carlsbad, CA 92008

Attention: John Strohming, Project Manager

Subject: Sewer Study for the Pavilion Project in the City of Oceanside

Introduction

The Pavilion project is located in the northern portion of the City of Oceanside. It is generally situated east of US Interstate 5 and west of El Camino Real. Specifically, it is bound by open space to the north, Mission Avenue and Highway 76 to the south, existing development on Fireside Street to the east, and Foussat Road and the San Luis Rey River to the west. See Figure 1 for the location of the project. Historically, the site has functioned as a drive-in movie theater and is presently a meeting location for a weekly swap meet.

Features to note in proximity to the project are the two utility easements traversing the project. The larger of the two easements, in the eastern portion of the property, contains City of Oceanside water and sewer lines as well as San Diego Gas and Electric transmission lines. The easement in the western portion of the property is a prior extension of Foussat Road and contains City water and sewer lines.

The Pavilion project proposes to construct 930,805 square feet of commercial space over approximately 92 acres. Individual commercial spaces shall range in size from

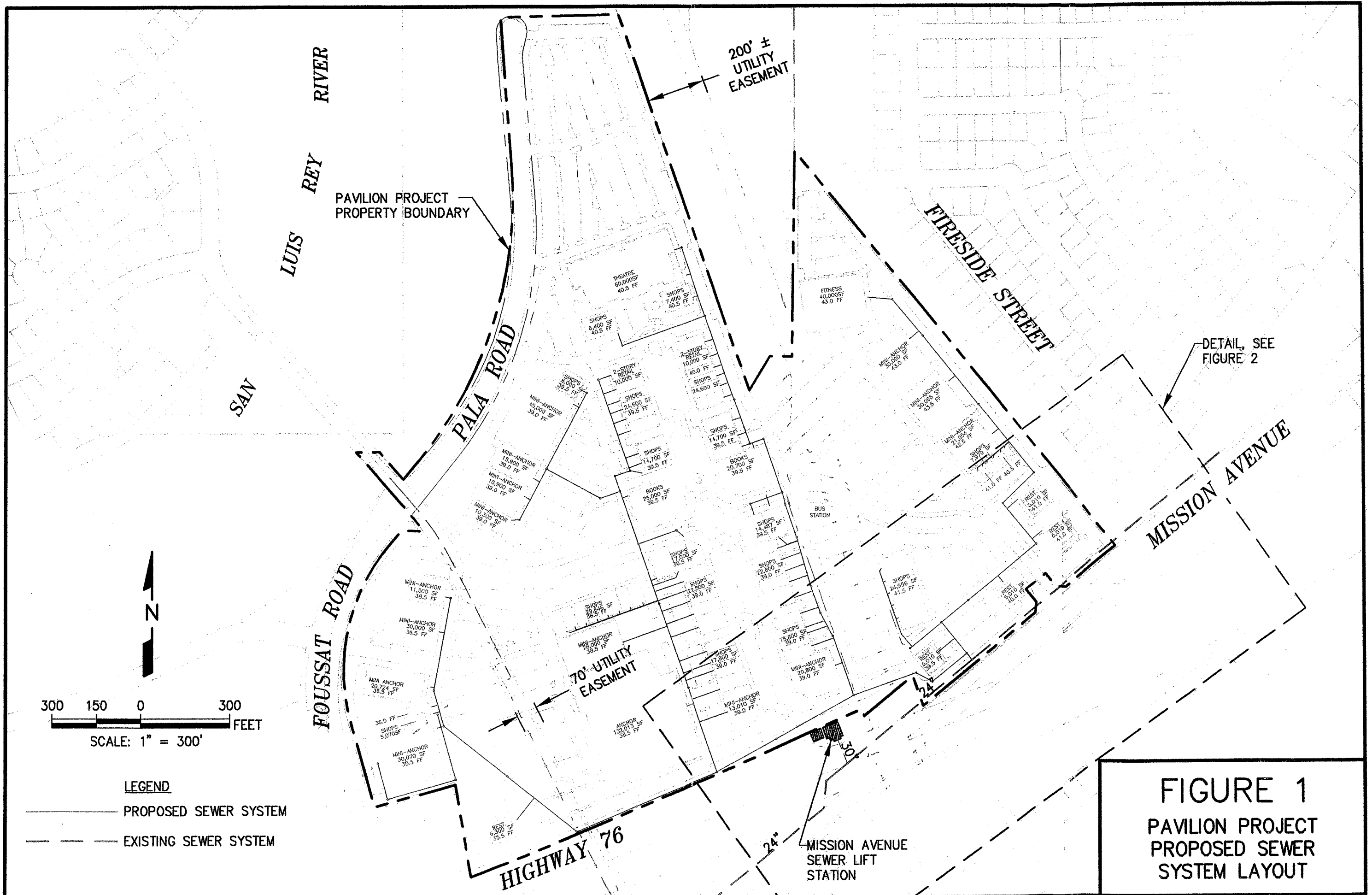
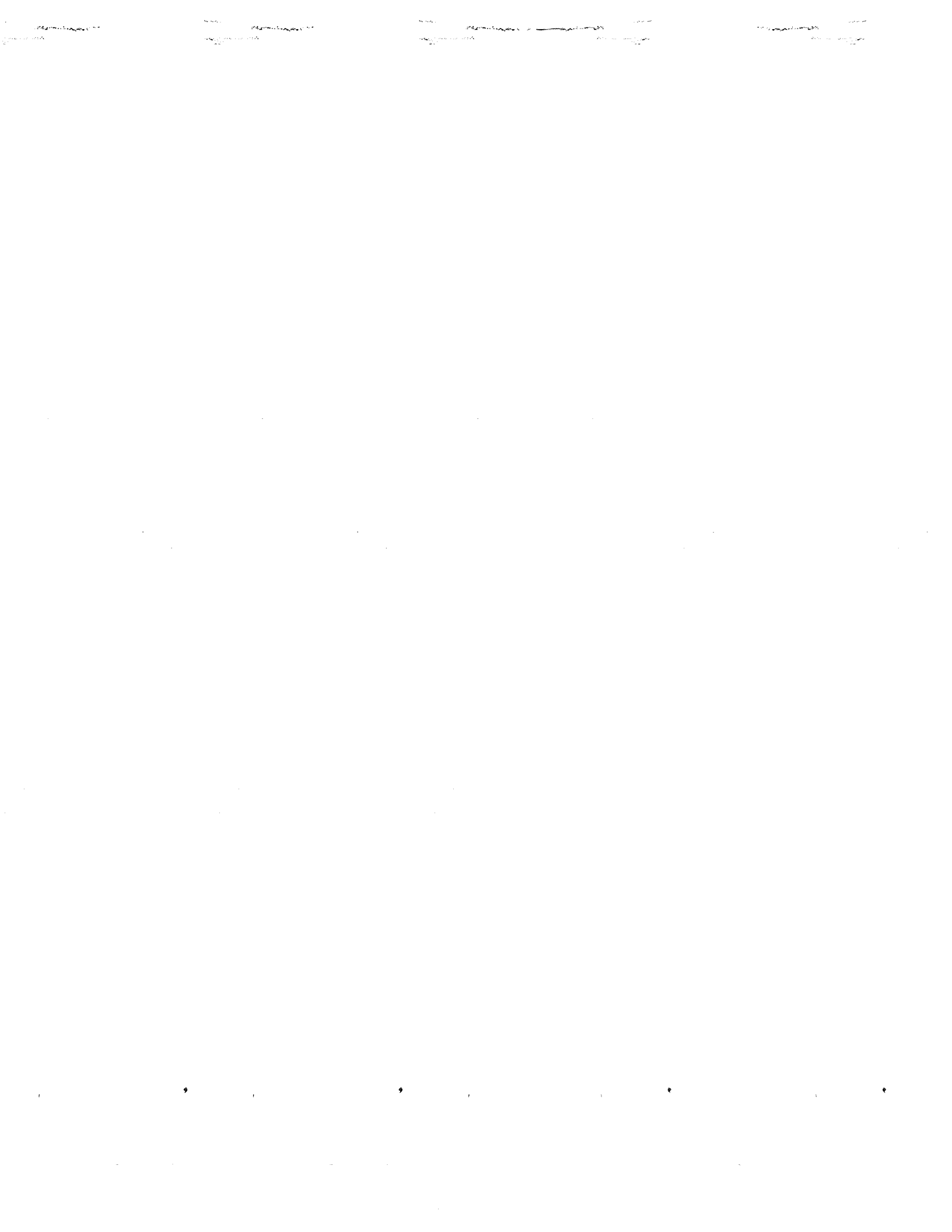
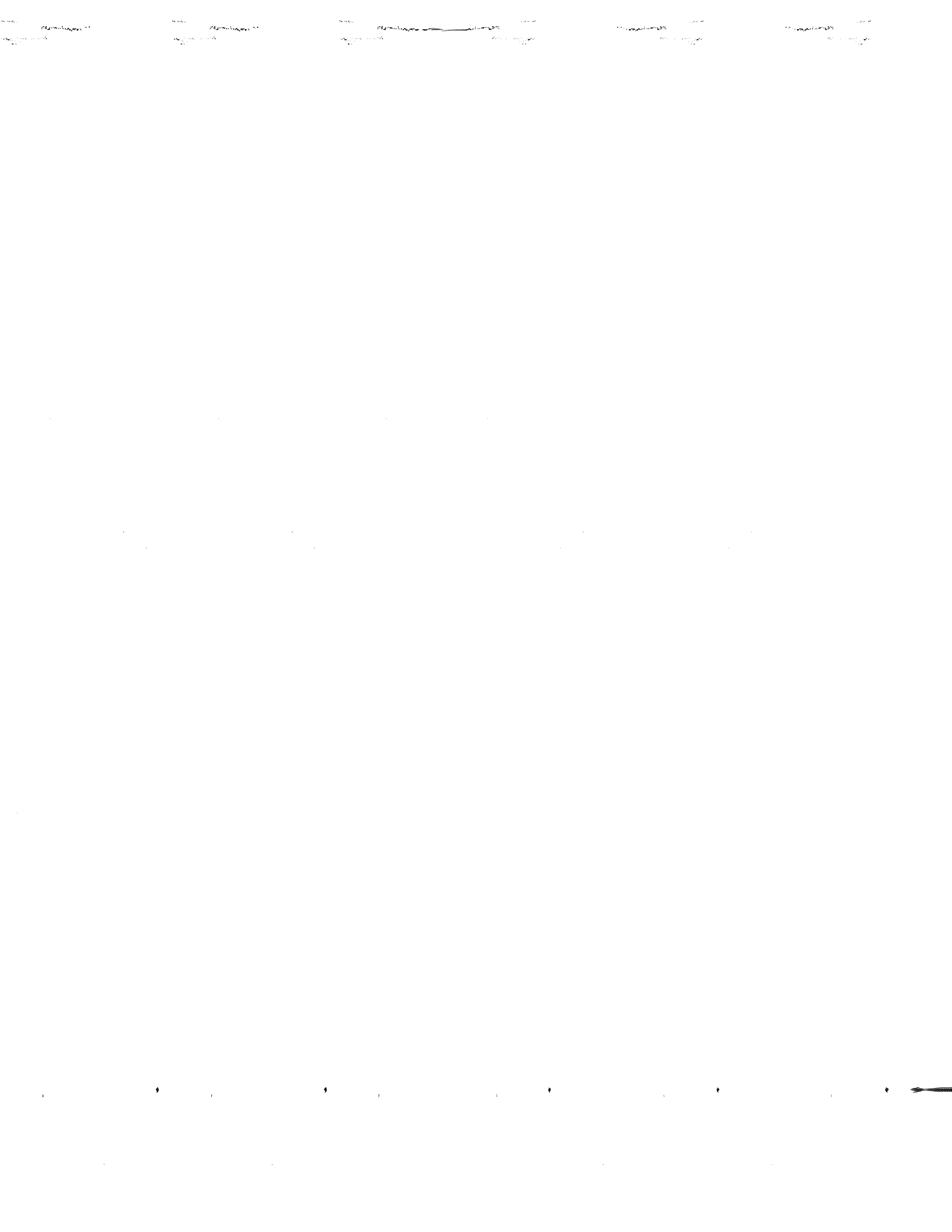


