SECTION 6

EXISTING PUMP STATIONS

6-1 GENERAL DESCRIPTION

The City of Manhattan Beach owns and operates eight (8) pump stations to lift wastewater from the lower lying areas to the local or the regional gravity systems. Table 6-1 provides general information on each pump station and Figure 6-1 shows the locations of the pump stations and their associated tributary areas and force mains. Description and planning level evaluation of each pump station are included in this section.

6-2 BELL AVENUE PUMP STATION

Location and Tributary Area

Bell Avenue Pump Station is a wet well-dry well type facility located on the east side of Bell Avenue between 31st Street and 31st Place. Access to the pump station, shown on Photograph 6-1, is through an access hatch above the dry well. The pump station was originally constructed in 1938. It was improved to its current condition in 1997.

Bell Avenue Pump Station serves a 78 acre tributary area consisting mostly of low density residential land use, with a small number of high density residential and public recreation areas. The tributary area, shown on Figure 6-2, is generally located between 27th Street and Rosecrans Avenue, east of Grandview Avenue and west of Agnes Road. The tributary land use categories are shown in Table 6-2.

Photograph 6-1 Bell Avenue Pump Station Access

Table 6-1
Pump Stations

General Pump Station Information											Pump Specifications					Motor Specifications			Estimated Flows		
Pump Station	Location	Date of Cons.	Plan No.	Area Served (Acres)	Force Main Dia (in)	Force Main Length (ft)	Force Main Material	Type	Wet Well Dimensions	Generator Set	Number of Pumps	Pump Mfg	Pump Type	Pump Model	Estimated Flow Capacity (gpm)	RPM	Phase	HP	ADWF (gpm)	PDWF (gpm)	PWWF (gpm)
Bell Avenue	Bell Ave between 31st St and 31st Pl	1938	S-60 S-150 S-230	78	6	900	CIP	Wetwell/ Drywell	12' x 9.5' x ~7'	Diesel Fueled	2	Flygt	submersible, non-clog	CT3102	263	1750	3	5	70	198	278
Palm Avenue	Palm Ave south of Rosecrans Ave	1953	S-149 S-230	39	6	775	CIP	Wetwell/ Drywell	10' x 4' x ~11.5'	Diesel Fueled	2	Flygt	submersible, non-clog	CT3127	174	1740	3	10	38	114	159
Pacific Avenue	Pacific Ave south of 31st St	1953	S-149	103	6	1,225	CIP	Wetwell/ Drywell	10' x 4' x ~11.5'	Diesel Fueled	2	Flygt	submersible, non-clog	CT3127	304	1740	3	10	98	269	376
Poinsettia Avenue	Poinsettia Ave south of Manhattan Beach Blvd	1949	S-227 S-145	25	4	163	CIP	Wetwell/ Drywell	18.6 ft^2 x 6'-10"	Diesel Fueled	2	Flygt	submersible, non-clog	CT3102	136	NA	3	NA	19	60	85
Meadows Avenue	Meadows Ave south of 9th St	1953	S-148 S-230	99	6	730	CIP	Wetwell/ Drywell	10' x 4' x ~11.5'	Diesel Fueled	2	Flygt	submersible, non-clog	CT3127	304	1740	3	10	77	216	303
Voorhees Avenue	Voorhees Ave at Rowell Ave	1953	S-148 S-230	103	6	1,321	CIP	Wetwell/ Drywell	10' x 4' x ~11.5'	Diesel Fueled	2	Flygt	submersible, non-clog	CT3127	227	1740	3	10	90	250	350
Civic Center	Highland Ave south of 15th St	1992	-	Civic Center Bulding	-	-	-	Submersible	-	-	2	-	-	-	-	-	-	-	-	-	-
Pier	End of Manhattan Beach Pier	1992	-	Pier Restaurant	4	-	CIP	Submersible	4' x 4' x 4'	-	2	-	submersible	-	-	-	-	3	-	-	-

City of El Segundo

City of Hawthorne

City of Redondo Beach

City of Hermosa Beach

Pacific Ocean

Bell Ave PS

Palm Ave PS

Pacific Ave PS

LACSD PS

Civic Center PS

Poinsettia Ave PS

Pier PS

Meadows Ave PS

Voorhees Ave PS

N

0 600 1,200 2,400 Feet

1" = 1,200'

Legend

- Sewer Manholes
- Manhattan Beach Sewage Pump Station
- LACSD Sewage Pump Station
- Manhattan Beach Forcemain
- Manhattan Beach Sewer
- LACSD Trunk Sewer
- City Boundary
- Bell Pump Station Tributary Area
- Meadows Pump Station Tributary Area
- Pacific Pump Station Tributary Area
- Palm Pump Station Tributary Area
- Poinsettia Pump Station Tributary Area
- Voorhees Pump Station Tributary Area

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

Pump Station Tributary Areas

PROJECT NO: 1640901.10

DATE: September 2009

Figure 6-1

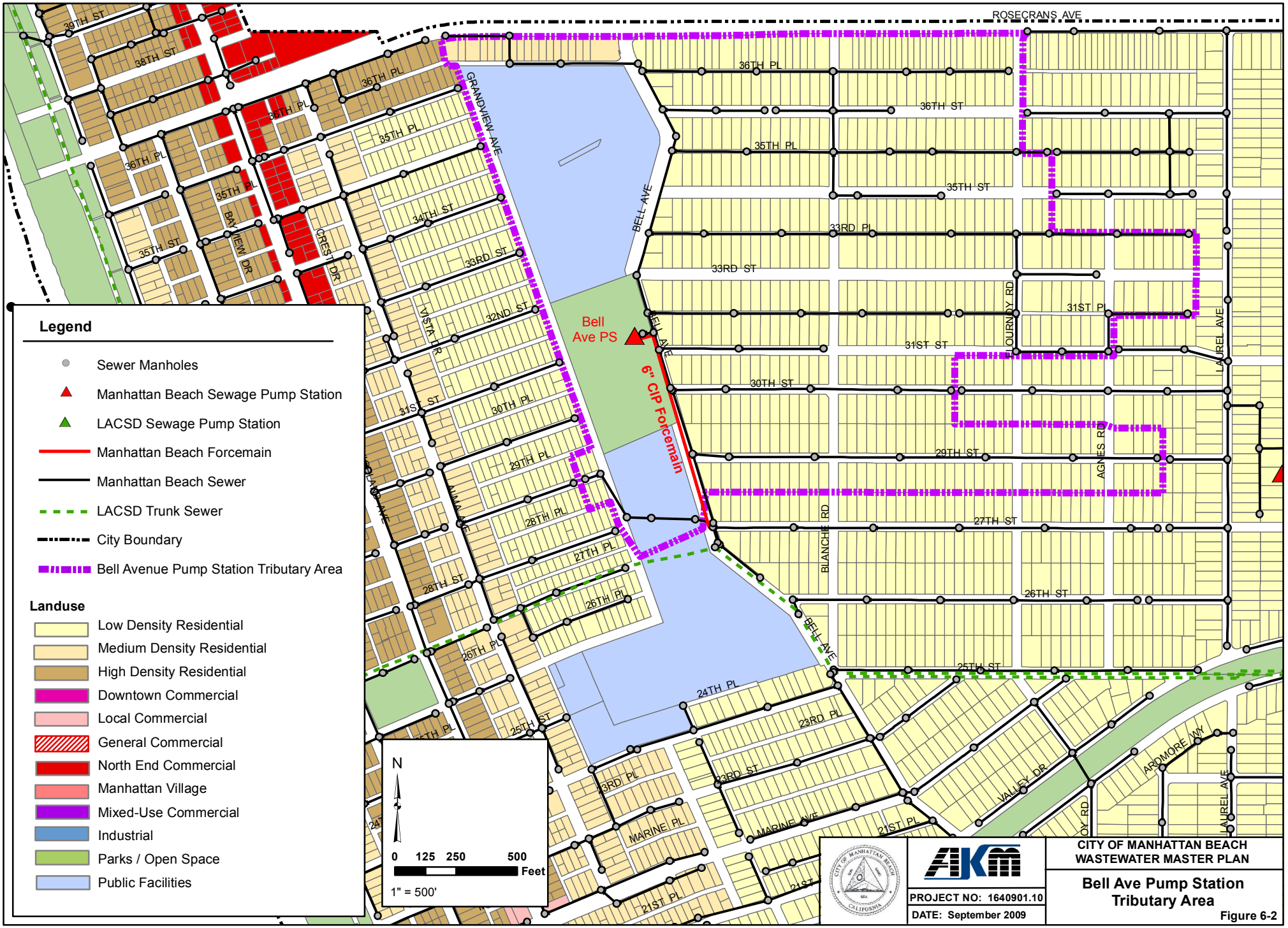

ROSECRANS AVE
39TH ST
38TH ST
36TH PL
35TH PL
34TH ST
33RD ST
32ND ST
31ST ST
30TH PL
29TH PL
28TH ST
27TH PL
26TH PL
25TH ST
24TH PL
23RD PL
21ST PL
MARINE PL
MARINE AVE
GRANDVIEW AVE
BELL AVE
BAYVIEW DR
CREST DR
VISTA DR
ALMA AVE
BLANCHE RD
LOURNOY RD
AGNES RD
LAUREL AVE
VALLEY DR
ARDMORE WY
Bell Ave PS
6" CIP Forcemain
Legend
Sewer Manholes
Manhattan Beach Sewage Pump Station
LACSD Sewage Pump Station
Manhattan Beach Forcemain
Manhattan Beach Sewer
LACSD Trunk Sewer
City Boundary
Bell Avenue Pump Station Tributary Area
Landuse
Low Density Residential
Medium Density Residential
High Density Residential
Downtown Commercial
Local Commercial
General Commercial
North End Commercial
Manhattan Village
Mixed-Use Commercial
Industrial
Parks / Open Space
Public Facilities
N
0 125 250 500
Feet
1" = 500'
CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN
Bell Ave Pump Station
Tributary Area
PROJECT NO: 1640901.10
DATE: September 2009
Figure 6-2

Table 6-2
Bell Avenue Pump Station Tributary Land Uses

Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	487	56.7
Medium Density Residential	16	1.3
High Density Residential	3	0.3
Parks / Open Space	1	5.2
Public Facilities	3	14.7
Total	**510**	**78.2**

Influent Sewer

The wastewater generated within the tributary area is conveyed to the pump station wet well by two gravity sewers. A 10-inch sewer on Bell Avenue brings flows from the south and an 8-inch sewer on Bell Avenue conveys flows from the north. They then confluence into one 10-inch sewer that enters the wet well from the east with an invert elevation of 53.80 feet.

