Water Supply Assessment
for
Rockefeller Group Professional Center
Torrance, CA

Proposed by:

Rockefeller Group

Prepared for:

City of Torrance

November 4, 2008

WATER SUPPLY ASSESSMENT
for
ROCKEFELLER GROUP PROFESSIONAL CENTER

TORRANCE, CA

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Prepared for:
City of Torrance

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1.0 EXECUTIVE SUMMARY

This Water Supply Assessment (WSA) has been prepared for the proposed Rockefeller Group Professional Center project in accordance with applicable sections of the Public Resources Code and California Water Code as referenced in Senate Bill 610. This WSA will provide information to verify that there is sufficient water supply to the City of Torrance to provide for the proposed project now and into the future.

The Rockefeller Group Professional Center would provide medical offices, professional offices, industrial uses, and associated parking on 23 gross acres located along Lomita Boulevard, just west of Crenshaw Boulevard within the City of Torrance. Additional water demands will need to be served by the City as a result of the proposed Rockefeller Group project, which requires the preparation of a WSA.

Water Demand

Water supply to the project will be provided by Torrance Municipal Water Department (TMWD). TMWD service area is approximately 10,350 acres and comprises about 78 percent of the land within the City of Torrance. Current water demand within TMWD service area is approximately 28,550 acre-feet per year (AFY). The 20-year planning period from the time of this WSA, as required by SB 610, projects total TMWD water demand by 2029/30 to be approximately 32,810 AFY, including the Rockefeller Group Professional Center. This projection is consistent with the City's 2005 Urban Water Management Plan (UWMP) water demand projections.

It is anticipated the Project will result in approximately 62 AFY of water demand at build-out of which 23% is irrigation demands that could be served from non-potable or recycled water. The City's projected demands, as included in the 2005 UWMP, account for projected population growth within the City. The City of Torrance is largely built-out with little land left for development. This means that increases in water demand are primarily due to higher density use. No projects were specifically referenced in the UWMP to account for the projected water demand increases. It is assumed that the Rockefeller Group Professional Center development is included within the UWMP projected demand increases as part of the overall growth and development within the City.

Supply Projections

TMWD is a direct member agency of Metropolitan Water District of Southern California (MWD). Water sources currently available to TMWD consist of imported water purchased from MWD, groundwater including desalinated water purchased from the Water Replenishment District of Southern California (WRD), and recycled water purchased form West Basin Municipal Water District (WBMWD). TMWD currently receives approximately 32 percent of its water supply from groundwater and recycled water and 68 percent from MWD.

Analysis of water supply projections for TMWD demonstrates that projected supplies will exceed demand through fiscal year 2029/30. These projections consider water development programs and projects as well as water conservation, as described in the City's 2005 UWMP. Water supply projections are based on continued development of groundwater and its share of imported water confirmed reliable by MWD. Additionally, analysis of normal, single-dry, and multiple-dry year scenarios also demonstrate the TMWD's ability to meet demand during the 20-year analysis period.

Conclusion

Collectively, the information included in this water supply assessment identifies a sufficient water supply and reliability to TMWD's service area to serve the Rockefeller Group Professional Center. Although imported water supplies from the State Water Project through the Delta are of significant concern especially in the short term, local water supplies in conjunction with the aggressive planning and conservation efforts on the state, regional, and local level, ensure that TMWD will be able to provide a reliable source of water to accommodate its existing and future users.

2.0 INTRODUCTION

Rockefeller Group Professional Center

This Water Supply Assessment will include the water demand increase as a result of the proposed Rockefeller Group Professional Center (RGPC) development. The proposed Rockefeller Group Professional Center development is a 23.6-acre site that will include a total of just over 351,000 square feet of building area made up of medical office buildings, office buildings, industrial uses, and associated parking. The project site is located on the south side of Lomita Boulevard, west of Crenshaw Boulevard and east of Garner Street in the City of Torrance. The existing site for the proposed project has been vacant for a long period of time and is therefore assumed to have no current water demand, so all projected water demand on the site must be included in the WSA as new demand on the City system.

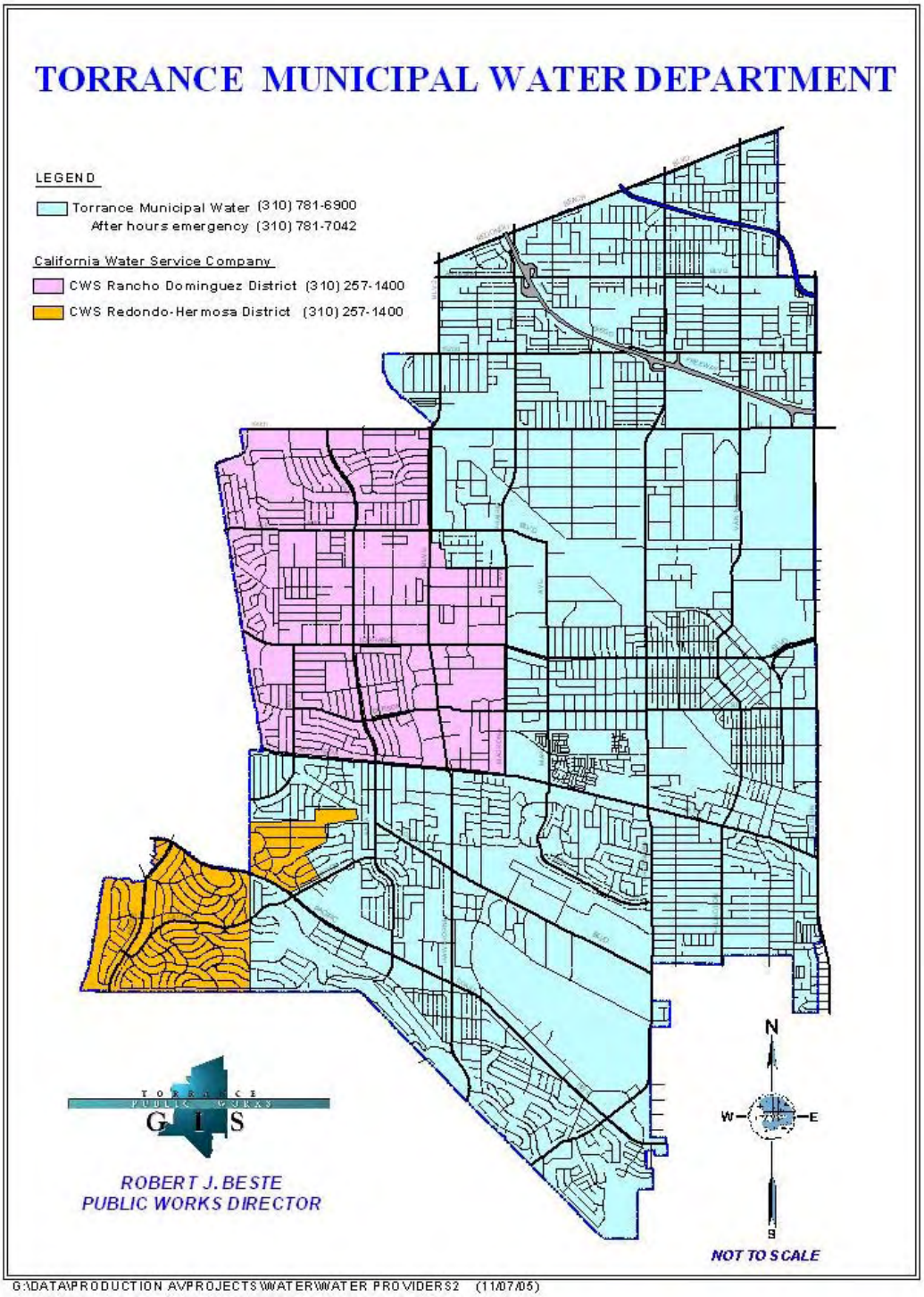
The project will be constructed in two phases. Phase I, located on the west side of the project site (west of the driveway), will include 66,182 square feet (sf) of medical office use, 99,790 sf of office use, and 44,211 sf of industrial use. Phase II, east of the driveway, will include an additional 62,838 sf of medical office use, 40,158 sf office use, and 38,265 sf industrial use. All buildings are proposed to have two floors.

Torrance Municipal Water Department

Torrance Municipal Water Department (TMWD) service area is approximately 10,350 acres and comprises about 78 percent of the land within the City of Torrance. California Water Services provides water service to the remaining portion of the City. Figure 2.1 shows the City of Torrance and the TMWD water service area boundary.

Topographically, the service area consists of the El Segundo Sand Hills and the Torrance Plain. Along the southern edge of the service area are the Palos Verdes Hills, which rise about 445 feet at the southern border of Torrance. The service area overlies the West Coast Groundwater Basin, which consists of four main water bearing formations in the vicinity of Torrance, the Gage, Gardena, Lynwood, and Silverado aquifers.

Figure 2.1
Torrance Municipal Water Department Service Area



3.0 LEGISLATION

Due to the project's potential affect on current and future water supplies, the State of California, through Senate Bill (SB) 610, requires that a Water Supply Assessment be completed for the proposed development. The following outlines the requirements of SB 610.

3.1 SB 610

SB 610 was chaptered into law on October 9, 2001. If a project is subject to CEQA and meets certain size or water demand criteria, then SB 610 requires a city or county to identify the public water system that will supply water for the project and to request that public water system to prepare a specified water supply assessment. The assessment is to include the following:

1. Discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing.
2. Identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts.
3. Description of the quantities of water received in prior years by the public water system under the existing water supply entitlements, water rights or water service contracts.
4. Water supply entitlements, water rights or water service contracts shall be demonstrated by the following:
    a. Written contracts or other proof of entitlement to an identified water supply.
    b. Copies of capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.
    c. Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.
    d. Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.
5. Identification of other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system.

6. If groundwater is included for the supply for a proposed project, the following additional information is required:
    a. Review of any information contained in the Urban Water Management Plan (UWMP) relevant to the identified water supply for the proposed project.
    b. Description of any groundwater basin(s) from which the proposed project will be supplied. Adjudicated basins must have a copy of the court order or decree adopted and a description of the amount of groundwater the public water system has the legal right to pump. For non-adjudicated basins, information on whether the DWR has identified the basin as over-drafted or has projected that the basin will become over-drafted if present management conditions continue, in the most current bulletin of DWR that characterizes the condition of the basin, and a detailed description of the efforts being undertaken in the basin to eliminate the long-term overdraft condition.
    c. Description and analysis of the amount and location of groundwater pumped by the public water system for the past 5 years from any groundwater basin which the proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.
    d. Description and analysis of the amount and location of groundwater projected to be pumped by the public water system from any groundwater basin which the proposed project will be supplied. Analysis should be based on information that is reasonably available, including, but not limited to, historic use records.
    e. Analysis of sufficiency of the groundwater from the basin(s) from which the proposed project will be supplied.
    f. The water supply assessment shall be included in any environmental document prepared for the project.
    g. The assessment may include an evaluation of any information included in that environmental document. A determination shall be made whether the projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.

Additionally, SB 610 requires new information to be included as part of an UWMP if groundwater is identified as a source of water available to the supplier. Information must include a description of all water supply projects and programs that may be undertaken to meet total projected water use. SB 610 prohibits eligibility for funds from specified bond acts until the UWMP is submitted to the State.

3.2 Urban Water Management Plan

In accordance with the California Urban Water Management Planning Act (Water Code Sections 10610-10656), the City of Torrance adopted an Urban Water Management Plan (UWMP) in 2005 and it was subsequently submitted to the California Department of Water Resources (DWR). As required by law, the City's UWMP includes projected water supplies required to meet future demands through 2030. In accordance with Water Code Section 10910 (c)(2) and Government Code Section 66473.7 (c)(3), information from the City's adopted 2005 UWMP has been utilized to prepare this Water Supply Assessment and Verification Report per the requirements set forth in SB 610. While not specifically referenced, it is assumed that the proposed Rockefeller Group Professional Center water demands are included in the City's 2005 UWMP projections. No specific projects were referenced in the City's UWMP and the proposed project is within the overall growth projections included in the UWMP. A copy of the UWMP is available upon request through the City of Torrance.

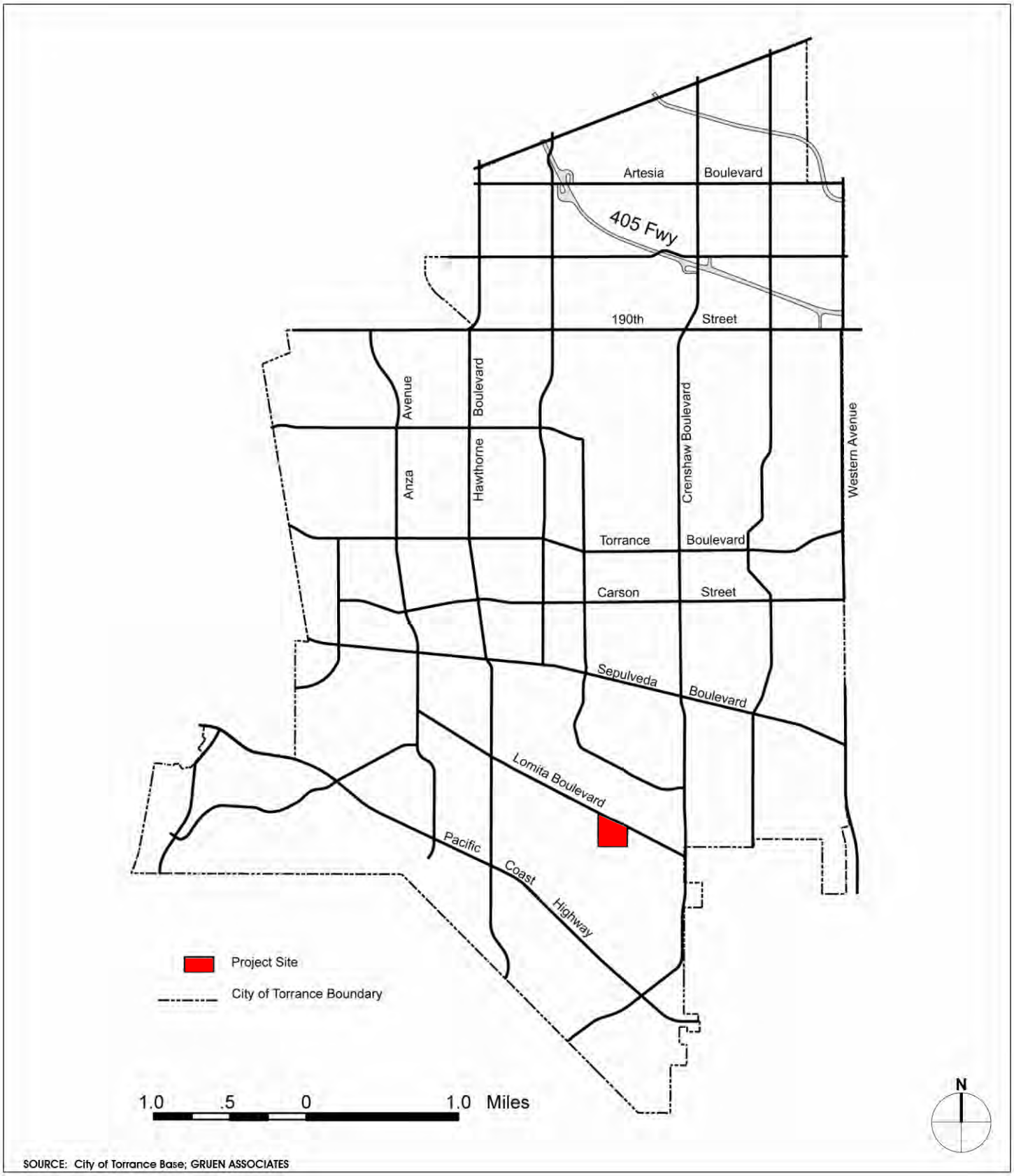
4.0 ROCKEFELLER PROFESSIONAL CENTER

4.1 Project Description

The proposed Rockefeller Group Professional Center development is a 23.6-acre site that will include a total of just over 351,000 square feet of building area made up of medical office buildings, office buildings, industrial uses, and associated parking. The project will be constructed in two phases. Phase I, located on the west side of the project site (west of the driveway), will include 66,182 square feet (sf) of medical office use, 99,790 sf of office use, and 44,211 sf of industrial use. Phase II, east of the driveway, will include an additional 62,838 sf of medical office use, 40,158 sf office use, and 38,265 sf industrial use. All buildings are proposed to have two floors.