FIGURE 1
PAVILION PROJECT
PROPOSED SEWER
SYSTEM LAYOUT





identical to its state in 1999 when the Master Plan was completed. From the image, it can be estimated that 0.5 acres of the property is developed, building area only, while 4 acres remain constrained due to easements through the property. This leaves approximately 87.5 acres of undeveloped area. Based on the 1999 Master Plan methodology, ultimately 20 percent of the undeveloped area, or 17.5 acres, would be developed and thus considered wastewater generating acreage at ultimate build-out. Using the 2,400 gpd/acre wastewater flow generation rate, the projected flow is 42,000 gpd or 29.2 gpm.

Current Design Guidelines. From the current Design Manual, the projected wastewater flow generated by the Pavilion project is based on the commercial land use generation rate of 1,500 gpd/ac and the project's size of 88.5 net acres. Based on this, the projected average flow generated by the project is 132,750 gpd or 92.2 gpm.

In comparing the projected ultimate flows of 29.2 gpm from the 1999 Master Plan to the flow of 92.2 gpm determined using the Design Manual, approximately 32% of the Pavilion site's sewage flow was accounted for in the ultimate wastewater projections for the City. The remainder of the calculations within the report considers the average flow generated by the project to be 92.2 gpm.

Proposed Connection

The Pavilion project is proposing to connect to the 24-inch sewer line in Mission Avenue at an existing manhole approximately 540 feet east of the Mission Avenue Lift Station. This manhole is identified on the City's sewer base map I18 as Manhole 26 at Station 4+34. The connection shall include an inspection manhole, upstream of which shall be a private sewer and downstream of which shall be a public reach of pipe to the existing public sewer system. Figure 2 illustrates the location of the connection.

Inspection Manhole and Public Reach

Figure 2 points to the most likely location of the inspection manhole based on the project's proposed sewer system layout. Since the 24-inch pipe which the project is proposing to connect to lies within the project's property line, an easement shall be necessary for the public reach of pipe.

From the inspection manhole, the public reach which connects to the existing 24-inch sewer line must be capable of conveying the project's peak flow without exceeding the City's d/D requirements. As determined previously, the average daily sewage flow generation rate for the Pavilion project is 92.2 gpm. Utilizing the peaking equation, the anticipated peak flow from the project is 192.0 gpm. To accommodate this peak flow at the minimum required slope of 0.4%, a 10-inch pipe is recommended. Calculations confirming this can be found in Appendix B.

Existing Sewer Facilities Evaluation

Bordering the Pavilion project to the south in Mission Avenue is a public 24-inch sewer pipe which carries flow from the east and west to a common manhole. This manhole then discharges into the 30-inch pipe which discharges to the Mission Avenue Lift Station splitter box and wet well. The lift station then pumps the wastewater north to the San Luis Rey Wastewater Treatment Plant through the eastern utility easement within the Pavilion project.

The Pavilion project is proposing to connect to the existing manhole in the 24-inch public sewer line in Mission Avenue approximately 540 feet east of the Lift Station as described previously. The capacity of each reach of pipe downstream from the connection point to the pump station, including the pump station, is evaluated in the following sections.

