Appendix G1: Preliminary Sewer Report

Appendices

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Appendix G1: Preliminary Sewer Report

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HUNSAKER
& ASSOCIATES
IRVINE, INC.

PLANNING
ENGINEERING
SURVEYING
GOVERNMENT RELATIONS

IRVINE
LOS ANGELES
RIVERSIDE
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Preliminary Sewer System Hydraulic Analysis

Date: July 9, 2024

For: City of Brea
Public Works
Brea, CA

By: Katie O'Connor, P.E.
Hunsaker & Associates Irvine, Inc.

Project:**Greenbriar**

Hunsaker & Associates Irvine, Inc. (H&A) is pleased to submit the Preliminary Sewer System Hydraulic Analysis for the Greenbriar development. This analysis has been prepared to describe the proposed sewer system for the aforementioned residential development project and examine the existing sewer system in the City of Brea. The project lies within the jurisdiction of the City of Brea and their standards have been used for this report. Hydraulic models were prepared using Bentley Systems modeling software to model the peak flows the proposed sewer systems would experience.

THE EXISTING AND PROPOSED SEWER COLLECTION SYSTEM FOR THE GREENBRIAR PROJECT MEETS THE DESIGN STANDARDS SPECIFIED BY THE CITY OF BREA. This evaluation is based on existing and known conditions and should be re-evaluated if these conditions change or new information becomes available. Any interpretation of the information presented in this report should be referred to H&A to ensure the integrity of the results.

Project Location

The Greenbriar project is a proposed 179 unit residential development located adjacent to the 57 freeway, south of Greenbriar Lane, and west of Associated Road. The project is north of the existing Brea Plaza commercial development.

Summary of Findings

1. The development will include 99 multifamily residential units and 80 high density residential units on approximately 9.5 acres.

2. The proposed sewer system schematic is shown on the attached “Greenbriar Preliminary Sewer Exhibit – Figure 1.” The exhibit identifies points of sewer connection, sewer reaches, manholes, proposed and existing sewer mains that are affected by the proposed development.

3. The proposed onsite private sewer collection system consists of 6-inch diameter mains to be constructed at slopes of one percent or greater. The existing sewer mains examined include an 8-inch sewer main in Greenbriar Lane and 12-inch sewer mains in Associated Road.

4. The proposed sewer system is a private system. At the direction of the City of Brea, public sewer flow criteria and design criteria were used to design the proposed sewer system.

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5. The proposed development is on the site of the existing Mercury Insurance Complex. City of Brea Sewer Master Plan (November 2021) provides a unit flow factor of 4,805 gallons per day per acre for Administrative and Professional Office land uses. Excerpt from the Sewer Master Plan (November 2021) can be found in the Appendix. Based on the duty factors and peaking equation provided in the City of Brea Sewer Master Plan (November 2021), the existing commercial site adds the flows below into the existing system:

Table 1: Mercury Insurance Complex Existing Sewer Flows

	CITY OF BREA UNIT FLOW FACTOR	SITE (acres)	AVERAGE DRY WEATHER FLOW (ADWF) (MGD)	PEAK DRY WEATHER FLOW (PDWF)	PEAK WET WEATHER FLOW (PWWF)
EXISTING MERCURY INSURANCE COMPLEX	4,805 gallons per day per acre	9.5	ADWF = Unit Flow Factor*acre =4,805 gpd/ac*9.5 ac **=0.046 MGD**	PDWF = 1.777*ADWF^0.92 =1.777*0.046 MGD^0.92 **=0.105 MGD**	PWWF = 1.25*PDWF =1.25 * 0.105 MDG **=0.131 MGD**

6. The total estimated sanitary sewer flows for the proposed Greenbriar residential development are based upon Table ES-1 of the City of Brea Sewer Master Plan (November 2021). The City Average Dry Weather Flow factor is 210 gpd/DU for high density residential with a density of 12.1-24.89 DU/AC. The proposed project is 18.84 DU/acre. The table below summarizes the City of Brea Design Criteria as provided in the Table ES-2 of the Sewer Master Plan (November 2021).

TABLE ES-2 SUMMARY: CITY OF BREA DESIGN CRITERIA

	AVERAGE DRY WEATHER FLOW (ADWF)	PEAK DRY WEATHER FLOW (PDWF)	PEAK WET WEATHER FLOW (PWWF)
FLOWS	ADWF = Unit Flow Factor*DU	PDWF = 1.777*ADWF^0.92	PWWF = 1.25*PDWF
VELOCITY	ADWF Velocity> 2 fps	3 fps<PDWF Velocity<5 fps	
NEW CONSTRUCTION d/D	N/A	0.50	0.75
EXISTING CONSTRUCTION d/D	N/A	0.64	0.75

7. The sewer system for the proposed Greenbriar residential development was designed to meet all the design criteria contained within the City of Brea Sewer Master Plan (November 2021) and industry standards.

8. Industry standards allow for pipes that do not have the volume of flow to obtain the minimum required velocity due to the number of connections and/ or topographic constraints to be constructed at one percent minimum. Every effort will be made during final engineering design for the slopes to be greater than one percent and for velocities to exceed 2 feet per second during average dry weather flows and 3 feet per second during peak dry weather flow.

9. The proposed pipe analysis was provided for the pipes labeled P-30 and P-31 at a slope of one percent. These pipes have the with the maximum and minimum sewer flows from the entire development. The representative pipes depict the worst possible scenario for the project site.

10. The City of Brea Sewer Master Plan (November 2021) has the following information on the existing sewer mains affected by the proposed development:

Table 2: Existing Sewer Flows Summary

EX. PIPE ID	SLOPE (ft/ft)	EX. ADWF (mgd)	EX PDWF (mgd)	EX PDWF Velocity (fps)	EX. PDWF d/D
A26-A27	0.0099	0.441235	0.837112	4.17	0.42
A27-A28	0.0088	0.44211	0.868676	3.99	0.43
A28-A29	0.0088	0.45614	0.863093	4.03	0.44
A29-A30	0.0098	0.45614	0.863093	4.91	0.43
A30-OUTLET	0.0111	0.474686	0.895326	4.43	0.42

11. Sewer main segment P-32 is an existing sewer main in Greenbriar Lane that the proposed project will connect to. The existing flows and capacity for this pipe segment can be determined using the information in the Sewer Master Plan. The difference between the flows in pipe A25-A26 (pipe upstream of P-32) and the flows in pipe A26-A27 (downstream of P-32) are equivalent to the existing flows in P-32.

Table 3: Existing Flows from Greenbriar Lane into Associated Road

EXISTING PIPE ID	LOCATION	EXISTING PDWF (mgd)	EXISTING ADWF (mgd)
A25-A26	Upstream Greenbriar Lane	0.664013	0.331801
A26-A27	Downstream Greenbriar Lane	0.837112	0.441235
P-32	Greenbriar Lane	0.17310*	0.109434*

*P32 EXISTING= (A25-A26 EXISTING– A26-A27 EXISTING)

12. The proposed development of 179 residential units produces the following sewer flows:

Table 4: Proposed Greenbriar Residential Development Sewer Flows

	UNITS (DU)	DUTY FACTOR (gpd/DU)	ADWF (mgd)	PDWF (mgd)	PWWF (mgd)
TOTALS	179	210	0.03759	0.0868	0.1086

13. As calculated in Table 1, the existing flows from the Mercury Insurance Complex (based on November 2021 City of Brea Sewer Master Plan duty and peaking factors) are greater than the expected proposed flows from the Greenbriar residential development calculated in Table 4. The table below compares the flows:

Table 5: Greenbriar Site Sewer Flow Comparison

	ADWF (mgd)	PDWF (mgd)	PWWF (mgd)
Existing Mercury Insurance Complex (Table 1)	0.046	0.105	0.131
Proposed Residential Development (Table 4)	0.038	0.087	0.109

14. The flows calculated using the criteria in the November 2021 Sewer Master Plan for the proposed Greenbriar residential development are less than the calculated flows being removed from the system with the redevelopment of the existing Mercury Insurance Complex.

15. The existing sewer system's capacity and ability to accept additional flows from the proposed residential development was calculated using the existing flows in the existing sewer system without accounting for the loss of flows from the removal of the Mercury Insurance Complex. This method of analysis will provide an additional factor of safety for the overall system.

16. In order to calculate the pipe sizes and capacity of the proposed sewer system for Greenbriar and verify that the existing system has capacity to accept flows from Greenbriar, we have prepared a hydraulic model using Bentley FlowMaster V8i. The summary of outputs from the model runs is included in the Appendix of this report.

17. The hydraulic model of the existing sewer system that is affected by the Greenbriar residential development, using the design criteria provided by the City of Brea, indicates the existing sewer system has capacity for the development. Additionally, the proposed system will be designed in final engineering to meet or exceed the criteria presented in this report.

We sincerely trust these calculations will provide sufficient evidence that the proposed and existing sewer system is adequate for the proposed Greenbriar development. Please contact me at (949) 458-5437 if you have any questions.

KO
Enclosures
xc: Gary Jones, Lennar
Peter Carlson, CSLS
Kamal Karam, H&A
Sean Swanson, H&A

W.O. 3916-89X
(F:\1285\Engineering\WS STUDIES\SEWER\Greenbriar Prelim_ss report.doc)

SEE FIGURE APP 4-1f
SEWERSHED 6 (ASSOCIATED) AND MAINLINE SEWER FROM THE CITY OF BREA SEWER MASTER PLAN FOR EXISTING PIPE NODES

LEGEND

- SEWER JUNCTION
- P-# — PROPOSED 6" SEWER MAINS & PIPE NUMBER
- P-# — EXISTING 8" SEWER MAINS & PIPE NUMBER
- EXISTING 12" SEWER MAINS & PIPE NUMBER

GRAPHIC SCALE: 1"=80'

PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92615

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949)583-1010 ▪ FX: (949)583-0759

