



## **CARSON – VICTORIA GREENS PRELIMINARY SANITARY SEWER CAPACITY ANALYSIS**

This preliminary Sanitary Sewer Analysis is being prepared for the proposed Victoria Greens Multi-Family Development per Tentative Tract Map 78226. The project is located at the northeast corner of Central Avenue and Victoria Street in the City of Carson. The project site is currently vacant and is 8.0723 gross acres in size. The proposed development is for 176 Multi-Family Condominium Units within 25 separate buildings ranging in size from 5-Plex to 11-Plex buildings. There is also a recreation area with a pool that will have a pool / restroom building.

The Site currently does not have a sanitary sewer connection. A 12-inch sanitary sewer is available within Victoria Street, consisting of a 12-mainline with a pipe slope of 0.0110. There are 4 existing manholes on Victoria, and the 3 that front the project have been surveyed for location and invert elevations. The existing sanitary sewer information as provided by the Los Angeles County Sewer Maintenance Districts is noted per Atlas No. S-1758 as included herewith. The Map notes that the existing 12-inch sewer in Victoria is currently designated as a “Dry Sewer”, so there is currently no sewage being conveyed within this system and should have no capacity or deficiency issues. The existing sewer is approximately 9.4 feet deep in Victoria Street. The project is proposing to install a new manhole in Victoria Street at between existing manholes 270 and 271 at approximately invert elevation 155.90.

There are no other available existing public sanitary sewer lines in Central Avenue that could serve this project, so our sanitary sewer connection will be made to the existing 12-inch line Victoria as noted above. The project site elevations range from elevation 171 to 150 sloping from the southeast corner of the site to the northwest corner of the site. Based on the constraints of the existing topography of the site and the proposed site development, the project site will not be able to completely gravity flow to the existing sewer in Victoria; and the use of an on-site lift station and force main will be required to collect and convey the majority of the site as required to pump the sewage back up stream from north to south where it can ultimately gravity flow into the sewer system. Approximately 79 of the 176 units may be able to gravity flow to the existing sewer, with approximately 97 units having to gravity flow to a sump pit lift station where it would be pumped from the low end of the site back to a manhole at the high side of the site into a manhole where it could join the gravity flows to the existing system. The lift station would consist of a minimum of 2 pumps to meet the on-site sewer demand and would include a generator to keep the lift station operational during any power outage.

The proposed project consisting of 176 multi-family condominium units with 2 and 3 bedroom unit types will generate maximum sewer demands as noted below for the average sewer generation factors, and based on this information and analysis, the existing 12-inch sewer in Victoria would have more than sufficient capacity to handle the project sewer demands without any negative impacts to the existing sewer system capacity.

## PIPE CAPACITY

### Design Criteria:

$$Q = 1.49/n AR_N^{2/3} s^{1/2}$$

- $s$  = pipe slope
- $A$  = area of flow (calculated at 50% full)
- $R_N = A/p$  (based on depth of flow)
- $p$  = wet perimeter of pipe ( $c=3.14d$ ), .5 for 50% full
- $n$  = friction coefficient

### Existing 12 inch pipe: Section on Victoria Street

- $s=0.0110$
- $n = 0.013$
- $p$  (50% full) =  $3.14d(.5) = 3.14(1)(.5) = 1.57$
- $A$  (50% full) =  $(.5)(3.14)r^2 = (.5)(3.14)(.5)^2 = 0.3925$
- $R_N = A/p = 0.3925/1.57 = 0.25$
- $Q = 1.49/.013 (0.3925)(0.25)^{2/3}(0.0110)^{1/2}$
- $Q = 1.8682$  CFS = **838.51 GPM**

## PROJECT MAXIMUM SEWER DEMANDS

- Residential Design Flows: Average Sewer Generation Factors per Table 1, Loadings of each Class of Land Use, of the LACSD's Will Serve Program Instructions, and Table M.2-12, Sewage Generation Factors, of the Los Angeles CEQA Thresholds Guide (2006). Assumes 160gal/DU/day (gallons per dwelling unit per day) for 2 bedroom Condo and 200gal/DU/day (gallons per dwelling unit per day) for 3 bedroom Condo and
- Peak Factor: 2.5
- Proposed project Sewer Units = **176** (50, 2-bedroom units and 126, 3-bedroom units)