Wet Well

The existing wet well (Photograph 6-2) is a 12'-0" long and 9'-6" feet wide rectangular unlined reinforced concrete structure, located directly south of the dry well. Access to the wet well is through a 17" x 24" square hatch at ground level.

The bottom elevation of the wet well is 51.44 feet amsl. A fillet starting at elevation 52.53 feet amsl along the southerly wall slopes to elevation 51.44 feet amsl towards the northerly wall over 9 feet. 6-inch pump suction pipes exit the wet well with an invert elevation of 51.91 feet amsl and extend about 20 inches north where they enter the dry well.

Photograph 6-2 Bell Avenue Pump Station Wet Well

Significant exposed aggregate indicates concrete corrosion due to hydrogen sulfide generated by the wastewater. A basket is located below the influent pipe at the wet well to intercept rags and other debris/non-dispersible material. City maintenance crews visit the pump station twice a week (Monday & Friday) to clean out the debris from the basket.

The wet well has 512 gallons of operational storage between the pump start and stop levels, which indicates maximum cycling of 7 to 8 times per hour. Since the pump start level is the same as the influent sewer invert elevation, Bell Avenue Pump Station has no emergency storage.

Dry Well

The dry well is a 9'-0" long and 9'-6" wide rectangular reinforced concrete structure located north of the wet well. Its top slab is at elevation 65.80 feet amsl. The bottom elevation of the dry well is at 51.03 feet amsl. The pumps are located 2'-6" and 5'-4" from the easterly wall. The floor slopes towards the southwest corner of the dry well where a sump pump is located. The sump pump conveys any leakage and wash water back to the wet well through a 1-¼" discharge pipe. Access to the dry well is through a 5'-0" x 2'-6" rectangular hatch at ground level and stairs.

Suction Piping

The suction pipes extend through the wet well wall, and connect to 6-inch isolation pinch valves in the dry well. Then they connect to a spool and a 6" x 4" reducer before terminating at the suction elbow of the pumps.

Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 6" x 4" flanged 90 degree reducing bend and a 6-inch swing check valve in the vertical run, followed by a 6-inch isolation pinch valve, a spool extending up with a flexible coupling, and a 6-inch 90 degree elbow that connects to the 6-inch discharge header. The discharge header (Photograph 6-3) exits the dry well through the easterly wall toward Bell Avenue.

Photograph 6-3 Bell Avenue Pump Station Discharge Header

Forcemain

The forcemain is a 6-inch cast iron pipe. It conveys the sewage from an average wet well elevation of 52.68 feet amsl to a discharge elevation of 68.00 feet amsl. The forcemain turns south on Bell Avenue and discharges to a City sewer manhole at the intersection of Bell Avenue and 27th Street. The downstream sewer is an 8-inch VCP extending further south on Bell Avenue. The total length of the forcemain is about 900 feet. It was constructed in 1938.

Based on the existing pump capacity of 263 gpm, the forcemain velocity is 3.0 fps, which is within the recommended velocity range of 3 to 5 fps.

Photograph 6-4 Bell Avenue Pump Station Pumps

Pumps

Bell Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3102) with non-clog impellers. One of the pumps is shown on Photograph 6-4. The pumps are driven by 5 HP motors.

The existing pump capacity based on SCADA information from April 6, 2009 is approximately 263 gpm. The pumps start 4 to 6 times per hour during morning peak hours (5:00 am – 9:00 am).

Electrical and Controls

The Bell Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well water level, which is determined by an ultrasonic level sensor. The pumps alternate and start when the level rises to about 2.4 feet above the wet well floor and stop when the level drops to about 1.8 feet above the wet well floor.

Photograph 6-5 Bell Avenue Pump Station Control Panel

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 70 gpm. The associated peak dry weather flow and peak wet weather flow are 198 gpm and 278 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 160 gpm.

Recommendations

The existing pump capacity is approximately 265 gpm, based upon SCADA data and wet well dimensions. Therefore, the firm pumping capacity is somewhat lower than the estimated peak wet weather flow of 278 gpm. Because the pump station has no emergency storage, the existing pumps should be replaced with 300 gpm capacity pumps.

Emergency storage of 8,400 gallons, as well as operating volume of 1,150 gallons should be provided. This may require the construction of a new station with a lower bottom elevation, and incorporation of the existing structure into emergency storage, which would provide approximately 3,400 gallons.

The forcemain should be replaced with a new 6-inch pipe when the pump station is improved.

6-3 PALM AVENUE PUMP STATION

Location and Tributary Area

Palm Avenue Pump Station is a wet well-dry well facility located at 3529 Palm Avenue south of Rosecrans Avenue. Access to the pump station, shown on Photograph 6-6, is through a hatch above the dry well, on the westerly sidewalk of Palm Avenue. The pump station was originally constructed in 1953. It was improved to its current condition in 1997.

Photograph 6-6 Palm Avenue Pump Station Access

Palm Avenue Pump Station serves a 39 acre tributary area consisting of low density residential and general commercial land uses. The tributary

area is illustrated on Figure 6-3. The tributary land use categories are shown in Table 6-3.

Table 6-3
Palm Avenue Pump Station Tributary Land Uses

Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	335	38.2
General Commercial	2	1.2
Total	**337**	**39.4**

Influent Sewer

The wastewater generated within the tributary area is conveyed to the pump station wet well by two 8-inch gravity sewers, one from the south, and another from the north. They confluence at a manhole just east of the pump station, and enter the wet well as 10-inch sewer with an invert elevation of 81.90 feet amsl.

Wet Well

The existing wet well (Photograph 6-7) is a 10'-0" long and 4'-0" wide rectangular unlined reinforced concrete structure, located directly east of the dry well. Access to the wet well is through a 30-inch diameter manhole on Palm Avenue at street level.

Photograph 6-7 Palm Avenue Pump Station Wet Well

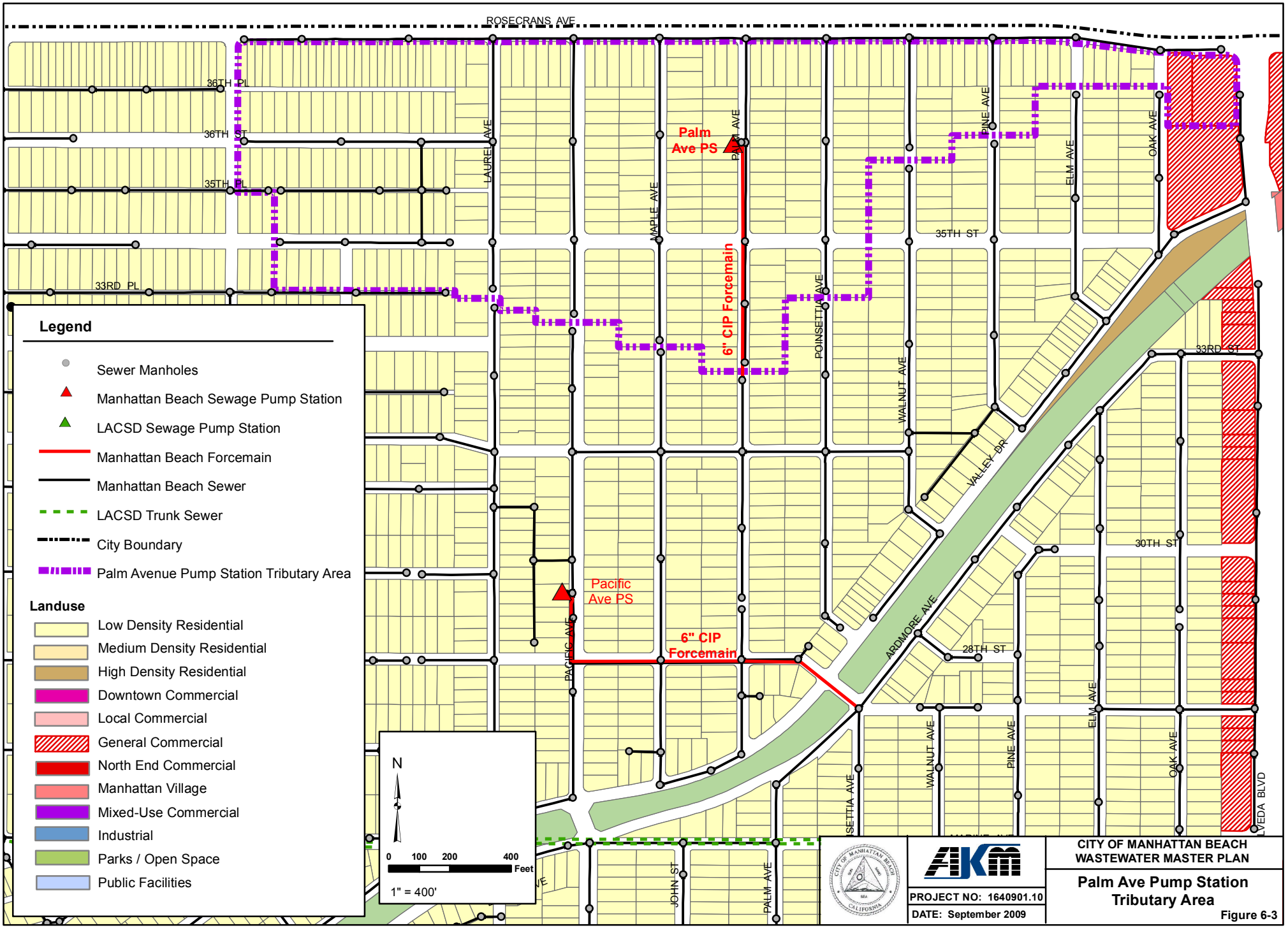
The bottom elevation of the wet well is 78.10 feet amsl at the westerly wall. Two 6-inch suction pipes extend through the wet well wall into the dry well with invert elevations of 78.10 feet amsl.