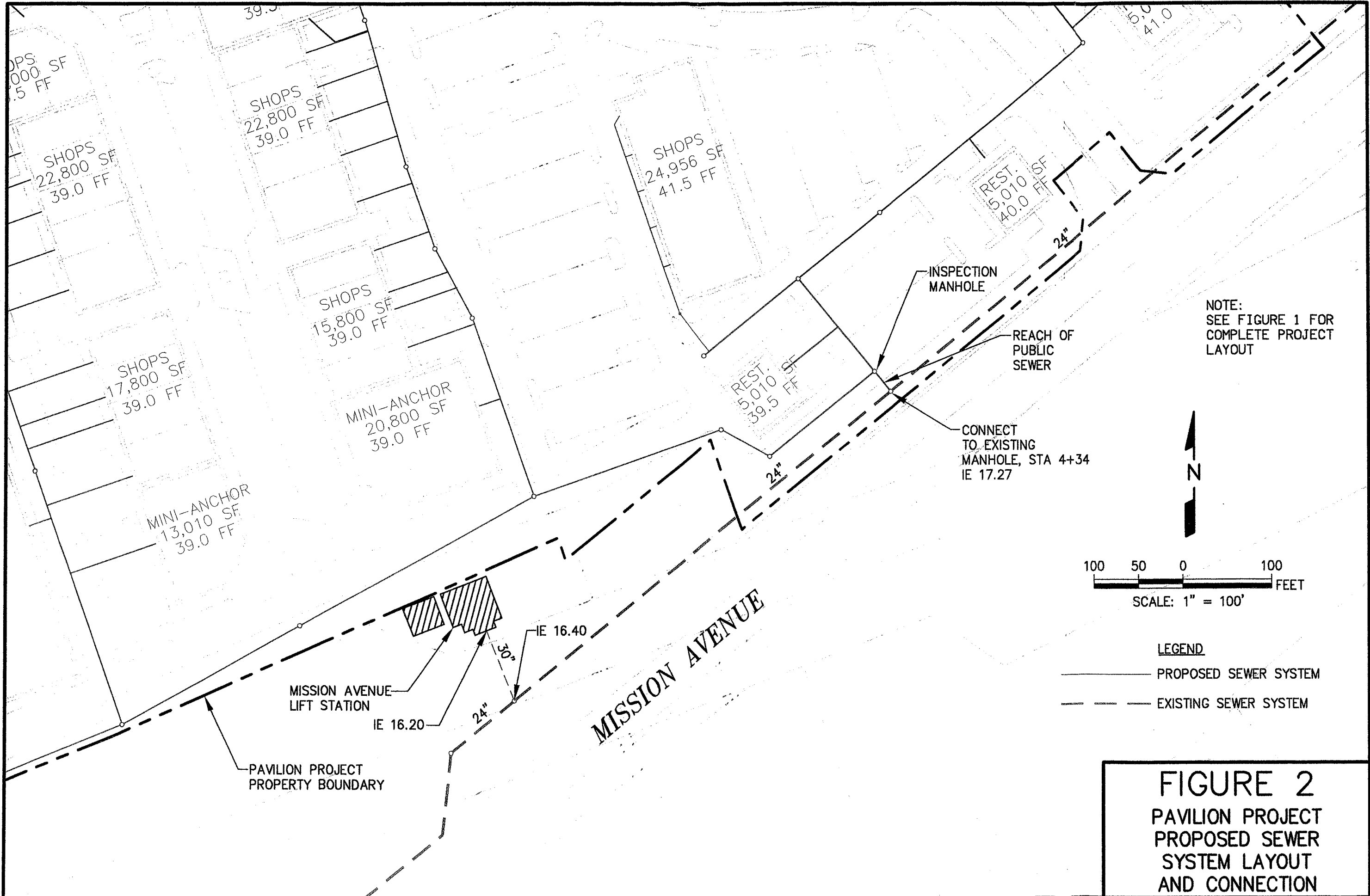


FIGURE 2
PAVILION PROJECT
PROPOSED SEWER
SYSTEM LAYOUT
AND CONNECTION

24-inch East of Lift Station. The 24-inch sewer line in Mission Avenue carries sewage flows from areas east of the Pavilion project to the Mission Avenue Lift Station. The Pavilion project is proposing to connect to this sewer line at the existing manhole approximately 540 feet east of the Lift Station. Based on the City's requirements of a maximum d/D of 2/3 and "as-built" drawings of this pipe, the maximum capacity was determined to be approximately 5,200 gpm. Calculations can be found in Appendix C.

30-inch Into the Lift Station. Based on the City's maximum d/D requirement of 2/3 and "as-built" drawings of this pipe segment obtained from the City, the 30-inch sewer line's maximum capacity was determined to be approximately 13,100 gpm. Calculations can be found in Appendix C.

Mission Avenue Lift Station. The Mission Avenue Lift Station is located at the southern border of the Pavilion project site approximately halfway between Fousat Road to the west and Fireside Street to the east. According to Table 6-10 of the City of Oceanside's 1999 Wastewater Master Plan, the theoretical pumping capacity of the Mission Avenue Lift Station is 6,000 gpm with each of the two pumps capable of pumping 3,000 gpm. The Master Plan ultimate flow projections specify the ultimate peak flow to the lift station is 4,300 gpm. This information was found in Table 6-10 of the 1999 Master Plan and can be found in Appendix A.

Conclusion

The Pavilion project's on-site private sewer system is proposing to discharge 192.0 gpm at peak flow to the City of Oceanside's public sewer system. Based on the City's Design Manual, the transition from private to public sewer systems occurs through an inspection manhole typically located at the project's property line. At the proposed point of connection, approximately 540 feet east of the Mission Avenue Lift Station, the 24-inch sewer line lies inside the Pavilion project's property line.

John Strohminger
August 10, 2007

Therefore, future discussion between the project and the City shall be necessary to determine the specific location of the inspection manhole and to detail the easements which may be necessary to accommodate the public pipe reach between the inspection manhole and the existing public system.

Regarding the existing public system, the capacities of the 24-inch and 30-inch pipe which shall transport the Pavilion project's flows were evaluated based on City of Oceanside "as-built" drawings to determine their maximum capacities in adhering to the City's d/D requirements. It was determined the maximum capacities of the 24-inch and 30-inch pipe are 5,200 gpm and 13,100 gpm, respectively. The 30-inch pipe discharges to the Mission Avenue Lift Station which has a maximum pumping capacity of 6,000 gpm based on the City of Oceanside's 1999 Wastewater Master Plan.

The 1999 Wastewater Master Plan states that the ultimate peak flow projected to reach the Mission Avenue Lift Station is 4,300 gpm. As stated previously, 32% (29.2 gpm of 92.2 gpm) of the wastewater flow generated by the Pavilion site based on the current Design Manual was included in the 1999 projection. The balance of the difference in methodologies (63 gpm) is 135.2 gpm at peak flow. This balance in addition to the 4,300 gpm ultimate flow projection to the Mission Avenue Lift Station is 4,435.2 gpm. In comparing this combined flow to the maximum capacities of the 24-inch and 30-inch pipes, it can be seen that neither pipe exceeds the City's d/D requirements. Moreover, the combined flow to the Mission Avenue Lift Station falls within the 6,000 gpm pumping capacity of the station.

Based on the capacities of the existing sewer system pipes which shall carry the Pavilion project's wastewater flow and the capacity of the Mission Avenue Lift Station specified in the City's 1999 Wastewater Master Plan, the existing public sewer system can adequately convey the Pavilion project's peak wastewater flows while adhering to City criteria.

John Strohming
August 10, 2007

We appreciate the opportunity to assist you with the sewer system planning for the Pavilion project. If you have any questions regarding the information presented in this report, please do not hesitate to contact us.

Dexter Wilson Engineering, Inc.

Natalie Frasciotta, for Andrew Owen

Andrew Owen

AO, NF:ssr

Attachments

APPENDIX A

**CITY OF OCEANSIDE
1999 WASTEWATER MASTER PLAN INFORMATION**

5.5 Commercial, Industrial and Institutional Flow Allocation

The percentages of developed acreage within each commercial/industrial land use area were also estimated from 1995 aerial photographs and multiplied by the total acreages to obtain developed acreages for each area. Parking lots, right-of-ways, and fields were considered non-flow generating (constrained) and were not included in the developed acreage estimates.

