Preliminary Drainage Study

Portion of Parcel 1, Parcel Map No. 18252
7991-93 Prospect Place
La Jolla, California 92037

Prepared for:
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June 07, 2016
Revised December 21, 2016

Introduction

This project involves the removal of one of the existing cottages and the construction of a basement below the remaining cottage and construction of a new single family residence at the rear of the site. The existing historic cottage will be raised while basement construction is completed and will be lowered to be supported by the new basement, once it is completed. Additional improvements include a driveway with vegetated swale, vegetated planters and landscaping fronting the site.

The attached drainage area maps are from a topographic survey by Christensen Engineering & Surveying dated May 22, 2015 and revised April 11, 2016. Prior to development some runoff flows from the site northerly to the adjacent property, with the majority of the site runoff flowing onto Prospect Place. Following construction all onsite runoff will be conveyed onto Prospect Place. Since there is a slight increase in total site imperviousness (3,325 sf (60.3%) prior to construction and 3,695 sf (67.0%) following construction), a slight increase in runoff (0.02 cfs) is expected to leave the site (0.40 cfs – 0.38 cfs). No runoff will flow over the neighboring property following construction. So, there will be a slight but insignificant increase in runoff from the site. There will be no adverse effect on public storm drain system from this small increase in total runoff. The runoff is conveyed to the City of San Diego storm drain system located in Prospect Place and then conveyed to the Pacific Ocean.

Since the project flows in a hardened conveyance system to an exempt water body it is exempt from hydromodification requirements. Calcultions for site pollutant treatment is included below for a Filterra Biofiltration unit.

The Rational Method was used to calculate the anticipated flow for the 100-year storm return frequency event using the method outlined in the City of San Diego Drainage Design Manual.

_____ 12-21-16

Antony K. Christensen
RCE 54021
Exp. 12-31-17

Date

JN A2015-24

Calculations

1. *Intensity Calculation*

(From the City of San Diego Design Manual, Page86)
Tc = Time of concentration

$$= \frac{1.8(1.1-C)Dist.^{1/2}}{(S^{1/3})}$$

Since the slope over the area with the greatest elevation change (122'-118') is (4'/70') 5.7% over the area of the site to be developed and the distance traveled is 70 feet and the runoff coefficient is 0.55.

Tc = 4.7 minutes.

From the Intensity Duration Curve on page 83

I_{100} = 4.4 inches

Since the design elevation is less then 1500' there is no correction factor for elevation.

2. *Coefficient Determination*

Using the County of San Diego method for determining runoff coefficient and impervious area (San Diego County Hydrology Manual Table 3-1, "D" Soil Type):

Pre-Construction (60.3% imperviousness) C = 0.68
Post Construction (67.0% imperviousness) C = 0.72

3. *Volume calculations*

Q = CIA

Areas of Drainage

The total area of the site to be developed is shown on the drainage area maps since that is the area to be compared pre-construction and post-construction due to the Pre-Construction versus the Post-Construction area of improvements.

Pre-Construction

Area draining northerly to neighboring property (C = 0.68)	X = 0.0152 Acres
Area draining southerly to Prospect Place (C = 0.68)	Y = 0.1113 Acres

Post-Construction

Area draining driveway catch basin (C = 0.71)	A = 0.1044 Acres
Area draining southerly to Prospect Place (C = 0.71)	B = 0.0221 Acres

Pre-Construction

Q_{100X} = (0.68) (4.4) (0.0152)
Q_{100Y} = (0.68) (4.4) (0.1113)

Q_{100X} = 0.05 cfs
Q_{100Y} = 0.33 cfs

Post-Construction

Q_{100A} = (0.71) (4.4) (0.1044)
Q_{100B} = (0.71) (4.4) (0.0221)

Q_{100A} = 0.33 cfs
Q_{100B} = 0.07 cfs

4. Discussion

Prior to development some runoff flows from the site northerly to the adjacent property, with the majority of the site runoff flowing onto Prospect Place. Following construction all onsite runoff will be conveyed onto Prospect Place. Since there is a slight increase in total site imperviousness, a slight increase in runoff (0.02 cfs) is expected to leave the site. No runoff will flow over the neighboring property. So, there will be a slight but insignificant increase in runoff from the site. There will be no adverse effect on public storm drain system from this small increase in total runoff.