GREENBRIAR PRELIMINARY SEWER EXHIBIT

WO NO. 3916-89X | DATE: 9 JULY 2024

FIGURE 1

PLOTTED BY: katieo DATE: Jul. 09, 2024 TIME: 01:21 PM

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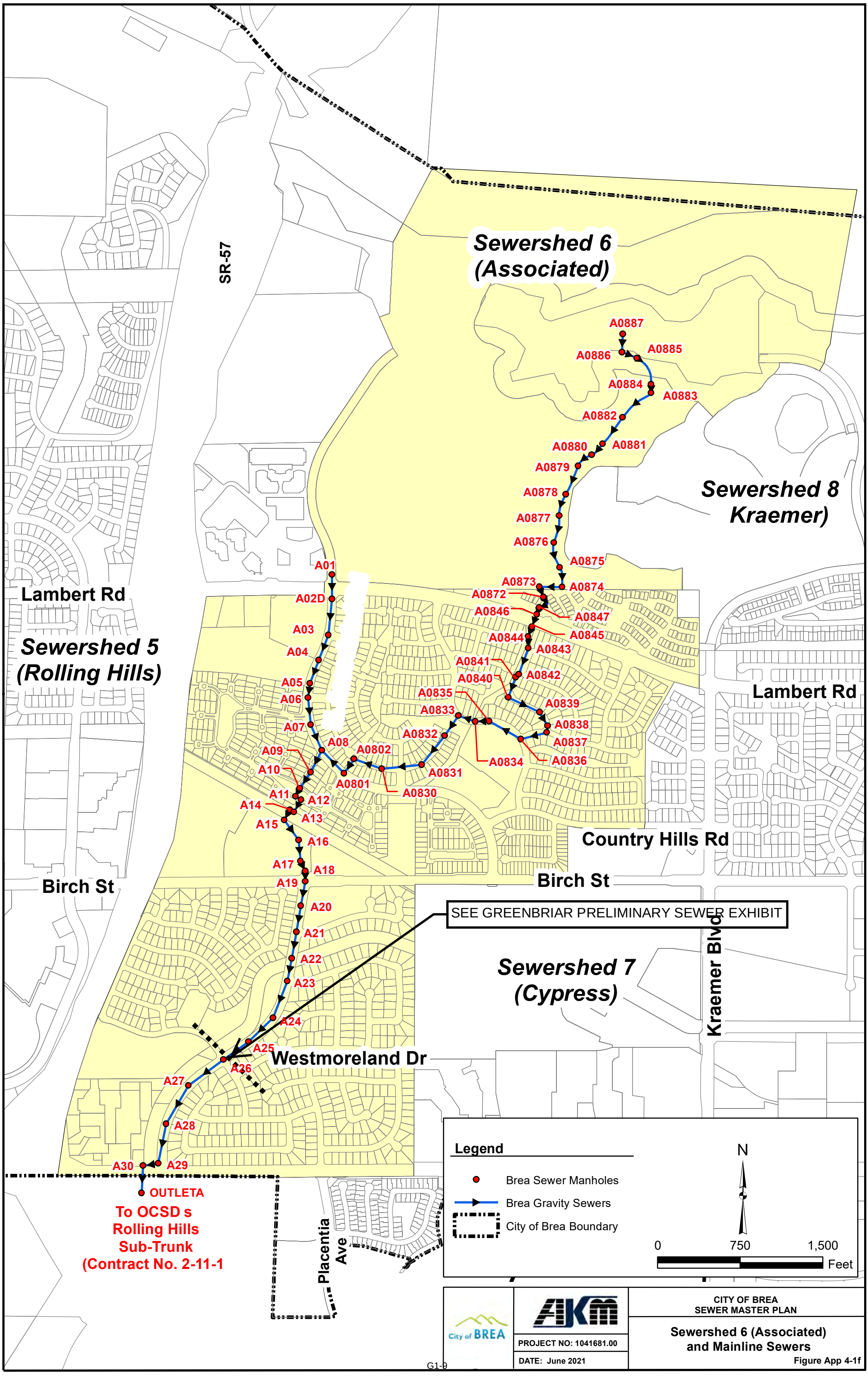
Sewershed 6
(Associated)
Sewershed 8
Kraemer)
Sewershed 5
(Rolling Hills)
Sewershed 7
(Cypress)
SR-57
Lambert Rd
Lambert Rd
Country Hills Rd
Birch St
Birch St
Kraemer Blvd
Placentia Ave
Westmoreland Dr
A01
A02D
A03
A04
A05
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OUTLETA
A0801
A0802
A0830
A0831
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To OCSD s
Rolling Hills
Sub-Trunk
(Contract No. 2-11-1
SEE GREENBRIAR PRELIMINARY SEWER EXHIBIT
Legend
Brea Sewer Manholes
Brea Gravity Sewers
City of Brea Boundary
N
0
750
1,500
Feet
City of BREA
AKM
CITY OF BREA
SEWER MASTER PLAN
PROJECT NO: 1041681.00
DATE: June 2021
Sewershed 6 (Associated)
and Mainline Sewers
Figure App 4-1f

APPENDIX

GREENBRIAR EXISTING PIPES: SEWER FLOW SUMMARY

Information from Sewer Master Plan (EXISTING)								Calculations based on Sewer Master Plan flows (EX) + Proposed flows (PR)						
EXISTING NODES FROM MASTER PLAN		PIPE SIZE (inches)	PIPE SLOPE (ft/ft)	EXISTING ADWF (mgd)	EXISTING PDWF (mgd)	EX. PDWF Velocity (fps)	EX. PDWF d/D	PR + EX ADWF (mgd)	PR + EX ADWF Velocity (fps) > 2 fps	PR+EX PDWF (mgd)	PR. + EX. PDWF Velocity (fps) (3 fps<V< 5 fps)	PR. + EX. PDWF d/D (must be <0.64)	PROPOSED & EX PWWF (mgd)	PR. + EX. PWWF d/D (must be <0.75)
P-32**		8	0.004	0.109434	0.173099	2.06	0.434	0.147024	1.9	0.30457	2.3	0.57	0.3807	0.659
A25	A26	10	0.0217	0.331801	0.664013	5.23	0.38	EXISTING PIPE NOT AFFECTED BY PROPSOED DEVELOPMENT						
A26	A27	12	0.0099	0.441235	0.837112	4.17	0.42	0.47883	3.6	0.90251	4.25	0.436	1.128	0.495
A27	A28	12	0.0088	0.44211	0.838676	3.99	0.43	0.47970	3.4	0.90402	4.06	0.451	1.130	0.514
A28	A29	12	0.0088	0.45614	0.863093	4.03	0.44	0.49373	3.5	0.92832	4.1	0.458	1.160	0.522
A29	A30	12	0.0098	0.45614	0.863093	4.91	0.43	0.49373	3.6	0.92832	4.26	0.445	1.160	0.506
A30	OUTLETA	12	0.0111	0.474686	0.895326	4.43	0.42	0.51228	3.8	0.96035	4.5	0.437	1.200	0.497

** Indicates information calculated from the City of Brea Sewer Master Plan (November 2021)

Indicates information taken directly from the City of Brea Sewer Master Plan (November 2021)

GREENBRIAR PROPOSED PIPES: SEWER FLOW SUMMARY

PROPOSED PIPE	PIPE SIZE (inches)	PIPE SLOPE (ft/ft)	ADWF (mgd)	ADWF Velocity (fps) > 2 fps	PDWF (mgd)	PDWF Velocity (fps) (3 fps<V< 5 fps)	PDWF d/D (must be <0.50)	PWWF (mgd)	PWWF d/D (must be <0.75)	
P- 31	6	0.01	0.03759	1.85	0.0868	2.35	0.3330	0.1086	0.375	PROPOSED PIPE WITH MOST FLOW
P- 30	6	0.01	0.00084	0.59	0.0026	0.82	0.0610	0.0033	0.068	PROPOSED PIPE WITH LEAST FLOW

GREENBRIAR PROPOSED SEWER FLOW SUMMARY

	Units (DU)	City Duty Factor (gpd/DU)	ADWF (gpd)	ADWF (gpd)	PDWF =1.777*ADWF$^{0.92}$ (MGD)	PWWF = 1.25 *PDWF (MGD)
TOTALS	179	210	37590	0.03759	0.0868	0.1086

GREENBRIAR PROPOSED SEWER FLOWS

PIPE	Units (DU)	ADWF (gpd)	PDWF =1.777*ADWF$^{0.92}$ (MGD)	PWWF = 1.25 *PDWF (MGD)	TOTAL UNITS (DU)	TOTAL ADWF (gpd)	TOTAL ADWF (MGD)	TOTAL PDWF (MGD)	TOTAL PWWF (MGD)
P- 1	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 2	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 3					20	4200	0.0042	0.0115	0.0144
P- 4	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 5					30	6300	0.0063	0.0167	0.0209
P- 6	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 7	16	3360	0.0094	0.0117	16	3360	0.0034	0.0094	0.0117
P- 8					56	11760	0.0118	0.0297	0.0371
P- 9	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 10					66	13860	0.0139	0.0345	0.0432
P- 11	13	2730	0.0077	0.0097	13	2730	0.0027	0.0077	0.0097
P- 12					79	16590	0.0166	0.0408	0.0509
P- 13	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 14					89	18690	0.0187	0.0455	0.0569
P- 15	9	1890	0.0055	0.0069	9	1890	0.0019	0.0055	0.0069
P- 16					98	20580	0.0206	0.0497	0.0621
P- 17	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 18					108	22680	0.0227	0.0543	0.0679
P- 19	8	1680	0.0050	0.0062	8	1680	0.0017	0.0050	0.0062
P- 20					116	24360	0.0244	0.0580	0.0725
P- 21	10	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 22					126	26460	0.0265	0.0626	0.0783
P- 23	8	1680	0.0050	0.0062	8	1680	0.0017	0.0050	0.0062
P- 24					134	28140	0.0281	0.0663	0.0828
P- 25	4	840	0.0026	0.0033	4	840	0.0008	0.0026	0.0033
P- 26					138	28980	0.0290	0.0681	0.0851
P- 27	4	840	0.0026	0.0033	4	840	0.0008	0.0026	0.0033
P- 28					142	29820	0.0298	0.0699	0.0874
P- 29	33	6930	0.0183	0.0228	33	6930	0.0069	0.0183	0.0228
P- 30	4	840	0.0026	0.0033	4	840	0.0008	0.0026	0.0033
P- 31					179	37590	0.0376	0.0865	0.1081

Project Description	
Worksheet:	PIPE 30_ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0008	mgd

Results		
Normal Depth	0.20	in
Flow Area	0.0022	ft²
Wetted Perimeter	0.20	ft
Top Width	0.19	ft
Critical Depth	0.20	in
Percent Full (**d/D)**	3.60	%
Critical Slope	0.01170	ft/ft
Velocity	0.59	ft/s
Velocity Head	0.01	ft
Specific Energy	0.02	ft
Froude Number	0.943	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00011	ft/ft
Flow Type	Subcritical	

Project Description	
Worksheet:	PIPE 31_ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0376	mgd

Results		
Normal Depth	1.30	in
Flow Area	0.03	ft²
Wetted Perimeter	0.50	ft
Top Width	0.41	ft
Critical Depth	1.40	in
Percent Full (**d/D**)	21.70	%
Critical Slope	0.00709	ft/ft
Velocity	1.85	ft/s
Velocity Head	0.05	ft
Specific Energy	0.16	ft
Froude Number	1.18	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00011	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 32_ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.1470	mgd

