Technical Appendix F

Assessment of Sewer Capacity Availability Relative to Increase Allocation of Residential Development

RBF Consulting

May 10, 2012

RBF CONSULTING
A Baker Company

NORTH NEWPORT CENTER
ASSESSMENT OF SEWER CAPACITY AVAILABILITY
RELATIVE TO INCREASED ALLOCATION
OF RESIDENTIAL DEVELOPMENT
(May 10, 2012)

Introduction:

An application has been filed to incorporate 94 additional residential units to the North Newport Center Planned Community (NNCPC) within the San Joaquin Plaza area adjacent to the corner of San Joaquin Hills Road and Santa Cruz Drive.

The subject site is currently occupied by low-rise office buildings. However, the current request to incorporate 94 additional residential units to the previous allocation of 430 residential units established on this site has been anticipated to result in increased demand on the local sewer system when compared to the existing office uses. This assessment has been prepared to assess whether there is adequate capacity within the existing infrastructure within the vicinity to serve the proposed expanded number of residential units proposed to be allocated to the San Joaquin Plaza site.

Existing Conditions:

The subject site is contained within an area of existing development bounded by San Joaquin Hills Road, Santa Cruz Drive, San Clemente Drive and Santa Barbara Drive. While sewer lines exist within each of these roadways, the primary means of serving the existing office buildings on the site utilizes 8 inch VCP sewer lines extending from the subject site to San Clemente, which connects into the 8 inch VCP in Santa Barbara that connects to the facilities in Jamboree. Examination of the plans for the sewer lines in San Clemente and Santa Barbara indicated that a short segment (approximately 64 feet long) between Manhole 3 and Manhole 4 generally westerly of the art museum had a significantly flatter slope than all other potentially affected segments and, therefore, would be the location within the lowest potential capacity. (See attached excepts from record plans for San Clemente Drive).

Capacity Assessment:

The previously identified point of lowest capacity along the system serving the project site has been constructed with a slope slightly over one percent, but for purposes of this assessment the calculations utilize a one percent slope to be conservative. On that basis and reflecting standard conditions regarding the peak flows, the capacity for an 8 inch VCP flowing half full was calculated to be 390,100 gallons per day. This capacity is consistent with industry standard criteria and would be the basis of design for installation of a new sewer line. Furthermore, it should be noted that this facility is calculated to have a capacity of 711,900 gallons per day when ¾ full. (See attached worksheets).

Demand Assessment:

It should be noted that the subject segment of the sewer system currently serves only the art museum and the San Joaquin Plaza office buildings. Therefore, as currently configured, should residential units replace the office uses in San Joaquin Plaza, the only other demand for the capacity in the previously discussed pipe segment would be from the Art Museum. That being said, should the entire San Joaquin Plaza site continue to utilize the subject pipe segment, the demand associated with implementing the residential units would make up virtually all the demand for this segment of the sewer system.

The demand associated with the 94 additional units requested for allocation to the subject site was calculated based on an estimate of 200 gallons per day per unit with an assumed peaking factor of 3.0 and resulted in a projected demand of 56,400 gallons per day. When compared to the previously identified capacity range, it can be seen that the projected demand would represent approximately 15 percent of the design capacity at the most capacity constrained segment in the proximate sewer system.

Although the application currently under review by the City is specifically limited to the allocation of 94 additional units, the projected demand associated with the combined total of 524 residential units has also been calculated. The projected demand associated with all 524 units, based on the previously stated assumptions would be 314,000 gallons per day. When compared to the previously calculated capacity, the demand would utilize approximately 80 percent of the design capacity.

When including an estimated demand of 18,000 gallons per day for the Art Museum, the combined peak flow would with all 524 residential units be estimated to be 334,400 gallons per day. This combined total peak demand would then equate to being 86 percent of the capacity for the pipe flowing half full.

Conclusion:

The projected demand associated with the 94 additional residential units requested for the San Joaquin Plaza site equates to approximately 15 percent of the most constrained pipe segment capacity within the existing sewer system proximate to the project. Since the subject segment of the sewer system serves only the subject site and the Art Museum, it can be concluded that there is adequate capacity within the most capacity constrained portion of the existing sewer system in the vicinity of the project (above Manhole 3) to serve the proposed allocation of additional units.