5. Biofiltration of Site Runoff

Since it is not possible to treat all impervious surface runoff by allowing it to flow over landscaped areas (some location elevations prohibit flow by gravity to landscaped areas, all area runoff will be conveyed to a 4' x 4' Filterra Biofiltraton Unit (even landscaped areas). To determine the required size of the unit to treat this runoff the site area (0.1265 Ac), the Intensity (0.2 in/hr for flow through treatment) and a runoff coefficient of C=0.55) This results in a required treatment capacity of 0.014 cfs). The unit is capable of treating 0.037 cfs and so is adequate.

6. *Test for Adequacy (fill in for final drainage study)*

The attached programs were used to test for adequacy of the PVC drain, as well as the exiting private 18" PVC shown on drawing 31378-2-D. The runoff from the area covered by this study and shown on the attached drainage area map accounts for a total quantity of 4.9 cfs. This total runoff reaches and is conveyed by the existing private 18" PVC drain from the curb inlet located in Carrizo drive. The attached program was used to determine the capacity of the existing 18" PVC drain. A minimum slope of 2% was selected to determine a conservative value for the capacity of the drain. Using this slope and runoff coefficient of 0.01 for the PVC drain the capacity was calculated. Using this value the PVC drain can convey 19.4 cfs, well in excess of the calculated 4.9 cfs that is expected to reach the existing and proposed curb inlets.

The change in imperviousness due to the new construction is expected to increase runoff by only 0.27 cfs, approximately 6% of the total area runoff. This increase in runoff will have an insignificant effect on the downstream system.

The concrete ditches and onsite drains were tested and were found to be adequate to convey the expected runoff.

The greatest water quality volume to be treated is 0.37 cfs or 166 gpm. The 36x35 filter is capable of treating 2.4 cfs so it is adequate to treat the expected water quality volume. It has a bypass capacity of 9.1 cfs and can therefore accept the total volume of runoff from a 100-yr storm without being compromised

Type of conveyance is a: Sidewalk Underdrain
Diameter of conveyance equals .25 Feet
Slope of conveyance equals 2 %
Roughness equals .01
Flow quantity equals .1100314 CFS
Area equals 2.992894E-02 Square Feet
Velocity equals 3.675372 FPS
Depth of flow equals .1680001 Feet

APPENDIX

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
	D
Residential:	
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

