

**City of Woodcreek Planning and Zoning Commission Meeting
August 16, 2017; 5:00 p.m.**

NOTICE/AGENDA

This notice is posted pursuant to the Texas Open Meetings Act (Vernon's Texas Codes Ann. Gov. Code Chapter 551). The Woodcreek Planning and Zoning commission will hold a Meeting on August 16, 2017, at 5:00 p.m. at Woodcreek City Hall, 41 Champions Circle, Woodcreek, Texas at which time the following items will be considered:

- 1. Call to Order**
- 2. Pledges**
- 3. Roll Call**
- 4. Approval of Minutes of April 6, 2017.**
- 5. Consider a resubmittal of both a Concept Plan Application and a Site Development Permit Application from Camp Young Judaea, 5410 Bellaire Blvd., Suite 207, Bellaire, Texas 77401 to build housing at Camp Young Judaea in Woodcreek, TX. Recommendation to City Council.**
- 6. Adjourn**

Executive sessions held during this meeting will generally take place in the City Manager's office, at the discretion of the Planning & Zoning Commission.

The Planning & Zoning Commission may retire to executive session any time between the meeting's opening and adjournment for the purpose of consultation with legal counsel pursuant to Chapter 551.071 of the Texas Government Code; discussion of personnel matters pursuant to Chapter 551.074 of the Texas Government Code; deliberation regarding real property pursuant to Chapter 551.072 of the Texas Government Code; deliberation regarding economic development negotiations pursuant to Chapter 551.087 of the Texas Government Code; and/or deliberation regarding the deployment, or specific occasions for implementation of security personnel or devices pursuant to Chapter 551.076 of the Texas Government Code. Action, if any, will be taken in open session.

This agenda has been reviewed and approved by the City's legal counsel and the presence of any subject in any Executive Session portion of the agenda constitutes a written interpretation of Texas Government Code Chapter 551 by legal counsel for the governmental body and constitutes an opinion by the attorney that the items discussed therein may be legally discussed in the closed portion of the meeting considering available opinions of a court of record and opinions of the Texas Attorney General known to the attorney. This provision has been added to this agenda with the intent to meet all elements necessary to satisfy Texas Government Code Chapter 551.144(c) and the meeting is conducted by all participants in reliance on this opinion.

Attendance By Other Elected or Appointed Officials:

It is anticipated that members of other city board, commissions and/or committees may attend the meeting in numbers that may constitute a quorum of the other city boards, commissions and/or committees. Notice is hereby given that the meeting, to the extent required by law, is also noticed as a meeting of the other boards, commissions and/or committees of the City, whose members may be in attendance. The members of the boards, commissions and/or committees may participate in discussions on the same items listed on the agenda, which occur at the meeting, but no action will be taken by such in attendance unless such item and action is specifically provided for on an agenda for that board, commission or committee subject to the Texas Open Meetings Act.

The City of Woodcreek is committed to compliance with the Americans with Disabilities Act. Reasonable modifications and equal access to communications will be provided upon request. Please call the City Secretary's Office at 512-847-9390 for information. Hearing-impaired or speech-disabled persons equipped with telecommunications devices for the deaf may call 7-1-1 or may utilize the statewide Relay Texas program at 1-800-735-2988.

Pursuant to Section 30.07, Penal Code (trespass by license holder with an openly carried handgun), a person licensed under Subchapter 11, Chapter 411, Government Code (handgun licensing law), may not enter this property with a handgun that is carried openly.

I certify that the above notice was posted on the 10th day of August, 2017 at 12:47pm

By: 
Brenton B. Lewis, City Manager

City of Woodcreek Planning and Zoning Commission Meeting
Woodcreek City Hall, 41 Champions Circle
April 6, 2017, 5:00 p.m.
Minutes

1. **Call to Order.** Chairperson Anne Greene called the meeting to order at 5:00 p.m.
2. **Pledge**
3. **Roll Call. Present:** Chairperson Anne Greene, Commissioner Steve Evans, Commissioner Gordon Marsh, Commissioner John Lewis, Alternate Commissioner Larry Alford, City Manager Brenton B. Lewis, City Clerk Barbara Grant, Assistant Administrator Linda Land. **Absent:** Vice Chairperson Joe Kotarba, and Alternate Commissioner Bill Kammerer.
4. **Approval of Minutes of September 20, 2016.** Commissioner Lewis moved to approve the minutes of September 20, 2016. The motion was seconded by Commissioner Evans and passed unanimously (5-0-0).
5. **Consider an amended Concept Plan Application and a Site Development Permit Application from Camp Young Judaea, 5410 Bellaire Blvd., Suite 207, Bellaire, Texas 77401 to build housing at Camp Young Judaea in Woodcreek, TX.**
 - a) **Staff Report.** City Manager Lewis explained the history of the project and reported that all required notices were completed by the applicant.
 - b) **Public Hearing. Begin – 5:04 p.m.** Chairperson Greene took comments from those citizens who signed up to speak and then asked for any further public comments. **End – 6:04 p.m.**
 - c) **Discussion and Action.** Commissioners expressed appreciation for public input and discussed missing documentation in the applications. Commission Lewis moved to table any recommendation to City Council. The motion was seconded by Commissioner Marsh and passed with a vote of 5-0-0.
6. **Adjourn.** There being no other business, the meeting was adjourned at 6:17 p.m.

Anne Greene, Chairperson

Brenton B. Lewis, City Manager

MATKIN-HOOVER ENGINEERING

Transmittal

Date: 05/03/2017

Company: City of Woodcreek

Attention: Brenton B. Lewis

Address: 41 Champions Circle, Woodcreek, TX 78676-3327

Re: Camp Young Judaea – Retreat Village Concept Plan Application

For Approval For Review Please Comment Please Reply For Your Information

ITEMS ATTACHED

Qty:	Description:
1	Digital Copy of Complete Submittal Package
2	Hard Copies of the following:
ITEM:	
1	Signed Concept Plan Application (3 Pages)
2	Concept Plan (X) (1 Page of 1)
3	Architectural Plan (4 Pages)
4	Grading Plan (X) (1 Page of 1)
5	Drainage Report (Re: Drainage Report Binder provided)
6	Erosion and Sedimentation Control Plans (X) (2 Pages of 2)
7	FEMA Floodplain Map (1 Page)
8	Adjacent Land Owners requested information (1 Page)
9	Survey Files (19 Pages)
10	Fire Access Plan (X) (1 Page of 1)
11	Landscaping Plans (X) (1 Page of 1)
12	Lighting Layout File (X) (1 Page of 4)
13	Tax Exempt Property Information (33 Pages)
N/A	Fees (<u>Previously submitted</u>)

(X) 36" x 24" Full Size Print (2 Ea.) provided in addition to the bound 17" x 11" prints of same.

● **Comments:** If you have any questions please feel free to give me a call at (830) 249-0600 – Garrett D. Keller

Sent by: Garrett D. Keller, P.E.

Job No. 2620.02



City of Woodcreek Concept Plan Application

No application will be considered complete without all required information and fee payment. Refer to Chapter 154, Woodcreek Code of Ordinances, Section 154.080 for explanations of terms and instructions.

Date: 05/02/2017

Property Owner's Name: CAMP YOUNG JUDAEA, INC. Phone: (713) 723-8354

Mailing Address: 121 Camp Young Judaea Road, Wimberley, TX 78767

Address of Subject Property:

Section(s) _____ Lot(s) _____ Street Address: 121 Camp Young Judaea Road, Wimberley, TX 78767

Description of Development: _____ Single-Family Residences _____ Duplexes

_____ Townhouse/Condo Multi-Family _____ Commercial

Two copies of the following are required:

Maps Showing:

- Subject property = **(CONCEPT PLAN)**
- Subject property in relationship to City's ETJ = **(CONCEPT PLAN)**
- Total acreage = **(CONCEPT PLAN)**
- Location and names of existing streets = **(CONCEPT PLAN)**
- Adjacent property indicating land uses and structures and names and addresses of property owners = **(CONCEPT PLAN)**
- Location and names of adjacent streets = **(CONCEPT PLAN)**
- Percentage of impervious cover = **(CONCEPT PLAN)**

Plot Plan Showing the Following:

- Boundaries and dimensions of property including total acreage and proposed footprints
- Setbacks = **(CONCEPT PLAN)**
- Location and use of structures = **(CONCEPT PLAN)**
- Recreational areas = **(CONCEPT PLAN)**
- Elevations, indicating location and percentage of masonry = **(ARCHITECTURAL PLAN)**
- Percentage of impervious cover = **(CONCEPT PLAN)**

Drainage/Erosion Control:

- Grading and storm drainage = **(GRADING PLAN AND DRAINAGE REPORT)**
- Erosion control proposed during and after construction = **(EROSION & SEDIMENTATION PLANS)**
- Surface drainage/storm sewers/retention ponds or other aspects of drainage
- Copy of flood plain map = **(FEMA FLOODPLAIN MAP SHEET)**

Street/Parking:

- Location of proposed streets, curb cuts, driveways, sidewalks, fire lanes, alleys and specifications = **(SURVEY FILES)**

Utilities:

- Utility providers including waste water system = **(CONCEPT PLAN SHEET)**

Floor Plans:

- Floor plans for all sizes and types of dwellings = **(ARCHITECTURAL PLAN SHEETS)**
- Building heights = **(ARCHITECTURAL PLAN SHEETS)**

Miscellaneous:

- Fire plugs = **(FIRE ACCESS PLAN SHEET)**
- Sign Plan
- Landscaping/irrigation plans/tree preservation = **(LANDSCAPING PLAN)**
- Fencing/landscape screening = **(LANDSCAPING PLAN)**
- Lighting plan = **(LIGHTING LAYOUT SHEETS)**
- Other environmental issues particular to this property
- Verification of current tax status with Hays County = **(TAX EXEMPT PROPERTY FILES)**
- Fees-The applicant seeking a concept plan approval shall pay to the City of Woodcreek at the time of submittal a fee as noted in Chapter 35 (Fee Schedule) of the Woodcreek of Ordinances. (This amount does not include the City's engineering costs which will be passed on to the developer.)

Site Inspection Authorization

As owner or authorized agent, my signature authorizes City of Woodcreek authorized representatives to inspect the property for which the site development application is being submitted.

Signature: *Ful &*

Submittal Verification

My signature attests to the fact that this application, as well as attachments thereto, is complete and accurate to the best of my knowledge. I understand this application review is dependent upon the accuracy of the information provided and that any inaccurate, inadequate or incomplete information provided by me or my firm or other entity operating on my behalf may delay or cause this application to be denied.

Signature: *Matthew Hoover*

Date: 5-3-17

Firm: Matthew Hoover

The Concept Plan shall be used to determine the adequacy of public facilities and services needed to serve a proposed development. Formal approval is not granted until a Site Development Plan is approved. The Concept Plan approval is a general acknowledgement that the proposed layout conforms to City's regulations and the proposed development can be adequately served by utility providers. If applicant chooses to construct a development in phases, a new concept plan may be required, or may be required if substantial changes are made to plans.

Applicant Signature: *Ful &*

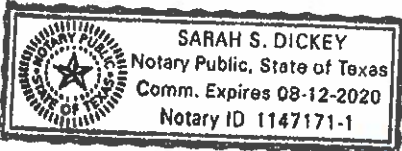
Applicant Title: Camp Director

STATE OF TEXAS §

COUNTY OF HAYS §

The foregoing instrument was acknowledged before me on the 2nd day of May

2017 by Aaron Dickey



Aaron Dickey
NOTARY PUBLIC, STATE OF TEXAS

MY COMMISSION EXPIRES: 8-12-2020

For Use by City Hall

_____Erection of signs on property within ten feet of all streets _____Date

_____ Concept Plan review:

_____ Fees (The applicant seeking a site development plan approval shall pay to the City of Woodcreek at the time of submittal a fee as noted in the Chapter 35 (Fee Schedule) of the Woodcreek Code of Ordinances. This amount does not include the City's engineering costs which will be passed on to the developer)

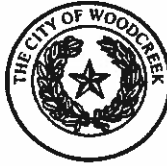
Approved Denied by City Administrator _____Date

_____ Council Review

Council Approval _____, Disapproval: _____, Date: _____

Reason(s) for disapproval:

_____ Review by P&Z if denied or appealed _____Date



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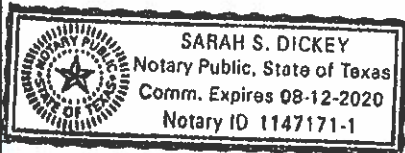
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Aaron Dickey
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Approved Denied by City Administrator _____Date

_____Council Review

Council Approval_____, Disapproval:_____, Date: _____

Reason(s) for disapproval:

_____Review by P&Z if denied or appealed _____Date

Camp Young Judaea

Woodcreek, Texas

Drainage Analysis

DRAFT FOR REVIEW

May 2017

TBPE # 4512

MHE 2620.02

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Exhibits

- ❖ Exhibit “A” – Concept Plan
- ❖ Exhibit “B” – FEMA Map
- ❖ Exhibit “C” – Existing Conditions Watershed Map
- ❖ Exhibit “D” – Proposed Conditions Watershed Map
- ❖ Exhibit “E” – WS-A-Impervious Cover Exhibit-Existing Conditions
- ❖ Exhibit “F” – WS-A-Impervious Cover Exhibit-Proposed Conditions
- ❖ Exhibit “G” – WS-B-Curve Number Calculation Exhibit
- ❖

Appendices

- ❖ Appendix “A” – HEC-HMS Report with Time of Concentration Calculations
- ❖ Appendix “B” – Composite Curve Number Calculation Table
- ❖ Appendix “C” – NRCS Soil Survey, Hydrologic Soil Groups with Soil Rating Per Watershed Calculation Table.
- ❖ Appendix “D” – References

Project Overview

The Camp Young Judaea proposed dormitory development consist of developing approximately 4-acres in 2 phases of a 245-acre property. The proposed development is located on the far east side of the Camp Young Judaea property. The majority of the camp property is located in the City of Woodcreek ETJ and the portion of the camp property the proposed development is located in is in the city of Woodcreek City limits. The site plan for both phases includes 7 dormitory buildings, 1 laundry room, 1 activity center, a gravel court yard, concrete sidewalk and a paved fire lane around the development with paved parking. (See Exhibit "A" -Concept Plan)

Drainage Analysis (SCS Method):

Existing Conditions Hydrologic Analysis

The project site is mostly undeveloped with an existing 8.34(3.4%) acres of impervious cover on the property. Watershed "A" was formed first to find the effects of the proposed development as the storm water leaves the property. Watershed "A" is included in a much larger drainage basin (WS-B) that flows in to Cypress Creek. The drainage basin is a total of 1215.8-acres (WS-A+B) that drains from north to south. From watershed "A", storm water runoff exits the property and flows over an existing road (Cypress Point Drive) into a drainage easement of Cypress Point Property Owners Association that contains a large channel that then flows into a small lake before flowing into Cypress Creek. Calculation point 1 (CP-1) is placed at the at the most downstream point of the combined 1215.8-acre watershed to compare to the proposed runoff from the site. (See Exhibit "C" – Existing Conditions Watershed Map).

According to the NRCS Web Soil Survey the existing on and off-site soils within the established watersheds belong to hydrologic soil group B, C, and D. A composite curve number of 85.1 was calculated for existing watershed "A" and 79.1 was calculated for watershed "B" (See Appendix "B" – Composite Curve Number Calculation Table).

Proposed Conditions Hydrologic Analysis

Proposed on-site drainage patterns will mimic existing drainage patterns with the exception of diversion channels being proposed on the north side of the site. Therefore, watershed boundaries remain the same from existing to proposed conditions. The proposed development will consist of the addition of 2.02-acres and the demolition of 0.18-acres of impervious cover for a net increase of 1.84-acres of impervious cover to watershed "A". This drainage analysis has been performed using the ultimate proposed developed site, thus the net increase of 1.84 acres of impervious cover includes phase 1 and 2 of the project. The diversion channels are proposed to be developed along the north side of the proposed site and storm water will flow back into the natural flow path before exiting the property. (See Exhibit "D" – Proposed Conditions Watershed Map).

Composite curve number analysis revealed a proposed composite curve number of 85.5 for watershed "A" and watershed "B" remains at 79.1 (See Appendix "B" – Composite Curve Number Calculation Table).

Hydrologic Model Development

The method of hydrologic analysis for this study was the National Resources Conservation Service (SCS) method with a type III rainfall distribution in accordance with the Austin Drainage Criteria Manual, section 2.3.0. (See References) Pre and post-development runoff conditions were then analyzed in order to perform a comparison between pre and post-development peak flow rate.

Watershed boundaries were established using a combination of LiDAR data received from TNRIS, USGS contour data, aerial photo, and field investigations. Time of Concentration values used within this study were derived using Technical Release-55 (TR-55), Urban Hydrology for Small Watersheds. Table 2-3 of the Austin Drainage Criteria Manual was used in order to get a depth for the 24-hour storm. Manning’s “n” values were taken from Table 2-2 of the Austin Drainage Criteria Manual. Flow rates for each model have been computed for the 2-year, 10-year, 25-year, and 100-year storm events as required in Section 8.3.0 – Stormwater Management Ponds. (See Appendix D).

Downstream Impact Analysis Results

Watershed “A” combined with watershed “B” make up the entire drainage basin the proposed site is included in. Watershed “A” storm water flow increases after development while Watershed “B” stays the same because there is not any proposed development in “WS-B”. Calculation point 1 (CP-1) is located in the natural drainage crossing at the most downstream point of the combined 1215.8-acre drainage basin. Although the storm water flow from watershed “A” increased after development, the peak flow at CP-1 decreased for the 2, 10, 25, 100-year storm water frequencies.

In evaluating each of the above described models we have prepared a Downstream Impact Analysis Summary Table, listed below, which compares the 2-year, 10-year, 25-year, and 100-year storm water frequencies for the above described models.

Downstream Impact Analysis Summary				
	2 Year	10 Year	25 Year	100 Year
WS-A				
Pre-Development	90.7	199.2	262.5	366.6
Post Development	95.9	209.7	275.9	385.1
Change in Flow	5.20	10.50	13.40	18.50
WS-B				
Pre-Development	778.6	1959.8	2676.0	3876.0
Post Development	778.6	1959.8	2676.0	3876.0
Change in Flow	0.00	0.00	0.00	0.00
CP-1				
Pre-Development	815.3	2038.6	2783.3	4031.4
Post Development	812.0	2030.2	2772.1	4015.6
Change in Flow	(3.30)	(8.40)	(11.20)	(15.80)

Summary

This study demonstrates that the effect of the development on this site does not adversely impact downstream owners. Camp Young Judaea Dormitory development is to be developed in two phases. For the purposed of this drainage analysis the ultimate developed impervious cover has been included in the calculation of the proposed storm water runoff. Storm water flow was analyzed at the property boundary as it left the site and an increase has been calculated for all storm frequencies. However, when compared at calculation point 1 leaving the overall drainage basin the storm water flow decreases for all storm water frequencies. This is because the increase of impervious cover to the site and the addition of diversion ditches increase the rate of flow across the camp property. This causes the peak flow from watershed "A" to leave the property before the flow from the larger drainage basin (WS-B) has peaked, resulting in a lower peak flow for the combined watersheds at CP-1. As is often the case, when the downstream portion of a substantially larger watershed is developed, detention facilities can adversely impact the peak flow rates of drainage ways. If storm water is released without detention before the peak flow from the adjacent watershed occurs, the water contributed from development can pass through downstream properties and into a larger conveyance system prior to the arrival of the upstream peak flow rate. Alternatively, if detention is provided, discharge from the detention pond, which would have passed otherwise, will add to the peak flow rates of the larger contributing watershed creating larger peak flow. Therefore, no detention has been provided.

Exhibit “A” – Concept Plan

CITY OF WOODCREEK, TX
CONCEPT PLAN APPLICATION

SCALE: 1" = 200'

 REVIEW PURPOSES ONLY.

 NOT FOR CONSTRUCTION.

 Use not permitted under any

 circumstances.

 Professional Professional Engineer,

 State of Texas,

 License No. 28421,

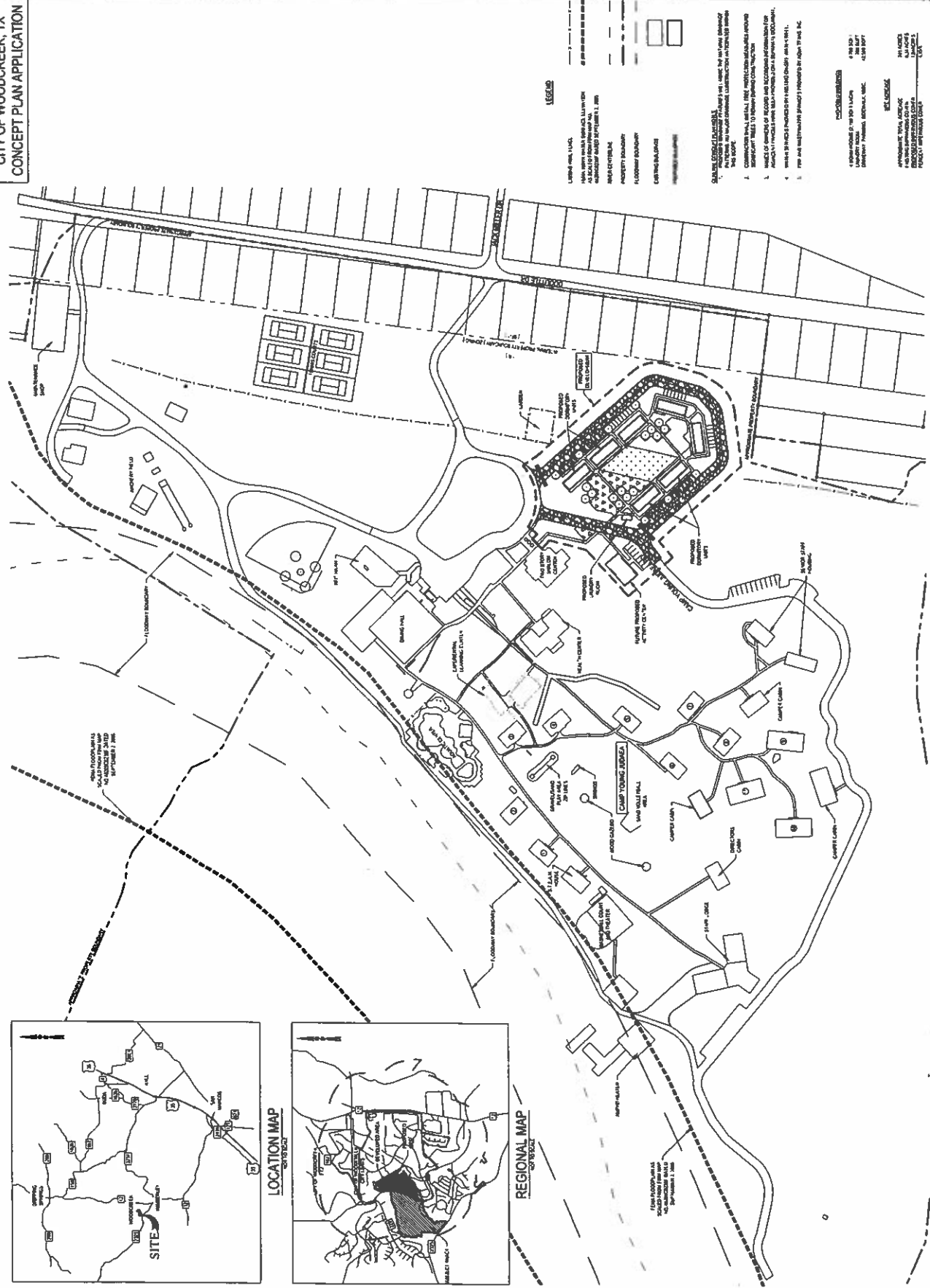
 Date: MAY 06, 2017

MATKINHOVER
 ENGINEERING
 & SURVEYING
 13133 DALLAS ROAD, SUITE 100
 DALLAS, TEXAS 75244
 TEL: 972.251.1000

CONCEPT PLAN
 FOR
 CAMP YOUNG JUDEFA - RETREAT VILLAGE
 WOODCREEK, TEXAS

CS100

JOB NO.	CS100
DESIGNED BY	DKK
DRAWN BY	DKK
CHECKED BY	DKK



- LEGEND**

 1. EXISTING UTILITY

 2. PROPOSED UTILITY

 3. EXISTING DRIVEWAY

 4. PROPOSED DRIVEWAY

 5. EXISTING SIDEWALK

 6. PROPOSED SIDEWALK

 7. EXISTING CURB

 8. PROPOSED CURB

 9. EXISTING PROPERTY BOUNDARY

 10. PROPOSED PROPERTY BOUNDARY

 11. EXISTING FLOORING

 12. PROPOSED FLOORING

 13. EXISTING CURBING

 14. PROPOSED CURBING
- NOTES:**

 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF WOODCREEK, TEXAS SUBDIVISION MAP ACT AND ALL APPLICABLE ORDINANCES.

 2. THE CITY ENGINEER SHALL REVIEW THIS CONCEPT PLAN FOR CONFORMANCE WITH THE CITY OF WOODCREEK, TEXAS SUBDIVISION MAP ACT AND ALL APPLICABLE ORDINANCES.

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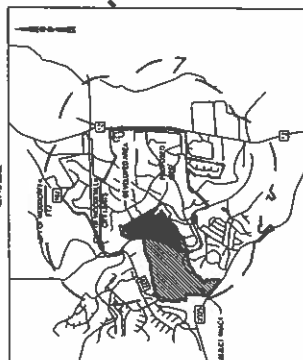
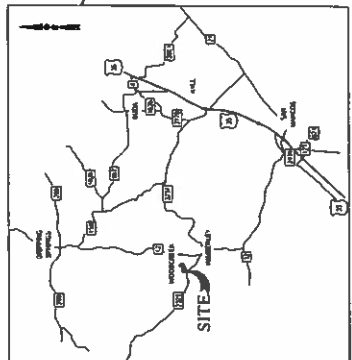


Exhibit "B" – FEMA Map

LEGEND

AREA FLOOD INSURANCE RATE (FIRM) MAP
 This map is a Flood Insurance Rate (FIRM) map for the area shown. It is based on the Flood Insurance Rate Study (FIRS) conducted by the Federal Emergency Management Agency (FEMA) and the Texas Department of Insurance (TDI). The map shows the flood insurance rates for the area, which are based on the flood risk of the area. The map is subject to change without notice. For more information, contact the Texas Department of Insurance, Office of Flood Insurance, Austin, Texas.

ZONE A1
 Special Flood Hazard Area (SFHA) - High Risk
 Areas with a 1% annual chance flood (100-year return period flood). These areas are subject to the highest flood risk.

ZONE A2
 Special Flood Hazard Area (SFHA) - Moderate Risk
 Areas with a 1% annual chance flood (100-year return period flood). These areas are subject to a moderate flood risk.

ZONE A3
 Special Flood Hazard Area (SFHA) - Low Risk
 Areas with a 1% annual chance flood (100-year return period flood). These areas are subject to a low flood risk.

ZONE V
 Special Flood Hazard Area (SFHA) - Very Low Risk
 Areas with a 1% annual chance flood (100-year return period flood). These areas are subject to a very low flood risk.

ZONE X
 Special Flood Hazard Area (SFHA) - Minimal Risk
 Areas with a 1% annual chance flood (100-year return period flood). These areas are subject to a minimal flood risk.

OTHER FLOOD AREAS
 Areas that are not included in the FIRM map. These areas may be subject to flood risk, but they are not included in the FIRM map.

COASTAL BARRETT/REQUIREMENTS SYSTEM CAPS AREA
 Areas that are subject to coastal barriers and requirements system caps. These areas are subject to special flood risk.

OTHERWISE PROTECTED AREAS (OPA)
 Areas that are otherwise protected. These areas are not subject to flood risk.

UNDEVELOPED AREAS
 Areas that are undeveloped. These areas are not subject to flood risk.

WATER BODIES
 Areas that are water bodies. These areas are not subject to flood risk.

ROADS
 Areas that are roads. These areas are not subject to flood risk.

RAILROADS
 Areas that are railroads. These areas are not subject to flood risk.

UTILITIES
 Areas that are utilities. These areas are not subject to flood risk.

BOUNDARIES
 Areas that are boundaries. These areas are not subject to flood risk.

INDEX
 Areas that are index. These areas are not subject to flood risk.

SCALE
 1" = 1 MILE

DATE
 1998

FIRM
FLOOD INSURANCE RATE MAP
HALLS COUNTY,
TEXAS
AND INCORPORATED AREAS

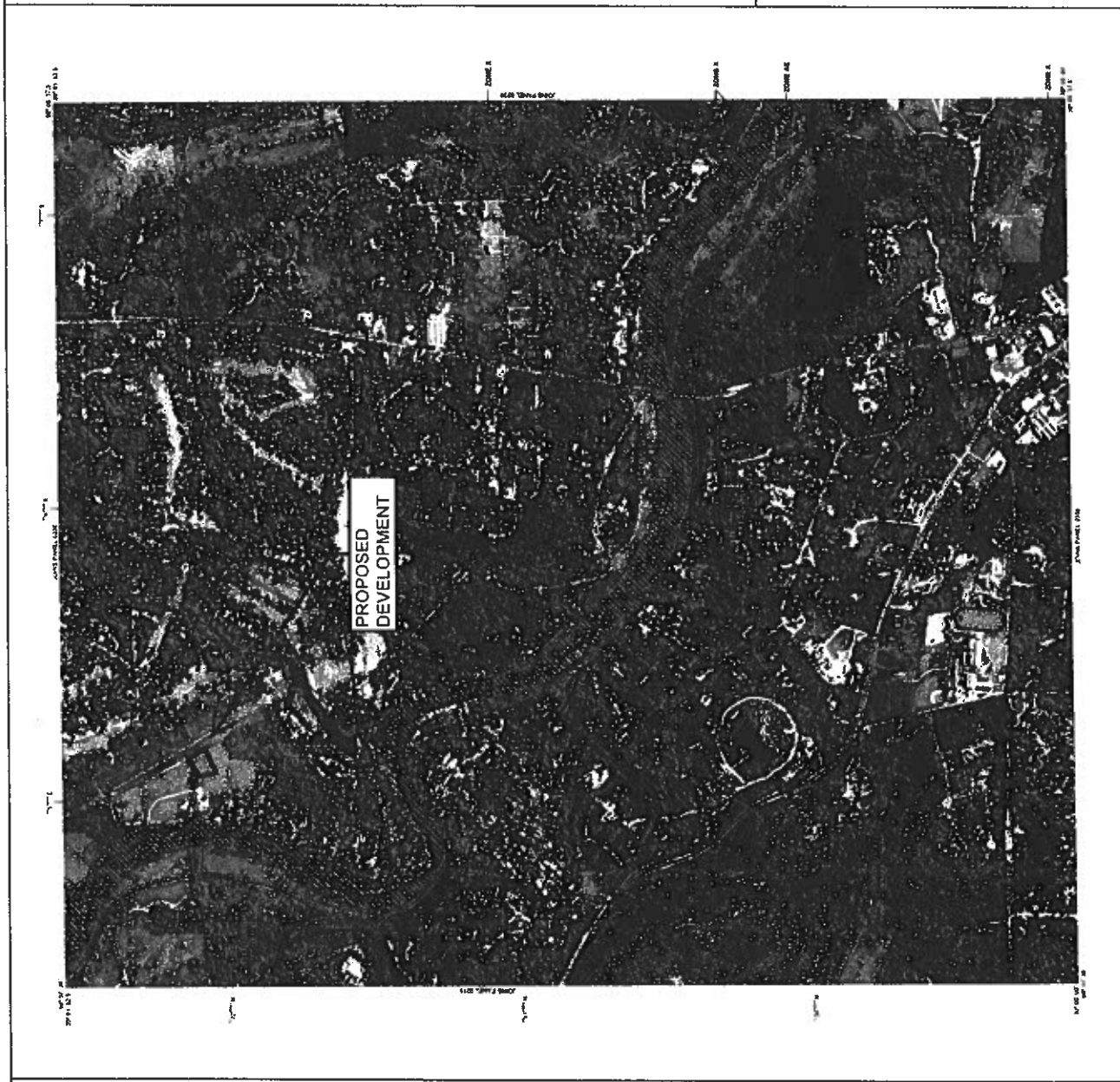
PANEL 238 OF 465

DATE OF STUDY: 1998
 DATE OF MAP: 1998
 DATE OF REVISION: 1998

MAP NUMBER
 48030238P

MAP REVISION
 SEPTEMBER 7, 1998

Federal Emergency Management Agency



NOTES TO USERS

This map is a Flood Insurance Rate (FIRM) map for the area shown. It is based on the Flood Insurance Rate Study (FIRS) conducted by the Federal Emergency Management Agency (FEMA) and the Texas Department of Insurance (TDI). The map shows the flood insurance rates for the area, which are based on the flood risk of the area. The map is subject to change without notice. For more information, contact the Texas Department of Insurance, Office of Flood Insurance, Austin, Texas.

The information on this map is for informational purposes only. It is not intended to be used as a basis for any insurance policy. The information on this map is not a guarantee of any insurance policy. The information on this map is not a contract. The information on this map is not a warranty. The information on this map is not a representation. The information on this map is not a statement of fact. The information on this map is not a statement of opinion. The information on this map is not a statement of intent. The information on this map is not a statement of value. The information on this map is not a statement of quality. The information on this map is not a statement of quantity. The information on this map is not a statement of condition. The information on this map is not a statement of performance. The information on this map is not a statement of result. The information on this map is not a statement of benefit. The information on this map is not a statement of loss. The information on this map is not a statement of gain. The information on this map is not a statement of risk. The information on this map is not a statement of reward. The information on this map is not a statement of punishment. The information on this map is not a statement of consequence. The information on this map is not a statement of effect. The information on this map is not a statement of cause. The information on this map is not a statement of action. The information on this map is not a statement of inaction. The information on this map is not a statement of omission. The information on this map is not a statement of commission. The information on this map is not a statement of error. The information on this map is not a statement of omission. The information on this map is not a statement of commission. The information on this map is not a statement of error. The information on this map is not a statement of omission. The information on this map is not a statement of commission. The information on this map is not a statement of error.

PROPOSED DEVELOPMENT

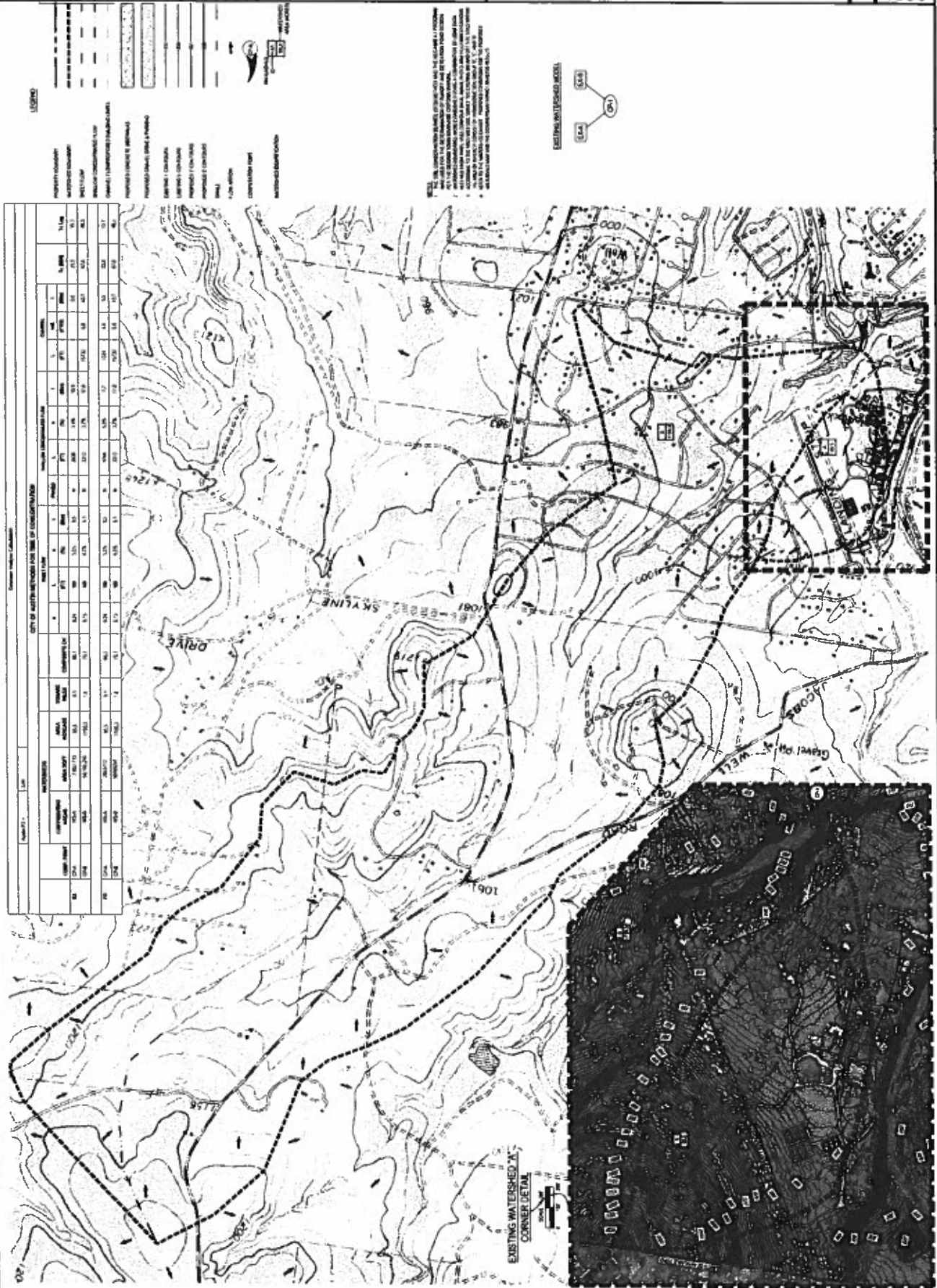
Exhibit “C” – Watershed Map
Existing Conditions

WATERSHED EXHIBIT - EXISTING CONDITIONS
FOR
CAMP YOUNG JUDEA, DORM ROOMS
WOODCREK, TEXAS

MATKINHOVER
ENGINEERING
& SURVEYING

DATE: 01/15/2011
PROJECT: CAMP YOUNG JUDEA, DORM ROOMS
SHEET NO. 1 OF 1

DATE	01/15/2011
BY	JLM
CHECKED BY	JLM
DATE	01/15/2011
BY	JLM
CHECKED BY	JLM



CITY OF WATERSHED CORNER DETAIL

STATION	DATE	DESCRIPTION	BY	CHECKED
1	01/15/2011	WATERSHED CORNER DETAIL	JLM	JLM

NO.	DATE	DESCRIPTION	BY	CHECKED
1	01/15/2011	WATERSHED CORNER DETAIL	JLM	JLM

NOT FOR CONSTRUCTION
NOT TO BE USED FOR ANY OTHER PURPOSES
NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM MATKINHOVER ENGINEERING & SURVEYING.

Exhibit “D” – Watershed Map
Proposed Conditions

WATERSHED EXHIBIT - PROPOSED CONDITIONS
 FOR
 CAMP YOUNG JUDEA, DORM ROOMS
 WOODCREEK, TEXAS

MATKIN HOOVER
 ENGINEERING & SURVEYING
 2200 S. WOODCREEK BLVD., SUITE 100
 WOODCREEK, TEXAS 75992
 (409) 833-7200
 www.matkin-hoover.com

PROJECT LOCATION:
 PROJECT NUMBER:
 SHEET NUMBER:
 SHEET TOTAL:
 DATE:
 DRAWN BY:
 CHECKED BY:

THESE PLANS WERE PREPARED BY THE ENGINEER AND SURVEYOR, AND THEY REPRESENT THE BEST INFORMATION AVAILABLE TO THEM AT THE TIME OF THEIR PREPARATION. THEY ARE NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN CONSENT OF MATKIN HOOVER ENGINEERING & SURVEYING. ANY CHANGES TO THESE PLANS MUST BE MADE BY THE ENGINEER AND SURVEYOR.

DATE OF SURVEY: []
 DATE OF DESIGN: []
 DATE OF PLOTTING: []

LEGEND

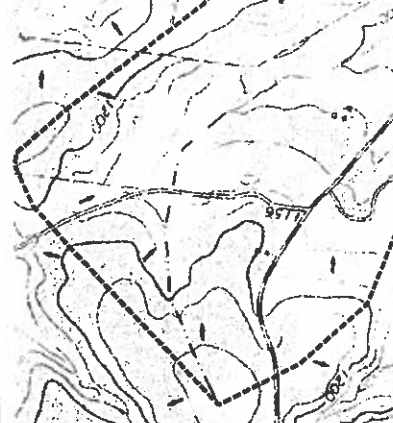
[Symbol]	PROPOSED WATERSHED
[Symbol]	EXISTING WATERSHED
[Symbol]	PROPOSED DRAINAGE
[Symbol]	EXISTING DRAINAGE
[Symbol]	PROPOSED CONTOUR
[Symbol]	EXISTING CONTOUR
[Symbol]	PROPOSED ROAD
[Symbol]	EXISTING ROAD
[Symbol]	PROPOSED UTILITY
[Symbol]	EXISTING UTILITY
[Symbol]	PROPOSED LOT
[Symbol]	EXISTING LOT
[Symbol]	PROPOSED PROPERTY LINE
[Symbol]	EXISTING PROPERTY LINE
[Symbol]	PROPOSED CURB
[Symbol]	EXISTING CURB
[Symbol]	PROPOSED DRIVEWAY
[Symbol]	EXISTING DRIVEWAY
[Symbol]	PROPOSED SIDEWALK
[Symbol]	EXISTING SIDEWALK
[Symbol]	PROPOSED FENCE
[Symbol]	EXISTING FENCE
[Symbol]	PROPOSED WALL
[Symbol]	EXISTING WALL
[Symbol]	PROPOSED POLE
[Symbol]	EXISTING POLE
[Symbol]	PROPOSED SIGN
[Symbol]	EXISTING SIGN
[Symbol]	PROPOSED LIGHT
[Symbol]	EXISTING LIGHT
[Symbol]	PROPOSED TREE
[Symbol]	EXISTING TREE
[Symbol]	PROPOSED BENCH
[Symbol]	EXISTING BENCH
[Symbol]	PROPOSED FURNITURE
[Symbol]	EXISTING FURNITURE
[Symbol]	PROPOSED SIGNAGE
[Symbol]	EXISTING SIGNAGE

PROPOSED WATERSHED 'X' CORNER DETAIL

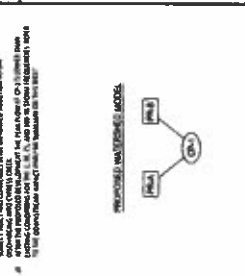
NO.	DESCRIPTION	AREA (SQ. FT.)	PERCENT	TOTAL AREA (SQ. FT.)
1	Lot 1	10,000	10.00%	10,000
2	Lot 2	20,000	20.00%	30,000
3	Lot 3	30,000	30.00%	60,000
4	Lot 4	40,000	40.00%	100,000
5	Lot 5	50,000	50.00%	150,000
6	Lot 6	60,000	60.00%	210,000
7	Lot 7	70,000	70.00%	280,000
8	Lot 8	80,000	80.00%	360,000
9	Lot 9	90,000	90.00%	450,000
10	Lot 10	100,000	100.00%	550,000

CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS

NO.	SECTION	AREA (SQ. FT.)	PERCENT	TOTAL AREA (SQ. FT.)
1	Section 1	10,000	10.00%	10,000
2	Section 2	20,000	20.00%	30,000
3	Section 3	30,000	30.00%	60,000
4	Section 4	40,000	40.00%	100,000
5	Section 5	50,000	50.00%	150,000
6	Section 6	60,000	60.00%	210,000
7	Section 7	70,000	70.00%	280,000
8	Section 8	80,000	80.00%	360,000
9	Section 9	90,000	90.00%	450,000
10	Section 10	100,000	100.00%	550,000



THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS IS A SUBDIVISION OF THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS. THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS IS A SUBDIVISION OF THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS. THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS IS A SUBDIVISION OF THE CITY OF AUSTIN WATERSHED FOR THE CITY OF WOODCREEK, TEXAS.



PROPOSED WATERSHED 'X' CORNER DETAIL
 SCALE: []

PROPOSED WATERSHED 'X' CORNER DETAIL
 SCALE: []

PROPOSED WATERSHED 'X' CORNER DETAIL
 SCALE: []



**Exhibit “E” – WS-A-Impervious Cover Exhibit-
Existing Conditions**

WS-A - IMPERVIOUS COVER EXHIBIT - EXISTING CONDITIONS

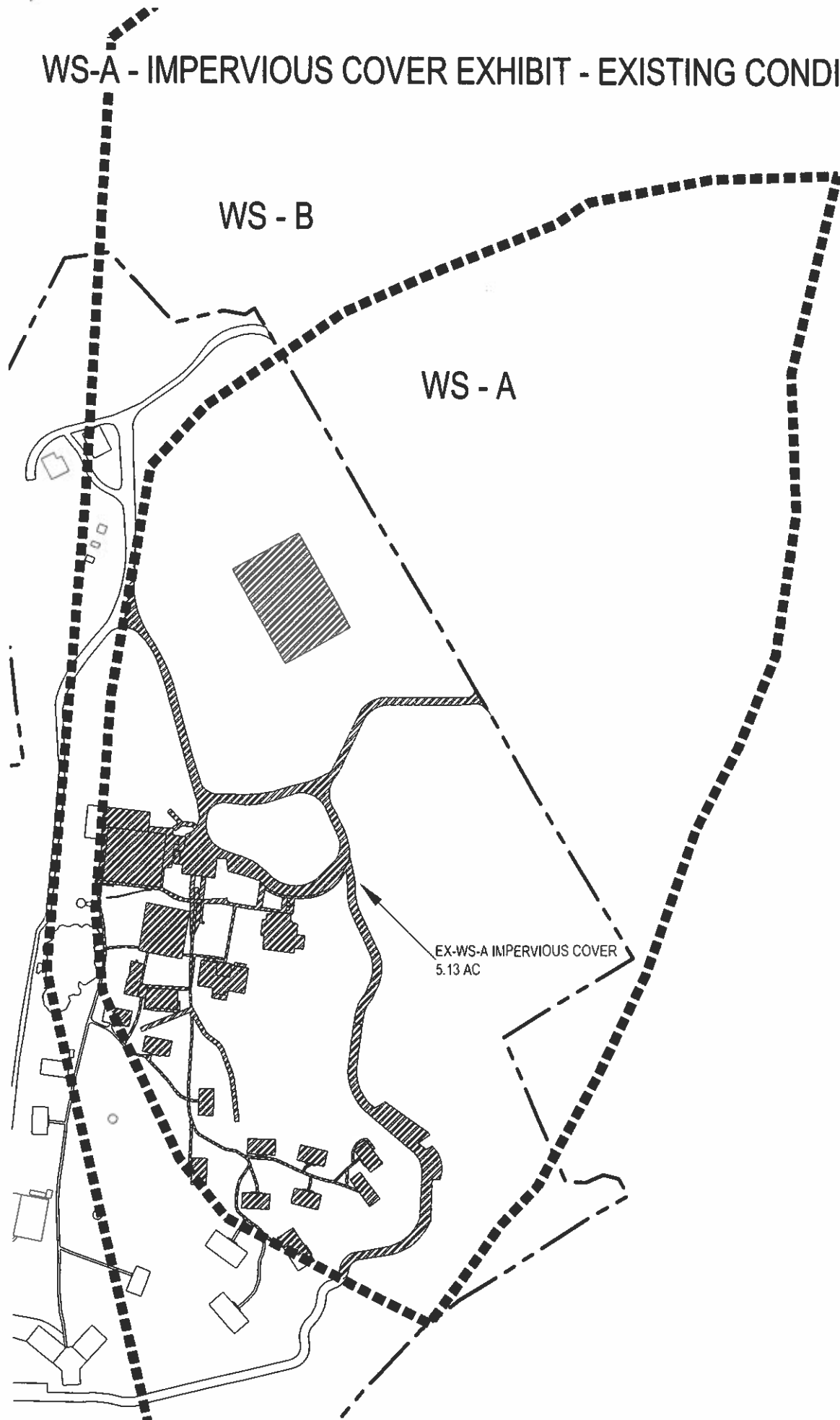
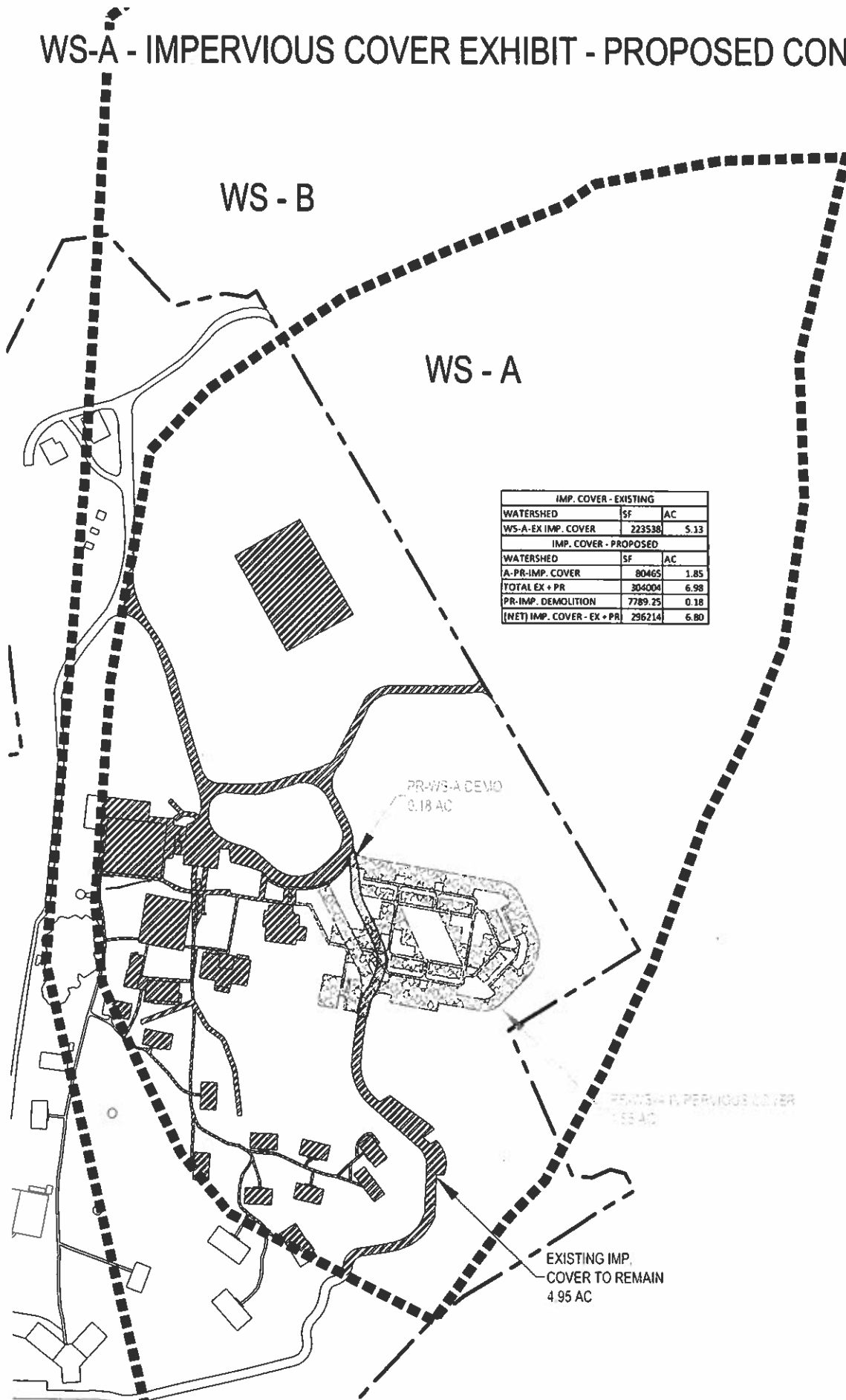


Exhibit "F" – WS-A-Impervious Cover Exhibit-
Proposed Conditions

WS-A - IMPERVIOUS COVER EXHIBIT - PROPOSED CONDITIONS



IMP. COVER - EXISTING		
WATERSHED	SF	AC
WS-A-EX IMP. COVER	223538	5.13
IMP. COVER - PROPOSED		
WATERSHED	SF	AC
A-PR-IMP. COVER	80465	1.85
TOTAL EX + PR	304004	6.98
PR-IMP. DEMOLITION	7789.25	0.18
[NET] IMP. COVER - EX + PR	296214	6.80

PR-WS-A DEMO
0.18 AC

PERVIOUS COVER
155 AC

EXISTING IMP.
COVER TO REMAIN
4.95 AC

Exhibit "G" – WS-B-Curve Number Calculation
Exhibit

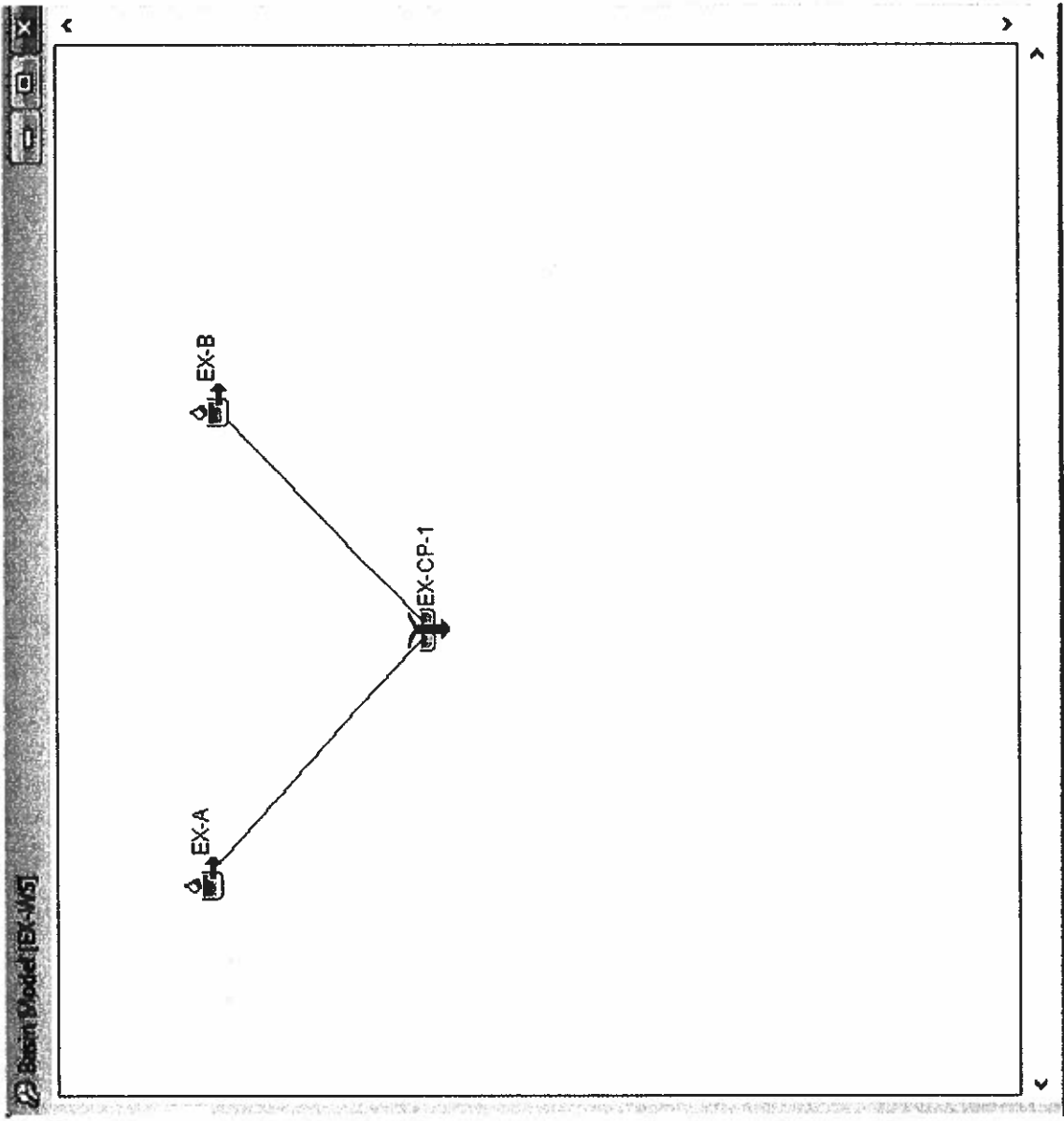
2620.02 - CYJ - WSIB CURVE
NUMBER CALCULATION EXHIBIT



**Appendix “A” – HEC-HMS Report With Time of
Concentration Calculations**

Detention Analysis Calculations

Austin P2 = 3.44		CITY OF AUSTIN METHODS FOR TIME OF CONCENTRATION																				
COMP. POINT	CONTRIBUTING AREAS	WATERSHEDS		SQUARE MILES	COMPOSITE CN	SHEET FLOW			SHALLOW CONCENTRATED FLOW			CHANNEL			Tc Lag							
		AREA SQFT	ACREAGE			n	L (FT)	s (%)	t (Min)	PAVED	L (FT)	s (%)	t (Min)	L (FT)		v _{ch} (FT/S)	t (Min)					
EX	WS-A	2,853,713	65.5	0.1	85.1	0.24	100	5.0%	9.5	N	2838	3.4%	15.9	N	3313	3.7%	17.8	15732	6.0	43.7	67.6	15.3
	WS-B	50,105,295	1150.3	1.8	79.1	0.15	100	6.0%	6.1	N	3313	3.7%	17.8	N	3313	3.7%	17.8	15732	6.0	43.7	67.6	40.5
PR	WS-A	2853713	65.5	0.1	85.5	0.24	100	5.0%	9.5	N	1744	5.5%	7.7	N	1744	5.5%	7.7	1331	4.0	5.5	22.8	13.7
	WS-B	50105295	1150.3	1.8	79.1	0.15	100	6.0%	6.1	N	3313	3.7%	17.8	N	3313	3.7%	17.8	15732	6.0	43.7	67.6	40.5



Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-2

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 03May2017, 10:33:58 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	90.7	02May2017, 00:18	1.96
EX-B	1.8	778.6	02May2017, 00:48	1.51
EX-CP-1	1.9	815.3	02May2017, 00:45	1.53

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-10

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 03May2017, 10:33:57 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	199.2	02May2017, 00:18	4.39
EX-B	1.8	1959.8	02May2017, 00:45	3.74
EX-CP-1	1.9	2038.6	02May2017, 00:42	3.77

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-25

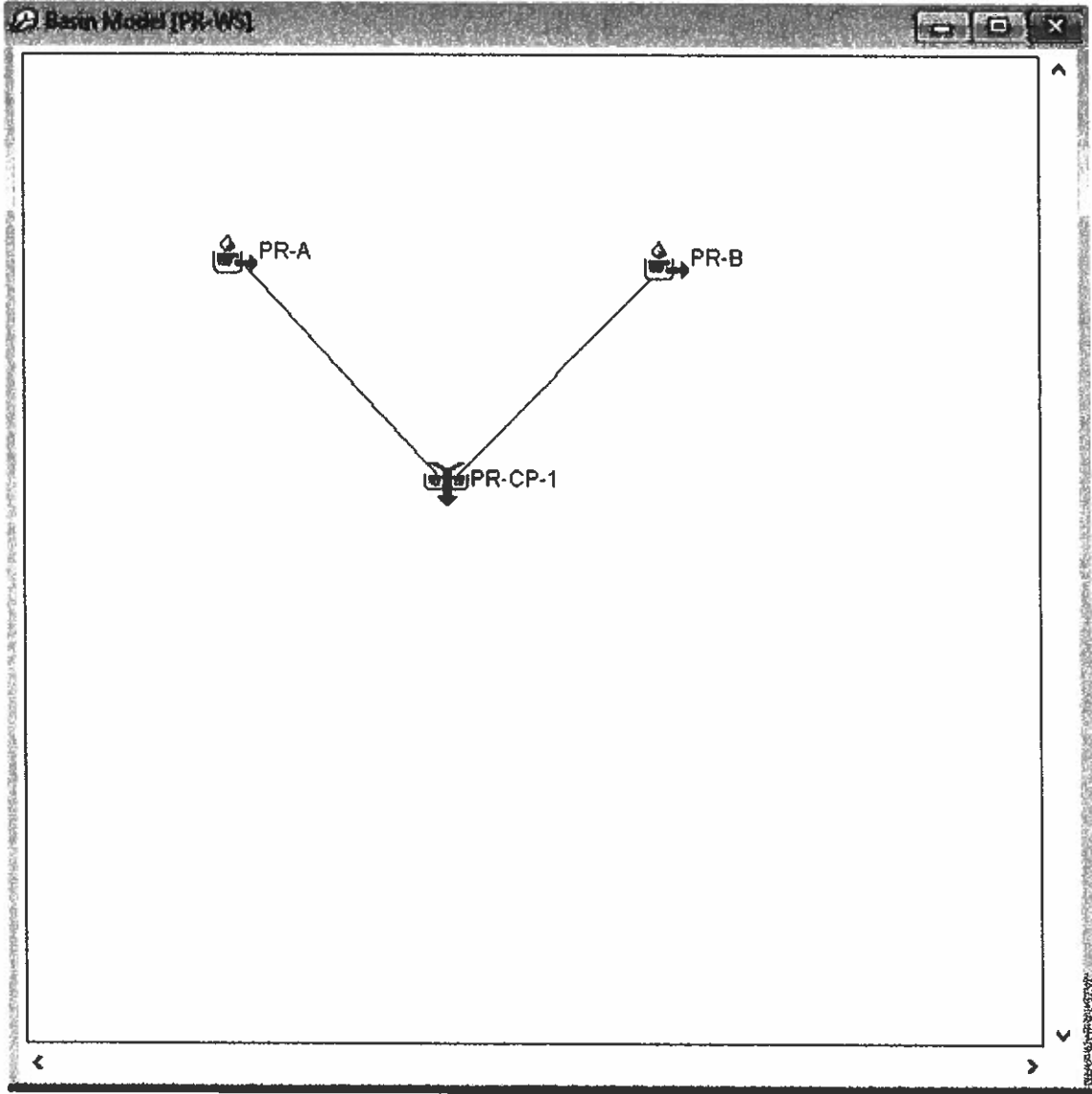
Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR
Compute Time: 03May2017, 10:33:58 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	262.4	02May2017, 00:18	5.86
EX-B	1.8	2676.0	02May2017, 00:45	5.13
EX-CP-1	1.9	2783.3	02May2017, 00:42	5.17

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-100

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 100-YR
Compute Time: 03May2017, 10:33:58 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	366.6	02May2017, 00:18	8.34
EX-B	1.8	3876.0	02May2017, 00:45	7.52
EX-CP-1	1.9	4031.4	02May2017, 00:42	7.57



Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-2

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 03May2017, 10:33:59 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	95.9	02May2017, 00:15	2.00
PR-B	1.8	778.6	02May2017, 00:48	1.51
PR-CP-1	1.9	812.0	02May2017, 00:45	1.53

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-10

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 03May2017, 10:33:58 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	209.7	02May2017, 00:15	4.44
PR-B	1.8	1959.8	02May2017, 00:45	3.74
PR-CP-1	1.9	2030.2	02May2017, 00:42	3.77

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-25

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR
Compute Time: 03May2017, 10:33:59 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	275.9	02May2017, 00:15	5.91
PR-B	1.8	2676.0	02May2017, 00:45	5.13
PR-CP-1	1.9	2772.1	02May2017, 00:42	5.17

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-100

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 100-YR
Compute Time: 03May2017, 10:33:58 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	385.1	02May2017, 00:15	8.39
PR-B	1.8	3876.0	02May2017, 00:45	7.52
PR-CP-1	1.9	4015.6	02May2017, 00:42	7.57

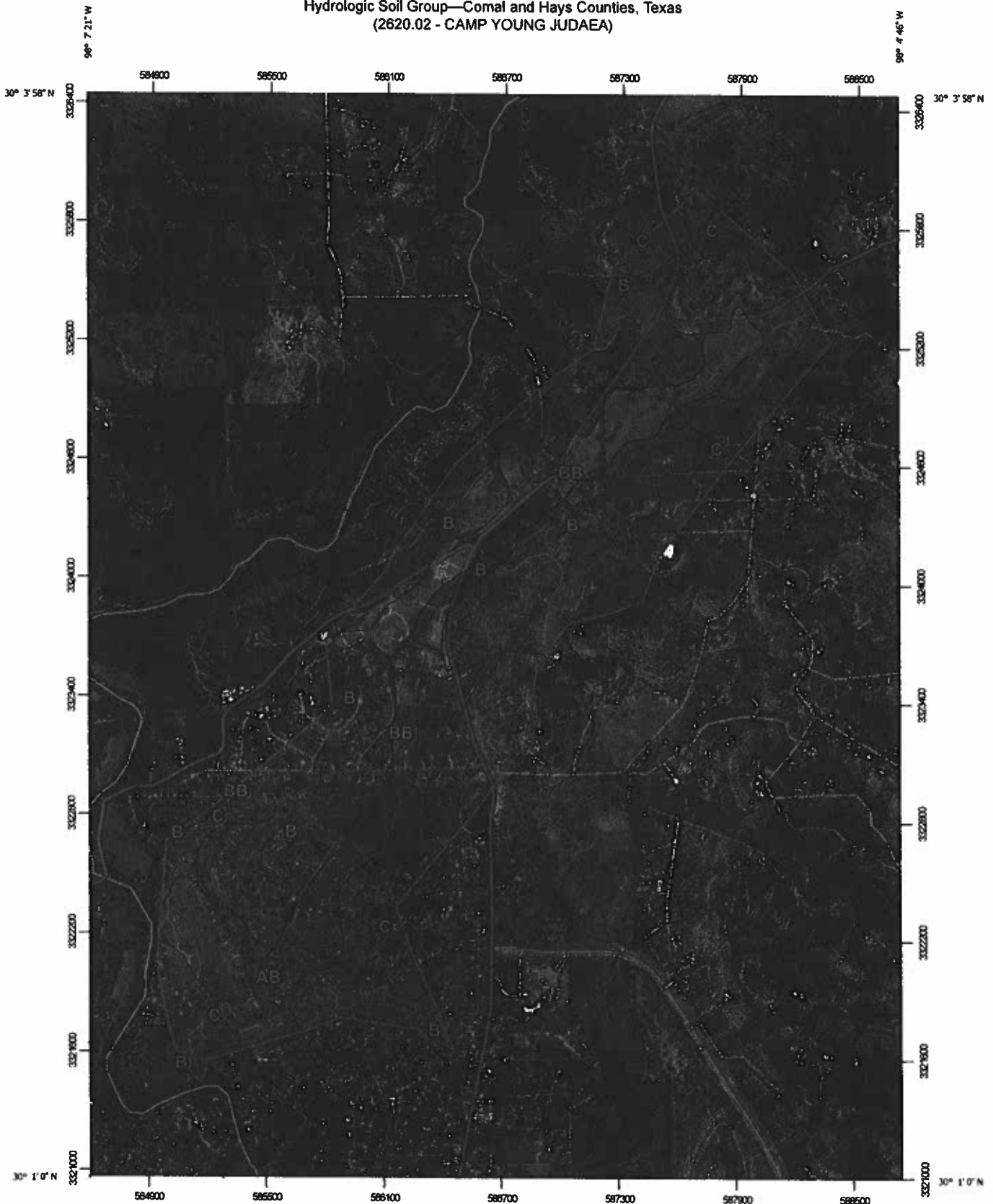
**Appendix “B” – Composite Curve Number
Calculation**

COMPOSITE CN CALCULATION TABLE

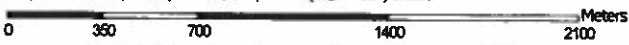
Site Info					
	sqft	Acre	%		
Property Area =	10,672,200	245.00			
WS-A	2,853,713	65.51	100%		
WS-A Existing Impervious	223,538	5.13	8%		
WS-A Existing Pervious	2,630,174	60.38	92%		
WS-A Proposed Impervious =	296,214	6.80	10%		
WS-A Proposed Pervious =	2,557,498	58.71	90%		
WATERSHED INFO					
EXISTING WATERSHEDS = PROPOSED WATERSHEDS					
	sqft	Acre	%		
WS-A	2,853,713	65.5	100%		
WS-B (EXCLUDING WS-A)	50,105,295	1150.3	100%		
CURVE NUMBERS					
WATERSHED - A - EX & PR					
SOIL RATING			B	C	D
%					100.0%
PERVIOUS	PASTURE, GRASSLAND(FAIR)				84
IMPERVIOUS	PAVED PARKING, ROOFS, DRIVEWAYS				98
WATERSHED - B - EX & PR (REF. TO TR-55 MANUAL TABLE 2-2)					
NO IMP. COVER IS PROPOSED IN WS-B, THEREFORE THE CALCULATED CN IS THE SAME EXISTING AND PROPOSED					
SOIL RATING			B	C	D
%			2.5%	10.7%	86.8%
(EX & PR)	COMMERCIAL		92	94	95
COMPOSITE (EX & PR)	COMMERCIAL		84.3		
(EX & PR)	1/4 ACRE LOT RESIDENTIAL		75	83	87
COMPOSITE (EX & PR)	1/4 ACRE LOT RESIDENTIAL		85.7		
(EX & PR)	BRUSH (FAIR CONDITION)		56	70	77
COMPOSITE (EX & PR)	BRUSH (FAIR CONDITION)		75.7		
(EX & PR)	JUNIPER (GOOD CONDITION)		41	61	71
COMPOSITE (EX & PR)	JUNIPER (GOOD CONDITION)		69.2		
CALCULATED COMPOSITE CURVE NUMBERS					
EXISTING					
COMPOSITE EX-A					
SOIL RATING:					D
					100.0%
	PERVIOUS COVER =	92%	CN=		84
	IMPERVIOUS COVER=	8%	CN=		98
			CN=		85.1
PROPOSED					
COMPOSITE PR-A					
SOIL RATING:					D
					100.0%
	PERVIOUS COVER =	90%	CN=		84
	IMPERVIOUS COVER=	10%	CN=		98
			CN=		85.5
WATERSHED - B DEFINED AREAS (REFER TO CURVE NUMBER CALC EXHIBIT)					
	sqft	Acre	%	CN	
COMMERCIAL	3,109,765	71.4	6%	5.9	
1/4 ACRE LOT RESIDENTIAL	14,888,749	341.8	30%	25.6	
BRUSH (FAIR CONDITION)	24,927,331	572.3	50%	37.7	
JUNIPER (GOOD CONDITION)	7,179,451	164.8	14%	9.9	
WS - B - EX & PR CALCULATED COMPOSITE CN =	50,105,295	1150.3	100%	79.1	

**Appendix “C” – NRCS Soil Survey, Hydrologic
Soil Groups With Soil Rating Per Watershed
Calculation Table**

Hydrologic Soil Group—Comal and Hays Counties, Texas
(2620.02 - CAMP YOUNG JUDAEA)






































Map Scale: 1:26,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



MAP LEGEND

 Area of Interest (AOI)	 C
 Area of Interest (AOI)	 C/D
 Soils	 D
 Soil Rating Polygons	 Not rated or not available
 A	Water Features
 A/D	 Streams and Canals
 B	Transportation
 B/D	 Rails
 C	 Interstate Highways
 C/D	 US Routes
 D	 Major Roads
 Not rated or not available	 Local Roads
Soil Rating Lines	Background
 A	 Aerial Photography
 A/D	
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	
Soil Rating Points	
 A	
 A/D	
 B	
 B/D	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas
Survey Area Data: Version 12, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 6, 2011—Apr 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Comal and Hays Counties, Texas (TX604)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnB	Anhalt clay, 1 to 3 percent slopes	D	103.4	8.1%
BrB	Bolar clay loam, 1 to 3 percent slopes	C	123.7	9.7%
BiD	Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes	D	225.6	17.7%
BiG	Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes	D	383.2	30.1%
CrD	Comfort-Rock outcrop complex, 1 to 8 percent slopes	D	222.3	17.4%
LeB	Lewisville silty clay, 1 to 3 percent slopes	B	0.1	0.0%
Or	Orif soils, moist, 0 to 3 percent slopes, frequently flooded	A	0.3	0.0%
Pt	Pits	D	9.4	0.7%
PuC	Purves clay, 1 to 5 percent slopes	D	78.2	6.1%
RcD	Real-Comfort-Doss complex, 1 to 8 percent slopes	D	99.3	7.8%
SuB	Sunev clay loam, 1 to 3 percent slopes	B	28.7	2.3%
Totals for Area of Interest			1,274.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

SOIL RATING PER WATERSHED CALCULATION TABLE		
WS - A+B (REFER TO HYDROLOGIC SOIL GROUP SUMMARY)		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	100.7	8.3%
D	195.0	16.0%
D	384.4	31.6%
D	234.1	19.3%
D	9.4	0.8%
D	42.1	3.5%
D	98.3	8.1%
TOTAL	1215.8	100.0%
TOTALS		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	1064.0	87.5%
WS-A IS ALL TYPE "D" SOIL		
D	65.5	100%
WS-B CALCULATED SOIL SOIL TYPE W/O WS-A		
RATING	ACRES	%
B	28.7	2.5%
C	123.1	10.7%
D	998.5	86.8%
TOTAL	1150.3	100.0%

Appendix “D” – References

City of Wood Creek Technical Construcitons
Standards and Specifications Manual

SECTION 4. DRAINAGE FACILITIES

4.1. General

The design and construction of drainage facilities and systems within the incorporated limits and the ETJ of the ~~City of Woodcreek shall comply with the following Hays County Standards~~ which are incorporated herein by reference and which are modified herein. ~~The City encourages the use of the City of Austin Drainage Criteria Manual and Standard Specifications when applicable.~~

Hays County Subdivision and Development Regulations, latest edition.
Hays County Specifications for Paving and Drainage Improvements, latest edition.

City of Austin, Texas Drainage Criteria Manual, latest edition;
City of Austin, Texas Standard Specifications, latest edition.

4.2. Definition of Drainage Facilities and Systems

Drainage systems and facilities shall include street drainage, site drainage, bridges and culverts and stormwater detention.

4.3. Exceptions to the Referenced Standards

4.3.1. General

The following exceptions shall apply to the referenced standards. All references to Hays County or the City of Austin shall be construed to mean the City of Woodcreek. All provisions and standards of the City of Woodcreek Ordinances shall be applicable and shall govern if there is a conflict with the standards referenced in Section 4.1.

4.3.2. City of Austin, Texas Drainage Criteria Manual

(a) Section 1.2.4 "Drainage Systems"

(1) Subsection E.1. Fencing shall comply with the City of Woodcreek Ordinances.

(2) Subsection E.2. Landscaping shall comply with the City of Woodcreek Ordinances.

(3) Subsection E.15. This subsection does not apply.

(b) Section 1.4.0 "Code Designation of Austin Area Watersheds". This section does not apply.

(c) Section 6.4.2 "Concrete Lined Channels". Concrete lined channels shall not be allowed without the authorization of the City as a variance.

(d) Section 8.2.0 "Regional Stormwater Management Program". This section does not apply.

(e) Section 8.3.4 "Safety Criteria for SWM Ponds".

(1) In addition to the criteria given in this section, SWM ponds shall also comply with all applicable dam safety standards of the Texas Commission on Environmental Quality.

8.6. Drainage Plan (In addition to the Base information, sufficient information to reflect the existing conditions just prior to the proposed development are to be shown, but not limited to the following)

- (a) Legible licensed engineer's seal, signature, and date;
- (b) Drainage area map including contributing drainage areas to storm sewer and/or inlet tie-ons;
- (c) Drainage area maps for the offsite contributing areas passing through site existing impervious cover, including buildings and surrounding information: structures, drainage release points, etc.;
- (d) Direction, location, and quantity of peak ~~2-, 25-, and 100-year~~ flood flows from off-site in existing conditions.
- (e) ~~Indicate 2-, 25-, and 100-year flows from off site in existing condition~~
- (f) Delineation of the fully developed 2-, 25- and 100- year floodplains, or, if applicable, a note stating that no 100-year floodplain exists on the site existing storm sewer systems on site or adjacent streets;
- (g) Delineation of the centerline of waterways, and the average water surface elevation of lakes, ponds, and springs contours at two-foot intervals;
- (h) Sufficient information to reflect the fully developed conditions of the proposal is to be shown, but not limited to, the following:

- (1) Developed drainage areas and proposed grading with two-foot contours;
- (2) Curbs, retaining walls, and other structures indicate elevations at critical points on driveways, curbs, etc.;
- (3) Overflow points and control elevations;
- (4) Construction details for control devices, curbs, walls, channel, swales, etc.;
- (5) Direction of flow from building roofs and outlet locations; and
- (6) Direction of flow from gutters; pass through flow rates, if any;
- (7) Shade in limits of ponding at overflow elevation and give cubic feet of storage at the maximum storage elevation overflow points and control elevations for overflow structures;
- (8) Action and direction of unrestricted flow from site, if any, with calculations;
- (9) ~~Storm drainage profiles and plans (swales, channels, pipes, culverts, etc.) including % grade, HGL 25, HGL 100, Q 25, Q 100, V 25, V 100, depth of flow 25 and 100, and Manning's Roughness coefficients ("n" values);~~
- (10) ~~Hydrographs or hydrologic tabulation for proposed 25-year peak flow rate and two-year peak flow rate;~~
- (11) ~~Hydrologic summary of existing and proposed conditions in tabular form;~~

~~(i) Area of each drainage area;~~

~~(ii) Time of concentration;~~

~~(iii) Distance of flow where the time of concentration is measured;~~

~~(iv) Slope of site where the time of concentration is measured;~~

~~(v) C 25 and C 100 values;~~

~~(vi) Required storage volumes for up to 100-year storm.~~

~~(12) Calculations and formulas for discharge or control structures for 2-, 5-, 10-, 25-, 50-, and 100-year storms; pipes, inlets, etc. Discharge pipes should not be less than six inches. In the event that less than six inches must be used, every effort should be made to mitigate the "clogging" potential. Direction of flow must be at an angle less than 45 degrees with the curb line. Discharge across a sidewalk area will not be allowed. A channel section can be used under the sidewalk area, provided it is covered and the outlet device utilizes sheet flow methods.~~

~~(13) Location and limits of filtration/sedimentation pond, details and design information and calculations.~~

8.7. Construction Details (The following items or notes should be shown)

- (a) Include in the construction detail sheets any required structural walls, inlets, sedimentation/filtration and detention inlet and outlet controls, etc.;
- (b) Show adequate dimensions, layout details, and general notes adjacent to all details;
- (c) Include traffic control plan when working in street;
- (d) If driveways are proposed, a City standard driveway detail shall be shown to be constructed.

8.8. Environmental Site Plan and Report Submittal Information

(This document establishes submittal requirements for all environmental ordinances)

- (a) A professional engineer's seal, signature, and statement certifying that the plan is complete, correct, and in compliance with the City of Woodcreek Ordinances is required for all projects.
- (b) An introduction which states project acreage, watershed, a description of proposed development, a description of project phasing, if phasing is proposed;
- (c) An explanation of and documentation for any special exception or waiver claimed;
- (d) Drainage area map showing the location of all waterways within the tract or which impact the tract, the location of the 100-year floodplain, the area and acreage of upstream drainage, and the location of the critical water quality zone;
- (e) Discussion of the following issues, if applicable to the project:
 - (1) Proposed and existing drainage patterns;
 - (2) Proposed method of treating both quantity and quality of stormwater runoff;
 - (3) Proposed extent of floodplain modification, if applicable;
- (f) Critical Environmental Features within the project and known features within 150 feet of the project;
- (g) Discuss all proposed variances and provide letter of variance request addressing proposed Findings of Fact;
- (h) Requests for consideration of alternatives to the water quality requirements of the City of Woodcreek Ordinances. These shall include any written request for consideration of an alternative or innovative water quality control which differs

Austin Drainage Criteria Manual

linear additive analysis but rather a network of hydrographs which considers incremental timing of discharge and potential coincidence of outlet peaks.

2.3.0 - METHOD OF ANALYSIS

Numerous methods of rainfall-runoff computation are available on which the design of storm drainage and flood control systems may be based. The Rational Method is accepted as adequate for drainage areas totaling 100 acres or less. The National Resources Conservation Service (formerly the Soil Conservation Service) hydrologic methods (available in the NRCS TR-20, and the US Army Corps of Engineers' Hydrologic Engineering Center's HEC-HMS program) should be used for drainage areas larger than 100 acres but may also be used for drainage areas of any size. The method of analysis must remain consistent when drainage areas are combined and the method which applies to the largest combined drainage area should be used unless the situation requires the use of NRCS hydrologic methods (i.e., a detention facility connected to a downstream storm drainage system). The engineer can use other methods but must have their acceptability approved by the Director of the Watershed Protection Department.

2.4.0 RATIONAL METHOD

The Rational Method is based on the direct relationship between rainfall and runoff, and is expressed by the following equation:

$$Q_p = CIA \text{ (Eq. 2-1)}$$

Where:

Q_p is defined as the peak runoff in cubic feet per second. Actually, Q_p is in units of acre-inches per hour. Since this rate of acre-in/hr differs from cubic feet per second by less than one (1) percent (1 acre-in/hr = 1.008 cfs), the more common units of cfs are used.

C is the composite coefficient of runoff representing the ratio of peak runoff rate " Q_p " to average rainfall intensity rate " I " for the soil types and land uses characteristic of the contributing drainage area.

I is the average intensity of rainfall in inches per hour for a period of time equal to the time of concentration (t_c) for the drainage area to the design point under consideration.

A is the area in acres contributing runoff to the point of design.

The following basic assumptions are associated with the Rational Method:

- A. The storm duration is equal to the time of concentration.
- B. The computed peak rate of runoff at the design point is a function of the average rainfall rate over a duration equal to the time of concentration at that point.
- C. The return period or frequency of the computed peak flow is the same as that for the design storm.
- D. The necessary basin characteristics can be identified and the runoff coefficient does not vary during a storm.
- E. Rainfall intensity is constant during the storm duration and spatially uniform for the area under analysis.
- F. The maximum rate of discharge at the point of design will occur when the entire area above the point of design is contributing runoff.

2.4.1 - Runoff Coefficient (C)

The proportion of the total rainfall that will reach the drainage system depends on the surface vegetation condition, soil type, imperviousness of the surface, land slope and ponding characteristics of the area. Impervious surfaces, such as asphalt pavements and roofs of buildings, will be subject to approximately 100 percent runoff (regardless of the slope). On-site inspections and aerial photographs may prove valuable in estimating the nature of the surfaces within the drainage area.

It should be noted that the runoff coefficient "C" is the Rational Method variable which is least amenable to precise determination. A reasonable coefficient must be chosen to represent the integrated effects of infiltration, surface ponding, evaporation, flow routing and interception, all of which affect the time distribution and peak rate of runoff.

It is often desirable to develop a composite runoff coefficient based upon the percentages of different types of surfaces in the drainage area. This procedure is often applied to typical "sample blocks" as a guide to selection of reasonable values of the coefficient for an entire area. Suggested coefficients with respect to specific surface types are given in Table 2-1. "C" values for developed conditions should be based on maximum allowable impervious cover as listed in the City's zoning and watershed ordinances.

2.4.2 - Time of Concentration

The time of concentration is the time for surface runoff to flow from the most remote point in the watershed to the point of interest. This applies to the most remote point in time, not necessarily the most remote point in distance. Runoff from a drainage area usually reaches a peak at the time when the entire area is contributing. However, runoff may reach a peak prior to the time the entire drainage area is contributing if the area is irregularly shaped or if land use characteristics differ significantly within the area. Sound engineering judgment should be used to determine a flow path representative of the drainage area and in the subsequent calculation of the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which may include storm drains. The minimum time of concentration for any drainage area shall be 5 minutes. Additionally, the minimum slope used for calculation of sheet and shallow flow travel time components should be 0.005 feet per foot (0.5%). The preferred procedure for estimating time of concentration is the NRCS method as described in NRCS's Technical Release 55 (TR-55). This method is outlined below. The overall time of concentration is calculated as the sum of the sheet, shallow concentrated and channel flow travel times. Note that there may be multiple shallow concentrated and channel segments depending on the nature of the flow path.

$$T_c = T_s + T_{sc} + T_{ch} \quad (Eq. 22)$$

- A. **Sheet Flow** Sheet flow is shallow flow over land surfaces, which usually occurs in the headwaters of streams. The engineer should realize that sheet flow occurs for only very short distances, especially in urbanized conditions. Sheet flow for both natural (undeveloped) and developed conditions should be limited to a maximum of 100 feet. Sheet flow for developed conditions should be based on the actual pavement or grass conditions for areas that are already developed and should be representative of the anticipated land use within the headwater area in the case of currently undeveloped areas. In a typical residential subdivision, sheet flow may be the distance from one end of the lot to the other or from the house to the edge of the lot. In some heavily urbanized drainage areas, sheet flow may not exist in the headwater area. The NRCS method employs equation 2-3, which is a modified form kinematic wave equation, for the calculation of the sheet flow travel time.

$$T_s = 0.42(L)^{0.76} / (P)^{0.54} \quad (Eq. 23)$$

Where,

T_s = Sheet flow travel time in minutes

L = Length of the reach in ft.

n = Manning's n (see Table 2-2)

P₂ = 2-year, 24-hour rainfall in inches (see Table 2-3)

s = Slope of the ground in ft/ft

- B. **Shallow Concentrated Flow** After a maximum of approximately 100 feet, sheet flow usually becomes shallow concentrated flow collecting in swales, small rills, and gullies. Shallow concentrated flow is assumed not to have a well-defined channel and has flow depths of 0.1 to 0.5 feet. The travel time for shallow concentrated flows can be computed by equations 2-4 and 2-5. These two equations are based on the solution of Manning's equation with different assumptions for n (Manning's roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

$$\text{Unpaved } T_t = L / (60(16.134s)(s)^{0.5}) \text{ (Eq. 2-4)}$$

$$\text{Paved } T_t = L / (60(20.3282)(s)^{0.5}) \text{ (Eq. 2-5)}$$

Where,

T_t = Travel time for shallow concentrated flows in minutes

L = Length of the reach in ft.

s = Slope of the ground in ft/ft

- C. **Channel or Storm Drain Flow** The velocity in an open channel or a storm drain not flowing full can be determined by using Manning's Equation. Channel velocities can also be determined by using backwater profiles. For open channel flow, average flow velocity is usually determined by assuming a bank-full condition. Note that the channel flow component of the time of concentration may need to be divided into multiple segments in order to represent significant changes in channel characteristics. The details of using Manning's equation and selecting Manning's "n" values for channels can be obtained from Section 6.

For storm drain flow under pressure conditions (hydraulic grade line is higher than the lowest crown of a storm drain) the following equation should be applied:

$$V = Q/A \text{ (Eq. 2-6)}$$

Where:

V = Average velocity, ft/s

Q = Design discharge, cfs

A = Cross-sectional area, ft²

Flow travel time through a channel can be calculated by equation (2-7):

$$T_t = \sum(L_i / 60 V_i) \text{ (Eq. 2-7)}$$

Where:

L_i = The i-th channel segment length, ft

V_i = The average flow velocity within the i th channel segment, ft/s

T_t = Total Flow travel time through the channel, min

TABLE 2-1
RATIONAL METHOD RUNOFF COEFFICIENTS FOR COMPOSITE ANALYSIS
Runoff Coefficient (C)

Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
DEVELOPED							
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (Lawns, Parks, etc.)							
Poor Condition*							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.40	0.43	0.45	0.49	0.52	0.55	0.62
Fair Condition**							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Good Condition***							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56

Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
UNDEVELOPED							
Cultivated							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	0.42	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-7%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58
Assumptions:							
1. Composite "C" value for developed conditions (C_{DEV}) is : $C_{DEV} = IC_1 + (1-I)C_2$							
<p>Where:</p> <p>I = Impervious cover, percent</p> <p>C_1 = "C" value for impervious cover</p> <p>C_2 = "C" value for pervious area (grass, lawns, parks, etc.)</p>							
2. For maximum allowable impervious coverage values for various land use types, refer to the City of Austin Zoning Ordinance.							

* Grass cover less than 50 percent of the area.

** Grass cover on 50 to 75 percent of the area.

*** Grass cover larger than 75 percent of the area.

Source: 1. Rossmiller, R.L. "The Rational Formula Revisited."
2. City of Austin, Watershed Engineering Division

TABLE 2-2
Manning's "n" for overland flow

Manning's "n" ¹	Surface Description
0.015	Concrete (rough or smoothed finish)
0.016	Asphalt
0.05	Fallow (no residue)
	Cultivated Soils:
0.06	Residue Cover ≤ 20%
0.17	Residue cover > 20%
	Grass:
0.15	Short-grass prairie
0.24	Dense grasses ²
0.13	Range (natural)
	Woods: ³
0.40	Light underbrush

0.80	Dense underbrush
1 The Manning's n values are a composite of information compiled by Engman (1986).	
2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.	
3 When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.	

(Rule No. 161-14.24, 9-2-2014)

2.4.3 - Rainfall Intensity (i)

Rainfall intensity (i) is the average rainfall rate in inches per hour, and is selected on the basis of design rainfall duration and design frequency of occurrence. The design duration is equal to the time of concentration for the drainage area under consideration. The design frequency of occurrence is a statistical variable which is established by design standards or chosen by the engineer as a design parameter.

The selection of the frequency criteria is necessary before applying any hydrologic method. Storm drainage improvements in Austin must be designed to intercept and carry the runoff from a 25 year frequency storm (4% annual chance event), with an auxiliary or overflow system capable of carrying a 100 year frequency storm (1% annual chance event).

The rainfall intensity used in the rational method can be read from the intensity-duration-frequency (IDF) curves based on the selected design frequency and design duration. The design engineer can also calculate the value of rainfall intensity from the best-fit IDF equation (2-8) to be discussed later in this subsection with known Tc value for the entire drainage area of interest.

In 1998, William Asquith at the USGS Texas Office analyzed virtually all rainfall data available in the State of Texas using L-moment methodology and published the results in a USGS Water Resources Investigations Report (WRIR 98-4044). In November 2001, Dr. Asquith summarized his rainfall study of 1998 and generated the IDF and the DDF (depth-duration-frequency) values that are suitable for use in the City of Austin and Travis County. These DDF and IDF values are shown in Table 2-3 and Table 2-4.

An explanation of the derivation of the Austin intensity-duration-frequency curves is given in Appendix B.

The Austin intensity-duration-frequency curves are shown in Figure 2-2 in Appendix D of this manual.

Table 2-3. Depth-Duration-Frequency Table for Austin and Travis County>									
Depth of Precipitation (in inches)									
Recurrence Interval (year)	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr

2	0.48	0.98	1.32	1.72	2.16	2.32	2.67	3.06	3.44
5	0.62	1.26	1.71	2.28	2.89	3.13	3.56	4.07	4.99
10	0.71	1.47	1.98	2.68	3.42	3.71	4.21	4.81	6.1
25	0.84	1.76	2.36	3.28	4.2	4.55	5.14	5.9	7.64
50	0.94	2.01	2.68	3.79	4.88	5.28	5.94	6.86	8.87
100	1.05	2.29	3.04	4.37	5.66	6.11	6.85	7.96	10.2
250	1.21	2.73	3.57	5.26	6.86	7.38	8.24	9.67	12
500	1.33	3.11	4.02	6.06	7.94	8.51	9.47	11.2	13.5

* The 5-min rainfall depths were calculated using the 5-min rainfall intensity values from Table 2-4.

Table 2-4. Intensity-Duration-Frequency Table for Austin and Travis County

Intensity of Precipitation (inches per hour)									
Recurrence Interval (year)	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	5.76	3.92	2.64	1.72	1.08	0.773	0.445	0.255	0.143
5	7.39	5.04	3.42	2.28	1.45	1.04	0.593	0.339	0.208
10	8.57	5.88	3.96	2.68	1.71	1.24	0.702	0.401	0.254
25	10.1	7.04	4.72	3.28	2.10	1.52	0.857	0.492	0.318
50	11.2	8.04	5.36	3.79	2.44	1.76	0.990	0.572	0.370
100	12.5	9.16	6.08	4.37	2.83	2.04	1.14	0.663	0.424

250	14.5	10.9	7.14	5.26	3.43	2.46	1.37	0.806	0.501
500	15.9	12.4	8.04	6.06	3.97	2.84	1.58	0.934	0.564

* The 5-min rainfall intensity values were calculated using Equation 2-8 and the coefficients listed in Table 2-5 for the return periods of 2, 5, 10, 25, 100, 250, and 500 years.

The following equation mathematically represents the Austin area intensity-duration-frequency curves:

$$i = a/(t+b)^c \text{ (Eq. 2-8)}$$

Where,

i = Average rainfall intensity, inches per hour

t = Storm duration in minutes, which is equal to the time of concentration for the entire drainage area of interest

a, b and c = Coefficients for different storm frequencies.

The final best-fit coefficients of a, b, and c for equation (2-8) are listed in Table 2-5 below:

Return Period	Fitting parameters for IDF equation (2-8)		
Year	a	b	c
2	54.767	11.051	0.8116
5	62.981	10.477	0.7820
10	70.820	10.396	0.7725
25	82.936	10.746	0.7634
50	100.60	12.172	0.7712
100	118.30	13.185	0.7736
250	150.10	14.892	0.7822

500	188.00	17.233	0.7959
Source: Asquith, W.H., "Depth-Duration Frequency and Intensity-Duration Frequency for Austin and Travis County, Texas, 2001".			

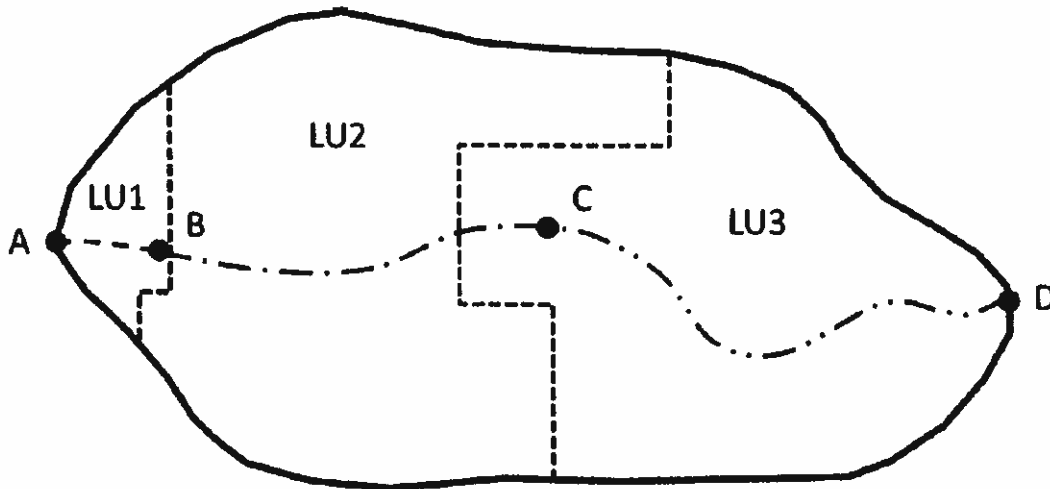
The a, b and c parameters listed in Table 2-5 were derived using nonlinear regression methods and the data included in Table 2-4. The IDF curves and the IDF equations are applicable for all design frequencies shown. They are required for use in determining peak flows by the Rational Method or other appropriate methods.

2.4.4 - Drainage Area (A)

The size (acres) of the watershed needs to be determined for application of the Rational Method. The area may be determined through the use of topographic maps, supplemented by field surveys where topographic data has changed or where the contour interval is too great to distinguish the direction of flow. The drainage divide lines are determined based on topography, street layout, lot grading, building structure configuration and orientation, drainage system layout and other features that are created by the urbanization process.

