

Appendix J. Water System Utility Impact Study

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TECHNICAL MEMORANDUM

To: De Novo Planning Group
From: Harris & Associates
RE: Water System Utility Impact Study for the Brea Core Specific Plan
Date: February 6, 2026

1. Introduction

The City of Brea (City) is developing the Brea Core Specific Plan (BCSP) as part of their Focused General Plan Update. The BCSP is generally bounded by Lambert Road to the north, Imperial Highway (SR-90) to the south, Berry Street to the west, and SR-57 to the east. The BCSP will increase the number of residential units and allowable non-residential square footage as summarized in [Table 1](#).

Table 1. Proposed BCSP Land Use Change Summary

Land Use Designation	Existing Land Use	Proposed Land Use
Residential Units	1,417	4,752
Non-Residential Square Footage	5,113,863	6,379,588

This Technical Memorandum documents Harris and Associates' (Harris) analysis of the impacts on the City's public water system from incremental water demand changes associated with allowable BCSP land uses at a programmatic level. The incremental impact is compared with existing land use assumptions and findings of the "existing system scenario" in the City's Water Master Plan (WMP, 2021). Hydraulic modeling of the water system was not included in the scope of this work.

2. Existing Water System Description

The BCSP area is served by the City's water system, which receives purchased water from the California Domestic Water Company (CDWC) and the Municipal Water District of Orange County (MWDOC). The BCSP area lies within the City's Pressure Zone 515, which is supplied by the Berry Street Pump Station, which pumps from the Berry Street Reservoir, and by PRVs connected to higher zones. [Figure 1](#) illustrates the water system within the BCSP area.

3. Water System Performance Criteria

The water system is evaluated under several criteria to confirm that the incremental BCSP water demand changes can be adequately served. The assessment considers impacts on hydraulic performance (e.g., pressure and velocity), water supply capacity, required storage, booster pump station capacities, and available fire flow.

The analysis applies the following WMP criteria:

- Minimum static pressure of 40 psi during average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD)
- Maximum pressure of 125 psi at all service connections
- Minimum residual pressure of 20 psi during fire flow (FF)
- Maximum pipe velocity of 7 feet per second (fps) during PHD

- Maximum pipe velocity of 15 fps during FF plus MDD
- Booster pump stations sized to meet MDD with the largest pump out of service
- Non-emergency water supply capacity sufficient to meet system MDD with the largest single sources unavailable
- MDD peaking factor: 1.59 x ADD
- PHD peaking factor: 3.00 x ADD

4. Existing Water System Deficiencies Within the BCSP Area

According to the WMP, the existing system within the BCSP area meets most design criteria. No system deficiencies were identified related to pressure, velocity, water supply, fire flow, or water storage. However, the WMP provided recommendations for the Berry Street Booster Pump Station to aid in meeting the dependent MDD in both the 790 and 515 pressure zones. The WMP identified that in order to meet dependent MDD in the 790-pressure zone, all the pumps must be active at the Berry Street Booster Pump Station. An additional high-pressure pump was recommended to be added to the station with a minimum capacity of 1,191 gpm to address this. To meet the dependent MDD in the 515-pressure zone, an additional low-pressure pump was also recommended to be added to this station with a minimum capacity of 1,424 gpm.

5. Water Demand Changes

The incremental change in water demand between existing conditions and BCSP land uses is estimated by applying water duty factors to each land use type. All duty factors were taken from the WMP, except where otherwise noted in [Table 2](#). These factors were used for the existing and proposed land uses. The WMP describes the development of these duty factors based on customer meter usage data. [Figure 2](#) presents the existing land use adopted from the WMP, [Figure 3](#) shows the BCSP land uses, and [Figure 4](#) identifies the parcels with land use changes.

Table 2. Water Duty Factors

Land Use Type	Land Use	Water Duty Factor (gpm/AC)	Source
Single-Family Residential	R-1, Single-Family Residential	1.28	WMP
	R-1-5000, Single-Family Residential 5000	1.28	WMP
High Density Residential	R-3, Multiple Family	2.14	WMP
Business/Commercial	C-G, General Commercial	0.59	WMP
	C-C, Major Shopping Center	0.59	WMP
	C-P, Administrative and Professional Office	0.59	WMP
Industrial	C-M, Industrial Commercial	0.81	WMP
	M-1, Light Industrial	0.81	WMP
	M-2, General Industrial	0.81	WMP
Parks	P/R/OS-PR, Parks, Recreation/Open Space-Parks	0	Estimated ¹
Flood Plain	FP, Flood Plain	0	Estimated ¹
Public Facilities	PF, Public Facilities	0.83	Estimated ²
Mixed Use	MU-1, Mixed Use I	0.92	WMP
	MU-2, Mixed Use II	0.92	WMP
	MU-3, Mixed Use III	0.92	WMP
	Mixed Use 18	0.92	Estimated ³
	Mixed Use 50	0.92	Estimated ³