Figure 4.1 shows the Project Location and Figure 4.2 shows the Land Use Plan. Project demand calculations are detailed in the Technical Memorandum included in Appendix A. It is anticipated that Project demands will result in approximately 62 AFY at build-out of which 23% is irrigation demands that could be served from non-potable or recycled water. The City's projected demands, as included in the 2005 UWMP, account for projected population growth within the City. The City of Torrance is largely built-out with little land left for development. This means that increases in water demand are primarily due to higher density use. No specific projects were included in the UWMP to account for the projected water demand increases. It is assumed that the Rockefeller Group Professional Center development is included within the UWMP projected demand increases as part of the overall growth and development within the City. The project demands broken down by land use category are shown in Table 4.1.

The existing site for the proposed project has been vacant for a long period of time and is therefore assumed to have no current water demand, so all projected water demand on the site must be included in the WSA as new demand on the City system.



Rockefeller Professional Center

Figure 4-1
Regional Location of Project

Phase I

PROJECT DATA

BUILDING	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED			PARKING PROVIDED				SITE AREA (S.F.)	FOOT-PRINT (S.F.)	SITE COVERAGE	F.A.R.
					PARKING RATIO	PER BLDG.	TOTAL	STD.	C	H/C	TOTAL				
A - MEDICAL / OFFICE	13,091	13,091	13,424	26,515	1/200	133		116	14	3	133				
B - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		100	14	3	117				
C - MEDICAL / OFFICE	8,194	8,194	8,302	16,496	1/200	83	332	73	9	2	84				
D - OFFICE	5,519	5,519	5,793	11,312	1/200	57		50	6	2	58				
E - OFFICE	5,519	5,519	5,793	11,312	1/200	57		50	6	2	58				
F - OFFICE	8,230	8,230	8,568	16,798	1/200	56		49	6	2	57				
G - OFFICE	8,230	8,230	8,568	16,798	1/300	56		49	6	2	57				
H - OFFICE	8,230	8,230	8,568	16,798	1/300	56		49	6	2	57				
I - OFFICE	6,538	6,538	6,848	13,386	1/300	45		40	5	2	47				
J - OFFICE	6,538	6,538	6,848	13,386	1/300	45	372	40	5	2	47				
K - INDUSTRIAL	30,144	30,144	14,067	44,211	1/300	148	148	129	17	6	152				
TOTAL:	111,690	111,690	98,493	210,183	852	SPACES		745	94	28	867	631,427	111,690	17.7%	33.3%

Phase II

PROJECT DATA

BUILDING	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED			PARKING PROVIDED				SITE AREA (S.F.)	FOOT-PRINT (S.F.)	SITE COVERAGE	F.A.R.
					PARKING RATIO	PER BLDG.	TOTAL	STD.	C	H/C	TOTAL				
B2 - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		113	-	3	116				
B3 - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		113	-	3	116				
C2 - MEDICAL / OFFICE	8,194	8,194	8,302	16,496	1/200	83	315	81	-	2	83				
J2 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
J3 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
J4 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
L - INDUSTRIAL	26,089	26,089	12,176	38,265	1/300	128	263	129	-	2	131				
TOTAL:	76,811	76,811	64,450	141,261	578	SPACES		565	0	16	581	396,045	76,811	19.4%	35.7%

PROJECT DATA (PHASE I & II)

	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED	PARKING PROVIDED				SITE AREA (S.F.)	FOOT PRINT (S.F.)	SITE COVER AGE	F.A.R.
					TOTAL	STD.	C	H/C	TOTAL				
GRAND TOTAL	188,501	188,501	162,943	351,444	1,430 SPACES	1,310	94	44	1,448	1,027,472	188,352	18.5%	34.5%

NORTH

scale: 1" = 50'-0"

0 50 100 150 200

ROCKEFELLER GROUP PROFESSIONAL CENTER
TORRANCE, CALIFORNIA

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JOB NO. A6049.205
SCALE: 1"=50'-0"
MAY 6, 2008

Figure 4-2
Land Use Plan

Table 4.1
Rockefeller Group Professional Center
Water Demand Survey

Land Use	Building Area (Square Feet)	Water Use	
		gpd	AFY
PHASE I			
Medical Office Building	66,182	15,222	17.0
Office Building	99,790	5,987	6.7
Industrial	44,211	2,653	3.0
Irrigation		6,902	7.7
Phase I Subtotal	**210,183**	**30,764**	**34.4**
PHASE II			
Medical Office Building	62,838	14,453	16.2
Office Building	40,158	2,409	2.7
Industrial	38,265	2,296	2.6
Irrigation		5,630	6.3
Phase II Subtotal	**141,261**	**24,788**	**27.8**
Total	**351,444**	**55,552**	**62.2**

Notes:

1. Medical Office Building demand = square footage of building in each phase x 230 gpd/1,000 sf.
2. Office Building demand = square footage of building in each phase x 60 gpd/1,000 sf.
3. Industrial Building demand = square footage of building in each phase x 60 gpd/1,000 sf.
4. Irrigation water demand based on Ridge Landscape Architects plans and calculations included in Attachment B.

Table 4.2 shows the projected water demand phasing by type by year. It should be noted that the irrigation demand is shown as potentially non-potable demand. Although it will be served from potable water sources, initially, it could eventually be converted to recycled water if it becomes available nearby in the future. To be conservative it is shown in this WSA as being served by potable water throughout the planning period. The analysis of the Project is over a 22-year period meeting the required minimum 20-year planning period, and maintaining consistency with TMWD 2005 UWMP demand projections (to 2030). The project is proposed to be constructed and occupied in two distinct phases and current projections call for commencement of construction by Spring of 2009 with occupancy by early 2010. Phase II timing is less certain but for the purpose of the WSA, it has been assumed that it will come on line approximately two years later with occupancies in 2012. These phased demands are used later in Section 5 to compare with overall TMWD demands.

Table 4.2
Water Demand Phasing

Water Type	2009	2010	2011	2012	2013	2014	2015
Potable	0	26.7	26.7	48.2	48.2	48.2	48.2
Non-Potable (Potential)	0	7.7	7.7	14.0	14.0	14.0	14.0
Total	**0**	**34.4**	**34.4**	**62.2**	**62.2**	**62.2**	**62.2**

5.0 TORRANCE MUNICIPAL WATER DEPARTMENT

5.1 Overview of Demand and Supply

The City's Public Works Department manages the health and welfare of the City's infrastructure and natural resources. To address these responsibilities more effectively, Public Works is organized into two major functional sectors, Engineering/Capital Projects and Operations. The Public Water Utility, known as the "Torrance Municipal Water Department," function consists of efforts from various Public Works sections: Water Operations, Engineering, and Administrative Services. The Operations section is responsible for providing high quality drinking water through the operation and maintenance of water production, distribution treatment, and storage facilities. The Engineering section is responsible for the Capital Improvement Program which consists of the development and replacement of water system infrastructure. The Administrative Services section, along with management, is responsible for acting as the liaison with outside agencies, most notable the State and County Health Departments, water districts and other regulatory agencies. In addition, the Administrative Services section, along with management, supports the Torrance Water Commission (which functions as an advisory board to the City Council) and the City's representative on the Metropolitan Board of Directors. Additional Administrative Services responsibilities include developing and monitoring the Operations budget; monitoring the Capital Improvement budget and water rates; and providing customer service.

TMWD maintains four water storage reservoirs ranging in capacity from 0.9 million gallons (MG) to 18.7 MG with a total capacity of 30.6 MG. Walteria Reservoir has a capacity of 10 MG, Ben Haggot Reservoir has a capacity of 18.7 MG, North Torrance Reservoir at Well #6 has a capacity of 1 MG, and Border Avenue Reservoir at Well #7 has a capacity of 0.9 MG. Currently, Border Avenue Reservoir is on standby.

TMWD has five imported water connections with a total capacity of 33,666 gallons per minute (GPM) to receive Metropolitan water. TMWD also has one active well (Well #6) and one inactive, or standby well, (Well #7) to pump groundwater from the West Coast Basin. TMWD is also considering the construction of a well field in north Torrance to allow TMWD to enable pumping up to its full groundwater rights.

Population

Using information from City sources, current census data and historic trends, growth projections can be determined. Since World War II, the Los Angeles County region has experienced substantial growth, increasing by more than 160 percent by 2000. The City of Torrance grew rapidly from its incorporation in 1921, although during the past few decades, population growth in Torrance has been somewhat level. The City's current

population is estimated at 147,400 based on the latest City General Plan Update. This is expected to increase to 157,030 by 2030.[1]

TMWD serves water to about 78 percent of the City parcels. There are no data available showing the population percentage within TMWD's service area. It is assumed that the existing population within the service area is proportional to City parcelage, and population growth within the service area will occur at the same growth rate projected for the City as a whole. Table 5.1 provides current and future population projections comparing the General Plan Update projections and an assumed, calculated projection for TMWD's service area based on 78 percent of the City's population.

Table 5.1
Torrance Municipal Water Department
Population Projections

	2000	2005	2007	2020	2030
Service Area	98,000	100,100	114,980	118,010	122,480
General Plan Update	138,870	141,130	147,410	151,290	157,030

Source: City of Torrance 2005 UWMP for years 2000 and 2005. City of Torrance Draft General Plan Update (October, 2008) for years 2007, 2020, and 2030.

Water Demand

Residential is the largest customer class (sector) in the District's service area and is the primary water user. Table 5.2 shows the water use per classification for TMWD based on the 2005 UWMP and updated for historical use for the years 2006, 2007 and 2008. Construction and demolition permits obtained from the City for these same years (2006-2008) show an increase in commercial land use of approximately 500,000 square feet and a residential land use increase of approximately 800 dwelling units. The corresponding overall decrease in water demand through 2008 is assumedly attributed to conservation efforts on the part of the City and its water customers. Historical water use (2005-2008) and projected water demands from the 2005 UWMP are plotted on Figure 5.1.

[1] City of Torrance General Plan Update, Public Review Draft (October 2008), www.ci.torrance.ca.us

Table 5.2
Past, Current and Projected Water Use by Sector (AF)

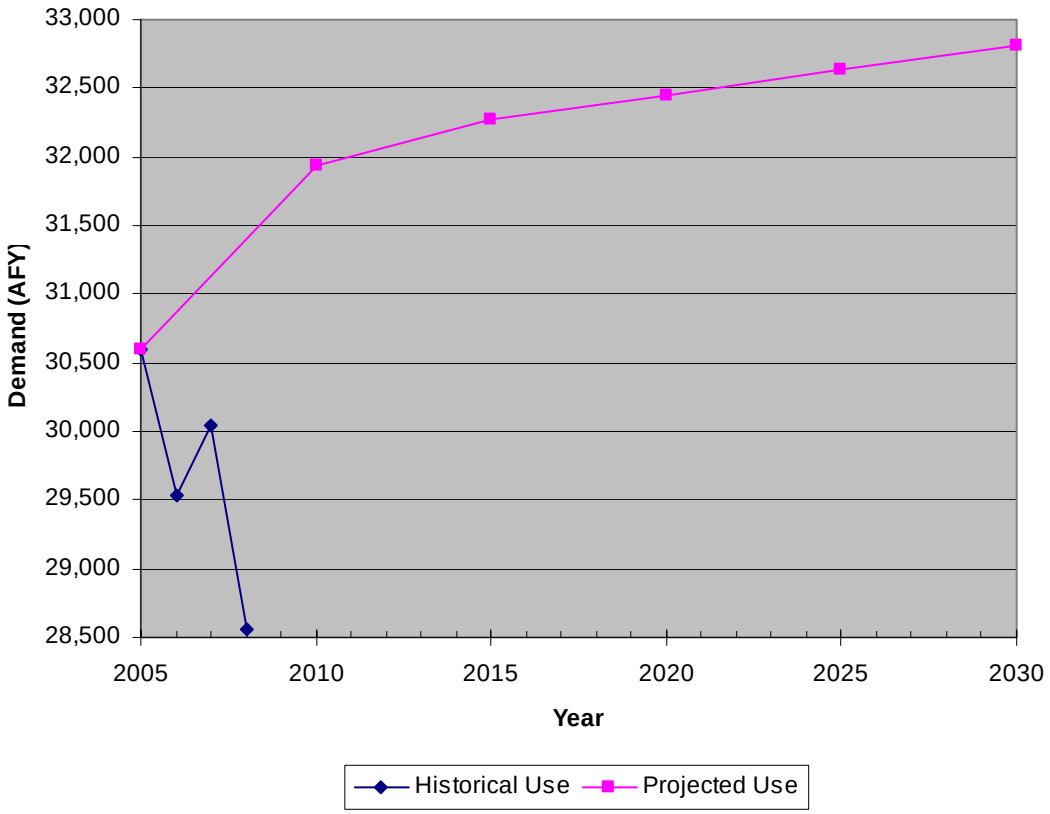
Water Use Sector	2005	2006	2007	2008	2010	2015	2020	2025	2030
Residential	11,806	11,654	12,414	12,052	12,450	12,540	12,630	12,715	12,810
Commercial	3,212	3,392	3,426	3,233	3,390	3,410	3,435	3,460	3,490
Industrial	3,689	3,394	3,251	3,723	3,890	3,920	3,945	3,975	4,000
Other	3,882	3,808	3,647	3,040	4,090	4,120	4,150	4,180	4,210
Subtotal Potable[1]	**22,589**	**22,248**	**22,738**	**22,048**	**23,820**	**23,990**	**24,160**	**24,330**	**24,510**
Industrial[1]	6,765	6,153	5,775	6,180	6,765	6,765	6,765	6,765	6,765
Landscape	280	258	285	312	335	485	485	485	485
Subtotal Recycled	**7,045**	**6,411**	**6,060**	**6,492**	**7,100**	**7,250**	**7,250**	**7,250**	**7,250**
Subtotal Potable and Recycled	**29,634**	**28,659**	**28,798**	**28,540**	**30,920**	**31,240**	**31,410**	**31,580**	**31,760**
Unaccounted for System Losses[2]	970	869	1251	14	1,020	1,030	1,040	1,050	1,050
Total Water Use	**30,604**	**29,528**	**30,049**	**28,554**	**31,940**	**32,270**	**32,450**	**32,630**	**32,810**

[1] Potable projections for future years based on Table 5.2-5; projections are proportioned in same percentage as 2005 breakdown.

[1] 97% of recycled water demand is estimated to supply a single industrial customer (Exxon-Mobil), based on 2003/04 and 2004/05 averages. The usage of 6,765 AF is expected to remain constant over all future years with additional recycled demand coming from irrigation usage.

[2] Estimated at 4.3% of potable water usage from the City of Torrance UWMP (based on average loss for years 2003/04 and 2004/05).

Figure 5.1
TMWD Historical vs. Projected Water Demand



The total water use presented in Table 5.2 takes unaccounted-for losses into consideration. Unaccounted-for water is the difference between water production and water consumption and represents "lost" water. Unaccounted-for water occurs for a number of reasons:

- Water lost from system leaking, i.e. from pipes, valves, pumps, and other water system appurtenances.
- The City Fire Department performs hydrant testing to monitor the level of fire protection available throughout the City. TMWD 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.

Table 5.3 shows the number of water service customers by sector between 2000 and 2005, and projections of customers through 2030. The number of service connections is anticipated to increase very slightly through 2030, consistent with the projected small increase in population.

Table 5.3
Number of Water Service Connections by Sector (AF)

Water Use Sector	2000	2005[1]	2010	2015	2020	2025	2030
Residential	22,677	22,900	23,200	23,500	23,800	24,100	24,400
Commercial	1,769	1,758	1,760	1,770	1,780	1,790	1,800
Industrial	317	282	280	280	280	280	280
Other	1,074	1,090	1,100	1,100	1,100	1,100	1,100
Industrial – Recycled [2]	1	2	4	4	4	4	4
Landscape Irrigation - Recycled	6	18	34	34	40	40	40
Total Connections	**25,844**	**26,050**	**26,378**	**26,688**	**27,004**	**27,314**	**27,624**

[1] 2005 data represent actual connections; future years have been estimated based on anticipated growth in demand as reflected in Section 5.2.

[2] 2010 includes Exxon Mobile and Toyota Motors; 2015 includes American Honda and Los Angeles County Sanitation District Methane Gas Recovery Plant.

Demand and Supply Comparison

TMWD is a direct member agency of Metropolitan. Water sources currently available to TMWD consist of imported water purchased from Metropolitan, groundwater including desalinated water purchased from the Water Replenishment District of Southern California (WRD), and recycled water purchased from West Basin Municipal Water District (WBMWD). Imported water supplies are delivered to TMWD by Metropolitan which imports water from the Colorado River Aqueduct (CRA), and from the State Water Project (SWP), via the California Aqueduct.

TMWD currently receives approximately 68 percent of its water supply from Metropolitan and 32 percent from local supplies. Local supplies include groundwater, desalinated groundwater, and recycled water. Currently recycled water is approximately 22 percent of TMWD's water supply while groundwater supplies (including desalinated groundwater) makes up approximately 10 percent. Of potable water supplies, imported water is approximately 88 percent and local sources (groundwater and Desalter) are 12 percent. Current and projected water supplies are shown in Table 5.4 and described in subsequent sections. Water reliability of these supplies is analyzed in Section 6.

