

**CITY OF MANHATTAN BEACH**  
**Water and Wastewater**  
**Capital Improvement Programs**

**July 28, 2009**



- **Manhattan Beach provides potable and recycled water to 13,500 customers**
- **Service area population is 33,800**
- **Average annual demand is 7,000 acre feet (6.3 million gallons per day or 4,350 gallons per minute)**



- **Manhattan Beach's water demand is met by potable imported water, groundwater, and recycled water**
- **Potable imported water is supplied by MWD of Southern California through the West Basin Municipal Water District**
- **The City purchased 5,278 acre feet of potable water in 2008**
- **The City has adjudicated rights to 1,131.2 acre feet of water in the West Coast Groundwater Basin**



- The City has two wells in Redondo Beach
- In 2008, the City pumped 953 acre feet of groundwater
- Because of high manganese levels, groundwater has to be blended with potable imported water prior to delivery into the system (2 parts groundwater to 1 part potable imported water)
- Existing recycled water demand of 260 acre feet per year is 4 percent of the total demand
- Recycled water is served through 27 meters

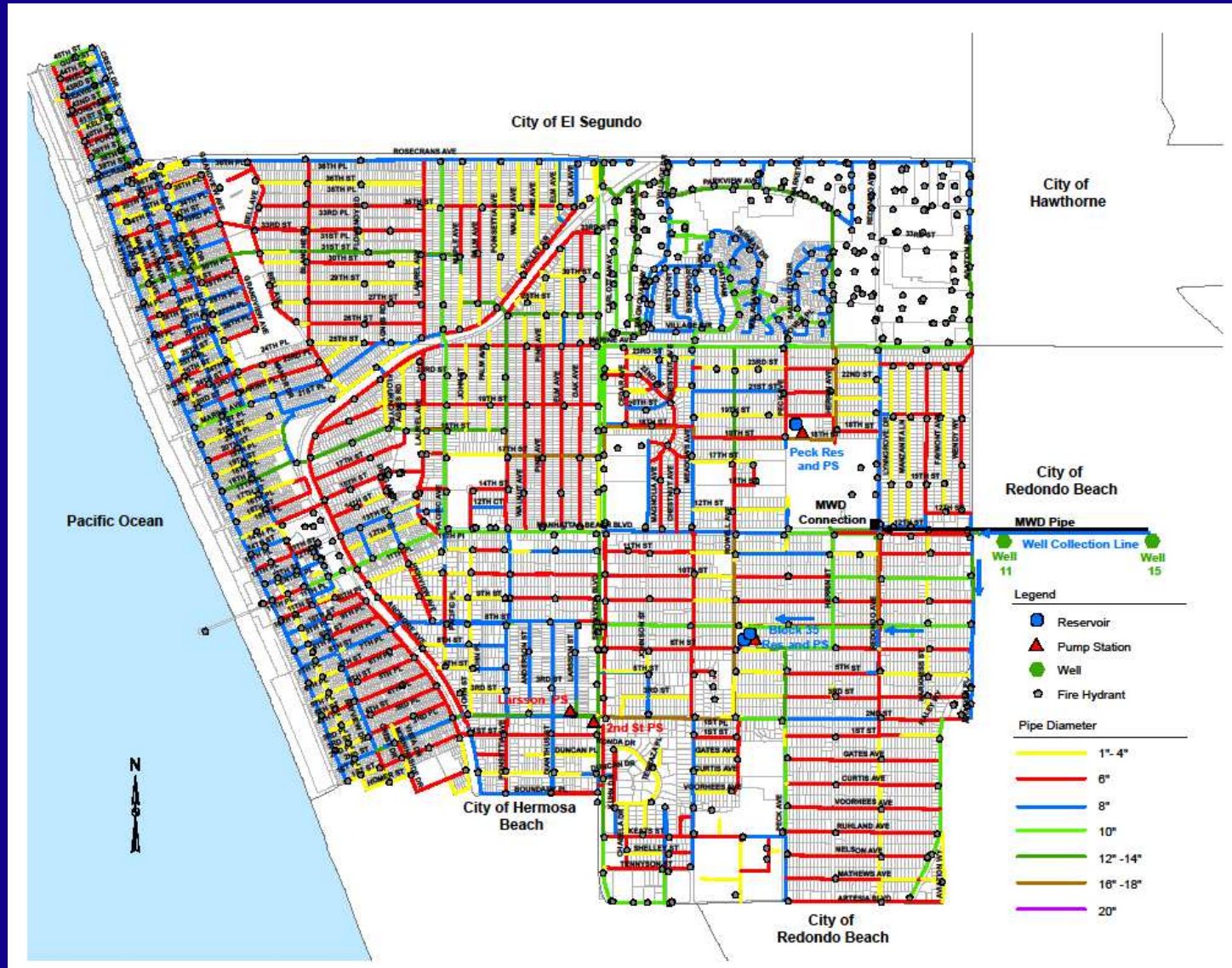


- **The existing water system consist of:**
  - ✓ **Three storage reservoirs with a total constructed volume of 9.8 million gallons**
  - ✓ **Four booster pump stations**
  - ✓ **Two wells**
  - ✓ **114 miles (602,000 feet) of pipe ranging in size from 1-inch to 20-inches in diameter**
  - ✓ **The estimated replacement value of the system is \$250,000,000**



# Water

# Existing System



- **Master Plan Tasks**

- ✓ Develop new Water Geographic Information System
- ✓ Geo-referenced 1,100 intersection drawings
- ✓ Geo-referenced 1,561 as-built drawings
- ✓ Build hydraulic model of the system (geometry based on Water GIS)
- ✓ Create diurnal water use curves for two zones based on SCADA information
- ✓ Develop hydraulic model loads from existing water use records and diurnal curves
- ✓ Install 15 pressure data loggers and collect SCADA information for calibrating the hydraulic model



- **Master Plan Tasks**

- ✓ Flow test 25 fire hydrants
- ✓ Calibrate hydraulic model
- ✓ Field inspect all water facilities – Wells, Reservoirs, Booster Pump Stations
- ✓ Develop system evaluation criteria
- ✓ Evaluate system based on criteria; hydraulic analysis results with average day, maximum day, and maximum day plus fire flows; and operational efficiency
