

Scottish Rite Center San Diego, California

Private Sanitary Sewer System Sizing Calculations

Prepared by:

Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
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Job Number 536-013/4



Prepared for:

San Dieguito Engineering, Inc.

Approach to the Project:

Sizing of the private sanitary sewer system for the Scottish Rite project is based on an approach consistent with the 2016 California Plumbing Code, Chapter 7 Sanitary Drainage.

The procedure we followed was to estimate the number of Drainage Fixture Units for the two-story building within the project. Once the Drainage Fixture Units (DFUs) were determined, we used the Plumbing Code Table 703.2 to determine the size of the sewer lines. Table 703.2 requires sewer lines to have a minimum slope of 1/8 inch per foot.

Detailed Presentation of the Calculations:

The following page includes the spreadsheet calculations done to determine the total project DFUs. Architectural plans were provided which illustrate some of the proposed water fixtures; the layout of the kitchen facility and location of other miscellaneous fixtures such as floor drains are unknown. Assumptions were made related to the fixtures in the kitchen area as well as the addition of floor drains and mop sinks which may be necessary but not available on architectural plans at this time. The following pages present the summary of DFUs and the approach toward their estimation.

Project Name Scottish Rite Center
 Sewer System Analysis

Job Number 536-013/4
 Date 1/20/2020

Drainage Fixture Units:

The basis for the Drainage Fixture Units is the 2016 California Plumbing Code (Assembly Use).

DESCRIPTION	First Floor			Second Floor		
	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS
CLOTHES WASHER	0	3	0	0	3	0
TUB/SHOWER	0	2	0	0	2	0
SHOWER	0	2	0	0	2	0
KITCHEN SINK	4	3	12	0	3	0
BAR SINK	0	2	0	0	2	0
WASHUP FAUCET	2	2	4	0	2	0
DISHWASHER	2	2	4	0	2	0
LAUNDRY SINK	0	2	0	0	2	0
SERVICE SINK	2	3	6	1	3	3
LAVATORY	7	2	14	5	2	10
URINAL	3	5	15	2	5	10
WATER CLOSET (1.6 GPF FT, private)	0	6	0	0	6	0
WATER CLOSET (1.6 GPF FV, private)	10	6	60	9	6	54
DRINKING FOUNTAIN	2	1	2	2	1	2
FLOOR DRAIN	4	2	8	0	2	0
TOTAL			125			79