For each commercial/industrial land use area, existing developed acreage and geographically-constrained acreage was subtracted from total acreage to obtain undeveloped acreage. For commercial areas, it was assumed that 20% of the undeveloped acreage would be flow-generating development at ultimate conditions, with the remaining 80% being non-flow generating development (parking lots, fields, right-of-way). For industrial land use areas, it was assumed that 30% of the undeveloped acreage would be flow-generating at ultimate conditions, with the remaining 70% being non-flow generating development.

5.6 Wastewater Flows and Calibration

5.6.1 Existing Conditions

A residential contribution per capita (CPC) of 73 gpd was determined by using the flow data generated during the flow monitoring study and correlated that to the existing residential areas and population. These values were then applied to the population estimates to determine wastewater generation from residential areas. The resulting flow of 10.85 MGD was subtracted from the known existing influent average daily dry weather flow of 12.8 MGD to the San Luis Rey and La Salina plants. **Appendix B-2** includes the residential CPC values used for each land use zone. The remainder of the flow was assumed to be the commercial/industrial contribution. Commercial and industrial generation rates (gpd/acre) were assigned to approximately match this flow rate. The flows were then correlated to the acreage shown in **Appendix B-1**. See **Table 5-5** for a summary of the generation rates and calculated flow rates. Combining residential, commercial, industrial and institutional flows the total estimated average daily dry weather (ADDW) flow rate used as input to the model is 13.22 MGD.

For contributions from the Rainbow Municipal Water District (Rainbow MWD), an existing flow rate of 0.6 MGD was used at the model node where Rainbow's system connects into the Oceanside's system. Contributions from the City of Vista were included in the land use data.

To simulate wet flow conditions, ADDW values were increased by 40 percent. This increase was determined by examination of plant influent flows during dry and wet weather.

Wastewater Master Plan

SEWAGE LIFT STATION HYDRAULIC CAPABILITIES

| Lift Station | Pump Cap. Each Pump gpm | Max. No. of Pumps Oper. No. | Theoret. Pump Cap. gpm | Existing | | | | Ultimate | | | | | | |
|------------------------------|-------------------------------|-----------------------------------|------------------------------|----------|------|-------|------|----------|------|-------|------|--|--|--|
| | | | | Average | | Peak | | Average | | Peak | | | | |
| | | | | gpm | MGD | gpm | MGD | gpm | MGD | gpm | MGD | | | |
| CLASS I | | | | | | | | | | | | | | |
| Buena Vista | 2,000 | 2 | 4,000 | 1,370 | 1.97 | 3,600 | 5.18 | 1,845 | 2.66 | 4,000 | 5.76 | | | |
| Leisure Village I | 800 | 2 | 1,600 | 190 | 0.27 | 320 | 0.46 | 260 | 0.37 | 435 | 0.63 | | | |
| Mission Boulevard | 3,000 | 2 | 6,000 | 1,660 | 2.39 | 2,550 | 3.67 | 2,820 | 4.06 | 4,300 | 6.19 | | | |
| North Bridge | 700 | 2 | 1,400 | 175 | 0.25 | 290 | 0.42 | 195 | 0.28 | 325 | 0.47 | | | |
| North Valley | 2,200 | 2 | 4,400 | 1,770 | 2.55 | 3,220 | 4.64 | 2,525 | 3.64 | 4,300 | 6.19 | | | |
| Oceanside Boulevard | 1,600 | 2 | 3,200 | 720 | 1.04 | 1,460 | 2.10 | 1,000 | 1.44 | 1,660 | 2.39 | | | |
| Pilgrim Creek | 1,125 | 2 | 2,250 | 290 | 0.42 | 475 | 0.68 | 460 | 0.66 | 480 | 0.69 | | | |
| CLASS II | | | | | | | | | | | | | | |
| Calaveras | 850 | 3 | 2,550 | 185 | 0.19 | 225 | 0.32 | 150 | 0.22 | 250 | 0.36 | | | |
| Lake Boulevard | 1,000 | 2 | 2,000 | 425 | 0.61 | 710 | 1.02 | 650 | 0.94 | 1,250 | 1.80 | | | |
| Ninth Street (North Pacific) | 550 | 2 | 1,100 | 10 | 0.01 | 20 | 0.03 | 10 | 0.01 | 20 | 0.03 | | | |
| South Pacific | 700 | 2 | 1,400 | 420 | 0.60 | 715 | 1.03 | 500 | 0.72 | 850 | 1.22 | | | |
| CLASS III | | | | | | | | | | | | | | |
| Bandstand | 250 | 2 | 500 | 20 | 0.03 | 30 | 0.04 | 20 | 0.03 | 30 | 0.04 | | | |
| Mar Lado | 600 | 2 | 1,200 | 55 | 0.08 | 90 | 0.13 | 170 | 0.24 | 300 | 0.43 | | | |
| Roymar | 950 | 2 | 1,900 | 240 | 0.35 | 445 | 0.64 | 365 | 0.53 | 675 | 0.97 | | | |
| Wisconsin | 250 | 2 | 500 | 10 | 0.01 | 20 | 0.03 | 15 | 0.02 | 20 | 0.03 | | | |

Note: Lift stations identified in bold font are within 10% of theoretical pump station capacity at present flows.
 Lift stations identified in italics are within 10% of theoretical pump station capacity at ultimate flows.

TABLE 6-10

APPENDIX B

PIPE SIZING FROM INSPECTION MANHOLE TO EXISTING MANHOLE

DEXTER WILSON ENGINEERING, INC.

PROJECT PEAK FLOW = 192.0 gpm

FOR 10-INCH PIPE, $d/D \leq 0.5$

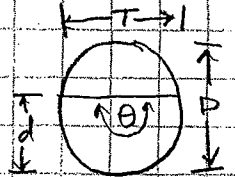
MIN. SLOPE = 0.004

MAXIMUM CAPACITY & MINIMUM SLOPE DETERMINATION

FOR 10-INCH PIPE, $d/D = 0.5$

$$\therefore D = 10/12 = 0.833 \text{ ft}$$

$$d = 0.416 \text{ ft}$$



$$T = 2\sqrt{d(D-d)} = 0.833$$

$$P = \frac{\theta D}{2} = 1.3089$$

$$\theta = 2\pi - 2\sin^{-1}\left(\frac{T}{D}\right)$$

$$= 3.14 \text{ rad}$$

$$A = \frac{D^2}{8}(\theta - \sin\theta)$$

$$= 0.272 \text{ ft}^2$$

$$V = \frac{k}{n} \left(\frac{A}{P}\right)^{2/3} (S)^{1/2}$$

$$k = 1.49$$

$$n = 0.013$$

$$= \frac{1.49}{0.013} \left(\frac{0.272}{1.3089}\right)^{2/3} (0.004)^{1/2}$$

$$= 2.55 \text{ ft/s}$$

$$Q = VA$$

$$= 2.55 \text{ ft/s} (0.272 \text{ ft}^2)$$

$$= 0.69 \text{ ft}^3/\text{s} \left(\frac{7.48 \text{ gal}}{\text{ft}^3}\right) \left(\frac{60 \text{ s}}{\text{min}}\right)$$

$$= \underline{\underline{311 \text{ gpm}}}$$

APPENDIX C

PIPE CAPACITY CALCULATIONS

DEXTER WILSON ENGINEERING, INC.