Results		
Normal Depth	3.00	in
Flow Area	0.12	ft²
Wetted Perimeter	0.90	ft
Top Width	0.65	ft
Critical Depth	2.60	in
Percent Full (**d/D)**	37.40	%
Critical Slope	0.00645	ft/ft
Velocity	1.91	ft/s
Velocity Head	0.06	ft
Specific Energy	0.31	ft
Froude Number	0.78	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00035	ft/ft
Flow Type	Subcritical	

Project Description	
Worksheet:	A26-A27 ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	0.4788	mgd

Results		
Normal Depth	3.70	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.30	in
Percent Full (**d/D**)	31.00	%
Critical Slope	0.00566	ft/ft
Velocity	3.57	ft/s
Velocity Head	0.20	ft
Specific Energy	0.51	ft
Froude Number	1.33	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00043	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A27-A28 ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.4797	mgd

Results		
Normal Depth	3.80	in
Flow Area	0.22	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.30	in
Percent Full (**d/D)**	32.00	%
Critical Slope	0.00568	ft/ft
Velocity	3.42	ft/s
Velocity Head	0.18	ft
Specific Energy	0.50	ft
Froude Number	1.25	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00043	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A28-A29 ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.4937	mgd

Results		
Normal Depth	3.90	in
Flow Area	0.22	ft²
Wetted Perimeter	1.20	ft
Top Width	0.94	ft
Critical Depth	4.40	in
Percent Full (**d/D**)	32.50	%
Critical Slope	0.00567	ft/ft
Velocity	3.45	ft/s
Velocity Head	0.19	ft
Specific Energy	0.51	ft
Froude Number	1.25	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00046	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A29-A30 ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	0.4937	mgd

Results		
Normal Depth	3.80	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.40	in
Percent Full (**d/D)**	31.60	%
Critical Slope	0.00567	ft/ft
Velocity	3.59	ft/s
Velocity Head	0.20	ft
Specific Energy	0.52	ft
Froude Number	1.32	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00046	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A30-OUTLET ADWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	0.5123	mgd

Results		
Normal Depth	3.70	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.50	in
Percent Full (**d/D**)	31.20	%
Critical Slope	0.00570	ft/ft
Velocity	3.79	ft/s
Velocity Head	0.22	ft
Specific Energy	0.54	ft
Froude Number	1.41	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00049	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 30_PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0026	mgd

Results		
Normal Depth	0.40	in
Flow Area	0.0049	ft²
Wetted Perimeter	0.20	ft
Top Width	0.24	ft
Critical Depth	0.40	in
Percent Full (**d/D)**	6.10	%
Critical Slope	0.00944	ft/ft
Velocity	0.82	ft/s
Velocity Head	0.01	ft
Specific Energy	0.04	ft
Froude Number	1.02	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00000	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 31_PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0868	mgd

Results		
Normal Depth	2.0	in
Flow Area	0.06	ft²
Wetted Perimeter	0.60	ft
Top Width	0.47	ft
Critical Depth	2.20	in
Percent Full (**d/D**)	33.30	%
Critical Slope	0.00715	ft/ft
Velocity	2.35	ft/s
Velocity Head	0.09	ft
Specific Energy	0.25	ft
Froude Number	1.19	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00057	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 32_PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.3046	mgd

Results		
Normal Depth	4.50	in
Flow Area	0.20	ft²
Wetted Perimeter	1.10	ft
Top Width	0.66	ft
Critical Depth	3.90	in
Percent Full (**d/D)**	56.80	%
Critical Slope	0.00693	ft/ft
Velocity	2.30	ft/s
Velocity Head	0.08	ft
Specific Energy	0.46	ft
Froude Number	0.73	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00152	ft/ft
Flow Type	Subcritical	

Project Description	
Worksheet:	A26-A27 PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	0.9025	mgd

Results		
Normal Depth	5.20	in
Flow Area	0.33	ft²
Wetted Perimeter	1.40	ft
Top Width	0.99	ft
Critical Depth	6.00	in
Percent Full (**d/D**)	43.60	%
Critical Slope	0.00614	ft/ft
Velocity	4.25	ft/s
Velocity Head	0.28	ft
Specific Energy	0.72	ft
Froude Number	1.30	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00154	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A27-A28 PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.9040	mgd

Results		
Normal Depth	5.40	in
Flow Area	0.34	ft²
Wetted Perimeter	1.50	ft
Top Width	1.00	ft
Critical Depth	6.00	in
Percent Full (**d/D)**	45.10	%
Critical Slope	0.00614	ft/ft
Velocity	4.06	ft/s
Velocity Head	0.26	ft
Specific Energy	0.71	ft
Froude Number	1.22	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00154	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A28-A29 PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.9283	mgd

Results		
Normal Depth	5.50	in
Flow Area	0.35	ft²
Wetted Perimeter	1.50	ft
Top Width	1.00	ft
Critical Depth	6.10	in
Percent Full (**d/D**)	45.80	%
Critical Slope	0.00618	ft/ft
Velocity	4.10	ft/s
Velocity Head	0.26	ft
Specific Energy	0.72	ft
Froude Number	1.22	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00163	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A29-A30 PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	0.9283	mgd

Results		
Normal Depth	5.30	in
Flow Area	0.34	ft²
Wetted Perimeter	1.50	ft
Top Width	0.99	ft
Critical Depth	6.10	in
Percent Full (**d/D)**	44.50	%
Critical Slope	0.00618	ft/ft
Velocity	4.26	ft/s
Velocity Head	0.28	ft
Specific Energy	0.73	ft
Froude Number	1.29	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00163	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A30-OUTLET PDWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	0.9604	mgd

Results		
Normal Depth	5.20	in
Flow Area	0.33	ft²
Wetted Perimeter	1.40	ft
Top Width	0.99	ft
Critical Depth	6.20	in
Percent Full (**d/D**)	43.70	%
Critical Slope	0.00623	ft/ft
Velocity	4.50	ft/s
Velocity Head	0.32	ft
Specific Energy	0.75	ft
Froude Number	1.38	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00174	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 30_PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0033	mgd

Results		
Normal Depth	0.40	in
Flow Area	0.0058	ft²
Wetted Perimeter	0.30	ft
Top Width	0.25	ft
Critical Depth	0.40	in
Percent Full (**d/D)**	6.80	%
Critical Slope	0.00921	ft/ft
Velocity	0.89	ft/s
Velocity Head	0.01	ft
Specific Energy	0.05	ft
Froude Number	1.03	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00000	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 31_PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.1086	mgd

Results		
Normal Depth	2.30	in
Flow Area	0.07	ft²
Wetted Perimeter	0.70	ft
Top Width	0.48	ft
Critical Depth	2.50	in
Percent Full (**d/D**)	37.50	%
Critical Slope	0.00728	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.28	ft
Froude Number	1.18	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.0009	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	PIPE 32_PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.3807	mgd

Results		
Normal Depth	5.30	in
Flow Area	0.24	ft²
Wetted Perimeter	1.30	ft
Top Width	0.63	ft
Critical Depth	4.30	in
Percent Full (**d/D)**	65.90	%
Critical Slope	0.00730	ft/ft
Velocity	2.42	ft/s
Velocity Head	0.09	ft
Specific Energy	0.53	ft
Froude Number	0.69	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00238	ft/ft
Flow Type	Subcritical	

Project Description	
Worksheet:	A26-A27 PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	1.1280	mgd

Results		
Normal Depth	5.90	in
Flow Area	0.39	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.70	in
Percent Full (**d/D**)	49.50	%
Critical Slope	0.00652	ft/ft
Velocity	4.50	ft/s
Velocity Head	0.31	ft
Specific Energy	0.81	ft
Froude Number	1.27	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00240	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A27-A28 PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	1.1300	mgd

Results		
Normal Depth	6.20	in
Flow Area	0.41	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.80	in
Percent Full (**d/D)**	51.40	%
Critical Slope	0.00653	ft/ft
Velocity	4.30	ft/s
Velocity Head	0.29	ft
Specific Energy	0.80	ft
Froude Number	1.19	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00241	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A28-A29 PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	1.1600	mgd

Results		
Normal Depth	6.30	in
Flow Area	0.41	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.80	in
Percent Full (**d/D**)	52.20	%
Critical Slope	0.00658	ft/ft
Velocity	4.33	ft/s
Velocity Head	0.29	ft
Specific Energy	0.81	ft
Froude Number	1.19	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00254	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A29-A30 PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	1.1600	mgd

Results		
Normal Depth	6.10	in
Flow Area	0.40	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.80	in
Percent Full (**d/D)**	50.50	%
Critical Slope	0.00659	ft/ft
Velocity	4.51	ft/s
Velocity Head	0.32	ft
Specific Energy	0.82	ft
Froude Number	1.26	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00254	ft/ft
Flow Type	Supercritical	

Project Description	
Worksheet:	A30-OUTLET PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	1.2000	mgd

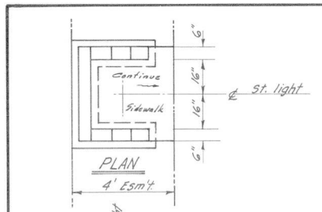
Results		
Normal Depth	6.00	in
Flow Area	0.39	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	7.00	in
Percent Full (**d/D**)	49.70	%
Critical Slope	0.00666	ft/ft
Velocity	4.77	ft/s
Velocity Head	0.35	ft
Specific Energy	0.85	ft
Froude Number	1.35	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00272	ft/ft
Flow Type	Supercritical	

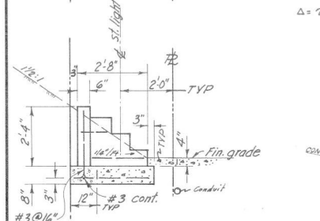
1253-01

GENERAL NOTES

1. SEE STANDARD 104 FOR TYPICAL SECTION OF LOCAL
2. SEE STANDARD 902.
3. ONE PARKWAY TREE SHALL BE PLANTED AT APPR
4. STREET LIGHTING SPECIFICATIONS — SEE STANDARD
5. NO JOINT PIPE MAY BE SUBSTITUTED FOR R.C.P. WH STANDARD PLAN 515.
6. UPON COMPLETION OF THE ROUGH GRADING, THE CI HAVE THE ORANGE COUNTY ROAD DEPARTMENT MA TESTS AND DETERMINE THE CONSTRUCTION SECTI AND BASE THICKNESS SHOWN ON THESE PLANS A THE ENGINEER AND DO NOT INDICATE FINAL SECTIO TO BE INCLUDED IN CONTRACT.
7. THE CITY OF BREA WILL DO ALL NECESSARY ST DEVELOPER FOR COSTS THEREOF.
8. THE EXISTENCE AND LOCATION OF ANY UNDERGROU STRUCTURES SHOWN ON THESE PLANS ARE OBTAIN OF THE AVAILABLE RECORDS. TO THE BEST OF OUR ARE NO EXISTING UTILITIES OTHER THAN SHOWN THE CONTRACTOR IS REQUIRED TO TAKE ALL PRE URES TO PROTECT THE UTILITY LINES AND ANY O RECORD OR NOT SHOWN ON THESE PLANS.
9. TYPE I BEDDING PER STD. 308 SHALL BE USED ATIONS UNLESS OTHERWISE NOTED ON THESE PLA
10. DRIVEWAYS TO BE CONSTRUCTED PER CITY OF BRE UNLESS OTHERWISE NOTED ON THESE PLANS.
11. ALL LOCAL STREETS TO HAVE SOLID WHITE CENTER
12. ELECTROLIER (38) SHALL BE FURNISHED WITHO BUT, WITH: PLATE OVER ARM SOCKET, HAND OPPOSITE TRAFFIC, PLUGGED HOLES FO PEDESTRIAN BUTTON — SIGNAL HEADS AN WALK SIGNALS.