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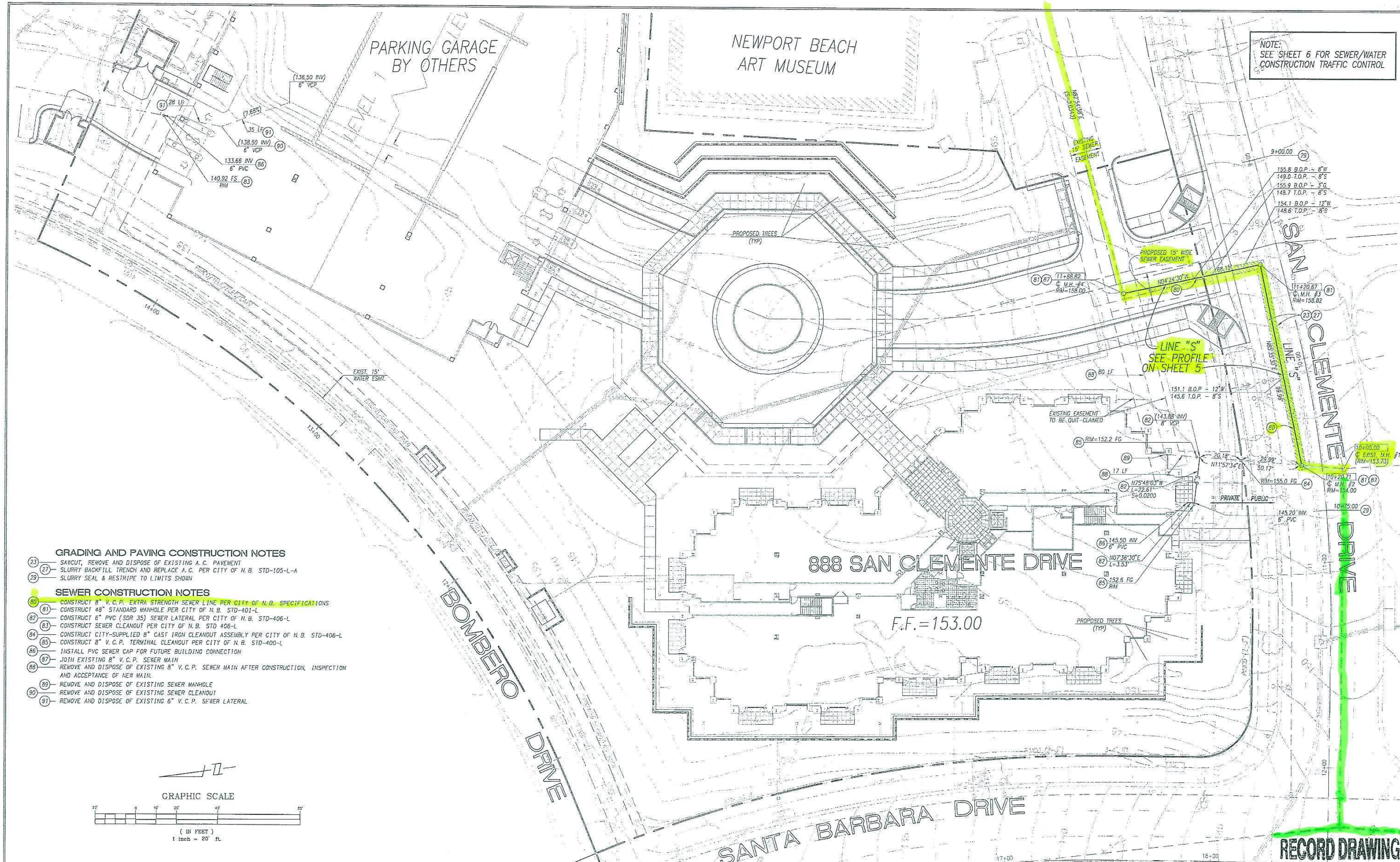