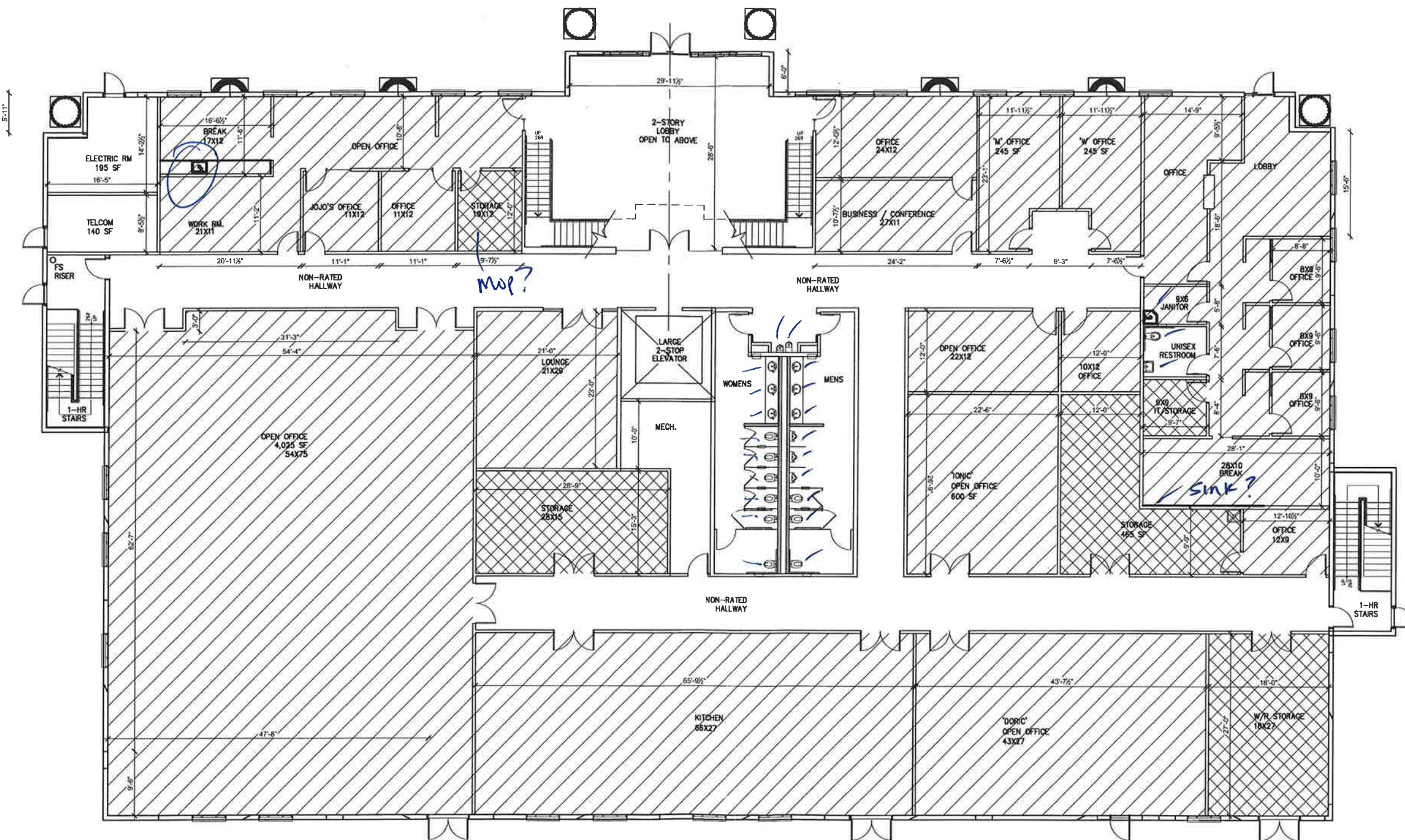
*Estimated based on preliminary information.

*Assembly use assumed.

Potentially to GGI (no kitchen layout)

TOTAL DFU = 204.0

Since 35 is max for 3" and 216 is max for 4", assume grease and sanitary are both 4", with 6" to street.

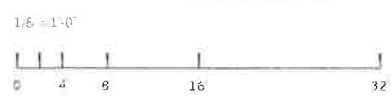


- 10 WC
- 3 Urinal
- 7 1/2 Lav
- 2 Water Ftn
- 2 + Sink (other) *
- 2 + Mop *
- 2' Hose Bib *
- 2 Dishwasher **
- 4 Sinks **