Example 2-1

An urbanized watershed is shown on the following figure. Three types of flow conditions exist between the most distant point in the watershed and the outlet. The calculation of time of concentration and travel time in each reach is as follows:



Reach	Description of Flow	Slope (%)	Length (Ft.)	"n" value/Surface Type
A to B	Sheet flow (grass lawn)	1.8	50	0.3

The rainfall intensity (i) of the 100 year storm can be calculated using equation (2-8) together with the coefficients in Table 2-5 for a time of concentration of 7.08 minutes as 11.54 inches per hour.

The composite runoff coefficient (C) = $(0.41 \times 3 + 0.85 \times 20 + 0.81 \times 30)/53 = 0.80$

Thus the peak flow $Q_p = CiA = 0.80 \times 11.54 \text{ in/hr} \times 53 \text{ acre} = 489 \text{ cfs}$

2.5.0 THE SOIL CONSERVATION SERVICE METHOD FOR CALCULATION OF PEAK FLOWS

The Soil Conservation Service hydrologic method is widely used by engineers and hydrologists for analyses of small urban watersheds. This method is based on extensive analytical work using a wide range of statistical data concerning storm patterns, rainfall-runoff characteristics and many hydrologic observations in the United States.

The SCS method can be applied to urban drainage areas of any size. The major parameters required to calculate a runoff hydrograph with the method include the rainfall distribution, runoff curve numbers, time of concentration and drainage area. For detailed information regarding the SCS method and the TR-20 program, the user is referred to the following NRCS publications. These can be obtained from the Natural Resources Conservation Service at <http://www.wcc.nrcs.usda.gov/>. They are:

NEH-4: "Hydrology," Section 4, National Engineering Handbook

TR-20: Computer Program for Project Formulation, Hydrology

TR-55: Urban Hydrology for Small Watersheds

TP-149: A Method for Estimating Volume and Rate of Runoff in Small Watersheds

The HEC-HMS programs can be downloaded from the US Army Corps of Engineers website at <http://www.hec.usace.army.mil/>. Refer to Section 8.2.3 for information regarding watershed hydrologic models that are maintained by the City. These models may be requested by the public and used as the basis for drainage analysis where applicable. Any results based on models obtained from the City must be certified by a Texas Licensed Professional Engineer.

2.5.1 - Austin Twenty-Four (24) Hour Storm Rainfall Distributions

The City of Austin has adopted the use of an SCS 24-hour storm duration with a Type III distribution for use with the SCS method. The DDF and IDF values to be used for the Austin area are shown in Table 2-3 and 2-4 above. For use in spreadsheet calculations, Table 2-6 below provides the Type III distribution ordinates in 5-minute increments as derived from the HEC-HMS program. The ordinates should be multiplied by the total 24 hour precipitation depth to produce the design rainfall distribution. When using the HEC-HMS model, the computational time interval should be selected based on criteria for the minimum lag time. The maximum computational time interval used in a HEC-HMS model should be 6 minutes.

Table 2-6
Type III Distribution Ordinates In 5-Minute Time Increment

Time	Incremental	Cumulative	Time	Incremental	Cumulative	Time	Incremental	Cumulative
0:00	0.0000	0.0000	8:05	0.0023	0.1163	16:10	0.0021	0.8903
0:05	0.0008	0.0008	8:10	0.0022	0.1185	16:15	0.0021	0.8924

6:50	0.0017	0.0871	14:55	0.0033	0.8511	23:00	0.0007	0.9909
6:55	0.0016	0.0887	15:00	0.0032	0.8543	23:05	0.0008	0.9917
7:00	0.0018	0.0905	15:05	0.0030	0.8573	23:10	0.0008	0.9925
7:05	0.0017	0.0922	15:10	0.0030	0.8603	23:15	0.0008	0.9933
7:10	0.0019	0.0941	15:15	0.0030	0.8633	23:20	0.0008	0.9941
7:15	0.0018	0.0959	15:20	0.0028	0.8661	23:25	0.0007	0.9948
7:20	0.0019	0.0978	15:25	0.0028	0.8689	23:30	0.0008	0.9956
7:25	0.0019	0.0997	15:30	0.0027	0.8716	23:35	0.0008	0.9964
7:30	0.0019	0.1016	15:35	0.0026	0.8742	23:40	0.0007	0.9971
7:35	0.0020	0.1036	15:40	0.0025	0.8767	23:45	0.0008	0.9979
7:40	0.0020	0.1056	15:45	0.0025	0.8792	23:50	0.0007	0.9986
7:45	0.0020	0.1076	15:50	0.0023	0.8815	23:55	0.0006	0.9992
7:50	0.0021	0.1097	15:55	0.0022	0.8837	24:00	0.0008	1.0000
7:55	0.0021	0.1118	16:00	0.0023	0.8860			
8:00	0.0022	0.1140	16:05	0.0022	0.8882			

2.5.2 - Conservation Service Runoff Curve Numbers

The National Resources Conservation Service has developed an index, the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors have the most significant impact in estimating the volume of runoff, and can be assessed from soil surveys, site investigations and land use maps.

The curve number is an indication of the potential runoff for a given antecedent soil moisture condition, and it ranges in value from zero to 100. The National Resources Conservation Service runoff curve numbers are grouped into three (3) antecedent soil moisture conditions — Antecedent Runoff Condition (ARC) I,

ARC II and ARC III. Values of runoff curve numbers for all three (3) conditions may be computed following guidelines in Part 630, Chapter 10 of the National Engineering Handbook. ARC I is the dry soil condition and ARC III is the wet soil condition. ARC II is normally considered to be the average condition. The Antecedent Runoff Condition (ARC) was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

However, studies of hydrologic data indicate that ARC II is not necessarily representative of the average condition throughout Texas. Instead, investigations have shown that the average condition ranges from ARC I in west Texas to between ARC II and ARC III in east Texas. The NRCS curve number values provided in Table 2-7 are for an ARC II. If it is desired to change to an ARC I or III condition, the adjustments given in Part 630, Chapter 10 of the National Engineering Handbook should be used. Justification must be provided for the selection of an ARC other than condition II.

The National Resources Conservation Service has classified more than 4,000 soils into four (4) hydrologic groups, identified by the letters A, B, C, and D, to represent watershed characteristics.

Group A: (Low runoff potential). Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep, well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential). Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

Table 2-7 lists the curve numbers for the four (4) soil groups under various land uses, land treatment and hydrologic conditions. Curve numbers for fully developed conditions should be based on maximum allowable impervious cover listed in Austin zoning and watershed ordinances. When calculating fully developed peak runoff rates it is recommended that the undeveloped curve number and the maximum allowable impervious cover be used as input parameters. In order to determine the soil classifications in the Austin area, the Natural Resource Conservation Service Soil Survey of Travis, Williamson or Hays County, Texas should be used. Digital versions of these soil datasets are available online at <http://soildatamart.nrcs.usda.gov> (accessed 12/18/2012).

Cover Description	Average % Impervious Area ¹	Curve Numbers for Hydrologic Soil Group			
		A	B	C	D
Fully developed urban areas (vegetation established)					

Open space (lawns, parks, golf courses, cemeteries, etc.)					
Poor condition (grass cover 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right of way)		98	98	98	98
Streets and roads:					
Paved; curbs and storms drains (excluding right of way)		98	98	98	98
Paved; open ditches (including right of way)	83	89	92	93	
Gravel (including right of way)	76	85	89	91	
Dirt (including right of way)		72	82	87	89
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)		77	86	91	94
Agricultural lands					
Grassland, or range-continuous forage for grazing ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay		30	58	71	78

Brush—brush-weed-grass mixture with brush the major element ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ⁴	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ⁵	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways and surrounding lots		59	74	82	86
<p>1 Poor: less than 50 percent ground cover or heavily grazed with no mulch. Fair: 50 to 75 percent ground cover and not heavily grazed. Good: greater than 75 percent ground cover and lightly or only occasionally grazed.</p>					
<p>2 Poor: less than 50 percent ground cover. Fair: 50 to 75 percent ground cover. Good: greater than 75 percent ground cover.</p>					
<p>3 Curve numbers shown were computed for areas with 50 percent woods and 50 percent grass (pasture) cover. Other combinations of conditions may be computed from the curve numbers for woods and pasture.</p>					
<p>4 Poor: Forest litter, small trees and brush are destroyed by heavy grazing or regular burning. Fair: Woods are grazed but not burned, and some forest litter covers the soil. Good: Woods are protected from grazing, and litter and brush adequately cover the soil.</p>					
<p>Source: National Resources Conservation Service. TR-55: Urban Hydrology for Small Watersheds</p>					

2.5.3 - Time of Concentration

The procedures for estimating time of concentration for the NRCS method are described in the SCS Technical Release 55 (TR-55) and in Section 2.4.2 of this manual. Three (3) types of flow (sheet flow, shallow concentrated flow and channel flow) are considered. Note that Table 2-2 shall be used for determination of sheet flow Manning's roughness coefficients rather than the table included in TR-55.

In hydrograph analysis, the time of concentration can be defined as the time from the end of excess rainfall to the point of inflection on the falling limb of the hydrograph. The time of concentration determines the shape of the runoff hydrograph. Times of concentration are required for the existing and developed conditions to adequately model the impact of the development on stormwater runoff. The methodology presented in TR-55 provides a reasonable approach for the estimation of time of concentration. The lag time, defined as the time between the center of mass of excess rainfall to the runoff peak, is typically used in the HEC-HMS implementation of the SCS methodology. The lag time can be estimated with equation 2-9.

$$T_{lag} = 0.6 T_c \text{ (Eq. 2-9)}$$

In general, times of concentration for the developed condition should be calculated based on conservative assumptions that consider the increased hydraulic efficiency expected with an ultimate developed condition. Times of concentration should be representative of the overall drainage area, not simply based on the longest (in either distance or time) flow path. Sheet flow for both existing and proposed conditions should be limited to 100 feet. This length should be considered a maximum; sheet flow lengths should be measured and justified for all conditions. Additionally, the minimum slope used for calculation of sheet and shall flow travel time components should be 0.005 feet per foot (0.5%).

2.6.0 - PROBABLE MAXIMUM STORM/FLOOD DEVELOPMENT

The purpose of this section is to describe a method for developing the Probable Maximum Flood (PMF) within the City of Austin jurisdiction. The PMF is calculated by obtaining the Probable Maximum Precipitation (PMP) for a specific storm duration and drainage area. The PMP rainfall depths presented in this section were derived for the Austin area and are only applicable for designing and managing dams within City of Austin's full purpose, limited purpose and extraterritorial jurisdictions. Typically, a PMF runoff model requires both a temporal and spatial distribution of the PMP. However, if the drainage area is less than 10 square miles, the spatial distribution is not required (i.e. the drainage area is considered small enough that the PMP values can reasonably be considered point rainfall values). The PMP values shown in this section are valid only for drainage areas less than 10 square miles.

2.6.1 - Probable Maximum Precipitation (PMP)

The PMP values were derived using Hydrometeorological Report No. 52 (HMR-52) and Hydrometeorological Report No. 51 (HMR-51) per the guidance provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas (January 2007) available from the Dam Safety Program at the Texas Commission on Environmental Quality (TCEQ). Table 2-8 contains a summary of PMP depths and intensities for various storm durations for drainage areas less than 10 square miles.

Storm Duration	Depth (in)
1 hr	17.4
2 hr	21.6
3 hr	24.9

6 hr	31.1
12 hr	37.6
24 hr	44.7
48 hr	50.0
72 hr	53.4
1. All values are valid for drainage areas less than 10 square miles.	
2. Do not use these depths with the Soil Conservation Service (SCS) Type III distribution. The relevant storm distributions are provided in DCM Section 2.6.2 "Probable Maximum Flood (PMF)" and were derived using the Hydrologic and Hydraulic Guidelines for Dams in Texas.	

2.6.2 - Probable Maximum Flood (PMF)

To determine the PMF, each of the possible storm durations (1, 2, 3, 6, 12, 24, 48, and 72 hour storms) needs to be analyzed in order to determine the critical duration. The critical duration is the storm duration that produces the highest water surface elevation behind the dam. The PMF for each storm duration is derived using the PMP depths from Table 2-8 and using a rainfall-runoff model (i.e. HEC-HMS, TR-20). The rainfall-runoff model should use the temporal distribution as provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas. The temporal distribution for each storm duration has been reproduced in Figure 2-4, Appendix D. Figure 2-4 provides the temporal distribution ordinates to be multiplied by the associated storm depths for use in the various rainfall-runoff models. The runoff parameters used in the PMF model are the same as those used for runoff analyses of the more frequent storm events, with the exception of curve numbers and the temporal distribution of rainfall.

Runoff curve numbers for the PMF need to reflect the assumption that the soils will be saturated. Therefore the runoff curve number should be based on ARC III. The appropriate curve number should be chosen using the tables provided in the DCM Section 2.5.2. These are ARC II values which can be converted to ARC III values using Table 10.1 in Part 630, Chapter 10 of the National Engineering Handbook. Note that the ARC was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

SECTION 3 - STREET FLOW

3.1.0 - GENERAL

The location of inlets and permissible flow of water in streets should be related to the extent and frequency of interference to traffic and the likelihood of flood damage to surrounding property for the 25 and 100 year frequency storms. Interference to traffic is regulated by design limits of the spread of water into traffic lanes, especially in regard to arterials. Flooding of surrounding property from streets is controlled by limiting curb

TR-55 CURVE NUMBERS

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description Cover type and hydrologic condition	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

^{1/} Average runoff condition, and $I_p = 0.2S$.^{2/} The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.^{3/} CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.^{4/} Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.^{5/} Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ¹

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ²	Hydrologic condition ³	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$

² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

Cover type	Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
			A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ^{2/}		Poor	68	79	86	89
		Fair	49	69	79	84
		Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.		—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ^{3/}		Poor	48	67	77	83
		Fair	35	56	70	77
		Good	30 ^{4/}	48	65	73
Woods—grass combination (orchard or tree farm). ^{5/}		Poor	57	73	82	86
		Fair	43	65	76	82
		Good	32	58	72	79
Woods. ^{6/}		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	30 ^{4/}	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.		—	59	74	82	86

^{1/} Average runoff condition, and $I_a = 0.2S$.

^{2/} *Poor*: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

^{3/} *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

^{4/} Actual curve number is less than 30; use CN = 30 for runoff computations.

^{5/} CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

^{6/} *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description	Hydrologic condition ^{2/}	Curve numbers for hydrologic soil group			
		A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper, pinyon, juniper, or both, grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

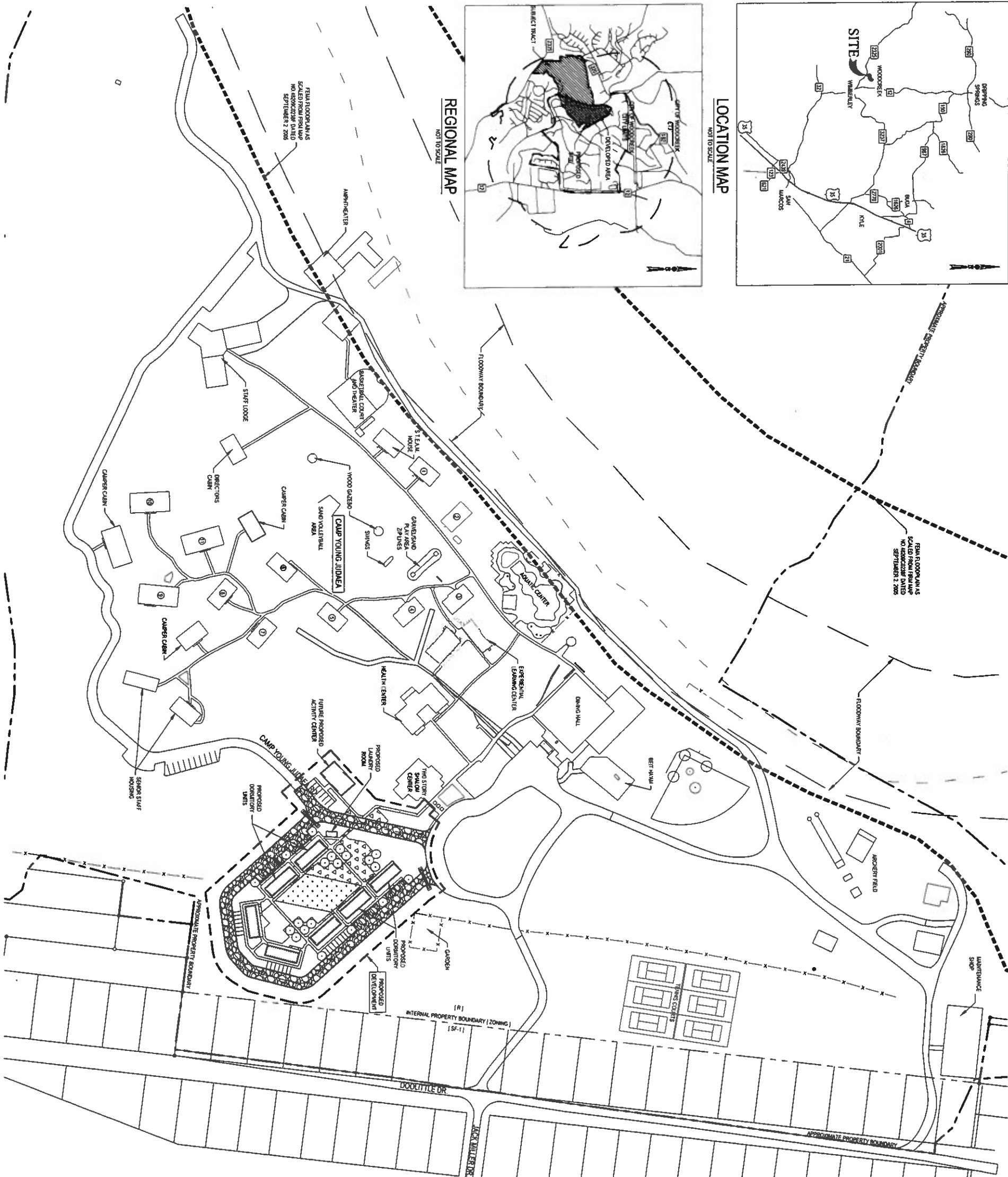
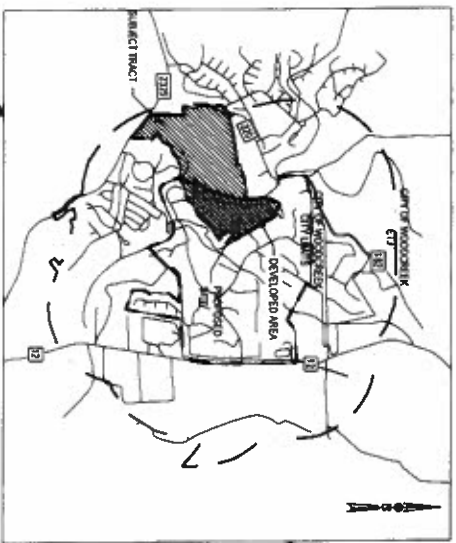
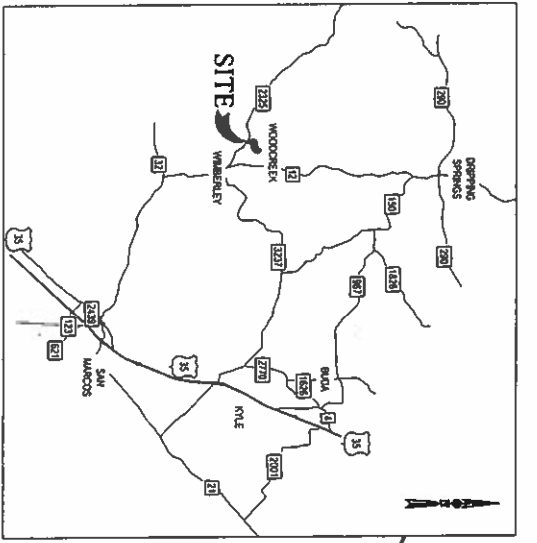
^{1/} Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.^{2/} Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

^{3/} Curve numbers for group A have been developed only for desert shrub.

CITY OF WOODCREEK, TX
CONCEPT PLAN APPLICATION



LEGEND

- EXISTING FENCE
- FEIN 100' W/ WATER SURFACE ELEVATION 4599.2025' DATED SEPTEMBER 2, 2005
- RIVER CENTERLINE
- PROPERTY BOUNDARY
- FLOODWAY BOUNDARY
- EXISTING BUILDINGS
- PROPOSED BUILDINGS
- PROPOSED WATER SURFACE ELEVATION 4599.2025' DATED SEPTEMBER 2, 2005
- FEIN 100' W/ WATER SURFACE ELEVATION 4599.2025' DATED SEPTEMBER 2, 2005
- RIVER CENTERLINE
- PROPERTY BOUNDARY
- FLOODWAY BOUNDARY
- EXISTING BUILDINGS
- PROPOSED BUILDINGS

- GENERAL CONCEPT PLAN NOTES:**
1. PROPOSED BUILDINGS SHALL MAINTAIN THE MINIMUM 50' SETBACK TO ADJACENT PROPERTIES WITHIN THE SUBMITTED ZONING DISTRICT.
 2. CONTRACTOR SHALL INSTALL TREE PROTECTION MEASURES AROUND SIGNIFICANT TREES TO REMAIN DURING CONSTRUCTION.
 3. NAMES OF OWNERS OF RECORD AND RECORD INFORMATION FOR ADJACENT PARCELS HAVE BEEN PROVIDED ON A SEPARATE DOCUMENT.
 4. WATER SERVICES PROVIDED BY EXISTING ON-SITE WATER WELL.
 5. FIRE AND MAINTENANCE SERVICES PROVIDED BY AQUA TEXAS, INC.

SITE ACREAGE

APPROXIMATE TOTAL ACREAGE	246.00 ACRES
EXISTING IMPROVED COVER	2.00 ACRES
PROPOSED IMPROVED COVER	1.55 ACRES

PROPOSED BUILDINGS

1 CORNER ROOMS (9' X 10' X 9' TYPICAL)	8,190 SQFT
EXISTING CORNER ROOMS	2,000 SQFT
OVERVIEW PARKING 30' X 45' TYPICAL	42,580 SQFT
	45,570 SQFT

CONCEPT PLAN FOR CAMP YOUNG JUDAEA - RETREAT VILLAGE WOODCREEK, TEXAS

CS100

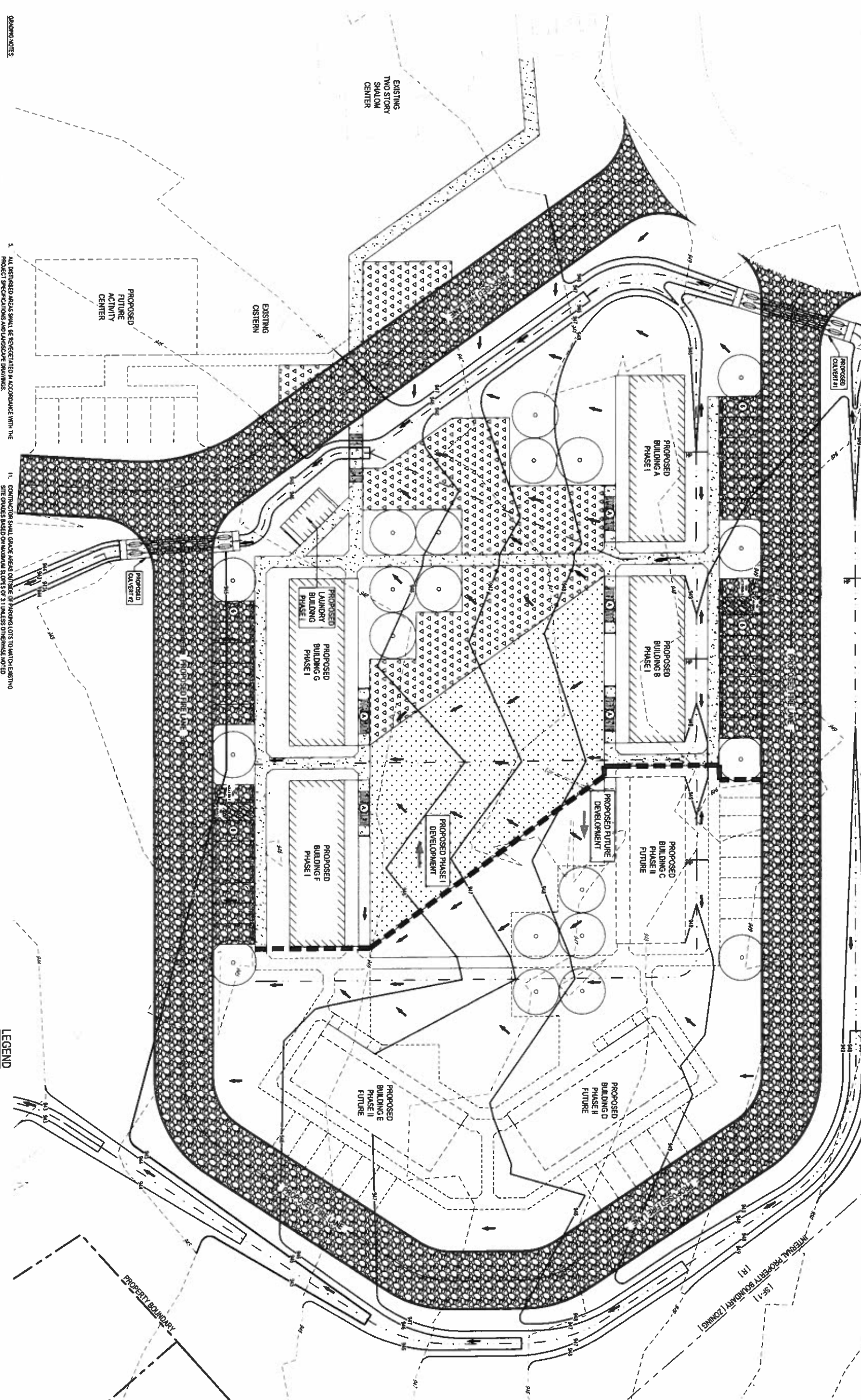
JOB NO. 262002
DESIGNED BY: DLK
DRAWN BY: DLK
CHECKED BY: GDK

MATKINHOOPER ENGINEERING & SURVEYING
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 TEXAS REGISTERED ENGINEERING FIRM #400112121212 AND SURVEYING FIRM #1111212121

Scale: 1" = 100'
 SHEET SIZE: 11" X 17"
 0' 50' 100' 150' 200'

The document is released for REVIEW PURPOSES ONLY. NOT FOR CONSTRUCTION and was prepared under the authorization of Gerald D. Matkin, Registered Professional Engineer, State of Texas, Registration No. 111511.
 DATE: MAY 04, 2017

**CITY OF WOODCREEK, TX
CONCEPT PLAN APPLICATION**



- GRADING NOTES:**
1. ALL GRADES AND CONTOURS SHOWN ARE FINAL, TOP OF FINISH SURFACE ELEVATIONS UNLESS OTHERWISE NOTED.
 2. PROPOSED GRADES SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. DRAINAGE SHALL BE DIRECTED AWAY FROM ALL BUILDING FOUNDATIONS. CONTRACTOR TO TAKE PRECAUTIONS NOT TO ALLOW ANY FLOODING OF WATER.
 3. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR ALLOW STORM WATER TO FLOW AND SUBSEQUENTLY RE-ENTRANCE. RECONSTRUCTION OF EXISTING DRAINAGE SHALL BE MAINTAINED. CONTRACTOR SHALL MAINTAIN ALL EXISTING DRAINAGE WHICH CANNOT BE MAINTAINED WITHIN SPECIFIC ATTENTION REQUIRED TO THE BUILDING AND MAINTAIN STORMAGE BASINS AND WATER RETENTION TO PROTECT FROM OVERFLOW. CONTRACTOR SHALL MAINTAIN ALL EXISTING DRAINAGE FROM TO COMPLETION OF CONSTRUCTION OF NEXT SUBSEQUENT PHASE.
 4. CONTRACTOR TO OBTAIN GRADES FROM NEIGHBORING PROPERTIES (BLVD OR A ROAD) SHOULD ANY ELEVATIONS BE FOUND TO BE OUT OF LEVEL BEYOND THE 5' STRIP TOLERANCE IT SHALL BE CORRECTED AT THE CONTRACTORS EXPENSE.
 5. ALL DISTURBED AREAS SHALL BE REVEGETATED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND LANDSCAPE DIMANICES.
 6. ALL EXISTING SLOPES SHALL BE MAINTAINED OR 1:1 AND A MINIMUM OF 2' UNLESS OTHERWISE NOTED.
 7. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE SPECIFICALLY COVERED IN THE PROJECT SPECIFICATIONS SHALL COMPLY TO ALL APPLICABLE LOCAL, COUNTY AND TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (LATEST EDITION).
 8. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION ANY DAMAGED SOIL TO EXISTING BUILDINGS UTILITIES.
 9. CONTRACTOR SHALL MAINTAINLY VENT THE LOCATION OF ANY EXISTING THAT MAY ARISE DURING THE PROJECT. CONTRACTOR SHALL MAINTAIN ALL EXISTING GRADES NECESSARY FOR CONSTRUCTION OF THIS PROJECT.
 10. TREE PROTECTION SHALL BE PERFORMED IN ACCORDANCE WITH PROJECT PLANS AND SPECIFICATIONS.
 11. CONTRACTOR SHALL GRADE AREAS ADJACENT TO EXISTING LOT TO MATCH EXISTING SITE GRADES BASED ON MAXIMUM SLOPES OF 3:1 UNLESS OTHERWISE NOTED.
 12. ALL EXCAVATIONS UNCLASSIFIED.
 13. SEE AREA REQUESTED FOR EXCAVATION SHALL BE SCOURED AND ADJUSTED TO BE ADAPTED TO WHEN A 3' OR CIRCUMFERENCE CONTENT, COMPACT SANDWICH TO BE MAINTAINED OR COVERED.
 14. CONTRACTOR IS REQUIRED TO HAVE A TREE TRIMMER PRESENT ISSUED BY TEXAS A&M. CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL EXISTING GRADERS, VALVES, CLEANOUTS, MANHOLES, SMALL TRENCH, ETC. TO THE PROPOSED GRADES AS SHOWN ON THE PLANS.
 15. ALL NON FINISHING SHALL HAVE A MAXIMUM GRADE OF 3:1% IN ANY DIRECTION.
 16. CORRODIVE FINAL GRADES ADJACENT TO BUILDING WITH LANDSCAPE ARCHITECT.

LEGEND

	PROPOSED BUILDING LIMITS
	EXISTING WIRE FENCE
	EXISTING ASPHALT PAVEMENT
	PROPOSED DECOMPOSED GRANITE COUNTERTOP
	PROPOSED ARTIFICIAL TURF
	PROPOSED CONCRETE AND PAVING AREAS
	PROPOSED FUTURE DEVELOPMENT
	PROPOSED 1:1 CONTOUR
	PROPOSED 3:1 CONTOUR
	HIGH POINT (HP)
	ON/OFF FLOW LINE
	SLOPE AND DIRECTION
	PROPOSED SPOT ELEVATION
	FLOW ARROWS
	ACCESSIBLE (ADA) RAMP
	PROPOSED WARNING STILL COUNT
	PROPOSED MANHOLE PARAPET STILL (SHOWN BLURRED FOR CLARITY)
	PROPOSED TREE
	ACCESSIBLE ELEVATION

ALL SYMBOLS SHALL BE CONSIDERED UNLESS OTHERWISE NOTED. A MAXIMUM OF 45% SLOPE SHALL BE MAINTAINED. ALL SLOPES MUST BE MAINTAINED WITHIN A MAXIMUM VERTICAL RISE OF 1:1. THE CONTRACTOR SHALL BE NOTIFIED BY FIELD CHECKS OF ANY VIOLATIONS.

GRADING PLAN
FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
WOODCREEK, TEXAS

CG101

JOB NO. 2620.02
DESIGNED BY: DJK
DRAWN BY: DJK
CHECKED BY: GJK

MATKINHOOPER
ENGINEERING & SURVEYING

1450 W. SHILOH ROAD, SUITE 100
HOUSTON, TEXAS 77056
TEL: 281.416.1111
WWW.MATKINHOOPER.COM

1450 W. SHILOH ROAD, SUITE 100
HOUSTON, TEXAS 77056
TEL: 281.416.1111
WWW.MATKINHOOPER.COM

REGISTERED PROFESSIONAL ENGINEER
Garrett D. Kiefer
State of Texas,
Registration No. 118111,
DATE: MAY 03, 2017

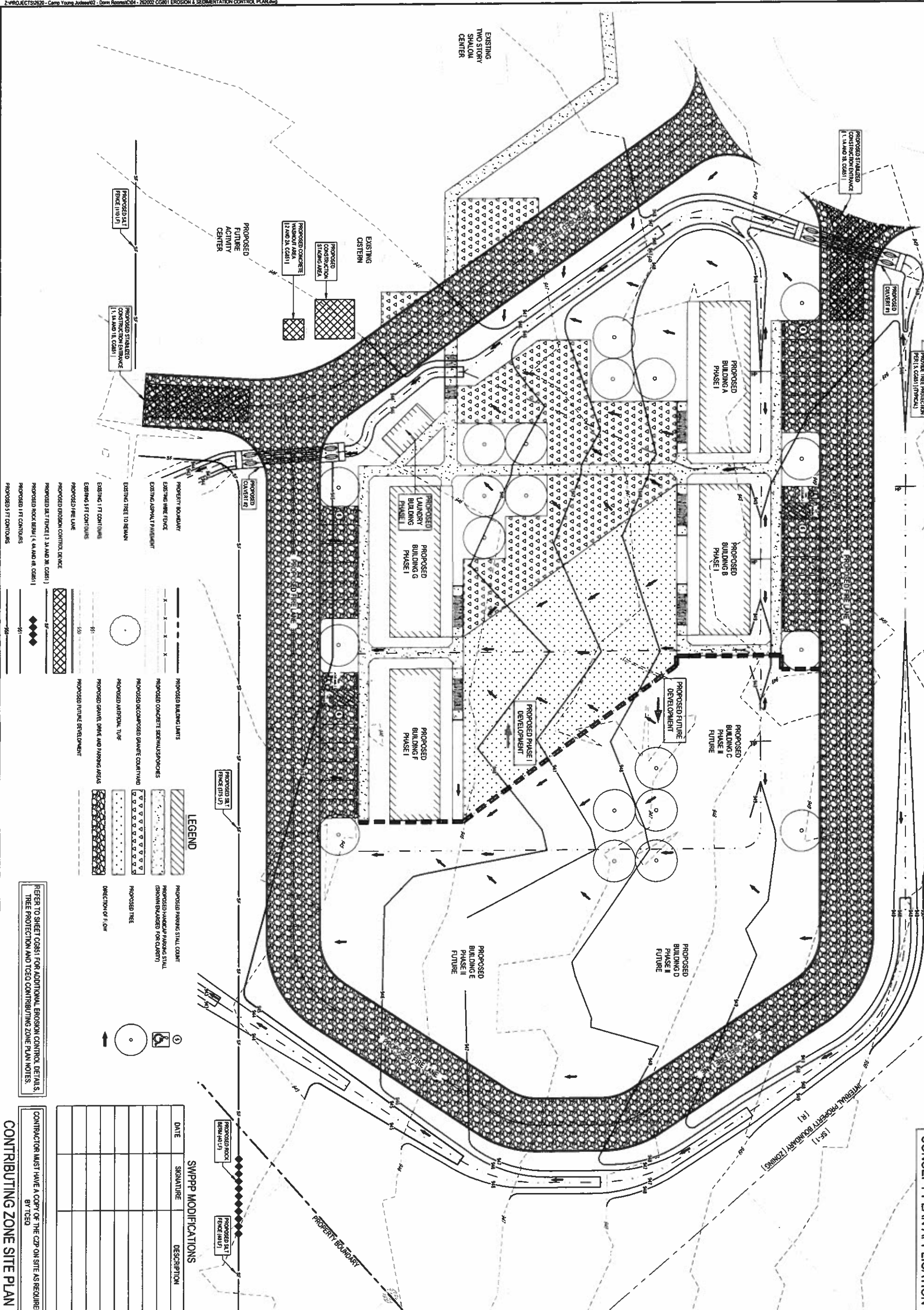
REVISIONS

SCALE: 1"=20'

0 10 20 30 40
1"=20'

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CITY OF WOODCREEK, TX
CONCEPT PLAN APPLICATION



SCALE 1"=40'
SHEET SIZE: 24" x 36"
This document is released for REVIEW PURPOSES ONLY, NOT FOR CONSTRUCTION and was prepared under the authorization of Garrett D. Keller, Registered Professional Engineer, State of Texas, Registration No. 111511, DATE: MAY 20, 2017.

MATKIN HOOVER
ENGINEERING & SURVEYING
1100 HILL ROAD, SUITE 400
MEADE, TEXAS 75854
TEL: 409.335.5555
WWW.MATKINHOOVER.COM

EROSION & SEDIMENTATION CONTROL PLAN
FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
WOODCREEK, TEXAS

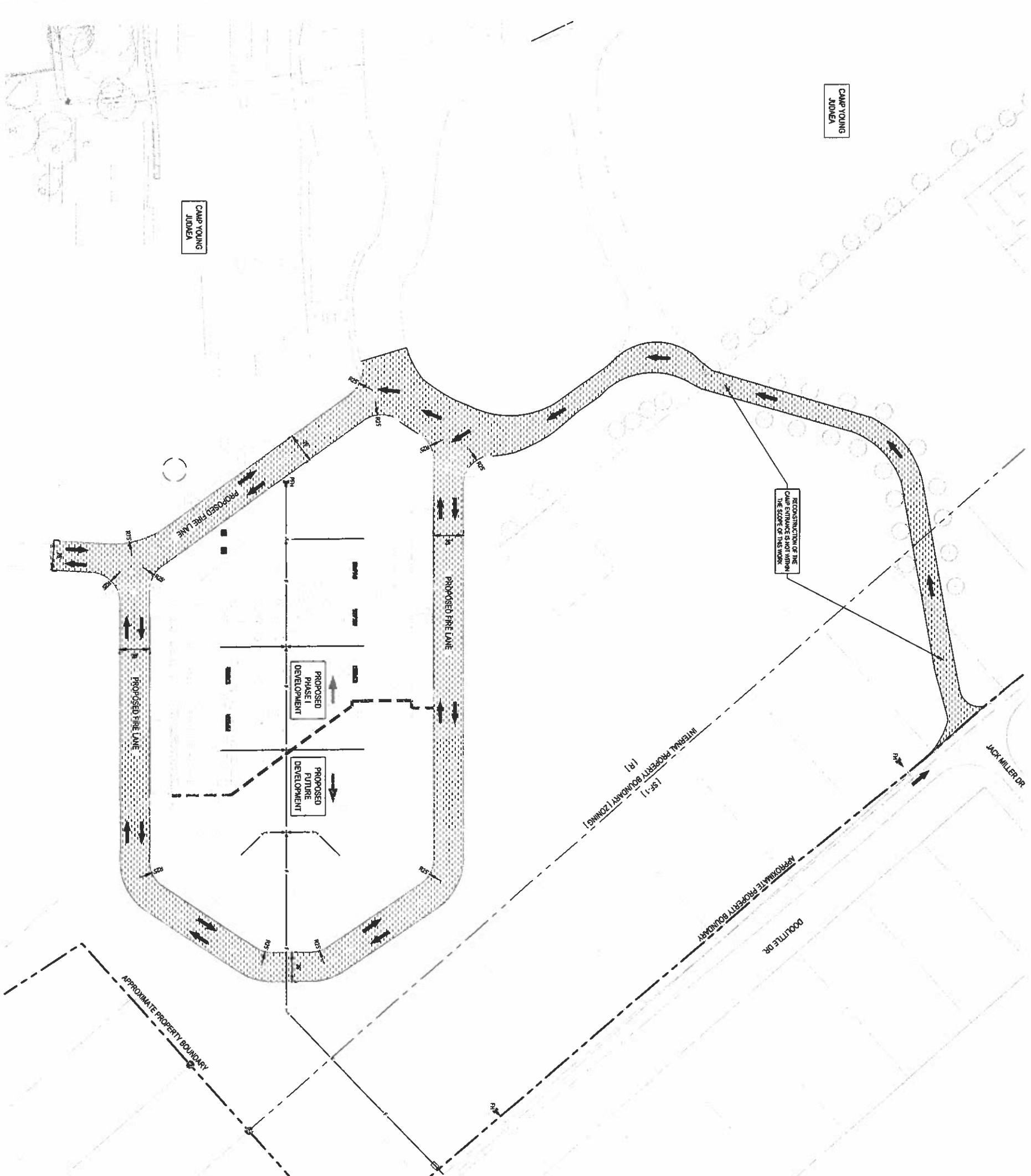
SWPPP MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

CONTRACTOR MUST HAVE A COPY OF THE CDP ON SITE AS REQUIRED BY TCEQ

REFER TO SHEET CG801 FOR ADDITIONAL EROSION CONTROL DETAILS, TREE PROTECTION AND TCEQ CONTRIBUTING ZONE PLAN NOTES.

JOB NO. CG801
DESIGNED BY: DJK
DRAWN BY: DJK
CHECKED BY: GJK



CAMP YOUNG
JUDAEA

CAMP YOUNG
JUDAEA

RECONSTRUCTION OF THE
CAMP ENTRANCES IS NOT WITHIN
THE SCOPE OF THIS WORK

PROPOSED
PHASE I
DEVELOPMENT

PROPOSED
PHASE II
DEVELOPMENT

APPROXIMATE PROPERTY BOUNDARY

INTERNAL PROPERTY BOUNDARY (ZONING)

APPROXIMATE PROPERTY BOUNDARY

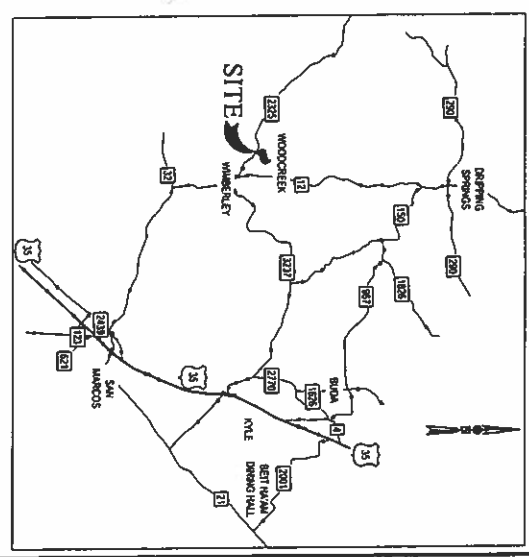
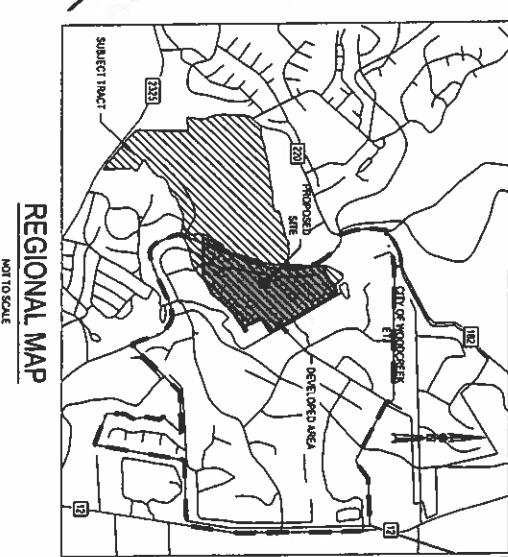
POOL LITTLE DR

JACK MILLER DR

LEGEND

- EXISTING FIRE HYDRANT ASSEMBLY
- EXISTING WATER MAIN
- PROPOSED FIRE VEHICLE ACCESS
- PROPOSED FIRE LANE
- PROPOSED FIRE HYDRANT ASSEMBLY
- PROPOSED FIRE WATER DISTRIBUTION

NOTE
OWNER TO ENSURE THE FIRE ACCESS LANE IS 20 FEET WIDE. ALL VEHICLES ACCESS AND HAS A MINIMUM VERTICAL CLEARANCE OF 13 FEET IN ACCORDANCE WITH THE FIRE CODE.



FIRE ACCESS PLAN
FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
WOODCREEK, TEXAS

CF100

JOB NO. 262002
DESIGNED BY DJK
DRAWN BY DJK
CHECKED BY GDM

MATKINHOOPER
ENGINEERING & SURVEYING

REGISTERED PROFESSIONAL ENGINEER
State of Texas,
Registration No. 111511,
DATE: MAY 03, 2017

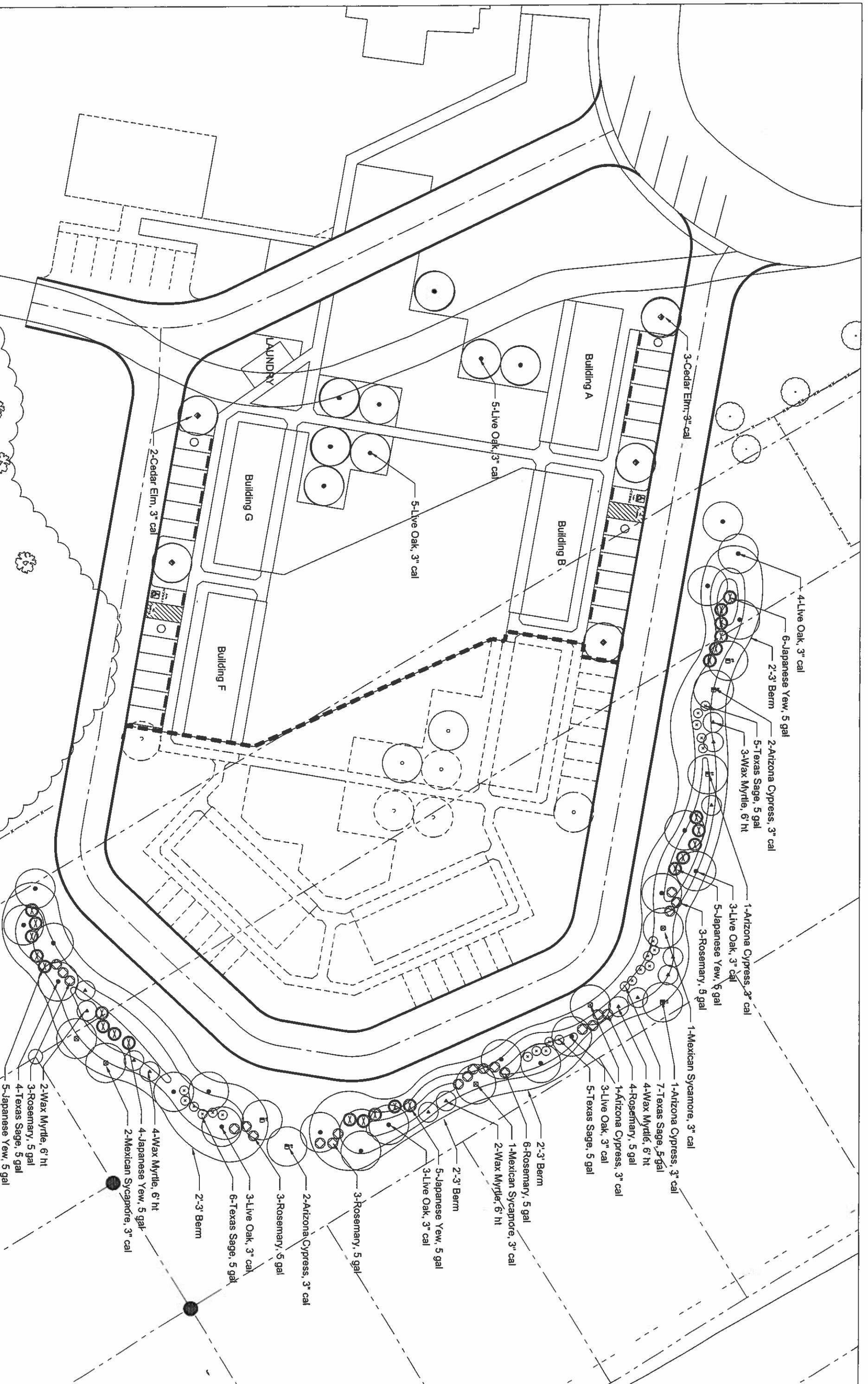
SCALE: 1"=40'

0 20 40 60 80

North arrow pointing up.

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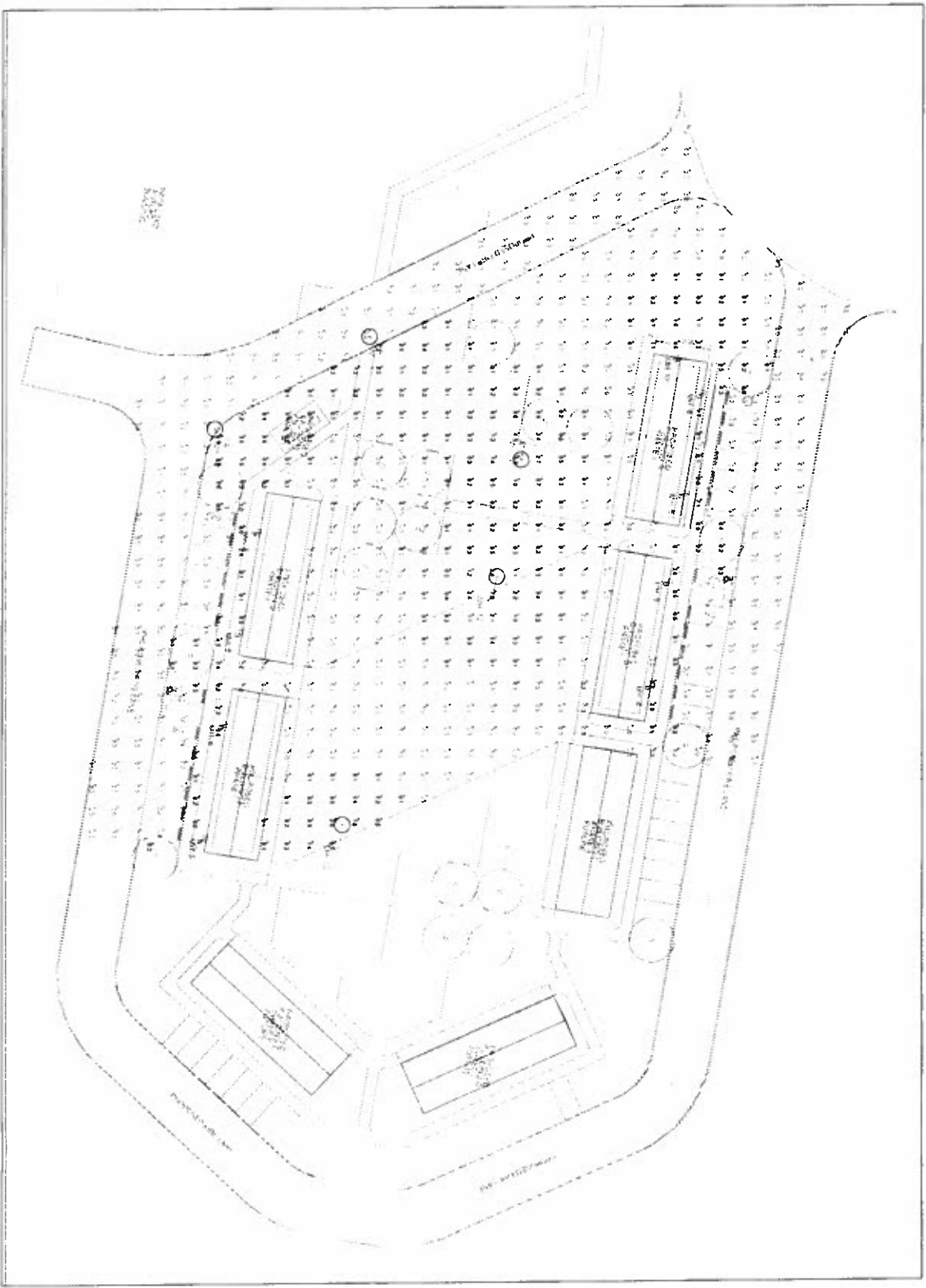
CAMP YOUNG JUDEAEA RETREAT VILLAGE LANDSCAPE PLAN
 May 3, 2017



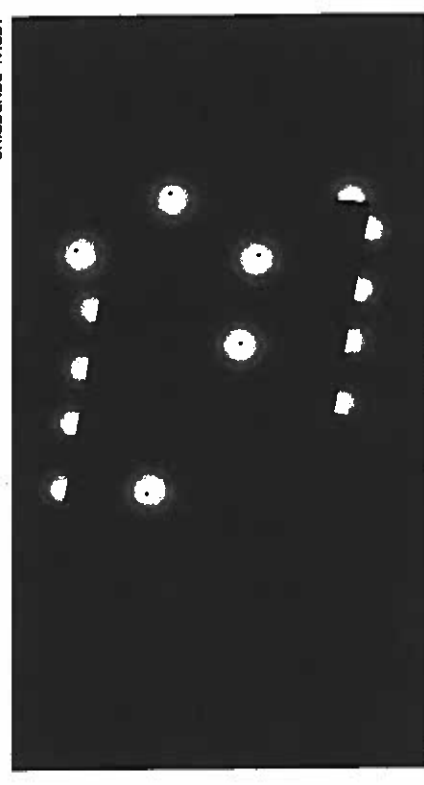
Luminaire Schedule	Label	Arrangement	Lum. Lumens	Total Lamp Lumens	LF	Description	Fixture
5	A	SINGLE	3193	3300	0.900	LBELL-LED40W 3 ARM	LBELL-LED40W/3A
9	B	SINGLE	1816	N/A	0.910	WPLED26 ALED26	WPLED26-160653.95

Calculation Summary	Collective Luminaire	Units	Avg	Max	Min	Avg/Min	Max/Min	Description
GROUPS	ILLUMINANCE	FC	0.51	10.4	0.0	N/A	N/A	readings taken at grade
PARKING AND DRIVE LANES	ILLUMINANCE	FC	0.23	3.3	0.0	N/A	N/A	readings taken at grade

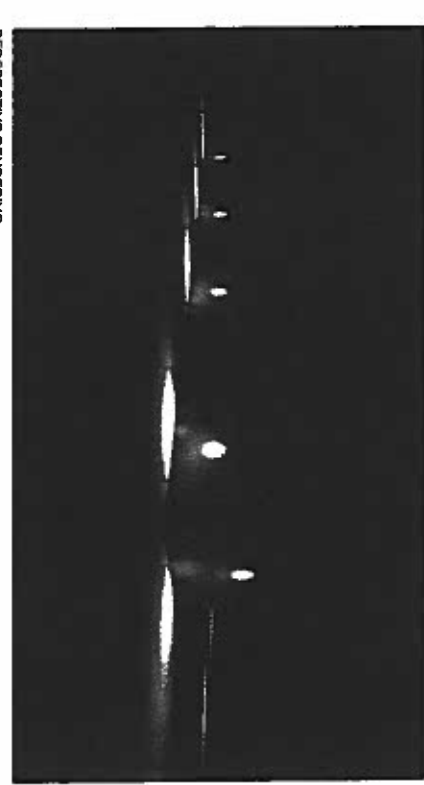
- ALL BUILDINGS BUILT AS GABLE ROOF WITH 9 SIDES AND 3 ROOF.
- NOTES:
- 1) EXACT MOUNTING DETAILS TO BE DETERMINED AT JOBSITE BY OTHERS.
 - 2) CALCULATIONS DO NOT SHOW THE EFFECT OF SHADOWING CAUSED BY OBJECTS WITHIN THE AREA.
 - 3) READINGS SHOWN ARE MAINTAINED HORIZONTAL FOOTCANDLES TAKEN AS SHOWN IN THE DRAWING.
 - 4) READINGS SHOWN ARE MAINTAINED HORIZONTAL FOOTCANDLES TAKEN AS SHOWN IN THE DRAWING.
 - 5) THE LAYOUT DRAWING MUST BE CORRELATED WITH THE SITE LOCATION FOR CORRECT FUTURE ORIENTATION.
 - 6) CHECK GRAPHIC SCALE. DOCUMENTS PRINTED OR PLOTTED FROM ELECTRONIC FILES MAY OCCUR AT OTHER THAN THE DESIRED OR ASSUMED GRAPHIC SCALE.
 - 7) THIS IS THE RESPONSIBILITY OF THE USER TO VERIFY THAT THE PRINTED OR PLOTTED SCALE IS CORRECT.
 - 8) LUMINAIRE LUMENS = LUMENS LEAVING LUMINAIRE WITH EFFICIENCY CONSIDERED.



View: 1-Floor Rotated 0 Tilted 0
Scale: 1 inch= 30 Ft.



AERIAL RENDERING



PERSPECTIVE RENDERING



PERSPECTIVE RENDERING

<p>NOTICE: THIS DRAWING IS THE EXCLUSIVE PROPERTY OF LIGHTING APPLICATION SCIENCES. ITS ACCEPTANCE CONSTITUTES AN AGREEMENT THAT THE DRAWING WILL BE TREATED AS CONFIDENTIAL. THIS DRAWING IS TO BE USED FOR NO PURPOSE OTHER THAN AS SET FORTH IN THE INFORMATION CONCERNING THE OPERATION OF LIGHTS FURNISHED BY THE MANUFACTURER. IT IS TO BE RETURNED UPON PROJECT AND IS NOT TO BE REPRODUCED, COPIED, OR LOANED EXCEPT AS EXPRESSLY AUTHORIZED BY LIGHTING APPLICATION SCIENCES.</p> <p>NOTICE: THE INTENT OF THIS LIGHTING LAYOUT IS TO SUGGEST THE BEST UTILIZATION OF LIGHTING FIXTURES. MANUFACTURER'S SPECIFICATIONS AND PERFORMANCE DATA FURNISHED BY THE MANUFACTURER. ANY VARIATIONS IN FIXTURE PERFORMANCE FROM PERFORMANCE SHOWN IN THIS FILE IS THE RESPONSIBILITY OF THE MANUFACTURER. IT IS NOT FOR ANY OTHER PURPOSE. IT IS NOT AUTHORIZED BY LIGHTING APPLICATION SCIENCES.</p>	<p>DESIGNED BY: SPENALACA</p> <p>SCALE: AS SHOWN</p> <p>REFERENCE: YK08360.AGI</p>	<p>TITLE: CAMP YOUNG JUDAEA, TEXAS LIGHTING LAYOUT USING GIVEN LOCATIONS</p> <p>DATE: 5/1/2017</p>	<p>LIGHTING LAYOUT GENERATED BY LIGHTING APPLICATION SCIENCES IN SAN MARCOS, TEXAS</p>
	<p>LIGHTING APPLICATION SCIENCES 206 DEERWOOD DRIVE SAN MARCOS, TX 78666 512-353-3890 PH/FAX 512-787-0477 CELL</p>	<p>Page 1 of 1</p>	

LBELL

Dark Sky Hookarm

Site Lighting

STANDARD PRODUCT SPECIFICATIONS

Materials: Cast Aluminum

Finish: Powder Coated

Lens: Clear Polycarbonate

Lamps: Lamps are Included

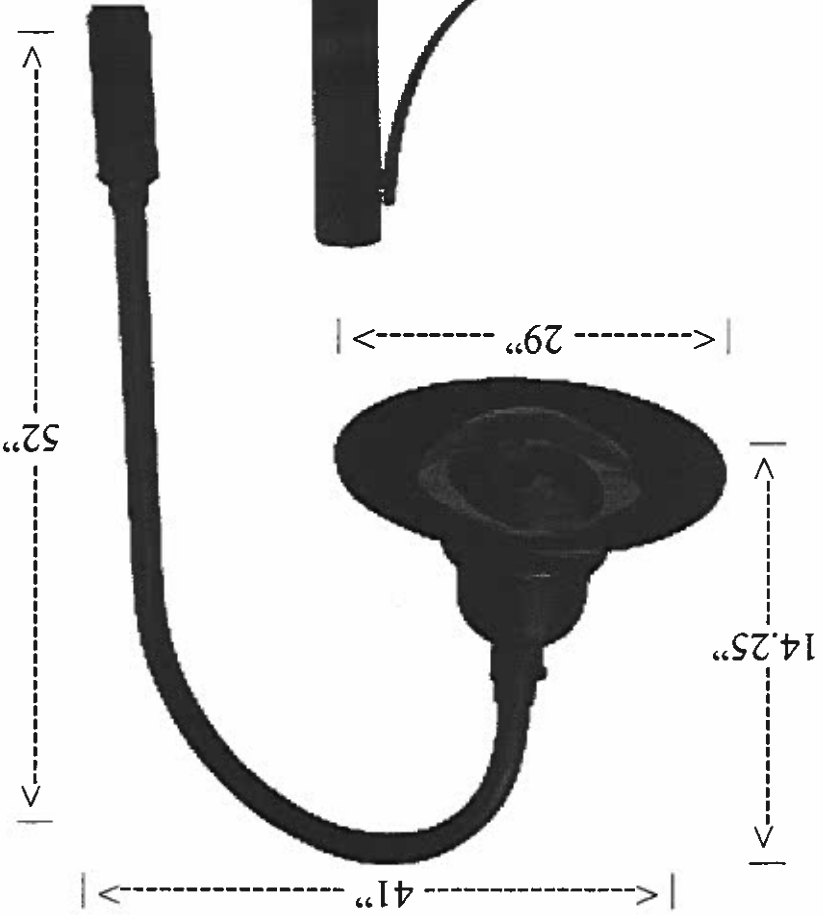
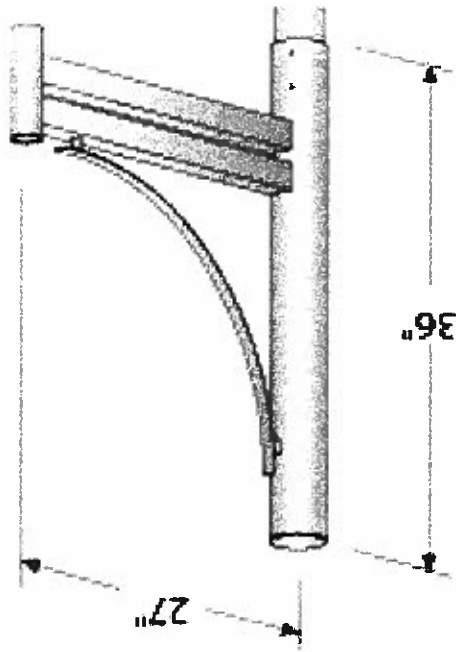
Listing: Wet Listed

Ballast Info: See Options Below.

Installation: Hardware is Included. Install by a Qualified Electrician.

Warranty: 1 Year Limited From Date of Shipment

Additional Info: All Light Emitted Below Horizontal Plane of the Head



DIMENSION:
Shown Below



EXAMPLE: DL-LBELL-BL-100M-4-H

MODEL	FINISH	WATTAGE	VOLTAGE	BALLAST	KELVIN	OPTIONS
-------	--------	---------	---------	---------	--------	---------

Model

LBELL - HID

LBELLF - Fluor.

LBELLI - ILS

Finish

BL - Black

BR - Bronze

RT - Rust

CC - Custom Color

Wattage (HID)

50H - 50W HPS

70H - 70W HPS

100H - 100W HPS

150H - 150W HPS

50M - 50W MH

70M - 70W MH

100M - 100W MH

150M - 150W MH

Wattage (LED)

40LED - 40W LED

Wattage (Fluorescent)

SE42C - 1-42W Electronic Cluster

SE57C - 1-57W Electronic Cluster

Wattage (Induction)

40ILS - 40W ILS

70ILS - 70W ILS

Voltage (HID)

1 - Single Tap

4 - Multi Tap

Ballast (HID)

N - Normal Power Factor

H - High Power Factor

Kelvin (Fluor.)

27 - Warm White

35 - Day Light

41 - Cool White

50 - Bright White

Options

WM - Wall Mount

DSA - Deco Straight Arm

PH: 936-494-3900 • FX: 936-494-3910

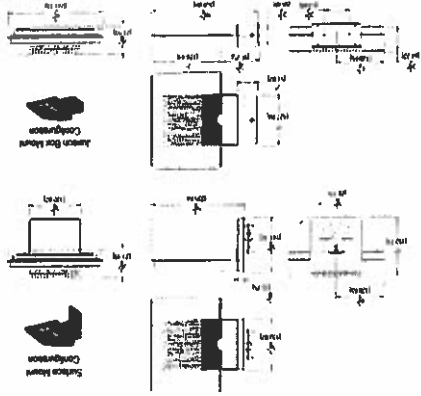
04/02/12

WPLED26

26 Watt LED Wallpack. Equivalent to 175W MH wallpack. Includes both junction box and surface mount for recessed box. IESNA Full Cutoff, Fully Shielded optics. 5 Year warranty.

Color: Bronze

Weight: 7.5 lbs



LED Info

Watts:	26W
Color Temp:	5000K (Cool)
Color Accuracy:	66
L70 Lifespan:	100000
LM79 Lumens:	1,816
Efficacy:	61 LPW
Type:	Constant Current
Input Watts:	30W
Efficiency:	87%
277V:	0.12 A
240V:	0.14 A
208V:	0.16 A
120V:	0.26 A

Driver Info

Technical Specifications

UL Listing: Suitable for wet locations. Suitable for mounting within 1.2m (4ft) of the ground.

Lumen Maintenance: 100,000-hour LED lifespan based on IES LM-80 results and TM-21 calculations.

IP Rating: Ingress Protection rating of IP66 for dust and water

Finish: Chip and fade resistant polyester powder coat finish.

Color Stability: RAB LEDs exceed industry standards for chromatic stability.

Color Uniformity: RAB's range of CCT (Correlated color temperature) follows the guidelines of the American National Standard for Specifications for the Chromaticity of Solid State Lighting (SSL) Products, ANSI C78.377-2008.

Ambient Temperature: Suitable for use in 40°C ambient temperatures.

Fixture Efficacy: 61 Lumens per Watt

Color Accuracy: 66 CRI

Color Temperature (Nominal CCT): 5000K

Driver: Multi-chip 26W high output long life LED Driver
Constant Current, 720mA, Class 2, 6 KV Surge Protection, 100V-277V, 50-60 Hz, 100-240V, 4 Amps



Tech Help Line: 888 RAB-1000

Email: sales@rabweb.com

On the web at: www.rabweb.com

Note: Specifications are subject to change without notice

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Dark Sky Approved: The International Dark Sky Association has approved this product as a full cutoff, fully shielded luminaire.

For use on LEED Buildings: IDA Dark Sky Approval means that this fixture can be used to achieve LEED Credits for Light Pollution Reduction

Patents: The WPLED design is protected by U.S. PATENT D608,040 and patents pending in the U.S., Canada, China, Taiwan and Mexico.

Green Technology: RAB LEDs are Mercury, Arsenic and UV free.

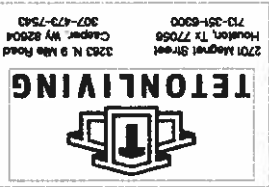
HID Replacement Range: The WPLED26 can be used to replace 150 - 200W Metal Halide Wallpacks based on delivered lumens.

Equivalency: The WPLED26 is Equivalent in delivered lumens to a 175W Metal Halide Wallpack.

California Title 24: WPLED complies with California Title 24 building and electrical codes.

Thermal Management: Cast aluminum Thermal Management system for optimal heat sinking. The LPACK is designed for cool operation, most efficient output and maximum LED life by minimizing LED junction temperature.

Cold Weather Starting: The minimum starting temperature is -40°C



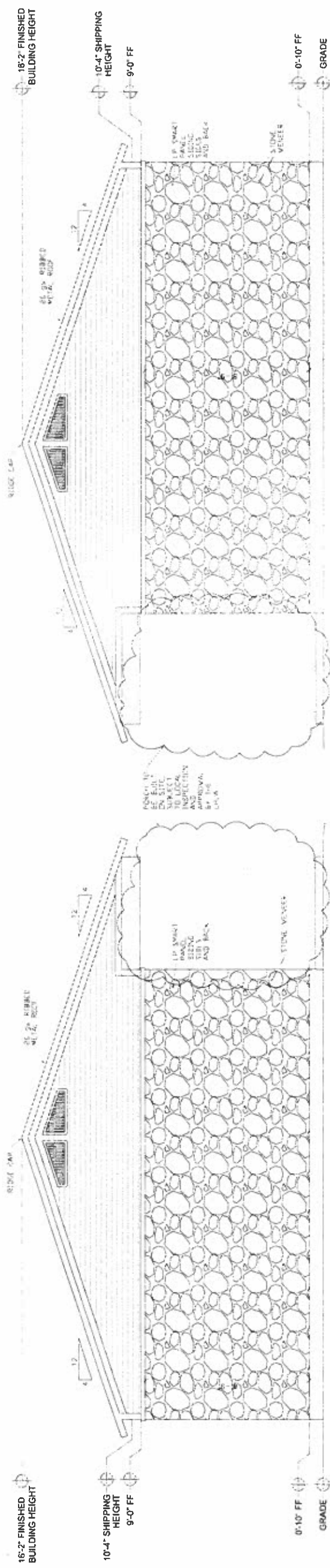
professional seals

24'-0" X 73'-0"
SLEEPER

Rev #	Date	Description	By
2	2/28	UPDATED FLOOR PLAN	z. stddiqui
3	3/16	UPDATED ELEVATIONS	
4	4/21	UPDATED ELEVATIONS	

date:	02-28-2017
designers:	z. stddiqui

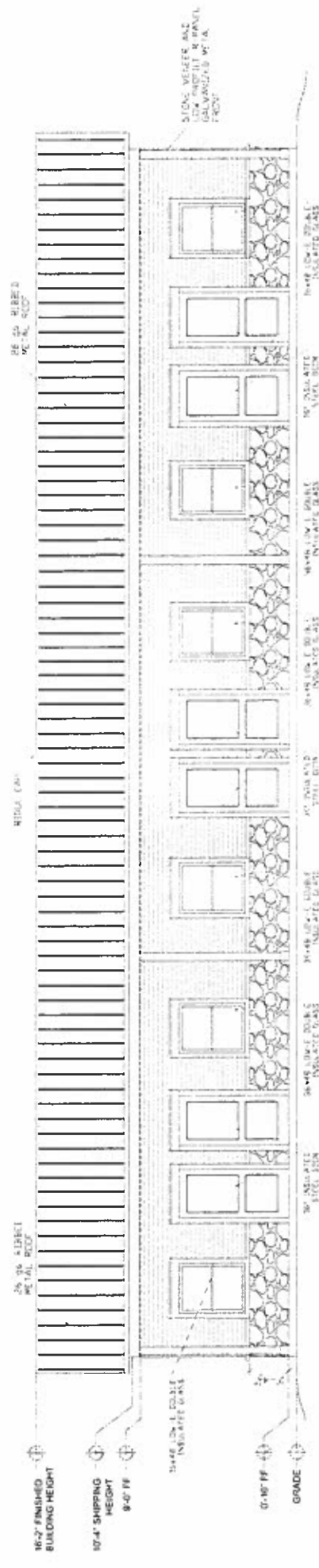
sheet no.	A202
4 of 12	



1 LEFT ELEVATION: ADA UNIT

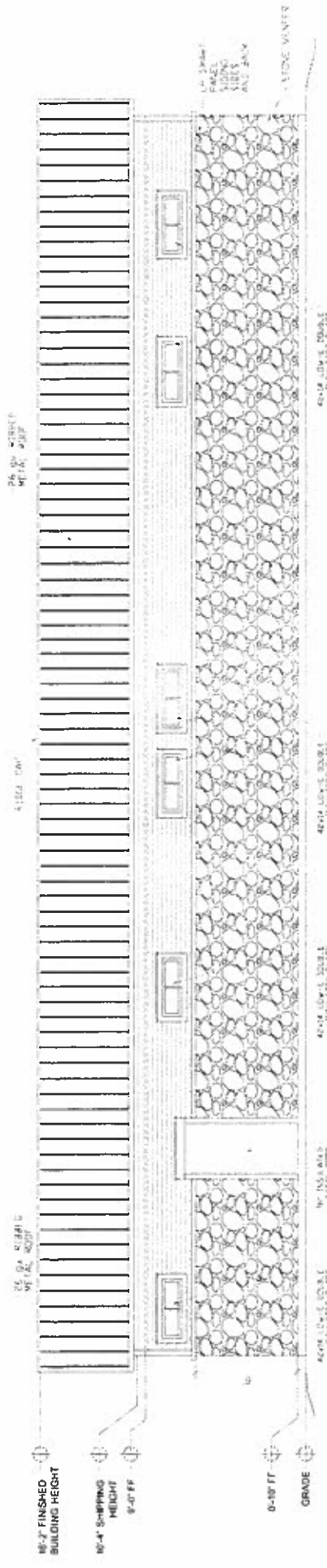
2 RIGHT ELEVATION: ADA UNIT

SCALE: 3/8" = 1'-0"



3 FRONT ELEVATION: ADA UNIT

SCALE: 1/4" = 1'-0"

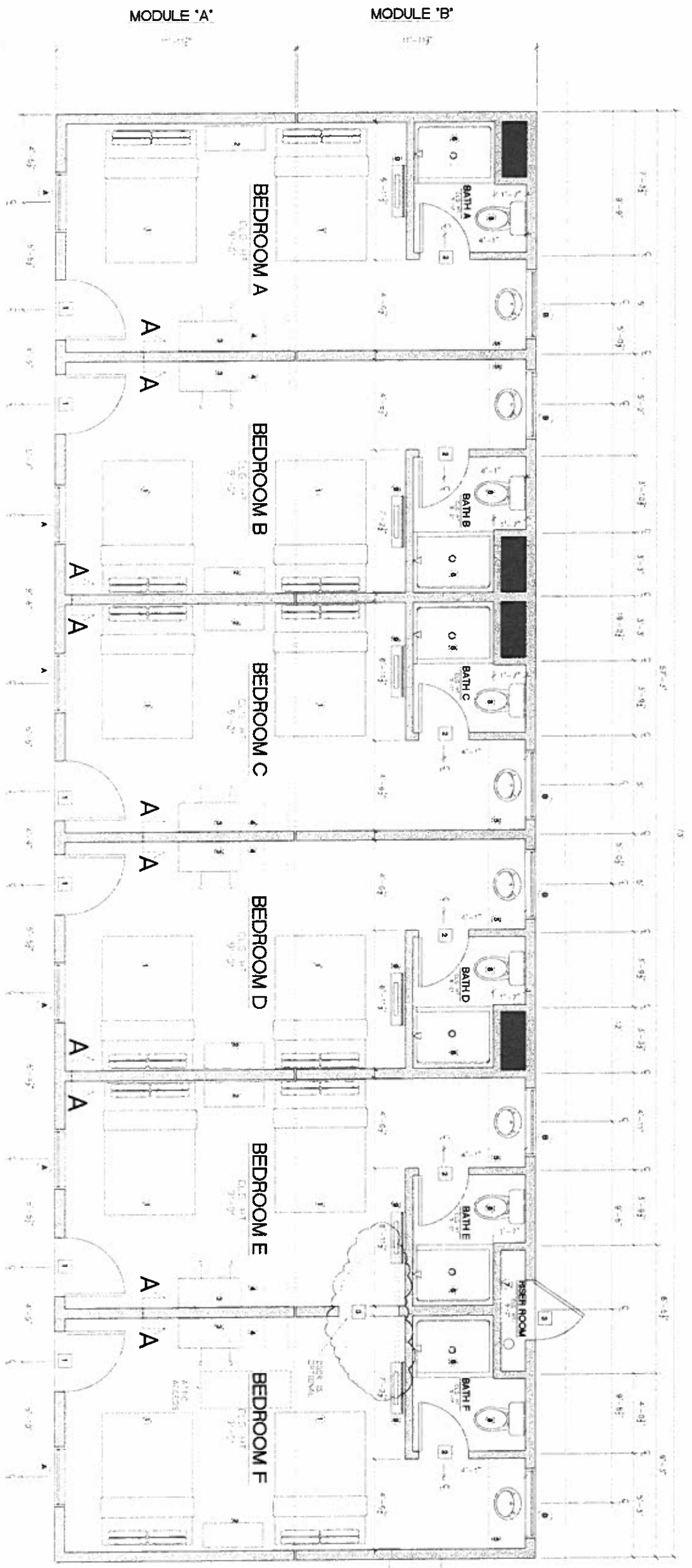


4 REAR ELEVATION: ADA UNIT

SCALE: 1/4" = 1'-0"

April 26, 2017
TX FIRM 18663





1 FLOOR PLAN

April 26, 2017
TX FIRM 18663

SCALE: 1/4" = 1'-0"

EQUIPMENT + FIXTURE TABLE

NO.	DESCRIPTION
1	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
2	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
3	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
4	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
5	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
6	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
7	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
8	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
9	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
10	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
11	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL
12	12 QUIN. KID. 54"x60" SEE CROSS SECTION FOR DETAIL



ROOM FINISH SCHEDULE

ROOM NAME	CEILING	WALLS	BASE	CROWN	CEILING	FLOOR	REMARKS
BED	9'-0" W/AC	VCB	PVC	RV	SEASPRAY COATED OVP	VINYL PLANK FLOORING	WOOD PANELING 1/2" PINE FLOOR TOCK TO 2 1/2" AFF
BATH	9'-0" W/AC	VCB	PVC	RV	SEASPRAY COATED OVP	VINYL PLANK FLOORING	WOOD PANELING 1/2" PINE FLOOR TOCK TO 2 1/2" AFF
MISER ROOM	9'-0" W/AC	VCB	PVC	RV	SEASPRAY COATED OVP	VINYL PLANK FLOORING	WOOD PANELING 1/2" PINE FLOOR TOCK TO 2 1/2" AFF

DOOR SCHEDULE

LTR	QTY	TYPE	DOOR SIZE	OPENING SIZE	MATL	INSULATION	FRAME	REMARKS
1	6	A	36" W	80" H	VEAL	SOLID	VEAL	STEEL TYPED OR INSULATED (2) 2X6 W/DOOR ON-EDGE
2	6	C	36" W	80" H	WOOD	N/A	WOOD	N/A
3	6	B	36" W	80" H	VEAL	N/A	VEAL	N/A

WINDOW SCHEDULE

LTR	QTY	TYPE	WINDOW SIZE	VALUES	GLAZING	FRAME	COVERING	REMARKS
1	6	1	36" W x 42" H	0.31 U-FAC	6-8	VEAL	N/A	6-8 AFF
2	6	2	36" W x 42" H	0.31 U-FAC	6-8	VEAL	N/A	6-8 AFF

INTERIOR WALL HEADER / KIND STUD SCHEDULE

OPENING WIDTH	HEADER	KIND STUD
24'-0"	2x4 SYP #2, 1A1	2x6 SYP #2

EXTERIOR WALL HEADER / KIND STUD SCHEDULE

OPENING WIDTH	HEADER	KIND STUD
36"	(2) 2x4 SYP OR SYP #2 ON EDGE	(1) 2x4 SYP OR SYP #2

GENERAL NOTES

1. DIMENSIONS VANILLA - 3/8" O.D. BE APPROXIMATE
2. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE
3. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE
4. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE
5. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE



A Staggered 2x4 studs on 2x6 plates
2x6 WALL SECTION DETAIL

24'-0" X 73'-0" SLEEPER



Rev #	Date	Description	By
2	2/28	UPDATED FLOOR PLAN	ZS
3	4/21	UPDATED ELEVATIONS	ZS

designer: z.siddiqui

02-28-2017

A201

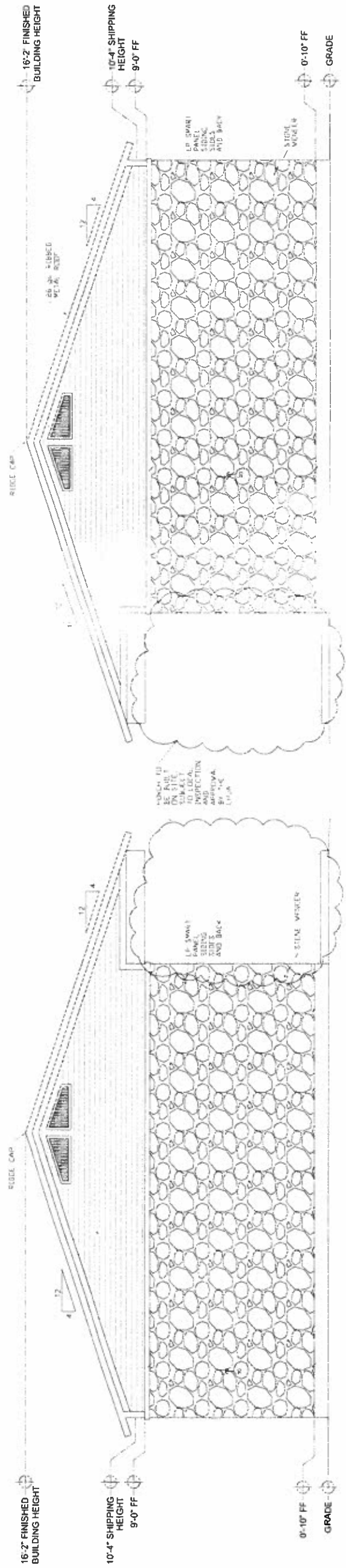
3 of 12

24'-0" X 73'-0" SLEEPER

date: **02-28-2017**
 designer: **z. abdelqad**

Rev #	Date	Description
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3	3/31	UPDATED ELEVATIONS
4	4/21	UPDATED ELEVATIONS

A200
 sheet no.
 2 of 12

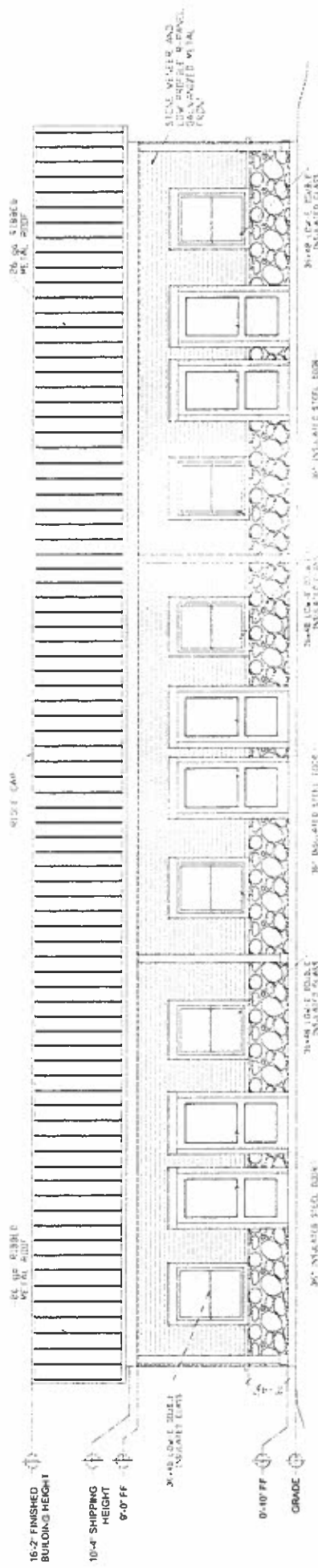


1 LEFT ELEVATION

SCALE: 3/8" = 1'-0"

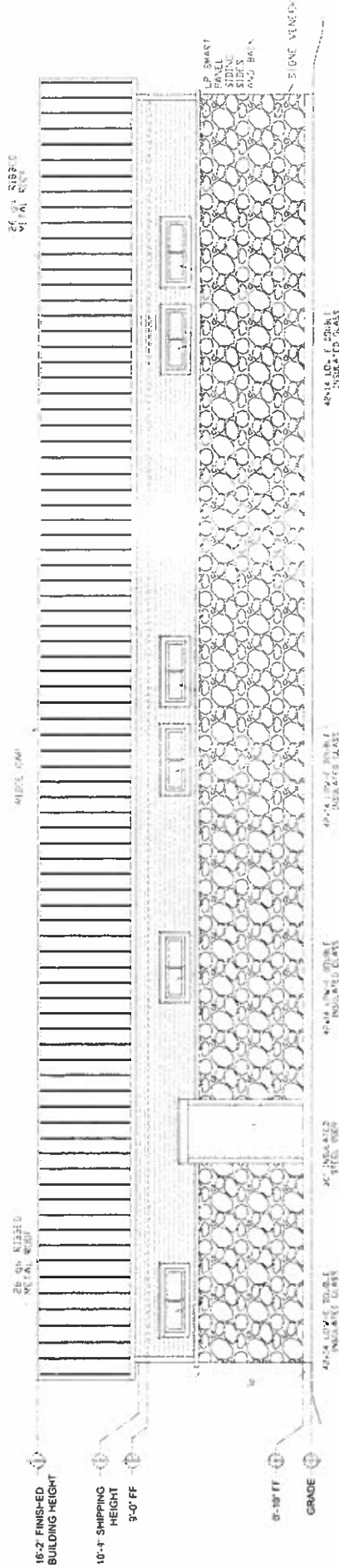
2 RIGHT ELEVATION

SCALE: 3/8" = 1'-0"



3 FRONT ELEVATION

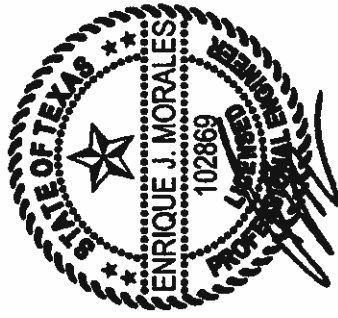
SCALE: 1/4" = 1'-0"



4 REAR ELEVATION

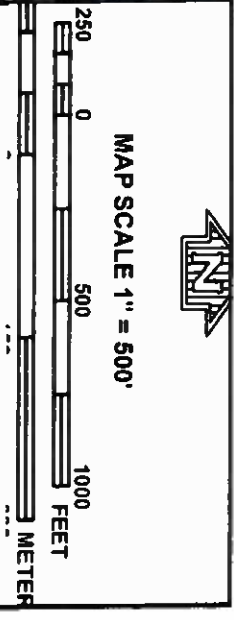
SCALE: 1/4" = 1'-0"

April 26, 2017
 TX FIRM 18663



CURRENT		TOTAL	
SIDE	SQFT	SIDE	SQFT
FRONT	416	FRONT	4644
REAR	210	REAR	829
LEFT	210	LEFT	35
RIGHT	210	RIGHT	35
TOTAL	846	TOTAL	7073
		55Z	639

CURRENT		TOTAL	
SIDE	SQFT	SIDE	SQFT
FRONT	416	FRONT	4644
REAR	210	REAR	829
LEFT	210	LEFT	35
RIGHT	210	RIGHT	35
TOTAL	846	TOTAL	7073
		55Z	639



NEIP
 PANEL 0238F

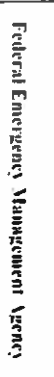
FIRM
 FLOOD INSURANCE RATE MAP
 HAYS COUNTY,
 TEXAS
 UNINCORPORATED AREAS

PANEL 238 OF 495

SEE MAP INDEX FOR FIRM PANEL LOCATION.
 CONTAINS
 COMMUNITY NUMBER PANEL SIZE
 HAYS COUNTY 480321 12.48 F
 AMBERLEY WILL-GE OF 481654 02.28 F
 WOODCREEK CITY OF 481641 02.28 F

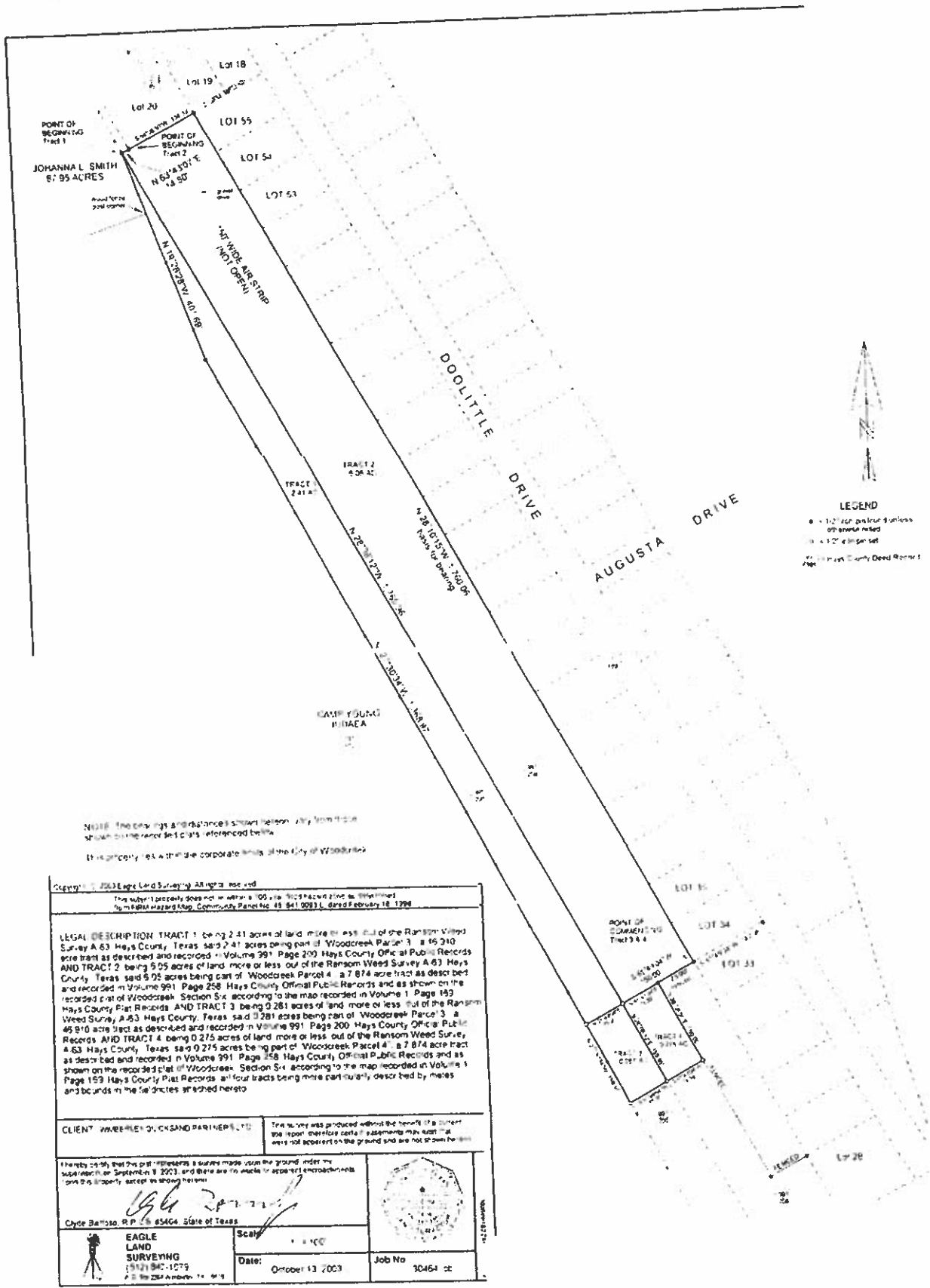
Notice to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
 48209C0238F
 MAP REVISED
 SEPTEMBER 2, 2005



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at www.msc.fema.gov



POINT OF BEGINNING Tract 1
 JOHANNA L SMITH
 6.795 ACRES

POINT OF BEGINNING Tract 2
 N 63°43'07"E
 14.80'

Actual North
 2008 corner

N 10°32'27.70" E 40.76'
 1/4" WIDE AIR STRIP
 (NOT OPEN)

TRACT 2
 4.06 AC

TRACT 2A1A
 2.41 AC

N 28°10'55"W 160.06'
 Road for bearing

S 2°12'34.12" E 132.36'
 S 2°12'34.12" E 132.36'

CAMP YOUNG
 BRITACA

DOOLITTLE DRIVE

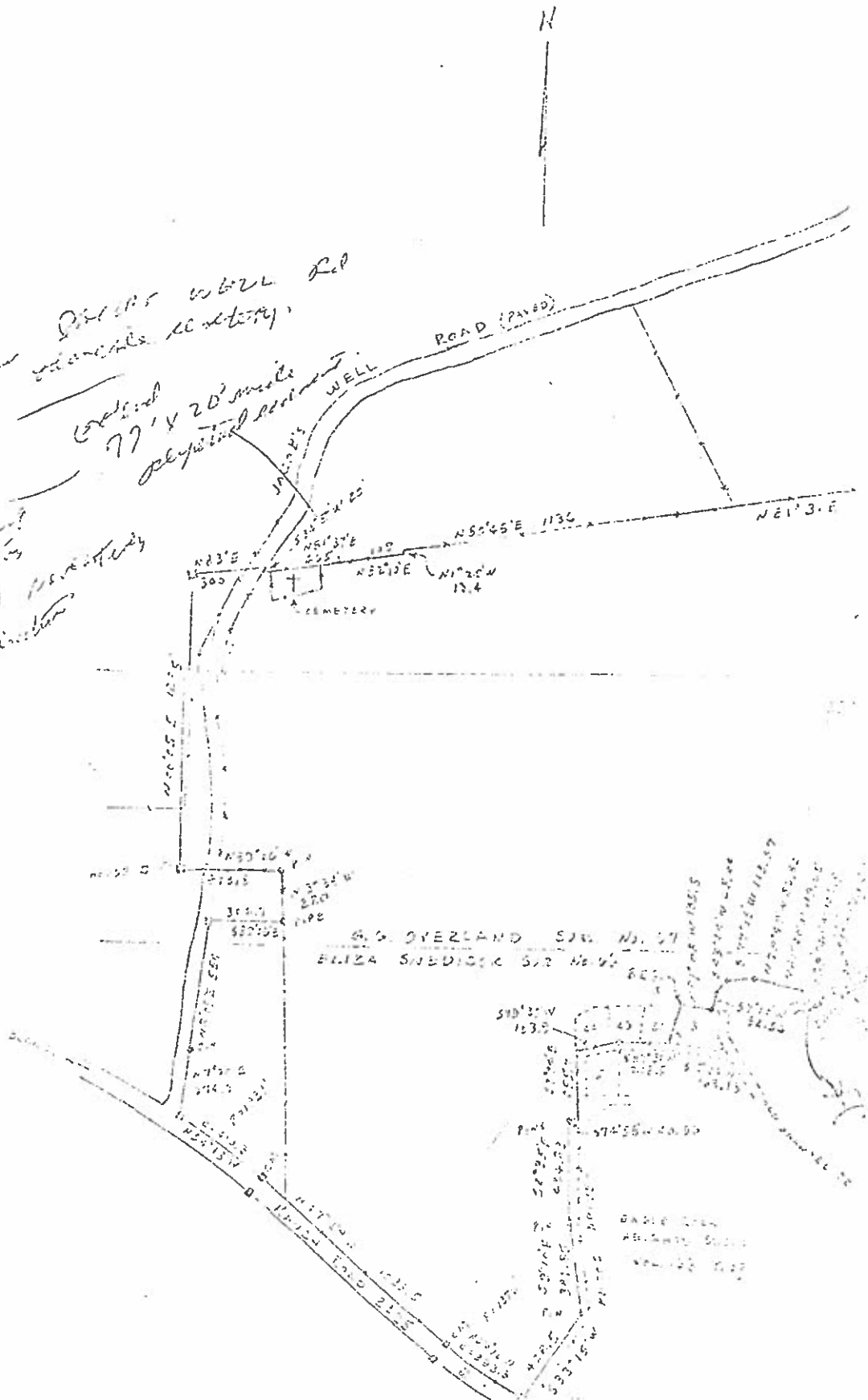
AUGUSTA DRIVE

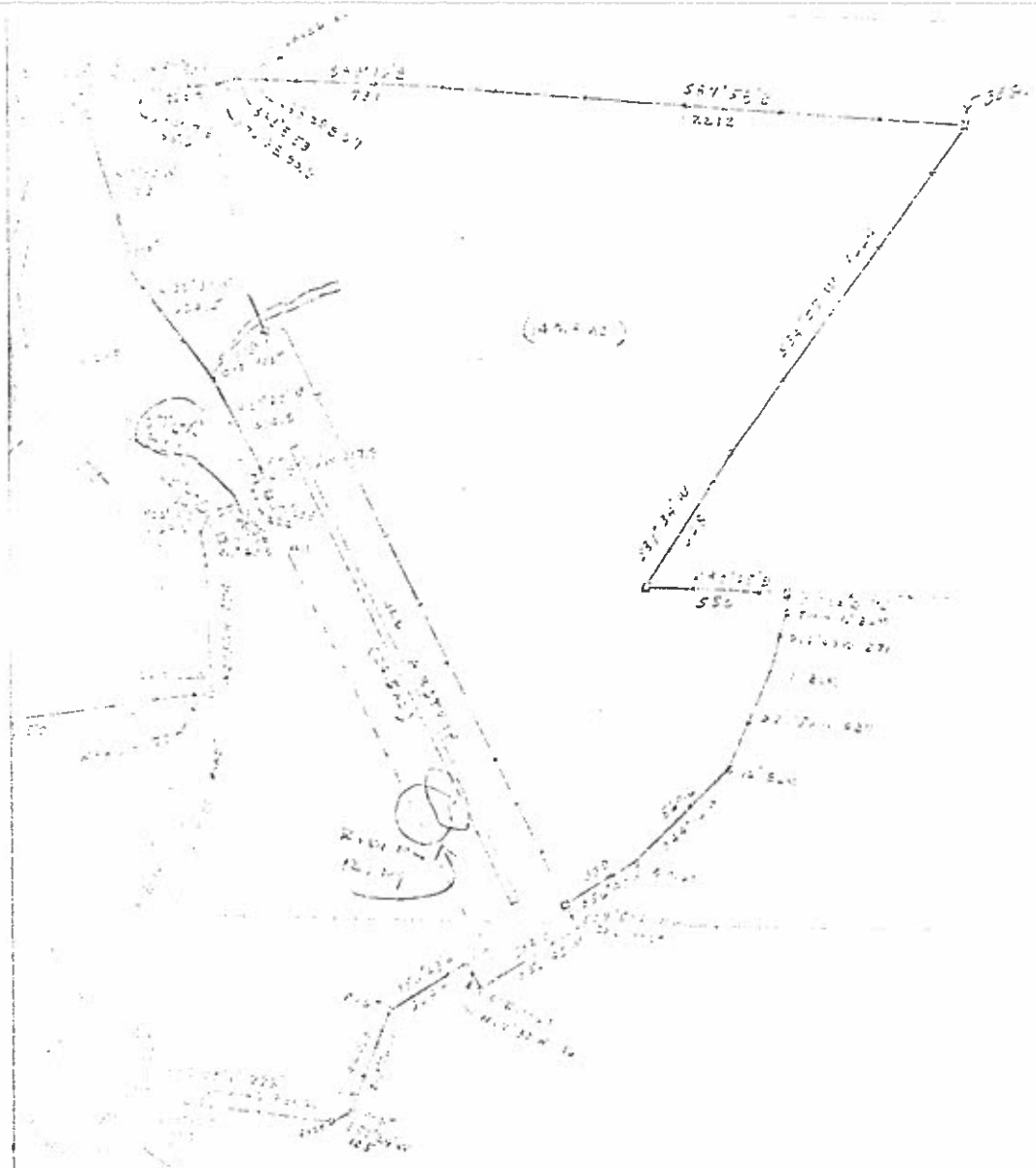
NOTE: The bearings and distances shown herein vary from those shown on the record plat(s) referenced herein.
 It is hereby left within the corporate limits of the City of Woodcreek.