GRADING AND PAVING CONSTRUCTION NOTES

(23) SAWCUT, REMOVE AND DISPOSE OF EXISTING A.C. PAVEMENT
(27) SLURRY BACKFILL TRENCH AND REPLACE A.C. PER CITY OF N.B. STD-105-L-A
(29) SLURRY SEAL & RESTRIPE TO LIMITS SHOWN

SEWER CONSTRUCTION NOTES

(80) CONSTRUCT 8" V.C.P. EXTRA STRENGTH SEWER LINE PER CITY OF N.B. SPECIFICATIONS
(81) CONSTRUCT 48" STANDARD MANHOLE PER CITY OF N.B. STD-401-L
(82) CONSTRUCT 6" PVC (SDR 35) SEWER LATERAL PER CITY OF N.B. STD-406-L
(83) CONSTRUCT SEWER CLEANOUT PER CITY OF N.B. STD 406-L
(84) CONSTRUCT CITY-SUPPLIED 8" CAST IRON CLEANOUT ASSEMBLY PER CITY OF N.B. STD-406-L
(85) CONSTRUCT 8" V.C.P. TERMINAL CLEANOUT PER CITY OF N.B. STD-400-L
(86) INSTALL PVC SEWER CAP FOR FUTURE BUILDING CONNECTION
(87) JOIN EXISTING 8" V.C.P. SEWER MAIN
(88) REMOVE AND DISPOSE OF EXISTING 8" V.C.P. SEWER MAIN AFTER CONSTRUCTION, INSPECTION AND ACCEPTANCE OF NEW MAIN.
(89) REMOVE AND DISPOSE OF EXISTING SEWER MANHOLE
(90) REMOVE AND DISPOSE OF EXISTING SEWER CLEANOUT
(91) REMOVE AND DISPOSE OF EXISTING 6" V.C.P. SEWER LATERAL

NOTES TO CONTRACTOR

1. DRY UTILITIES ARE SCHEMATIC AND SHOWN FOR REFERENCE ONLY. SEE UTILITY COMPANY PLANS FOR FINAL DESIGN AND SPECIFICATIONS.

NO.	DATE	REVISIONS	NO.	APP.	DATE
1	5/22/00	AS-BUILT: NO CHANGES			

CITY OF NEWPORT BEACH

THIS PLAN IS SIGNED BY THE CITY OF NEWPORT BEACH FOR CONCEPT AND ADHERENCE TO CITY STANDARDS AND REQUIREMENTS ONLY. THE CITY IS NOT RESPONSIBLE FOR DESIGN ASSUMPTIONS AND ACCURACY.

APPROVED [signature] PUBLIC WORKS ENGINEER DATE 1/12/99
APPROVED [signature] UTILITIES ENGINEER DATE 1/11/99

REGISTERED PROFESSIONAL ENGINEER DOUGLAS J. JOHNSON No. 47447 Exp. 12/31/99 CIVIL STATE OF CALIFORNIA

PREPARED BY:
THE KEITH COMPANIES
Civil Engineering • Land Surveying • Mapping • Environmental Services • Water Resources • Land Planning
2955 Red Hill Avenue, Costa Mesa, CA 92626, (714)540-0800
[signature] 12/30/98
DOUGLAS J. JOHNSON R.C.E. 47447 (EXP. 12/31/99)

888 SAN CLEMENTE DRIVE IMPROVEMENT PLAN SEWER

PARCELS 1-3 OF P.M. 82-712 AND PARCEL 1 OF N.B.L.L.A. 95-3

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

SHEET 3 OF 6

RBF CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION
800.479.3808 • www.RBF.com

JOB NAME NORTH NEWPORT CENTER
JOB NO.
SHEET NO. 1 OF 2
DESIGNED BY DATE
CHECKED BY J. NALLE DATE 5/10/12

WASTEWATER FLOW ESTIMATES FOR ON SITE SEWER COLLECTION SYSTEM

ASSUMPTIONS

TRIBUTARY TO ON-SITE SEWER (UPSTREAM OF MH #2)

- ART MUSEUM
- SAN JOAQUIN PLAZA OFFICE BUILDINGS
- RESIDENTIAL UNITS (MULTI-FAMILY)