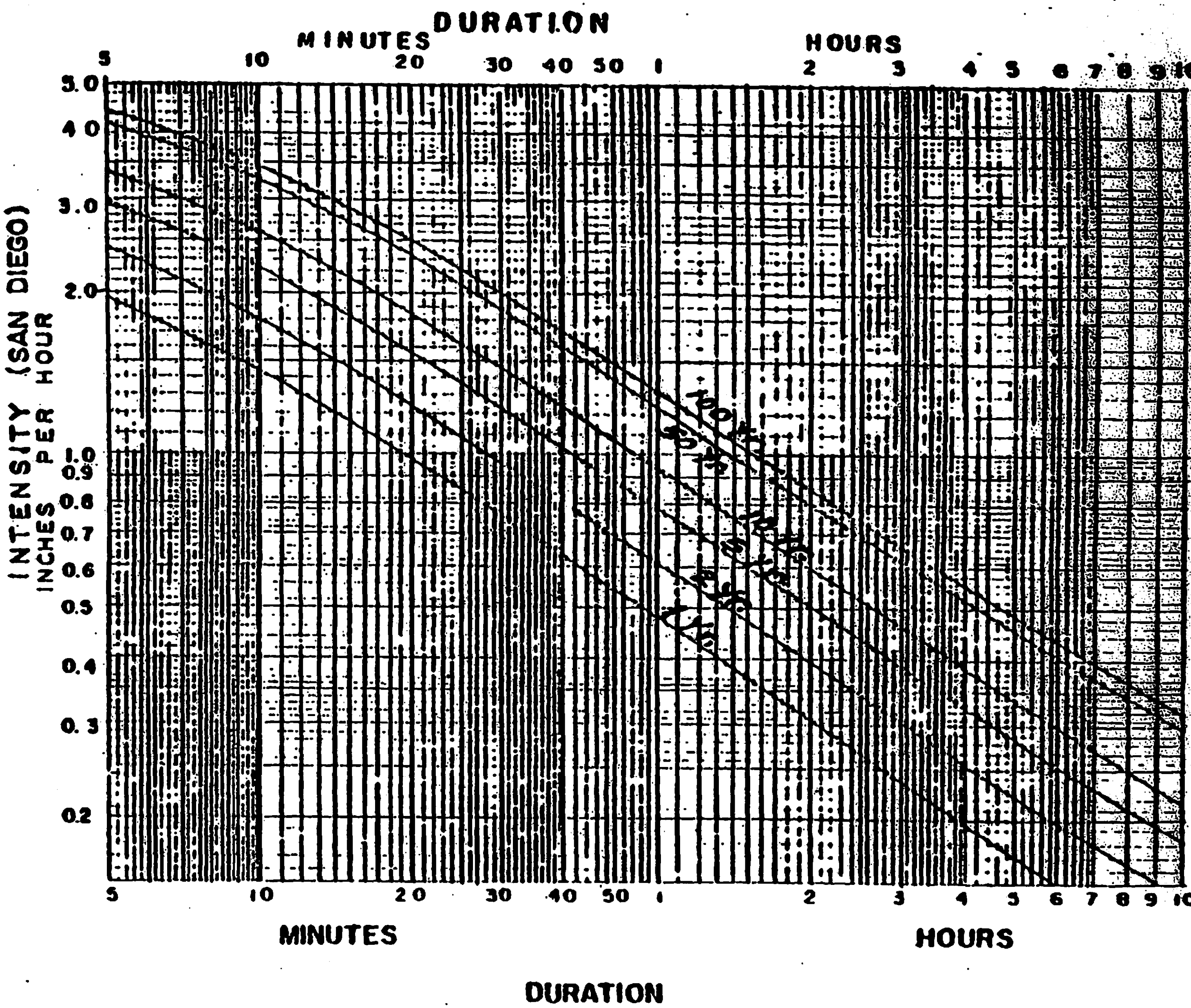
Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $\frac{50}{80}$ x 0.85 = 0.53

ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

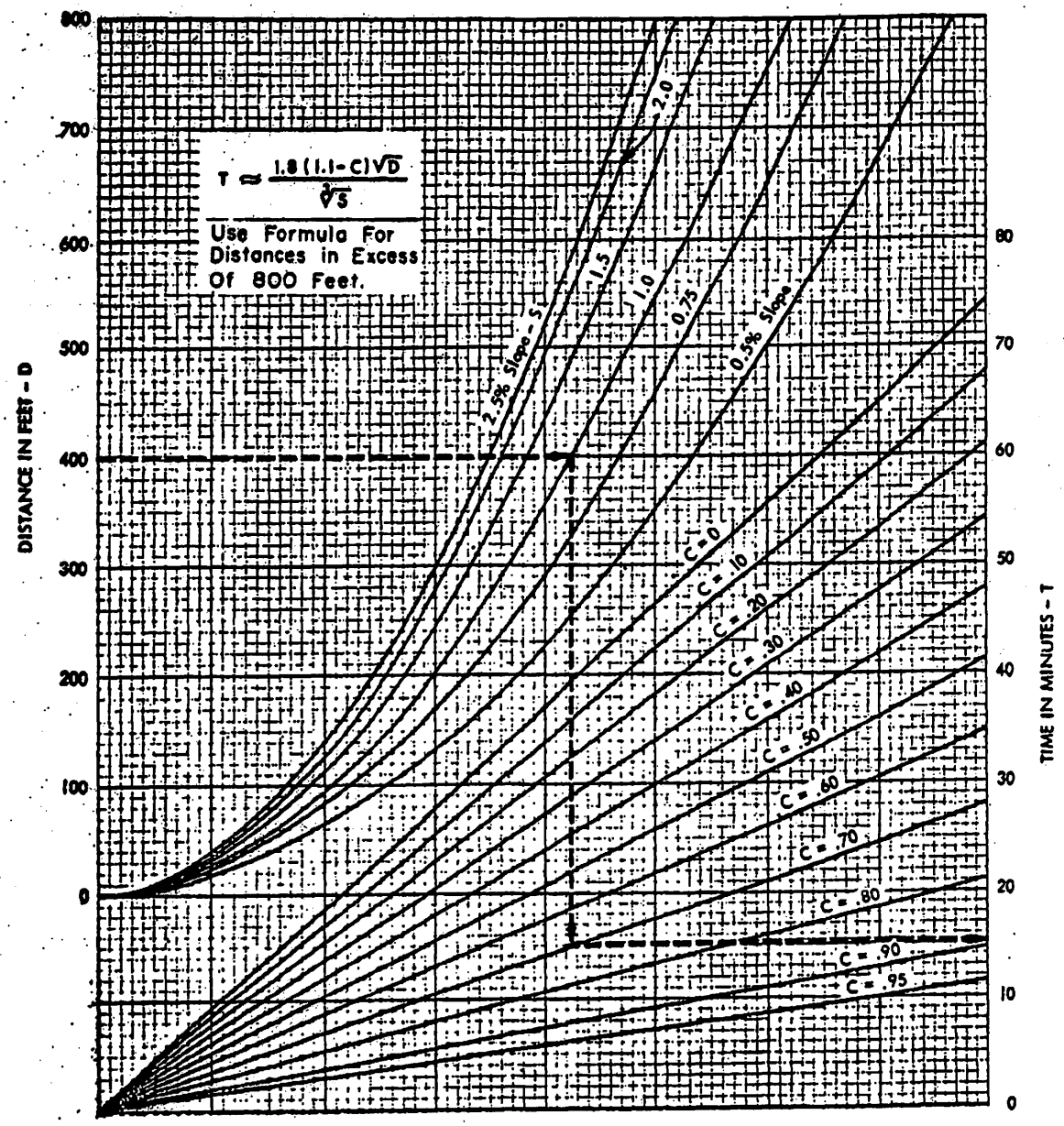
To obtain correct intensity, multiply intensity on chart by factor for design elevation.



RAINFALL INTENSITY-DURATION-FREQUENCY CURVES for COUNTY OF SAN DIEGO

APPENDIX I

URBAN AREAS OVERLAND TIME OF FLOW CURVES



Surface Flow Time Curves

EXAMPLE:

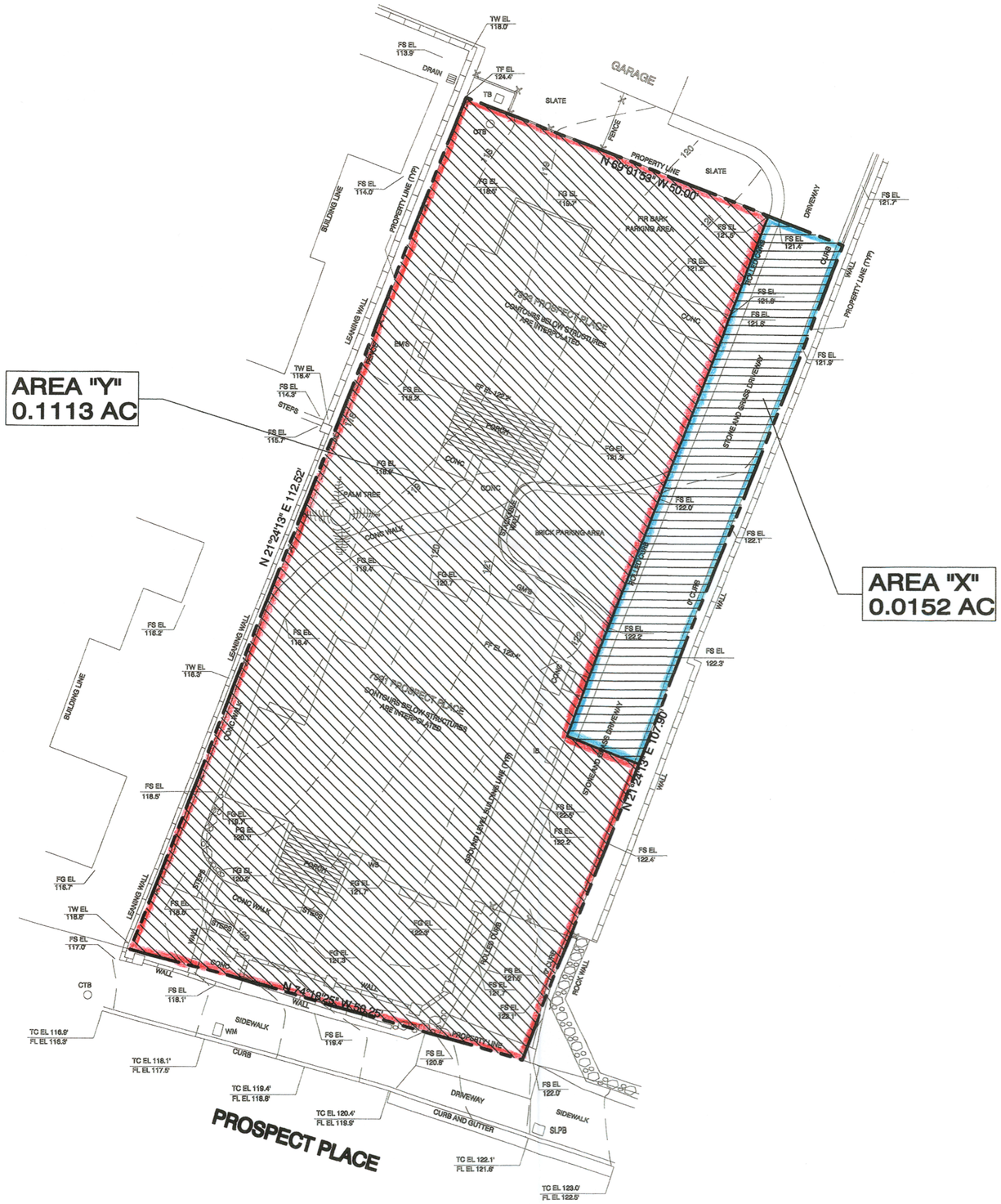
GIVEN: LENGTH OF FLOW = 400 FT.
SLOPE = 1.0 %
COEFFICIENT OF RUNOFF C = .70

READ: OVERLAND FLOWTIME = 15 MINUTES

DRAINAGE AREA MAPS

PRE-DEVELOPMENT DRAINAGE AREA MAP

PRE-CONSTRUCTION DRAINAGE AREA MAP



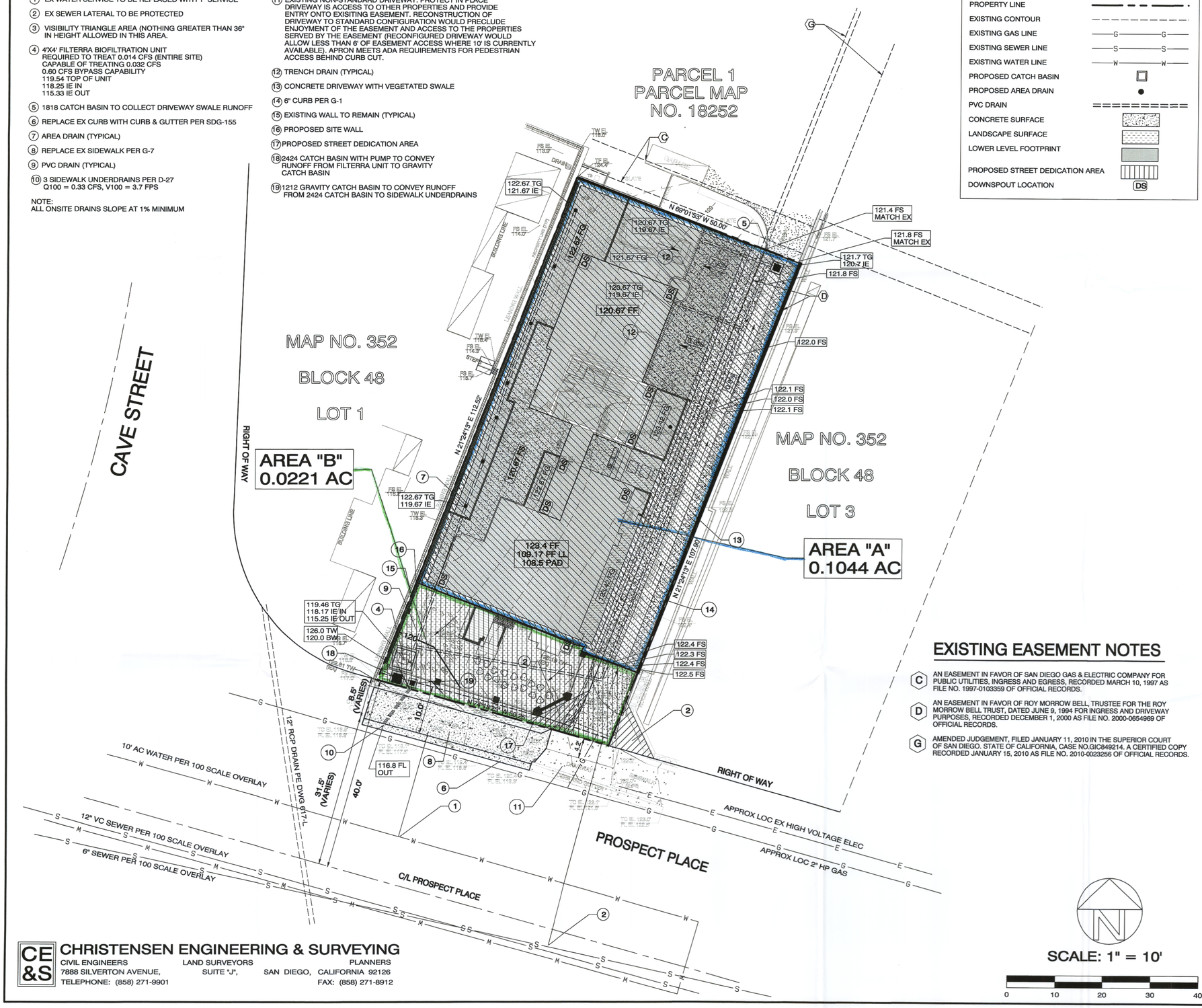
POST-DEVELOPMENT DRAINAGE AREA MAP

CONSTRUCTION NOTES

1. EX WATER SERVICE TO BE REPLACED WITH 1" SERVICE
2. EX SEWER LATERAL TO BE PROTECTED
3. VISIBILITY TRIANGLE AREA (NOTHING GREATER THAN 36" IN HEIGHT ALLOWED IN THIS AREA.
4. 4'X4' FILTERRA BIOFILTRATION UNIT
   REQUIRED TO TREAT 0.014 CFS (ENTIRE SITE)
   CAPABLE OF TREATING 0.032 CFS
   0.60 CFS BYPASS CAPABILITY
   119.54 TOP OF UNIT
   118.25 IE IN
   115.33 IE OUT
5. 1818 CATCH BASIN TO COLLECT DRIVEWAY SWALE RUNOFF
6. REPLACE EX CURB WITH CURB & GUTTER PER SDG-155
7. AREA DRAIN (TYPICAL)
8. REPLACE EX SIDEWALK PER G-7
9. PVC DRAIN (TYPICAL)
10. 3 SIDEWALK UNDERDRAINS PER D-27
    Q100 = 0.33 CFS, V100 = 3.7 FPS

NOTE:
ALL ONSITE DRAINS SLOPE AT 1% MINIMUM