Significant exposed aggregate indicates concrete corrosion due to hydrogen sulfide generated by the wastewater. There is a basket at the terminus of the influent pipe to intercept rags and other debris/non-dispersible material. City maintenance crew visits the pump station twice a week (Monday & Friday) to clean out the rags from the basket.

The wet well has 226 gallons of operational storage between the pump start level (2.66 ft above wet well floor) and stop level (1.91 ft above wet well floor). Emergency storage available is 344 gallons. Currently wet well has only 2.1 minutes of emergency storage during peak wet weather flow of 159 gpm.

Dry Well

The dry well is a 10'-6" long and 10'-0" wide rectangular reinforced concrete structure located to the west of the wet well. Its top slab is at elevation 90.62 feet amsl. The bottom elevation of the dry well is at 76.97 feet amsl. The pumps are located 3'-0" and 7'-0" from the southerly wall. The floor slopes towards the middle of the easterly wall of the dry well where the sump pump is located. The sump pump conveys any leakage and wash water back to the wet well through a 1- ¼" discharge pipe. Access to the dry well is through a 30" x 60" rectangular hatch, located at ground level on the westerly sidewalk of Palm Avenue. A ladder leads down to each of the two levels of the dry well.


ROSECRANS AVE
36TH PL
36TH ST
35TH PL
33RD PL
LAUREL AVE
MAPLE AVE
PALM AVE
PINE AVE
ELM AVE
OAK AVE
35TH ST
33RD ST
30TH ST
28TH ST
POINSETTIA AVE
WALNUT AVE
VALLEY DR
ARDMORE AVE
PACIFIC AVE
JOHN ST
VEDA BLVD
Palm Ave PS
6" CIP Forcemain
Pacific Ave PS
6" CIP Forcemain
Legend
Sewer Manholes
Manhattan Beach Sewage Pump Station
LACSD Sewage Pump Station
Manhattan Beach Forcemain
Manhattan Beach Sewer
LACSD Trunk Sewer
City Boundary
Palm Avenue Pump Station Tributary Area
Landuse
Low Density Residential
Medium Density Residential
High Density Residential
Downtown Commercial
Local Commercial
General Commercial
North End Commercial
Manhattan Village
Mixed-Use Commercial
Industrial
Parks / Open Space
Public Facilities
N
0 100 200 400 Feet
1" = 400'
CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN
Palm Ave Pump Station
Tributary Area
PROJECT NO: 1640901.10
DATE: September 2009
Figure 6-3

Suction Piping

The suction pipes start at the wet well bottom, extend through the wet well wall and connect to 6-inch isolation pinch valves. Then they connect to a spool before terminating at the suction elbow of the pump.

Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 6-inch flanged 90 degree bend and a 6-inch swing check valve in the vertical run, followed by a 6-inch isolation pinch valve, a spool extending up, a flexible coupling, and a 6-inch 90 degree elbow that connects to the 6-inch discharge header. The discharge header (Photograph 6-8) exits the dry well through the southerly wall.

Photograph 6-8 Palm Avenue Pump Station Discharge Header

Forcemain

The forcemain is a 6-inch cast iron pipe. It conveys the sewage from an average wet well elevation of 79.02 feet amsl to a discharge elevation of 118.42 feet amsl. The forcemain exits the dry well through the southerly wall of the pump station, follows Palm Avenue south and discharges to a City sewer manhole on Palm Avenue, north of 31st Street. The total length of the forcemain is 775 feet. It was constructed in 1953.

Based on the existing pump capacity of 174 gpm, the forcemain velocity is 2.0 fps, which is less than the recommended velocity range of 3 to 5 fps.

Photograph 6-9 Palm Avenue Pump Station Control Panel

Pumps

Palm Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3127) with non-clog impellers. They are driven by 10 HP motors. The existing pump capacities are 167 gpm and 181 gpm, based on SCADA information from April 6, 2009. The existing firm capacity of 167 gpm is greater than the estimated peak wet weather flow of 159 gpm. The pumps start 5 to 8 times per hour during morning peak hours (5:00 am – 9:00 am).

Electrical and Controls

The Palm Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well

water level, which is determined by an ultrasonic level sensor. The pumps alternate and start when the level rises to about 2.6 to 2.8 feet above the wet well floor and stop when the level drops to about 1.8 to 2.1 feet above the wet well floor.

A 25 kVA diesel generator (Photograph 6-10) is located at the bottom level of the dry well adjacent the pumps.

Photograph 6-10 Palm Avenue Pump Station Generator

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 38 gpm. The associated peak dry weather and peak wet weather flows are 114 gpm and 159 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 83 gpm.

Recommendations

The existing firm capacity of 167 gpm is greater than the estimated peak wet weather flow of 159 gpm. Therefore, Palm Avenue Pump Station has adequate pumping capacity.

Emergency storage of 4,800 gallons, as well as operating volume of 700 gallons should be provided. This may require the construction of a new station with a lower bottom elevation, and incorporation of the existing structure into emergency storage, which would provide approximately 3,200 gallons.

The forcemain should be replaced with a new 4-inch pipe when the pump station is improved.

6-4 PACIFIC AVENUE PUMP STATION

Location and Tributary Area

Pacific Avenue Pump Station is a wet well-dry well type facility located on Pacific Avenue south of 31st Street. Access to the pump station, shown on Photograph 6-11, is through a access hatch above the dry well on the westerly sidewalk of Pacific Avenue. It was constructed in 1953, and retrofitted in 1997.

Photograph 6-11 Pacific Avenue Pump Station Access

Pacific Avenue Pump Station serves a 103 acre tributary area consisting of low density residential, medium density residential and general commercial land uses. The tributary area is shown on Figure 6-4. The tributary land use categories are shown in Table 6-4.

