Appendices

Appendix I Assessment of Water Availability

Appendices

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Assessment of Water Availability for Proposed Residential Development

FOR

1401 Quail Street
Newport Beach, CA 92660

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I. INTRODUCTION:

The subject site is currently occupied by an office building on a 1.71-acre lot located at the north-west corner of Quail Street and Spruce Avenue with a land use classification of “General Commercial - Office”. The proposed site will have a land use classification of “Very High Residential”. The proposed site is anticipated to result in an increased local water demand and utilizes an existing 16” water main on Spruce St. for domestic water service. The purpose of this study is to determine the adequacy of the existing facilities to serve the proposed residential development. It is not meant to be a Water Supply Assessment under California SB610/SB221.

II. EXISTING CONDITIONS ANALYSIS

The existing facility is currently served by a fire water service and a second domestic water service, both of which connect to a 16” main located on Spruce St. Existing peak flows have been calculated based on section 4.4 “Land Use Demand Factors” of the City of Newport Beach Water Master Plan (WMP) based on the land use classification of “General Commercial - Office”. Based on the WMP, average demand for the site is calculated as follows.

1.71 Acres x 2,000 GPD/acre = 3420 GPD or **2.38 GPM**

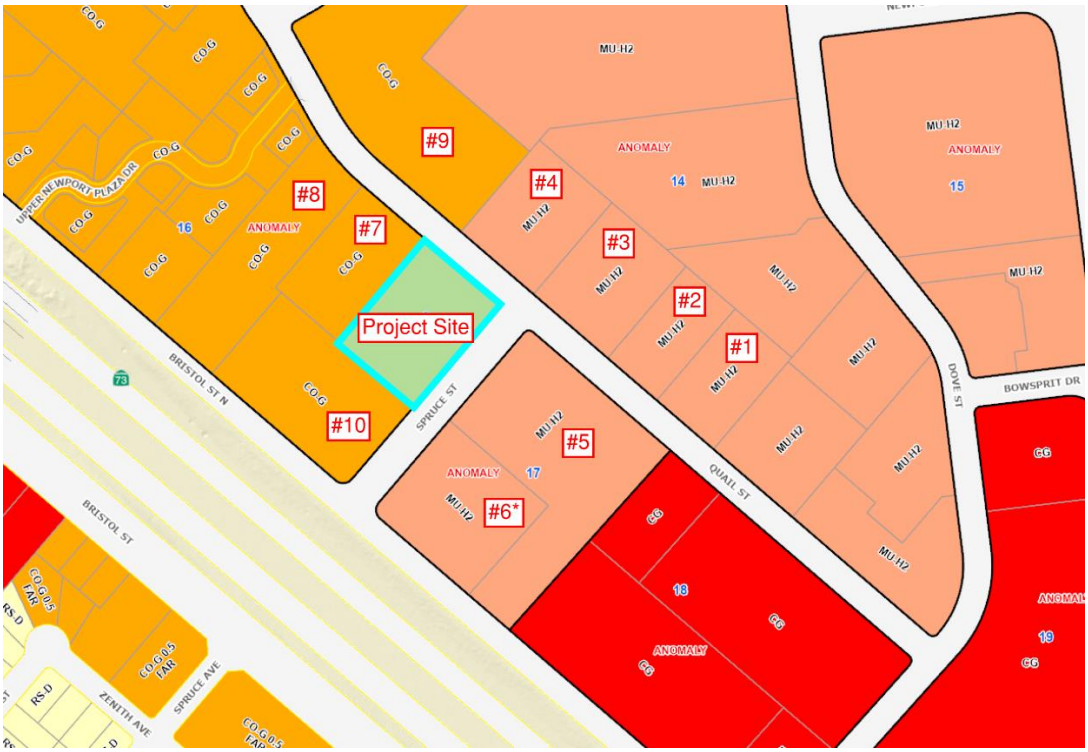
Per City WMP, a peaking factor of 2.6 is required to calculate peak hour demand. However, in order to provide a factor of safety, a peaking factor of 3.0 has been used for the purpose of calculating peak flow rates. Peak flow calculations are as follows:

2.38 GPM x 3.00 = **7.14 GPM of domestic water at peak demand**

For this analysis, existing flow and pressure at the site were determined from a fire hydrant flow test conducted by the City of Newport Beach Utilities Department on 11/22/2022 (See Appendix A). The Fire hydrant tested (FH#B17) is located on Spruce Street, approximately 230 feet away in the south-westerly direction from the project site. The findings of this flow test were then used to create a model of the domestic water pipe network in the immediate vicinity of the site using WaterCAD by Bentley Systems, Inc.

The following parcels on Quail Street and Spruce Street were considered in the water model. The land use is a combination of “Mixed-Use” and “General Commercial – Office” parcels. It was assumed that the 16” water main on Spruce street as well as the 16” & 8” water mains on Quail Street are servicing the existing parcels near the project site.

The same methodology that was used to gather the peak flow demand of the project site is used to find the peak flow demand of the other parcels. Please refer to the GIS map and the table below for clarification:



	Land Use	Area (acre)	GPD/Area	GPD	GPM	GPM x Safety Factor of 3
Project Site	General Commercial Office	1.710	2,000	3,420	2.38	7.14
Parcel #1	Mixed-use	1.151	2,200	2,532	1.76	5.28
Parcel #2	Mixed-use	1.000	2,200	2,200	1.53	4.58
Parcel #3	Mixed-use	1.506	2,200	3,313	2.30	6.90
Parcel #4	Mixed-use	1.472	2,200	3,238	2.25	6.75
Parcel #5	Mixed-use	3.700	2,200	8,140	5.65	16.96
Parcel #6*	Very High Residential	1.970	3,800	7,486	5.20	15.60
Parcel #7	General Commercial Office	1.415	2,000	2,830	1.97	5.90
Parcel #8	General Commercial Office	2.215	2,000	4,430	3.08	9.23
Parcel #9	General Commercial Office	4.775	2,000	9,550	6.63	19.90
Parcel #10*	Very High Residential	2.376	3,800	9,029	6.28	18.84
Total	**-**	**23.290**	**-**	**56,169**	**39.02**	**117.07**

***Land use for Parcel #6 & #10 has been changed to Very High Residential to reflect actual future condition per Water Study Reports prepared by Tait and Associates, Dec. 2021 and Dec. 2022.**

III. PROPOSED CONDITIONS ANALYSIS

The site will be developed to have a categorized land use of “Very High Residential”. The proposed development will utilize a new domestic water, fire water, and irrigation water service laterals with a connection to the 16” water main on Spruce Street.

Proposed peak flows have been calculated based on section 4.4 “Land Use Demand Factors” of the City of Newport Beach Water Master Plan (WMP) based on the noted land use “Very High Residential”. Based on the WMP, average demand for the site is calculated as follows:

1.71 acres x 3,800 GPD/acre = 6,498 or **4.51 GPM**

Peak flow calculations are as follows:

4.51 GPM x 3.00 = **13.53 GPM of domestic water at peak demand**

The peak demand for the proposed site would be 13.53 GPM which is 6.40 GPM higher than the existing condition.

The tables below depict the junction and pipe line serving the project site in both the existing and proposed condition. The full results of the model can be found in Appendix B.

EXISTING JUNCTION DATA				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
PROJECT SITE	41.5	7	273.56	100

PROPOSED JUNCTION DATA				
Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
PROJECT SITE	41.5	14	273.52	100

EXISTING PIPE DATA							
Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
L-P	23	6	Asbestos Cement	140	7	0.08	0

PROPOSED PIPE DATA							
Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
L-P	23	6	Asbestos Cement	140	14	0.16	0

IV. CAPACITY ASSESMENT AND CONCLUSION

An analysis of the existing conditions for both domestic water mains on Spruce Street and Quail Street resulted in velocity changes less than 0.08 FT/S and a pressure change of less than 1 PSI for domestic water usages which can be considered negligible. Therefore, it has been determined the existing public water system at the project site is more than adequate to handle the increased demand of the proposed residential development and will not adversely affect the existing network's ability to serve the surrounding developments.