WASTEWATER DUTY FACTORS

- RESIDENTIAL (MULTI-FAMILY)
  - Q_{AV} = 200 GPD/DU
  - $Q_{PK} = 3 \times Q_{AV}$
- OFFICE BUILDINGS (241,711 SQ. FT.)
  - Q_{AV} = 250 GPD / 1000 FT^2
  - $Q_{PK} = 3 \times Q_{AV}$
- ART MUSEUM (60,000 SQ. FT.)
  - Q_{AV} = 100 GPD / 1000 FT^2
  - $Q_{PK} = 3 \times Q_{AV}$

ON-SITE SEWER

- CRITICAL SEGMENT: AT ENTRY FROM SAN CLEMENTE DR. PER RECORD DRAWINGS: 888 SAN CLEMENTE DRIVE IMPROVEMENT PLANS (MAY 2000) CITY OF NEWPORT BEACH
- MH #3 – MH #4: S = 0.64 FT / 64.15

$S = 0.00998 \approx 0.01$

→ @ $\frac{d}{D}$ = 50% ⇒ Q_{50} = 390,100 GPD ←

@ $\frac{d}{D}$ = 67% ⇒ Q_{67} = 611,600 GPD

@ $\frac{d}{D}$ = 75% ⇒ Q_{75} = 711,400 GPD

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JOB NAME NORTH NEWPORT CENTER
JOB NO.
SHEET NO. 2 OF 2
DESIGNED BY DATE
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WASTEWATER FLOW ESTIMATES
FOR ON-SITE SEWER COLLECTION SYSTEM