- ✓ Formulate a Capital Improvement Program
- ✓ Prepare Master Plan report





- **Source of Supply**

- ✓ Maximum day demand system wide
- ✓ Average day demand from local sources-Groundwater

- **Storage**

- ✓ Average day demand in above ground storage

- **Pumping**

- ✓ Maximum day demand plus fire flow, or peak hour demand with the largest pump out of service



- **Pressure**

- ✓ Minimum 50 pounds per square inch (psi) during average day demand
- ✓ Minimum 40 psi during peak hour demand
- ✓ Minimum 20 psi at the hydrant during maximum day demand plus fire flow

- **Fire Flow**

- ✓ 2,000 gallons per minute (gpm) for single family residential
- ✓ 3,000 gpm for multiple family residential
- ✓ 3,500 gpm for schools
- ✓ 4,000 gpm for Commercial/Industrial



- **Reservoirs**

Peck Reservoir, completed in 1957, has a constructed volume of 7.5 million gallons.

Its roof is in fair condition and is projected to reach the end of its useful life around 2020.



- **Reservoirs**

**Block 35 Ground Level Reservoir was constructed in 1948.**

**Although its constructed volume is 2.0 million gallons, it is kept only half full due to leakage at higher levels.**



- **Reservoirs**

**Block 35 Elevated Reservoir has a constructed volume of 300,000 gallons.**

**It was constructed in 1948 and was seismically rehabilitated in 2000.**

**It is in good condition and is expected to last beyond the planning horizon of this master plan.**



- **Booster Pump Stations**

Block 35 Pump Station was upgraded in 2000 and is in good condition.



- **Booster Pump Stations**

Peck Pump Station was also upgraded in 2000 and is in good condition.



- **Booster Pump Stations**

Larsson Pump Station  
mechanical and  
electrical equipment  
was replaced in 2000,  
but the structure is in  
poor condition.





- **Booster Pump Stations**

Second Street Pump Station was constructed in 1977 and is in fair condition. The engine is old, and spare parts are hard to find

The pump starts before the third pump at Larsson Pump Station starts, causing frequent vibration in the area.

Pump controls need to be upgraded to eliminate frequent pump starts. Engine should be replaced and vibration isolators should be installed.



- **Wells**

Well 11A was drilled in 1998 and equipped in 2000.

It is in good condition.

It has a capacity of 2,300 gallons per minute.