24" EAST OF WPT STATION, $S = 0.0014$

FOR 24", $d/D \approx 2/3$

$$A = \frac{\pi D^2}{4} = 3.14 \text{ ft}^2$$

@ MAX. CAPACITY, $d/D = 0.666 \therefore D = 2 \text{ ft}$
 $d = 1.333 \text{ ft}$

$$T = 2\sqrt{d(D-d)} = 2\sqrt{1.33(2-1.33)} = 1.886 \text{ ft}$$

$$\theta = 2 \sin^{-1}\left(\frac{T}{D}\right), \text{ IF } d > \frac{D}{2}, \theta = 365 - \theta$$

$$= 223.88^\circ = 3.91 \text{ rad}$$

$$P = \frac{\theta D}{2} = 3.91 \text{ ft}$$

$$Q = \frac{1.49}{0.013} \frac{(3.14)^{5/3}}{(3.91)^{2/3}} (0.0014)^{1/2} = 4.2885 \left(\frac{6.73}{2.48}\right)$$

$$= 11.61 \frac{\text{ft}^3}{\text{s}} \left(\frac{7.48 \text{ gal}}{\text{ft}^3}\right) \left(\frac{60 \text{ s}}{\text{min}}\right)$$

$$= 5212.5 \text{ gpm}$$

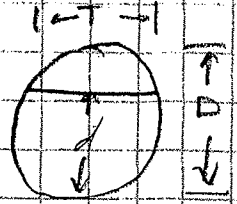
$e S = 0.0012$
 $Q_{\text{MAX}} = 4834 \text{ gpm}$

DEXTER WILSON ENGINEERING, INC.

30" PIPE INTO WEST WELL, $S = 0.0026$

FOR 30", $d/D \leq 2/3$

THEREFORE, MAX CAPACITY IS @
 $d/D = 2/3$ WHERE $d = \frac{2}{3} \left(\frac{30}{12} \right)$
 $= 1.66 \text{ ft}$



$$T = 2\sqrt{d(D-d)} = 2\sqrt{1.66(2.5-1.66)} = 2.357$$

$$\theta = 2 \sin^{-1} \left(\frac{T}{D} \right) = 2 \left(\sin^{-1} \left(\frac{2.357}{2.5} \right) \right) = 210.9$$

$$P = \frac{\theta D}{2} = 4.78 \text{ ft}$$

$$V = \frac{K}{n} \left(\frac{A}{P} \right)^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} \left(\frac{\pi \left(\frac{2.357^2}{4} \right)}{4.78} \right)^{2/3} (0.0026)^{1/2}$$

$$= 5.95 \text{ ft/s}$$

$$Q = 5.95 \frac{\text{ft}}{\text{s}} (4.91 \text{ ft}^2) \left(\frac{7.48 \text{ gal}}{\text{ft}^3} \right) \left(\frac{60 \text{ s}}{\text{min}} \right)$$

$$= 13,108.1 \text{ gpm}$$

**SEWER STUDY
FOR THE PAVILION PROJECT
IN THE
CITY OF OCEANSIDE**

Revised December 13, 2007

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008

Job No. 866-001

Filed w/Application

12/20/07

December 13, 2007

866-001

O'Day Consultants
2710 Loker Avenue West, Ste. 100
Carlsbad, CA 92008

Attention: John Strohminger, Project Manager

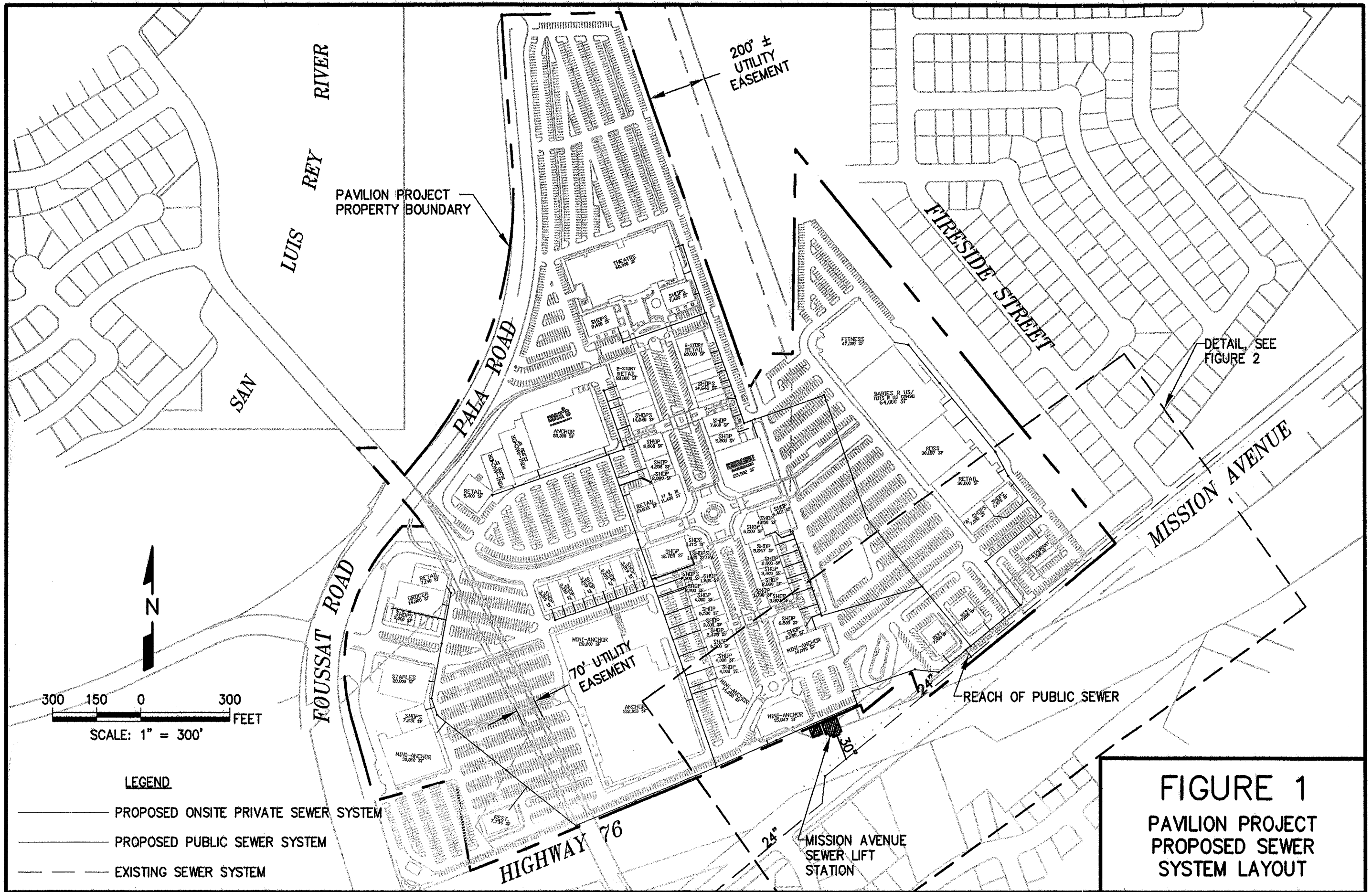
Subject: Sewer Study for the Pavilion Project in the City of Oceanside

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Features to note in proximity to the project are the two utility easements traversing the project. The larger of the two easements, in the eastern portion of the property, contains City of Oceanside water and sewer lines as well as San Diego Gas and Electric transmission lines. The easement in the western portion of the property is a prior extension of Foussat Road and contains City water and sewer lines.

The Pavilion project proposes to construct 950,000 square feet of commercial space over approximately 92 acres. Individual commercial spaces shall range in size from



approximately 1,000 ft² to 132,000 ft² to accommodate a movie theater, retail stores and shops, restaurants, and the like. Sewer service to the project shall be provided by an on-site private sewer system connected to the City of Oceanside's public sewer system.

The purpose of this report is to present an overview of the Pavilion project's private sewer system including detailing the sewage flows generated by the project, specifying the connection point to the City of Oceanside's public sewer system, and evaluating the public system components which shall transport these flows.