¹ Assumed to have negligible water demand based on the land use and location

² Assumed to have the same water duty factor as schools tabulated in the WMP based off the land use and location

³ MU-1 and MU-3 factors were used for Mixed Use 50 and Mixed Use 18, respectively, aligning with their allowable housing

The incremental change in water demand between existing and BCSP land uses is provided in the attached [Table A1](#). Overall, the BCSP is estimated to increase ADD, MDD, and PHD by 4.2% compared to existing land use. A summary of these estimates is presented in [Table 3](#).

Table 3. BCSP Incremental Water Demand Change

City Imported Capacity (gpm)	Existing (gpm)	BCSP (gpm)	BCSP – Existing (gpm)	% Increase
ADD	596.27	621.13	24.86	4.2%
MDD	948.07	987.60	39.52	4.2%
PHD	1788.81	1,863.39	74.57	4.2%

6. Water Supply Impacts

The anticipated increase in water demand from the BCSP is compared with the City’s existing supply capacity to confirm that the total MDD can be met with the largest single source out of service. [Table 4](#) summarizes the existing MDD and incremental MDD increase associated with BCSP land uses. This analysis indicates that sufficient supply is available to meet the projected higher demand, as the City’s available capacity is larger than the demand.

Table 4. Water Supply Analysis

City Imported Capacity (gpm)	Capacity with largest single source out of service (gpm)	Existing MDD (gpm)	With BCSP MDD (gpm)
23,697	15,708	8,615	8,655

7. Water Storage Impacts

The City’s water storage requirements are determined by pressure zone and account for operational needs (supply and demand equalization), fire flow, and emergency storage. These requirements were evaluated with the incremental BCSP water demand increase and are summarized in [Table 5](#). Storage needs for Pressure Zone 515, where the BSCP is located, are included within the requirements for Pressure Zone 790 because Pressure Zone 515 is supplied by PRVS from Zone 750 and does not have dedicated storage facilities.

Existing storage requirements total 16.48 million gallons (MG) and increases slightly to 16.58 MG with the BCSP demand. With 25.00 MG of available storage, the system has sufficient storage capacity to accommodate the BCSP land uses.

Table 5. Water Storage Analysis (Zone 750)

Land Use Scenario	Storage Volume Available (Million Gallons)	ADD (MGD) ²	MDD (MGD) ²	Fire Storage ¹	Operational (30% of MDD) (MG)	Emergency (2 x ADD) (MG)	Required Storage Total (MG)	Surplus Capacity (MG)
Existing	25.00	6.27	9.96	0.96	2.99	12.53	16.48	8.52
With BCSP		6.31	10.02	0.96	3.00	12.62	16.58	8.42

¹ Fire storage requirement was calculated as 4,000 gpm for 4 hours based on the highest fire flow requirement

² The incremental BCSP in units of million gallons per day (MGD) for ADD is 0.036 MGD and 0.057 MGD for MDD

8. Booster Pump Capacity Impact

The WMP provided recommendations for the Berry Street Booster Pump Station to aid in meeting the dependent MDD in both the 790 and 515 Pressure Zones, including the addition of a high-pressure pump with a minimum capacity of 1,191 gpm for the 790 Pressure Zone and the addition of a low-pressure pump with a minimum capacity of 1,424 gpm. [Table 6](#) summarizes the incremental MDD increase associated with the BCSP relative to these pumping capacity recommendations.

Table 6. Berry Street Booster Pump Capacity (to Pressure Zone 515)

Water Demand Scenario	Initial Capacity (gpm)	MDD (gpm)	Surplus Capacity (gpm)
Existing Land Use	2,000	3,424	(-1,424)
With BCSP Land Use		3,520 ¹	(-1,463)

¹ Estimated as existing plus the BCSP incremental MDD of 39.52 gpm

9. Fire Flow Requirement Impacts

Fire flow requirements by land use were taken from the WMP and used to assess potential increases associated with the proposed BCSP land uses. [Table 7](#) summarizes the changes in land use from existing to BCSP and the corresponding required fire flow rates. An increase in fire flow requirements was identified for parcels with land use changes from business/commercial use to mixed use. Locations of these parcels are shown in [Figure 5](#). As development plans become available for these areas, hydrant flow testing is recommended to confirm that the system can meet the potentially higher fire flow needs. While the mixed-use fire flow requirement in [Table 7](#) is used for planning purposes here, project-specific building features and uses may also affect the required fire flow and should be evaluated accordingly.