STREET NAME SIGN (7)			
NO. COR.	ASSOCIATED RD.	400 S.	GREENB

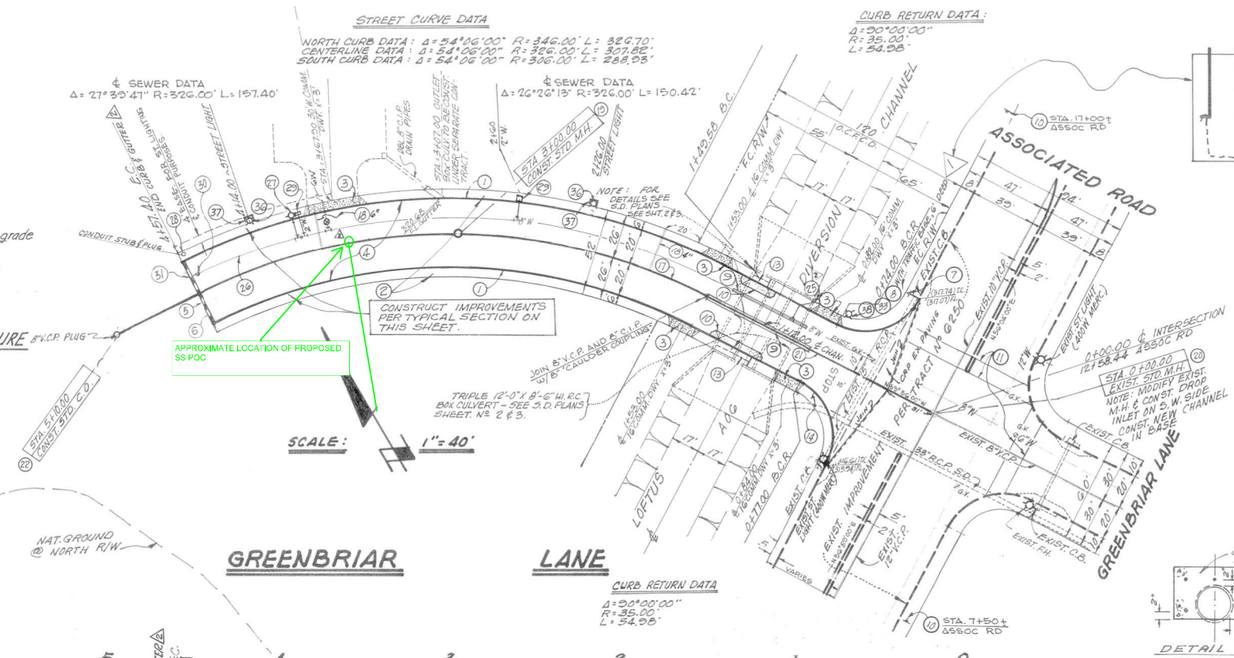




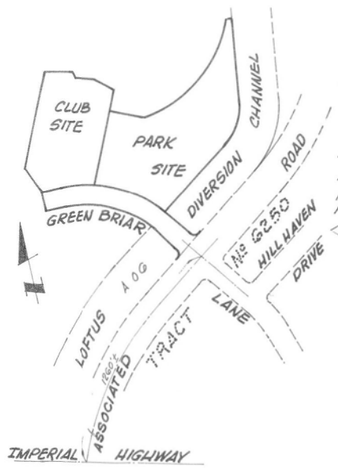
STREET LIGHT ENCLOSURE

STA. 4+14 & STA. 2+26.

SCALE 3/8" = 1'-0"

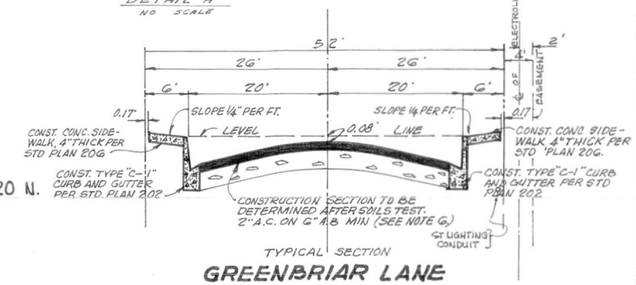


STREET LIGHTING SCHEMATIC



DETAIL "A" NO SCALE

KEY MAP SCALE: 1" = 200'



TYPICAL SECTION

GREENBRIAR LANE

NOTES APPLYING TO CONSTRUCTION IN O.C.F.C.D. R/W.

1. THE CONTRACTOR SHALL NOTIFY O.C.F.C.D. AT 834-0336 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE DISTRICT RIGHT-OF-WAY.
2. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH ATTACHED PLANS. ALL EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED TO A RELATIVE DENSITY OF AT LEAST 90 % OF THE MAXIMUM DENSITY BY THE "FIVE LAYER METHOD" AS SPECIFIED IN CALIFORNIA TEST METHOD № 216 C., 1964. See SHT. 2.
3. ALL WORK WITHIN THE FLOOD CONTROL RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY ORANGE COUNTY FLOOD CONTROL DISTRICT AND THE PLANS STAMPED WITH THE APPROVAL OF ORANGE COUNTY FLOOD CONTROL DISTRICT. THE CONTRACTOR SHALL HAVE A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE.

ESTIMATE OF QUANTITIES

		STREETS	
1	(1)	CURB & GUTTER TYPE "C-1"	
2	(2)	P.C.C. SIDEWALK 4" THICK	206
	(3)	P.C.C. COMMERCIAL DRIVEWAY	2
4	(4)	2" A.C. W/SC. 2½ P.C. ON 6" A.B. (SEE NOTE 6)	214
	(5)	BARRICADE	6
	(6)	2" x 6" REDWOOD HEADER	6
	(7)	STREET NAME SIGN	6
	(8)	TRAFFIC SIGN W 55 R (TEMP.)	6
	(9)	CONCRETE ENCASEMENT	3
	(10)	"GREENBRIAR LANE" ADVANCE SIGN 8" U.S. G1 R.W. / BACK FRAME G.L.C.	6
	(11)	CROSSWALK	6
	(13)	INLET - VARIABLE LENGTH PER SHT. 8	1
	(14)	TRAFFIC SIGN R1R	6
		SEWERS	
	(17)	8" V.C.P. MAINLINE SEWER	4
	(18)	4" V.C.P. HOUSE LATERAL	4
	(19)	STD. MANHOLE	4
	(20)	CONST. DROP INTO EXIST STD. MANHOLE	4
	(21)	8" C.I.P. MAINLINE SEWER	30
	(22)	STD. CLEAN-OUT	4
		WATER	
	(22)	AIR RELEASE VALVE ASSEMBLY	3
	(26)	4" C.I.P. WATER	5
	(27)	FIRE HYDRANT ASSEMBLIES, A 24015	3
	(28)	BLOW-OFF ASSEMBLY	3
	(29)	WATER SERVICE - 2"	3
	(30)	8" G.V. & 6" G.V.	3
	(31)	8" C.I.P. PLUG	3
		STREET LIGHTS	
	(33)	EXTERNAL SHIELDS 35-1007447-02	6
	(34)	SHIELDS (STREET) 35-1034313-01	6
	(35)	SHIELDS (HOUSE) 35-1045612-02	6
1	(36)	D7425120 175W II Pratt & Kandall ELECTROLIER	6
	(37)	STREET LIGHT ENCLOSURE	6
1	(38)	WR-15 J-309-5-0, 400W II Westinghouse ELECTROLIER	822
	ITEM	DESCRIPTION	PER P

PREPARED UNDER THE DIRECTION OF:
JAMES E. WHITELAW R.C.E. 14385 — DATE 3-13-68

APPROVED BY:
CITY ENGINEER R.C.E. 8640 — DATE 4-5-68

REVISED 4-12-68

BENCH MARK: № 2B-17-58

O.C.S.B.M. DISK STAMPED "R.C.B. 1872" 1.2 MI. S.E. AND E. ALONG IMPERIAL HWY. FROM PIMONA AVE., 100' W. OF ASSOCIATED RD. 18' S. ℄ IMPERIAL HWY. IN TOP OF CONC. HDWL. (STAMPED 1954) OF A TRIPLE CONC. ℄ C.M.P. CULV. TO THE FLOOD CONTROL CHANNEL 1' E. OF W. END OF HDWL. BRIDGE № 55-222. 1964 READJ. EL. 308.483.

REVISION	Approved	Date
1		7-18-68
2		8-12-68

O.C.F.C.D. DATE 03168 PERMIT №

CITY OF BREA
IMPROVEMENT FOR
GREENBRIAR

PREPARED IN THE OFFICE OF
Voorheis-Trindle & Nelson, Inc.
13794 Beach Blvd
Westminster, Calif

Date: 3-5-68 J.N. G-3015

SEWER MASTER PLAN

November 2021

City of Brea
1 Civic and Cultural Center
Brea, CA 92821

ES-3.2 Existing Wastewater Flows and Peaking Factors =

Peaking factors are needed for estimating peak dry weather flows (PDWF) and peak wet weather flows (PWWF). These relationships are based on the average dry weather flows (ADWF). PWWF flows include an allowance for inflow and infiltration (I/I .

The following dry weather peaking relationship was selected for this study:

= **PDWF = 1.777 x ADWF$^{0.92}$ =**

Note: Above peaking factor formula is used for 2021 Sewer Master Plan analysis and is based on 2005 Sewer Master Plan Study

Peak wet weather flow estimates were based on the following relationship:

= **PWWF = 1.25 X PDWF =**

Although the PWWF/PDWF factor of 1.25 may not cover all situations, it is not reasonable or feasible to design the sewer system to carry the flows that would result from the use of a larger ratio. Instead, it is recommended that the City concentrate on projects such as replacing manhole covers, installing plugs in manhole covers, and replacing or relining cracked pipes to reduce inflow and infiltration.