* Assumed
 ** Assumed kitchen

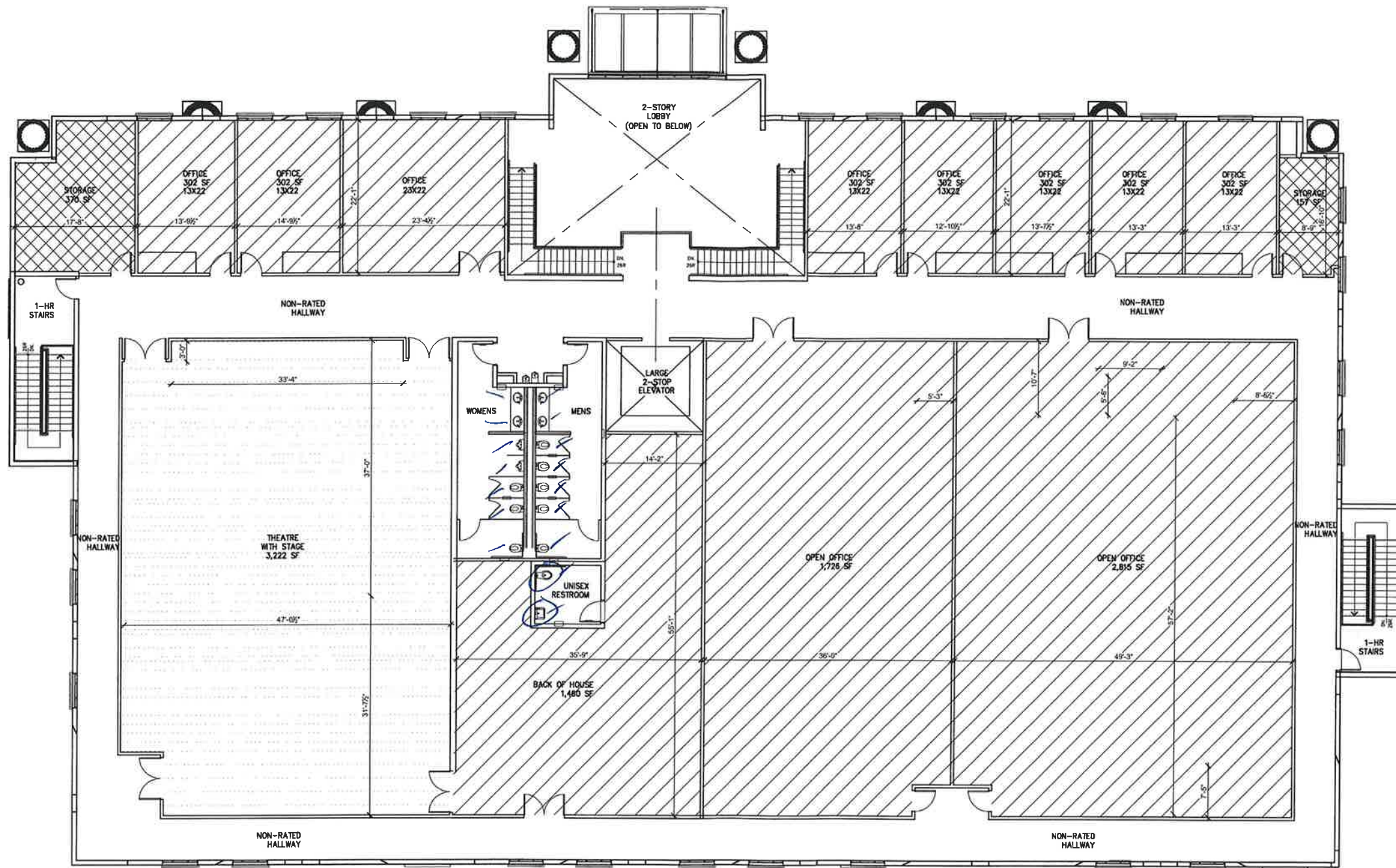
- BUSINESS USE +/-12,413 SF
- STORAGE +/-1,472 SF
- ASSEMBLY USE

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1st Floor
 Dexter Wilson Engineering, Inc.
 1-15-2020



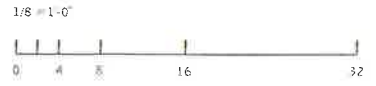


9 WC
 2 Urinal
 5 Lav
 2 Water Ftn
 0 Sink (other)
 1 MOP *

* Assumed

-  BUSINESS USE +/-8,457 SF
-  STORAGE +/-496 SF
-  ASSEMBLY USE +/-3,161 SF

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2ND FLOOR

Dexter Wilson Engineering, Inc.
 1-15-2020



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SCOTTISH RITE /
 HOME DEPOT
 1895 & 1561 CAMINO DEL RIO S
 SAN DIEGO, CA 92108

FLOOR-02
A-SR-3
 (2020-01-16) 18134.00

The total Drainage Fixture Unit count is 204 DFUs for the two-story building. Based on the proposed layout of the sewer system, the pipe size for the main sewer line was determined using the maximum unit loadings found in Table 703.2 of the Plumbing Code. The unit loadings given in Table 703.2 are for pipes sloped at sloped at 1/4-inch per foot or 1/8-inch per foot if multiplied by a factor of 0.8 for pipe that is 4-inch in diameter or larger.