Copyright © 2003 Eagle Land Surveying, All rights reserved.	
The information herein does not constitute a 100 year flood hazard zone as determined from FEMA Hazard Map, Community Panel No. 48 841 0083 L, dated February 18, 1998.	
<p>LEGAL DESCRIPTION: TRACT 1 being 2.41 acres of land, more or less, all of the Ransom Weed Survey A 63 Hays County, Texas, said 2.41 acres being part of Woodcreek Parcel 3, a 16.910 acre tract as described and recorded in Volume 991 Page 200 Hays County Official Public Records AND TRACT 2 being 5.05 acres of land, more or less, out of the Ransom Weed Survey A 63 Hays County, Texas, said 5.05 acres being part of Woodcreek Parcel 4, a 7.874 acre tract as described and recorded in Volume 991 Page 258 Hays County Official Public Records and as shown on the recorded plat of Woodcreek Section Six, according to the map recorded in Volume 1 Page 143 Hays County Plat Records AND TRACT 3 being 0.281 acres of land, more or less, out of the Ransom Weed Survey A 63 Hays County, Texas, said 0.281 acres being part of Woodcreek Parcel 3, a 49.910 acre tract as described and recorded in Volume 991 Page 200 Hays County Official Public Records AND TRACT 4 being 0.275 acres of land, more or less, out of the Ransom Weed Survey A 63 Hays County, Texas, said 0.275 acres being part of Woodcreek Parcel 4, a 7.874 acre tract as described and recorded in Volume 991 Page 258 Hays County Official Public Records and as shown on the recorded plat of Woodcreek Section Six, according to the map recorded in Volume 1 Page 143 Hays County Plat Records, all four tracts being more particularly described by metes and bounds in the plat(s) attached hereto.</p>	
CLIENT: WHEELER OXGARD PARTNERS, LTD.	The survey was produced without the benefit of a current title report therefore certain easements may exist that were not apparent on the ground and are not shown hereon.
I hereby certify that the plat hereon is a true and correct survey made upon the ground under the supervision of September 9, 2003, and there are no clerical or apparent errors or omissions on this plat, except as shown hereon.	
Clyde Belmonte, R.P. 016546, State of Texas	
<p>EAGLE LAND SURVEYING (512) 947-1079 P.O. Box 284, Austin, TX 78768</p>	<p>Scale: 1" = 100'</p> <p>Date: October 13, 2003</p> <p>Job No: 30464.ct</p>

LEGEND
 1/4" = 100' for all other dimensions
 1/4" = 100' for all other dimensions
 1/4" = 100' for all other dimensions
 1/4" = 100' for all other dimensions

From 1811's well led
 across cemetery,
 77' x 20' made
 physical settlement
 77' x 20' made
 physical settlement
 77' x 20' made
 physical settlement





Section 29
 Section 30
 Section 31
 Section 32

BEARING AND DISTANCE
 S 89° 56' 0" W 7212
 S 89° 56' 0" W 7212

SURVEYED AND VERIFIED
 I, JAMES V. ...
 of the State of Texas, and ...
 in the presence of my ...
 and ...
 and ...

JUNE 30, 1890

BY ...
 ...
 ...

SCALE: 1" = 40'
 D. C. ...

WHEREAS, on July 16, 1870, by deed of that date, now recorded

in Volume 237, Pages 564-567, Hays County Deed Records, C. B. Smith and Ruth C. Smith, husband and wife, did grant, sell and convey unto Camp

Young Judas, Inc., a tract of 248.7 acres of land out of the Ransom Weed

Survey No. 63, G. G. Overland Survey No. 67, Eliza Sneedcor Survey

No. 66, and the John Marks Survey No. 62 in Hays County, Texas; and,

WHEREAS, the South line of said tract of 248.7 acres coincides with

the center line of a dam across Cypress Creek, and also coincides with

the North line of a tract of land owned by C. B. Smith and Ruth C. Smith,

and retained by them and not conveyed by said deed; and,

WHEREAS, the said dam across Cypress Creek is constructed in

such a way that the top thereof may be used as a bridge or roadway or

passageway, to afford passage over said creek from East to West, and from

West to East, and the said bridge has recently been reconstructed at the joint

cost of the parties, and it is the purpose and intention of the parties that said

dam shall hereafter be maintained at the joint cost of the parties, and it is

further the purpose and intention of the parties that the said dam and the

approaches thereto on the East end and on the West end, shall be jointly

used by each of the parties, and the strip 40 feet wide including the said

bridge as so reconstructed and the approaches to each end as recently

strengthened and reconstructed is accurately described by field notes resulting

from a survey on the ground by a registered surveyor, as follows:

40 foot easement across dam; the centerline of a 40 foot

strip of land described as follows:

BEGINNING at a point in the South line of the 287.7 acre

tract of land conveyed by the deed above referred to,

from which the Northeast corner of Lot 50, Eagle Rock

STATE OF TEXAS
|
COUNTY OF HAYS
|

65762

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Heights Sec. 1 bears No. 81° 20' W. 175.3 feet, N. 79° 49' W. 86.32 feet; S. 77° 13' W. 113.57 feet; S. 43° 24' W. 68.04 feet; S. 7° 40' W. 92.54 feet; and N. 81° 08' W. 135.8 feet;

THENCE S. 81° 20' E. 80 ft. to a concrete monument on the West bank of Cypress Creek for angle;

THENCE N. 67° 09' E. 165 feet to a concrete monument on the East bank of Cypress Creek for angle;

THENCE N. 74° 54' E. 80 feet to point of termination of easement.

AND, WHEREAS, Camp Young Judaea, Inc., owns other property

in the near vicinity, in addition to said tract of 248.7 acres above referred

to, such other property being 165.3 acres of land in the Ransom Weed

Survey, in Hays County, Texas, and all of Lots Nos. Forty Eight (48),

Forty Nine (49) and Fifty (50) of Eagle Rock Heights Section One (1), all of

same having been conveyed by and described in deed from Eagle Rock Ranch,

Inc., to Camp Young Judaea, Inc., dated July 16, 1970, recorded in

Volume 237, Pages 572-574, Hays County Deed Records; and,

WHEREAS, C. B. Smith and wife own other property in the near

vicinity in addition to the tract South and East of the said dam-bridge and

40 foot strip of land; and,

WHEREAS, it is the purpose and intention of the parties that the

easement for passageway and for ingress and egress over said 40 foot strip,

shall inure to the benefit of the present and all subsequent owners of all or

any part of each of the several tracts owned by Camp Young Judaea, Inc.,

at this time, and that the said easement shall be permanent and perpetual

and shall be a covenant running with the land; and,

WHEREAS, it is the purpose and intention of the parties that the

easement for passageway and for ingress and egress over said 40 foot strip

of land, shall inure to the benefit of the present and all subsequent owners

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of all or any part of each of the several tracts of land owned by C. B. Smith and Ruth C. Smith at this time in the near vicinity and whether contiguous to such 40 foot strip or not, and that said easement shall be permanent and perpetual and shall be a covenant running with the land; NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS: THAT WE, C. B. Smith and Ruth C. Smith, husband and wife, of Travis County, Texas, for and in consideration of the sum of Ten Dollars (\$10.00) cash and other good and valuable consideration to us paid by Camp Young Judaea, Inc., a Texas Corporation, of Harris County, Texas, the receipt whereof is hereby fully acknowledged and confessed, have GRANTED, SOLD AND CONVEYED and by these presents do GRANT, SELL AND CONVEY, as to any land now owned by us within and part of said 40 foot strip, unto the said Camp Young Judaea, Inc., its successors and assigns, and all subsequent owners of all or any part of the tracts of 248.7 acres, and the tract of 165.3 acres, and the lots hereinabove enumerated in Eagle Rock Heights Section One (1), the permanent and perpetual right, privilege, and easement of using as a passageway the top of said dam and the approaches thereto on said 40 foot strip of land, and the free and uninterrupted use, right, liberty, privilege, and easement of passing over, upon, along and across, the said strip of land, the said easement to be used in common with us, the said grantors herein, C. B. Smith and Ruth C. Smith, and in common with subsequent owners of all or any part of the land now owned by us in the vicinity of, but not necessarily contiguous to, said strip of land 40 feet wide, and the said easement shall be a covenant running with the land. The said strip of land 40 feet wide hereinabove described in the preamble hereto, is partially upon land owned by us, the said C. B. Smith and Ruth C. Smith, and partially upon land owned by Camp Young Judaea, Inc., and we intend

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hereby to grant such easement as to such portion of said strip as is now owned by us.

That Camp Young Judaea, Inc., a Texas Corporation, of Harris County, Texas, acting herein by and through its proper officers, herunto duly authorized, for and in consideration of the sum of Ten Dollars (\$10.00) cash, and other good and valuable consideration to it paid by C. B. Smith and Ruth C. Smith, the receipt whereof is hereby fully acknowledged and confessed, has GRANTED, SOLD AND CONVEYED and by these presents does GRANT, SELL AND CONVEY as to any land now owned by Camp Young Judaea, Inc., within and part of said 40 foot strip, unto the said C. B. Smith and Ruth C. Smith, their heirs, executors, administrators, assigns, and all subsequent owners of all or any part of the land now owned by the said C. B. Smith and Ruth C. Smith in the vicinity of the said 40 foot easement strip, and whether contiguous thereto or not, the permanent and perpetual right, privilege, and easement of using as a passageway the top of said dam and the approaches on said 40 foot strip of land, and the free and uninterrupted use, right, liberty, privilege and easement of passing over, upon, along and across the said strip of land, the said easement to be used in common with Camp Young Judaea, Inc., its officers, agents, servants, employees, and tenants, and in common with subsequent owners of all or any part of the land now owned by Camp Young Judaea, Inc., as hereinabove set forth; and the said easement shall be a covenant running with the land. The said strip of land 40 feet wide hereinabove described in the preamble hereto is partially upon land owned by Camp Young Judaea, Inc., and it is the purpose and intention of said corporation to grant and create such easement as to such portion of said strip as is now owned by said corporation.

EXECUTED this the 28th day of September, A. D., 1970.

for the purposes and consideration therein expressed for and as the act and
the foregoing instrument, and acknowledged to me that he executed the same
Inc., known to me to be the person and officer whose name is subscribed to
appeared James A. Judaea, 2005, President of Camp Young Judaea,
BEFORE ME, the undersigned authority, on this day personally

STATE OF TEXAS)
COUNTY OF Texas)

Thomas R. Johnson
Notary Public in and for
County, Texas.

of September, A. D., 1970.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 28th day

and consideration therein expressed.
and acknowledged to me that they each executed the same for the purposes
to be the persons whose names are subscribed to the foregoing instrument,
appeared C. B. Smith and Ruth C. Smith, husband and wife, known to me
BEFORE ME, the undersigned authority, on this day personally

STATE OF TEXAS)
COUNTY OF Texas)

BY: James A. Judaea, 2005
President

Thomas R. Johnson
Assistant Secretary

CAMP YOUNG JUDAEA, INC.

ATTEST:

C. B. Smith
C. B. Smith
Ruth C. Smith
Ruth C. Smith

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LYDELL B. CLAYTON, COUNTY CLERK
HAYS COUNTY, TEXAS.
Deputy *[Signature]*

Given under my hand and seal of office at San Marcos, Texas,
this the 9th day of December A.D. 1970.

I, Lydell B. Clayton, County Clerk in and for Hays County,
Texas, do hereby certify that the foregoing contains a true and
correct copy of an Easement from "C. B. Smith, et ux to Camp
Young Judaea, Inc." as the same appears of record in Volume 240
Pages 21-25, of the Deed Records of Hays County, Texas.

STATE OF TEXAS
COUNTY OF HAYS

[Signature]
LYDELL B. CLAYTON, COUNTY CLERK, HAYS COUNTY, TEXAS

FILED FOR RECORD THE 5th DAY OF December
A.D., 1970 AT 9:10 O'CLOCK P.M.
A.D., 1970 AT 3:25 O'CLOCK P.M.

[Signature]
Notary Public in and for
County, Texas.



of September, A. D., 1970.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 2 day

stated.

deed of Camp Young Judaea, Inc., a corporation, and in the capacity therein

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<p>68280</p>	<p>FRANCIS BERRY RANCH, INC.</p>	<p>100</p>	<p>FRANCIS BERRY RANCH, INC.</p>	<p>FRANCIS BERRY RANCH, INC.</p>	<p>FRANCIS BERRY RANCH, INC.</p>	<p>457 de 2409</p> <p>FRANCIS BERRY RANCH, INC.</p> <p>FRANCIS BERRY RANCH, INC.</p>
--------------	----------------------------------	------------	----------------------------------	----------------------------------	----------------------------------	--

32 Deed Records.
31 the map or plat thereof recorded in Vol. 168, Page 30, Hays County.
30 SECOND TRACT: All of Lots Nos. Forty-eight (48), Forty-nine (49)
29 and Fifty (50) of Eagle Rock Heights Section One (1), according to
The above and foregoing field notes are according to a survey made
by James T. Watson, Registered Surveyor No. 290, on July 9, 1970.

28 581 E 2212 ft. to the place of BEGINNING, containing 165.3 acrs
27 THENCE along a fence as follows:
S 83° E 59 ft.; N 88° 25' E 67 ft.; S 89° 16' E 731 ft.; and S 87°
26 E 90.9 ft. to a corner post for angle;
angle post; N 87° 06' E 264.7 ft. to angle post; and N 76° 13'
25 N 64° 34' E 238.9 ft. to angle post; N 74° 17' E 95.6 ft. to
THENCE along the south fence line of said road as follows:

24 paved road for corner;
301 W 623 ft. to a concrete monument in the south fence line of a
23 THENCE along a fence, N 39° 30' W 624.5 ft. to angle post and N 21°
41.5 ft. to iron pin at corner post for corner;
22 THENCE N 19° 16' W 117.7 ft. to iron pin for angle and N 30° 20' W
concrete monument for angle;
21 THENCE N 27° 30' W 1817 ft. for angle and N 19° 30' W 284 ft. to

20 THENCE N 56° 43' E 100 ft. for corner;
corner;
THENCE along a fence, N 27° 32' W 116 ft. to a corner post for
19 corner;
THENCE along a fence, S 56° 45' W 502.3 ft. to corner post for
18 THENCE along a fence, S 27° 50' E 116 ft. to corner post for corne
339 ft. to a concrete monument for corner;
17 for angle; S 44° 16' W 560.6 ft. to angle post; and S 56° 40' W
ft. to an 11" Elm for angle; S 21° 56' W 427 ft. to a 15" Elm
16 S 1° 22' E 75 ft. to a twin 10" Elm for angle; S 14° 43' W 271
THENCE along a fence as follows:

15 590 ft. to a concrete monument for corner;
14 THENCE along the south fence of said Franklin tract, N 89° 45' E
and a 24" I. O. bears N 72° 40' E 81.8 ft.;
Vol. 132, Pg. 165, from which a 10" I. O. bears S 15° W 20.3 ft.
13 at the southwest corner of the O. C. Franklin tract described in
1664 ft. and S 31° 34' W 668 ft. to a concrete monument for corner
12 THENCE along the east fence of said Delamain tract, S 34° 07' W
27° 35' E 20.3 ft. and a 6" I. O. bears S 62° 40' W 96.3 ft;

11 H. F. Delamain 147.48 acre tract, from which a 22" I. O. bears S
BEGINNING at a concrete monument, at the northeast corner of the
10 follows:
9 FIRST TRACT: 165.3 acres of land out of the Ransom Weed Survey
No. 63, in Hays County, Texas, described by metes and bounds as

8 follows, to-wit:
7 in Hays County, Texas, and being more particularly described as
6 successors and assigns, all that certain real property situated
5 Judaea, Inc., a Texas corporation, of Harris County, Texas, its
4 and by these presents does GRANT, SELL and CONVEY, unto Camp Your

3 tion hereinafter shown and stated, has GRANTED, SOLD and CONVEYED
2 principal office in Austin, Travis County, Texas, for the consider
1 That Eagle Rock Ranch, Inc., a Texas corporation, having its
COUNTY OF HAYS
THE STATE OF TEXAS

KNOW ALL MEN BY THESE PRESENTS:

§
§
§



Each and all of the instruments hereinabove mentioned are here-
1 referred to and made a part hereof for all pertinent, legal and
2 descriptive purposes.
3 TO HAVE AND TO HOLD the above described premises, together
4 with all and singular the rights and appurtenances thereto in any-
5 wise belonging, unto the said Camp Young Judaea, Inc., its succes-
6 sors or assigns, forever. And the said Eagle Rock Ranch, ~~xxx~~,
7 grantor herein, does hereby bind itself, its successors and assigns
8 to WARRANT and FOREVER DEFEND all and singular said premises unto
9 the said Camp Young Judaea, Inc., its successors and assigns,
10 against every person whatsoever lawfully claiming or to claim the
11 same, or any part thereof.
12 The consideration for this conveyance is as follows:
13 1. The sum of Ten and No/100 (\$10.00) Dollars cash and other
14 good and valuable consideration to us in hand paid by the said
15 Camp Young Judaea, Inc., grantee herein, the receipt and sufficiency
16 of which is hereby acknowledged and confessed.
17 2. The remaining Fifty-one Thousand Nine Hundred Twenty and
18 No/100 (\$51,920.00) Dollars of said consideration is evidenced by
19 one promissory note in the principal amount of Fifty-one thousand
20 Nine Hundred Twenty and No/100 (\$51,920.00) Dollars, bearing even
21 date herewith, payable to the order of Eagle Rock Ranch, ~~xxx~~,
22 executed by the grantee herein, Camp Young Judaea, Inc., with
23 interest and other terms as set out in said note; the terms and
24 conditions of which note are incorporated herein by reference and
25 made a part hereof.
26 But it is expressly agreed and stipulated that the vendor's
27 lien is retained against the above described property, premises and
28 improvements until the above described note, and all interest
29 thereon, is fully paid according to its face and tenor, effect and
30 reading, when this deed shall become absolute.
31 For the purpose of additionally securing the payment of the
32 above described note, the grantee herein, Camp Young Judaea, Inc.,

1 has this day executed and delivered to Wm. Z. Fitzgerald, Trustee,
for the use and benefit of the said Eagle Rock Ranch, Inc., a

3 deed of trust conveying the above described real property, and
4 said note is subject to maturity according to the terms and pro-
5 visions of said deed of trust, which is not yet of record but
6 which is, together with any future record thereof, here referred
7 to and made a part hereof for all pertinent purposes.

8 Grantee assumes payment of all taxes for the year 1970, same
9 having been prorated to the date hereof.

10 This conveyance is made and accepted subject to the following

11 1. 1/16 royalty interest, the royalties, bonuses, rentals
12 and all other rights reserved in instrument from Eagle Rock Cor-
13 poration to Eagle Rock Ranch, dated April 13, 1955, recorded in
14 Volume 164, Pages 270-272, of Deed Records of Hays County, Texas,
15 and in instrument from Conso Realty Co., to Eagle Rock Ranch, dated
16 April 13, 1955, recorded in Volume 164, Pages 272-281, of the Deed
17 Records of Hays County, Texas, reference to which instruments is
18 here made for all purposes.

19 2. A five (5') foot utility easement across the rear of all
20 lots in Eagle Rock Heights Section One (1) as shown on the record-
21 ed plat.

22 3. An assessment of Five and No/100 (\$5.00) Dollars per month
23 maintenance charge on lots in Eagle Rock Heights Section One (1).
24 WITNESS OUR HAND this the 16 day of July, A. D. 1970.

EAGLE ROCK RANCH
By C. B. Smith
C. B. Smith
President

ATTEST:
Henry Clepton
Secretary



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NCAC - W
Special
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121563
19.00

GENERAL WARRANTY DEED

Date: November 25, 2003

Grantor: Wimberley Quicksand Partners, Ltd., a Texas limited partnership

Grantor's Mailing Address (including county):

#1 Pro Lane
Wimberley, TX 78676
Hays County

Grantee: Camp Young Judaea, Inc., a Texas corporation

Grantee's Mailing Address (including County):

2100 W. Loop South, Suite 430
Houston, TX 77027
Harris County

Consideration: TEN AND NO/100 DOLLARS and other good and valuable consideration including the exchange of property in which Grantee has simultaneously conveyed other property to Grantor in exchange for the hereinafter described property.

Property (including any improvements):

Tract One: Being 2.41 acres of land, more or less, out of the Ransom Weed Survey A-63, Hays County, Texas, and being more particularly described by metes and bounds in Exhibit "B" attached hereto and made a part hereof for all legal and relevant purposes.

Tract Two: Being 6.05 acres of land, more or less, out of the Ransom Weed Survey A-63, Hays County, Texas, and being more particularly described by metes and bounds in Exhibit "A" attached hereto and made a part hereof for all legal and relevant purposes.

Tract Three: Being 0.713 acres of land, more or less, out of the Ransom Weed Survey A-63, Hays County, Texas, and being more particularly described by metes and bounds in Exhibit "C" attached hereto and made a part hereof for all legal and relevant purposes.

Tract Four: Lots 34 through 55, inclusive, Woodcreek, Section 6, a subdivision in Hays County, Texas, according to the map or plat thereof recorded in Volume 1, pages 169-170, Hays County Plat Records.

Reservations From and Exceptions to Conveyance and Warranty:

This conveyance is made and accepted subject to any and all restrictions, covenants, reservations, and easements, if any, relating to the hereinabove described property, but only to the extent they are still in effect, shown of record in the hereinabove mentioned County and State.

It is expressly understood and agreed that no lien, express or implied is intended to be created as a result of the exchange of property.

Grantor, for the consideration, receipt of which is acknowledged, and subject to the reservations from and exceptions to conveyance and warranty, grants, sells and conveys to Grantee the property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold it to Grantee, Grantee's heirs, executor, administrators,

successors or assigns forever. Grantor's heirs, executors, administrators and successors are hereby bound to warrant and forever defend all and singular the property to Grantee and Grantee's heirs, executors, administrators, successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, except as to the reservations from and exceptions to conveyance and warranty.

When the context requires, singular nouns and pronouns include the plural.

WIMBERLEY QUICKSAND PARTNERS, LTD.,
a Texas limited partnership

By: Quicksand Operating, Inc., a Texas corporation,
General Partner

By: *Mike Holbrook*
Mike Holbrook, Vice-President

ACKNOWLEDGMENT

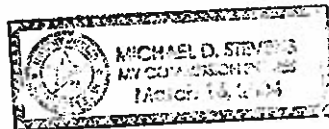
STATE OF TEXAS

COUNTY OF HAYS

This instrument was acknowledged before me on this 25th day of November, 2003, by Mike Holbrook, Vice-President of Quicksand Operating, Inc., a Texas corporation, General Partner for Wimberley Quicksand Partners, Ltd., a Texas limited partnership, on behalf of said partnership.

Michael D. Stevens
NOTARY PUBLIC, State of Texas

(print or stamp name of Notary)
My commission expires _____



PREPARED IN THE OFFICE OF:
Fitzgerald, Majors & Stevens
P.O. Box 727, Wimberley, Texas 78676

AFTER RECORDING RETURN TO:
The Hays County Abstract Company



**EAGLE
LAND
SURVEYING**

P.O. Box 2264 Wimberley, Texas 78676 (512) 847-1079 Fax: (512) 847-6522

Doc Bk Vol Pg
03039166 0PR 2365 709

October 13, 2003

TRACT 1

FIELD NOTES DESCRIBING 2.41 ACRES OF LAND, MORE OR LESS, OUT OF THE RANSOM WEED SURVEY A-63, HAYS COUNTY, TEXAS, SAID 2.41 ACRES BEING PART OF "WOODCREEK PARCEL 3", A 46.910 ACRE TRACT AS DESCRIBED AND RECORDED IN VOLUME 991, PAGE 200, HAYS COUNTY OFFICIAL PUBLIC RECORDS, BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS;

COMMENCING at a ½" iron pin found at the South corner of Lot 20, Woodcreek Village 6, a subdivision in Hays County, Texas, according to the map recorded in Volume 2, Page 45, Hays County Plat Records;

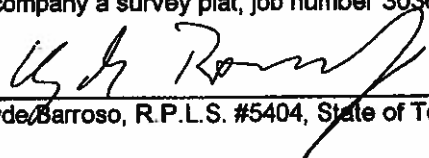
THENCE, S 63°43'07" W, a distance of 14.80 feet to a ½" iron pin found for the most Westerly corner of a 150 foot wide "air strip" a shown on the recorded plat of Woodcreek, Section 6, a subdivision in Hays County, Texas, according to the map recorded in Volume 1, Page 169, Hays County Plat Records, being the North corner of the herein described tract and the POINT OF BEGINNING for this description;

THENCE, S 28°08'12" W, with Southwest line of the 150 foot wide "air strip", a distance of 1,765.96 feet to a ½" iron pin set for the Southeast corner of the herein described parcel;

THENCE, S 61°49'04" W, leaving the Southwest line of the 150 foot wide "air strip", a distance of 75.55 feet to a ½" iron pin set for the South corner of the herein described parcel, being on the fenced Northeasterly line of the Camp Young Judaea property as described and recorded in Volume 237, Page 572, Hays County Deed Records.

THENCE, N 27°30'34" W, with the fenced Northeasterly line of the Camp Young Judaea property, a distance of 1,368.97 feet to a ½" iron pin found for an angle point;

THENCE, N 19°28'28" W, continuing with the fenced Northeasterly line of the Camp Young Judaea property, a distance of 401.69 feet to the POINT OF BEGINNING, containing 2.41 acres of land, more or less. These field notes accompany a survey plat, job number 30362.


Clyde Barroso, R.P.L.S. #5404, State of Texas



page one of one
30362/Tract 1field notes.doc
cb

EXHIBIT 'A'



**EAGLE
LAND
SURVEYING**

P.O. Box 2264 Wimberley, Texas 78676 (512) 847-1079 Fax: (512) 847-8522

Doc 03039166 Bk 0PR Vol 2365 Pg 718

October 13, 2003

TRACT 2

FIELD NOTES DESCRIBING 6.05 ACRES OF LAND, MORE OR LESS, OUT OF THE RANSOM WEED SURVEY A-63, HAYS COUNTY, TEXAS, SAID 6.05 ACRES BEING PART OF "WOODCREEK PARCEL 4", A 7.874 ACRE TRACT AS DESCRIBED AND RECORDED IN VOLUME 991, PAGE 258, HAYS COUNTY OFFICIAL PUBLIC RECORDS, AND AS SHOWN ON THE RECORDED PLAT OF WOODCREEK, SECTION SIX, ACCORDING TO THE MAP RECORDED IN VOLUME 1, PAGE 169, HAYS COUNTY PLAT RECORDS, SAID 6.05 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS;

BEGINNING at a 1/2" iron pin found at the South corner of Lot 20, Woodcreek Village 6, a subdivision in Hays County, Texas, according to the map recorded in Volume 2, Page 45, Hays County Plat Records, said point being an angle point on the North line of the herein described tract, and the POINT OF BEGINNING for this description;

THENCE, N 64°06'50"E, a distance of 134.33 feet to a 1/2" iron pin found for the East corner of the afore mentioned Lot 20 Woodcreek Village 6, being the West corner of Lot 55, Woodcreek, Section 6, a subdivision in Hays County, Texas, according to the map recorded in Volume 1, Page 169, Hays County Plat Records, same being the North corner of the herein described tract;

THENCE, S 28°10'15"E, with the Southwest lines of Lot 55 through Lot 34 (inclusive), of Woodcreek, Section 6, a distance of 1,760.06 feet to a 1/2" iron pin found for the South corner of Lot 34, Woodcreek, Section 6, same being the West corner of Lot 33, and the East corner of the herein described tract;

THENCE, S 61°49'04"W, a distance of 150.00 feet to a 1/2" iron pin set on the Southwest line of the afore mentioned 7.874 acre tract as described and recorded in Volume 991, Page 258, for the South corner of the herein described tract, passing at 75.00 feet, a 1/2" iron pin found at a fence corner;

THENCE, N 28°08'12"W, with the Southwest line of the afore mentioned 7.874 acre tract, a distance of 1,765.96 feet to a 1/2" iron pin found for the West corner of the herein described tract;

THENCE N 63°43'07"E, a distance of 14.80 feet to the POINT OF BEGINNING containing 6.05 acres of land, more or less. These field notes accompany a survey plat, job number 30362.


Clyde Barroso, R.P.L.S. #5404, State of Texas





**EAGLE
LAND
SURVEYING**

P.O. Box 2284 Wimberley, Texas 78678 (512) 847-1079 Fax: (512) 847-8522

Doc Bk Vol Pg
03039166 OPR 2365 711

September 17, 2003

FIELD NOTES DESCRIBING 0.713 ACRES OF LAND, MORE OR LESS, OUT OF THE RANSOM WEED SURVEY A-63, HAYS COUNTY, TEXAS, SAID 0.713 ACRES BEING A STRIP OF LAND, FIFTEEN TO TWENTY FEET IN WIDTH AND BEING A PART OF WOODCREEK, SECTION 6-C, AS SHOWN ON THE PLAT RECORDED IN VOLUME 1, PAGE 301, HAYS COUNTY PLAT RECORDS AND PART OF WOODCREEK VILLAGE SIX, AS SHOWN ON THE PLAT RECORDED IN VOLUME 2, PAGE 45, HAYS COUNTY PLAT RECORDS, SAID 0.713 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS;

BEGINNING at a ½" iron pin found at the Southwest corner of Lot 20 Woodcreek Village 6, said point being the Southeast corner of the herein described tract and the **POINT OF BEGINNING** for this description;

THENCE S 63°43'07"W, a distance of 14.80 feet to a ½" iron pin found for the Southeast corner of the Johanna L. Smith 87.95 acre tract, being the Southwest corner of the herein described tract;

THENCE with the fenced Northeast line of the afore mentioned Johanna L. Smith 87.95 acre tract, being the West line of the herein described tract the following five courses numbered 1) through 5),

- 1) N 30°12'11"W, a distance of 415.37 feet to a ½" iron pin found for an angle point;
- 2) N 39°26'29"W, a distance of 187.01 feet to a steel fence post found for an angle point;
- 3) N 39°44'23"W, a distance of 202.19 feet to a steel fence post found for an angle point;
- 4) N 39°26'42"W, a distance of 238.25 feet to a ½" iron pin found for an angle point;
- 5) N 20°33'22"W, a distance of 618.45 feet to a concrete monument found on the South right-of-way line of Jacob's Well Road for the Northeast corner of the Johanna L. Smith 87.95 acre tract, being the Northwest corner of the herein described tract;

THENCE N 67°29'42"E, with the South right-of-way line of Jacob's Well Road, a distance of 21.27 feet to a ½" iron pin set for the Northeast corner of the herein described tract;

THENCE with the East line of the herein described tract, the West line of Woodcreek, Section 6-C (corrected), as recorded in Volume 1, Page 301, Hays County Plat Records, the following ten courses numbered 6) through 15),

- 6) S 20°42'57"E, a distance of 12.51 feet to a ½" iron pin found at the North corner of Lot 63;
- 7) S 20°42'57"E, a distance of 609.60 feet to a ½" iron pin found at the rear angle point of Lot 57;
- 8) S 39°29'56"E, a distance of 228.85 feet to a ½" iron pin found at the South corner of Lot 56;

continued

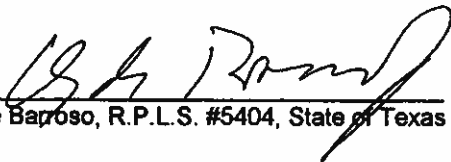


**EAGLE
LAND
SURVEYING**

P.O. Box 2284 Wimberley, Texas 78678 (512) 847-1079 Fax: (512) 847-8522

Doc 03039166 Bk OPR Vol 2365 Pg 712

- 9) S 37°38'47"E, a distance of 24.32 feet to a ½" iron pin found at the most Westerly corner of Lot 21, Woodcreek Village 6, as recorded in Volume 2, Page 45, Hays County Plat Records;
- 10) S 38°08'03"E, a distance of 178.47 feet to a ½" iron pin found for an angle point;
- 11) S 39°18'03"E, a distance of 188.04 feet to a ½" iron pin found for an angle point;
- 12) S 30°00'25"E, a distance of 160.46 feet to a ½" iron pin found at the South corner of Lot 21, the West corner of Lot 20, for an angle point;
- 13) S 29°55'33"E, a distance of 35.91 feet to a ½" iron pin found for an angle point;
- 14) S 30°17'49"E, a distance of 117.40 feet to a ½" iron pin found for an angle point;
- 15) S 30°26'42"E, a distance of 102.61 feet to the POINT OF BEGINNING, containing 0.713 acres of land, more or less. These field notes accompany a survey plat, job number 30362.


Clyde Barroso, R.P.L.S. #5404, State of Texas



page two of two
30362/field notes.doc
cb

FILED AND RECORDED
OFFICIAL PUBLIC RECORDS
On: Dec 05, 2003 at 03:12P
Document Number: 03039166
Amount 19.00
Lee Carlisle
County Clerk
By
Rebecca Hall, Deputy
Hays County

Hays CAD Property Search

Property ID: R16512 For Year 2017

Map

Unable to determine the physical location of the property. Please contact Hays CAD for more information.

Property Details

Account

Property ID: R16512
Legal Description: ABST 310 J MARKS ABST 349 G OVERLAND ABST 421 E SNEDICOR ABST 480 R WEED 82.407AC
Geographic ID: 10-0310-0049-00001-8
Agent Code:

Type: Real

Location

Address: FM 2325, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: 8ABS

Owner

Owner ID: O836285
Name: CAMP YOUNG JUDAEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	\$0
Improvement Non-Homesite Value:	\$0
Land Homesite Value:	\$0
Land Non-Homesite Value:	\$1,532,370
Agricultural Market Valuation:	\$0
Market Value:	\$1,532,370
Ag Use Value:	\$0
Appraised Value:	\$1,532,370
HS Cap:	\$0
Assessed Value:	\$0

VALUES DISPLAYED ARE 2017 PRELIMINARY VALUES and are subject to change prior to Certification.

DISCLAIMER Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Property Taxing Jurisdiction

Entity	Description	Market Value	Taxable Value
CAD	APPRAISAL DISTRICT	\$1,532,370	\$0
EWI	WIMBERLEY HAYS CO ES DIST #7	\$1,532,370	\$0
FWI	WIMBERLEY FIRE HAYS CO ES DIST #4	\$1,532,370	\$0
GHA	HAYS COUNTY	\$1,532,370	\$0
RSP	SPECIAL ROAD	\$1,532,370	\$0
SWI	WIMBERLEY ISD	\$1,532,370	\$0

Property Improvement - Building

Property Land

Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
E5	Rural Homesite > 5 Ac	82.407				\$1,532,370	\$0

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2017		\$0	\$1,532,370	\$0	\$1,532,370	\$0
2016		\$0	\$1,532,370	\$0	\$1,532,370	\$0
2015		\$0	\$1,445,610	\$0	\$1,445,610	\$0
2014		\$0	\$1,363,760	\$0	\$1,363,760	\$0
2013		\$0	\$1,363,760	\$0	\$1,363,760	\$0
2012		\$0	\$1,369,300	\$0	\$1,369,300	\$0
2011		\$0	\$1,369,300	\$0	\$1,369,300	\$0
2010		\$0	\$1,363,770	\$0	\$1,363,770	\$0
2009		\$0	\$454,590	\$0	\$454,590	\$0

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
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DISCLAIMER

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Hays CAD Property Search

Property ID: R16511 For Year 2017

Map

Unable to determine the physical location of the property. Please contact Hays CAD for more information.

Property Details

Account

Property ID: R16511
Legal Description: ABS 310-349-421-480 MARKS,OVERLAND,SNEDICOR,WEED 151.206 AC EXEMPT % 1/1/07
Geographic ID: 10-0310-0049-00000-8
Agent Code:
Type: Real
Location
Address: FM 2325, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: 8ABS
Owner
Owner ID: O836285
Name: CAMP YOUNG JUDAEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964
% Ownership: 100.0%
Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	\$0
Improvement Non-Homesite Value:	\$0
Land Homesite Value:	\$0
Land Non-Homesite Value:	\$2,811,690
Agricultural Market Valuation:	\$0
Market Value:	\$2,811,690
Ag Use Value:	\$0
Appraised Value:	\$2,811,690
HS Cap:	\$0
Assessed Value:	\$0

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Property Taxing Jurisdiction

Entity	Description	Market Value	Taxable Value
CAD	APPRAISAL DISTRICT	\$2,811,690	\$0
EWM	WIMBERLEY HAYS CO ES DIST #7	\$2,811,690	\$0
FWI	WIMBERLEY FIRE HAYS CO ES DIST #4	\$2,811,690	\$0
GHA	HAYS COUNTY	\$2,811,690	\$0
RSP	SPECIAL ROAD	\$2,811,690	\$0
SWI	WIMBERLEY ISD	\$2,811,690	\$0

Property Improvement - Building

Property Land

Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
E5	Rural Homesite > 5 Ac	151.206				\$2,811,690	\$0

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2017		\$0	\$2,811,690	\$0	\$2,811,690	\$0
2016		\$0	\$2,811,690	\$0	\$2,811,690	\$0
2015		\$0	\$2,652,510	\$0	\$2,652,510	\$0
2014		\$0	\$2,502,330	\$0	\$2,502,330	\$0
2013		\$0	\$2,502,330	\$0	\$2,502,330	\$0
2012		\$0	\$2,512,480	\$0	\$2,512,480	\$0
2011		\$0	\$2,512,480	\$0	\$2,512,480	\$0
2010		\$0	\$2,621,120	\$0	\$2,621,120	\$0
2009		\$0	\$873,710	\$0	\$873,710	\$0

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
7/16/1970	CVD	CVD		CAMP YOUNG JUDAEA INC	237	564	

DISCLAIMER

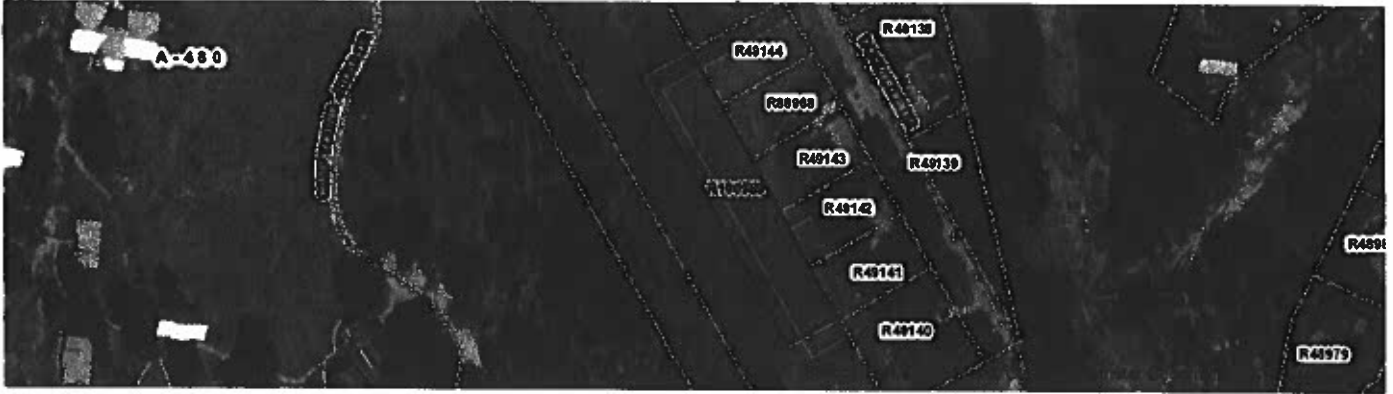
VALUES DISPLAYED ARE 2017 PRELIMINARY VALUES and are subject to change prior to Certification.

DISCLAIMER Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Hays CAD Property Search

Property ID: R52673 For Year 2017

Map



Property Details

Account

Property ID: R52673
Legal Description: WOODCREEK PHASE I AIRSTRIP 7.185 AC WC PARCEL # 4
Geographic ID: 11-9810-9991-99999-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: WOOD1

Owner

Owner ID: O836285
Name: CAMP YOUNG JUDAEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	\$0
Improvement Non-Homesite Value:	\$0
Land Homesite Value:	\$0
Land Non-Homesite Value:	\$44,540
Agricultural Market Valuation:	\$0
Market Value:	\$44,540
Ag Use Value:	\$0
Appraised Value:	\$44,540
HS Cap:	\$0
Assessed Value:	\$0

VALUES DISPLAYED ARE 2017 PRELIMINARY VALUES and are subject to change prior to Certification.

DISCLAIMER Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Property Taxing Jurisdiction

Entity	Description	Market Value	Taxable Value
CAD	APPRAISAL DISTRICT	\$44,540	\$0
CWC	CITY OF WOODCREEK	\$44,540	\$0
EWI	WIMBERLEY HAYS CO ES DIST #7	\$44,540	\$0
FWI	WIMBERLEY FIRE HAYS CO ES DIST #4	\$44,540	\$0
GHA	HAYS COUNTY	\$44,540	\$0
RSP	SPECIAL ROAD	\$44,540	\$0
SWI	WIMBERLEY ISD	\$44,540	\$0

Property Improvement - Building

Property Land

Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
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Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2017		\$0	\$44,540	\$0	\$44,540	\$0
2016		\$0	\$44,540	\$0	\$44,540	\$0
2015		\$0	\$42,010	\$0	\$42,010	\$0
2014		\$0	\$39,640	\$0	\$39,640	\$0
2013		\$0	\$39,640	\$0	\$39,640	\$0
2012		\$0	\$3,590	\$0	\$3,590	\$3,590
2011		\$0	\$3,590	\$0	\$3,590	\$3,590
2010		\$0	\$3,590	\$0	\$3,590	\$3,590
2009		\$0	\$3,590	\$0	\$3,590	\$3,590

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
11/15/2003	WD	Warranty Deed	WIMBERLEY SPRINGS PARTNERS LTD	CAMP YOUNG JUDAEA INC	2417	446	04005988
10/12/2005	DOC	Varies Types Of Documents		WIMBERLEY SPRINGS PARTNERS LTD	3877	4	10011393
8/29/2001	WD	Warranty Deed	WOODCREEK DEVELOPMENT LTD	WIMBERLEY QUICKSAND PARTNERS LTD	1881	57	
5/6/1993	CVD	CVD		WOODCREEK DEVELOPMENT LTD	991	258	

DISCLAIMER

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Hays CAD Property Search

Property ID: R47891 For Year 2017

Map

Unable to determine the physical location of the property. Please contact Hays CAD for more information.

Property Details

Account

Property ID: R47891
 Legal Description: WC VILLAGE WILDWOOD VILLAGE LOT 20 GEO#90607986 (EXEMPT % 1/1/2006)
 Geographic ID: 11-9510-0000-02000-8
 Agent Code:
 Type: Real

Location

Address: 23 WILDWOOD DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WCVI

Owner

Owner ID: O9158018
 Name: CAMP YOUNG JUDAEA INC
 Mailing Address: 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	\$0
Improvement Non-Homesite Value:	\$0
Land Homesite Value:	\$0
Land Non-Homesite Value:	\$8,700
Agricultural Market Valuation:	\$0
Market Value:	\$8,700
Ag Use Value:	\$0
Appraised Value:	\$8,700
HS Cap:	\$0
Assessed Value:	\$0

VALUES DISPLAYED ARE 2017 PRELIMINARY VALUES and are subject to change prior to Certification.

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Property Taxing Jurisdiction

Entity	Description	Market Value	Taxable Value
CAD	APPRAISAL DISTRICT	\$8,700	\$0
CWC	CITY OF WOODCREEK	\$8,700	\$0
EWI	WIMBERLEY HAYS CO ES DIST #7	\$8,700	\$0
FWI	WIMBERLEY FIRE HAYS CO ES DIST #4	\$8,700	\$0
GHA	HAYS COUNTY	\$8,700	\$0
RSP	SPECIAL ROAD	\$8,700	\$0
SWI	WIMBERLEY ISD	\$8,700	\$0

Property Improvement - Building

Property Land

Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
C1	Vac Platted - 5.00 Ac Or Less					\$8,700	\$0

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2017		\$0	\$8,700	\$0	\$8,700	\$0
2016		\$0	\$8,700	\$0	\$8,700	\$0
2015		\$0	\$8,700	\$0	\$8,700	\$0
2014		\$0	\$8,700	\$0	\$8,700	\$0
2013		\$0	\$8,400	\$0	\$8,400	\$0
2012		\$0	\$8,400	\$0	\$8,400	\$0
2011		\$0	\$8,400	\$0	\$8,400	\$0
2010		\$0	\$8,400	\$0	\$8,400	\$0
2009		\$0	\$6,000	\$0	\$6,000	\$0

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
2/19/2003	SWD	Special Warranty Deed	AQUA TEXAS INC	CAMP YOUNG JUDAEA INC	2172	803	
9/27/2002	SWD	Special Warranty Deed	AQUASOURCE ACQUISITION INC	AQUA TEXAS INC	2087	825	
9/4/1997	Conv	Conversion	RDMS FAMILY PARTNERS LTD	AQUASOURCE ACQUISITION INC	1342	464*	
5/15/1997	CVD	CVD		RDMS FAMILY PARTNERS LTD	1313	006	

DISCLAIMER

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DISCLAIMER Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Hays CAD Property Search

Property ID: R113370 For Year 2017

 Map

Unable to determine the physical location of the property. Please contact Hays CAD for more information.

Property Details

Account

Property ID: R113370
Legal Description: WOODCREEK SEC 1, LOT UNPLATTED PT OF TR 894, ACRES 0.556 EXEMPT %1/1/2005
Geographic ID: 11-9810-9991-89403-8
Agent Code:

Type: Real

Location

Address: PRO LN, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD:

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	\$0
Improvement Non-Homesite Value:	\$0
Land Homesite Value:	\$0
Land Non-Homesite Value:	\$5,650
Agricultural Market Valuation:	\$0
Market Value:	\$5,650
Ag Use Value:	\$0
Appraised Value:	\$5,650
HS Cap:	\$0
Assessed Value:	\$0

VALUES DISPLAYED ARE 2017 PRELIMINARY VALUES and are subject to change prior to Certification.

DISCLAIMER Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Property Taxing Jurisdiction

Entity	Description	Market Value	Taxable Value
CAD	APPRAISAL DISTRICT		\$5,650
CWC	CITY OF WOODCREEK		\$5,650
EWI	WIMBERLEY HAYS CO ES DIST #7		\$5,650
FWI	WIMBERLEY FIRE HAYS CO ES DIST #4		\$5,650
GHA	HAYS COUNTY		\$5,650
RSP	SPECIAL ROAD		\$5,650
SWI	WIMBERLEY ISD		\$5,650

Property Improvement - Building

Property Land

Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
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Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2017		\$0	\$5,650	\$0	\$5,650	\$0
2016		\$0	\$5,650	\$0	\$5,650	\$0
2015		\$0	\$5,650	\$0	\$5,650	\$0
2014		\$0	\$5,650	\$0	\$5,650	\$0
2013		\$0	\$5,650	\$0	\$5,650	\$0
2012		\$0	\$5,650	\$0	\$5,650	\$0
2011		\$0	\$5,650	\$0	\$5,650	\$0
2010		\$0	\$5,650	\$0	\$5,650	\$0
2009		\$0	\$5,650	\$0	\$5,650	\$0

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
3/2/2004	GWD	General Warranty Deed	WIMBERLEY QUICKSAND PARTNERS LTD	CAMP YOUNG JUDEA INC	2417	442	
4/23/2001	WD	Warranty Deed		WIMBERLEY QUICKSAND PARTNERS LTD	1801	166	

DISCLAIMER

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Hays CAD Property Search

Property ID: R49145 For Year 2017

Map



Property Details

Account

Property ID: R49145
Legal Description: WOODCREEK SEC 6 LOT 34 GEO#90608104
Geographic ID: 11-9810-0600-03400-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49146 For Year 2017

Map



Property Details

Account

Property ID: R49146
Legal Description: WOODCREEK SEC 6 LOT 35 GEO#90608105
Geographic ID: 11-9810-0600-03500-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49147 For Year 2017

Map



Property Details

Account

Property ID: R49147

Legal Description: WOODCREEK SEC 6 LOT 36 GEO#90608685

Geographic ID: 11-9810-0600-03600-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875

Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

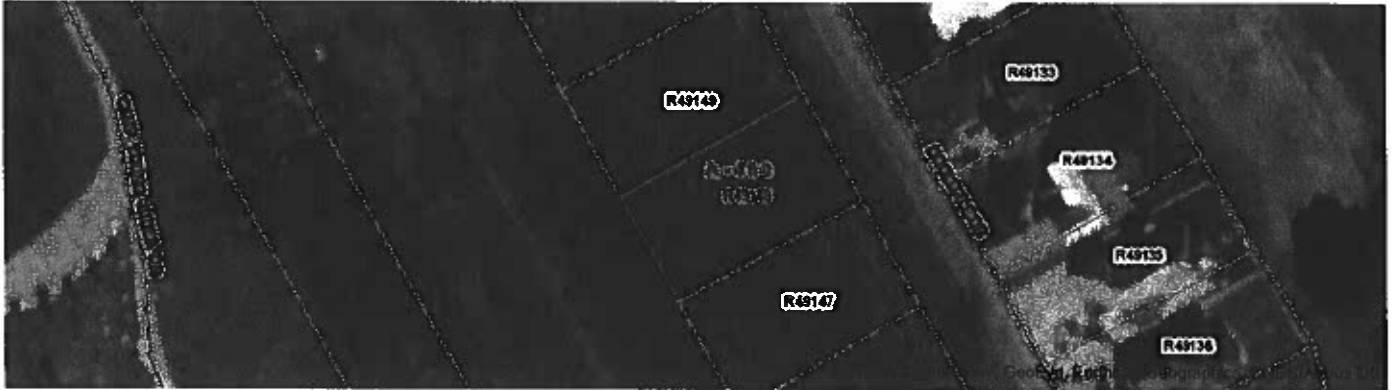
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49148 For Year 2017

Map



Property Details

Account

Property ID: R49148
Legal Description: WOODCREEK SEC 6 LOT 37 GEO#90608106
Geographic ID: 11-9810-0600-03700-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49149 For Year 2017

Map



Property Details

Account

Property ID: R49149
Legal Description: WOODCREEK SEC 6 LOT 38 GEO#90608107
Geographic ID: 11-9810-0600-03800-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

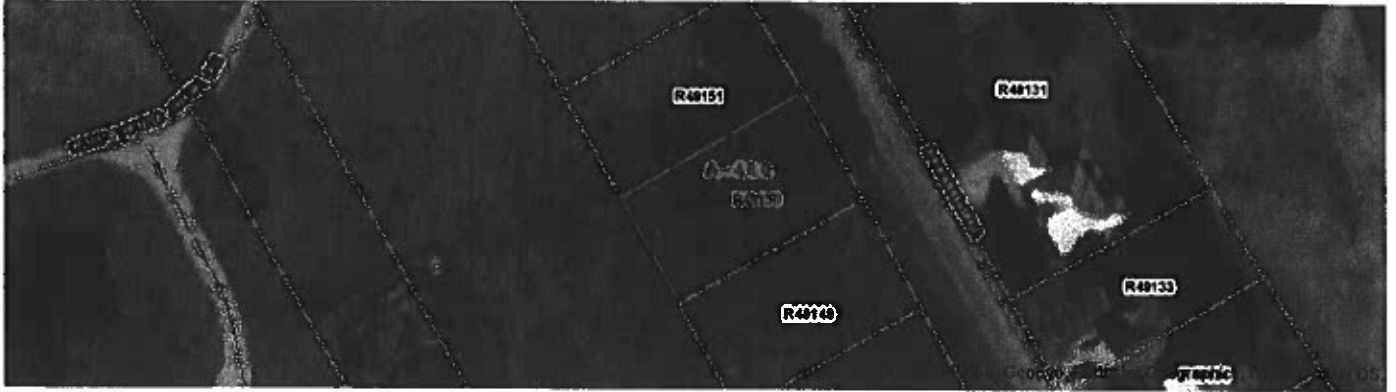
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49150 For Year 2017

Map



Property Details

Account

Property ID: R49150
Legal Description: WOODCREEK SEC 6 LOT 39 GEO#90608108
Geographic ID: 11-9810-0600-03900-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49151 For Year 2017

Map



Property Details

Account

Property ID: R49151

Legal Description: WOODCREEK SEC 6, LOT 40

Geographic ID: 11-9810-0600-04000-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875

Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

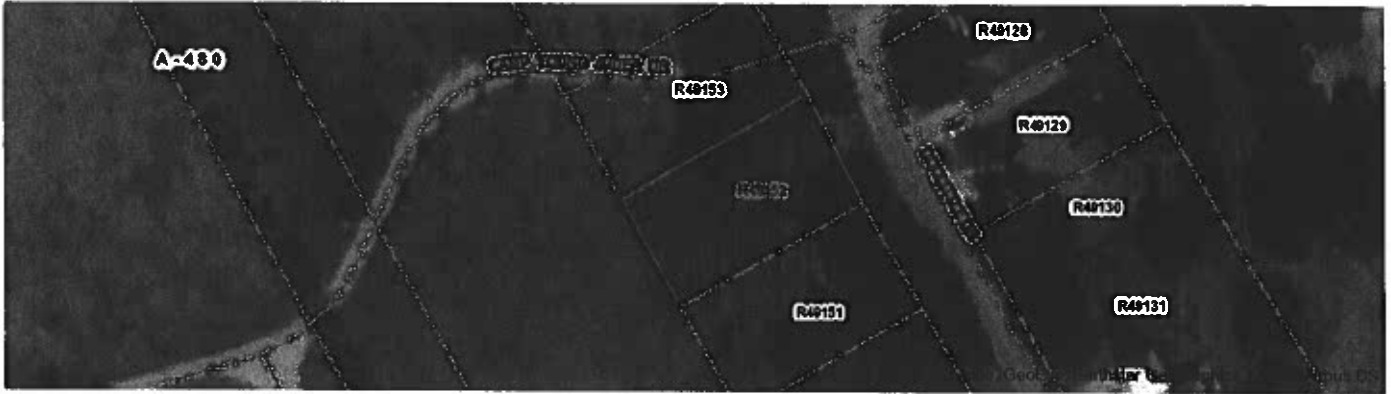
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49152 For Year 2017

Map



Property Details

Account

Property ID: R49152
Legal Description: WOODCREEK SEC 6, LOT 41
Geographic ID: 11-9810-0600-04100-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: 09162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

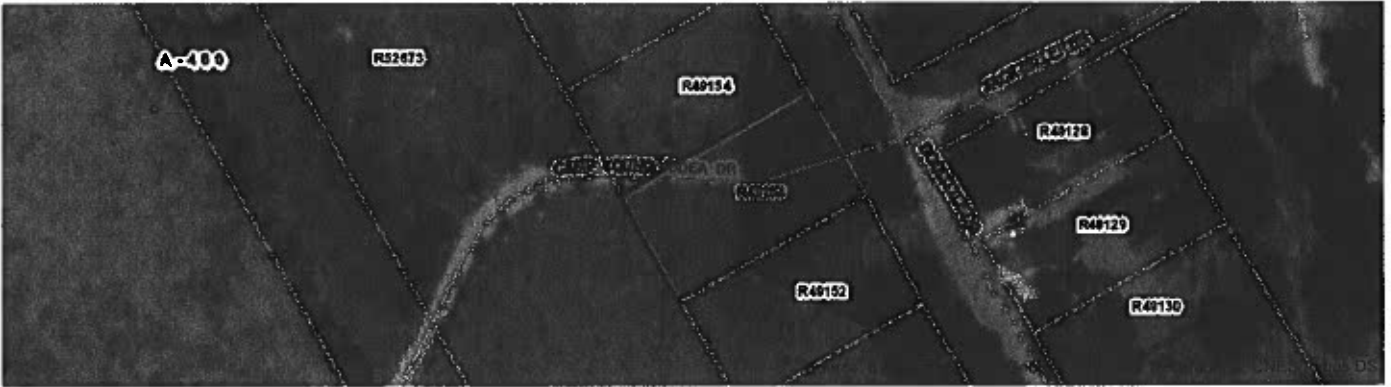
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49153 For Year 2017

Map



Property Details

Account

Property ID: R49153
Legal Description: WOODCREEK SEC 6, LOT 42
Geographic ID: 11-9810-0600-04200-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49154 For Year 2017

Map



Property Details

Account

Property ID: R49154
Legal Description: WOODCREEK SEC 6 LOT 43 GEO#90608689
Geographic ID: 11-9810-0600-04300-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676
Map ID:
Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49155 For Year 2017

Map



Property Details

Account

Property ID: R49155

Legal Description: WOODCREEK SEC 6 LOT 44 GEO#90608690

Geographic ID: 11-9810-0600-04400-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875

Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

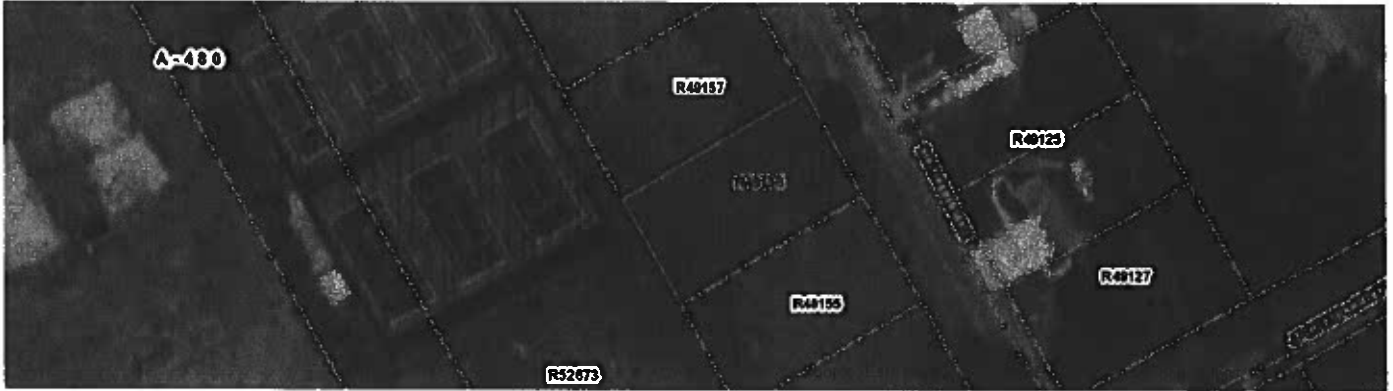
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49156 For Year 2017

Map



Property Details

Account

Property ID: R49156
Legal Description: WOODCREEK SEC 6 LOT 45 GEO#90608109
Geographic ID: 11-9810-0600-04500-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49157 For Year 2017

Map



Property Details

Account

Property ID: R49157
Legal Description: WOODCREEK SEC 6 LOT 46 GEO#90608110
Geographic ID: 11-9810-0600-04600-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49158 For Year 2017

Map



Property Details

Account

Property ID: R49158
Legal Description: WOODCREEK SEC 6 LOT 47 GEO#90608111
Geographic ID: 11-9810-0600-04700-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

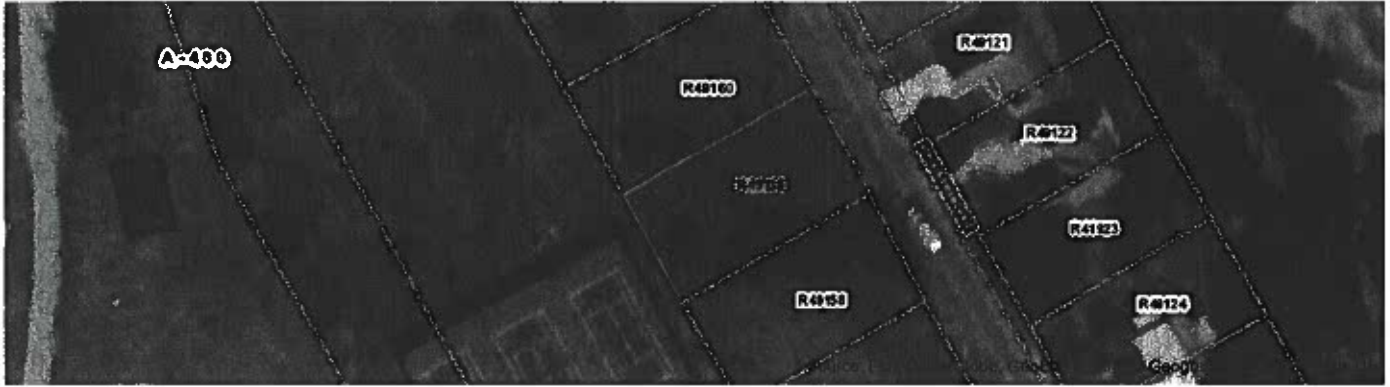
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49159 For Year 2017

Map



Property Details

Account

Property ID: R49159
Legal Description: WOODCREEK SEC 6 LOT 48 GEO#90608691
Geographic ID: 11-9810-0600-04800-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49160 For Year 2017

Map



Property Details

Account

Property ID: R49160
Legal Description: WOODCREEK SEC 6 LOT 49 GEO#90619742
Geographic ID: 11-9810-0600-04900-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49161 For Year 2017

Map



Property Details

Account

Property ID: R49161
Legal Description: WOODCREEK SEC 6 LOT 50 GEO#90608113
Geographic ID: 11-9810-0600-05000-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49162 For Year 2017

[Map](#)


Property Details

Account

Property ID: R49162
Legal Description: WOODCREEK SEC 6 LOT 51 GEO#90608114
Geographic ID: 11-9810-0600-05100-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

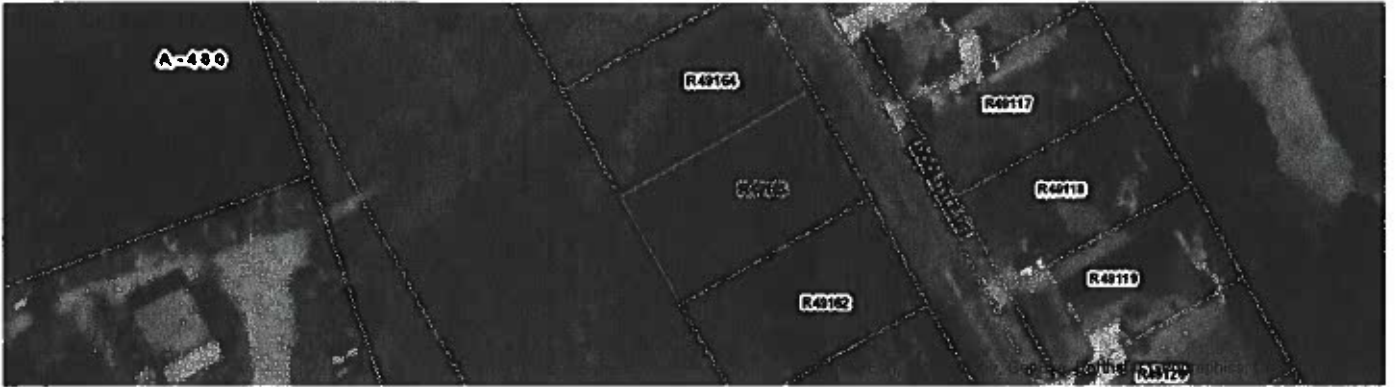
% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49163 For Year 2017

Map



Property Details

Account

Property ID: R49163
Legal Description: WOODCREEK SEC 6 LOT 52 GEO#90608692
Geographic ID: 11-9810-0600-05200-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O8162875
Name: CAMP YOUNG JUDEA INC

Mailing Address: Attn: TREASURER
 5410 BELLAIRE BLVD
 STE 207
 BELLAIRE, TX 77401-3964

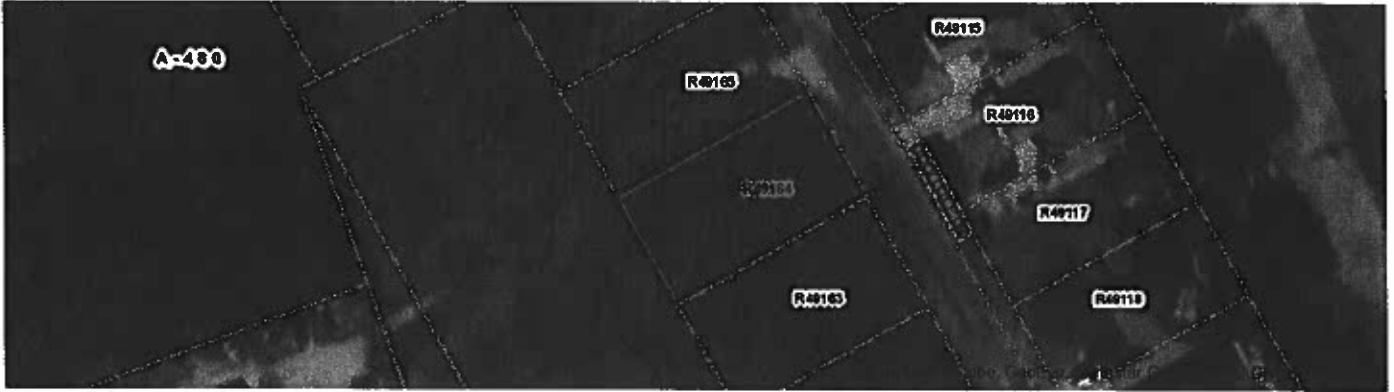
% Ownership: 100.0%

Exemptions: EX - Exempt Property
 For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49164 For Year 2017

Map



Property Details

Account

Property ID: R49164
Legal Description: WOODCREEK SEC 6 LOT 53 GEO#90608115
Geographic ID: 11-9810-0600-05300-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

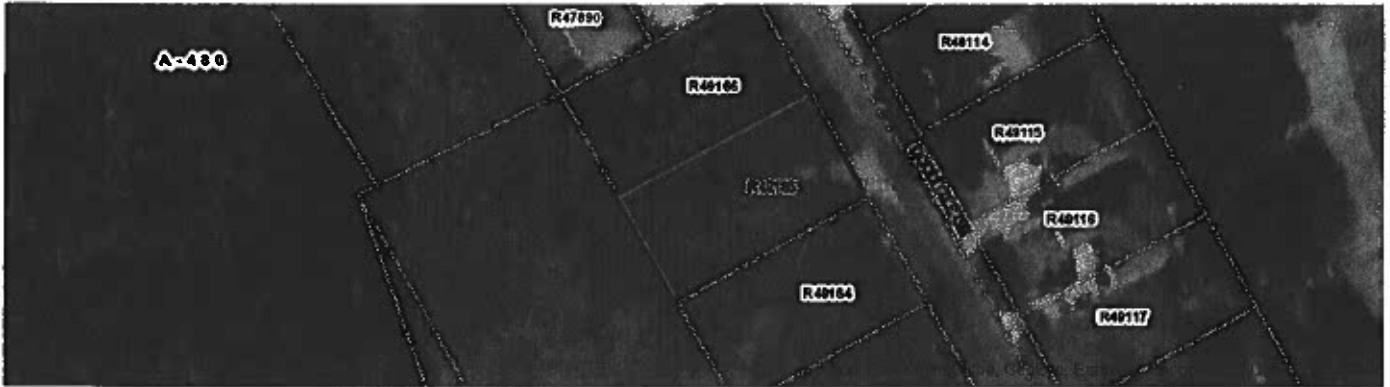
% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49165 For Year 2017

Map



Property Details

Account

Property ID: R49165
Legal Description: WOODCREEK SEC 6 LOT 54 GEO#90608116
Geographic ID: 11-9810-0600-05400-8

Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3984

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

Hays CAD Property Search

Property ID: R49166 For Year 2017

Map



Property Details

Account

Property ID: R49166
Legal Description: WOODCREEK SEC 6 LOT 55 GEO#90608117
Geographic ID: 11-9810-0600-05500-8
Agent Code:

Type: Real

Location

Address: DOOLITTLE DR, WIMBERLEY, TX 78676

Map ID:

Neighborhood CD: WOOD1

Owner

Owner ID: O9162875
Name: CAMP YOUNG JUDEA INC
Mailing Address: Attn: TREASURER
5410 BELLAIRE BLVD
STE 207
BELLAIRE, TX 77401-3964

% Ownership: 100.0%

Exemptions: EX - Exempt Property
For privacy reasons not all exemptions are shown online.

July 28, 2017

City of Woodcreek
41 Champions Circle
Woodcreek, Texas 78676

Attn: Brenton B. Lewis, City Manager
Phone: (512) 847-9390
Email: manager@woodcreektx.gov

Attn: Mr. Gilbert Watt, Fire Marshall
Email: durhamconst312@gmail.com

Re: Camp Young Judaea – Retreat Village
Matkin Hoover Job No. 2620.02

Dear Mr. Lewis:

This letter and its attachments serve as a response to comments received from the City of Woodcreek for the Site Development Plan Application for the above referenced project on June 12, 2017 from Mr. Brenton Lewis and on July 20th, 2017 from Mr. Gilbert Watt.

Comment 1:

Sht CS- 100 - Proposed bldgs. represent 52,722 SF or 1.21 ac. Proposed Impervious Cover is indicated as 1.84 ac. Pls reconcile difference between Proposed Bldgs and Prop IC.

Response:

The Impervious cover has been checked and corrected on sheet CS100 to be 85914.9 SF (1.97AC). In addition, a net impervious cover has been added because there is 0.18 acres of impervious cover that is proposed to be demolished in the development of this site to equal a net proposed impervious cover of 78074.1 SF (1.79AC).

Comment 2:

Sht CG-701 – A.) The master drainage plan does not analyze the pre-construction drainage vs the post-construction drainage. This plan need to assure that the increase in Q at all design frequencies as a result of new impervious cover does not increased the flows and velocities on downstream and surrounding properties. Please also address the need for detention or explain why none is provided.
B.) Note 11 explains that Culvert 2 will experience overtopping - why not increase the diameter of Culvert 2? It appears that no consideration was given to downstream areas from both new channels. You may at least should consider level spreaders and/or energy dissipaters.
C.) Does the current drainage design take into account future phases?

Response:

A.) Please refer to note 3 on the Master Drainage Plan. (3. The intent of this plan is for on-site storm drain and channel design only. Refer to the drainage analysis for the downstream impact analysis and results) Please refer to the Drainage Analysis that was submitted with the Concept Plan Application on May 5, 2017 for the downstream impact analysis results. The Drainage Analysis includes both existing and proposed condition flows calculated per the City of Austin Drainage Criteria Manual. The proposed analysis includes both phases of the development to calculated for ultimate development conditions. The Drainage analysis also contains all the documents referenced for the completion of this drainage analysis and explains why detention is



not proposed in the summary of the drainage letter. B.) A second culvert was added to the second culvert crossing and 2 notes on this sheet were updated to reflect these changes. B.) The diversion channels release the storm water just pass the site with sufficient room for the storm water to return to its existing patterns before exiting the property, therefor no energy dissipaters have been proposed. Additionally, the proposed channel that runs along the west of the project site has been moved for downstream development considerations.

Comment 3:

Please comply with all requirements of the City's Water Quality Ordinance

Response:

Water Quality sheets have been added to the plans and a City of Woodcreek water quality plan has been completed and is included with this submittal.

Comment 4:

Please address how the contractor is to handle construction traffic on City streets.

Response:

Large construction vehicle haul route information and a plan note has been added to Sheet G-001. Plan note states the contractor shall notify the City of Woodcreek City Manager 48 hours prior to large construction vehicles using city roads for site access and provides the cities preferred days and time for usage.

Comment 5:

Please provide an Engineer's summary report addressing all of the elements of your proposed site plan including the design engineer's certification that the submittal meets all City regulations related to your proposed development.

Response:

An Engineering design report has been included in this submittal.

Comment 6:

Additional Comment: These comments do not include compliance with the Fire Code, and we have not received any correspondence from the Fire Marshall.

Response:

Noted. Comments received from Fire Marshall, Mr. Gilbert Watt on July 20th, 2017 and our corresponding responses follow.

Comment 1 (Fire Review):

The proposed fire hydrant needs to be located between the two proposed fire lane access points. This requires adding about 100 feet of pipe.

Response:

The proposed fire hydrant will be relocated on all corresponding plan sheets to the noted location. Concurrently, an updated Fire Flow Calculation Sheet CU201 will be provided.

Comment 2 (Fire Review):

CU101 shows a rectangle near the tap to the water main. I presume this indicates a backflow prevention device. The device must be a type acceptable to the water purveyor. Please provide a detail acceptable to the water purveyor for this device.

Response:

Plan note on Sheet CU100 will be revised to indicate a backflow device as approved by the water purveyor Aqua Texas and a detail reference will be added (Ref: Detail on Sheet C-502).



General Comment 1 (Fire Review):

It is not my intent that these comments hold up the issuance of a permit, but will consider them as part of the plans and inspections will verify that these comments have adequately been addressed.

Response:

Noted. MatkinHoover Engineering acknowledges the Fire Marshall's prior acceptance of these Site Development Plans as reviewed for permit issuance. While these revisions are not part of this resubmittal application, MatkinHoover Engineering is committed to providing these plan revisions prior to construction.

Should you or your staff have questions, comments, or require additional information, please feel free to contact our office.

Sincerely,
Matkin Hoover Engineering & Surveying
TBPE Firm Registration No. F-4512

A handwritten signature in blue ink that reads "Garrett Keller". The signature is written in a cursive, flowing style.

Garrett D. Keller, P.E.
Project Manager

MATKIN-HOOVER ENGINEERING

Transmittal

Date: 07/28/2017

Company: City of Woodcreek

Attention: Brenton B. Lewis

Address: 41 Champions Circle, Woodcreek, TX 78676-3327

Re: Camp Young Judaea – Retreat Village Site Development Plan Application Resubmittal

For Approval For Review Please Comment Please Reply For Your Information

ITEMS ATTACHED

Item	Description:
1	Comments Response Letter
2	Civil Concept Plan Sheet CS100
3	Downstream Impact Analysis
4	Civil Master Drainage Plan Sheet CG701
5	Civil Grading Plan Sheet CG101
6	City of Woodcreek Water Quality Plan (modified BMP's)
7	Civil Site Plan Sheet G-001
8	Engineer's Summary Report
9	Fire Marshall Review Plan Approval for Permitting (email from Mr. Gilbert Watt)

• **Comments:** If you have any questions please feel free to give me a call at (830) 249-0600 – Garrett D. Keller

Sent by: Garrett D. Keller, P.E.

Job No. 2620.02

Post Office Box 54 1499 S. Main Boerne, Texas 78006 Phone 830.249.0600 Fax 830.249.0099

MATKIN-HOOVER ENGINEERING

Transmittal

Date: 08/09/2017

Company: City of Woodcreek

Attention: Brenton B. Lewis

Address: 41 Champions Circle, Woodcreek, TX 78676-3327

Re: Camp Young Judaea – Retreat Village Site Development Plan Application Submittal #3

For Approval For Review Please Comment Please Reply For Your Information

ITEMS ATTACHED

Qty:

Description:

NOTE:	<i>[Concept Plan Application Submitted on 05/04/2017]</i>
1	Digital Copy of Complete Submittal Package [Note: To be delivered on 08/09/2017 via downloadable Dropbox link emailed to the City of Woodcreek, TX. to the following addresses: manager@woodcreektx.gov (Brenton Lewis), and admin@woodcreektx.gov]
ITEM:	
1	2 – 24X36 Copies of Construction Drawings
2	1 – 11X17 Copy of Construction Drawings
3	1 – Copy of the Downstream Impact Analysis
4	City of Woodcreek Water Quality Plan (modified BMP's)
5	1 – Copy of Engineer's Summary Report

● **Comments:** If you have any questions please feel free to give me a call at (830) 249-0600 – Garrett D. Keller

Sent by: Garrett D. Keller, P.E.

Job No. 2620.02

August 9, 2017

City of Woodcreek
41 Champions Circle
Woodcreek, Texas 78676

Attn: Brenton B. Lewis, City Manager
Phone: (512) 847-9390
Email: manager@woodcreektx.gov

Re: Camp Young Judaea – Retreat Village
Matkin Hoover Job No. 2620.02

Dear Mr. Lewis:

The purpose of this correspondence is to summarize the engineering approach to the Camp Young Judaea Proposed Dormitory development project. All aspects of design comply with the City of Woodcreek Code of Ordinances as well as TCEQ's Technical Guidance Manual, RG-348.

I. General Site Information

The proposed new dormitory housing development will be constructed within Camp Young Judaea in Woodcreek, Texas. It will be located east of Camp Young Judaea Road and just east and south of the two story Shalom Center. The existing site is currently undeveloped grasslands with trees to the south that are to remain undisturbed.

II. Proposed Development

The proposed development includes the construction of 7 new 1,750 sq. ft. dormitories, a 2,940 sq. ft. Activity Center, and 288 sq. ft. laundry room with associated service drive, sidewalks, fire protection and general water service, sanitary service and electrical service in two phases. Two fire lanes will tie-in to the existing Camp Young Judaea Road turnaround to provide vehicle access to the new buildings. Part of the existing Camp Young Judaea Road will be demolished and converted into a fire lane that will lead south to accommodate the proposed development with a secondary fire lane proposed to tie-in to the existing turnabout and circulate around the dormitories creating a closed loop around the 7 dormitories. The drive will be built around the dormitories connecting to the existing Camp Young Judaea Road in front of the activity center providing complete unimpeded access to the buildings with designated parking for each. 5 ft. concrete sidewalks will be provided

around each building and between buildings to provide pedestrian access to all of the new building entry locations as well as access to existing structures on the property.

III. Site Fire Protection

The proposed development will provide Fire Lane access to all future buildings. Each dormitory will be provided with an engineered Fire Suppression Sprinkler System. A proposed Fire Hydrant will be accessible between the two-proposed fire lane access points.

IV. Site Drainage and Grading

The natural drainage patterns of the site convey drainage from the north to the south. Existing conditions sheet flow across the existing project site south through the existing grassland towards the trees located just south of the proposed development location, along a naturally occurring flow path exiting the property. Currently no drainage structures are in place on-site. Two diversion channels are proposed to direct the water around the developed site, one to the east of the development to capture all current runoff from the, mostly, off-site contributing zone II which consists of approximately 1,150 acres of watershed to be diverted south of the development and into a culvert. The second channel is proposed to run adjacent to the section of Camp You Judaea Road to be converted into a fire lane. The channel will begin with a culvert under the northern most proposed fire lane continuing adjacent to the newly constructed fire lane to a third proposed culvert. The first culvert will collect water from the onsite watershed and route it into the channel proposed to direct the runoff from upgradient storm runoff and the onsite watershed towards the third culvert.

V. Water Quality

The storm water captured on site will be treated by a combination of rainwater harvesting and vegetative filter strips. Rainwater harvesting will be utilized on all proposed building structures, diverting water to two proposed water storage tanks. Other paved areas (pavement and sidewalk) will be captured and treated by vegetative filter strips. Storm water captured by both rainwater harvesting tanks and vegetative filter strips will be treated to remove 90% of Total Suspended Solids in accordance with TCEQ's Technical Guidance Manual RG-348 as well as 90% of the Phosphorous per the City of Woodcreek's requirements. The land Owner's representative has signed an agreement stating that there will be no use of pesticides, herbicides, and or fertilizers on the property. The rainwater

harvesting system has been designed to capture 1.5" of rainfall on all proposed buildings regardless of which phase of construction they will be built in.

VI. Civil Site Utilities

Fire Protection Water

The proposed fire protection water service to the new development will be provided by an existing off-site 10" water line operated by Aqua Texas that runs parallel to and along the Doolittle Drive Right of Way. A proposed 8" fire line shall connect to the existing 10" line and extend due west to the proposed development. The proposed branch connection shall be provided with a branch tee fitting, branch isolation valve with box and an Aqua Texas approved double check backflow prevention device. On-site distribution shall include a dedicated 6" fire line to each of the proposed dormitories on the site as well as an on-site fire hydrant (as approved by the local Fire Marshall) located between the two fire lane access lanes.

Domestic Water

A proposed looped 6" water line shall connect to an existing off-site water main on the site operated by Aqua Texas and will extend and provide domestic water service to entire proposed development. Individual dedicated domestic water branch service lines will be extended to each of the proposed dormitories on the site.

Sanitary Sewer

A proposed gravity flow sanitary sewer system shall be provided for the entire proposed development. Individual sanitary sewer service laterals will serve each of the proposed dormitories and will connect to a sanitary sewer main line. The proposed sanitary sewer system shall connect to an existing on-site sewage collection system operated by Aqua Texas.

Camp Young Judaea

Woodcreek, Texas

Downstream Impact Analysis

July 2017
TBPE # 4512
MHE 2620.02

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Project Overview

The Camp Young Judaea proposed dormitory development consist of developing approximately 4-acres in 2 phases of a 245-acre property. The proposed development is located on the far east side of the Camp Young Judaea property. The majority of the camp property is located in the City of Woodcreek ETJ and the portion of the camp property the proposed development is located in is in the city of Woodcreek City limits. The site plan for both phases includes 7 dormitory buildings, 1 laundry room, 1 activity center, concrete sidewalk and a paved fire lane around the development with paved parking. (See Exhibit "A" - Concept Plan)

Drainage Analysis (SCS Method):

Existing Conditions Hydrologic Analysis

The project site is mostly undeveloped with an existing 8.34(3.4%) acres of impervious cover on the property. Watershed "A" was formed first to find the effects of the proposed development as the storm water leaves the property. Watershed "A" is included in a much larger drainage basin (WS-B) that flows in to Cypress Creek. The drainage basin is a total of 1215.8-acres (WS-A+B) that drains from north to south. From watershed "A", storm water runoff exits the property and flows over an existing road (Cypress Point Drive) into a drainage easement of Cypress Point Property Owners Association (See Appendix "F") that contains a large channel that then flows into a small lake before flowing into Cypress Creek. Calculation point 1 (CP-1) is placed at the at the most downstream point of the combined 1215.8-acre watershed to compare to the proposed runoff from the site. (See Exhibit "C" – Existing Conditions Watershed Map).

According to the NRCS Web Soil Survey the existing on and off-site soils within the established watersheds belong to hydrologic soil group B, C, and D. A composite curve number of 86.1 was calculated for existing watershed "A" and 79.1 was calculated for watershed "B" (See Appendix "B" – Composite Curve Number Calculation Table).

Proposed Conditions Hydrologic Analysis

Proposed on-site drainage patterns will mimic existing drainage patterns with the exception of diversion channels being proposed on the north side of the site. Therefore, watershed boundaries remain the same from existing to proposed conditions. The proposed development will consist of the addition of 1.70-acres and the demolition of 0.18-acres of impervious cover for a net increase of 1.52-acres of impervious cover to watershed "A". This drainage analysis has been performed using the ultimate proposed developed site, thus the net increase of 1.52 acres of impervious cover includes phase 1 and 2 of the project. The diversion channels are proposed to be developed along the north side of the proposed site and storm water will flow back into the natural flow path before exiting the property. (See Exhibit "D" – Proposed Conditions Watershed Map).

Composite curve number analysis revealed a proposed composite curve number of 86.4 for watershed "A" and watershed "B" remains at 79.1 (See Appendix "B" – Composite Curve Number Calculation Table).

Hydrologic Model Development

The method of hydrologic analysis for this study was the National Resources Conservation Service (SCS) method with a type III rainfall distribution in accordance with the Austin Drainage Criteria Manual, section 2.3.0. (See References) Pre and post-development runoff conditions were then analyzed in order to perform a comparison between pre and post-development peak flow rate.

Watershed boundaries were established using a combination of LiDAR data received from TNRIS, USGS contour data, aerial photo, and field investigations. Time of Concentration values used within this study were derived using Technical Release-55 (TR-55), Urban Hydrology for Small Watersheds. Table 2-3 of the Austin Drainage Criteria Manual was used in order to get a depth for the 24-hour storm. Manning's "n" values were taken from Table 2-2 of the Austin Drainage Criteria Manual. Flow rates for each model have been computed for the 2-year, 10-year, 25-year, and 100-year storm events as required in Section 8.3.0 – Stormwater Management Ponds. (See Appendix D).

Downstream Impact Analysis Results

Watershed "A" combined with watershed "B" make up the entire drainage basin the proposed site is included in. Watershed "A" storm water flow increases after development while Watershed "B" stays the same because there is not any proposed development in "WS-B". Calculation point I (CP-1) is located in the natural drainage crossing at the most downstream point of the combined 1215.8-acre drainage basin. Although the storm water flow from watershed "A" increased after development, the peak flow at CP-1 decreased for the 2, 10, 25, 100-year storm water frequencies.

In evaluating each of the above described models we have prepared a Downstream Impact Analysis Summary Table, listed below, which compares the 2-year, 10-year, 25-year, and 100-year storm water frequencies for the above described models.

Downstream Impact Analysis Summary				
	2 Year	10 Year	25 Year	100 Year
WS-A				
Pre-Development (CFS)	94.4	203.2	266.3	370.2
Post Development (CFS)	99.4	213.5	279.6	385.1
Change in Flow (CFS)	5.00	10.30	13.30	14.90
WS-B				
Pre-Development (CFS)	778.6	1959.8	2676.0	3876.0
Post Development (CFS)	778.6	1959.8	2676.0	3876.0
Change in Flow (CFS)	0.00	0.00	0.00	0.00
CP-1				
Pre-Development (CFS)	816.4	2039.9	2784.5	4032.5
Post Development (CFS)	812.9	2031.2	2773.0	4016.4
Change in Flow (CFS)	(3.50)	(8.70)	(11.50)	(16.10)

To evaluate the results of our downstream impact analysis, we performed a hydraulic analysis for the downstream property at the calculation point for watershed A. The evaluation point is at the discharge point where storm water leaves the Camp Young Judaea property, crosses Cypress Point Drive, and enters an existing well-defined creek within the adjacent subdivision. In this location based on the Cypress Point plat found in Appendix "F", both Cypress Point Drive and the existing creek are located within a platted drainage easement. To perform this analysis, our office looked at three cross section (1, 1.2, and 2, refer to Exhibit "H"). The critical cross section, 1.2, is located at the narrowest point within this existing downstream creek, adjacent to an existing home. In this location, we evaluated the ability for the downstream creek to convey the 14.9 cfs increase for the 100-yr storm event. Based on our findings, the increase in the 100-yr flowrate results in an increase in the 100-yr water surface elevation of 0.04 feet. At this cross section location the proposed limits do not inundate the existing residential structure. The 100-year water surface elevation in this location is calculated to be 930.24 and the finished floor elevation of the residential home adjacent to this creek is 938.77. Although the water surface elevation (WSE) of the 100-yr storm will increase, from the proposed development, it will be a negligible compared to the existing WSE and it is still 8.53 feet below the finished flow elevation(FFE) of the existing house. The channel has the ability to convey the full 100-yr storm event and the development as proposed will not adversely impact downstream properties.

Summary

This study demonstrates that the effect of the development on this site does not adversely impact downstream owners. Camp Young Judaea Dormitory development is to be developed in two phases. For the purposed of this drainage analysis the ultimate developed impervious cover has been included in the calculation of the proposed storm water runoff. Storm water flow was analyzed at the property boundary as it left the site and an increase has been calculated for all storm frequencies. However, when compared at calculation point 1 leaving the overall drainage basin the storm water flow decreases for all storm water frequencies. This is because the increase of impervious cover to the site and the addition of diversion ditches increase the rate of flow across the camp property. This causes the peak flow from watershed "A" to leave the property before the flow from the larger drainage basin (WS-B) has peaked, resulting in a lower peak flow for the combined watersheds at CP-1. As is often the case, when the downstream portion of a substantially larger watershed is developed, detention facilities can adversely impact the peak flow rates of drainage ways. If storm water is released without detention before the peak flow from the adjacent watershed occurs, the water contributed from development can pass through downstream properties and into a larger conveyance system prior to the arrival of the upstream peak flow rate. Alternatively, if detention is provided, discharge from the detention pond, which would have passed otherwise, will add to the peak flow rates of the larger contributing watershed creating larger peak flow. Therefore, no detention has been provided.

Exhibit “A” – Concept Plan

JOB NO: CS100
 DATE: 07/20/2017
 DRAWN BY: [Name]
 CHECKED BY: [Name]

CONCEPT PLAN
FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
WOODCREEK, TEXAS

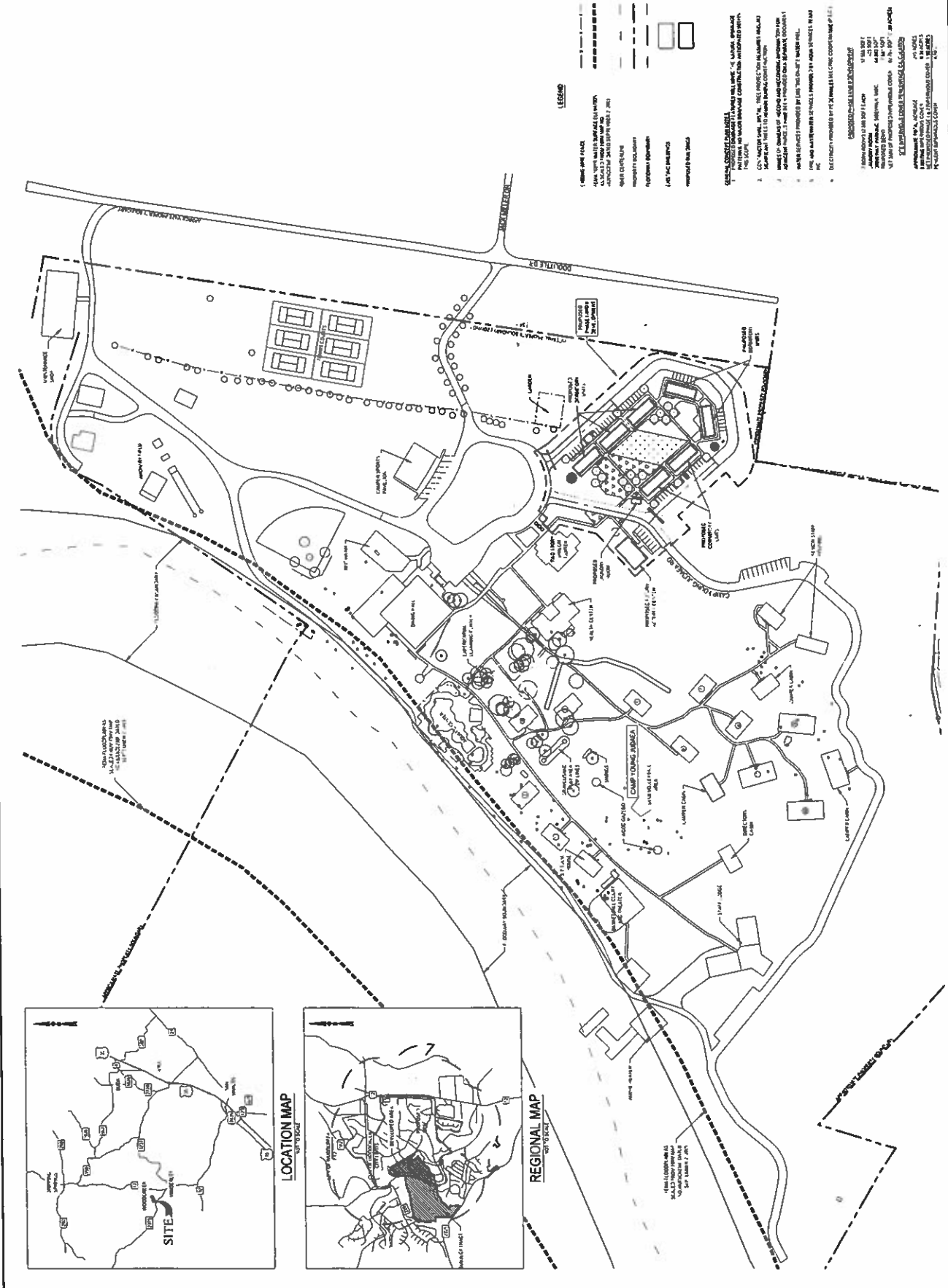


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 Consent of the State of Texas
 Registration No. 111511
 DATE: July 20th, 2017



SITE DEVELOPMENT PLAN APPLICATION - NOT FOR CONSTRUCTION



- LEGEND**
- Proposed Building Footprint
 - Proposed Parking Lot
 - Proposed Road
 - Proposed Utility
 - Proposed Landscaping
 - Proposed Fencing
 - Proposed Signage
 - Proposed Stormwater Management
 - Proposed Electrical
 - Proposed Telecommunications
 - Proposed Security
 - Proposed Other
- NOTES:**
1. ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE SPECIFIED.
 2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
 3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
 4. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
 5. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
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 9. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
 10. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.