Project Sewer Flows =

- $160 \text{ gal/du/day} \times 1 \text{ day/24hours} \times 1 \text{ hour/60 minutes} \times 50 \text{ units} = 5.55 \text{ GPM}$
- $200 \text{ gal/du/day} \times 1 \text{ day/24hours} \times 1 \text{ hour/60 minutes} \times 126 \text{ units} = 17.50 \text{ GPM}$
- Total project Sewer flows for 176 units = 23.05 GPM

Peak Sewer Flows = sewer flows x 2.5 peak factor =

- **5.55 GPM x 2.5 = 13.88 GPM for 50 - 2 bedroom units**
- **17.50 GPM x 2.5 = 43.75 GPM for 126 - 3 bedroom units**
- **Total Peak Sewer Flow for 176 Units = 57.63 GPM**

The existing 12 inch line in Victoria Street at slope  $s=0.0110$  as calculated above has a capacity of 838.51 GPM. The total peak flow for the units flowing to the existing Victoria Street Sewer is 176 units at 57.63 GPM that can be accommodated in the existing 12" line.

Based on this analysis, there should not be any negative impact to the existing sewer system in Victoria Street and this would be the appropriate discharge location for this project's sanitary sewer system demands. We are assuming that the Los Angeles County Sewer Maintenance District in cooperation with the City of Carson will serve this project with it's existing 12-inch line in Victoria Street as required.

Urban Resource Corporation

S-1758

C-38  
C-43  
C-42

THIS MAP IS INTENDED FOR USE ONLY AS OPERATIONS MAINTENANCE DISTRICTS. COUNTY SEWER MAINTENANCE DISTRICTS. EXPRESSLY DISCLAIMS ANY LIABILITY FOR ANY INACCURACIES THAT MAY BE PRESENT IN THIS MAP.