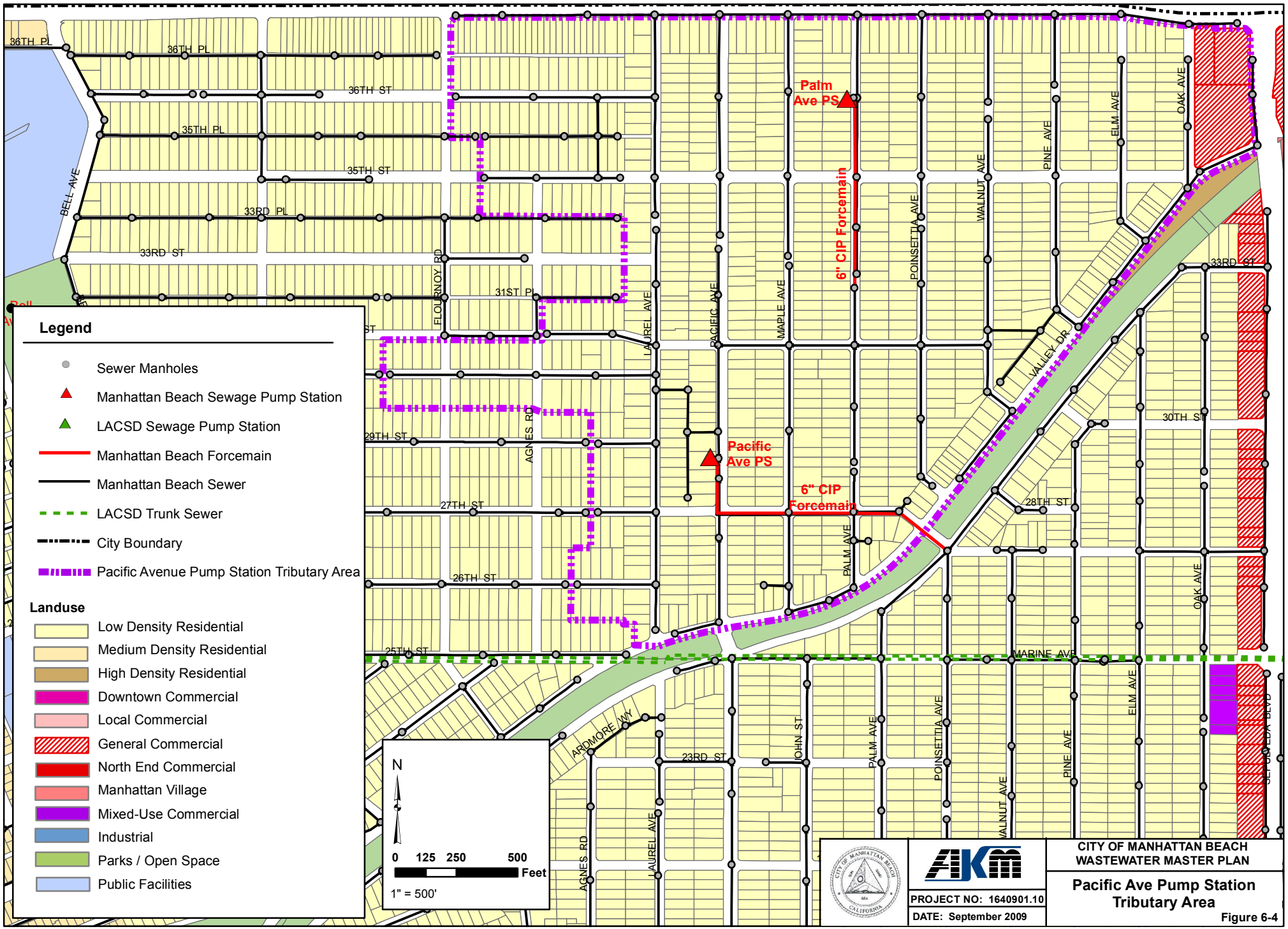

Palm Ave PS
6" CIP Forcemain
Pacific Ave PS
6" CIP Forcemain
Legend
Sewer Manholes
Manhattan Beach Sewage Pump Station
LACSD Sewage Pump Station
Manhattan Beach Forcemain
Manhattan Beach Sewer
LACSD Trunk Sewer
City Boundary
Pacific Avenue Pump Station Tributary Area
Landuse
Low Density Residential
Medium Density Residential
High Density Residential
Downtown Commercial
Local Commercial
General Commercial
North End Commercial
Manhattan Village
Mixed-Use Commercial
Industrial
Parks / Open Space
Public Facilities
N
0 125 250 500 Feet
1" = 500'
36TH PL
36TH ST
35TH PL
35TH ST
33RD PL
33RD ST
31ST PL
29TH ST
27TH ST
26TH ST
25TH ST
23RD ST
30TH ST
28TH ST
BELL AVE
FLOURNOY RD
LAUREL AVE
PACIFIC AVE
MAPLE AVE
POINSETTIA AVE
WALNUT AVE
PINE AVE
ELM AVE
OAK AVE
VALLEY DR
AGNES RD
PALM AVE
JOHN ST
ARDMORE WY
MARINE AVE
SEPULVEDA BLVD
CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN
Pacific Ave Pump Station
Tributary Area
PROJECT NO: 1640901.10
DATE: September 2009
Figure 6-4

Table 6-4
Pacific Avenue Pump Station Tributary Land Uses

Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	880	99.4
Medium Density Residential	1	1.0
General Commercial	3	2.8
Total	**884**	**103.2**

Influent Sewer

The wastewater generated within the tributary area is conveyed to the pump station wet well by two 8-inch gravity sewers on Pacific Avenue, one from the south and another from the north. The two sewers confluence at a manhole east of the wet well, and a 10-inch sewer enters the wet well with an invert elevation of 79.66 feet amsl.

Wet Well

The existing wet well (Photograph 6-12) is a 10'-0" long and 4'-0" wide rectangular unlined reinforced concrete structure, located directly east of the dry well. Access to the wet well is through a 30-inch diameter manhole on Pacific Avenue at street level.

Photograph 6-12 Pacific Avenue Pump Station Wet Well

The bottom elevation of the wet well is 73.85 feet amsl at the westerly wall. Two pump suction pipes, 6-inch in diameter, exit the wet well with an invert elevation of 73.85 feet amsl and extend into the dry well.

The wet well has 305 gallons of operational storage between the pump start and stop levels. Pumps cycled 8 to times per hour during the peak flow period of 6:00 am and 8:00 am on April 6, 2009.

Dry Well

The dry well is a 10'-6" long and 10'-0" wide rectangular reinforced concrete structure located to the west of the wet well. Its top slab is at elevation 86.37 feet amsl. The bottom elevation of the dry well is at 72.72 feet amsl. The pumps are located 3'-0" and 7'-0" from the southerly wall. The floor slopes towards the middle of the eastern wall of the dry well where the sump pump is located. The sump pump conveys any leakage and wash water back to the wet well through a 1-¼" discharge pipe. Access to the dry well is through a 30" x 60" rectangular hatch, located at ground level on the westerly sidewalk of Pacific Avenue. A ladder leads down to each of the two levels of the dry.

Suction Piping

The suction pipes start at the wet well, extend through the wet well wall and connect to 6-inch isolation pinch valves in the dry well. Then they connect to a spool before terminating at the suction elbow of the pumps.

Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 6-inch flanged 90 degree bend and a 6-inch swing check valve in the vertical run, followed by a 6-inch isolation pinch valve, a spool extending up, a flexible coupling, and a 6-inch 90 degree elbow that connects to the 6-inch discharge header. The discharge header (Photograph 6-13) exits the dry well through the southerly wall.

Photograph 6-13 Pacific Avenue Pump Station Discharge Header

Forcemain

The forcemain is a 6-inch diameter cast iron pipe. It conveys the sewage from an average wet well elevation of 76.78 feet amsl to discharge elevation of 109.23 feet amsl. The forcemain follows Pacific Avenue south for 200 feet, then turns east on 27th Street, and discharges to a City manhole at the intersection of 27th Street and Ardmore Avenue. The total length of the forcemain is 1225 feet. It was constructed in 1953.

Based on the existing average pump capacity of 304 gpm, the forcemain velocity is 3.4 fps, which is within the recommended velocity range of 3 to 5 fps.

Photograph 6-14 Pacific Avenue Pump Station Pumps

Pumps

Pacific Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3127) with "non-clog" impellers. One of the pumps is shown on Photograph 6-14. The pumps are driven by 10 HP motors. The existing pump capacities are 291 gpm and 317 gpm, based on SCADA information from April 6, 2009.

Electrical and Controls

The Pacific Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well water level, which is determined by an ultrasonic level sensor. Per SCADA information, the pumps alternate and start when the level rises to about 3.3 feet above the wet well floor and stop when the level drops to about 2.1 feet above the wet well floor.

A diesel fuel generator is located at the bottom level of the dry well.

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 98 gpm. The associated peak dry weather and peak wet weather flows are 269 gpm and 376 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 251 gpm.

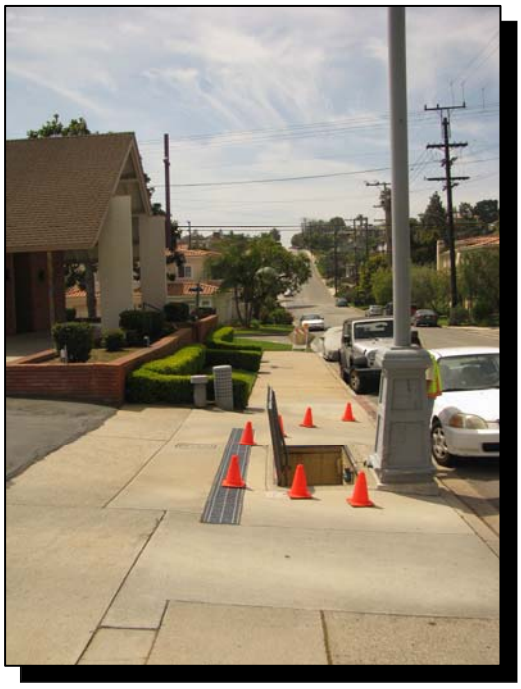
Recommendations

The existing pump capacities are approximately 291 gpm and 317 gpm, based upon SCADA data and wet well dimensions. The firm pumping capacity of 291 gpm is lower than the estimated peak wet weather flow of 376 gpm. The existing pumps should be replaced with 400 gpm capacity pumps.

Emergency storage of 12,000 gallons, as well as operating volume of 1,500 gallons should be provided. This may require the construction of a new station with a lower bottom elevation, and incorporation of the existing structure into emergency storage, which would provide approximately 7,180 gallons.

The forcemain should be replaced with a new 6-inch pipe when the pump station is improved.

