CRWMS/M&O

Non-Q Design Analysis Cover Sheet

Complete only applicable items.

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QA: N/A

Page: 1 Of: 5

2. DESIGN ANALYSIS TITLE

NORTH PORTAL - SANITARY SEWER CALCULATION - CHANGE HOUSE FACILITY #5008

(SCPB: N/A)

3. DOCUMENT IDENTIFIER (Including Rev. No.)

BABBAF000-01717-0200-00157 REV 01

4. REV. NO.

01

5. TOTAL PAGES

5

6. TOTAL ATTACHMENTS

1

7. ATTACHMENT NUMBERS - NO. OF PAGES IN EACH

I-3

8. SYSTEM ELEMENT

MGDS

Print Name

Signature

Date

9. Originator

R. Blackstone

 FOR R. BLACKSTONE

1-24-96

10. Checker

D. F. Vanica

1-24-96

11. Lead Design Engineer

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1-24-96

12. Department Manager

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1-25-96

13. Remarks

Design Analysis Revision Record

Complete only applicable items.

①

Page: 2

Of: 5

2. DESIGN ANALYSIS TITLE

NORTH PORTAL - SANITARY SEWER CALCULATION - CHANGE HOUSE FACILITY #5008

3. DOCUMENT IDENTIFIER (Including Rev. No.)

BABBAF000-01717-0200-00157 REV 01

4. Revision No.	5. Description of Revision
00 01	Initial Issue Reformatted to NAP-MG-013, Rev. 0 Deleted TBV-122 Changed QA Classification to QA: N/A

1. PURPOSE

The purpose of this design calculation is to determine the demand on the waste system and to size the three main sanitary sewer lines serving the Change House Facility #5008, in accordance with the Uniform Plumbing Code (Section 4.4.1) and U.S. Department of Energy Order 6430.1A-1540 (Section 4.4.2).

2. QUALITY ASSURANCE

This analysis is non-Q because it is for a temporary item. Determination of Importance Evaluations (References 5.1, 5.2) of the Change House Facility and Sanitary Sewer Collection System has determined that no quality assurance (QA) controls are applicable within the context of this analysis.

3. METHOD

The method used for the calculations is based on the guidelines from Section 4.4.1. Fixture units are assigned for each plumbing fixture that determines the total fixture units. The size of the drainage and vent pipe is determined in accordance with Section 4.4.1.

4. DESIGN INPUTS

4.1 DESIGN PARAMETERS

Number of plumbing fixture units:

85	Area 1	Attachment I
55	Area 2	Attachment I
34	Area 3	Attachment I

4.2 CRITERIA

The Plumbing Design for the change house facility will be designed in accordance with DOE Order 6430.1A (Section 4.4.2) and appropriate state and local codes (ESFDR Sections 3.2.1Q, 3.2.1R, and 3.2.1S, Reference 5.4).

4.3 ASSUMPTIONS

Not used.

4.4 CODES AND STANDARDS

4.4.1 International Association of Plumbing and Mechanical Officials:

UPC 1991 Uniform Plumbing Code

4.4.2 U.S. Department of Energy (DOE):

DOE Order 6430.1A - 89 General Design Criteria

5. REFERENCES

- 5.1 Determination of Importance Evaluation for ESF Change House Facility and Shop Building BABBA0000-01717-2200-00007 Rev. 00.
- 5.2 Determination of Importance Evaluation for Subsurface Wastewater (Surface Portion) and Sanitary Sewer Collection Systems BABBD0000-01717-2200-00009 Rev. 02.
- 5.3 Plumbing Drawings:
 - 5.3.1 BABBAF000-01717-2100-27150-01 Change House - Bldg 5008 Plumbing Isometrics and Details
 - 5.3.2 BABBAF000-01717-2100-27151-00 Change House - Bldg 5008 Plumbing and Piping Plan
 - 5.3.3 BABBAF000-01717-2100-27152-00 Change House - Bldg 5008 Plumbing Enlarged Plans
- 5.4 Yucca Mountain Site Characterization Project Exploratory Studies Facility Design Requirements, YMP/CM-0019, REV. 1, ICN 3

6. USE OF COMPUTER SOFTWARE

Not used.