Table 5.4
TMWD Current and Projected Water Supplies

Water Supply Sources	2005	2006	2007	2008	2010	2015	2020	2025	2030
Imported Water	19,370	21,338	21,100	19,306	25,630	20,890	21,080	20,220	19,270
Local Groundwater	1,114	0	884	1,487	7,100	7,250	7,250	7,250	7,250
Local Desalter	2,542	1,779	2,005	1,269	1,600	5,640	5,640	5,640	5,640
Recycled Water	7,044	6,411	6,059	6,492	2,400	2,400	2,400	2,400	2,400
Total Water Supply	**30,070**	**29,528**	**30,049**	**28,554**	**36,730**	**36,180**	**36,370**	**35,510**	**34,560**

Source: City of Torrance 2005 UWMP updated with (1) supply data from the City for 2006 – 2008 and (2) MWD's projected supply reliability from MWDSC 2005 RUWMP.

Table 5.5 shows the current and projected water demand and supply for the City of Torrance through Year 2030. A supply surplus is indicated demonstrating a sufficient water supply for the City and the proposed project through the 20-year planning period. The projected demands shown in Table 5.5 are from the 2005 UWMP based on a steady projected increase in population. Actual data from the City shows a water demand decrease between 2005 and 2008 of approximately 2,000 acre-feet per year (Table 5.2). The UWMP accounts for sufficient supply through the year 2030 projecting a total demand increase of 2,200 acre-feet over 2005 demands by the year 2030. Given the updated demand data for 2006 through 2008, there is sufficient supply for a total demand increase of over 4,200 acre-feet above 2008 demands by the year 2030.

Table 5.5
TMWD Projected Water Supply and Demand, Normal Year

(AFY – All projections rounded to nearest 10 AF)

Water Sources	2010	2015	2020	2025	2030
Supply					
Projected Supply During an Average Year as a % of Demand During an Average Year	129.3	131.0	130.8	124.1	117.0
Imported	25,630	20,890	21,080	20,220	19,270
Recycled	7,100	7,250	7,250	7,250	7,250
Local (Groundwater)	1,600	5,640	5,640	5,640	5,640
Local (Desalter)	2,400	2,400	2,400	2,400	2,400
Total Supply	**36,730**	**36,180**	**36,370**	**35,510**	**34,560**
Demand					
Imported[2]	19,820	15,950	16,120	16,290	16,470
Recycled[3]	7,100	7,250	7,250	7,250	7,250
Local (Groundwater)	1,600	5,640	5,640	5,640	5,640
Local (Desalter)	2,400	2,400	2,400	2,400	2,400
Total Demand	**30,920**	**31,240**	**31,410**	**31,580**	**31,760**
Unaccounted for System Losses	1,020	1,030	1,040	1,050	1,050
Total Demand	**31,940**	**32,270**	**32,450**	**32,630**	**32,810**
Supply Surplus	**5,080**	**3,210**	**4,340**	**3,100**	**1,910**

Source: TMWD 2005 UWMP with supply data updated to reflect MWD's Final 2005 RUWMP.

5.2 Groundwater

West Coast Groundwater Basin (Basin)

Extensive pumping from the West Coast Groundwater Basin (Basin) has led to critical overdraft and seawater intrusion within the coastal plain of the local groundwater basins. In 1961, the Los Angeles Superior Court adjudicated groundwater pumping rights. As a result, the City has water rights of 5,640 AFY from the Basin. The 5,640 AFY includes the City's original adjudication and additional purchased water rights in the Basin.

WRD tracks the amount of groundwater production (pumping) that occurs every year in the Central and West Coast groundwater basins to identify trends that may impact groundwater resources. The groundwater basins currently face overdraft every year because pumping exceeds natural groundwater replenishment. As a result, WRD developed a Groundwater Management Plan to solve future water quality and supply

problems in both the Central and West Coast groundwater basins. TMWD conforms to the WRD's Groundwater Management Plan. Sources of groundwater replenishment water to WRD include recycled water, imported water, and natural runoff, which are captured in the regional spreading grounds.

The Basin is comprised of four separate portable-use aquifers, or water bearing layers, underlying the City of Torrance. The Basin covers approximately 160 square miles and is bounded on the north by Baldwin Hills and Ballona Escarpment, on the east by the Newport-Inglewood Uplift, to the south by San Pedro Bay and the Palos Verdes Hills, and to the west by the Santa Monica Bay. The surface of the Basin is crossed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap both of which flow into the San Pedro Bay.[2] Aquifers in the Basin are generally confined and receive the majority of their natural recharge from adjacent groundwater basins from the Pacific Ocean (Sea Water Intrusion).[3]

Adjudication

Groundwater in the Basin was adjudicated (Judgment) to protect the groundwater supply within the Basin. Groundwater production in the Basin is regulated by DWR, acting as Watermaster under the terms of California Water Services Company et al vs. City of Compton et al, No. 506806. Prior to adjudication, annual pumping rates reached levels as high as 94,000 AF. In the early 1960's, the Superior Court, County of Los Angeles limited the amount of pumping that could occur because the groundwater levels were declining causing the seawater to intrude into the coastal aquifers. The Basin adjudicated rights were set at 64,468.25 AFY.[4] The Judgment also allows water users to carryover any unused water rights up to 20 percent of their water right as well as extract up to 10 percent beyond their allowable pumping rights within a given year. The adjudicated pumping amounts were set higher than the natural replenishment of groundwater, hence the annual overdrafts. A copy of the order adopted by the court describing the City's legal right to pump groundwater is included in Appendix F (West Coast Basin Judgment).

Groundwater production in the Basin has been fairly consistent over the past 5 years. The amount of water that member agencies are allowed to pump is set annually, but the values remain fairly constant. The City's ability to extract 5,640 AF of groundwater annually is limited due to water quality problems. In 2007, TMWD used only 884 AF of its groundwater supplies and 1,487 AF in 2008. TMWD is investigating ways to use all of its annual 5,640 AFY of groundwater pumping rights to offset imported water demands.

Because TMWD is not currently using their full groundwater rights, TMWD is able to lease water rights to other purveyors. In 2003/2004, TMWD leased 450 AF of its groundwater rights (with flex) to the Roman Catholic Archdiocese of Los Angeles.

[2] California's Groundwater Bulletin 118
[3] Water Replenishment District of Southern California's Web Site. http://www.wrd.org
[4] WRD of Southern California Engineering Survey Report, 2008

Groundwater Production and Overdraft

Groundwater supply meets approximately 20 percent of the water supply demand for agencies within the WBMWD.[5] During the water year 2006/2007, total basin production for all agencies was approximately 37,655 AF. As mentioned earlier, the Central and West Coast groundwater basins are in an overdraft condition; however, the groundwater levels and amount of overdraft fluctuate over time. WRD continually monitors groundwater level trends. WRD's annual Engineering Survey and Report discusses groundwater levels within the Basin and estimates water levels have remained generally flat or decreased slightly over the 2006/2007 water year. WRD estimates that the annual overdraft for 2006/2007 for both the West Coast and Central groundwater basins was 165,735 AF; however, 106,735 AF was purchased as replenishment water and therefore the loss in groundwater storage was 59,000 AF. The accumulated overdraft of the basins fluctuates depending on demands and availability of replenishment water. The accumulated overdraft was determined to be 660,000 AF for both basins in 2006/2007.[6]

In an effort to eliminate long-term overdraft conditions, WRD closely monitors the groundwater basins for fluctuations in groundwater levels. WRD utilizes a groundwater model developed by the United States Geological Survey (USGS) to study and better understand the Basin's reaction to pumping and recharge. WRD works closely with the Los Angeles County Department of Public Works, Metropolitan, and LACSD on current and future replenishment supplies.

Recharge

Another method for controlling overdraft is through recharge management programs. Natural groundwater replenishment through percolation of precipitation and irrigation waters is insufficient to sustain the groundwater pumping that takes place in the Basin.[7] WRD must therefore depend on artificial recharge programs to replace the annual overdraft. The amount of water available for recharge will vary from year to year. In 2006/2007, WRD recharged 106,735 AF.[8] The various methods of recharging the Basin using imported and recycled water are described below:

- Injection – WRD recharges the Basin by injecting water in the Basin to prevent seawater intrusion. A barrier is formed by injection of treated imported water from Metropolitan in wells along the West Coast Barrier Project (between Redondo Beach and El Segundo) and the Dominguez Gap Barrier Project (east of Palos Verdes Peninsula).
- Spreading - Groundwater recharge through surface spreading occurs in the Montebello Forebay Spreading Grounds adjacent to the Rio Hondo and the San Gabriel River, within the unlined portion of the San Gabriel River, and behind the Whittier Narrows Dam in the Whittier Narrows Reservoir.

[5] West Basin Municipal Water District, 2005 UWMP
[6] WRD of Southern California Engineering Survey Report, 2008
[7] WRD of Southern California, Regional Groundwater Monitoring Report Water Year 2003-2004, April 2005
[8] WRD of Southern California, Engineering Survey and Report, 2008

- In-lieu Replenishment Water – The in-lieu program allows the natural recharge of the Basin by offsetting groundwater production with the use of imported water. The reduction in pumping naturally recharges the Basin.
- Transfer from the Central groundwater basin – Although not well quantified, groundwater from the Central groundwater basin flows into the West Coast groundwater basin through the Newport Inglewood Uplift. This, along with natural percolation due to storm water and irrigation, make up a small part of the overall recharge to the West Coast groundwater basin.

Groundwater Wells within TMWD Service Area

TMWD has one active well (Well #6) and one inactive, or standby well, (Well #7). The total capacity of Well #6 is about 950 gallons per minute (gpm) although it was designed for 2,500 gpm. The 40-year old well degraded over time and was rehabilitated in 2003 to provide a capacity of 1,600 gpm. The well was rehabilitated again in 2006 and its capacity was restored to approximately 1,000 gpm. A new replacement facility (Well #9) is currently under construction and expected to be completed in spring 2009. This new well is planned to have a capacity of approximately 2,500 gpm. The one active well discharges into a small reservoir, from which a booster station pumps into the distribution system. Table 5.6 shows the details of TMWD's current wells.

Table 5.6
Current Wells in TMWD Service Area

Well Number	Date Completed	Depth (feet)	Design Flow (gpm)
Well #6 (Active) [1]	1966	810	2,500
Well #7 (Inactive, Standby)	1996	870	2,400
Well #8[2] (Not Equipped)	1998	720	2,400

[1] Well #6 was restored to approximately 1,000 gpm in 2006.
[2] Well #8 is not equipped and its capacity may change when activated.

TMWD's only active well, Well #6, is located near the southwestern corner of Artesia Boulevard and Yukon Avenue, adjacent to McMaster Park. The water is discharged into the Yukon Avenue water tank where it is aerated to remove hydrogen sulfide. Prior to entering the tank, the water is treated with sodium hypochlorite and ammonia for chloramination disinfection.

Well #7 is listed as an inactive well because it has been out of service since October 1998 due to deterioration of physical quality and high total organic carbon in the well water. Well #7 can be used in emergency situations such as meeting fire flow demands. Naturally occurring ammonia is present in the well water and TMWD is proposing wellhead treatment. Well #8 was drilled near Well #7 and the water quality concerns are the same as Well #7.

In 2004, TMWD demolished two wells (Well #4 and Well #5), which had been inactive since 1996 due to poor water quality and had been physically disconnected from the water system. Table 5.7 summarizes the amount of groundwater pumped by TMWD for the last nine years.

Table 5.7
Historic Groundwater Production (AFY)

Well Number	2000	2001	2002	2003	2004	2005	2006	2007	2008
Well #6 (Active)	1,969	1,793	1,831	867	1,660	1,114	0	884	1,487
Well #7 (Inactive, Standby)	67	233	0	0	0	0	0	0	0
Well #8 (Not Equipped)	0	0	0	0	0	0	0	0	0
TOTAL	**2,036**	**2,026**	**1,831**	**867**	**1,660**	**1,114**	**0**	**884**	**1,487**

Note: Totals are based on a water year of July 1 to June 30. For example, production shown for 2001 is for groundwater pumped from 7/1/00 to 6/30/01.

Table 5.8 shows the amount of water that is projected to be pumped from each well in the future. TMWD uses desalinated groundwater pumped from a well located in the City Service Facility into an adjacent groundwater desalination plant (Goldsworthy Desalter). The desalinated groundwater is purchased from WRD and is included in Table 5.4 and labeled Local Desalter. Table 5.8 includes only those wells that are credited towards the City's groundwater rights.

Table 5.8
Projected Groundwater Production (AFY)

Well Number	2010	2015	2020	2025	2030
Well #6 (Active)	1,600	0	0	0	0
Well #7 (Inactive, Standby)	0	0	0	0	0
Well #8 (Not Equipped)	0	0	0	0	0
North Torrance Wells	0	5,640	5,640	5,640	5,640
TOTAL	**1,600**	**5,640**	**5,640**	**5,640**	**5,640**

Notes: 1) Future projections are from the City of Torrance 2005 UWMP.

2) Although TMWD is proposing a Nanofiltration Treatment Plant for Wells #7 and #8, its construction is dependant on outside grant funding. At this time, it is unclear if TMWD will receive funding and therefore groundwater projections do not include water supplies from these wells.

3) Well #6 is in the process of being replaced with new Well #9, which is currently under construction.

Water Replenishment District of Southern California (WRD)

In 1959, the State Legislature enacted the Water Replenishment Act enabling the formation of WRD by voter approval. WRD was formed for the purpose of protecting and managing the groundwater resources of the Central and West Coast groundwater basins of south Los Angeles County. WRD manages groundwater for 43 cities in south Los Angeles County covering a 420 square mile service area. The users of the groundwater basin pump approximately 250,000 acre-feet (AF) of groundwater per year.[9] The State of California relies on WRD to manage, regulate, replenish, and protect the quality of the groundwater supplies in the Central and West Coast groundwater basins.

Because of increasing populations and diminishing groundwater resources, the Central and West Coast groundwater basins were adjudicated to limit the allowable extraction amount for every water right holder within the basins. The adjudication was a result of a judgment from the Superior Court, County of Los Angeles. The final judgments for the Central and West Coast groundwater basins became effective on October 1, 1966 and August 18, 1961 respectively and appointed the DWR as the Watermaster.[10] WRD and the Watermaster cooperate closely to record groundwater extractions from the Central and West Coast groundwater basins (the City of Torrance was granted 5,640 acre-feet per year (AFY) in the Judgment).

TMWD is currently under contract with WRD to purchase water from WRD's Goldsworthy Groundwater Desalter Project (Desalter). The Desalter was constructed to remove a saline plume located in the Basin that was trapped as a result of barrier operations designed to halt seawater intrusion and to treat the water to meet potable

[9] Water Replenishment District of Southern California website, http://www.wrd.org/Purpose.htm
[10] Watermaster Service in the West Coast Basin, Los Angeles County. 2004

standards. The plant began operating in 2001 and currently treats approximately 2.25 MGD. The plant treats saline water using microfiltration and reverse osmosis. The product water meets all the state and federal drinking water standards and is used as drinking water for the TMWD.

The desalted water received by TMWD is used as a supplemental potable water supply source. TMWD purchases approximately 2,000 to 2,400 AF of groundwater annually from the Desalter. Table 5.9 summarizes the past and projected Desalter sales to TMWD. Since the groundwater would otherwise be unusable, it is not included in the adjudicated groundwater rights, provided the source water from the extraction well contains at least 1,000 ppm of chloride or higher (i.e., it does not count against the City's annual groundwater pumping rights). The 1,000 ppm exemption standard resulted from a judicial ruling with regard to the operation of the Desalter. The pumping and treatment of this groundwater aids in halting the migration of the saline plume. In addition, the utilization of this groundwater creates a new source of supply, expands the availability of local water supplies, reduces TMWD's reliance on imported supplies from Metropolitan, and further drought-proofs the community.

Table 5.9
Past and Projected Desalter Water Projection

Desalter	2003	2004	2005	2010	2015	2020	2025	2030
Goldsworthy Desalter	1,516	2,374	2,542	2,400	2,400	2,400	2,400	2,400

Source: 2003 through 2005 data are actual production; all other years are projected supply totals from the City of Torrance 2005 UWMP. It is expected that the Desalter may be expanded in the future to double its current capacity.

5.3 Imported Water (Surface Water)

MWD provides imported water supplies to the City. Metropolitan was formed in the late 1920's. Collectively, charter members recognized the limited water supplies available within the region, and realized that continued prosperity and economic development of Southern California depended upon the acquisition and careful management of an adequate supplemental water supply. This foresight made the continued development of Southern California possible.