# Water

# Evaluation

- **Wells**

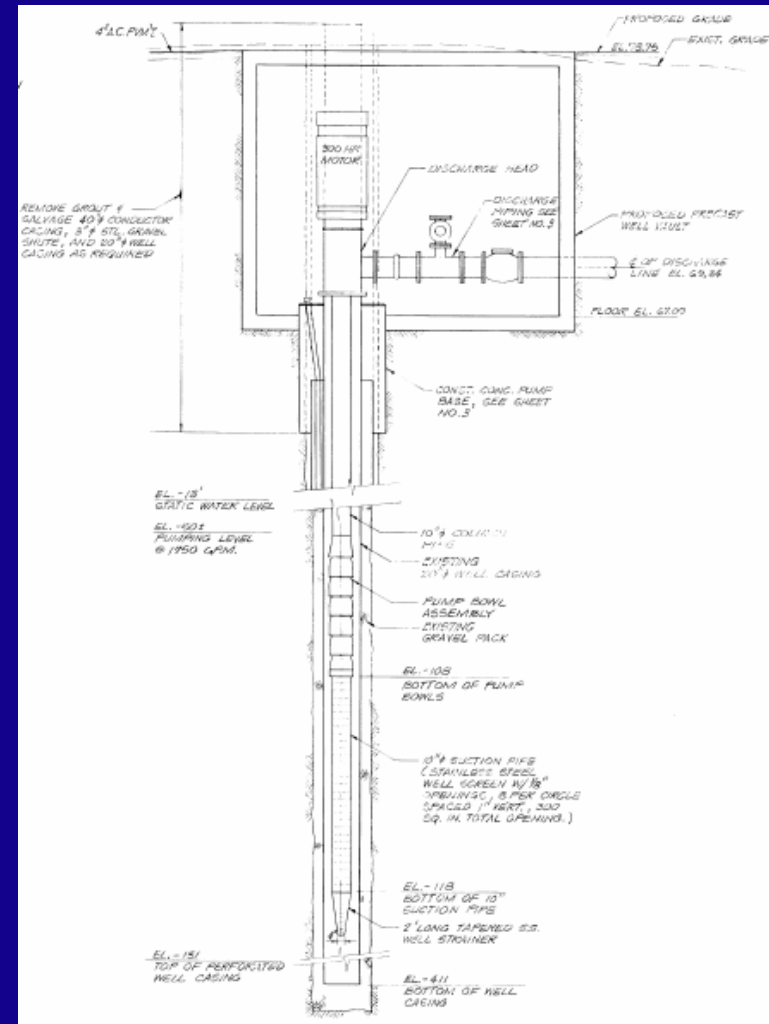
Well 15 was constructed in 1978.

The electrical equipment was upgraded in 2000.

The original capacity of 1,600 gpm has declined to about 500 gpm.

Its mechanical equipment needs to be replaced.

Its discharge pipe, constructed in 1979, is too small for Well 15 to operate simultaneously with Well 11A.