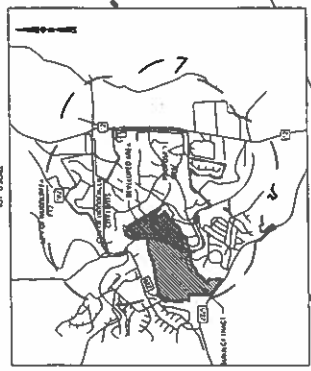
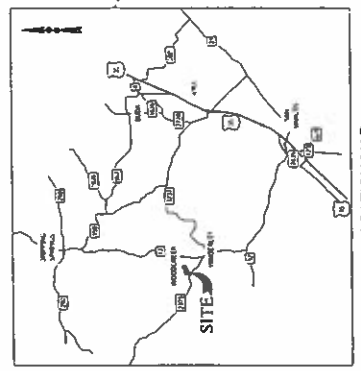


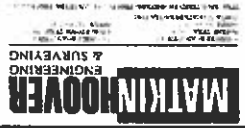
Exhibit “B” – FEMA Map

Exhibit “C” – Watershed Map
Existing Conditions

Exhibit “D” – Watershed Map
Proposed Conditions

DATE: 12/11/11
 DRAWN BY: DAK
 CHECKED BY: DAK
 DESIGNED BY: DAK

WATERSHED EXHIBIT - PROPOSED CONDITIONS
 FOR
 CAMP YOUNG JUDAEA - RETREAT VILLAGE
 WOODCREEK, TEXAS



Scale: 1" = 100'
 North Arrow
 Legend: (various symbols for roads, boundaries, etc.)
 Notes: This document is intended for REVIEW PURPOSES ONLY. It is not to be used for construction or any other purpose without the approval of the author.

SITE DEVELOPMENT PLAN APPLICATION - NOT FOR CONSTRUCTION



NOTES:
 1. THE PROPOSED WATERSHED MODEL IS BASED ON THE PROPOSED WATERSHED EXHIBIT AND THE PROPOSED WATERSHED MODEL. THE PROPOSED WATERSHED MODEL IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE WITHOUT THE APPROVAL OF THE AUTHOR.
 2. THE PROPOSED WATERSHED MODEL IS BASED ON THE PROPOSED WATERSHED EXHIBIT AND THE PROPOSED WATERSHED MODEL. THE PROPOSED WATERSHED MODEL IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE WITHOUT THE APPROVAL OF THE AUTHOR.
 3. THE PROPOSED WATERSHED MODEL IS BASED ON THE PROPOSED WATERSHED EXHIBIT AND THE PROPOSED WATERSHED MODEL. THE PROPOSED WATERSHED MODEL IS NOT TO BE USED FOR CONSTRUCTION OR ANY OTHER PURPOSE WITHOUT THE APPROVAL OF THE AUTHOR.

CITY OF JUSTIN METHODS FOR TIME OF CONCENTRATION

Watershed	Area (Ac)	Length (ft)	Slope (%)				Time (min)
			0-5	6-10	11-15	16-20	
1	100	100	0.5	1.0	1.5	2.0	10
2	200	200	0.5	1.0	1.5	2.0	15
3	300	300	0.5	1.0	1.5	2.0	20
4	400	400	0.5	1.0	1.5	2.0	25
5	500	500	0.5	1.0	1.5	2.0	30
6	600	600	0.5	1.0	1.5	2.0	35
7	700	700	0.5	1.0	1.5	2.0	40
8	800	800	0.5	1.0	1.5	2.0	45
9	900	900	0.5	1.0	1.5	2.0	50
10	1000	1000	0.5	1.0	1.5	2.0	55



PROPOSED WATERSHED
 "A" CORNER DETAIL



Exhibit “E” – WS-A-Impervious Cover Exhibit-
Existing Conditions

WS-A - IMPERVIOUS COVER EXHIBIT - EXISTING CONDITIONS

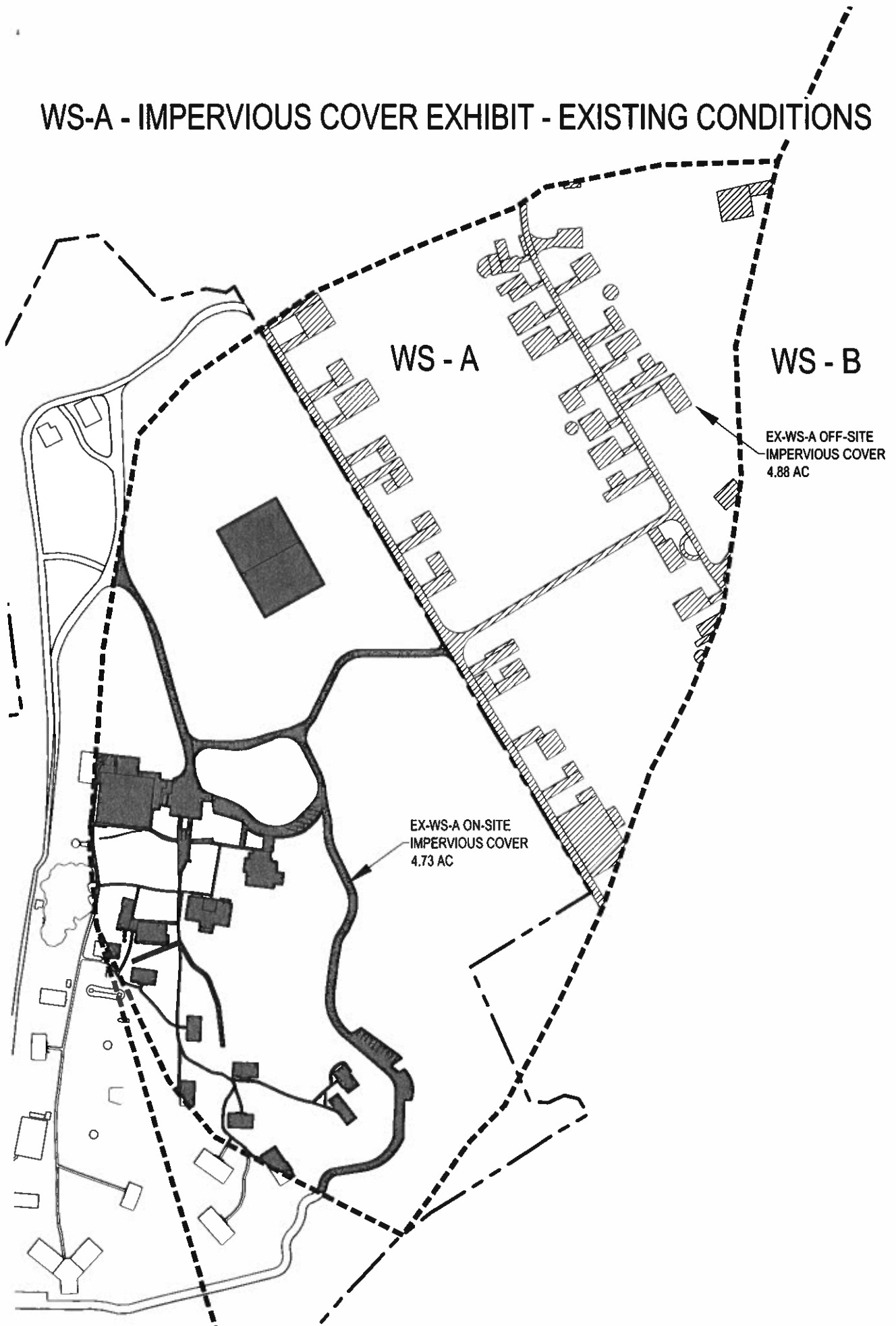


Exhibit “F” – WS-A-Impervious Cover Exhibit-
Proposed Conditions

WS-A - IMPERVIOUS COVER EXHIBIT - PROPOSED CONDITIONS

IMP COVER - EXISTING		
WATERSHED	SF	AC
WS-A-EX IMP COVER (ON-SITE)	206,179	4.73
WS-A-EX IMP COVER (OFF-SITE)	212,677	4.88
WS-A-EX IMP COVER	418,856	9.62
IMP COVER - PROPOSED		
WATERSHED	SF	AC
A-PR-IMP COVER	73,989	1.70
TOTAL EX + PR	492,845	11.31
PR-IMP DEMOLITION	77,892	0.18
(NET) IMP COVER - EX + PR	414,953	11.14

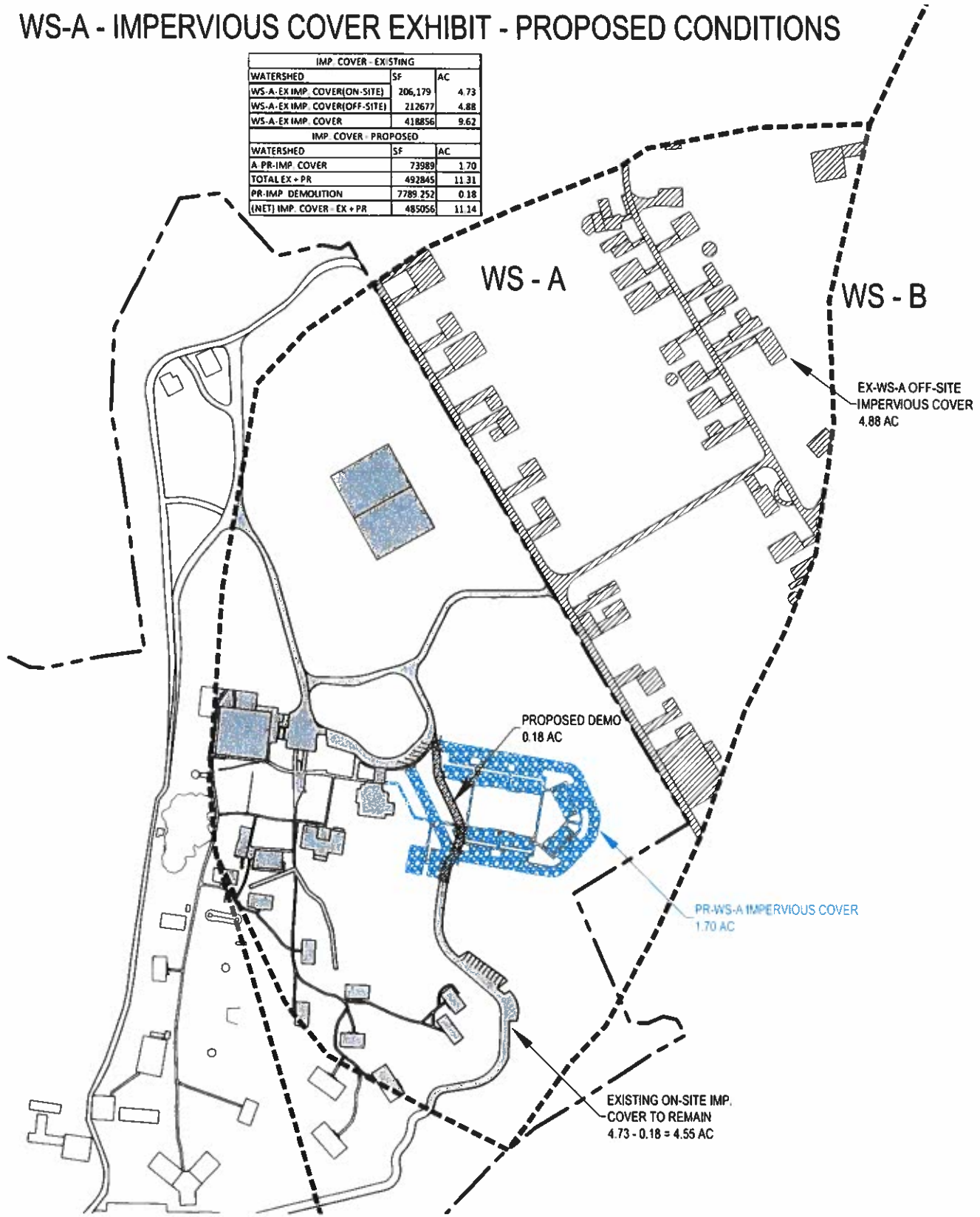


Exhibit “G” – WS-B-Curve Number Calculation
Exhibit

2620.02 - GYJ - WS-B CURVE NUMBER CALCULATION EXHIBIT

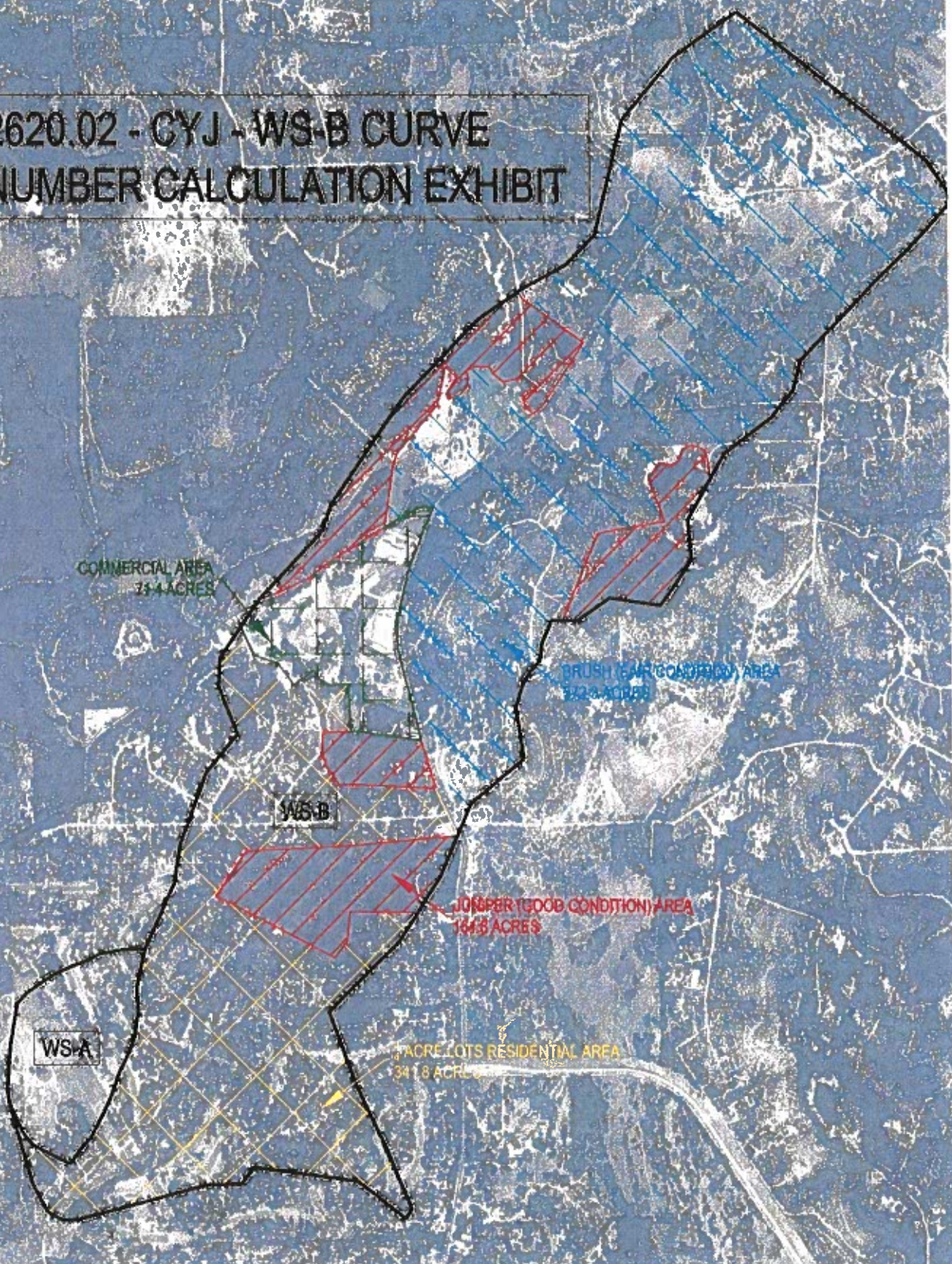


Exhibit “H” – Cross Section Layout Exhibit

Cross Section Layout Exhibit Goes Here

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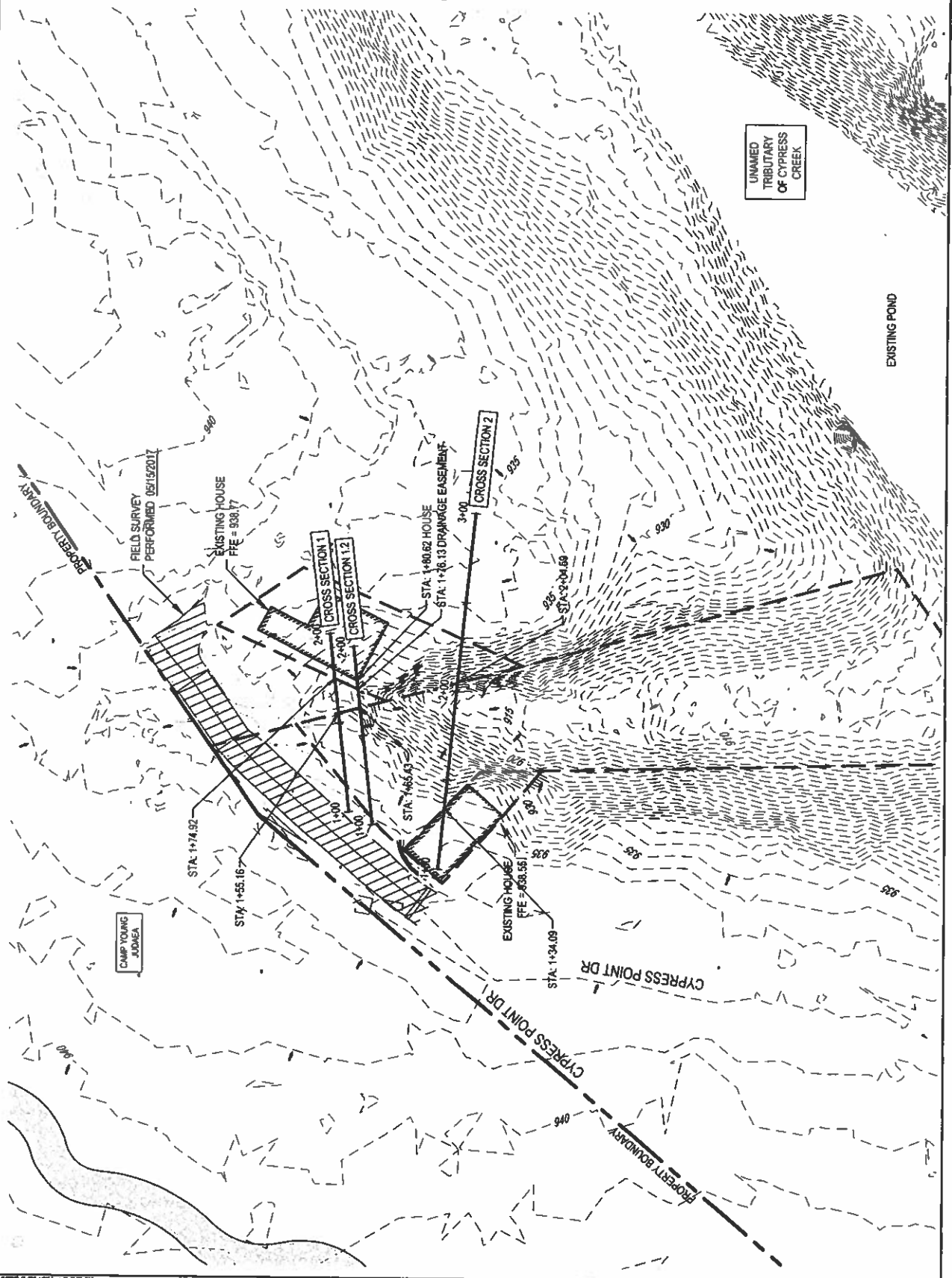
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CROSS SECTION LAYOUT
FOR
CAMP YOUNG JUDEA - RETREAT VILLAGE
WOODCREEK, TEXAS

EXHIBIT "H"

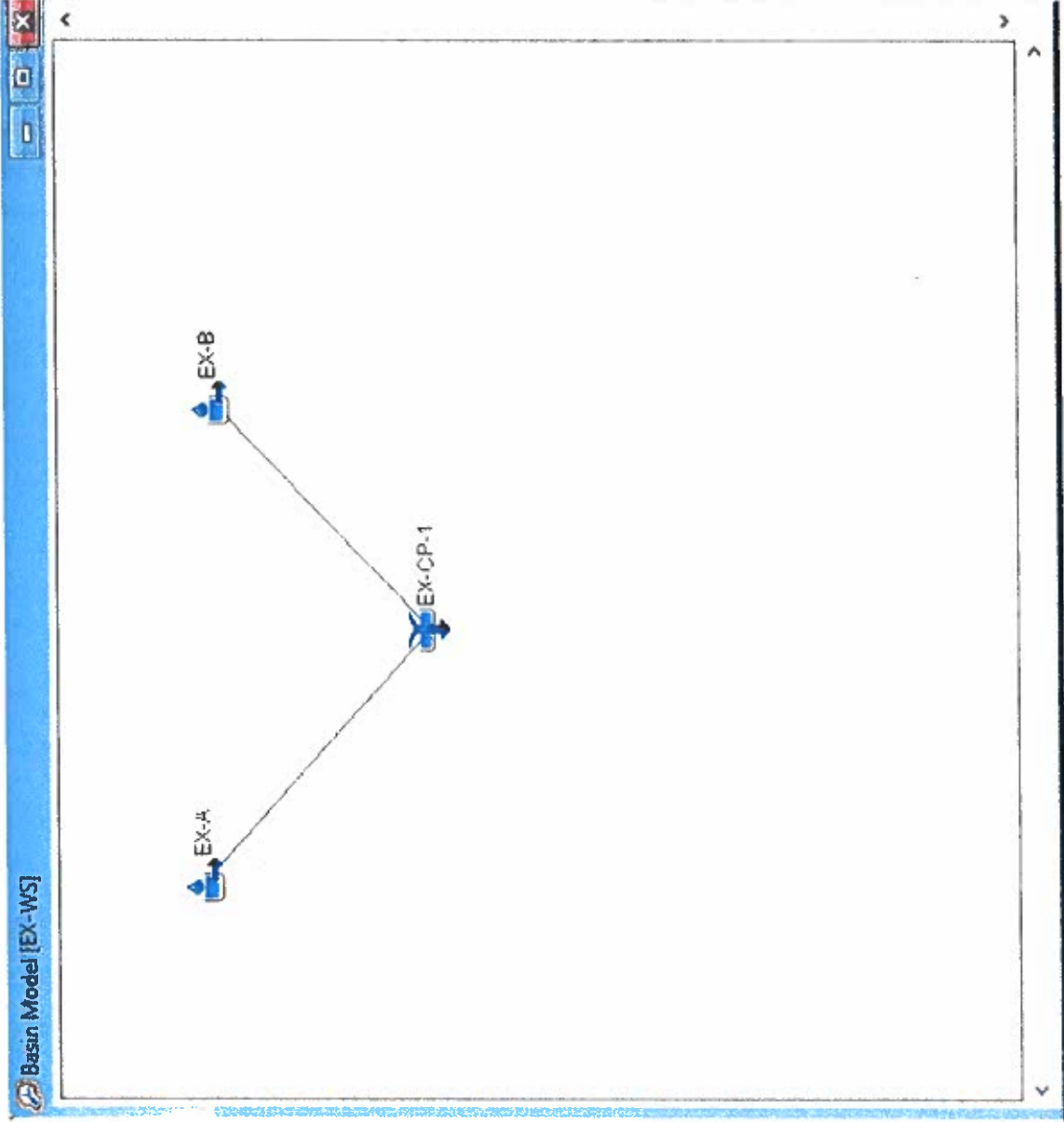
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CHECKED BY _____



**Appendix “A” – HEC-HMS Report With Time of
Concentration Calculations**

Delimiton Analysis Calculations

AUSTIN PZ =		3.44																	
CITY OF AUSTIN METHODS FOR TIME OF CONCENTRATION																			
COMP. POINT	CONTRIBUTING AREAS	WATERSHEDS				SQUARE MILES	COMPOSITE CN	SHEET FLOW				SHALLOW CONCENTRATED FLOW				CHANNEL			
		AREA SQFT	ACREAGE	AREA	PERCENT			L (FT)	S (%)	T (Min)	PAVED	L (FT)	S (%)	T (Min)	L (FT)	VEL. (FT/S)	T (Min)	Tc Lag	
EX	CP-A	2,853,713	65.5	0.1	86.1	0.24	86.1	100	5.0%	9.5	N	2838	3.4%	15.9	15732	6.0	43.7	25.5	15.3
	CP-B	50,105,295	1150.3	1.8	79.1	0.15	79.1	100	6.0%	6.1	N	3313	3.7%	17.8	15732	6.0	43.7	67.6	40.5
PR	CP-A	2,853,713	65.5	0.1	86.4	0.24	86.4	100	5.0%	9.5	N	1744	5.5%	7.7	1331	4.0	5.5	22.8	13.7
	CP-B	50,105,295	1150.3	1.8	79.1	0.15	79.1	100	6.0%	6.1	N	3313	3.7%	17.8	15732	6.0	43.7	67.6	40.5



Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-2

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 28Jul2017, 10:00:28 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	94.4	02May2017, 00:18	2.05
EX-B	1.8	778.6	02May2017, 00:48	1.51
EX-CP-1	1.9	816.4	02May2017, 00:45	1.53

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-10

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 28Jul2017, 10:00:27 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	203.2	02May2017, 00:18	4.50
EX-B	1.8	1959.8	02May2017, 00:45	3.74
EX-CP-1	1.9	2039.9	02May2017, 00:42	3.78

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-25

Start of Run: 01May2017, 12:00 Basin Model: EX-WS

End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR

Compute Time: 28Jul2017, 10:00:29 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	266.3	02May2017, 00:18	5.98
EX-B	1.8	2676.0	02May2017, 00:45	5.13
EX-CP-1	1.9	2784.5	02May2017, 00:42	5.18

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-100

Start of Run: 01May2017, 12:00

Basin Model: EX-WS

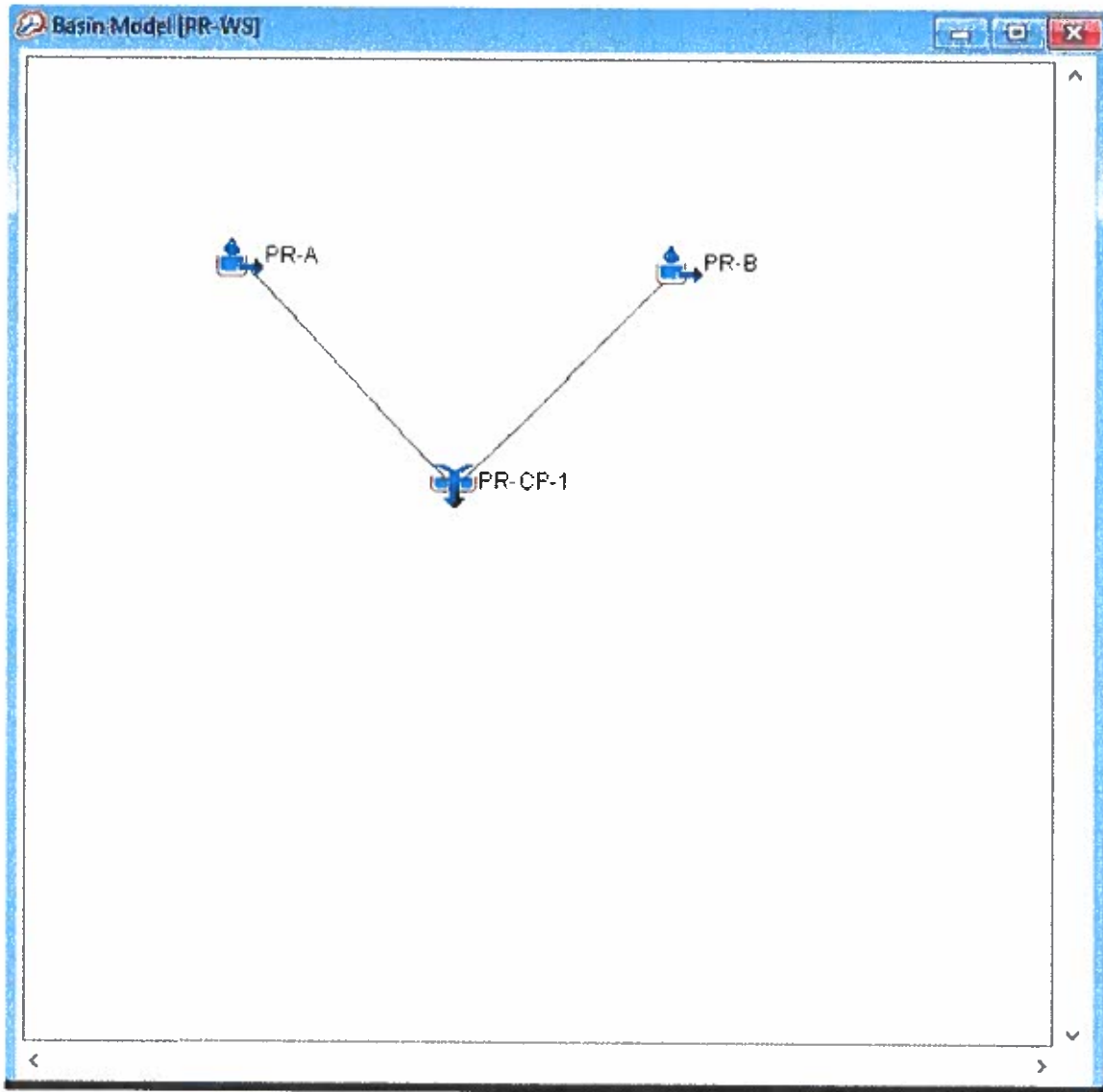
End of Run: 02May2017, 12:03

Meteorologic Model: 100-YR

Compute Time: 28Jul2017, 10:00:28

Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	370.2	02May2017, 00:18	8.46
EX-B	1.8	3876.0	02May2017, 00:45	7.52
EX-CP-1	1.9	4032.5	02May2017, 00:42	7.57



Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-2

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 28Jul2017, 10:00:30 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	99.4	02May2017, 00:15	2.07
PR-B	1.8	778.6	02May2017, 00:48	1.51
PR-CP-1	1.9	812.9	02May2017, 00:45	1.54

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-10

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 28Jul2017, 10:00:29 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	213.5	02May2017, 00:15	4.53
PR-B	1.8	1959.8	02May2017, 00:45	3.74
PR-CP-1	1.9	2031.2	02May2017, 00:42	3.78

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-25

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR
Compute Time: 28Jul2017, 10:00:30 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	279.6	02May2017, 00:15	6.01
PR-B	1.8	2676.0	02May2017, 00:45	5.13
PR-CP-1	1.9	2773.0	02May2017, 00:42	5.18

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-100

Start of Run: 01May2017, 12:00

Basin Model: PR-WS

End of Run: 02May2017, 12:03

Meteorologic Model: 100-YR

Compute Time: 28Jul2017, 10:00:29

Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	388.5	02May2017, 00:15	8.51
PR-B	1.8	3876.0	02May2017, 00:45	7.52
PR-CP-1	1.9	4016.4	02May2017, 00:42	7.57

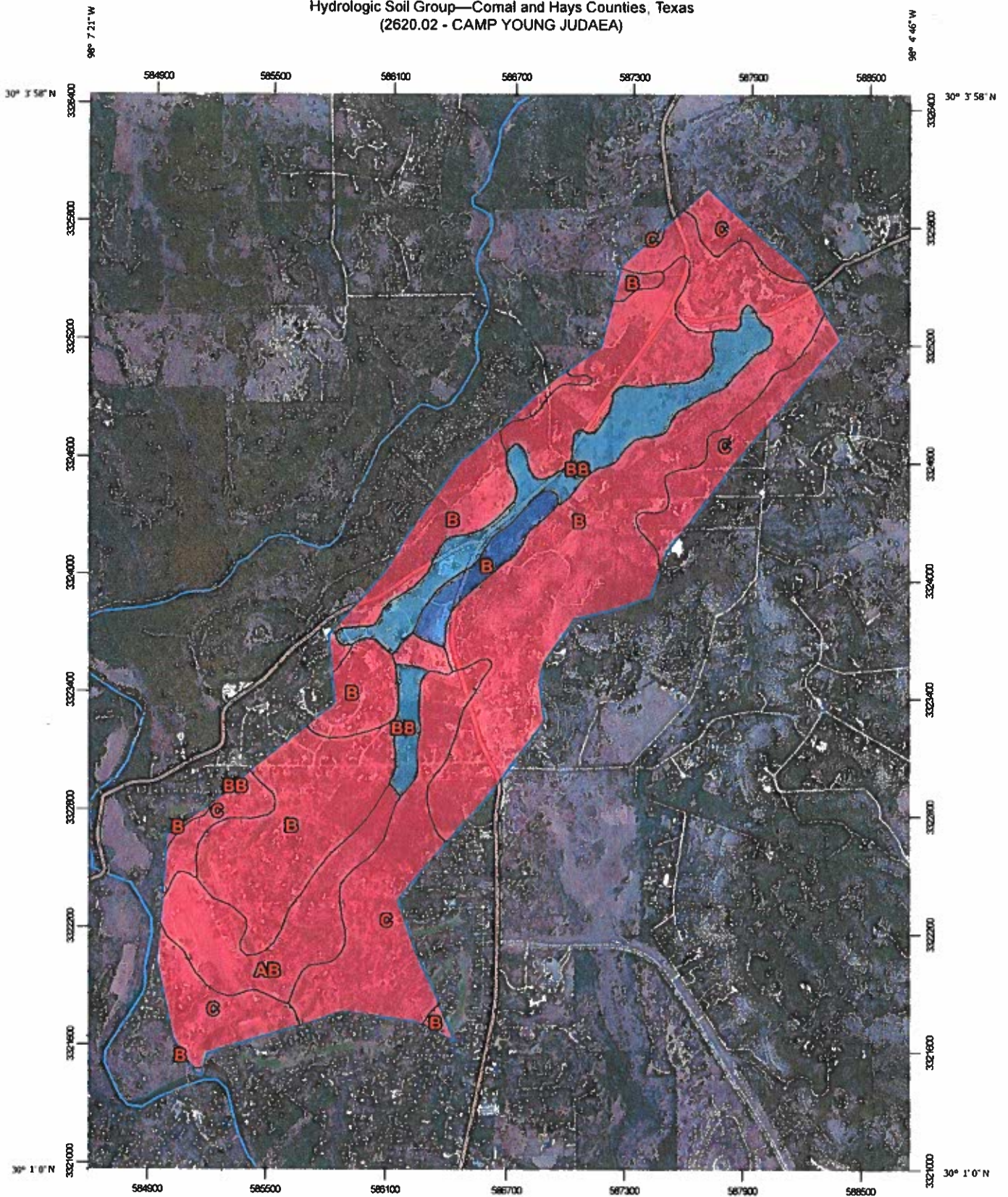
**Appendix “B” – Composite Curve Number
Calculation**

COMPOSITE CN CALCULATION TABLE

Site Info					
	sqft	Acre	%		
Property Area =	10,672,200	245.00			
WS-A	2,853,713	65.51	100%		
WS-A Existing Impervious	418,739	9.61	15%		
WS-A Existing Pervious	2,434,974	55.90	85%		
WS-A Existing + Proposed Impervious =	484,939	11.13	17%		
WS-A Existing + Proposed Pervious =	2,368,774	54.38	83%		
WATERSHED INFO					
EXISTING WATERSHEDS = PROPOSED WATERSHEDS					
	sqft	Acre	%		
WS-A	2,853,713	65.5	100%		
WS-B (EXCLUDING WS-A)	50,105,295	1150.3	100%		
CURVE NUMBERS					
WATERSHED - A - EX & PR					
SOIL RATING			B	C	D
%					100.0%
PERVIOUS	PASTURE, GRASSLAND (FAIR)				84
IMPERVIOUS	PAVED PARKING, ROOFS, DRIVEWAYS				98
WATERSHED - B - EX & PR (REF. TO TR-55 MANUAL TABLE 2-2)					
NO IMP. COVER IS PROPOSED IN WS-B, THEREFORE THE CALCULATED CN IS THE SAME EXISTING AND PROPOSED					
SOIL RATING			B	C	D
%			2.5%	10.7%	86.8%
[EX & PR]	COMMERCIAL		92	94	95
COMPOSITE (EX & PR)	COMMERCIAL		94.8		
[EX & PR]	1/4 ACRE LOT RESIDENTIAL		75	83	87
COMPOSITE (EX & PR)	1/4 ACRE LOT RESIDENTIAL		86.3		
[EX & PR]	BRUSH (FAIR CONDITION)		56	70	77
COMPOSITE (EX & PR)	BRUSH (FAIR CONDITION)		75.7		
[EX & PR]	JUNIPER (GOOD CONDITION)		41	61	71
COMPOSITE (EX & PR)	JUNIPER (GOOD CONDITION)		69.2		
CALCULATED COMPOSITE CURVE NUMBERS					
EXISTING					
COMPOSITE EX-A					
SOIL RATING:					D
					100.0%
	PERVIOUS COVER =	85%	CN=	84	
	IMPERVIOUS COVER =	15%	CN=	98	
			CN=	86.1	
PROPOSED					
COMPOSITE PR-A					
SOIL RATING:					D
					100.0%
	PERVIOUS COVER =	83%	CN=	84	
	IMPERVIOUS COVER =	17%	CN=	98	
			CN=	86.4	
WATERSHED - B DEFINED AREAS (REFER TO CURVE NUMBER CALC EXHIBIT)					
	sqft	Acre	%	CN	
COMMERCIAL	3,109,765	71.4	6%	5.9	
1/4 ACRE LOT RESIDENTIAL	14,888,749	341.8	30%	25.6	
BRUSH (FAIR CONDITION)	24,927,331	572.3	50%	37.7	
JUNIPER (GOOD CONDITION)	7,179,451	164.8	14%	9.9	
WS - B - EX & PR CALCULATED COMPOSITE CN =	50,105,295	1150.3	100%	79.1	

**Appendix “C” – NRCS Soil Survey, Hydrologic
Soil Groups With Soil Rating Per Watershed
Calculation Table**

Hydrologic Soil Group—Comal and Hays Counties, Texas
(2620.02 - CAMP YOUNG JUDAEA)



Map Scale: 1:26,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 14N WGS84



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.












































Soil Survey Area: Comal and Hays Counties, Texas
Survey Area Data: Version 12, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 6, 2011—Apr 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

MAP LEGEND

 Area of Interest (AOI)	 C
 Soils	 C/D
 Soil Rating Polygons	 D
 A	 Not rated or not available
 A/D	 Water Features
 B	 Streams and Canals
 B/D	 Transportation
 C	 Rails
 C/D	 Interstate Highways
 D	 US Routes
 Not rated or not available	 Major Roads
 Soil Rating Lines	 Local Roads
 A	 Background
 A/D	 Aerial Photography
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	
 Soil Rating Points	
 A	
 A/D	
 B	
 B/D	
 C	
 C/D	
 D	
 Not rated or not available	

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Comal and Hays Counties, Texas (TX604)				
Map unit symbol	Map unit name	Rating	Acres In AOI	Percent of AOI
AnB	Anhalt clay, 1 to 3 percent slopes	D	103.4	8.1%
BrB	Bolar clay loam, 1 to 3 percent slopes	C	123.7	9.7%
BD	Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes	D	225.6	17.7%
BiG	Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes	D	383.2	30.1%
CrD	Comfort-Rock outcrop complex, 1 to 8 percent slopes	D	222.3	17.4%
LeB	Lewisville silty clay, 1 to 3 percent slopes	B	0.1	0.0%
Or	Orif soils, moist, 0 to 3 percent slopes, frequently flooded	A	0.3	0.0%
Pt	Pits	D	9.4	0.7%
PuC	Purves clay, 1 to 5 percent slopes	D	78.2	6.1%
RcD	Real-Comfort-Doss complex, 1 to 8 percent slopes	D	99.3	7.8%
SuB	Sunev clay loam, 1 to 3 percent slopes	B	28.7	2.3%
Totals for Area of Interest			1,274.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

SOIL RATING PER WATERSHED CALCULATION TABLE		
WS - A+B (REFER TO HYDROLOGIC SOIL GROUP SUMMARY)		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	100.7	8.3%
D	195.0	16.0%
D	384.4	31.6%
D	234.1	19.3%
D	9.4	0.8%
D	42.1	3.5%
D	98.3	8.1%
TOTAL	1215.8	100.0%
TOTALS		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	1064.0	87.5%
WS-A IS ALL TYPE "D" SOIL		
D	65.5	100%
WS-B CALCULATED SOIL SOIL TYPE W/O WS-A		
RATING	ACRES	%
B	28.7	2.5%
C	123.1	10.7%
D	998.5	86.8%
TOTAL	1150.3	100.0%

Appendix “D” – References

8.6. Drainage Plan (In addition to the Base information, sufficient information to reflect the existing conditions just prior to the proposed development are to be shown, but not limited to the following)

- (a) Legible licensed engineer's seal, signature, and date;
- (b) Drainage area map including contributing drainage areas to storm sewer and/or inlet tie-ons;
- (c) Drainage area maps for the offsite contributing areas passing through site existing impervious cover, including buildings and surrounding information: structures, drainage release points, etc.;
- (d) Direction, location, and quantity of peak 2-, 25-, and 100-year flood flows from off-site in existing conditions.
- (e) Indicate 2-, 25- and 100-year flows from off-site in existing condition;
- (f) Delineation of the fully developed 2-, 25- and 100- year floodplains, or, if applicable, a note stating that no 100-year floodplain exists on the site existing storm sewer systems on site or adjacent streets;
- (g) Delineation of the centerline of waterways, and the average water surface elevation of lakes, ponds, and springs contours at two-foot intervals;
- (h) Sufficient information to reflect the fully developed conditions of the proposal is to be shown, but not limited to, the following:
 - (1) Developed drainage areas and proposed grading with two-foot contours;
 - (2) Curbs, retaining walls, and other structures indicate elevations at critical points on driveways, curbs, etc.;
 - (3) Overflow points and control elevations;
 - (4) Construction details for control devices, curbs, walls, channel, swales, etc.;
 - (5) Direction of flow from building roofs and outlet locations; and
 - (6) Direction of flow from gutters; pass through flow rates, if any;
 - (7) Shade in limits of ponding at overflow elevation and give cubic feet of storage at the maximum storage elevation overflow points and control elevations for overflow structures;
 - (8) Action and direction of unrestricted flow from site, if any, with calculations;
 - (9) Storm drainage profiles and plans (swales, channels, pipes, culverts, ...) including % grade HGL 25, HGL 100, Q 25, Q100, V 25, V 100, depth of flow 25 and 100, and Manning's Roughness coefficients ("n" values);
 - (10) Hydrographs or hydrologic tabulation for proposed 25-year peak-flow rate and two-year peak flow rate;
 - (11) Hydrologic summary of existing and proposed conditions in tabular form:
 - (i) Area of each drainage area;
 - (ii) Time of concentration;
 - (iii) Distance of flow where the time of concentration is measured;
 - (iv) Slope of site where the time of concentration is measured;
 - (v) C 25 and C 100 values;
 - (vi) Required storage volumes for up to 100-year storm.

(12) Calculations and formulas for discharge or control structures (for 2-, 5-, 10-, 25-, 50-, and 100-year storms) pipes, inlets, etc. Discharge pipes should not be less than six inches. In the event that less than six inches must be used, every effort should be made to mitigate the "clogging" potential. Direction of flow must be at an angle less than 45 degrees with the curb line. Discharge across a sidewalk area will not be allowed. A channel section can be used under the sidewalk area, provided it is covered and the outlet device utilizes sheet flow methods.

(13) Location and limits of filtration/sedimentation pond details and design information and calculations.

8.7. Construction Details (The following items or notes should be shown)

- (a) Include in the construction detail sheets any required structural walls, inlets, sedimentation/filtration and detention inlet and outlet controls, etc.;
- (b) Show adequate dimensions, layout details, and general notes adjacent to all details;
- (c) Include traffic control plan when working in street;
- (d) If driveways are proposed, a City standard driveway detail shall be shown to be constructed.

8.8. Environmental Site Plan and Report Submittal Information

(This document establishes submittal requirements for all environmental ordinances)

- (a) A professional engineer's seal, signature, and statement certifying that the plan is complete, correct, and in compliance with the City of Woodcreek Ordinances is required for all projects.
- (b) An introduction which states project acreage, watershed, a description of proposed development, a description of project phasing, if phasing is proposed;
- (c) An explanation of and documentation for any special exception or waiver claimed;
- (d) Drainage area map showing the location of all waterways within the tract or which impact the tract, the location of the 100-year floodplain, the area and acreage of upstream drainage, and the location of the critical water quality zone;
- (e) Discussion of the following issues, if applicable to the project:
 - (1) Proposed and existing drainage patterns;
 - (2) Proposed method of treating both quantity and quality of stormwater runoff;
 - (3) Proposed extent of floodplain modification, if applicable;
- (f) Critical Environmental Features within the project and known features within 150 feet of the project;
- (g) Discuss all proposed variances and provide letter of variance request addressing proposed Findings of Fact;
- (h) Requests for consideration of alternatives to the water quality requirements of the City of Woodcreek Ordinances. These shall include any written request for consideration of an alternative or innovative water quality control which differs

The proportion of the total rainfall that will reach the drainage system depends on the surface vegetation condition, soil type, imperviousness of the surface, land slope and ponding characteristics of the area. Impervious surfaces, such as asphalt pavements and roofs of buildings, will be subject to approximately 100 percent runoff (regardless of the slope). On-site inspections and aerial photographs may prove valuable in estimating the nature of the surfaces within the drainage area.

It should be noted that the runoff coefficient "C" is the Rational Method variable which is least amenable to precise determination. A reasonable coefficient must be chosen to represent the integrated effects of infiltration, surface ponding, evaporation, flow routing and interception, all of which affect the time distribution and peak rate of runoff.

It is often desirable to develop a composite runoff coefficient based upon the percentages of different types of surfaces in the drainage area. This procedure is often applied to typical "sample blocks" as a guide to selection of reasonable values of the coefficient for an entire area. Suggested coefficients with respect to specific surface types are given in Table 2-1. "C" values for developed conditions should be based on maximum allowable impervious cover as listed in the City's zoning and watershed ordinances.

2.4.2 - Time of Concentration

The time of concentration is the time for surface runoff to flow from the most remote point in the watershed to the point of interest. This applies to the most remote point in time, not necessarily the most remote point in distance. Runoff from a drainage area usually reaches a peak at the time when the entire area is contributing. However, runoff may reach a peak prior to the time the entire drainage area is contributing if the area is irregularly shaped or if land use characteristics differ significantly within the area. Sound engineering judgment should be used to determine a flow path representative of the drainage area and in the subsequent calculation of the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which may include storm drains. The minimum time of concentration for any drainage area shall be 5 minutes. Additionally, the minimum slope used for calculation of sheet and shallow flow travel time components should be 0.005 feet per foot (0.5%). The preferred procedure for estimating time of concentration is the NRCS method as described in NRCS's Technical Release 55 (TR-55). This method is outlined below. The overall time of concentration is calculated as the sum of the sheet, shallow concentrated and channel flow travel times. Note that there may be multiple shallow concentrated and channel segments depending on the nature of the flow path.

$$T_c = T_{t(\text{sheet})} + T_{t(\text{shallow concentrated})} + T_{t(\text{channel})} \quad (\text{Eq. 2-2})$$

- A. **Sheet Flow.** Sheet flow is shallow flow over land surfaces, which usually occurs in the headwaters of streams. The engineer should realize that sheet flow occurs for only very short distances, especially in urbanized conditions. Sheet flow for both natural (undeveloped) and developed conditions should be limited to a maximum of 100 feet. Sheet flow for developed conditions should be based on the actual pavement or grass conditions for areas that are already developed and should be representative of the anticipated land use within the headwater area in the case of currently undeveloped areas. In a typical residential subdivision, sheet flow may be the distance from one end of the lot to the other or from the house to the edge of the lot. In some heavily urbanized drainage areas, sheet flow may not exist in the headwater area. The NRCS method employs equation 2-3, which is a modified form kinematic wave equation, for the calculation of the sheet flow travel time.

$$T_t = 0.42(nL)^{0.8}/((P_2)^{0.5}S^{0.4}) \quad (\text{Eq. 2-3})$$

Where,

T_t = Sheet flow travel time in minutes

L = Length of the reach in ft.

n = Manning's n (see Table 2-2)

P_2 = 2-year, 24-hour rainfall in inches (see Table 2-3)

s = Slope of the ground in ft/ft

- B. **Shallow Concentrated Flow**. After a maximum of approximately 100 feet, sheet flow usually becomes shallow concentrated flow collecting in swales, small rills, and gullies. Shallow concentrated flow is assumed not to have a well-defined channel and has flow depths of 0.1 to 0.5 feet. The travel time for shallow concentrated flows can be computed by equations 2-4 and 2-5. These two equations are based on the solution of Manning's equation with different assumptions for n (Manning's roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

$$\text{Unpaved } T_t = L / (60(16.1345)(s)^{0.5}) \text{ (Eq. 2-4)}$$

$$\text{Paved } T_t = L / (60(20.3282)(s)^{0.5}) \text{ (Eq. 2-5)}$$

Where,

T_t = Travel time for shallow concentrated flows in minutes

L = Length of the reach in ft.

s = Slope of the ground in ft/ft

- C. **Channel or Storm Drain Flow**. The velocity in an open channel or a storm drain not flowing full can be determined by using Manning's Equation. Channel velocities can also be determined by using backwater profiles. For open channel flow, average flow velocity is usually determined by assuming a bank-full condition. Note that the channel flow component of the time of concentration may need to be divided into multiple segments in order to represent significant changes in channel characteristics. The details of using Manning's equation and selecting Manning's " n " values for channels can be obtained from Section 6.

For storm drain flow under pressure conditions (hydraulic grade line is higher than the lowest crown of a storm drain) the following equation should be applied:

$$V = Q/A \text{ (Eq. 2-6)}$$

Where:

V = Average velocity, ft/s

Q = Design discharge, cfs

A = Cross-sectional area, ft²

Flow travel time through a channel can be calculated by equation (2-7):

$$T_t = \sum(L_i / 60 V_i) \text{ (Eq. 2-7)}$$

Where:

L_i = The i -th channel segment length, ft

V_i = The average flow velocity within the i th channel segment, ft/s

T_i = Total Flow travel time through the channel, min

TABLE 2-1 RATIONAL METHOD RUNOFF COEFFICIENTS FOR COMPOSITE ANALYSIS Runoff Coefficient (C)							
Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
DEVELOPED							
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (Lawns, Parks, etc.)							
Poor Condition*							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.40	0.43	0.45	0.49	0.52	0.55	0.62
Fair Condition**	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Good Condition***							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56

Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
UNDEVELOPED							
Cultivated							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	0.42	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-7%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58
Assumptions:							
1. Composite "C" value for developed conditions (C_{DEV}) is : $C_{DEV} = IC_1 + (1-I)C_2$							
<p>Where:</p> <p>I = Impervious cover, percent</p> <p>C_1 = "C" value for impervious cover</p> <p>C_2 = "C" value for pervious area (grass, lawns, parks, etc.)</p>							
2. For maximum allowable impervious coverage values for various land use types, refer to the City of Austin Zoning Ordinance.							

* Grass cover less than 50 percent of the area.
** Grass cover on 50 to 75 percent of the area.
*** Grass cover larger than 75 percent of the area.
Source: 1. Rossmiller, R.L. "The Rational Formula Revisited." 2. City of Austin, Watershed Engineering Division

TABLE 2-2 Manning's "n" for overland flow	
Manning's "n" ¹	Surface Description
0.015	Concrete (rough or smoothed finish)
0.016	Asphalt
0.05	Fallow (no residue)
	Cultivated Soils:
0.06	Residue Cover ≤ 20%
0.17	Residue cover > 20%
	Grass:
0.15	Short-grass prairie
0.24	Dense grasses ²
0.13	Range (natural)
	Woods: ³
0.40	Light underbrush

n = Manning's n (see Table 2-2)

P_2 = 2-year, 24-hour rainfall in inches (see Table 2-3)

s = Slope of the ground in ft/ft

- B. **Shallow Concentrated Flow** After a maximum of approximately 100 feet, sheet flow usually becomes shallow concentrated flow collecting in swales, small rills, and gullies. Shallow concentrated flow is assumed not to have a well-defined channel and has flow depths of 0.1 to 0.5 feet. The travel time for shallow concentrated flows can be computed by equations 2-4 and 2-5. These two equations are based on the solution of Manning's equation with different assumptions for n (Manning's roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

$$\text{Unpaved } T_t = L / (60(16.1345)(s)^{0.5}) \text{ (Eq. 2-4)}$$

$$\text{Paved } T_t = L / (60(20.3282)(s)^{0.5}) \text{ (Eq. 2-5)}$$

Where,

T_t = Travel time for shallow concentrated flows in minutes

L = Length of the reach in ft.

s = Slope of the ground in ft/ft

- C. **Channel or Storm Drain Flow** The velocity in an open channel or a storm drain not flowing full can be determined by using Manning's Equation. Channel velocities can also be determined by using backwater profiles. For open channel flow, average flow velocity is usually determined by assuming a bank-full condition. Note that the channel flow component of the time of concentration may need to be divided into multiple segments in order to represent significant changes in channel characteristics. The details of using Manning's equation and selecting Manning's "n" values for channels can be obtained from Section 6.

For storm drain flow under pressure conditions (hydraulic grade line is higher than the lowest crown of a storm drain) the following equation should be applied:

$$V = Q/A \text{ (Eq. 2-6)}$$

Where:

V = Average velocity, ft/s

Q = Design discharge, cfs

A = Cross-sectional area, ft²

Flow travel time through a channel can be calculated by equation (2-7):

$$T_t = \sum(L_i / 60 V_i) \text{ (Eq. 2-7)}$$

Where:

L_i = The i -th channel segment length, ft

V_i = The average flow velocity within the i th channel segment, ft/s

T_i = Total Flow travel time through the channel, min

TABLE 2-1 RATIONAL METHOD RUNOFF COEFFICIENTS FOR COMPOSITE ANALYSIS Runoff Coefficient (C)							
Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
DEVELOPED							
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (Lawns, Parks, etc.)							
Poor Condition*							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.40	0.43	0.45	0.49	0.52	0.55	0.62
Fair Condition**	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Good Condition***							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56

Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
UNDEVELOPED							
Cultivated							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	.042	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-7%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58
Assumptions:							
1. Composite "C" value for developed conditions (C_{DEV}) is : $C_{DEV} = IC_1 + (1-I)C_2$							
<p>Where:</p> <p>I = Impervious cover, percent</p> <p>C_1 = "C" value for impervious cover</p> <p>C_2 = "C" value for pervious area (grass, lawns, parks, etc.)</p>							
2. For maximum allowable impervious coverage values for various land use types, refer to the City of Austin Zoning Ordinance.							

* Grass cover less than 50 percent of the area.
** Grass cover on 50 to 75 percent of the area.
*** Grass cover larger than 75 percent of the area.
Source: 1. Rossmiller, R.L. "The Rational Formula Revisited." 2. City of Austin, Watershed Engineering Division

TABLE 2-2 Manning's "n" for overland flow	
Manning's "n" ¹	Surface Description
0.015	Concrete (rough or smoothed finish)
0.016	Asphalt
0.05	Fallow (no residue)
	Cultivated Soils:
0.06	Residue Cover ≤ 20%
0.17	Residue cover > 20%
	Grass:
0.15	Short-grass prairie
0.24	Dense grasses ²
0.13	Range (natural)
	Woods: ³
0.40	Light underbrush

0.80

Dense underbrush

1 The Manning's n values are a composite of information compiled by Engman (1986).

2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

3 When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

(Rule No. 161-14.24 9-2-2014)

2.4.3 - Rainfall Intensity (i)

Rainfall intensity (i) is the average rainfall rate in inches per hour, and is selected on the basis of design rainfall duration and design frequency of occurrence. The design duration is equal to the time of concentration for the drainage area under consideration. The design frequency of occurrence is a statistical variable which is established by design standards or chosen by the engineer as a design parameter.

The selection of the frequency criteria is necessary before applying any hydrologic method. Storm drainage improvements in Austin must be designed to intercept and carry the runoff from a 25 year frequency storm (4% annual chance event), with an auxiliary or overflow system capable of carrying a 100 year frequency storm (1% annual chance event).

The rainfall intensity used in the rational method can be read from the intensity-duration-frequency (IDF) curves based on the selected design frequency and design duration. The design engineer can also calculate the value of rainfall intensity from the best-fit IDF equation (2-8) to be discussed later in this subsection with known Tc value for the entire drainage area of interest.

In 1998, William Asquith at the USGS Texas Office analyzed virtually all rainfall data available in the State of Texas using L-moment methodology and published the results in a USGS Water Resources Investigations Report (WRIR 98-4044). In November 2001, Dr. Asquith summarized his rainfall study of 1998 and generated the IDF and the DDF (depth-duration-frequency) values that are suitable for use in the City of Austin and Travis County. These DDF and IDF values are shown in Table 2-3 and Table 2-4.

An explanation of the derivation of the Austin intensity-duration-frequency curves is given in Appendix B.

The Austin intensity-duration-frequency curves are shown in Figure 2-2 in Appendix D of this manual.

Table 2-3. Depth-Duration-Frequency Table for Austin and Travis County>

	Depth of Precipitation (in inches)								
Recurrence Interval (year)	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr

2	0.48	0.98	1.32	1.72	2.16	2.32	2.67	3.06	3.44
5	0.62	1.26	1.71	2.28	2.89	3.13	3.56	4.07	4.99
10	0.71	1.47	1.98	2.68	3.42	3.71	4.21	4.81	6.1
25	0.84	1.76	2.36	3.28	4.2	4.55	5.14	5.9	7.64
50	0.94	2.01	2.68	3.79	4.88	5.28	5.94	6.86	8.87
100	1.05	2.29	3.04	4.37	5.66	6.11	6.85	7.96	10.2
250	1.21	2.73	3.57	5.26	6.86	7.38	8.24	9.67	12
500	1.33	3.11	4.02	6.06	7.94	8.51	9.47	11.2	13.5

* The 5-min rainfall depths were calculated using the 5-min rainfall intensity values from Table 2-4.

Table 2-4. Intensity-Duration-Frequency Table for Austin and Travis County

Recurrence Interval (year)	Intensity of Precipitation (inches per hour)								
	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	5.76	3.92	2.64	1.72	1.08	0.773	0.445	0.255	0.143
5	7.39	5.04	3.42	2.28	1.45	1.04	0.593	0.339	0.208
10	8.57	5.88	3.96	2.68	1.71	1.24	0.702	0.401	0.254
25	10.1	7.04	4.72	3.28	2.10	1.52	0.857	0.492	0.318
50	11.2	8.04	5.36	3.79	2.44	1.76	0.990	0.572	0.370
100	12.5	9.16	6.08	4.37	2.83	2.04	1.14	0.663	0.424

250	14.5	10.9	7.14	5.26	3.43	2.46	1.37	0.806	0.501
500	15.9	12.4	8.04	6.06	3.97	2.84	1.58	0.934	0.564

* The 5-min rainfall intensity values were calculated using Equation 2-8 and the coefficients listed in Table 2-5 for the return periods of 2, 5, 10, 25, 100, 250, and 500 years.

The following equation mathematically represents the Austin area intensity-duration-frequency curves:

$$i = a/(t+b)^c \text{ (Eq. 2-8)}$$

Where,

i = Average rainfall intensity, inches per hour

t = Storm duration in minutes, which is equal to the time of concentration for the entire drainage area of interest

a , b and c = Coefficients for different storm frequencies.

The final best-fit coefficients of a , b , and c for equation (2-8) are listed in Table 2-5 below:

Table 2-5

Austin Intensity-Duration-Frequency Curve Coefficients

Return Period	Fitting parameters for IDF equation (2-8)		
Year	a	b	c
2	54.767	11.051	0.8116
5	62.981	10.477	0.7820
10	70.820	10.396	0.7725
25	82.936	10.746	0.7634
50	100.60	12.172	0.7712
100	118.30	13.185	0.7736
250	150.10	14.892	0.7822

500	188.00	17.233	0.7959
Source: Asquith, W.H., "Depth-Duration Frequency and Intensity-Duration Frequency for Austin and Travis County, Texas, 2001".			

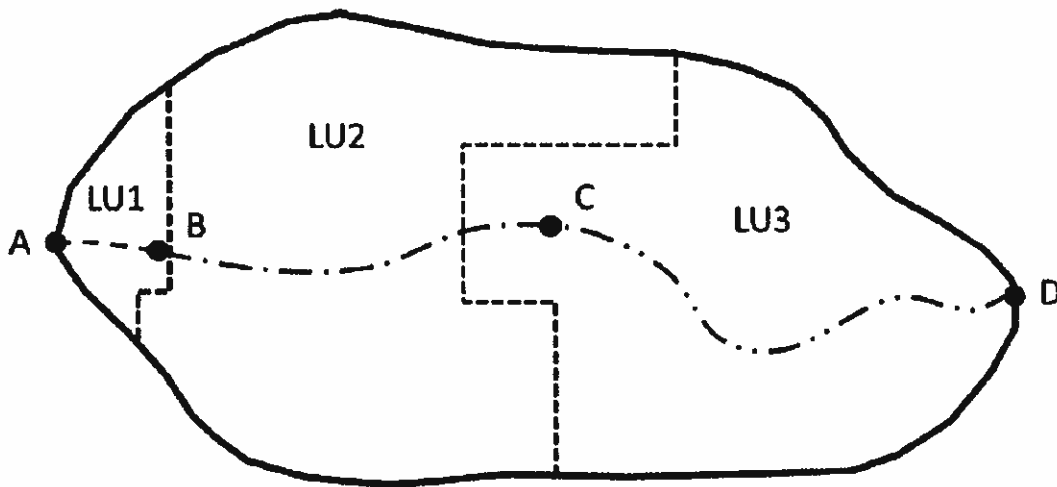
The a, b and c parameters listed in Table 2-5 were derived using nonlinear regression methods and the data included in Table 2-4. The IDF curves and the IDF equations are applicable for all design frequencies shown. They are required for use in determining peak flows by the Rational Method or other appropriate methods.

2.4.4 - Drainage Area (A)

The size (acres) of the watershed needs to be determined for application of the Rational Method. The area may be determined through the use of topographic maps, supplemented by field surveys where topographic data has changed or where the contour interval is too great to distinguish the direction of flow. The drainage divide lines are determined based on topography, street layout, lot grading, building structure configuration and orientation, drainage system layout and other features that are created by the urbanization process.

Example 2-1

An urbanized watershed is shown on the following figure. Three types of flow conditions exist between the most distant point in the watershed and the outlet. The calculation of time of concentration and travel time in each reach is as follows:



Reach	Description of Flow	Slope (%)	Length (Ft.)	"n" value/Surface Type
A to B	Sheet flow (grass lawn)	1.8	50	0.3

The rainfall intensity (i) of the 100 year storm can be calculated using equation (2-8) together with the coefficients in Table 2-5 for a time of concentration of 7.08 minutes as 11.54 inches per hour.

The composite runoff coefficient (C) = $(0.41 \times 3 + 0.85 \times 20 + 0.81 \times 30)/53 = 0.80$

Thus the peak flow $Q_p = CiA = 0.80 \times 11.54 \text{ in/hr} \times 53 \text{ acre} = 489 \text{ cfs}$

2.5.0 - THE SOIL CONSERVATION SERVICE METHOD FOR CALCULATION OF PEAK FLOWS

The Soil Conservation Service hydrologic method is widely used by engineers and hydrologists for analyses of small urban watersheds. This method is based on extensive analytical work using a wide range of statistical data concerning storm patterns, rainfall-runoff characteristics and many hydrologic observations in the United States.

The SCS method can be applied to urban drainage areas of any size. The major parameters required to calculate a runoff hydrograph with the method include the rainfall distribution, runoff curve numbers, time of concentration and drainage area. For detailed information regarding the SCS method and the TR-20 program, the user is referred to the following NRCS publications. These can be obtained from the Natural Resources Conservation Service at <http://www.wcc.nrcs.usda.gov/>. They are:

NEH-4. "Hydrology," Section 4, National Engineering Handbook

TR-20: Computer Program for Project Formulation, Hydrology

TR-55: Urban Hydrology for Small Watersheds

TP-149: A Method for Estimating Volume and Rate of Runoff in Small Watersheds

The HEC-HMS programs can be downloaded from the US Army Corps of Engineers website at <http://www.hec.usace.army.mil/>. Refer to Section 8.2.3 for information regarding watershed hydrologic models that are maintained by the City. These models may be requested by the public and used as the basis for drainage analysis where applicable. Any results based on models obtained from the City must be certified by a Texas Licensed Professional Engineer.

2.5.1 - Austin Twenty-Four (24) Hour Storm Rainfall Distributions

The City of Austin has adopted the use of an SCS 24-hour storm duration with a Type III distribution for use with the SCS method. The DDF and IDF values to be used for the Austin area are shown in Table 2-3 and 2-4 above. For use in spreadsheet calculations, Table 2-6 below provides the Type III distribution ordinates in 5-minute increments as derived from the HEC-HMS program. The ordinates should be multiplied by the total 24 hour precipitation depth to produce the design rainfall distribution. When using the HEC-HMS model, the computational time interval should be selected based on criteria for the minimum lag time. The maximum computational time interval used in a HEC-HMS model should be 6 minutes.

Table 2-6
Type III Distribution Ordinates In 5-Minute Time Increment

Time	Incremental	Cumulative	Time	Incremental	Cumulative	Time	Incremental	Cumulative
0:00	0.0000	0.0000	8:05	0.0023	0.1163	16:10	0.0021	0.8903
0:05	0.0008	0.0008	8:10	0.0022	0.1185	16:15	0.0021	0.8924

6:50	0.0017	0.0871	14:55	0.0033	0.8511	23:00	0.0007	0.9909
6:55	0.0016	0.0887	15:00	0.0032	0.8543	23:05	0.0008	0.9917
7:00	0.0018	0.0905	15:05	0.0030	0.8573	23:10	0.0008	0.9925
7:05	0.0017	0.0922	15:10	0.0030	0.8603	23:15	0.0008	0.9933
7:10	0.0019	0.0941	15:15	0.0030	0.8633	23:20	0.0008	0.9941
7:15	0.0018	0.0959	15:20	0.0028	0.8661	23:25	0.0007	0.9948
7:20	0.0019	0.0978	15:25	0.0028	0.8689	23:30	0.0008	0.9956
7:25	0.0019	0.0997	15:30	0.0027	0.8716	23:35	0.0008	0.9964
7:30	0.0019	0.1016	15:35	0.0026	0.8742	23:40	0.0007	0.9971
7:35	0.0020	0.1036	15:40	0.0025	0.8767	23:45	0.0008	0.9979
7:40	0.0020	0.1056	15:45	0.0025	0.8792	23:50	0.0007	0.9986
7:45	0.0020	0.1076	15:50	0.0023	0.8815	23:55	0.0006	0.9992
7:50	0.0021	0.1097	15:55	0.0022	0.8837	24:00	0.0008	1.0000
7:55	0.0021	0.1118	16:00	0.0023	0.8860			
8:00	0.0022	0.1140	16:05	0.0022	0.8882			

2.5.2 - Conservation Service Runoff Curve Numbers

The National Resources Conservation Service has developed an index, the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors have the most significant impact in estimating the volume of runoff, and can be assessed from soil surveys, site investigations and land use maps.

The curve number is an indication of the potential runoff for a given antecedent soil moisture condition, and it ranges in value from zero to 100. The National Resources Conservation Service runoff curve numbers are grouped into three (3) antecedent soil moisture conditions — Antecedent Runoff Condition (ARC) I,

ARC II and ARC III. Values of runoff curve numbers for all three (3) conditions may be computed following guidelines in Part 630, Chapter 10 of the National Engineering Handbook. ARC I is the dry soil condition and ARC III is the wet soil condition. ARC II is normally considered to be the average condition. The Antecedent Runoff Condition (ARC) was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

However, studies of hydrologic data indicate that ARC II is not necessarily representative of the average condition throughout Texas. Instead, investigations have shown that the average condition ranges from ARC I in west Texas to between ARC II and ARC III in east Texas. The NRCS curve number values provided in Table 2-7 are for an ARC II. If it is desired to change to an ARC I or III condition, the adjustments given in Part 630, Chapter 10 of the National Engineering Handbook should be used. Justification must be provided for the selection of an ARC other than condition II.

The National Resources Conservation Service has classified more than 4,000 soils into four (4) hydrologic groups, identified by the letters A, B, C, and D, to represent watershed characteristics.

Group A: (Low runoff potential). Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep, well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential). Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

Table 2-7 lists the curve numbers for the four (4) soil groups under various land uses, land treatment and hydrologic conditions. Curve numbers for fully developed conditions should be based on maximum allowable impervious cover listed in Austin zoning and watershed ordinances. When calculating fully developed peak runoff rates it is recommended that the undeveloped curve number and the maximum allowable impervious cover be used as input parameters. In order to determine the soil classifications in the Austin area, the Natural Resource Conservation Service Soil Survey of Travis, Williamson or Hays County, Texas should be used. Digital versions of these soil datasets are available online at <http://soildatamart.nrcs.usda.gov> (accessed 12/18/2012).

Table 2-7

NRCS Runoff Curve Numbers for Urban Areas and Agricultural Lands (assuming ARC-II condition)

Cover Description	Average % Impervious Area ¹	Curve Numbers for Hydrologic Soil Group			
		A	B	C	D
Cover type and Hydrologic Condition					
Fully developed urban areas (vegetation established)					

Open space (lawns, parks, golf courses, cemeteries, etc.)					
Poor condition (grass cover 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right of way)		98	98	98	98
Streets and roads:					
Paved; curbs and storms drains (excluding right of way)		98	98	98	98
Paved; open ditches (including right of way)	83	89	92	93	
Gravel (including right of way)	76	85	89	91	
Dirt (including right of way)		72	82	87	89
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)		77	86	91	94
Agricultural lands					
Grassland, or range-continuous forage for grazing ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay		30	58	71	78

Brush—brush-weed-grass mixture with brush the major element ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ⁴	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ⁵	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways and surrounding lots		59	74	82	86
<p>1 Poor: less than 50 percent ground cover or heavily grazed with no mulch. Fair: 50 to 75 percent ground cover and not heavily grazed. Good: greater than 75 percent ground cover and lightly or only occasionally grazed.</p>					
<p>2 Poor: less than 50 percent ground cover. Fair: 50 to 75 percent ground cover. Good: greater than 75 percent ground cover.</p>					
<p>3 Curve numbers shown were computed for areas with 50 percent woods and 50 percent grass (pasture) cover. Other combinations of conditions may be computed from the curve numbers for woods and pasture.</p>					
<p>4 Poor: Forest litter, small trees and brush are destroyed by heavy grazing or regular burning. Fair: Woods are grazed but not burned, and some forest litter covers the soil. Good: Woods are protected from grazing, and litter and brush adequately cover the soil.</p>					
<p>Source: National Resources Conservation Service. TR-55: Urban Hydrology for Small Watersheds</p>					

2.5.3 - Time of Concentration

The procedures for estimating time of concentration for the NRCS method are described in the SCS Technical Release 55 (TR-55) and in Section 2.4.2 of this manual. Three (3) types of flow (sheet flow, shallow concentrated flow and channel flow) are considered. Note that Table 2-2 shall be used for determination of sheet flow Manning's roughness coefficients rather than the table included in TR-55.

In hydrograph analysis, the time of concentration can be defined as the time from the end of excess rainfall to the point of inflection on the falling limb of the hydrograph. The time of concentration determines the shape of the runoff hydrograph. Times of concentration are required for the existing and developed conditions to adequately model the impact of the development on stormwater runoff. The methodology presented in TR-55 provides a reasonable approach for the estimation of time of concentration. The lag time, defined as the time between the center of mass of excess rainfall to the runoff peak, is typically used in the HEC-HMS implementation of the SCS methodology. The lag time can be estimated with equation 2-9.

$$T_{lag} = 0.6 T_c \text{ (Eq. 2-9)}$$

In general, times of concentration for the developed condition should be calculated based on conservative assumptions that consider the increased hydraulic efficiency expected with an ultimate developed condition. Times of concentration should be representative of the overall drainage area, not simply based on the longest (in either distance or time) flow path. Sheet flow for both existing and proposed conditions should be limited to 100 feet. This length should be considered a maximum; sheet flow lengths should be measured and justified for all conditions. Additionally, the minimum slope used for calculation of sheet and shall flow travel time components should be 0.005 feet per foot (0.5%).

2.6.0 - PROBABLE MAXIMUM STORM/FLOOD DEVELOPMENT

The purpose of this section is to describe a method for developing the Probable Maximum Flood (PMF) within the City of Austin jurisdiction. The PMF is calculated by obtaining the Probable Maximum Precipitation (PMP) for a specific storm duration and drainage area. The PMP rainfall depths presented in this section were derived for the Austin area and are only applicable for designing and managing dams within City of Austin's full purpose, limited purpose and extraterritorial jurisdictions. Typically, a PMF runoff model requires both a temporal and spatial distribution of the PMP. However, if the drainage area is less than 10 square miles, the spatial distribution is not required (i.e. the drainage area is considered small enough that the PMP values can reasonably be considered point rainfall values). The PMP values shown in this section are valid only for drainage areas less than 10 square miles.

2.6.1 - Probable Maximum Precipitation (PMP)

The PMP values were derived using Hydrometeorological Report No. 52 (HMR-52) and Hydrometeorological Report No. 51 (HMR-51) per the guidance provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas (January 2007) available from the Dam Safety Program at the Texas Commission on Environmental Quality (TCEQ). Table 2-8 contains a summary of PMP depths and intensities for various storm durations for drainage areas less than 10 square miles.

Table 2-8
Probable Maximum Precipitation Depths for the City of Austin

Storm Duration	Depth (in)
1 hr	17.4
2 hr	21.6
3 hr	24.9

6 hr	31.1
12 hr	37.6
24 hr	44.7
48 hr	50.0
72 hr	53.4
1. All values are valid for drainage areas less than 10 square miles.	
2. Do not use these depths with the Soil Conservation Service (SCS) Type III distribution. The relevant storm distributions are provided in DCM Section 2.6.2 "Probable Maximum Flood (PMF)" and were derived using the Hydrologic and Hydraulic Guidelines for Dams in Texas.	

2.6.2 - Probable Maximum Flood (PMF)

To determine the PMF, each of the possible storm durations (1, 2, 3, 6, 12, 24, 48, and 72 hour storms) needs to be analyzed in order to determine the critical duration. The critical duration is the storm duration that produces the highest water surface elevation behind the dam. The PMF for each storm duration is derived using the PMP depths from Table 2-8 and using a rainfall-runoff model (i.e. HEC-HMS, TR-20). The rainfall-runoff model should use the temporal distribution as provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas. The temporal distribution for each storm duration has been reproduced in Figure 2-4, Appendix D. Figure 2-4 provides the temporal distribution ordinates to be multiplied by the associated storm depths for use in the various rainfall-runoff models. The runoff parameters used in the PMF model are the same as those used for runoff analyses of the more frequent storm events, with the exception of curve numbers and the temporal distribution of rainfall.

Runoff curve numbers for the PMF need to reflect the assumption that the soils will be saturated. Therefore the runoff curve number should be based on ARC III. The appropriate curve number should be chosen using the tables provided in the DCM Section 2.5.2. These are ARC II values which can be converted to ARC III values using Table 10.1 in Part 630, Chapter 10 of the National Engineering Handbook. Note that the ARC was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

SECTION 3 - STREET FLOW

3.1.0 - GENERAL

The location of inlets and permissible flow of water in streets should be related to the extent and frequency of interference to traffic and the likelihood of flood damage to surrounding property for the 25 and 100 year frequency storms. Interference to traffic is regulated by design limits of the spread of water into traffic lanes, especially in regard to arterials. Flooding of surrounding property from streets is controlled by limiting curb

TR-55 CURVE NUMBERS

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description Cover type and hydrologic condition	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	80	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	80
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation) ^{5/}					
		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

^{1/} Average runoff condition, and $I_p = 0.2S$.^{2/} The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.^{3/} CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.^{4/} Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.^{5/} Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ¹

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ²	Hydrologic condition ³	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

¹ Average runoff condition, and $I_a=0.2S$ ² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ¹

Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
		A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 ⁴	48	65	73
Woods—grass combination (orchard or tree farm). ⁵	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ⁶	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 ⁴	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.

² *Poor*: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: >75% ground cover and lightly or only occasionally grazed.

³ *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30, use $CN = 30$ for runoff computations.

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

^{1/} Average runoff condition, and $I_{a,0.25} = 0.2S$. For range in humid regions, use table 2-2c.

^{2/} Poor: < 30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

^{3/} Curve numbers for group A have been developed only for desert shrub.

Appendix “E” – Cross Section Results

Channel Report

CROSS SECTION 1 - EXISTING

User-defined

Invert Elev (ft) = 930.52
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

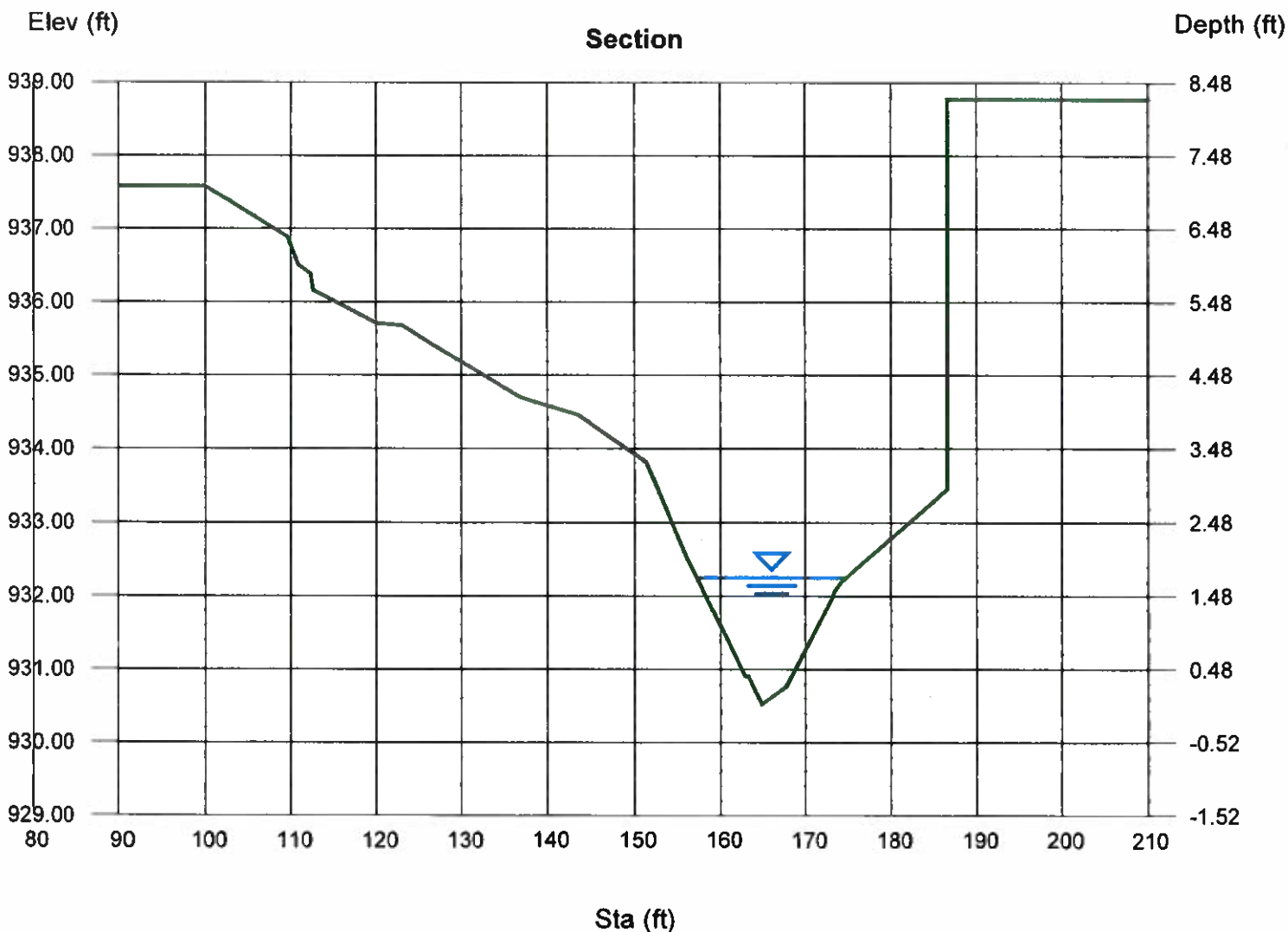
Depth (ft) = 1.73
 Q (cfs) = 370.20
 Area (sqft) = 16.34
 Velocity (ft/s) = 22.65
 Wetted Perim (ft) = 18.05
 Crit Depth, Yc (ft) = 3.09
 Top Width (ft) = 17.67
 EGL (ft) = 9.71

Calculations

Compute by: Known Q
 Known Q (cfs) = 370.20

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.58)-(109.64, 936.89, 0.060)-(110.90, 936.51, 0.060)-(112.36, 936.39, 0.060)-(112.65, 936.16, 0.060)-(120.08, 935.71, 0.060)-(123.01, 935.68, 0.060)
 -(136.80, 934.70, 0.060)-(143.54, 934.46, 0.060)-(151.30, 933.82, 0.025)-(155.91, 932.55, 0.025)-(162.90, 930.91, 0.025)-(163.28, 930.91, 0.025)-(164.85, 930.52, 0.025)
 -(167.75, 930.77, 0.025)-(173.16, 931.97, 0.025)-(173.42, 932.06, 0.025)-(174.18, 932.18, 0.025)-(186.66, 933.46, 0.025)-(186.66, 938.77, 0.025)-(200.00, 938.77, 0.025)



Channel Report

CROSS SECTION 1 - PROPOSED

User-defined

Invert Elev (ft) = 930.52
 Slope (%) = 16.80
 N-Value = 0.025

Calculations

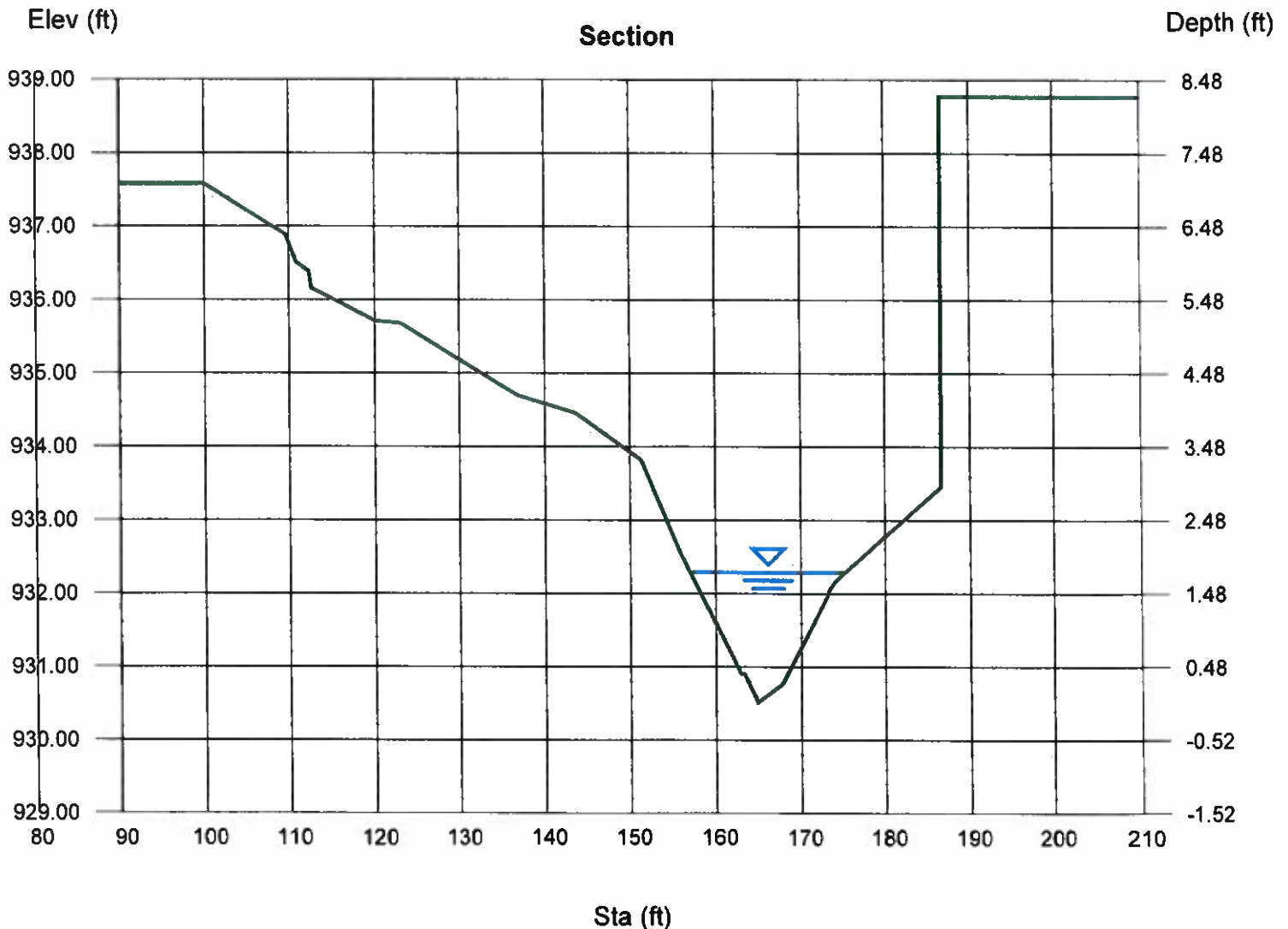
Compute by: Known Q
 Known Q (cfs) = 388.50

Highlighted

Depth (ft) = 1.77
 Q (cfs) = 388.50
 Area (sqft) = 17.06
 Velocity (ft/s) = 22.77
 Wetted Perim (ft) = 18.61
 Crit Depth, Yc (ft) = 3.15
 Top Width (ft) = 18.23
 EGL (ft) = 9.83

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.58, 0.060)-(109.64, 936.89, 0.060)-(110.90, 936.51, 0.060)-(112.36, 936.39, 0.060)-(112.65, 936.16, 0.060)-(120.08, 935.71, 0.060)-(123.01, 935.68, 0.060)
 -(136.80, 934.70, 0.060)-(143.54, 934.46, 0.060)-(151.30, 933.82, 0.025)-(155.91, 932.55, 0.025)-(162.90, 930.91, 0.025)-(163.28, 930.91, 0.025)-(164.85, 930.52, 0.025)
 -(167.75, 930.77, 0.025)-(173.16, 931.97, 0.025)-(173.42, 932.06, 0.025)-(174.18, 932.18, 0.025)-(186.66, 933.46, 0.025)-(186.66, 938.77, 0.025)-(200.00, 938.77, 0.025)



Channel Report

CROSS SECTION 1.2 - EXISTING

User-defined

Invert Elev (ft) = 928.36
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

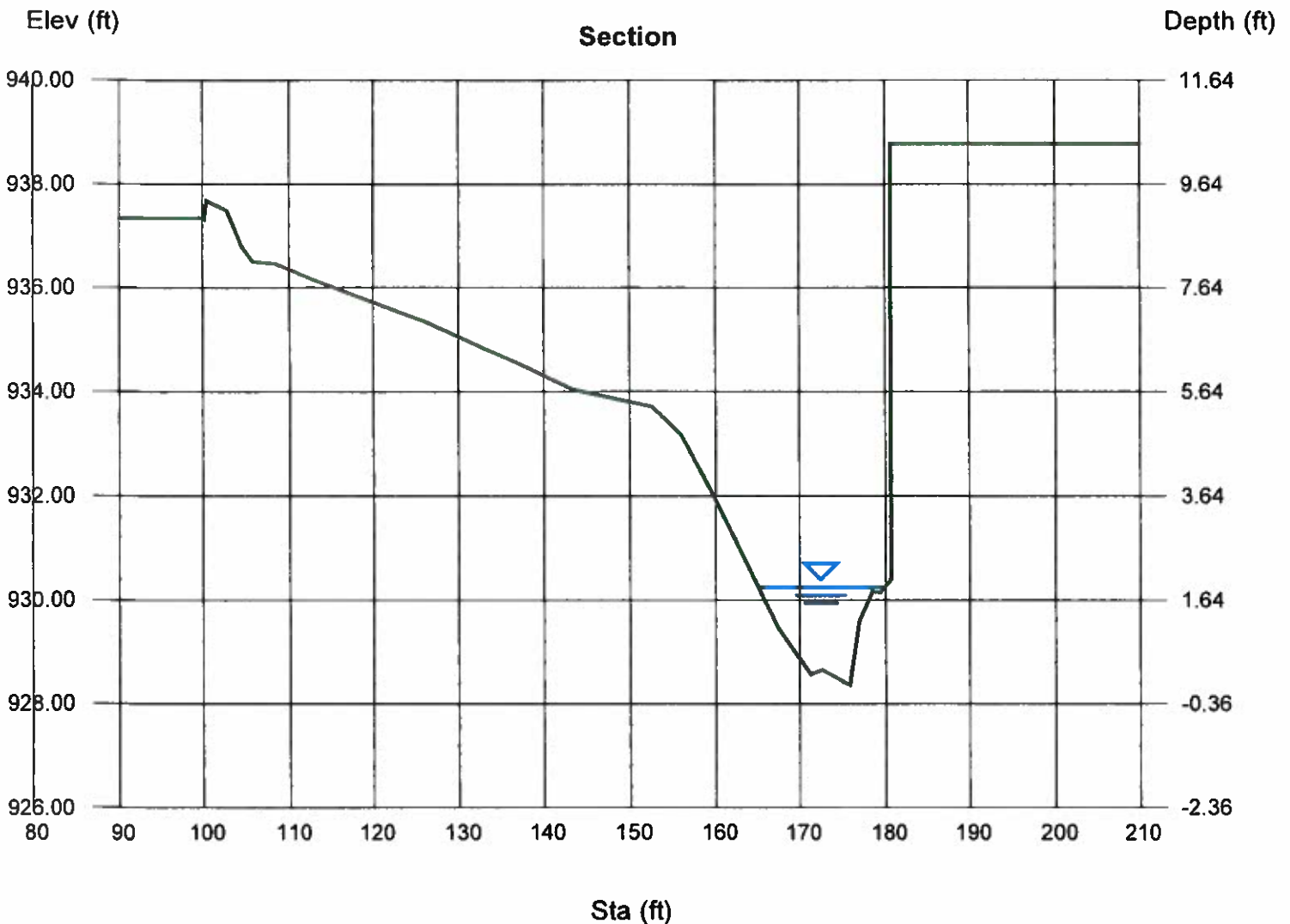
Depth (ft) = 1.88
 Q (cfs) = 370.20
 Area (sqft) = 15.37
 Velocity (ft/s) = 24.08
 Wetted Perim (ft) = 15.67
 Crit Depth, Yc (ft) = 3.50
 Top Width (ft) = 14.77
 EGL (ft) = 10.90

Calculations

Compute by: Known Q
 Known Q (cfs) = 370.20

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.33)-(100.23, 937.31, 0.060)-(100.45, 937.67, 0.060)-(102.84, 937.48, 0.060)-(104.56, 936.78, 0.060)-(105.78, 936.50, 0.060)-(108.44, 936.46, 0.060)
 -(112.30, 936.18, 0.060)-(126.04, 935.35, 0.060)-(139.50, 934.34, 0.060)-(143.27, 934.05, 0.060)-(152.48, 933.71, 0.060)-(155.84, 933.19, 0.025)-(159.48, 932.09, 0.025)
 -(167.41, 929.47, 0.025)-(171.28, 928.57, 0.025)-(172.65, 928.65, 0.025)-(175.79, 928.36, 0.025)-(176.88, 929.58, 0.025)-(178.46, 930.16, 0.025)-(179.33, 930.14, 0.025)
 -(180.62, 930.39, 0.025)-(180.62, 938.77, 0.025)-(200.00, 938.77, 0.025)



Channel Report

CROSS SECTION 1.2 - PROPOSED

User-defined

Invert Elev (ft) = 928.36
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

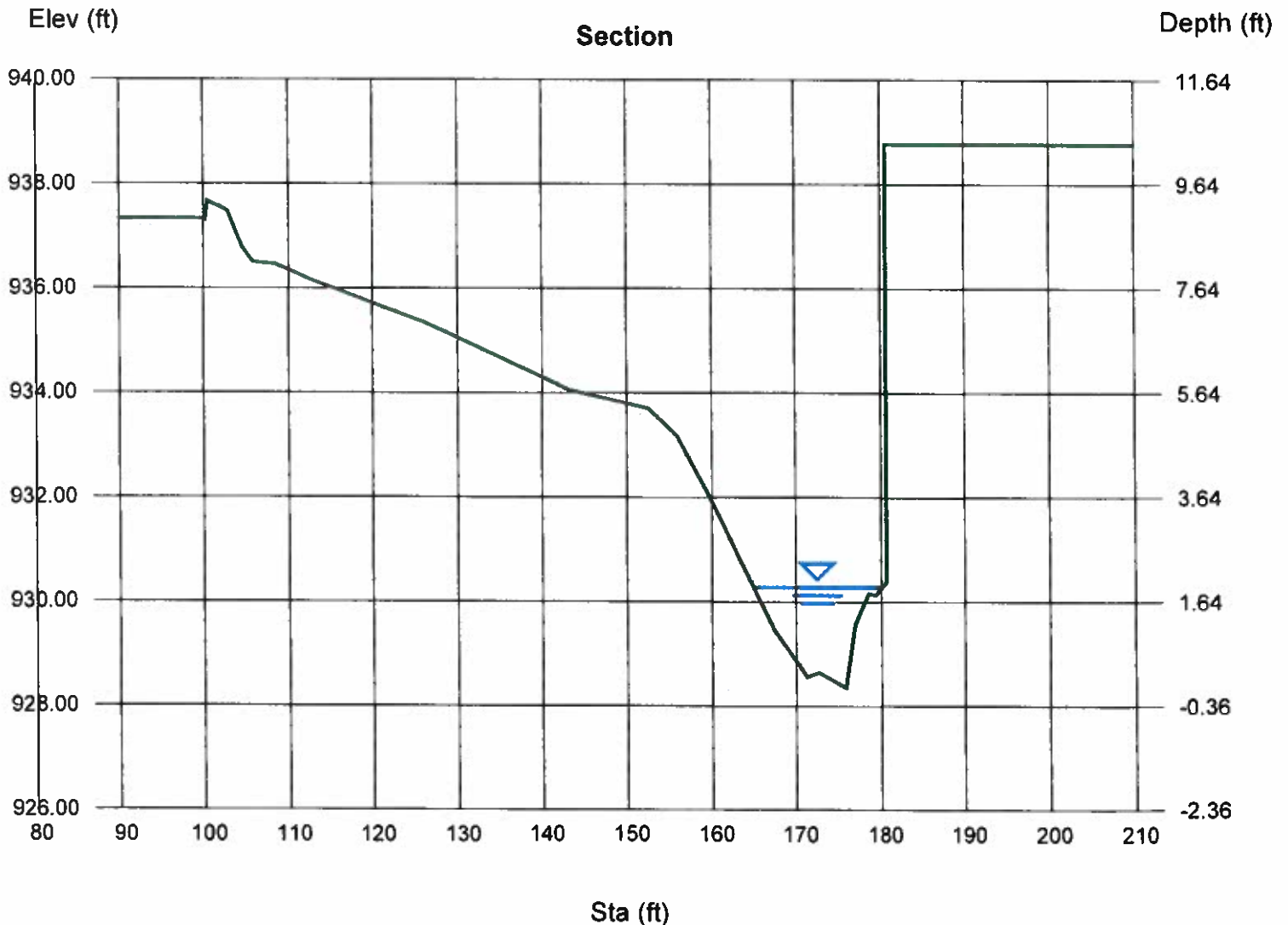
Depth (ft) = 1.92
 Q (cfs) = 388.50
 Area (sqft) = 15.97
 Velocity (ft/s) = 24.33
 Wetted Perim (ft) = 16.01
 Crit Depth, Yc (ft) = 3.58
 Top Width (ft) = 15.09
 EGL (ft) = 11.12

Calculations

Compute by: Known Q
 Known Q (cfs) = 388.50

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.33, 0.060)-(100.23, 937.31, 0.060)-(100.45, 937.67, 0.060)-(102.84, 937.48, 0.060)-(104.56, 936.78, 0.060)-(105.78, 936.50, 0.060)-(108.44, 936.46, 0.060)
 -(112.30, 936.18, 0.060)-(126.04, 935.35, 0.060)-(139.50, 934.34, 0.060)-(143.27, 934.05, 0.060)-(152.48, 933.71, 0.060)-(155.84, 933.19, 0.025)-(159.48, 932.09, 0.025)
 -(167.41, 929.47, 0.025)-(171.28, 928.57, 0.025)-(172.65, 928.65, 0.025)-(175.79, 928.36, 0.025)-(176.88, 929.58, 0.025)-(178.46, 930.16, 0.025)-(179.33, 930.14, 0.025)
 -(180.62, 930.39, 0.025)-(180.62, 938.77, 0.025)-(200.00, 938.77, 0.025)



955

CROSS SECTION 1.2

955

950

950

945

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940

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935

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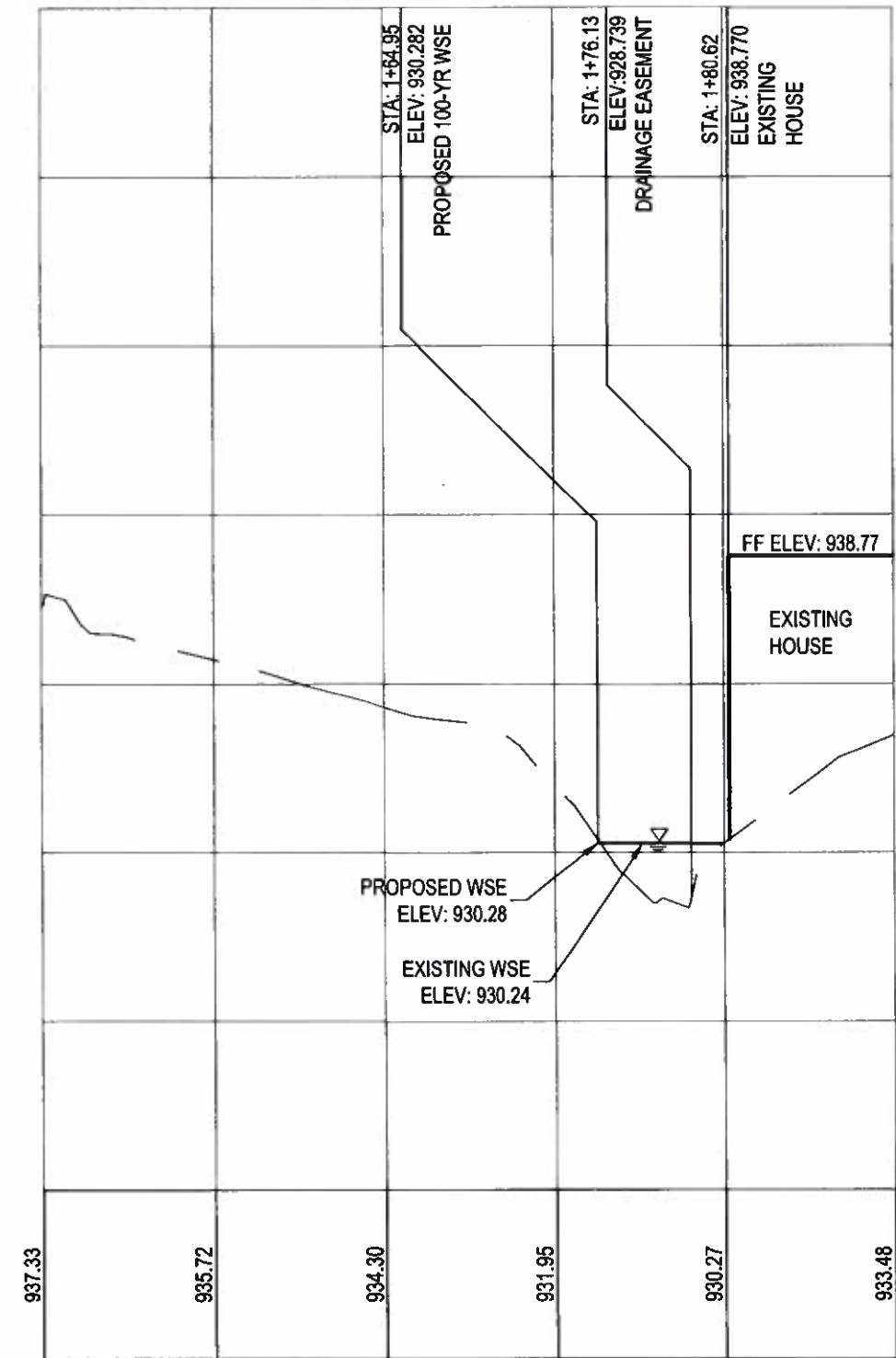
930

925

925

920

920



1+00

2+00

Channel Report

CROSS SECTION 2 - EXISTING

User-defined

Invert Elev (ft) = 916.08
 Slope (%) = 7.40
 N-Value = 0.025

Calculations

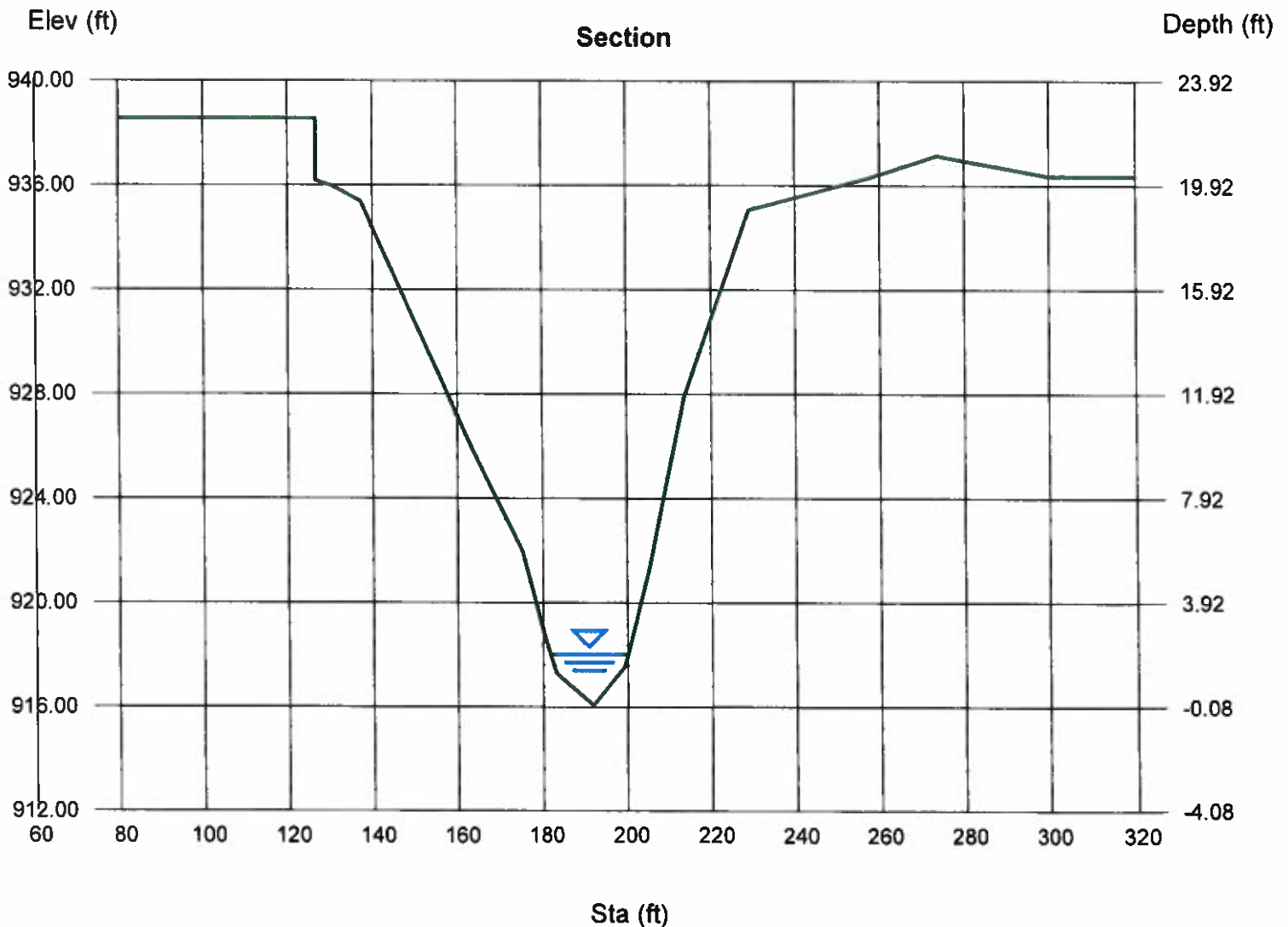
Compute by: Known Q
 Known Q (cfs) = 370.20

Highlighted

Depth (ft) = 1.94
 Q (cfs) = 370.20
 Area (sqft) = 21.21
 Velocity (ft/s) = 17.45
 Wetted Perim (ft) = 18.85
 Crit Depth, Yc (ft) = 3.15
 Top Width (ft) = 18.31
 EGL (ft) = 6.68

(Sta, El, n)-(Sta, El, n)...