11. EXISTING NON-STANDARD DRIVEWAY. PROTECT IN PLACE
    DRIVEWAY IS ACCESS TO OTHER PROPERTIES AND PROVIDE ENTRY ONTO EXISITING EASEMENT. RECONSTRUCTION OF DRIVEWAY TO STANDARD CONFIGURATION WOULD PRECLUDE ENJOYMENT OF THE EASEMENT AND ACCESS TO THE PROPERTIES SERVED BY THE EASEMENT (RECONFIGURED DRIVEWAY WOULD ALLOW LESS THAN 6' OF EASEMENT ACCESS WHERE 10' IS CURRENTLY AVAILABLE). APRON MEETS ADA REQUIREMENTS FOR PEDESTRIAN ACCESS BEHIND CURB CUT.
12. TRENCH DRAIN (TYPICAL)
13. CONCRETE DRIVEWAY WITH VEGETATED SWALE
14. 6" CURB PER G-1
15. EXISTING WALL TO REMAIN (TYPICAL)
16. PROPOSED SITE WALL
17. PROPOSED STREET DEDICATION AREA
18. 2424 CATCH BASIN WITH PUMP TO CONVEY RUNOFF FROM FILTERRA UNIT TO GRAVITY CATCH BASIN
19. 1212 GRAVITY CATCH BASIN TO CONVEY RUNOFF FROM 2424 CATCH BASIN TO SIDEWALK UNDERDRAINS



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR
- EXISTING GAS LINE
- EXISTING SEWER LINE
- EXISTING WATER LINE
- PROPOSED CATCH BASIN
- PROPOSED AREA DRAIN
- PVC DRAIN
- CONCRETE SURFACE