6-5 POINSETTIA AVENUE PUMP STATION



Photograph 6-15 Poinsettia Avenue Pump Station Access

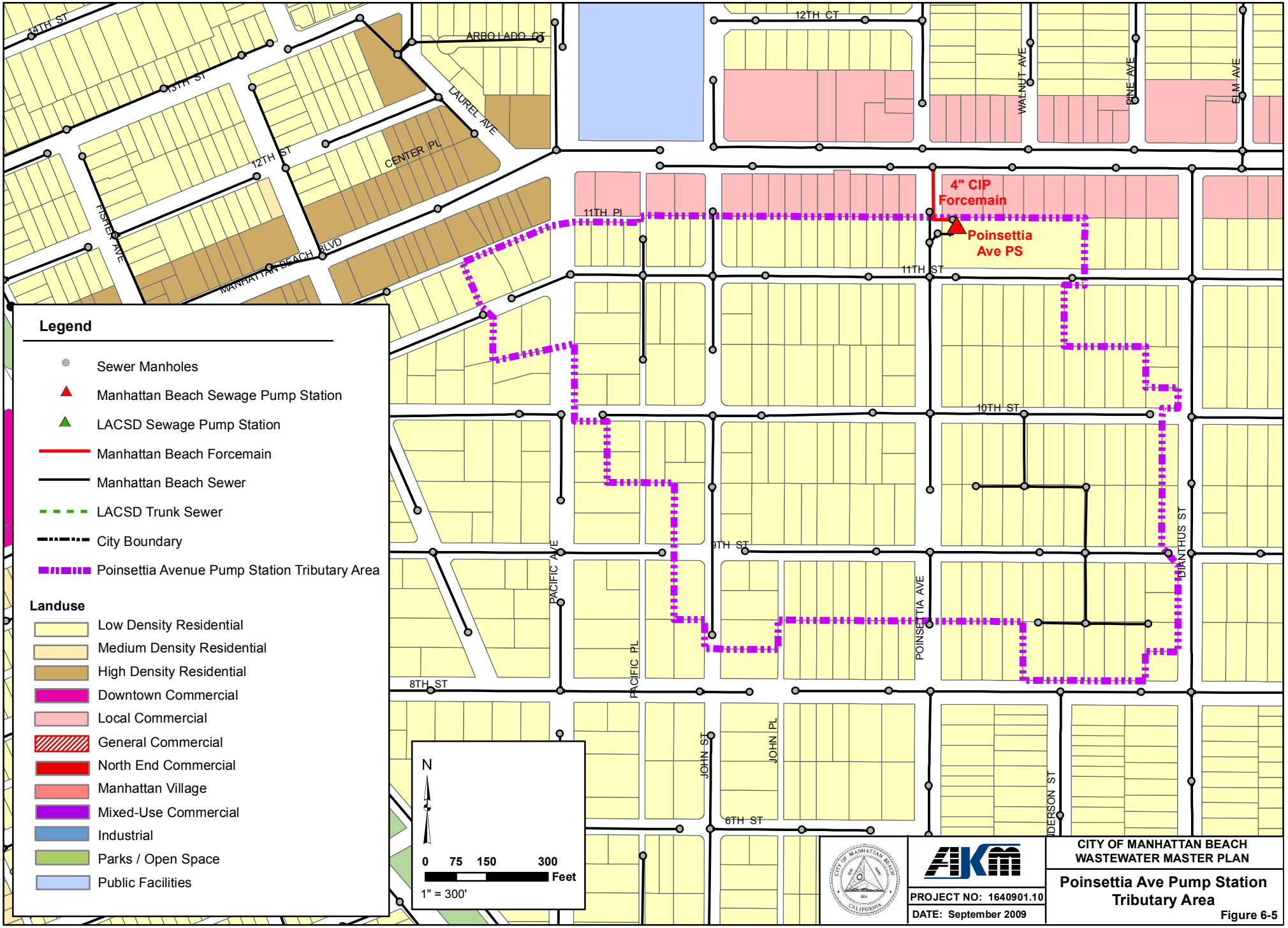
Location and Tributary Area

Poinsettia Avenue Pump Station is a wet well-dry well type facility located on Poinsettia Avenue south of Manhattan Beach Boulevard. Access to the pump station, shown on Photograph 6-15, is through a hatch above the dry well, on the easterly sidewalk of Poinsettia Avenue. The pump station was originally constructed in 1949 and retrofitted in 1995.

Poinsettia Avenue Pump Station serves a 25 acre tributary area consisting of only low density residential land uses. The tributary area of the pump station is shown on Figure 6-5. The details of the tributary area land uses are shown in Table 6-5.

Table 6-5
Poinsettia Avenue Pump Station Tributary Land Uses

Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	152	25.3
Total	**152**	**25.3**


14TH ST
13TH ST
12TH ST
ARBOLADO CT
LAUREL AVE
CENTER PL
TISTER AVE
MANHATTAN BEACH BLVD
12TH CT
WALNUT AVE
PINE AVE
ELM AVE
4" CIP Forcemain
Poinsettia Ave PS
11TH PL
11TH ST
10TH ST
9TH ST
8TH ST
6TH ST
PACIFIC AVE
PACIFIC PL
POINSETTIA AVE
MANHATTUS ST
JOHN ST
JOHN PL
IDERSON ST
Legend
Sewer Manholes
Manhattan Beach Sewage Pump Station
LACSD Sewage Pump Station
Manhattan Beach Forcemain
Manhattan Beach Sewer
LACSD Trunk Sewer
City Boundary
Poinsettia Avenue Pump Station Tributary Area
Landuse
Low Density Residential
Medium Density Residential
High Density Residential
Downtown Commercial
Local Commercial
General Commercial
North End Commercial
Manhattan Village
Mixed-Use Commercial
Industrial
Parks / Open Space
Public Facilities
N
0 75 150 300
Feet
1" = 300'
CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN
Poinsettia Ave Pump Station
Tributary Area
PROJECT NO: 1640901.10
DATE: September 2009
Figure 6-5

Influent Sewer

A great majority of the wastewater generated within the tributary area is conveyed to the pump station by an 8-inch sewer on Poinsettia Avenue from the south. A 70 foot section of 8-inch sewer serves the parcels between the pump station and Manhattan Beach Boulevard. The two gravity sewers confluence at a manhole southwesterly of the pump station. The influent 8-inch diameter sewer extends northeasterly, and enters the wet well from the west with an invert elevation of 93 feet amsl.

Wet Well

The pump station is an 11 foot diameter reinforced concrete structure. The existing wet well (Photograph 6-16) is a portion of the pump station structure with cross sectional area of 18.6 square feet. Access to the wet well is through a 24-inch diameter cover located on the floor of the dry well mezzanine level.

The bottom elevation of the wet well is 86.92 feet amsl. Two 4-inch diameter suction start with 90 degree bends and short flanged spools through the north wall of the wet well.

Photograph 6-16 Poinsettia Avenue Pump Station Wet Well

The wet well has 154 gallons of operational storage between the pump start and stop levels, which indicates pump cycling of up to 13 per hour. The pumps cycled about 6 times per hour between 6 am and 9 am on April 6, 2009. The wet well has 394 gallons of emergency storage, which provides 4.7 minutes of storage during the estimated peak wet weather flow of 85 gpm.

Dry Well

The dry well has a mezzanine level, which houses most of the electrical equipment and the standby generator, and a bottom level which contains the pumps. The bottom elevation of the dry well is at 86.92 feet amsl.

Suction Piping

The suction pipes start at the wet well, extend through the wet well wall to 4-inch isolation pinch valves and a spool before terminating at the suction elbow of the pumps.

Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 4-inch flanged 90 degree elbow followed by a 4-inch check valve, a 4-inch isolation pinch valve, a spool and a 4-inch flanged 45 degree elbow. The piping for one pump then connects directly into a 4-inch tee that connects to the discharge header. The piping for the second pump requires another 4-inch spool before it connects into the tee.

Forcemain

The forcemain is a 4-inch diameter cast iron pipe. It conveys the sewage from an average wet well elevation of 89.92 feet amsl to a discharge elevation of 111.83 feet amsl. The forcemain exits the dry well through the westerly wall of the pump station, follows Poinsettia Avenue north, and discharges to a City sewer manhole at the intersection of Poinsettia Avenue and Manhattan Beach Boulevard. The total length of the forcemain is about 163 feet. It was constructed in 1949.

Based on the existing pump capacity of 136 gpm, the forcemain velocity is 3.5 fps, which is within the recommended velocity range of 3 to 5 fps.

Pumps

Poinsettia Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3102) with "non-clog" impellers. One of the pumps is shown in Photograph 6-17. The pumps are driven by 5 HP motors. The existing pump capacity, based on SCADA information from April 6, 2009, is approximately 136 gpm. The pumps start and stop 5 to 6 times per hour during morning peak hours (6:00 am – 9:00 am).

Photograph 6-17 Poinsettia Avenue Pump Station Pumps

Electrical and Controls

The Poinsettia Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well water level, which is determined by an ultrasonic level sensor. Per SCADA information, the pumps alternate and start when the level rises to about 3.1 to 3.3 feet above the wet well floor and stop when the level drops to about 1.9 to 2.2 feet above the wet well floor.

A diesel generator is located on the mezzanine level of the pump station.

Photograph 6-18 Poinsettia Avenue Pump Station Control Panel

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 19 gpm. The associated peak dry weather and peak wet weather flows are 60 gpm and 85 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 48 gpm.