Sewer System Design Criteria

From the City of Oceanside's *Water, Sewer, and Reclaimed Water Design and Construction Manual*, August 2005 edition, the average daily sewer generation rate for the project, based on the commercial land use type, is 1,500 gpd/ac (gallons per day per acre). Additionally, peak daily flow is calculated based on the peaking equation,

$$Q_p = 1.84 * Q_a^{0.92}$$

where Q_a is average flow and Q_p is peak flow, both as cubic feet per second (cfs). For calculation purposes throughout this report, the equation expressed as gallons per minute (gpm) is,

$$Q_p = 2.99 * Q_a^{0.92}$$

Based on the City's Design Manual, private sewer systems are required to have an inspection manhole at the property line of the project. Upstream of this inspection manhole the system is considered private. Downstream of the inspection manhole the system is considered public and is subject to the maximum d/D criteria (depth to diameter ratio) of 0.5 for pipes 10-inch and smaller and a maximum d/D of 2/3 for

pipes 12-inch and larger. Furthermore, a minimum velocity of 2 feet per second (fps) must be achieved through the pipe to avoid the deposition of solids. Additionally, a Manning's equation "n" value of 0.013 is used in headloss calculations.

Projected Wastewater Flows

In May 1999, ASL Consulting Engineers and HYA Consulting Engineers completed the City of Oceanside's Wastewater Master Plan. The 1999 Master Plan detailed the current state of the City's wastewater facilities based on the population and development at that time and also projected the ultimate wastewater needs of the City at full development. The ultimate projection accounted for not only the development of undeveloped parcels, but also the redevelopment of parcels to maximize land use, as is the case with the Pavilion site. In the 1999 Master Plan, the wastewater generation rate used was 2,400 gpd/ac for the commercial land use category. In contrast to this, the City's current Design Manual defines a generation rate of 1,500 gpd/ac. The following section will compare the projected ultimate wastewater flows generated by the Pavilion project site based on the 1999 Master Plan and the City's current Design Manual criteria.

1999 Master Plan. Zoning of the Pavilion site is commercial and was evaluated as such during development of the 1999 Master Plan. Although reference data for the 1999 Master Plan is not available of the specific delineation between wastewater generating and non-generating acreage of the commercial parcel, the methodology described in the Master Plan is sufficient to develop an approximation of the numbers used. The methodology from the 1999 Master Plan can be found in Appendix A.

The total acreage of the Pavilion site is approximately 92 gross acres. Using aerial imagery of the site in its current state as a drive-in theater, it is similar if not

identical to its state in 1999 when the Master Plan was completed. From the image, it can be estimated that 0.5 acres of the property is developed, building area only, while 4 acres remain constrained due to easements through the property. This leaves approximately 87.5 acres of undeveloped area. Based on the 1999 Master Plan methodology, ultimately 20 percent of the undeveloped area, or 17.5 acres, would be developed and thus considered wastewater generating acreage at ultimate build-out. Using the 2,400 gpd/acre wastewater flow generation rate, the projected flow is 42,000 gpd average or 29.2 gpm average.

Current Design Guidelines. From the current Design Manual, the projected wastewater flow generated by the Pavilion project is based on the commercial land use generation rate of 1,500 gpd/ac and the project's size of 88.5 net acres. Based on this, the projected average flow generated by the project is 132,750 gpd or 92.2 gpm.

In comparing the projected ultimate flows of 29.2 gpm from the 1999 Master Plan to the flow of 92.2 gpm determined using the Design Manual, approximately 32% of the Pavilion site's sewage flow was accounted for in the ultimate wastewater projections for the City. The remainder of the calculations within this report considers the average flow generated by the proposed Pavilion project to be 92.2 gpm average.

Proposed Connection

The Pavilion project is proposing to connect to the 24-inch sewer line in Mission Avenue at an existing manhole approximately 540 feet east of the Mission Avenue Lift Station. This manhole is identified on the City's sewer base map I18 as Manhole 26 at Station 4+34. The connection shall include an inspection manhole, upstream of which shall be a private sewer and downstream of which shall be a public reach of pipe to the existing public sewer system. Figure 2 illustrates the location of the connection.

Inspection Manhole and Public Reach

Figure 2 points to the most likely location of the inspection manhole based on the project's proposed sewer system layout. Since the 24-inch pipe which the project is proposing to connect to lies within the project's property line, an easement shall be necessary for the public reach of pipe.

From the inspection manhole, the public reach which connects to the existing 24-inch sewer line must be capable of conveying the project's peak flow without exceeding the City's d/D requirements. As determined previously, the average daily sewage flow generation rate for the Pavilion project is 92.2 gpm. Utilizing the peaking equation, the anticipated peak flow from the project is 192.0 gpm. To accommodate this peak flow at the minimum required slope of 0.4%, a 10-inch pipe is recommended. Calculations confirming this can be found in Appendix B.

Existing Sewer Facilities Analysis

Bordering the Pavilion project to the south in Mission Avenue is a public 24-inch sewer pipe which carries flow from the east and west to a common manhole. This manhole then discharges into the 30-inch pipe which discharges to the Mission Avenue Lift Station splitter box and wet well. The lift station then pumps the wastewater north to the San Luis Rey Wastewater Treatment Plant through the eastern utility easement within the Pavilion project.

The Pavilion project is proposing to connect to an existing manhole on the 24-inch public gravity sewer line in Mission Avenue approximately 540 feet east of the Mission Avenue Lift Station as described previously. The capacity of each reach of pipe downstream from the connection point to the pump station, including the pump station, is evaluated in the following sections.

24-inch East of Lift Station. The 24-inch gravity sewer line in Mission Avenue carries sewage flows from areas east of the Pavilion project to the Mission Avenue Lift Station. The Pavilion project is proposing to connect to this sewer line at an existing manhole approximately 540 feet east of the Mission Avenue Lift Station. Based on the City's requirements of a maximum d/D of 2/3 and As-Built drawings of this pipe, the maximum capacity of the existing 24" gravity sewer was determined to be approximately 5,200 gpm. Calculations can be found in Appendix C.

30-inch Into the Lift Station. Based on the City's maximum d/D requirement of 2/3 and As-Built drawings of this pipe segment obtained from the City, the 30-inch sewer line's maximum capacity was determined to be approximately 13,100 gpm. Calculations are included in Appendix C.