Metropolitan acquires water from Northern California via the SWP and from the Colorado River to supply water to most of Southern California. As a wholesaler, Metropolitan has no retail customers, and distributes treated and untreated water directly to its 26 member agencies. One such member agency is TMWD.

Most of TMWD's domestic water supply comes from imported water wholesaled by Metropolitan. Imported water is delivered from northern California via the SWP and from the Colorado River, and is treated at the Robert B. Diemer Filtration Plant and the

Weymouth Filtration Plant before the water is delivered through five connections to TMWD. The characteristics of these connections are shown in Table 5.10.

Table 5.10
Imported Water Connections

Designation	Metropolitan Pipeline	Capacity (GPM)	Capacity (CFS)
T-1	Torrance Lateral	8,980	20
T-5	Palos Verdes Feeder	2,245	5
T-6	Palos Verdes Feeder	4,490	10
T-7	Palos Verdes Feeder	6,730	15
T-8	Second Lower Feeder	11,220	25
Total Capacity		33,665	75

Source: City of Torrance Water System Master Plan, June 2002.

MWD has a goal to provide 100 percent reliability, despite the decline in existing imported water supplies from the SWP and Colorado River, through implementing new programs. Due to competing needs and uses for all of the water sources and regional water operation issues, MWD undertook a number of planning processes: the Integrated Resources Planning (IRP) Process, the Water Surplus and Drought Management (WSDM) Plan, the Strategic Planning Process, the Regional Urban Water Management Plan, and most recently, the Report on Metropolitan Water Supplies: A Blueprint for Water Reliability. Combined, these documents provide a framework and guidelines for optimum water planning into the future. Reliability of MWD's supply is further discussed in Section 6.0, Reliability of Water Supplies.

5.4 Recycled Water

West Basin Municipal Water District (WBMWD)

In 1947, WBMWD was formed to help mitigate the over pumping of groundwater resources in southwest Los Angeles County. Although local groundwater was inexpensive, it was diminishing rapidly and it was realized that pumping would have to be curtailed. This reduction in groundwater was to be supplemented with imported water. In 1948, WBMWD became a member agency of Metropolitan. WBMWD service area includes 17 cities and several unincorporated portions of southwest Los Angeles County.

In response to the increasing demands for water, limitations on imported water supplies and the threat of drought, WBMWD developed the West Basin Water Recycling Project in the early 1990's. In 1995, WBMWD opened a state-of-the-art water recycling facility

in El Segundo, which is still one of the largest recycled water plants of its kind. All recycled water is produced at the West Basin Water Recycling Treatment Plant in El Segundo, CA where it is distributed to either end-use sites or one of several satellite facilities where further treatment prepares the product water for large industrial customers such as Chevron, Exxon-Mobil, and BP Amoco. More than 200 sites currently use more than 9 billion gallons annually.

Wastewater collected and treated at the Hyperion Wastewater Treatment Plant[11] is sent to the West Basin Water Recycling Treatment Plant where it is treated to Title 22 standards. WBMWD purchases secondary effluent from Hyperion prior to ocean disposal and provides, at a minimum, tertiary treatment and disinfection to meet applicable Title 22 standards.[12] More advanced treatment is provided according to customer specifications, also known as "designer water." WBMWD distributes recycled water from the West Basin Water Recycling Treatment Plant to customer sites in its service area, the City of Los Angeles, and the City of Torrance.

TMWD purchases recycled water from WBMWD through the Water Recycling Project. Recycled water comes from the West Basin Water Recycling Plant located in El Segundo. In the 2002-2003 and 2003-2004 fiscal years, TMWD used 7,455 AF and 6,581 AF of recycled water, respectively. In addition, refineries in El Segundo in the WBMWD's service area and in TMWD's service area used approximately 6,500 to 8,000 AFY of recycled water annually.

Sanitation Districts of Los Angeles County (LACSD)

The LACSD includes 25 separate sanitation districts that serve about 5.1 million people in Los Angeles County for collection and treatment of wastewater, including the City of Torrance. The service area is approximately 800 square miles and encompasses 78 cities as well as unincorporated areas of the County.[13] The LACSD constructs, operates, and maintains facilities to collect, treat, recycle, and dispose of wastewater. The LACSD operates one wastewater treatment plant and nine reclamation plants to produce approximately 190 mgd of recycled water.[14]

[11] The City of Los Angeles, Department of Public Works, Bureau of Sanitation, owns and operates the Hyperion Wastewater Treatment Plant. Hyperion discharges most of its effluent into Santa Monica Bay through a five-mile ocean outfall; nearly 50 mgd of secondary effluent is recycled on-site or transported to the West Basin Municipal Water District Recycling Facility in El Segundo.
[12] West Basin Municipal Water District, 2005 Urban Water Management Plan
[13] Sanitation Districts of Los Angeles website, http://www.lacsd.org
[14] Sanitation Districts of Los Angeles Fact Sheet, available online at http://www.lacsd.org/CSDFactSheet_Eng.pdf

6.0 RELIABILITY OF WATER SUPPLIES

Reliability is a measure of a water service system's expected success in managing water shortages. The combination of demand management and supply augmentation options help to reduce the frequency and severity of shortages. Reliability planning requires information about the following: (1) expected frequency and severity of shortages; (2) how additional water management measures are likely to affect the frequency and severity of shortages; and (3) how available contingency measures can reduce the impact of shortages when they occur.

The City of Torrance and all southern California communities and water suppliers are facing increasing challenges in their role as stewards of water resources in the region. The region faces a growing gap between its water requirements and its firm water supplies. Increased environmental regulations and the collaborative competition for water from outside the region have resulted in reduced supplies of imported water. Continued population and economic growth also contribute to increased water demands within the region, putting an even larger burden on local supplies.

The reliability of TMWD's water supply is very dependent on the reliability of imported water supplies, given that TMWD has only one functioning production well. Imported supplies are managed and delivered by Metropolitan, while the groundwater supplies are managed by WRD. The LACSD and the Regional Water Quality Control Board, Los Angeles Region, also play a role in water supply reliability to the region. Although the City of Torrance is not a member agency of WBMWD, TMWD does participate in some of the programs of WBMWD and other cooperative efforts between the City and WBMWD. In 2006 the City and WBMWD entered into an agreement for implementation of various conservation programs focused on the commercial and institutional sectors. Section 4 of the TMWD 2005 UWMP describes these agencies and their roles in water supply reliability and the near and long-term efforts they are involved with to ensure future reliability of water supplies to Torrance and the region as a whole. Section 6 of the 2005 UWMP describes water demand management measures, and Section 7 illustrates the City's water shortage plans.

6.1 Torrance Municipal Water Department

TMWD's water service area is approximately 10,350 acres and comprises about 78 percent of the land within City limits. California Water Services provides water service to the remaining portion of the City. Figure 1.1 shows the City of Torrance and the TMWD water service area boundary.

The distribution system is divided into three pressure zones in order to adequately meet pressure requirements within the service area and to effectively use system components. TMWD maintains four water storage reservoirs ranging in capacity from 0.9 million gallons (MG) to 18.7 MG with a total capacity of 30.6 MG. Walteria Reservoir has a

capacity of 10 MG, Ben Haggot Reservoir has a capacity of 18.7 MG, North Torrance Reservoir at Well #6 has a capacity of 1 MG, and Border Avenue Reservoir at Well #7 has a capacity of 0.9 MG. Currently, Border Avenue Reservoir is on standby.

TMWD has five imported water connections with a total capacity of 33,665 gallons per minute (GPM) to receive Metropolitan water. TMWD also has one active well (Well #6) and one inactive, or standby well, (Well #7) to pump groundwater from the West Coast Basin (discussed in Section 2). TMWD is also considering the construction of a well field in north Torrance to allow TMWD to enable pumping up to its full groundwater rights and has recently developed a focused Draft Business Plan to address local water supply augmentation and infrastructure requirements over the next 20 years.

Ongoing Efforts

TMWD continually reviews practices that will provide its customers with adequate and reliable supplies. Trained staff continues to ensure the water quality is safe and the water supply will meet present and future needs in an environmentally and economically responsible manner. TMWD consistently coordinates its long-term water shortage planning with Metropolitan Water District and is actively working with MWD and other member agencies in various task force study groups to increase regional water supply reliability.

TMWD's water demand within its service area could remain relatively constant over the next 20 years due to minimal growth combined with water use efficiency measures and the potential use of recycled water. Water use efficiency measures described in Section 6 of the UWMP and possible increased use of recycled water described in Section 8 of the UWMP have the potential to reduce overall demand on imported water. Any new water supply sources will be aimed primarily at replacing or upgrading well production rather than to support population growth and new development.

The projects that have been identified to improve TMWD's water supply reliability and enhance the operations of TMWD's facilities include replacing 30 miles of water mains; water meter replacements; distribution and storage system improvements; security improvements; and probable pump station improvements.[15] The improvement projects identified for production purposes include:

- Rehabilitation of Well #6 and Construction of new Well #9 - Well #6 was rehabilitated approximately two years ago with a reduced capacity of approximately 1,000 gpm. This restoration project was an interim measure to restore Well #6 to active service until a replacement facility was constructed. As part of TMWD's water diversification plan, Well #9 located at the same site is currently being drilled and the facility is expected to be completed in the spring of 2009. The capacity of this facility is expected to be approximately 2,500 gpm.

[15] City of Torrance Capital Improvement Program, Engineering Capital Budget

- Additional Groundwater Resources – The draft "Water Resources and Infrastructure Business Plan" recommends the development of three new groundwater wells in North Torrance, in addition to Well #9, which is currently under construction. In late summer 2008, the City purchased a 1.5 acre parcel to serve as a central treatment, storage and pumping site for the proposed groundwater well field. TMWD will then be able to pump its full entitlement of groundwater rights and have additional capacity for other related purposes.
- Walteria and Ben Haggott Reservoir Rehabilitation – Both reservoirs will be rehabilitated to improve water quality and water circulation.
- Wells #7 and #8 Groundwater Treatment – TMWD is conducting another review of options for the use of Wells #7 and #8. It appears that without expensive reverse osmosis treatment to mitigate the problems of excessive color and objectionable taste and odor, these facilities will not be able to produce acceptable water quality. Because outside funding may not be available, this project is not included in the projections as a new water supply for TMWD. However, the wells could be used as injection wells to store water in the groundwater basin.
- Potential additional storage – TMWD is also investigating several potential reservoir sites to increase storage throughout the distribution system.
- Desalter Project Expansion - TMWD in conjunction with WRD are exploring options for expansion of the Goldsworthy Desalter Project. The expansion would include an additional 2,500 AFY of water to TMWD. Because outside funding may not be available, this project is not included in the projections as a new water supply for TMWD. It is, however, a potential project for sometime in the future.

TMWD relies on Metropolitan to supply the majority of its annual potable water demand. Well #6 has been reliable in the past; however, it is over 40 years old and near the end of its useful life and requires rehabilitation to maintain capacity. On efforts to reduce TMWD's dependence on imported water, TMWD continues to convert customers to recycled water, and is proposing projects such as additional groundwater wells, the future expansion of the Goldsworthy Desalter Project and the additional use of recycled water supplies to diversify its water source portfolio.

Table 6.1 lists the TMWD future water supply projects and the projected water supply from these projects. These projects will enhance TMWD's water reliability into the future and provide the capability and reliability to pump groundwater up to its adjudicated rights.

Table 6.1
TMWD Scheduled and Potential Future Water Supply Projects

	2010	2015	2020	2025	2030
Scheduled Projects					
Well #6 Rehabilitation (complete in 2006) and Storage Tank [1]	2,000	0	0	0	0
Walteria and Ben Haggott Reservoir Rehabilitation	Improved water quality and circulation				
Potential Projects					
Well #7 & 8 Groundwater Treatment [2]	0	5,300	5,300	5,300	5,300
North Torrance Wells [3]	0	5,640	5,640	5,640	5,640
Goldsworthy Desalter Project Expansion	0	2,500	2,500	2,500	2,500

[1] Well #6 to be replaced with new wells in north Torrance after 2010 and will be removed from service.

[2] TMWD is proposing nanofiltration treatment for Wells #7 and #8. Implementation is uncertain at this time pending confirmation of TMWD's request for outside funding.

[3] TMWD is planning three to four new wells in north Torrance with capacity of approximately 10,000 AFY.

Since TMWD purchases imported water from the SWP and the Colorado River from Metropolitan, the projects implemented by Metropolitan to secure their water supplies have a direct effect on TMWD. In addition, WRD's and WBMWD's planned projects and programs for groundwater and recycled water will also impact TMWD.

Exchange or Transfer Opportunities

The City owns rights to extract 5,640 AF of groundwater annually; however, currently uses only 1,500 AFY of its adjudicated water rights due to water quality problems. As a result, TMWD leased some of its rights to the Roman Catholic Archdiocese of Los Angeles on May 25, 2004, in the amount of 450 AF. In addition, Metropolitan and WRD are exploring exchange and/or transfer options that would benefit the region.

TMWD maintains four 2-way emergency inter-connections to adjacent water purveyor systems. These connections have the ability to transfer approximately 9,900 gpm into TMWD's distribution system. There are two 8-inch connections to the City of Lomita, one 8-inch connection to California Water Service Company (CWSC), and one 12-inch connection to the CWSC system. Each has a two-way interconnection, allowing water transfers to and from TMWD, depending on the emergency situation. However, records show that these connections have not been used recently. There are also two 10-inch one way metered interconnections that can only flow from TMWD to CWSC.

Desalinated Water Opportunities

Desalination is viewed as a way to develop a local, reliable source of water that can assist agencies to reduce their demand on imported water, reduce groundwater overdraft, and in some cases make unusable groundwater available for municipal uses. TMWD was a partner in a joint venture between Metropolitan and DWR in the Robert W. Goldsworthy Desalter project located in the Torrance City Yard on Madrona Avenue. The Desalter removes intruding diluted seawater from groundwater. The desalination project is part of a comprehensive, large-scale program designed to accomplish three primary goals: 1) prevent further migration of a trapped saline plume in the Basin; 2) restore the affected aquifer to use; and 3) prevent deeper intrusion of brackish water into the Basins. In addition to the Robert W. Goldsworthy Desalter Project, TMWD also benefits from regional desalination projects and efforts.

6.2 Dry Year Reliability Comparison

TMWD water demand in fiscal year 2004/05 was 30,604 AF and decreased to 28,554 AF in 2007/08. By the year 2029/30, TMWD's projected water demand is 32,810 AFY based on the 2005 UWMP, including nominal growth and corresponding demand increases as well as the approximately 62 AFY of water associated with the Rockefeller Group Professional Center. The effectiveness of conservation efforts since 2005, as demonstrated in the reduction of water demands over the past three years, will further enhance the reliability of water supply beyond what was reflected in the 2005 UWMP.

Metropolitan Supplies and Demands

As previously noted, the City of Torrance is a direct member agency of Metropolitan. In its 2005 Regional UWMP (RUWMP), Metropolitan chose the year 1977 as the single driest year since 1922 and the years 1990-1992 as the multiple driest years over that same period. These years were selected because they represent the timing of the least amount of available water resources from the SWP, a major source of Metropolitan's supply.

Over the 20-year period beginning in 2010 and ending in 2030, Metropolitan projects a 0.5 percent decrease in available supply during an average year, a 1.6 percent increase during a single dry year, and a 3.4 percent increase during the third year of the multiple dry year period. The increased available supplies during drought year scenarios are primarily due to increased contract allotments of in-basin storage as well as a number of supplies under development.

In its RUWMP, Metropolitan also projects an increase in member agency demands. Specifically, they project a 10 percent increase over the same 20-year period in the average demand, an 6.9 percent increase during the single dry year scenario, and an 7.8 percent increase during the multiple dry year scenario. However, in all cases, the projected regional increase in demands by member agencies are offset by available surpluses in the Metropolitan supply.

Table 6.2 summarizes Metropolitan's current imported supply availability projections for average and single dry years over the 20-year period beginning in 2010 and ending in 2030. Based on these projections, Metropolitan will be able to meet all of its projected single dry year service area demands through the year 2030.

The entries in Rows I and J in Table 6.2 are important and will be used later in this section for developing TMWD's projected demands over the next 25 years. It is also important to note that Row J (Projected Supply During a Single Dry Year as a % of Single Dry Year Demand) indicates Metropolitan's projected supply (including surplus water) will exceed its projected single dry year demand in all years.