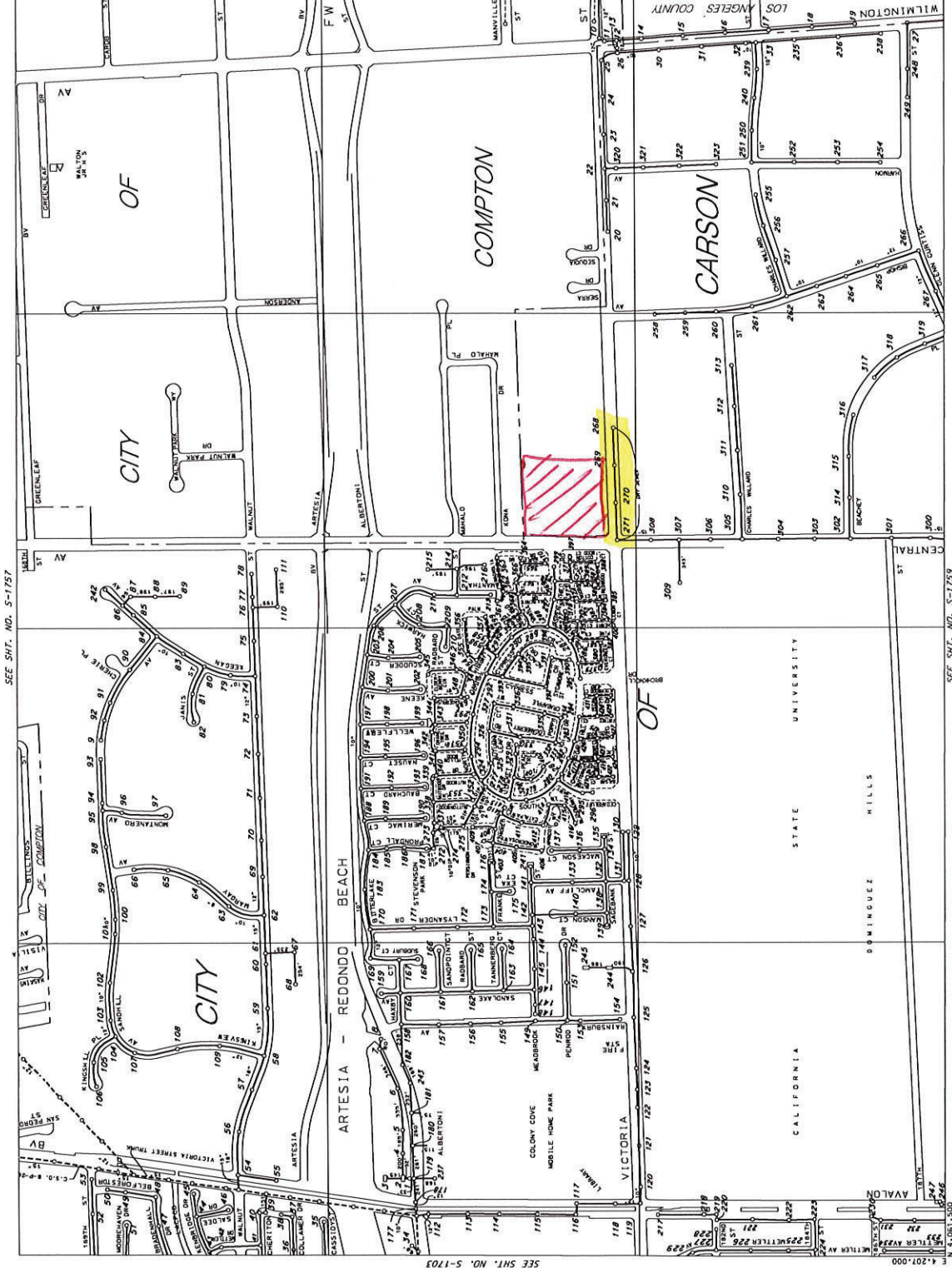


0 50 100 200 250  
0 100 200 300 400  
METERS  
FEET

LEGEND

- CLAY SEWER PIPE (MAINTAINED) - DASHED LINE WITH 'S'
- CLAY SEWER PIPE (NOT MAINTAINED) - DASHED LINE WITH 'N'
- PLASTIC SEWERS - DASHED LINE WITH 'P'
- CONCRETE SEWERS - DASHED LINE WITH 'C'
- CLAY SEWER LINED - DASHED LINE WITH 'L'
- CONCRETE SEWER LINED - DASHED LINE WITH 'L'
- FORCE MAINS - SOLID LINE WITH 'F'
- SEWERS NOT MAINTAINED BY SMC - DASHED LINE WITH 'N'
- CITY BOUNDARY - DASHED LINE WITH 'C'
- STANDARD MANHOLE - OPEN SQUARE
- DROP MANHOLE - OPEN TRIANGLE
- SHALLOW MANHOLE - OPEN CIRCLE
- TREP MANHOLE - OPEN SQUARE WITH 'T'
- WEIR MANHOLE - OPEN TRIANGLE WITH 'W'
- CLEANOUT - OPEN CIRCLE WITH 'C'
- LAMP HOLE - OPEN SQUARE WITH 'L'
- PUMP STATION - SOLID SQUARE