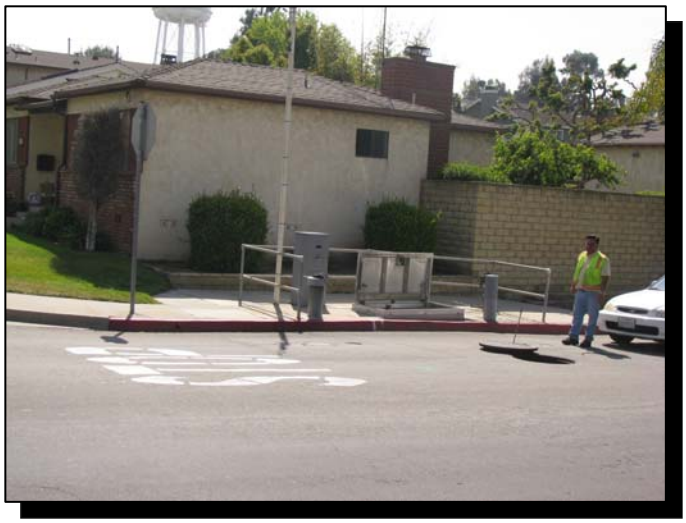
Recommendations

Poinsettia Avenue Pump Station has a very small operational wet well, which may result in the pumps cycling about 14 times per hour, which is excessive. The emergency storage capacity of 394 gallons is much less than that required by the criterion (2,600 gallons). Its location in the driveway of the adjacent school precludes construction of improvements needed to completely eliminate surface water leakage into the dry well. The electrical equipment is old, and does not meet current standards. It has exceeded its useful life. It should be replaced with a new pump station. A new forcemain should be constructed at the same time.

6-6 MEADOWS AVENUE PUMP STATION

Location and Tributary Area

Meadows Avenue Pump Station is a wet well – dry well type facility located on Meadows Avenue south of 9th Street. Access to the pump station, shown on Photograph 6-19, is through a hatch above the dry well, on the easterly sidewalk of Meadows Avenue. The pump station was originally constructed in 1953 and upgraded in 1997.



Photograph 6-19 Meadows Avenue Pump Station Access

Meadows Avenue Pump Station serves a 99 acre tributary area consisting of low density residential, medium density residential, general commercial and public facilities land uses. The tributary area is shown on Figure 6-6. The tributary land use categories are shown in Table 6-6.

Table 6-6
Meadows Avenue Pump Station Tributary Land Uses

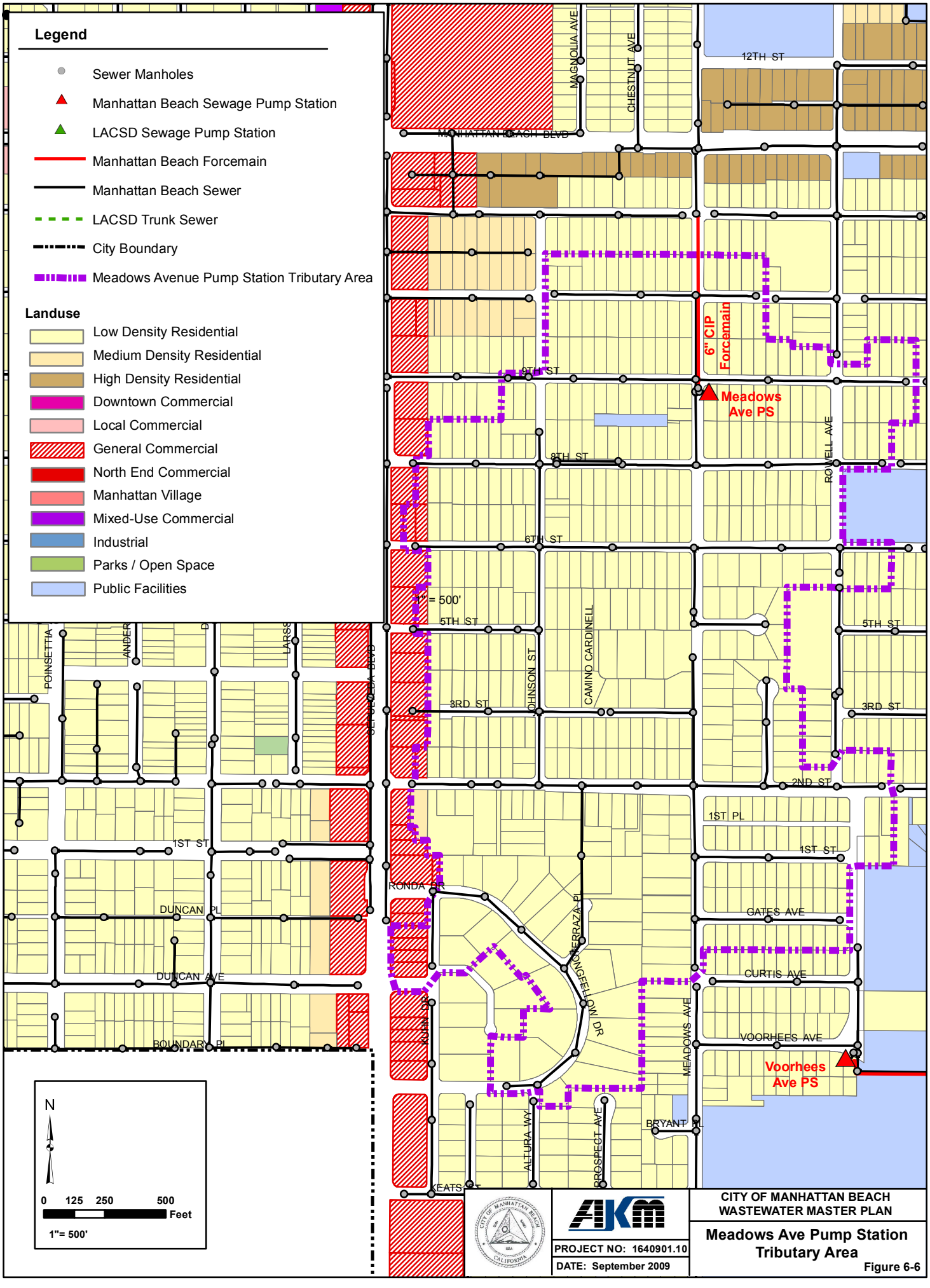
Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	492	93.2
Medium Density Residential	1	0.3
General Commercial	20	5.3
Public Facilities	1	0.3
Total	**514**	**99.1**

Influent Sewer

The wastewater generated within the tributary area is conveyed to the pump station wet well by gravity sewers. A 12-inch sewer on Meadows Avenue conveys flows from the south and an 8-inch sewer brings flows from the north. They then combine into one 12-inch sewer that enters the wet well from the west at an elevation of 103.90 ft.

Wet Well

The existing wet well (Photograph 6-20) is a 10'-0" long and 4'-0" wide rectangular unlined reinforced concrete structure, located directly west of the dry well. Access to the wet well is through a 30-inch diameter manhole on Meadows Avenue.


Legend
Sewer Manholes
Manhattan Beach Sewage Pump Station
LACSD Sewage Pump Station
Manhattan Beach Forcemain
Manhattan Beach Sewer
LACSD Trunk Sewer
City Boundary
Meadows Avenue Pump Station Tributary Area
Landuse
Low Density Residential
Medium Density Residential
High Density Residential
Downtown Commercial
Local Commercial
General Commercial
North End Commercial
Manhattan Village
Mixed-Use Commercial
Industrial
Parks / Open Space
Public Facilities
1" = 500'
N
0 125 250 500
Feet
1"= 500'
6" CIP Forcemain
Meadows Ave PS
Voorhees Ave PS
MANHATTAN BEACH BLVD
MAGNOLIA AVE
CHESTNUT AVE
12TH ST
9TH ST
8TH ST
6TH ST
5TH ST
3RD ST
2ND ST
1ST PL
1ST ST
ROWELL AVE
JOHNSON ST
CAMINO CARDINELL
POINSETTIA
ANDER
LARSS
SEPULVEDA BLVD
RONDA DR
DUNCAN PL
DUNCAN AVE
BOUNDARY PL
JOHN DR
TERRAZA PL
LONGFELLOW DR
GATES AVE
CURTIS AVE
VOORHEES AVE
MEADOWS AVE
BRYANT PL
ALTURA WY
PROSPECT AVE
KEATS ST
CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN
Meadows Ave Pump Station Tributary Area
Figure 6-6
PROJECT NO: 1640901.10
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The bottom elevation of the wet well is 98.98 feet amsl at the westerly wall. Two 6-inch pipes exit the wet well with an invert of 98.98 feet amsl and extend east into the dry well.

The wet well has 300 gallons of operational storage between the pump start and stop levels, which indicates that pumps may cycle up to 19 times per hour. The wet well has 536 gallons of emergency storage, which provides 1.8 minutes of wet weather storage.

Photograph 6-20 Meadows Avenue Pump Station Wet Well

Dry Well

The dry well is a 10'-6" long and 10'-0" wide rectangular reinforced concrete structure located to the east of the wet well. Its top slab is at elevation 111.50 feet amsl. The bottom elevation of the dry well is at 97.85 feet amsl. The pumps are located 3'-0" and 7'-0" from the northerly wall. The floor slopes towards the middle of the westerly wall of the dry well where the sump pump is located. The sump pump conveys any leakage and wash water back to the wet well through a 1-¼" discharge pipe. Access to the dry well is through a 30" x 60" rectangular hatch, located at ground level on the easterly sidewalk of Meadows Avenue. A ladder leads down to each of the two levels of the pump station.

Suction Piping

The suction pipes start at the wet well, extend through the wet well wall and connect to 6-inch isolation pinch valves. Then they connect to 6" x 4" flanged reducers before terminating at the suction elbow of the pumps.

