PRELIMINARY DRAINAGE STUDY

BURRTEC YARD

SAN BERNARDINO, CA

Prepared by

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4/7/16

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SAN BERNARDINO, CA

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1. Existing Condition

The proposed site consists of approximately 12.28 +/- acres located on the south side of Mill Street at the intersection of Mill Street and South Sierra Way in the City of San Bernardino. The most recent occupant of the site was Barr Lumber Company. Approximately 86% of the site is covered by impervious surfacing. Existing buildings consist of the following:

a. Main office and storage building	18,760 SF
b. Separate office building	2,050 SF
c. Separate commercial building	4,750 SF
d. Pole storage building with sheet metal siding	13,975 SF
e. Portable storage building	1,300 SF
f. Pole building previously used for wood milling and vehicle maintenance	11,644 SF

See Aerial Photograph contained in Appendix A of this report for building locations.

The site is bounded on the north by Mill Street, on the east by an existing industrial building, on the southeast by the Twin Creek Channel, on the southwest by a new industrial building and on the west by an Auto Body Shop and various residential / storage uses.

The site slopes at a gradient of approximately 0.8% from north to south.

2. Existing Drainage

Most of the site currently drains by sheet flow from north to south. There are no storm drain facilities existing on the site. A small portion of the site in front of the existing commercial building drains into Mill Street by way of a parkway drain. The roof of the main office building drains to down drains located on the north wall. There are 4 of these roof drains. They currently discharge into an AC paved swale located between the building and the street right of way. This swale drains to the middle of the building and discharges into Mill Street by way of a parkway drain. When the additional 6' of right of way is dedicated, to bring the right of way to the required 50' from centerline, these drains will be discharging directly into the street right of way.

There are no existing interceptor drains located in the southerly area of the site. Current storm water sheet flows over the southern property boundary onto the San Bernardino County Flood Control District's Twin Creek Channel right of way and into the truck court area of the new industrial building to the south.

3. Proposed Project

All buildings except a & f will be removed. Additionally, there are 2 bulk storage hoppers, various concrete slabs and footings and AC pavement that we be removed.

Building a will be upgraded and used for customer service, dispatching and administrative offices, break rooms and storage. Building f will be upgraded and used for trash bin washing, painting and maintenance.

A new building will be constructed in the northeast area of the site adjacent to Building a. This building will be 300' x 50' and will contain truck maintenance bays and truck truck washing bays. There will be a 30' wide canopy along the west side of the building. All existing AC pavement and concrete shall be removed.

The existing grades will be adjusted and a portion of the site will be repaved. The heavy truck drive aisles, maneuvering areas and parking stalls will be paved with concrete. The automobile drive aisles and parking stalls will be paved with AC pavement. The 14% +/- of the site that is currently not paved will remain so for drainage and water quality facilities. There will be no increase in the impervious area of the site.

4. Proposed Drainage Improvements

The majority of the site will drain on the surface to the southwesterly corner. There will be an infiltration basin constructed in this area. Storm flows will be directed to 2 inlets to the infiltration basin. These inlets will have a pre-filter between the inlet and the basin. See the Preliminary Drainage Plan contained in Appendix D of this report. The basin overflow will discharge to Twin Creek.

There will be a trench drain installed along the front of the truck maintenance and truck wash building. There is an existing containment area within the bin wash building. This containment area and the trench drain will both drain into clarifiers / grease interceptors and then to a sump and be pumped into the City Sewer Main in Mill Street. See the Preliminary Drainage Plan contained in Appendix D of this report.

The area north of the existing main office building that now drains into an AC paved swale on private property will be modified as follows. The required additional right of way dedication will place this swale within the street right of way. The swale is located between the back of the sidewalk and the north wall of the existing building. The AC pavement in this area will be removed and landscaping provided to filter the flows prior to their being discharged into Mill Street. The existing parkway drain will remain in place. The Owner will be willing to enter into an agreement with the City of San Bernardino to maintain this landscaped area within the City right of way. The existing parkway drain north of the commercial building in the northwest portion of the site will be removed and all flows directed south to the filters and infiltration basin.

5. Drainage Calculations

Drainage calculations were performed using "San Bernardino County Rational Hydrology Program by CIVILCADD/CIVIL DESIGN Engineering Software 1989-2005 Version 7.1".

The site was divided into 4 drainage areas. Calculation results are as follows:

Node 1-2	9.04 Acres	Q_{100} = 18.50 CFS
Node 3-4	1.48 Acres	Q_{100} = 12.57 CFS
Node 5-6	1.33 Acres	Q_{100} = 4.43 CFS
Node 7-8	0.43 Acres	Q_{100} = 1.364 CFS

See the Preliminary Drainage Plan contained in Appendix D of this report. See Rational Method Calculations contained in Appendix E of this report.