TOTAL MAP'S THIS MAP: 430



SEE SHIT. NO. S-1757

SEE SHIT. NO. S-1703

SEE SHIT. NO. S-1759

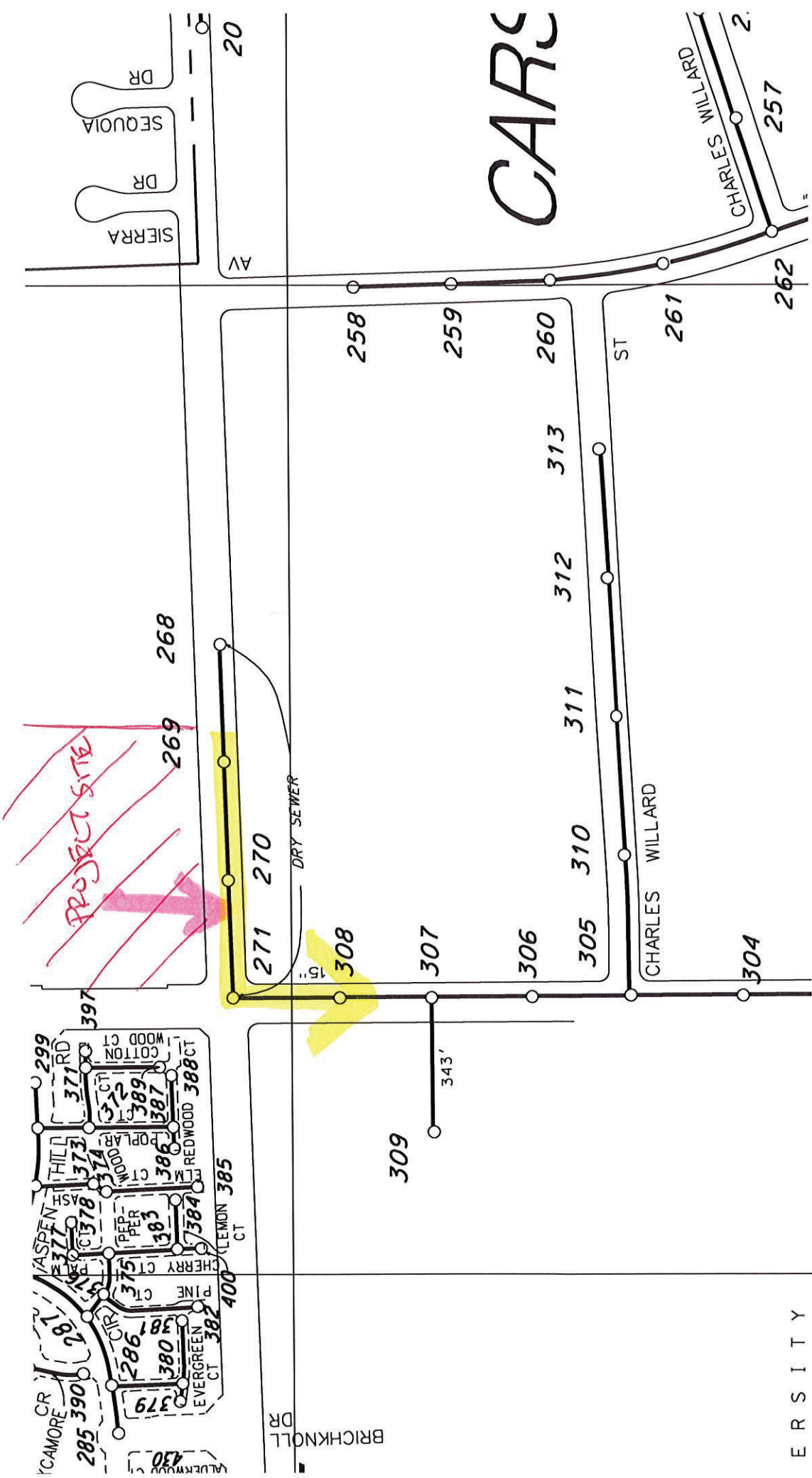
S-1758

CONSOLIDATED S.M.D.

S-1758

MAP REV  
05-15-12  
DATA BASE REV  
11-23-04

T: 134-E7



CARS

PROJECT SITE

20

AV

SIERRA DR  
SEQUOIA DR

CHARLES WILLARD ST  
257

258

259

260

ST

261

262

268

269

271 270

DRY SEWER

308

307

306

305 310

311

312

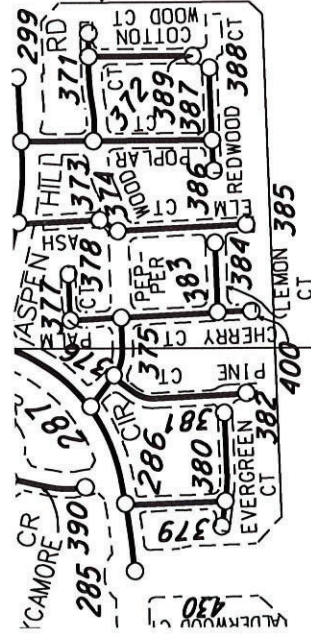
313

CHARLES WILLARD

304

309

343'