Photograph 6-21 Meadows Avenue Pump Station Discharge Header

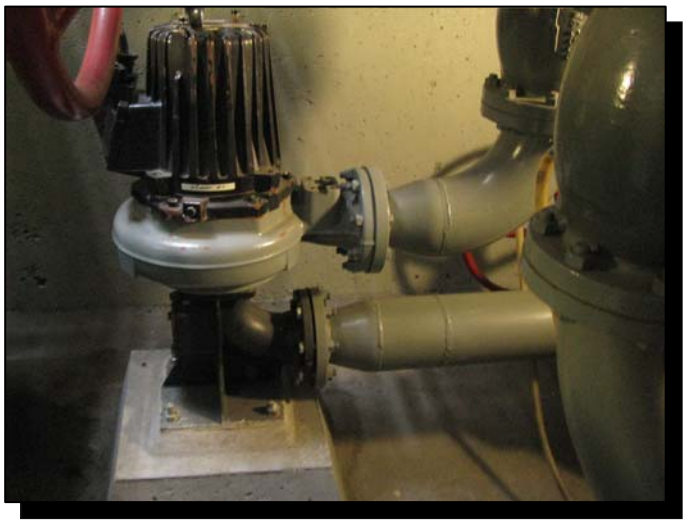
Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 6" x 4" flanged 90 degree reducing bend and a 6-inch swing check valve in the vertical run, followed by a 6-inch isolation pinch valve, a spool extending up with a flexible coupling, and a 6-inch flanged 90 degree elbow that connects to the discharge header. The discharge header (Photograph 6-21) exits the dry well through the northerly wall.

Forcemain

The forcemain is a 6-inch cast iron pipe. It conveys the sewage from an average wet well elevation of 101.48 feet amsl to a discharge elevation of 149.17 feet amsl. The forcemain

exits the dry well through the northerly wall, follows Meadows Avenue north and discharges to a City sewer manhole at the intersection of Meadows Avenue and 11th Street. The total length of the forcemain is about 730 feet. It was constructed in 1953.



Photograph 6-22 Meadows Avenue Pump Station Pumps

Pumps

Meadows Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3127) with "non-clog" impellers. One of the pumps is shown on Photograph 6-22. The pumps are driven by 10 HP motors. The existing pump capacity, based on SCADA information from April 6, 2009, is approximately 230 gpm. The pumps start 5 to 8 times per hour during morning peak hours (5:00 am – 9:00 am).

Photograph 6-23 Meadows Avenue Pump Station Control Panel

Electrical and Controls

The Meadows Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well water level, which is determined by an ultrasonic level sensor. Per SCADA information, the pumps alternate cycles and start when the level rises to about 3.2 to 3.3 feet above the wet well floor and stop when the level drops to about 2.2 to 2.3 feet above the wet well floor.

A diesel standby generator is located on the bottom level of the pump station adjacent the wastewater pumps.

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 77 gpm. The associated peak dry weather and peak wet weather flows are 216 gpm and 303 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 145 gpm.

Recommendations

The existing pump capacities are approximately 291 gpm and 317 gpm, based upon SCADA data and wet well dimensions. The firm pumping capacity of 291 gpm is lower than the estimated peak wet weather flow of 376 gpm. The existing pumps should be replaced with 400 gpm capacity pumps.

Emergency storage of 12,000 gallons, as well as operating volume of 1,500 gallons should be provided. This may require the construction of a new station with a lower bottom elevation, and incorporation of the existing structure into emergency storage, which would provide approximately 7,180 gallons.

The forcemain should be replaced with a new 6-inch pipe when the pump station is improved.

6-7 VOORHEES AVENUE PUMP STATION

Location and Tributary Area

Voorhees Avenue Pump Station is a wet well-dry well type facility located adjacent to the intersection of Voorhees Avenue and Rowell Avenue. Access to the pump station is through a hatch above the drywell. The pump station was originally constructed in 1953 and retrofitted in 1997.

Voorhees Avenue Pump Station serves a 103 acre tributary area consisting of low density residential, high density residential, general commercial and public facilities land uses. The tributary area of the pump station is shown on Figure 6-7. The tributary land use categories are shown in Table 6-7.

Table 6-7
Voorhees Avenue Pump Station Tributary Area

Land Use Description	Number of Parcels	Total Area (ac)
Low Density Residential	227	39.5
High Density Residential	6	3.8
General Commercial	14	11.2
Public Facilities	6	48.7
Total	**253**	**103.2**

Influent Sewer

The wastewater generated within the tributary area is conveyed to the pump station wet well by gravity sewers. An 8-inch sewer brings flows from the north and another 8-inch sewer brings flows from the south. They then combine into one 10-inch sewer that enters the wet well from east at an elevation of 113 feet amsl.

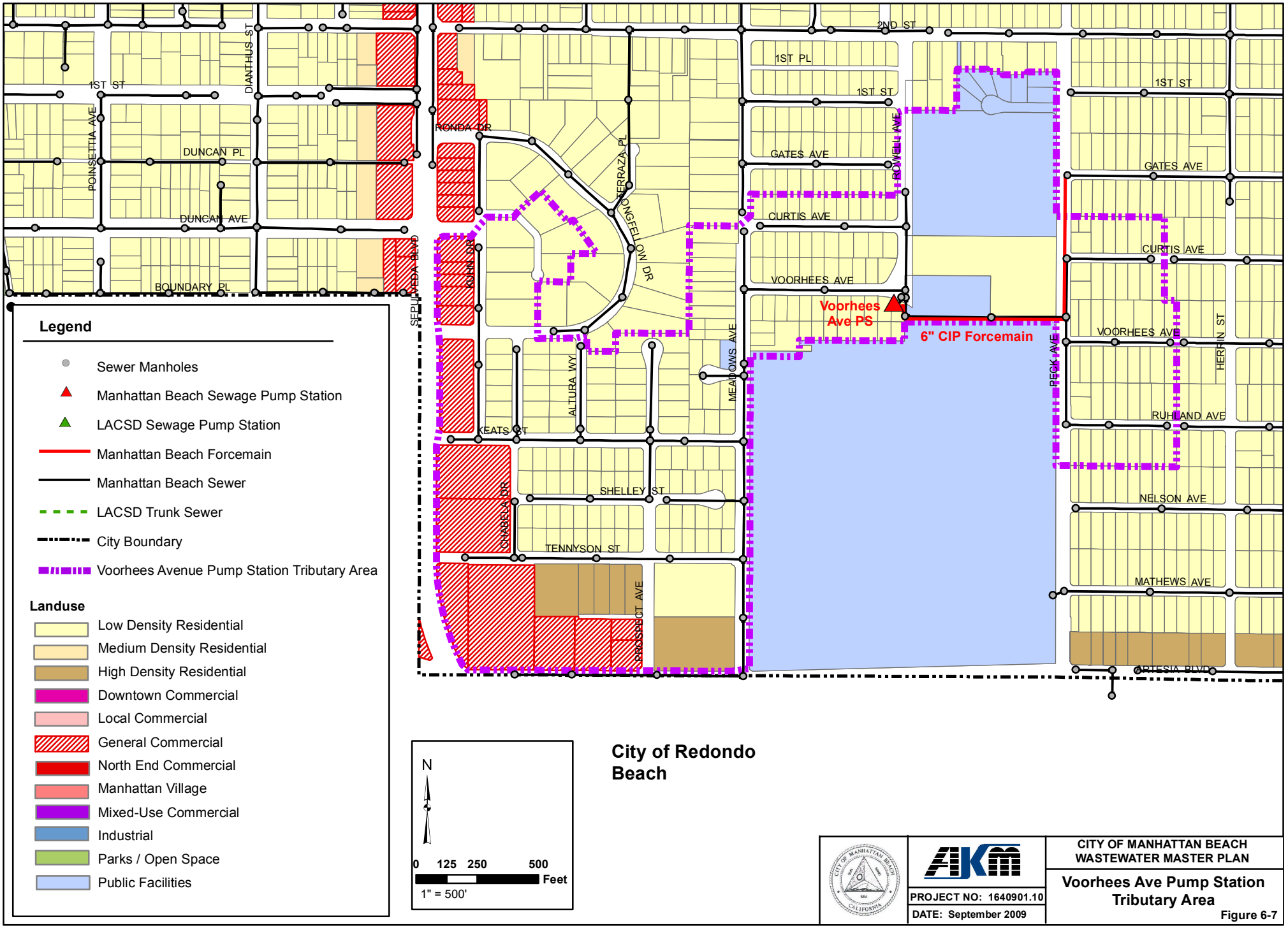
Photograph 6-24 Voorhees Avenue Pump Station Wet Well

Wet Well

The existing wet well (Photograph 6-24) is a 10'-0" long and 4'-0" wide rectangular unlined reinforced concrete structure, located north of the dry well. Access to the wet well is through a 30-inch diameter manhole cover.

The bottom elevation of the wet well is 109.68 feet amsl. Two 6-inch suction pipes exit the wet well with an invert of 109.68 feet amsl and extend into the dry well.

The wet well has 300 gallons of operational storage between the pump start and stop levels, which indicates that the pumps may cycle up to 12 times per hour.



City of Redondo Beach

CITY OF MANHATTAN BEACH
WASTEWATER MASTER PLAN

Voorhees Ave Pump Station Tributary Area

PROJECT NO: 1640901.10
DATE: September 2009

Figure 6-7

Dry Well

The dry well is a 10'-6" long and 10'-0" wide rectangular reinforced concrete structure located to the east of the wet well. Its top slab is at elevation 122.20 feet amsl. The bottom elevation of the dry well is at 108.55 feet amsl. The pumps are located 3'-0" and 7'-0" from the easterly wall. The floor slopes towards the middle of the northerly wall of the dry well where the sump pump is located. The sump pump conveys any leakage and wash water back to the wet well through a 1-¼" discharge pipe. Access to the dry well is through a 30" x 60" rectangular hatch, located at ground level. A ladder leads down to each of the two levels of the pump station.