Sanitary sewer piping for the Scottish Rite Center will potentially consist of grease waste from the kitchen facility as well as sanitary waste. Since the fixture units within the kitchen are not yet known and the plumbing plans have yet to be prepared for the remainder of the Scottish Rite Center, the sizing of the sanitary lines should be conservatively sized and also consider achievable slope.

For the grease waste, 4-inch piping should be sufficient based on our preliminary estimate of fixtures from the kitchen that would go to grease waste. At 20 DFUs, 4-inch piping would be sufficient at the 1/8-inch per foot slope or greater; this slope cannot be decreased. For the sanitary waste, 4-inch piping would be sufficient at 1/4-inch per foot or greater; this slope could not be decreased. For the combination piping downstream of the GGI, based on the assumptions herein, 6-inch piping would be sufficient at the 1/8-inch per foot slope or greater.

Table 703.2 from the 2016 Plumbing Code is included for your reference as well as Figure 1 showing the recommended sizing.

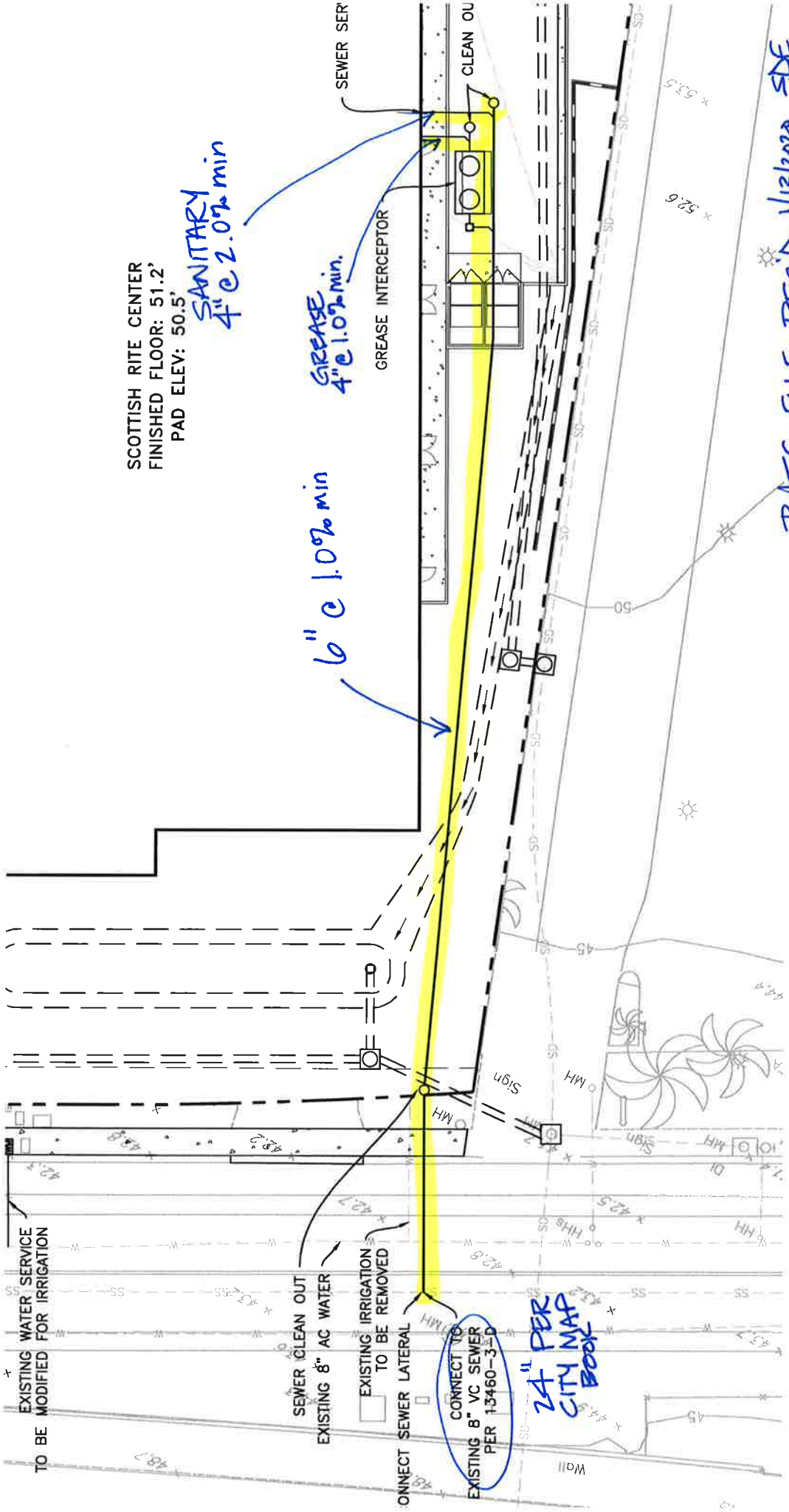
**TABLE 703.2
MAXIMUM UNIT LOADING AND MAXIMUM LENGTH OF DRAINAGE AND VENT PIPING**