BRICKKNOLL DR

ERSITY

**Exhibit M.2-12**  
**SEWAGE GENERATION FACTORS**

Type Description	Average Daily Flow (Gpd/unit)
Acupuncture Office/Clinic	150/1000 Gr.sq.ft.
Arcade - Video Games	80/1000 Gr.sq.ft.
Auditorium	4/seat
Auto Parking	20/1000 Gr.sq.ft.
Auto Body/Mech Repair Shop	800/1000 Gr.sq.ft. + Process Flow
Bakery	280/1000 Gr.sq.ft.
Bank: Headquarters	150/1000 Gr.sq.ft.
Bank: Branch	80/1000 Gr.sq.ft.
Banquet Room/ Ballroom	800/1000 Gr.sq.ft.
Bar: Cocktail, Fixed Seat	18/seat
Bar: Juice (No Baking Facilities)	120/1000 Gr.sq.ft.
Bar: Juice (With Baking Facilities)	280/1000 Gr.sq.ft.
Bar: Cocktail Public Table Area	500/1000 Gr.sq.ft.
Barber Shop	100/1000 Gr.sq.ft.
Beauty Parlor	280/1000 Gr.sq.ft.
Building Construction Field Office	150/office
Bowling Alley: Alley, Lanes & Lobby Area	80/1000 Gr.sq.ft.
Bowling Facility: Arcade/ Bar/ Restaurant/ Dancing	See Individual Categories
Cafeteria: Fixed Seat	30/seat
Car Wash: Automatic	Process Flow
Car Wash: Coin Operated Bays	Process Flow
Car Wash: Hand Wash	Process Flow
Car Wash: Counter & Sale Area	80/1000 Gr.sq.ft.
Chapel: Fixed Seat	4/seat
Chiropractic Office	150/1000 Gr.sq.ft.
Church: Fixed Seat	4/seat
Church School: Day Care/elem	8/occupant
Church School: One Day Use/week	200/1000 Gr.sq.ft.
Cocktail Lounge: Fixed Seat	18/seat
Coffee House: No Pastry Baking & No Food Prep.	120/1000 Gr.sq.ft.
Coffee House: Pastry Baking Only	280/1000 Gr.sq.ft.
Coffee House: Serves Prepared Food	30/seat
Cold Storage: No Sales	20/1000 Gr.sq.ft.
Cold Storage: Retail Sales	80/1000 Gr.sq.ft.
Comfort Station: Public	100/fixture
Commercial Use	80/1000 Gr.sq.ft.
Community Center	4/occupant
Conference Room of Office Bldg.	Same as other areas in an office bldg.
Counseling Center <sup>1</sup>	150/1000 Gr.sq.ft.
Credit Union	150/1000 Gr.sq.ft.
Dairy	Process Flow
Dairy: Barn	Process Flow
Dairy: Retail Area	80/1000 Gr.sq.ft.

<sup>1</sup> Counseling center include marriage counseling centers, alcohol/drug rehabilitation/dependency centers, nutrition center, diet centers, etc.

**Exhibit M.2-12, continued**  
**SEWAGE GENERATION FACTORS**

Type Description	Average Daily Flow (Gpd/unit)
Dancing Area of Bar or Nightclub	600/1000 Gr.sq.ft.
Dance Studio	80/1000 Gr.sq.ft.
Dental Office/Clinic	250/1000 Gr.sq.ft.
Doughnut Shop	280/1000 Gr.sq.ft.
Drug Rehabilitation Center	150/1000 Gr.sq.ft.
Equipment Booth	20/1000 Gr.sq.ft.
Film Processing – 1-Hour Photo, etc.	100/1000 Gr.sq.ft.
Film Processing – Industrial	80/1000 Gr.sq.ft. + Process Flow
Food Processing Plant	80/1000 Gr.sq.ft. + Process Flow
Gas Station: Self Service	100/w.c.
Gas Station: Four Bays Maximum	430/station
Golf Course: 18-hole/ 9-hole Green Area	0
Golf Course: Driving Range	0
Golf Course Facility: Lobby/Office/Restaurant/Bar	See Individual Categories
Gymnasium – Basketball, Volleyball	250/1000 Gr.sq.ft.
Hanger (Aircraft)	80/1000 Gr.sq.ft.
Health Club/ Spa <sup>2</sup>	800/1000 Gr.sq.ft.
Homeless Shelter	75/bed
Hospital	75/bed
Hospital: Convalescent	75/bed
Hospital: Animal	280/1000 Gr.sq.ft.
Hospital: Psychiatric	75/bed
Hospital: Surgical	450/bed
Hotel: Use Guest Rooms Only	130/room
Jail	85/inmate
Kennel: Dog Kennel/Open Run	100/1000 Gr.sq.ft.
Laboratory: Commercial	250/1000 Gr.sq.ft.
Laboratory: Industrial	Process Flow
Laundromat	170/machine
Library: Public Area	80/1000 Gr.sq.ft.
Library: Stacks, Storage	25/1000 Gr.sq.ft.
Lobby of Retail Area <sup>3</sup>	80/1000 Gr.sq.ft.
Lodge Hall	4/seat
Lounge	See Lobby of Retail Area
Machine Shop	80/1000 Gr.sq.ft. + Process Flow
Manufact or Indust Facility	80/1000 Gr.sq.ft. + Process Flow
Massage Parlor	275/1000 Gr.sq.ft.
Medical Building	250/1000 Gr.sq.ft.
Medical Lab in Hospital	250/1000 Gr.sq.ft.