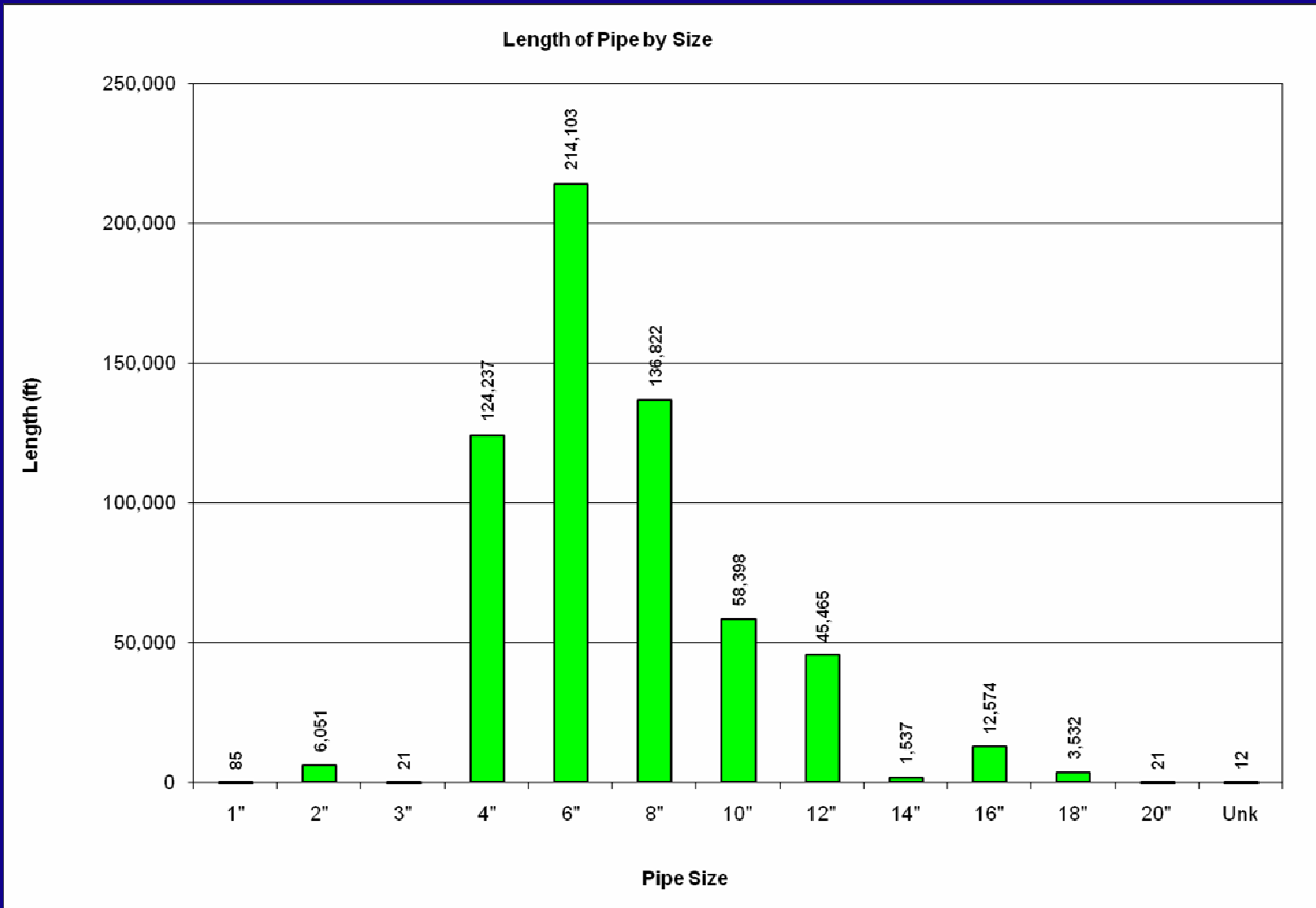


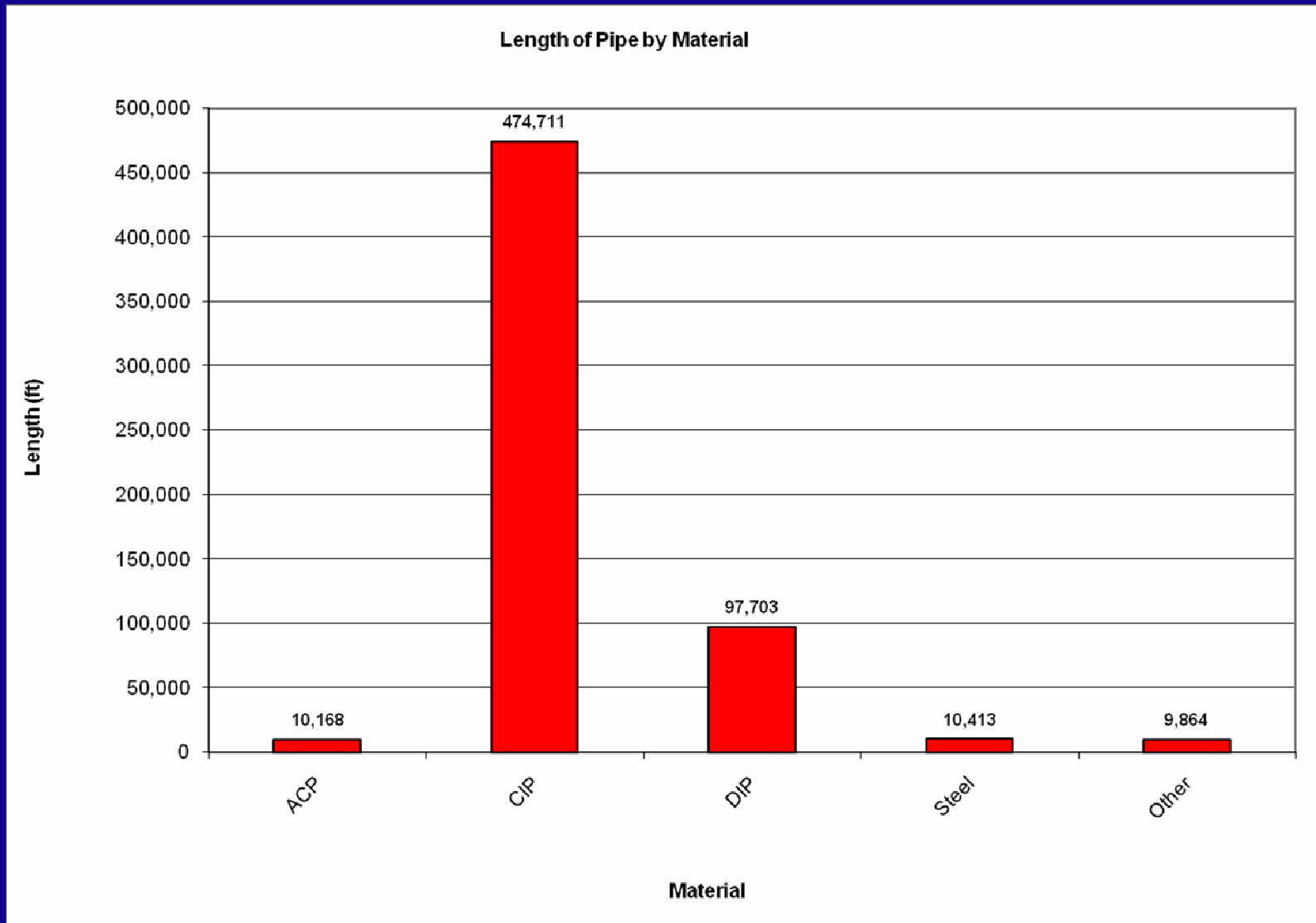
- **Transmission and Distribution System**
  - ✓ **Constructed between 1920s and the present**
  - ✓ **The system includes nearly 220,000 feet of pipe older than 60 years**
  - ✓ **Over 79% of the system is made up of unlined cast iron pipe**
  - ✓ **22% of the pipes are 4-inch and smaller**