Table 6.2
MWD's Regional Imported Water Supply Reliability Prijections for Average and Single Dry Year

Row	Region Wide Projections	2010	2015	2020	2025	2030
Supply Information						
A	Projected Supply During an Average Year[1]	2,668,000	2,600,000	2,654,000	2,654,000	2,654,000
B	Projected Supply During a Single Dry Year[1]	3,151,000	3,356,000	3,309,000	3,252,000	3,203,000
C = B/A	Projected Supply During a Single Dry Year as a % of Average Supply	**118.3**	**129.1**	**124.7**	**122.7**	**120.7**
Demand Information						
D	Projected Demand During an Average Year	2,063,000	1,985,000	2,029,000	2,141,000	2,269,000
E	Projected Demand During a Single Dry Year	2,348,000	2,234,000	2,275,000	2,388,000	2,511,000
F = E/D	Projected Demand During a Single Dry Year as a % of Average Demand	**113.8**	**112.5**	**112.1**	**111.5**	**110.7**
Surplus Information						
G = A-D	Projected Surplus During an Average Year	605,000	615,000	625,000	513,000	385,000
H = B-E	Projected Surplus During a Single Dry Year	803,000	1,122,000	1,034,000	864,000	692,000
Additional Supply Information						
I = A/D	Projected Supply During an Average Year as a % of Demand During an Average Year	**129.3**	**131.0**	**130.8**	**124.1**	**117.0**
J = B/E	Projected Supply During a Single Dry Year as a % of Single Dry Year Demand (including surplus)	**134.2**	**150.2**	**145.5**	**136.2**	**127.6**

[1] Projected supplies include current supplies and supplies under development, but are limited by Metropolitan's 1.25 MAF allotment to Colorado River water; data obtained from Metropolitan's 2005 RUWMP supply/demand projections.

[1] Metropolitan 2005 Regional UWMP

Table 6.3 summarizes Metropolitan's current imported supply availability projections over the 20-year period beginning in 2010 and ending in 2030 for average and multiple dry year scenarios. When reviewing Table 6.3, it is important to note that Metropolitan is projecting a surplus of supply for all multiple dry year scenarios through 2030.

The entries in Rows I and J in Table 6.3 are important and will be used later in this section for developing TMWD's projected multiple year demands over the next 25 years. It is also important to note that Row J indicates Metropolitan's projected supply (including surplus water) will exceed its projected multiple dry year demand during all years through 2030. The findings in this plan were derived based upon Metropolitan's 2005 RUWMP. These figures can be interpolated to project Metropolitan's ability to meet a specified demand expressed in terms of a percentage of average demand and supply availability.

As discussed previously, MWDSC currently receives imported water from the Colorado River via the CRA and the SWP via the California Aqueduct. The SWP is owned and operated by the DWR. Recently DWR conducted simulations to evaluate current (2007) SWP delivery reliability and incorporate actions to protect delta smelt defined by the 2007 federal court ruling (Wanger decision) and a range of possible climate change impacts to hydrology in the Central Valley (DWR, 2007). In December 2007, the DWR submitted its Draft State Water Project Delivery Reliability Report 2007. The report estimates future deliveries to decrease in 93% of future years in comparison to the 2005 Reliability Report. A number of significant areas affecting the uncertainty for delivery reliability are discussed in detail. Major sources of uncertainty include Delta pumping restrictions, organism decline, climate change and sea level rise, and levee vulnerability associated with floods and earthquakes. The estimated current SWP delivery reliability assumed that the SWP and Central Valley Project operate to meet Old and Middle River flow targets specified in the 2007 federal court ruling on interim measures to protect delta smelt.

On the regional level, Metropolitan has taken a number of actions to secure a reliable water source for its member agencies. Metropolitan recently adopted a water supply allocation plan for dealing with potential shortages that takes into consideration the impact on retail customers and the economy, changes and losses in local supplies, the investment in and development of local resources, and conservation achievements. Additional actions taken by Metropolitan during the first half of 2008 include the adoption of a $1.9 billion spending plan, increased rates and charges, and the funding of a new reservoir to benefit Colorado River supply capabilities.

Table 6.3
MWD's Regional Imported Water Supply Reliability Projections for Average and Single Dry Year

Row	Region Wide Projections	2010	2015	2020	2025	2030
Supply Information						
A	Projected Supply During an Average Year[1]	2,668,000	2,600,000	2,654,000	2,654,000	2,654,000
B	Projected Supply During Year 3 of a Multiple Dry Year Period[1]	2,651,000	2,804,000	2,782,000	2,757,000	2,740,000
C = B/A	Projected Supply During Year 3 of a Multiple Dry Year as a % of Average Supply	**99.5**	**107.8**	**104.8**	**103.9**	**103.2**
Demand Information						
D	Projected Demand During an Average Year	2,063,000	1,985,000	2,029,000	2,141,000	2,269,000
E	Projected Demand During Year 3 of a Multiple Dry Year Period[2]	2,420,000	2,341,000	2,355,000	2,479,000	2,609,000
F = E/D	Projected Demand During Year 3 of a Multiple Dry Year Period as a % of Average Demand	**117.3**	**117.9**	**116.1**	**115.8**	**115.0**
Surplus Information						
G = A-D	Projected Surplus During an Average Year	605,000	615,000	625,000	513,000	385,000
H = B-E	Projected Surplus During Year 3 of a Multiple Dry Year Period	231,000	463,000	427,000	278,000	131,000
Additional Supply Information						
I = A/D	Projected Supply During an Average Year as a % of Demand During an Average Year	**129.3**	**131.0**	**130.8**	**124.1**	**117.0**
J = B/E	Projected Supply During a Multiple Dry Year as a % of Multiple Dry Year Demand (including surplus)	**109.5**	**119.8**	**118.1**	**111.2**	**105.0**

[1] Projected supplies include current supplies and supplies under development, but are limited by Metropolitan's 1.25 MAF allotment to Colorado River water; data obtained from Metropolitan's 2005 RUWMP supply/demand projections.

[2] Metropolitan only projects demands for year 3 of a multiple dry year period.

Torrance Municipal Water Department

To establish a reasonable foundation from which to project future TMWD demands, recent TMWD production records were reviewed to determine a basis for normal year usage. Table 6.4 summarizes production records for the 2000/01 through 2003/04 water years. The average total potable water usage over that period was 23,645 AFY.[16] Based on recorded rainfall, 2001 was the closest to a normal year (14.98 inches of rainfall in downtown Los Angeles compared with a long term historical average of 14.62 inches). The calendar year 2002 is representative of a single dry year based on the recorded calendar year rainfall of only 3.77 inches, which is one of the lowest recorded years on record for downtown Los Angeles. The following two years, 2003 and 2004, were also below-normal dry years and coupled with the 2002 year are representative of a multiple dry year period.

Although TMWD is not a member agency of WBMWD, it is interesting to compare WBMWD's dry year projections with actual historical demands in the TMWD service area. In its 2005 UWMP, WBMWD calculated a single dry year increase in demand over its service area of 2.0 percent, which is less than the actual 7.6 percent increase TMWD experienced in the same very dry year of 2002. WBMWD projected increases in multiple year demands of 2.0%, 2.5% and 4.7% based on the three consecutive dry years of 2002, 2003 and 2004. TMWD's experience for the same three years indicate demands 7.6%, 2.3%, and 6.6% above normal water use for this multiple year dry period. These increases are also representative of demand increases experienced in other southern California locales.[17]

Based on this information, the following factors were used in developing Torrance's single and multiple year demands:

- Single Dry Year Factor 107.6 percent of normal
- Multiple Dry Year Factor for Year 1 107.6 percent of normal
- Multiple Dry Year Factor for Year 2 102.3 percent of normal
- Multiple Dry Year Factor for Year 3 106.6 percent of normal

It is important to note that the percentages reflected above for Multiple Dry Years 1, 2, and 3 are less than Metropolitan's projected available supplies during all multiple dry year periods through the year 2030 (refer to Row J of Table 6.3), which means that TMWD should not encounter any problems in meeting its demands over the next 25 years.

[16] 2005 usage was approximately 5.5% less than 2004 usage because of record rainfall in 2005 (wettest year since 1883 in downtown Los Angeles) and is therefore not representative of normal usage and thus not included in the overall 2000/2004 average.

[17] The Municipal Water District of Orange County (MWDOC) has conducted extensive analyses of water demand in Orange County based on hydrologic records for the period 1922-2004 and has concluded that during a multiple dry year period, demands in years 1, 2 and 3 are 106.7%, 103.7% and 105.5% of a normal year demand. MWDOC has also determined that single dry year demands in Orange County are 105.5% of normal year demands. These percentages are very close to those experienced in Torrance, i.e., 107.6%, 103.2% and 106.6% in Years 1, 2 and 3, respectively.

Table 6.4
TMWD Water Production for 2000 – 2005
Including Comparison with WBMWD Dataand Climatologic Data
(in AFY or inches of rainfall per year)

	2000	2001	2002	2003	2004	2005	Average 2000/04
Total Potable Demand	**23,025**	**22,862**	**24,590**	**23,377**	**24,372**	**23,026**	**23,645**
Calendar Year Rainfall[18] in inches	11.93	19.06	NA	NA	NA	NA	14.62[19]
Water Year Rainfall[20] in inches	17.94	14.98	3.77	8.61	8.50	37.25	---
Water Year Rainfall at LA Civic Center[21]	11.57	17.94	4.42	16.42	9.25	37.25	---
Climatologic Classification	Average	Average	Very Dry	Average/ Dry	Dry	Very Wet	---
TMWD Water Usage as a % of 2001 Assumed Average Year	**100.7**	**100.0**	**107.6**	**103.2**	**106.6**	**100.7**	**---**
WBMWD Single Dry Year Occurring in 2002 as a % of a Normal Year	**---**	**100.0**	**102.0**	**---**	**---**	**---**	**---**
WBMWD Multiple Dry Year Occurring in 2002-04 as a % of a Normal Year	**---**	**100.0**	**102.0**	**102.5**	**104.7**	**---**	**---**

City of Torrance data suggests there will be an 11.2 percent increase in population over 25 years (from 2005 to 2030).[22] Given that the City is largely built-out, it is reasonable to assume that the increase in water demand will be about half that of the population increase, i.e., the 11.2 percent projected increase in population over the next 25 years can be expected to result in a 5.6 percent increase in water demand over that same period. This is a sensible approach in that there is little land left for development in Torrance, which means any increases in population will probably be reflected in higher densities per dwelling unit, with no concurrent increase in landscape irrigation or other non residential water usage. Based on a straight-line analysis, the anticipated increases in water demand over the next 25 years, reflected in five-year planning increments, are presented in Row A of Table 6.5. As noted in Row D of the table, Metropolitan has an abundant supply of available water that can more than meet these slight increases in City demands.

[18] Data for years 2000-2003 obtained from National Weather Service website; data is for downtown Los Angeles; refer to http://www.wrh.noaa.gov/lox/climate/cvc.php.

[19] Average rainfall recording in downtown Los Angeles over the period 1921-2001.

[20] Data for years Water Years (October to September) 2000 – 2003 obtained from Los Angeles County Department of Public Works website; data was recorded at Downey Fire Station 107D; refer to http://ladpw.org/wrd/Precip/index.cfm.

[21] Data from http://www.laalmanac.com/weather/we13.htm for July/June period.

[22] City of Torrance General Plan Update, Public Review Draft, October 2008.

Table 6.5
Comparison Between Metropolitan Supply Availability and TMWD Demand During an Average Year

Row	Projection	2010	2015	2020	2025	2030
A	Projected Increase in Demand During an Average Year as a % of 2005 Average Demand[1]	102.8	103.9	104.5	105.0	105.6
B	Metropolitan Projected Increase in Regional Supply Availability During an Average Year as a % of 2005 Average Year[2]	104.9	102.2	104.4	104.4	104.4
C	Metropolitan Projected Regional Supply During an Average Year as a % of Demand During an Average Year[3]	129.3	131.0	130.8	124.1	117.0
D = (C-A)	Percentage Difference Between Growth in Metropolitan Supply Availability (including surplus supply) During an Average Year Compared with Growth in Torrance Demand During an Average Year	26.5	27.1	26.3	19.1	11.4

[1] Increase in demand based on historical usage records from 2000-2004.
[2] Metropolitan did not include any supply projections for 2005 in its RUWMP supply/demand tables released in 2005. The 2005 supply projection released in May 2005 (2,542,800 AFY) is therefore used as a base year for calculating the increase in supply availability in future years as compared with 2005 average year supply.
[3] Values extracted from Table 6.2.

Table 6.2 presents future normal year water demands based on growth factors reflected in the City's 2005 UWMP. Table 6.3 shows single dry water year supply and demand projections under normal groundwater supply conditions. Tables 6.4 through 6.8 show the multiple dry water years projected supply and demand projections. If Metropolitan implements specific resource management actions and measures that allow for consistency in available water supply in dry year conditions and does not make any reductions, the City's demands should continue to be met, as shown on the following tables. In addition, the following tables show that under reduced water supply conditions from Metropolitan, available supply continues to exceed demand in single and multiple dry years. This analysis, as well as for the normal supply conditions, was completed for the end of the 20-year planning period. The results displayed in Tables 6.6 through 6.11 indicate that TMWD can expect to meet all of its water demands over the next 20 years for all average, single and multiple dry years.

Table 6.6
TMWD Projected Water Supply and Demand
Normal Water Year
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2010	2015	2020	2025	2030
Supply	**Normal Water Years**				
Projected Supply During an Average Year as a % of Demand During an Average Year[1]	129.3	131.0	130.8	124.1	117.0
Imported[2]	25,630	20,890	21,080	20,220	19,270
Recycled[3]	7,100	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	1,600	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Supply	**36,730**	**36,180**	**36,370**	**35,510**	**34,560**
% of Normal Year[6]	100	100	100	100	100
Demand					
Imported[2]	19,820	15,950	16,120	16,290	16,470
Recycled[3]	7,100	7,250	7,250	7,250	7,250
Local (Groundwater) [4]	1,600	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Demand	**30,920**	**31,240**	**31,410**	**31,580**	**31,760**
% of Year 2005 Demand (30,070 AF) [7]	102.8	103.9	104.5	105.0	105.6
Supply/ Demand Difference	**5,810**	**4,940**	**4,960**	**3,930**	**2,800**
Difference as % of Supply	**15.8**	**13.7**	**13.6**	**11.1**	**8.1**
Difference as % of Demand	**18.8**	**15.8**	**15.8**	**12.4**	**8.8**

[1] From Table 6.2, Row I.

[2] Imported water supply = (imported water demand) x (Metropolitan Projected Supply Available During an Average Year as a % of Demand During an Average Year (from Table 6.2, Row I); Imported demand = Total Demand - Recycled Water Demand – Local (Groundwater) demand – Local (Desalter) demand.

[3] Projections for recycled water demand provided by TMWD staff as determined from historical records. Recycled water supply assumed to be equal to recycled water demand.

[4] Groundwater demand for 2010 is based on historical amounts pumped from Well #6. Groundwater demand for future years assumes TMWD's north Torrance well system will be operational by 2015 and allow the City to pump its full adjudicated water right of 5,640 AF and reduce imported water by 4,000 AF.

[5] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[6] Normal Year supply is assumed to reflect the total supply available in the row labeled "Total Supply."

[7] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

Table 6.7

TMWD Projected Water Supply and Demand
Single Dry Water Year
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2010	2015	2020	2025	2030
Supply	**Single Dry Years**				
Metropolitan Projected Supply Available During a Single Dry Year as a % of Single Dry Year Demand (including surplus) [2]	134.2	150.2	145.5	136.2	127.6
Imported[3]	34,400	31,380	30,670	27,540	24,590
Recycled [4]	7,100	7,250	7,250	7,250	7,250
Local (Groundwater)[5]	1,600	5,640	5,640	5,640	5,640
Local (Desalter)[6]	2,400	2,400	2,400	2,400	2,400
Total Supply	**45,500**	**46,670**	**45,960**	**42,830**	**39,880**
Normal Year Supply[7]	36,730	36,180	36,370	35,510	34,560
% of Normal Year Supply	123.9	129.0	126.4	120.6	115.4
Demand					
Imported[3]	22,170	18,320	18,510	18,690	18,880
Recycled[4]	7,100	7,250	7,250	7,250	7,250
Local (Groundwater)[5]	1,600	5,640	5,640	5,640	5,640
Local (Desalter)[6]	2,400	2,400	2,400	2,400	2,400
Total Demand	**33,270**	**33,610**	**33,800**	**33,980**	**34,170**
Normal Year Demand[7]	30,920	31,240	31,410	31,580	31,760
% of Normal Year Demand	107.6	107.6	107.6	107.6	107.6
% of Year 2005 Demand (30,070 AF)[8]	110.6	111.8	112.4	113.0	113.6
Supply/ Demand Difference	**12,230**	**13,060**	**12,160**	**8,850**	**5,710**
Difference as % of Supply	**26.9**	**28.0**	**26.5**	**20.7**	**14.3**
Difference as % of Demand	**36.8**	**38.9**	**36.0**	**26.0**	**16.7**

[2] From Table 6.2, Row J (includes Metropolitan surplus supplies).