- LANDSCAPE SURFACE
- LOWER LEVEL FOOTPRINT
- PROPOSED STREET DEDICATION AREA
- DOWNSPOUT LOCATION (DS)

EXISTING EASEMENT NOTES

C. AN EASEMENT IN FAVOR OF SAN DIEGO GAS & ELECTRIC COMPANY FOR PUBLIC UTILITIES, INGRESS AND EGRESS, RECORDED MARCH 10, 1997 AS FILE NO. 1997-0103359 OF OFFICIAL RECORDS.

D. AN EASEMENT IN FAVOR OF ROY MORROW BELL, TRUSTEE FOR THE ROY MORROW BELL TRUST, DATED JUNE 9, 1994 FOR INGRESS AND DRIVEWAY PURPOSES, RECORDED DECEMBER 1, 2000 AS FILE NO. 2000-0654969 OF OFFICIAL RECORDS.

G. AMENDED JUDGEMENT, FILED JANUARY 11, 2010 IN THE SUPERIOR COURT OF SAN DIEGO. STATE OF CALIFORNIA, CASE NO.GIC849214. A CERTIFIED COPY RECORDED JANUARY 15, 2010 AS FILE NO. 2010-0023256 OF OFFICIAL RECORDS.

SCALE: 1" = 10'

0 10 20 30 40

CE&S CHRISTENSEN ENGINEERING & SURVEYING
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COASTAL DEVELOPMENT PERMIT
PRELIMINARY GRADING PLAN

LEGAL DESCRIPTION

PARCEL 1 OF PARCEL MAP NO. 18252, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 7, 1999.