ES-3.3 Sewer Unit Flow Factors =

Non-residential land uses typically include a wide variety of businesses and manufacturing processes that cause sewage generation to vary significantly from one customer to another. This is evident in the wide range of water use for different non-residential businesses. For example, warehouses typically use a low amount of water and generate low amounts of sewage. On the other hand, some manufacturing businesses can use large of amounts of water and contribute large amounts of sewage to the sewer system.

In addition, the flow monitoring conducted in 2020 was subjected to California and Orange County stay-at-home orders, which affected the estimated unit flow factors. For these reasons, the unit flow factors were primarily based on the City's 2005 Sewer Master Plan. The unit flow factors developed in 2005 were based on flow monitoring completed under more normal conditions. The sewer unit flow factors are detailed in Table ES-1.

Moving forward, the City will require that potential developers perform a sewage generation analysis on a case by case basis, as details regarding the proposed development or redevelopment area becomes available. Specific data regarding the proposed dwelling units, gross building floor area, and floor to area ratios is to be used to develop the sewage flow estimate. Hydraulic analyses are to be conducted to verify available downstream system capacity and ensure that the system can convey the proposed sewage generation. **=**

ES-3.4 Sewer System Performance Evaluation Criteria =

Collection system design standards include minimum pipe size, minimum flow velocity, and depth of flow to pipe diameter ratio (d/D). Lift station criteria includes but is not limited to: the capacity and number of pumps, wet well and force main sizes, redundancy, and emergency power.

A summary of sewer system performance evaluation criteria used for this study is listed in Table ES-2.

Table ES-1 =
Sewer Unit Flow Factors=

Land Use Type=	Land Use=	Land Use = Code=	Unit Density/ = Maximum = FAR)[1]=	Unit Flow = Factor[2]=	Units=	Unit Flow = Factor[3]=	Units=
Single-Family Residential	Hillside Residential	HR, R1-H	0.05 -2.2 DU/AC	385	gpd/DU	20 - 847	gpd/AC
	Single Family Residential	R-1	1.0-6.0 DU/AC	270	gpd/DU	270 - 1,620	gpd/AC
	Single Family Residential 5000[4]	R-1(5000)	1.0-6.0 DU/AC	270	gpd/DU	270 - 1,620	gpd/AC
Multi-Family Residential	Multiple Family: Medium Density	R-2	6.1 - 12.0 DU/AC	248	gpd/DU	1,515 - 2,980	gpd/AC
	Planned Community[5]	P-C	6.1 - 12.0 DU/AC	248	gpd/DU	1,515 - 2,980	gpd/AC
High Density Residential	Multiple Family: High Density	R-3	12.1 -24.89 DU/AC	210	gpd/DU	2,545 - 5,230	gpd/AC
Business/ Commercial[6]	General Commercial	C-G	0.5	73.5	gpd/TSF	1,605	gpd/AC
	Major Shopping Center	C-C	0.65	73.5	gpd/TSF	2,085	gpd/AC
	Administrative and Professional Office	C-P	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Neighborhood Commercial	C-N	0.35	73.5	gpd/TSF	1,125	gpd/AC
Industrial[6]	Industrial Commercial	C-M	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Light Industrial	M-1	0.75	73.5	gpd/TSF	2,405	gpd/AC
	General Industrial	M-2	0.75	73.5	gpd/TSF	2,405	gpd/AC
	Planned Industrial[6]	M-P	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Brea Industrial Specific Plan[6]	BISP	1.5	73.5	gpd/TSF	4,805	gpd/AC
Restaurant	Restaurant			1,575	gpd/TSF		
Car Wash	Car wash			21,000	gpd/Location		
Commercial Recreational	Commercial Recreational	C-RC		3.15	gpd/AC		
Motel/Hotel	Motel/ Hotel			173.25	gpd/Room		
Parks	Parks/ Recreation/ Open Space - Parks and Recreation	P/R/OS-NOS P/R/OS-PR		10.5	gpd/AC		
Schools	High School			21	gpd/Student		
Schools	School			10.5	gpd/Student		
Theater	Theater			8.4	gpd/Seat		

[1] Unit Density and FAR are based on values included in the City's 2003 General Plan

[2] Unit flow factors are based on values from the City's 2005 Sewer Master Plan

[3] Unit flow factors by acreage were calculated from Unit Density/FAR and unit flow factors from the 2005 Sewer Master Plan. For planning purposes the maximum unit flow factors were used for this planning study . As the development plans are updated, the more detailed planning data should be used to estimate the future sewer loads.

[4] Unit Density for R-1-5000 is assumed to be the same as R-1

[5] Unit Density for P-C is assumed to be the same as R-2

[6] FAR for Planned Industrial (M-P) is assumed to be the same as Industrial Commercial (C-M)

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Table ES-2 =
Sewer System Criteria =

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 fps at average dry weather flow 3.0 fps at peak dry weather flow
Maximum Velocity	6.0 fps at peak dry weather flow for VCP 5.0 fps at peak dry weather flow for PVC
Minimum Slope	Refer to Table 3-3
Maximum Slope	Slope that generates the maximum flow velocity.
Pipe Depth to Diameter Ratio	0.64 at peak dry weather flows for all pipes existing prior to the Sewer Master Plan hydraulic analysis 0.50 at peak dry weather flows for all newly constructed pipes 15-inches and smaller 0.64 at peak dry weather flows for all newly constructed pipes 18-inches and larger 0.75 at peak wet weather flows for all pipes
Lift Station	
Pumps	• Minimum 2 each sized at peak wet weather flow • Minimum solids handling capacity 3”
Wet Wells	• Sized to limit pump cycling to less than 6 times/hr for motor HP up to 20; 4 times/hr up to 50 HP; 3 times/hr up to 75 HP; 2 times/hr 100 HP and above • Provide 30 minutes of storage at peak flow to allow response to a failure • Equipment to be maintained must be accessible without entering the structure
Ventilation	• 15-air change/hour minimum in wet wells operated continuously • 30-air change/hour minimum in wet wells not operated continuously • 15-air changes/hour minimum in dry well
Controls	Redundant system. Ultrasonic level sensor for primary level controls. Float operated back-up controls.
Emergency Power	Stationary source with automatic transfer switch
Telemetry	Dialer system at all pump stations to alert personnel in the event of a station failure
Force Mains	• Minimum velocity 3 fps • Maximum velocity 5 fps • Minimum size 4” • Air/Vacs installed in vaults
Inverted Siphons	
Siphon Barrels	• Dual or multiple • Minimum diameters of 8-inches • Minimum velocity of 3 fps ADWF and 4 fps PDWF • Vertical curves, with no sharp horizontal angles or changes of grade • If crossing a waterway, minimum 5 ft between the top of the siphon and the level of possible scour in the waterway • Location away from an outlet of a lateral or a drop manhole • Invert at the outlet structure at least 0.1 ft lower than invert of inlet structure • Material is HDPE or PVC • Maximum angle of downstream leg no more than 15 degrees from horizontal • Maximum angle of upstream leg no more than 30 degrees from horizontal


Sewershed 6
(Associated)
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OUTLETA
To OCSD s
Rolling Hills
Sub-Trunk
(Contract No. 2-11-1
SR-57
Lambert Rd
Sewershed 5
(Rolling Hills)
Sewershed 8
Kraemer)
Lambert Rd
Country Hills Rd
Birch St
Birch St
Sewershed 7
(Cypress)
Kraemer Blvd
Westmoreland Dr
Placentia
Ave
Legend
Brea Sewer Manholes
Brea Gravity Sewers
City of Brea Boundary
N
0
750
1,500
Feet
City of BREA
CITY OF BREA
SEWER MASTER PLAN
PROJECT NO: 1041681.00
DATE: June 2021
Sewershed 6 (Associated)
and Mainline Sewers
Figure App 4-1f