SIZE OF PIPE (Inches)	1¼	1½	2	3	4	5	6	8	10	12
Maximum Units Drainage Piping¹										
Vertical	1	2 ²	16 ³	48 ⁴	256	600	1380	3600	5600	8400
Horizontal	1	1	8 ³	35 ⁴	216 ⁵	428 ⁵	720 ⁵	2640 ⁵	4680 ⁵	8200 ⁵
Maximum Length Drainage Piping										
Vertical, (feet)	45	65	85	212	300	390	510	750	—	—
Horizontal (unlimited)										
Vent Piping Horizontal and Vertical⁶										
Maximum Units	1	8 ³	24	84	256	600	1380	3600	—	—
Maximum Lengths, (feet)	45	60	120	212	300	390	510	750		

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm

Notes:

- ¹ Excluding trap arm.
- ² Except sinks, urinals, and dishwashers – exceeding 1 fixture unit.
- ³ Except six-unit traps or water closets.
- ⁴ Only four water closets or six-unit traps allowed on a vertical pipe or stack; and not to exceed three water closets or six-unit traps on a horizontal branch or drain.
- ⁵ Based on ¼ inch per foot (20.8 mm/m) slope. For ⅛ of an inch per foot (10.4 mm/m) slope, multiply horizontal fixture units by a factor of 0.8.
- ⁶ The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. Fixture unit load values for drainage and vent piping shall be computed from Table 702.1 and Table 702.2(2). Not to exceed one-third of the total permitted length of a vent shall be permitted to be installed in a horizontal position. Where vents are increased one pipe size for their entire length, the maximum length limitations specified in this table do not apply. This table is in accordance with the requirements of Section 901.3.



SCOTTISH RITE CENTER
 FINISHED FLOOR: 51.2'
 PAD ELEV: 50.5'

SANITARY
 4" @ 2.0% min

GREASE
 4" @ 1.0% min.

6" @ 1.0% min

SEWER SER

CLEAN OU

GREASE INTERCEPTOR

EXISTING WATER SERVICE
 TO BE MODIFIED FOR IRRIGATION

SEWER CLEAN OUT
 EXISTING 8" AC WATER

EXISTING IRRIGATION
 TO BE REMOVED

CONNECT SEWER LATERAL

CONNECT TO
 EXISTING 8" VC SEWER
 PER 13460-3-D

24 PER
 CITY MAP
 BOOK

BASE FILE REED 1/13/2020 SDE

FIGURE 1
 SANITARY

**The Home Depot,
Mission Valley**

San Diego, California

**Private Sanitary Sewer System
Sizing Calculations**

Prepared by:

**Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
(760) 438-4422**



Job Number 536-013/5

Prepared for:

San Dieguito Engineering, Inc.

Approach to the Project:

Sizing of the private sanitary sewer system for The Home Depot project is based on an approach consistent with the 2016 California Plumbing Code, Chapter 7 Sanitary Drainage.