(100.00, 938.55)-(126.56, 938.55, 0.060)-(126.57, 936.19, 0.060)-(130.30, 935.98, 0.060)-(137.15, 935.38, 0.060)-(164.09, 925.68, 0.060)-(175.17, 921.97, 0.025)
 -(180.66, 918.61, 0.025)-(183.14, 917.30, 0.025)-(191.85, 916.08, 0.025)-(199.40, 917.58, 0.025)-(205.25, 921.33, 0.025)-(213.52, 927.90, 0.060)-(228.92, 935.06, 0.060)
 -(257.61, 936.30, 0.060)-(273.44, 937.15, 0.060)-(300.00, 936.36, 0.060)



Channel Report

CROSS SECTION 2 - PROPOSED

User-defined

Invert Elev (ft) = 916.08
 Slope (%) = 7.40
 N-Value = 0.025

Highlighted

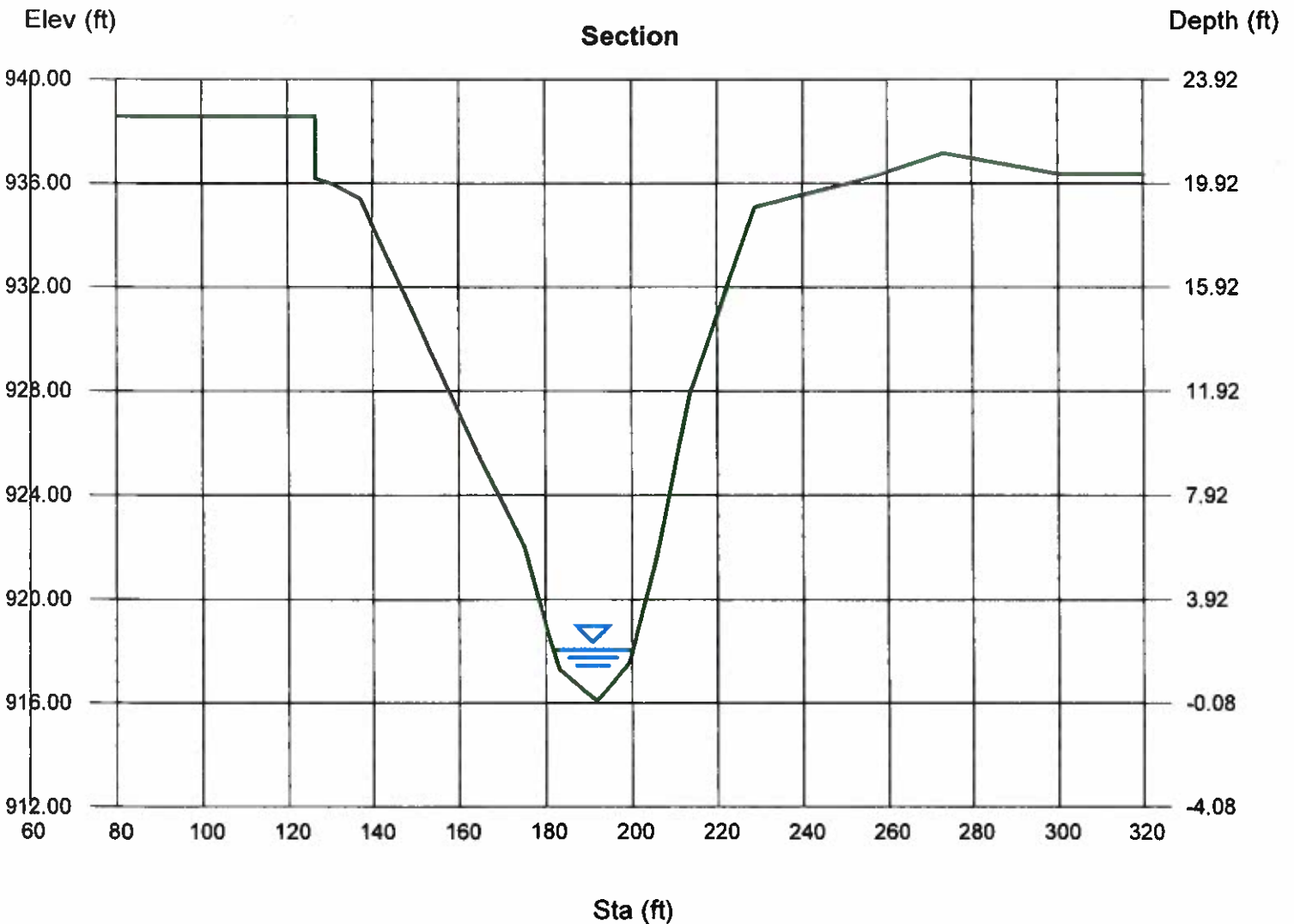
Depth (ft) = 1.98
 Q (cfs) = 388.50
 Area (sqft) = 21.95
 Velocity (ft/s) = 17.70
 Wetted Perim (ft) = 19.01
 Crit Depth, Yc (ft) = 3.22
 Top Width (ft) = 18.45
 EGL (ft) = 6.85

Calculations

Compute by: Known Q
 Known Q (cfs) = 388.50

(Sta, El, n)-(Sta, El, n)...

(100.00, 938.55)-(126.56, 938.55, 0.060)-(126.57, 936.19, 0.060)-(130.30, 935.98, 0.060)-(137.15, 935.38, 0.060)-(164.09, 925.68, 0.060)-(175.17, 921.97, 0.025)
 -(180.66, 918.61, 0.025)-(183.14, 917.30, 0.025)-(191.85, 916.08, 0.025)-(199.40, 917.58, 0.025)-(205.25, 921.33, 0.025)-(213.52, 927.90, 0.060)-(228.92, 935.06, 0.060)
 -(257.61, 936.30, 0.060)-(273.44, 937.15, 0.060)-(300.00, 936.36, 0.060)



**Appendix "F" – Cypress Point Plat (Down
Stream Subdivision)**

Camp Young Judaea

Woodcreek, Texas

CITY OF WOODCREEK WATER QUALITY PLAN

JULY 2017
TBPE # 4512
MHE 2620.02



July 28, 2017

City of Woodcreek
41 Champions Circle
Woodcreek, Texas 78676

Re: Camp Young Judaea
Woodcreek, Texas
Water Quality Plan

Please find attached one (1) copy of the Camp Young Judaea Camp Improvements City of Woodcreek Water Quality Plan. This Water Quality Plan has been prepared in accordance with the Woodcreek, Texas Code of Ordinances, Title V, Chapter 50.

This Water Quality Plan applies to a 263.393 acre tract located on 121 Camp Young Judaea Drive, approximately 2.3 miles west from FM 2325, just north of Wiberley, TX.

This submittal was originally created for submission to TCEQ for Improvements including the dormitory project as well as future Improvements. **This submittal is seeking approval for the dormitory project only**, however some of the documents contain information regarding future improvements that will need City approval later.

Please review the attached Water Quality Plan information for the items it is intended to address, and if acceptable, provide a written approval of the plan in order that construction may begin at the earliest opportunity.

Respectfully Submitted,
Matkin Hoover Engineering & Surveying
TBPE #4152



Garrett Keller, P.E.
Vice President

Attachments
cc:

Contributing Zone Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Contributing Zone to the Edwards Aquifer and Relating to 30 TAC §213.24(1), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

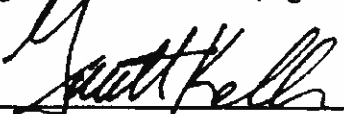
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Contributing Zone Plan Application** is hereby submitted for TCEQ review and Executive Director approval. The application was prepared by:

Print Name of Customer/Agent: Garrett D. Keller, P.E.

Date: July 28, 2017

Signature of Customer/Agent:



Garrett D. Keller

Regulated Entity Name: Camp Young Judaea

Project Information

1. County: Hays
2. Stream Basin: Cypress Creek
3. Groundwater Conservation District (if applicable): N/A
4. Customer (Applicant):

Contact Person: Frank Silberlicht

Entity: Camp Young Judaea, Inc.

Mailing Address: 5410 Bellaire Blvd. Suite 207

City, State: Bellaire, Texas

Telephone: (713) 723-8354

Email Address: frank@cyjtexas.org

Zip: 77401

Fax: (713) 728-5061

5. Agent/Representative (If any):

Contact Person: Garrett D. Keller

Entity: Matkin-Hoover Engineering and Surveying

Mailing Address: 8 Spencer Rd, Suite 100

City, State: Boerne, Texas

Zip: 78006

Telephone: (830) 249-0600

Fax: (830) 249-0099

Email Address: gkeller@matkinhoover.com

6. Project Location:

- The project site is located inside the city limits of Woodcreek, Texas.
- The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
- The project site is not located within any city's limits or ETJ.

7. The location of the project site is described below. Sufficient detail and clarity has been provided so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

The project site is located in the City of Woodcreek TX , north of Wimberley, TX and 40 minutes south of Austin. The total site of 263.393 acres adjoins to the South with FM 2325 , to the East to FM 12 and to the West with Jacobs Well Rd.

8. **Attachment A - Road Map.** A road map showing directions to and the location of the project site is attached. The map clearly shows the boundary of the project site.

9. **Attachment B - USGS Quadrangle Map.** A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') is attached. The map(s) clearly show:

- Project site boundaries.
- USGS Quadrangle Name(s).

10. **Attachment C - Project Narrative.** A detailed narrative description of the proposed project is attached. The project description is consistent throughout the application and contains, at a minimum, the following details:

- Area of the site
- Offsite areas
- Impervious cover
- Permanent BMP(s)
- Proposed site use
- Site history
- Previous development
- Area(s) to be demolished

11. Existing project site conditions are noted below:

- Existing commercial site

- Existing industrial site
- Existing residential site
- Existing paved and/or unpaved roads
- Undeveloped (Cleared)
- Undeveloped (Undisturbed/Not cleared)
- Other: Children's Religious Camp

12. The type of project is:

- Residential: # of Lots: _____
- Residential: # of Living Unit Equivalents: _____
- Commercial
- Industrial
- Other: Civic

13. Total project area (size of site): 263.393 Acres

Total disturbed area: 8.00 Acres

14. Estimated projected population: 2 Full Time. Actual population will vary.

15. The amount and type of impervious cover expected after construction is complete is shown below:

Table 1 - Impervious Cover

<i>Impervious Cover of Proposed Project</i>	<i>Sq. Ft.</i>	<i>Sq. Ft./Acre</i>	<i>Acres</i>
Structures/Rooftops	165,337	÷ 43,560 =	3.796
Parking	33,067	÷ 43,560 =	0.759
Other paved surfaces	214,937	÷ 43,560 =	4.934
Total Impervious Cover	413,341	÷ 43,560 =	9.489

Total Impervious Cover $9.489 \div$ Total Acreage $263.393 \times 100 = 3.6\%$ Impervious Cover

16. **Attachment D - Factors Affecting Surface Water Quality.** A detailed description of all factors that could affect surface water quality is attached. If applicable, this includes the location and description of any discharge associated with industrial activity other than construction.

17. Only inert materials as defined by 30 TAC 330.2 will be used as fill material.

For Road Projects Only

Complete questions 18 - 23 if this application is exclusively for a road project.

N/A

18. Type of project:

- TXDOT road project.
- County road or roads built to county specifications.
- City thoroughfare or roads to be dedicated to a municipality.
- Street or road providing access to private driveways.

19. Type of pavement or road surface to be used:

- Concrete
- Asphaltic concrete pavement
- Other: _____

20. Right of Way (R.O.W.):

Length of R.O.W.: _____ feet.
Width of R.O.W.: _____ feet.
 $L \times W = \text{_____ Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} = \text{_____ acres.}$

21. Pavement Area:

Length of pavement area: _____ feet.
Width of pavement area: _____ feet.
 $L \times W = \text{_____ Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} = \text{_____ acres.}$
Pavement area _____ acres \div R.O.W. area _____ acres $\times 100 = \text{_____ \%}$ impervious cover.

22. A rest stop will be included in this project.

A rest stop will not be included in this project.

23. Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

24. **Attachment E - Volume and Character of Stormwater.** A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

25. Wastewater is to be discharged in the contributing zone. Requirements under 30 TAC §213.6(c) relating to Wastewater Treatment and Disposal Systems have been satisfied.

N/A

26. Wastewater will be disposed of by:

On-Site Sewage Facility (OSSF/Septic Tank):

Attachment F - Suitability Letter from Authorized Agent. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

Sewage Collection System (Sewer Lines):

The sewage collection system will convey the wastewater to the Aqua Texas (name) Treatment Plant. The treatment facility is:

Existing.

Proposed.

N/A

Permanent Aboveground Storage Tanks (ASTs) \geq 500 Gallons

Complete questions 27 - 33 if this project includes the installation of AST(s) with volume(s) greater than or equal to 500 gallons.

N/A

27. Tanks and substance stored:

Table 2 - Tanks and Substance Storage

AST Number	Size (Gallons)	Substance to be Stored	Tank Material
1			
2			
3			
4			
5			

Total x 1.5 = _____ Gallons

28. The AST will be placed within a containment structure that is sized to capture one and one-half (1 1/2) times the storage capacity of the system. For facilities with more than one tank system, the containment structure is sized to capture one and one-half (1 1/2) times the cumulative storage capacity of all systems.
- Attachment G - Alternative Secondary Containment Methods.** Alternative methods for providing secondary containment are proposed. Specifications showing equivalent protection for the Edwards Aquifer are attached.

29. Inside dimensions and capacity of containment structure(s):

Table 3 - Secondary Containment

<i>Length (L)(Ft.)</i>	<i>Width(W)(Ft.)</i>	<i>Height (H)(Ft.)</i>	<i>L x W x H = (Ft3)</i>	<i>Gallons</i>

Total: _____ Gallons

30. Piping:

- All piping, hoses, and dispensers will be located inside the containment structure.
- Some of the piping to dispensers or equipment will extend outside the containment structure.
- The piping will be aboveground
- The piping will be underground

31. The containment area must be constructed of and in a material impervious to the substance(s) being stored. The proposed containment structure will be constructed of: _____.

32. **Attachment H - AST Containment Structure Drawings.** A scaled drawing of the containment structure is attached that shows the following:

- Interior dimensions (length, width, depth and wall and floor thickness).
- Internal drainage to a point convenient for the collection of any spillage.
- Tanks clearly labeled
- Piping clearly labeled
- Dispenser clearly labeled

33. Any spills must be directed to a point convenient for collection and recovery. Spills from storage tank facilities must be removed from the controlled drainage area for disposal within 24 hours of the spill.

- In the event of a spill, any spillage will be removed from the containment structure within 24 hours of the spill and disposed of properly.
- In the event of a spill, any spillage will be drained from the containment structure through a drain and valve within 24 hours of the spill and disposed of properly. The drain and valve system are shown in detail on the scaled drawing.

Site Plan Requirements

Items 34 - 46 must be included on the Site Plan.

34. The Site Plan must have a minimum scale of 1" = 400'.
Site Plan Scale: 1" = 200'.
35. 100-year floodplain boundaries:
- Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
 - No part of the project site is located within the 100-year floodplain.
The 100-year floodplain boundaries are based on the following specific (including date of material) source(s): FIRM Hays County, Texas and incorporated areas. Map number 48209C0238F dated September 2, 2005. No development is proposed within the floodplain.
36. The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.
- The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot contour intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.
37. A drainage plan showing all paths of drainage from the site to surface streams.
38. The drainage patterns and approximate slopes anticipated after major grading activities.
39. Areas of soil disturbance and areas which will not be disturbed.
40. Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
41. Locations where soil stabilization practices are expected to occur.
42. Surface waters (including wetlands).
 N/A
43. Locations where stormwater discharges to surface water.
 There will be no discharges to surface water.

44. Temporary aboveground storage tank facilities.
 Temporary aboveground storage tank facilities will not be located on this site.
45. Permanent aboveground storage tank facilities.
 Permanent aboveground storage tank facilities will not be located on this site.
46. Legal boundaries of the site are shown.

Permanent Best Management Practices (BMPs)

Practices and measures that will be used during and after construction is completed.

47. Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.
 N/A
48. These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.
 The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.
 A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: RG-348 (Revised) July 2005.
 N/A
49. Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.
 N/A
50. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
 The site will be used for low density single-family residential development and has 20% or less impervious cover.

The site will be used for low density single-family residential development but has more than 20% impervious cover.

The site will not be used for low density single-family residential development.

51. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

Attachment I - 20% or Less Impervious Cover Waiver. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.

The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.

The site will not be used for multi-family residential developments, schools, or small business sites.

52. **Attachment J - BMPs for Upgradient Stormwater.**

A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.

No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.

Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.

53. **Attachment K - BMPs for On-site Stormwater.**

A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.

Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.

54. **Attachment L - BMPs for Surface Streams.** A description of the BMPs and measures that prevent pollutants from entering surface streams is attached.

N/A

55. **Attachment M - Construction Plans.** Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. Construction plans for the proposed permanent BMPs and measures are attached and include: Design calculations, TCEQ Construction Notes, all proposed structural plans and specifications, and appropriate details.

N/A

56. **Attachment N - Inspection, Maintenance, Repair and Retrofit Plan.** A site and BMP specific plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan fulfills all of the following:

Prepared and certified by the engineer designing the permanent BMPs and measures

Signed by the owner or responsible party

Outlines specific procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofit.

Contains a discussion of record keeping procedures

N/A

57. **Attachment O - Pilot-Scale Field Testing Plan.** Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.

N/A

58. **Attachment P - Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that result in water quality degradation.

N/A

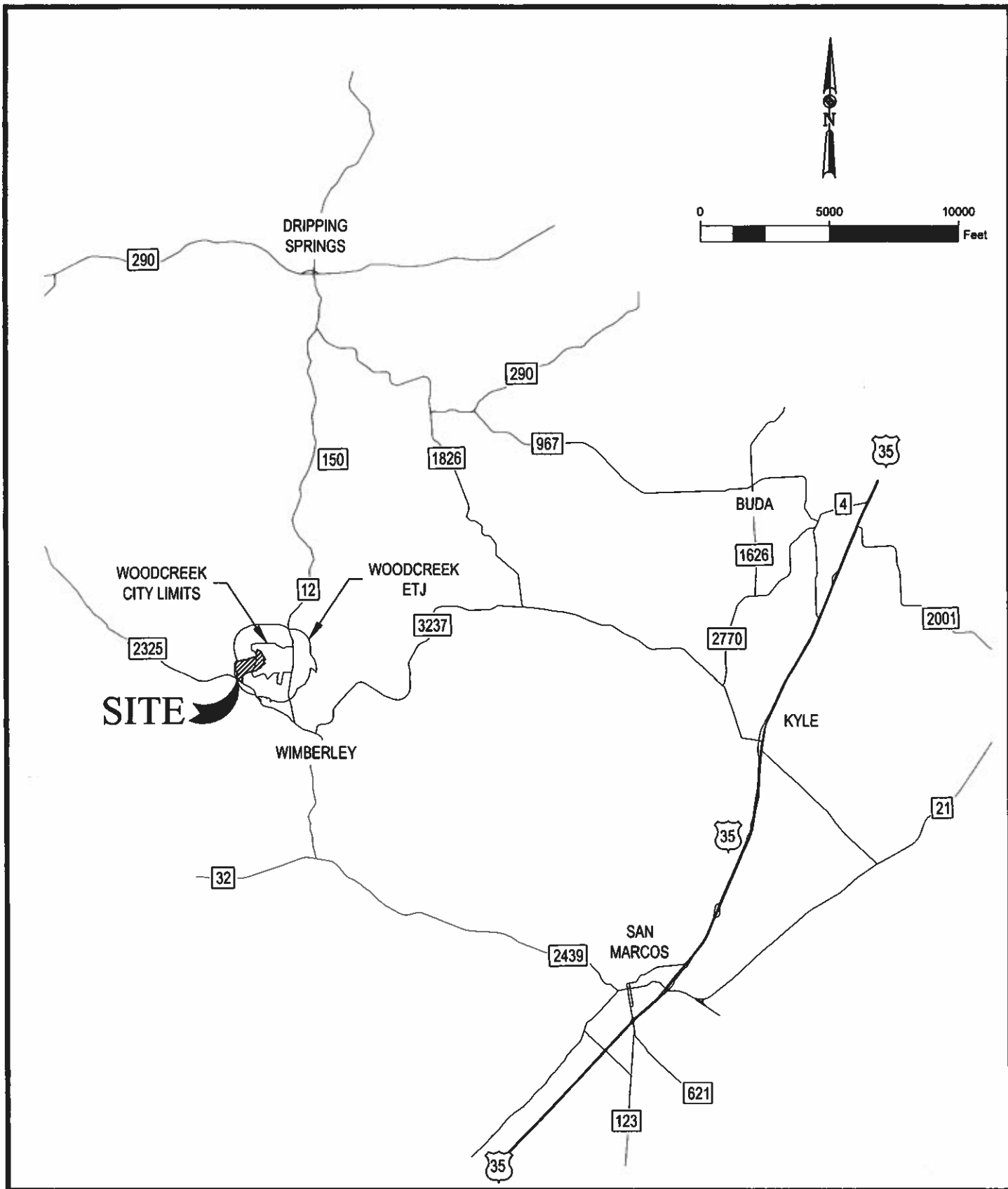
Responsibility for Maintenance of Permanent BMPs and Measures after Construction is Complete.

59. The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.

60. A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.

Administrative Information

61. Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions.
62. Any modification of this Contributing Zone Plan may require TCEQ review and Executive Director approval prior to construction, and may require submission of a revised application, with appropriate fees.
63. The site description, controls, maintenance, and inspection requirements for the storm water pollution prevention plan (SWPPP) developed under the EPA NPDES general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) of the technical report. All requirements of 30 TAC §213.24(1-5) have been met by the SWPPP document.
- The Temporary Stormwater Section (TCEQ-0602) is included with the application.



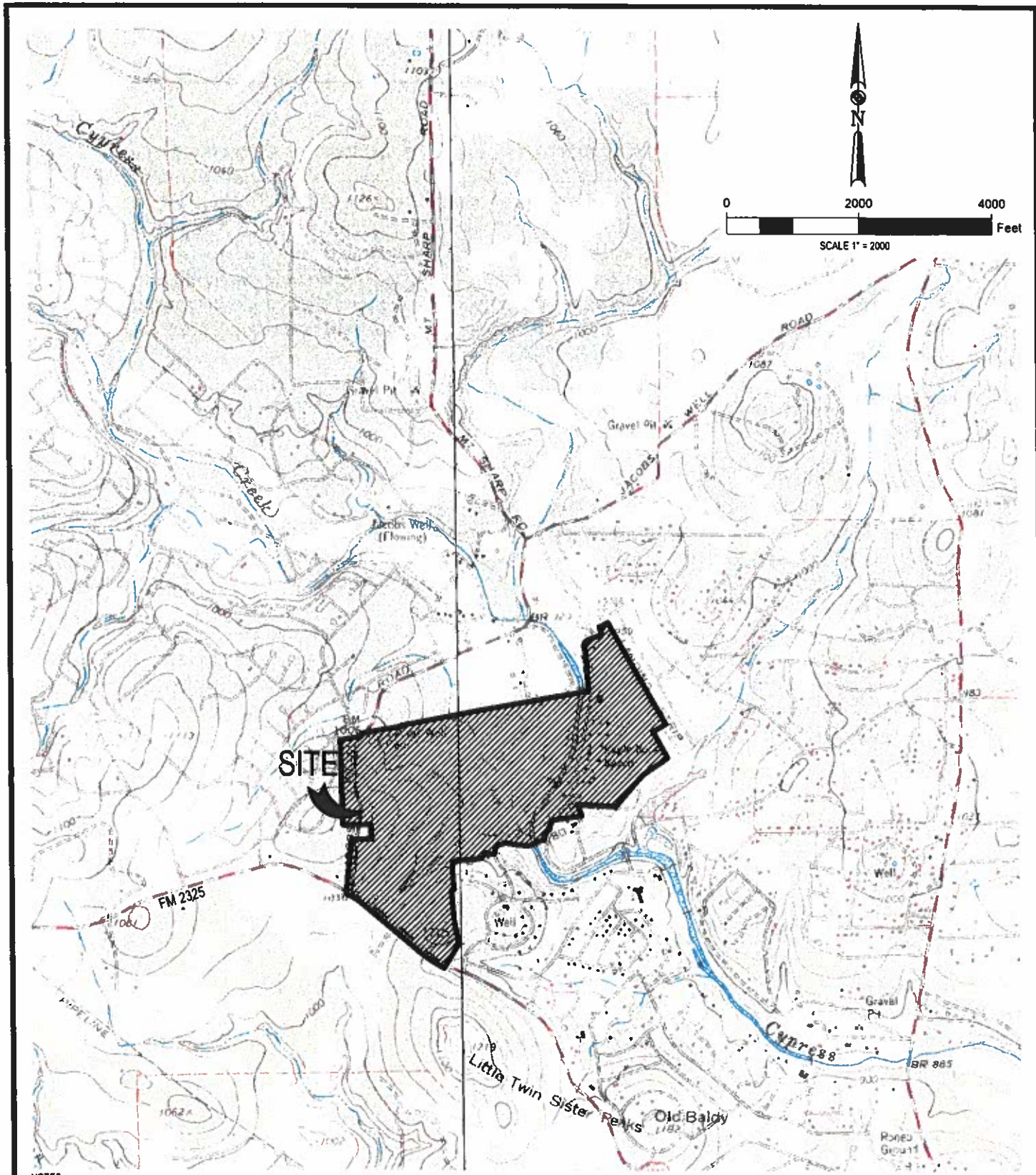
MATKINHOOVER

ENGINEERING & SURVEYING

P.O. BOX 34
 4 SPENCER ROAD SUITE 140
 ROSSINI, TEXAS 75086
 OFFICE: 817-247-6600 FAX: 817-292-0297
 TEXAS REGISTERED ENGINEERING FIRM # 001412
 TEXAS BOARD OF PROFESSIONAL LAND SURVEYING FIRM # 0429701
 CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

ROAD MAP
 FOR
CAMP YOUNG JUDAEA
 WOODCREEK, TEXAS

ATTACHMENT A



NOTES

USGS QUADRANGLE NAME: DRIFTWOOD
ROUGH HOLLOW

MATKIN HOOVER

P.O. BOX 43
3 SPENCER ROAD, SUITE 100
BOSSIERE, TEXAS 75004
PHONE: 409-248-0600 FAX: 409-248-0699
TELEFAX: REGISTERED ENGINEERING FIRM # F-44931

**ENGINEERING
& SURVEYING**

CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

USGS MAP
FOR
CAMP YOUNG JUDAEA
WOODCREEK, TEXAS

ATTACHMENT B

CAMP YOUNG JUDAEA CAMP IMPROVEMENTS PROJECT NARRATIVE

Camp Young Judea is a non-profit children religious camp that has been in operation since 1952. Located in the City of Woodcreek TX , north of Wimberley, TX and 40 minutes south of Austin. The total site of 263.393 acres adjoins to the South with FM 2325 , to the East to FM 12 and to the West with Jacobs Well Rd. Cypress Creek intersects the property and divides it into +/- 200 acres of undisturbed area and the remaining +/- 63 acres where development is proposed. This camp is located within the Contributing Zone, draining primarily from north to south and discharging into Cypress Creek. The site is encroached by the FEMA 100 year flood plain as shown on the Flood Insurance Rate Map Panel Number 48209C0238F dated September 2, 2005.

Below is a quick summary of the site's development history going back to the start of the Camp.

- Prior to 1999 – the camp constructed various cabins, roads, trails, amenities which resulted in a total of 4.068 acres of impervious cover.
- 1999 to Present – the camp constructed a total of 4.469 acres of impervious cover.
- Proposed – the camp is proposing to construct additional buildings and features which will result in an additional 5.02 acres of impervious cover.

The currently proposed improvements to the Camp Young Judaea will consist of new camper cabins, laundry room swimming pools, sidewalks, parking areas, driveways, detention pond, etc. This 5.02 acres combined with the previous 4.469 acres of impervious cover (1999 to Present) will result in a total of 9.489 acres of impervious cover, that represents 3.6 % of the total site acreage.

CAMP YOUNG JUDAEA CAMP IMPROVEMENTS FACTORS AFFECTING WATER QUALITY

Potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the site during construction include:

- **Soil erosion due to the clearing of the site**
- **Oil, grease, fuel, and hydraulic fluid contamination from construction equipment and vehicle drippings**
- **Hydrocarbons from asphalt paving operations**
- **Miscellaneous trash and litter from construction operations and material wrappings**

Potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the site after construction include:

- **Fertilizers, herbicides, and pesticides from agricultural operations**
- **Oil, grease, fuel and hydraulic fluid contamination from vehicle drippings**
- **Dirt and dust that may fall off vehicles**
- **Miscellaneous trash and litter**

**CAMP YOUNG JUDAEA CAMP IMPROVEMENTS
VOLUME AND CHARACTER OF STORMWATER**

The total project acreage of this site is 263.393 acres. The general slope of the site ranges from 4% to 5.5% and has primarily been used as a pasture field. The proposed development will consist of the construction of additional buildings, sidewalks, parking, etc. Upon completion, the site will consist of an estimated 3.49% impervious cover.

To evaluate the runoff the SCS method with a type III rainfall distribution was utilized. Time of concentration values were established using Technical Release-55 and curve numbers used for these calculations are from the City of Austin Drainage Criteria Manual. HEC-HMS 4.1 was used to calculate the storm water runoff for the 100-year storm event. Two watersheds were modeled in order to compare the existing and proposed conditions (CP-1). Below is a summary of the existing and proposed runoff:

WS-A

Pre-Development Runoff:

	CN	Area (acres)	Runoff (cfs)
Q₁₀₀	86.1	65.5	370.2

Post-Development Runoff:

	CN	Area (acres)	Runoff (cfs)
Q₁₀₀	86.4	65.5	385.1

Change in Runoff:

Q₁₀₀ = 14.9 cfs

CP-1

Pre-Development Runoff:

	Area (acres)	Runoff (cfs)
Q₁₀₀	1215.8	4032.5

Post-Development Runoff:

	Area (acres)	Runoff (cfs)
Q₁₀₀	1215.8	4016.4

Increase in Runoff:

Q₁₀₀ = - 16.10 cfs

**CAMP YOUNG JUDAEA CAMP IMPROVEMENTS
SUITABILITY LETTER FROM AUTHORIZED AGENT**

Not Applicable – No On-Site Sewage Facility will be used to treat and dispose water from this site.

**CAMP YOUNG JUDAEA CAMP IMPROVEMENTS
ALTERNATIVE SECONDARY CONTAINMENT METHODS**

Not Applicable – No above ground storage tanks (AST's) will be constructed as part of this development.

**CAMP YOUNG JUDAEA CAMP IMPROVEMENTS
AST CONTAINMENT STRUCTURE DRAWINGS**

Not Applicable – No above ground storage tanks (AST's) will be constructed as part of this development.



MATTHEW HOVER
ENGINEERING & SURVEYING

EROSION AND SEDIMENTATION CONTROL PLAN DETAILS
FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
WOODCREEK, TEXAS

SHEET 3
JOB NO. 20242
DESIGNED BY DKS
DRAWN BY GSB
CHECKED BY GBL

CONTRIBUTING ZONE PLAN APPLICATION - NOT FOR CONSTRUCTION

CONTRIBUTING ZONE SITE PLAN

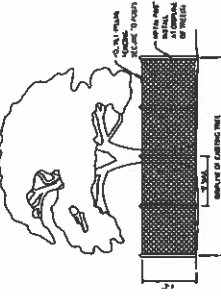


- GENERAL NOTES:**
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 2. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
 3. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES AND STRUCTURES UNLESS OTHERWISE SPECIFIED.
 4. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING TREES UNLESS OTHERWISE SPECIFIED.
 5. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING EROSION CONTROL MEASURES UNLESS OTHERWISE SPECIFIED.
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 19. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING EROSION CONTROL MEASURES UNLESS OTHERWISE SPECIFIED.
 20. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING EROSION CONTROL MEASURES UNLESS OTHERWISE SPECIFIED.

CONTRACTOR MUST HAVE A COPY OF THE CDZ ON SITE AS REQUIRED BY LOCAL REGULATIONS.

CONTRACTOR MUST HAVE A COPY OF THE CDZ ON SITE AS REQUIRED BY LOCAL REGULATIONS.

CONTRACTOR MUST HAVE A COPY OF THE CDZ ON SITE AS REQUIRED BY LOCAL REGULATIONS.



- TREE PROTECTION - ORANGE SAFETY FENCE NOTES:**
1. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING TREES UNLESS OTHERWISE SPECIFIED.
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TREE PROTECTION - ORANGE SAFETY FENCE NOTES:

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CAMP YOUNG JUDAEA CAMP IMPROVEMENTS 20% OR LESS IMPERVIOUS COVER WAIVER

Camp Young Judaea, Inc., the current owner of Camp Young Judaea, is requesting a waiver per the current *Contributing Zone Plan Application, Permanent Best Management Practice (BMPs) Attachment I – 20% or Less Impervious Cover Waiver of TCEQ-1025, item 51.*

Camp Young Judaea, is an existing religious children's camp sitting on a 263.393 -acre site and has been in operation since 1952. Please see the attached Overall Site Plan for site layout. Over the years Camp Young Judaea has constructed various cabins, roads, trails, parking, tennis courts, basketball courts, amenities, Experiential Learning Center, etc. As of today, the site has 4.469 acres of impervious cover (1.70%). At full buildout, the proposed improvements will add approximately 5.02 acres of impervious cover (1.90%) for a total of 9.489 acres of impervious cover (3.6%).

The proposed camp improvements include access roads, sidewalks, parking areas, camp fire area, covered buildings, camper cabins, laundry rooms, etc. and will result in approximately 3.6% of impervious cover. This falls well below the generally accepted limit of 15% impervious in which the occurrence of degradation is expected. Also, the proposed uses are recreational in nature and are not anticipated to be a significant generation of pollutants.

Additionally, Camp Young Judaea Inc. qualifies as a small business entity meeting the following criteria:

- *CFR Title 13, Chapter I, Part 121, Subpart A 121.201- Size Standards*
 - *NAICS Code 813110 – Religious Organization*
 - Income less than \$ 7.5 million
- *TCG Title 10, Subtitle A, Chapter 2006, Subchapter A, Section 2006.001(2) –*
 - Independently owned and operate
 - Fewer than 100 employees and annual gross income less than \$6 million.
- *FCAAA, Sec 507(c)(1)*
 - Fewer than 100 employees and income less than \$7.5 million
- *TWC 5.135*
 - Fewer than 100 employees and income less than \$7.5 million

Camp Young Judaea Inc., is an independently owned and operated, not for profit organization with 14 full time employees and an annual gross income of \$3 million.

Thank you for your time and consideration of this request. If you have any questions regarding the information provided, please do not hesitate to contact Frank Silberlicht, Camp Young Judaea's Camp Director at (713) 723-8354 or via email at frank@cyjtxas.org.

**CAMP YOUNG JUDAEA
BMPs FOR UPGRADIENT STORMWATER**

The location of this site and the natural grade of the land around it result in a significant amount of upgradient stormwater runoff. All upgradient storm water has been diverted around the proposed dormitory site via two channels and bypass all permanent BMP's. The vegetative filter strips and rainwater harvesting systems have been designed per the City of Woodcreek's requirements to remove 90% of the increased Phosphorous as well as TCEQ's Technical Guidance Manual RG-348's requirement of 80% Total Suspended Solids (TSS) removal.

**CAMP YOUNG JUDAEA
BMPs FOR ON-SITE STORMWATER**

The Camp Young Judaea proposed development project consists of developing approximately 4-acres in 2 phases of a 245-acre property. The runoff from this proposed development will either be captured by the rainwater harvesting storage tanks, capturing the water off of all of the 9 proposed buildings, or treated by vegetative filter strips placed in appropriate locations as to capture the required 80% of the Total Suspended Solids (TSS) in accordance with TCEQ's Technical Guidance Manual RG-348 as well as 90% of Phosphorous in accordance with the City of Woodcreek requirements. The proposed engineered vegetative filter strips provide water-quality protection by reducing the amount of TSS, phosphorus, etc., in the runoff before the runoff leaves the project site. The rainwater harvesting tanks have been sized to capture the required water quality volume. The client has signed an agreement stating that there will be no use of pesticides, herbicides, and or fertilizers on the property.

**CAMP YOUNG JUDAEA
BMPs FOR SURFACE STREAMS**

There are no surface streams located on the property. Runoff from the proposed development will be captured and treated by the permanent BMPs on-site. Once the storm water has been treated it will flow into a small lake before flowing into Cypress Creek.

The rainwater harvesting and vegetative filter strips are the source of permanent pollution prevention for the site.

The client has signed an agreement stating that there will be no use of pesticides, herbicides, and or fertilizers on the property.

ATTACHMENT "M" COVER

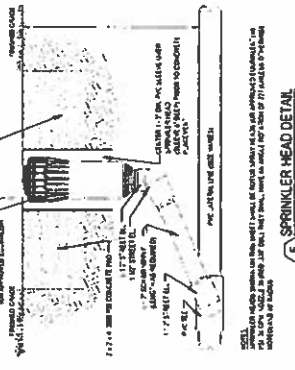
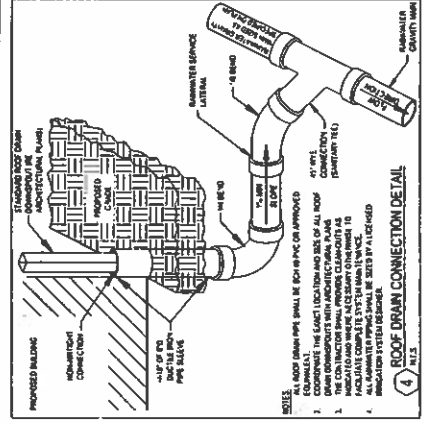
CITY OF WOODCREEK - WATER QUALITY PLAN (SHEET 3)
 FOR
 RAINWATER HARVESTING DETAILS
 CAMP YOUNG JUDAEA - RETREAT VILLAGE
 WOODCREEK, TEXAS

MATKINHOVER
 ENGINEERING & SURVEYING
 1100 W. WOODCREEK BLVD. SUITE 100
 WOODCREEK, TEXAS 77380

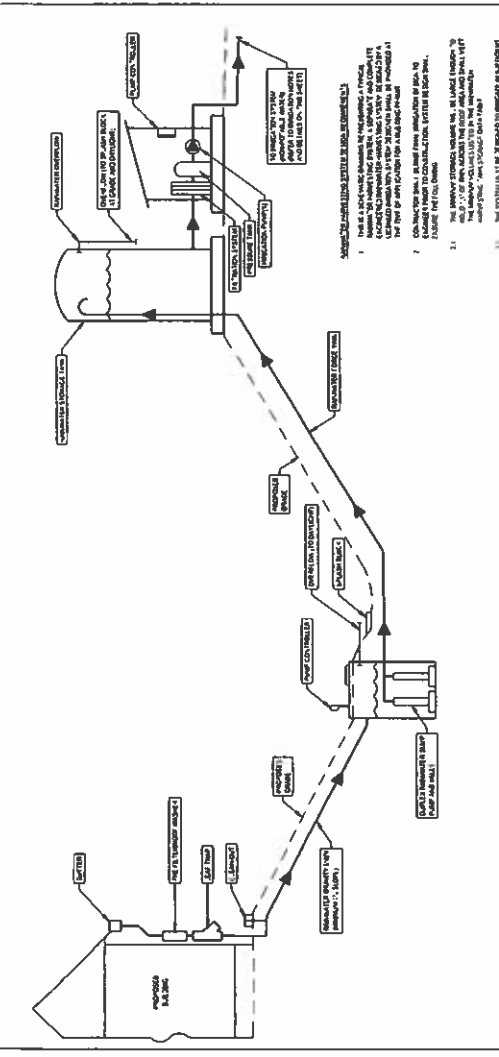
Projected Professional Engineer
 State of Texas
 Registration No. 11311
 License Expires 08/31/2025
 Date: 08/31/2023

WQ103

SITE DEVELOPMENT PLAN APPLICATION - NOT FOR CONSTRUCTION

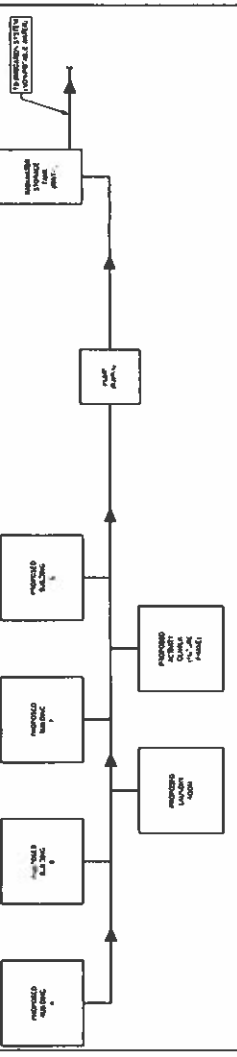


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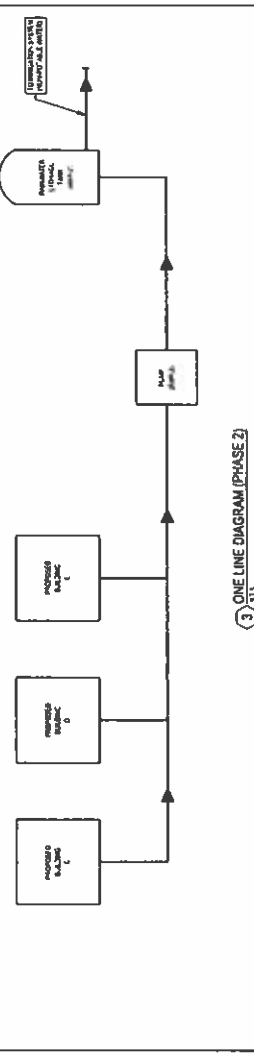


1 RAINWATER HARVESTING SCHEMATIC

TANK	TANK CAPACITY (GAL.)	TANK DIAMETER	TANK HEIGHT
RWT-1	10000	12' 0"	18' 6"
RWT-2	8000	10' 0"	15' 3"



2 ONE LINE DIAGRAM (PHASE 1)



3 ONE LINE DIAGRAM (PHASE 2)

TOTAL PHOSPHORUS (TP)			
THE CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL WAS REFERENCED FOR THE COMPLETION OF THIS TABLE			
VERSION: UPDATED ONLINE 6/5/2017			
EXISTING CONDITIONS POLUTANT LOAD CALCULATION (L_{EX})			
		UNITS	REFERENCE / NOTES
DRAINAGE AREA =	65.5	ACRES	WATERSHED A(W5-A)
EX-IMPERVIOUS COVER	9.61	ACRES	IMP. COVER IN DRAINAGE AREA
EX-IMPERVIOUS COVER	14.67%		W5-A PERCENT IMP. COVER
CF =	0.2267	mg/L	SECTION 1.6.9.3.B.6 EQ. 1 CONVERSION FACTOR
C_{EX} =	0.396	mg/L	TABLE 1-10 (PG. 250) TOTAL PHOSPHORUS (TP) W/O CONTROLS
V_{EX} =	3.57	in./yr	TABLE 1-9 (PG. 248-249) INTERPOLATED
L_{EX} =	20.99	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 1
DEVELOPED CONDITIONS POLUTANT LOAD CALCULATION (L_D) (PHASE 1 AND 2 WITHOUT CONTROLS)			
		UNITS	REFERENCE / NOTES
PR-IMPERVIOUS COVER	1.70	ACRES	PROPOSED IMP. COVER IN DRAINAGE AREA (INCLUDES ROOF AREA>BUILDING FOOTPRINT)
TOTAL IMPERVIOUS COVER	11.31	ACRES	TOTAL DEVELOPED IMP. COVER IN DRAINAGE AREA
TOTAL IMPERVIOUS COVER	17.27%		W5-A PERCENT IMP. COVER (INCLUDES BUILDINGS)
C_D =	0.396	mg/L	TABLE 1-10 (PG. 250) TOTAL PHOSPHORUS (TP) W/O CONTROLS
V_D =	4.03	in./yr	TABLE 1-9 (PG. 248-249) INTERPOLATED
L_D =	23.70	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 1
MAX POLUTANT LOAD CALCULATION			
		UNITS	REFERENCE / NOTES
POLUTANT LOAD INCREASE	2.7	lb/yr	$L_{INC} = L_D - L_{EX}$
$L_{REMOVED}$	2.43	lb/yr	$L_{RR} = L_{INC} * 90\%$
L_{MAX} POLUTANT LOAD	21.26	lb/yr	$L_{EX} + (L_{INC} - L_{RR})$
DEVELOPED CONDITIONS POLUTANT LOAD CALCULATION (L_{DR}) (PHASE 1 AND 2 WITH CONTROLS)			
AREA WITH OUT CONTROLS			
		UNITS	REFERENCE / NOTE
(A ₁) UNTREATED AREA	63.56		ROOF AND VFS AREA EXCLUDED
IMP. COVER IN UNTREATED AREA	9.37	ACRES	ROOF AND VFS AREA EXCLUDED (INCLUDED IN CALCS BELOW)
IMP. COVER IN UNTREATED AREA	14.31%		W5-A PERCENT IMP. COVER (W/O ROOF AND VFS AREA)
C_1 =	0.396	mg/L	TABLE 1-10 (PG. 250) TOTAL PHOSPHORUS (TP) W/O CONTROLS
V_1 =	3.50	in./yr	TABLE 1-9 (PG. 248-249) INTERPOLATED
L_1 =	20.0	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 8 A
RAIN WATER HARVESTING (R.W.H.)			
(A ₂) RAIN WATER HARVEST AREA	0.49	ACRES	ROOF AREA OF PROPOSED BUILDINGS TREATED BY R.W.H.
IMPERVIOUS COVER TREATED	100.00%		R. W. HARVEST AREA DOES NOT COUNT TOWARDS IMP. COVER
C_2 =	0.124	mg/L	TABLE 1-11 (PG. 256-257)(WATER HARVESTING TO VFS/INFILTRATION)
V_2 =	22.91	in./yr	TABLE 1-9 (PG. 248-249) INTERPOLATED
L_2 =	0.31	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 8 A
VEGITATIVE FILTER STRIPS (VFS)			
(A ₃) VFS TREATED AREA	1.45	ACRES	IMPERVIOUS AREA THAT VFS TREATS
IMPERVIOUS COVER	100.00%		IMPERVIOUS AREA THAT VFS TREATS
C_3 =	0.124	mg/L	TABLE 1-11 (PG. 256-257)(VFS/INFILTRATION)
V_3 =	22.91	in./yr	TABLE 1-9 (PG. 248-249) INTERPOLATED
L_3 =	0.93	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 8 A
$L_{REMOVED}$ =	2.48	lb/yr	$L_R = L_D - L_{TOTAL}$
L_{TOTAL} =	21.22	lb/yr	SECTION 1.6.9.3.B.6 - EQUATION 8 A

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.

Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project:

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 30.6(A_N \times P)$ Equation revised for 90% removal by MAH per Equation 3.2 in RG-348

where:

$L_{M \text{ TOTAL PROJECT}}$ = Required TSS removal resulting from the proposed development = 90% of increased load

A_N = Net increase in impervious area for the project

P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County = **Hays**
 Total project area included in plan * = **245.00** acres
 Predevelopment impervious area within the limits of the plan * = **4.73** acres
 Total post-development impervious area within the limits of the plan * = **5.94** acres
 Total post-development impervious cover fraction * = **0.02**
 P = **33** inches

$L_{M \text{ TOTAL PROJECT}}$ = **1222** lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **1**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **VFS**

Total drainage basin/outfall area = **65.50** acres
 Predevelopment impervious area within drainage basin/outfall area = **0.00** acres
 Post-development impervious area within drainage basin/outfall area = **1.45** acres
 Post-development impervious fraction within drainage basin/outfall area = **0.02**
 $L_{M \text{ THIS BASIN}}$ = **1464** lbs.

PESTICIDE, HERBICIDE, AND FERTILIZER AGREEMENT

In accordance with §50.22 PESTICIDES, HERBICIDES, AND FERTILIZERS,

I, FRANK SILBLICHT agree on the behalf of Camp Young Judaea, Inc. that there is no use or plans for use of any pesticide, herbicide, or fertilizers to be used within the proposed Dormitory Facility. I understand the ordinance in its entirety and affirm there are not any stored pesticides, herbicides, or fertilizers currently on the property, and confirm that none of these products are to be used during normal grounds keeping duties.

Camp Representative:

FRANK SILBLICHT

NAME (PRINTED)

CAMP DIRECTOR

TITLE

FULL

SIGNATURE

7-27-17

DATE

CAMP YOUNG JUDAEA
INSPECTION AND MAINTENANCE FOR BMPs

ATTACHMENT N – INSPECTION AND MAINTENANCE PLAN

NAME OF PROPOSED PROJECT: Camp Young Judaea

PROJECT LOCATION: Woodcreek, Texas

NAME OF APPLICANT: Frank Silberlicht

Typical Storm Drain Outflow Structure

INSPECTIONS

Typical Storm Drain Outflow Structure should be inspected at least twice a year and after 1/2" rainfall or greater.(once during or immediately following wet weather) to evaluate facility operation. The Typical Storm Drain Outflow Structure should be checked for debris and litter, and areas of sediment accumulation. The Typical Storm Drain Outflow Structure shall be inspected for damage to sheathing and possible reshaping of the berm. During each inspection, erosion areas inside and downstream of the BMP should be identified and repaired or revegetated immediately.

MAINTENANCE

Debris and Litter Removal: Debris and litter will accumulate near the Typical Storm Drain Outflow Structure and should be removed during regular inspections.

Structural Repairs and Replacement: With each inspection, any damage to the structural elements of the system should be identified and repaired immediately. These repairs should include fixing loose wire sheathing and reshaping of the berm.

Sediment Removal: When properly installed, the Typical Storm Drain Outflow Structure will accumulate quantities of sediment over time. Sediment accumulation is a serious maintenance concern in Typical Storm Drain Outflow Structures for couple of reasons. First, the sediment gradually reduces the efficiency of the energy dissipation. Second, sediment accumulation can cause water to build up along the berm. For these reasons, accumulated sediment needs to be removed when sediment buildup exceeds 6 inches and disposed in an approved manner that will not cause any additional siltation.

Engineered Vegetative Filter Strips

INSPECTIONS

Inspect filter strips at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The strip should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance

CAMP YOUNG JUDAEA INSPECTION AND MAINTENANCE FOR BMPs

needs, bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

MAINTENANCE

Pest Management. An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.

Seasonal Mowing and Lawn Care. If the filter strip is made up of turf grass, it should be mowed as needed to limit vegetation height to 18 inches, using a mulching mower (or removal of clippings). If native grasses are used, the filter may require less frequent mowing, but a minimum of twice annually. Grass clippings and brush debris should not be deposited on vegetated filter strip areas. Regular mowing should also include weed control practices; however herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients. Irrigation of the site can help assure a dense and healthy vegetative cover.

Debris and Litter Removal. Trash tends to accumulate in vegetated areas, particularly along highways. Any filter strip structures (i.e. level spreaders) should be kept free of obstructions to reduce floatables being flushed downstream and for aesthetic reasons. The need for this practice is determined through periodic inspection, but should be performed no less than 4 times per year.

Sediment Removal. Sediment removal is not normally required in filter strips, since the vegetation normally grows through it and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip preventing uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.

Grass Reseeding and Mulching. A healthy dense grass should be maintained on the filter strip. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during filter strip establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established. Bare spots and areas of erosion identified during semi-annual inspections must be replanted and restored to meet specifications. Corrective maintenance, such as weeding or replanting should be done more frequently in the first two to three years after installation to ensure stabilization. Dense vegetation may require irrigation immediately after planting, and during particularly dry periods, particularly as the vegetation is initially established.

The Engineered Vegetative Filter Strips, shall be maintained by the HOA.

CAMP YOUNG JUDAEA
INSPECTION AND MAINTENANCE FOR BMPs

Rainwater Harvesting Systems

INSPECTIONS AND MAINTENANCE

Rainwater harvesting systems must be inspected to ensure they operate in good working condition and in accordance with the approved design and specifications. Items in need of repair must be immediately addressed.

All rainwater harvesting system components should be inspected by the responsible party twice per year. A comprehensive inspection by a qualified third party inspector should occur every third year.

Routine Maintenance Tasks	Frequency
Remove leaves and debris from gutters and downspouts	Semi-annually
Remove any algae growth	Semi-annually
Inspect and clean prescreening devices and first flush diverters	Quarterly
Inspect and clean storage tank lids	Annually
Inspect for and repair any clogging	Annually
Inspect and repair mosquito screens	Annually
Inspect tank and remove sediment build up	Every 3 years
Clear overhanging vegetation and trees over roof	Every 3 years
Check integrity of backflow preventer	Every 3 years
Inspect structural integrity of tank, pump, pipe, and electrical system and repair any damage	Every 3 years
Replace damaged or defective system components	As needed

The Rainwater Harvesting System should be managed so that it is emptied at least weekly to provide storage for subsequent storms.

A written record should be kept of inspection results and maintenance performed.

I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule

Owner

Date

CAMP YOUNG JUDAEA
INSPECTION AND MAINTENANCE FOR BMPs

INSPECTION REPORT

Approved Inspection intervals:

- i. Conducted at least twice annually

PROJECT NAME _____
 REPORT # _____ DATE _____
 INSPECTOR _____ TITLE _____
 DATE OF LAST RAINFALL _____ AMOUNT _____

SITE CONDITIONS:

ACTION	IN CONFORMANCE	EFFECTIVE
TYPICAL STORM DRAIN OUTFLOW STRUCTURE		
Debris and Litter Removal	Yes/No/Na	Yes/No
Structural Repairs and Replacement	Yes/No/Na	Yes/No
Sediment Removal	Yes/No/Na	Yes/No
ENGINEERED VEGETATIVE FILTER STRIPS		
Pest Management	Yes/No/Na	Yes/No
Seasonal Mowing and Lawn Care	Yes/No/Na	Yes/No
Debris and Litter Removal	Yes/No/Na	Yes/No
Sediment Removal	Yes/No/Na	Yes/No
RAINWATER HARVESTING		
Remove leaves and debris from gutters and downspouts	Yes/No/Na	Yes/No
Remove any algae growth	Yes/No/Na	Yes/No
Inspect and clean prescreening devices and first flush divert	Yes/No/Na	Yes/No
Inspect and clean storage tank lids	Yes/No/Na	Yes/No
Inspect for and repair any clogging	Yes/No/Na	Yes/No
Inspect and repair mosquito screens	Yes/No/Na	Yes/No
Inspect tank and remove sediment build up	Yes/No/Na	Yes/No
Clear overhanging vegetation and trees over roof	Yes/No/Na	Yes/No
Check integrity of backflow preventer	Yes/No/Na	Yes/No
Inspect structural integrity of tank, pump, pipe, and electrical system and repair any damage	Yes/No/Na	Yes/No
Replace damaged or defective system components	Yes/No/Na	Yes/No

*Refer to I&M plan for detail descriptions of each Action.

RECOMMENDED REMEDIAL ACTIONS:

CAMP YOUNG JUDAEA
INSPECTION AND MAINTENANCE FOR BMPs

COMMENTS:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

INSPECTOR: _____ DATE: _____

**CAMP YOUNG JUDAEA CAMP IMPROVEMENTS
PILOT-SCALE FIELD TESTING**

Not Applicable. No Permanent BMPs are proposed within the scope of this project. See Attachment I.

CAMP YOUNG JUDAEA CAMP IMPROVEMENTS MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

Contamination of surface streams will be kept at a minimum during construction by implementing temporary BMPs such as silt fencing and rock berms. Further BMPs are discussed in the temporary section. Before construction, the two extended detention basins will be used to reduce pollution and minimize surface stream contamination. Any discharge from the outlet pipe will be controlled with baffle blocks or splash pads to reduce the velocity of the discharge.

Drain pipes from developed areas of the site will be designed to reduce discharge velocities of stormwater to below erosive rates with baffle blocks or splash pad as required by the City of New Braunfels Drainage Criteria Manual.

Matkin-Hoover Engineering discussed the extended detention basin design with Warren Samuelson with the TCEQ regarding dam safety. Because the extended detention basin will only temporarily detain runoff, no dam safety measures will be required.

Camp Young Judaea Camp Improvements Woodcreek, Texas

Project No.: 2620.02

Firm #F-4512

Storm Water T.P.D.E.S. Plan



June 23, 2017

Executive Director
Texas Commission on Environmental Quality
Storm Water and Pretreatment Team
P.O. Box 13087, MC-148
Austin, TX 78711-3087

Subject: Delegation of Signatories to Reports

Facility/Company/Site Name: Camp Young Judaea

TPDES Permit Number: : _____

Dear Executive Director:

This letter serves to designate the following people or positions as authorized personnel for signing reports, storm water pollution prevention plans, certifications or other information requested by the Executive Director or required by the general permit, as set forth by 30 TAC §305.128 (see page 2).

Name or Position	
Name or Position	NOT USED
Name or Position	NOT USED
Name or Position	NOT USED

I understand that this authorization does not extend to the signing of a Notice of Intent for obtaining coverage under a storm water general permit.

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in 30 TAC §305.44 (see page 2).

Sincerely,

Name

Title

Date

TCEQ-20403(7/10/17)

STORM WATER POLLUTION PREVENTION PLAN

Camp Young Judaea Camp Improvements

Woodcreek, Texas

June 2017

I hereby certify that the enclosed *Stormwater Pollution Prevention Plan*, shown and marked in this submittal, is that proposed to be incorporated with the Construction of Camp Improvements in Woodcreek, Texas. This Addendum is in compliance with the contract drawings and specifications, and is submitted for government approval.

Reviewed by:

Project Manager **Date**

Quality Control System Manager **Date**

Accepted By:

Contracting Officer **Date**

Storm Water Pollution Prevention Plan Certification Letter



June 23, 2017

Camp Young Judaea, Inc.
c/o Frank Silberlicht
5410 Bellaire Blvd Suite 207
Bellaire, TX 77401

Re: Camp Young Judaea Camp Improvements
Woodcreek, Texas

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Contractor Representative

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Attachment 2	SWPPP Inspection & Maintenance Report Form
Attachment 3	Notice of Intent
Attachment 4	Construction Site Notice
Attachment 5	Log of Major Construction Activities
Attachment 6	BMP Training Log
Attachment 7	Day to Day Operator Qualifications
Attachment 8	Vicinity and Site Map

LIST OF ABBREVIATIONS AND ACRONYMS

ASTM	American Society for Testing and Materials
BMP	Best Management Practice
CO	Contact Officer
CWA	Clean Water Act
EPA	United States Environmental Protection Agency
EPP	Environmental Protection Plan
MSDS	Material Safety Data Sheet
NPDES	National Pollution Discharge Elimination System
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission of Environment Quality
TPDES	Texas Pollution Discharge Elimination System
WQA	Water Quality Act

Construction Stormwater Pollution Prevention Plan

Camp Young Judaea Camp Improvements
Woodcreek, Texas

1.0 INTRODUCTION

This Construction Storm Water Pollution Prevention Plan (SWPPP) has been prepared to establish site procedures and place structures to control storm water and prevent the transport of sediments from the construction site of the Camp Young Judaea Camp Improvements in Woodcreek, Texas. The work is being performed by _____. This SWPPP will provide a means for compliance within the terms and conditions of the National Pollution Discharge Elimination System (NPDES) and Texas Pollution Discharge Elimination System (TPDES) Permits for Storm Water Discharges from Construction Activities.

1.1 Background

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), was passed by the United States Congress in 1972 to restore and maintain the quality of the nation's waterways. The Water Quality Act (WQA) was subsequently passed in 1987 and added provisions to the CWA that allowed the United States Environmental Protection Agency (EPA) to govern storm water discharges from construction sites. In 1998, EPA published the final notice for *General Permits for Storm Water Discharges from Construction Activities*. Camp Young Judaea Camp Improvements construction area is approximately 4.72 acres. The general permit includes provisions for developing a SWPPP. The intention of the SWPPP is to maximize the potential benefits of pollution prevention and erosion control measures at construction sites.

The objective of this SWPPP is to implement site controls and establish site procedures to control storm water and prevent the transport of sediments from the construction sites at Camp Young Judaea Camp Improvements. This SWPPP was prepared in accordance with requirements presented in the contract specifications. All controls and practices will be in place before any work is performed.

1.2 Storm Water Pollution Prevention Plan Content

This SWPPP includes the following:

- Description of the existing site conditions;
- Identification of the body of water(s) which will receive runoff from the construction sites;
- Identification of the potential storm water contaminants;
- Description of storm water controls and best management practices (BMPs) to reduce erosion, and the transport of sediments and pollutant in storm water discharge;
- Description of the sequencing for construction activities and pollution control measures; and
- Description of the stabilization measures to be implemented at project completion.

Construction Stormwater Pollution Prevention Plan

*Camp Young Judaea Camp Improvements
Woodcreek, Texas*

2.0 STORM WATER POLLUTION PREVENTION PLAN COORDINATOR

The project SWPPP Coordinator's duties will include the following:

- Implement the SWPPP with assistance from designated SWPPP personnel;
- Implement and oversee personnel training for SWPPP duties;
- Oversee maintenance activities identified as BMPs in the SWPPP;
- Conduct or provide for inspection and monitoring activities;
- Identify other potential pollutant sources and ensure that the sources are incorporated in the SWPPP;
- Identify any deficiencies in the SWPPP and make corrections; and
- Ensure that changes in construction plans are addressed in the SWPPP, if appropriate.

The inspector will have past experience, a basic knowledge of the engineering principles in eliminating pollutants in storm water, and will thoroughly understand the requirements of the Storm Water Discharge Permit, BMPs, and government requirements.

Designated SWPPP personnel will ensure that all monitoring procedures, housekeeping activities, and corrective action requirements are implemented.

Construction Stormwater Pollution Prevention Plan

Camp Young Judaea Camp Improvements
Woodcreek, Texas

3.0 SITE LOCATION AND PROJECT DESCRIPTION

The _____ and associated construction will occupy approximately 1.61 acres of area and is located at Woodcreek, Texas. The project site has slopes primarily from north to south and discharges into Cypress Creek. Site location is shown on Attachment 8 – Vicinity and Site Map.

Camp Young Judaea is located 2 miles north of FM 2325. This site is located within the City of Woodcreek City Limits.

Drainage across the site flows in one general direction. The runoff drains from north to south into Cypress Creek. The surface drainage patterns will generally follow the existing drainage patterns through the use of high points and site grading. A silt fence will be installed prior to commencement of construction activities as indicated on the plans to capture sediment prior to leaving the site. All silt fences will be perpendicular to surface runoff flows. The Ground surface within the site generally slopes around the proposed buildings towards proposed drainage swales.

The Camp Improvements include a 4.72 acre addition to the existing 4.469 acres that includes development of new assemblies, access sidewalks, driveways, etc. No portion of the construction area is located within the FEMA 100 year flood plain as shown on the Flood Insurance Rate Map Panel Number 48209C0238F dated September 2, 2005.

Additional site activities will include clearing and grubbing, grading, installing site drainage devices, constructing foundations, and paving. All the storm water control structures will be established prior to any site disturbing activities. Temporary and permanent site stabilization at each portion of the site will be maintained. Dates of any major construction site activities and dates of stabilization will be recorded. Storm water control structures will not be removed until after final stabilization and upon approval of the Contracting Officer (CO). Dates also will be recorded when construction activities temporarily or permanently cease on a portion of the site, and the start of stabilization activities. When all soil disturbing activities have been completed for the project, final stabilization will be established at the disturbed sites and a uniform perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or other stabilization measures (such as riprap, gabions, or geotextile).

The proposed sequence of construction activities is as follows:

- Clear and grub construction areas to the extent necessary for facilitating the installation of erosion controls;
- Install erosion control devices and implement temporary erosion control measures as shown on project Design Drawings prior to grubbing of cleared areas;
- Construct stabilized construction entrances;
- Install temporary filter fences around all stockpiles;
- Clear and grub, as necessary;
- Install controls at outfall locations and natural drainage ways downstream from construction/disturbance sites;
- Grade appropriate areas;

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- Protect swales and ditch lines from erosion;
- Stabilize slopes, embankments, and graded areas with temporary seeding prior to turf establishment;
- Trench and excavate for utilities;
- Place sub-base material as soon as possible over exposed subgrade;
- Protect all catch basin openings from siltation with inlet protection;
- Place topsoil with a minimum compacted thickness of 4 inches in unpaved areas;
- Apply seed, mulch, and fertilizer;
- Construct or install targets and roads;
- Conduct Pre-final Inspection with the CO;
- Remove erosion and sediment control structures, after approval by the CO;
- Conduct Final Inspection and obtain acceptance by the CO; and
- Conduct final site cleanup and disposal activities.

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4.0 POTENTIAL POLLUTANTS AND SPILL CONTROL

Camp Young Judaea Camp Improvements will identify if any pollutant source discharges occur during project activities. The BMP methods of pollutant control will be discussed in case of any potential pollutants discharge. _____ will have a list of materials and associated potential pollutants and the methods of storage and containment in the project Health and Safety Plan. - _____ and subcontractors will use less hazardous, alternate or environmental friendly material; however, the Material Safety Data Sheet (MSDS) for each construction material or substance brought on-site will be available. The MSDS file will be presented to regulator agency visitors, safety officers, or CO on request.

4.1 Potential Stormwater Contaminants

Pollutants that may result from clearing, grading, excavation, demolition, and construction activities, and have the potential to be present in stormwater runoff are listed in Table 4-1.

**Table 4-1
Potential Stormwater Pollutants
Camp Young Judaea Camp Improvements
Woodcreek, TX**

Material	Chemical/Physical Description	Stormwater Pollutants
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous
Plaster	White granules or powder	Calcium sulfate, calcium carbonate, sulfuric acid
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White or gray solid	Limestone, sand
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquids	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	White liquid	Naptha
Decontamination wash water	Liquid	Soil, oil and grease, solids
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic fluid	Red or brown viscous liquid	Mineral oil
Gasoline	Colorless, pale brown or pink liquid	Benzene, ethyl benzene, toluene, xylenes, MTBE
Kerosene	Pale yellow liquid	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green or yellow liquid	Ethylene glycol, propylene glycol, heavy metals
Erosion	Solid particles	Soil, sediment

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Table 4-2 presents site-specific information regarding the stormwater pollution potential from project sources.

**Table 4-2
Potential Sources of Stormwater Contamination
Camp Young Judaea Camp Improvements
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Source	Potential Pollutants	Potential Problems
Cleared and graded areas	Soil erosion, fertilizers	Erosion of soil from cleared and graded areas have the potential to discharge into the site drainages and eventually to Cypress Creek.
Asphalt paving	Asphalt, concrete, paints, hydraulic fluid, gasoline, antifreeze, soil erosion, curing compounds, kerosene	Accidental spills of gasoline and diesel fuel from fueling construction equipment, leaking hydraulic fluid and antifreeze from construction equipment, erosion of exposed and stockpiled soil, leaching of asphalt chemicals before curing is completed have the potential to discharge into the site drainages and eventually to Cypress Creek.
Construction site entrance	Asphalt, hydraulic fluid, gasoline, antifreeze, soil erosion, fertilizer	Leaking hydraulic fluid and antifreeze from construction equipment, spills of gasoline and diesel fuel from fueling construction equipment, erosion of exposed and stockpiled soil, leaching of asphalt chemicals before curing is completed have the potential to discharge into the site drainages and eventually to Cypress Creek.
Tree removal areas	Soil erosion, fertilizer	Ruts caused by logging equipment and support vehicles can fill with water, preventing complete revegetation.

4.2 Spill Control and Reporting

In case of spill of any hazardous, toxic, and radiological waste, work will be stopped. The CO and Safety Office will be notified and spill control procedures will be initiated in accordance with the Spill Prevention and Control Plan (included in the Construction EPP).

4.3 Spill Prevention

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. The general construction site superintendent is responsible for cleanup and disposition of spills.

4.3.1 Good Housekeeping

The following good housekeeping practices will be followed onsite during the construction project.

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- An effort will be made to store only enough product required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- Designation areas shall be established on the site for equipment maintenance and repair (control of oil, grease and fuel spills)
- Waste receptacles with regular collection for litter and construction debris.
- Equipment wash down area on-site with appropriate control of wash waters (including concrete truck wash down).
- Protected storage areas for chemicals, paints, solvents, fertilizers and other potentially toxic materials.
- Adequately maintained sanitary facilities.
- Proper control of raw materials stored on-site (for example, sand, aggregate and cement used in the manufacture of concrete or stockpiles of topsoil).
- Street sweeping or cleaning.
- Verification that reinforced filter fabric fences are in proper condition prior to all rainfall events.
- The site superintendent will inspect daily to ensure proper use and disposal of materials on-site.
- Product specific practices are to be followed.

4.3.2 Hazardous Products

These practices will be used to reduce the risks associated with hazardous materials, if hazardous materials are used.

- Products will be kept in their original containers unless they are not resealable.
- Original labels and material safety data sheets will be retained
- If surplus product must be disposed, manufacturers or local and state recommended methods for proper disposal will be followed.

4.3.3 Spill Prevention Practices

Spills and releases (of reportable quantities). The following steps must be taken:

- Notify the National Response Center at 800 424-8802 as soon as you have knowledge of the spill.
- TCEQ must be notified within 14 calendar days to provide a description of the release, the circumstances leading to the release and the date of the release.
- Refer to Section IV, Federal Register, Part III.B, page 36501 for a complete description.
- Provided the spill material, amount, and location.

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The permittee must notify the National Response Center (NRC) at 800-424-8802 in accordance with the requirements of 40 CFR 110, 40 CFR 117, 40 CFR 355, and CFR 302 as soon as he or she has knowledge of the discharge. Copies of the written notification and documentation that a verbal notification was made must be provided within 20 days. Should a reportable event occur, the permit must be modified within 14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of release. In addition, the SWPPP must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Spill cleanup equipment and materials shall be maintained at the work site. Exercise due diligence to prevent, contain and respond to spills of hazardous material, hazardous substances, hazardous wastes, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by law. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any release the notification procedures found above shall be followed.

4.3.4 Fueling area

Fueling of equipment on the project site shall take place in an area designated by the contractor. In the instance that a piece of equipment must be fueled in place, temporary containment devices in addition to over-fill protection devices will be utilized.

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Ten Elements of a Construction SWPPP

1. Limit Soil Disturbance- Efforts will be made in order to protect existing trees and vegetation whenever possible during construction activities. Once construction activities have ceased in an area, temporary controls will be implemented in order to alleviate soil disturbance.
2. Prevent Soil Erosion-Temporary and Permanent Stabilization controls will be implemented in order to reduce soil erosion.
3. Protect Slopes- Temporary controls including matting will be used to protect slopes. Final grading and installation of permanent stabilization will take place as soon as practicable.
4. Minimize Sediment Loss From Site- Silt fence will be installed around the footprint of the project site on the inside of the curb (See attached drawing). Hay bales will be placed in front of catch basins in order to filter sediment prior to entering storm drains. Construction entrance/exit points will be stabilized with large course aggregate in order to reduce sediment tracking by vehicles from the site.
5. Control Flow Rates- If areas are identified with high flow rates, temporary controls will be implemented to control these flow rates.
6. Establish Construction Access- Construction vehicles will access the site using two entrance/exit points while will be stabilized with large course aggregate. See Section 3D of this section for further details.
7. Protect Drain Inlets- Silt fence installed around the project footprint is located inside the curb in order to collect sediment prior to water entering drain inlets of storm drain system. Catch basins within the footprint of construction activities will contain hay bales to reduce the amount of sediment entering the storm drain system.
8. Control Dewatering- All water from flooded excavations shall be pumped to a dewatering facility. All dewatering facilities shall be of the self-contained type with filters. Contractor will follow all of the manufacturer's operation and maintenance instructions. All dewatering discharge shall be directly to the existing storm sewer collection system or stone energy dissipation if discharging to the ground surface.
9. Control Waste and Pollutants- Spill and discharge control program to be utilized in order to control waste and pollutants.
10. Construction Phasing- Every effort will be made to complete areas before moving on to other activities in order to provide stabilization measures.

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5.0 STORM WATER MANAGEMENT CONTROL

Refer to TPDES General Permit TXR150000, Part III.F, Pages 28-36 for a complete description

5.1 Temporary Stabilization

Temporary soil stabilization will be provided for following conditions:

- Construction activities cease for periods longer than 14 days, unless the construction activities will resume within 21 days;
- Turf placement is delayed and a quick cover is required to prevent erosion; or
- Seasonal conditions preclude immediate permanent stabilization measures.

Temporary stabilization includes seeding and mulching.

5.1.1 Seeding

Final stabilization through seeding or sodding will not occur until the completion of all potential earth disturbing activities. However as part of the SWPPP, staged seeding and/or sodding may be performed in completed areas to prevent soil erosion and to help control runoff from storm events.

5.1.2 Mulching

Ground organic materials from clearing and grubbing operations will be the primary source of mulch. Hay mulch will be used if the clearing and grubbing materials are insufficient to meet all temporary stabilization needs.

5.2 Permanent Stabilization

Following the completion of construction activities, disturbed areas will be filled, graded, and/or seeded, unless otherwise indicated. Excavating, filling, and/or plowing of temporary roadways may be required to restore the area to near original conditions and permit the growth of vegetation. Sufficient topsoil will be spread to provide a minimum depth of 4 inches of suitable soil for the growth of grass. The entire area will be seeded and a uniform perennial vegetative cover will be established. Restoration to original contours is not required. Permanent Stabilization may include earthwork, seeding, mulching, and/or placing topsoil.

5.2.1 Earthwork

Diversion berms may be placed along the upslope side of access roads, construction entrance(s), support facilities, and excavations to divert storm water runoff to controlled locations. Drainage channels may also be placed to divert runoff flows if necessary.

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5.2.2 Seeding

Final stabilization through seeding or sodding will not occur until the completion of all potential earth disturbing activities.

5.2.3 Soil Preparation

Soil Additives to include fertilizers and soil conditioners (rotted manure or peat) will be added to soils to meet soil composition standards.

5.2.4 Topsoil

All topsoil necessary to complete the work will be obtained from topsoil stockpiles from grading and excavating operations and, if necessary, from approved Base topsoil sources or from the native organic material that has been screened to be free of roots, branches, stones and other deleterious materials. Topsoil from approved sources and stockpiled topsoil will be natural, friable, topsoil characteristic of representative soils in the vicinity that produce heavy growths of crops, grass, or other vegetation. Topsoil will be applied to provide a compacted thickness of at least 4 inches.

5.3 Structural Controls

Storm water runoff controls for the site will consist of the control measures and the maintenance and inspection practices discussed in this SWPPP. These control measures have been designed to retain sediment onsite. The location and type of control measures that will be used are shown on the project Design Drawings. Unless otherwise noted in this SWPPP or in the construction documents, erosion, sediment, and storm water control measures will be implemented, installed, and maintained according to the standards and specifications of the *Planning and Design Manual for the Control of Erosion, Sediment, and Stormwater* produced in April 1994 (USDA, 1994).

Structural practices that will be used during and/or following construction activities for storm water runoff control are described in the following sections.

5.3.1 Silt Fence

Silt fences will be properly installed using the STATIC SLICING METHOD in accordance with American Society for Testing and Materials (ASTM) D 6462-03. Silt fences will pond runoff and hold sediments from storm runoff. Silt fence will not be installed in lieu of construction or temporary sediment pond or basin.

Any inspected deficiencies and required repairs will be made within seven (7) calendar days. Close attention will be paid to repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric will be replaced promptly. Sediment deposits will be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it will be removed when final stabilization is established. The immediate area occupied by the fence and any sediment deposits will be shaped to an acceptable grade. The areas disturbed will be stabilized according to the approved Contractor SWPPP.

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5.3.2 Rock Check Dams

Rock Berm or Check Dam using fiber rolls are recommended as velocity dissipation devices along drainage channels. If rock berms are used, they will be constructed of open graded rock of 4 to 6 inches diameter. The graded rock will be secured with woven sheath of 1-inch diameter opening (maximum) and wire diameter of 20 gauge (minimum). Sediment at 1/3 height of the berm or dam will be removed.

5.3.3 Stabilized Construction Ingress/Egress

_____ will establish, inspect, and maintain the stabilized construction ingress/egress at the juncture between the unpaved new access road and the existing paved roadway. _____ will determine locations for stabilized construction entrance/egress on drawing. The stabilized construction entrance/egress will be located away from waterways. The minimum width and depth of entrance is 18 feet and 50 feet, respectively. The construction access will have a wheel wash device and sediment trap unless it drains to a construction sediment pond. If the access roadway is the major access roadway for other construction activities, or dusty conditions would post adverse effect for existing facilities in operation, or muddy site conditions may impact emergency vehicle access, _____ will use temporary asphalt pavement for site access roadway.

5.3.4 Protection for Staging, Parking, Material Storage, Borrow and Disposal Areas

Storm water control structures (silt fences, diversion berms, hay bales, sand bags) may be established around the staging, parking, material stockpile, borrow, and disposal areas. Gravel also may be used to stabilize these areas. Storm water control structure details are shown on Sheet 2.4.1 in the Design Drawings. If used, the structures will be properly inspected and maintained.

A stabilized area with BMP control structures is required for laydown. If dusty conditions adversely affect existing facilities in operation, _____ will use temporary asphalt pavement for laydown, unless a gravel laydown area is approved _____ will inspect and maintain the control structures at these locations.

Structural practices that may be used during and/or following construction activities for storm water runoff control are described in the following sections.

5.3.5 Straw Bale Dike

Straw bale dikes (or dams) may be used for perimeter control and around the unpaved perimeter of curbs and surface inlets, new manholes, and trenched material from the utility construction. Straw bale dikes will only be used where the effectiveness is required for less than 3 months. When sediment accumulates to a depth of 1/2 the height of the bale barrier, the sediment will be removed. If used, straw bale dikes will be inspected to ensure that the bales are intact and adequately removing sediment from storm runoff.

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5.3.6 Gravel Bag Berm

Gravel bag berms will use filter bags with ultra-violet light inhibitor fabric (reusable, woven, and with no stitched seams) and gravels size of 3/8 to 3/4 inch diameter. It is acceptable for construction of embankments for sediment basins, sediment barriers placed 10 feet from the toes of slopes, ditch check dams to reduce flow velocity, and flow diversion dikes. _____ will inspect gravel bag berms after each rain, remove sediment, and reshape or replace gravel bags as needed.

5.3.7 Protection for New and Existing Inlets

Sediment logs or gravel filter bags with gravel (3 to 5 inches diameter) may be placed to prevent sediment from entering new curb and surface inlets at the paved areas, and at existing surface or curb inlets downstream from the disturbed site.

5.3.8 Outlet Protection Device

Outlet protection devices will be placed at existing and new drainage outlets to minimize soil scouring by absorbing flow energy to produce non-erosive velocity. Examples include sour mats, turf reinforcement mats, and sod/seedling.

5.3.9 Pipe Slope Drain

Pipe slope drains may be used for drainage areas that do not exceed 10 acres. The outlet of the pipe drain will be inspected for erosion and the pipe will be checked for breakage.

5.3.10 Diversion or Earth Dike

Diversion dikes may be placed parallel to existing ground contours around the up-slope side of disturbed areas to divert run-on water away from the disturbed areas. The dike height will be at least 1 foot greater than the calculated flow depth for a 10-year storm event. The side slopes of diversion dikes will be less than 3 to 1.

5.3.11 Interceptor Swale

Interceptor swales will be installed to divert runoff from disturbed upland areas. The flow will be directed to a sediment trapping device. Swale stabilization is required.

5.3.12 Excavated Sediment Trap

An Excavated Sediment Trap is acceptable for drainage area of less than 1 acre and with slope of 5 percent or less, where overflow capacity is needed, and in areas of heavy flow of 0.5 cubic feet per second or greater. The recommended volume of the sediment trap is 35 cubic yards per acre disturbed area. _____. will remove and dispose of sediment when it accumulates to 1/2 of the filter stone height.

5.3.13 Filter Sock and Sediment Log

The Filter Sock (Tube) or Sediment Log is a sediment control device that is biodegradable and is free of weed and seed. The filter sock or sediment log can be used as soil amendment material after site

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stabilization. The log or filter sock (tube) is porous and reusable. It holds its shape and retains sediments from storm water that passes through the log or sock (tube). It is typically placed in swales and storm grates to polish water quality. It is also used as a perimeter control at a distance of 10 feet away from stockpiled material and for construction of catch basins. The standard size log or sock (tube) is 12-inch diameter or less. For concentrated flow area, a minimum of 20-inch diameter log or sock (tube) will be used.

5.3.14 Soil Stabilization

A vegetative buffer strip with a minimum of 10-foot width, will be placed on disturbed area adjacent to curbs, gutters, and surface grates, perimeters of disturbed construction site, and disturbed areas adjacent to concrete or asphalt pavement. Soil stabilization is required on exposed soil by the 14th day if no construction is scheduled in the next 7 days.

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5.4 Storm Water Management

Storm water management practices include all of the following measure employed to control storm water runoff and reduce discharge of pollutants from the construction site. Typical approaches employed to achieve this goal include controlling drainage and drainage patterns in a manner that matches preconstruction conditions. Regardless of the approach, these practices must be described in the SWPPP and implemented. Storm water management efforts must be documented while the permit is in effect.

The Following records shall be maintained and attached to the SWPPP and made readily available upon request to the parties listed in Part III.D.1 of TXR 150000:

- The dates when grading activities occur;
- The dates when construction activities temporarily or permanently cease on a portion of the site, and
- The dates when stabilization measures are initiated.

5.5 Other Pollution Prevention Controls

5.5.1 Waste Disposal

All waste material except scrap timber and brush will be collected and stored in a secure metal dumpster (or equivalent). The waste container will be inspected regularly with contents disposed of properly by the contractor. No construction waste materials will be buried on-site. No waste oil or other petroleum-based products should be disposed of on-site (e.g., buried, poured, etc.), but should be taken off-site for proper disposal.

Hazardous Waste: No hazardous waste is expected to be generated or encountered in the project. In the even that hazardous waste is encountered, all hazardous waste materials will be disposed of in a manner specified by local and State regulations and/or by the manufacturer. Site personnel will be instructed to be aware of this requirement.

Sanitary Waste: All sanitary waste must be collected from portable units as required and disposed of properly off-site.

Public roads, which provide access to the construction site, must be monitored for any tracking of sediments (mud, etc.) from the site onto the road as follow:

- Weekly during dry periods, and
- Daily after rainfall events that leave the work area wet while construction activity is proceeding.

A Stabilized Construction Exit (SCE) shall be installed at the location as shown on the attached drawings. The SCE is necessary to keep soils on the construction site and prevent transport of these soils from the site onto paved roadways.

5.5.2 State/Local Waste Disposal, Sanitary Sewer and Septic System Regulations

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Any regulations that may apply to the type of construction proposed must be identified.

5.5.3 Pollution Sources other Than Construction

All on-site vehicles will be monitored for leaks and receive proper preventative maintenance to reduce the chance of leakage. Petroleum products must be stored in tightly sealed containers, which are clearly labeled. All spills must be cleaned up immediately after discovery. Waste oil and other petroleum products shall not be discharged into the ground. Petroleum products used on-site shall be applied/used according to the manufacturer's recommendations.

5.5.4 Offsite Vehicle Tracking

Construction vehicles will access the site using the facility entrance off Doolittle Drive. To minimize the amount of sediment loss to nearby roads, access to the construction site should be limited to as few points as possible.

5.5.5 Dewatering

All water from flooded excavations shall be pumped to a dewatering facility. All dewatering facilities shall be of the self-contained type with filters. Contractor will follow all of the manufacturer's operation and maintenance instructions. All dewatering discharge shall be directly to the existing storm sewer collection system or stone energy dissipation if discharging to the ground surface. There will be no discharge of excavation ground water to the sanitary sewer or storm sewer drains without prior specific authorization.

5.5.6 Approved State or Local Plans

Permittee's must identify federal, state or local regulations in order to ensure this SWPPP is consistent with their requirements for sediment and erosion site plans (or permits), or storm water management site plans (or permits). The measures used to control erosion and sedimentation must address other federal, state, and local regulations. A state of local authority may require amendments to this SWPPP. The state of local authority must send the permittee written notice that amendments are to be made with the proper documentation of authority to make such a request. This SWPPP Must be updated to remain consistent with all applicable requirements or changes.

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5.6 Authorized Non-Stormwater Discharges Anticipated During the Project

The following non-storm water discharges from active construction sites are authorized by this permit provided the non-storm water component of the discharges is in compliance with Part II.A.3 (Non-Storm Water Discharges. Refer to TPDES General Permit TXR150000, Part II.A.3, pages 10-11 for a complete description.

- Discharges from firefighting activities
- Uncontaminated fire hydrant flushings, which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants.
- Water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred, and where the purpose is to remove mud, dirt, or dust;
- Uncontaminated water used to control dust;
- Potable water sources including waterline flushings;
- Uncontaminated air conditioning condensate;
- Uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents; and
- Lawn watering and similar irrigation drainage.
- Other permitted discharges: Any discharge under a separate MPDES, TPDES, or TCEQ permit may be combined with discharges authorized by this general permit, provided those discharges comply with the associated permit.

These effluents are to be controlled as required to minimize creation of sediment discharge to offsite drainage structures.

The washout of concrete trucks associated with off-site production facilities may be conducted at regulated construction sites in accordance with the requirements of Part V of the General Permit.

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5.7 Inspections

INSPECTION AND MAINTENANCE OF EROSION AND SEDIMENT CONTROLS

All BMP and control structures will be inspected at least once every 14 calendar days and within 24 hours following any storm event resulting in 0.5 inch or more of precipitation. In general, during construction activities, all erosion, sediment, and storm water control measures will be checked daily and after each runoff-producing rainfall event. Any required repairs will be made immediately.

The inspection schedule and documentation procedures have been designed so that erosion and sediment control measures, vegetation, and other protective measures identified in the SWPPP are maintained in good and effective operating condition. Inspection of erosion and soil loss from the outfall and perimeter of the site will be performed. Temporary erosion control measures will be inspected for bare spots and washouts. Sediment control structures will be inspected for breaches and for sediment accumulation. Discharge points will be inspected for signs of erosion or sediment. Locations where vehicles enter and leave the site will be checked for signs of off-site sediment tracking, including erosion control structure at contractor staging, material borrow, disposal, and stockpiled areas. Inspection results will be recorded on the Inspection and Maintenance Report form. A copy of the Inspection and Maintenance Report form is included as Attachment 1.