7-1 Infosewer Model Results

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2147-A2145	A2147	A2145	8	125	0.0016	0.001838	0.000000	0.000569	0.38	0.04	0.05	0.001838	0.000000	0.000569	0.38	0.04	0.05	0.001838	0.000000	0.000569	0.38	0.04	0.05
A2148-A2111	A2148	A2111	8	361	0.0503	0.012708	0.000000	0.004654	2.27	0.04	0.06	0.012708	0.000000	0.004654	2.27	0.04	0.06	0.012708	0.000000	0.004654	2.27	0.04	0.06
A2149-A2148	A2149	A2148	8	188	0.0301	0.007895	0.000000	0.002774	1.64	0.04	0.05	0.007895	0.000000	0.002774	1.64	0.04	0.05	0.007895	0.000000	0.002774	1.64	0.04	0.05
A2150-A2146BS	A2150	A2146BS	8	30	0.0067	0.000735	0.000000	0.000210	0.47	0.02	0.03	0.000735	0.000000	0.000210	0.47	0.02	0.03	0.000735	0.000000	0.000210	0.47	0.02	0.03
A2151-A2102	A2151	A2102	8	127	0.0212	0.001713	0.000000	0.000527	0.91	0.02	0.03	0.001713	0.000000	0.000527	0.91	0.02	0.03	0.001713	0.000000	0.000527	0.91	0.02	0.03
A22-A23	A22	A23	10	247	0.0180	0.620293	0.000000	0.318539	4.83	0.33	0.39	0.620293	0.000000	0.318539	4.83	0.33	0.39	0.620293	0.000000	0.318539	4.83	0.33	0.39
A23-A24	A23	A24	10	317	0.0197	0.644013	0.000000	0.331801	5.04	0.33	0.39	0.644013	0.000000	0.331801	5.04	0.33	0.39	0.644013	0.000000	0.331801	5.04	0.33	0.39
A2301-A23	A2301	A23	8	200	0.0270	0.031861	0.000000	0.012639	2.41	0.07	0.11	0.031861	0.000000	0.012639	2.41	0.07	0.11	0.031861	0.000000	0.012639	2.41	0.07	0.11
A2302-A2301	A2302	A2301	8	235	0.0648	0.030697	0.000000	0.012138	3.23	0.06	0.09	0.030697	0.000000	0.012138	3.23	0.06	0.09	0.030697	0.000000	0.012138	3.23	0.06	0.09
A2303-A2302	A2303	A2302	8	265	0.0248	0.018617	0.000000	0.007048	1.99	0.06	0.09	0.018617	0.000000	0.007048	1.99	0.06	0.09	0.018617	0.000000	0.007048	1.99	0.06	0.09
A2304-A2303	A2304	A2303	8	347	0.0140	0.015054	0.000000	0.005595	1.53	0.06	0.09	0.015054	0.000000	0.005595	1.53	0.06	0.09	0.015054	0.000000	0.005595	1.53	0.06	0.09
A2305-A2304	A2305	A2304	8	350	0.0243	0.006346	0.000000	0.002188	1.42	0.03	0.05	0.006346	0.000000	0.002188	1.42	0.03	0.05	0.006346	0.000000	0.002188	1.42	0.03	0.05
A2306S-A2305	A2306S	A2305	8	131	0.0095	0.001844	0.000000	0.000571	0.70	0.02	0.04	0.001844	0.000000	0.000571	0.70	0.02	0.04	0.001844	0.000000	0.000571	0.70	0.02	0.04
A2307-A2302	A2307	A2302	8	202	0.0264	0.011310	0.000000	0.004100	1.75	0.04	0.07	0.011310	0.000000	0.004100	1.75	0.04	0.07	0.011310	0.000000	0.004100	1.75	0.04	0.07
A2308-A2307	A2308	A2307	8	180	0.0177	0.009061	0.000000	0.003222	1.42	0.04	0.07	0.009061	0.000000	0.003222	1.42	0.04	0.07	0.009061	0.000000	0.003222	1.42	0.04	0.07
A2309-A2308	A2309	A2308	8	323	0.0100	0.006703	0.000000	0.002322	1.06	0.04	0.07	0.006703	0.000000	0.002322	1.06	0.04	0.07	0.006703	0.000000	0.002322	1.06	0.04	0.07
A24-A25	A24	A25	10	312	0.0212	0.644013	0.000000	0.331801	5.18	0.32	0.38	0.644013	0.000000	0.331801	5.18	0.32	0.38	0.644013	0.000000	0.331801	5.18	0.32	0.38
A25-A26	A25	A26	10	324	0.0217	0.644013	0.000000	0.331801	5.23	0.32	0.38	0.644013	0.000000	0.331801	5.23	0.32	0.38	0.644013	0.000000	0.331801	5.23	0.32	0.38
A26-A27	A26	A27	12	350	0.0099	0.837112	0.000000	0.441235	4.17	0.42	0.42	0.837112	0.000000	0.441235	4.17	0.42	0.42	0.837112	0.000000	0.441235	4.17	0.42	0.42
A2601-A26	A2601	A26	8	192	0.0341	0.092504	0.000000	0.040259	3.59	0.11	0.17	0.092504	0.000000	0.040259	3.59	0.11	0.17	0.092504	0.000000	0.040259	3.59	0.11	0.17
A2602-A2601	A2602	A2601	8	221	0.0428	0.087875	0.000000	0.038074	3.83	0.11	0.16	0.087875	0.000000	0.038074	3.83	0.11	0.16	0.087875	0.000000	0.038074	3.83	0.11	0.16
A2603-A2602	A2603	A2602	8	285	0.0439	0.085911	0.000000	0.037150	3.84	0.10	0.16	0.085911	0.000000	0.037150	3.84	0.10	0.16	0.085911	0.000000	0.037150	3.84	0.10	0.16
A2604-A2603	A2604	A2603	8	232	0.0439	0.080851	0.000000	0.034778	3.77	0.10	0.15	0.080851	0.000000	0.034778	3.77	0.10	0.15	0.080851	0.000000	0.034778	3.77	0.10	0.15
A2605-A2604	A2605	A2604	8	250	0.0301	0.027664	0.000000	0.010840	2.40	0.07	0.10	0.027664	0.000000	0.010840	2.40	0.07	0.10	0.027664	0.000000	0.010840	2.40	0.07	0.10
A2606-A2605	A2606	A2605	8	279	0.0334	0.020813	0.000000	0.007956	2.28	0.06	0.08	0.020813	0.000000	0.007956	2.28	0.06	0.08	0.020813	0.000000	0.007956	2.28	0.06	0.08
A2607-A2606	A2607	A2606	8	274	0.0208	0.006788	0.000000	0.002354	1.38	0.04	0.06	0.006788	0.000000	0.002354	1.38	0.04	0.06	0.006788	0.000000	0.002354	1.38	0.04	0.06
A2608-A2607	A2608	A2607	8	159	0.0098	0.003360	0.000000	0.001096	0.86	0.03	0.05	0.003360	0.000000	0.001096	0.86	0.03	0.05	0.003360	0.000000	0.001096	0.86	0.03	0.05
A2609-A2601	A2609	A2601	8	260	0.0719	0.004476	0.000000	0.001497	1.87	0.02	0.03	0.004476	0.000000	0.001497	1.87	0.02	0.03	0.004476	0.000000	0.001497	1.87	0.02	0.03
A2610-A2603	A2610	A2603	8	111	0.0177	0.002019	0.000000	0.000630	0.90	0.02	0.03	0.002019	0.000000	0.000630	0.90	0.02	0.03	0.002019	0.000000	0.000630	0.90	0.02	0.03
A2611-A2605	A2611	A2605	8	239	0.0115	0.005273	0.000000	0.001789	1.04	0.04	0.06	0.005273	0.000000	0.001789	1.04	0.04	0.06	0.005273	0.000000	0.001789	1.04	0.04	0.06
A2612-A2606	A2612	A2606	8	265	0.0076	0.010799	0.000000	0.003899	1.12	0.06	0.09	0.010799	0.000000	0.003899	1.12	0.06	0.09	0.010799	0.000000	0.003899	1.12	0.06	0.09
A2613-A2612	A2613	A2612	8	273	0.0104	0.005474	0.000000	0.001863	1.01	0.04	0.06	0.005474	0.000000	0.001863	1.01	0.04	0.06	0.005474	0.000000	0.001863	1.01	0.04	0.06
A2614S-A2612	A2614S	A2612	8	266	0.0136	0.003873	0.000000	0.001279	1.00	0.03	0.05	0.003873	0.000000	0.001279	1.00	0.03	0.05	0.003873	0.000000	0.001279	1.00	0.03	0.05
A2615-A2604	A2615	A2604	8	286	0.0067	0.055456	0.000000	0.023085	1.74	0.13	0.20	0.055456	0.000000	0.023085	1.74	0.13	0.20	0.055456	0.000000	0.023085	1.74	0.13	0.20
A2616-A2615	A2616	A2615	8	333	0.0072	0.007011	0.000000	0.002438	0.96	0.05	0.07	0.007011	0.000000	0.002438	0.96	0.05	0.07	0.007011	0.000000	0.002438	0.96	0.05	0.07
A2617-A2615	A2617	A2615	8	300	0.0307	0.021498	0.000000	0.008241	2.24	0.06	0.09	0.021498	0.000000	0.008241	2.24	0.06	0.09	0.021498	0.000000	0.008241	2.24	0.06	0.09
A2618-A2617	A2618	A2617	8	225	0.0351	0.010260	0.000000	0.003688	1.87	0.04	0.06	0.010260	0.000000	0.003688	1.87	0.04	0.06	0.010260	0.000000	0.003688	1.87	0.04	0.06
A2619-A2618	A2619	A2618	8	278	0.0252	0.007399	0.000000	0.002585	1.51	0.04	0.06	0.007399	0.000000	0.002585	1.51	0.04	0.06	0.007399	0.000000	0.002585	1.51	0.04	0.06
A2620AS-A2619	A2620AS	A2619	8	131	0.0109	0.002341	0.000000	0.000740	0.80	0.03	0.04	0.002341	0.000000	0.000740	0.80	0.03	0.04	0.002341	0.000000	0.000740	0.80	0.03	0.04
A2620BS-A2626	A2620BS	A2626	8	128	0.0050	0.003303	0.000000	0.001076	0.67	0.04	0.06	0.003303	0.000000	0.001076	0.67	0.04	0.06	0.003303	0.000000	0.001076	0.67	0.04	0.06
A2621-A2615	A2621	A2615	8	308	0.0160	0.027957	0.000000	0.010965	1.93	0.08	0.12	0.027957	0.000000	0.010965	1.93	0.08	0.12	0.027957	0.000000	0.010965	1.93	0.08	0.12
A2622-A2621	A2622	A2621	8	330	0.0086	0.025572	0.000000	0.009952	1.51	0.09	0.13	0.025572	0.000000	0.009952	1.51	0.09	0.13	0.025572	0.000000	0.009952	1.51	0.09	0.13
A2623-A2622	A2623	A2622	8	320	0.0180	0.017002	0.000000	0.006386	1.73	0.06	0.09	0.017002	0.000000	0.006386	1.73	0.06	0.09	0.017002	0.000000	0.006386	1.73	0.06	0.09
A2624-A2623	A2624	A2623	8	324	0.0180	0.013473	0.000000	0.004959	1.61	0.05	0.08	0.013473	0.000000	0.004959	1.61	0.05	0.08	0.013473	0.000000	0.004959	1.61	0.05	0.08
A2625-A2624	A2625	A2624	8	71	0.0327	0.006929	0.000000	0.002407	1.62	0.03	0.05	0.006929	0.000000	0.002407	1.62	0.03	0.05	0.006929	0.000000	0.002407	1.62	0.03	0.05
A2626-A2625	A2626	A2625	8	161	0.0200	0.006421	0.000000	0.002216	1.34	0.04	0.05	0.006421	0.000000	0.002216	1.34	0.04	0.05	0.006421	0.000000	0.002216	1.34	0.04	0.05