[3] Available Imported supply is estimated to equal Metropolitan's September 2005 Final Draft RUWMP projected available supplies including surplus supplies = (normal year import) x (Metropolitan projected supply as a % of the single dry year demand); Imported demand = normal year demand x 107.6% single dry year demand, calculated from demand data in 2002 (Dry Year) divided by demand in 2001 (Normal Precipitation Year).

[4] Projections for recycled water demand provided by TMWD based on historical records and assumes a slight increase in irrigation demands in future years. Recycled water supply assumed to be equal to recycled water demand. Recycled water is not projected to increase during a single dry year given that 97% of the total supply is used by a single industrial customer (Exxon-Mobil) whose demands are not weather dependent and therefore are not expected to vary during dry years.

[5] Groundwater demand for 2010 is based on historical amounts pumped from Well #6. Groundwater demand for future years assumes TMWD's north Torrance well system will be operational by 2015 and allow the City to pump its full adjudicated water right of 5,640 AF. Groundwater supply for 2010 is assumed to equal demand (since additional pumping capacity will not yet be on-line). Groundwater supply for all future years is also assumed to equal groundwater demand which is equal to TMWD's adjudicated pumping right of 5,640 AF. Demand in future years cannot be increased to account for 107.6% single dry year demand factor because it will result in pumping beyond TMWD's adjudicated right.

[6] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[7] Normal year supplies and demands and taken from Table 6.6.

[8] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

Table 6.8
TMWD Projected Water Supply and Demand
Multiple Dry Water Years 2011-2015
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2011	2012	2013	2014	2015
Supply	**Normal Years**		**Dry Years**		
Metropolitan Projected Supply During a Multiple Dry Year as a % of Average Supply[1]			107.8	107.8	107.8
Imported[2]	24,680	23,730	24,560	23,540	22,520
Recycled[3]	7,130	7,160	7,190	7,220	7,250
Local (Groundwater)[4]	1,600	1,600	1,600	1,600	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Supply	**35,810**	**34,890**	**35,750**	**34,760**	**37,810**
Normal Year Supply[6]	35,810	34,890	33,980	33,060	36,180
% of Normal Year Supply	100.0	100.0	105.2	105.1	104.5
Demand					
Imported[2]	19,850	19,880	22,280	20,670	18,010
Recycled[3]	7,130	7,160	7,190	7,220	7,250
Local (Groundwater)[4]	1,600	1,600	1,600	1,600	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Demand	**30,980**	**31,040**	**33,470**	**31,890**	**33,300**
Normal Year Demand[8]	30,980	31,040	31,110	31,170	31,240
% of Normal Year Demand	100	100	107.6	102.3	106.6
% of Year 2005 Demand (30,070 AF)[9]	103.0	103.2	111.3	106.1	110.7
Supply/ Demand Difference	**4,830**	**3,850**	**2,280**	**2,870**	**4,510**
Difference as % of Supply	**13.5**	**11.0**	**6.4**	**8.3**	**11.9**
Difference as % of Demand	**15.6**	**12.4**	**6.8**	**9.0**	**13.5**

[1] From Table 5-3, Row C.

[2] Imported supply = (imported supply interpolated from Table 5.2-5) x (escalation factor from Table 5.2-2, Row C); Imported demand = (normal year demand) x (107.6%, 102.3% or 106.6% Year 1, 2 and 3 multiple dry year demand factors calculated from demand in 2002, 2003, and 2004 (three consecutive dry years) divided by demand in 2001 (Normal Precipitation Year). Imported demand for normal years is 100% of normal demand interpolated from Table 5.2-5.

[3] Projections for recycled water demand determined from historical records. Recycled water supply assumed to be equal to recycled water demand. Recycled water is not projected to increase during a single dry year given that 97% of the total supply is used by a single industrial customer whose demands are not weather dependent and therefore are not expected to vary during dry years.

[4] Groundwater demand is based on historical amounts pumped from Well #6. Given that the total projected demand is well below the City's adjudicated pumping right, demand is estimated to equal supply. Total Groundwater demand = (normal year demand) x (107.6%, 103.2% or 106.6% for Multiple Dry Years 1, 2 and 3, calculated from demand data in 2002, 2003 and 2004 (3 consecutive Dry Years) divided by demand in 2001 (Normal Precipitation Year).

[5]] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[6] Interpolated from Table 6.6.

[8] Interpolated from Table 6.6.

[9] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

Table 6.9
TMWD Projected Water Supply and Demand
Multiple Dry Water Years 2016-2020
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2016	2017	2018	2019	2020
Supply	**Normal Years**		**Dry Years**		
Metropolitan Projected Supply During a Multiple Dry Year as a % of Average Supply[1]			104.8	104.8	104.8
Imported[2]	20,930	20,970	22,010	22,050	22,090
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Supply	**36,220**	**36,260**	**37,300**	**37,340**	**37,380**
Normal Year Supply[6]	36,220	36,260	36,290	36,330	36,370
% of Normal Year Supply	100.0	100.0	102.8	102.8	102.8
Demand					
Imported[2]	15,980	16,020	18,430	16,810	18,190
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Demand	**31,270**	**31,310**	**33,720**	**32,100**	**33,480**
Normal Year Demand[8]	31,270	31,310	31,340	31,380	31,410
% of Normal Year Demand	100	100	107.6	102.3	106.6
% of Year 2005 Demand (30,070 AF)[9]	104.0	104.1	112.1	106.8	111.3
Supply/ Demand Difference	**4,950**	**4,950**	**3,580**	**5,240**	**3,900**
Difference as % of Supply	**13.7**	**13.7**	**9.6**	**14.0**	**10.4**
Difference as % of Demand	**15.8**	**15.8**	**10.6**	**16.3**	**11.6**

[1 From Table 6.3, Row C.

[2] Imported supply = (imported supply interpolated from Table 5.2-5) x (escalation factor from Table 5.2-2, Row C); Imported demand = (normal year demand) x (107.6%, 102.3% or 106.6% Year 1, 2 and 3 multiple dry year demand factors calculated from demand in 2002, 2003, and 2004 (three consecutive dry years) divided by demand in 2001 (Normal Precipitation Year). Imported demand for normal years is 100% of normal demand interpolated from Table 5.2-5.

[3] Projections for recycled water demand determined from historical records. Recycled water supply assumed to be equal to recycled water demand. Recycled water is not projected to increase during a single dry year given that 97% of the total supply is used by a single industrial customer whose demands are not weather dependent and therefore are not expected to vary during dry years.

[4] Groundwater demand is based on historical amounts pumped from Well #6. Given that the total projected demand is well below the City's adjudicated pumping right, demand is estimated to equal supply. Total Groundwater demand = (normal year demand) x (107.6%, 103.2% or 106.6% for Multiple Dry Years 1, 2 and 3, calculated from demand data in 2002, 2003 and 2004 (3 consecutive Dry Years) divided by demand in 2001 (Normal Precipitation Year).

[5]] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[6] Interpolated from Table 6.6.

[8 Interpolated from Table 6.6.

[9] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

Table 6.10
TMWD Projected Water Supply and Demand
Multiple Dry Water Years 2021-2025
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2021	2022	2023	2024	2025
Supply	**Normal Years**		**Dry Years**		
Metropolitan Projected Supply During a Multiple Dry Year as a % of Average Supply[1]			103.9	103.9	103.9
Imported[2]	20,910	20,740	21,370	21,190	21,010
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Supply	**36,200**	**36,030**	**36,660**	**36,480**	**36,300**
Normal Year Supply[6]	36,200	36,030	35,850	35,680	35,510
% of Normal Year Supply	100.0	100.0	102.3	102.2	102.2
Demand					
Imported[2]	16,150	16,190	18,610	16,990	18,370
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Demand	**31,440**	**31,480**	**33,900**	**32,280**	**33,660**
Normal Year Demand[8]	31,440	31,480	31,510	31,550	31,580
% of Normal Year Demand	100	100	107.6	102.3	106.6
% of Year 2005 Demand (30,070 AF)[9]	104.6	104.7	112.7	107.3	111.9
Supply/ Demand Difference	**4,760**	**4,550**	**2,760**	**4,200**	**2,640**
Difference as % of Supply	**13.1**	**12.6**	**7.5**	**11.5**	**7.3**
Difference as % of Demand	**15.1**	**14.5**	**8.1**	**13.0**	**7.8**

[1 From Table 6.3, Row C.

[2] Imported supply = (imported supply interpolated from Table 5.2-5) x (escalation factor from Table 5.2-2, Row C); Imported demand = (normal year demand) x (107.6%, 102.3% or 106.6% Year 1, 2 and 3 multiple dry year demand factors calculated from demand in 2002, 2003, and 2004 (three consecutive dry years) divided by demand in 2001 (Normal Precipitation Year). Imported demand for normal years is 100% of normal demand interpolated from Table 5.2-5.

[3] Projections for recycled water demand determined from historical records. Recycled water supply assumed to be equal to recycled water demand. Recycled water is not projected to increase during a single dry year given that 97% of the total supply is used by a single industrial customer whose demands are not weather dependent and therefore are not expected to vary during dry years.

[4] Groundwater demand is based on historical amounts pumped from Well #6. Given that the total projected demand is well below the City's adjudicated pumping right, demand is estimated to equal supply. Total Groundwater demand = (normal year demand) x (107.6%, 103.2% or 106.6% for Multiple Dry Years 1, 2 and 3, calculated from demand data in 2002, 2003 and 2004 (3 consecutive Dry Years) divided by demand in 2001 (Normal Precipitation Year).

[5]] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[6] Interpolated from Table 6.6.

[8] Interpolated from Table 6.6.

[9] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

Table 6.11
TMWD Projected Water Supply and Demand
Multiple Dry Water Years 2026-2030
(AFY – All projections rounded to nearest 10 AF)

Water Sources	2026	2027	2028	2029	2030
Supply	**Normal Years**		**Dry Years**		
Metropolitan Projected Supply During a Multiple Dry Year as a % of Average Supply[1]			103.2	103.2	103.2
Imported[2]	20,030	19,840	20,280	20,080	19,890
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Supply	**35,320**	**35,130**	**35,570**	**35,370**	**35,180**
Normal Year Supply[6]	35,320	35,130	34,940	34,750	34,560
% of Normal Year Supply	100.0	100.0	101.8	101.8	101.8
Demand					
Imported[2]	16,330	16,360	18,810	17,160	18,570
Recycled[3]	7,250	7,250	7,250	7,250	7,250
Local (Groundwater)[4]	5,640	5,640	5,640	5,640	5,640
Local (Desalter)[5]	2,400	2,400	2,400	2,400	2,400
Total Demand	**31,620**	**31,650**	**34,100**	**32,450**	**33,860**
Normal Year Demand[8]	31,620	31,650	31,690	31,720	31,760
% of Normal Year Demand	100	100	107.6	102.3	106.6
% of Year 2005 Demand (30,070 AF)[9]	105.2	105.3	113.4	107.9	112.6
Supply/ Demand Difference	**3,700**	**3,480**	**1,470**	**2,920**	**1,320**
Difference as % of Supply	**10.5**	**9.9**	**4.1**	**8.3**	**3.8**
Difference as % of Demand	**11.7**	**11.0**	**4.3**	**9.0**	**3.9**

[1] From Table 6.3, Row C.

[2] Imported supply = (imported supply interpolated from Table 5.2-5) x (escalation factor from Table 5.2-2, Row C); Imported demand = (normal year demand) x (107.6%, 102.3% or 106.6% Year 1, 2 and 3 multiple dry year demand factors calculated from demand in 2002, 2003, and 2004 (three consecutive dry years) divided by demand in 2001 (Normal Precipitation Year). Imported demand for normal years is 100% of normal demand interpolated from Table 5.2-5.

[3] Projections for recycled water demand determined from historical records. Recycled water supply assumed to be equal to recycled water demand. Recycled water is not projected to increase during a single dry year given that 97% of the total supply is used by a single industrial customer whose demands are not weather dependent and therefore are not expected to vary during dry years.

[4] Groundwater demand is based on historical amounts pumped from Well #6. Given that the total projected demand is well below the City's adjudicated pumping right, demand is estimated to equal supply. Total Groundwater demand = (normal year demand) x (107.6%, 103.2% or 106.6% for Multiple Dry Years 1, 2 and 3, calculated from demand data in 2002, 2003 and 2004 (3 consecutive Dry Years) divided by demand in 2001 (Normal Precipitation Year).

[5]] Desalter supply and demand projections provided by City of Torrance 2005 UWMP; desalter demand assumed to equal supply in all years.

[6] Interpolated from Table 6.6.

[8] Interpolated from Table 6.6.

[9] 2005 Demand = 2005 potable water demand (23,026 AF) + 2005 recycled water demand (7,044 AF).

7.0 CONCLUSION

The City of Torrance and all southern California communities and water suppliers are facing increasing challenges in their role as stewards of water resources in the region. The region faces a growing gap between its water requirements and its firm water supplies. Increased environmental regulations and the collaborative competition for water from outside the region have resulted in reduced supplies of imported water. Continued population and economic growth also contribute to increased water demands within the region, putting an even larger burden on local supplies.

The reliability of TMWD's water supply is very dependent on the reliability of imported water supplies. TMWD currently receives approximately 68 percent of its water supply from Metropolitan and 32 percent from local supplies. Local supplies include groundwater, desalinated groundwater, and recycled water. Of potable water supplies, imported water is approximately 85 percent and groundwater is 15 percent.

Metropolitan's current imported supply availability projections over the 20-year period beginning in 2010 and ending in 2030 for average and multiple dry year scenarios project a surplus of supply for single dry year and multiple dry year scenarios through 2030. On the regional level, Metropolitan has taken a number of actions to secure a reliable water source for its member agencies. Metropolitan recently adopted a water supply allocation plan for dealing with potential shortages that takes into consideration the impact on retail customers and the economy, changes and losses in local supplies, the investment in and development of local resources, and conservation achievements. Additional actions taken by Metropolitan during the first half of 2008 include the adoption of a $1.9 billion spending plan, increased rates and charges, and the funding of a new reservoir to benefit Colorado River supply capabilities.

Current and projected water demand and supply for the City of Torrance through Year 2030 also show a supply surplus demonstrating a sufficient water supply for the City and the proposed project through the 20-year planning period. TMWD water demand in fiscal year 2004/05 was 30,604 AF and decreased to 28,554 AF in 2007/08. By the year 2029/30, TMWD's projected water demand is 32,810 AFY based on the 2005 UWMP, including nominal growth and corresponding demand increases as well as the approximately 62 AFY of water associated with the Rockefeller Group Professional Center. Therefore, the Rockefeller Group Professional Center is less than 0.2% of total water demands of TMWD. The effectiveness of conservation efforts since 2005, as demonstrated in the reduction of water demands over the past three years, will further enhance the reliability of water supply beyond what was reflected in the 2005 UWMP.

Collectively, the information included in this water supply assessment identifies a sufficient water supply and reliability to TMWD's service area to serve the Rockefeller Group Professional Center. Although imported water supplies from the State Water Project through the Delta are of significant concern especially in the near future, local water supplies in conjunction with the aggressive planning and conservation efforts on the state, regional, and local level, ensure that TMWD will be able to provide a reliable source of water to accommodate its existing and future users.

8.0 REFERENCES

The following documents were used, in conjunction with discussions with the City of Torrance, in preparing this water supply assessment.

Assembly Bill 797, *California Water Code Division 6 Part 2.6 Urban Water Management Planning*, 1983, as amended to 2005

California Urban Water Conservation Council, *Memorandum of Understanding Regarding Urban Water Conservation in California (MOU)*, September 1991

Central Basin and West Basin Municipal Water District, *2002-2003 Annual Report*, 2002-2003

City of Torrance, *2005 Urban Water Management Plan*

City of Torrance, *General Plan Update*, October 2008

City of Torrance, *City of Torrance Water System Master Plan*, June 2002

Department of Water Resources, *Draft State Water Project Delivery Reliability Report*, 2007

Metropolitan Water District of Southern California, *2005 Urban Water Management Plan*, November 2005

Metropolitan Water District of Southern California, *Integrated Water Resources Plan, 2003 Update*, May 2004

Water Replenishment District of Southern California [On-line] http://www.wrd.org/Purpose.htm

Water Replenishment District of Southern California, *Water Replenishment District of Southern California Engineering Survey Report*, 2008

Water Replenishment District of Southern California, *Regional Groundwater Monitoring Report for Water Year 2003/2004*, April 2005

West Basin Municipal Water District, *2005 Urban Water Management Plan*

APPENDIX A
Technical Memorandum

Water Demands for Rockefeller Group Professional Center

PSOMAS

TECHNICAL MEMORANDUM

To: Danny Santana

From: Michael D. Swan, PE

Date: August 22, 2008

Subject: Water Demands for Rockefeller Group Professional Center - **DRAFT**

BACKGROUND

The purpose of this technical memorandum is to develop the additional water demands that will need to be served by the City of Torrance as a result of the proposed Rockefeller Group Professional Center. These additional water demands require the preparation of a Water Supply Assessment for the City of Torrance and this Tech Memo will serve as the basis for the additional demands that need to be addressed in that WSA. The existing site for the proposed project has been vacant for a long period of time and is therefore assumed to have no current water demand, so all projected water demand on the site must be included in the WSA as new demand on the City system.