5.8 Schedule

The following list includes, but is not limited to, areas that will be inspected by the qualified personnel at least once every seven calendar days and within 24 hours after the end of a storm that results in 0.5 inch or more of precipitation:

- Disturbed areas of the construction site that have not undergone final stabilization;
- Areas used for the storage of materials that are exposed to precipitation that have not undergone final stabilization;
- Structural control measures; and
- Locations of vehicle ingress and egress.

For any non-compliance incident, a report summarizing the scope of inspection, the name and qualifications of the inspector, the date of inspection, major observations relating to the implementation of the SWPPP, and actions taken in accordance with the Permit will be retained as part of the SWPPP for at least three years after final stabilization of site.

5.9 Retention of Records

_____ will retain a copy of the SWPPP at the project site from the date of project commencement to the date of final stabilization. _____ will retain copies of the SWPPP and all reports as required by the Permit and records of all data used for a minimum of three years after the final stabilization date. All written correspondence under the Permit will be directed to the TCEQ. Records may include:

1. A copy of the SWPPP;

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2. All reports and actions required, including a copy of the construction site notice;
3. All data used to complete the NOI, if an NOI is required;
4. All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable.

Additionally a binder of documents that demonstrate compliance with the Stormwater Construction Activity permit will be created and maintained. At the end of the project the binder will be turned into the Contracting Officer and become property of the Government. An Advance copy of the Registration Statement shall be provided to the Contracting Officer immediately after the form is presented to the permitting agency. The binder shall include:

1. A copy of the Permit Registration Statement;
2. Proof of permit fee payment;
3. SWPPP and SWPPP update amendments;
4. Inspection reports;
5. Copies of correspondence and a copy of the permit Notice of Termination.

5.10 Repair, Modification, and Revision

Based on the results of the inspection, any inadequate control measures or control measures in disrepair will be replaced, modified, or repaired as soon as practicable (i.e., before the next rain event, if possible, and in no case more than seven days after the need is identified). If the site description and pollution prevention measures in the SWPPP need to be revised based on the results of an inspection, those revisions will be completed in accordance with the Permit, following the inspection identifying the need.

5.11 Maintenance

Maintenance activities will be undertaken so that vegetation, erosion, and sediment control measures and other protective measures identified in the SWPPP drawings are kept in good and effective operating condition. Maintenance needs identified by inspections or by other means will be accomplished as soon as practicable. All erosion, sediment, and storm water control measures will be checked every 14 days and within 24 hours after each runoff-producing rainfall event. Any required repairs will be made immediately. The following items will be checked:

- The construction entrance(s)/exit(s) will be maintained in a condition that will minimize tracking sediment onto roads, including the addition of stone or other repairs;
- Silt fencing will be checked daily for undermining or deterioration of the fabric; sediment will be removed when the level of sediment deposition causes “bulging” or reaches one-half of the fabric height;
- Diversion structures will be checked daily for integrity; any damage identified will be repaired immediately.

In addition to the practices listed above, the project will be monitored as required by this SWPPP and Texas Construction Site BMP Handbook and the Texas Storm Water Management and Sediment Control Handbook to ensure the maintenance and effectiveness of the erosion control measures.

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5.12 Employee Training

A training program will be developed and implemented to educate employees about the requirements of the SWPPP. The training program will include background on the components and objectives of the SWPPP and hands-on training in erosion and sediment control implementation; spill prevention; spill response; good housekeeping procedures; material handling; waste disposal and control; equipment fueling and maintenance procedures; and proper storage, washing, and inspection procedures. All employees will be trained prior to their first day on the site.

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Woodcreek, Texas

6.0 REFERENCES

- United States Environmental Protection Agency, 1992. *Storm Water Management for Construction Activities: Summary Guidance on Developing Pollution Prevention Plans and Best Management Practice*, EPA 832-R-92-001, October.
- United States Army Corps of Engineers, 1994. *Planning and Design Manual for the Control of Erosion, Sediment, and Stormwater*, April.
- Texas Commission on Environmental Quality. (2008). *TPDES General Permit No. TXR150000*. Austin: TCEQ

Attachment 1

TPDES General Permit

Texas Commission on Environmental Quality

P.O. Box 13087, Austin, Texas 78711-3087



GENERAL PERMIT TO DISCHARGE UNDER THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM

under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

This permit supersedes and replaces
TPDES General Permit No. TXR150000, issued March 5, 2008

Construction sites that discharge stormwater associated with construction activity
located in the state of Texas
may discharge to surface water in the state

only according to monitoring requirements and other conditions set forth in this general permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ or Commission), the laws of the State of Texas, and other orders of the Commission of the TCEQ. The issuance of this general permit does not grant to the permittee the right to use private or public property for conveyance of stormwater and certain non-stormwater discharges along the discharge route. This includes property belonging to but not limited to any individual, partnership, corporation or other entity. Neither does this general permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This general permit and the authorization contained herein shall expire at midnight, five years from the permit effective date.

EFFECTIVE DATE: March 5, 2013

ISSUED DATE: FEB 19 2013


For the Commission

**TPDES GENERAL PERMIT NUMBER TXR150000 RELATING TO
STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION
ACTIVITIES**

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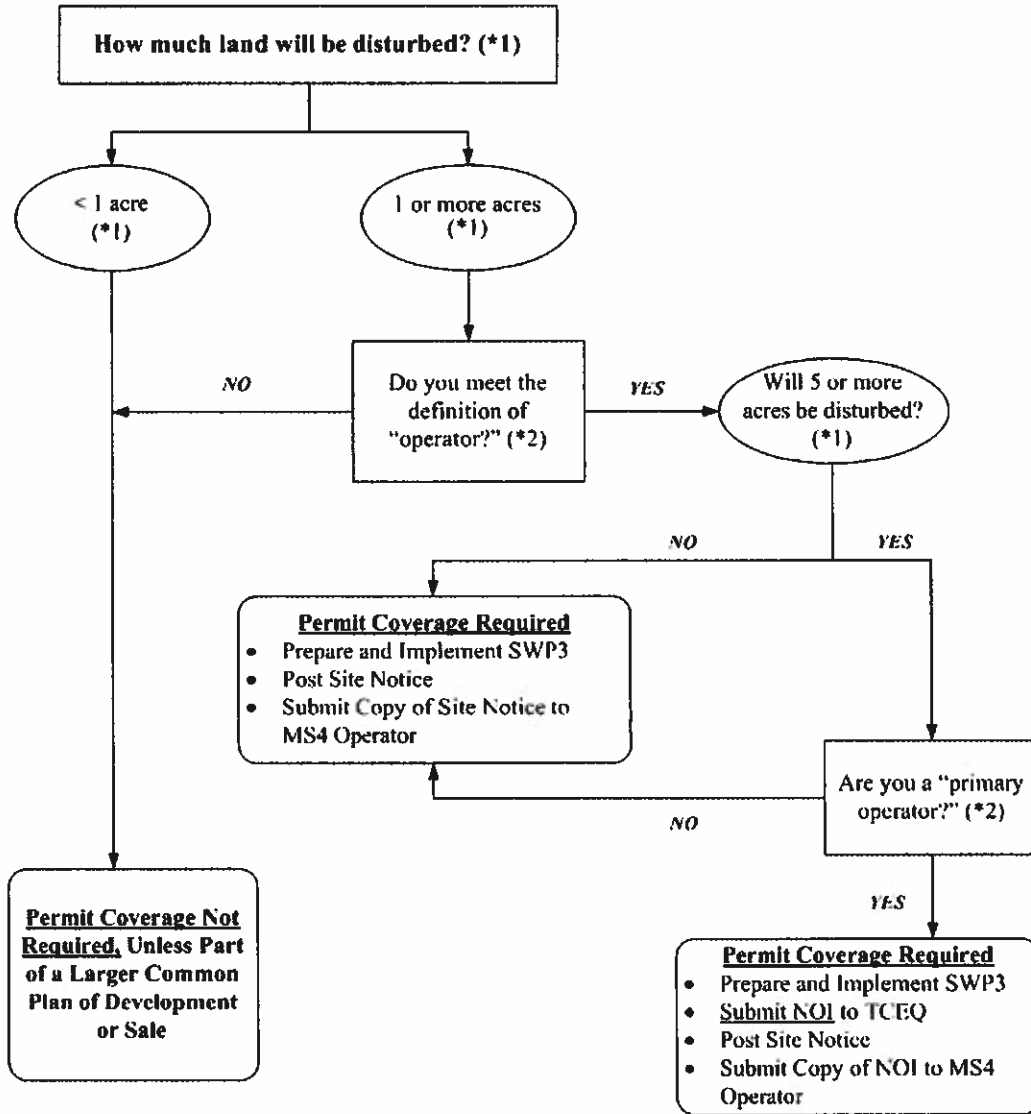
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Part I. Flow Chart and Definitions

Section A. Flow Chart to Determine Whether Coverage is Required



(*1) To determine the size of the construction project, use the size of the entire area to be disturbed, and include the size of the larger common plan of development or sale, if the project is part of a larger project (refer to Part I.B., "Definitions," for an explanation of "common plan of development or sale").

(*2) Refer to the definitions for "operator," "primary operator," and "secondary operator" in Part I., Section B. of this permit.

Section B. Definitions

Arid Areas - Areas with an average annual rainfall of 0 to 10 inches.

Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, structural controls, local ordinances, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control construction site runoff, spills or leaks, waste disposal, or drainage from raw material storage areas.

Commencement of Construction - The initial disturbance of soils associated with clearing, grading, or excavation activities, as well as other construction-related activities (e.g., stockpiling of fill material, demolition).

Common Plan of Development - A construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. A common plan of development (also known as a "common plan of development or sale") is identified by the documentation for the construction project that identifies the scope of the project, and may include plats, blueprints, marketing plans, contracts, building permits, a public notice or hearing, zoning requests, or other similar documentation and activities. A common plan of development does not necessarily include all construction projects within the jurisdiction of a public entity (e.g., a city or university). Construction of roads or buildings in different parts of the jurisdiction would be considered separate "common plans," with only the interconnected parts of a project being considered part of a "common plan" (e.g., a building and its associated parking lot and driveways, airport runway and associated taxiways, a building complex, etc.). Where discrete construction projects occur within a larger common plan of development or sale but are located ¼ mile or more apart, and the area between the projects is not being disturbed, each individual project can be treated as a separate plan of development or sale, provided that any interconnecting road, pipeline or utility project that is part of the same "common plan" is not included in the area to be disturbed.

Construction Activity - Includes soil disturbance activities, including clearing, grading, and excavating; and does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (e.g., the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities). Regulated construction activity is defined in terms of small and large construction activity.

Dewatering – The act of draining rainwater or groundwater from building foundations, vaults, and trenches.

Discharge – For the purposes of this permit, the drainage, release, or disposal of pollutants in stormwater and certain non-stormwater from areas where soil disturbing activities (e.g., clearing, grading, excavation, stockpiling of fill material, and demolition), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck wash out, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

Drought-Stricken Area – For the purposes of this permit, an area in which the National Oceanic and Atmospheric Administration's U.S. Seasonal Drought Outlook indicates for the period during which the construction will occur that any of the following conditions are likely: (1) "Drought to persist or intensify", (2) "Drought ongoing, some improvement", (3) "Drought likely to improve, impacts ease", or (4) "Drought development likely". See http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

Edwards Aquifer - As defined under Texas Administrative Code (TAC) § 213.3 of this title (relating to the Edwards Aquifer), that portion of an arcuate belt of porous, water-bearing, predominantly carbonate rocks known as the Edwards and Associated Limestones in the Balcones Fault Zone trending from west to east to northeast in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, and Williamson Counties; and composed of the Salmon Peak

Limestone, McKnight Formation, West Nueces Formation, Devil's River Limestone, Person Formation, Kainer Formation, Edwards Formation, and Georgetown Formation. The permeable aquifer units generally overlie the less-permeable Glen Rose Formation to the south, overlie the less-permeable Comanche Peak and Walnut Formations north of the Colorado River, and underlie the less-permeable Del Rio Clay regionally.

Edwards Aquifer Recharge Zone - Generally, that area where the stratigraphic units constituting the Edwards Aquifer crop out, including the outcrops of other geologic formations in proximity to the Edwards Aquifer, where caves, sinkholes, faults, fractures, or other permeable features would create a potential for recharge of surface waters into the Edwards Aquifer. The recharge zone is identified as that area designated as such on official maps located in the offices of the Texas Commission on Environmental Quality (TCEQ) and the appropriate regional office. The Edwards Aquifer Map Viewer, located at http://www.tceq.texas.gov/compliance/field_ops/eapp/mapdisclaimer.html, can be used to determine where the recharge zone is located.

Edwards Aquifer Contributing Zone - The area or watershed where runoff from precipitation flows downgradient to the recharge zone of the Edwards Aquifer. The contributing zone is located upstream (upgradient) and generally north and northwest of the recharge zone for the following counties: all areas within Kinney County, except the area within the watershed draining to Segment No. 2304 of the Rio Grande Basin; all areas within Uvalde, Medina, Bexar, and Comal Counties; all areas within Hays and Travis Counties, except the area within the watersheds draining to the Colorado River above a point 1.3 miles upstream from Tom Miller Dam, Lake Austin at the confluence of Barrow Brook Cove, Segment No. 1403 of the Colorado River Basin; and all areas within Williamson County, except the area within the watersheds draining to the Lampasas River above the dam at Stillhouse Hollow reservoir, Segment No. 1216 of the Brazos River Basin. The contributing zone is illustrated on the Edwards Aquifer map viewer at http://www.tceq.texas.gov/compliance/field_ops/eapp/mapdisclaimer.html.

Effluent Limitations Guideline (ELG) – Defined in 40 Code of Federal Regulations (CFR) § 122.2 as a regulation published by the Administrator under § 304(b) of the Clean Water Act (CWA) to adopt or revise effluent limitations.

Facility or Activity – For the purpose of this permit, a construction site or construction support activity that is regulated under this general permit, including all contiguous land and fixtures (for example, ponds and materials stockpiles), structures, or appurtenances used at a construction site or industrial site described by this general permit.

Final Stabilization - A construction site status where any of the following conditions are met:

- A. All soil disturbing activities at the site have been completed and a uniform (that is, evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.
- B. For individual lots in a residential construction site by either:
 - (1) the homebuilder completing final stabilization as specified in condition (a) above; or
 - (2) the homebuilder establishing temporary stabilization for an individual lot prior to the time of transfer of the ownership of the home to the buyer and after informing the homeowner of the need for, and benefits of, final stabilization. If temporary stabilization is not feasible, then the homebuilder may fulfill this requirement by retaining perimeter controls or BMPs, and informing the homeowner of the need for removal of temporary controls and the establishment of final stabilization.

Fullfillment of this requirement must be documented in the homebuilder's stormwater pollution prevention plan (SWP3).

- C. For construction activities on land used for agricultural purposes (such as pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to surface water and areas that are not being returned to their preconstruction agricultural use must meet the final stabilization conditions of condition (a) above.
- D. In arid, semi-arid, and drought-stricken areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
- (1) Temporary erosion control measures (for example, degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the operator, and
 - (2) The temporary erosion control measures are selected, designed, and installed to achieve 70% of the native background vegetative coverage within three years.

Hyperchlorination of Waterlines – Treatment of potable water lines or tanks with chlorine for disinfection purposes, typically following repair or partial replacement of the waterline or tank, and subsequently flushing the contents.

Impaired Water - A surface water body that is identified on the latest approved CWA §303(d) List as not meeting applicable state water quality standards. Impaired waters include waters with approved or established total maximum daily loads (TMDLs), and those where a TMDL has been proposed by TCEQ but has not yet been approved or established.

Indian Country Land – (from 40 CFR §122.2) (1) all land within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation; (2) all dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and (3) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

Indian Tribe - (from 40 CFR §122.2) any Indian Tribe, band, group, or community recognized by the Secretary of the Interior and exercising governmental authority over a Federal Indian Reservation.

Large Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than five (5) acres of land. Large construction activity also includes the disturbance of less than five (5) acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than five (5) acres of land. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (for example, the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

Linear Project – Includes the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area.

Minimize - To reduce or eliminate to the extent achievable using stormwater controls that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer System (MS4) - A separate storm sewer system owned or operated by the United States, a state, city, town, county, district, association, or other public body (created by or pursuant to state law) having jurisdiction over the disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, that discharges to surface water in the state.

Notice of Change (NOC) - Written notification to the executive director from a discharger authorized under this permit, providing changes to information that was previously provided to the agency in a notice of intent form.

Notice of Intent (NOI) - A written submission to the executive director from an applicant requesting coverage under this general permit.

Notice of Termination (NOT) - A written submission to the executive director from a discharger authorized under a general permit requesting termination of coverage.

Operator - The person or persons associated with a large or small construction activity that is either a primary or secondary operator as defined below:

Primary Operator - the person or persons associated with a large or small construction activity that meets either of the following two criteria:

- (a) the person or persons have on-site operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- (b) the person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a Storm Water Pollution Prevention Plan (SWP3) for the site or other permit conditions (for example, they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

Secondary Operator - The person or entity, often the property owner, whose operational control is limited to:

- (a) the employment of other operators, such as a general contractor, to perform or supervise construction activities; or
- (b) the ability to approve or disapprove changes to construction plans and specifications, but who does not have day-to-day on-site operational control over construction activities at the site.

Secondary operators must either prepare their own SWP3 or participate in a shared SWP3 that covers the areas of the construction site where they have control over the plans and specifications.

If there is not a primary operator at the construction site, then the secondary operator is defined as the primary operator and must comply with the requirements for primary operators.

Outfall - For the purpose of this permit, a point source at the point where stormwater runoff associated with construction activity discharges to surface water in the state and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other water of the U.S. and are used to convey waters of the U.S.

Permittee - An operator authorized under this general permit. The authorization may be gained through submission of a notice of intent, by waiver, or by meeting the requirements for automatic coverage to discharge stormwater runoff and certain non-stormwater discharges.

Point Source – (from 40 CFR §122.2) Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are, or may be, discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Pollutant - Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, filter backwash, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into any surface water in the state. The term "pollutant" does not include tail water or runoff water from irrigation or rainwater runoff from cultivated or uncultivated rangeland, pastureland, and farmland. For the purpose of this permit, the term "pollutant" includes sediment.

Pollution - (from Texas Water Code (TWC) §26.001(14)) The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any surface water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property or to public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.

Rainfall Erosivity Factor (R factor) - the total annual erosive potential that is due to climatic effects, and is part of the Revised Universal Soil Loss Equation (RUSLE).

Receiving Water - A "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

Semiarid Areas - areas with an average annual rainfall of 10 to 20 inches

Separate Storm Sewer System - A conveyance or system of conveyances (including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains), designed or used for collecting or conveying stormwater; that is not a combined sewer, and that is not part of a publicly owned treatment works (POTW).

Small Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres of land. Small construction activity also includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one (1) and less than five (5) acres of land. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (for example, the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

Steep Slopes – Where a state, Tribe, local government, or industry technical manual (e.g. stormwater BMP manual) has defined what is to be considered a "steep slope", this permit's definition automatically adopts that definition. Where no such definition exists, steep slopes are automatically defined as those that are 15 percent or greater in grade.

Stormwater (or Stormwater Runoff) - Rainfall runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Associated with Construction Activity - Stormwater runoff from a construction activity where soil disturbing activities (including clearing, grading, excavating) result in the disturbance of one (1) or more acres of total land area, or are part of a larger common plan of development or sale that will result in disturbance of one (1) or more acres of total land area.

Structural Control (or Practice) - A pollution prevention practice that requires the construction of a device, or the use of a device, to reduce or prevent pollution in stormwater

runoff. Structural controls and practices may include but are not limited to: silt fences, earthen dikes, drainage swales, sediment traps, check dams, subsurface drains, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins.

Surface Water in the State - Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, wetlands, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state (from the mean high water mark (MHW) out 10.36 miles into the Gulf), and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or nonnavigable, and including the beds and banks of all water-courses and bodies of surface water, that are wholly or partially inside or bordering the state or subject to the jurisdiction of the state; except that waters in treatment systems which are authorized by state or federal law, regulation, or permit, and which are created for the purpose of waste treatment are not considered to be water in the state.

Temporary Stabilization - A condition where exposed soils or disturbed areas are provided a protective cover or other structural control to prevent the migration of pollutants. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either permanent stabilization can be achieved or until further construction activities take place.

Total Maximum Daily Load (TMDL) - The total amount of a pollutant that a water body can assimilate and still meet the Texas Surface Water Quality Standards.

Turbidity - A condition of water quality characterized by the presence of suspended solids and/or organic material.

Waters of the United States - (from 40 CFR §122.2) Waters of the United States or waters of the U.S. means:

- (a) all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (b) all interstate waters, including interstate wetlands;
- (c) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds that the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
 - (1) which are or could be used by interstate or foreign travelers for recreational or other purposes;
 - (2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - (3) which are used or could be used for industrial purposes by industries in interstate commerce;
- (d) all impoundments of waters otherwise defined as waters of the United States under this definition;
- (e) tributaries of waters identified in paragraphs (a) through (d) of this definition;
- (f) the territorial sea; and
- (g) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the U.S. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the U.S. (such as

disposal area in wetlands) nor resulted from the impoundment of waters of the U.S. Waters of the U.S. do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with EPA.

Part II. Permit Applicability and Coverage

Section A. Discharges Eligible for Authorization

1. Stormwater Associated with Construction Activity

Discharges of stormwater runoff from small and large construction activities may be authorized under this general permit.

2. Discharges of Stormwater Associated with Construction Support Activities

Examples of construction support activities include, but are not limited to, concrete batch plants, rock crushers, asphalt batch plants, equipment staging areas, material storage yards, material borrow areas, and excavated material disposal areas. Construction support activities authorized under this general permit are not commercial operations, and do not serve multiple unrelated construction projects. Discharges of stormwater runoff from construction support activities may be authorized under this general permit, provided that the following conditions are met:

- (a) the activities are located within one (1) mile from the boundary of the permitted construction site and directly support the construction activity;
- (b) an SWP₃ is developed for the permitted construction site according to the provisions of this general permit, and includes appropriate controls and measures to reduce erosion and discharge of pollutants in stormwater runoff from the construction support activities; and
- (c) the construction support activities either do not operate beyond the completion date of the construction activity or, at the time that they do, are authorized under separate Texas Pollutant Discharge Elimination System (TPDES) authorization. Separate TPDES authorization may include the TPDES Multi Sector General Permit (MSGP), TXR050000 (related to stormwater discharges associated with industrial activity), separate authorization under this general permit if applicable, coverage under an alternative general permit if available, or authorization under an individual water quality permit.

3. Non-Stormwater Discharges

The following non-stormwater discharges from sites authorized under this general permit are also eligible for authorization under this general permit:

- (a) discharges from fire fighting activities (fire fighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, or similar activities);
- (b) uncontaminated fire hydrant flushings (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life), which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional pollutants (uncontaminated fire hydrant flushings do not include systems utilizing reclaimed wastewater as a source water);
- (c) water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used, where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials

have been removed; and if local state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust;

- (d) uncontaminated water used to control dust;
- (e) potable water sources, including waterline flushings, but excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life;
- (f) uncontaminated air conditioning condensate;
- (g) uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents; and
- (h) lawn watering and similar irrigation drainage.

4. Other Permitted Discharges

Any discharge authorized under a separate National Pollutant Discharge Elimination System (NPDES), TPDES, or TCEQ permit may be combined with discharges authorized by this general permit, provided those discharges comply with the associated permit.

Section B. Concrete Truck Wash Out

The wash out of concrete trucks at regulated construction sites must be performed in accordance with the requirements of Part V of this general permit.

Section C. Limitations on Permit Coverage

1. Post Construction Discharges

Discharges that occur after construction activities have been completed, and after the construction site and any supporting activity site have undergone final stabilization, are not eligible for coverage under this general permit. Discharges originating from the sites are not authorized under this general permit following the submission of the notice of termination (NOT) or removal of the appropriate site notice, as applicable, for the regulated construction activity.

2. Prohibition of Non-Stormwater Discharges

Except as otherwise provided in Part II.A. of this general permit, only discharges that are composed entirely of stormwater associated with construction activity may be authorized under this general permit.

3. Compliance With Water Quality Standards

Discharges to surface water in the state that would cause, have the reasonable potential to cause, or contribute to a violation of water quality standards or that would fail to protect and maintain existing designated uses are not eligible for coverage under this general permit. The executive director may require an application for an individual permit or alternative general permit (see Parts II.H.2. and 3.) to authorize discharges to surface water in the state if the executive director determines that any activity will cause, has the reasonable potential to cause, or contribute to a violation of water quality standards or is found to cause, has the reasonable potential to cause, or contribute to, the impairment of a designated use. The executive director may also require an application for an individual permit considering factors described in Part II.H.2. of this general permit.

4. Impaired Receiving Waters and Total Maximum Daily Load (TMDL) Requirements

New sources or new discharges of the pollutants of concern to impaired waters are not authorized by this permit unless otherwise allowable under 30 TAC Chapter 305 and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the EPA approved CWA §303(d) List. Pollutants of concern are those for which the water body is listed as impaired.

Discharges of the pollutants of concern to impaired water bodies for which there is a TMDL are not eligible for this general permit unless they are consistent with the approved TMDL. Permittees must incorporate the conditions and requirements applicable to their discharges into their SWP3, in order to be eligible for coverage under this general permit. For consistency with the construction stormwater-related items in an approved TMDL, the SWP3 must be consistent with any applicable condition, goal, or requirement in the TMDL, TMDL Implementation Plan (I-Plan), or as otherwise directed by the executive director.

5. Discharges to the Edwards Aquifer Recharge or Contributing Zone

Discharges cannot be authorized by this general permit where prohibited by 30 TAC Chapter 213 (relating to Edwards Aquifer). In addition, commencement of construction (i.e., the initial disturbance of soils associated with clearing, grading, or excavating activities, as well as other construction-related activities such as stockpiling of fill material and demolition) at a site regulated under 30 TAC Chapter 213, may not begin until the appropriate Edwards Aquifer Protection Plan (EAPP) has been approved by the TCEQ's Edwards Aquifer Protection Program.

- (a) For new discharges located within the Edwards Aquifer Recharge Zone, or within that area upstream from the recharge zone and defined as the Contributing Zone (CZ), operators must meet all applicable requirements of, and operate according to, 30 TAC Chapter 213 (Edwards Aquifer Rule) in addition to the provisions and requirements of this general permit.
- (b) For existing discharges located within the Edwards Aquifer Recharge Zone, the requirements of the agency-approved Water Pollution Abatement Plan (WPAP) under the Edwards Aquifer Rule is in addition to the requirements of this general permit. BMPs and maintenance schedules for structural stormwater controls, for example, may be required as a provision of the rule. All applicable requirements of the Edwards Aquifer Rule for reductions of suspended solids in stormwater runoff are in addition to the requirements in this general permit for this pollutant.

6. Discharges to Specific Watersheds and Water Quality Areas

Discharges otherwise eligible for coverage cannot be authorized by this general permit where prohibited by 30 TAC Chapter 311 (relating to Watershed Protection) for water quality areas and watersheds.

7. Protection of Streams and Watersheds by Other Governmental Entities

This general permit does not limit the authority or ability of federal, other state, or local governmental entities from placing additional or more stringent requirements on construction activities or discharges from construction activities. For example, this permit does not limit the authority of a home-rule municipality provided by Texas Local Government Code §401.002.

8. Indian Country Lands

Stormwater runoff from construction activities occurring on Indian Country lands are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of stormwater require authorization under federal NPDES

regulations, authority for these discharges must be obtained from the U.S. Environmental Protection Agency (EPA).

9. Oil and Gas Production

Stormwater runoff from construction activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline, are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of stormwater require authorization under federal NPDES regulations, authority for these discharges must be obtained from the EPA.

10. Stormwater Discharges from Agricultural Activities

Stormwater discharges from agricultural activities that are not point source discharges of stormwater are not subject to TPDES permit requirements. These activities may include clearing and cultivating ground for crops, construction of fences to contain livestock, construction of stock ponds, and other similar agricultural activities. Discharges of stormwater runoff associated with the construction of facilities that are subject to TPDES regulations, such as the construction of concentrated animal feeding operations, would be point sources regulated under this general permit.

11. Endangered Species Act

Discharges that would adversely affect a listed endangered or threatened aquatic or aquatic-dependent species or its critical habitat are not authorized by this permit, unless the requirements of the Endangered Species Act are satisfied. Federal requirements related to endangered species apply to all TPDES permitted discharges and site-specific controls may be required to ensure that protection of endangered or threatened species is achieved. If a permittee has concerns over potential impacts to listed species, the permittee may contact TCEQ for additional information.

12. Other

Nothing in Part II of the general permit is intended to negate any person's ability to assert the force majeure (act of God, war, strike, riot, or other catastrophe) defenses found in 30 TAC §70.7.

Section D. Deadlines for Obtaining Authorization to Discharge

1. Large Construction Activities

- (a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.
- (b) Ongoing Construction - Operators of large construction activities continuing to operate after the effective date of this permit, and authorized under TPDES general permit TXR150000 (effective on March 5, 2008), must submit an NOI to renew authorization or a NOT to terminate coverage under this general permit within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit, the operator must continue to meet the conditions and requirements of the previous TPDES permit.

2. Small Construction Activities

- (a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either

under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.

- (b) Ongoing Construction - Discharges from ongoing small construction activities that commenced prior to the effective date of this general permit, and that would not meet the conditions to qualify for termination of this permit as described in Part II.E. of this general permit, must meet the requirements to be authorized, either under this general permit or a separate TPDES permit, within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit, the operator must continue to meet the conditions and requirements of the previous TPDES permit.

Section E. Obtaining Authorization to Discharge

1. Automatic Authorization for Small Construction Activities With Low Potential for Erosion:

If all of the following conditions are met, then a small construction activity is determined to occur during periods of low potential for erosion, and a site operator may be automatically authorized under this general permit without being required to develop an SWP3 or submit an NOI:

- (a) the construction activity occurs in a county listed in Appendix A;
- (b) the construction activity is initiated and completed, including either final or temporary stabilization of all disturbed areas, within the time frame identified in Appendix A for the location of the construction site;
- (c) all temporary stabilization is adequately maintained to effectively reduce or prohibit erosion, permanent stabilization activities have been initiated, and a condition of final stabilization is completed no later than 30 days following the end date of the time frame identified in Appendix A for the location of the construction site;
- (d) the permittee signs a completed TCEQ construction site notice, including the certification statement;
- (e) a signed copy of the construction site notice is posted at the construction site in a location where it is readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction activities, and maintained in that location until completion of the construction activity;
- (f) a copy of the signed and certified construction site notice is provided to the operator of any MS4 receiving the discharge at least two days prior to commencement of construction activities;
- (g) any supporting concrete batch plant or asphalt batch plant is separately authorized for discharges of stormwater runoff or other non-stormwater discharges under an individual TPDES permit, another TPDES general permit, or under an individual TCEQ permit where stormwater and non-stormwater is disposed of by evaporation or irrigation (discharges are adjacent to water in the state); and
- (h) any non-stormwater discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

Part II.G. of this general permit describes how an operator may apply for and obtain a waiver from permitting, for certain small construction activities that occur during a period with a low potential for erosion, where automatic authorization under this section is not available.

2. Automatic Authorization For All Other Small Construction Activities:

Operators of small construction activities not described in Part II.E.1. above may be automatically authorized under this general permit, and operators of these sites shall not be required to submit an NOI, provided that they meet all of the following conditions:

- (a) develop a SWP3 according to the provisions of this general permit, that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;
- (b) sign and certify a completed TCEQ small construction site notice, post the notice at the construction site in a location where it is safely and readily available for viewing by the general public, local, state, and federal authorities, prior to commencing construction, and maintain the notice in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities); and
- (c) provide a copy of the signed and certified construction site notice to the operator of any municipal separate storm sewer system receiving the discharge prior to commencement of construction activities.

Operators of small construction activities as defined in Part I.B of this general permit shall not submit an NOI for coverage unless otherwise required by the executive director.

As described in Part I (Definitions) of this general permit, large construction activities include those that will disturb less than five (5) acres of land, but that are part of a larger common plan of development or sale that will ultimately disturb five (5) or more acres of land, and must meet the requirements of Part II.E.3. below.

3. Authorization for Large Construction Activities:

Operators of large construction activities that qualify for coverage under this general permit must meet all of the following conditions:

- (a) develop a SWP3 according to the provisions of this general permit that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;
- (b) primary operators must submit an NOI, using a form provided by the executive director, at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction activities. If an additional primary operator is added after the initial NOI is submitted, the new primary operator must submit an NOI at least seven (7) days before assuming operational control, or if utilizing electronic NOI submittal, prior to assuming operational control. If the primary operator changes after the initial NOI is submitted, the new primary operator must submit a paper NOI or an electronic NOI at least ten (10) days before assuming operational control;
- (c) all operators of large construction activities must post a site notice in accordance with Part III.D.2. of this permit. The site notice must be located where it is safely and readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction, and must be maintained in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities);

- (d) prior to commencing construction activities, all primary operators must (1) provide a copy of the signed NOI to the operator of any MS4 receiving the discharge and to any secondary construction operator, and (2) list in the SWP3 the names and addresses of all MS4 operators receiving a copy;
- (e) all persons meeting the definition of "secondary operator" in Part I of this permit are hereby notified that they are regulated under this general permit, but are not required to submit an NOI, provided that a primary operator at the site has submitted an NOI, or is required to submit an NOI, and the secondary operator has provided notification to the operator(s) of the need to obtain coverage (with records of notification available upon request). Any secondary operator notified under this provision may alternatively submit an NOI under this general permit, may seek coverage under an alternative TPDES individual permit, or may seek coverage under an alternative TPDES general permit if available; and
- (f) all secondary operators must provide a copy of the signed and certified Secondary Operator construction site notice to the operator of any MS4 receiving the discharge prior to commencement of construction activities.

4. Waivers for Small Construction Activities:

Part II.G. describes how operators of certain small construction activities may obtain a waiver from coverage.

5. Effective Date of Coverage

- (a) Operators of small construction activities as described in either Part II.E.1. or II.E.2. above are authorized immediately following compliance with the applicable conditions of Part II.E.1. or II.E.2. Secondary operators of large construction activities as described in Part II.E.3. above are authorized immediately following compliance with the applicable conditions in Part II.E.3. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator's responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.
- (b) Primary operators of large construction activities as described in Part II.E.3. above are provisionally authorized seven (7) days from the date that a completed NOI is postmarked for delivery to the TCEQ, unless otherwise notified by the executive director. If electronic submission of the NOI is provided, and unless otherwise notified by the executive director, primary operators are authorized immediately following confirmation of receipt of the NOI by the TCEQ. Authorization is non-provisional when the executive director finds the NOI is administratively complete and an authorization number is issued for the activity. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator's responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.
- (c) Operators are not prohibited from submitting late NOIs or posting late notices to obtain authorization under this general permit. The TCEQ reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization was obtained.

6. Notice of Change (NOC)

If relevant information provided in the NOI changes, an NOC must be submitted at least 14 days before the change occurs, if possible. Where 14-day advance notice is not possible, the operator must submit an NOC within 14 days of discovery of the change. If

the operator becomes aware that it failed to submit any relevant facts or submitted incorrect information in an NOI, the correct information must be provided to the executive director in an NOC within 14 days after discovery. The NOC shall be submitted on a form provided by the executive director, or by letter if an NOC form is not available. A copy of the NOC must also be provided to the operator of any MS4 receiving the discharge, and a list must be included in the SWP3 that includes the names and addresses of all MS4 operators receiving a copy.

Information that may be included on an NOC includes, but is not limited to, the following: the description of the construction project, an increase in the number of acres disturbed (for increases of one or more acres), or the operator name. A transfer of operational control from one operator to another, including a transfer of the ownership of a company, may not be included in an NOC.

A transfer of ownership of a company includes changes to the structure of a company, such as changing from a partnership to a corporation or changing corporation types, so that the filing number (or charter number) that is on record with the Texas Secretary of State must be changed.

An NOC is not required for notifying TCEQ of a decrease in the number of acres disturbed. This information must be included in the SWP3 and retained on site.

7. Signatory Requirement for NOI Forms, Notice of Termination (NOT) Forms, NOC Letters, and Construction Site Notices

NOI forms, NOT forms, NOC letters, and Construction Site Notices that require a signature must be signed according to 30 TAC § 305.44 (relating to Signatories for Applications).

8. Contents of the NOI

The NOI form shall require, at a minimum, the following information:

- (a) the TPDES CGP authorization number for existing authorizations under this general permit, where the operator submits an NOI to renew coverage within 90 days of the effective date of this general permit;
- (b) the name, address, and telephone number of the operator filing the NOI for permit coverage;
- (c) the name (or other identifier), address, county, and latitude/longitude of the construction project or site;
- (d) the number of acres that will be disturbed by the applicant;
- (e) confirmation that the project or site will not be located on Indian Country lands;
- (f) confirmation that a SWP3 has been developed in accordance with this general permit, that it will be implemented prior to construction, and that it is compliant with any applicable local sediment and erosion control plans; for multiple operators who prepare a shared SWP3, the confirmation for an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator;
- (g) name of the receiving water(s);
- (h) the classified segment number for each classified segment that receives discharges from the regulated construction activity (if the discharge is not directly to a classified segment, then the classified segment number of the first classified segment that those discharges reach); and
- (i) the name of all surface waters receiving discharges from the regulated construction activity that are on the latest EPA-approved CWA § 303(d) List of impaired waters.

Section F. Terminating Coverage**1. Notice of Termination (NOT) Required**

Each operator that has submitted an NOI for authorization under this general permit must apply to terminate that authorization following the conditions described in this section of the general permit. Authorization must be terminated by submitting an NOT on a form supplied by the executive director. Authorization to discharge under this general permit terminates at midnight on the day the NOT is postmarked for delivery to the TCEQ. If electronic submission of the NOT is provided, authorization to discharge under this permit terminates immediately following confirmation of receipt of the NOT by the TCEQ. Compliance with the conditions and requirements of this permit is required until an NOT is submitted.

The NOT must be submitted to TCEQ, and a copy of the NOT provided to the operator of any MS4 receiving the discharge (with a list in the SWP3 of the names and addresses of all MS4 operators receiving a copy), within 30 days after any of the following conditions are met:

- (a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;
- (b) a transfer of operational control has occurred (See Section II.F.4. below); or
- (c) the operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit.

2. Minimum Contents of the NOT

The NOT form shall require, at a minimum, the following information:

- (a) if authorization was granted following submission of an NOI, the permittee's site-specific TPDES authorization number for the construction site;
- (b) an indication of whether the construction activity is completed or if the permittee is simply no longer an operator at the site;
- (c) the name, address, and telephone number of the permittee submitting the NOT;
- (d) the name (or other identifier), address, county, and location (latitude/longitude) of the construction project or site; and
- (e) a signed certification that either all stormwater discharges requiring authorization under this general permit will no longer occur, or that the applicant is no longer the operator of the facility or construction site, and that all temporary structural erosion controls have either been removed, will be removed on a schedule defined in the SWP3, or have been transferred to a new operator if the new operator has applied for permit coverage. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.

3. Termination of Coverage for Small Construction Sites and for Secondary Operators at Large Construction Sites

Each operator that has obtained automatic authorization and has not been required to submit an NOI must remove the site notice upon meeting any of the conditions listed below, complete the applicable portion of the site notice related to removal of the site notice, and submit a copy of the completed site notice to the operator of any MS4 receiving the discharge (or provide alternative notification as allowed by the MS4 operator, with documentation of such notification included in the SWP3), within 30 days of meeting any of the following conditions:

- (a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;
- (b) a transfer of operational control has occurred (See Section II.F.4. below); or
- (c) the operator has obtained alternative authorization under an individual or general TPDES permit.

Authorization to discharge under this general permit terminates immediately upon removal of the applicable site notice. Compliance with the conditions and requirements of this permit is required until the site notice is removed.

4. Transfer of Operational Control

Coverage under this general permit is not transferable. A transfer of operational control includes changes to the structure of a company, such as changing from a partnership to a corporation, or changing to a different corporation type such that a different filing (or charter) number is established with the Texas Secretary of State.

When the primary operator of a large construction activity changes or operational control is transferred, the original operator must submit an NOT within ten (10) days prior to the date that responsibility for operations terminates, and the new operator must submit an NOI at least ten (10) days prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the NOT must be provided to the operator of any MS4 receiving the discharge in accordance with Section II.F.1. above.

Operators of regulated construction activities who are not required to submit an NOI must remove the original site notice, and the new operator must post the required site notice prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the completed site notice must be provided to the operator of any MS4 receiving the discharge, in accordance with Section II.F.3. above.

A transfer of operational control occurs when either of the following criteria is met:

- (a) Another operator has assumed control over all areas of the site that have not been finally stabilized; and all silt fences and other temporary erosion controls have either been removed, scheduled for removal as defined in the SWP3, or transferred to a new operator, provided that the permitted operator has attempted to notify the new operator in writing of the requirement to obtain permit coverage. Record of this notification (or attempt at notification) shall be retained by the operator in accordance with Part VI of this permit. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.
- (b) A homebuilder has purchased one or more lots from an operator who obtained coverage under this general permit for a common plan of development or sale. The homebuilder is considered a new operator and shall comply with the requirements listed above, including the development of a SWP3 if necessary. Under these circumstances, the homebuilder is only responsible for compliance with the general permit requirements as they apply to lot(s) it has operational control over, and the original operator remains responsible for common controls or discharges, and must amend its SWP3 to remove the lot(s) transferred to the homebuilder.

Section G. Waivers from Coverage

The executive director may waive the otherwise applicable requirements of this general permit for stormwater discharges from small construction activities under the terms and conditions described in this section.

1. Waiver Applicability and Coverage

Operators of small construction activities may apply for and receive a waiver from the requirements to obtain authorization under this general permit, where all of the following conditions are met. This waiver from coverage does not apply to non-stormwater discharges. The operator must insure that any non-stormwater discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

- (a) the calculated rainfall erosivity (R) factor for the entire period of the construction project is less than five (5);
- (b) the operator submits to the TCEQ a signed waiver certification form, supplied by the executive director, certifying that the construction activity will commence and be completed within a period when the value of the calculated R factor is less than five (5); and
- (c) the waiver certification form is postmarked for delivery to the TCEQ at least seven (7) days before construction activity begins or, if electronic filing is available, then any time following the receipt of written confirmation from TCEQ that a complete electronic application was submitted and acknowledged.

2. Steps to Obtaining a Waiver

The construction site operator may calculate the R factor to request a waiver using the following steps:

- (a) Estimate the construction start date and the construction end date. The construction end date is the date that final stabilization will be achieved.
- (b) Find the appropriate Erosivity Index (EI) zone in Appendix B of this permit.
- (c) Find the EI percentage for the project period by adding the results for each period of the project using the table provided in Appendix D of this permit, in EPA Fact Sheet 2.1, or in USDA Handbook 703, by subtracting the start value from the end value to find the percent EI for the site.
- (d) Refer to the Isoerodent Map (Appendix C of this permit) and interpolate the annual isoerodent value for the proposed construction location.
- (e) Multiply the percent value obtained in Step (c) above by the annual isoerodent value obtained in Step (d). This is the R factor for the proposed project. If the value is less than 5, then a waiver may be obtained. If the value is five (5) or more, then a waiver may not be obtained, and the operator must obtain coverage under Part II.E.2. of this permit.

Alternatively, the operator may calculate a site-specific R factor utilizing the following online calculator: <http://ei.tamu.edu/index.html>, or using another available resource.

The waiver certification form is not required to be posted at the small construction site.

3. Effective Date of Waiver

Operators of small construction activities are provisionally waived from the otherwise applicable requirements of this general permit seven (7) days from the date that a completed waiver certification form is postmarked for delivery to TCEQ, or immediately upon receiving confirmation of approval of an electronic submittal, if electronic form submittals are available.

4. Activities Extending Beyond the Waiver Period

If a construction activity extends beyond the approved waiver period due to circumstances beyond the control of the operator, the operator must either:

- (a) recalculate the R factor using the original start date and a new projected ending date, and if the R factor is still under five (5), submit a new waiver certification form at least two (2) days before the end of the original waiver period; or
- (b) obtain authorization under this general permit according to the requirements delineated in either Part II.E.2. or Part II.E.3. before the end of the approved waiver period.

Section H. Alternative TPDES Permit Coverage

1. Individual Permit Alternative

Any discharge eligible for coverage under this general permit may alternatively be authorized under an individual TPDES permit according to 30 TAC §305 (relating to Consolidated Permits). Applications for individual permit coverage should be submitted at least three hundred and thirty (330) days prior to commencement of construction activities to ensure timely authorization.

2. Individual Permit Required

The executive director may suspend an authorization or deny an NOI in accordance with the procedures set forth in 30 TAC §205 (relating to General Permits for Waste Discharges), including the requirement that the executive director provide written notice to the permittee. The executive director may require an operator of a construction site, otherwise eligible for authorization under this general permit, to apply for an individual TPDES permit in the following circumstances:

- (a) the conditions of an approved TMDL or TMDL I-Plan on the receiving water;
- (b) the activity being determined to cause a violation of water quality standards or being found to cause, or contribute to, the loss of a designated use of surface water in the state: and
- (c) any other consideration defined in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges) including 30 TAC Chapter 205.4(c)(3)(D), which allows the commission to deny authorization under the general permit and require an individual permit if a discharger "has been determined by the executive director to have been out of compliance with any rule, order, or permit of the commission, including non-payment of fees assessed by the executive director."

Additionally, the executive director may cancel, revoke, or suspend authorization to discharge under this general permit based on a finding of historical and significant noncompliance with the provisions of this general permit, relating to 30 TAC §60.3 (Use of Compliance History). Denial of authorization to discharge under this general permit or suspension of a permittee's authorization under this general permit shall be done according to commission rules in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges).

3. Alternative Discharge Authorization

Any discharge eligible for authorization under this general permit may alternatively be authorized under a separate general permit according to 30 TAC Chapter 205 (relating to General Permits for Waste Discharges), if applicable.

Section I. Permit Expiration

1. This general permit is effective for a term not to exceed five (5) years. All active discharge authorizations expire on the date provided on page one (1) of this permit. Following public notice and comment, as provided by 30 TAC §205.3 (relating to

Public Notice, Public Meetings, and Public Comment), the commission may amend, revoke, cancel, or renew this general permit.

2. If the executive director publishes a notice of the intent to renew or amend this general permit before the expiration date, the permit will remain in effect for existing, authorized discharges until the commission takes final action on the permit. Upon issuance of a renewed or amended permit, permittees may be required to submit an NOI within 90 days following the effective date of the renewed or amended permit, unless that permit provides for an alternative method for obtaining authorization.
3. If the commission does not propose to reissue this general permit within 90 days before the expiration date, permittees shall apply for authorization under an individual permit or an alternative general permit. If the application for an individual permit is submitted before the expiration date, authorization under this expiring general permit remains in effect until the issuance or denial of an individual permit. No new NOIs will be accepted nor new authorizations honored under the general permit after the expiration date.

Part III. Stormwater Pollution Prevention Plans (SWP₃)

All regulated construction site operators shall prepare an SWP₃, prior to submittal of an NOI, to address discharges authorized under Parts II.E.2. and II.E.3. of this general permit that will reach Waters of the U.S., including discharges to MS4s and privately owned separate storm sewer systems that drain to Waters of the U.S., to identify and address potential sources of pollution that are reasonably expected to affect the quality of discharges from the construction site, including off-site material storage areas, overburden and stockpiles of dirt, borrow areas, equipment staging areas, vehicle repair areas, fueling areas, etc., used solely by the permitted project. The SWP₃ must describe the implementation of practices that will be used to minimize to the extent practicable the discharge of pollutants in stormwater associated with construction activity and non-stormwater discharges described in Part II.A.3., in compliance with the terms and conditions of this permit.

Individual operators at a site may develop separate SWP₃s that cover only their portion of the project, provided reference is made to the other operators at the site. Where there is more than one SWP₃ for a site, permittees must coordinate to ensure that BMPs and controls are consistent and do not negate or impair the effectiveness of each other. Regardless of whether a single comprehensive SWP₃ is developed or separate SWP₃s are developed for each operator, it is the responsibility of each operator to ensure compliance with the terms and conditions of this general permit in the areas of the construction site where that operator has control over construction plans and specifications or day-to-day operations.

Section A. Shared SWP₃ Development

For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site is encouraged. Operators must independently obtain authorization, but may work together to prepare and implement a single, comprehensive SWP₃ for the entire construction site.

1. The SWP₃ must clearly list the name and, for large construction activities, the general permit authorization numbers, for each operator that participates in the shared SWP₃. Until the TCEQ responds to receipt of the NOI with a general permit authorization number, the SWP₃ must specify the date that the NOI was submitted to TCEQ by each operator. Each operator participating in the shared plan must also sign the SWP₃.

2. The SWP3 must clearly indicate which operator is responsible for satisfying each shared requirement of the SWP3. If the responsibility for satisfying a requirement is not described in the plan, then each permittee is entirely responsible for meeting the requirement within the boundaries of the construction site where they perform construction activities. The SWP3 must clearly describe responsibilities for meeting each requirement in shared or common areas.
3. The SWP3 may provide that one operator is responsible for preparation of a SWP3 in compliance with the CGP, and another operator is responsible for implementation of the SWP3 at the project site.

Section B. Responsibilities of Operators

1. **Secondary Operators and Primary Operators with Control Over Construction Plans and Specifications**

All secondary operators and primary operators with control over construction plans and specifications shall:

- (a) ensure the project specifications allow or provide that adequate BMPs are developed to meet the requirements of Part III of this general permit;
- (b) ensure that the SWP3 indicates the areas of the project where they have control over project specifications, including the ability to make modifications in specifications;
- (c) ensure that all other operators affected by modifications in project specifications are notified in a timely manner so that those operators may modify their BMPs as necessary to remain compliant with the conditions of this general permit; and
- (d) ensure that the SWP3 for portions of the project where they are operators indicates the name and site-specific TPDES authorization number(s) for operators with the day-to-day operational control over those activities necessary to ensure compliance with the SWP3 and other permit conditions. If the party with day-to-day operational control has not been authorized or has abandoned the site, the person with control over project specifications is considered to be the responsible party until the authority is transferred to another party and the SWP3 is updated.

2. **Primary Operators with Day-to-Day Operational Control**

Primary operators with day-to-day operational control of those activities at a project that are necessary to ensure compliance with an SWP3 and other permit conditions must ensure that the SWP3 accomplishes the following requirements:

- (a) meets the requirements of this general permit for those portions of the project where they are operators;
- (b) identifies the parties responsible for implementation of BMPs described in the SWP3;
- (c) indicates areas of the project where they have operational control over day-to-day activities; and
- (d) includes, for areas where they have operational control over day-to-day activities, the name and site-specific TPDES authorization number of the parties with control over project specifications, including the ability to make modifications in specifications.

Section C. Deadlines for SWP3 Preparation, Implementation, and Compliance

The SWP3 must be prepared prior to obtaining authorization under this general permit, and implemented prior to commencing construction activities that result in soil

disturbance. The SWP3 must be prepared so that it provides for compliance with the terms and conditions of this general permit.

Section D. Plan Review and Making Plans Available

1. The SWP3 must be retained on-site at the construction site or, if the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWP3. The SWP3 must be made readily available at the time of an on-site inspection to: the executive director; a federal, state, or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; and the operator of a municipal separate storm sewer receiving discharges from the site. If the SWP3 is retained off-site, then it shall be made available as soon as reasonably possible. In most instances, it is reasonable that the SWP3 shall be made available within 24 hours of the request.
2. A primary operator of a large construction activity must post the TCEQ site notice near the main entrance of the construction site. An operator of a small construction activity seeking authorization under this general permit and a secondary operator of a large construction activity must post the TCEQ site notice required in Part II.E.1., 2., or 3. of this general permit in order to obtain authorization. If the construction project is a linear construction project, such as a pipeline or highway, the notices must be placed in a publicly accessible location near where construction is actively underway. Notices for these linear sites may be relocated, as necessary, along the length of the project. The notices must be readily available for viewing by the general public; local, state, and federal authorities; and contain the following information:
 - (a) the site-specific TPDES authorization number for the project if assigned;
 - (b) the operator name, contact name, and contact phone number;
 - (c) a brief description of the project; and
 - (d) the location of the SWP3.
3. This permit does not provide the general public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the general public access to a construction site.

Section E. Revisions and Updates to SWP3s

The permittee must revise or update the SWP3 whenever the following occurs:

1. a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants and that has not been previously addressed in the SWP3;
2. changing site conditions based on updated plans and specifications, new operators, new areas of responsibility, and changes in BMPs; or
3. results of inspections or investigations by site operators, operators of a municipal separate storm sewer system receiving the discharge, authorized TCEQ personnel, or a federal, state or local agency approving sediment and erosion plans indicate the SWP3 is proving ineffective in eliminating or significantly minimizing pollutants in discharges authorized under this general permit.

Section F. Contents of SWP3

The SWP3 must include, at a minimum, the information described in this section and must comply with the construction and development effluent guidelines in Part III, Section G of the general permit.

1. A site or project description, which includes the following information:
 - (a) a description of the nature of the construction activity;
 - (b) a list of potential pollutants and their sources;
 - (c) a description of the intended schedule or sequence of activities that will disturb soils for major portions of the site, including estimated start dates and duration of activities;
 - (d) the total number of acres of the entire property and the total number of acres where construction activities will occur, including off-site material storage areas, overburden and stockpiles of dirt, and borrow areas that are authorized under the permittee's NOI;
 - (e) data describing the soil or the quality of any discharge from the site;
 - (f) a map showing the general location of the site (e.g. a portion of a city or county map);
 - (g) a detailed site map (or maps) indicating the following:
 - (i) drainage patterns and approximate slopes anticipated after major grading activities;
 - (ii) areas where soil disturbance will occur;
 - (iii) locations of all controls and buffers, either planned or in place;
 - (iv) locations where temporary or permanent stabilization practices are expected to be used;
 - (v) locations of construction support activities, including off-site activities, that are authorized under the permittee's NOI, including material, waste, borrow, fill, or equipment or chemical storage areas;
 - (vi) surface waters (including wetlands) either at, adjacent, or in close proximity to the site, and also indicating those that are impaired waters;
 - (vii) locations where stormwater discharges from the site directly to a surface water body or a municipal separate storm sewer system;
 - (viii) vehicle wash areas; and
 - (ix) designated points on the site where vehicles will exit onto paved roads (for instance, this applies to construction transition from unstable dirt areas to exterior paved roads).

Where the amount of information required to be included on the map would result in a single map being difficult to read and interpret, the operator shall develop a series of maps that collectively include the required information.

- (h) the location and description of support activities authorized under the permittee's NOI, including asphalt plants, concrete plants, and other activities providing support to the construction site that is authorized under this general permit;
- (i) the name of receiving waters at or near the site that may be disturbed or that may receive discharges from disturbed areas of the project;
- (j) a copy of this TPDES general permit;
- (k) the NOI and acknowledgement certificate for primary operators of large construction sites, and the site notice for small construction sites and for secondary operators of large construction sites;
- (l) stormwater and allowable non-stormwater discharge locations, including storm drain inlets on site and in the immediate vicinity of the construction site; and

(m) locations of all pollutant-generating activities, such as paving operations; concrete, paint and stucco washout and water disposal; solid waste storage and disposal; and dewatering operations.

2. A description of the BMPs that will be used to minimize pollution in runoff.

The description must identify the general timing or sequence for implementation. At a minimum, the description must include the following components:

(a) General Requirements

- (i) Erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type, and rainfall.
- (ii) Control measures must be properly selected, installed, and maintained according to the manufacturer's or designer's specifications.
- (iii) Controls must be developed to minimize the offsite transport of litter, construction debris, and construction materials.

(b) Erosion Control and Stabilization Practices

The SWP3 must include a description of temporary and permanent erosion control and stabilization practices for the site, compliant with the requirements of Part III.G.1 and G.2 of this general permit, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where it is possible.

- (i) Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.
- (ii) The following records must be maintained and either attached to or referenced in the SWP3, and made readily available upon request to the parties listed in Part III.D.1 of this general permit:
 - (A) the dates when major grading activities occur;
 - (B) the dates when construction activities temporarily or permanently cease on a portion of the site; and
 - (C) the dates when stabilization measures are initiated.
- (iii) Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased. The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased. Except as provided in (A) through (D) below, these measures must be completed as soon as practicable, but no more than 14 calendar days after the initiation of soil stabilization measures:
 - (A) Where the immediate initiation of stabilization measures after construction activity temporarily or permanently ceased is precluded

by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable.

- (B) In arid areas, semi-arid areas, or drought-stricken areas where the immediate initiation of stabilization measures after construction activity has temporarily or permanently ceased or is precluded by arid conditions, erosion control and stabilization measures must be initiated as soon as practicable. Where vegetative controls are not feasible due to arid conditions, the operator shall immediately install, and within 14 calendar days of a temporary or permanent cessation of work in any portion of the site complete, non-vegetative erosion controls. If non-vegetative controls are not feasible, the operator shall install temporary sediment controls as required in Paragraph (C) below.
 - (C) In areas where temporary stabilization measures are infeasible, the operator may alternatively utilize temporary perimeter controls. The operator must document in the SWP3 the reason why stabilization measures are not feasible, and must demonstrate that the perimeter controls will retain sediment on site to the extent practicable. The operator must continue to inspect the BMPs at the frequency established in Section III.F.7.(a) for unstabilized sites.
 - (D) If the initiation or completion of vegetative stabilization is affected by circumstances beyond the control of the permittee, vegetative stabilization must be initiated or completed as soon as conditions or circumstances allow it on the site. The requirement to initiate stabilization is triggered as soon as it is known with reasonable certainty that work will be stopped for 14 or more additional calendar days.
- (iv) Final stabilization must be achieved prior to termination of permit coverage.
 - (v) TCEQ does not expect that temporary or permanent stabilization measures to be applied to areas that are intended to be left un-vegetated or unstabilized following construction (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, or materials).
- (c) Sediment Control Practices

The SWP3 must include a description of any sediment control practices used to remove eroded soils from stormwater runoff, including the general timing or sequence for implementation of controls.

- (i) Sites With Drainage Areas of Ten or More Acres

(A) Sedimentation Basin(s)

- (1) A sedimentation basin is required, where feasible, for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A sedimentation basin may be temporary or permanent, and must provide sufficient storage to contain a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained. When calculating the volume of runoff from a 2-year, 24-hour storm event, it is not required to include the flows from offsite areas and flow from onsite areas that are either undisturbed or have already undergone permanent stabilization, if these flows are diverted around both the disturbed areas of the site and the sediment basin. Capacity calculations shall be included in the SWP3.

- (b) The SWP3 must include a description of construction and waste materials expected to be stored on-site and a description of controls to minimize pollutants from these materials.
 - (c) The SWP3 must include a description of potential pollutant sources from areas other than construction (such as stormwater discharges from dedicated asphalt plants and dedicated concrete batch plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.
 - (d) Permittees shall place velocity dissipation devices at discharge locations and along the length of any outfall channel (i.e., runoff conveyance) to provide a non-erosive flow velocity from the structure to a water course, so that the natural physical and biological characteristics and functions are maintained and protected.
 - (e) Permittees shall design and utilize appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water from the site.
 - (f) Permittees shall ensure that all other required controls and BMPs comply with all of the requirements of Part III.G of this general permit.
5. Documentation of Compliance with Approved State and Local Plans
- (a) Permittees must ensure that the SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or stormwater management site plans or site permits approved by federal, state, or local officials.
 - (b) SWP3s must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or stormwater management site plans or site permits approved by state or local official for which the permittee receives written notice.
 - (c) If the permittee is required to prepare a separate management plan, including but not limited to a WPAP or Contributing Zone Plan in accordance with 30 TAC Chapter 213 (related to the Edwards Aquifer), then a copy of that plan must be either included in the SWP3 or made readily available upon request to authorized personnel of the TCEQ. The permittee shall maintain a copy of the approval letter for the plan in its SWP3.
6. Maintenance Requirements
- (a) All protective measures identified in the SWP3 must be maintained in effective operating condition. If, through inspections or other means, the permittee determines that BMPs are not operating effectively, then the permittee shall perform maintenance as necessary to maintain the continued effectiveness of stormwater controls, and prior to the next rain event if feasible. If maintenance prior to the next anticipated storm event is impracticable, the reason shall be documented in the SWP3 and maintenance must be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed, or otherwise rendered ineffective must be replaced or corrected immediately upon discovery.
 - (b) If periodic inspections or other information indicates a control has been used incorrectly, is performing inadequately, or is damaged, then the operator shall replace or modify the control as soon as practicable after making the discovery.
 - (c) Sediment must be removed from sediment traps and sedimentation ponds no later than the time that design capacity has been reduced by 50%. For perimeter

controls such as silt fences, berms, etc., the trapped sediment must be removed before it reaches 50% of the above-ground height.

- (d) If sediment escapes the site, accumulations must be removed at a frequency that minimizes off-site impacts, and prior to the next rain event, if feasible. If the permittee does not own or operate the off-site conveyance, then the permittee shall work with the owner or operator of the property to remove the sediment.

7. Inspections of Controls

- (a) Personnel provided by the permittee must inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, discharge locations, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Personnel conducting these inspections must be knowledgeable of this general permit, familiar with the construction site, and knowledgeable of the SWP3 for the site. Sediment and erosion control measures identified in the SWP3 must be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking. Inspections must be conducted at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized or where runoff is unlikely due to winter conditions (e.g. site is covered with snow, ice, or frozen ground exists), inspections must be conducted at least once every month. In arid, semi-arid, or drought-stricken areas, inspections must be conducted at least once every month and within 24 hours after the end of a storm event of 0.5 inches or greater. The SWP3 must also contain a record of the total rainfall measured, as well as the approximate beginning and ending dates of winter or drought conditions resulting in monthly frequency of inspections.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, then the inspection must occur regardless of whether or not there has been a rainfall event since the previous inspection.

The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of "dry" season and beginning of "wet" season).

- (b) Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may provide inspection personnel with limited access to the areas described in Part III.F.7.(a) above. Inspection of these areas could require that vehicles compromise temporarily or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described in Part III.F.7.(a)

above. The conditions of the controls along each inspected 0.25 mile portion may be considered as representative of the condition of controls along that reach extending from the end of the 0.25 mile portion to either the end of the next 0.25 mile inspected portion, or to the end of the project, whichever occurs first.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur regardless of whether or not there has been a rainfall event since the previous inspection. The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of "dry" season and beginning of "wet" season).

- (c) In the event of flooding or other uncontrollable situations which prohibit access to the inspection sites, inspections must be conducted as soon as access is practicable.
- (d) The SWP3 must be modified based on the results of inspections, as necessary, to better control pollutants in runoff. Revisions to the SWP3 must be completed within seven (7) calendar days following the inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3 and wherever possible those changes implemented before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.
- (e) A report summarizing the scope of the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWP3 must be made and retained as part of the SWP3. Major observations should include: The locations of discharges of sediment or other pollutants from the site; locations of BMPs that need to be maintained; locations of BMPs that failed to operate as designed or proved inadequate for a particular location; and locations where additional BMPs are needed.

Actions taken as a result of inspections must be described within, and retained as a part of, the SWP3. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the facility or site is in compliance with the SWP3 and this permit. The report must be signed by the person and in the manner required by 30 TAC §305.128 (relating to Signatories to Reports).

The names and qualifications of personnel making the inspections for the permittee may be documented once in the SWP3 rather than being included in each report.

- 8. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for all eligible non-stormwater components of the discharge, as listed in Part II.A.3. of this permit.
- 9. The SWP3 must include the information required in Part III.B. of this general permit.
- 10. The SWP3 must include pollution prevention procedures that comply with Part III.G.4 of this general permit.

Section G. Erosion and Sediment Control Requirements Applicable to All Sites

Except as provided in 40 CFR §§125.30-125.32, any discharge regulated under this general permit, with the exception of sites that obtained waivers based on low rainfall erosivity, must achieve, at a minimum, the following effluent limitations representing the degree of effluent reduction attainable by application of the best practicable control technology currently available (BPT).

1. *Erosion and sediment controls.* Design, install, and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed, and maintained to:
 - (a) Control stormwater volume and velocity within the site to minimize soil erosion;
 - (b) If any stormwater flow will be channelized at the site, stormwater controls must be designed to control both peak flowrates and total stormwater volume to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
 - (c) Minimize the amount of soil exposed during construction activity;
 - (d) Minimize the disturbance of steep slopes;
 - (e) Minimize sediment discharges from the site. The design, installation, and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
 - (f) If earth disturbance activities are located in close proximity to a surface water, provide and maintain appropriate natural buffers if feasible and as necessary, around surface waters, depending on site-specific topography, sensitivity, and proximity to water bodies. Direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration. If providing buffers is infeasible, the permittee shall document the reason that natural buffers are not feasible, and shall implement additional erosion and sediment controls to reduce sediment load;
 - (g) Preserve native topsoil at the site, unless infeasible; and
 - (h) Minimize soil compaction in post-construction pervious areas. In areas of the construction site where final vegetative stabilization will occur or where infiltration practices will be installed, either:
 - (1) restrict vehicle and equipment use to avoid soil compaction; or
 - (2) prior to seeding or planting areas of exposed soil that have been compacted, use techniques that condition the soils to support vegetative growth, if necessary and feasible;
 - (i) TCEQ does not consider stormwater control features (e.g., stormwater conveyance channels, storm drain inlets, sediment basins) to constitute "surface waters" for the purposes of triggering the buffer requirement in Part III.G.(f) above.
2. *Soil stabilization.* Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased. Temporary

stabilization must be completed no more than 14 calendar days after initiation of soil stabilization measures, and final stabilization must be achieved prior to termination of permit coverage. In arid, semi-arid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative non-vegetative stabilization measures must be employed as soon as practicable. Refer to Part III.F.2.(b) for complete erosion control and stabilization practice requirements.

3. *Dewatering*. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited, unless managed by appropriate controls.
4. *Pollution prevention measures*. Design, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented, and maintained to:
 - (a) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
 - (b) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
 - (c) Minimize the discharge of pollutants from spills and leaks, and implement chemical spill and leak prevention and response procedures.
5. *Prohibited discharges*. The following discharges are prohibited:
 - (a) Wastewater from wash out of concrete trucks, unless managed by an appropriate control (see Part V of the general permit);
 - (b) Wastewater from wash out and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 - (c) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
 - (d) Soaps or solvents used in vehicle and equipment washing.
6. *Surface outlets*. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface, unless infeasible.

Part IV. Stormwater Runoff from Concrete Batch Plants

Discharges of stormwater runoff from concrete batch plants at regulated construction sites may be authorized under the provisions of this general permit provided that the following requirements are met for concrete batch plant(s) authorized under this permit. If discharges of stormwater runoff from concrete batch plants are not covered under this general permit, then discharges must be authorized under an alternative general permit or individual permit. This permit does not authorize the discharge or land disposal of any wastewater from concrete batch plants at regulated construction sites. Authorization for these wastes must be obtained under an individual permit or an alternative general permit.

Section A. Benchmark Sampling Requirements

1. Operators of concrete batch plants authorized under this general permit shall sample the stormwater runoff from the concrete batch plants according to the requirements

of this section of this general permit, and must conduct evaluations on the effectiveness of the SWP₃ based on the following benchmark monitoring values:

Table 1. Benchmark Parameters

Benchmark Parameter	Benchmark Value	Sampling Frequency	Sample Type
Oil and Grease	15 mg/L	1/quarter (*1) (*2)	Grab (*3)
Total Suspended Solids	100 mg/L	1/quarter (*1) (*2)	Grab (*3)
pH	6.0 – 9.0 Standard Units	1/quarter (*1) (*2)	Grab (*3)
Total Iron	1.3 mg/L	1/quarter (*1) (*2)	Grab (*3)

- (*1) When discharge occurs. Sampling is required within the first 30 minutes of discharge. If it is not practicable to take the sample, or to complete the sampling, within the first 30 minutes, sampling must be completed within the first hour of discharge. If sampling is not completed within the first 30 minutes of discharge, the reason must be documented and attached to all required reports and records of the sampling activity.
- (*2) Sampling must be conducted at least once during each of the following periods. The first sample must be collected during the first full quarter that a stormwater discharge occurs from a concrete batch plant authorized under this general permit.

January through March

April through June

July through September

October through December

For projects lasting less than one full quarter, a minimum of one sample shall be collected, provided that a stormwater discharge occurred at least once following submission of the NOI or following the date that automatic authorization was obtained under Section II.E.2., and prior to terminating coverage.

- (*3) A grab sample shall be collected from the stormwater discharge resulting from a storm event that is at least 0.1 inches of measured precipitation that occurs at least 72 hours from the previously measurable storm event. The sample shall be collected downstream of the concrete batch plant, and where the discharge exits any BMPs utilized to handle the runoff from the batch plant, prior to commingling with any other water authorized under this general permit.
2. The permittee must compare the results of sample analyses to the benchmark values above, and must include this comparison in the overall assessment of the SWP₃'s effectiveness. Analytical results that exceed a benchmark value are not a violation of this permit, as these values are not numeric effluent limitations. Results of analyses are indicators that modifications of the SWP₃ should be assessed and may be necessary to protect water quality. The operator must investigate the cause for each exceedance and must document the results of this investigation in the SWP₃ by the end of the quarter following the sampling event.

The operator's investigation must identify the following:

- (a) any additional potential sources of pollution, such as spills that might have occurred,
- (b) necessary revisions to good housekeeping measures that are part of the SWP3,
- (c) additional BMPs, including a schedule to install or implement the BMPs, and
- (d) other parts of the SWP3 that may require revisions in order to meet the goal of the benchmark values.

Background concentrations of specific pollutants may also be considered during the investigation. If the operator is able to relate the cause of the exceedance to background concentrations, then subsequent exceedances of benchmark values for that pollutant may be resolved by referencing earlier findings in the SWP3.

Background concentrations may be identified by laboratory analyses of samples of stormwater runoff to the permitted facility, by laboratory analyses of samples of stormwater runoff from adjacent non-industrial areas, or by identifying the pollutant is a naturally occurring material in soils at the site.

Section B. Best Management Practices (BMPs) and SWP3 Requirements

Minimum SWP3 Requirements – The following are required in addition to other SWP3 requirements listed in this general permit (including, but not limited to Part III.F.7. of this permit):

1. **Description of Potential Pollutant Sources** - The SWP3 must provide a description of potential sources (activities and materials) that may reasonably be expected to affect the quality of stormwater discharges associated with concrete batch plants authorized under this permit. The SWP3 must describe practices that will be used to reduce the pollutants in these discharges to assure compliance with this general permit, including the protection of water quality, and must ensure the implementation of these practices.

The following must be developed, at a minimum, in support of developing this description:

- (a) **Drainage** – The site map must include the following information:
 - (1) the location of all outfalls for stormwater discharges associated with concrete batch plants that are authorized under this permit;
 - (2) a depiction of the drainage area and the direction of flow to the outfall(s);
 - (3) structural controls used within the drainage area(s);
 - (4) the locations of the following areas associated with concrete batch plants that are exposed to precipitation: vehicle and equipment maintenance activities (including fueling, repair, and storage areas for vehicles and equipment scheduled for maintenance); areas used for the treatment, storage, or disposal of wastes; liquid storage tanks; material processing and storage areas; and loading and unloading areas; and
 - (5) the locations of the following: any bag house or other dust control device(s); recycle/sedimentation pond, clarifier or other device used for the treatment of facility wastewater (including the areas that drain to the treatment device); areas with significant materials; and areas where major spills or leaks have occurred.
- (b) **Inventory of Exposed Materials** – A list of materials handled at the concrete batch plant that may be exposed to stormwater and that have a potential to

- affect the quality of stormwater discharges associated with concrete batch plants that are authorized under this general permit.
- (c) **Spills and Leaks** - A list of significant spills and leaks of toxic or hazardous pollutants that occurred in areas exposed to stormwater and that drain to stormwater outfalls associated with concrete batch plants authorized under this general permit must be developed, maintained, and updated as needed.
 - (d) **Sampling Data** - A summary of existing stormwater discharge sampling data must be maintained, if available.
2. **Measures and Controls** - The SWP₃ must include a description of management controls to regulate pollutants identified in the SWP₃'s "Description of Potential Pollutant Sources" from Part IV.B.1.(a) of this permit, and a schedule for implementation of the measures and controls. This must include, at a minimum:
- (a) **Good Housekeeping** - Good housekeeping measures must be developed and implemented in the area(s) associated with concrete batch plants.
 - (1) Operators must prevent or minimize the discharge of spilled cement, aggregate (including sand or gravel), settled dust, or other significant materials from paved portions of the site that are exposed to stormwater. Measures used to minimize the presence of these materials may include regular sweeping or other equivalent practices. These practices must be conducted at a frequency that is determined based on consideration of the amount of industrial activity occurring in the area and frequency of precipitation, and shall occur at least once per week when cement or aggregate is being handled or otherwise processed in the area.
 - (2) Operators must prevent the exposure of fine granular solids, such as cement, to stormwater. Where practicable, these materials must be stored in enclosed silos, hoppers or buildings, in covered areas, or under covering.
 - (b) **Spill Prevention and Response Procedures** - Areas where potential spills that can contribute pollutants to stormwater runoff, and the drainage areas from these locations, must be identified in the SWP₃. Where appropriate, the SWP₃ must specify material handling procedures, storage requirements, and use of equipment. Procedures for cleaning up spills must be identified in the SWP₃ and made available to the appropriate personnel.
 - (c) **Inspections** - Qualified facility personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP₃ related to the concrete batch plant(s) for the site) must be identified to inspect designated equipment and areas of the facility specified in the SWP₃. The inspection frequency must be specified in the SWP₃ based upon a consideration of the level of concrete production at the facility, but must be a minimum of once per month while the facility is in operation. The inspection must take place while the facility is in operation and must, at a minimum, include all areas that are exposed to stormwater at the site, including material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, truck wash down and equipment cleaning areas. Follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections must be maintained and be made readily available for inspection upon request.
 - (d) **Employee Training** - An employee training program must be developed to educate personnel responsible for implementing any component of the SWP₃, or personnel otherwise responsible for stormwater pollution prevention, with the provisions of the SWP₃. The frequency of training must be documented in

- the SWP₃, and at a minimum, must consist of one training prior to the initiation of operation of the concrete batch plant.
- (e) Record Keeping and Internal Reporting Procedures - A description of spills and similar incidents, plus additional information that is obtained regarding the quality and quantity of stormwater discharges, must be included in the SWP₃. Inspection and maintenance activities must be documented and records of those inspection and maintenance activities must be incorporated in the SWP₃.
 - (f) Management of Runoff - The SWP₃ shall contain a narrative consideration for reducing the volume of runoff from concrete batch plants by diverting runoff or otherwise managing runoff, including use of infiltration, detention ponds, retention ponds, or reusing of runoff.
3. Comprehensive Compliance Evaluation – At least once per year, one or more qualified personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP₃ related to the concrete batch plant(s) for the site) shall conduct a compliance evaluation of the plant. The evaluation must include the following.
- (a) Visual examination of all areas draining stormwater associated with regulated concrete batch plants for evidence of, or the potential for, pollutants entering the drainage system. These include but are not limited to: cleaning areas, material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, and truck wash down and equipment cleaning areas. Measures implemented to reduce pollutants in runoff (including structural controls and implementation of management practices) must be evaluated to determine if they are effective and if they are implemented in accordance with the terms of this permit and with the permittee's SWP₃. The operator shall conduct a visual inspection of equipment needed to implement the SWP₃, such as spill response equipment.
 - (b) Based on the results of the evaluation, the following must be revised as appropriate within two weeks of the evaluation: the description of potential pollutant sources identified in the SWP₃ (as required in Part IV.B.1., "Description of Potential Pollutant Sources"); and pollution prevention measures and controls identified in the SWP₃ (as required in Part IV.B.2., "Measures and Controls"). The revisions may include a schedule for implementing the necessary changes.
 - (c) The permittee shall prepare and include in the SWP₃ a report summarizing the scope of the evaluation, the personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the SWP₃, and actions taken in response to the findings of the evaluation. The report must identify any incidents of noncompliance. Where the report does not identify incidences of noncompliance, the report must contain a statement that the evaluation did not identify any incidence(s), and the report must be signed according to 30 TAC §305.128, relating to Signatories to Reports.
 - (d) The Comprehensive Compliance Evaluation may substitute for one of the required inspections delineated in Part IV.B.2.(c) of this general permit.

Section C. Prohibition of Wastewater Discharges

Wastewater discharges associated with concrete production including wastewater disposal by land application are not authorized under this general permit. These wastewater discharges must be authorized under an alternative TCEQ water quality permit or otherwise disposed of in an authorized manner. Discharges of concrete truck wash out at construction sites may be authorized if conducted in accordance with the requirements of Part V of this general permit.

Part V. Concrete Truck Wash Out Requirements

This general permit authorizes the wash out of concrete trucks at construction sites regulated under Sections II.E.1., 2., and 3. of this general permit, provided the following requirements are met. Authorization is limited to the land disposal of wash out water from concrete trucks. Any other direct discharge of concrete production waste water must be authorized under a separate TCEQ general permit or individual permit.

1. Direct discharge of concrete truck wash out water to surface water in the state, including discharge to storm sewers, is prohibited by this general permit.
2. Concrete truck wash out water shall be discharged to areas at the construction site where structural controls have been established to prevent direct discharge to surface waters, or to areas that have a minimal slope that allow infiltration and filtering of wash out water to prevent direct discharge to surface waters. Structural controls may consist of temporary berms, temporary shallow pits, temporary storage tanks with slow rate release, or other reasonable measures to prevent runoff from the construction site.
3. Wash out of concrete trucks during rainfall events shall be minimized. The direct discharge of concrete truck wash out water is prohibited at all times, and the operator shall insure that its BMPs are sufficient to prevent the discharge of concrete truck wash out as the result of rainfall or stormwater runoff.
4. The discharge of wash out water must not cause or contribute to groundwater contamination.
5. If a SWP3 is required to be implemented, the SWP3 shall include concrete wash out areas on the associated site map.

Part VI. Retention of Records

The permittee must retain the following records for a minimum period of three (3) years from the date that a NOT is submitted as required by Part II.E.3. For activities in which an NOT is not required, records shall be retained for a minimum period of three (3) years from the date that the operator terminates coverage under Section II.F.3. of this permit. Records include:

1. A copy of the SWP3;
2. All reports and actions required by this permit, including a copy of the construction site notice;
3. All data used to complete the NOI, if an NOI is required for coverage under this general permit; and
4. All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable.

Part VII. Standard Permit Conditions

1. The permittee has a duty to comply with all permit conditions. Failure to comply with any permit condition is a violation of the permit and statutes under which it was issued, and is grounds for enforcement action, for terminating, revoking, or denying coverage under this general permit, or for requiring a discharger to apply for and obtain an individual TPDES permit.
2. Authorization under this general permit may be suspended or revoked for cause. Filing a notice of planned changes or anticipated non-compliance by the permittee does not stay any permit condition. The permittee must furnish to the executive director, upon request and within a reasonable time, any information necessary for the executive director to determine whether cause exists for revoking, suspending, or

- terminating authorization under this permit. Additionally, the permittee must provide to the executive director, upon request, copies of all records that the permittee is required to maintain as a condition of this general permit.
3. It is not a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the permit conditions.
 4. Inspection and entry shall be allowed under TWC Chapters 26-28, Texas Health and Safety Code §§361.032-361.033 and 361.037, and 40 CFR §122.41(i). The statement in TWC §26.014 that commission entry of a facility shall occur according to an establishment's rules and regulations concerning safety, internal security, and fire protection is not grounds for denial or restriction of entry to any part of the facility or site, but merely describes the commission's duty to observe appropriate rules and regulations during an inspection.
 5. The discharger is subject to administrative, civil, and criminal penalties, as applicable, under TWC Chapter 7 for violations including but not limited to the following:
 - (a) negligently or knowingly violating the federal CWA §§301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under CWA §402, or any requirement imposed in a pretreatment program approved under CWA §§402(a)(3) or 402(b)(8);
 - (b) knowingly making any false statement, representation, or certification in any record or other document submitted or required to be maintained under a permit, including monitoring reports or reports of compliance or noncompliance; and
 - (c) knowingly violating §303 of the federal CWA, and placing another person in imminent danger of death or serious bodily injury.
 6. All reports and other information requested by the executive director must be signed by the person and in the manner required by 30 TAC §305.128 (relating to Signatories to Reports).
 7. Authorization under this general permit does not convey property or water rights of any sort and does not grant any exclusive privilege.
 8. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.
 9. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
 10. The permittee shall comply with the reporting requirements in 40 CFR §122.41(l), as applicable.

Part VIII. Fees

1. A fee of must be submitted along with the NOI:
 - (a) \$325 if submitting a paper NOI, or
 - (b) \$225 if submitting an NOI electronically.

- 2. Fees are due upon submission of the NOI. An NOI will not be declared administratively complete unless the associated fee has been paid in full.**
- 3. No separate annual fees will be assessed for this general permit. The Water Quality Annual Fee has been incorporated into the NOI fees as described above.**

Appendix A: Automatic Authorization
 Periods of Low Erosion Potential by County – Eligible Date Ranges

Andrews: Nov. 15 - Apr. 30	Ector: Nov. 15 - Apr. 30
Archer: Dec. 15 - Feb. 14	Edwards: Dec. 15 - Feb. 14
Armstrong: Nov. 15 - Apr. 30	El Paso: Jan. 1 - Jul. 14, or May 15 - Jul. 31, or Jun. 1 - Aug. 14, or Jun. 15 - Sept. 14, or Jul. 1 - Oct. 14, or Jul. 15 - Oct. 31, or Aug. 1 - Apr. 30, or Aug. 15 - May 14, or Sept. 1 - May 30, or Oct. 1 - Jun. 14, or Nov. 1 - Jun. 30, or Nov. 15 - Jul. 14
Bailey: Nov. 1 - Apr. 30, or Nov. 15 - May 14	Fisher: Dec. 15 - Feb. 14
Baylor: Dec. 15 - Feb. 14	Floyd: Nov. 15 - Apr. 30
Borden: Nov. 15 - Apr. 30	Foard: Dec. 15 - Feb. 14
Brewster: Nov. 15 - Apr. 30	Gaines: Nov. 15 - Apr. 30
Briscoe: Nov. 15 - Apr. 30	Garza: Nov. 15 - Apr. 30
Brown: Dec. 15 - Feb. 14	Glasscock: Nov. 15 - Apr. 30
Callahan: Dec. 15 - Feb. 14	Hale: Nov. 15 - Apr. 30
Carson: Nov. 15 - Apr. 30	Hall: Feb. 1 - Mar. 30
Castro: Nov. 15 - Apr. 30	Hansford: Nov. 15 - Apr. 30
Childress: Dec. 15 - Feb. 14	Hardeman: Dec. 15 - Feb. 14
Cochran: Nov. 1 - Apr. 30, or Nov. 15 - May 14	Hartley: Nov. 15 - Apr. 30
Coke: Dec. 15 - Feb. 14	Haskell: Dec. 15 - Feb. 14
Coleman: Dec. 15 - Feb. 14	Hockley: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Collingsworth: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28	Howard: Nov. 15 - Apr. 30
Concho: Dec. 15 - Feb. 14	Hudspeth: Nov. 1 - May 14
Cottle: Dec. 15 - Feb. 14	Hutchinson: Nov. 15 - Apr. 30
Crane: Nov. 15 - Apr. 30	Irion: Dec. 15 - Feb. 14
Crockett: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30	Jeff Davis: Nov. 1 - Apr. 30 or Nov. 15 - May 14
Crosby: Nov. 15 - Apr. 30	Jones: Dec. 15 - Feb. 14
Culberson: Nov. 1 - May 14	Kent: Nov. 15 - Jan. 14 or Feb. 1 - Mar. 30
Dallam: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30	Kerr: Dec. 15 - Feb. 14
Dawson: Nov. 15 - Apr. 30	Kimble: Dec. 15 - Feb. 14
Deaf Smith: Nov. 15 - Apr. 30	King: Dec. 15 - Feb. 14
Dickens: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30	Kinney: Dec. 15 - Feb. 14
Dimmit: Dec. 15 - Feb. 14	Knox: Dec. 15 - Feb. 14
Donley: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28	Lamb: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Eastland: Dec. 15 - Feb. 14	

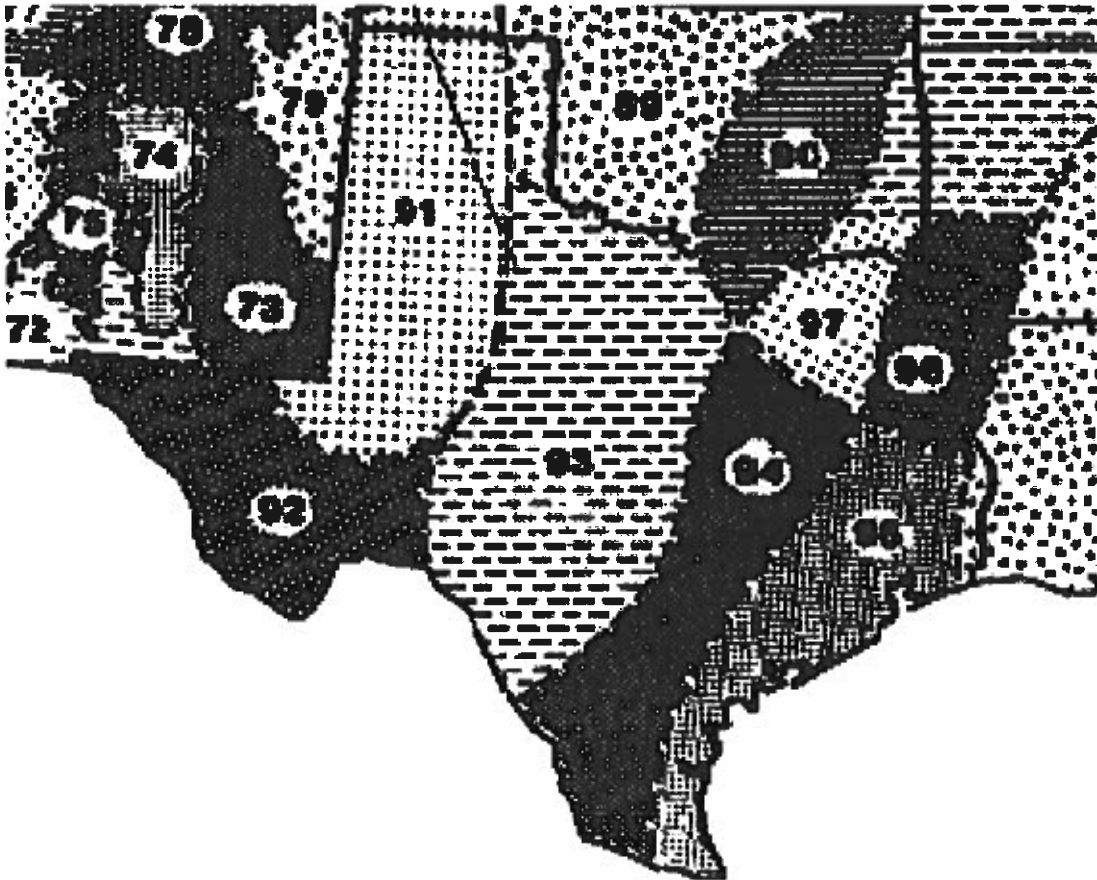
Construction General Permit

TPDES General Permit TXR150000

Loving: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Lubbock: Nov. 15 - Apr. 30
Lynn: Nov. 15 - Apr. 30
Martin: Nov. 15 - Apr. 30
Mason: Dec. 15 - Feb. 14
Maverick: Dec. 15 - Feb. 14
McCulloch: Dec. 15 - Feb. 14
Menard: Dec. 15 - Feb. 14
Midland: Nov. 15 - Apr. 30
Mitchell: Nov. 15 - Apr. 30
Moore: Nov. 15 - Apr. 30
Motley: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Nolan: Dec. 15 - Feb. 14
Oldham: Nov. 15 - Apr. 30
Parmer: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Pecos: Nov. 15 - Apr. 30
Potter: Nov. 15 - Apr. 30
Presidio: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Randall: Nov. 15 - Apr. 30
Reagan: Nov. 15 - Apr. 30
Real: Dec. 15 - Feb. 14
Reeves: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Runnels: Dec. 15 - Feb. 14
Schleicher: Dec. 15 - Feb. 14

Scurry: Nov. 15 - Apr. 30
Shackelford: Dec. 15 - Feb. 14
Sherman: Nov. 15 - Apr. 30
Stephens: Dec. 15 - Feb. 14
Sterling: Nov. 15 - Apr. 30
Stonewall: Dec. 15 - Feb. 14
Sutton: Dec. 15 - Feb. 14
Swisher: Nov. 15 - Apr. 30
Taylor: Dec. 15 - Feb. 14
Terrell: Nov. 15 - Apr. 30
Terry: Nov. 15 - Apr. 30
Throckmorton: Dec. 15 - Feb. 14
Tom Green: Dec. 15 - Feb. 14
Upton: Nov. 15 - Apr. 30
Uvalde: Dec. 15 - Feb. 14
Val Verde: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Ward: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Wichita: Dec. 15 - Feb. 14
Wilbarger: Dec. 15 - Feb. 14
Winkler: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Yoakum: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Young: Dec. 15 - Feb. 14
Wheeler: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28
Zavala: Dec. 15 - Feb. 14

Appendix B: Erosivity Index (EI) Zones in Texas



Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Appendix C: Isoerodent Map

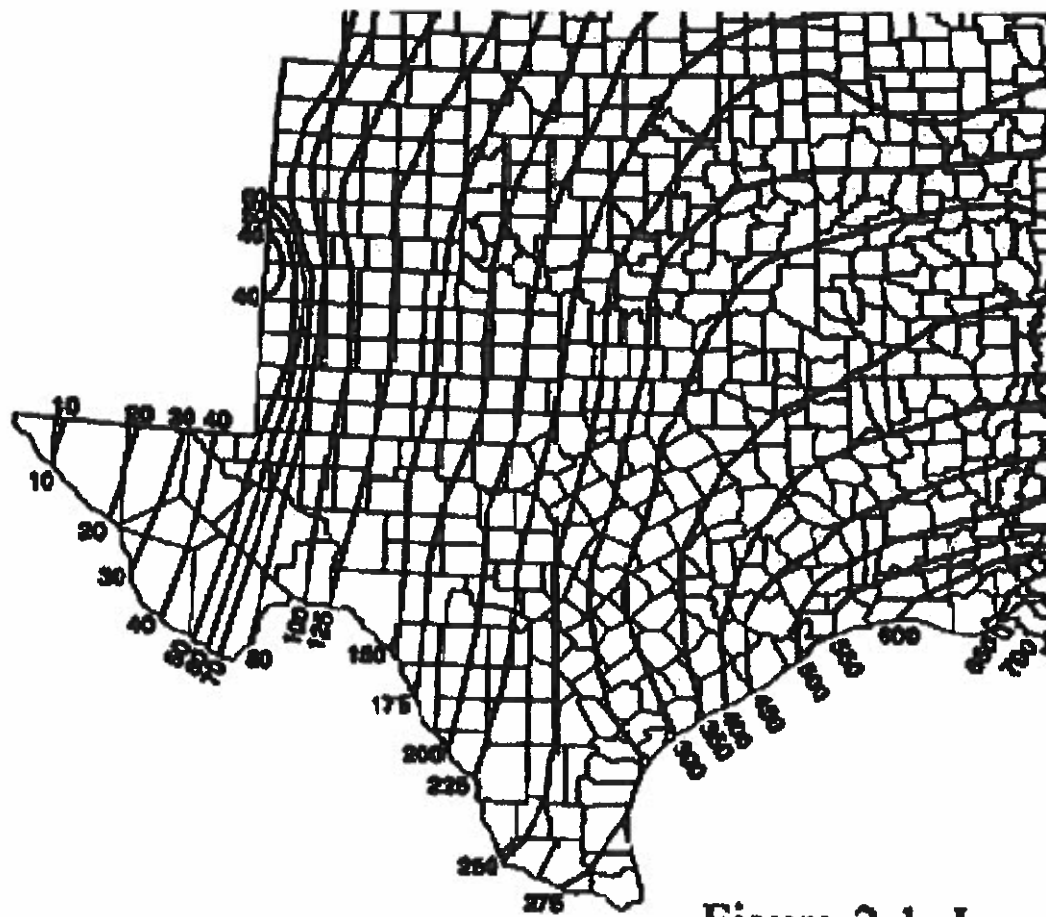


Figure C.1 Isoerodent Map

Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Appendix D: Erosivity Indices for EI Zones in Texas

Periods:

EI #	1/1	1/16	1/31	2/15	3/1	3/16	3/31	4/15	4/30	5/15	5/30	6/14	6/29	7/14	7/29	8/13	8/28	9/12	9/27	10/12	10/27	11/11	11/26	12/11	12/31
89	0	1	1	2	3	4	7	2	8	27	38	48	55	62	69	76	83	90	94	97	98	99	100	100	100
90	0	1	2	3	4	6	8	13	21	29	37	46	54	60	65	69	74	81	87	92	95	97	98	99	100
91	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100	100
92	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100	100
93	0	1	1	2	3	4	6	8	13	25	40	49	56	62	67	72	76	80	85	91	97	98	99	99	100
94	0	1	2	4	6	8	10	15	21	29	38	47	53	57	61	65	70	76	83	88	91	94	96	98	100
95	0	1	3	5	7	9	11	14	18	27	35	41	46	51	57	62	68	73	79	84	89	93	96	98	100
96	0	2	4	6	9	12	17	23	30	37	43	49	54	58	62	66	70	74	78	82	86	90	94	97	100
97	0	1	3	5	7	10	14	20	28	37	48	56	61	64	68	72	77	81	86	89	92	95	98	99	100
106	0	3	6	9	13	17	21	27	33	38	44	49	55	61	67	71	75	78	81	84	86	90	94	97	100

* Each period begins on the date listed in the table above and lasts until the day before the following period. The final period begins on December 11 and ends on December 31.

Table adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Attachment 4



LARGE CONSTRUCTION SITE NOTICE

FOR THE
 Texas Commission on Environmental Quality (TCEQ)
 Storm Water Program
TPDES GENERAL PERMIT TXR150000

“PRIMARY OPERATOR” NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.E.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Storm Water Pollution Prevention Plan:	

Attachment 3



LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program
TPDES GENERAL PERMIT TXR150000
“SECONDARY OPERATOR” NOTICE

This notice applies to secondary operators of construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.E.2. of the general permit. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Storm Water Pollution Prevention Plan (SWP3):	

For Large Construction Activities Authorized Under Part II.E.3. (Obtaining Authorization to Discharge) the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.2. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A storm water pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title _____ Date _____

 Date Notice Removed
 MS4 operator notified per Part II.F.3.

Attachment 2

SWPPP Inspection and Maintenance Report Form

Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		Location	
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: <input type="checkbox"/> Regular <input type="checkbox"/> Pre-storm event <input type="checkbox"/> During storm event <input type="checkbox"/> Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Sleet <input type="checkbox"/> Fog <input type="checkbox"/> Snowing <input type="checkbox"/> High Winds <input type="checkbox"/> Other: Temperature:			
Have any discharges occurred since the last inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			
Are there any discharges at the time of inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe:			

Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
9		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
13		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
14		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
15		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
16		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
17		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
18		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
19		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
20		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4	Are discharge points and receiving waters free of any sediment deposits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5	Are storm drain inlets properly protected?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6	Is the construction exit preventing sediment from being tracked into the street?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	(Other)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title: _____

Signature: _____ **Date:** _____

Attachment 3

Notice of Intent

TCEQ Office Use Only
Permit No.:
RN:
CN:
Region:



TCEQ Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

IMPORTANT:

- Use the [INSTRUCTIONS](#) to fill out each question in this form.
- Use the [CHECKLIST](#) to make certain you filled out all required information. Incomplete applications **WILL** delay approval or result in denial.
- Once processed your permit can be viewed at: <http://www.tceq.texas.gov/goto/wq-dpa>

ePERMITS: Sign up now for online NOI: <https://www3.tceq.texas.gov/steers/>
Pay a \$225 reduced application fee by using ePermits.