Appendix A: Fire Hydrant Flow Test

CITY OF NEWPORT BEACH
UTILITIES DEPARTMENT

FIRE HYDRANT FLOW TEST

AMOUNT PAID: $458.00 DATE: 11/22/2022
CHECK NO: TIME: 6:00AM
TEST NO: WEATHER: CLEAR

PROJECT:
PROJECT LOCATION: SPRUCE AVENUE
TEST CONDUCTED FOR: Nick Streeter
TEST PERFORMED BY: O'CAMPO/ AUGER
TEST WITNESSED BY:

FIELD OBSERVATIONS AND FLOW DATA

STATIC HYDRANT # : 817 LOCATION: 3661 Spruce
F/H MANUFACTURER: AVK NUMBER & SIZE OF OUTLETS: 2-2.5" 1-4"
STATIC PRESSURE, (Ps , psi), PRE-FLOW: 98
RESIDUAL PRESSURE, (Pr , psi) FLOWING: 85
FLOW HYDRANT # : 818 LOCATION: 1400 Bristol
F/H MANUFACTURER: AVK NUMBER & SIZE OF OUTLETS: 2-2.5" 1-4"
STATIC PRESSURE, PRE-FLOW (INFO ONLY, NOT FOR TEST CALCS) :
F/H OUTLET SIZE (2.5 or 4.0): 2.5 (d, inches)
FLOW LOSS COEFFICIENT - TUBE C=1.0 / BUTT C=0.9 0.9
PITOT GAUGE READING (p, psi): 67

OBSERVED FLOW: THE OBSERVED FLOW FROM A HYDRANT OUTLET IS CALCULATED FROM THE FOLLOWING EQUATION:

$$Q_s = 29.83(Cd^2)\sqrt[2]{p}$$

WHERE; Q IS THE OBSERVED FLOW IN GPM; d IS THE OUTLET DIAMETER IN INCHES; p IS THE PITOT GAUGE PRESSURE IN PSI; AND C IS THE FLOW LOSS COEFFICIENT (C = 1.0 FOR FLOW TUBES AND C = 0.9 FOR BUTT FLOW READINGS).

OBSERVED FLOW (Qs, gpm): 1373 GPM

DISCHARGE CALCS: THE DISCHARGE FOR A GIVEN FIRE HYDRANT CAN BE DETERMINED FROM THE FOLLOWING EQUATION USING THE INITIAL (STATIC) WATER PRESSURE AND THE RESIDUAL (DYNAMIC) WATER PRESSURE:

$$Q_r = Q_s\left(\frac{P_s - 20}{P_s - P_r}\right)^{0.54}$$

WHERE; Q (STATIC OR RESIDUAL) IS THE FLOW IN GPM; AND P (STATIC OR RESIDUAL) IS THE PRESSURE IN PSI. NOTE: A 10 PSI DROP IS REQUIRED FOR VALID TEST!

CALCULATED FLOW AT 20 psi (Qr, gpm): 3614 GPM

Appendix B: WaterCAD Model and Results

Water Analysis for Existing Conditions

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	38.5	5	273.56	102
J-2	37.5	5	273.56	102
J-3	38.5	7	273.56	102
J-4	39.5	7	273.56	101
J-5	41.5	17	273.56	100
J-6	47.3	16	273.56	98
J-7	39.5	6	273.56	101
J-8	40.5	9	273.56	101
J-9	39.5	20	273.55	101
J-10	48.5	19	273.56	97
PROJECT SITE	41.5	7	273.56	100