- **Transmission and Distribution System**
  - ✓ Fire hydrant spacing does not meet current criteria
  - ✓ Fire flow tests conducted showed deficiencies in over 40 percent of the hydrants
  - ✓ Fire hydrant tests conducted in 2009 showed a 10 % or more decrease in flows at most of the hydrants since 2003
  - ✓ Up to 10 pipe breaks per year occurred since 2006

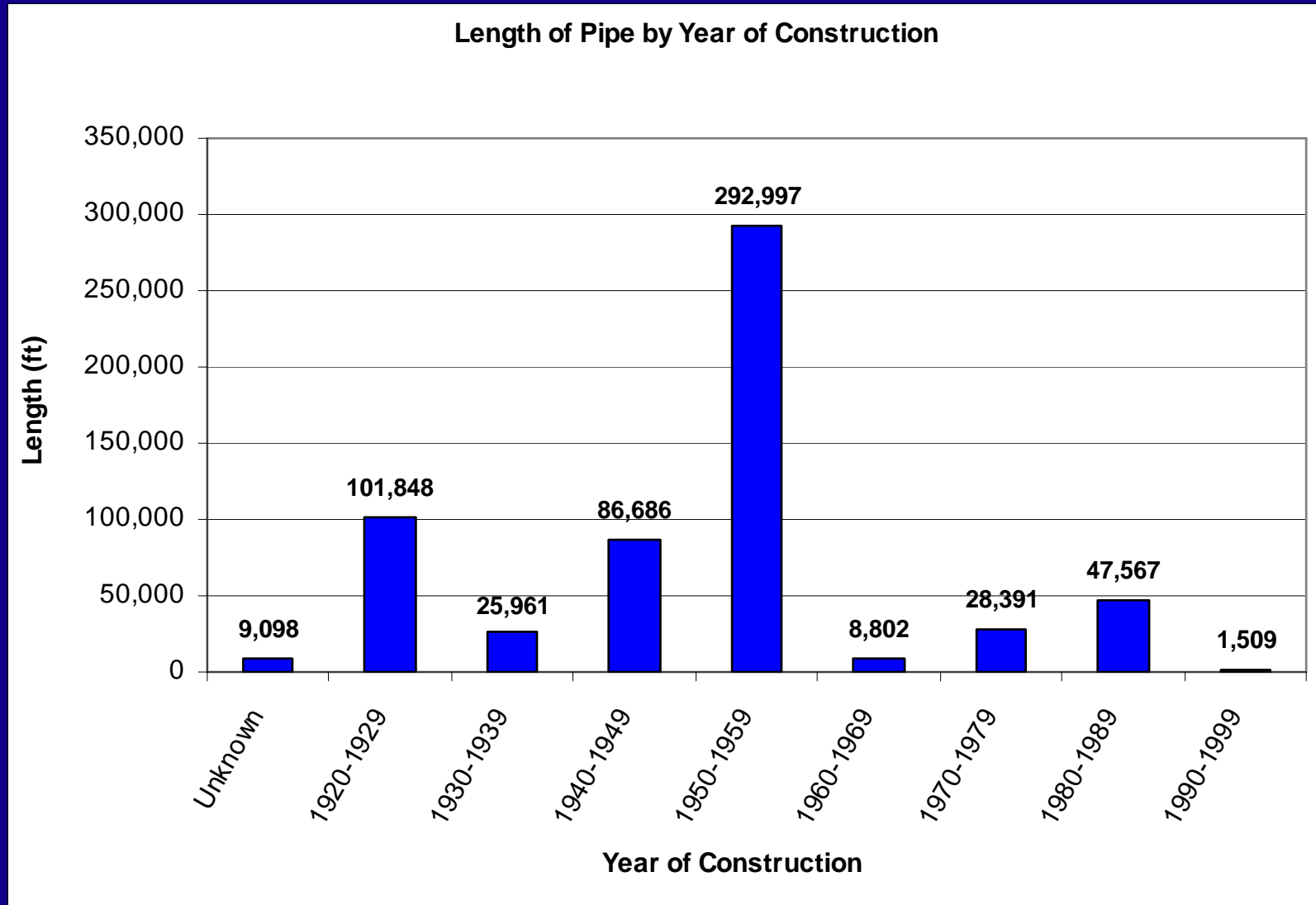






# Water

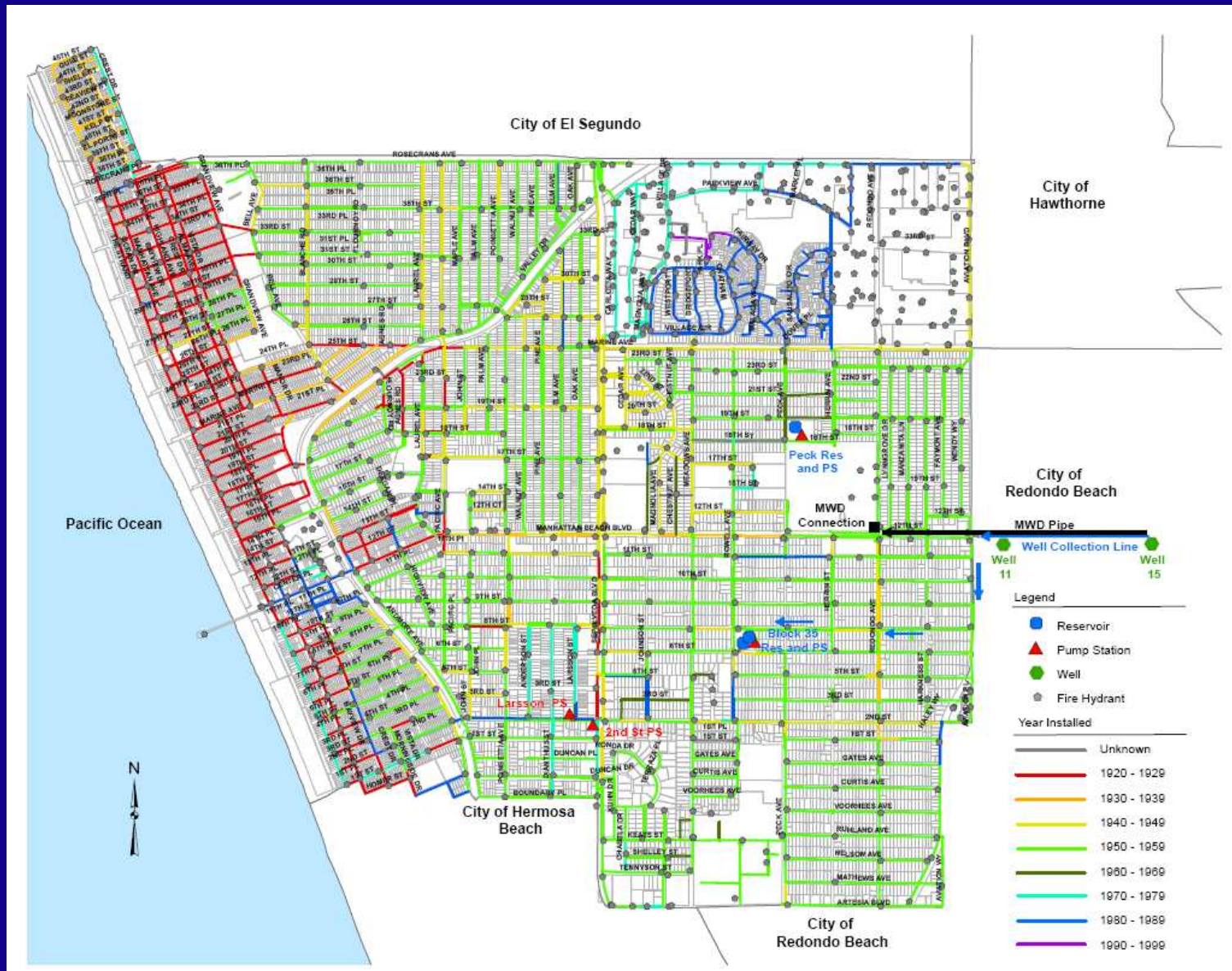
# Year of Construction





# Water

# Year Installed



# Water

# Fire Hydrant Flow Tests



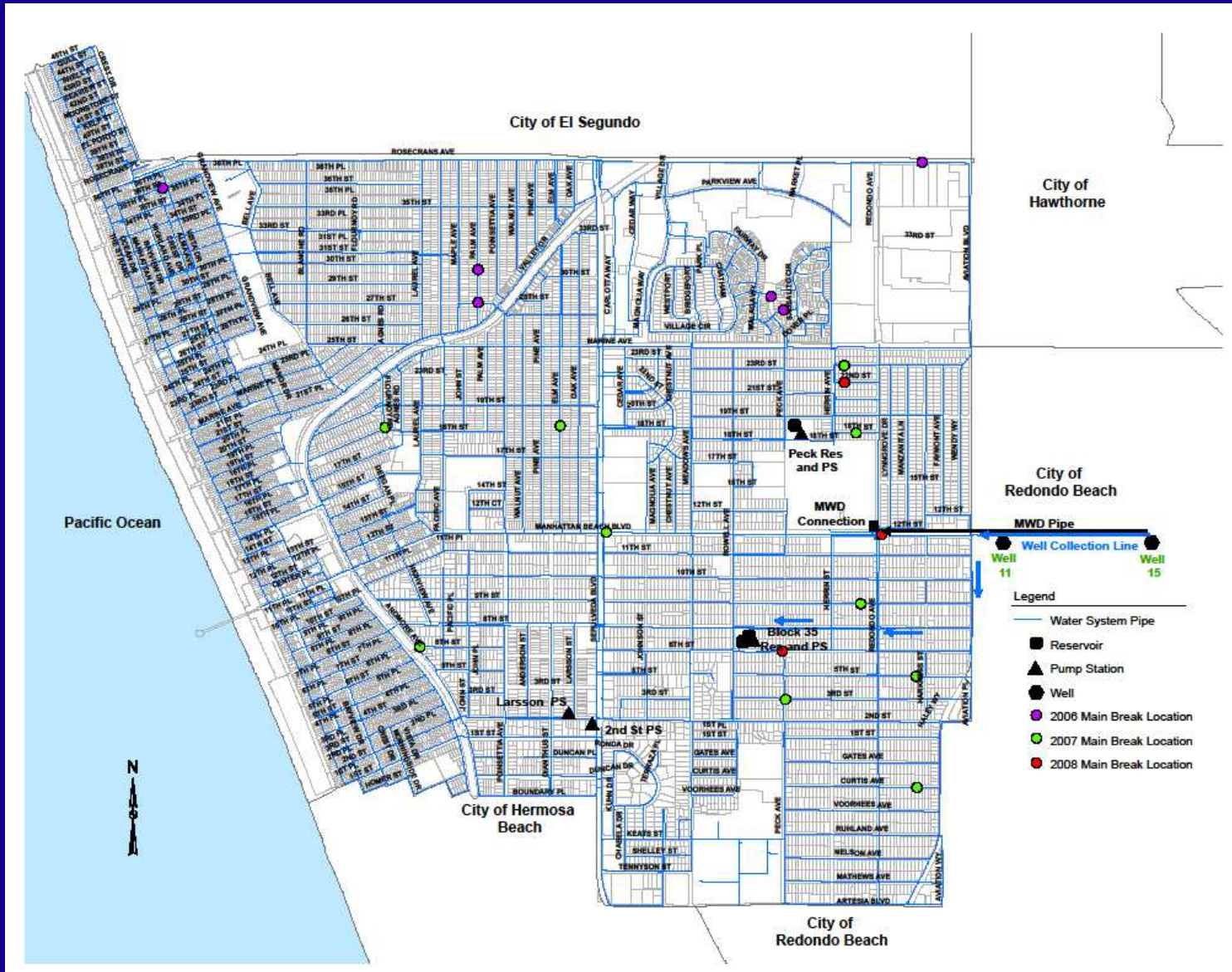
Fire Flow Test Results							