ANALYSIS

The proposed Rockefeller Group Professional Center development is a 23.6-acre site that will include a total of just over 351,000 square feet of building area made up of medical office buildings, office buildings, industrial uses, and associated parking. The project site plan is included in Attachment A. The project will be constructed in two phases. Phase I, located on the west side of the project site (west of the driveway), will include 66,182 square feet (sf) of medical office use, 99,790 sf of office use, and 44,211 sf of industrial use. Phase II, east of the driveway, will include an additional 62,838 sf of medical office use, 40,158 sf office use, and 38,265 sf industrial use. All buildings are proposed to have two floors.

Based on the project description above, projected water demands were developed and are listed in Table 1. The proposed development calculated flows total 62.2 acre-feet per year (AFY), or 55,552 gallons per day (gpd). A flow factor of 230 gpd per 1,000 sf was used for the medical office space, 60 gpd per 1,000 sf for the office building space, and 60 gpd per 1,000 sf for industrial use. These flow factors were estimated based on inside water demand factors from the Irvine Ranch Water District (IRWD) Water Resources Master Plan dated March 2002 and supplemented in January 2004. The IRWD demand data reflect actual usage (broken down between inside water demand and outside, or irrigation demand), based on experience, by detailed categories of land use. The strong scientific basis behind the IRWD demand factors make it appropriate to use these factors to estimate project demand.

A Sewer Capacity Study was completed for the project by Thienes Engineering and uses a flow factor of 200 gpd per 1,000 sf in estimating average day sewer generation for all proposed

buildings/uses. This more conservative sewage generation for the site is based on the Los Angeles County Sanitation District (LACSD) loading criteria for office building use and is appropriate for the purposes of analyzing the capacity of the trunk sewer serving the site since this 15-inch diameter trunk sewer in Lomita Blvd. is owned by LACSD. The LACSD factors are used in the sizing and design of sewer pipelines and are considered too conservative in estimating indoor water use for the entire site on an average annual basis (indoor water use is equivalent to sewer generation). We believe the IRWD demand factors are more realistic having been generated from detailed water use, land use and square footage statistics.

The irrigation water demand estimate was provided by the project landscape architect (Ridge Landscape Architects) and is based on the State of California's AB 325 Irrigation Water Use Calculation. This calculation is based on plant species and associated plant factors, local evapotranspiration data, and an assumed irrigation efficiency based on the irrigation system proposed (spray, drip, etc.). The landscape irrigation calculations for both Phase I and Phase II are included in Attachment B along with the landscape planting plans.

PHASING

The project is proposed to be constructed and occupied in two distinct phases and current projections call for commencement of construction by Spring of 2009 with occupancy by early 2010. Phase II timing is less certain but for the purpose of the WSA, we have assumed that it will come on line approximately two years later with occupancies in 2012.

Table 1: Water Demands for the Rockefeller Group Professional Center

Land Use	Building Area (Square Feet)	Water Use	
		gpd	AFY
PHASE I			
Medical Office Building	66,182	15,222	17.0
Office Building	99,790	5,987	6.7
Industrial	44,211	2,653	3.0
Irrigation		6,902	7.7
Phase I Subtotal	**210,183**	**30,764**	**34.4**
PHASE II			
Medical Office Building	62,838	14,453	16.2
Office Building	40,158	2,409	2.7
Industrial	38,265	2,296	2.6
Irrigation		5,630	6.3
Phase II Subtotal	**141,261**	**24,788**	**27.8**
Total	**351,444**	**55,552**	**62.2**

Notes:
1. Medical Office Building demand = square footage of building in each phase x 230 gpd/1,000 sf.
2. Office Building demand = square footage of building in each phase x 60 gpd/1,000 sf.
3. Industrial Building demand = square footage of building in each phase x 60 gpd/1,000 sf.
4. Irrigation water demand based on Ridge Landscape Architects plans and calculations included in Attachment B.

ATTACHMENT A

Phase I

PROJECT DATA

BUILDING	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED			PARKING PROVIDED				SITE AREA (S.F.)	FOOT-PRINT (S.F.)	SITE COVERAGE	F.A.R.
					PARKING RATIO	PER BLDG.	TOTAL	STD.	C	H/C	TOTAL				
A - MEDICAL / OFFICE	13,091	13,091	13,424	26,515	1/200	133		116	14	3	133				
B - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		100	14	3	117				
C - MEDICAL / OFFICE	8,194	8,194	8,302	16,496	1/200	83	332	73	9	2	84				
D - OFFICE	5,519	5,519	5,793	11,312	1/200	57		50	6	2	58				
E - OFFICE	5,519	5,519	5,793	11,312	1/200	57		50	6	2	58				
F - OFFICE	8,230	8,230	8,568	16,798	1/200	56		49	6	2	57				
G - OFFICE	8,230	8,230	8,568	16,798	1/300	56		49	6	2	57				
H - OFFICE	8,230	8,230	8,568	16,798	1/300	56		49	6	2	57				
I - OFFICE	6,538	6,538	6,848	13,386	1/300	45		40	5	2	47				
J - OFFICE	6,538	6,538	6,848	13,386	1/300	45	372	40	5	2	47				
K - INDUSTRIAL	30,144	30,144	14,067	44,211	1/300	148	148	129	17	6	152				
TOTAL:	111,690	111,690	98,493	210,183	852	SPACES		745	94	28	867	631,427	111,690	17.7%	33.3%

Phase II

PROJECT DATA

BUILDING	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED			PARKING PROVIDED				SITE AREA (S.F.)	FOOT-PRINT (S.F.)	SITE COVERAGE	F.A.R.
					PARKING RATIO	PER BLDG.	TOTAL	STD.	C	H/C	TOTAL				
B2 - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		113	-	3	116				
B3 - MEDICAL / OFFICE	11,457	11,457	11,714	23,171	1/200	116		113	-	3	116				
C2 - MEDICAL / OFFICE	8,194	8,194	8,302	16,496	1/200	83	315	81	-	2	83				
J2 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
J3 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
J4 - OFFICE	6,538	6,538	6,848	13,386	1/300	45		43	-	2	45				
L - INDUSTRIAL	26,089	26,089	12,176	38,265	1/300	128	263	129	-	2	131				
TOTAL:	76,811	76,811	64,450	141,261	578	SPACES		565	0	16	581	396,045	76,811	19.4%	35.7%

PROJECT DATA (PHASE I & II)

	BUILDING FOOTPRINT (S.F.)	1-ST FLOOR OFFICE (S.F.)	2-ND FLOOR OFFICE (S.F.)	TOTAL FLOOR AREA (S.F.)	PARKING REQUIRED	PARKING PROVIDED				SITE AREA (S.F.)	FOOT PRINT (S.F.)	SITE COVER AGE	F.A.R.
					TOTAL	STD.	C	H/C	TOTAL				
GRAND TOTAL	188,501	188,501	162,943	351,444	1,430 SPACES	1,310	94	44	1,448	1,027,472	188,352	18.5%	34.5%

NORTH

scale: 1" = 50'-0"

0 50 100 150 200

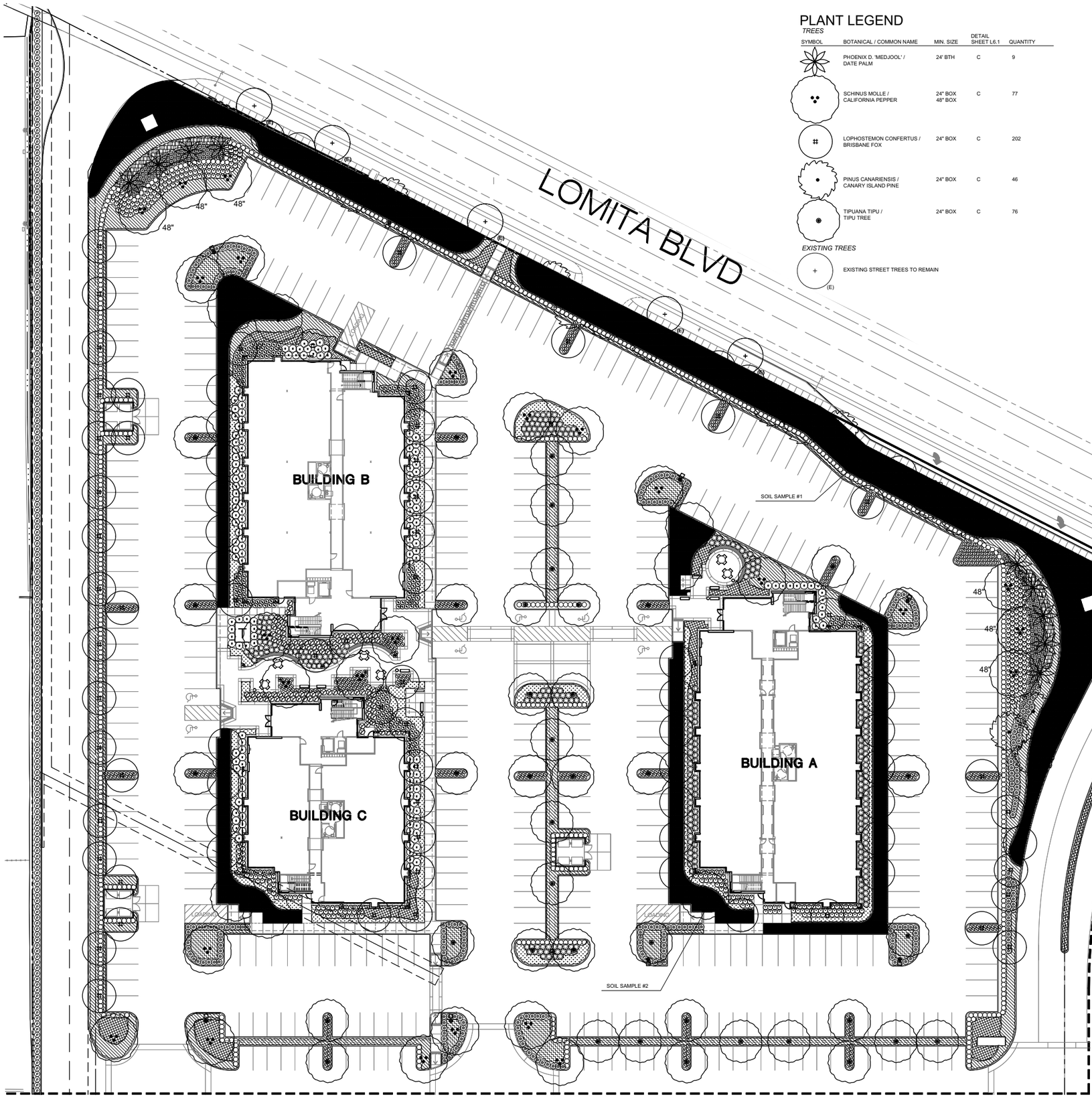
Withee Malcolm Architects, LLP
2251 W. 190th Street
Torrance, Ca 90504
Tel. (310) 217-8885
Fax (310) 217-0425

ROCKEFELLER GROUP PROFESSIONAL CENTER
TORRANCE, CALIFORNIA

APPLICANT
ROCK-LOMITA, LLC
4 PARK PLAZA, SUITE 540, IRVINE, CA 92614
tel: (949) 468-1808 fax: (949) 468-1805

JOB NO. A6049.205
SCALE: 1"=50'-0"
MAY 6, 2008

ATTACHMENT B



PLANT LEGEND

TREES

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE	DETAIL SHEET L6.1	QUANTITY
	PHOENIX D. 'MEDJOOL' / DATE PALM	24" BTH	C	9
	SCHINUS MOLLE / CALIFORNIA PEPPER	24" BOX 48" BOX	C	77
	LOPHOSTEMON CONFERTUS / BRISBANE FOX	24" BOX	C	202
	PINUS CANARIENSIS / CANARY ISLAND PINE	24" BOX	C	46
	TIPUANA TIPU / TIPU TREE	24" BOX	C	76

EXISTING TREES

(E)	EXISTING STREET TREES TO REMAIN			

SHRUBS

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE / SPACING	DETAIL SHEET L6.1	QUANTITY
	DIETES BICOLOR / FORTNIGHT LILY	1 GAL. / 24" O.C.	A,B,D	248
	HELICTOTRICHON SEMPERVIRENS / BLUE OAT GRASS	1 GAL / 24" O.C.	A,B,D	1748
	HEMEROCALLIS HYBRID / DAYLILY (COLOR YELLOW)	1 GAL / 24" O.C.	A,B,D	1834
	PENNISETUM S. 'RUBRUM' / RED FOUNTAIN GRASS	1 GAL / 36" O.C.	A,B,D	557
	LANTANA MONTEVIDENSIS / COMMON LANTANA	1 GAL / 36" O.C.	A,B,D	532
	MUHLENBERGIA 'REGAL MIST' / DEER GRASS	1 GAL / 24" O.C.	A,B,D	1150
	LIRIOPE MUSCARI 'SILVERY SUNPROOF' / LILLY TURF	1 GAL / 30" O.C.		867
	SALVIA LEUCANTHA / MEXICAN BUSH SAGE	5 GAL / 36" O.C.	A,B,D	431
	WESTRINGIA FRUTICOSA / COASTAL ROSEMARY	5 GAL / 48" O.C.	A,B,D	307
	PITTOSPORUM T. 'VARIEGATA' / DWARF MOCK ORANGE	5 GAL / 36" O.C.	A,B,D	38
	STIPA TENUISSIMA / FEATHER GRASS	1 GAL / 30 " O.C.	A,B,D	1169
	LIGUSTRUM J. 'TEXANUM' / PRIVET	5 GAL / 30" O.C.	A,B,D	2414
	PRUNUS CAROLINIANA / CAROLINA LAUREL CHERRY	5 GAL / 36" O.C.	A,B,D	405

GROUND COVERS

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE	DETAIL SHEET L6.1	QUANTITY
	ROSMARINUS O. 'PROSTRATUS' / PROSTRATE ROSEMARY	FLATS / 12" O.C.	A,B,D	--
	SENECIO MANDRALISCAE / BLUE FINGER	FLATS 8" O.C.	A,B,D	--
	FRAGARIA CHILOENSIS / ORNAMENTAL STRAWBERRY	FLATS 8" O.C.	A,B,D	--
	ANNUALS TO BE DETERMINED	4" POTS 8" O.C.	A,B,D	--
	MARATHON FESCUE 2	SOD	A,B,D	--

NOTES:

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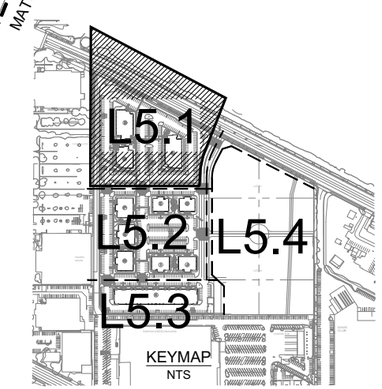
- PROVIDE LINEAR ROOT BARRIERS AT ALL TREES WITHIN 10' (TEN FEET) OF PAVED AREAS. ROOT BARRIERS SHALL BE LOCATED AT THE EDGE OF WALKWAYS OR BACK OF CURBS. ROOT BARRIERS SHALL NOT CIRCLE ROOTBALL OF THE TREES.