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
L-1	57	6	Asbestos Cement	140	5	0.06	0
L-2	58	6	Asbestos Cement	140	5	0.06	0
L-3	57	6	Asbestos Cement	140	7	0.08	0
L-4	57	6	Asbestos Cement	140	7	0.08	0
L-5	80	6	Asbestos Cement	140	17	0.19	0
L-6	77	6	Asbestos Cement	140	16	0.18	0
L-7	26	6	Asbestos Cement	140	6	0.07	0
L-8	34	6	Asbestos Cement	140	9	0.1	0
L-9	57	6	Asbestos Cement	140	20	0.23	0
L-10	23	6	Asbestos Cement	140	19	0.22	0
L-P	23	6	Asbestos Cement	140	7	0.08	0
MP-1	4	48	Asbestos Cement	140	118	0.02	0
MP-2	77	16	Asbestos Cement	140	118	0.19	0
MP-3	30	16	Asbestos Cement	140	102	0.16	0
MP-4	182	16	Asbestos Cement	140	83	0.13	0
MP-5	36	16	Asbestos Cement	140	76	0.12	0
MP-6	224	16	Asbestos Cement	140	59	0.09	0
MP-7	17	16	Asbestos Cement	140	24	0.04	0
MP-8	120	16	Asbestos Cement	140	17	0.03	0
MP-9	204	16	Asbestos Cement	140	10	0.02	0
MP-10	128	16	Asbestos Cement	140	5	0.01	0
MP-11	140	16	Asbestos Cement	140	0	0	0
MP-12	268	16	Asbestos Cement	140	35	0.06	0
MP-13	188	16	Asbestos Cement	140	9	0.01	0
MP-14	148	16	Asbestos Cement	140	0	0	0

FlexTable: Pump Table

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	52.1	47.5	273.56	118	226.06

Water Analysis for Proposed Conditions

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	38.5	5	273.52	102
J-2	37.5	5	273.52	102
J-3	38.5	7	273.52	102
J-4	39.5	7	273.52	101
J-5	41.5	17	273.52	100
J-6	47.3	16	273.52	98
J-7	39.5	6	273.52	101
J-8	40.5	9	273.52	101
J-9	39.5	20	273.52	101
J-10	48.5	10	273.52	97
PROJECT SITE	41.5	14	273.52	100

FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
L-1	57	6	Asbestos Cement	140	5	0.06	0
L-2	58	6	Asbestos Cement	140	5	0.06	0
L-3	57	6	Asbestos Cement	140	7	0.08	0
L-4	57	6	Asbestos Cement	140	7	0.08	0
L-5	80	6	Asbestos Cement	140	17	0.19	0
L-6	77	6	Asbestos Cement	140	16	0.18	0
L-7	26	6	Asbestos Cement	140	6	0.07	0
L-8	34	6	Asbestos Cement	140	9	0.1	0
L-9	57	6	Asbestos Cement	140	20	0.23	0
L-10	23	6	Asbestos Cement	140	19	0.22	0
L-P	23	6	Asbestos Cement	140	14	0.16	0
MP-1	4	48	Asbestos Cement	140	125	0.02	0
MP-2	77	16	Asbestos Cement	140	125	0.2	0
MP-3	30	16	Asbestos Cement	140	109	0.17	0
MP-4	182	16	Asbestos Cement	140	90	0.14	0
MP-5	36	16	Asbestos Cement	140	76	0.12	0
MP-6	224	16	Asbestos Cement	140	59	0.09	0
MP-7	17	16	Asbestos Cement	140	24	0.04	0
MP-8	120	16	Asbestos Cement	140	17	0.03	0
MP-9	204	16	Asbestos Cement	140	10	0.02	0
MP-10	128	16	Asbestos Cement	140	5	0.01	0
MP-11	140	16	Asbestos Cement	140	0	0	0
MP-12	268	16	Asbestos Cement	140	35	0.06	0
MP-13	188	16	Asbestos Cement	140	9	0.01	0
MP-14	148	16	Asbestos Cement	140	0	0	0

FlexTable: Pump Table

Label	Elevation (ft)	Hydraulic Grade (Suction) (ft)	Hydraulic Grade (Discharge) (ft)	Flow (Total) (gpm)	Pump Head (ft)
PMP-1	52.1	47.5	273.52	125	226.02

WaterCAD Model