Fire Hydrant Number	Location	Pipe Size	2003 Test Results			2009 Test Results	
			High Pressure (psi)	Low Pressure (psi)	GPM	Pitot Reading (psi)	GPM
6	Herrin Street and 3rd Street	6"	61	38	1,030	22	790
37	Harkness Street and 6th Street	4"	87	57	1,220	28	890
15	Mathews Avenue and Herrin Street	6"	58	42	1,040	24	820
75	Altura Way and Keats St	4" & 6"	71	42	1,060	30	920
80	Ronda Drive and Kuhn Drive	4" & 6"	55	28	950	20	750
86	Meadows Avenue and 10th Street	4" & 6"	62	47	1,030	26	860
158	15th Street, west of Deegan Place	6"	75	55	1,250	36	1,010
201	Palm Avenue and 35th Street	4" & 6"	74	21	700	34	980
219	Bell Avenue and 35th Street	6"	98	75	1,350	34	980
231	Flournoy Road and 29th Street	4"	74	55	1,130	28	890
258	Vista Drive and 24th Street	4" & 6"	64	18	725	33	960
284	Alma Avenue and 33rd Street	8"	56	52	1,160	36	1,010
366	John Stret and 9th Street	4"	58	40	1,040	28	890
375	Ingleside Drive and 1st Street	4" & 6"	92	20	750	18	730
441	Wendy Way and 19th Street	6"	92	73	1,300	36	1,010
467	Peck Avenue and 21st Street	6" & 8"	85	51	1,130	30	920
491	Magnolia Avenue and 22nd Street	8"	52	37	980	26	860
546	Brideport, south of Village Circle	8"	85	75	1,350	40	1,060
N/A	Northeast corner of Parkview Ave and Market Place	10"				54	1,230