SOIL SAMPLE LOCATION, SEE NOTE 'H' UNDER PLANTING NOTES' ON SHEET L6.1

FOR LANDSCAPE PLANTING DETAILS
SEE SHEET L6.1.
FOR LANDSCAPE SPECIFICATIONS
SEE SHEETS L7.1 - L7.4



scale: 1" = 20'-0"
0 20 40 60 80
NORTH

REGISTERED LANDSCAPE ARCHITECT
(Signature)
(Date)
STATE OF CALIFORNIA

job no.	A6049.400
drawn	NM, SWK
date	submittal
08-03-07	design development
10-08-07	plan check submittal

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LANDSCAPE PLANTING PLAN

sheet title

sheet L5.1

LANDSCAPE REVIEW

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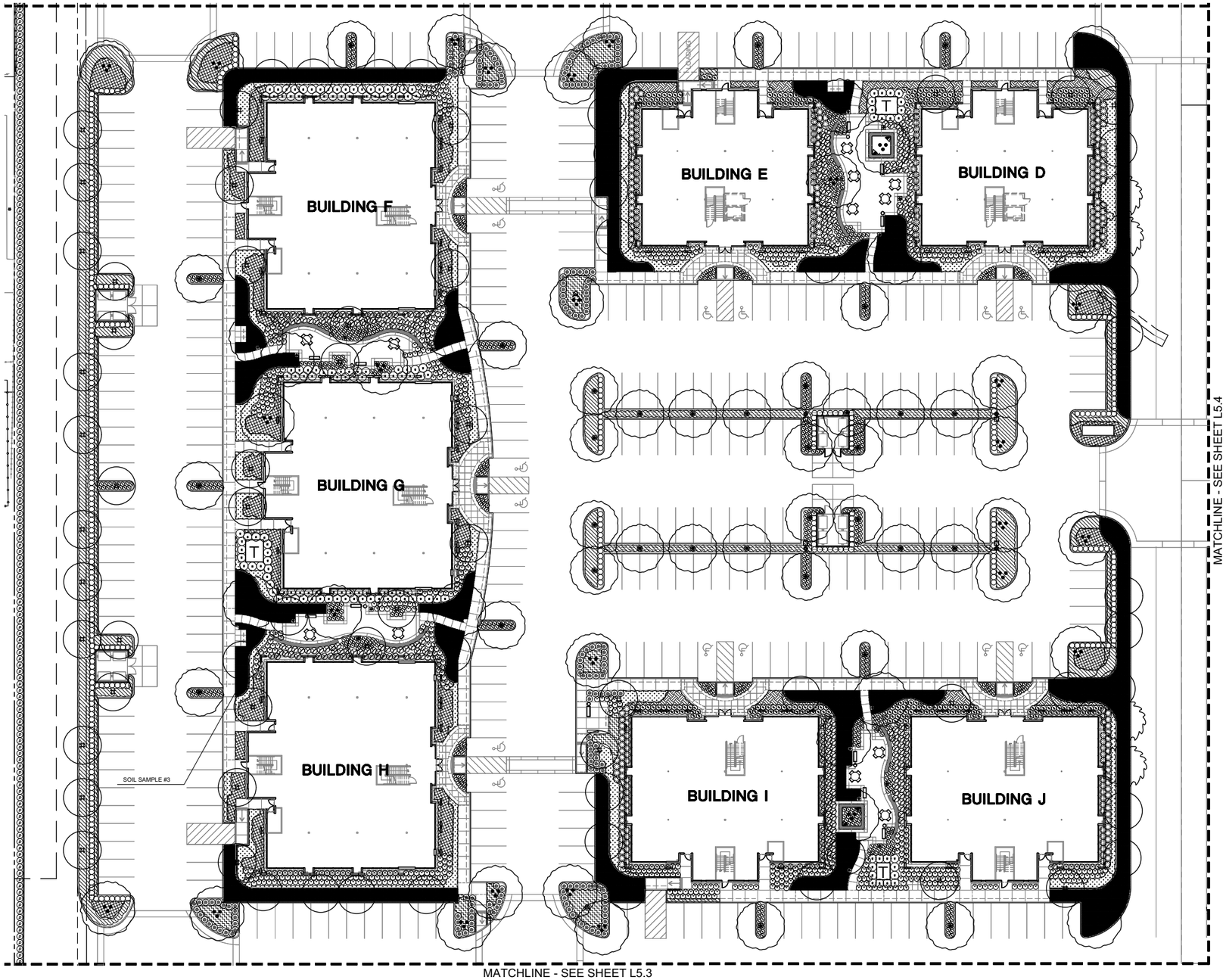
MATCHLINE - SEE SHEET L5.1



MATCHLINE - SEE SHEET L5.3

PLANT LEGEND

TREES

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE	DETAIL SHEET L6.1	QUANTITY
	PHOENIX D. 'MEDJOOL' / DATE PALM	24' BTH	C	9
	SCHINUS MOLLE / CALIFORNIA PEPPER	24" BOX 48" BOX	C	77
	LOPHOSTEMON CONFERTUS / BRISBANE FOX	24" BOX	C	202
	PINUS CANARIENSIS / CANARY ISLAND PINE	24" BOX	C	46
	TIPUANA TIPU / TIPU TREE	24" BOX	C	76

EXISTING TREES

+ (E)	EXISTING STREET TREES TO REMAIN	

SHRUBS

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE / SPACING	DETAIL SHEET L6.1	QUANTITY
	DIETES BICOLOR / FORTNIGHT LILY	1 GAL. / 24" O.C.	A,B,D	248
	HELICTOTRICHON SEMPERVIRENS / BLUE OAT GRASS	1 GAL / 24" O.C.	A,B,D	1748
	HEMEROCALLIS HYBRID / DAYLILY (COLOR YELLOW)	1 GAL / 24" O.C.	A,B,D	1834
	PENNISETUM S. 'RUBRUM' / RED FOUNTAIN GRASS	1 GAL / 36" O.C.	A,B,D	557
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	PRUNUS CAROLINIANA / CAROLINA LAUREL CHERRY	5 GAL / 36" O.C.	A,B,D	405

GROUND COVERS

SYMBOL	BOTANICAL / COMMON NAME	MIN. SIZE	DETAIL SHEET L6.1	QUANTITY
	ROSMARINUS O. 'PROSTRATUS' / PROSTRATE ROSEMARY	FLATS / 12" O.C.	A,B,D	--
	SENECIO MANDRALISCAE / BLUE FINGER	FLATS 8" O.C.	A,B,D	--
	FRAGARIA CHILOENSIS / ORNAMENTAL STRAWBERRY	FLATS 8" O.C.	A,B,D	--
	ANNUALS TO BE DETERMINED	4" POTS 8" O.C.	A,B,D	--
	MARATHON FESCUE 2	SOD	A,B,D	--

NOTES:

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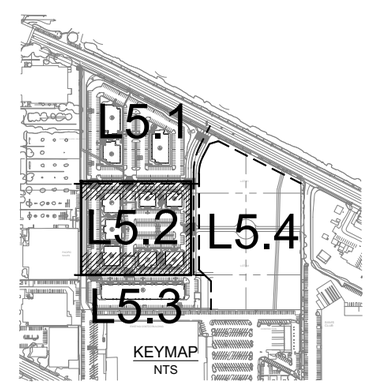

KEYMAP
NTS

scale: 1" = 20'-0"
0 20 40 60 80

NORTH

job no.	A6049.400
drawn	NM, SWK
date	submittal
08-03-07	design development
10-08-07	plan check submittal

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LANDSCAPE PLANTING PLAN

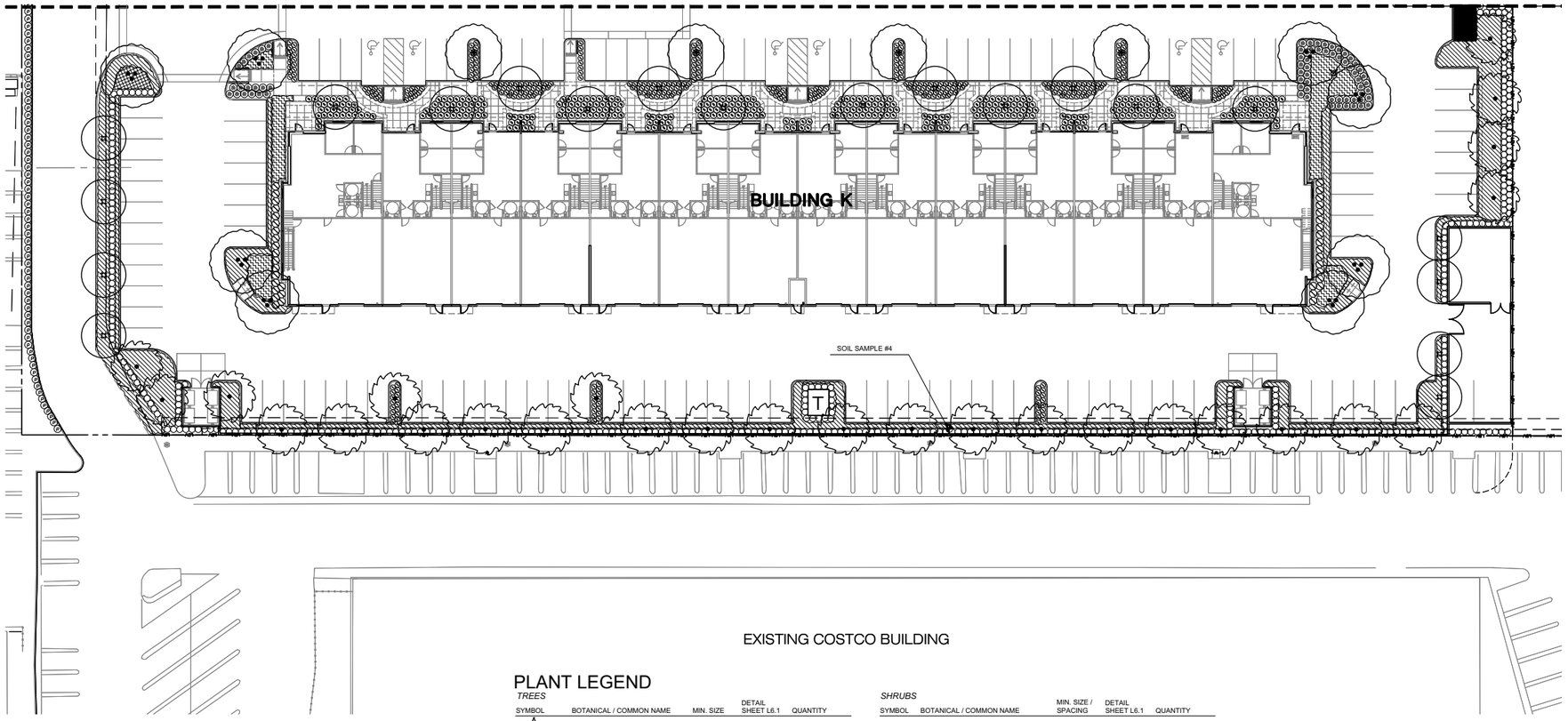
sheet title

sheet L5.2

LANDSCAPE REVIEW

REGISTERED LANDSCAPE ARCHITECT
Mark J. Ridge
(Signature)
12/13/06
(Date)
STATE OF CALIFORNIA

MATCHLINE - SEE SHEET L5.3



PLANT LEGEND

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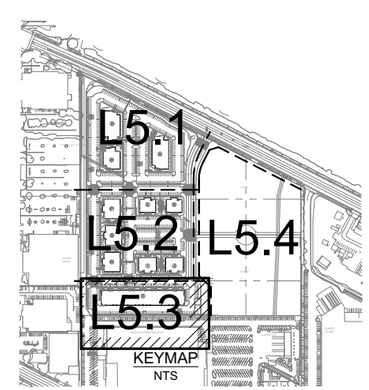

scale: 1" = 20'-0"

0 20 40 60 80

NORTH

REGISTERED LANDSCAPE ARCHITECT
Thomas J. Ridge
(Signature)
12/11/08
(Date)
STATE OF CALIFORNIA

job no.	A6049.400
drawn	NM, SWK
date	submittal
08-03-07	design development
10-08-07	plan check submittal

date	revision

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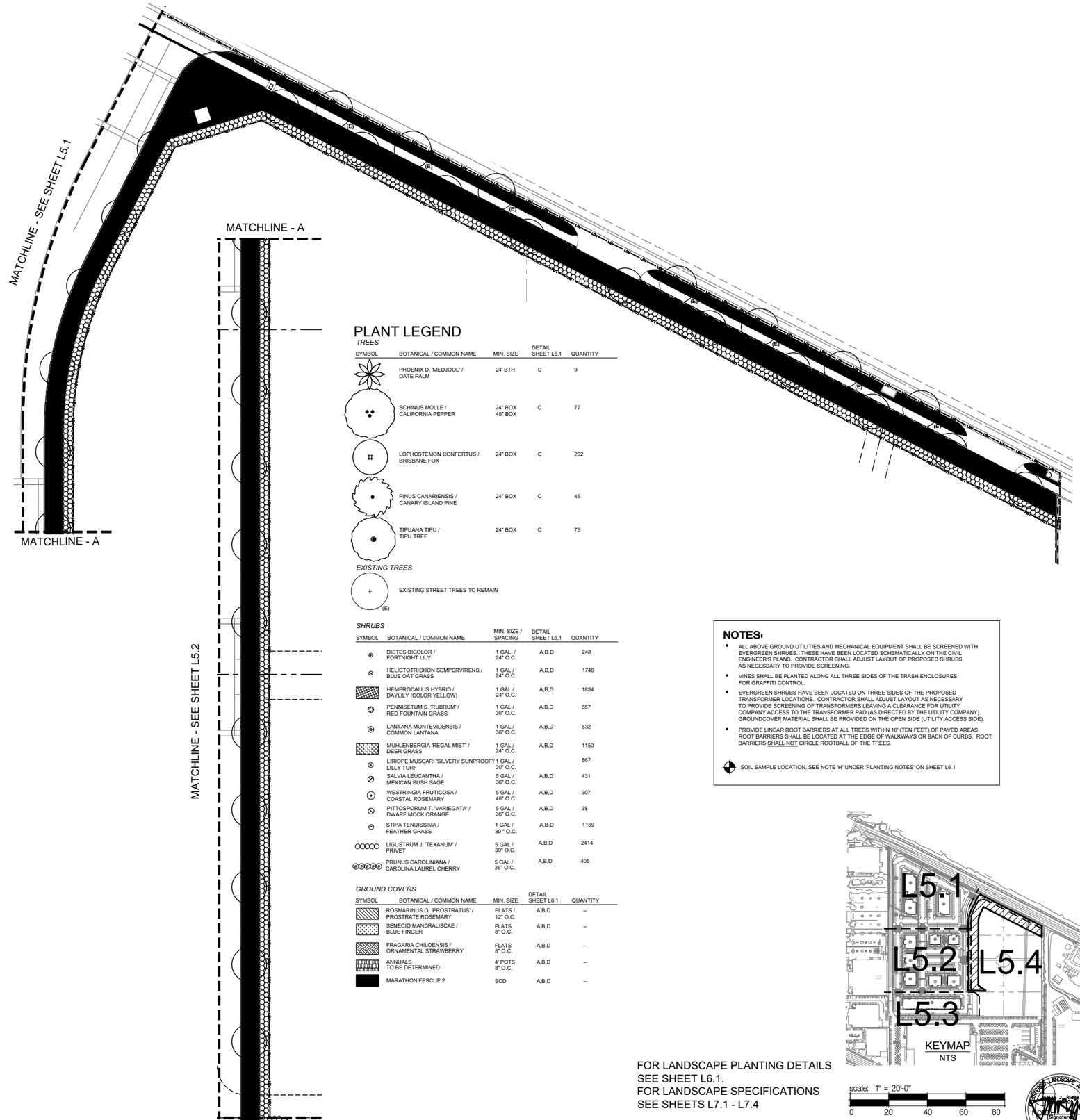
LANDSCAPE PLANTING PLAN

sheet title

sheet L5.3

LANDSCAPE REVIEW



PLANT LEGEND

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scale: 1" = 20'-0"

0 20 40 60 80

REGISTERED LANDSCAPE ARCHITECT
Ridge
(Signature)
12.13.08
(Date)
STATE OF CALIFORNIA

job no.	A6049.400
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LANDSCAPE PLANTING PLAN

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sheet L5.4

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WATER MANAGEMENT CHART AB-325				
CATEGORY Meter #1 Controller "A" & "B"	UNITS	TURF SPRAY	SHRUB SPRAY	SHRUB DRIP
Yealy Eto	Inches per Year	44.10	44.10	44.10
Area of Hydrozone / Landscaped Area	Square Feet	29,613	49,313	46,785
Yealy Average Plant Factor (PF)		0.90	0.40	0.40
Proposed Irrigation Efficiency (IE)	Percentage	0.65	0.65	0.90
Estimated Water Usage (EWU)	Gallons / Year	1,121,094	829,733	568,531.32
Total Water Usage for All Landscaping	Gallons / Year	2,519,358		
Maximum Water Allowance	Gallons / Year	2,749,752		

FORMULAS

MAWA = AREA x Eto x .80 x .62

MAWA = AREA x Eto x PF x .62 / IE

WATER MANAGEMENT CHART AB-325			
CATEGORY Meter #2 Controller "C"	UNITS	TURF SPRAY	SHRUB SPRAY
Yealy Eto	Inches per Year	44.10	44.10
Area of Hydrozone / Landscaped Area	Square Feet	23,409	69,461
Yealy Average Plant Factor (PF)		0.90	0.40
Proposed Irrigation Efficiency (IE)	Percentage	0.65	0.65
Estimated Water Usage (EWU)	Gallons / Year	886,222	1,168,740
Total Water Usage for All Landscaping	Gallons / Year	2,054,962	
Maximum Water Allowance	Gallons / Year	2,031,401	