APPLICATION FEE:

- You must pay the **\$325** Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
 - Go to <http://www.tceq.texas.gov/goto/epay>
 - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION
- **Provide your payment information below, for verification of payment:**
 - Mailed Check/Money Order Number: _____
Name Printed on Check: _____
Copy of check enclosed? Yes
 - EPAY Voucher Number: _____
Is the Payment Voucher copy attached? Yes

RENEWAL: Is this NOI a Renewal of an existing General Permit Authorization?
(Note: A permit cannot be renewed after June 3, 2013.)

- Yes The Permit number is: TXR15_____
- No (If a permit number is not provided, a new number will be assigned.)

1) OPERATOR (Applicant)

a) If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity? You may search for your CN at:
<http://www.tceq.texas.gov/goto/cr-customer>

CN _____

b) What is the Legal Name of the entity (applicant) applying for this permit?

(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

c) What is the contact information for the Operator (Responsible Authority)? The mailing address must be recognized by the US Postal Service (USPS). You may verify the address at: <https://tools.usps.com/go/ZipLookupAction!input.action>

Prefix (Mr. Ms. Miss): _____
First/Last Name: _____ Suffix: _____
Title: _____ Credential: _____
Phone Number: _____ Ext: _____ Fax Number: _____
E-mail: _____
Mailing Address: _____
Internal Routing (Mail Code, Etc.): _____
City: _____ State: _____ ZIP Code: _____
If outside USA:
Territory: _____ Country Code: _____ Postal Code: _____

d) Indicate the type of Customer (The instructions will help determine your customer type):

- Individual
- Limited Partnership
- Sole Proprietorship-DBA
- Joint Venture
- General Partnership
- Corporation
- Trust
- Estate
- Federal Government
- State Government
- County Government
- City Government
- Other Government

e) Independent Operator? (If governmental entity, subsidiary, or part of a larger corporation, check "No".)

- Yes
- No

f) Number of Employees:

- 0-20;
- 21-100;
- 101-250;
- 251-500; or
- 501 or higher

g) Customer Business Tax and Filing Numbers:

(REQUIRED for Corporations and Limited Partnerships. Not Required for Individuals, Government, or Sole Proprietors)

State Franchise Tax ID Number: _____

Federal Tax ID: _____

Texas Secretary of State Charter (filing) Number: _____

DUNS Number (if known): _____

2) APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

Is the application contact the same as the applicant identified above?

- Yes, go to Section 3).
- No, complete section below

Prefix (Mr. Ms. Miss): _____
First/Last Name: _____ Suffix: _____
Title: _____ Credential: _____
Organization Name: _____
Phone Number: _____ Ext: _____ Fax Number: _____
E-mail: _____
Mailing Address: _____
Internal Routing (Mail Code, Etc.): _____
City: _____ State: _____ ZIP Code: _____
Mailing Information if outside USA:
Territory: _____ Country Code: _____ Postal Code: _____

3) REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

If the site of your business is part of a larger business site or if other businesses were located at this site before yours, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at:
<http://www.tceq.texas.gov/goto/cr-searchrn>

If the site is found, provide the assigned Regulated Entity Reference Number and provide the information for the site to be authorized through this application below. The site information for this authorization may vary from the larger site information.

a) TCEQ issued RE Reference Number (RN): RN101279172

b) Name of project or site (the name known by the community where located):
CAMP YOUNG JUDAEA

c) In your own words, briefly describe the primary business of the Regulated Entity: (Do not repeat the SIC and NAICS code):

Sporting and Recreational Camps.

d) County (or counties if > 1)
Hays

e) Latitude: 30.0262667° Longitude: 98.1185628°

f) Does the site have a physical address?
 Yes, complete Section A for a physical address.
 No, complete section B for site location information.

Section A: Enter the physical address for the site.
Verify the address with USPS. If the address is not recognized as a delivery address, provide the address as identified for overnight mail delivery, 911 emergency or other online map tools to confirm an address.

Physical Address of Project or Site:
Street Number: 121 Street Name: Camp Young Judaea
City: Wimberley State: Texas ZIP Code: 78676

Section B: Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site. (Example: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)

Located in the City of Woodcreek TX , north of Wimberley, TX and 40 minutes south of Austin. The site adjoins to the South with FM 2325 , to the East to FM 12 and to the West with Jacobs Well Rd.

City where the site is located or, if not in a city, what is the nearest city:

State: Texas ZIP Code where the site is located: 78676

4) GENERAL CHARACTERISTICS

- a) Is the project/site located on Indian Country Lands?
 Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.
 No

- b) Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?
 Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.
 No

- c) What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?
Primary SIC Code: _____

- d) If applicable, what is the Secondary SIC Code(s): _____

- e) What is the total number of acres disturbed? _____

- f) Is the project site part of a larger common plan of development or sale?
 Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.
 No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

- g) What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?

- h) What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

i) Is the discharge into an MS4?

Yes - If the answer is Yes, provide the name of the MS4 operator below.

Note: The general permit requires you to send a copy of the NOI to the MS4 operator.

No

j) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?

Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.

Cypress Creek

No

k) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?

Yes - If the answer is Yes, complete certification below by checking "Yes."

No

I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.

Yes

NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

Application Fee:

If paying by Check:

- Check was mailed **separately** to the TCEQs Cashier's Office. (See Instructions for Cashier's address and Application address.)
- Check number and name on check is provided in this application.

If using ePay:

- The voucher number is provided in this application or a copy of the voucher is attached.

PERMIT NUMBER:

- Permit number provided – if this application is for renewal of an existing authorization.

OPERATOR INFORMATION - Confirm each item is complete:

- Customer Number (CN) issued by TCEQ Central Registry
- Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)
- Name and title of responsible authority signing the application
- Mailing address is complete & verifiable with USPS. www.usps.com
- Phone numbers/e-mail address
- Type of operator (entity type)
- Independent operator
- Number of employees
- For corporations or limited partnerships – Tax ID and SOS filing numbers
- Application contact and address is complete & verifiable with USPS. <http://www.usps.com>

REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is complete:

- Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)
- Site/project name/regulated entity
- Latitude and longitude <http://www.tceq.texas.gov/gis/sqmaview.html>
- County
- Site/project physical address. Do not use a rural route or post office box.
- Business description

GENERAL CHARACTERISTICS - Confirm each item is complete:

- Indian Country Lands –the facility is not on Indian Country Lands
- Construction activity related to facility associated to oil, gas, or geothermal resources
- Standard Industrial Classification (SIC) Code www.osha.gov/oshstats/sicser.html
- Acres disturbed is provided and qualifies for coverage through a NOI
- Common plan of development or sale
- Receiving water body(s)
- Segment number(s)
- Impaired water body(s)
- MS4 operator
- Edwards Aquifer rule

CERTIFICATION

- Certification statements have been checked indicating "Yes"
- Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

General Information and Instructions

GENERAL INFORMATION

Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
P.O. Box 13087
Austin, Texas 78711-3087

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)
12100 Park 35 Circle
Austin, TX 78753

TCEQ Contact List:

Application – status and form questions:

512/239-3700, swpermit@tceq.texas.gov

Technical questions:

512/239-4671, swgp@tceq.texas.gov

Environmental Law Division:

512/239-0600

Records Management - obtain copies of forms:

512/239-0900

Reports from databases (as available):

512/239-DATA (3282)

Cashier's office:

512/239-0357 or 512/239-0187

Notice of Intent Process:

When your NOI is received by the program, the form will be processed as follows:

- 1) Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.
- 2) Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- 3) Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.
-or-
Denial of Coverage: If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

General Permit (Your Permit)

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For **paper** NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <http://www.tceq.texas.gov>. Search using key word TXR150000.

General Permit Forms

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <http://www.tceq.texas.gov>.

Change in Operator

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

TCEQ Central Registry Core Data Form

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <http://www15.tceq.texas.gov/crpub/>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Program ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

Fees associated with a General Permit

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

Application Fee: This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

Mailed Payments:

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, Texas 78711-3088

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

ePAY Electronic Payment: <http://www.tceq.texas.gov/epay>

When making the payment you must select Water Quality, and then select the fee category "General Permit Construction Storm Water Discharge NOI Application". You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

INSTRUCTIONS FOR FILLING OUT THE NOI FORM

Renewal of General Permit. Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

1. Operator (Applicant)

a) Enter assigned Customer Number (CN)

TCEQ's Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number.** If this customer has not been assigned a CN, leave the space for the CN blank. If this customer has already been assigned this number, enter the permittee's CN.

b) Legal Name

Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

c) Operator Contact's (Responsible Authority) Contact Information and Mailing Address

Provide the first and last name, and the title of the person signing the Certification section of the application. This person must be an individual having signatory authority in accordance with 30 TAC Chapter §305.44. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at <https://tools.usps.com/go/ZipLookupAction!input.action> for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

d) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.

Sole Proprietorship – DBA

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

Partnership

- A customer that is established as a partnership as defined by the Texas Secretary of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership (Partnership) is required to file with the Texas Secretary of State. A General Partnership or Joint Venture is not required to register with the state.
- **Partnership (Limited Partnership or Limited Liability Partnership):** A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- **General Partnership:** A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- **Joint Venture:** A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

Corporation

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State
- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

Government

Federal, state, county, or city government (as appropriate)

The customer is either an agency of one of these levels of government or the governmental body itself. The government agency's 'legal name' must be provided as the

applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

Trust or Estate

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

Other Government

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

e) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

f) Number of Employees

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

g) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

State Franchise Tax ID Number

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

Federal Tax ID

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

TX SOS Charter (filing) Number

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

DUNS Number

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

2. APPLICATION CONTACT

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

a) Regulated Entity Reference Number (RN)

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at:

<http://www.tceq.texas.gov/goto/cr-searchrn>

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

b) Site/Project Name/Regulated Entity

Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

c) Description of Activity Regulated

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

d) County

Identify the county or counties in which the regulated entity is located.

e) Latitude and Longitude

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form.

For help obtaining the latitude and longitude, go to:

<http://www.tceq.texas.gov/gis/sqmvview.html> or <http://nationalmap.gov/ustopo>

f) Site/Project (RE) Physical Address/Location Information

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane."

Provide the city (or nearest city) and zip code of the facility location.

4. GENERAL CHARACTERISTICS

a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:

[http://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30](http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=16&pt=1&ch=3&rl=30)

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(l)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 - Construction of Single Family Homes
- 1522 - Construction of Residential Bldgs. Other than Single Family Homes
- 1541 - Construction of Industrial Bldgs. and Warehouses

- 1542 - Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 - Highway and Street Construction, except Highway Construction
- 1622 - Bridge, Tunnel, and Elevated Highway Construction
- 1623 - Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:

<http://www.osha.gov/pls/imis/sicsearch.html>

d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to: <http://www.osha.gov/pls/imis/sicsearch.html>

e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at swgp@tceq.texas.gov.

f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to:

www.tceq.texas.gov/permitting/stormwater/common_plan_of_development_steps.html

For further information, go to the TCEQ stormwater construction webpage at:

www.tceq.texas.gov/goto/construction and search for "Additional Guidance and Quick Links". If you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

g) Identify the water body(s) receiving stormwater runoff

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

h) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: www.tceq.texas.gov/waterquality/monitoring/viewer.html

You may also find the segment number in TCEQ publication GI-316:

www.tceq.texas.gov/publications/gi/gi-316

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- 0200 (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

i) Discharge into MS4 – Identify the MS4 Operator

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

j) Surface Water bodies on list of impaired waters – Identify the impaired water body(s)

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:

www.tceq.texas.gov/waterquality/assessment/305_303.html

NOTE: Do not use any "draft" documents.

k) Discharges to the Edwards Aquifer Recharge Zone and Certification

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at: www.tceq.texas.gov/field/eapp/viewer.html

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin. The certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

5. CERTIFICATIONS

Failure to indicate **Yes** to ALL of the certification items may result in denial of coverage under the general permit.

a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: www.tceq.texas.gov/goto/construction

b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

c) Understanding of Notice of Termination

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

Operator Certification:

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

IF YOU ARE A CORPORATION:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

30 Texas Administrative Code

§305.44. Signatories to Applications

(a) All applications shall be signed as follows.

(1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.

(2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

Texas Commission on Environmental Quality General Permit Payment Submittal Form

Use this form to submit your Application Fee only if you are mailing your payment.

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

Mail this form and your check to:

BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
P.O. Box 13088
Austin, TX 78711-3088

BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

Fee Code: GPA

General Permit:

TXR150000

1. Check / Money Order Number:

2. Amount of Check/Money Order:

3. Date of Check or Money Order:

4. Name on Check or Money Order:

5. NOI INFORMATION

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.

See Attached List of Sites (If more space is needed, you may attach a list.)

Project/Site (RE) Name:

Project/Site (RE) Physical Address:

Staple Check in This Space

Attachment 4

Construction Site Notice



LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Stormwater Program
TPDES GENERAL PERMIT TXR150000

“PRIMARY OPERATOR” NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of stormwater runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/wq_construction.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Stormwater Pollution Prevention Plan:	



LARGE CONSTRUCTION SITE NOTICE

FOR THE

Texas Commission on Environmental Quality (TCEQ)
Stormwater Program

TPDES GENERAL PERMIT TXR150000 "SECONDARY OPERATOR" NOTICE

This notice applies to secondary operators of construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of stormwater runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.D.2. of the general permit. Additional information regarding the TCEQ stormwater permit program may be found on the internet at:

http://www.tceq.state.tx.us/nav/permits/wq_construction.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: <i>Physical address or description of the site's location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.</i>	
Location of Stormwater Pollution Prevention Plan (SWP3):	

For Large Construction Activities Authorized Under Part II.E.3. (Obtaining Authorization to Discharge) the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.3. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A stormwater pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title _____ Date _____

_____ Date Notice Removed

_____ MS4 operator notified per Part II.F.3.

Attachment 5

Log of Major Construction Activities

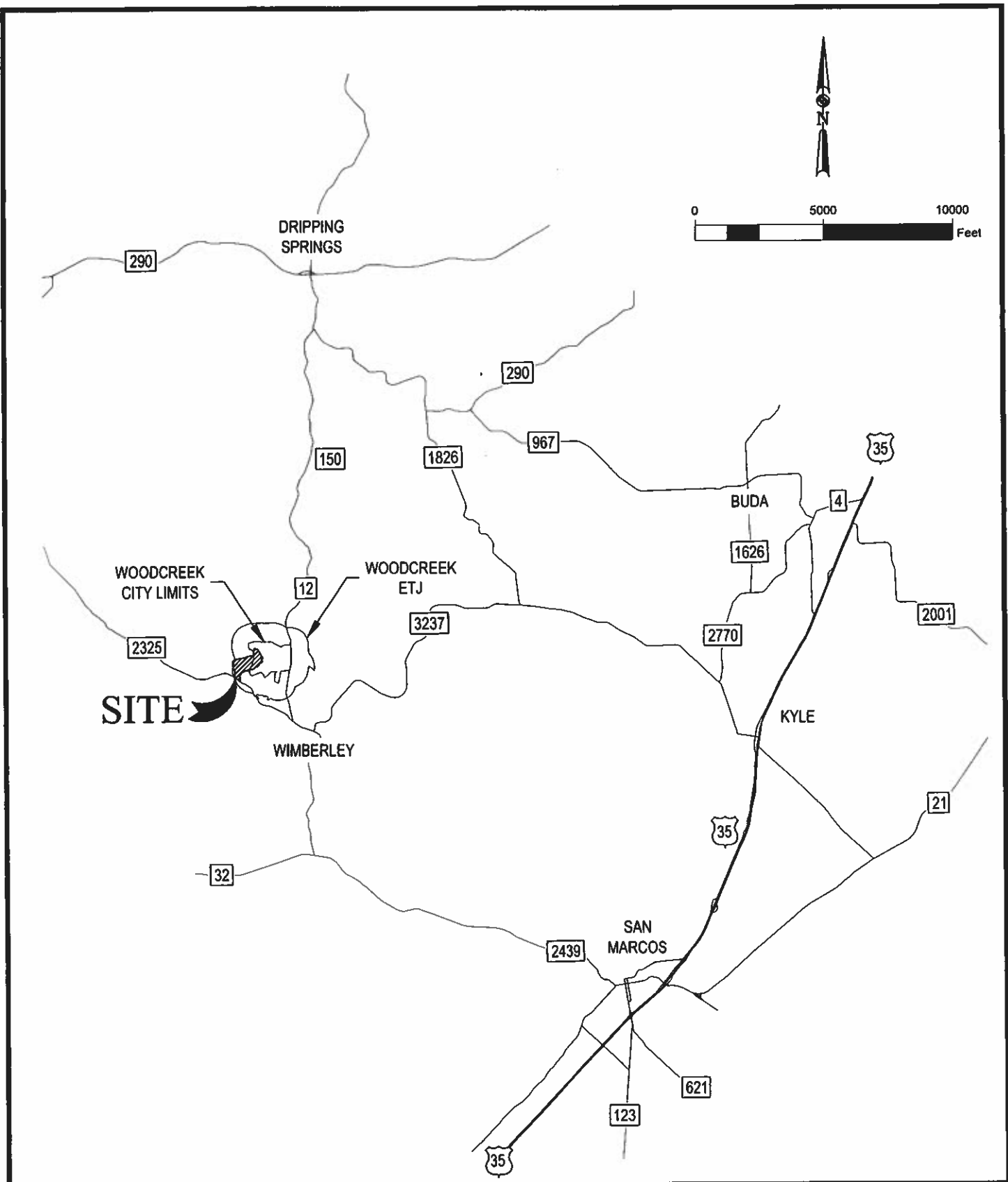
Attachment 6

BMP Training Log

Attachment 7

Day to Day Operator Qualifications

Attachment 8
Vicinity and Site Map



MATKINHOOPER

P.O. BOX 54
 5 SPENCER ROAD SUITE 100
 BOERNE, TEXAS 78006
 OFFICE 512-293-5600 FAX 512-293-0097
 TEXAS REGISTERED ENGINEERING FIRM 7-021512
 TEXAS BOARD OF PROFESSIONAL LAND SURVEYING FIRM 110228-001
 CIVIL ENGINEERS SURVEYORS LAND PLANNERS CONSTRUCTION MANAGERS CONSULTANTS

ENGINEERING & SURVEYING

VICINITY & SITE MAP
 FOR
CAMP YOUNG JUDAEA
 WOODCREEK, TEXAS

ATTACHMENT A

Camp Young Judaea

Woodcreek, Texas

Drainage Analysis

July 2017
TBPE # 4512
MHE 2620.02



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- ❖ Appendix “B” – Composite Curve Number Calculation Table
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Project Overview

The Camp Young Judaea proposed dormitory development consist of developing approximately 4-acres in 2 phases of a 245-acre property. The proposed development is located on the far east side of the Camp Young Judaea property. The majority of the camp property is located in the City of Woodcreek ETJ and the portion of the camp property the proposed development is located in is in the city of Woodcreek City limits. The site plan for both phases includes 7 dormitory buildings, 1 laundry room, 1 activity center, concrete sidewalk and a paved fire lane around the development with paved parking. (See Exhibit "A" - Concept Plan)

Drainage Analysis (SCS Method):

Existing Conditions Hydrologic Analysis

The project site is mostly undeveloped with an existing 8.34(3.4%) acres of impervious cover on the property. Watershed "A" was formed first to find the effects of the proposed development as the storm water leaves the property. Watershed "A" is included in a much larger drainage basin (WS-B) that flows in to Cypress Creek. The drainage basin is a total of 1215.8-acres (WS-A+B) that drains from north to south. From watershed "A", storm water runoff exits the property and flows over an existing road (Cypress Point Drive) into a drainage easement of Cypress Point Property Owners Association (See Appendix "F") that contains a large channel that then flows into a small lake before flowing into Cypress Creek. Calculation point 1 (CP-1) is placed at the at the most downstream point of the combined 1215.8-acre watershed to compare to the proposed runoff from the site. (See Exhibit "C" – Existing Conditions Watershed Map).

According to the NRCS Web Soil Survey the existing on and off-site soils within the established watersheds belong to hydrologic soil group B, C, and D. A composite curve number of 86.1 was calculated for existing watershed "A" and 79.1 was calculated for watershed "B" (See Appendix "B" – Composite Curve Number Calculation Table).

Proposed Conditions Hydrologic Analysis

Proposed on-site drainage patterns will mimic existing drainage patterns with the exception of diversion channels being proposed on the north side of the site. Therefore, watershed boundaries remain the same from existing to proposed conditions. The proposed development will consist of the addition of 1.70-acres and the demolition of 0.18-acres of impervious cover for a net increase of 1.52-acres of impervious cover to watershed "A". This drainage analysis has been performed using the ultimate proposed developed site, thus the net increase of 1.52 acres of impervious cover includes phase 1 and 2 of the project. The diversion channels are proposed to be developed along the north side of the proposed site and storm water will flow back into the natural flow path before exiting the property. (See Exhibit "D" – Proposed Conditions Watershed Map).

Composite curve number analysis revealed a proposed composite curve number of 86.4 for watershed "A" and watershed "B" remains at 79.1 (See Appendix "B" – Composite Curve Number Calculation Table).

Hydrologic Model Development

The method of hydrologic analysis for this study was the National Resources Conservation Service (SCS) method with a type III rainfall distribution in accordance with the Austin Drainage Criteria Manual, section 2.3.0. (See References) Pre and post-development runoff conditions were then analyzed in order to perform a comparison between pre and post-development peak flow rate.

Watershed boundaries were established using a combination of LiDAR data received from TNRIS, USGS contour data, aerial photo, and field investigations. Time of Concentration values used within this study were derived using Technical Release-55 (TR-55), Urban Hydrology for Small Watersheds. Table 2-3 of the Austin Drainage Criteria Manual was used in order to get a depth for the 24-hour storm. Manning’s “n” values were taken from Table 2-2 of the Austin Drainage Criteria Manual. Flow rates for each model have been computed for the 2-year, 10-year, 25-year, and 100-year storm events as required in Section 8.3.0 – Stormwater Management Ponds. (See Appendix D).

Downstream Impact Analysis Results

Watershed “A” combined with watershed “B” make up the entire drainage basin the proposed site is included in. Watershed “A” storm water flow increases after development while Watershed “B” stays the same because there is not any proposed development in “WS-B”. Calculation point 1 (CP-1) is located in the natural drainage crossing at the most downstream point of the combined 1215.8-acre drainage basin. Although the storm water flow from watershed “A” increased after development, the peak flow at CP-1 decreased for the 2, 10, 25, 100-year storm water frequencies.

In evaluating each of the above described models we have prepared a Downstream Impact Analysis Summary Table, listed below, which compares the 2-year, 10-year, 25-year, and 100-year storm water frequencies for the above described models.

Downstream Impact Analysis Summary				
	2 Year	10 Year	25 Year	100 Year
WS-A				
Pre-Development (CFS)	94.4	203.2	266.3	370.2
Post Development (CFS)	99.4	213.5	279.6	385.1
Change in Flow (CFS)	5.00	10.30	13.30	14.90
WS-B				
Pre-Development (CFS)	778.6	1959.8	2676.0	3876.0
Post Development (CFS)	778.6	1959.8	2676.0	3876.0
Change in Flow (CFS)	0.00	0.00	0.00	0.00
CP-1				
Pre-Development (CFS)	816.4	2039.9	2784.5	4032.5
Post Development (CFS)	812.9	2031.2	2773.0	4016.4
Change in Flow (CFS)	(3.50)	(8.70)	(11.50)	(16.10)

To evaluate the results of our downstream impact analysis, we performed a hydraulic analysis for the downstream property at the calculation point for watershed A. The evaluation point is at the discharge point where storm water leaves the Camp Young Judaea property, crosses Cypress Point Drive, and enters an existing well-defined creek within the adjacent subdivision. In this location based on the Cypress Point plat found in Appendix "F", both Cypress Point Drive and the existing creek are located within a platted drainage easement. To perform this analysis, our office looked at three cross section (1, 1.2, and 2, refer to Exhibit "H"). The critical cross section, 1.2, is located at the narrowest point within this existing downstream creek, adjacent to an existing home. In this location, we evaluated the ability for the downstream creek to convey the 14.9 cfs increase for the 100-yr storm event. Based on our findings, the increase in the 100-yr flowrate results in an increase in the 100-yr water surface elevation of 0.04 feet. At this cross section location the proposed limits do not inundate the existing residential structure. The 100-year water surface elevation in this location is calculated to be 930.24 and the finished floor elevation of the residential home adjacent to this creek is 938.77. Although the water surface elevation (WSE) of the 100-yr storm will increase, from the proposed development, it will be a negligible compared to the existing WSE and it is still 8.53 feet below the finished flow elevation (FFE) of the existing house. The channel has the ability to convey the full 100-yr storm event and the development as proposed will not adversely impact downstream properties.

Summary

This study demonstrates that the effect of the development on this site does not adversely impact downstream owners. Camp Young Judaea Dormitory development is to be developed in two phases. For the purposed of this drainage analysis the ultimate developed impervious cover has been included in the calculation of the proposed storm water runoff. Storm water flow was analyzed at the property boundary as it left the site and an increase has been calculated for all storm frequencies. However, when compared at calculation point 1 leaving the overall drainage basin the storm water flow decreases for all storm water frequencies. This is because the increase of impervious cover to the site and the addition of diversion ditches increase the rate of flow across the camp property. This causes the peak flow from watershed "A" to leave the property before the flow from the larger drainage basin (WS-B) has peaked, resulting in a lower peak flow for the combined watersheds at CP-1. As is often the case, when the downstream portion of a substantially larger watershed is developed, detention facilities can adversely impact the peak flow rates of drainage ways. If storm water is released without detention before the peak flow from the adjacent watershed occurs, the water contributed from development can pass through downstream properties and into a larger conveyance system prior to the arrival of the upstream peak flow rate. Alternatively, if detention is provided, discharge from the detention pond, which would have passed otherwise, will add to the peak flow rates of the larger contributing watershed creating larger peak flow. Therefore, no detention has been provided.

Exhibit “A” – Concept Plan

Exhibit “B” – FEMA Map

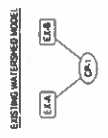
Exhibit “C” – Watershed Map
Existing Conditions

JOB NO. 2023-01
 DESIGNED BY D.M.
 DRAWN BY D.M.
 CHECKED BY D.M.

WATERSHED EXHIBIT - EXISTING CONDITIONS
 FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
 WOODCREEK, TEXAS

MATKIN HOOPER
 ENGINEERING
 & SURVEYING

ISSUED FOR CONSTRUCTION

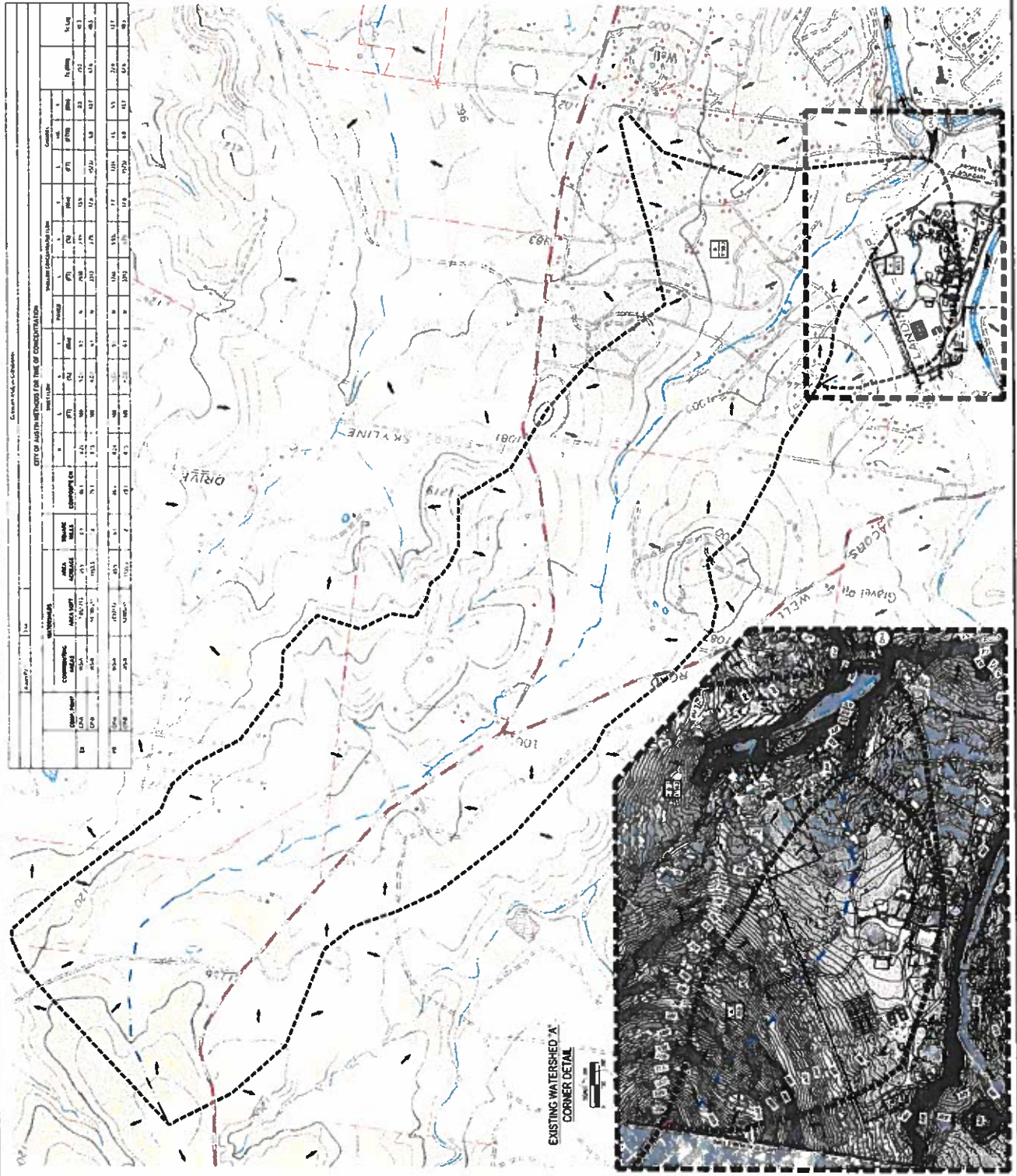


This watershed exhibit is intended to show the watershed boundary for the proposed development. The boundary is shown as a dashed line. The watershed boundary is defined by the 100-foot contour line. The boundary is shown as a dashed line. The boundary is shown as a dashed line.

PROJECT INFORMATION
 PROJECT NO. 2023-01
 SHEET NO. 1 OF 1
 DATE: 10/2023
 DRAWN BY: D.M.
 CHECKED BY: D.M.

CLIENT INFORMATION
 CLIENT: CAMP YOUNG JUDAEA
 ADDRESS: 10000 WOODCREEK ROAD
 WOODCREEK, TEXAS 75090

LEGEND
 Dashed line: Watershed Boundary
 Solid line: Property Boundary
 Dotted line: Easement Boundary
 Blue line: Stream
 Brown line: Contour Line
 Red line: Right-of-Way Line
 Yellow shaded area: Wetland Area



CITY OF WATERSHED FOR THE CITY OF CONSTITUTIONS
 COUNTY OF WATERSHED, TEXAS

Station	Distance	Bearing	Length	Area	Volume	Remarks
1	0.00	N 00° 00' 00" E	0.00	0.00	0.00	Start of Watershed
2	100.00	N 00° 00' 00" E	100.00	100.00	100.00	Contour 100
3	200.00	N 00° 00' 00" E	200.00	400.00	400.00	Contour 100
4	300.00	N 00° 00' 00" E	300.00	900.00	900.00	Contour 100
5	400.00	N 00° 00' 00" E	400.00	1600.00	1600.00	Contour 100
6	500.00	N 00° 00' 00" E	500.00	2500.00	2500.00	Contour 100
7	600.00	N 00° 00' 00" E	600.00	3600.00	3600.00	Contour 100
8	700.00	N 00° 00' 00" E	700.00	4900.00	4900.00	Contour 100
9	800.00	N 00° 00' 00" E	800.00	6400.00	6400.00	Contour 100
10	900.00	N 00° 00' 00" E	900.00	8100.00	8100.00	Contour 100
11	1000.00	N 00° 00' 00" E	1000.00	10000.00	10000.00	Contour 100
12	1100.00	N 00° 00' 00" E	1100.00	12100.00	12100.00	Contour 100
13	1200.00	N 00° 00' 00" E	1200.00	14400.00	14400.00	Contour 100
14	1300.00	N 00° 00' 00" E	1300.00	16900.00	16900.00	Contour 100
15	1400.00	N 00° 00' 00" E	1400.00	19600.00	19600.00	Contour 100
16	1500.00	N 00° 00' 00" E	1500.00	22500.00	22500.00	Contour 100
17	1600.00	N 00° 00' 00" E	1600.00	25600.00	25600.00	Contour 100
18	1700.00	N 00° 00' 00" E	1700.00	28900.00	28900.00	Contour 100
19	1800.00	N 00° 00' 00" E	1800.00	32400.00	32400.00	Contour 100
20	1900.00	N 00° 00' 00" E	1900.00	36100.00	36100.00	Contour 100
21	2000.00	N 00° 00' 00" E	2000.00	40000.00	40000.00	Contour 100
22	2100.00	N 00° 00' 00" E	2100.00	44100.00	44100.00	Contour 100
23	2200.00	N 00° 00' 00" E	2200.00	48400.00	48400.00	Contour 100
24	2300.00	N 00° 00' 00" E	2300.00	52900.00	52900.00	Contour 100
25	2400.00	N 00° 00' 00" E	2400.00	57600.00	57600.00	Contour 100
26	2500.00	N 00° 00' 00" E	2500.00	62500.00	62500.00	Contour 100
27	2600.00	N 00° 00' 00" E	2600.00	67600.00	67600.00	Contour 100
28	2700.00	N 00° 00' 00" E	2700.00	72900.00	72900.00	Contour 100
29	2800.00	N 00° 00' 00" E	2800.00	78400.00	78400.00	Contour 100
30	2900.00	N 00° 00' 00" E	2900.00	84100.00	84100.00	Contour 100
31	3000.00	N 00° 00' 00" E	3000.00	90000.00	90000.00	Contour 100
32	3100.00	N 00° 00' 00" E	3100.00	96100.00	96100.00	Contour 100
33	3200.00	N 00° 00' 00" E	3200.00	102400.00	102400.00	Contour 100
34	3300.00	N 00° 00' 00" E	3300.00	108900.00	108900.00	Contour 100
35	3400.00	N 00° 00' 00" E	3400.00	115600.00	115600.00	Contour 100
36	3500.00	N 00° 00' 00" E	3500.00	122500.00	122500.00	Contour 100
37	3600.00	N 00° 00' 00" E	3600.00	129600.00	129600.00	Contour 100
38	3700.00	N 00° 00' 00" E	3700.00	136900.00	136900.00	Contour 100
39	3800.00	N 00° 00' 00" E	3800.00	144400.00	144400.00	Contour 100
40	3900.00	N 00° 00' 00" E	3900.00	152100.00	152100.00	Contour 100
41	4000.00	N 00° 00' 00" E	4000.00	160000.00	160000.00	Contour 100
42	4100.00	N 00° 00' 00" E	4100.00	168100.00	168100.00	Contour 100
43	4200.00	N 00° 00' 00" E	4200.00	176400.00	176400.00	Contour 100
44	4300.00	N 00° 00' 00" E	4300.00	184900.00	184900.00	Contour 100
45	4400.00	N 00° 00' 00" E	4400.00	193600.00	193600.00	Contour 100
46	4500.00	N 00° 00' 00" E	4500.00	202500.00	202500.00	Contour 100
47	4600.00	N 00° 00' 00" E	4600.00	211600.00	211600.00	Contour 100
48	4700.00	N 00° 00' 00" E	4700.00	220900.00	220900.00	Contour 100
49	4800.00	N 00° 00' 00" E	4800.00	230400.00	230400.00	Contour 100
50	4900.00	N 00° 00' 00" E	4900.00	240100.00	240100.00	Contour 100
51	5000.00	N 00° 00' 00" E	5000.00	250000.00	250000.00	Contour 100
52	5100.00	N 00° 00' 00" E	5100.00	260100.00	260100.00	Contour 100
53	5200.00	N 00° 00' 00" E	5200.00	270400.00	270400.00	Contour 100
54	5300.00	N 00° 00' 00" E	5300.00	280900.00	280900.00	Contour 100
55	5400.00	N 00° 00' 00" E	5400.00	291600.00	291600.00	Contour 100
56	5500.00	N 00° 00' 00" E	5500.00	302500.00	302500.00	Contour 100
57	5600.00	N 00° 00' 00" E	5600.00	313600.00	313600.00	Contour 100
58	5700.00	N 00° 00' 00" E	5700.00	324900.00	324900.00	Contour 100
59	5800.00	N 00° 00' 00" E	5800.00	336400.00	336400.00	Contour 100
60	5900.00	N 00° 00' 00" E	5900.00	348100.00	348100.00	Contour 100
61	6000.00	N 00° 00' 00" E	6000.00	360000.00	360000.00	Contour 100
62	6100.00	N 00° 00' 00" E	6100.00	372100.00	372100.00	Contour 100
63	6200.00	N 00° 00' 00" E	6200.00	384400.00	384400.00	Contour 100
64	6300.00	N 00° 00' 00" E	6300.00	396900.00	396900.00	Contour 100
65	6400.00	N 00° 00' 00" E	6400.00	409600.00	409600.00	Contour 100
66	6500.00	N 00° 00' 00" E	6500.00	422500.00	422500.00	Contour 100
67	6600.00	N 00° 00' 00" E	6600.00	435600.00	435600.00	Contour 100
68	6700.00	N 00° 00' 00" E	6700.00	448900.00	448900.00	Contour 100
69	6800.00	N 00° 00' 00" E	6800.00	462400.00	462400.00	Contour 100
70	6900.00	N 00° 00' 00" E	6900.00	476100.00	476100.00	Contour 100
71	7000.00	N 00° 00' 00" E	7000.00	490000.00	490000.00	Contour 100
72	7100.00	N 00° 00' 00" E	7100.00	504100.00	504100.00	Contour 100
73	7200.00	N 00° 00' 00" E	7200.00	518400.00	518400.00	Contour 100
74	7300.00	N 00° 00' 00" E	7300.00	532900.00	532900.00	Contour 100
75	7400.00	N 00° 00' 00" E	7400.00	547600.00	547600.00	Contour 100
76	7500.00	N 00° 00' 00" E	7500.00	562500.00	562500.00	Contour 100
77	7600.00	N 00° 00' 00" E	7600.00	577600.00	577600.00	Contour 100
78	7700.00	N 00° 00' 00" E	7700.00	592900.00	592900.00	Contour 100
79	7800.00	N 00° 00' 00" E	7800.00	608400.00	608400.00	Contour 100
80	7900.00	N 00° 00' 00" E	7900.00	624100.00	624100.00	Contour 100
81	8000.00	N 00° 00' 00" E	8000.00	640000.00	640000.00	Contour 100
82	8100.00	N 00° 00' 00" E	8100.00	656100.00	656100.00	Contour 100
83	8200.00	N 00° 00' 00" E	8200.00	672400.00	672400.00	Contour 100
84	8300.00	N 00° 00' 00" E	8300.00	688900.00	688900.00	Contour 100
85	8400.00	N 00° 00' 00" E	8400.00	705600.00	705600.00	Contour 100
86	8500.00	N 00° 00' 00" E	8500.00	722500.00	722500.00	Contour 100
87	8600.00	N 00° 00' 00" E	8600.00	739600.00	739600.00	Contour 100
88	8700.00	N 00° 00' 00" E	8700.00	756900.00	756900.00	Contour 100
89	8800.00	N 00° 00' 00" E	8800.00	774400.00	774400.00	Contour 100
90	8900.00	N 00° 00' 00" E	8900.00	792100.00	792100.00	Contour 100
91	9000.00	N 00° 00' 00" E	9000.00	810000.00	810000.00	Contour 100
92	9100.00	N 00° 00' 00" E	9100.00	828100.00	828100.00	Contour 100
93	9200.00	N 00° 00' 00" E	9200.00	846400.00	846400.00	Contour 100
94	9300.00	N 00° 00' 00" E	9300.00	864900.00	864900.00	Contour 100
95	9400.00	N 00° 00' 00" E	9400.00	883600.00	883600.00	Contour 100
96	9500.00	N 00° 00' 00" E	9500.00	902500.00	902500.00	Contour 100
97	9600.00	N 00° 00' 00" E	9600.00	921600.00	921600.00	Contour 100
98	9700.00	N 00° 00' 00" E	9700.00	940900.00	940900.00	Contour 100
99	9800.00	N 00° 00' 00" E	9800.00	960400.00	960400.00	Contour 100
100	9900.00	N 00° 00' 00" E	9900.00	980100.00	980100.00	Contour 100
101	10000.00	N 00° 00' 00" E	10000.00	100000.00	100000.00	End of Watershed

EXISTING WATERSHED A CORNER DETAIL

Exhibit “D” – Watershed Map
Proposed Conditions

Exhibit “E” – WS-A-Impervious Cover Exhibit-
Existing Conditions

WS-A - IMPERVIOUS COVER EXHIBIT - EXISTING CONDITIONS

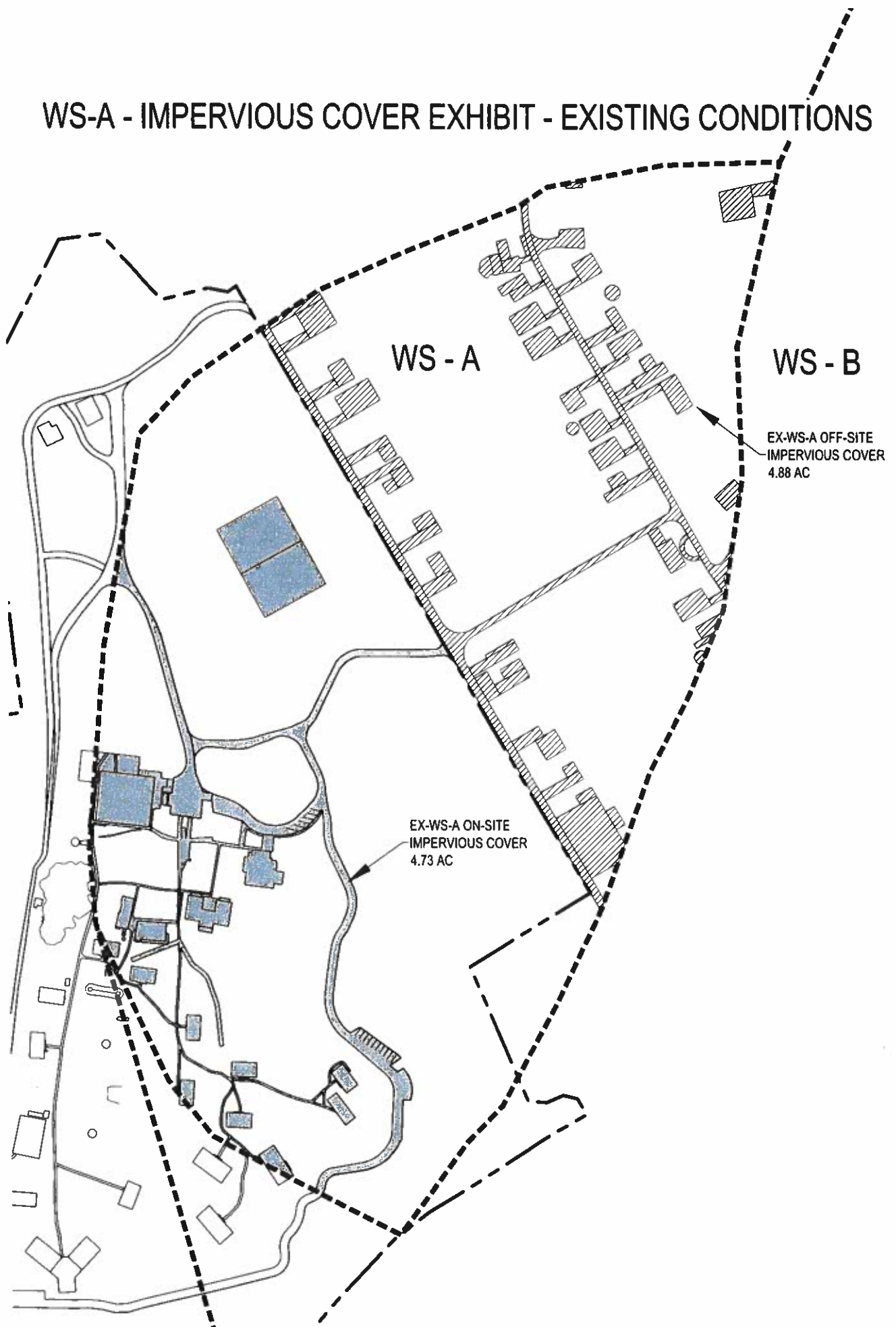
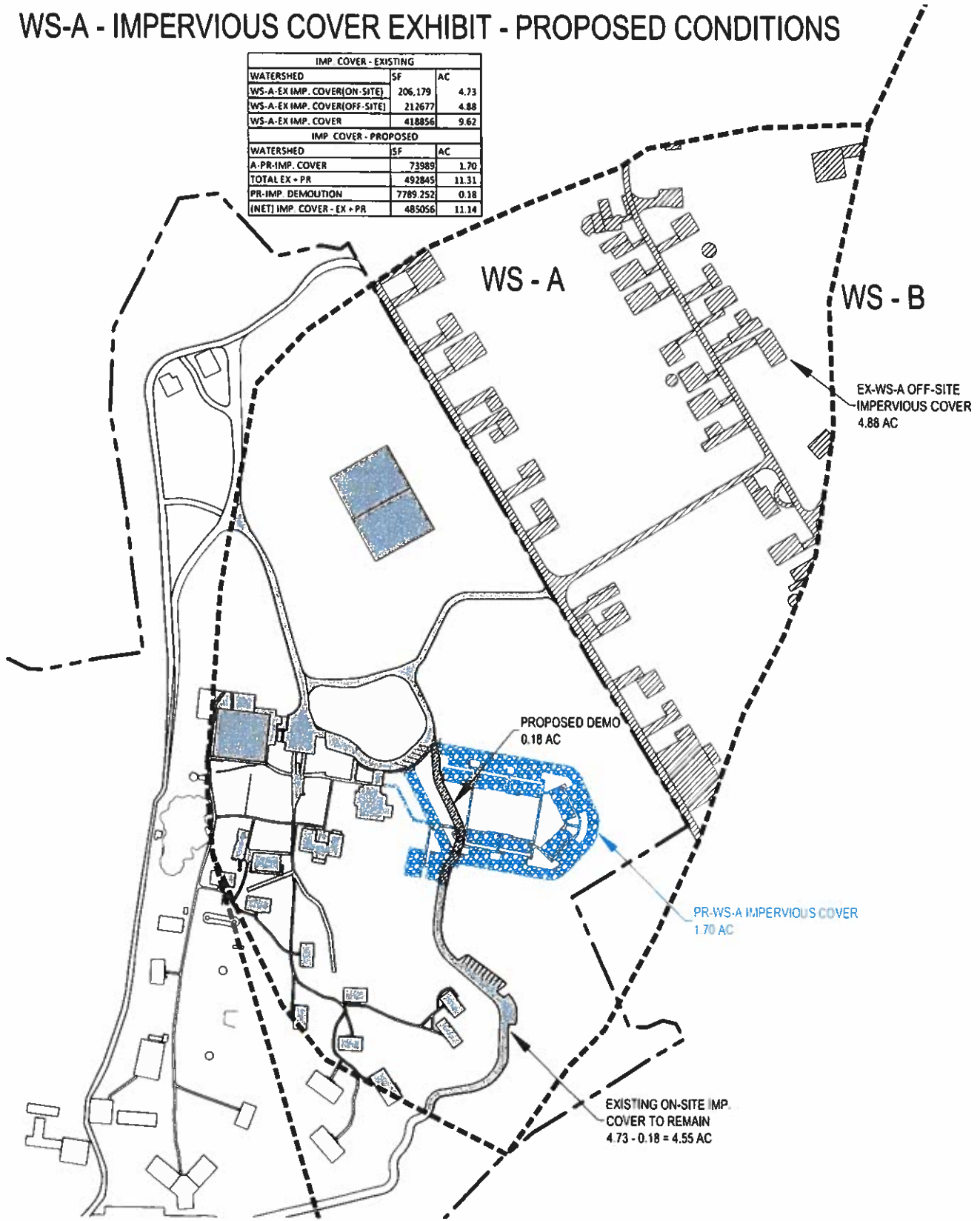


Exhibit “F” – WS-A-Impervious Cover Exhibit-
Proposed Conditions

WS-A - IMPERVIOUS COVER EXHIBIT - PROPOSED CONDITIONS

IMP COVER - EXISTING		
WATERSHED	SF	AC
WS-A-EX IMP. COVER(ON-SITE)	206,179	4.73
WS-A-EX IMP. COVER(OFF-SITE)	212,677	4.88
WS-A-EX IMP. COVER	418,856	9.62
IMP COVER - PROPOSED		
WATERSHED	SF	AC
A-PR-IMP. COVER	73,989	1.70
TOTAL EX + PR	492,845	11.31
PR-IMP. DEMOLITION	7789,252	0.18
(NET) IMP COVER - EX + PR	485,056	11.14



WS - A

WS - B

EX-WS-A OFF-SITE
IMPERVIOUS COVER
4.88 AC

PROPOSED DEMO
0.18 AC

PR-WS-A IMPERVIOUS COVER
1.70 AC

EXISTING ON-SITE IMP.
COVER TO REMAIN
 $4.73 - 0.18 = 4.55$ AC

Exhibit “G” – WS-B-Curve Number Calculation
Exhibit

2620.02 - CYJ - WS-B CURVE NUMBER CALCULATION EXHIBIT

COMMERCIAL AREA
21.4 ACRES

BRUSH (FAIR CONDITION) AREA
82.4 ACRES

WS-B

JUMPER (GOOD CONDITION) AREA
16.8 ACRES

WS-A

7 ACRES LOTS RESIDENTIAL AREA
34.8 ACRES

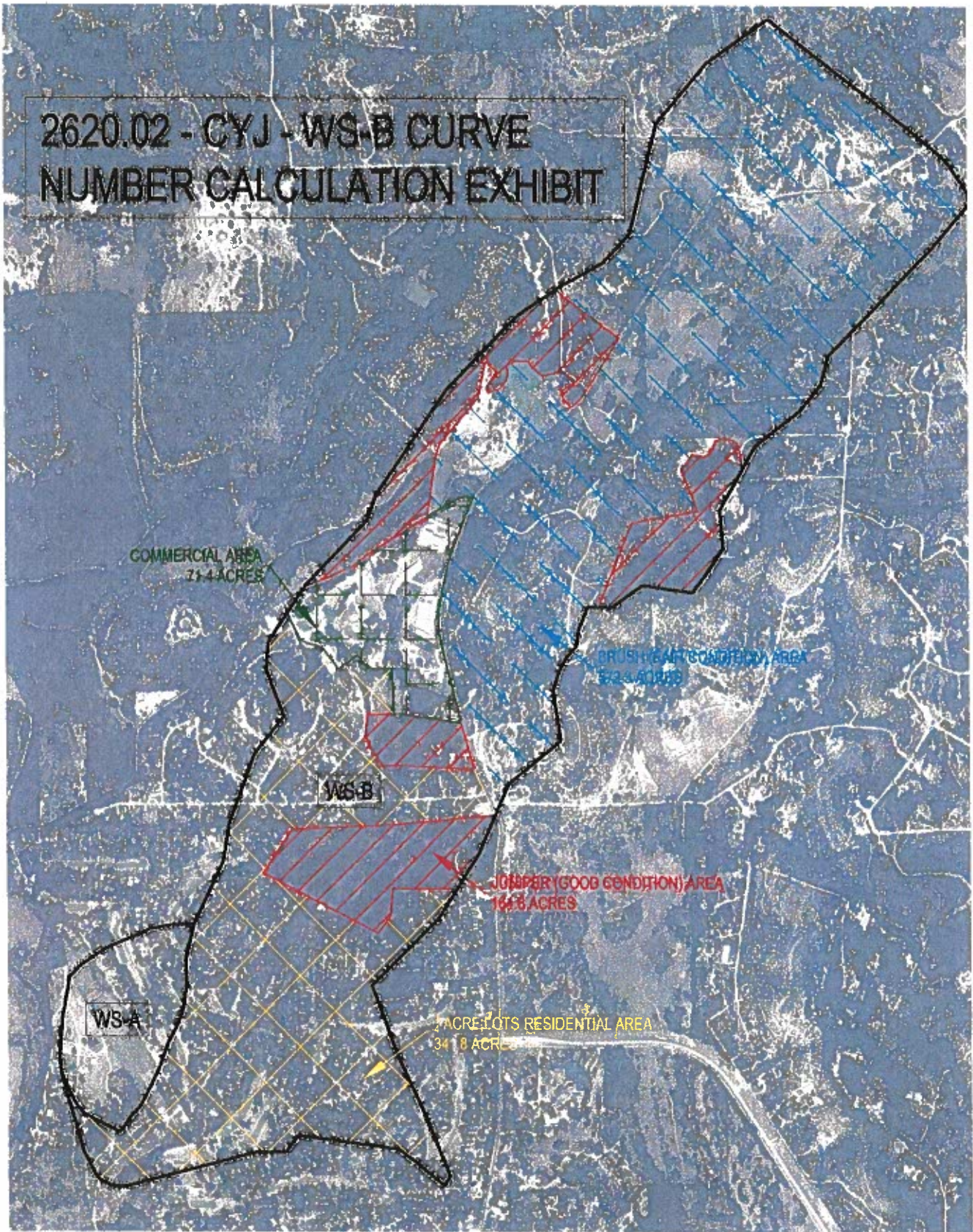


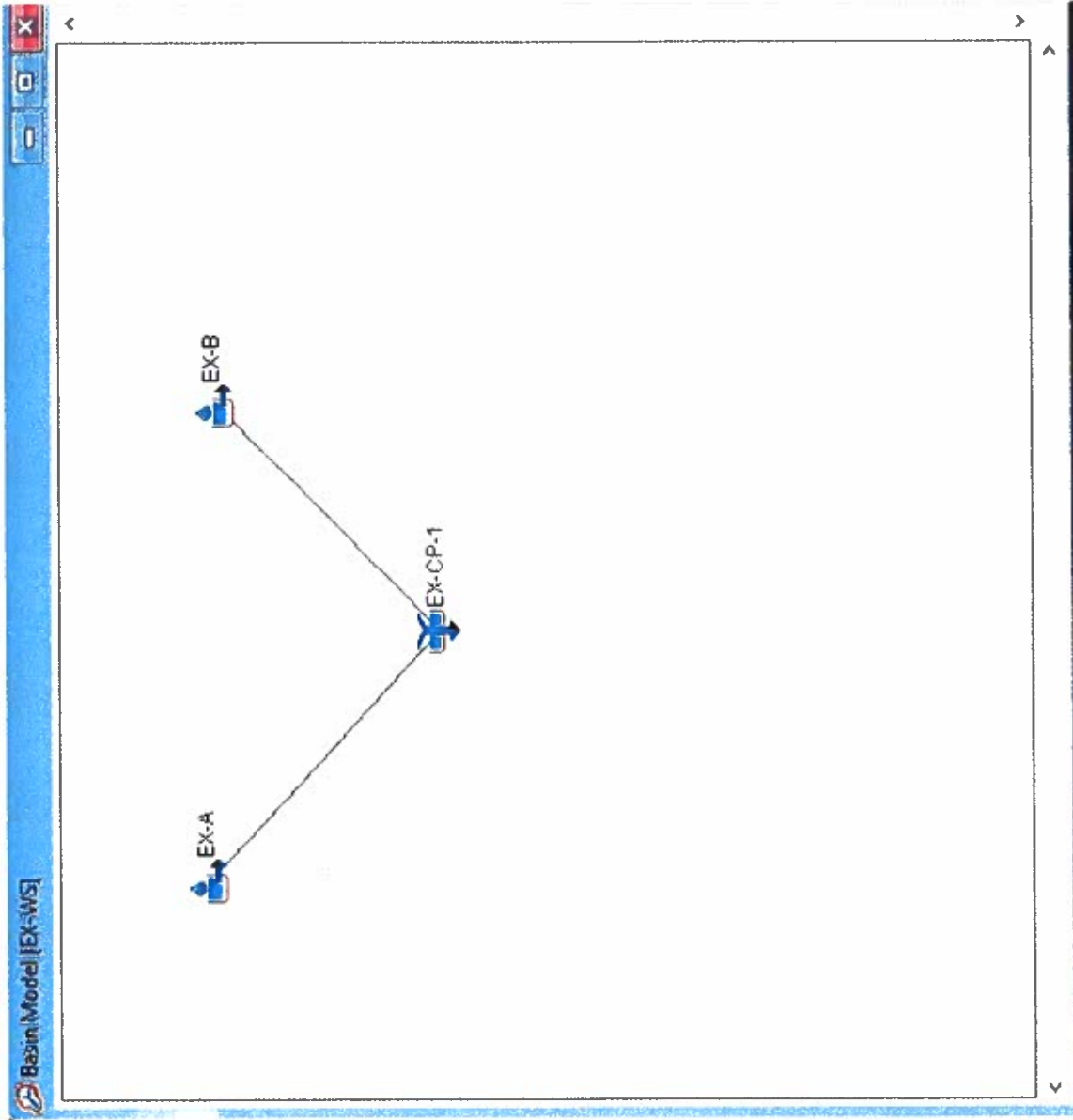
Exhibit “H” – Cross Section Layout Exhibit

**Appendix “A” – HEC-HMS Report With Time of
Concentration Calculations**

Austin PZ = 3.44
Detention Analysis Calculations

CITY OF AUSTIN METHODS FOR TIME OF CONCENTRATION

COMP. POINT	CONTRIBUTING AREAS		WATERSHEDS		SQUARE MILES	COMPOSITE CN	n	SHEET FLOW			SHALLOW CONCENTRATED FLOW			CHANNEL			Tc Lag	
	WS-A	WS-B	AREA SQFT	AREA ACRES				L (FT)	s (%)	t (Min)	L (FT)	s (%)	t (Min)	L (FT)	vel. (F/TS)	t (Min)		Tc (MIN)
EX	CP-A	WS-A	2,863,713	65.5	0.1	86.1	0.24	100	5.0%	9.5	N	2838	3.4%	15.9	0.0	25.5	15.3	
	CP-B	WS-B	50,105,295	1150.3	1.8	79.1	0.15	100	6.0%	6.1	N	3313	3.7%	17.8	6.0	43.7	40.5	
PR	CP-A	WS-A	2853713	65.5	0.1	86.4	0.24	100	5.0%	9.5	N	1744	5.5%	7.7	1331	4.0	22.8	13.7
	CP-B	WS-B	50105295	1150.3	1.8	79.1	0.15	100	6.0%	6.1	N	3313	3.7%	17.8	15732	6.0	67.6	40.5



Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-2

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 28Jul2017, 10:00:28 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	94.4	02May2017, 00:18	2.05
EX-B	1.8	778.6	02May2017, 00:48	1.51
EX-CP-1	1.9	816.4	02May2017, 00:45	1.53

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-10

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 28Jul2017, 10:00:27 Control Specifications: SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	203.2	02May2017, 00:18	4.50
EX-B	1.8	1959.8	02May2017, 00:45	3.74
EX-CP-1	1.9	2039.9	02May2017, 00:42	3.78

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-25

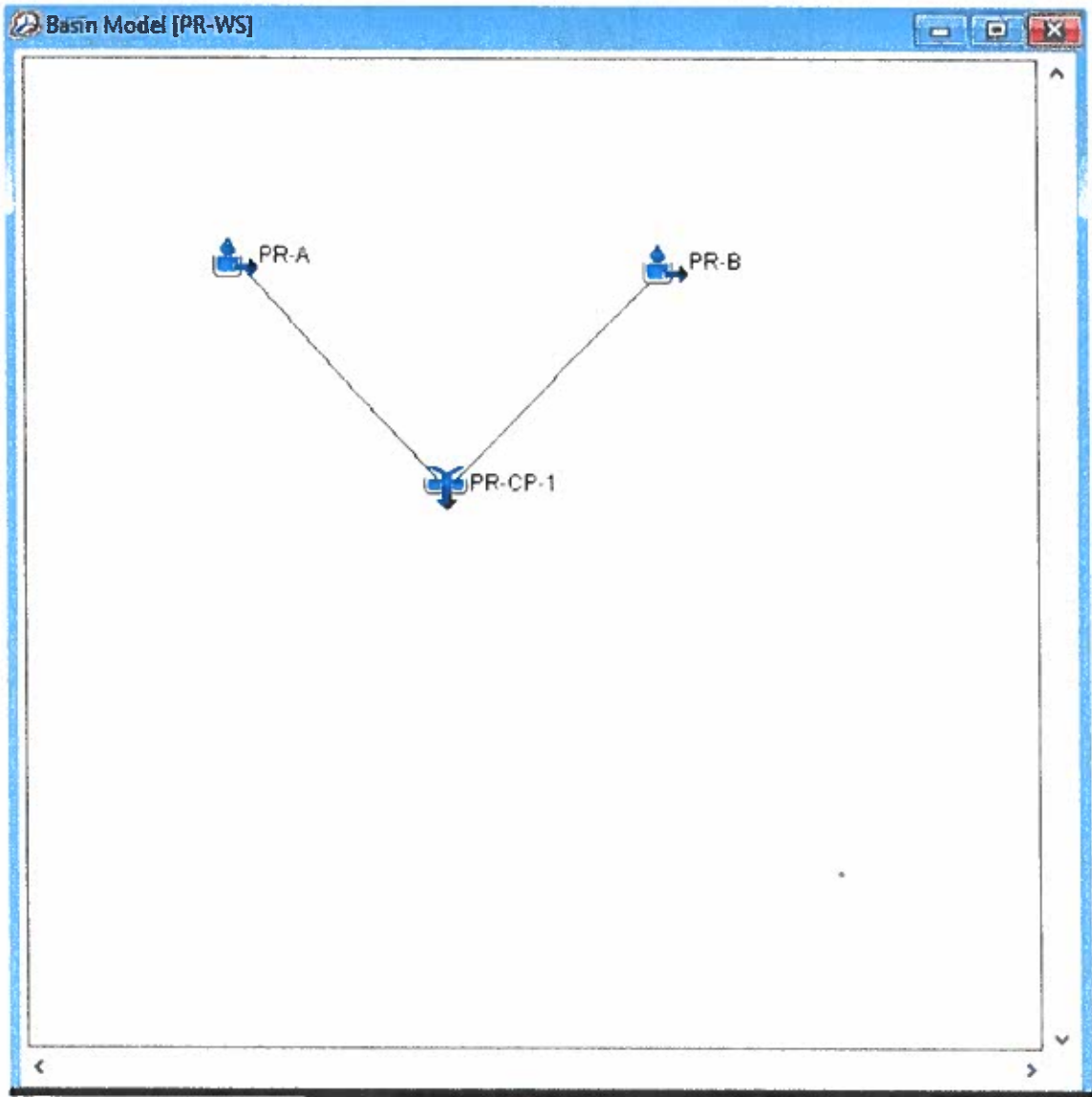
Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR
Compute Time: 28Jul2017, 10:00:29 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	266.3	02May2017, 00:18	5.98
EX-B	1.8	2676.0	02May2017, 00:45	5.13
EX-CP-1	1.9	2784.5	02May2017, 00:42	5.18

Project: 2620.02 - CYJ - D.I.A Simulation Run: EX-100

Start of Run: 01May2017, 12:00 Basin Model: EX-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 100-YR
Compute Time: 28Jul2017, 10:00:28 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
EX-A	0.1	370.2	02May2017, 00:18	8.46
EX-B	1.8	3876.0	02May2017, 00:45	7.52
EX-CP-1	1.9	4032.5	02May2017, 00:42	7.57



Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-2

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 2-YR
Compute Time: 28Jul2017, 10:00:30 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	99.4	02May2017, 00:15	2.07
PR-B	1.8	778.6	02May2017, 00:48	1.51
PR-CP-1	1.9	812.9	02May2017, 00:45	1.54

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-10

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 10-YR
Compute Time: 28Jul2017, 10:00:29 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	213.5	02May2017, 00:15	4.53
PR-B	1.8	1959.8	02May2017, 00:45	3.74
PR-CP-1	1.9	2031.2	02May2017, 00:42	3.78

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-25

Start of Run: 01May2017, 12:00 Basin Model: PR-WS
End of Run: 02May2017, 12:03 Meteorologic Model: 25-YR
Compute Time: 28Jul2017, 10:00:30 Control Specifications:SCS

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	279.6	02May2017, 00:15	6.01
PR-B	1.8	2676.0	02May2017, 00:45	5.13
PR-CP-1	1.9	2773.0	02May2017, 00:42	5.18

Project: 2620.02 - CYJ - D.I.A Simulation Run: PR-100

Start of Run: 01May2017, 12:00
End of Run: 02May2017, 12:03
Compute Time: 28Jul2017, 10:00:29

Basin Model: PR-WS
Meteorologic Model: 100-YR
Control Specifications:SCS

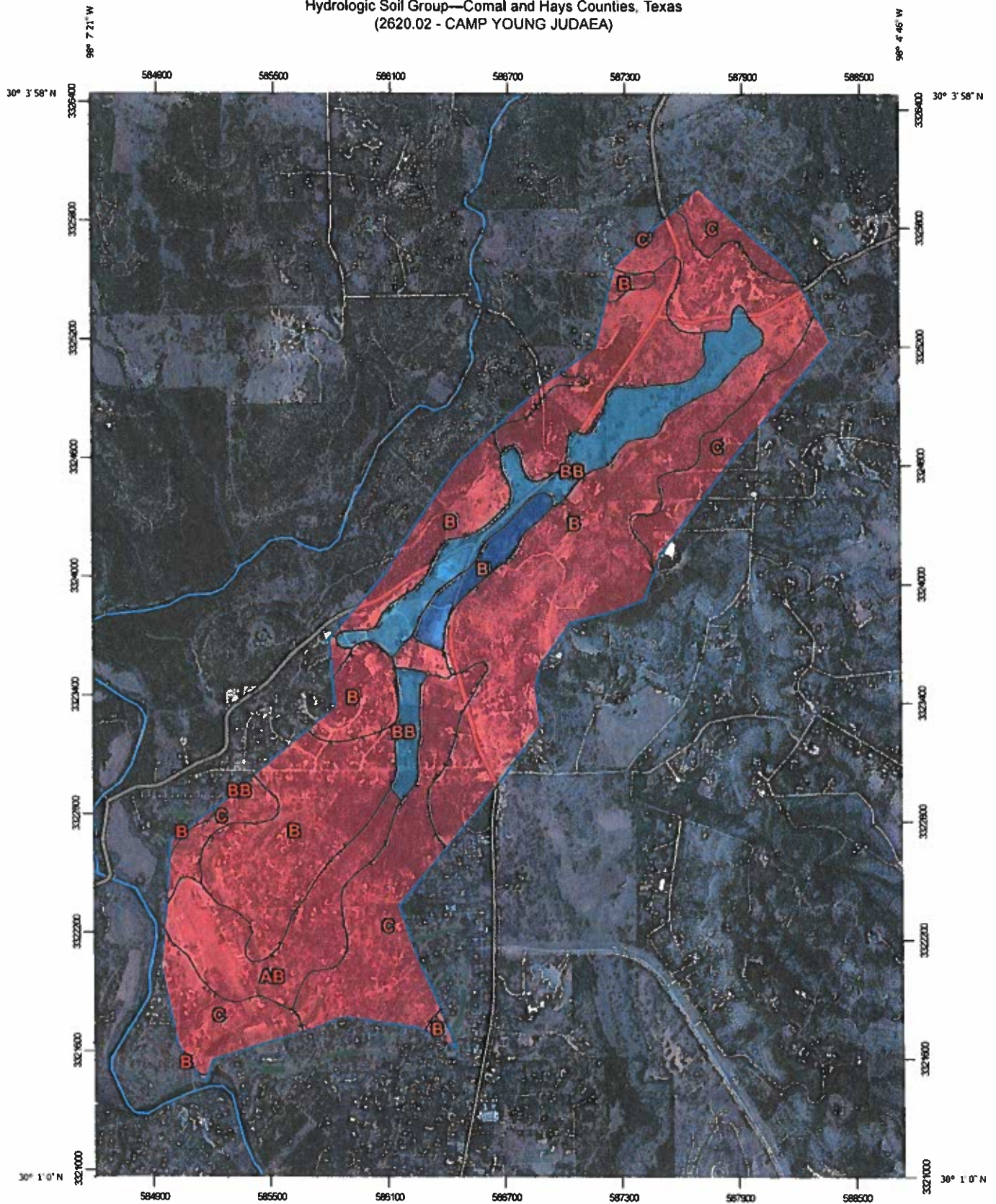
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
PR-A	0.1	388.5	02May2017, 00:15	8.51
PR-B	1.8	3876.0	02May2017, 00:45	7.52
PR-CP-1	1.9	4016.4	02May2017, 00:42	7.57

**Appendix “B” – Composite Curve Number
Calculation**

COMPOSITE CN CALCULATION TABLE				
Site Info				
	sqft	Acre	%	
Property Area =	10,672,200	245.00		
WS-A	2,853,713	65.51	100%	
WS-A Existing Impervious	418,739	9.61	15%	
WS-A Existing Pervious	2,434,974	55.90	85%	
WS-A Existing + Proposed Impervious =	484,939	11.13	17%	
WS-A Existing + Proposed Pervious =	2,368,774	54.38	83%	
WATERSHED INFO				
EXISTING WATERSHEDS = PROPOSED WATERSHEDS				
	sqft	Acre	%	
WS-A	2,853,713	65.5	100%	
WS-B (EXCLUDING WS-A)	50,105,295	1150.3	100%	
CURVE NUMBERS				
WATERSHED - A - EX & PR				
SOIL RATING		B	C	D
%				100.0%
PERVIOUS	PASTURE, GRASSLAND (FAIR)			84
IMPERVIOUS	PAVED PARKING, ROOFS, DRIVEWAYS			98
WATERSHED - B - EX & PR (REF. TO TR-55 MANUAL TABLE 2-2)				
NO IMP. COVER IS PROPOSED IN WS-B, THEREFORE THE CALCULATED CN IS THE SAME EXISTING AND PROPOSED				
SOIL RATING		B	C	D
%		2.5%	10.7%	86.8%
(EX & PR)	COMMERCIAL	92	94	95
COMPOSITE (EX & PR)	COMMERCIAL		94.8	
(EX & PR)	1/4 ACRE LOT RESIDENTIAL	75	83	87
COMPOSITE (EX & PR)	1/4 ACRE LOT RESIDENTIAL		86.3	
(EX & PR)	BRUSH (FAIR CONDITION)	56	70	77
COMPOSITE (EX & PR)	BRUSH (FAIR CONDITION)		75.7	
(EX & PR)	JUNIPER (GOOD CONDITION)	41	61	71
COMPOSITE (EX & PR)	JUNIPER (GOOD CONDITION)		69.2	
CALCULATED COMPOSITE CURVE NUMBERS				
EXISTING				
COMPOSITE EX-A				
SOIL RATING:				D
				100.0%
	PERVIOUS COVER =	85%	CN=	84
	IMPERVIOUS COVER=	15%	CN=	98
			CN=	86.1
PROPOSED				
COMPOSITE PR-A				
SOIL RATING:				D
				100.0%
	PERVIOUS COVER =	83%	CN=	84
	IMPERVIOUS COVER=	17%	CN=	98
			CN=	86.4
WATERSHED - B DEFINED AREAS (REFER TO CURVE NUMBER CALC EXHIBIT)				
	sqft	Acre	%	CN
COMMERCIAL	3,109,765	71.4	6%	5.9
1/4 ACRE LOT RESIDENTIAL	14,888,749	341.8	30%	25.6
BRUSH (FAIR CONDITION)	24,927,331	572.3	50%	37.7
JUNIPER (GOOD CONDITION)	7,179,451	164.8	14%	9.9
WS - B EX & PR CALCULATED COMPOSITE CN =	50,105,295	1150.3	100%	79.1

**Appendix “C” – NRCS Soil Survey, Hydrologic
Soil Groups With Soil Rating Per Watershed
Calculation Table**

Hydrologic Soil Group—Comal and Hays Counties, Texas
(2620.02 - CAMP YOUNG JUDAEA)



Map Scale: 1:26,800 if printed on A portrait (8.5" x 11") sheet.











































0 350 700 1400 2100 Meters

0 1000 2000 4000 6000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



MAP LEGEND

 Area of Interest (AOI)	 Area of Interest (AOI)	 C
 Soils	 C/D	 C/D
 Soil Rating Polygons	 D	 Not rated or not available
 A	 Water Features	 Streams and Canals
 A/D	 Transportation	 Rails
 B	 Interstate Highways	 US Routes
 B/D	 Major Roads	 Local Roads
 C	 Not rated or not available	 Background
 C/D	 Aerial Photography	
 D		
 Not rated or not available		
 Soil Rating Lines		
 A		
 A/D		
 B		
 B/D		
 C		
 C/D		
 D		
 Not rated or not available		
 Soil Rating Points		
 A		
 A/D		
 B		
 B/D		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas
Survey Area Data: Version 12, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 6, 2011—Apr 18, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Comal and Hays Counties, Texas (TX604)				
Map unit symbol	Map unit name	Rating	Acres In AOI	Percent of AOI
AnB	Anhalt clay, 1 to 3 percent slopes	D	103.4	8.1%
BrB	Bolar clay loam, 1 to 3 percent slopes	C	123.7	9.7%
BiD	Brackett-Rock outcrop-Comfort complex, 1 to 8 percent slopes	D	225.6	17.7%
BiG	Brackett-Rock outcrop-Real complex, 8 to 30 percent slopes	D	383.2	30.1%
CrD	Comfort-Rock outcrop complex, 1 to 8 percent slopes	D	222.3	17.4%
LeB	Lewisville silty clay, 1 to 3 percent slopes	B	0.1	0.0%
Or	Orif soils, moist, 0 to 3 percent slopes, frequently flooded	A	0.3	0.0%
Pt	Pits	D	9.4	0.7%
PuC	Purves clay, 1 to 5 percent slopes	D	78.2	6.1%
RcD	Real-Comfort-Doss complex, 1 to 8 percent slopes	D	99.3	7.8%
SuB	Sunev clay loam, 1 to 3 percent slopes	B	28.7	2.3%
Totals for Area of Interest			1,274.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

SOIL RATING PER WATERSHED CALCULATION TABLE		
WS - A+B (REFER TO HYDROLOGIC SOIL GROUP SUMMARY)		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	100.7	8.3%
D	195.0	16.0%
D	384.4	31.6%
D	234.1	19.3%
D	9.4	0.8%
D	42.1	3.5%
D	98.3	8.1%
TOTAL	1215.8	100.0%
TOTALS		
RATING	ACRES	%
B	28.7	2.4%
C	123.1	10.1%
D	1064.0	87.5%
WS-A IS ALL TYPE "D" SOIL		
D	65.5	100%
WS-B CALCULATED SOIL SOIL TYPE W/O WS-A		
RATING	ACRES	%
B	28.7	2.5%
C	123.1	10.7%
D	998.5	86.8%
TOTAL	1150.3	100.0%

Appendix “D” – References

City of Wood Creek Technical Construcitons
Standards and Specifications Manual

SECTION 4. DRAINAGE FACILITIES

4.1. General

The design and construction of drainage facilities and systems within the incorporated limits and the ETJ of the City of Woodcreek shall comply with the following Hays County Standards, which are incorporated herein by reference and which are modified herein. The City encourages the use of the "City of Austin Drainage Criteria Manual" and "Standard Specifications" when applicable:

Hays County Subdivision and Development Regulations, latest edition.
Hays County Specifications for Paving and Drainage Improvements, latest edition.
City of Austin, Texas Drainage Criteria Manual, latest edition;
City of Austin, Texas Standard Specifications, latest edition.

4.2. Definition of Drainage Facilities and Systems

Drainage systems and facilities shall include street drainage, site drainage, bridges and culverts and stormwater detention.

4.3. Exceptions to the Referenced Standards

4.3.1. General

The following exceptions shall apply to the referenced standards. All references to Hays County or the City of Austin shall be construed to mean the City of Woodcreek. All provisions and standards of the City of Woodcreek Ordinances shall be applicable and shall govern if there is a conflict with the standards referenced in Section 4.1.

4.3.2. City of Austin, Texas Drainage Criteria Manual

(a) Section 1.2.4 "Drainage Systems"

(1) Subsection E.1. Fencing shall comply with the City of Woodcreek Ordinances.

(2) Subsection E.2. Landscaping shall comply with the City of Woodcreek Ordinances.

(3) Subsection E.15. This subsection does not apply.

(b) Section 1.4.0 "Code Designation of Austin Area Watersheds". This section does not apply.

(c) Section 6.4.2 "Concrete Lined Channels". Concrete lined channels shall not be allowed without the authorization of the City as a variance.

(d) Section 8.2.0 "Regional Stormwater Management Program". This section does not apply.

(e) Section 8.3.4 "Safety Criteria for SWM Ponds".

(1) In addition to the criteria given in this section, SWM ponds shall also comply with all applicable dam safety standards of the Texas Commission on Environmental Quality.

8.6. Drainage Plan (In addition to the Base information, sufficient information to reflect the existing conditions just prior to the proposed development are to be shown, but not limited to the following)

- (a) Legible licensed engineer's seal, signature, and date;
- (b) Drainage area map including contributing drainage areas to storm sewer and/or inlet tie-ons;
- (c) Drainage area maps for the offsite contributing areas passing through site existing impervious cover, including buildings and surrounding information: structures, drainage release points, etc.;
- (d) Direction, location, and quantity of peak 2-, 25-, and 100-year flood flows from off-site in existing conditions.
- (e) Indicate 2-, 25- and 100-year flows from off-site in existing condition;
- (f) Delineation of the fully developed 2-, 25- and 100- year floodplains, or, if applicable, a note stating that no 100-year floodplain exists on the site existing storm sewer systems on site or adjacent streets;
- (g) Delineation of the centerline of waterways, and the average water surface elevation of lakes, ponds, and springs contours at two-foot intervals;
- (h) Sufficient information to reflect the fully developed conditions of the proposal is to be shown, but not limited to, the following:
 - (1) Developed drainage areas and proposed grading with two-foot contours;
 - (2) Curbs, retaining walls, and other structures indicate elevations at critical points on driveways, curbs, etc.;
 - (3) Overflow points and control elevations;
 - (4) Construction details for control devices, curbs, walls, channel, swales, etc.;
 - (5) Direction of flow from building roofs and outlet locations; and
 - (6) Direction of flow from gutters; pass through flow rates, if any;
 - (7) Shade in limits of ponding at overflow elevation and give cubic feet of storage at the maximum storage elevation overflow points and control elevations for overflow structures;
 - (8) Action and direction of unrestricted flow from site, if any, with calculations;
 - (9) Storm drainage profiles and plans (swales, channels, pipes, culverts, ...) including % grade, HGL 25, HGL 100, Q 25, Q100, V 25, V 100, depth of flow 25 and 100, and Manning's Roughness coefficients ("n" values);
 - (10) Hydrographs or hydrologic tabulation for proposed 25-year peak-flow rate and two-year peak flow rate;
 - (11) Hydrologic summary of existing and proposed conditions in tabular form:
 - (i) Area of each drainage area;
 - (ii) Time of concentration;
 - (iii) Distance of flow where the time of concentration is measured;
 - (iv) Slope of site where the time of concentration is measured;
 - (v) C 25 and C 100 values;
 - (vi) Required storage volumes for up to 100-year storm.

(12) Calculations and formulas for discharge or control structures (for 2-, 5-, 10-, 25-, 50-, and 100-year storms), pipes, inlets, etc. Discharge pipes should not be less than six inches. In the event that less than six inches must be used, every effort should be made to mitigate the "clogging" potential. Direction of flow must be at an angle less than 45 degrees with the curb line. Discharge across a sidewalk area will not be allowed. A channel section can be used under the sidewalk area, provided it is covered and the outlet device utilizes sheet flow methods.

(13) Location and limits of filtration/sedimentation pond, details and design information and calculations.

8.7. Construction Details (The following items or notes should be shown)

- (a) Include in the construction detail sheets any required structural walls, inlets, sedimentation/filtration and detention inlet and outlet controls, etc.;
- (b) Show adequate dimensions, layout details, and general notes adjacent to all details;
- (c) Include traffic control plan when working in street;
- (d) If driveways are proposed, a City standard driveway detail shall be shown to be constructed.

8.8. Environmental Site Plan and Report Submittal Information

(This document establishes submittal requirements for all environmental ordinances)

- (a) A professional engineer's seal, signature, and statement certifying that the plan is complete, correct, and in compliance with the City of Woodcreek Ordinances is required for all projects.
- (b) An introduction which states project acreage, watershed, a description of proposed development, a description of project phasing, if phasing is proposed;
- (c) An explanation of and documentation for any special exception or waiver claimed;
- (d) Drainage area map showing the location of all waterways within the tract or which impact the tract, the location of the 100-year floodplain, the area and acreage of upstream drainage, and the location of the critical water quality zone;
- (e) Discussion of the following issues, if applicable to the project:
 - (1) Proposed and existing drainage patterns;
 - (2) Proposed method of treating both quantity and quality of stormwater runoff;
 - (3) Proposed extent of floodplain modification, if applicable;
- (f) Critical Environmental Features within the project and known features within 150 feet of the project;
- (g) Discuss all proposed variances and provide letter of variance request addressing proposed Findings of Fact;
- (h) Requests for consideration of alternatives to the water quality requirements of the City of Woodcreek Ordinances. These shall include any written request for consideration of an alternative or innovative water quality control which differs

Austin Drainage Criteria Manual

linear additive analysis but rather a network of hydrographs which considers incremental timing of discharge and potential coincidence of outlet peaks.

2.3.0 - METHOD OF ANALYSIS

Numerous methods of rainfall-runoff computation are available on which the design of storm drainage and flood control systems may be based. The Rational Method is accepted as adequate for drainage areas totaling 100 acres or less. The National Resources Conservation Service (formerly the Soil Conservation Service) hydrologic methods (available in the NRCS TR-20, and the US Army Corps of Engineers' Hydrologic Engineering Center's HEC-HMS program) should be used for drainage areas larger than 100 acres but may also be used for drainage areas of any size. The method of analysis must remain consistent when drainage areas are combined and the method which applies to the largest combined drainage area should be used unless the situation requires the use of NRCS hydrologic methods (i.e., a detention facility connected to a downstream storm drainage system). The engineer can use other methods but must have their acceptability approved by the Director of the Watershed Protection Department.

2.4.0 - RATIONAL METHOD

The Rational Method is based on the direct relationship between rainfall and runoff, and is expressed by the following equation:

$$Q_p = CIA \text{ (Eq. 2-1)}$$

Where:

Q_p is defined as the peak runoff in cubic feet per second. Actually, Q_p is in units of acre-inches per hour. Since this rate of acre-in/hr differs from cubic feet per second by less than one (1) percent (1 acre-in/hr = 1.008 cfs), the more common units of cfs are used.

C is the composite coefficient of runoff representing the ratio of peak runoff rate " Q_p " to average rainfall intensity rate " i " for the soil types and land uses characteristic of the contributing drainage area.

I is the average intensity of rainfall in inches per hour for a period of time equal to the time of concentration (t_c) for the drainage area to the design point under consideration.

A is the area in acres contributing runoff to the point of design.

The following basic assumptions are associated with the Rational Method:

- A. The storm duration is equal to the time of concentration.
- B. The computed peak rate of runoff at the design point is a function of the average rainfall rate over a duration equal to the time of concentration at that point.
- C. The return period or frequency of the computed peak flow is the same as that for the design storm.
- D. The necessary basin characteristics can be identified and the runoff coefficient does not vary during a storm.
- E. Rainfall intensity is constant during the storm duration and spatially uniform for the area under analysis.
- F. The maximum rate of discharge at the point of design will occur when the entire area above the point of design is contributing runoff.

2.4.1 - Runoff Coefficient (C)

The proportion of the total rainfall that will reach the drainage system depends on the surface vegetation condition, soil type, imperviousness of the surface, land slope and ponding characteristics of the area. Impervious surfaces, such as asphalt pavements and roofs of buildings, will be subject to approximately 100 percent runoff (regardless of the slope). On-site inspections and aerial photographs may prove valuable in estimating the nature of the surfaces within the drainage area.

It should be noted that the runoff coefficient "C" is the Rational Method variable which is least amenable to precise determination. A reasonable coefficient must be chosen to represent the integrated effects of infiltration, surface ponding, evaporation, flow routing and interception, all of which affect the time distribution and peak rate of runoff.

It is often desirable to develop a composite runoff coefficient based upon the percentages of different types of surfaces in the drainage area. This procedure is often applied to typical "sample blocks" as a guide to selection of reasonable values of the coefficient for an entire area. Suggested coefficients with respect to specific surface types are given in Table 2-1. "C" values for developed conditions should be based on maximum allowable impervious cover as listed in the City's zoning and watershed ordinances.

2.4.2 - Time of Concentration

The time of concentration is the time for surface runoff to flow from the most remote point in the watershed to the point of interest. This applies to the most remote point in time, not necessarily the most remote point in distance. Runoff from a drainage area usually reaches a peak at the time when the entire area is contributing. However, runoff may reach a peak prior to the time the entire drainage area is contributing if the area is irregularly shaped or if land use characteristics differ significantly within the area. Sound engineering judgment should be used to determine a flow path representative of the drainage area and in the subsequent calculation of the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which may include storm drains. The minimum time of concentration for any drainage area shall be 5 minutes. Additionally, the minimum slope used for calculation of sheet and shallow flow travel time components should be 0.005 feet per foot (0.5%). The preferred procedure for estimating time of concentration is the NRCS method as described in NRCS's Technical Release 55 (TR-55). This method is outlined below. The overall time of concentration is calculated as the sum of the sheet, shallow concentrated and channel flow travel times. Note that there may be multiple shallow concentrated and channel segments depending on the nature of the flow path.

$$T_c = T_{t(\text{sheet})} + T_{t(\text{shallow concentrated})} + T_{t(\text{channel})} \quad (\text{Eq. 2-2})$$

- A. **Sheet Flow.** Sheet flow is shallow flow over land surfaces, which usually occurs in the headwaters of streams. The engineer should realize that sheet flow occurs for only very short distances, especially in urbanized conditions. Sheet flow for both natural (undeveloped) and developed conditions should be limited to a maximum of 100 feet. Sheet flow for developed conditions should be based on the actual pavement or grass conditions for areas that are already developed and should be representative of the anticipated land use within the headwater area in the case of currently undeveloped areas. In a typical residential subdivision, sheet flow may be the distance from one end of the lot to the other or from the house to the edge of the lot. In some heavily urbanized drainage areas, sheet flow may not exist in the headwater area. The NRCS method employs equation 2-3, which is a modified form kinematic wave equation, for the calculation of the sheet flow travel time.

$$T_t = 0.42(nL)^{0.8} / ((P_2)^{0.5} s^{0.4}) \quad (\text{Eq. 2-3})$$

Where,

T_t = Sheet flow travel time in minutes

L = Length of the reach in ft.

n = Manning's n (see Table 2-2)

P_2 = 2-year, 24-hour rainfall in inches (see Table 2-3)

s = Slope of the ground in ft/ft

- B. **Shallow Concentrated Flow**, After a maximum of approximately 100 feet, sheet flow usually becomes shallow concentrated flow collecting in swales, small rills, and gullies. Shallow concentrated flow is assumed not to have a well-defined channel and has flow depths of 0.1 to 0.5 feet. The travel time for shallow concentrated flows can be computed by equations 2-4 and 2-5. These two equations are based on the solution of Manning's equation with different assumptions for n (Manning's roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

$$\text{Unpaved } T_t = L / (60(16.1345)(s)^{0.5}) \text{ (Eq. 2-4)}$$

$$\text{Paved } T_t = L / (60(20.3282)(s)^{0.5}) \text{ (Eq. 2-5)}$$

Where,

T_t = Travel time for shallow concentrated flows in minutes

L = Length of the reach in ft.

s = Slope of the ground in ft/ft

- C. **Channel or Storm Drain Flow**, The velocity in an open channel or a storm drain not flowing full can be determined by using Manning's Equation. Channel velocities can also be determined by using backwater profiles. For open channel flow, average flow velocity is usually determined by assuming a bank-full condition. Note that the channel flow component of the time of concentration may need to be divided into multiple segments in order to represent significant changes in channel characteristics. The details of using Manning's equation and selecting Manning's "n" values for channels can be obtained from Section 6.

For storm drain flow under pressure conditions (hydraulic grade line is higher than the lowest crown of a storm drain) the following equation should be applied:

$$V = Q/A \text{ (Eq. 2-6)}$$

Where:

V = Average velocity, ft/s

Q = Design discharge, cfs

A = Cross-sectional area, ft²

Flow travel time through a channel can be calculated by equation (2-7):

$$T_t = \sum(L_i / 60 V_i) \text{ (Eq. 2-7)}$$

Where:

L_i = The i -th channel segment length, ft

V_i = The average flow velocity within the i th channel segment, ft/s

T_t = Total Flow travel time through the channel, min

TABLE 2-1
RATIONAL METHOD RUNOFF COEFFICIENTS FOR COMPOSITE ANALYSIS
Runoff Coefficient (C)

Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
DEVELOPED							
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (Lawns, Parks, etc.)							
Poor Condition*							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.40	0.43	0.45	0.49	0.52	0.55	0.62
Fair Condition**							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Good Condition***							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56

Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
UNDEVELOPED							
Cultivated							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	0.42	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-7%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58

Assumptions:

1. Composite "C" value for developed conditions (C_{DEV}) is : $C_{DEV} = I C_1 + (1-I) C_2$

Where:

I = Impervious cover, percent

C_1 = "C" value for impervious cover

C_2 = "C" value for pervious area (grass, lawns, parks, etc.)

2. For maximum allowable impervious coverage values for various land use types, refer to the City of Austin Zoning Ordinance.

* Grass cover less than 50 percent of the area.

** Grass cover on 50 to 75 percent of the area.

*** Grass cover larger than 75 percent of the area.

Source: 1. Rossmiller, R.L. "The Rational Formula Revisited."
2. City of Austin, Watershed Engineering Division

TABLE 2-2
Manning's "n" for overland flow

Manning's "n" ¹	Surface Description
0.015	Concrete (rough or smoothed finish)
0.016	Asphalt
0.05	Fallow (no residue)
	Cultivated Soils:
0.06	Residue Cover ≤ 20%
0.17	Residue cover > 20%
	Grass:
0.15	Short-grass prairie
0.24	Dense grasses ²
0.13	Range (natural)
	Woods: ³
0.40	Light underbrush

0.80

Dense underbrush

1 The Manning's n values are a composite of information compiled by Engman (1986).

2 Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

3 When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

(Rule No. 161-14.24, 9-2-2014)

2.4.3 - Rainfall Intensity (i)

Rainfall intensity (i) is the average rainfall rate in inches per hour, and is selected on the basis of design rainfall duration and design frequency of occurrence. The design duration is equal to the time of concentration for the drainage area under consideration. The design frequency of occurrence is a statistical variable which is established by design standards or chosen by the engineer as a design parameter.

The selection of the frequency criteria is necessary before applying any hydrologic method. Storm drainage improvements in Austin must be designed to intercept and carry the runoff from a 25 year frequency storm (4% annual chance event), with an auxiliary or overflow system capable of carrying a 100 year frequency storm (1% annual chance event).

The rainfall intensity used in the rational method can be read from the intensity-duration-frequency (IDF) curves based on the selected design frequency and design duration. The design engineer can also calculate the value of rainfall intensity from the best-fit IDF equation (2-8) to be discussed later in this subsection with known Tc value for the entire drainage area of interest.

In 1998, William Asquith at the USGS Texas Office analyzed virtually all rainfall data available in the State of Texas using L-moment methodology and published the results in a USGS Water Resources Investigations Report (WRIR 98-4044). In November 2001, Dr. Asquith summarized his rainfall study of 1998 and generated the IDF and the DDF (depth-duration-frequency) values that are suitable for use in the City of Austin and Travis County. These DDF and IDF values are shown in Table 2-3 and Table 2-4.

An explanation of the derivation of the Austin intensity-duration-frequency curves is given in Appendix B.

The Austin intensity-duration-frequency curves are shown in Figure 2-2 in Appendix D of this manual.

Table 2-3. Depth-Duration-Frequency Table for Austin and Travis County>

	Depth of Precipitation (in inches)								
Recurrence Interval (year)	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr

2	0.48	0.98	1.32	1.72	2.16	2.32	2.67	3.06	3.44
5	0.62	1.26	1.71	2.28	2.89	3.13	3.56	4.07	4.99
10	0.71	1.47	1.98	2.68	3.42	3.71	4.21	4.81	6.1
25	0.84	1.76	2.36	3.28	4.2	4.55	5.14	5.9	7.64
50	0.94	2.01	2.68	3.79	4.88	5.28	5.94	6.86	8.87
100	1.05	2.29	3.04	4.37	5.66	6.11	6.85	7.96	10.2
250	1.21	2.73	3.57	5.26	6.86	7.38	8.24	9.67	12
500	1.33	3.11	4.02	6.06	7.94	8.51	9.47	11.2	13.5

* The 5-min rainfall depths were calculated using the 5-min rainfall intensity values from Table 2-4.

Table 2-4. Intensity-Duration-Frequency Table for Austin and Travis County

Recurrence Interval (year)	Intensity of Precipitation (inches per hour)								
	5 min*	15 min	30 min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	5.76	3.92	2.64	1.72	1.08	0.773	0.445	0.255	0.143
5	7.39	5.04	3.42	2.28	1.45	1.04	0.593	0.339	0.208
10	8.57	5.88	3.96	2.68	1.71	1.24	0.702	0.401	0.254
25	10.1	7.04	4.72	3.28	2.10	1.52	0.857	0.492	0.318
50	11.2	8.04	5.36	3.79	2.44	1.76	0.990	0.572	0.370
100	12.5	9.16	6.08	4.37	2.83	2.04	1.14	0.663	0.424

250	14.5	10.9	7.14	5.26	3.43	2.46	1.37	0.806	0.501
500	15.9	12.4	8.04	6.06	3.97	2.84	1.58	0.934	0.564

* The 5-min rainfall intensity values were calculated using Equation 2-8 and the coefficients listed in Table 2-5 for the return periods of 2, 5, 10, 25, 100, 250, and 500 years.

The following equation mathematically represents the Austin area intensity-duration-frequency curves:

$$i = a/(t+b)^c \text{ (Eq. 2-8)}$$

Where,

i = Average rainfall intensity, inches per hour

t = Storm duration in minutes, which is equal to the time of concentration for the entire drainage area of interest

a, b and c = Coefficients for different storm frequencies.

The final best-fit coefficients of a, b, and c for equation (2-8) are listed in Table 2-5 below:

Table 2-5
Austin Intensity-Duration-Frequency Curve Coefficients

Return Period	Fitting parameters for IDF equation (2-8)		
Year	a	b	c
2	54.767	11.051	0.8116
5	62.981	10.477	0.7820
10	70.820	10.396	0.7725
25	82.936	10.746	0.7634
50	100.60	12.172	0.7712
100	118.30	13.185	0.7736
250	150.10	14.892	0.7822

500	188.00	17.233	0.7959
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Source: Asquith, W.H., "Depth-Duration Frequency and Intensity-Duration Frequency for Austin and Travis County, Texas, 2001".