Note: "-" indicates pressure change across adjacent hydrant was too great



# Water

# Recent Main Breaks



- **Water Mains**

- ✓ Replace cast iron pipes older than 60 years and 4-inch and smaller pipe by 2030

1.5 miles per year to 2019-2020 (\$3.45 M/yr)

2.5 miles per year to 2029-2030 (\$5.75 M/yr)

- ✓ Add 440 fire hydrants

18 hydrants per year through 2019-2020 (\$121,500/yr)

30 hydrants per year thereafter (\$201,500/yr)



- **Booster Pump Stations**

- ✓ **Second Street Pump Station**

Upgrade control system (\$0.27 M)

Replace engine install vibration isolators (\$0.4 M)

- ✓ **Larsson Pump Station**

Replace with a new facility (\$2.025 M)



- **Local Supply**

- ✓ Construct a new well of 1,800 gpm capacity at 6<sup>th</sup> Street and Aviation Boulevard (\$4.32 M)
- ✓ Construct well collection lines

Well 15 to Well 11A (\$1.36 M)

Well 11A to Block 35 Reservoir (\$3.38 M)

New well to 8th Street (\$0.324 M)

- **Reservoirs**

- ✓ Replace Block 35 Reservoir with a 4 million gallon facility (\$8.1 M)
- ✓ Replace Peck Reservoir with a 4 million Gallon reservoir (\$8.1 M)



# Water

# Capital Improvement Program

City of Manhattan Beach  
Water Capital Improvement Program  
2010-2020

CIP No.	Project Description	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
1	Pipe replacement program (annual-small diameter cast iron pipe, 1.5 mile/yr through 2021, 2.5 miles/yr thereafter)	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000	\$3,450,000
2	New Fire Hydrants (18 per year through 2021, 30 per year thereafter)	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500	\$121,500
3	Second Street Booster Pump Station-Install Solid State Controller	\$270,000										
4	Second Street Booster Pump Station-Install engine vibration isolators	\$400,000										
5	Replace or parallel well collection line from Well 15 to Well 11A	\$1,360,800										
6	Replace Larsson Pump Station		\$2,025,000									
7	Construct Well at Aviation and 6th Street (Well Site 13)			\$4,320,000								
8	Construct well collection line from Well 11A to Block 35				\$3,037,500							
9	Construct well collection line on Aviation from Well Site 13 to 8th St				\$324,000							
10	Replace Block 35 Reservoir (4 mg)								\$8,100,000			
11	Replace Peck Reservoir (4 mg)											\$8,100,000
	<b>Total</b>	<b>\$5,602,300</b>	<b>\$5,596,500</b>	<b>\$7,891,500</b>	<b>\$6,933,000</b>	<b>\$3,571,500</b>	<b>\$3,571,500</b>	<b>\$3,571,500</b>	<b>\$11,671,500</b>	<b>\$3,571,500</b>	<b>\$3,571,500</b>	<b>\$11,671,500</b>