<sup>2</sup> Health club/spa includes lobby area, workout floors, aerobic rooms, swimming pools, Jacuzzi, sauna, locker rooms, showers, and restrooms. If a health club/spa has a gymnasium facility, use the gymnasium rate for that portion. Gymnasiums include basketball courts, volleyball courts, and any other large open space with low occupancy density.

<sup>3</sup> Lobby of retail includes lounges, holding rooms, waiting areas, etc.

**Exhibit M.2-12, continued**  
**SEWAGE GENERATION FACTORS**

Type Description	Average Daily Flow (Gpd/unit)
Medical Office/ Clinic	250/1000 Gr.sq.ft.
Mini-mall	80/1000 Gr.sq.ft.
Mortuary: Embalming	5/7 Gr.sq.ft.
Mortuary: Chapel	4/seat
Mortuary: Living Area	80/1000 Gr.sq.ft.
Motel: Use Guest Rooms Only	130/room
Museum: All Areas	20/1000 Gr.sq.ft.
Museum: Office over 15%	150/1000 Gr.sq.ft.
Museum: Sales Area	80/1000 Gr.sq.ft.
Office Building	150/1000 Gr.sq.ft.
Office Building with Cooling Tower	180/1000 Gr.sq.ft.
Plating Plant	80/1000 Gr.sq.ft. + Process Flow
Pool Hall (No Alcohol)	80/1000 Gr.sq.ft.
Post Office: Full Service <sup>4</sup>	150/1000 Gr.sq.ft.
Prisons	175/inmate
Residential Dorm: College or Residential	75/student
Residential: Apt. -Bachelor/single	80/dwelling Unit
Residential: Apt. - 1 Bedroom	120/dwelling Unit
Residential: Apt. - 2 Bedroom	160/dwelling Unit
Residential: Apt. - 3 Bedroom	200/dwelling Unit
Residential: Apt. - >3 Bedroom	40/additional bedroom
Residential: Boarding House	75/bed
Residential: Condo - 1 Bedroom	120/dwelling Unit
Residential: Condo - 2 Bedroom	160/dwelling Unit
Residential: Condo - 3 Bedroom	200/dwelling Unit
Residential: Condo - >3 Bedroom	40/additional bedroom
Residential: Duplex/ Townhouse/ SFD - 1 Bd.	130/dwelling Unit
Residential: Duplex/ Townhouse/ SFD - 2 Bd.	180/dwelling Unit
Residential: Duplex/ Townhouse/ SFD - 3 Bd.	230/dwelling Unit
Residential: Duplex/ Townhouse/ SFD - >3 Bd	50/additional bedroom
Residential: Room Addition – Bedroom	50/additional bedroom
Residential: Room Addition Other Than Bedroom	0
Residential: Room Conversion into Bedroom	50/additional bedroom
Residential: Room Conversion into Other Than Bedroom	0
Residential: Mobile Home	160/dwelling Unit
Residential: Artist 2/3 of Area	250/dwelling Unit
Residential: Artist Residence	80/dwelling Unit
Residential: Guest Home With Kitchen	See Residential: Apartment
Residential: Guest Home without Kitchen	50/bedroom
Rest Home	75/bed
Restaurant: Drive-in	40/stall
Restaurant: Drive-in	20/seat

<sup>4</sup> Full service post offices include U.S. Postal Service, UPS, Federal Express, and other private express mail services.