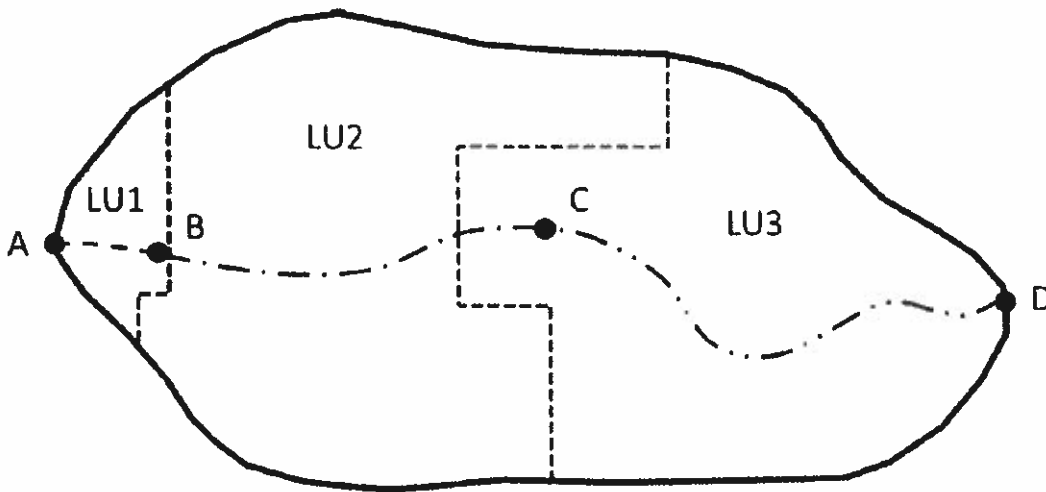
The a, b and c parameters listed in Table 2-5 were derived using nonlinear regression methods and the data included in Table 2-4. The IDF curves and the IDF equations are applicable for all design frequencies shown. They are required for use in determining peak flows by the Rational Method or other appropriate methods.

2.4.4 - Drainage Area (A)

The size (acres) of the watershed needs to be determined for application of the Rational Method. The area may be determined through the use of topographic maps, supplemented by field surveys where topographic data has changed or where the contour interval is too great to distinguish the direction of flow. The drainage divide lines are determined based on topography, street layout, lot grading, building structure configuration and orientation, drainage system layout and other features that are created by the urbanization process.

Example 2-1

An urbanized watershed is shown on the following figure. Three types of flow conditions exist between the most distant point in the watershed and the outlet. The calculation of time of concentration and travel time in each reach is as follows:



Reach	Description of Flow	Slope (%)	Length (Ft.)	"n" value/Surface Type
A to B	Sheet flow (grass lawn)	1.8	50	0.3

The rainfall intensity (i) of the 100 year storm can be calculated using equation (2-8) together with the coefficients in Table 2-5 for a time of concentration of 7.08 minutes as 11.54 inches per hour.

The composite runoff coefficient (C) = $(0.41 \times 3 + 0.85 \times 20 + 0.81 \times 30)/53 = 0.80$

Thus the peak flow $Q_p = CiA = 0.80 \times 11.54 \text{ in/hr} \times 53 \text{ acre} = 489 \text{ cfs}$

2.5.0 - THE SOIL CONSERVATION SERVICE METHOD FOR CALCULATION OF PEAK FLOWS

The Soil Conservation Service hydrologic method is widely used by engineers and hydrologists for analyses of small urban watersheds. This method is based on extensive analytical work using a wide range of statistical data concerning storm patterns, rainfall-runoff characteristics and many hydrologic observations in the United States.

The SCS method can be applied to urban drainage areas of any size. The major parameters required to calculate a runoff hydrograph with the method include the rainfall distribution, runoff curve numbers, time of concentration and drainage area. For detailed information regarding the SCS method and the TR-20 program, the user is referred to the following NRCS publications. These can be obtained from the Natural Resources Conservation Service at <http://www.wcc.nrcs.usda.gov/>. They are:

NEH-4: "Hydrology," Section 4, National Engineering Handbook

TR-20: Computer Program for Project Formulation, Hydrology

TR-55: Urban Hydrology for Small Watersheds

TP-149: A Method for Estimating Volume and Rate of Runoff in Small Watersheds

The HEC-HMS programs can be downloaded from the US Army Corps of Engineers website at <http://www.hec.usace.army.mil/>. Refer to Section 8.2.3 for information regarding watershed hydrologic models that are maintained by the City. These models may be requested by the public and used as the basis for drainage analysis where applicable. Any results based on models obtained from the City must be certified by a Texas Licensed Professional Engineer.

2.5.1 - Austin Twenty-Four (24) Hour Storm Rainfall Distributions

The City of Austin has adopted the use of an SCS 24-hour storm duration with a Type III distribution for use with the SCS method. The DDF and IDF values to be used for the Austin area are shown in Table 2-3 and 2-4 above. For use in spreadsheet calculations, Table 2-6 below provides the Type III distribution ordinates in 5-minute increments as derived from the HEC-HMS program. The ordinates should be multiplied by the total 24 hour precipitation depth to produce the design rainfall distribution. When using the HEC-HMS model, the computational time interval should be selected based on criteria for the minimum lag time. The maximum computational time interval used in a HEC-HMS model should be 6 minutes.

Table 2-6
Type III Distribution Ordinates In 5-Minute Time Increment

Time	Incremental	Cumulative	Time	Incremental	Cumulative	Time	Incremental	Cumulative
0:00	0.0000	0.0000	8:05	0.0023	0.1163	16:10	0.0021	0.8903
0:05	0.0008	0.0008	8:10	0.0022	0.1185	16:15	0.0021	0.8924

6:50	0.0017	0.0871	14:55	0.0033	0.8511	23:00	0.0007	0.9909
6:55	0.0016	0.0887	15:00	0.0032	0.8543	23:05	0.0008	0.9917
7:00	0.0018	0.0905	15:05	0.0030	0.8573	23:10	0.0008	0.9925
7:05	0.0017	0.0922	15:10	0.0030	0.8603	23:15	0.0008	0.9933
7:10	0.0019	0.0941	15:15	0.0030	0.8633	23:20	0.0008	0.9941
7:15	0.0018	0.0959	15:20	0.0028	0.8661	23:25	0.0007	0.9948
7:20	0.0019	0.0978	15:25	0.0028	0.8689	23:30	0.0008	0.9956
7:25	0.0019	0.0997	15:30	0.0027	0.8716	23:35	0.0008	0.9964
7:30	0.0019	0.1016	15:35	0.0026	0.8742	23:40	0.0007	0.9971
7:35	0.0020	0.1036	15:40	0.0025	0.8767	23:45	0.0008	0.9979
7:40	0.0020	0.1056	15:45	0.0025	0.8792	23:50	0.0007	0.9986
7:45	0.0020	0.1076	15:50	0.0023	0.8815	23:55	0.0006	0.9992
7:50	0.0021	0.1097	15:55	0.0022	0.8837	24:00	0.0008	1.0000
7:55	0.0021	0.1118	16:00	0.0023	0.8860			
8:00	0.0022	0.1140	16:05	0.0022	0.8882			

2.5.2 - Conservation Service Runoff Curve Numbers

The National Resources Conservation Service has developed an index, the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors have the most significant impact in estimating the volume of runoff, and can be assessed from soil surveys, site investigations and land use maps.

The curve number is an indication of the potential runoff for a given antecedent soil moisture condition, and it ranges in value from zero to 100. The National Resources Conservation Service runoff curve numbers are grouped into three (3) antecedent soil moisture conditions — Antecedent Runoff Condition (ARC) I,

ARC II and ARC III. Values of runoff curve numbers for all three (3) conditions may be computed following guidelines in Part 630, Chapter 10 of the National Engineering Handbook. ARC I is the dry soil condition and ARC III is the wet soil condition. ARC II is normally considered to be the average condition. The Antecedent Runoff Condition (ARC) was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

However, studies of hydrologic data indicate that ARC II is not necessarily representative of the average condition throughout Texas. Instead, investigations have shown that the average condition ranges from ARC I in west Texas to between ARC II and ARC III in east Texas. The NRCS curve number values provided in Table 2-7 are for an ARC II. If it is desired to change to an ARC I or III condition, the adjustments given in Part 630, Chapter 10 of the National Engineering Handbook should be used. Justification must be provided for the selection of an ARC other than condition II.

The National Resources Conservation Service has classified more than 4,000 soils into four (4) hydrologic groups, identified by the letters A, B, C, and D, to represent watershed characteristics.

Group A: (Low runoff potential). Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep, well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential). Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

Table 2-7 lists the curve numbers for the four (4) soil groups under various land uses, land treatment and hydrologic conditions. Curve numbers for fully developed conditions should be based on maximum allowable impervious cover listed in Austin zoning and watershed ordinances. When calculating fully developed peak runoff rates it is recommended that the undeveloped curve number and the maximum allowable impervious cover be used as input parameters. In order to determine the soil classifications in the Austin area, the Natural Resource Conservation Service Soil Survey of Travis, Williamson or Hays County, Texas should be used. Digital versions of these soil datasets are available online at <http://soildatamart.nrcs.usda.gov> (accessed 12/18/2012).

Table 2-7

NRCS Runoff Curve Numbers for Urban Areas and Agricultural Lands (assuming ARC-II condition)

Cover Description	Average % Impervious Area ¹	Curve Numbers for Hydrologic Soil Group			
		A	B	C	D
Cover type and Hydrologic Condition					
Fully developed urban areas (vegetation established)					

Open space (lawns, parks, golf courses, cemeteries, etc.)					
Poor condition (grass cover 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right of way)		98	98	98	98
Streets and roads:					
Paved; curbs and storms drains (excluding right of way)		98	98	98	98
Paved; open ditches (including right of way)	83	89	92	93	
Gravel (including right of way)	76	85	89	91	
Dirt (including right of way)		72	82	87	89
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)		77	86	91	94
Agricultural lands					
Grassland, or range-continuous forage for grazing ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay		30	58	71	78

Brush—brush-weed-grass mixture with brush the major element ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ⁴	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods ⁵	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways and surrounding lots		59	74	82	86

1 Poor: less than 50 percent ground cover or heavily grazed with no mulch.
Fair: 50 to 75 percent ground cover and not heavily grazed.
Good: greater than 75 percent ground cover and lightly or only occasionally grazed.

2 Poor: less than 50 percent ground cover.
Fair: 50 to 75 percent ground cover.
Good: greater than 75 percent ground cover.

3 Curve numbers shown were computed for areas with 50 percent woods and 50 percent grass (pasture) cover. Other combinations of conditions may be computed from the curve numbers for woods and pasture.

4 Poor: Forest litter, small trees and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Source: National Resources Conservation Service. TR-55: Urban Hydrology for Small Watersheds

2.5.3 - Time of Concentration

The procedures for estimating time of concentration for the NRCS method are described in the SCS Technical Release 55 (TR-55) and in Section 2.4.2 of this manual. Three (3) types of flow (sheet flow, shallow concentrated flow and channel flow) are considered. Note that Table 2-2 shall be used for determination of sheet flow Manning's roughness coefficients rather than the table included in TR-55.

In hydrograph analysis, the time of concentration can be defined as the time from the end of excess rainfall to the point of inflection on the falling limb of the hydrograph. The time of concentration determines the shape of the runoff hydrograph. Times of concentration are required for the existing and developed conditions to adequately model the impact of the development on stormwater runoff. The methodology presented in TR-55 provides a reasonable approach for the estimation of time of concentration. The lag time, defined as the time between the center of mass of excess rainfall to the runoff peak, is typically used in the HEC-HMS implementation of the SCS methodology. The lag time can be estimated with equation 2-9.

$$T_{lag} = 0.6 T_c \text{ (Eq. 2-9)}$$

In general, times of concentration for the developed condition should be calculated based on conservative assumptions that consider the increased hydraulic efficiency expected with an ultimate developed condition. Times of concentration should be representative of the overall drainage area, not simply based on the longest (in either distance or time) flow path. Sheet flow for both existing and proposed conditions should be limited to 100 feet. This length should be considered a maximum; sheet flow lengths should be measured and justified for all conditions. Additionally, the minimum slope used for calculation of sheet and shall flow travel time components should be 0.005 feet per foot (0.5%).

2.6.0 - PROBABLE MAXIMUM STORM/FLOOD DEVELOPMENT

The purpose of this section is to describe a method for developing the Probable Maximum Flood (PMF) within the City of Austin jurisdiction. The PMF is calculated by obtaining the Probable Maximum Precipitation (PMP) for a specific storm duration and drainage area. The PMP rainfall depths presented in this section were derived for the Austin area and are only applicable for designing and managing dams within City of Austin's full purpose, limited purpose and extraterritorial jurisdictions. Typically, a PMF runoff model requires both a temporal and spatial distribution of the PMP. However, if the drainage area is less than 10 square miles, the spatial distribution is not required (i.e. the drainage area is considered small enough that the PMP values can reasonably be considered point rainfall values). The PMP values shown in this section are valid only for drainage areas less than 10 square miles.

2.6.1 - Probable Maximum Precipitation (PMP)

The PMP values were derived using Hydrometeorological Report No. 52 (HMR-52) and Hydrometeorological Report No. 51 (HMR-51) per the guidance provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas (January 2007) available from the Dam Safety Program at the Texas Commission on Environmental Quality (TCEQ). Table 2-8 contains a summary of PMP depths and intensities for various storm durations for drainage areas less than 10 square miles.

Table 2-8
Probable Maximum Precipitation Depths for the City of Austin

Storm Duration	Depth (in)
1 hr	17.4
2 hr	21.6
3 hr	24.9

6 hr	31.1
12 hr	37.6
24 hr	44.7
48 hr	50.0
72 hr	53.4
1. All values are valid for drainage areas less than 10 square miles.	
2. Do not use these depths with the Soil Conservation Service (SCS) Type III distribution. The relevant storm distributions are provided in DCM Section 2.6.2 "Probable Maximum Flood (PMF)" and were derived using the Hydrologic and Hydraulic Guidelines for Dams in Texas.	

2.6.2 - Probable Maximum Flood (PMF)

To determine the PMF, each of the possible storm durations (1, 2, 3, 6, 12, 24, 48, and 72 hour storms) needs to be analyzed in order to determine the critical duration. The critical duration is the storm duration that produces the highest water surface elevation behind the dam. The PMF for each storm duration is derived using the PMP depths from Table 2-8 and using a rainfall-runoff model (i.e. HEC-HMS, TR-20). The rainfall-runoff model should use the temporal distribution as provided in the Hydrologic and Hydraulic Guidelines for Dams in Texas. The temporal distribution for each storm duration has been reproduced in Figure 2-4, Appendix D. Figure 2-4 provides the temporal distribution ordinates to be multiplied by the associated storm depths for use in the various rainfall-runoff models. The runoff parameters used in the PMF model are the same as those used for runoff analyses of the more frequent storm events, with the exception of curve numbers and the temporal distribution of rainfall.

Runoff curve numbers for the PMF need to reflect the assumption that the soils will be saturated. Therefore the runoff curve number should be based on ARC III. The appropriate curve number should be chosen using the tables provided in the DCM Section 2.5.2. These are ARC II values which can be converted to ARC III values using Table 10.1 in Part 630, Chapter 10 of the National Engineering Handbook. Note that the ARC was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

SECTION 3 - STREET FLOW

3.1.0 - GENERAL

The location of inlets and permissible flow of water in streets should be related to the extent and frequency of interference to traffic and the likelihood of flood damage to surrounding property for the 25 and 100 year frequency storms. Interference to traffic is regulated by design limits of the spread of water into traffic lanes, especially in regard to arterials. Flooding of surrounding property from streets is controlled by limiting curb

TR-55 CURVE NUMBERS

Table 2 2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

^{1/} Average runoff condition, and $I_p = 0.2S$.^{2/} The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.^{3/} CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.^{4/} Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.^{5/} Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
Good	51	67	76	80		

^{1/} Average runoff condition, and $I_a = 0.2S$

^{2/} Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

^{3/} Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ¹

Cover type	Cover description	Hydrologic condition	Curve numbers for hydrologic soil group			
			A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. ²		Poor	68	79	86	89
		Fair	49	69	79	84
		Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.		—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ³		Poor	48	67	77	83
		Fair	35	56	70	77
		Good	30 ⁴	48	65	73
Woods—grass combination (orchard or tree farm). ⁵		Poor	57	73	82	86
		Fair	43	65	76	82
		Good	32	58	72	79
Woods. ⁶		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	30 ⁴	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.		—	59	74	82	86

¹ Average runoff condition, and $I_a = 0.2S$.

² *Poor*: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

³ *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ¹

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ²	A ³	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

¹ Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

Appendix “E” – Cross Section Results

Channel Report

CROSS SECTION 1 - EXISTING

User-defined

Invert Elev (ft) = 930.52
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

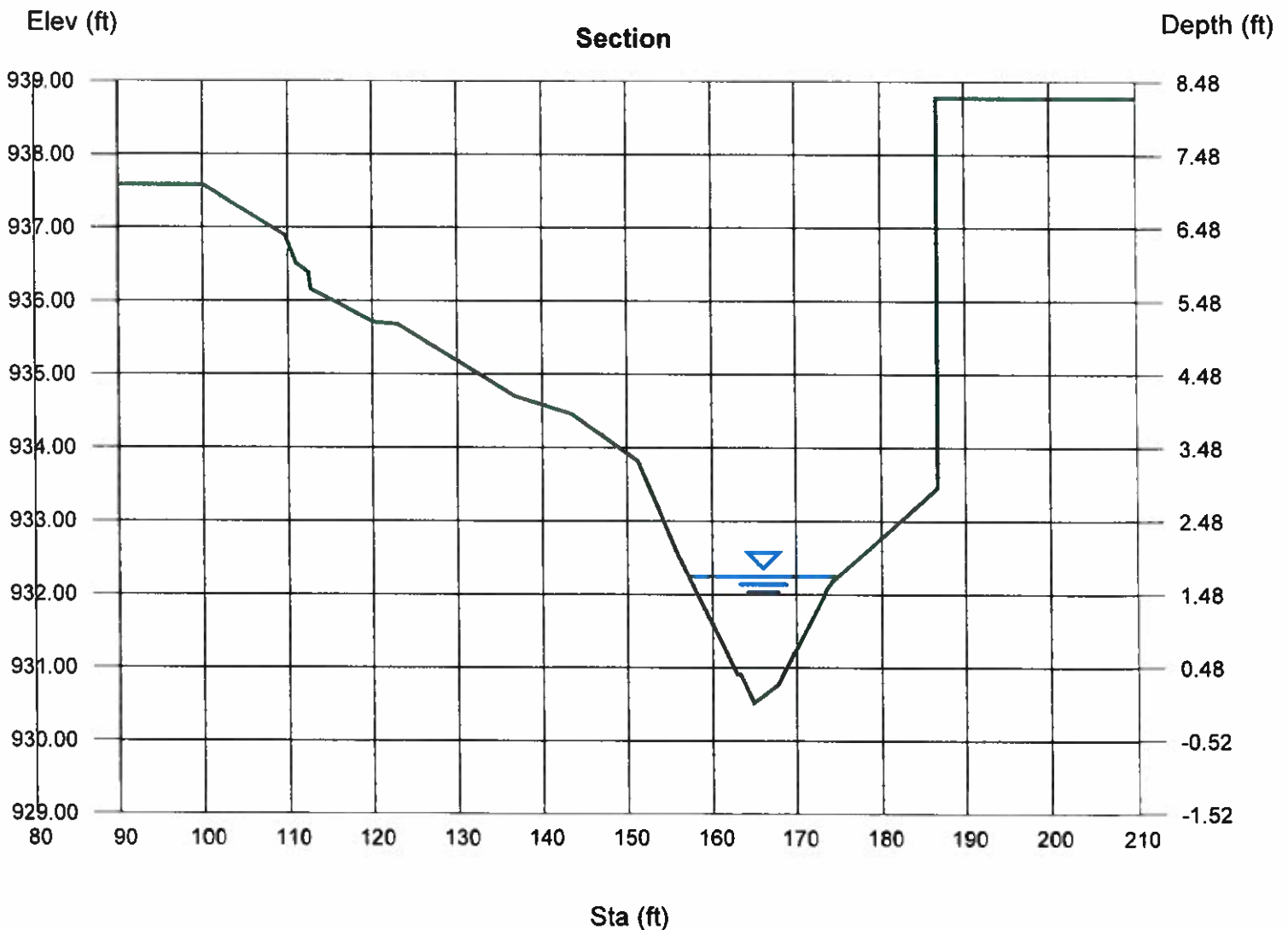
Depth (ft) = 1.73
 Q (cfs) = 370.20
 Area (sqft) = 16.34
 Velocity (ft/s) = 22.65
 Wetted Perim (ft) = 18.05
 Crit Depth, Yc (ft) = 3.09
 Top Width (ft) = 17.67
 EGL (ft) = 9.71

Calculations

Compute by: Known Q
 Known Q (cfs) = 370.20

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.58)-(109.64, 936.89, 0.060)-(110.90, 936.51, 0.060)-(112.36, 936.39, 0.060)-(112.65, 936.16, 0.060)-(120.08, 935.71, 0.060)-(123.01, 935.68, 0.060)
 -(136.80, 934.70, 0.060)-(143.54, 934.46, 0.060)-(151.30, 933.82, 0.025)-(155.91, 932.55, 0.025)-(162.90, 930.91, 0.025)-(163.28, 930.91, 0.025)-(164.85, 930.52, 0)
 -(167.75, 930.77, 0.025)-(173.16, 931.97, 0.025)-(173.42, 932.06, 0.025)-(174.18, 932.18, 0.025)-(186.66, 933.46, 0.025)-(186.66, 938.77, 0.025)-(200.00, 938.77, 0)



Channel Report

CROSS SECTION 1 - PROPOSED

User-defined

Invert Elev (ft) = 930.52
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

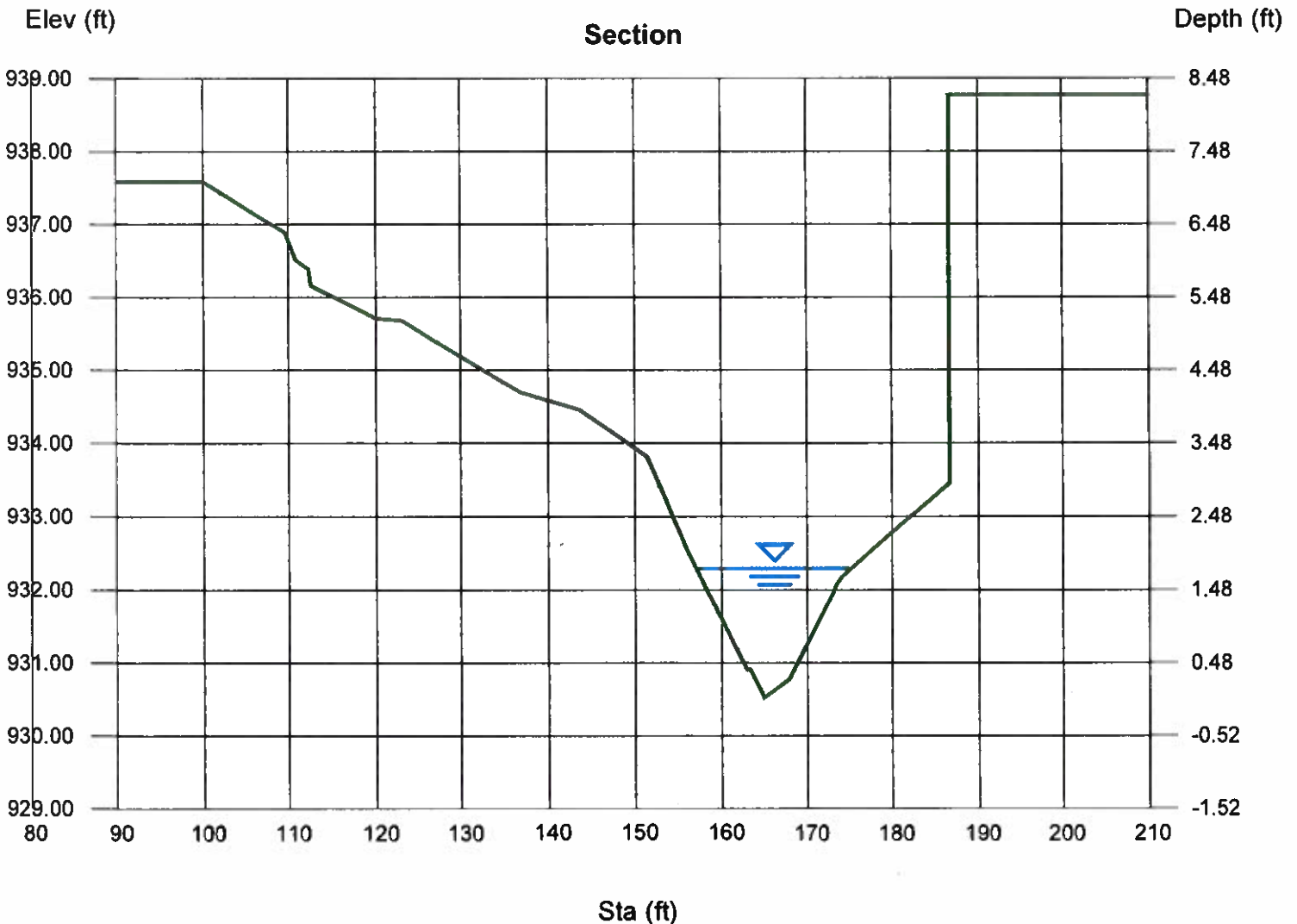
Depth (ft) = 1.77
 Q (cfs) = 388.50
 Area (sqft) = 17.06
 Velocity (ft/s) = 22.77
 Wetted Perim (ft) = 18.61
 Crit Depth, Yc (ft) = 3.15
 Top Width (ft) = 18.23
 EGL (ft) = 9.83

Calculations

Compute by: Known Q
 Known Q (cfs) = 388.50

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.58)-(109.64, 936.89, 0.060)-(110.90, 936.51, 0.060)-(112.36, 936.39, 0.060)-(112.65, 936.16, 0.060)-(120.08, 935.71, 0.060)-(123.01, 935.68, 0.060)
 -(136.80, 934.70, 0.060)-(143.54, 934.46, 0.060)-(151.30, 933.82, 0.025)-(155.91, 932.55, 0.025)-(162.90, 930.91, 0.025)-(163.28, 930.91, 0.025)-(164.85, 930.52, 0.025)
 -(167.75, 930.77, 0.025)-(173.16, 931.97, 0.025)-(173.42, 932.06, 0.025)-(174.18, 932.18, 0.025)-(186.66, 933.46, 0.025)-(186.66, 938.77, 0.025)-(200.00, 938.77, 0.025)



Channel Report

CROSS SECTION 1.2 - EXISTING

User-defined

Invert Elev (ft) = 928.36
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

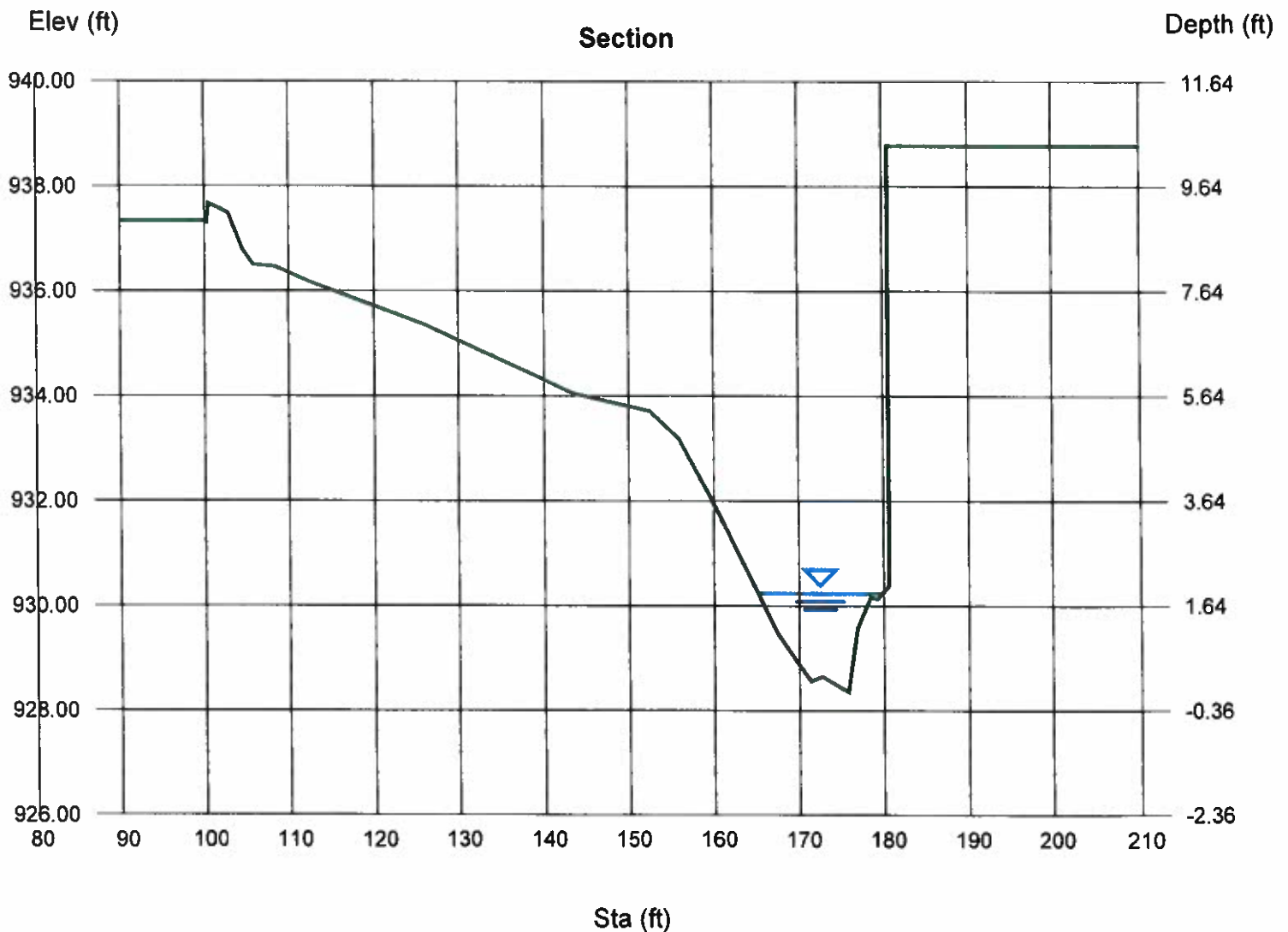
Depth (ft) = 1.88
 Q (cfs) = 370.20
 Area (sqft) = 15.37
 Velocity (ft/s) = 24.08
 Wetted Perim (ft) = 15.67
 Crit Depth, Yc (ft) = 3.50
 Top Width (ft) = 14.77
 EGL (ft) = 10.90

Calculations

Compute by: Known Q
 Known Q (cfs) = 370.20

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.33)-(100.23, 937.31, 0.060)-(100.45, 937.67, 0.060)-(102.84, 937.48, 0.060)-(104.56, 936.78, 0.060)-(105.78, 936.50, 0.060)-(108.44, 936.46, 0.060)-
 -(112.30, 936.18, 0.060)-(126.04, 935.35, 0.060)-(139.50, 934.34, 0.060)-(143.27, 934.05, 0.060)-(152.48, 933.71, 0.060)-(155.84, 933.19, 0.025)-(159.48, 932.09, 0.025)-
 -(167.41, 929.47, 0.025)-(171.28, 928.57, 0.025)-(172.65, 928.65, 0.025)-(175.79, 928.36, 0.025)-(176.88, 929.58, 0.025)-(178.46, 930.16, 0.025)-(179.33, 930.14, 0.025)-
 -(180.62, 930.39, 0.025)-(180.62, 938.77, 0.025)-(200.00, 938.77, 0.025)



Channel Report

CROSS SECTION 1.2 - PROPOSED

User-defined

Invert Elev (ft) = 928.36
 Slope (%) = 16.80
 N-Value = 0.025

Highlighted

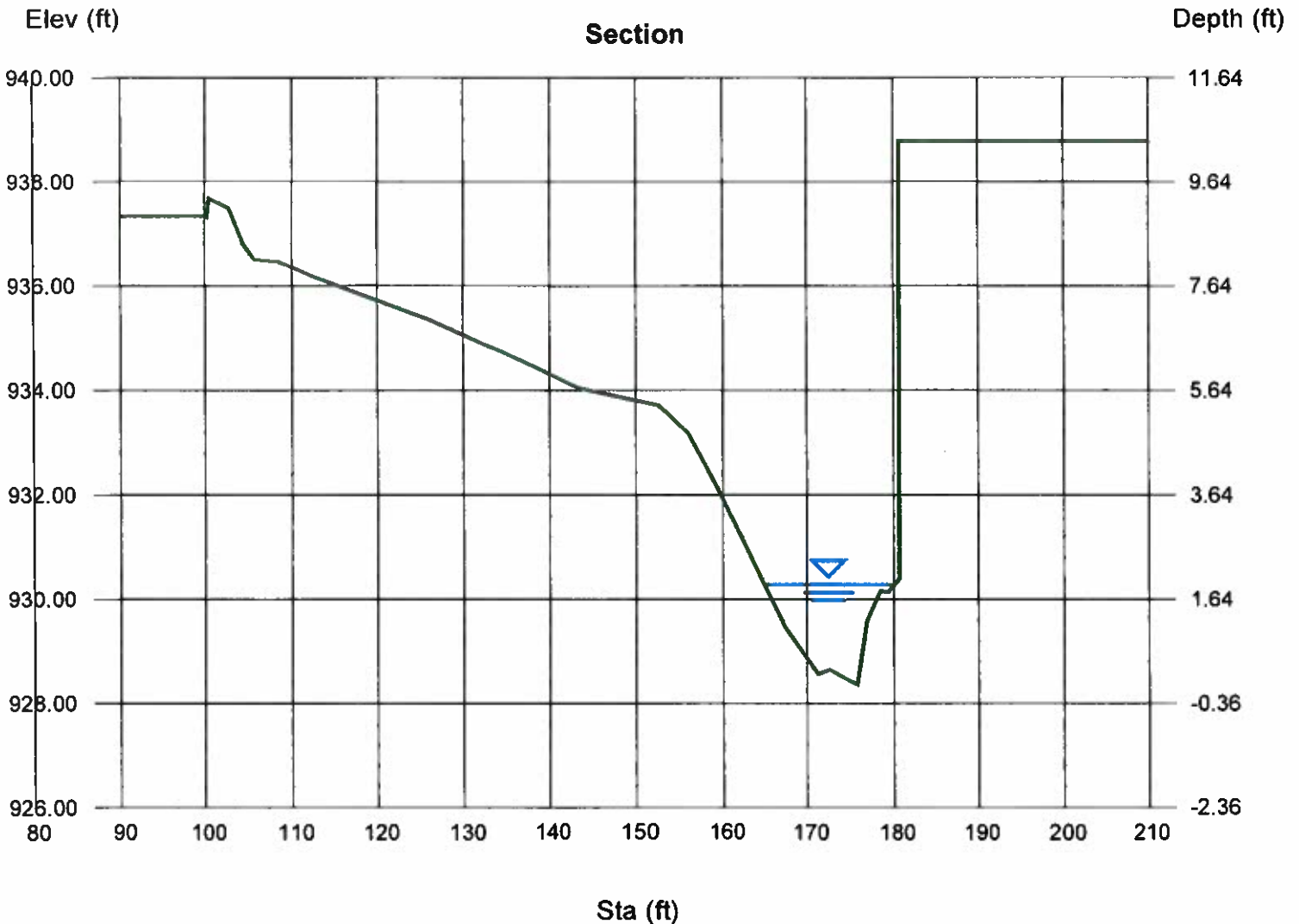
Depth (ft) = 1.92
 Q (cfs) = 388.50
 Area (sqft) = 15.97
 Velocity (ft/s) = 24.33
 Wetted Perim (ft) = 16.01
 Crit Depth, Yc (ft) = 3.58
 Top Width (ft) = 15.09
 EGL (ft) = 11.12

Calculations

Compute by: Known Q
 Known Q (cfs) = 388.50

(Sta, El, n)-(Sta, El, n)...

(100.00, 937.33)-(100.23, 937.31, 0.060)-(100.45, 937.67, 0.060)-(102.84, 937.48, 0.060)-(104.56, 936.78, 0.060)-(105.78, 936.50, 0.060)-(108.44, 936.46, 0.060)
 -(112.30, 936.18, 0.060)-(126.04, 935.35, 0.060)-(139.50, 934.34, 0.060)-(143.27, 934.05, 0.060)-(152.48, 933.71, 0.060)-(155.84, 933.19, 0.025)-(159.48, 932.09, 0.025)
 -(167.41, 929.47, 0.025)-(171.28, 928.57, 0.025)-(172.65, 928.65, 0.025)-(175.79, 928.36, 0.025)-(176.88, 929.58, 0.025)-(178.46, 930.16, 0.025)-(179.33, 930.14, 0.025)
 -(180.62, 930.39, 0.025)-(180.62, 938.77, 0.025)-(200.00, 938.77, 0.025)



955

CROSS SECTION 1.2

955

950

950

945

945

940

940

935

935

930

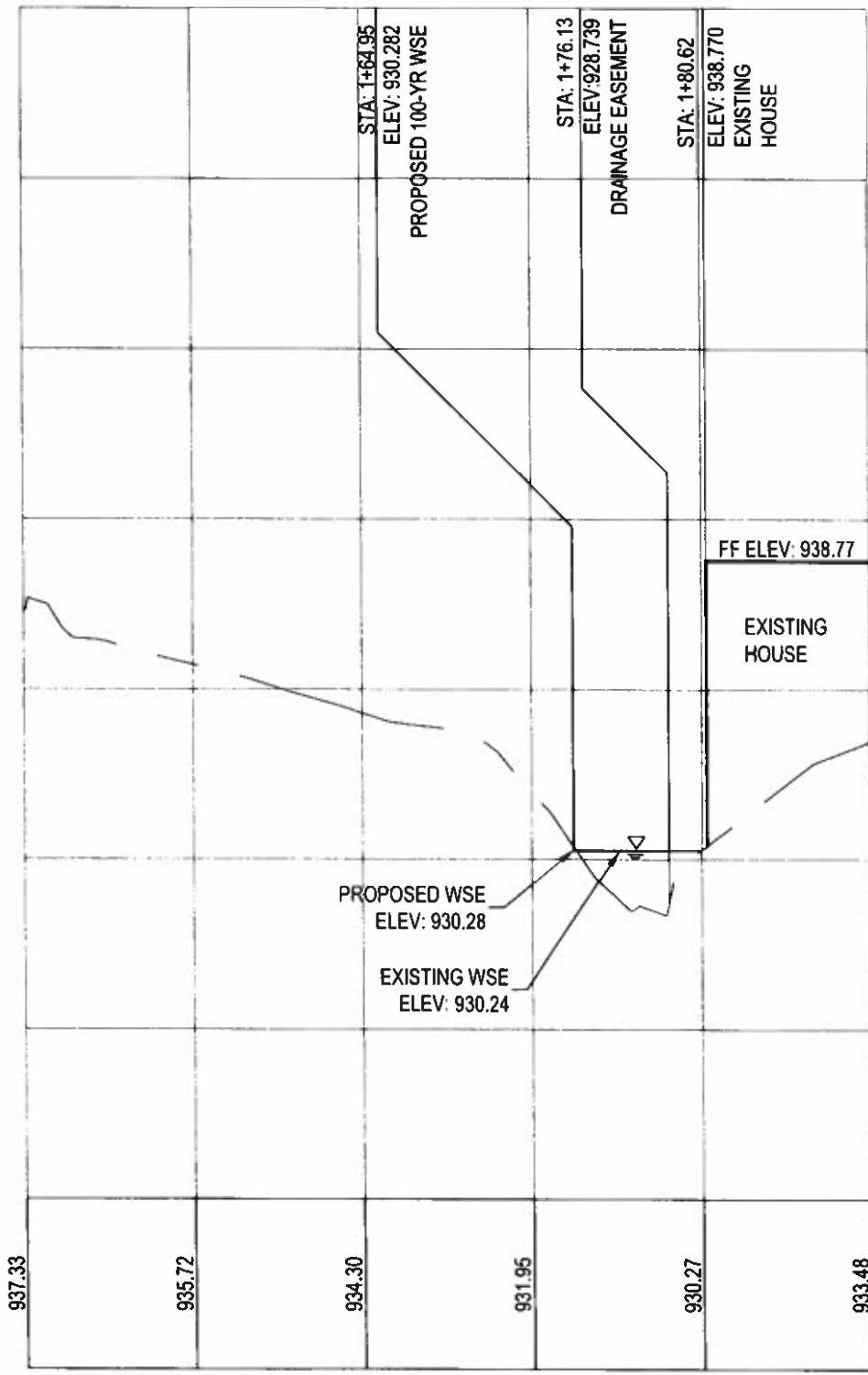
930

925

925

920

920



1+00

2+00

Channel Report

CROSS SECTION 2 - EXISTING

User-defined

Invert Elev (ft) = 916.08
 Slope (%) = 7.40
 N-Value = 0.025

Calculations

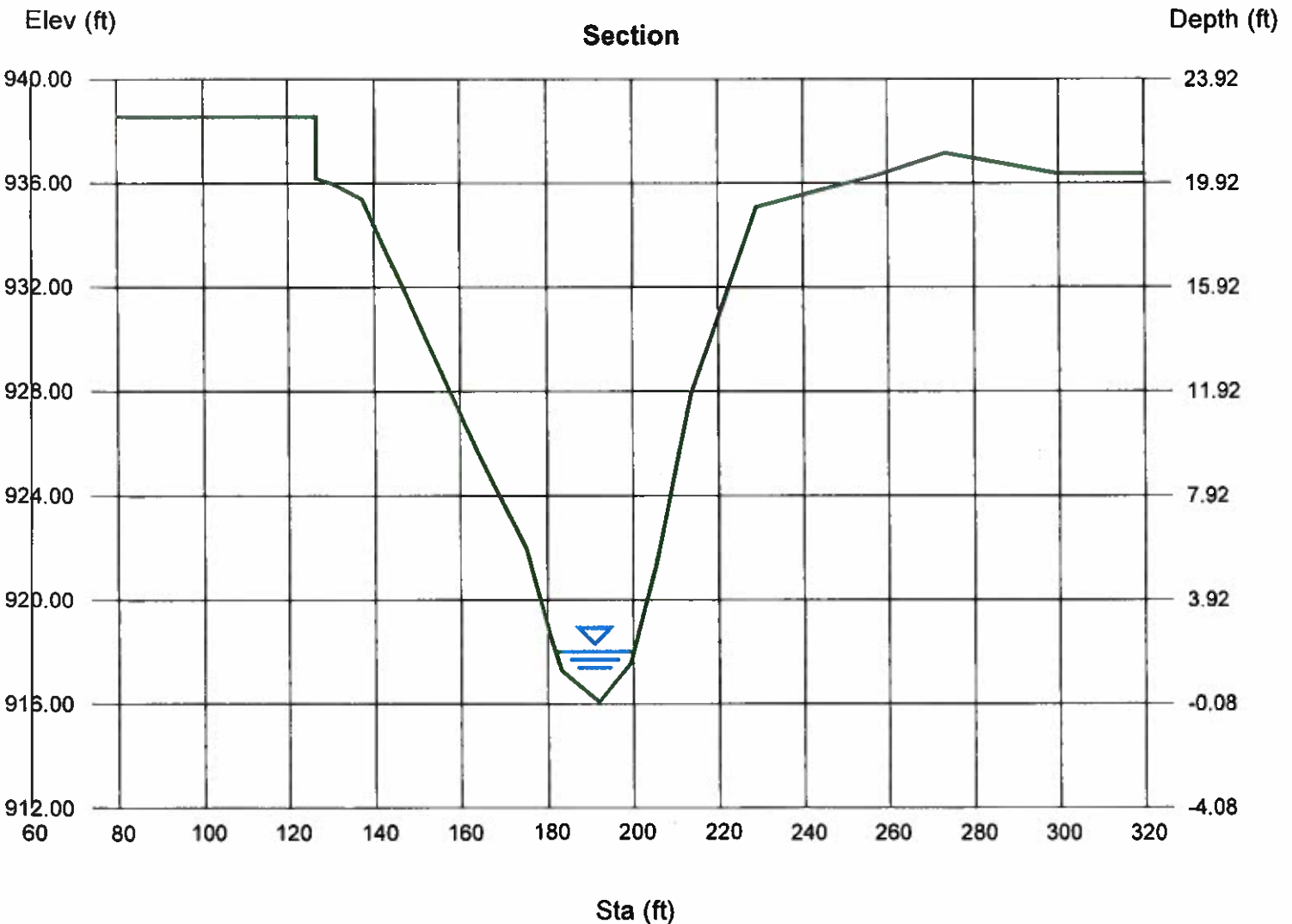
Compute by: Known Q
 Known Q (cfs) = 370.20

Highlighted

Depth (ft) = 1.94
 Q (cfs) = 370.20
 Area (sqft) = 21.21
 Velocity (ft/s) = 17.45
 Wetted Perim (ft) = 18.85
 Crit Depth, Yc (ft) = 3.15
 Top Width (ft) = 18.31
 EGL (ft) = 6.68

(Sta, El, n)-(Sta, El, n)...

(100.00, 938.55)-(126.56, 938.55, 0.060)-(126.57, 936.19, 0.060)-(130.30, 935.98, 0.060)-(137.15, 935.38, 0.060)-(164.09, 925.68, 0.060)-(175.17, 921.97, 0.025)
 -(180.66, 918.61, 0.025)-(183.14, 917.30, 0.025)-(191.85, 916.08, 0.025)-(199.40, 917.58, 0.025)-(205.25, 921.33, 0.025)-(213.52, 927.90, 0.060)-(228.92, 935.06, 0.060)
 -(257.61, 936.30, 0.060)-(273.44, 937.15, 0.060)-(300.00, 936.36, 0.060)



Channel Report

CROSS SECTION 2 - PROPOSED

User-defined

Invert Elev (ft) = 916.08
 Slope (%) = 7.40
 N-Value = 0.025

Highlighted

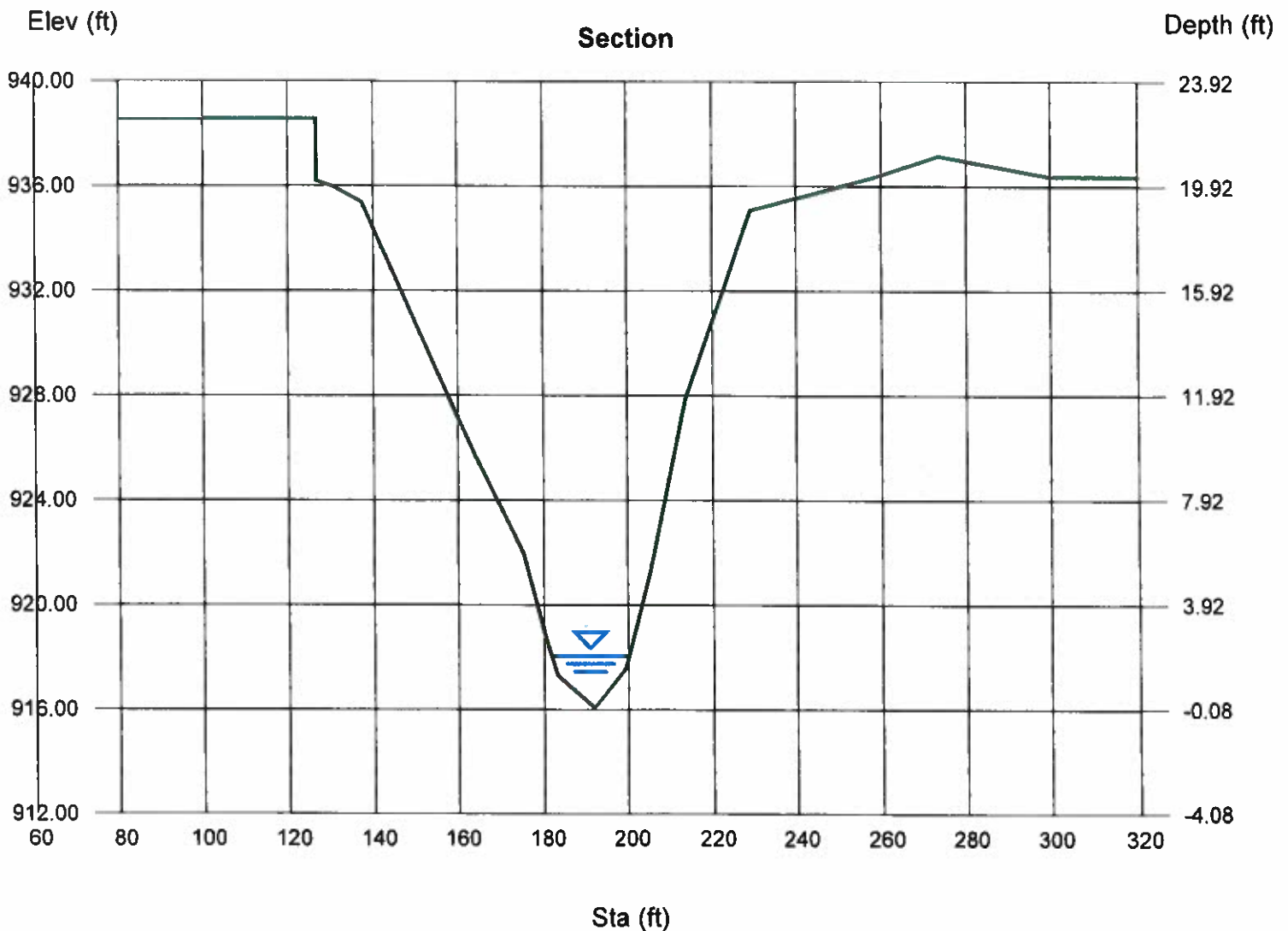
Depth (ft) = 1.98
 Q (cfs) = 388.50
 Area (sqft) = 21.95
 Velocity (ft/s) = 17.70
 Wetted Perim (ft) = 19.01
 Crit Depth, Yc (ft) = 3.22
 Top Width (ft) = 18.45
 EGL (ft) = 6.85

Calculations

Compute by: Known Q
 Known Q (cfs) = 388.50

(Sta, El, n)-(Sta, El, n)...

(100.00, 938.55)-(126.56, 938.55, 0.060)-(126.57, 936.19, 0.060)-(130.30, 935.98, 0.060)-(137.15, 935.38, 0.060)-(164.09, 925.68, 0.060)-(175.17, 921.97, 0.025)
 -(180.66, 918.61, 0.025)-(183.14, 917.30, 0.025)-(191.85, 916.08, 0.025)-(199.40, 917.58, 0.025)-(205.25, 921.33, 0.025)-(213.52, 927.90, 0.060)-(228.92, 935.06, 0.060)
 -(257.61, 936.30, 0.060)-(273.44, 937.15, 0.060)-(300.00, 936.36, 0.060)



**Appendix “F” – Cypress Point Plat (Down
Stream Subdivision)**

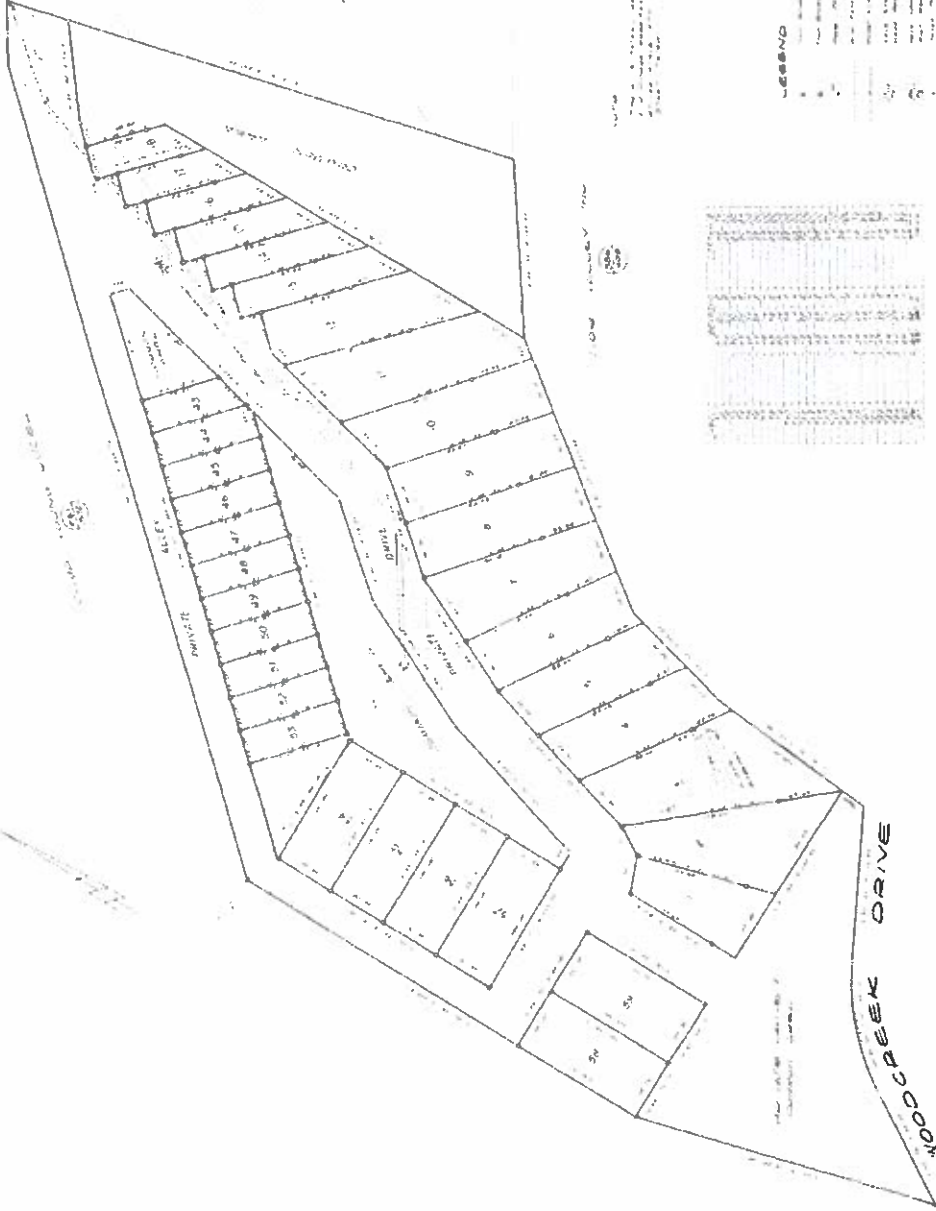
Vol. 2 of 180-138

CYPRESS POINT

SECTION I

35 LOTS 6.15 ACRES

11/25/75



LEGEND



COUNTY OF TEXAS

BEFORE ME, the undersigned authority, on this day personally appeared _____, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

My commission expires _____

NOTARY PUBLIC

STATE OF TEXAS
COUNTY OF BENT

STATE OF TEXAS
COUNTY OF BENT

WITNESSES my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

WITNESSED my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

WITNESSED my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

WITNESSED my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

WITNESSED my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

WITNESSED my hand and seal of office this 15th day of May 1975.

STATE OF TEXAS
COUNTY OF BENT

PRO-TECH ENGINEERING GROUP, INC.

REGISTERED PROFESSIONAL ENGINEERS

SCALE 1" = 40'

PLAT NO. 180-138

Dean Keller

From: Gilbert Watt <durhamconst312@gmail.com>
Sent: Thursday, July 20, 2017 5:01 AM
To: Matt Hubble
Cc: Garrett Keller; Dan Jackson; Dean Keller; Cesar DeLaCruz; Silberlicht, Frank
Subject: Re: Camp Young Judaea - Concept Plan and Site Plan Applications

Matt,

The plans dated May 2017 are different from the plans I previously reviewed. I have two comments regarding the plans.

- 1) The proposed fire hydrant needs to be located between the two proposed fire lane access points. This requires adding about 100 feet of pipe.
- 2) CU101 shows a rectangle near the tap to the water main. I presume this indicates a backflow prevention device. The device must be a type acceptable to the water purveyor. Please provide a detail acceptable to the water purveyor for this device.

It is not my intent that these comments hold up the issuance of a permit, but will consider them as part of the plans and inspections will verify that these comments have adequately been addressed.

Gib

On Wed, Jul 5, 2017 at 4:45 PM, Matt Hubble <mhubble@matkinhoover.com> wrote:

Gilbert,

Per our conversation last week, you thought that you may have already reviewed the Camp Young Judaea (CYJ) plans and if you have not yet reviewed them, you would review and get back to me. Can you please update me on the status of your review of the CYJ Plans and let me know when we should expect a completed review of the plans? If you have already reviewed the plans and approve of them, can you provide an approval letter for us to submit to the City of Woodcreek for our next submittal?

Thank you,

Matt Hubble, EIT

MATKINHOVER

TBPE Firm Registration #F-4512

O: [\(830\) 249-0600](tel:(830)249-0600) | F: [\(830\) 249-0099](tel:(830)249-0099)

8 Spencer Rd Ste 100 | Boerne, TX 78006

CONSTRUCTION DRAWINGS

SITE DEVELOPMENT PLAN APPLICATION

CAMP YOUNG JUDAEA

RETREAT VILLAGE

CITY OF WOODCREEK, TEXAS

CITY OF WOODCREEK
MAYOR
ERIC C. ESKEJLUND
41 CHAMPIONS CIRCLE
WOODCREEK, TEXAS 78676
OFFICE (512) 847-9390

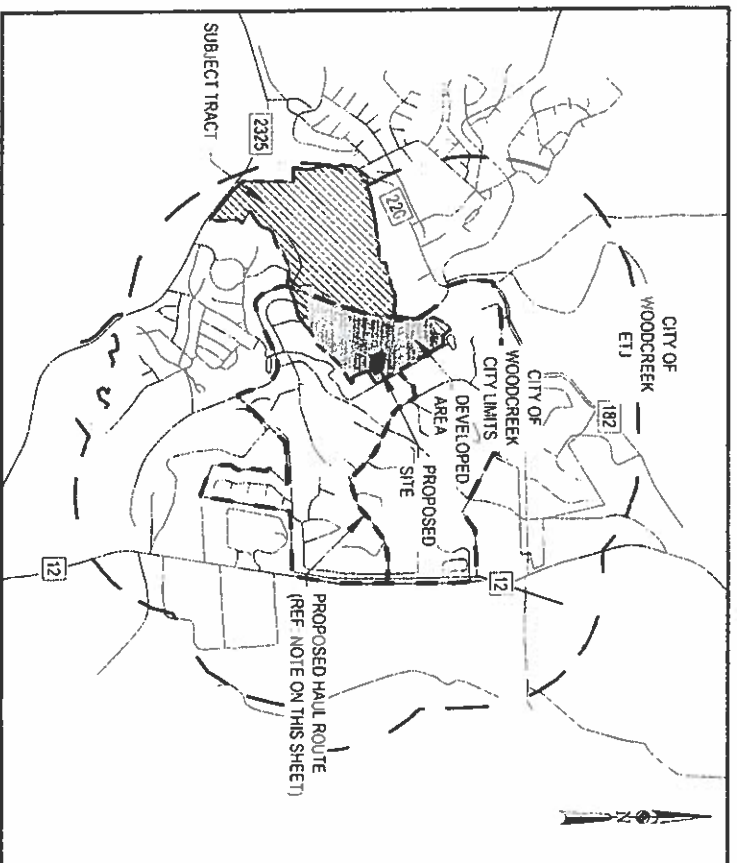
CITY OF WOODCREEK
CITY ENGINEER
RICK CONEWAY, P.E.
41 CHAMPIONS CIRCLE
WOODCREEK, TEXAS 78676
OFFICE (512) 847-9390

CITY OF WOODCREEK
CITY MANAGER
BRENTON B. LEWIS
41 CHAMPIONS CIRCLE
WOODCREEK, TEXAS 78676
OFFICE (512) 847-9390

CITY OF WOODCREEK
EMERGENCY SERVICES DISTRICT
41 CHAMPIONS CIRCLE
WOODCREEK, TEXAS 78676
OFFICE (512) 847-9390

OWNER/DEVELOPMENT COORDINATOR
FRANK SILBERLICHT
CAMP YOUNG JUDAEA, INC.
121 CAMP YOUNG JUDAEA ROAD
WIMBERLEY, TX 78676
(713) 723-9354

SUBMITTAL DATE: AUGUST 8TH, 2017



LOCATION MAP AND HAUL ROUTE
NOT TO SCALE

ENGINEER
Garrett C. Keller
GARRETT C. KELLER, P.E.
DATE 8/8/17



ENGINEER & SURVEYOR:
MATKIN-HOOVER ENGINEERING & SURVEYING
P.O. BOX 54
8 SPENCER ROAD, SUITE 100
BOERNE, TX 78006
(830) 249-0800 OFF
(830) 249-0099 FAX

CIVIL SHEET LISTING	
SHEET NAME	SHEET DESCRIPTION
G-001	COVER AND ORDER SHEET
G-100	CONCRETE SLAB
G-101	ENGINEERING NOTES
G-201	EROSION AND SEDIMENTATION CONTROL PLAN
G-202	LANDSCAPE AND SITEWORK/CONSTRUCTION PLAN DETAILS
G-301	DRAINAGE PLAN
G-302	STREET PLAN
G-303	IRE ACCESS PLAN
G-304	OVERSIGHT CONSTRUCTION
G-305	WATER QUANTITY PLAN
G-306	WATER QUANTITY PLAN (SHEET 2)
G-307	WATER QUANTITY PLAN (SHEET 3)
G-308	OVERALL SITE PLAN
G-309	UTILITY PLAN
G-310	FINAL CONSTRUCTION
G-311	CONSTRUCTION
G-312	CONSTRUCTION

- GENERAL SITE DEVELOPMENT NOTES:**
1. WATER PROVIDED BY ON SITE WELL
 2. FIRE AND WASTE WATER SERVICES PROVIDED BY AQUA SERVICES TEXAS INC.
 3. ELECTRICITY PROVIDED BY PEDERNALES ELECTRIC COOPERATIVE (P.E.C.)
 4. CONSTRUCTION TRAFFIC ON CITY STREETS: THE CONTRACTOR SHALL NOTIFY THE CITY OF WOODCREEK CITY MANAGER 48 HOURS PRIOR TO LARGE CONSTRUCTION VEHICLES USING CITY ROADS FOR SITE ACCESS. PLEASE NOTE THE CITIES PREFERRED TIMES FOR USAGE ARE RESTRICTED TO MONDAY THRU SATURDAY FROM 7AM TO 7PM.

COVER AND ORDER SHEET

Rev.	Date	Description	Appr.

MATKIN-HOOVER
ENGINEERING
& SURVEYING

SHEET
G-001

Job No. 2620.02

ISSUED FOR CONSTRUCTION



1

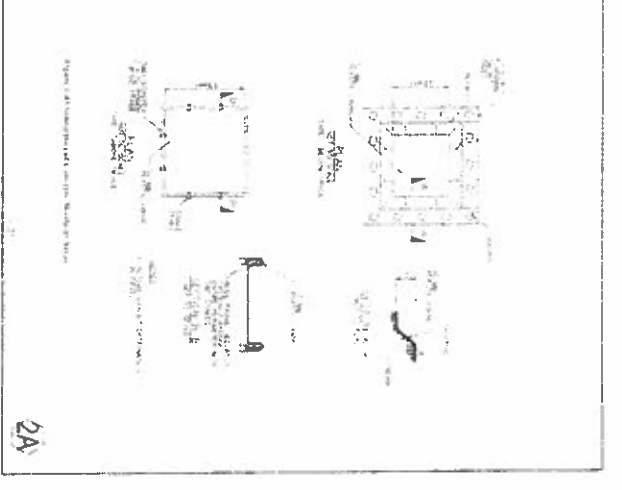
1.1. The gutter shall be constructed of concrete and shall be finished with a smooth surface. The gutter shall be installed in accordance with the manufacturer's instructions. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

1A

1.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

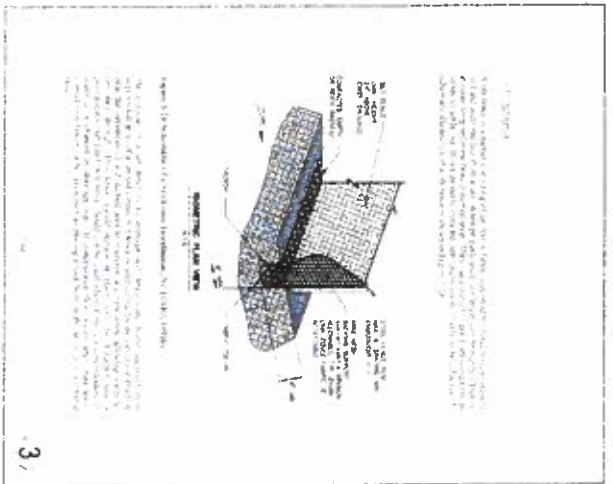
2

2.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.



2A

2.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.



3

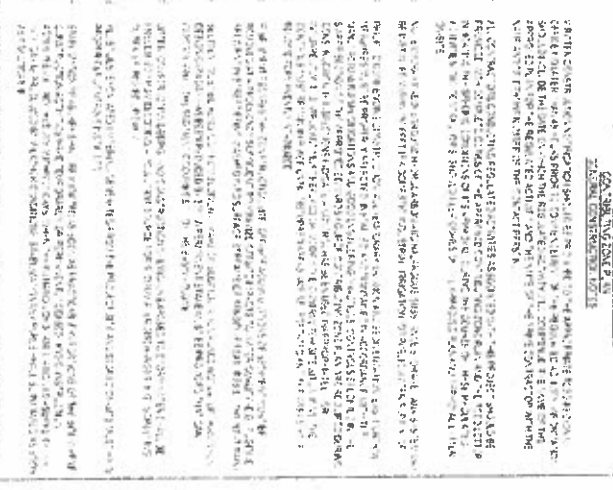
3.1. The gutter shall be constructed of concrete and shall be finished with a smooth surface. The gutter shall be installed in accordance with the manufacturer's instructions. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

3A

3.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

3B

3.1.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

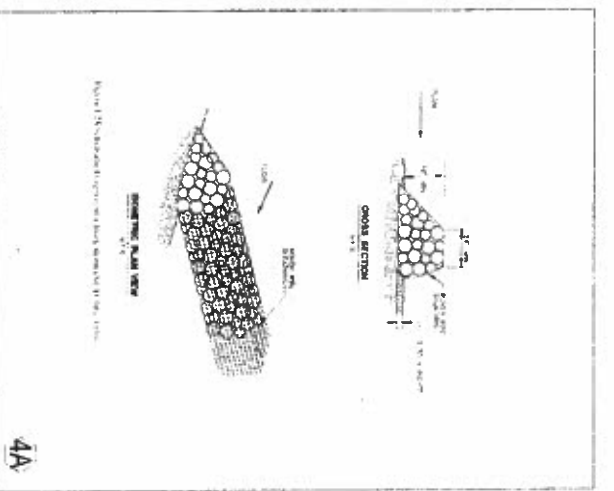


3A

3.1.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

4

4.1. The gutter shall be constructed of concrete and shall be finished with a smooth surface. The gutter shall be installed in accordance with the manufacturer's instructions. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

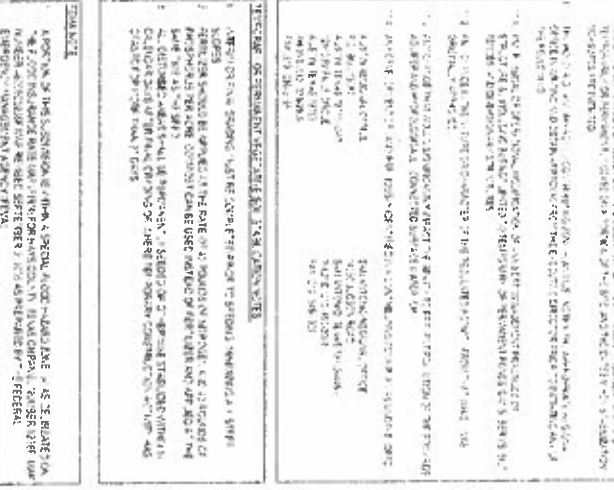


4A

4.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

4B

4.1.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.



4A

4.1.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

5. TREE PROTECTION - ORANGE SAFETY FENCE

5.1. The tree protection shall be installed in a manner that allows for proper drainage of water from the gutter. The tree protection shall be installed in a manner that allows for proper drainage of water from the gutter.



5

5.1.1. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter. The gutter shall be installed in a manner that allows for proper drainage of water from the gutter.

ISSUED FOR CONSTRUCTION

EROSION AND SEDIMENTATION CONTROL PLAN DETAILS
 FOR
CAMP YOUNG JUDAEA - RETREAT VILLAGE
 WOODCREEK, TEXAS



SHEET 22 OF 28

CG851

JOB NO. 201702
 DESIGNED BY: DJK
 DRAWN BY: DJK
 CHECKED BY: DJK

WOODCREEK, TEXAS
 CAMP YOUNG JUDEA - RETREAT VILLAGE
 FOR
 FIRE ACCESS PLAN

CF100

JOB NO 262012
 DESIGNED BY DJK
 DRAWN BY DJK
 CHECKED BY GJK

MATKINHOOPER
 ENGINEERING
 & SURVEYING



SCALE 1"=40'
 SHEET SIZE 11" x 17"



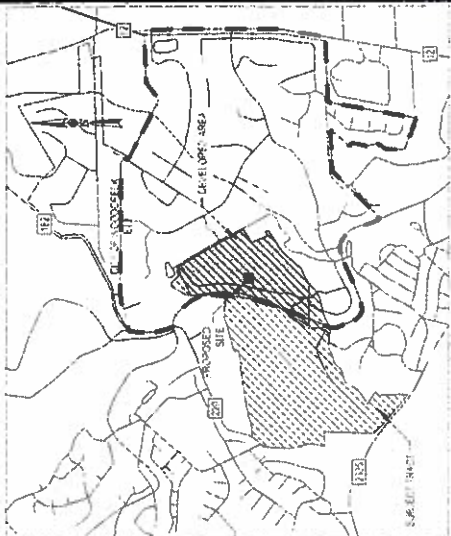
ISSUED FOR CONSTRUCTION

NOTES:
 1. VERIFY ALL FIRE ACCESS LANE WIDTHS AND ALL DESIGN ACCESS AND EGRESS REQUIREMENTS WITH THE LOCAL FIRE DEPARTMENT.
 2. REFER TO CITY OF ASSOCIATED FIRE REGULATIONS.

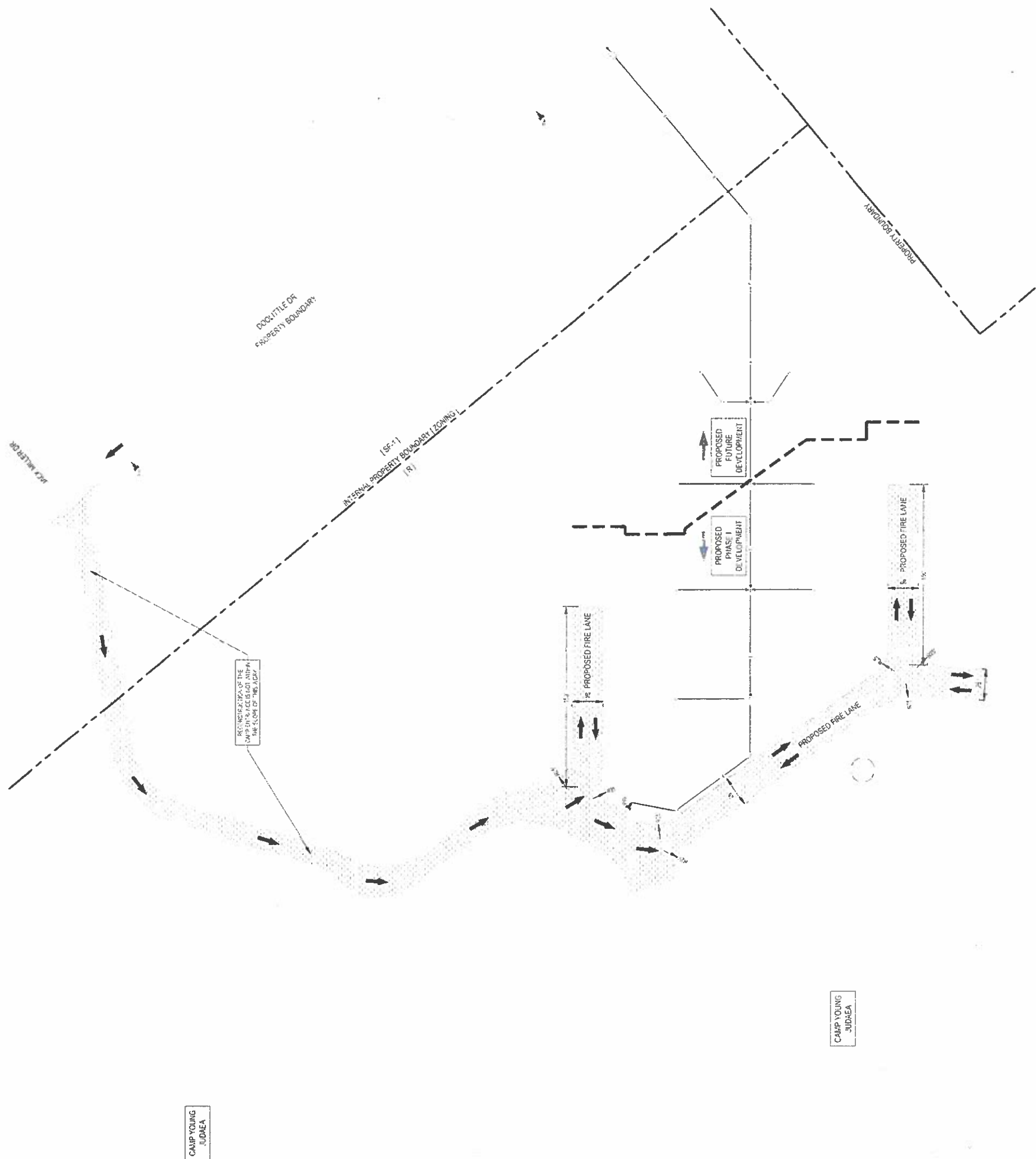
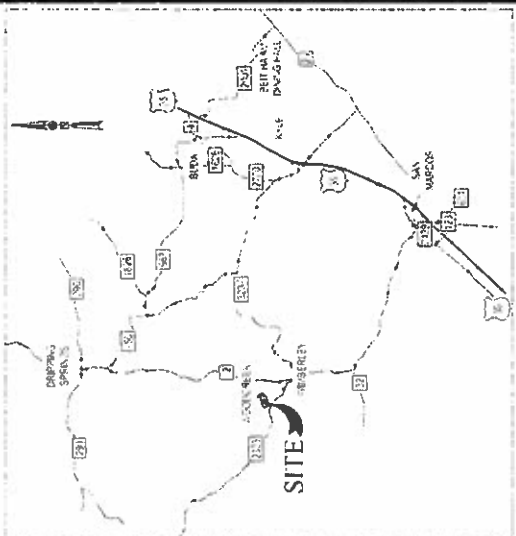
LEGEND

- EXISTING "AS-BUILT" ASSESSMENT
- EXISTING WATER MAIN
- PROPOSED FIRE ACCESS LANE
- PROPOSED FIRE LANE
- PROPOSED FIRE RETENNA ASSESSMENT
- PROPOSED FIRE ALARM INSTALLATION

REGIONAL MAP
 NOT TO SCALE



LOCATION MAP
 NOT TO SCALE



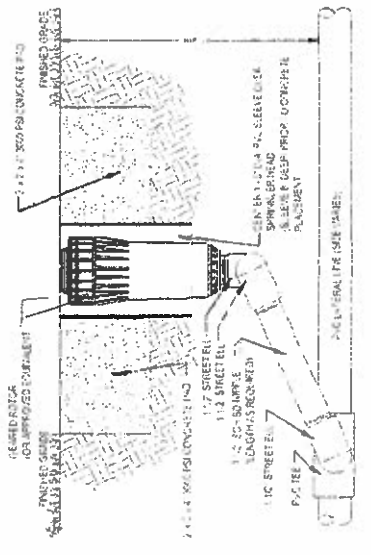
CAMP YOUNG JUDEA

CAMP YOUNG JUDEA

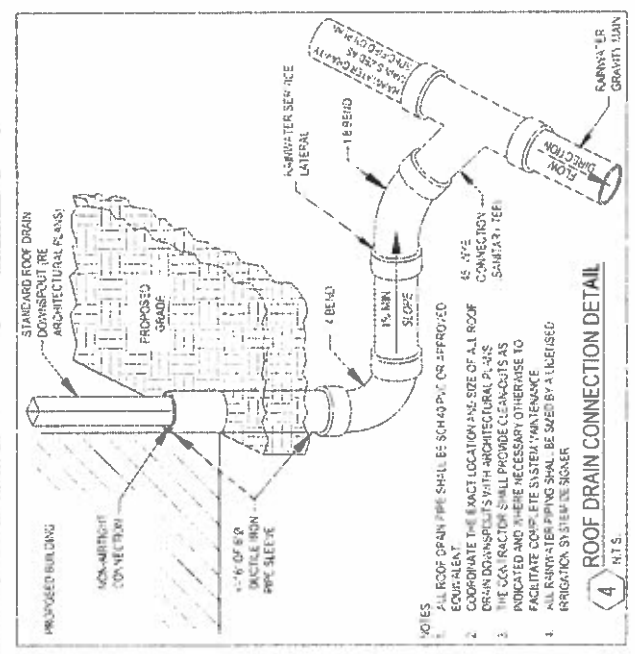


ISSUED FOR CONSTRUCTION

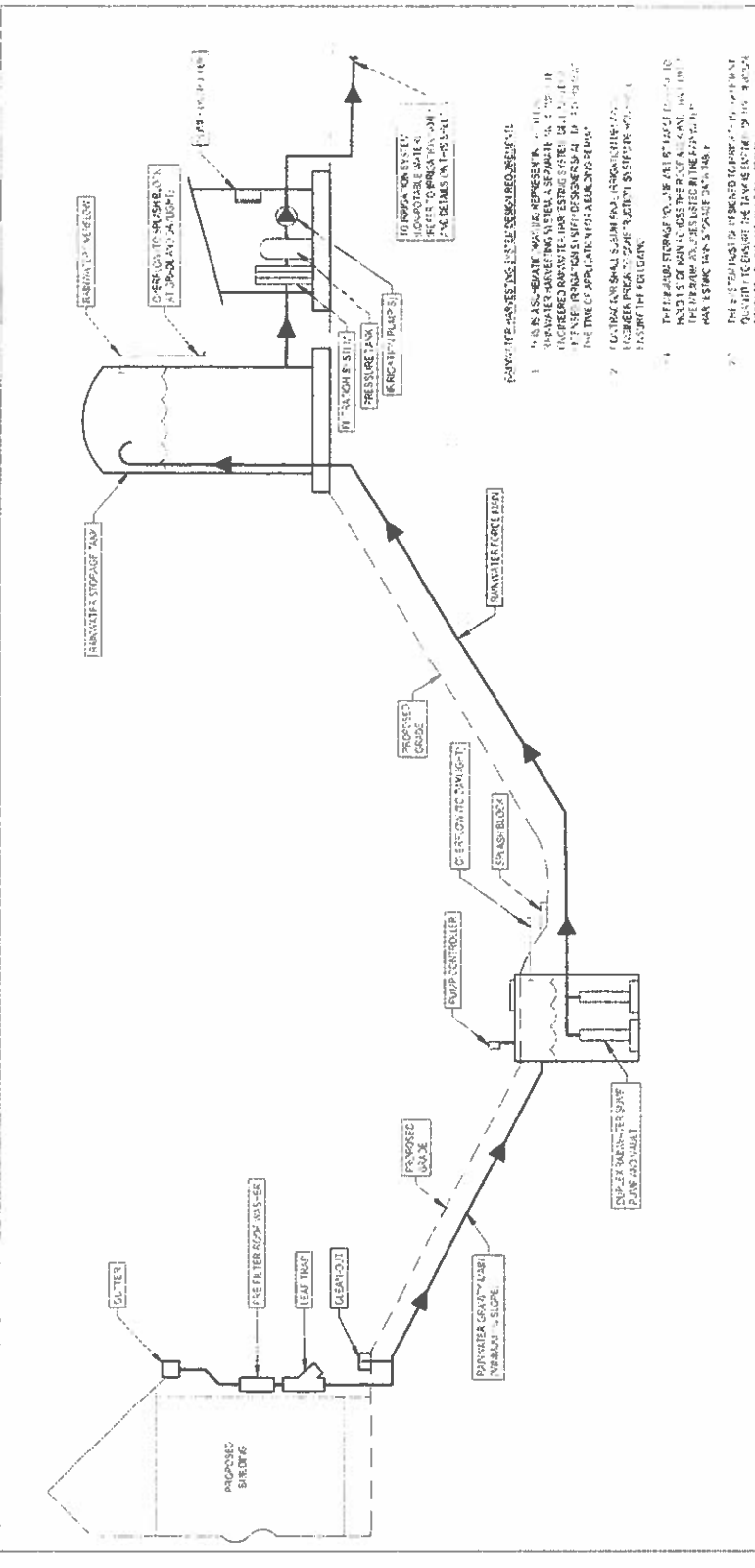
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF WOODCREEK AND THE STATE OF TEXAS.



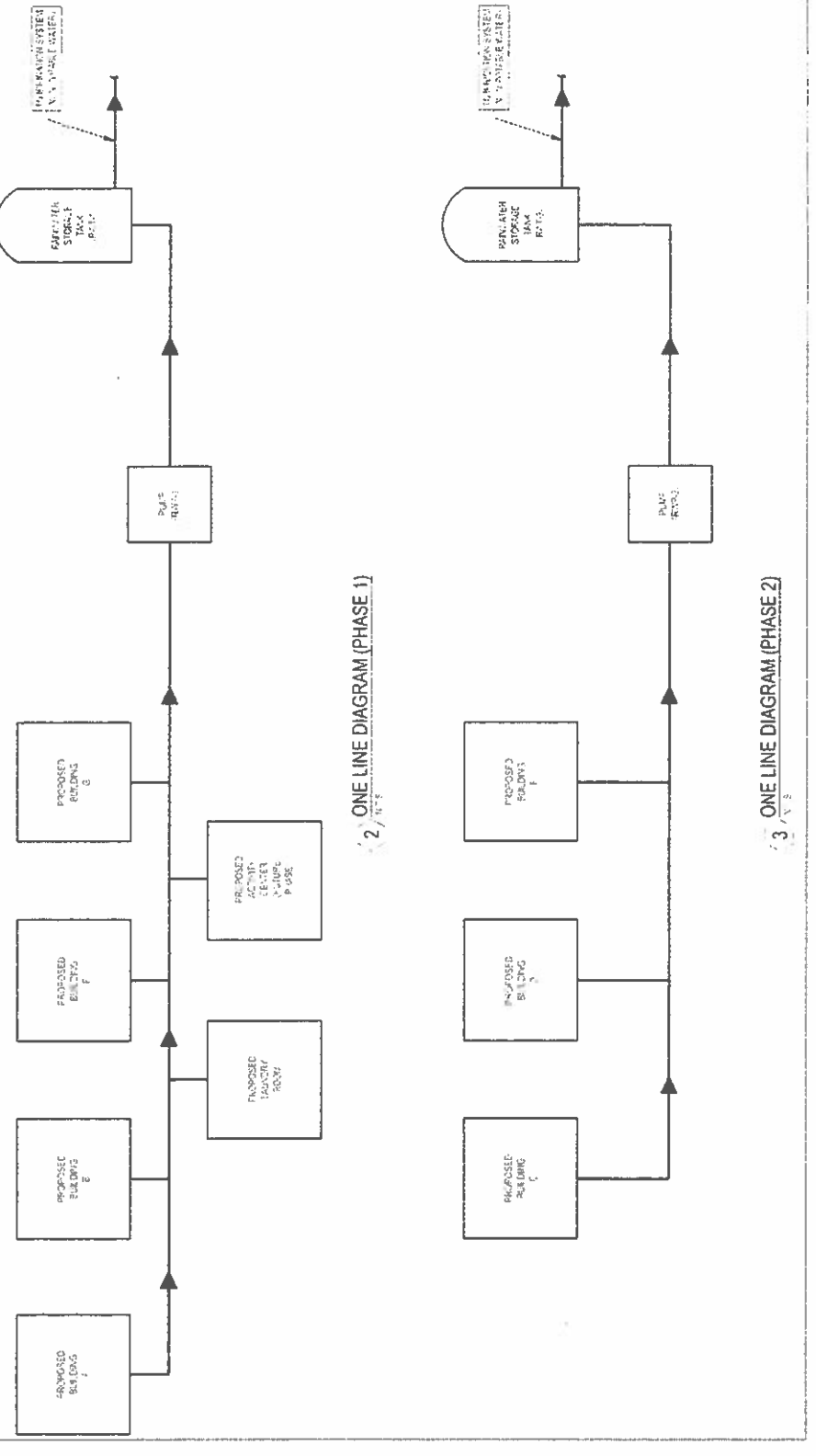
5 SPRINKLER HEAD DETAIL
 5/13



4 ROOF DRAIN CONNECTION DETAIL
 4/13



1 RAINWATER HARVESTING SCHEMATIC
 1/13



2 ONE LINE DIAGRAM (PHASE 1)
 2/13

3 ONE LINE DIAGRAM (PHASE 2)
 3/13

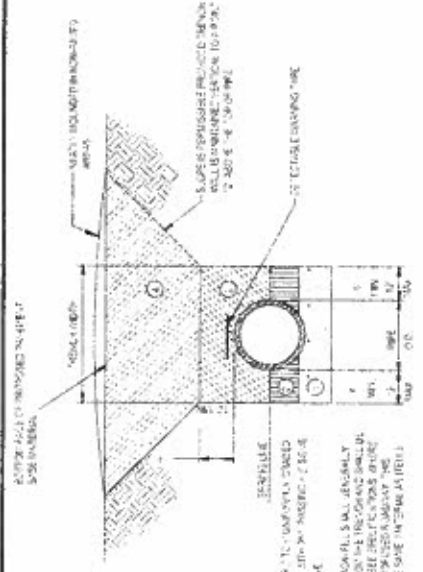


MATKINHOVER
ENGINEERING
& SURVEYING

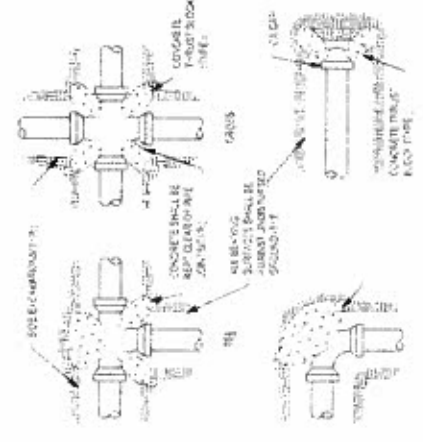
CAMP YOUNG JUDAEA - RETREAT VILLAGE
FOR
CIVIL SITE DETAILS (SHEET 1)
WOODCREEK, TEXAS

C-501
JOB NO. 262037
DESIGNED BY DJK
DRAWN BY DJK
CHECKED BY GOK

ISSUED FOR CONSTRUCTION



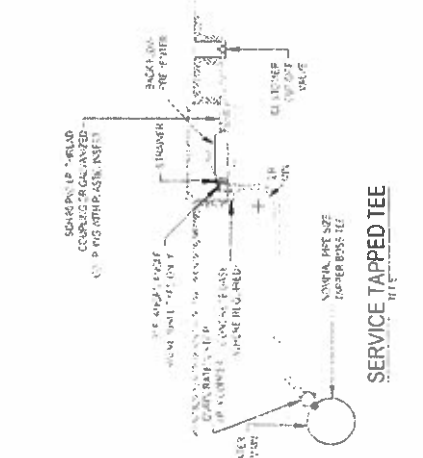
WATERLINE PIPE EMBEDMENT DETAIL



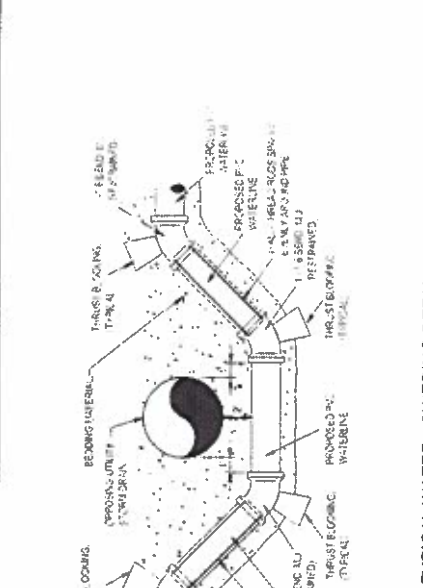
TYPICAL THRUST BLOCK INSTALLATION DETAIL



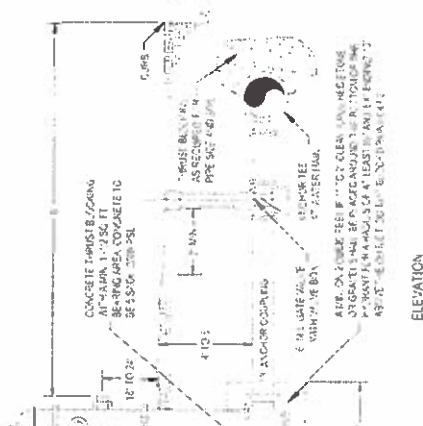
SERVICE TAPPED TEE



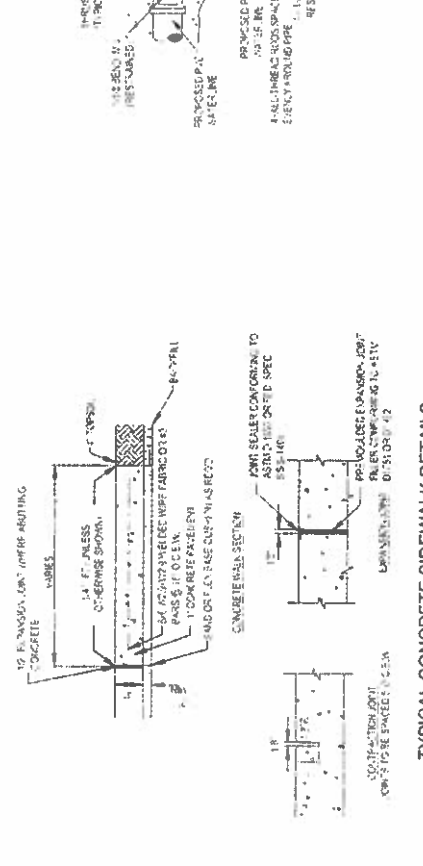
RPZ BACKFLOW DEVICE



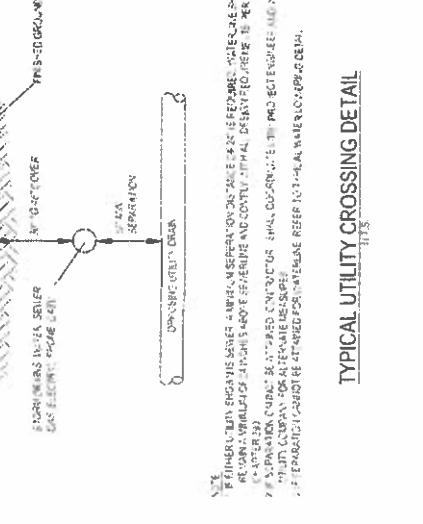
TYPICAL WATER LOWERING DETAIL



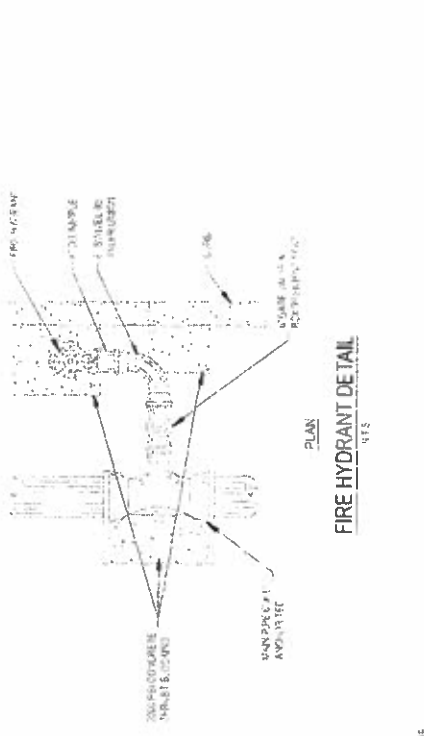
FIRE HYDRANT DETAIL



TYPICAL CONCRETE SIDEWALK DETAILS



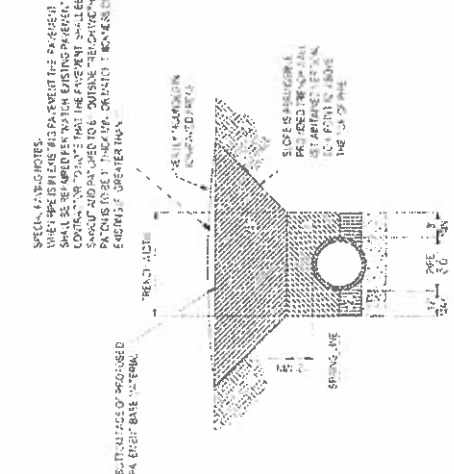
TYPICAL UTILITY CROSSING DETAIL



TYPICAL SANITARY SEWER DOUBLE CLEANOUT TO GRADE (DCO)



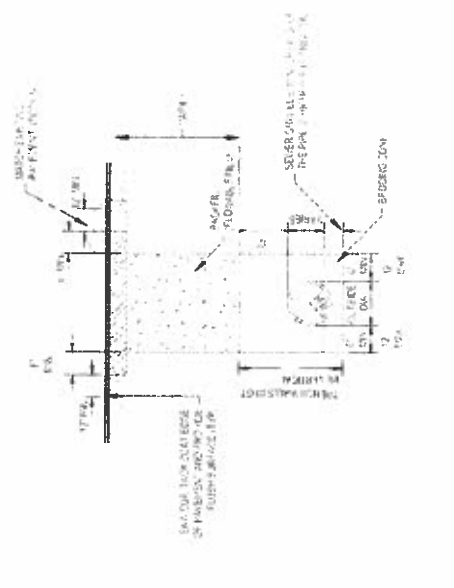
PAVEMENT REPAIR DETAIL



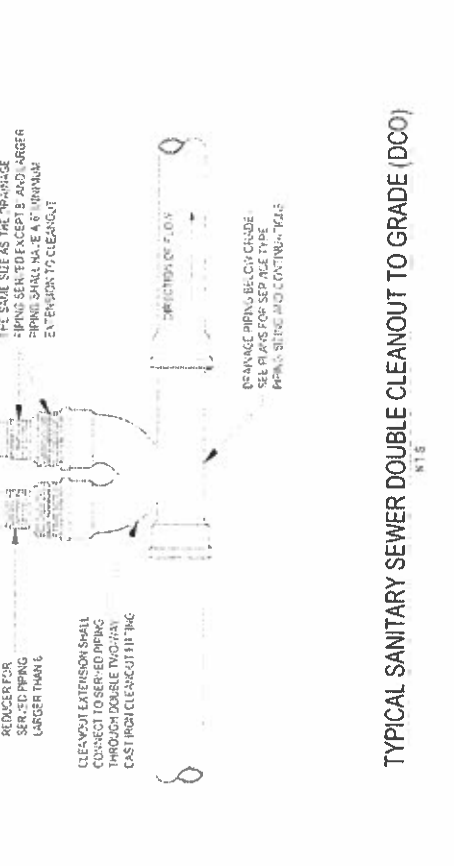
PVC SEWER PIPE/STORMWATER PIPE EMBEDMENT DETAIL



SECTION VIEW



PLAN



TYPICAL UTILITY CROSSING DETAIL