The procedure we followed was to estimate the number of Drainage Fixture Units for the store/garden center within the project. Once the Drainage Fixture Units (DFUs) were determined, we used the Plumbing Code Table 703.2 to determine the size of the sewer lines. Table 703.2 requires sewer lines to have a minimum slope of 1/8 inch per foot.

Detailed Presentation of the Calculations:

The following page includes the spreadsheet calculations done to determine the total project DFUs. Architectural plans were provided which illustrate some of the proposed water fixtures; the location of other miscellaneous fixtures such as floor drains are unknown. Assumptions were made related to the addition of floor drains and mop sinks which may be necessary but not available on architectural plans at this time. The following pages present the summary of DFUs and the approach toward their estimation.

Project Name Home Depot, Mission Valley
Sewer System Analysis

Job Number 536-013/5
Date 1/20/2020

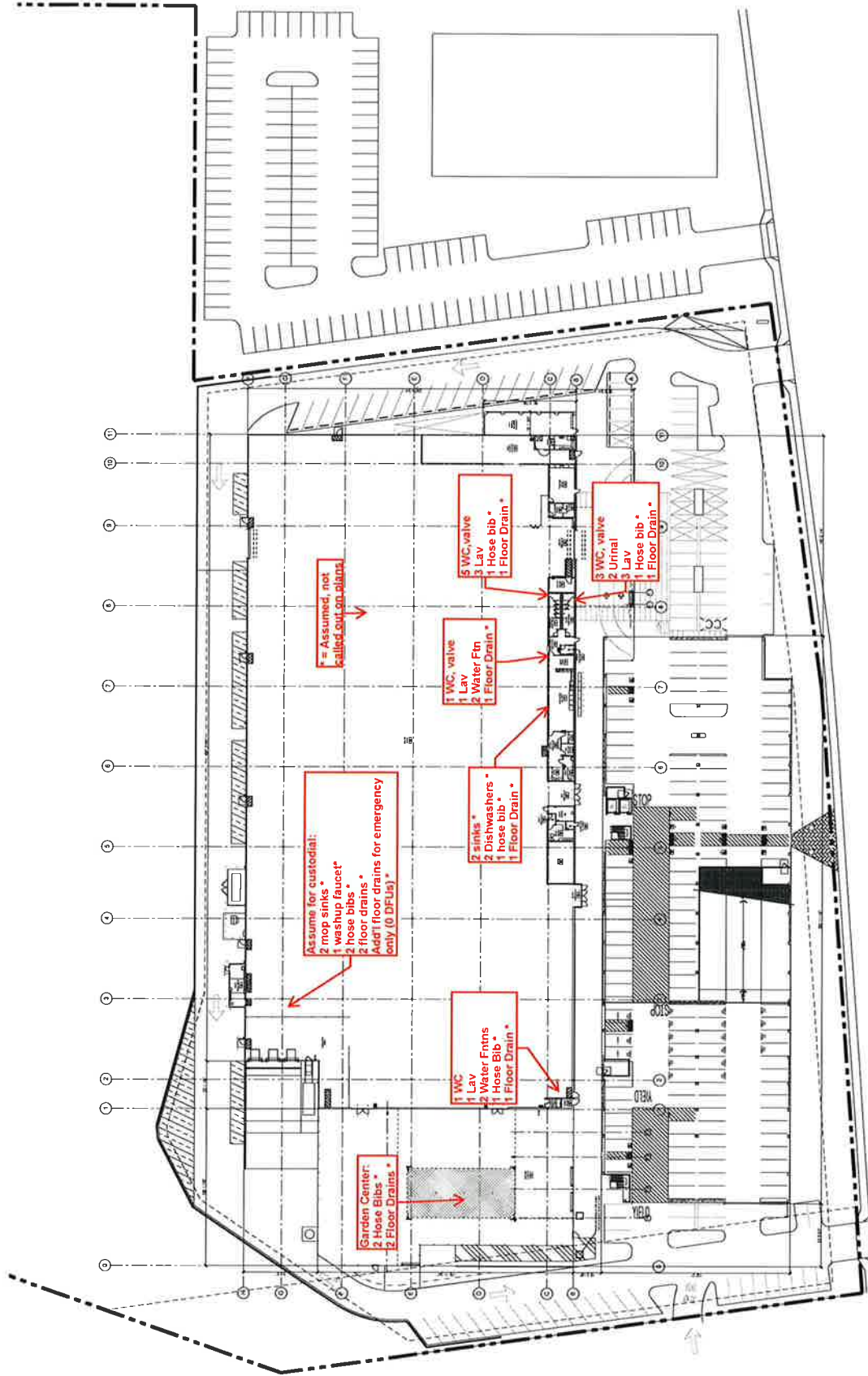
Drainage Fixture Units:

The basis for the Drainage Fixture Units is the 2016 California Plumbing Code.

DESCRIPTION	FIXTURE TOTAL	
	QUANTITY	FIXTURE UNITS
CLOTHES WASHER	0	3
TUB/SHOWER	0	2
SHOWER	0	2
KITCHEN SINK	2	3
BAR SINK	0	2
WASHUP FAUCET	1	2
DISHWASHER	2	2
LAUNDRY SINK	0	2
SERVICE SINK	2	3
LAVATORY	8	2
URINAL	2	5
WATER CLOSET (1.6 GPF FT, private)	0	6
WATER CLOSET (1.6 GPF FV, private)	10	6
DRINKING FOUNTAIN	4	1
FLOOR DRAIN	9	2
TOTAL		126

*Estimated based on preliminary information.
*Public use assumed.

TOTAL DFU = 126.0



01 FLOOR PLAN
SCALE: 1/32" = 1'-0"



PROJECT NORTH

SCOTTISH RITE / HOME DEPOT
PLAN A-HD-1
JANUARY 14, 2020 18'x34.00

1895 & 1561 CAMINO DEL RIO S
SAN DIEGO, CA 92108



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Leading Design for Commercial Real Estate



The total Drainage Fixture Unit count is 126.0 DFUs for the store area/garden center. Based on the proposed layout of the sewer system, the pipe size for the main sewer line was determined using the maximum unit loadings found in Table 703.2 of the Plumbing Code. The unit loadings given in Table 703.2 are for pipes sloped at 1/4-inch per foot or 1/8-inch per foot if multiplied by a factor of 0.8 for pipe that is 4-inch in diameter or larger.

4-inch piping installed at 1/8-inch per foot would allow for a maximum of 172.8 DFUs and 6-inch piping installed at 1/8-inch per foot would allow for a maximum of 576 DFUs. Because the final count of drainage fixtures is unknown as well as whether they will discharge to the eastern or western branch of the onsite sewer system prior to combining in the center of the site, it is recommended to plan for 6-inch piping throughout the site at the 1/8-inch per foot slope. The 1/8-inch per foot slope may be increased; this slope cannot be decreased.

Table 703.2 from the 2016 Plumbing Code is included for your reference as well as Figure 1 showing the recommended sizing.