7. DESIGN ANALYSIS

The number of plumbing fixtures is determined by reviewing the plumbing plan drawings (Reference 5.3) for the Change House Facility. For each type of fixture, the UPC (Section 4.4.1) assigns a unit value. The product of the number of plumbing fixtures and the unit value for each type

of fixture nets the total number of fixture units. This number is then used to size the sewer main, as shown in the UPC, Table 4-3 (Section 4.4.1).

8. CONCLUSIONS

Based on the calculations, a 4-inch sewer main is required for each of the three areas in the Change House Facility containing sanitary accommodations.

9. ATTACHMENTS

ATTACHMENT

TITLE

I

Calculations

Title: North Portal - Sanitary Sewer Calculation -
Change House Facility #5008

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CALCULATIONS

AREA 1		SANITARY SEWER		
Fixture	No. Req'd A*	Units per Fixture B**	Fixture Units A x B	Remarks
Water Closet	5	6	30	
Urinal	3	2	6	
Lavatory				
Lavatories (Sets)				
Wash Fountain	2	3	6	
Shower (Stall)				
Shower Drain (Gang)	4	6	24	
Service Sink	1	2	2	
Mop Sink	1	3	3	
Lab Sink				
Cup Sink				
Kitchen Sink				
Electric Water Cooler				
Floor Drain	4	2	8	
Floor Sink	3	2	6	
Total Fixture Units			85	= 4 Inch Building Sewer

* Number of Fixture Units required was obtained from References 5.3.1, 5.3.2, and 5.3.3.

** Units per Fixture are obtained from Table 4-1 of UPC (Section 4.4.1). From Table 4-3 of UPC, a 4-inch diameter sewer is required for 85 fixture units.

Title: North Portal - Sanitary Sewer Calculation -
Change House Facility #5008

CALCULATIONS (Continued)

AREA 2		SANITARY SEWER		
Fixture	No. Req'd A*	Units per Fixture B**	Fixture Units A x B	Remarks
Water Closet	3	6	18	
Urinal	1	2	2	
Lavatory	3	1	3	
Lavatories (Sets)				
Wash Fountain				
Shower (Stall)				
Shower Drain (Gang)				
Service Sink	3	2	6	
Mop Sink	1	3	3	
Lab Sink				
Cup Sink				
Kitchen Sink				
Electric Water Cooler				
Floor Drain	4	2	8	
Floor Sink				
Boot Wash	5	3	15	
Total Fixture Units			55	= 4 Inch Building Sewer

* Number of Fixture Units required was obtained from References 5.3.1, 5.3.2, and 5.3.3.

** Units per Fixture are obtained from Table 4-1 of UPC (Section 4.4.1). From Table 4-3 of UPC, a 4-inch diameter sewer is required for 55 fixture units.

Title: North Portal - Sanitary Sewer Calculation -
Change House Facility #5008

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CALCULATIONS (Continued)

AREA 3		SANITARY SEWER		
Fixture	No. Req'd A*	Units per Fixture B**	Fixture Units A x B	Remarks
Water Closet	2	6	12	
Urinal	1	2	2	
Lavatory	4	1	4	
Lavatories (Sets)				
Wash Fountain				
Shower (Stall)	4	2	8	
Shower Drain (Gang)				
Service Sink				
Mop Sink				
Lab Sink				
Cup Sink				
Kitchen Sink				
Electric Water Cooler				
Floor Drain	4	2	8	
Floor Sink				
Total Fixture Units			34	= 4 Inch Building Sewer

* Number of Fixture Units required was obtained from References 5.3.1, 5.3.2, and 5.3.3.

** Units per Fixture are obtained from Table 4-1 of UPC (Section 4.4.1). From Table 4-3 of UPC, a 4-inch diameter sewer is required for 34 fixture units.