6. Pipe Capacity Calculations

Capacity Calculations for pipes connecting the filters to the basin are contained in Appendix F of this report.

See Water Quality Management Plan for information on basin design and filters.

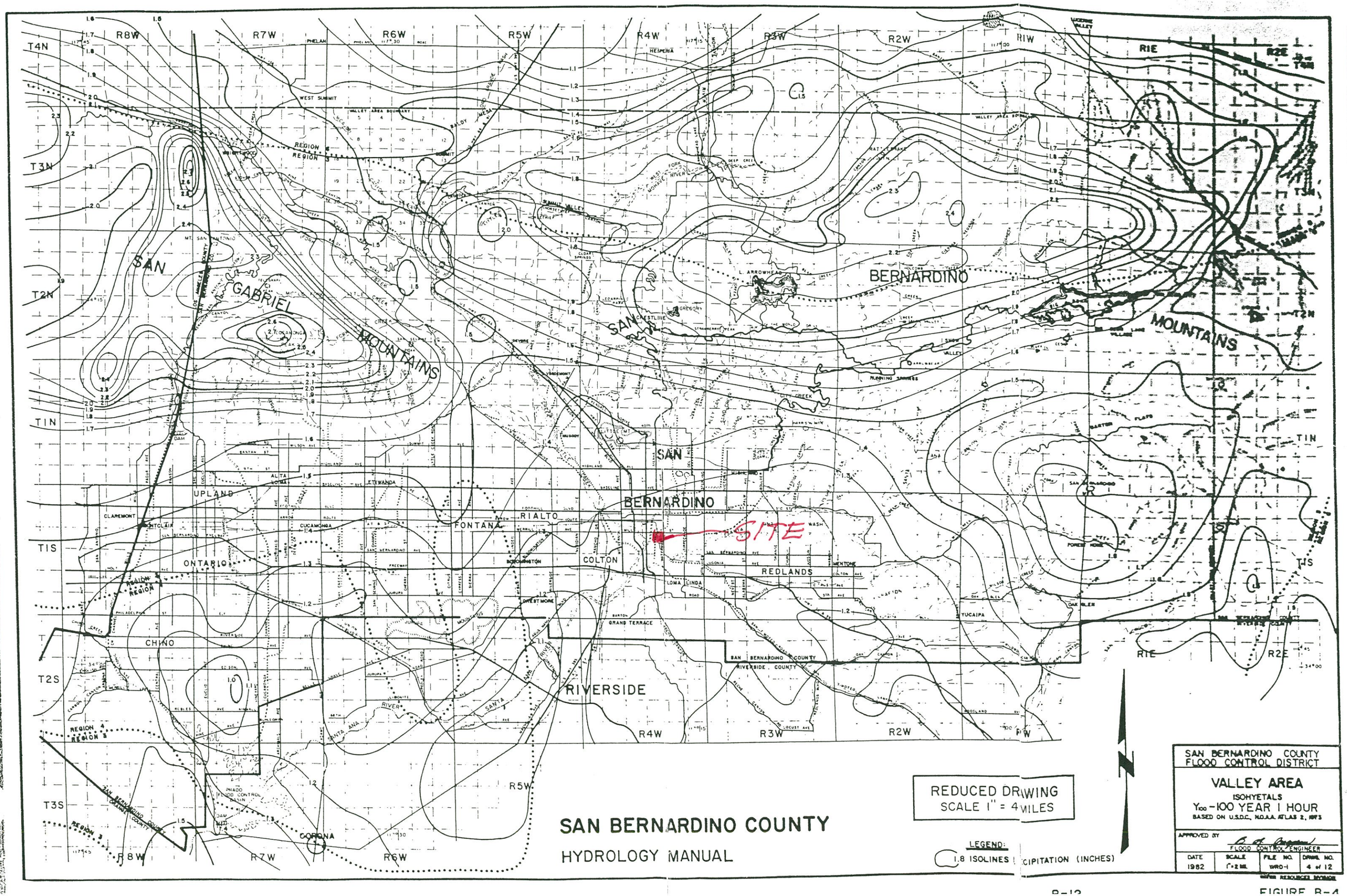
EXHIBIT "A"