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2627-A2624	A2627	A2624	8	127	0.0116	0.003492	0.000000	0.001143	0.92	0.03	0.05	0.003492	0.000000	0.001143	0.92	0.03	0.05	0.003492	0.000000	0.001143	0.92	0.03	0.05
A2628-A2622	A2628	A2622	8	76	0.0074	0.005512	0.000000	0.001877	0.90	0.04	0.06	0.005512	0.000000	0.001877	0.90	0.04	0.06	0.005512	0.000000	0.001877	0.90	0.04	0.06
A2629-A2617	A2629	A2617	8	373	0.0105	0.009801	0.000000	0.003509	1.21	0.05	0.08	0.009801	0.000000	0.003509	1.21	0.05	0.08	0.009801	0.000000	0.003509	1.21	0.05	0.08
A2630-A2629	A2630	A2629	8	172	0.0211	0.006464	0.000000	0.002232	1.36	0.04	0.05	0.006464	0.000000	0.002232	1.36	0.04	0.05	0.006464	0.000000	0.002232	1.36	0.04	0.05
A2631-A26	A2631	A26	8	300	0.0235	0.102141	0.000000	0.044838	3.25	0.13	0.20	0.102141	0.000000	0.044838	3.25	0.13	0.20	0.102141	0.000000	0.044838	3.25	0.13	0.20
A2632-A2631	A2632	A2631	8	90	0.0300	0.102141	0.000000	0.044838	3.54	0.12	0.19	0.102141	0.000000	0.044838	3.54	0.12	0.19	0.102141	0.000000	0.044838	3.54	0.12	0.19
A2633-A2632	A2633	A2632	8	353	0.0173	0.077483	0.000000	0.033206	2.68	0.12	0.19	0.077483	0.000000	0.033206	2.68	0.12	0.19	0.077483	0.000000	0.033206	2.68	0.12	0.19
A2634-A2633	A2634	A2633	8	180	0.0046	0.065449	0.000000	0.027640	1.59	0.16	0.24	0.065449	0.000000	0.027640	1.59	0.16	0.24	0.065449	0.000000	0.027640	1.59	0.16	0.24
A2635-A2634	A2635	A2634	8	59	0.0112	0.047190	0.000000	0.019370	1.99	0.11	0.16	0.047190	0.000000	0.019370	1.99	0.11	0.16	0.047190	0.000000	0.019370	1.99	0.11	0.16
A2636-A2635	A2636	A2635	8	258	0.0103	0.046714	0.000000	0.019158	1.93	0.11	0.16	0.046714	0.000000	0.019158	1.93	0.11	0.16	0.046714	0.000000	0.019158	1.93	0.11	0.16
A2637-A2636	A2637	A2636	8	216	0.0031	0.018947	0.000000	0.007184	0.97	0.09	0.14	0.018947	0.000000	0.007184	0.97	0.09	0.14	0.018947	0.000000	0.007184	0.97	0.09	0.14
A2638-A2637	A2638	A2637	8	85	0.0040	0.009252	0.000000	0.003296	0.85	0.06	0.09	0.009252	0.000000	0.003296	0.85	0.06	0.09	0.009252	0.000000	0.003296	0.85	0.06	0.09
A2639-A2638	A2639	A2638	8	250	0.0138	0.008248	0.000000	0.002909	1.27	0.04	0.07	0.008248	0.000000	0.002909	1.27	0.04	0.07	0.008248	0.000000	0.002909	1.27	0.04	0.07
A2640-A2639	A2640	A2639	8	255	0.0232	0.004742	0.000000	0.001594	1.28	0.03	0.05	0.004742	0.000000	0.001594	1.28	0.03	0.05	0.004742	0.000000	0.001594	1.28	0.03	0.05
A2641-A2632	A2641	A2632	8	120	0.0300	0.029518	0.000000	0.011632	2.44	0.07	0.10	0.029518	0.000000	0.011632	2.44	0.07	0.10	0.029518	0.000000	0.011632	2.44	0.07	0.10
A2642-A2641	A2642	A2641	8	124	0.0313	0.029518	0.000000	0.011632	2.48	0.07	0.10	0.029518	0.000000	0.011632	2.48	0.07	0.10	0.029518	0.000000	0.011632	2.48	0.07	0.10
A2643-A2642	A2643	A2642	8	246	0.0300	0.021646	0.000000	0.008303	2.22	0.06	0.09	0.021646	0.000000	0.008303	2.22	0.06	0.09	0.021646	0.000000	0.008303	2.22	0.06	0.09
A2644-A2643	A2644	A2643	8	313	0.0300	0.004184	0.000000	0.001391	1.35	0.03	0.04	0.004184	0.000000	0.001391	1.35	0.03	0.04	0.004184	0.000000	0.001391	1.35	0.03	0.04
A2645-A2642	A2645	A2642	8	208	0.0263	0.009032	0.000000	0.003211	1.63	0.04	0.06	0.009032	0.000000	0.003211	1.63	0.04	0.06	0.009032	0.000000	0.003211	1.63	0.04	0.06
A2646-A2645	A2646	A2645	8	217	0.0317	0.006889	0.000000	0.002392	1.60	0.03	0.05	0.006889	0.000000	0.002392	1.60	0.03	0.05	0.006889	0.000000	0.002392	1.60	0.03	0.05
A2647-A2646	A2647	A2646	8	225	0.0312	0.004228	0.000000	0.001407	1.37	0.03	0.04	0.004228	0.000000	0.001407	1.37	0.03	0.04	0.004228	0.000000	0.001407	1.37	0.03	0.04
A2648-A2633	A2648	A2633	8	265	0.0271	0.009024	0.000000	0.003208	1.65	0.04	0.06	0.009024	0.000000	0.003208	1.65	0.04	0.06	0.009024	0.000000	0.003208	1.65	0.04	0.06
A2649-A2648	A2649	A2648	8	289	0.0228	0.007114	0.000000	0.002477	1.44	0.04	0.06	0.007114	0.000000	0.002477	1.44	0.04	0.06	0.007114	0.000000	0.002477	1.44	0.04	0.06
A2650-A2649	A2650	A2649	8	255	0.0290	0.003873	0.000000	0.001279	1.30	0.03	0.04	0.003873	0.000000	0.001279	1.30	0.03	0.04	0.003873	0.000000	0.001279	1.30	0.03	0.04
A2651-A2634	A2651	A2634	8	283	0.0244	0.018352	0.000000	0.006939	1.97	0.06	0.09	0.018352	0.000000	0.006939	1.97	0.06	0.09	0.018352	0.000000	0.006939	1.97	0.06	0.09
A2652-A2651	A2652	A2651	8	350	0.0257	0.014668	0.000000	0.005439	1.87	0.05	0.08	0.014668	0.000000	0.005439	1.87	0.05	0.08	0.014668	0.000000	0.005439	1.87	0.05	0.08
A2653-A2652	A2653	A2652	8	342	0.0100	0.007483	0.000000	0.002617	1.10	0.05	0.07	0.007483	0.000000	0.002617	1.10	0.05	0.07	0.007483	0.000000	0.002617	1.10	0.05	0.07
A2654-A2636	A2654	A2636	8	176	0.0140	0.027702	0.000000	0.010856	1.84	0.08	0.12	0.027702	0.000000	0.010856	1.84	0.08	0.12	0.027702	0.000000	0.010856	1.84	0.08	0.12
A2655-A2654	A2655	A2654	8	223	0.0260	0.025078	0.000000	0.009743	2.21	0.07	0.10	0.025078	0.000000	0.009743	2.21	0.07	0.10	0.025078	0.000000	0.009743	2.21	0.07	0.10
A2656-A2655	A2656	A2655	8	215	0.0123	0.017097	0.000000	0.006425	1.52	0.06	0.10	0.017097	0.000000	0.006425	1.52	0.06	0.10	0.017097	0.000000	0.006425	1.52	0.06	0.10
A2657-A2656	A2657	A2656	8	318	0.0158	0.011614	0.000000	0.004220	1.47	0.05	0.08	0.011614	0.000000	0.004220	1.47	0.05	0.08	0.011614	0.000000	0.004220	1.47	0.05	0.08
A2658-A2657	A2658	A2657	8	108	0.0296	0.003464	0.000000	0.001133	1.27	0.02	0.04	0.003464	0.000000	0.001133	1.27	0.02	0.04	0.003464	0.000000	0.001133	1.27	0.02	0.04
A2659-A2657	A2659	A2657	8	190	0.0123	0.004871	0.000000	0.001641	1.04	0.04	0.05	0.004871	0.000000	0.001641	1.04	0.04	0.05	0.004871	0.000000	0.001641	1.04	0.04	0.05
A2660-A2656	A2660	A2656	8	225	0.0129	0.005072	0.000000	0.001715	1.07	0.04	0.05	0.005072	0.000000	0.001715	1.07	0.04	0.05	0.005072	0.000000	0.001715	1.07	0.04	0.05
A2661-A2655	A2661	A2655	8	324	0.0082	0.007259	0.000000	0.002532	1.02	0.05	0.07	0.007259	0.000000	0.002532	1.02	0.05	0.07	0.007259	0.000000	0.002532	1.02	0.05	0.07
A2662-A2661	A2662	A2661	8	172	0.0077	0.001972	0.000000	0.000614	0.67	0.03	0.04	0.001972	0.000000	0.000614	0.67	0.03	0.04	0.001972	0.000000	0.000614	0.67	0.03	0.04
A2663-A2637	A2663	A2637	8	250	0.0126	0.009234	0.000000	0.003289	1.27	0.05	0.07	0.009234	0.000000	0.003289	1.27	0.05	0.07	0.009234	0.000000	0.003289	1.27	0.05	0.07
A2664-A2663	A2664	A2663	8	253	0.0223	0.006490	0.000000	0.002242	1.39	0.04	0.05	0.006490	0.000000	0.002242	1.39	0.04	0.05	0.006490	0.000000	0.002242	1.39	0.04	0.05
A27-A28	A27	A28	12	400	0.0088	0.838676	0.000000	0.442131	3.99	0.43	0.43	0.838676	0.000000	0.442131	3.99	0.43	0.43	0.838676	0.000000	0.442131	3.99	0.43	0.43
A28-A29	A28	A29	12	367	0.0088	0.863093	0.000000	0.456140	4.03	0.44	0.44	0.863093	0.000000	0.456140	4.03	0.44	0.44	0.863093	0.000000	0.456140	4.03	0.44	0.44
A2801-A28	A2801	A28	8	194	0.0295	0.035025	0.000000	0.014009	2.56	0.07	0.11	0.035025	0.000000	0.014009	2.56	0.07	0.11	0.035025	0.000000	0.014009	2.56	0.07	0.11
A2802-A2801	A2802	A2801	8	190	0.0303	0.021243	0.000000	0.008135	2.22	0.06	0.09	0.021243	0.000000	0.008135	2.22	0.06	0.09	0.021243	0.000000	0.008135	2.22	0.06	0.09
A2803-A2802	A2803	A2802	8	316	0.0368	0.018998	0.000000	0.007205	2.30	0.05	0.08	0.018998	0.000000	0.007205	2.30	0.05	0.08	0.018998	0.000000	0.007205	2.30	0.05	0.08
A2804-A2803	A2804	A2803	8	316	0.0400	0.013782	0.000000	0.005083	2.14	0.04	0.07	0.013782	0.000000	0.005083	2.14	0.04	0.07	0.013782	0.000000	0.005083	2.14	0.04	0.07
A2805-A2804	A2805	A2804	8	317	0.0361	0.009531	0.000000	0.003404	1.85	0.04	0.06	0.009531	0.000000	0.003404	1.85	0.04	0.06	0.009531	0.000000	0.003404	1.85	0.04	0.06
A2806-A2805	A2806	A2805	8	151	0.0113	0.005146	0.000000	0.001742	1.02	0.04	0.06	0.005146	0.000000	0.001742	1.02	0.04	0.06	0.005146	0.000000	0.001742	1.02	0.04	0.06