**Exhibit M.2-12, continued**  
**SEWAGE GENERATION FACTORS**

Type Description	Average Daily Flow (Gpd/unit)
Restaurant: Fast Food - Indoor Seat	20/seat
Restaurant: Fast Food - Outdoor Seat	12/seat
Restaurant: Full Service - Indoor Seat	30/seat
Restaurant: Full Service - Outdoor Seat	18/seat
Restaurant: Take-out	300/1000 Gr.sq.ft.
Retail Area	80/1000 Gr.sq.ft.
Rifle Range: Shooting Stalls, Shooting Lanes, Lobby	80/1000 Gr.sq.ft.
Rifle Range Facility: Bar, Restaurant	See Individual Categories
School: Arts/Dancing/Music (Part Time)	80/1000 Gr.sq.ft.
School: Arts/Dancing/Music (Full Time)	See type of school below
School: Day Care Center	8/child
School: Elementary or Junior High <sup>5</sup>	8/student
School: High School <sup>5</sup>	12/student
School: Kindergarten	200/1000 Gr.sq.ft.
School: Martial Arts (Part Time)	80/1000 Gr.sq.ft.
School: Martial Arts (Full Time) <sup>5</sup>	See type of school below
School: Nursery - Day Care	8/child
School: Special Class	8/student
School: Trade or Vocational <sup>5</sup>	12/student
School: Training <sup>5</sup>	12/student
School: University or College <sup>5</sup>	18/student
School: Dormitory <sup>6</sup>	75/student
School: Stadium, Pavilion	4/seat
Spa/ Jacuzzi: Commercial - with backwash	Process Flow
Spa/ Jacuzzi: Residential, replaceable filter crtrdg	0
Storage: Building/Warehouse	20/1000 Gr.sq.ft.
Storage: Self Storage Bldg.	20/1000 Gr.sq.ft.
Store: Ice Cream/Yogurt	80/1000 Gr.sq.ft.
Store: Retail	80/1000 Gr.sq.ft.
Studio: Film/ TV – Audience Viewing Room	4/seat
Studio: Film/ TV – Regular Use Indoor Filming Area	80/1000 Gr.sq.ft.
Studio: Film/ TV – Indust. Use Film Proc, Machine Shop	80/1000 Gr.sq.ft. + Process Flow
Studio: Recording	80/1000 Gr.sq.ft.
Swimming Pool: Commercial with backwash	Process Flow
Swimming Pool: Residential replaceable filter crtrdg	0
Tanning Salon: Independent, No Shower	80/1000 Gr.sq.ft.
Tanning Salon: Within a Health Spa/Club	800/1000 Gr.sq.ft.

<sup>5</sup> The sewage generation factor for schools based on student capacity covers the following facilities: classrooms and lecture halls, professors' offices, administration offices, laboratories for classes or research, libraries, bookstores, student/professor lounges, school cafeterias, warehouses and storage areas, auditoriums and gymnasiums. For any facility not listed under "schools" (e.g., stadium), see the generation factor listed for that land use type.

<sup>6</sup> The sewage generation factor for a college dormitory based on student capacity also includes the sewage generation factor for the dormitory cafeterias.

**Exhibit M.2-12, continued**  
**SEWAGE GENERATION FACTORS**

Type Description	Average Daily Flow (Gpd/unit)
Theatre: Drive-in	10/vehicle
Theatre: Live/Music/Opera	4/seat
Theatre: Cinema	4/seat
Tract: Commercial/ residential	1/acre
Trailer: Construction/Field Office	150/office
Veterinary Clinic/Office	280/1000 Gr.sq.ft.
Warehouse	20/1000 Gr.sq.ft.
Warehouse with Office	Use Factor for Each Separate Category
Waste Dump: Recreational	430/station
Wine Tasting Room: Kitchen	215/1000 Gr.sq.ft.
Wine Tasting Room: All Areas	80/1000 Gr.sq.ft.

Notes:

Gpd/unit = Gallons per day (gpd) per unit as indicated.

Gr.sq.ft. = Gross Square Feet: area included within the exterior or the surrounding walls of a building excluding courts.

GPM Peak = Peak Flow in gallons per minute. There is an assumption that the peak to average flow ratio is 3.5. Therefore, 1.0 gpm x 1440 minutes/day divided by 3.5 = 412 gpd which is the unit flow factor in the table.

See next page for metric equivalents.

Source: Bureau of Sanitation. Sewerage Facilities Charge, Sewage Generation Factors for Residential and Commercial Categories. Effective June 6, 1996.