AERIAL PHOTOGRAPH


Burrtec SB Yard
495 S SIERRA
140 E
140 E
W Mill St
E Mill St
Bates Auto Body
125 W
BLD "a"
BLD "b"
BLD "c"
BLD "d"
BLD "e"
BLD "p"
141 E
165 E
145 E
199 W
171 W
179 W
161 W
MILL
111 E
615 S
625 S
651 S
675 S
MILL
704 S ALLEN
705 S LUGO
715 S LUGO
Google earth
© 2016 Google

EXHIBIT "B"

ISOHYETALS



SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

REDUCED DRAWING
SCALE 1" = 4 MILES

LEGEND:
1.8 ISOLINES OF PRECIPITATION (INCHES)

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

VALLEY AREA
ISOHYETALS
Y_{100} - 100 YEAR 1 HOUR
BASED ON U.S.D.C., N.O.A.A. ATLAS 2, 1973

APPROVED BY			
FLOOD CONTROL ENGINEER			
DATE	SCALE	FILE NO.	DRAWING NO.
1982	1"=2 MI.	WRD-1	4 of 12

WATER RESOURCES DIVISION

FIGURE B-4

EXHIBIT "C"

HYDROLOGICAL SOILS MAP

SOURCE: GEOLOGY MAP

SOURCE: GEOLOGY MAP
SOURCE: 1971 SCS SURVEY

SITE

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

SCALE 1:48,000

SCALE REDUCED BY 1/2

INDEX MAP

C-1 C-2 SAN BERNARDINO COUNTY C-5 C-6 C-7 C-8 C-3 C-4

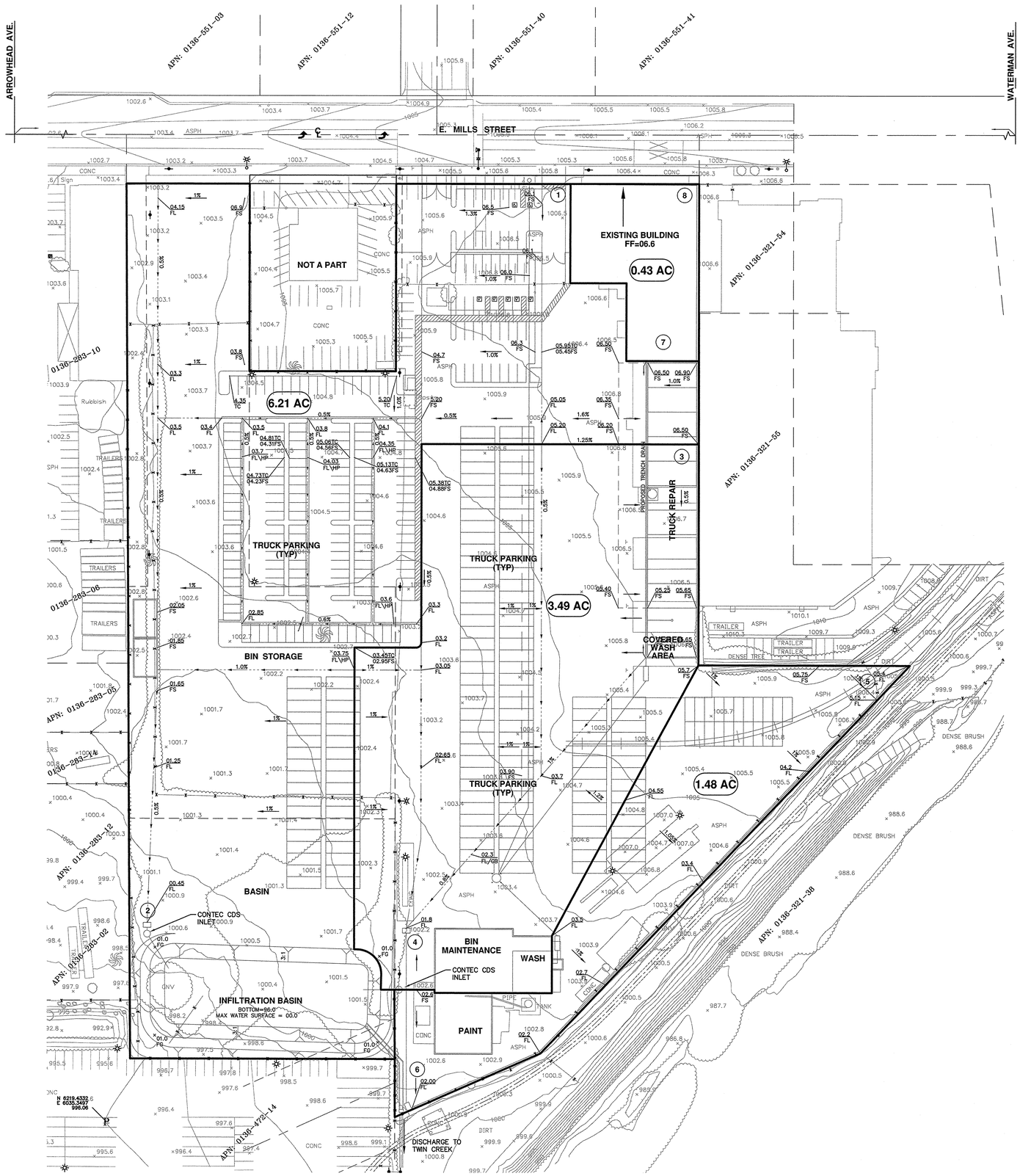
SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP FOR SOUTHWEST-B AREA