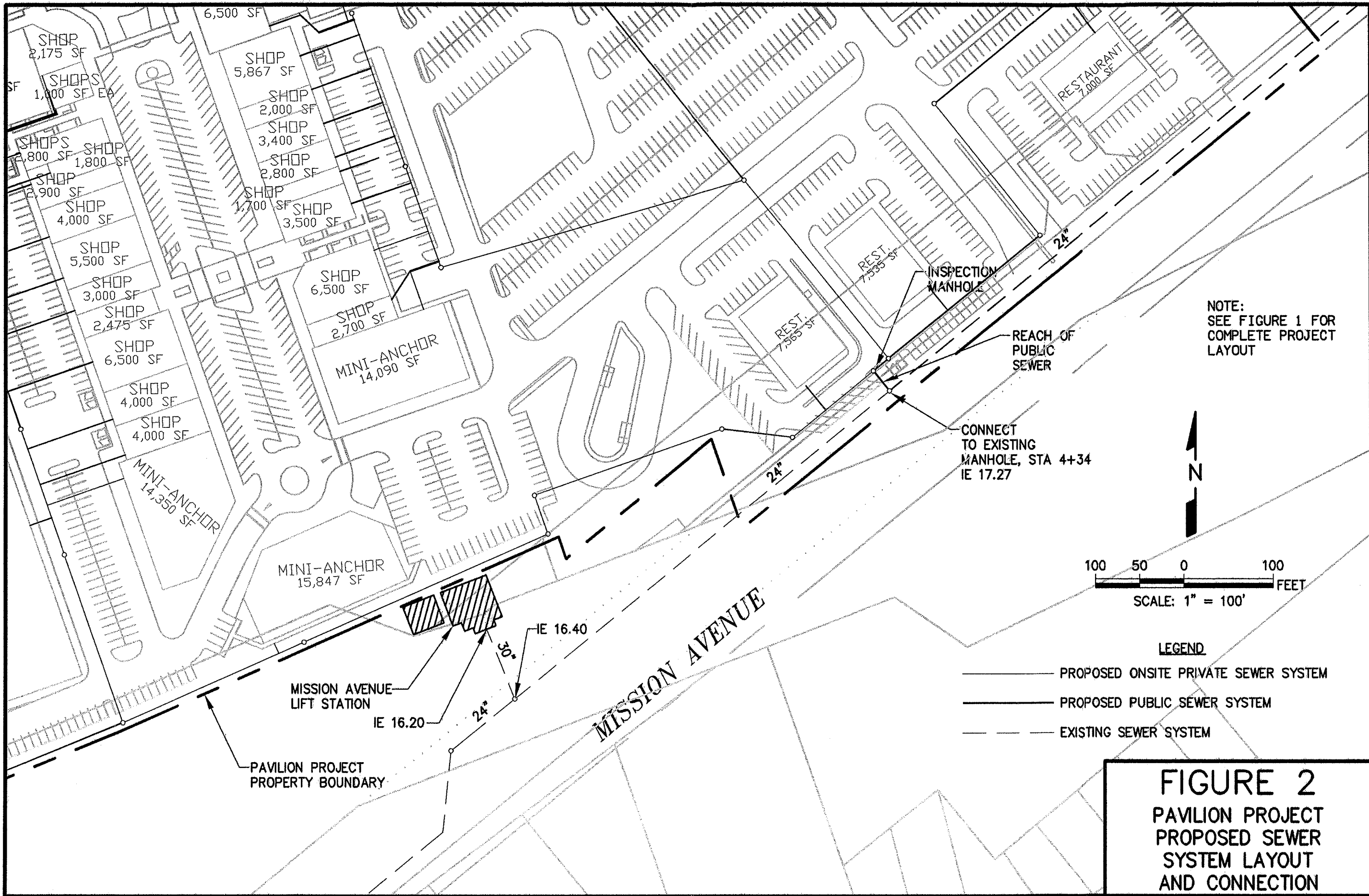
Mission Avenue Lift Station. The Mission Avenue Lift Station is located at the southern border of the Pavilion project site approximately halfway between Fousstat Road to the west and Fireside Street to the east. According to Table 6-10 of the City of Oceanside's 1999 Wastewater Master Plan, the theoretical pumping capacity of the Mission Avenue Lift Station is 6,000 gpm with each of the two pumps capable of pumping 3,000 gpm.

1999 Master Plan Ultimate Flows

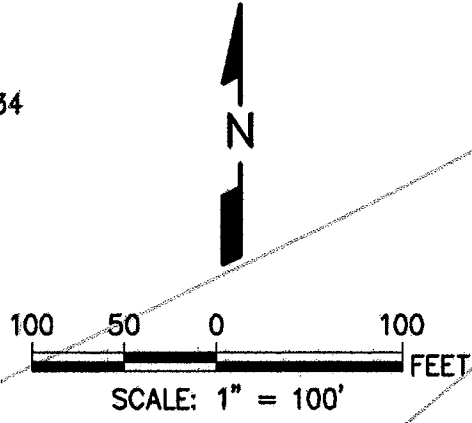
The 1999 Master Plan ultimate flow projections identify the ultimate peak flow to the Mission Avenue Lift Station to be 4,300 gpm. This information is found in Table 6-10 of the 1999 Master Plan and is presented in Appendix A. of this report

Projected Ultimate Flows Including the Pavilion Project

As presented earlier in this report, 32 percent (29.2 gpm of 92.2 gpm) of the wastewater flow generated by the Pavilion project based on using the current Design Manual sewage generation factors was already included in the 1999 Master



NOTE:
SEE FIGURE 1 FOR
COMPLETE PROJECT
LAYOUT



- LEGEND**
- PROPOSED ONSITE PRIVATE SEWER SYSTEM
 - PROPOSED PUBLIC SEWER SYSTEM
 - - - EXISTING SEWER SYSTEM

FIGURE 2
PAVILION PROJECT
PROPOSED SEWER
SYSTEM LAYOUT
AND CONNECTION

Plan ultimate flow projection. The incremental flow from the proposed Pavilion project is 63 gp average flow, or 135.2 gpm peak flow. Therefore, for the sewer basin served by the Mission Avenue Lift Station, the total ultimate peak sewage flow to the station is estimated to be 4,300 gpm from the 1999 Master Plan plus 135.2 gpm previously unaccounted flow from the Pavilion project. Thus, the ultimate peak flow projection influent to the Mission Avenue Lift Station is 4,435.2 gpm.

Adequacy of Existing Facilities

As previously calculated for the gravity sewers and obtained from the 1999 Master Plan for the lift station, the maximum capacities of the existing sewerage facilities downstream of the proposed Pavilion project are as follows:

| | |
|---|-----------------|
| 24" gravity sewer along Mission Avenue | 5,200 gpm peak |
| 30" gravity sewer influent to Mission Avenue Lift Station | 13,100 gpm peak |
| Mission Avenue Lift Station firm pumping capacity | 6,000 gpm |

All these existing facilities have sewer conveyance capacities in excess of the projected ultimate sewage flow based upon the 1999 Master Plan flow projections plus the incremental sewer from the proposed Pavilion project (4,435.2 gpm peak).

Conclusions

The following conclusions are summarized based on the sewer system analysis performed for the proposed Pavilion project.

John Strohminger
December 13, 2007

1. The gravity sewer connection between the onsite private sewer collection system and the existing 24" public gravity sewer system must be sized as a 10" pipe for a minimum slope of 0.4 percent.
2. The proposed 10" gravity sewer connection from the private onsite sewer collection system and the existing 24" public gravity sewer system is to be a public sewer.
3. An easement in favor of the City of Oceanside on the proposed Pavilion project will be necessary for the 10" sewer connection to the existing 24" public gravity sewer.
4. Based on the maximum design criteria capacities of the existing gravity sewer system which will carry the Pavilion project's wastewater flow, and the capacity of the Mission Avenue Lift Station identified in the City's 1999 Wastewater Master Plan, the existing public sewer system can adequately convey the Pavilion project's peak wastewater flows while adhering to City criteria.

We appreciate the opportunity to assist you with the sewer system planning for the Pavilion project. If you have any questions regarding the information presented in this report, please do not hesitate to contact us.

Dexter Wilson Engineering, Inc.


Andrew Oven

AO, NF:ssr
Attachments



APPENDIX A

**CITY OF OCEANSIDE
1999 WASTEWATER MASTER PLAN INFORMATION**

5.5 Commercial, Industrial and Institutional Flow Allocation

The percentages of developed acreage within each commercial/industrial land use area were also estimated from 1995 aerial photographs and multiplied by the total acreages to obtain developed acreages for each area. Parking lots, right-of-ways, and fields were considered non-flow generating (constrained) and were not included in the developed acreage estimates.

For each commercial/industrial land use area, existing developed acreage and geographically-constrained acreage was subtracted from total acreage to obtain undeveloped acreage. For commercial areas, it was assumed that 20% of the undeveloped acreage would be flow-generating development at ultimate conditions, with the remaining 80% being non-flow generating development (parking lots, fields, right-of-way). For industrial land use areas, it was assumed that 30% of the undeveloped acreage would be flow-generating at ultimate conditions, with the remaining 70% being non-flow generating development.