EXCEPTING THEREFROM THAT PORTION OF SAID PARCEL 1 AS DESCRIBED IN DEED DOCUMENT RECORDED DECEMBER 22, 2011, AS DOCUMENT NO. 2011-0690431 OF OFFICIAL RECORDS.

THIS LEGAL DESCRIPTION IS MADE PURSUANT TO THAT CERTAIN CERTIFICATE OF COMPLIANCE SHOWN AS PARCEL B RECORDED DECEMBER 27, 2011 AS INSTRUMENT NO. 2011-0696417 OF OFFICIAL RECORDS.

APN: 350-121-39-00

BENCHMARK

CITY OF SAN DIEGO BENCHMARK BRASS PLUG IN TOP OF CURB AT THE SOUTHERLY CORNER OF PARK ROW AND PROSPECT PLACE. ELEVATION 138.50' MEAN SEA LEVEL (N.G.V.D. 1929).

NOTES

1. THE SOURCE OF THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS AN ON THE GROUND SURVEY BY CHRISTENSEN ENGINEERING & SURVEYING, DATED MAY 22, 2015 AND REVISED APRIL 11, 2016.
2. THE EXISTING AND PROPOSED USE OF THE PROPERTY IS A SINGLE-FAMILY RESIDENCE.
3. THE SUBJECT PROPERTY IS SERVED BY CITY OF SAN DIEGO SANITARY SEWER AND WATER MAINS.
4. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS.
5. TREATMENT OF SITE RUNOFF IS BY FLOW OVER LANDSCAPED AREAS BEFORE LEAVING SITE
6. AN ENCROACHMENT MAINTENANCE AND REMOVAL AGREEMENT WILL BE REQUIRED FOR PRIVATE IMPROVEMENTS WITHIN PROSPECT PLACE, INCLUDING SIDEWALK UNDERDRAIN AND NON-STANDARD DRIVEWAY.
7. PROPERTY AREA IS 0.1265 AC.

GRADING DATA

AREA OF SITE - 0.1265 AC
AREA OF SITE TO BE GRADED 0.113 AC
PERCENT OF SITE TO BE GRADED 89.3%
AMOUNT OF SITE WITH 25% SLOPES OR GREATER: AREA - 0 SF, PERCENT OF TOTAL SITE - 0%.
AMOUNT OF CUT - 1,700 C.Y. (WITHIN BUILDING FOOTPRINT)
AMOUNT OF FILL - 75 C.Y. WITHIN BUILDING FOOTPRINT
AMOUNT OF EXPORT - 1,625 C.Y.
MAXIMUM HEIGHT OF FILL - 2 FEET
MAXIMUM DEPTH OF CUT - 12.5 FEET WITHIN BUILDING
NO CUT OR FILL SLOPES
RETAINING WALL: NONE NOT PART OF BUILDING

EXISITNG IMPERVIOUS AREA: 3,325 SF (60.3%)
PROPOSED IMPERVIOUS AREA: 3,695 SF (67.0 %)

REGISTERED PROFESSIONAL ENGINEER ANTONY K. CHRISTENSEN No. 54021 Exp. 12-31-17 CIVIL STATE OF CALIFORNIA

DECEMBER 21, 2016
ANTONY K. CHRISTENSEN, RCE 54021 — Date

Prepared By:

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Project Address:

7991 AND 7993 PROSPECT PLACE
LA JOLLA, CA 92037

Project Name:

STEEL RESIDENCE

Revision 6:
Revision 5:
Revision 4:
Revision 3:
Revision 2: 12-11-16 ADDRESS CITY COMMENTS
Revision 1: 10-11-16 ADDRESS CITY COMMENTS

Original Date: JUNE 06, 2016

Sheet Title: PRELIMINARY GRADING PLAN

Sheet 1 of 1 Sheets

C-2

JN 2015-24

POST CONSTRUCTION DRAINAGE AREA MAP