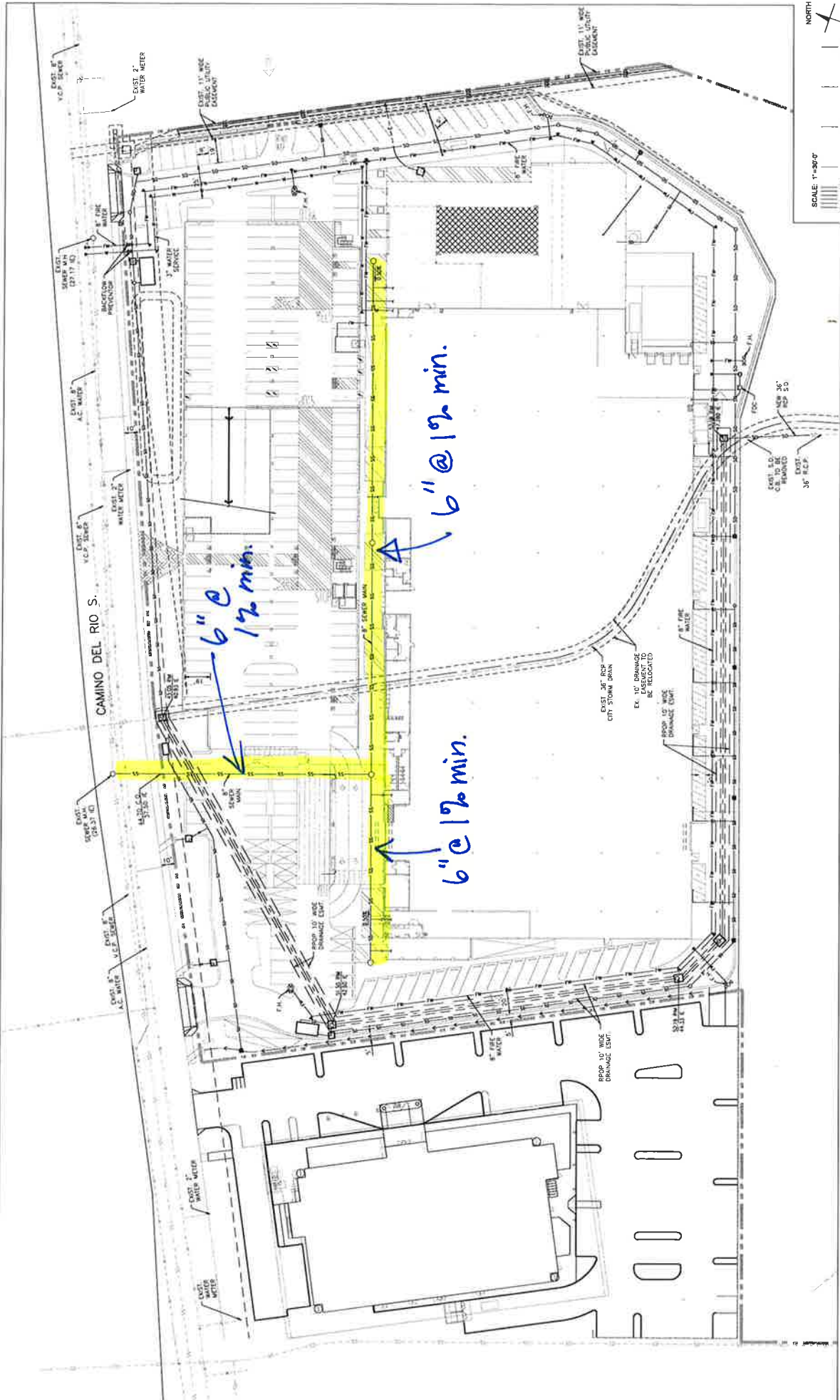
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Maximum Length Drainage Piping										
Vertical, (feet)										
Horizontal (unlimited)	45	65	85	212	300	390	510	750	—	—
Vent Piping (Horizontal and Vertical)⁶										
Maximum Units	1	8 ³	24	84	256	600	1380	3600	—	—
Maximum Lengths, (feet)	45	60	120	212	300	390	510	750		

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm

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- ¹ Excluding trap arm.
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- ⁵ Based on ¼ inch per foot (20.8 mm/m) slope. For ½ of an inch per foot (10.4 mm/m) slope, multiply horizontal fixture units by a factor of 0.8.
- ⁶ The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. Fixture unit load values for drainage and vent piping shall be computed from Table 702.1 and Table 702.2(2). Not to exceed one-third of the total permitted length of a vent shall be permitted to be installed in a horizontal position. Where vents are increased one pipe size for their entire length, the maximum length limitations specified in this table do not apply. This table is in accordance with the requirements of Section 901.3.



UTILITY PLAN
 C-2
 THE HOME DEPOT
 1895 CAMINO DEL RIO S
 SAN DIEGO, CA 92108

PROGRESS PRINT - 01/06/2020

FIGURE 1
 SEWER

SAN DIEGO ENGINEERING, INC.
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