EXHIBIT "D"

PRELIMINARY DRAINAGE PLAN



NOTES:

PROJECT ADDRESS: 111 E. MILL STREET AND 125 W. MILL STREET
ZONING:
0136-321-50 AND 51, 0136-472-12: CH (COMMERCIAL-HEAVY)
0136-472-11, AND 15: LO (LIGHT INDUSTRIAL)

GENERAL PLAN: CH (COMMERCIAL-HEAVY)
ACREAGE: 12.56 ACRES

CIVIL ENGINEER:

W.J. McKEEVER, INC.
900 E. WASHINGTON ST.
SUITE 208
COLTON, CA, 92324
(909) 825-8048
(909) 825-8639

OWNER:

FOOD EXPRESS, INC.
521 N. 1ST AVENUE
ARCADIA, CA 91006
(626) 574-9094

APPLICANT:

BURRTEC WASTE INDUSTRIES, INC.
9890 CHERRY AVENUE
FONTANA, CA 92335
(909) 429-4200

NOTES:

SEWER AND WATER SERVICE BY CITY OF SAN BERNARDINO
TELEPHONE SERVICE:
GAS SERVICE:
CABLE TV SERVICE:
ELECTRIC SERVICE: SOUTHER CALIFORNIA EDISON
SITE IS LOCATED WITHIN FLOOD ZONE "X" PER FLOOD

SITE IS ZONE :

LEGAL DESCRIPTION:

A PORTION OF LOT 39, BLOCK 54, AND A PORTION OF LOTS 1 AND 2, BLOCK 31, RANCHO SAN BERNARDINO, IN THE CITY OF SAN BERNARDINO, AS PER RECORDED IN BOOK 7 OF MAPS, PAGE 2, RECORDS OF SAID COUNTY.

PARCELS 2 AND 3 OF PARCEL MAP NO. 19330, IN THE CITY OF SAN BERNARDINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS PER PARCEL MAP RECORDED IN BOOK 241, PAGES 9 THROUGH 14, INCLUSIVE OF PARCEL MAPS.

APN:

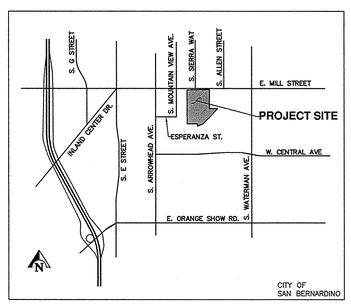
0136-321-50
0136-472-11 & 15

LEGEND

- ⊸ – INDICATES EXISTING POWER POLE
- ⊸ – INDICATES EXISTING STREET SIGN
- ☼ – INDICATES EXISTING STREET LIGHT
- FS – INDICATES FINISH SURFACE
- FG – INDICATES FINISH GROUND
- TC – INDICATES TOP OF CURB
- FL – INDICATES FLOW LINE
- HP – INDICATES HIGH POINT
- CF – INDICATES CURB FACE
- PP – INDICATES POWER POLE

PARKING:

PARKING STALLS: 239 SPACES
HC PARKING STALLS: 7 SPACES
TRUCK SPACES: 126 SPACES
SUPPORT PARKING VEHICLE: 26 SPACES



REGISTERED PROFESSIONAL ENGINEER
WILLIAM J. McKEEVER
No. 22502
Exp. 12-31-17
CIVIL
STATE OF CALIFORNIA

DATE PREPARED 04/07/16

AMENDMENT BLOCK		
REF.	DESCRIPTION	DATE
–	–	
–	–	

W.J. McKEEVER, INC.
CIVIL ENGINEERING
900 E. WASHINGTON STREET, SUITE 208 COLTON, CA 92324
PH:(909) 825-8048 FAX:(909) 825-8639

PREPARED BY: WILLIAM J. McKEEVER
R.C.E. NO. 22502
DATE 4/7/16

PRELIMINARY DRAINAGE PLAN

BURRTEC WASTE INDUSTRIES, INC.
111 E. MILL STREET AND
125 W. MILL STREET
CA 92408
CITY OF SAN BERNARDINO

SHEET 1 OF 1
CONTRACT
ACCOUNT
DWG. NO.