5.6 Wastewater Flows and Calibration

5.6.1 Existing Conditions

A residential contribution per capita (CPC) of 73 gpd was determined by using the flow data generated during the flow monitoring study and correlated that to the existing residential areas and population. These values were then applied to the population estimates to determine wastewater generation from residential areas. The resulting flow of 10.85 MGD was subtracted from the known existing influent average daily dry weather flow of 12.8 MGD to the San Luis Rey and La Salina plants. **Appendix B-2** includes the residential CPC values used for each land use zone. The remainder of the flow was assumed to be the commercial/industrial contribution. Commercial and industrial generation rates (gpd/acre) were assigned to approximately match this flow rate. The flows were then correlated to the acreage shown in **Appendix B-1**. See **Table 5-5** for a summary of the generation rates and calculated flow rates. Combining residential, commercial, industrial and institutional flows the total estimated average daily dry weather (ADDW) flow rate used as input to the model is 13.22 MGD.

For contributions from the Rainbow Municipal Water District (Rainbow MWD), an existing flow rate of 0.6 MGD was used at the model node where Rainbow's system connects into the Oceanside's system. Contributions from the City of Vista were included in the land use data.

To simulate wet flow conditions, ADDW values were increased by 40 percent. This increase was determined by examination of plant influent flows during dry and wet weather.

SEWAGE LIFT STATION HYDRAULIC CAPABILITIES

| Lift Station | Pump Cap. Each Pump gpm | Max. No. of Pumps Oper. No. | Theoret. Pump Cap. gpm | Existing | | | | Ultimate | | | | | | |
|------------------------------|-------------------------------|-----------------------------------|------------------------------|----------|------|-------|------|----------|------|-------|------|--|--|--|
| | | | | Average | | Peak | | Average | | Peak | | | | |
| | | | | gpm | MGD | gpm | MGD | gpm | MGD | gpm | MGD | | | |
| CLASS I | | | | | | | | | | | | | | |
| Buena Vista | 2,000 | 2 | 4,000 | 1,370 | 1.97 | 3,600 | 5.18 | 1,845 | 2.66 | 4,000 | 5.76 | | | |
| Leisure Village I | 800 | 2 | 1,600 | 190 | 0.27 | 320 | 0.46 | 260 | 0.37 | 435 | 0.63 | | | |
| Mission Boulevard | 3,000 | 2 | 6,000 | 1,660 | 2.39 | 2,550 | 3.67 | 2,820 | 4.06 | 4,300 | 6.19 | | | |
| North Bridge | 700 | 2 | 1,400 | 175 | 0.25 | 290 | 0.42 | 195 | 0.28 | 325 | 0.47 | | | |
| North Valley | 2,200 | 2 | 4,400 | 1,770 | 2.55 | 3,220 | 4.64 | 2,525 | 3.64 | 4,300 | 6.19 | | | |
| Oceanside Boulevard | 1,600 | 2 | 3,200 | 720 | 1.04 | 1,460 | 2.10 | 1,000 | 1.44 | 1,660 | 2.39 | | | |
| Pilgrim Creek | 1,125 | 2 | 2,250 | 290 | 0.42 | 475 | 0.68 | 460 | 0.66 | 480 | 0.69 | | | |
| CLASS II | | | | | | | | | | | | | | |
| Calaveras | 850 | 3 | 2,550 | 135 | 0.19 | 225 | 0.32 | 150 | 0.22 | 250 | 0.36 | | | |
| Lake Boulevard | 1,000 | 2 | 2,000 | 425 | 0.61 | 710 | 1.02 | 650 | 0.94 | 1,250 | 1.80 | | | |
| Ninth Street (North Pacific) | 550 | 2 | 1,100 | 10 | 0.01 | 20 | 0.03 | 10 | 0.01 | 20 | 0.03 | | | |
| South Pacific | 700 | 2 | 1,400 | 420 | 0.60 | 715 | 1.03 | 500 | 0.72 | 850 | 1.22 | | | |
| CLASS III | | | | | | | | | | | | | | |
| Bandstand | 250 | 2 | 500 | 20 | 0.03 | 30 | 0.04 | 20 | 0.03 | 30 | 0.04 | | | |
| Mar Lado | 600 | 2 | 1,200 | 55 | 0.08 | 90 | 0.13 | 170 | 0.24 | 300 | 0.43 | | | |
| Roymar | 950 | 2 | 1,900 | 240 | 0.35 | 445 | 0.64 | 365 | 0.53 | 675 | 0.97 | | | |
| Wisconsin | 250 | 2 | 500 | 10 | 0.01 | 20 | 0.03 | 15 | 0.02 | 20 | 0.03 | | | |

Note: Lift stations identified in bold font are within 10% of theoretical pump station capacity at present flows.
 Lift stations identified in italics are within 10% of theoretical pump station capacity at ultimate flows.

TABLE 6-10

APPENDIX B

PIPE SIZING FROM INSPECTION MANHOLE TO EXISTING MANHOLE

DEXTER WILSON ENGINEERING, INC.

PROJECT PEAK FLOW = 192.0 gpm

FOR 10-INCH PIPE, $d/D \leq 0.5$

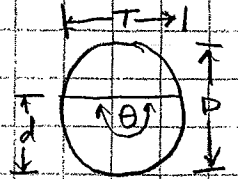
MIN SLOPE = 0.004

MAXIMUM CAPACITY @ MINIMUM SLOPE DETERMINATION

FOR 10-INCH PIPE, $d/D = 0.5$

$$\therefore D = 10/12 = 0.833 \text{ ft}$$

$$d = 0.416 \text{ ft}$$



$$T = 2\sqrt{d(D-d)} = 0.833$$

$$P = \frac{\theta D}{2} = 1.3089$$

$$\theta = 2\pi - 2\sin^{-1}\left(\frac{T}{D}\right)$$

$$= 3.14 \text{ rad}$$

$$A = \frac{D^2}{8}(\theta - \sin\theta)$$

$$= 0.272 \text{ ft}^2$$

$$V = \frac{k}{n} \left(\frac{A}{P}\right)^{2/3} (S)^{1/2}$$

$$k = 1.49$$

$$n = 0.013$$

$$= \frac{1.49}{0.013} \left(\frac{0.272}{1.3089}\right)^{2/3} (0.004)^{1/2}$$

$$= 2.55 \text{ ft/s}$$

$$Q = VA$$

$$= 2.55 \text{ ft/s} (0.272 \text{ ft}^2)$$

$$= 0.69 \text{ ft}^3/\text{s} \left(\frac{7.48 \text{ gal}}{\text{ft}^3}\right) \left(\frac{60 \text{ s}}{\text{min}}\right)$$

$$= \underline{\underline{311 \text{ gpm}}}$$



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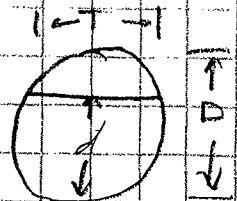
.....

DEXTER WILSON ENGINEERING, INC.

30" PIPE INTO WEST WELL, $S = 0.0026$

FOR 30", $d/D \leq 2/3$

THEREFORE, MAX CAPACITY 15 @
 $d/D = 2/3$ WHERE $d = \frac{2}{3} \left(\frac{30}{12} \right)$
 $= 1.66$ ft



$$T = 2\sqrt{d(D-d)} = 2\sqrt{1.66(2.5-1.66)} = 2.357$$

$$\theta = 2 \sin^{-1} \left(\frac{T}{D} \right) = 2 \left(\sin^{-1} \left(\frac{2.357}{2.5} \right) \right) = 210.9$$

$$D = \frac{\theta D}{2} = 4.78 \text{ ft}$$

$$V = \frac{K}{n} \left(\frac{A}{P} \right)^{2/3} S^{1/2}$$

$$= \frac{1.49}{0.013} \left(\frac{\pi(2.5)^2}{4 \cdot 4.78} \right)^{2/3} (0.0026)^{1/2}$$

$$= 5.95 \text{ ft}^3/\text{s}$$

$$Q = 5.95 \frac{\text{ft}^3}{\text{s}} (4.91 \text{ ft}^2) \left(\frac{7.48 \text{ gal}}{\text{ft}^3} \right) \left(\frac{60 \text{ s}}{\text{min}} \right)$$

$$= 13,108.1 \text{ gpm}$$