Table 7. Fire Flow Requirement Changes

Existing Land Use Description	Existing Minimum Fire Flow (gpm)	Existing Minimum Duration (hrs)	BCSP Land Use Description	BCSP Minimum Fire Flow (gpm)	BCSP Minimum Duration (hrs)
Business/Commercial	2500	2	Business/Commercial	2500	2
			Mixed Use	4000	4
High Density Residential	4000	4	High Density Residential	4000	4
			Mixed Use	4000	4
Industrial	4000	4	Industrial	4000	4
			Flood Plain	0	0
			Mixed Use	4000	4
Mixed Use	4000	4	Mixed Use	4000	4
Public Facilities	3500	4	Public Facilities	3500	4
Single-Family Residential	1500	2	Single-Family Residential	1500	2

10. Summary of Findings

Based on existing land use from the WMP, the BCSP is estimated to increase water demand by 4.2%. The City's current water supply and storage capacities are sufficient to meet this additional demand. However, the WMP provided recommendations for the Berry Street Booster Pump Station, which services Pressure Zone 515 (encompassing the BCSP area), including the addition of a high-pressure pump to the 790 Pressure Zone and a

low-pressure pump to the 515 Pressure Zone to meet dependent MDD in each zone. Any upgrades to this station should account for the potential additional BCSP demand. Fire flow requirements are also higher under the BCSP land use, and it is recommended that actual available fire flow be verified for new developments that may have increased requirements.

To assess the contribution of individual new developments to the upgrades needed at the pump station or potential fire flow inadequacies that are determined through fire flow testing, updated modeling should be conducted once detailed development plans are available. This modeling can identify the required upgrades and associated costs. With this information, potential developer impact fees could be determined for new development or redevelopment within the BCSP area.

11. References

City of Brea Water Master Plan, Prepared by Civiltec Engineering inc., May 2021

Table A1: Incremental Water Demand Changes Within the BCSP Area

Existing Land Use Designation	BCSP Land Use Designation	Area (Acres)	Existing Land Use Water Demand (gpm)	BCSP Land Use Water Demand (gpm)	Difference BCSP – Existing (gpm)	% Change
C-C, Major Shopping Center	C-C, Major Shopping Center	14.5	8.57	8.57	0.00	0.0%
	Mixed Use 50	14.3	8.43	13.15	4.72	55.9%
C-G, General Commercial	C-G, General Commercial	3.7	2.16	2.16	0.00	0.0%
	Mixed Use 18	7.4	4.37	6.81	2.44	55.9%
	Mixed Use 50	54.0	31.84	49.64	17.81	55.9%
C-M, Industrial Commercial	C-M, Industrial Commercial	11.8	9.58	9.58	0.00	0.0%
	M-1, Light Industrial	6.2	5.03	5.03	0.00	0.0%
	Mixed Use 50	7.7	6.23	7.08	0.85	13.6%
C-P, Administrative and Professional Office	C-P, Administrative and Professional Office	2.0	1.19	1.19	0.00	0.0%
	Mixed Use 18	2.0	1.16	1.80	0.65	55.9%
	Mixed Use 50	3.3	1.93	3.00	1.08	55.9%
FP, Flood Plain	FP, Flood Plain	10.4	0.00	0.00	0.00	0.0%
M-1, Light Industrial	M-1, Light Industrial	60.1	48.66	48.66	0.00	0.0%
M-2, General Industrial	M-2, General Industrial	52.7	42.69	42.69	0.00	0.0%
MU-1, Mixed Use I	Mixed Use 50	131.9	121.39	121.39	0.00	0.0%
MU-2, Mixed Use II	Mixed Use 50	22.9	21.08	21.08	0.00	0.0%
MU-3, Mixed Use III	Mixed Use 18	5.7	5.23	5.23	0.00	0.0%
P/R/OS-PR, Parks/Recreation/Open Space-Parks/Recreation	P/R/OS-PR, Parks/Recreation/Open Space-Parks/Recreation	19.9	0.00	0.00	0.00	0.0%
PF, Public Facilities	PF, Public Facilities	23.4	19.41	19.41	0.00	0.0%
R-1, Single-Family Residential	R-1, Single-Family Residential	84.7	108.38	108.38	0.00	0.0%
	P/R/OS-PR, Parks/Recreation/Open Space-Parks/Recreation	1.9	2.48	0.00	-2.48	-100.0%
R-3, Multiple Family	Mixed Use 18	0.2	0.34	0.15	-0.20	-57.0%
	R-3, Multiple Family	68.3	146.14	146.14	0.00	0.0%
		608.8				
ADD Totals		-	596.27	621.13	24.86	4.2%
MDD Totals		-	948.07	987.60	39.52	4.2%
PHD Totals		-	1788.81	1863.39	74.57	4.2%