EXHIBIT "E"

RATIONAL METHOD
DRAINAGE CALCULATIONS

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 04/07/16

BURRTEC
SAN BERNARDINO - MILL ST.
100 YR 1 HR

Program License Serial Number 6269

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.800(In.)
100 Year storm 1 hour rainfall = 1.280(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.280 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 3

++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:
Initial area flow distance = 820.000(Ft.)
Top (of initial area) elevation = 1006.100(Ft.)
Bottom (of initial area) elevation = 1000.450(Ft.)
Difference in elevation = 5.650(Ft.)
Slope = 0.00689 s(%)= 0.69
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.043 min.
Rainfall intensity = 3.355(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff = 18.503(CFS)
Total initial stream area = 6.210(Ac.)
Pervious area fraction = 0.100
Initial area Fm value = 0.044(In/Hr)

++
Process from Point/Station 3.000 to Point/Station 4.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000 Max loss rate(Fm)= 0.044(In/Hr)
Initial subarea data:

```
Initial area flow distance =   458.000(Ft.)
Top (of initial area) elevation =  1006.500(Ft.)
Bottom (of initial area) elevation =  1001.800(Ft.)
Difference in elevation =     4.700(Ft.)
Slope =    0.01026  s(%)=       1.03
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.810 min.
Rainfall intensity =      4.047(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =     12.573(CFS)
Total initial stream area =        3.490(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.044(In/Hr)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Process from Point/Station        5.000 to Point/Station        6.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Initial subarea data:
Initial area flow distance =   685.000(Ft.)
Top (of initial area) elevation =  1005.400(Ft.)
Bottom (of initial area) elevation =  1002.000(Ft.)
Difference in elevation =     3.400(Ft.)
Slope =    0.00496  s(%)=       0.50
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.967 min.
Rainfall intensity =      3.367(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.888
Subarea runoff =      4.427(CFS)
Total initial stream area =        1.480(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.044(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station        8.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 56.00
Adjusted SCS curve number for AMC 3 = 75.80
Pervious ratio(Ap) = 0.1000     Max loss rate(Fm)=     0.044(In/Hr)
Initial subarea data:
Initial area flow distance =   180.000(Ft.)
Top (of initial area) elevation =  1006.600(Ft.)
Bottom (of initial area) elevation =  1006.400(Ft.)
Difference in elevation =     0.200(Ft.)
Slope =    0.00111  s(%)=       0.11
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.459 min.
Rainfall intensity =      3.878(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.890
Subarea runoff =      1.484(CFS)
Total initial stream area =        0.430(Ac.)
Pervious area fraction = 0.100
Initial area Fm value =    0.044(In/Hr)
End of computations, Total Study Area =           11.61 (Ac.)
The following figures may
```

be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number = 56.0

EXHIBIT "F"

PIPE CAPACITY CALCULATIONS

OUTPUT INFORMATION

This report is for a channel running full.

The Flow Capacity is 43.84 cfs
The flow velocity is 13.95 fps

CHANNEL PROPERTIES

The friction factor 'n' = 0.0150
The channel slope = 0.0500 ft/ft

Round Channel:

Diameter = 2.000 ft
Flow Area = 3.142 sq-ft
Wetted perimiter = 6.283 ft
Hydraulic radius = 0.500 ft

OUTPUT INFORMATION

This report is for a channel running full.

The Flow Capacity is 20.36 cfs
The flow velocity is 11.52 fps

CHANNEL PROPERTIES

The friction factor 'n' = 0.0150
The channel slope = 0.0500 ft/ft

Round Channel:

Diameter = 1.500 ft
Flow Area = 1.767 sq-ft
Wetted perimiter = 4.712 ft
Hydraulic radius = 0.375 ft

OUT FALL TO TWIN CREEK

OUTPUT INFORMATION

This report is for a channel running full.

The Flow Capacity is 47.32 cfs
The flow velocity is 6.694 fps

CHANNEL PROPERTIES

The friction factor 'n' = 0.0150
The channel slope = 6.70E-03 ft/ft

Round Channel:

Diameter = 3.000 ft
Flow Area = 7.069 sq-ft
Wetted perimiter = 9.425 ft
Hydraulic radius = 0.750 ft