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2807-A2801	A2807	A2801	8	155	0.0133	0.014417	0.000000	0.005338	1.48	0.06	0.09	0.014417	0.000000	0.005338	1.48	0.06	0.09	0.014417	0.000000	0.005338	1.48	0.06	0.09
A2808-A2807	A2808	A2807	8	260	0.0407	0.012663	0.000000	0.004636	2.10	0.04	0.06	0.012663	0.000000	0.004636	2.10	0.04	0.06	0.012663	0.000000	0.004636	2.10	0.04	0.06
A2809-A2808	A2809	A2808	8	371	0.0700	0.010209	0.000000	0.003668	2.38	0.03	0.05	0.010209	0.000000	0.003668	2.38	0.03	0.05	0.010209	0.000000	0.003668	2.38	0.03	0.05
A2810-A2809	A2810	A2809	8	371	0.0200	0.004816	0.000000	0.001621	1.22	0.03	0.05	0.004816	0.000000	0.001621	1.22	0.03	0.05	0.004816	0.000000	0.001621	1.22	0.03	0.05
A2811-A2807	A2811	A2807	8	234	0.0100	0.001433	0.000000	0.000434	0.66	0.02	0.03	0.001433	0.000000	0.000434	0.66	0.02	0.03	0.001433	0.000000	0.000434	0.66	0.02	0.03
A29-A30	A29	A30	12	140	0.0098	0.863093	0.000000	0.456140	4.19	0.43	0.43	0.863093	0.000000	0.456140	4.19	0.43	0.43	0.863093	0.000000	0.456140	4.19	0.43	0.43
A30-OUTLETA	A30	OUT_ASSOCIATED	12	245	0.0111	0.895326	0.000000	0.474686	4.43	0.42	0.42	0.966681	0.000000	0.515946	4.52	0.44	0.44	0.966681	0.000000	0.515946	4.52	0.44	0.44
B01-B02	B01	B02	8	313	0.0121	0.007979	0.000000	0.002806	1.20	0.05	0.07	0.007979	0.000000	0.002806	1.20	0.05	0.07	0.007979	0.000000	0.002806	1.20	0.05	0.07
B02-B03	B02	B03	8	237	0.0217	0.023910	0.000000	0.009251	2.05	0.07	0.10	0.023910	0.000000	0.009251	2.05	0.07	0.10	0.023910	0.000000	0.009251	2.05	0.07	0.10
B03-B04	B03	B04	8	274	0.0067	0.029845	0.000000	0.011772	1.45	0.10	0.15	0.029845	0.000000	0.011772	1.45	0.10	0.15	0.029845	0.000000	0.011772	1.45	0.10	0.15
B04-B05	B04	B05	8	182	0.0158	0.039876	0.000000	0.016130	2.14	0.09	0.14	0.083945	0.000000	0.036227	2.66	0.13	0.20	0.083945	0.000000	0.036227	2.66	0.13	0.20
B05-B06	B05	B06	8	182	0.0104	0.044180	0.000000	0.018031	1.90	0.11	0.16	0.087990	0.000000	0.038128	2.33	0.15	0.22	0.087990	0.000000	0.038128	2.33	0.15	0.22
B06-B07	B06	B07	8	216	0.0014	0.044180	0.000000	0.018031	0.93	0.18	0.26	0.087990	0.000000	0.038128	1.13	0.25	0.38	0.087990	0.000000	0.038128	1.13	0.25	0.38
B07-B08	B07	B08	8	148	0.0032	0.044180	0.000000	0.018031	1.26	0.14	0.21	0.087990	0.000000	0.038128	1.54	0.20	0.30	0.087990	0.000000	0.038128	1.54	0.20	0.30
B08-B09	B08	B09	8	48	0.0083	0.044180	0.000000	0.018031	1.76	0.11	0.17	0.087990	0.000000	0.038128	2.15	0.16	0.24	0.087990	0.000000	0.038128	2.15	0.16	0.24
B09-B10	B09	B10	8	43	0.0093	0.136239	0.000000	0.061323	2.54	0.19	0.29	0.178943	0.000000	0.082477	2.74	0.22	0.33	0.178943	0.000000	0.082477	2.74	0.22	0.33
B0901-B09	B0901	B09	8	179	0.0063	0.098897	0.000000	0.043292	2.02	0.18	0.27	0.101116	0.000000	0.044349	2.03	0.18	0.27	0.101116	0.000000	0.044349	2.03	0.18	0.27
B0902-B0901	B0902	B0901	8	308	0.0056	0.098018	0.000000	0.042874	1.93	0.18	0.28	0.100239	0.000000	0.043931	1.94	0.19	0.28	0.100239	0.000000	0.043931	1.94	0.19	0.28
B0903-B0902	B0903	B0902	8	420	0.0052	0.098018	0.000000	0.042874	1.88	0.19	0.28	0.100239	0.000000	0.043931	1.89	0.19	0.28	0.100239	0.000000	0.043931	1.89	0.19	0.28
B0904-B0903	B0904	B0903	8	366	0.0058	0.098018	0.000000	0.042874	1.95	0.18	0.27	0.100239	0.000000	0.043931	1.96	0.18	0.28	0.100239	0.000000	0.043931	1.96	0.18	0.28
B0905-B0904	B0905	B0904	8	217	0.0057	0.098018	0.000000	0.042874	1.94	0.18	0.28	0.100239	0.000000	0.043931	1.95	0.19	0.28	0.100239	0.000000	0.043931	1.95	0.19	0.28
B0906-B0905	B0906	B0905	8	179	0.0063	0.085928	0.000000	0.037158	1.93	0.17	0.25	0.088174	0.000000	0.038215	1.95	0.17	0.25	0.088174	0.000000	0.038215	1.95	0.17	0.25
B0907-B0906	B0907	B0906	8	500	0.0044	0.085928	0.000000	0.037158	1.70	0.18	0.28	0.088174	0.000000	0.038215	1.72	0.19	0.28	0.088174	0.000000	0.038215	1.72	0.19	0.28
B0908D-B0907	B0908D	B0907	8	248	0.0006	0.064555	0.000000	0.027230	0.77	0.27	0.40	0.066857	0.000000	0.028287	0.78	0.27	0.41	0.066857	0.000000	0.028287	0.78	0.27	0.41
B0909-B0908D	B0909	B0908D	8	19	0.0063	0.064555	0.000000	0.027230	1.78	0.14	0.22	0.066857	0.000000	0.028287	1.80	0.15	0.22	0.066857	0.000000	0.028287	1.80	0.15	0.22
B0911-B0920	B0911	B0920	8	151	0.0070	0.060687	0.000000	0.025461	1.81	0.14	0.21	0.063001	0.000000	0.026518	1.83	0.14	0.21	0.063001	0.000000	0.026518	1.83	0.14	0.21
B0912-B0911	B0912	B0911	8	20	0.0125	0.060129	0.000000	0.025207	2.22	0.12	0.18	0.062445	0.000000	0.026264	2.25	0.12	0.18	0.062445	0.000000	0.026264	2.25	0.12	0.18
B0913-B0912	B0913	B0912	8	337	0.0066	0.054107	0.000000	0.022475	1.72	0.13	0.20	0.056443	0.000000	0.023532	1.74	0.13	0.20	0.056443	0.000000	0.023532	1.74	0.13	0.20
B0914-B0913	B0914	B0913	8	6	0.0667	0.052250	0.000000	0.021638	3.83	0.07	0.11	0.054594	0.000000	0.022695	3.88	0.08	0.11	0.054594	0.000000	0.022695	3.88	0.08	0.11
B0915-B0914	B0915	B0914	8	378	0.0099	0.041672	0.000000	0.016921	1.84	0.10	0.16	0.044061	0.000000	0.017978	1.87	0.11	0.16	0.044061	0.000000	0.017978	1.87	0.11	0.16
B0916-B0915	B0916	B0915	8	371	0.0073	0.033643	0.000000	0.013409	1.55	0.10	0.15	0.036075	0.000000	0.014466	1.58	0.11	0.16	0.036075	0.000000	0.014466	1.58	0.11	0.16
B0917-B0914	B0917	B0914	8	213	0.0052	0.012866	0.000000	0.004717	1.03	0.07	0.10	0.012866	0.000000	0.004717	1.03	0.07	0.10	0.012866	0.000000	0.004717	1.03	0.07	0.10
B0918-B0917	B0918	B0917	8	268	0.0050	0.012866	0.000000	0.004717	1.02	0.07	0.11	0.012866	0.000000	0.004717	1.02	0.07	0.11	0.012866	0.000000	0.004717	1.02	0.07	0.11
B0919-B0914	B0919	B0914	6	172	0.0300	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00
B0920-B0909	B0920	B0909	8	217	0.0067	0.064555	0.000000	0.027230	1.82	0.14	0.21	0.066857	0.000000	0.028287	1.84	0.15	0.22	0.066857	0.000000	0.028287	1.84	0.15	0.22
B0921-B0920	B0921	B0920	6	98	0.0626	0.004128	0.000000	0.001371	1.81	0.02	0.05	0.004128	0.000000	0.001371	1.81	0.02	0.05	0.004128	0.000000	0.001371	1.81	0.02	0.05
B0922-B0921	B0922	B0921	6	244	0.0148	0.003011	0.000000	0.000973	1.00	0.03	0.06	0.003011	0.000000	0.000973	1.00	0.03	0.06	0.003011	0.000000	0.000973	1.00	0.03	0.06
B10-B1001	B10	B1001	8	212	0.0057	0.156370	0.000000	0.071233	2.68	0.20	0.31	0.198632	0.000000	0.092387	2.86	0.23	0.35	0.198632	0.000000	0.092387	2.86	0.23	0.35
B1001-B11	B1001	B11	8	434	0.0073	0.160338	0.000000	0.073200	2.44	0.22	0.33	0.202520	0.000000	0.094354	2.60	0.25	0.38	0.202520	0.000000	0.094354	2.60	0.25	0.38
B11-B12	B11	B12	8	180	0.0258	0.244564	0.000000	0.115827	4.32	0.20	0.30	0.292548	0.000000	0.140728	4.54	0.22	0.33	0.292548	0.000000	0.140728	4.54	0.22	0.33
B1101-B11	B1101	B11	8	360	0.0083	0.085579	0.000000	0.036994	2.14	0.16	0.23	0.093523	0.000000	0.040741	2.19	0.16	0.24	0.093523	0.000000	0.040741	2.19	0.16	0.24
B1102-B1101	B1102	B1101	8	660	0.0099	0.080993	0.000000	0.034844	2.24	0.15	0.22	0.088972	0.000000	0.038591	2.30	0.15	0.23	0.088972	0.000000	0.038591	2.30	0.15	0.23
B1103-B1102	B1103	B1102	8	650	0.0072	0.070647	0.000000	0.030034	1.92	0.15	0.22	0.078717	0.000000	0.033781	1.98	0.15	0.23	0.078717	0.000000	0.033781	1.98	0.15	0.23
B1104-B1103	B1104	B1103	6	699	0.0068	0.047828	0.000000	0.019655	1.73	0.13	0.27	0.047828	0.000000	0.019655	1.73	0.13	0.27	0.047828	0.000000	0.019655	1.73	0.13	0.27
B1105-B1104	B1105	B1104	6	120	0.0070	0.019175	0.000000	0.007278	1.34	0.09	0.17	0.019175	0.000000	0.007278	1.34	0.09	0.17	0.019175	0.000000	0.007278	1.34	0.09	0.17