CALCULATIONS

1) 430 DU's: Q_{AV} = 86,000 gpd; Q_{pk} = 258,000 gpd

2) 94 DU's: Q_{AV} = 18,800 gpd; Q_{pk} = 56,400 gpd

3) 524 DU's: Q_{AV} = 104,800 gpd; Q_{pk} = 314,400 gpd

4) OFFICE: Q_{AV} = 60,400 gpd; Q_{pk} = 181,200 gpd

5) ART MUSEUM: Q_{AV} = 6,000 gpd; Q_{pk} = 18,000 gpd

EXISTING FLOWS = OFFICE + MUSEUM

Q_{AV} = 66,400 gpd

Q_{pk} = 199,200 gpd

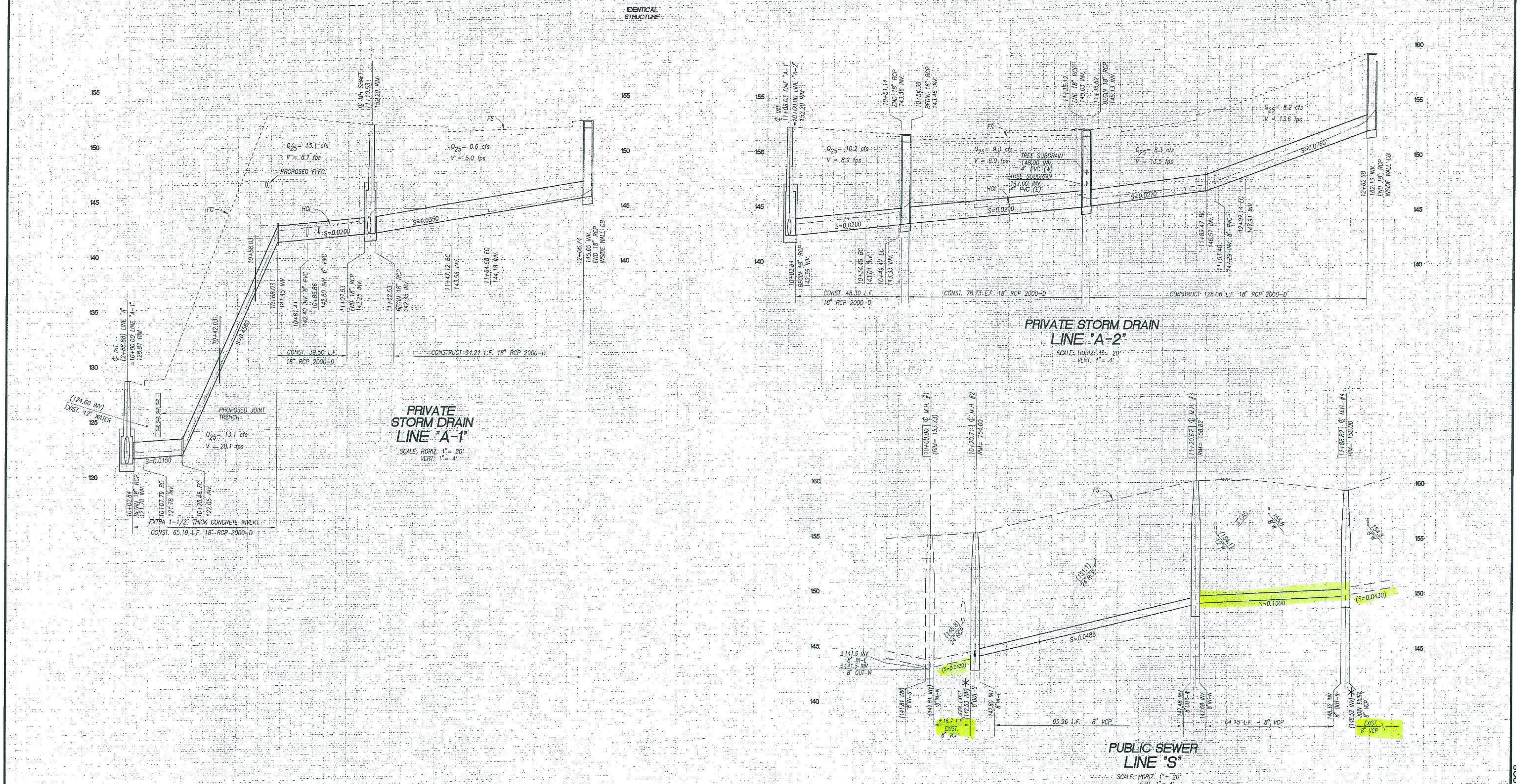
PROPOSED FLOWS = ART MUSEUM + RESIDENTIAL

A) W/ 94 UNITS: Q_{AV} = 24,800 gpd

Q_{pk} = 74,400 gpd < 390,100 gpd

B) W/ 524 UNITS: Q_{AV} = 110,800 gpd

Q_{pk} = 332,400 gpd < 390,100 gpd



* NOTE:
CONTRACTOR TO VERIFY LOCATION OF EXISTING SEWER POINTS OF CONNECTION PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY DISCREPANCIES.

RECORD DRAWING

PROFILE
HORIZ. 1" = 20'
VERT. 1" = 4'

NO.	DATE	REVISIONS	NO.	APP.	DATE
2	9/22/00	AS-BUILT: NO CHANGES			

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APPROVED ______ PUBLIC WORKS ENGINEER DATE 1/12/99
APPROVED ______ UTILITIES ENGINEER DATE 1/11/99

PREPARED BY:
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888 SAN CLEMENTE DRIVE
IMPROVEMENT PLAN
STORM DRAIN and SEWER PROFILES
PARCELS 1-3 OF P.M. 82-712 AND PARCEL 1 OF N.B.L.L.A. 95-3

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

SHEET 5 OF 6

Worksheet for 8" Pipe - @ d/D = 50%

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00998	ft/ft
Normal Depth	4.00	in
Diameter	8.00	in

Results

Discharge	390096.82	gal/day
Flow Area	0.17	ft^2
Wetted Perimeter	1.05	ft
Hydraulic Radius	2.00	in
Top Width	0.67	ft
Critical Depth	0.37	ft
Percent Full	50.0	%
Critical Slope	0.00736	ft/ft
Velocity	3.46	ft/s
Velocity Head	0.19	ft
Specific Energy	0.52	ft
Froude Number	1.19	
Maximum Discharge	1.30	ft^3/s
Discharge Full	1.21	ft^3/s
Slope Full	0.00250	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Pipe - @ d/D = 50%

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	4.00	in
Critical Depth	0.37	ft
Channel Slope	0.00998	ft/ft
Critical Slope	0.00736	ft/ft