Suction Piping

The suction pipes start at the wet well 2, extend through the wet well wall and connect to 6-inch isolation pinch valves. Then they connect to 6" x 4" flanged reducers before terminating at the suction elbow of the pumps.

Photograph 6-25 Voorhees Avenue Pump Station Discharge Header

Discharge Piping

The discharge piping for each pump starts at the discharge nozzle with a 6" x 4" flanged 90 degree reducing bend and a 6-inch swing check valve in the vertical run, followed by a 6-inch isolation pinch valve, a spool extending up with a flexible coupling, and a 6-inch flanged 90 degree elbow that connects to the discharge header. The discharge header (Photograph 6-25) exits the dry well through the easterly wall.

Forcemain

The forcemain is a 6-inch cast iron pipe. It conveys the sewage from an average wet well elevation of 110.39 feet to discharge elevation of 153 feet amsl. The forcemain exits the dry well and follows the easement to the south and east towards Peck Avenue. It then turns north on Peck Avenue and discharges at a City manhole located at the intersection of Gates Avenue and Peck Avenue.

Based on the existing pump capacity of 227 gpm, the forcemain velocity is 2.1 fps, which is less than the recommended velocity range of 3 to 5 fps.

Photograph 6-26 Voorhees Avenue Pump Station Pumps

Pumps

Voorhees Avenue Pump Station has two (2) FLYGT wastewater pumps (Model CT3127) with "non-clog" impellers. One of the pumps is shown on Photograph 6-26. The pumps are driven by 10 HP motors. The existing pump capacity,

based on SCADA information from April 6, 2009, is approximately 227 gpm. The pumps start 6 to 8 times per hour during morning peak hours (5:00 am – 9:00 am).

Electrical and Controls

The Voorhees Avenue Pump Station is powered by a 100 amp, 460 volt, 3 phase, 3 wire service. The pump station operation is controlled by the wet well water level, which is determined by an ultrasonic level sensor. Per SCADA information, the pumps alternate and start when the level rises to about 2.6 to 2.7 feet above the wet well floor and stop when the level drops to about 1.6 to 1.7 feet above the wet well floor.

A diesel standby generator is located on the bottom level of the pump station adjacent the wastewater pumps.

Tributary Flows

The average dry weather flow calculated by land use and unit flow factors is 90 gpm. The associated peak dry weather and peak wet weather flows are 250 gpm and 350 gpm, respectively. The peak dry weather flow based on the April 6, 2009 SCADA information is approximately 182 gpm.

Recommendations

The existing pump capacities are approximately 227 gpm. The firm pumping capacity is lower than the estimated peak wet weather flow of 350 gpm. The existing pumps should be replaced with 350 gpm capacity pumps.

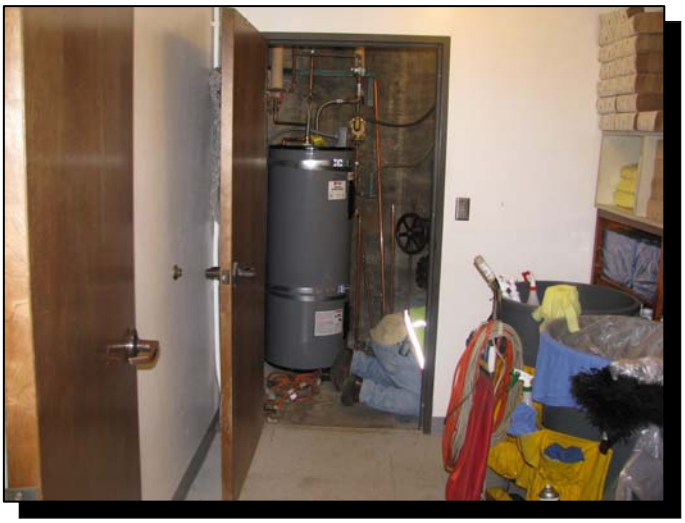
Emergency storage of 10,500 gallons, as well as operating volume of 1,330 gallons should be provided. This may require the construction of a new station with a lower bottom elevation, and incorporation of the existing structure into emergency storage, which would provide approximately 6,000 gallons.

The forcemain should be replaced with a new 6-inch pipe when the pump station is improved.

6-8 CIVIC CENTER PUMP STATION

The Civic Center Pump Station is a submersible station which serves the Civic Center. It is located in a utility room at the bottom level of the Civic Center Building, as shown on Photograph 6-27. The wet well, pumps, and discharge piping are shown on Photographs 6-28 and 6-29.

Record information for the facility could not be located. However, the pump station appears to have ample capacity for its tributary flows.



Photograph 6-27 Civic Center Pump Station Access

Photograph 6-28 Civic Center Pump Station Wet Well

Photograph 6-29 Civic Center Pump Station Pumps

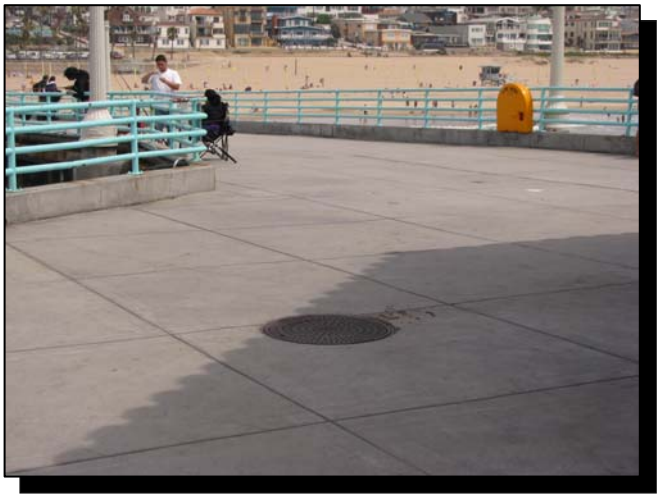
Recommendations

The Civic Center Pump Station is in good condition, and no improvements are necessary at this time.

6-9 PIER PUMP STATION

Location and Tributary Area

The Pier Pump Station is a submersible pump station located at the end of the Manhattan Beach Pier. Access to the pump station, shown on Photograph 6-30, is through manhole cover on the pier. The pump station is approximately 15 years old. The Pier Pump Station serves the restaurant located at the end of the pier.



Photograph 6-30 Pier Pump Station Access

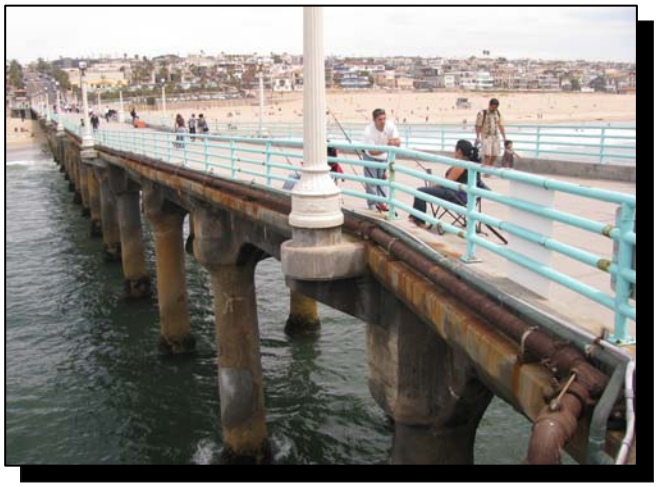
Photograph 6-31 Pier Pump Station Wet Well

Wet Well

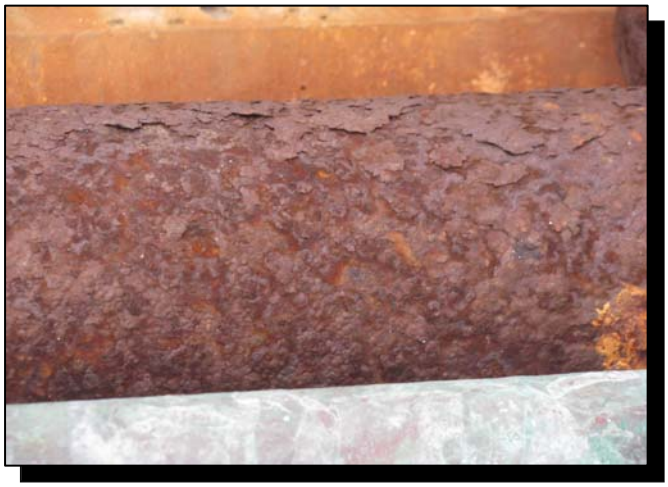
The existing wet well (Photograph 6-31) is a 4'-0" x 4'-0" reinforced concrete vault.

Forcemain

The forcemain/discharge pipe is a 4-inch cast iron pipe along the north side of the Pier. Due to its location, it has experienced significant corrosion, as shown on Photographs 6-32 and 6-33.



Photograph 6-32 Pier Pump Station Force Main



Photograph 6-33 Pier Pump Station Force Main Close-up

Pumps

There are two (2) submersible pumps that are driven by 3 HP motors. While record information is not available, the pumps appear to have ample capacity for the tributary flows.

Recommendations

Due to its significantly deteriorated condition, the force main/discharge pipe should be replaced with a non-corrosive pipe properly protected from the environment.